REPORT

Millport Coastal Flood Protection Scheme

Supplementary Environmental Impact Assessment Report

Client: North Ayrshire Council

Reference: PC1683-RHD-ZZ-XX-RP-Z-0001

Status: S0/P01.01

Date: 16 December 2021

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Acronyms

Acronyms	Description
µPa	Micro pascal
BNL	Basic Noise Level
BPM	Best Practise Measures
CAR	Controlled Activities Regulations
CCW	Countryside Council for Wales
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
CTMP	Construction Traffic Management Plan
DPF	Diesel Particulate Filters
EAP	Ecological Action Plan
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EPS	European Protected Species
ERCP	Emergency Response Cooperation Plan
ES	Environmental Statement
FPS	Flood Protection Scheme
FSC	Field Studies Council
GPP	Guidance for Pollution Prevention
HDVs	Heavy Duty Vehicles
HGVs	Heavy Goods Vehicles
IAQM	Institute of Air Quality Management
INNS	Invasive Non-Native Species
IPCC	Intergovernmental Panel on Climate Change
ISBMP	Invasive Species and Biosecurity Management Plan
JNCC	Joint Nature Conservation Committee
LNCS	Local Nature Conservation Site
MCA	Marine and Coastguard Agency
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMP	Material Management Plan
MPCP	Marine Pollution Contingency Plan
MS-LOT	Marine Scotland Licence Operating Team
NRMM	Non Road Mobile Machinery
PAC	Pre-Application Consultation
PAD	Protocol for Archaeological Discoveries
PARC	Port and Resource Centre
PAW	Peak Activity Weeks
PMF	Priority Marine Feature
SAC	Special Area of Conservation
SEIAR	Supplementary Environmental Impact Assessment Report
SEPA	Scottish Environmental Protection Agency
SES	Supplementary Environmental Report
SEWMP	Site and Excavated Waste Management Plan
SNH	Scottish Natural Heritage
SSSI	Site of Special Scientific Interest
SWT	Scottish Wildlife Trust

TN	Target Notes
VMP	Vessel Management Plan
WID	Water Injection Dredging
WSI	Written Scheme of Investigation
ZTI	Zone of Theoretical Influence
CGNS	Celtic and Greater North Seas
CIA	Cumulative Impact Assessment
CSD	Cutter Suction Dredger
CWSH	Coastal West Scotland and Hebrides
dB	Decibel
EDR	Effective Deterrence Range
EIA	Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
FPS	Flood Protection Scheme
HF	High Frequency
Hz	Hertz
IAMMWG	Inter-Agency Marine Mammal Working Group
JNCC	Joint Nature Conservation Committee
kHz	Kilohertz
km	Kilometre
km/h	Kilometre per hour
km2	Kilometre square
kW	Kilowatt
LF	Low Frequency
m	Metre
m/s	Metres per second
MPA	Marine Protected Area
MU	Management Unit
nm	Nautical mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PTS	Permanent Threshold Shift
PW	Pinnipeds in Water
RMS	Root Mean Square
SAC	Special Area of Conservation
SCANS	Small Cetaceans in the European Atlantic and North Sea
SCOS	Special Committee on Seals
SEL	Sound Exposure Level
SELcum	Cumulative Sound Exposure Level
SES	Supplementary Environmental Statement
SNH	Scottish Natural Heritage (now NatureScot)
SPL	Sound Pressure Level
SPLpeak	Peak Sound Pressure Level
SWS	South West Scotland
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
VHF	Very High Frequency
WS	West Scotland

1 INTRODUCTION AND BACKGROUND

1.1 Purpose of document

North Ayrshire Council seek to develop a coastal Flood Protection Scheme (FPS), hereafter referred to as 'the scheme', at Millport on Great Cumbrae to protect the town from increasingly frequent flooding events. An Environmental Statement (ES)[1], hereafter referred to as the 'original ES', was submitted for the scheme in January 2020 alongside the FPS notification and the scheme was approved by North Ayrshire Council Cabinet under the Flood Risk Management (Scotland) Act 2009 in November 2020.

A Marine Licence is required under the Marine (Scotland) Act 2010 to construct the parts of the Millport Coastal FPS which are located below Mean High Water Springs (MHWS), and an Environmental Report is required to support the Marine Licence. Detailed design decisions have resulted in a number of design changes since the submission of the original ES. Therefore, this Supplementary Environmental Impact Assessment Report (SEIAR) (2021) has been prepared on behalf of North Ayrshire Council to update the project description for the scheme and provide additional information on potential impacts and proposed mitigation further to those already considered within the original ES.

This SEIAR also takes account of feedback received from stakeholders on the ES, and other ongoing consultation including the Pre-Application Consultation (PAC) process.

This document supports the Marine Licence Application alongside the following documents:

- Original ES and appendices (Royal HaskoningDHV, 2020);
- PAC Report (Royal HaskoningDHV, 2021);
- Marine Licence Application Form; and
- European Protected Species Licence to disturb cetaceans.

1.2 Structure of document

This SEIAR is structured as follows:

- **Section 1** (this Section) sets out the context to the SEIAR and information on the scheme and the amendments that have been made since the original ES assessments;
- **Section 2** sets out the scope and structure of the technical assessments;
- **Sections 3** to **20** set out the supplementary assessments for each technical receptor; and
- **Section 21** sets out the conclusions and highlights any additional impacts or mitigation to those assessed in the original ES.

Technical appendices are provided where necessary, and are referred to in the appropriate section

[1] *The original EIA Report for the scheme is referred to as the 'Environmental Statement' because the report was prepared under the Town and Country Planning (EIA) (Scotland) Regulations 2011 (refer to Chapter 2 of the original ES).*

1.3 Description of the Proposed Scheme

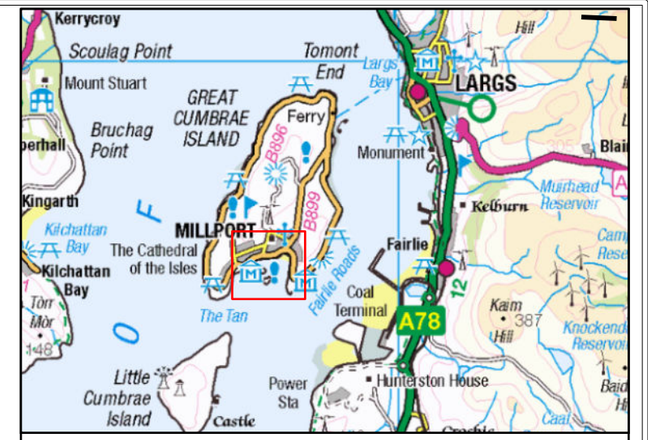
The town of Millport is located at the southern end of the island of Great Cumbrae, 2.5km offshore from mainland North Ayrshire in the Firth of Clyde. Millport is a small town which is built within a narrow low-lying coastal strip. Most of the residential and commercial properties in the town are built on this coastal strip immediately inshore of the coastal protection structures, promenade and coastal road. Tourism is a strong component of the local economy of Millport. The town is designated as a Conservation Area for its historic townscape, and the footprint of the proposed scheme is close to or within a number of important areas of ecological interest such as Kames Bay and Ballochmartin Bay, which are designated as Sites of Special Scientific Interest (SSSI).

Millport is at risk from flooding and erosion due to overtopping and potential failure of the existing coast protection structures. There is a history of flooding due to overtopping of the sea wall adjacent to the harbour, with minor to moderate flooding occurring most years. Many residents have taken individual action to reduce flood damages, such as installing flood boards to their doors and storing sandbags in case of need. Flooding also affects use of the coastal road and promenade, as well as impacting on revenue from visitors. This risk is reflected by the SEPA third generation flood map (SEPA, undated). The flood protection risks to Millport are also recognised in Scotland's national flood risk strategy, with the delivery of a flood protection scheme for Millport prioritised at 10 in a list of 42 proposed schemes for implementation between 2016 and 2021, considered in further detail in the Ayrshire Flood Risk Management Strategy (SEPA, 2015).

The layout of the proposed scheme is illustrated in **Figure 1**. The scheme includes offshore rock armour structures which will be built in the vicinity of the rock islets within Millport Bay. Works on the foreshore include shore-connected rock armour breakwaters and rock armour revetments. Onshore works will include flood walls, improvement works to existing coast protection structures, and works to raise the level of existing amenity grass areas. The process of development of the scheme proposals is described in **Section 4** Site Selection and Assessment of Alternatives of the original ES, and the landscape design approach taken for the proposed scheme is set out in **Appendix 22.1** – Landscape Design and Access Statement of the original ES and is unchanged.

The total construction period is estimated to be about 21 months, commencing in autumn 2022, with a number of activities undertaken concurrently during this period. The construction programme will depend on proposals from the appointed construction contractor and will need to be agreed with North Ayrshire Council. It is currently expected that North Ayrshire Council will require the construction contractor to programme the works to minimise impacts on residents and tourism as far as is reasonably practicable. For example, works during the summer period would be limited to those areas that are less busy in terms of tourist visitors, e.g. the Old Town Area (West Bay Road, Millburn Street, Crichton Street and Clyde Street). It is most likely that the offshore works would be carried out during autumn and winter 2022-23, with an estimated duration of 5 months. Staffing and Working Hours during construction are unchanged from **Section 5.2.11** of the ES.

Ongoing consultation will seek to minimise potential disruption to the local community and tourism due to noise, traffic and air quality impacts during the construction process.



Legend

- Redline Boundary
- Proposed site compound
- Proposed temporary slipway
- Flood Walls
- Rock Breakwater
- Rock Revetment
- Modifications to existing coast protection structures
- Modifications to existing promenade and grass areas
- Breakwater

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Client: North Ayrshire Council

Project: Millport Flood Protection Scheme - EIA Report

Title: Location Plan

Figure: 1

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	08/12/2021	TC	AS	A3	1:6,500

Co-ordinate system: British National Grid

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1.3.1 Construction Plans

The following plans will be submitted to the relevant stakeholders for approval prior to construction works commencing.

- Construction Environmental Management Plan (CEMP);
- Ecological Action Plan (EAP);
- Landscaping and planting plan;
- Invasive Species and Biosecurity Management Plan (ISBMP);
- Otter Protection Plan;
- Emergency Response Cooperation Plan (ERCoP);
- Marine Pollution Contingency Plan;
- Vessel Management Plan;
- Written Scheme of Investigation (WSI);
- Material Management Plan (MMP);
- Site and Excavated Waste Management Plan (SWMP);
- Construction Traffic Management Plan (CTMP);
- Method statements; and
- Pre Development Enquiries (Scottish Water).

1.4 Scope and Structure of the Original ES

The findings of the Environmental Impact Assessment (EIA) were set out in the original ES (2020) which comprised three volumes:

- Non Technical Summary;
- Volume 1: Main Technical Assessments;
- Volume 2: Figures; and
- Volume 3: Appendices

The scope of the EIA covered the following topics:

- Marine Geology, Oceanography and Physical Processes;
- Marine Water and Sediment Quality;
- Benthic and Intertidal Ecology;
- Fish and Shellfish Resource;
- Marine Mammals;
- Offshore and Coastal Ecology;
- Commercial Fisheries;

- Commercial and Recreational Navigation;
- Infrastructure and Utilities;
- Archaeology and Cultural Heritage;
- Terrestrial Ecology;
- Ground Conditions and Contamination;
- Water Resources and Flood Risk;
- Noise and Vibration;
- Traffic and Transport;
- Air Quality;
- Seascape, Landscape and Visual Assessment; and
- Tourism and Recreation.

The original ES was formally scoped with North Ayrshire Council, Marine Scotland and statutory consultees prior to its submission as part of the notification of the flood protection scheme under the Flood Risk Management (Scotland) Act 2009 in March 2020.

1.5 Amendments to the Project Description considered within this document

Since the submission of the planning application and original ES, further design work has been undertaken which has altered elements of the project. These changes are as follows:

Foreshore rock structures

The outline design of the scheme assumed that the foundations to the Clyde St revetment and the shore-connected breakwater would be formed by constructing a concrete toe beam, which would be tied into the rock foreshore by drilling steel dowel bars. Review of this proposal during detailed design determined that this would not be feasible due to the variability of rock levels on the foreshore, as well as a desire to minimise the use of in-situ concrete in the intertidal zone.

The current foundation design for the rock structures involves the construction of a rock toe by placing large rock armour directly onto the gently sloping foreshore. The worst case scenario for the construction of the foundation could involve some excavation of rock to form a trench. This might be required in areas where the rock foreshore is found during construction to have a steeper slope. If required, rock would be excavated using hydro-demolition or the use of a rock wheel, with the works taking up to two weeks for each structure. Blasting activities would not be required.

Offshore breakwaters

The original ES assumed that dredging works would be undertaken prior to construction of the offshore breakwaters in order to clear the seabed over the footprint of the breakwaters, likely using Water Injection Dredging (WID) of up to 45,000m^3 of sediment, assuming a sediment depth of 1-2 m above the seabed.

Following further analysis, the worst case scenario has been reduced to approximately 12,500m^3 of coarse sediment which would need to be cleared, assuming a reduced sediment depth of 0.5m. Due to the coarse nature of the sediment, WID would not be an appropriate method. Instead, this work is

expected to be undertaken by a long reach excavator operating from a barge or platform and would take approximately 1 week. The excavator and platform / barge are plant which would be on site for the placement of rock armour and core material. Excavated material would not need to be removed from the site and can be reused beneficially for toe stability.

Works to construct the offshore breakwaters are likely to be undertaken using a floating platform plus a barge delivering rock, or by working directly from one or two barges which would also collect the rock from the quarry. A third vessel might occasionally be required.

Materials delivery and storage

To minimise impacts upon the public highway and the Largs to Cumbrae Slip ferry route, the original EIA considered a number of potential locations where construction plant and materials could be delivered to the island by barge. Consideration was given within the EIA to improving piers at Keppel and Millport, but this will not be feasible due to the form of construction of the existing Keppel Pier and the associated cost of replacement. For Millport Pier, the poor condition of the existing structure means that improvements would be expensive, and deliveries to this pier would have significant traffic impacts on the busiest part of Millport town. Additional sites have since been considered, including the slipway at the watersports centre in the north-east of Great Cumbrae, which was not suitable due to health and safety concerns with traffic leaving the slipway area, ongoing commercial discussions regarding the future use of this site and because it would bring delivery and associated compound / onshore works very close to the Ballochmartin Bay SSSI.

Following consultation with the Community Council at Millport, an area to the north east of Farland Point, on the seaward side of the road from the Field Studies Council centre, has been identified as a suitable location for a temporary slipway. This location has a number of benefits including being relatively close to the footprint of the scheme which minimises impacts on the roads and road users (including tourists and cyclists) and is preferable to the local community.

A temporary slipway is proposed to be constructed (approximately 1500m^2), as shown in **Figure 1.1**. This is anticipated to be intertidal and built out from the shore to Mean Low Water Springs by creating a platform of crushed rock up to 5m wide. No excavation works or concreting are planned. It is most likely that the crushed rock would come from the Glensanda quarry near Oban. The slipway would be supported by a compound area above the shore, approximately 4,800m^2. The delivery compound will be used for materials for onshore works only (rock for the offshore/foreshore works will not come in by this route). The slipway and compound area are likely to be in place for around 12 months and then be fully removed and the area reinstated.

Two or three barge deliveries would be expected per day, and probably not every day. The bathymetry at the site means marine access is not restricted to just high tide. The site would be used for delivery of pre-cast and wet concrete to the island, and could be used for the delivery of other materials (e.g. earth fill for ground raising). One or two fork lifts would be required on the site to unload from barges, move to storage and load onto Heavy Goods Vehicles (HGVs) for transport to the footprint of the Scheme. In line with health and safety requirements for the compound, reversing of vehicles would be minimised and controlled.

Construction Programme

The programme for construction has been delayed because additional time has been required to complete the detailed design and further consultation. The Covid-19 pandemic has also affected the programme. Works are now anticipated to commence in September 2022 with some preparation works at the temporary slipway and compound area beginning mid August 2022.

Ground raising

The volume of earth fill required for ground raising to Kames Bay, Kelburn Street and Glasgow Street and has significantly reduced from 6,500m^3 to 2,000m^3. This is due to design optimisation which removed the need for ground raising works to Glasgow Street and Kelburn Street, as well as a desire to minimise construction works over existing Scottish Water assets. This change will have a positive impact for traffic and transport by reducing the total required HGV movements to each of the onshore scheme areas.

Stepped revetments

Detailed design of the stepped revetment at the Cross House has determined that this will need to extend into the intertidal zone by up to 10m in order to appropriately tie in the works with the natural rock outcrops on the foreshore. Works to construct a similar stepped revetment at Crichton Street will remain above MHWS.

All of the above changes have been reviewed with the North Ayrshire Council Planning team, and have been included in discussions with the local community in consultation events including through the PAC process.

2 Scope and Structure of this SEIAR

The scope and content of this SEIAR has been informed by ongoing design development since the original ES submission, and outcomes of continuing consultation with stakeholders. As the design changes have the potential to change impacts across all receptor groups, all technical topics considered within the original ES have been included within this document.

2.1 Policy context

The Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010 requires a local authority to consider whether a flood protection scheme is likely to have a significant effect on the environment. Where a local authority considers that a proposed scheme is likely to have a significant effect on the environment, or where consultative bodies have advised in a screening opinion that a scheme is likely to have a significant effect, then an environmental statement must be prepared.

A screening and scoping request was submitted by North Ayrshire Council to the consultative bodies in February 2017. Marine Scotland confirmed in April 2017 that an EIA would be required under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

Marine Scotland Licence Operating Team (MS-LOT) provided feedback on the scoping request, although they did not formally issue a Scoping Opinion for the Scheme. Upon re-examination of the original ES and associated documentation, MS-LOT have granted an exemption under the Marine Works EIA Regulations 2007 for the elements of the scheme below MHWS on the grounds that the EIA was carried out by another regulator (i.e. North Ayrshire Council as the Local Planning Authority under the Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010). MS-LOT have confirmed a Marine Licence will be required for works below MHWS.

The requirement for EIA was also considered in the context of planning policy, and the original ES includes a summary of planning policy to establish the wider context in with the proposed scheme has

been brought forward. Any updates to the policy context are included within the technical Sections (**Sections 3 – 20**) of this document. The amendments should be read in conjunction with the information provided in the original ES.

2.2 Footprint of the Proposed Scheme

The works at the new proposed temporary slipway and compound area (**Figure 1**) constitute an additional site location within the project. This location is within the Farland Point Scottish Wildlife Trust (SWT) Local Nature Conservation Site (LNCS). The nearest receptors to the compound area are the Field Studies Council (FSC) centre and a residential building, located 30m from the proposed boundary.

Figure 1 shows the footprint of the temporary to be approximately 3,800m^2. This is larger than the proposed 1,500m^2 anticipated for the works to allow some flexibility in siting the slipway. The compound area will be maximum 4,800m^2.

Apart from the proposed temporary slipway and compound area, there are no other changes to the site location described in the original ES.

2.3 EIA, SIGNIFICANCE AND METHODOLOGY

This report follows the process which was used within the original ES (January 2020).

Amendments to any methodologies and processes, and any limitations associated with the supplementary environmental information provided in this SEIAR (2021) are stated, where relevant, within the technical Sections (**Sections 3 - 20**) of this document. The amendments provided in this SEIAR should be read in conjunction with the information provided in the original ES. It is made clear in **Sections 3-20** where information in this SEIAR supersedes that provided in the original ES.

2.4 Scoping of potential impacts

This SEIAR re-considered each impact assessed within the original ES under the new changes made during the detailed design phase, and updates impacts where required. For consistency, the impacts are ordered and named the same as in the original ES. Additional impacts are also included as assessed where appropriate. All changes to the project design discussed in **Section 1.5** relate to construction activities and the construction phase only. As such, there are no changes to the impacts assessed for the operational phase of the scheme. All operation impacts are therefore scoped out from this supplementary assessment and the findings presented in the original ES remain unchanged.

2.5 Cumulative effects

The original ES contained an assessment of the direct and indirect cumulative impacts of the proposed scheme on surrounding schemes and sensitive receptors. The following paragraphs provide an update to these projects.

The Millburn FPS was approved in June 2021 became operative on 16th August 2021 and detailed design development is progressing. The Millburn FPS is managed by North Ayrshire Council, as is the proposed scheme. Further to the information provided in the original ES, the Millburn FPS is expected to commence construction in Summer 2022 and will therefore overlap with the construction period for the

Millport scheme. An Environmental Impact Assessment Screening Report was prepared for the Millburn FPS (RPS Group, 2021) which concluded no EIA was required with the following summary:

'With preparation and implementation of a construction management plan, and adherence to good practices, such as those outlined in the Engineering in the Water Environment Good Practice Guides published by SEPA, few impacts are anticipated to arise. Any potential impacts would be restricted to the immediate vicinity of the site and are not expected to be significant. Given the small scale and short term nature of the proposed works, any impact upon local receptors is likely to be short lived. Upon completion of the works, no adverse impacts are anticipated.'

Contractors of both the Millport and Millburn FPSs will be managed by North Ayrshire Council and there will be programming constraints in West Bay to allow the Millburn works to be completed prior to the works for the proposed scheme. It is recommended that both projects remain in communication and update each other with any environmental related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

No further information is available for Hunterston Port and Resource Centre (PARC) or Great Cumbrae Solar Farm, which were considered within the original ES. Neither project have yet applied for planning permission.

In addition to those projects considered within the original ES, several new fish farm developments are known to be in development (one on Bute to the west of the scheme (Dawnfresh, 2021a) one on the east coast of Great Cumbrae (Dawnfresh (2021b), and one to the south of the scheme on Little Cumbrae (Dawnfresh (2021c)) but these have not applied for planning permission yet and it is assumed that construction periods will not overlap

Cumulative impacts are considered within each technical receptor assessment in **Sections 3 to 20**.

2.6 Consultation since Submission of the original ES

A number of stakeholders responded to the original ES with comments, including the Scottish Environmental Protection Agency (SEPA), Scottish Natural Heritage (SNH) (now NatureScot), Marine and Coastguard Agency (MCA), Clydeport, Northern Lighthouse Board, Scottish Water and North Ayrshire Council planning team. In addition, consultation has been undertaken with stakeholders and local community as part of the PAC process (refer to PAC report, Royal HaskoningDHV, 2021) and consideration of the changes to the scheme design.

Stakeholder comments are considered within each technical receptor in **Sections 33 to 20** below. Community consultation is reported and considered within the PAC report (Royal HaskoningDHV, 2021), which is submitted with the Marine Licence application.

3 MARINE GEOLOGY, OCEANOGRAPHY AND PHYSICAL PROCESSES

This Section of the SEIAR sets out the outcome of additional physical processes assessments and provides new and updated information on excavation techniques at the toe of the foreshore rock structures, dredging within the footprint of the offshore breakwater and temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies

any new or altered significant effects which could arise as a result of the altered locations from that presented in **Section 6** of the original ES. Where the assessment has not changed it is referenced accordingly.

3.1 Response to consultee comments

Table 3-1 details consultation responses from stakeholders to the original ES or other consultation including PAC, regarding marine geology, oceanography and physical processes. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 3-1 Consultee comments related to Marine Geology, Oceanography and Physical Processes

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Response to ES		
Scottish Natural Heritage (SNH)	Kames Bay SSSI is designated for sandflat habitat which is underpinned by the natural action of waves and currents (including well beyond the SSSI), and the sediment budget in Millport Bay (mostly its eastern parts). A proportion of what little sediment accumulates in Millport Bay (by erosion of bedrock, freshwater input, and breakdown of shells) will be driven 'inwards' to Kames Bay. The very limited sediment transport eastward along the shore is further hindered by the various coastal engineering that mostly pre-date the SSSI designation (e.g., the sea walls, jetties, and pier). Given the baseline conditions of the existing nearby coastal modifications and the promenade that backs the SSSI beach, most elements of the proposed works have negligible potential to affect the SSSI. SNH consider that the only element of the proposal with potential to affect the SSSI is the large offshore breakwater linking the islands. Having reviewed **ES Section 6 Marine Geology**, Oceanography and Physical Processes, Section 8 Benthic Ecology and other associated documents SNH agree that in terms of physical processes, the proposals would not significantly affect the sandflat habitats of the SSSI.	N/A
	There are some shortcomings in the reasoning of the assessment in relation to operational effects of the proposals. These are: a. **Section 6.9.1 of the ES** "Operational Impact 1: Changes to the wave regime due to the presence of the scheme". SNH notes the unusual conclusion of only a negligible magnitude of change as SNH would expect wave height to be significantly reduced in the lee of the breakwater given that this is the aim of the scheme. Nevertheless, SNH agree there would be a negligible impact on the SSSI, as the waves affecting the SSSI would be little affected as shown in Figures 6.5, 6.6, 6.8 and 6.9. b. Regarding **Section 6.9.2** of the ES "Operational Impact 2: Changes to the tidal current regime due to the presence of the scheme" SNH notes the unusual conclusion of negligible magnitude of change but then at paragraph 85 predicts "small and local changes at Kames Bay beach". It's also important to note that currents were not modelled but assessed from broad assumptions. Nevertheless, while impacts on the SSSI might be Minor rather than the predicted Negligible, SNH agree that impacts are unlikely to be significant.	a. There will be more significant changes to wave height in the lee of the breakwater, but this assessment considers the magnitude of effect on Kames Bay and Farland Point as receptors, not on the general wave regime across the area. b. The Kames Bay SSSI is in very shallow water and so tidal currents here would be extremely small. The scheme would reduce or accelerate tidal current velocities locally, but given the baseline currents are already low velocity, these local changes would not influence the wider sedimentation patterns in Kames Bay.' Therefore, from a conceptual perspective, the effects are negligible because they are already negligible in terms of controlling sedimentation in Kames Bay. c. The combination of a negligible effect on waves and a negligible effect on tidal currents, could potentially 'overlap' to create a 'minor' impact. But, we consider it unlikely given that tidal currents play a very minor role in Kames

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	Regarding **Section 6.9.3 of the ES** "Operational Impact 3: Changes to Sediment transport and erosion/accretion patterns due to the presence of the scheme" SNH consider that impacts on the SSSI may also be Minor rather than the predicted Negligible, however we agree that impacts would not be significant.	Bay's evolution and the main driver is waves. So, the in-combination effect would be mostly wave driven. We have concluded through modelling that the wave impact is negligible at Kames Bay, and so the resultant changes to sediment transport driven by this physical process is also negligible.
Scottish Environmental Protection Agency (SEPA)	According to the Intergovernmental Panel on Climate Change (IPCC) Special Report on the Ocean and Cryosphere in a Changing (IPCC, 2019) and the UK Climate Projections 2018 (UKCP18) Marine report there is risk of increased rates of sea level rise this century. As a result, a range of structural and non-structural measures should be considered for the proposed scheme to ensure its future adaptation potential in a high-end climate change scenario (advised as a rise of up to 2m this century). Adaptation planning should assess implications of the scheme on the ability of the shoreline to adjust to rising sea levels and impacts on the amenity value of Millport beach.	The design of the scheme includes measures to ensure its future adaptation potential in a high-end climate change scenario, such as foundation design to enable wall heights to be increased. The offshore and foreshore rock structures could also be adapted. The presence of the offshore breakwaters should act to retain sediment at Newtown beach, which might be eroded under a high-end climate change scenario.
	The Kames Bay SSSI is a small sandy bay site to the east of the study area, it is designated as a site of ecological importance. The dip of the rocks at this locality results in the sands being constantly fed with freshwater seepage from the surrounding land. The SNH management statement for the site states is important for lugworm species, wading birds, bristle worms and specific algae which are present due to the variety of salinity profiles in the sand. SEPA agree that the proposed flood wall, designed to reduce the frequency of overtopping events, is unlikely to significantly change the position of the fresh-brackish-saline interfaces within the SSSI, as the over-topping events would be infrequent, and effects short lived. SEPA understand SNH have responded that the sandflat habitats of the SSSI will not be significantly affected by the proposal.	N/A

3.2 Updated Policy Context

There has been no update to the information provided within **Section 6.5** of the original ES.

3.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 6.4.1** of the ES, supported by expert judgement. Further numerical modelling has not been undertaken.

3.4 Updated Baseline Conditions

Farland Point (the proposed location of the temporary slipway) is composed of mainly sandstone and conglomerate of the Kelly Burn Sandstone Formation (Devonian age). The location of the temporary slipway consists of rocky coastline surrounding a number of small bays which trap gravel and shingle. The footprint of the proposed temporary slipway is a small south east facing shallow bay characterised by

cobble and pebble with small bedrock outcrops along a rocky shore coastline of sandstone bedrock and boulder. There is limited sediment transport along this section of coast due to the bedrock and coarse sediments.

Section 6 of the original ES considers Kames Bay SSSI and Farland Point LNCS as the sensitive receptors. This section updates the assessments for these receptors based on the detailed design changes.

3.5 Updated Assessment of Effects

This Section establishes the realistic SEIAR worst case scenario for each key impact category, forming the basis for the subsequent assessment.

3.5.1 Embedded Mitigation

Embedding mitigation into the proposed scheme design is a type of primary mitigation and is an inherent aspect of the EIA process. A full account of embedded mitigation measures is contained in **Section 5** Project Description of the original ES. Several techniques and engineering designs/modifications are committed to as part of the proposed scheme, to either reduce or avoid several effects/impacts as far as possible. As discussed in **Section 6** of the original ES, four main embedded mitigation measures have been proposed to reduce potential impacts on estuarine processes. These are:

- The size of the breakwater would be minimised;
- The breakwater would maintain an open tidal flow circulation;
- The flood walls would be set back from the coast wherever possible to reduce wave reflection; and
- The offshore structures have been designed to reduce impacts to the foreshore through wave reflections / changes in water and sediment movement.

Further to the mitigation detailed within the original ES, the footprint of the temporary slipway will also be minimised as far as practically possible.

3.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact marine geology, oceanography and physical processes assessment are detailed below:

Foreshore rock structures
The change in the design of the foundation to the foreshore rock structures may change the assessment for suspended sediments during construction, made in the original ES.

Offshore breakwaters
The change in volume and technique for proposed dredging work at the offshore breakwater may change the assessment made for suspended sediments during construction, in the original ES.

Materials delivery and storage
The location of the proposed temporary slipway and compound area has changed from what was assessed within the original ES.

No other design changes will alter the impacts assessed for marine geology, oceanography and coastal processes in the original ES.

3.5.2.1 Construction Impact 1: Changes in suspended sediment concentrations due to construction of the scheme

The original ES assessed for the installation of steel dowel bars and a concrete toe beam at the toe of the structures at Clyde St revetment and the shore-connected breakwater, which would require the use of grout to secure them in place. This activity will no longer take place and therefore the risk of impacts from the release of grout into the marine environment are removed.

Instead, some excavation of the bedrock may now be required at the toe of the structures to provide the foundation. This short-term work may be undertaken at low water in the dry or at high water. Should any of the arisings be washed out by the tide this is **not considered to have an adverse impact** on suspended sediment concentrations as the volume is predicted to be very small, the material is considered to be primarily coarse and rock fragments and will settle out quickly.

The effects on suspended sediment concentrations due to construction of the scheme do not directly impact upon the identified receptor groups for marine geology, oceanography and physical processes. This is because the designated features of the receptor groups are related to processes operating on the seabed and not in the water column. Hence, there is **no impact** on the identified receptor groups associated with the suspended sediment generated by the scheme.

Within the original ES, the construction activity with the highest potential for creating a sediment plume is water injection dredging of 25,000m^3 of seabed sediment for placement of the offshore breakwater. The maximum envisaged effect associated with sediment plumes arising from water injection dredging and other construction activities would therefore cause only very minor enhancements in suspended sediment concentration (typically less than 1mg/l a short distance from the release point) over only a small geographical area (a few hundred metres). The effects would be temporary, with a return to the very low background concentrations occurring rapidly upon cessation of the installation activity (i.e. the effect is temporary only).

Following further development of the design, the volume of anticipated dredged material is reduced to 12,500m^3, and the material is expected to be coarse sediment which means that water injection dredging is not suitable. Therefore, there is less potential for creating a sediment plume than the worst case was assessed within the original ES. The vessels and excavator will be plant already required on site for rock placement and material will be re-used to stabilise the toe. The potential effects are considered to be within the parameters of those already assessed within the original ES, which concluded no impacts on the Kames Bay SSSI and Farland Point LNCS designated sites. No additional mitigation is required.

3.5.2.2 Construction Impact 2: Changes in sea-bed level due to the construction of the scheme

The changes proposed to the project description do not alter the original assessment for this impact.

3.5.2.3 New Construction Impact 3: Impacts to coastal processes due to construction of temporary slipway

The temporary slipway will consist of a small structure located within the realms of the natural variation of the undulating and indented rocky coastline, for the duration of the construction phase of the scheme. The coastline consists of hard rock substrate with limited mobile sediment which is of a coarse nature. There will be no excavation of the foreshore for the construction of the temporary slipway, which would extend from land to MLWS.

There will be short term temporary reversible direct impacts on the Farland Point LNCS within the footprint of the slipway (1500m^2), which will be fully restored upon removal of the slipway after approximately 12

months. This constitutes a new impact in the EIA process. Construction material will be crushed rock, and the slipway is expected to be about 5m wide, located within the area shown in **Figure 1**. The slipway will be a platform of crushed rock (no concrete) that will be constructed from the shore extending to approximately Mean Low Water Springs (MLWS). Due to the small footprint of the slipway and rocky nature of the coastline, the magnitude of any effects to coastal process regime is anticipated to be **negligible**. Farland Point LNCS is not designated for geological features and the sensitivity of the site is considered to be **low**, with high recoverability following removal of the temporary slipway. Overall the impact of construction within the LNCS is considered to be of **negligible** significance. Impacts associated with habitat loss are assessed in **Section 5** of this SEIAR.

The temporary slipway will be removed once deliveries of construction materials have taken place and the site will be restored to its previous state upon the removal of the slipway. Therefore, there will **no additional impacts** during operation or decommissioning.

3.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 3-2**. The table demonstrates that all impacts are still considered to be negligible at the worst case.

Table 3-2 Potential Impacts Identified for marine geology, oceanography and physical processes for SEIAR Option

Impact	Receptor	Value / Sensitivity	Magnitude	Significance	Mitigation	Residual Impact	Potential change from original assessment
Construction							
Impact 1: Changes in suspended sediment concentrations due to the construction of the scheme	Kames Bay SSSI and Farland Point LNCS	N/A	N/A	No impact	N/A	No impact	Negligible impact
Impact 2: Changes in sea-bed level due to the construction of the scheme	Kames Bay SSSI and Farland Point LNCS	N/A	N/A	Negligible impact	N/A	Negligible impact	Negligible impact
New Impact 3: Impacts to coastal processes due to construction of temporary slipway	Farland Point LNCS	Low	Negligible	Negligible	N/A	Negligible	New Impact
Operation							
Impact 1: Changes to the wave regime due to the presence of the scheme	Kames Bay SSSI and Farland Point LNCS	N/A	N/A	Negligible impact	N/A	Negligible impact	No change
Impact 2: Changes to the tidal current regime due to the presence of the scheme	Kames Bay SSSI and Farland Point LNCS	N/A	N/A	Negligible impact	N/A	Negligible impact	No change
Impact 3: Changes to sediment transport and erosion/accretion patterns due to the presence of the scheme	Kames Bay SSSI and Farland Point LNCS	N/A	N/A	Negligible impact	N/A	Negligible impact	No change

Decommissioning
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.

3.6.1 Additional Mitigation and Monitoring Measures

No additional mitigation or monitoring measures are proposed.

3.6.2 Cumulative Impacts

Due to the geographical disconnect of the project (including the temporary slipway), no cumulative impacts are anticipated to occur with potential works for the Dawn Fresh fish farm or the Hunterston Marine Construction Yard Proposals.

The Millburn FPS includes an outfall extending into the intertidal zone, however no significant impacts have been raised within the Millburn Environmental Impact Assessment Screening Report (RPSGroup, 2021). As the Millburn FPS will adhere to its own CEMP and best practice, there is **not anticipated to be a cumulative impact with the proposed scheme**, albeit the construction timeframes may overlap and there will be programming constraints in West Bay to allow the Millburn works to be completed prior to the works for the proposed scheme.

3.7 Summary and Conclusion

All potential impacts on marine geology, oceanography and physical processes are assessment to be **negligible or less**, and no additional mitigation is required.

4 MARINE WATER AND SEDIMENT QUALITY

This section of the SEIAR sets out the outcome of the reassessment of marine water and sediment quality impacts and provides new and updated information on excavation techniques at the toe of the shore connected breakwater, dredging within the footprint of the offshore breakwater and temporary works at the site compound and temporary slipway for delivery and storage of material. This section therefore identifies any new or altered significant effects which could arise as a result of the altered locations from that presented in **Section 7** of the original ES. Where the assessment has not changed it is referenced accordingly.

4.1 Response to consultee comments

Table 4-1 details consultation responses from stakeholders in response to marine water and sediment quality. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 4-1 Consultee comments related to Marine Water and Sediment Quality

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Response to ES		
Scottish Environmental	SEPA will regulate any pollution that occurs as a result of the works under the Water Environment (Controlled Activities) (Scotland) Regulations	Construction works will be undertaken in accordance with good practice and will be

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Protection Agency (SEPA)	2011 (as amended) (CAR)[2]. It is our expectation that the proposed scheme will be undertaken in accordance with good practice and in a manner that does not result in pollution of the water environment.	managed by a series of plans, including CEMP.
	Discharge of run-off to the water environment from construction phase works, including to transitional and coastal waters from an area of greater than 4ha would require a construction site licence under CAR. Further advice is available in SEPA's Sector Specific Guidance: Construction Sites (WAT-SG-75). Below these thresholds, compliance with CAR General Binding Rule 10 is required (which includes reasonable steps to ensure discharge does not result in pollution of the water environment).	Construction works will be undertaken in accordance with good practice and will be managed by a series of plans, including CEMP and compliance with CAR General Binding Rule 10.
	SEPA welcome the embedded mitigation to ensure that dredging and offshore construction works will avoid the bathing water season as per **Section 7.6.1.1 of the ES**. This should suitably minimise the risk to bathing water quality.	n/a
Response to PAC		
SEPA	SEPA refer to SEPA Guidance Note 13 for construction of new structures (installation of slipways and launching ramps): To prevent pollution and safeguard marine ecology interests it is vital that good working practice is adopted and appropriate steps taken to prevent water pollution and minimise disturbance to sensitive receptors. With regard to works on the shoreline the applicant should refer to the appropriate Sections in the following guidance: • Guidance for Pollution Prevention (GPPs) in particular GPP5 Works and maintenance in or near water (Section 3) covers working with concrete, cement and grout. • CIRIA Guidance, in particular C584 - Coastal and Marine Environmental Site Guide. Disturbance to the shoreline and/or seabed should be minimised and the shore restored to as near its former condition following the works as reasonably possible. All waste materials should be removed and disposed of at a licensed onshore site.	This guidance will be followed for installation of the slipway

4.2 Updated Policy Context

There has been no update to the information provided within **Section 7.5** of the original ES.

4.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 7.4** of the original ES, supported by expert judgement.

4.4 Updated Baseline Conditions

There is no update to the baseline conditions described in the original ES.

[2] *https://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf*

4.5 Updated Assessment of Effects

This section establishes the realistic SEIAR worst case scenario for each key impact category, forming the basis for the subsequent assessment.

4.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5** Project Description of the original ES.

The expected construction schedule for dredging and offshore construction works will avoid the Bathing Water season which is a mitigation measure recommended by SEPA. Further mitigation measures relevant for marine water and sediment quality would include the adherence to the standard best practice and policy requirements as set out in **Section 7.4.1** of the original ES. This includes adherence to the following guidance:

- Guidance for Pollution Prevention (GPPs) in particular GPP5 Works and maintenance in or near water (Section 3) covers working with concrete, cement and grout.
- CIRIA Guidance, in particular C584 - Coastal and Marine Environmental Site Guide

As the guidance notes set out in **Section 7.4.1** of the original ES will be followed throughout the construction and operation of the proposed scheme the risk of an accidental spill occurring is considered to be adequately mitigated and will not be considered further, as set out in the Scoping Report.

Further to the embedded mitigation stated in the original ES, the following will also be adhered to:

- CAR General Binding Rule 10; and
- SEPA Guidance Note 13 for construction of new structures (installation of slipways and launching ramps)

No additional embedded mitigation is proposed.

4.6 Potential Changes to Original Assessment

A summary of the design changes that would impact the original ES marine and sediment water quality assessment are detailed below:

Foreshore rock structures
The change in technique to secure the works at toe of the breakwater may change the assessment for suspended sediments, during construction, made in the original ES

Offshore breakwaters
The change in volume and technique for proposed dredging work at the offshore breakwater may change the assessment made for suspended sediments, during construction, in the original ES

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES.

Construction programme

Although the programme has changed, the offshore construction works will avoid the Bathing Water season. Therefore, there will be no change to the original assessment.

No other design changes will change the impacts assessed for water and sediment quality in the original ES.

4.6.1.1 Construction Impact 1: Deterioration in water quality resulting from the disturbance of sediments and release of sediment-bound contaminants into the water column

Water quality within Millport Bay and the Largs Channel (Fairlie Roads) coastal water body is considered to be of medium value as the area supports designations such as Millport Bay bathing water, which is classed as 'Excellent' but the receiving water body is large compared to the size of the proposed scheme and has a large capacity for dilution and flushing.

The original ES assessed for the installation of steel dowel bars at the toe of the structures at Clyde St revetment and the shore-connected breakwater , which would require the use of grout to secure them in place. This activity will no longer take place and therefore the risk of impacts from the release of grout into the marine environment are removed.

Instead, some excavation of the bedrock may now be required at the toe of the structures to provide the foundation. This short-term work may be undertaken at low water in the dry or at high water. The excavated material would typically be large pieces of rock plus some coarse rock fragments. Should any of the arisings be washed out by the tide this is not considered to have an adverse impact on water quality as the volume is predicted to be very small, the rock fragments will settle out quickly and would not contain any contaminants.

Construction works will adhere to the proposed methodologies and standard best practice measures described in **Section 7.4.1** of the ES, supported by a CEMP, and no change is anticipated to the assessments of deteriorating water quality made in the original ES.

The original ES estimated that a maximum of 25,000m^3 of sediment would need to be removed from the footprint of the breakwaters, with the total sediment excavation volume more likely to be less than 10,000m^3. It is now proposed that up to 12,500m^3 of material will be removed by long armed excavator and re used on site to stabilise the offshore breakwater. This material is coarse and any material released will settle quickly and locally, therefore the potential impacts will less adverse than those initially assessed within the original ES.

The location of the temporary slipway will not affect the quality of Millport Bathing Waters due to the net northerly flow of current up the coastline of Great Cumbrae. The slipway will be located within the Largs Channel (Fairlie Roads) coastal water body, however as no excavation works will take place and the footprint will be very small (1,500m^2) within a large flushed water body, there will be no change to the assessments made within the original ES.

In line with SEPA guidance Note 13[3], disturbance to the shoreline and/or seabed will be minimised and the shore restored to as near its former condition following the works as reasonably possible. This will be undertaken through complete removal of all construction material, and the natural cobble habitat within the small bay should naturally recover very quickly with natural processes. All waste materials will be removed and disposed of at a licensed onshore site.

[3] *https://www.sepa.org.uk/media/143312/lups-gu13.pdf*

4.6.1.2 Impact 2: Deposition of mobilised sediments on the sea bed causing a deterioration in sediment quality

As discussed within the original ES the chemical analysis carried out on the sediment within the footprint of the offshore breakwaters shows that the sediment contains very marginal exceedances of heavy metals within five samples. These concentrations, when averaged, do not exceed Action Level 1. All other contaminants were present at levels below Action Level 1 and are not of concern to water or sediment quality (**Appendix 7.1, Volume III**).

The material will be coarse, with less potential for creating a sediment plume than the worst case was assessed within the original ES. The vessels and excavator will be plant already required on site for rock placement and material will be reduced to stabilise the toe, and material will be reused on site to stabilise the offshore breakwater.

As such these sediment contaminant concentrations do not present a risk to sea bed sediments, infauna or epifauna where the sediment may be deposited. Consequently, the potential magnitude of this effect is considered to be negligible. The sensitivity of the Largs Channel (Fairlie Roads) coastal water body and the Millport Bay Bathing Water to this impact are the same as that defined in Impact 1 – medium. This therefore results in an impact of **minor adverse** significance (which is considered to be not significant).

4.7 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 4-2**. The table demonstrates that all impacts are still considered to be worst case minor adverse.

Table 4-2 Potential Impacts Identified for water and sediment quality for SEIAR Option

Potential Impact	Receptor	Value	Magnitude	Significance	Mitigation Measures	Residual Impact	Potential change from Original Assessment
Construction							
Impact 1: Deterioration in water quality resulting from the disturbance of sediments and release of sediment-bound contaminants into the water column	Millport Bay Bathing Water and Largs Channel (Fairlie Roads) coastal water body	Medium	Negligible	Minor Adverse	n/a	Minor Adverse	No change
Impact 2: Deposition of mobilised sediments on the sea bed causing a deterioration in sediment quality	Millport Bay Bathing Water and Largs Channel (Fairlie Roads) coastal	Medium	Negligible	Minor Adverse	n/a	Minor Adverse	No change. WID is no longer required and material to be excavated is known to be coarse the

Potential Impact	Receptor	Value	Magnitude	Significance	Mitigation Measures	Residual Impact	Potential change from Original Assessment
	water body						likelihood of mobilising sediments will be reduced from the original assessment
Operation							
Impact 1: Entrainment of contaminants due to decreased flushing of water within Millport Bay	Millport Bay Bathing Water and Largs Channel (Fairlie Roads) coastal water body	Medium	Negligible	Minor Adverse	n/a	Minor Adverse	N/A
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

4.7.1 Additional Mitigation and Monitoring Measures

No additional mitigation or monitoring measures are proposed.

4.7.2 Cumulative Impacts

Peel Ports own Hunterston Marine Construction Yard and are planning to construct, decommission or reverse engineer large marine related structures. This will require improvements to the hammerhead quay (and associated dredging) and creation of dock gates to the existing dry dock.

The proposals will take place within the Largs Channel (Fairlie Roads) coastal water body and is approximately 3km from the Millport Bay Bathing Water and therefore could result in cumulative impacts with the proposed scheme in relation to overlap of sediment plumes which could lead to changes in physico-chemical parameters and contaminants. However, as dredging works will now not be required for the construction of the flood protection scheme, impacts associated with sediment plumes will be reduced. Information for the proposed dredge at Hunterston is not available and as such a cumulative impact on the marine water and sediment quality of the coastal water body and the Bathing Water is not yet possible. It is therefore assumed that any consented development would be subject to mitigation and management measures which would reduce impacts to non-significant unless there were exceptional circumstances, it is accepted that such projects or schemes may contribute to a wider cumulative impact.

The potential cumulative impact between the proposed scheme and the Hunterston proposals will therefore be assessed within the submission for the Hunterston proposals.

The Dawn Fresh fish farms have not applied for planning permission yet, and it is not understood when construction of the fish farms may take place. However, as no excavation works are proposed for construction of the slipway and limited sediment transport will naturally occur in the area, impacts associated with the temporary slipway will be localised and, should the Great Cumbrae fish farm begin construction works whilst the slipway is still present there is not anticipated to be a cumulative impact on water quality from the flood protection scheme. Dispersal modelling for the fish farm proposed for Little Cumbrae indicates material will be pushed towards Millport Bay Millport Bay is a sheltered area where baseline tidal currents are low. Flows are complicated by their interaction with the offshore islands and are likely to accelerate slightly through the gaps between The Leug, The Spoig and the southern Eilean islet rock outcrop. The presence of the offshore breakwater would close the gaps between the islands and provide a permanent barrier to the movement of water between the islands. However, the passage of water into the Bay would still be effective around the east and west sides of the breakwaters, as water will be forced in these directions by the obstruction.

The predicted changes to circulation and the local increases and decreases in current velocity are not significant because the existing currents are already very low velocity. The barrier across the central passage of water would not significantly affect the flushing ability of the Bay as the passages to the east and west would continue to allow entry and exit of water. The impact assessment in **Chapter 6, Section 6.9.2** of the original ES concluded that the presence of the proposed scheme would have an impact of negligible significance on tidal currents, and consequently the flushing ability, within Millport Bay. Impacts associated with the fish farms themselves will be managed through their own mitigation.

The construction period of the Millburn FPS will overlap with the proposed scheme, however as the Millburn FPS will adhere to its own CEMP and best practice, there is not anticipated to be a cumulative impact with the proposed Scheme. There will be programming constraints in West Bay to allow the Millburn works to be completed prior to the works for the proposed scheme.

4.8 Summary and Conclusion

All potential impacts on water and sediment quality are assessment to be **minor adverse or less**, and no additional mitigation is required

5 BENTHIC ECOLOGY

This Section of the SEIAR sets out the outcome of additional benthic ecology assessments and provides new and updated information on excavation techniques at the toe of the shore connected breakwater, works to extend into the intertidal area at Cross House, dredging within the footprint of the offshore breakwater and temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 8** of the original ES. Where the assessment has not changed it is referenced accordingly.

5.1 Response to consultee comments

Table 5-1 details consultation responses from stakeholders in response to benthic ecology. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 5-1 Consultee comments related to Benthic Ecology

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Response to ES		
SEPA	Whilst SEPA understand no invasive marine NNS were recorded during the intertidal or drop-down surveys, given the scale of the project and that it is in an area known to host NNS (as acknowledged in **Section 8.6.4.3** of the ES), a bespoke Biosecurity Plan (which could form part of the CEMP) is required. This would ensure measures are taken to reduce the risk that materials and construction craft will bring additional NNS or spread them from adjacent locations (i.e., measures to prevent the spread of NNS from the Clyde to currently un-impacted sites). SEPA request that a condition is attached to any permission granted such that the site-specific Biosecurity Plan is submitted for approval to the determining authority in consultation with SEPA prior to commencement of works. The following good practice advice for developing a project/site-specific Biosecurity Plan should be used: a. NatureScot's Marine Biosecurity Planning[4] b. Firth of Clyde Biosecurity Plan 2012 - 2016[5] c. Marine Scotland's Marine Invasive Non-native Species Guidance[6] d. GB Non-Natives Species Secretariat website[7] We also recommend that as the project progresses, this matter be discussed with Marine Scotland, as the lead body for marine NNS.	The Invasive Species and Biosecurity Management Plan will also include for marine INNS Consultation with MS and SEPA and NatureScot is ongoing for the development of the plan
SNH	There are natural heritage interests of national importance within the footprint of the proposed scheme, but in our view, these will not be adversely affected by the proposal.	Due to the design change to include works at Farland Point, see further consultation with NatureScot below for updated response
Response to PAC		
NatureScot	Work in the intertidal zone is often complicated and we advise that a fully competent ECoW provision is required for such a project and the choice of personnel is approved by the Council.	An EcoW (as approved by the Council) will be present for works in the intertidal area
	We note that the delivery of materials to the scheme, and the requirement to construct a temporary slipway, may cause significant impacts on environmental receptors and these impacts will need to be fully detailed in the forthcoming Marine Licence application.	Additional impacts associated with the temporary slipway are considered throughout this document.
	This also applies to the potential for impacts arising from the requirement for excavation for any required foreshore/ intertidal revetment works.	Potential impacts from excavation works are considered within this document.
	We note that a wide range of management and protection plans may be required in order to fully mitigate for the wide range of impacts arising from the project- the role of the ECoW is to ensure that these plans relate to each and are fully implemented and monitored as required	N/A
	We understand that works may be required within Kames Bay SSSI, contrary to that originally proposed in the original EIA for the project. We advise that early engagement with NatureScot in relation to the scope and scale of any potential works that may affect the SSSI is carried out in order to address any potential issues of National importance. We are also keen to understand if there will be any impact of this scheme on the existing functional drainage system ,	There will now be no additional works or impacts at Kames Bay SSSI

[4] *https://www.nature.scot/doc/marine-biosecurity-planning*
[5] *http://www.clydemarineplan.scot/wp-content/uploads/2016/05/FoCF-Biosecurity-plan.pdf*
[6] *https://www.gov.scot/policies/marine-environment/invasive-non-native-species/*
[7] *http://www.nonnativespecies.org/home/index.cfm*

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	currently operating with Kames Bay SSSI and what effect this could have on the notified features of the SSSI.	
	[regarding the proposed works at Farland Point] There are no sensitive marine habitats or species records nearby. There are records of kelp habitat, which is a PMF, but this habitat is likely to be widespread around the coast here.	N/A
	The method of removal of the slipway at the end of the project seems to be appropriate and we note that restoration of the habitats, currently present under the proposed slipway is not expected to be required. We advise that contingency plans be made to restore this habitat if so required. It would be beneficial to understand where the material from the slipway and compound were to be end up following completion of the project.	It is expected that materials recovered from the temporary slipway and site compound would either be re-used elsewhere on this site or at another local construction site. If disposal of this material at a licenced waste disposal site is required, the construction contractor will be responsible for obtaining the relevant licences.
SEPA	We have no concerns regarding this proposal. Slipways are covered by our standing advice on marine consultations (See Page 10). Please refer to that as you progress this element of the project.	Standing advice will be considered in the CEMP
	Given the presence of Japanese knotweed on site, we also support your proposed approach of managing this within the Invasive Species Biosecurity Management Plan (ISBMP). As you'll be aware, we offered advice on invasive non native species in Section 4 of our response to the ES last year which remains relevant	ISBMP will be prepared in line with SEPA guidance
	For infrastructure involving development on a sensitive receptor (e.g., a SSSI), we consider that mitigation measures alone may not adequately protect sensitive receptors. Therefore, applicants must provide detailed qualitative and/or quantitative risk assessments to demonstrate the proposals will not have a significant impact on identified sensitive receptors through the proposed design, construction and operation of the infrastructure.	There will now be no additional works or impacts at Kames Bay SSSI

5.2 Updated Policy Context

There has been no update to the information provided within **Section 8.5** of the original ES.

5.3 Updated Assessment Methodology

An intertidal ecology survey was undertaken within the footprint of the temporary slipway and surrounding coastline to support this SEIAR. The objectives of the survey were to:

- Identify the habitats and communities present within the survey area;
- Identify and locate the presence of any rare or protected species within the Intertidal Study Area; and
- Provide target notes (TN) of each biotope, including characterising, rare, protected and non-native species encountered.

The survey covered the intertidal habitats within the Intertidal Study Area presented in Appendix A – Terrestrial & Benthic Ecology, hereafter called the Intertidal Study Area.

The survey was conducted at low spring tide in November 2021. Weather conditions were fair to good for the duration of the survey. Wind conditions were slight. Sea state remained calm (sea state 1 or 2) throughout the survey. Low water was at 15:47 and was 0.9m in height. Water clarity was good for assessing in the shallows at low tide.

The field survey was completed by two experienced ecologists from Royal HaskoningDHV operating on foot, using a number of methods and techniques, based upon those specified in the Countryside Council for Wales (CCW) report 'CCW Handbook for marine intertidal Phase 1 mapping' (Wyn et al., 2000) and the 'Marine Nature Conservation Review: Rationale and methods' (Hiscock, 1996).

Target notes (Appendix A – Terrestrial & Benthic Ecology) were recorded and photos taken at target note locations. Target notes were located wherever an obvious change in either the biological zonation or physiological conditions appeared to occur. A handheld tablet (Samsung Galaxy Tab Active3) was used to plot target notes, positions and photographs in the field.

A biotope code was assigned to each target note using the Marine Habitat Classification for Britain & Ireland (v15.03) (JNCC, 2015). This was conducted using a combination of methods including the use of the Marine Habitat Classification online search facility available on the Joint Nature Conservation Committee (JNCC) website.

This assessment follows the general impact assessment methodology as described in **Section 8.4** of the original ES, supported by expert judgement.

5.4 Updated Baseline Conditions

The location of the temporary slipway is approximately 2km south of Ballochmartin Bay SSSI.

The intertidal survey recorded the coastline to consist of moderately exposed classic rocky shore of sandstone bedrock and boulder, with clear zonation down the shore of lichens (including *Xanthoria parietina* and *Ochrolechia parella*) leading to *Verucaria maura*, *Pelvetia canaliculata* and fucoid zones (*Fucus spiralis*, *Fucus vesiculosis* and *Fucus serratus*) with *Cladophora rupestris*, supporting beadlet anemone *Actinia equina*, limpet *Patella vulgata*, dog whelk *Nucella lapillus* , *Littorina littorea Chthamalus montagui* and amphipods.

Rockpools were present in the upper shore along the coastline, supporting *Corallina officinalis* and fillimentous red seaweeds with *Laminaria digitata, F. serratus* and *Dilsea carnosa* and *Chondrus crispus* with *A. equine*, *Electra spp*. And *Cancer pagurus*. Small outcrops of small *Mytilus edulis*, *Ascophyllum nodosum* and *Mastocarpus stellatus* were present in crevices. The amount of *M. edulis* was limited and highly localised, and therefore not considered to be a Priority Marine Feature (PMF) bed.

The footprint of the proposed temporary slipway was characterised by a shallow shore of pebble and cobble substate on sand with occasional boulders and outcrops of bedrock. The lower shore was characterised by *F. serratus and L digitata*, with *C. crispus*, *Ulva lactuca*, *C. rupestris*, Polysiphonia spp., *D. carnosa*, M*embranoptera alata*, *C. montagui*, dog whelk, *L. littorea*, *Idotea* spp., *P. vulgate* and beadlet anemone. Sea kale *Crambe maritima* was recorded in the shingle above the strandline and thrift *Armeria Maritima* was present in the spray zone . Due to the coarseness of the substate, no sieving was undertaken.

One rockpool biotope (LR.FLR.Rkp.Cor.Cor) of conservation importance was identified within the Intertidal Study area. There are also records of kelp habitat which is a PMF. However, although rockpools and kelp

have been identified as being of conservation importance, it is relatively common around the UK and along this coastline and recorded on the shore either side of the footprint of the temporary slipway therefore damage to these biotopes should be avoided, however minor impacts to this biotope should not constrain the proposed development.

Few species of conservation importance were identified within the Intertidal Study Area. The dog whelk *N. lapillus*, an OSPAR species (on a list of threatened and/or declining species and habitats in the North-East Atlantic, created under the OSPAR Convention for the protection of the marine environment of the North East Atlantic), was found throughout the Intertidal Study Area and is recorded within the desk study data (**Appendix 16.1 of the original ES**). Dog whelk is a common species in the UK and is not protected under any other pieces of legislation.

A summary of recorded biotopes in the 2021 is provided in **Table 5-2**: . The results of the previous surveys are provided in **Section 8** of the original ES.

Table 5-2: Biotopes recorded at Farland Point (2021)

Code	Biotope
LR.FLR.Lic.Ver.Ver	Verrucaria maura on very exposed to very sheltered upper littoral fringe rock
LR.FLR.Lic.YG	Yellow and grey lichens on supralittoral rock
LR.FLR.Rkp.Cor.Cor	Corallina officinalis and coralline crusts in shallow eulittoral rockpools
LR.HLR.MusB.Cht.Cht	Chthamalus montagui and Chthamalus stellatus on exposed upper eulittoral rock
LR.MLR.BF.PelB	Pelvetia canaliculata and barnacles on moderately exposed littoral fringe rock
LR.MLR.BF.FvesB	Fucus vesiculosus and barnacle mosaics on moderately exposed mid eulittoral rock
LR.MLR.BF.Fser.R	Fucus serratus and red seaweeds on moderately exposed lower eulittoral rock
LS.LCS.Sh	Shingle (pebble) and gravel shores

As discussed in **Section 8.5.7** of the original ES, a number of INNS have been recorded in the region of Farland Point, including American slipper limpet *Crepidula fornicate*, leathery sea squirt *Styela clava* and wireweed *Sargassum muticum*. These INNS are already included within the original assessments.

5.5 Updated Assessment of Effects

This section establishes the realistic SEIAR worst case scenario for each key impact category, forming the basis for the subsequent assessment.

5.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the original ES**.

Embedded mitigation relevant to benthic ecology to the scheme design includes reducing the footprint were practical and adhering to a strict footprint of works, ongoing consultation with stakeholders and regulators, and considering opportunities to enhance the design of offshore elements for the benefit of local benthic ecology. Best practice and policy (including tool box talks) would also be followed to minimise risks of a pollution event (including development of an Emergency Response Cooperation Plan, Marine Pollution Contingency Plan and Vessel Management Plan), and protect against the spread of INNS.

An Ecological Action Plan will be developed and agreed with relevant stakeholders, and will form part of the CEMP. An Ecological Clerk of Works (EcoW) will audit the implementation of the EAP.

The ISBMP will also include for marine INNS. No additional embedded mitigation is proposed.

5.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact benthic ecology assessment are detailed below:

Foreshore rock structures
The change in technique to secure the works at toe of the foreshore rock structures may change the assessment for benthic ecology made in the original ES

Offshore breakwaters
The change in volume and technique for proposed dredging work at the offshore breakwater may change the assessment made for benthic ecology in the original ES

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES.

Stepped revetments
The change in technique to extend the works at Cross House into the intertidal may change the assessment for benthic ecology made in the original ES

No other design changes will change the impacts assessed for benthic ecology in the original ES.

5.5.2.1 Construction Impact 1: Direct habitat loss

No rare or protected subtidal habitats have been recorded within Millport bay during drop down video surveys. The shallow sediment-rock interface is also sometimes populated by foliose algae such as (potentially) *Polyides rotundus* which are tolerant to sand scour. The change in technique at the breakwater is not anticipated to significantly change the footprint or have an increased impact on any sensitive benthic ecology receptors in regards to direct habitat loss. Works to extend into up to 500m^2 of the intertidal area at Cross House will slightly increase the habitat loss of intertidal features, but the base of the revetments is anticipated to re-colonise in line with the natural zonation of the area and there is no impact to sensitive benthic ecology receptors

Direct impacts on Farland Point LNCS were not included within the original ES and this constitutes an new impact. The construction of the temporary slipway will cause temporary direct habitat loss within the footprint (1,500m^2) in the medium term (approximately 12 months) within the Farland Point LNCS .

Farland Point is a locally designated non-statutory site and is considered to be of high ecological importance locally however the habitats and species found were common of this type of rocky coastline with good recoverability and limited species were recorded within the footprint of the temporary slipway due to the cobble/pebble coarse mobile substrate. The magnitude of impact of direct habitat loss on the site is considered to be **low** as the footprint of the temporary slipway (1,500m^2) will be very small in compared to the intertidal habitat around Farland Point and is of small scale and with recoverability of the intertidal habitat through natural or spontaneous regeneration following removal of the slipway after approximately 12 months.

Overall **minor adverse** impacts of direct habitat loss upon the intertidal habitats at Farland Point LNCS are therefore anticipated within the footprint of the temporary slipway in the medium term with natural recoverability. This constitutes a new impact to those assessed within the original ES. In line with the embedded mitigation, there will be a strict footprint of works and a toolbox talk will be provided to construction personnel prior to activities commencing, detailing the importance of this designation. Strict fencing of works will be used and the access along the shore closed to construction personnel to prevent being trampled by people, vehicles, or lay down of plant or materials.

The erection of fencing and construction of the temporary slipway will be supervised by the EcoW. Although it is not currently anticipated that habitat restoration will be required within the slipway footprint, a contingency plan will be made in case the baseline changes. No further mitigation is required.

5.5.2.2 Construction Impact 2: Physical disturbance of habitats or species during and following construction

Following further development of the design phase, the volume of anticipated excavated material within the footprint of the breakwater is reduced to 12,500m^3, and the material will be coarse, with less potential for creating a sediment plume than the worst case which was assessed within the original ES. The vessels and excavator will be plant already required on site for rock placement and material will be reduced to stabilise the toe.

The coarse nature of material and low risk of sediment plumes developing will not change the risk of smothering impacts from the settlement of suspended sediments assessment within the original ES and therefore the impacts of physical disturbance of habitats and species is considered to remain **minor adverse.**

The slipway will extend to MLWS and will therefore not have direct impacts on subtidal habitats. The slipway will be within the realms of natural variation of the rocky coastline. No excavation works are proposed and sediment transport is anticipated to be limited due to the coarse nature of the substrates. As such, impacts of physical disturbance of habitats or species during and following construction at Farland Point are considered to be **up to minor adverse** significance in the context of a dynamic environment in the medium term, and reversible in nature. There is not anticipated to be impacts to subtidal marine features which may be present off the coast whilst the temporary slipway is present.

5.5.2.3 Construction Impact 3: Potential introduction / spread of invasive non native species

Risks of introduction or spread of INNS at Farland Point and surrounding area will be managed as stated within the original ES, including compliance with relevant guidance regarding ballast water and non-native invasive species risk assessment prior to each deployment to identify mechanisms behind risk identified and appropriate mitigation measures. This can be undertaken once installation vessels and construction ports have been identified through maintenance of an ISBMP, any following guidance outlined in **Section 8 of the River Basin Management Plan** for the Scottish River Basin District 2015 – 2027 (SEPA 2015) including adherence to the preventable actions outlined in the marine biosecurity plans for the Firth of Cyde (Mills, 2010) and the UK Marine Pathway project. If the embedded mitigation is followed and measures put in place to assess the possible likelihood of non-native invasive species invasion based on project vessels, the likelihood of introducing invasive non-native species to Millport, Farland Point and the wider area will be reduced to low magnitude to and re-assessed to **minor adverse** significance.

No further additional mitigation is proposed.

5.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 5-3**. The table demonstrates that all impacts are still considered to be worst case minor adverse.

Table 5-3 Potential Impacts Identified for benthic ecology for SEIAR Option

Potential Impact	Receptor	Importance / sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Potential change from original assessment
Construction							
Impact 1: Direct habitat loss	Kames Bay SSSI	High	Low	Moderately adverse	Fencing off and no access onto Kames Bay	Minor adverse	No change
	Pioneer saltmarsh	Medium	Medium	Moderately adverse	Fencing off and no access onto saltmarsh habitat.	Minor adverse	No change
	Farland Point	High	Low	Minor adverse	Supervision by ECoW	Minor adverse	New impact
	Other habitats	Negligible	Medium	Minor adverse	None required	Minor adverse	No change
Impact 2: Physical disturbance of habitats or species during and following construction	Marine Pollution incidents	Low - High	Negligible	Minor adverse	Embedded mitigation	Minor adverse	No change
	Suspended sediments	Medium – high	Negligible	Minor adverse	None required	Minor adverse	No change
Impact 3: Potential introduction / spread of invasive non native species	Invasive non-native species	Medium	Low	Minor adverse	Embedded mitigation	Minor adverse	No change
Operation							
Impact 1: habitat alteration	Kames Bay SSSI and Farland Point LNCS	High	Negligible	Negligible	None required	Negligible	N/A
	Other habitats	Negligible	Medium	Minor adverse	None required	Minor adverse	N/A
Decommissioning							

Potential Impact	Receptor	Importance / sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Potential change from original assessment
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

5.7 Additional Mitigation measures

The erection of fencing and construction of the temporary slipway at Farland Point LNCS will be supervised by the EcoW. Although it is not currently anticipated that intertidal habitat restoration will be required within the slipway footprint, all introduced materials will be reoved and a contingency plan will be made in case the baseline changes. Habitat restoration will be undertaken within the footprint of the compound and is discussed in **Section 13 Terrestrial Ecology**.

5.8 Cumulative effects

The proposals will take place within the Largs Channel (Fairlie Roads) coastal water body and is approximately 3km from the Millport Bay Bathing Water and therefore could result in cumulative impacts with the proposed scheme in relation to overlap of sediment plumes which could lead to changes in physico-chemical parameters and contaminants. However, as dredging works will now not be required for the construction of the flood protection scheme, impacts associated with sediment plumes will be reduced.

Information for the proposed dredge at Hunterston is not available and as such a cumulative impact on the benthic habitats is not yet possible. It is therefore assumed that any consented development would be subject to mitigation and management measures which would reduce impacts to non-significant unless there were exceptional circumstances, it is accepted that such projects or schemes may contribute to a wider cumulative impact. The potential cumulative impact between the proposed scheme and the Hunterston proposals will therefore be assessed within the submission for the Hunterston proposals.

The Dawn Fresh fish farm on Great Cumbrae has not applied for planning permission yet, and it is not understood when construction of the fish farm may take place. However, as no excavation works are proposed for construction of the slipway and limited sediment transport will naturally occur in the area, impacts associated with the temporary slipway will be localised and, should the fish farm begin construction works whilst the slipway is still present there is not anticipated to be a cumulative impact on benthic habitats from the flood protection scheme. Impacts associated with the fish farms will be managed through their own mitigation.

The Millburn FPS includes an outfall extending into the intertidal zone, however no significant impacts have been raised within the Millburn Environmental Impact Assessment Screening Report (RPSGroup, 2021). As the Millburn FPS will adhere to its own CEMP and best practice, there is not anticipated to be a cumulative impact with the proposed scheme, albeit the construction timeframes may overlap and there will be programming constraints in West Bay to allow the Millburn works to be completed prior to the works for the proposed scheme.

5.9 Summary and Conclusion

All potential impacts on benthic ecology are assessment to be minor adverse or less. The erection of fencing and construction of the temporary slipway at Farland Point LNCS will be supervised by the EcoW. No further additional mitigation is required.

6 FISH AND SHELLFISH RESOURCE

This section of the SEIAR sets out the outcome of additional fish and shellfish resource assessments and provides new and updated information on excavation techniques at the toe of the foreshore rock structures, dredging within the footprint of the offshore breakwater and temporary works at the site compound and temporary slipway for delivery and storage of material. This section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 9 of the original ES**. Where the assessment has not changed it is referenced accordingly.

There has been no further consultation or stakeholder feedback on fish and shellfish resource following the submission of the original ES.

The current understanding of the fish and shellfish resource within the study area, namely species expected to be present within Millport Bay and Kames Bay will likely mirror those species found in the Firth of Clyde, and while there is potential for juvenile fish to utilise the area it is thought the habitat would not be suitable for spawning ground. Works at the temporary slipway will be within the intertidal region and will not extend sub tidally, therefore are also not within suitable spawning grounds.

Endrick Water Special Area of Conservation (SAC) is located upstream, over 10km away from of the propped scheme, and is designated for Atlantic salmon *Salmo salar*, brook lamprey *Lampetra planeri* and river lamprey *Lampetra fluviatilis*. The population of brook lamprey are non migratory. River lamprey and Atlantic salmon may to pass close to the study area as they navigate past Great Cumbrae on their migration route out of the Clyde however as the works at the temporary slipway will be small in footprint and reversed at approximately 12 months, within the intertidal region of a naturally rocky section of coast, there are not anticipated to be impacts to migratory fish navigating to the SAC. Furthermore, by locating the temporary slip at the south of Great Cumbrae, construction vessels will not be required to travel up the stretch of water east of the island, reducing journey times of vessels.

Based on the baseline for fish and shellfish resource the impact assessment presented in the Scoping Report and Interim EIA has not changed, meaning **no significant impacts are expected to fish and shellfish resource due to the Proposed Scheme**. As no change has occurred since the scoping phase of the EIA the impacts have remained scoped out of the EIA.

Embedded mitigation to minimise impacts to benthic ecology is discussed in **Section 5**.

7 MARINE MAMMALS

This Section of the SEIAR sets out the outcome of additional marine mammal assessments.

7.1 Further Works and Response to consultee comments

Table 7-1 details consultation responses from stakeholders in response to marine mammals. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 7-1 Consultee comments related to Marine Mammals

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Scottish Natural Heritage (SNH) (now NatureScot)	SNH are content that the risk of injury to marine mammals is not significant and mitigation to protect against injury (physical and auditory) is not required.	No further information / clarification required.
	SNH query the assessment of disturbance for cetaceans as it appears that the TTS (temporary threshold shift) has been used as the metric for disturbance, which may underestimate the potential for disturbance. For continuous noise types disturbance can occur at lower levels than would trigger TTS and so SNH do not recommend TTS for disturbance assessments, except for singular impulsive noise (e.g. underwater explosives).	Acknowledged, separate assessments on potential disturbance have been included, based on the latest information available.
	The ES Chapter 10 focuses on Joint Nature Conservation Committee (JNCC) European Protected Species (EPS) guidance, which excludes Scottish territorial waters and was developed for the rest of the UK. Therefore, reference should have been to Scottish EPS guidance[89]. In the Scottish guidance, Regulation 39 (2) (The Conservation and Natural Habitats &c. Regulations 1994 (as amended)) gives cetaceans additional protection from disturbance by providing that it is an offence to 'deliberately or recklessly disturb any dolphin, porpoise or whale'. This offence only applies in Scottish waters. Given that this proposal is likely to coincide with cetacean presence in the area, SNH advise that the applicant should apply for an EPS licence to disturb cetaceans during the construction period. However, given the magnitude of activity and the relatively limited duration of this proposal, even if some cetaceans are disturbed it is unlikely to impact on the favourable conservation of any cetacean species.	Reference has been updated to Scottish EPS guidance. An EPS licence application will be submitted.
	With regards to both common and grey seals there are no seal haulouts, designated under the Marine (Scotland) Act 2010, within the vicinity of the proposed works. Therefore, SNH are content that the risk of disturbance to seals at haul outs is low.	No further information / clarification required
Response to PAC		
NatureScot	We note that there are no MPAs (marine protected areas) in the vicinity of the project that are designated for seals, neither are there any designated seal haul-out sites. However, we support your commitment to re-assessing potential construction impacts upon seals as a demonstration of good practice in reducing environmental impacts. We look forward to engaging with you further to agree a series of measures to protect these species.	Further assessment has been undertaken for seals
	We support your proposal to focus your cumulative assessment on the Firth of Clyde area and not the wider seal Management Units, this is proportionate to the scale of the project.	N/A
	Assessing disturbance in impact assessments is complex and uncertain. Disturbance may or may not result in a behavioural response, but usually assumes that if an individual is disturbed, a fleeing response is observed. Southall *et al*. (2007) highlighted that "behavioural reactions to acoustic exposure are generally more variable, context dependant and less predictable than effects of noise exposure in hearing and physiology". There is no 'single' disturbance threshold that can be recommended. Instead, we look for supporting discussion relevant to the risk, ideally, where possible, using literature that relates to similar scale of activity. For example, harbour development piling could reference the work done by Graham *et al*. (2017). Whereas for offshore wind pile driving, we currently recommend using the latest dose response curves (e.g. Graham *et al*., 2019). We recommend using the TTS threshold only for UXO (unexploded ordnance) disturbance, because the noise from the UXO explosion is only fleetingly in the environment. Therefore, the assumption is that although noise levels lower than TTS threshold may startle the	Further assessment has been undertaken using recommended methodology

[8] *https://www.webarchive.org.uk/wayback/archive/3000/https://www.gov.scot/Resource/0044/00446679.pdf*
[9] *https://www2.gov.scot/Topics/marine/Licensing/marine/guidance/EPSbackground*

	individual; this has no lasting effect. TTS, on the other hand, results in a temporary reduction in hearing ability, and therefore may affect the individuals' fitness temporarily (as recommended in Southall *et al*. (2007) for a single pulse, they do not recommend TTS-onset for multi-pulses or non-pulse sound types). For other activities, it may be appropriate to use the NOAA (National Oceanic and Atmospheric Administration) level B behavioural disturbance thresholds (https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/esa-section-7-consultation-tools-marine-mammals-west). In these cases we would also look for discussion as to the background/ambient noise levels in the area to set the context. It may be in some cases, assessment can be provided qualitatively, rather than conducting complex noise modelling. We recognise that Natural England/JNCC have recommended effective deterrence ranges (EDR) in their guidance for assessing the significance of noise disturbance in harbour porpoise SAC https://data.jncc.gov.uk/data/2e60a9a0-4366-4971-9327-2bc409e09784/JNCC-Report-654-FINAL-WEB.pdf . We do not recommend these are used for Scottish assessment, but are perhaps useful for context.	
Response to draft chapter		
NatureScot (email dated 13th December 2021)	Marine Mammal Mitigation We support the position laid out in the draft chapter that the risk of injury to marine mammals is negligible, however there is risk of disturbance to cetaceans and seals. We also note the assessments in the draft chapter all conclude that any disturbance arising from the proposal will be minor and that mitigation is not required. Nevertheless a package of mitigation is offered in section 2.5.4: • timing of some works to avoid harbour seal pupping/ moulting period; • following the Scottish Marine Wildlife Watching Code (SMWWC); and • nominated marine mammal and basking shark observer during vessel transits. We also note that the EPS risk assessment/ licence processes may require other mitigation measures. We welcome this package of mitigation measures as best practice in avoiding impacts on marine mammals. We specifically note the proposal to avoid the harbour seal pupping/ moulting period and we will recommend that Marine Scotland secures this timing commitment One minor correction is that the Scottish Marine Wildlife Watching Code is now found here: www.nature.scot/marinecode	Acknowledged
NatureScot (email dated 3rd December 2021)	The use of barges to transport materials may have an impact on marine mammals and we would look for this aspect to be considered in the planning of this project and suitably mitigated for, for example by use of a Marine Mammal Observer following the appropriate JNCC protocol for MMOs.	As outlined in **Section 7.5.4**, the proposed approach is it use best practice measures, where a nominated competent observer will be on the bridge of all vessels, including barges, to keep watch for marine mammals and basking sharks during transit to and from the work site (as per the Scottish Marine Wildlife Watching Code). This is an appropriate approach taking into account the slow moving barges and that the

		assessments in **Section 7.5.1.3**, indicate the magnitude of any impact as a result of vessel noise is negligible / no impact.

7.2 Updated Policy Context

There has been no update to the information provided within **Section 10.2** of the original ES.

All species of cetacean (whale, dolphin and porpoise) occurring in UK waters and otters are listed in Annex IV of the Habitats Directive as EPS, meaning that they are species of community interest in need of strict protection, as directed by Article 12 of the Directive. This protection is afforded in Scottish territorial waters (within 12 nautical miles (nm)) under the Conservation(Natural Habitats, &c.) Regulations 1994 (as amended). Regulation 39(1) of these Regulations make it anoffence to:

a. Deliberately or recklessly capture, injure or kill a wild animal of an EPS;
b. Deliberately or recklessly:
    i. Harass a wild animal or group of wild animals of an EPS;
    ii. Disturb such an animal while it is occupying a structure or place which it uses for shelteror protection;
    iii. Disturb such an animal while it is rearing or otherwise caring for its young;
    iv. Obstruct access to a breeding site or resting place of such an animal, or otherwise to denythe animal use of the breeding site or resting place;
    v. Disturb such an animal in a manner that is, or in circumstances which are, likely tosignificantly affect the local distribution or abundance of the species to which it belongs;
    vi. Disturb such an animal in a manner that is, or in circumstances which are, likely to impairits ability to survive, breed, or reproduce, or rear or otherwise care for its young; or
    vii. Disturb such an animal while it is migrating or hibernating.

Further protection is afforded through an additional disturbance offence given under Regulation 39(2) which states that “it is an offence to deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean)”.

Outside of 12 nm, the extent of legislative protection against injury is the same as within 12 nm. However, the definition of disturbance outside of 12 nm does not extend to individual animals. Therefore, whilst disturbance of a single animal within 12 nm may be considered an offence and thus require an EPS licence, for an EPS licence to be required outside of 12 nm there must be disturbance of a significant group of animals.

7.3 Updated Assessment Methodology

7.3.1 Impact Assessment Methodology

General methods for EIA are outlined in **Chapter 3 EIA Methodology and Consultation** and **Chapter 10 Marine Mammals and Basking Shark** in **Section 10.4.2 Impact Assessment Methodology** of the original ES**.** The scoping report and additional desk based assessment identified the following impacts and potential risk of impacts to marine mammal species as a result of the proposed scheme:

- Disturbance from underwater noise; and

- Disturbance (and potential habitat loss) to seal haul outs.

The desk-based impact assessment has been updated to determine any significant level of effects on the local population under a precautionary principle (as listed in **Table 7-2**).

In the following impact assessment, effects on the maximum number of individuals and the resultant percentage of the reference population effected will be assessed for harbour porpoise, bottlenose dolphin *Tursiops truncatus*, common dolphin *Delphinus delphis*, minke whale *Balaenoptera acutorostrata*, harbour seal *Phoca vitulina* and grey seals *Halichoerus grypus*; SCANS III density estimates (Hammond *et al.*, 2021), seals at sea mapping (Russell *et al*., 2017) and Management Unit (MU) reference populations (Inter-Agency Marine Mammal Working Group (IAMMWG), 2021; Special Committee on Seals (SCOS), 2020) (summarised in **Section 7.4** and **Table 7-3**) have been used to inform this updated assessment.

Table 7-2 Summary of the risk of impact for the Millport FPS

Impact	Potential Source of Impact Assessed ES	Updated potential Source of Impact Assessed SEIAR
Disturbance from underwater noise during construction activities	• Dredging; • Rock dumping; and • Vessels.	• Excavation works; • Rock dumping; and • Vessels.
Disturbance to seal haul outs from increased human activity	• Vessel disturbance; and • Visual Disturbance during Construction.	• Vessel disturbance; and • Visual Disturbance during Construction.

7.4 Updated Baseline Conditions

7.4.1 Baseline Data Sources

A number of publicly available datasets and information on marine mammal in the area were used for the baseline information for marine mammals in the ES. No dedicated marine mammal or basking shark surveys were undertaken to assess the impact of the proposed scheme, but observations of marine mammals were recorded during the bird surveys undertaken between April 2018 and March 2019 (**original ES Appendix 11.1**). Since the production of the ES, a number of the datasets and sources have been updated. The updated data sources used for the assessment include:

- Small Cetaceans of the Atlantic and North Sea Surveys (SCANS-III) (Hammond *et al.,*2021)
- Updated abundance estimates for cetacean Management Units (MUs) in UK waters (IAMMWG, 2021)
- SCOS reports (SCOS, 2020)

For each species of marine mammal, the following study areas have been defined based on the relevant MUs (IAMMWG, 2021; SCOS, 2020), current knowledge and understanding of the biology of each species:

- Harbour porpoise: West Scotland (WS) MU
- Bottlenose dolphin: Coastal West Scotland and the Hebrides (CWSH) MU
- Common dolphin: Celtic and Greater North Seas (CGNS) MU
- Minke whale: CGNS MU
- Grey seal: Southwest Scotland (SWS) MU

- Harbour seal: SWS MU

Carter *et al*. (2020) provides habitat-based predictions of at-sea distribution for grey and harbour seals in the British Isles. The habitat preference approach predicted distribution maps provide estimates per species, on a 5km x 5km grid, of relative at-sea density for seals hauling-out in the British Isles. It is important to note that Carter *et al*. (2020) provides *relative density* (i.e. percentage of at-sea population within each 5km x 5km grid square), whereas previous usage maps (Russel *et al*., 2017) have presented *absolute density* (i.e. number of animals). Therefore, Russel *et al*. (2017) have been used to determine grey and harbour seal density estimates for the assessments.

For grey seal, the highest mean predicted relative density for the highest density grid square that overlap with the proposed scheme is 0.00025% of the overall population, a low relative density grey seal. For harbour seal, the highest mean predicted relative density for the highest density grid square that overlaps with the development area is 0.0033% of the overall population, a relative density of very high of harbour seal within the proposed scheme area (Carter *et al*., 2020).

The bird surveys were undertaken monthly in the Millport Bay survey area between April 2018 and March 2019 (**original ES Appendix 11.1**). Although the surveys were designed to characterise the ornithology of the survey area, a secondary aim was to opportunistically record other wildlife of potential relevance to the development, in particular seals, otters and cetaceans. Harbour seals were present throughout the year apart from the month of August, though the number varied greatly between months. The maximum count was 40 individuals seen in late March. Nearly all the harbour seals were hauled out on the various skerries or the shores of the Eileans. A recently born pup and its mother were seen on The Spoig skerry on the 2nd July 2018 survey, indicating that there is the potential for seal pupping in the bay. The harbour seal haul out sites were sometimes shared with grey seals. Grey seals were seen at haul out sites and swimming nearby from March to June 2019. The maximum number seen was six individuals on the 28th March survey. The only cetacean seen inside the survey area during the count was a single harbour porpoise on the 11th June 2018 survey. The animal was noted swimming in the outer part of the bay, approximately 50m south of The Spoig skerry.

A seal, potentially a grey but not confirmed, was observed milling offshore during the extended phase 1 habitat survey at the temporary slipway location at Farland Point. As works at Farland Point will be constructed over a few days to MLWS during low tide, no significant generation of underwater noise is anticipated.

7.4.2 Reference Populations and Densities

Table 7-3 summarises the updated density estimates and reference population used for each marine mammal species included within the following assessments of this SEIAR, compared to the previous density estimates and reference populations used for the assessments in the original ES. There is no density estimate available for humpback whale and killer whale, so a quantitative assessment has not been possible for these species.

Table 7-3 Summary of marine mammal density estimates and reference populations

Species	ES density estimate	ES reference population	SEIAR updated density estimate	SEIAR updated reference population
Harbour porpoise	0.336/km^2 (Hammond *et al*., 2017)	24,370 (Hammond *et al*., 2017)	0.336/km^2 (Hammond *et al*., 2021)	28,936 (IAMMWG, 2021)
Bottlenose dolphin	0.121/km^2 (Hammond *et al*., 2017)	45 (IAMMWG, 2015)	0.121/km^2 (Hammond *et al*., 2021)	45 (IAMMWG, 2021)

Species	ES density estimate	ES reference population	SEIAR updated density estimate	SEIAR updated reference population
Common dolphin[10]	0.133/km^2 (Hammond *et al*., 2017)	56,556 (IAMMWG, 2015)	0.133/km^2 (Hammond *et al*., 2021)	102,656 (IAMMWG, 2021)
Minke whale	0.027/km^2 (Hammond *et al*., 2017)	23,528 (IAMMWG, 2015)	0.027/km^2 (Hammond *et al*., 2021)	20,118 (IAMMWG, 2021)
Grey seal	0.375/km^2 (Russel *et al*., 2017)	374 (SCOS, 2018)	0.375/km^2 (Russel *et al*., 2017)	517 (SCOS, 2020)
Harbour seal	0.141/km^2 (Russel *et al*., 2017)	1,200 (SCOS, 2018)	0.141/km^2 (Russel *et al*., 2017)	1,709 (SCOS, 2020)

7.5 Updated Assessment of Effects

7.5.1 Potential Impacts during Construction

The Sound Pressure Levels (SPL) is normally used to characterise noise and vibration of a continuous nature. The variation in sound pressure can be measured over a specific time period to determine the root mean square (RMS) level of the time varying acoustic pressure, therefore SPL (i.e. SPL_{RMS}) can be considered as a measure of the average unweighted level of the sound over the measurement period. Peak SPLs (SPL_{peak}) are often used to characterise sound transients from impulsive sources, such as for impact piling. A peak SPL is calculated using the maximum variation of the pressure from positive to zero within the wave. This represents the maximum change in positive pressure (differential pressure from positive to zero) as the transient pressure wave propagates.

The Sound Exposure Level (SEL) sums the acoustic energy over a measurement period, and effectively takes account of both the SPL of the sound source and the duration the sound is present in the acoustic environment. To determine cumulative sound exposure level (SEL_{cum}) ranges, a fleeing animal model has been used. This assumes that the animal exposed to high noise levels will swim away from the noise source. A constant fleeing speed of 1.5 m/s has been used for harbour porpoise, dolphin species and grey seal (Otani *et al.*, 2000), with a swimming speed of 3.25 m/s for minke whale (Blix and Folkow, 1995). This is considered a 'worst-case' scenario as marine mammals are expected to be able to swim faster. For example, the swimming speed of a harbour porpoise during playbacks of pile driving sounds (SPL of 154 dB re 1 µPa) was 1.97m/s (7.1km/h) and during quiet baseline periods the mean swimming speed was 1.2m/s (4.3km/h; Kastelein *et al.*, 2018).

7.5.1.1 Underwater noise during excavation works

This section assesses the potential impacts that could be associated with underwater noise during excavation works at the proposed scheme during the construction period. There are two types of excavation work proposed during the proposed works (as described in **Section 1.3**), firstly during the shore-connected breakwater using hydro-demolition or the use of a rock wheel to create a trench; and secondly, there is the use of a long-reach excavator to clear the material away from the offshore breakwater footprint. The use of a rock wheel for excavation works has been assessed as the worst-case.

The excavation process emits continuous, broadband sound into the marine environment. SPL can vary widely, dependent on the activity type, operational stage, or environmental conditions (e.g. sediment type, water depth, salinity and seasonal phenomena such as thermoclines; Jones and Marten, 2016). These

[10] *No estimate made for common dolphin within SCANS-III Block G, the common dolphin density estimate is survey Block J*

factors will also affect the propagation of sound from excavation activities and along with ambient sound already present, will influence the distance at which sounds can be detected.

Desk Based Approach and Assessment

The creation of a trench by using either hydro-demolition or a rock wheel will produce a continuous, non-impulsive noise source.

Hydro-demolition is proposed to create a trench using ultra high-pressure water jets, the pressure of the water is sufficient to break up the bedrock (Whitby Piers Refurbishment, 2017). Very limited noise data is publicly available for subsea, high pressure water jetting. A source noise level of 170 dB re 1 µPa SPL_{RMS}., i.e. the noise level at 1 m from the equipment, was recorded for the jetting, using a Woma high pressure system. Work pressures varied between 275 and 412 bar with water only (Whitby Piers Refurbishment, 2017). Measured values were at range, and so the source level was back-calculated to 1m. For continuous noise, a 1-second SPL_{RMS} is equivalent to a 1-second SEL (Whitby Piers Refurbishment, 2017).

No publicly available data for underwater noise from a rock wheel could be found. However, A Cutter Suction Dredger (CSD) operates with a similar mechanism to a rock wheel and is proposed as a suitable proxy (Whitby Piers Refurbishment, 2018). In order to establish an approximate source level for a rock wheel, the source level from a CSD was scaled based on the power of the device (Whitby Piers Refurbishment, 2018). Measurements of the Phoenix CSD was suggested that it had a source level of 176.1 dB SPL_{RMS} re 1 µPa when operating at 678 kW. For the Whitby Piers refurbishment an Erkat ER 650 has been suggested as an appropriate rock wheel. The Erkat ER 650 has an operating power of 80 kW. The source level for an Erkat ER 650 rock wheel is therefore estimated to be an SPL_{RMS} of 166.8 dB re 1 µPa. The assumption that has been made for this scaling is that the acoustical energy radiated is proportional to the power of the plant (Whitby Piers Refurbishment, 2018).

In relation to marine mammals, based on criteria defined in Southall *et al.* (2019) threshold criteria (**Table 7-4**) neither source for both hydro-demolition and the rock wheel are not loud enough to trigger an injury-level exposure to noise at any distance. As the source level is lower, the impact due to noise from a rock wheel is expected to be less than that of hydro-demolition.

The activities that were assessed include:

- CSD with an estimated sound source of 178.7 dB re 1 µPa SPL_{RMS}

The results of the underwater noise modelling undertaken for similar activities were used in the following assessments, show that at the source levels predicted for the excavation works (with CSD used as a proxy), that any marine mammal would have to remain in close proximity (i.e. less than 10m) of an active CSD for 24 hours to be exposed to levels of sound that could induce permanent shift in hearing sensitivity (Permanent Threshold Shift (PTS)) or temporary shift in hearing sensitivity (Temporary Threshold Shift (TTS)) as per the Southall *et al.* (2019) threshold criteria. **Table 7-4** shows the modelled results and areas of impact. CSD has been used to inform the impact assessment for marine mammals as it is considered to represent the worst-case noise levels associated with any excavation works. As the source levels for the CSD used in the modelling differs from the values assessed in the Whitby Piers Refurbishment (2017, 2018), a precautionary assessment for PTS has been undertaken for completeness even though the value is considered conservative.

Table 7-4 Maximum predicted impact ranges (and areas) for PTS and TTS from excavation works based on underwater noise modelling undertaken for similar activities

Potential Impact	Receptor	Criteria and threshold (Southall *et al.*, 2019)	Modelled Impact Range (m) and area* (km^2) for CSD works
PTS from cumulative SEL during excavation works (CSD) over 24 hours	Very High frequency [VHF; harbour porpoise]	173 dB re 1 µPa VHF **SEL_{cum}**	<10m 0.0003km^2
	High frequency [HF; dolphin species]	198 dB re 1 µPa HF **SEL_{cum}**	<10m 0.0003km^2
	Low frequency [LF; whale species]	199 dB re 1 µPa LF **SEL_{cum}**	<10m 0.0003km^2
	Pinnipeds in water [PW; seal species]	201 dB re 1 µPa PW **SEL_{cum}**	<10m 0.0003km^2
TTS from cumulative SEL during excavation works (CSD) over 24 hours	Very High frequency [VHF; harbour porpoise]	153 dB re 1 µPa VHF SEL_{cum}	<10m 0.0003km^2
	High frequency [HF; dolphin species]	178 dB re 1 µPa HF SEL_{cum}	<10m 0.0003km^2
	Low frequency [LF; whale species]	179 dB re 1 µPa LF SEL_{cum}	<10m 0.0003km^2
	Pinnipeds in water [PW; seal species]	181 dB re 1 µPa PW SEL_{cum}	<10m 0.0003km^2

* based on the area of a circle.

PTS or TTS from Excavation Works

The number of harbour porpoise, bottlenose dolphin, common dolphin, minke whale, harbour seal and grey seal that could be at risk of PTS or TTS as a result of underwater noise from excavation works (**Table 7-5**) has been assessed based on the number of animals that could be present in the maximum predicted impact areas, based on precautionary worst-case scenario (**Table 7-4**).

Table 7-5 Maximum number of individuals (and % of reference population) that could be impacted as a result of underwater noise associated with excavation works

Potential Impact	Receptor	Estimated number of individuals in impact area (% of the reference population)	Magnitude
PTS from cumulative SEL during excavation works (CSD)	Harbour porpoise	0.0001 harbour porpoise (0.0000003% WS MU) based density of 0.336/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Bottlenose dolphin	0.00004 dolphins (0.00009% CWSH MU) based on a density of 0.121/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Common dolphin	0.00004 common dolphin (0.00000004% CGNS MU) based on density of 0.133/km^2)	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Minke whale	0.00008 minke whale (0.0000004% CGNS MU) based on density of 0.027/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Harbour seal	0.0004 harbour seal (0.00008% of SWS MU) based on density of 0.141/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Grey seal	0.0001 grey seal (0.000006% of SWS MU) based on density of 0.375/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
TTS from cumulative SEL during excavation works (CSD)	Harbour porpoise	0.03 harbour porpoise (0.0001% WS MU) based density of 0.336/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Bottlenose dolphin	0.0004 dolphins (0.0008% CWSH MU) based on a density of 0.121/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Common dolphin	0.00004 common dolphin (0.00000004% CGNS MU) based on density of 0.133/km^2)	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Minke whale	0.00008 minke whale (0.0000004% CGNS MU) based on density of 0.027/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Harbour seal	0.0004 harbour seal (0.00008% of SWS MU) based on density of 0.141/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Grey seal	0.0001 grey seal (0.000006% of SWS MU) based on density of 0.375/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).

The maximum duration of the excavation works is estimated to be completed over two weeks per shore-connected breakwater and one week for the offshore breakwater, with all the works being intermittent in nature. Therefore, the potential effects that could result from underwater noise during the excavation works would be temporary in nature, not consistent throughout this period and would be limited to only part of the proposed scheme area (in the vicinity of the works while they are taking place only). The

number of harbour porpoise, bottlenose dolphin, minke whale, harbour seal and grey seal that could be impacted (as shown in **Table 7-5**) are the maximum number of animals that could potentially disturbed during the excavation works.

The magnitude of the potential impact of PTS or TTS as a result of excavation works is **negligible** / no impact for all marine mammals, with less than 0.001% of the reference population likely to be affected for any permanent impacts (PTS) and less than 1% for any temporary impacts (TTS) (**Table 7-5**).

Behavioural Response from Excavation Works

There are a limited but growing number of studies reporting threshold effects for non-impulsive, low frequency sounds (Popper *et al.*, 2014; NMFS, 2018a). Gomez *et al*. (2016) found the sound levels received by the animals did not explain the severity of behavioural responses: more severe behavioural response severity scores were not consistently related to higher received levels and less severe behavioural response severity scores were not consistently related to lower received levels. When comparing one cetacean functional hearing group (considered a general proxy for species with similar known or expected hearing capabilities) with one type of sound (which provides a general proxy for frequency, duration, and source level of the sound source), the received levels still did not vary in relation with the severity of behavioural responses (Gomez *et al*., 2016).

The US National Marine Fisheries Service guidance (NMFS, 2018a) sets the Level B harassment threshold[11] for marine mammals at 160 dB re 1 µPa (rms) for impulsive noise and 120 dB re 1 µPa (rms) for continuous noise. But, Southall *et al*. (2021) found that simple all-or-nothing thresholds that attempt to relate single noise exposure parameters (e.g., received noise level) and behavioural response across broad taxonomic grouping and sound types can lead to severe errors in predicting effects.

McQueen *et al*. (2020) found the spatial scale and context of the dredging areas (adjacent to navigation channels and port infrastructure areas), determined that habitat avoidance was not at a sufficient spatial scale to pose risks to harbour porpoises or seals[12]. The unweighted 140 dB re 1 µPa SPL generic threshold level for behavioural avoidance of high-frequency cetaceans and pinnipeds in water is exceeded at distances up to approximately 400m from the dredge (McQueen *et al*., 2020). For behavioural assessments, there are a myriad of significant data gaps that contribute to the uncertainty of the assessment. The major sources of uncertainty are clear exposure–response relationships among observed marine mammal behavioural studies (McQueen *et al*., 2020). In some cases, there are orders of magnitude differences in reported sound thresholds for similar behavioural reactions, likely influenced by the difficulties with behavioural response scoring (Gomez *et al*., 2016) and study-specific context (e.g., multivariate exposure conditions; Ellison *et al*., 2012).

Although there is the potential for behavioural response to the construction activities and excavation works it is anticipated to be localised in effect and short in duration with animals returning to the area shortly after the sound source is stopped or completion of the works.

Mitigation

No mitigation is required. Best practice measures which will be used throughout the works have been detailed in **Section 7.5.4**

[11] Level B Harassment is defined as having the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioural patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

[12] using the maximum source level of 192 dB re 1 µPa·m, SELs for the marine mammals were calculated using the sheet for "non-impulsive, continuous, mobile sources" from the publicly available NMFS (2018b) spreadsheet tool

Residual Impact

Taking into account the receptor sensitivity (of high for PTS, and medium for TTS for marine mammals, and the potential magnitude of the effect, along with the temporary nature of the disturbance, the impact significance for any PTS, TTS or behavioural impact as a result of underwater noise from the excavation works on marine mammal species has been assessed as **minor** (not significant) (**Table 7-6**).

Table 7-6 Assessment of impact significance for underwater noise from excavation activities on marine mammals

Potential Impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation	Residual impact
PTS from cumulative SEL during excavation works (CSD)	Harbour porpoise	High	Negligible / no impact	Minor (not significant)	None required.	Minor (not significant)
	Bottlenose dolphin		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Common dolphin		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Minke whale		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Harbour seal		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Grey seal		Negligible / no impact	Minor (not significant)		Minor (not significant)
TTS from cumulative SEL during excavation works (CSD)	Harbour porpoise	Medium	Negligible / no impact	Minor (not significant)	None required.	Minor (not significant)
	Bottlenose dolphin		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Common dolphin		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Minke whale		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Harbour seal		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Grey seal		Negligible / no impact	Minor (not significant)		Minor (not significant)
Behavioural response	All marine mammals	Medium	Negligible	Minor (not significant)	None required.	Minor (not significant)

7.5.1.2 Underwater noise during rock placement

There are no updates to the rock placement assessment. The magnitude of the potential impact of PTS and TTS as a result of the rock dumping using excavation works as a proxy, is **negligible / no impact for all marine mammals**, with less than 0.001% of the reference population likely to be affected for any permanent impacts (PTS) and less than 1% temporary impacts (TTS) or behavioural response (as above). The resultant impacts for all species is therefore assessed to be **minor**.

Mitigation

No mitigation is required. Best practice measures which will be used throughout the works have been detailed in **Section 7.5.4**.

Residual Impact
The residual impact would be of **minor** (not significant) significance for all marine mammal species.

7.5.1.3 Underwater noise during vessel activities

During the construction phase of the proposed scheme, there will be an increase in the number of vessels associated with construction activities. The offshore breakwaters are located between 300m and 700m offshore and will therefore be constructed by barge. It is currently assumed that the rock and other materials required to build the breakwater will be delivered by sea. The vessels used in construction activities are generally slow moving with noise emitted at a low frequency.

Information provided by Marine Traffic (2016 (Original ES)) identifies moderate levels of commercial and recreational vessels off the coastline at Millport. There are also several important navigation routes within the study area, particularly the Hunterston and the Firth of Clyde channels, which are major shipping routes. A review of the Marine Scotland MAPS National Marine Plan Interactive (NMPI) shows that the area around Millport is relatively high for vessel numbers, with between 20 and 50 vessels within Millport Bay every week, up to 150 vessels each week travelling east past Great Cumbae Island, and more than 150 a week passing east of the island (Marine Scotland, 2021). This gives an indication that any marine mammals and basking shark in the area will be well used to high vessel presence.

Desk Based Approach and Assessment
Underwater noise modelling has not been conducted for the proposed scheme, however, underwater noise modelling has been conducted for vessels at the Wylfa Newydd Development Area (HNP, 2018) and was updated to take into account the NOAA (NMFS, 2018a) thresholds and criteria. For the purposes of modelling, vessels were divided into two categories: medium sized and large sized. Medium sized vessels include support boats such as tugs and workboats, while the large sized vessels are equivalent of barges and the vessels used for rock placement.

The underwater noise propagation modelling was undertaken using a simple modelling approach for underwater noise associated with both medium and large sized vessels, using measured sound source data. The source levels used in the underwater noise modelling of large and medium vessels for Wylfa Newydd are (HNP, 2018):

- Large vessels - 168dB re 1µPa (RMS) @ 1m
- Medium vessels - 161dB re 1µPa (RMS) @ 1m

The maximum predicted impact ranges for the risk of PTS and TTS to marine mammal species using the non-impulsive NMFS (2018a) criteria for large and medium vessels at Wylfa Newydd, assuming a stationary animal remaining in the vicinity over a 24-hour period, are presented in **Table 7-7**. Given the modelled impact ranges, any marine mammal would have to be less than 10m from the continuous noise source at the start of the activity, in most cases, to acquire the necessary exposure to induce PTS as per NMFS (2018a).

Table 7-7 Summary of the maximum predicted PTS and TTS impact ranges (and areas) for marine mammal species for large and medium vessels, based on NMFS (2018a) weighted SEL_{cum} criteria for non-impulsive sounds.*

Potential Impact	Receptor	Criteria and threshold (NMFS, 2018a)	Large vessels	Medium vessels
PTS from cumulative SEL from vessel noise over 24 hours	Harbour porpoise	173 dB re 1 μPa^2s Weighted SEL_{cum}	4m (0.00005 km^2)	<1m (0.000003 km^2)
	Dolphin sp.	198 dB re 1 μPa^2s Weighted SEL_{cum}	<1m (0.000003 km^2)	<1m (0.000003 km^2)

Potential Impact	Receptor	Criteria and threshold (NMFS, 2018a)	Large vessels	Medium vessels
	Whale sp.	199 dB re 1 µPa^{2}s Weighted SEL_{cum}	10m (0.0003 km^2)	3m (0.00003 km^2)
	Seal sp.	201 dB re 1 µPa^{2}s Weighted SEL_{cum}	<1m (0.000003 km^2)	<1m (0.000003 km^2)
TTS from cumulative SEL from vessel noise over 24 hours	Harbour porpoise	153 dB re 1 µPa^{2}s Weighted SEL_{cum}	140m (0.062 km^2)	30m (0.003 km^2)
	Dolphin sp.	178 dB re 1 µPa^{2}s Weighted SEL_{cum}	3m (0.00003 km^2)	<1m (0.000003 km^2)
	Whale sp.	179 dB re 1 µPa^{2}s Weighted SEL_{cum}	480m (0.72 km^2)	130m (0.053 km^2)
	Seal sp.	181 dB re 1 µPa^{2}s Weighted SEL_{cum}	40m (0.005 km^2)	9m (0.0003 km^2)

**Area based on area of a circle*

PTS or TTS from Vessel Noise

The maximum number of harbour porpoise, bottlenose dolphin, common dolphin, minke whale, harbour seal and grey seal that could be at risk of PTS and TTS from cumulative exposure over a 24 hour period, based on the density estimates for the area and maximum area of impact for large vessels at Millport FPS, are presented in **Table 7-8**. There is the potential that there could be up to two vessels on site at any one time (likely to be a floating platform plus a barge delivering rock, or working directly from two smaller barges which also collect the rock), and therefore an assessment for two vessels has also been presented. There is a very small chance a third (service) vessel may be required for limited works.

Table 7-8 Maximum number of individuals (and % of reference population) that could be impacted as a result of underwater noise associated with vessel noise

Potential Impact	Receptor	Estimated number of individuals in impact area (% of the reference population) for 1 large vessel	Estimated number of individuals in impact area (% of the reference population) for 2 large vessels	Magnitude
PTS from cumulative SEL from vessels	Harbour porpoise	0.00002 harbour porpoise (0.00000007% WS MU) based density of 0.336/km^2	0.00004 harbour porpoise (0.0000001% WS MU) based density of 0.336/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Bottlenose dolphin	0.0000004 dolphins (0.0000009% CWSH MU) based on a density of 0.121/km^2	0.000001 dolphins (0.000002% CWSH MU) based on a density of 0.121/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Common dolphin	0.0000004 common dolphin (0.0000000004% CGNS MU) based on density of 0.133/km^2)	0.000001 common dolphin (0.000000001% CGNS MU) based on density of 0.133/km^2)	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).

Potential Impact	Receptor	Estimated number of individuals in impact area (% of the reference population) for 1 large vessel	Estimated number of individuals in impact area (% of the reference population) for 2 large vessels	Magnitude
	Minke whale	0.00008 minke whale (0.0000004% CGNS MU) based on density of 0.027/km^2	0.0002 minke whale (0.000001% CGNS MU) based on density of 0.027/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Harbour seal	0.000004 harbour seal (0.0000008% of SWS MU) based on density of 0.141/km^2	0.00001 harbour seal (0.000002% of SWS MU) based on density of 0.141/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
	Grey seal	0.000001 grey seal (0.00000006% of SWS MU) based on density of 0.375/km^2	0.000002 grey seal (0.0000001% of SWS MU) based on density of 0.375/km^2	Permanent effect with **negligible** / no impact magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).
TTS from cumulative SEL from vessels	Harbour porpoise	0.02 harbour porpoise (0.00007% WS MU) based density of 0.336/km^2	0.04 harbour porpoise (0.0001% WS MU) based density of 0.336/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Bottlenose dolphin	0.0000008 dolphins (0.000002% CWSH MU) based on a density of 0.121/km^2	0.000002 dolphins (0.000004% CWSH MU) based on a density of 0.121/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Common dolphin	0.000004 common dolphin (0.000000004% CGNS MU) based on density of 0.133/km^2)	0.00001 common dolphin (0.00000001% CGNS MU) based on density of 0.133/km^2)	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Minke whale	0.02 minke whale (0.0001% CGNS MU) based on density of 0.027/km^2	0.04 minke whale (0.0002% CGNS MU) based on density of 0.027/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).
	Harbour seal	0.0007 harbour seal (0.0001% of SWS MU) based on density of 0.141/km^2	0.0014 harbour seal (0.0003% of SWS MU) based on density of 0.141/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).

Potential Impact	Receptor	Estimated number of individuals in impact area (% of the reference population) for 1 large vessel	Estimated number of individuals in impact area (% of the reference population) for 2 large vessels	Magnitude
	Grey seal	0.002 grey seal (0.0001% of SWS MU) based on density of 0.375/km^2	0.004 grey seal (0.0002% of SWS MU) based on density of 0.375/km^2	Temporary effect with **negligible** / no impact magnitude (less than 1% of the reference population anticipated to be exposed to effect).

The magnitude of the potential risk of PTS is assessed as **negligible** / no impact for all species, with less than 0.001% of all relevant reference populations anticipated to be exposed to any permanent effect and the magnitude of the potential of TTS is assessed as **negligible** / no impact for all species, with less than 1% of all relevant reference populations anticipated to be exposed to the temporary effect (**Table 7-8**).

Behavioural Response to Vessel Noise

There is the potential for vessel noise to impact marine mammals. For example, prior to offshore wind farm piling recordings of harbour porpoise detections decline, which is thought to be as a result of increased vessel activity (Brandt *et al*., 2018; Graham *et al*., 2019). Modelling by Heinänen and Skov (2015) indicates that the number of ships can determine the density of harbour porpoise in the North Sea MU, with a threshold level of approximately 20,000 ships per year (approximately 80 vessels per day within a 5km^2 area). There is also evidence that marine mammals can display a wide range of behavioural responses, ranging from the area avoidance to shifts in acoustic behaviour or raised cortisol levels (Erbe *et al*., 2019).

Other studies, such as Trigg *et al*. (2020) found the predicted exposure of grey seals to shipping noise did not exceed thresholds for temporary threshold shift. Thomsen *et al*. (2006) reviewed the effects of ship noise on harbour porpoise and seal species and concluded that ship noise around 0.25kHz could be detected at distances of 1km; and ship noise around 2kHz could be detected at around 3km.

The vessels on site would be slow moving (or stationary) and most noise emitted is likely to be of a lower frequency. The noise levels from could be sufficient to cause local disturbance to marine mammals in the immediate vicinity of the vessel, depending on ambient noise levels. Although the number of vessels on site, up to two, would be well below the Heinänen and Skov (2015) threshold.

If the behavioural response is displacement from the area, it is predicted that marine mammals will return once the activity has been completed and therefore any impacts from underwater noise as a result of vessels will be both localised and temporary. Therefore, there is unlikely to be the potential for any significant impact on marine mammals. Any disturbance to marine mammals would be temporary and they would be expected to return to the area once the disturbance had ceased or they had become habituated to the sound.

Mitigation

No mitigation is required. Best practice measures which will be used throughout the works have been detailed in **Section 7.5.4**.

Residual Impact

Taking into account the high sensitivity of all marine mammal species to PTS (i.e. receptor has very limited capacity to recover from the anticipated impact) and the medium sensitivity of all marine mammal

species to any TTS or disturbance (i.e. receptor has limited capacity to recover from the anticipated impact and the potential magnitude of the effect (negligible/ no impact for all species), the impact significance for any PTS, TTS or disturbance in harbour porpoise, bottlenose dolphin, common dolphin, minke whale, harbour seal and grey seal from cumulative exposure for vessel noise has been assessed as **minor** (not significant) (**Table 7-9**).

Table 7-9 Assessment of impact significance for underwater noise from vessels on marine mammals

Potential Impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation	Residual impact
(PTS from cumulative SEL from vessels	Harbour porpoise	High	Negligible / no impact	Minor (not significant)	None required.	Minor (not significant)
	Bottlenose dolphin		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Common dolphin		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Minke whale		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Harbour seal		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Grey seal		Negligible / no impact	Minor (not significant)		Minor (not significant)
TTS from cumulative SEL from vessels	Harbour porpoise	Medium	Negligible / no impact	Minor (not significant)	None required.	Minor (not significant)
	Bottlenose dolphin		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Common dolphin		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Minke whale		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Harbour seal		Negligible / no impact	Minor (not significant)		Minor (not significant)
	Grey seal		Negligible / no impact	Minor (not significant)		Minor (not significant)
Behavioural response	All marine mammals	Medium	Negligible	Minor (not significant)	None required.	Minor (not significant)

7.5.1.4 Disturbance (and potential habitat loss) to seal haul outs

There are no Marine Protected Areas (MPA) in the vicinity of the proposed scheme that are designated for seals, neither are there any nearby designated seal haul out sites. However, there has shown to be a small local haul out predominantly harbour seals which appear present throughout the year, and grey seals, present in lower numbers from March to July (**Original ES, Appendix 11.1**). Harbour seals in Millport Bay show a high degree of habituation to human activity. For example, individuals on The Eileans haul out sites allowed surveyors to approach within approximately 25m before showing any noticeable alarm (**Original ES, Appendix 11.1**).

Vessel Disturbance
Hauled-out seals are sensitive to disturbance, particularly during the breeding or moult periods. Taking into account that there is a small harbour and grey seal haul-out located very near the project at the Eileans, there is the potential for seals to be disturbed by construction vessels and activity.

The current levels of vessels in the area is already very high and therefore it is expected that seals are accustomed to the presence and movements of vessels, and that the increase in number due to the construction works will be insignificant and unlikely to result in any significant disturbance of seals at haul-out sites.

There has been no change in the assessment for vessel disturbance to seals so the magnitude of the impact of vessel disturbance to seal haul-out sites remains as negligible/no impact due to the intermittent and temporary nature of the vessel disturbance and the already busy nature of vessel movements in the area. Seal species are highly protected and as such have a very high value. However, their sensitivity to the small increase in vessel disturbance and their habituation to the already relatively high vessel use in the area, gives a sensitivity of very low. Therefore, the overall sensitivity is considered to be medium to take account of both the high value and the very low sensitivity. This gives an overall impact significance of **minor** (not significant).

Visual Disturbance during Construction
There is potential for unfamiliar visual stimuli, such as temporary infrastructure, machinery and people, or any changes to lighting levels on land to impact on seals during construction. These will mostly be associated with vessel traffic, as outlined above, but additionally with the personnel and infrastructure. Seals that are hauled-out on land, whether resting or breeding, are particularly sensitive to visual disturbance (Hoover-Miller *et al.*, 2013). Responses can vary from increased alertness to fleeing into the water (Wilson, 2014).

The project is close to the small seal haul-out site at the Eileans (within 100m) and therefore has the potential to be impacted by the proposed construction activities. The changes to the proposed scheme have not changed to assessment of vessel disturbance.

The magnitude of the impact of visual disturbance to seal haul-out sites is defined as negligible / no impact due to the intermittent and temporary nature of the disturbance and the already busy nature of vessel movements in the area. Seal species are highly protected and as such have a very high value. However, their sensitivity to the small increase in vessel disturbance and their habituation to the already high vessel use in the area, gives a sensitivity of very low. Therefore, the overall sensitivity is considered to be medium to take account of both the high value and the very low sensitivity. This gives an overall impact significance of **minor** (not significant).

Mitigation
No mitigation measures are required. Consideration will be given to the types and timing of construction activities undertaken and their potential to cause disturbance at the haul-out site, particularly to reduce potential impacts during sensitive times of the year, such as the breeding and moulting periods. Best practice measures which will be used throughout the works have been detailed in **Section 7.5.4**.

Residual Impact
The residual impact would be of **negligible** significance.

7.5.2 Potential Impacts during Operation and Decommissioning

There are no updates to the impacts during the operational or decommissioning phases of the proposed scheme.

Mitigation Measures and Residual Impact
No mitigation measures are required. The residual impact would be of **negligible** significance

7.5.3 Original Embedded Mitigation

No embedded mitigation measures have been developed into the design of the proposed scheme with specific regard to marine mammals.

Embedded mitigation measures that are relevant to marine mammals are those that are provided to ensure there are no water quality impacts. With regard to marine water quality, the standard best practice and policy requirements, as set out in the ES and would be adhered to throughout the construction and operation of the proposed scheme. The risk of an accidental spill occurring is considered to be adequately mitigated and will not be considered further, as set out in the original ES.

7.5.4 Mitigation and Monitoring Measures

During the harbour seal breeding season and the harbour and grey moult periods, individuals may be more sensitive to underwater noise. Therefore, as best practice, although the work for the proposed scheme will be of a limited scale, as much as possible, activities will be undertaken in such a way as to minimise the potential for disturbance at the haul-out site during sensitive times of the year, such as the breeding and moulting periods.

In north and west Scotland grey seal pupping occurs mainly between September and late November and they moult between December to April (SCOS, 2020). Harbour seals give birth to their pups in June and July and moult in August and the population in the Southwest MU is currently stable and showing a small increase in pups year on year (SCOS, 2020). Excavation works at the Clyde St revetment and the shore-connected breakwater are anticipated to be undertaken over a two week period per structure and one week for the offshore breakwater, and therefore there is limited risk of any overlap with the harbour pupping of June to July and the moult period being in August.

To minimise potential impacts on seals within the bay, a precautionary approach would be to carry out the excavation and rock placement works between September and December as there is limited numbers of grey seals in the area and no evidence of grey seal pupping locally.

Best practice measures will be undertaken, such as adherence to the Scottish Marine Wildlife Watching Code www.nature.scot/marinecode), a nominated competent observer on the bridge of all vessels, including barges, will keep watch for marine mammals and basking sharks during transit to and from the work site. Any sightings will be communicated to the Master of the vessel as soon as is practicable and the following actions, as per the Scottish Marine Wildlife Watching Code, implemented:

- The Master of the vessel will ensure that marine mammals and basking sharks are avoided to a safe distance (100 m or more) in all possible circumstances; and
- The Master of the vessel will minimise high powered manoeuvres where this does not impair safety.

Any further mitigation requirements for the project would be assessed during the EPS risk assessment during the licence application and would be suitable for all cetacean species and basking sharks.

7.5.5 Cumulative Impacts

Since the ES, there have been the following updates relevant to the marine mammal CIA:

- Hunterston PARC Marine construction Yard Proposals:
  - Have not applied for planning permission and date of proposed construction not confirmed – assumed no overlap in construction time frame
- Dawn Fresh Fish farms:
  - Have not applied for planning permission and date of proposed construction not confirmed – assumed no overlap in construction time frame

Therefore, there are currently there are no other marine construction projects planned which could result in cumulative effects with the Millport FPS.

7.6 Summary and Conclusion

There is no change to the summary and conclusions of the marine mammal assessments in the original ES Chapter (**Table 15-2**).

Table 7-10 Summary of potential impacts for marine mammals

Potential Impact	Receptor	Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change from original ES
Construction							
PTS from underwater noise from all activities	All marine mammal species	High	Negligible / no impact	Minor (not significant)	None required.	Minor (not significant)	No change
TTS from underwater noise from all activities	All marine mammal species	Medium	Negligible / no impact	Minor (not significant)	None required.	Minor (not significant)	No change
Disturbance from underwater noise from all activities	All marine mammal species	Medium	Negligible / no impact	Minor (not significant)	None required.	Minor (not significant)	No change
Disturbance at seal haul out sites	Grey and harbour seal	Medium	Negligible / no impact	Minor (not significant)	None required. Consideration will be given to the types and timing of construction activities undertaken and their potential to cause disturbance at the haul-out sites.	Negligible	No change
Operation							

Potential Impact	Receptor	Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change from original ES
Disturbance at seal haul out sites	Grey and harbour seal	Medium	Negligible / no impact	Minor (not significant)	None required. Consideration will be given to the types and timing of construction activities undertaken and their potential to cause disturbance at the haul-out sites.	Negligible	No change
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

8 OFFSHORE AND COASTAL ORNITHOLOGY

This section of the SEIAR sets out the outcome of additional offshore and coastal ornithology assessments and provides new and updated information on excavation techniques at the toe of the shore connected breakwater, dredging within the footprint of the offshore breakwater and temporary works at the site compound and temporary slipway for delivery and storage of material. This section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 11 of the original ES**. Where the assessment has not changed it is referenced accordingly.

8.1 Response to consultee comments

Table 8-1 details consultation responses from stakeholders in response to ornithology. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 8-1 Consultee comments related to Offshore and Coastal Ornithology

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Response to original ES		
SNH	The proposed scheme's site contains suitable habitat for nesting birds, in particular the skerries/islands and SNH therefore support the proposals detailed in Table 6.1 to undertake vegetation clearance outside the bird breeding season (April to August inclusive). If this is not possible, SNH also support the proposals to undertake pre-construction checks before any vegetation removal takes place. If nesting birds are found during pre-construction surveys, a suitably sized buffer zone should be set up around the nest and no work within this zone should commence until the young have fledged or the nest is no longer in use. This will ensure that no nests are destroyed during the site construction works and no offences are committed under the Wildlife and Countryside Act 1981 (as	Works on the Eileans. will be undertaken outside the bird breeding season Works at the temporary compound area will commence mid August which is 2 weeks before he end of the season. The EcoW will undertake pre construction checks and ensure suitable mitigation is implemented to prevent offences under Wildlife and Countryside Act 1981

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	amended). If the development is not carried out in accordance with this mitigation measure, the applicant may risk committing an offence. We also support the further embedded mitigation measures for ornithology as detailed in Table 11-12 of ES Section 11 Offshore and Coastal Ornithology.	
	SNH recommend the applicant adheres to biosecurity protocols to prevent introducing INNS such as rats, which may predate on nesting birds, to the Eileans, (please see the RSPB Shiant Isles Recovery Project INNS biosecurity manual as an example).	A biosecurity plan will be prepared. Protocols will be adhered to and included with the EAP
	SNH also recommend that any signage used on the Eileans/Skerries should aim to limit the disturbance to breeding and roosting birds and highlight the potential problems with INNS, such as rats, arriving from boats landing on any of the skerries/islands. The applicant should consider making this signage permanent to reduce these impacts in the long term.	Appropriate signage will be used on the Eileans
Response to PAC		
NatureScot	We have previously advised the applicant should adhere to biosecurity protocols to prevent introducing problem species, such as rats, on to the skerries/islands in Millport Bay. We understand that the situation may have changed and that the Eileans may now be home to a substantial rat presence- we would look for the applicant to see if an eradication programme could be incorporated into the scheme to help protect this locally important bird nesting area.	An eradication programme will be planned for the islands using Thomas et al (2017) as guidance.

8.2 Updated Policy Context

There has been no update to the information provided within **Section 11 of the original ES**.

8.3 Updated Assessment Methodology

The assessment is informed by desk based assessment and the results of the Extended Phase 1 Habitat Survey for the temporary compound and slipway (see **Section 13** Terrestrial Ecology for further details). This assessment follows the general impact assessment methodology as described in **Section 11.4 of the original ES**, supported by expert judgement.

8.4 Updated Baseline Conditions

Fulmar *Fulmarus glacialis*, and oystercatcher *Haematopus ostralegus* (amber status) rock pipit *Anthus petrosus* (green status) were recorded at Farland Point within the Biological Records held by SWSEIC. During the ecology survey at Farland Point, the following bird species were recorded within the site or on the water in the bay: blackbird *Turdus merula* (green status), robin *Erithacus rubecula* (green status) , crow *Corvus corone* (green status), guillemot *Uria aalge* (amber status), cormorant *Phalacrocorax carbo* (green status), oystercatcher, wren *Troglodytes troglodytes* (green status) , heron *Ardea cinerea* (green status) and sparrow *Passer domesticus* (red status). A coot *Fulica atra* (green status) was recorded on a small pond outside the footprint of the proposed compound area.

Other species of birds are likely to be present, and a number of trees and scrub habitat was present which may provide suitable nesting habitat for breeding birds.

8.5 Updated Assessment of Effects

8.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description** of the original ES.

Embedded mitigation relevant to ornithology includes vessel management to minimise disturbance, biosecurity measures and scheduling construction on the southern Eilean island outside the bird breeding season. Best practice and policy (including tool box talks) would also be followed to minimise risks of a pollution event (including development of an ERCoP, MPCP and VMP), and protect against the spread of INNS.

An EAP will developed and agreed with relevant stakeholders, and will form part of the CEMP. An Ecological Clerk of Works (EcoW) will audit the implementation of the EAP.

8.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact the ornithology assessment are detailed below:

Materials delivery and storage
The location of the temporary slipway and compound area has changed from the location that was assessed within the original ES.

No other design changes will change the impacts assessed for ornithology in the original ES.

8.5.2.1 Construction Impact 1: Disturbance

Works at the compound area may be required to start in mid- August to enable the area to be set up to allow offshore construction works to commence once the bathing water season and seal breeding / moulting seasons have finished. The bird breeding season finishes 31st August and therefore there is a small chance of late nesting birds still with nests within the footprint of the compound area. To minimise impacts to nesting birds, the ECoW will undertake a walkover immediately prior to construction works starting to ensure no nesting birds are present within the footprint. If nesting birds are found during pre-construction surveys, a suitably sized buffer zone should be set up around the nest and no work within this zone should commence until the young have fledged or the nest is no longer in use. This will ensure that no nests are destroyed during the site construction works and no offences are committed under the Wildlife and Countryside Act 1981 (as amended). If the development is not carried out in accordance with this mitigation measure, the applicant may risk committing an offence.

The temporary works at the slipway would affect one breeding season (and potentially the very end of the breeding season), following which the habitat would be restored. The impacts of loss of habitat for nesting birds at the temporary slipway is considered to be negligible magnitude upon species of negligible and low value with good tolerance and adaptability to use the scrub and tree habitat in the surrounding area for nesting activity. Overall following the mitigation measures, a short term, reversible impact of **negligible** significance is anticipated upon nesting birds.

8.5.2.2 Construction Impact 2: Habitat loss

The works at the temporary slipway will cause temporary reversable habitat loss within approximately 4,800m^2 of wet heath/marshy grassland / scrub habitat. This footprint is considered to be **negligible** within the context of habitat available for nesting birds within Farland Point, the surrounding coastline and Craigengour Hill, where taller scrub, along with trees, bushes and a pond have been recorded.

With appropriate conservation management it is possible that breeding terns could once again breed on The Eileans. Roseate tern is the UK's rarest breeding seabird and is a Birds of Conservation Concern red-listed species (Eaton et al., 2015). It is currently a very rare breeding species in the UK, being restricted to a few pairs breeding in Wales, the Firth of Forth and Northumberland, with larger numbers at colonies in Ireland. There has been recent advances in the practical methods to improve roseate tern breeding success(in particular, specially designed nest boxes), and this had led to partial population recovery[13]. Comments made by the local community during the PAC event indicated there to be rats on the Eileans. Mitigation within the original EIA included for a biosecurity protection plan to prevent rats being introduced to the islands during construction work. Instead, a rodent eradication programme will be planned, using techniques recommended in the UK rodent eradication best practice toolkit (Thomas et al, 2017) and will be complimented by vegetation removal of scrub encroachment and provision of tern nesting boxes to enhance biodiversity and increase nesting opportunities on the islands. any signage used on the Eileans/Skerries will aim to limit the disturbance to breeding and roosting birds and highlight the potential problems with INNS, such as rats, arriving from boats landing on any of the skerries/islands.

8.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 8-2**. The Table demonstrates that all impacts are still considered to be worst case **negligible**.

Table 8-2 Potential Impacts Identified for Ornithology

Potential Impact	Receptor	Nature Conservation Value	Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change from original assessment
Construction								
Impact 1: Disturbance	All screened-in receptors	Low or Medium (depending on species)	Low	Negligible	Negligible	Embedded mitigation only	Negligible	No change
Impact 2: Habitat loss/ change	All screened-in receptors	Low or Medium (depending on species)	Low	Negligible	Negligible	Embedded mitigation only	Negligible	No change
Operation								
Impact 1: Habitat loss/ change /gain	All screened-in receptors	Low or Medium (depending on species)	Low	Negligible	Negligible	Embedded mitigation only	Negligible	No change
Impact 2: Disturbance	All screened-in receptors	Low or Medium (depending on species)	Low	Negligible	Negligible	Embedded mitigation only	Negligible	No change
Decommissioning								

[13] *https://www.birdlife.org/europe-and-central-asia/news/road-recovery-roseate-tern*

Potential Impact	Receptor	Nature Conservation Value	Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change from original assessment
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.								

8.7 Additional mitigation measures

To minimise potential impacts to breeding birds, the EcoW will undertake a walkover of the footprint of the temporary slipway and associated compound to ensure no late nesting birds are still breeding when the compound is established in mid August. If breeding birds are found appropriate measures will be taken.

A rodent eradication programme will be planned, using techniques recommended in the UK rodent eradication best practice toolkit (Thomas et al, 2017) and will be complimented by vegetation removal of scrub encroachment to enhance biodiversity and increase nesting opportunities on the islands.

8.8 Cumulative effects

The impact assessment predicts that all impacts on bird receptors are of negligible magnitude and significance. Therefore, it is not plausible that the proposed scheme could materially contribute to a cumulative impact when taken into consideration with the effects of other projects.

For this reason it is considered that there is no pathway for a cumulative impact. The potential for cumulative impacts on bird receptors is not examined further.

8.9 Summary and Conclusion

All potential impacts on offshore and coastal ornithology are assessment to be negligible. The EcoW will undertake a walkover survey with be undertaken at Farland Point to check for nesting birds prior to construction at Farland Point LNCS. No further additional mitigation is required.

9 COMMERCIAL FISHERIES

This Section of the SEIAR sets out the outcome of additional commercial fisheries assessments. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 12 of the original ES**. Where the assessment has not changed it is referenced accordingly.

9.1 Response to consultee comments

There has been no additional consultation or responses from stakeholders regarding commercial fisheries following the submission of the original ES.

9.2 Updated Policy Context

There has been no update to the information provided within **Section 12 of the original ES**.

9.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 12.4 of the ES**, supported by expert judgement.

9.4 Updated Baseline Conditions

There is no update to the baseline conditions of the Proposed Scheme described in the original ES.

9.5 Updated Assessment of Effects

9.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the ES**.

There are mitigation measures that are considered to conform to best practice and policy requirements and are inherently assumed to be in place when considering the potential impacts in this assessment, namely:

- Issue of Notices to Mariners, giving fishing vessel operators ample notice of offshore construction works or works which may affect mooring / berthing sites;
- Safe-working practices, including the correct use of navigational aids and lights by construction vessels and barges; and,
- Development of an Environmental Action Plan to ensure correct procedures are adhered to in order to minimise pollution incidents

9.5.2 Potential Changes to Original Assessment

None of the design changes will cause a change to the original assessment for commercial fisheries. Works at the temporary slipway will be intertidal only, and all other changes will not cause additional disturbance to commercial fishing activities beyond that which is already assessed within the ES.

9.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 9-1**. The Table demonstrates that all impacts are still considered to be worst case negligible.

Table 9-1 Potential Impacts Identified for commercial fisheries

Potential Impact	Receptor	Value of receptor	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change to Impact
Construction							

Potential Impact	Receptor	Value of receptor	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change to Impact
Impact 1: Disrupted access to fishing grounds in Millport Bay due to offshore works	*Nephrops* trawlers and other gear-type users that may operate in Millport Bay	High (*Nephrops* trawlers) / low (other gear-type users)	Low	Minor adverse (*Nephrops* trawlers) / negligible (other gear type users)	N/A	Minor adverse (*Nephrops* trawlers) / negligible effect (other gear type users)	No change
Impact 2: Loss of earnings or increased fishing effort due to changes in fishery resources	All commercial fishing vessels and operators that may operate in Millport Bay	High (*Nephrops* trawlers) / low (other gear-type users)	Negligible	Negligible	N/A	Negligible	No change
Impact 3: Short-term changes to berthing and landing practices at Millport	Commercial vessels that may berth or land at Millport	High (*Nephrops* trawlers) / low (other gear-type users)	Negligible	Negligible	N/A	Negligible	No change
Operation							
Impact 1: Reduced access to fishing ground in Millport Bay due to offshore structures	All commercial fishing vessels and operators that may operate in Millport Bay	High (*Nephrops* trawlers) / low (other gear-type users)	Low	Minor adverse (*Nephrops* trawlers) / negligible (other gear type users)	N/A	Minor adverse (*Nephrops* trawlers) / negligible (other gear type users)	No change
Impact 2: Long-term changes to fishing practices due to hydrodynamic changes in Millport Bay	All commercial fishing vessels and operators that may operate in Millport Bay	High (*Nephrops* trawlers) / low (other gear-type users)	Negligible	Negligible	N/A	Negligible	No change
Impact 3: Long-term changes to berthing and landing	Commercial vessels that may berth or land at Millport	High (*Nephrops* trawlers) / low (other gear-type users)	Negligible	Negligible	N/A	Negligible	No change

Potential Impact	Receptor	Value of receptor	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change to Impact
practices at Millport							
Decommissioning							
As a flood prevention scheme, the Proposed Scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

9.7 Additional Mitigation measures

No additional mitigation is proposed.

9.8 Cumulative effects

There are no projects scoped into the Cumulative Impact Assessment (CIA) with regard to commercial fisheries, since there is no spatial overlap between the extent of effects on commercial fisheries (which are restricted to within Millport Bay as the location of the temporary slipway is restricted to the intertidal) and the extent of effects from other projects with marine-based works. While there may be temporal overlap with the Hunterston project (for which there is the potential for some localised dredging and marine construction), there is sufficient distance (over 1.5km) and a range of alternative fishing grounds available to ensure that there are unlikely to be any significant cumulative impacts on commercial fisheries activities, particularly given that the impacts from the proposed scheme are not significant (in EIA terms).

The Dawn Fresh fish farms have not applied for planning permission yet, and it is not understood when construction of the fish farms may take place. As discussed in Section 4.7.2 above, the proposed scheme will have a negligible impact on tidal currents and the flushing ability within Millport Bay and a cumulative impact is not anticipated. Impacts associated with the fish farms themselves will be managed through their own mitigation.

9.9 Summary and Conclusion

All potential impacts on commercial fisheries are assessment to be at worst **minor adverse**. No additional mitigation is required.

10 COMMERCIAL AND RECREATIONAL NAVIGATION

This Section of the SEIAR sets out the outcome of additional commercial and recreational navigation assessments. This Section identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 13 of the original ES**. Where the assessment has not changed it is referenced accordingly.

10.1 Response to consultee comments

Table 10-1: details consultation responses from stakeholders in response to commercial and recreational navigation. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 10-1: Consultee comments related to Commercial and recreational navigation

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Response to ES		
MCA	The MCA has an interest in any works in the marine environment and their potential impact on shipping, navigation and search and rescue. We would expect the project to comply with all maritime legislation, including the appropriate licensing and consenting processes under the Marine (Scotland) Act 2010. The MCA is a statutory consultee and primary advisor to the marine licensing regulators, we will therefore be consulted at formal marine licence application stage. It is likely that the risks to shipping and navigation can be addressed at that time through suitably worded conditions of consent and advisories.	All maritime legislation, including the appropriate licensing and consenting processes under the Marine (Scotland) Act 2010 will be complied with
	We note that the location for the works fall within the jurisdiction of a Statutory Harbour Authority (SHA) – Clydeport. They are therefore responsible for maintaining the safety of navigation during and after the works, so the MCA would unlikely have any concerns to raise on the understanding the SHA has approved the works. The MCA will of course be consulted at formal application stage when full details are available.	N/A
Clydeport	Consultation with Clydeport is required to agree the permanent Aids to Navigation which are required on completion of the works. A works licence for construction will also need to be agreed with Clydeport.	Consultation with Clydeport and NLB is ongoing to confirm the requirements for Aids to Navigation and works licence.

Northern Lighthouse Board	Northern Lighthouse Board have no objection to the proposed coastal protection works and recommend the following:
	• North Ayrshire Council should liaise with Peel Ports (Clydeport) regarding any requirement they may have for a works licence for the construction works associated with the Flood Protection Scheme.
	• On completion (or at any convenient point during construction) the following permanent Aids to Navigation are required:
	  ◦ Lit Port hand buoy to the east of The Clach
	  ◦ Lit Starboard hand spar buoy or fixed beacon to the mark the western extremity of The Leug breakwater
	  ◦ Lit Port hand spar buoy or beacon to mark the extent of the Millburn Street/ Crichton Street breakwater
	  ◦ Two vertical fixed red lights (2FR(vert) 2M) on the end of the pier
	  ◦ Discontinue the existing leading lights (bearing 333 degrees)
	  ◦ Discontinue the seasonal light (QG 2M) on The Eileans
	  ◦ Northern Lighthouse Board are happy to discuss these requirements further, ideally as part of a three-way discussion with Peel Ports as the Local Lighthouse Authority.
	• The Statutory Sanction of the Northern Lighthouse Board must be sought prior to the installation or discontinuation of any AtoN, please contact navigation@nlb.org.uk
	• North Ayrshire Council should liaise with Peel Ports (Clydeport) regarding issuing a Notice to Mariners clearly stating the nature and duration of the works prior to commencement, at key points of the construction and on
		Consultation with Clydeport and NLB is ongoing to confirm the requirements for Aids to Navigation and works licence.

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	completion of the works. The positions and characteristics of any temporary construction AtoN and the final permanent AtoN should be included as necessary in the issued Notice to Mariners. • On completion of the Coastal Flood Protection Scheme construction, a copy of the 'as built' plans along with details of the permanent Aids to Navigation should be submitted to the UK Hydrographic Office (sdr@ukho.gov.uk) in order that the associated charts and publications can be updated.	

10.2 Updated Policy Context

There has been no update to the information provided within **Section 13 of the original ES**.

10.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 13.4 of the ES**, supported by expert judgement.

10.4 Updated Baseline Conditions

There is no update to the baseline conditions of the proposed scheme described in the original ES, which considered delivery of plant and material to nearby Keppel Pier, located to the north of the proposed new slipway location at Farland Point.

10.5 Updated Assessment of Effects

10.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the ES**.

Additional mitigation relevant to shipping and navigation are detailed in **Section 13 of the original ES**, and include navigation aids, communication of changes to navigation, method statements for offshore works and materials deliveries and the use of best practice during construction.

10.5.2 Potential Changes to Original Assessment

None of the design changes will cause a change to the original assessment for shipping and navigation. Works at the temporary slipway will be intertidal only, and all other changes will not cause additional disturbance to shipping and navigation activities beyond that which is already assessed within the original ES. Any additional aids to navigation and Notices to Mariners required to minimise impacts to vessels will be confirmed with stakeholders prior to construction of the temporary slipway.

10.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 10-2**. The Table demonstrates that all impacts are still considered to be **worst case minor** to **moderate adverse**.

Table 10-2 Potential Impacts Identified for Commercial and Recreational Navigation

Potential Impact	Receptor	Value	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Potential change from original assessment
Construction							
Impact 1: Construction vessel movements	Owners and operators of commercial vessels, fishing vessels and recreational vessels	Medium	Low	Minor adverse	Short duration of offshore construction works. Notice to mariners.	Minor adverse	No change
Impact 2: Accidental release of pollutants	Human health, ornithological receptors and ecological receptors	Medium	Low	Minor adverse	Best practice construction methods, appropriate safety practices and contingency plans.	Minor adverse	No change
Impact 3: Disturbance to local navigation practices	Owners and operators of commercial vessels, fishing vessels and recreational vessels	Low to Medium	Low to Medium	Minor adverse	Limited duration of offshore construction works, navigation aids, consultation with mariners	Minor adverse	No change
melmpact 4: Restricted use of Millport Pier and harbour	Owners and operators of commercial vessels, fishing vessels and recreational vessels	Low	Low to High	Minor to moderate adverse	Alternative provisions for vessels that usually berth at the Pier.	Minor to moderate adverse	No change
Impact 5: Disturbance to local vessel moorings	Owners and operators of commercial vessels, fishing vessels and recreational vessels	Low	Low to High	Minor to major adverse	Short duration of offshore construction works. Alternative provisions for vessels that usually berth at the Pier.	Minor to moderate adverse	No change
Operation							
Impact 1: Change to existing navigation practices	Owners and operators of commercial vessels, fishing vessels and recreational vessels	Medium	Medium	Moderate adverse	Appropriate navigation aids, communication of changes, consultation with mariners	Minor to moderate adverse	No change
Impact 2: Change to local moorings facilities	Owners and operators of commercial vessels, fishing vessels and recreational vessels	Low	Negligible	Negligible	Alternative moorings location agreed through consultation. Moorings	Negligible	No change

Potential Impact	Receptor	Value	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Potential change from original assessment
					reinstated after construction, additional moorings provided if possible, communication of changes.		
Impact 3: Increased shelter in Millport Bay, increasing interest	Owners and operators of commercial vessels, fishing vessels and recreational vessels	Low	Negligible	Negligible	Additional moorings provided if possible. Communication about changes to navigation.	Negligible	No change
Impact 4: Improved shelter for vessels in Millport Bay	Owners and operators of commercial vessels, fishing vessels and recreational vessels	Medium	Medium	Moderate beneficial	Beneficial impact	Moderate beneficial	No change
Impact 5: Enhanced conditions for sailing/ watersports	Watersports users	Medium	High	Major beneficial	Beneficial impact	Major beneficial	No change
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

10.7 Additional Mitigation measures

No additional mitigation measures are proposed.

10.8 Cumulative effects

There may be cumulative impacts on navigation if there are any other works ongoing close to Millport that also require construction vessel movements. As a start date is still unknown for the works to the Hunterston terminal, it is considered unlikely that works will be taking place at the same time. If works become likely to take place at the same time the Hunterston terminal will be made aware of the vessel programme for the proposed scheme, to minimise the risk of adverse interactions.

10.9 Summary and Conclusion

All potential impacts on commercial and recreational navigation are assessment to be **minor-moderate adverse**. No further additional mitigation is required.

11 INFRASTRUCTURE AND UTILITIES

This Section of the SEIAR sets out the outcome of additional infrastructure and utilities assessments. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 14 of the original ES**. Where the assessment has not changed it is referenced accordingly.

11.1 Response to consultee comments

Table 11-1 details consultation responses from stakeholders in response to infrastructure and utilities.

Table 11-1: Consultee comments related to Infrastructure and Utilities

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Response to ES		
SEPA	We note that it is proposed that drainage through and/or past the crest walls will be included in the design, by adding new drainage gullies, scupper holes through the crest walls, and/or adjusting falls and levels of hard surfaces to maintain drainage flow paths. We can confirm that the discharge of surface water from the completed alterations/development would not require to be drained by SUDS as the discharge is to coastal waters.	N/a
	We understand that there are not anticipated to be any service diversions required for the works and that requirements for any works to or in the vicinity of services will be confirmed prior to construction. Sufficient mitigation must be in place to ensure there is no disruption to the sewerage system particularly during bathing season. We recommend this be addressed within the CEMP.	The works are not expected to impact on the sewerage system. The CEMP will include details of any mitigation measures relating to services.
Scottish Water	Scottish Water has no objection to this planning application; however, the applicant should be aware that this does not confirm that the proposed development can currently be serviced and would advise the following:	Consultation with Scottish Water is ongoing to confirm the specific mitigation measures required for any works to be undertaken close to Scottish Water assets. Diversion works are not expected to be required.
	Scottish Water has carried out a Capacity review and we can confirm the following: There is currently sufficient capacity in the Greenock Water Treatment Works to service your development. However, please note that further investigations may be required to be carried out once a formal application has been submitted to us	
	This proposed development will be serviced by Millport Waste Water Treatment Works. Unfortunately, Scottish Water is unable to confirm capacity currently so to allow us to fully appraise the proposals we suggest that the applicant completes a Pre-Development Enquiry (PDE) Form and submits it directly to Scottish Water via our Customer Portal or contact Development Operations	
	A review of our records indicates that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.	
	For reasons of sustainability and to protect our customers from potential future sewer flooding, Scottish Water will not accept any surface water connections into our combined sewer system. There may be limited exceptional circumstances where we would allow such a connection for brownfield sites only, however this will require significant justification from the customer taking account of various factors including legal, physical, and	

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	technical challenges. In order to avoid costs and delays where a surface water discharge to our combined sewer system is anticipated, the developer should contact Scottish Water at the earliest opportunity with strong evidence to support the intended drainage plan prior to making a connection request. We will assess this evidence in a robust manner and provide a decision that reflects the best option from environmental and customer perspectives. Any changes to surface water flood risk that may be caused by the proposed flood scheme (e.g. if existing outfalls and culverts are restricted or changed as part of the proposed design) should be communicated to Scottish Water. It is expected that the proposed scheme will have significant impacts on existing Scottish Water infrastructure. Detailed discussions are required as early as possible in the design development to ensure that proposals are feasible and buildable.	
	General notes: Scottish Water asset plans can be obtained from our appointed asset plan providers:4Site Investigation Services (UK) Ltd4Tel: 0333 123 1223 4Email: sw@sisplan.co.uk4www.sisplan.co.uk Scottish Water's current minimum level of service for water pressure is 1.0 bar or 10m head at the customer's boundary internal outlet. Any property which cannot be adequately serviced from the available pressure may require private pumping arrangements to be installed, subject to compliance with Water Byelaws. If the developer wishes to enquire about Scottish Water's procedure for checking the water pressure in the area, then they should write to the Customer Connections department at the above address. If the connection to the public sewer and/or water main requires to be laid through land out-with public ownership, the developer must provide evidence of formal approval from the affected landowner(s) by way of a deed of servitude. Scottish Water may only vest new water or waste water infrastructure which is to be laid through land out with public ownership where a Deed of Servitude has been obtained in our favour by the developer. The developer should also be aware that Scottish Water requires land title to the area of land where a pumping station and/or SUDS proposed to vest in Scottish Water is constructed .Please find information on how to submit application to Scottish Water at our Customer Portal.	

11.2 Updated Policy Context

There has been no update to the information provided within **Section 14 of the original ES**.

11.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 14.4 of the original ES**, supported by expert judgement.

11.4 Updated Baseline Conditions

At the location for the temporary slipway and compound area, telegraph poles and electricity pylons are present in the field to the north of Marine Parade. However, these have been avoided through the site selection process. Outfalls are present north east from the existing compound area, and along the coast from the FSC centre and these have also been avoided by the design. There are no known utilities within the footprint of the temporary compound area.

There is no further update to the baseline conditions of the proposed scheme described in the original ES..

11.5 Updated Assessment of Effects

11.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description** of the original ES. With regards to infrastructure and utilities, the scheme design has been designed to be as far from the water main as possible and the design takes account for the pumping station at Knox Port and water drainage flow paths. Telegraph poles and pylons have been avoided in the siting of the temporary compound area.
Method statements will be agreed between North Ayrshire Council, the construction contractor and the relevant utilities operators which will include specific mitigation requirements for the contractor. There is ongoing consultation with relevant utility operators.

No additional embedded mitigation is proposed.

11.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact the infrastructure and utilities assessment are detailed below:

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES.

No other design changes will change the impacts assessed for infrastructure and utilities in the original ES.

11.5.2.1 Construction Impact 1: Potential damage to utilities infrastructure

Design Change: Temporary slipway
No excavation works are proposed for the temporary slipway. The area avoids any sewage or water outfalls, or other utilities infrastructure. As such, there is no change to the impacts assessed within the original ES.

11.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 11-2**. The Table demonstrates that all impacts are still considered to be **worst case negligible**.

Table 11-2 Potential Impacts Identified for infrastructure and utilities

Potential Impact	Receptor	Value	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change to impact
Construction							
Impact 1: Potential damage to utilities infrastructure	Residents and businesses	Medium	High	Moderate adverse	Detailed design of scheme and construction method statements to be	Moderate adverse	No change

Potential Impact	Receptor	Value	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change to impact
					agreed with utilities operators. Best practice methods of construction.		
Operation							
Impact 1: Reduced risk of flooding and erosion to existing infrastructure	Residents and businesses	Medium	High	Major beneficial	Not applicable, as impact is beneficial.	Major beneficial	No change
Impact 2: Improvement to surface water drainage	Residents and businesses	Low	Low	Minor beneficial	Not applicable, as impact is beneficial.	Minor beneficial	No change
Impact 3: Removal of redundant outfalls	Residents and visitors	Low	Low	Minor beneficial	Not applicable, as impact is beneficial.	Minor beneficial	No change
Impact 4: Changes to street furniture	Residents and visitors	Low	Low	Minor beneficial	Scheme to include additional seating integrated into flood walls.	Minor beneficial	No change
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

11.7 Additional Mitigation measures

No additional mitigation measures are proposed.

11.8 Cumulative effects

Further to the information provided in the original ES, the Millburn FPS will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an Environmental Impact Assessment Screening Report (RPSGroup, Jan 2021) and no impacts to utilities or infrastructure have been raised.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any utility or infrastructure related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

11.9 Summary and Conclusion

All potential impacts on infrastructure and utilities are assessment to be at worst moderate adverse, but there are **no changes to the assessment made in the original ES**.

12 ARCHAEOLOGY AND CULTURAL HERITAGE

This Section of the SEIAR sets out the outcome of additional archaeology and cultural heritage assessments and provides new and updated information on excavation techniques at the toe of the foreshore rock structures, dredging within the footprint of the offshore breakwater and temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 15 of the original ES**. Where the assessment has not changed it is referenced accordingly.

12.1 Response to consultee comments

There has been no further comments made on the archaeology and cultural heritage receptors from any stakeholders following submission of the original ES.

12.2 Updated Policy Context

There has been no update to the information provided within **Section 15 of the original ES**.

12.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 15.4 of the ES**, supported by expert judgement.

12.4 Updated Baseline Conditions

The works required for the temporary slipway and associated compound at Farland Point will be located on the other side of the B896 (Marine Parade) and minimum 30m south west from the Robertson Building Millport Field Centre (LB52288), currently managed by the Field Studies Council (FSC).

The Robertson Building dates back to 1897 and is Category C listed and consists of a U-plan former marine station of red and stone sandstone with Diocletian windows (Historic Scotland, 2020). A number of extensions, including a house and aquarium have been added. The special interest of the building lies in its establishment as one of the two earliest permanent marine stations in Scotland (the other being The Gatty Marine Laboratory at St Andrews opened in 1896) and its setting facing the sea, with the building emphasising its continued relationship with it.

There are no further updates to the baseline conditions of the Proposed Scheme described in the original ES.

12.5 Updated Assessment of Effects

12.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the original ES**.

Embedded mitigation relevant to archaeology and cultural heritage is discussed **in Section 15 of the original ES**. In summary, key design elements which will reduce potential setting impacts for heritage assets include:

- Elements are designed to be unobtrusive and to blend with the existing streetscape elements;
- Care has been taken with colour and materials to ensure that they blend with existing features;
- The design seeks to reduce the visual effects of new wall elements in views from the road by raising the level of open grassland between them and the road to screen them, where possible;
- Linear walls are designed to function as seating elements where possible to further integrate and provide familiar elements into views; and
- The proposed offshore breakwater is designed using natural rock which would emulate existing rock features offshore such as the Spoig, the Leug and other rock outcrops.

The methodology for additional mitigation will be agreed in consultation with the archaeological adviser to North Ayrshire Council and with HES as the archaeological adviser to MS-LOT. This is currently expected to comprise an archaeological WSI. The WSI will include provision for a protocol for archaeological discoveries in the event that any unexpected archaeological material is identified during the construction works.

12.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact the ornithology assessment are detailed below:

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES.

No other design changes will change the impacts assessed for ornithology in the original ES.

12.5.2.1 Construction Impact 1: Direct impact to known heritage assets

The changes in the project description will not change the assessments made in the original ES for this impact.

12.5.2.2 Construction Impact 2: Direct impact to potential heritage assets

Excavations are not anticipated for the works at the slipway and compound area, and works will not extend into the subtidal area therefore direct impacts to previously undiscovered, buried or submerged archaeology are considered to be unlikely, however the heritage importance of any buried or submerged remains which may be present are currently unknown. The presence of significant buried remains or submerged wrecks is limited by the nature of the sub-surface geology, both onshore and offshore, and the nature of archaeological material is anticipated to be limited to isolated finds rather than extensive structures or sites. These types of finds are considered likely to be of local importance and for the purposes of this assessment, therefore, potential finds are assessed as being of **low sensitivity**.

It is anticipated that if remains are present, and if they are encountered during works, the nature of their discovery will result in removal from their current burial context and loss of heritage significance. As a

precautionary measure, therefore, it is anticipated that this could result in a **high magnitude**, and consequently, a **moderate adverse** impact.

In order to mitigate this potential impact, it is recommended that a Protocol for Archaeological Discoveries (PAD) be implemented to allow site staff to report any discoveries of chance finds and to ensure that unexpected remains can be effectively addressed. This mitigation forms part of the additional suite of mitigation measures identified with the original ES for the whole construction footprint. Full details of the PAD are detailed within the original ES. Will the application this mitigation the residual impact will be reduced to **minor adverse**.

12.5.2.3 Construction Impact 3: Impacts on settings and historic character

The compound area for the temporary slipway will be located minimum 30m from the Robertson Building Millport Field Centre and associated buildings. The works for the temporary, anticipated for 12 months during the construction period, and then will be restored. The buildings are considered to be of medium sensitivity.

There will be no direct impacts to the buildings. There will be temporary disruption to the setting during the construction period, due to the creation and operation of the temporary compound area and slipway to facilitate bringing the construction plant and materials to Millport (i.e. from the presence of work teams and machinery and the associated disturbance to how an asset is experienced in terms of visual impact, noise of machinery and dust and smells associated with the works). Although the impact will be continuous (the impact persists over the life of the activity causing it), it will also be short-term (the period over which the impact is experienced is temporary and lasts for the period of construction or less), limited to the immediate area of the works and reversible upon completion of the works.

By locating the temporary slipway and compound at Farland Point, disruption to the Conservation Area and other heritage assets at Millport will be minimised through the project design. In addition, by creating a temporary slipway south of the Millport Field Centre, less construction traffic will pass by the centre compared to if a more northerly pier or slipway was utilised (such as Keppel Peir).

The special interest of the Robertson Building in terms of its setting and relationship with the sea will be temporarily disrupted although there will be no permanent impact upon the significance of the listed building. Overall, there will be an appreciable effect upon the heritage assets' significance for the duration of construction and a **medium magnitude** impact. The impact to the setting of the Millport Field Centre is considered to be **moderate adverse** during construction. Due to the short term nature of the temporary works, however, no mitigation is proposed.

12.5.2.4 Construction Impact 4: Impacts associated with changes to physical processes

The changes in the project description will not change the assessments made in the original ES for this impact.

12.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 12-1**.

Table 12-1 Potential Impacts Identified for archaeology and cultural heritage

Potential Impact	Heritage asset	Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change to Impact
Construction							
Impact 1: Direct impact to known heritage assets	Designated heritage assets	High	N/A	N/A	Avoided through design, fencing/barriers to prevent accidental damage	No impact	No change
	Non-designated heritage assets	Low					No change
	Strathwherry jetty (WoSAS ID 54526) and Leck (Crocodile) jetty (WoSAS ID 54527/54516)	Low	High	Moderate beneficial	Preservation in situ, sympathetic design (agreed in consultation with heritage stakeholders)	Moderate beneficial	No change
Impact 2: Direct impact to potential heritage assets	Previously undiscovered, buried or submerged archaeology	Low	High	Moderate adverse	PAD and monitoring during ground works	Minor adverse	No change
Impact 3: Impacts on settings and historic character	Millport Conservation Areas and heritage assets along the seafront and foreshore	Medium	Medium	Moderate adverse	Measures to minimise local disruption	Moderate adverse	No change
Impact 4: Impacts associated with changes to physical processes	Heritage assets on the foreshore and marine areas	N/A	N/A	N/A	N/A	No impact	No change
Operation							
Impact 1: Direct impact to known heritage assets	Designated and non-designated heritage assets	N/A	N/A	N/A	N/A	No impact	No change
Impact 2: Direct impact to potential heritage assets	Previously undiscovered, buried or submerged archaeology	N/A	N/A	N/A	N/A	No impact	No change
Impact 3: Impacts on settings and historic character	Millport Conservation Areas and heritage assets along the seafront and foreshore	Low/High	Negligible to Low	Negligible to moderate beneficial	Increased seating, foreshore access and a sense of cohesion to the experience of the area.	Negligible to moderate beneficial	No change
Impact 4: Impacts associated with changes to	Heritage assets on the foreshore and marine areas	N/A	N/A	N/A	N/A	No impact	No change

physical processes							
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

12.7 Additional Mitigation measures

No additional mitigation measures are proposed.

12.8 Cumulative effects

Further to the information provided in the original ES, the Millburn FPS will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an Environmental Impact Assessment Screening Report (RPSGroup, 2021) detailing that the no impacts to archaeology or cultural heritage features are anticipated.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any archaeology or cultural heritage related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

12.9 Summary and Conclusion

All potential impacts on offshore and coastal ornithology are assessment to be at **worst moderate adverse**. This is no change to the original ES assessments.

13 TERRESTRIAL ECOLOGY

This Section of the SEIAR sets out the outcome of additional terrestrial ecology assessments and provides new and updated information on temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in Section 16 of the original ES. Where the assessment has not changed it is referenced accordingly.

13.1 Response to consultee comments

Table 13-1 details consultation responses from stakeholders in response to ornithology. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 13-1 Consultee comments related to Terrestrial Ecology

Consultee	Summary of Comment	Further information / clarification required in SEIAR
SNH	Provided that no works take place within 30m of any otter holts (200m if otters are breeding) the proposal is unlikely to require a species licence under protected species legislation. At present the ES hints at the possible presence of an otter holt but the survey work undertaken does not confirm its presence or absence. Therefore, it is possible that construction activities may come within 30m of an otter holt, where an otter could be disturbed by noise, vibration or lighting and so SNH advise that full details of the means by which the potential otter holt will be protected from disturbance of any kind throughout the development should be provided to the consenting authority in the form of an otter protection plan prior to determination of the application. Advice for planners and developers can be found at NatureScot's Licencing webpage .	Pre construction otter surveys will be undertaken and an Otter Protection Plan will be developed and agreed with NatureScot in advance of the works A licence will be applied for if needed.
	With regards to mitigation, SNH support the measures listed in Section 155 of the ES, Mitigation of ES Section 16 and those detailed in ES Section 24 Summary and Conclusions. SNH support the proposals to undertake an otter pre-construction survey within 8 weeks prior to commencement of construction to re-assess otter activity, the proposals for an Ecological Clerk of Works (ECoW) to be present during construction works, for a sensitive lighting regime to be followed and for ramps to be placed in trenches and open pipes capped to prevent any otters or other animals becoming trapped. These measures should therefore be included in the otter protection plan referred to above. However, if further otter surveys are undertaken which ultimately confirm that no otter holts are in fact present on site, we would still support the adoption of these precautionary measures to protect otters in line with NatureScot's Licencing webpage.	
	SNH refer the applicant to recently published species guidance notes on NatureScot's website for otters that brings together all the latest information and advice, including legal protection, survey methods, mitigation measures and licensing requirements	
SEPA	Regarding the planned pre-construction survey to ascertain up to date locations of any INNS and inform mitigation detailed in the planned Invasive Species Management Plan (ISMP), SEPA expect that additional measures beyond the 10m buffer would be required, should INNS be encountered.	An invasive species management plan will be developed in line with managed in line with the Code of Practice on Non-Native Species, 2012 and Biosecurity and management of invasive non-native species for construction sites and Controlled Activities
	The proposed ISMP does not take into consideration whether plants are in the way of construction works and would therefore have to be removed. In such a case, INNS and any soil containing seeds thereof are classified as non-hazardous controlled waste and procedures should be put in place to deal with this during and after the proposed construction works. Details of legal responsibilities can be found in the Code of Practice on Non-Native Species, 2012 .	
	Any INNS present on site should be managed in line with the Code of Practice on Non-Native Species, 2012. We recommend that the ISMP be developed in accordance with the advice on our INNS Webpage (as above) and the guidance document on Biosecurity and management of invasive non-native species for construction sites and Controlled Activities. This should be submitted alongside the CEMP.	
	SEPA have no concerns with the proposed practice and methodology of the proposed topsoil stripping and replacement in parklands.	
Response to PAC		
NatureScot	We advised the applicant should adhere to biosecurity protocols to prevent existing stands of Japanese knotweed that are to be found in and around the construction site/ storage area itself. The wider issue of an effective biosecurity plan is one for which we are keen to be consulted on.	An invasive species management plan will be developed

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	The chosen site appears to be a suitable one to minimise the impacts of the required activity on the wider environment. This is based on our understanding of the project which is very small scale, temporary in nature (12 months), and doesn't appear to involve any particularly noisy equipment. We welcome the ongoing commitment that works at the temporary slip/ storage compound would be mitigated through the measures already stated within the EIA, including: • Adhering to best practice measures to minimise impacts • Ecological Clerk of Works to be present during construction works • Ecological Action Plan • Not commencing work within bird breeding season • Mitigation measures to minimise impacts to protected species including otter (including otter protection plan and potential licence) and reptiles • Invasive Species and Biosecurity Management Plan	N/A
	We note the presence of otters and the commitment to produce an otter protection plan and seek a licence if needed and welcome the commitment to schedule barge movements to avoid known higher activity periods for the otters, ie avoiding dawn and dusk movements.	N/A
	The method of construction of the slipway (noting that no onsite excavation works are planned.) , eg using only crushed rock(no concrete) from freshly quarried material, planned to be from the Glensanda quarry near Oban, will reduce both pollution impacts and potential spread of invasive non-native species which may be incorporated if the use of recycled material was proposed.	N/A
	The slipway would be supported by a compound area above the shore, approximately 30,000m^2 in extent. Both the temporary slipway and compound area would be located within the footprint of the Farland Point Scottish Wildlife Trust Wildlife Site. This is a small but complex coastal site with a good variety of semi-natural habitats and with a total of 127 vascular plants. It consists of coastal grassland, marshy grassland, heath, bog, scrub and strandline vegetation. This site is registered as Site M14 in the North Ayrshire Council register of Local Nature Conservation Sites in the current Local Development Plan. We note the proposed mitigation and the assessment made of the habitats found within the site as a result of the October site visit by your ecology team. Given the potential for many species to have been missed due to the time of year of the survey, we advise that the Ecological Clerk of Works liaises with SWT to enable a more complete picture of the vascular plant distribution and their ecological requirements be carried out so that the best possible mitigation be used to safeguard the value of the site and facilitate post development restoration and, where appropriate, enhancement works.	The compound area will now be 4,800m^2. EcoW will continue to liaise with SWT to ensure appropriate mitigation is included.
	As part of biodiversity enhancement works, it would be beneficial to remove the adjoining areas of Japanese knotweed, to prevent them capitalising on any disturbance to the Farland point LNCS as a result of this Project	Adjacent areas of Japanese knotweed will be removed.
Millport Field Studies Council Centre	I think your conclusions of no long term impact for most of the ecological features are correct, providing you remove all trace of the slipway and staging area (as you state in your plans). It seems everything in the yellow and red areas will be pretty much destroyed and the ground levelled, however it's just bare rock or brambles/scrub, so won't take any time at all to regrow. The landing of materials and any processing in an on-shore compound during the construction phase is going to have a local negative effect wherever it is; however the work needs to be done, so we would have to trust that post-operation remedial work will be effective.	N/A
	There are, however, two main concerns for me. The main one is the otters. As we know, they're around that area all the time and the report states they've found two sites that they use nearby (though not actually in the zone). My worry is with the increased vessels, vehicles, machinery and the constant noisy human presence in an area that has never really had any	An Otter Protection Plan will be developed and agreed with

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	disturbance; they might at best depart for a good while and at worst be disturbed to the point they don't return or suffer some harm. We have seen regular daily presence of otters in that area. Otters are seen regularly though more prevalent dawn and dusk The report states that they potentially may need a license and I would advise they should obtain one given the high likelihood of disturbance (in fact, I'd say it's impossible an otter wouldn't be disturbed with activity going on there every day for a year). I'd also note the regular presence of seals (though they are correct that there is no haul out nearby).	NatureScot in advance of the works A licence will be applied for if needed.

13.2 Updated Policy Context

Further to what was presented in the original ES, North Ayrshire Council's Local Development Plan[14] Policy 16c states:

"*Nature Conservation Sites of Local Importance Development adversely affecting Local Nature Reserves or Local Nature Conservation Sites will generally not be permitted unless it can be demonstrated the overall objectives of the designation and the overall integrity of the designated area would not be compromised, or any adverse effects are clearly outweighed by social, environmental or economic benefits of local importance*"

There has been no further updates to the information provided within **Section 16 of the original ES**.

13.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 16.4 of the ES**, supported by expert judgement. It is supported by an Extended Phase 1 Habitat Survey of the temporary compound area and slipway site.

13.4 Updated Baseline Conditions

An extended Phase 1 Habitat Survey was undertaken in the footprint of the temporary slipway compound and surrounding area at Farland Point by two experienced ecologists. The survey was undertaken in November 2021 which is late in the survey season but due to a mild autumn many species were still readily identifiable.

Habitats

The footprint of the compound area is situated between an existing compound area and a public footpath. The ground was rough underfoot, gently sloping towards the coast and consisted of mosaic of wet heath/ marshy grassland / acid grassland/scrub /tall ruderal in the middle, including hard rush *Juncus inflexus*, cross leaf heather *Erica tetralix*, ling *Calluna vulgaris*, tormentil *Potentilla erecta*, yellow rattle *Rhinanthus Minor* and sphagnums transitioning to drier habitat to the east and west. Gorse *Ulex europaeus*, bramble *Rubus fructicosis*, raspberry *Rubus idaeus*, rosebay willowherb *Chamaenerion angustifolium*, a number of small saplings (ash *Fraxinus excelsior*, goat willow *Salix caprea*, sycamore *Acer pseudoplatanus*, rowan *Sorbus aucuparia*) were established on the wet heath/marshy grassland mosaic and an area of both rhododendron spp. and Japanese rose *Rosa Rugosa* were also present. One small stand of Japanese knotweed *Reynoutria japonica* was identified within the footprint of the proposed site, close to the Marine

[14] *https://www.north-ayrshire.gov.uk/planning-and-building-standards/ldp/local-development-plan.aspx*

Parade. This was approximately 0.5m in diameter. A number of small natural drains were present within the habitat, running from the road down towards the sea.

The habitat north of Marine Parade was also surveyed to rule out as an option for the compound area outwith the boundary of the Farland Point LNCS , following comments during the PAC consultation that this area would not be suitable for the compound due to being the 'best bog habitat on the island' (Royal HaskoningDHV, 2021). Large areas of rhododendron and gorse were noted on an uneven wet heath / marshy grassland / mire mosaic habitat including, star moss *Polytrichum commune*, tormentil, ling, hard rush, bramble, cross leaf heather, young sycamore sapling, cow parsley *Anthriscus sylvestris*, bilberry *Vaccinium myrtillus* soft rush *juncus effuses*, yellow flag iris *Iris pseudacorus* gorse, yellow rattle, sphagnum spp., rose indet., ranunculus spp., horsetail *Equisetum arvense*, ash, *potamgeton* spp., thistle *Cirsium vulgare*, rowan, hawthorn *Crataegus monogyna*, cottonester spp. This mosaic habitat was notably wetter and with higher quantities of heath habitat that the proposed footprint of the temporary compound. A large area of Japanese knotweed was recorded adjacent to the buildings. This area north of Marine Parade would not be disturbed.

Along the coast to the north- east was characterised by a narrow strip of grassland between the shore and the road. Crested dogs tail *Cynosurus cristatus*, thistle, ribwort plantain *Plantago lanceolata* were recorded, with sea ivory *Ramalina siliquosa*, *Xanthoria parietina, Ochrolechia parella*, butterbur *Petasites hybridus* and crowberry *Empetrum nigrum* were noted close to the shore. This area would not be disturbed as part of the works.

To the south west of the proposed compound site, large expanse of Japanese knotweed was identified on the other side of the footpath. This area would not be disturbed as part of the works, and fencing would be used to delineate the boundary of the construction works, maintaining access along the path for recreation and local users and creating a barrier between the works and the Japanese knotweed. Further into the Farland Point LNCS , the ground was drier underfoot, dominated by tall ruderal, scrub, bushes and wooded area with a network of small recreational paths. A number of bird nest boxes and empty bird feeders were present. A small pond was noted with a coot, and remains of a campfire and abandoned den were target noted.

Protected species

Two open otter *Lutra lutra* layups were identified approximately 70m along the coast north of the proposed compound site, amongst the coastal boulders, however no signs were found around the proposed slipway and the coastline in this areas was considered to be more exposed, with less natural shelter for the species, although some freshwater pools were noted at the top of the shore directly in front of the existing compound area. No pathways or signs of otter were found in the terrestrial vegetation within the proposed site.

The NBN Atlas records a number of otter records around Farland Point and the FSC centre. The FSC centre has reported seeing regular and daily presence of otter in the area, with noted crepuscular activity however no known holts or resting sites have been identified through survey or consultation further to those identified in the survey.

The NBN Atlas includes a number of records of common pipistrelle *Pipistrellus pipistrellus* within the footprint of the proposed compound area. No suitable roost habitat was present within the footprint.

There is no further update to the baseline conditions of the Proposed Scheme described in the original ES.

13.5 Updated Assessment of Effects

13.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the original ES**.

Embedded mitigation relevant to terrestrial ecology includes vessel management to minimise disturbance, biosecurity measures and scheduling construction on the southern Eilean island outside the bird breeding season (albeit the compound would be established in mid August). Best practice and policy (including tool box talks) would also be followed to minimise risks of a pollution event (including development of anERCoP, MPCP, and VMP), and protect against the spread of INNS.

An EAP will developed and agreed with relevant stakeholders, and will form part of the CEMP. An EcoW will audit the implementation of the EAP.

The following mitigation is already included within the original ES to manage and reduce impacts to terrestrial ecology:

- The roots of retained trees along the edge of the working width would be protected from soil compaction by the enforcement of Root Protection Areas that would be fenced off from the construction (the extent of which would be calculated using guidance from BS5837: 2012).
- Access onto the small islands in Millport Bay will be restricted as far as practically possible. Where access is required, there will be demarcation of narrow acceptable working areas, and checks of these areas by the ECoW.
- Good topsoil management practices will be followed. Topsoil will be stripped, stored and capped to minimise water erosion within the easement whilst works are conducted. The practices to be followed will be detailed in the EMP), the details and content of which will be agreed with stakeholders.
- Existing tracks, roadways and hardstanding will be utilised for access and storage where possible. Where temporary accesses are needed, topsoil and surface water management measures will be employed as defined in the EMP.
- Geotextile, or other suitable material, will be used to allow the safe storage and movement of vehicles within the area, maintain required drainage, and prevent soil erosion and increased surface runoff.
- All otter mitigation measures for the site will be agreed with SNH prior to construction, and a licence sought if required as detailed below;;
- Given otters are very mobile species, a pre-construction survey 8 weeks before construction commences should be undertaken, to re-assess otter activity. Prior to the commencement of operations an otter survey should be undertaken, within the proposed footprint of construction plus a 250m buffer zone, to determine current use at the time of construction (otters may increase their use of the site in the interim period between the current survey and the commencement of construction). The surveys should be undertaken in appropriate weather condition and following guidance in the ‘New Rivers and Wildlife Handbook’ (Holmes et al, 1994), Chanin (2003) and Strachan & Jefferies (1996), and SNH Standing Advise for Planning Consultations, Otter (SNH, undated).
- Should an active resting site be found, an European Protected Species (EPS) Licence is likely to be required to undertake work on this site. Consultation will be undertaken with SNH to discuss the mitigation required under this licence. This will include the following:

- Construction vehicles and equipment should not be active on, or stored by, the coastline for longer than is essential;
- Works undertaken adjacent to the islands in Millport Bay will be done in as short a time frame as practical. Equipment should not be stored on the islands in the bay;
- The risks can be further reduced by following best practice and guidance including SNH Standing Advise for Planning consultations (otter), SNH, undated), as well as guidance produced by Design Manual for Roads and Bridges (DMRB Volume 10 Section 4);
- If any otter fatalities occur during construction, carcases should be retained and SNH should be notified, if non-fatal injuries occur as a result of construction then SNH should be notified immediately;
- Where artificial light is required, lights should be directed away from the coastal area and watercourses to allow otters to migrate through the area undisturbed. Any lighting required at these areas will be low-intensity;
- An ECoW will be present during the works. Work should stop should an otter holt or resting place be found within 250m (SNH 2015), and SNH consulted, as a licence may be necessary before works can continue;
- A temporary ramp will be placed in trenches over 0.5 m deep in order to allow a potentially trapped animal to exit the trench;
- Any open pipes will be capped to prevent animals gaining access;
- All excavations and pipe systems will be checked at the start of each working day;
- Site construction fencing will not interfere with the passage of animals through coastal corridors; and
- Existing vegetation will be retained wherever possible.

- If construction takes place within the reptile active period (March – October inclusive) and long grass is present within the footprint of the proposed scheme at the time of construction, habitat manipulation will be undertaken of the working area to ensure it is unfavourable to reptiles during the works. This will include a vegetation strim down to 150mm of all vegetation in areas of vehicle tracking or construction works at least 48 hours prior to construction and all cut vegetation removed outside the footprint of the proposed scheme, to give any reptiles present time to leave the area. After this time the vegetation can be strimmed to a closer cut if required. A check of the area of potential reptile hibernacula will also be undertaken, and any features observed will be removed by hand. Pre-construction vegetation clearance and hibernacula dismantling will be supervised by a suitably qualified ecologist.
- To minimise impacts to foraging bats, night-time lighting of construction sites should be avoided where possible. If night-time working is necessary, then lighting will be designed in accordance with Bats and artificial Lighting in the UK (BCT, ILE, 2018); and Guidance Notes for the Reduction of Obtrusive Light ILE (2011).
- A pre-construction survey will be undertaken to ascertain up-to-date locations of any non-native invasive species within the Terrestrial Ecology Study Area;
- An Invasive Species Management Plan will be drawn up and included in the EMP. This Plan will include the following:
  - Fencing off a 10m buffer around all areas of non-native invasive species to avoid cross-spread.

13.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact the terrestrial ecology assessment are detailed below:

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES. Direct impacts upon Farland Point LNCS were not previously assessed and this is considered as a new impact.

No other design changes will change the impacts assessed for terrestrial ecology in the original ES.

13.5.2.1 Construction Impact 1: Temporary or permanent habitat loss

No legally protected terrestrial flora species were noted within the Terrestrial Ecology Study Area during the survey, however it should be noted that the survey was conducted at the end of the flowering plant season and as such, the absence of any observations of legally protected or notable flora species during the survey is not an indication that none are present. The habitats within the footprint of the temporary compound consist of wet heath/ marshy grassland with scrub and brambles with good potential for recoverability. The habitats within the footprint will be lost during the duration of works with the temporary compound, these impacts will be long term (i.e. over more than one year) within the footprint, but habitat loss will not extend beyond the footprint of the proposed works, and the impacts will be reversible upon removal of the compound area. Excavation is not required, and therefore the soils will not be mixed, which will aid restoration of the habitat following completion of the works. The habitat is part of the Farland Point SWT LNCS and is therefore considered to be of medium value. The magnitude of effect is assessed to be medium, as the works will be maximum 4,800m^2 within a small area (approximately 5%) of the Farland Point LNCS which covers approximately 85,000m^2, avoids wooded areas and should recover quickly, but there remains the potential to alter local drainage supporting the wet heath / marshy habitats within the site. Overall the impact of habitat loss on the footprint of the Farland Point LNCS is assessed to be **moderately adverse**.

To mitigate disturbance to the wet heath / drainage of the site and aid restoration post construction the following measures are proposed to be included within the design of the compound and temporary slipway:

- Existing drainage would be maintained (i.e. plastic pipes in the natural drainage ditches within the wetter habitat to flow water towards the sea);
- Vegetation would be cleared;
- No additional drainage would be added (i.e. the area would still be damp under matting and not dry out);
- No excavation would take place to maintain the seedbank and avoid mixing soils, no risk of release of contamination within soils etc;
- Ground protection mats would be laid;
- Areas which could attribute to pollution events (fuel storage etc) would be bunded and managed through the CEMP and associated plans; and
- Following construction, removal of materials and restoration of terrestrial habitats.

The EcoW will continue to liaise with NatureScot and Scottish Wildlife Trust to ensure any further mitigation for the habitats and species present can be used, to aid with post development restoration works. A Controlled Activities Regulations (CAR) Licence is not anticipated but consultation with SEPA will be ongoing to ensure the works are completed in line with CAR guidance.

Following the implementation of the mitigation, the magnitude of impact would be reduced to **minor adverse**, and the significance of the impact will be minor adverse for the duration of the works and during recoverability of the site. There may be opportunities for long term management of the site to control the distribution scrub habitat and restore heath habitat within the site if that falls within the objectives of the site.

13.5.2.2 Construction Impact 2: Habitat loss, disturbance or killing of reptiles

There is some habitat potential for reptiles within the footprint at Farland Point but much of this area is damp underfoot and part of a wider area of suitable habitat which is drier. There is no change to the assessment made for reptiles in the original ES and, following the additional mitigation already stated in Section 13.5.1 residual impacts are assessed to be **negligible**.

13.5.2.3 Construction Impact 3: Habitat loss, disturbance or killing of otter

The European otter is a semi-aquatic mammal, which is common around the freshwater and coastal areas of Scotland. UK Populations are internationally important, especially since their widespread decline across much of their western European range (JNCC, 2004). Populations in coastal areas utilise shallow, inshore marine areas for feeding and require fresh water for bathing and terrestrial areas for resting and breeding holts (JNCC, 2004). Where otters live in coastal area (particularly in Scotland) they tend to have a largely diurnal habitat, live in group territories, and have comparatively small home ranges, typically below 5km (Kruuk, 1995).

Otters are EPS, and protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). They are subject to the provisions of Regulation 43 of those Regulations. Otters are also protected under the Wildlife and Countryside Act 1981 (as amended) and are listed as an SNH Priority Species. Otters are also listed on the Local Biodiversity Action Plan (LBAP). As such, otter are considered to be of high importance.

As detailed in the embedded mitigation, North Ayrshire Council already commit to maintaining a strict footprint of works throughout the construction period, and habitat reinstatement upon the completion of the works. Toolbox Talks will also be provided to all construction staff regarding otters, their protection and the agreed mitigation. The working methodology will also follow construction industry good practice guidance, as detailed in **Table 16 11 of the original ES**, such as having spill kits on site at all times, checking equipment regularly to ensure leakages do not occur, and limiting refuelling of construction plant to designated impermeable areas.

Construction activities will maintain a strict footprint of works away from the coastline, and construction vehicles and equipment will not be active on, or stored by, the coastline for longer than is essential and access to the shore will be restricted when not loading / unloading the delivery vessel.

Whereas impacts to the otter population at the Eileans assessed in the original ES are considered to be temporary over a number of weeks during construction, works at the temporary slipway have potential to cause disturbance to otters over 12 months, which is considered to be long term. Although two lay ups were recorded 70m north along the coastline from the proposed site and the regular sitings indicate the area is well used by otters transiting the coastline, no otter holts were identified within the footprint of the temporary compound area and much of the ground is damp underfoot making it less likely for holts and lay ups, however suitable otter habitat is present along the coastline near the site, including the drier habitat

and freshwater pools. Otters are transient and may create holts and resting sites in new locations. During barge deliveries, there is likely to be inhibited access for otters along the coastline, but during quieter times individuals should be able to move freely along the coastline.

There is potential for otters at Farland Point to be disturbed by loud or sudden noise during construction activities. This may cause disturbance of resting otters, interruption of foraging behaviour or fright. These impacts would be of greater magnitude in the immediate vicinity of the temporary slipway and compound area. Impacts are considered to be of medium magnitude and intermittent in the long term over approximately 12 months, but will cease upon completion of the works. Upon completion of the slipway and compound area (over a few days) there will be no excavation works or loud regular banging noises associated with construction. Noise is most likely to be generated by vehicles and movement of materials. Equally, as no earthworks will be carried out at this location, potential impacts from dust are most likely to be generated from trackout at the turning point onto Marine Parade. Due to the potential importance of Farland Point to the local otter population, a precautionary impact of **major adverse** significance is predicted on noise disturbance and disturbance of potential resting sites at Farland Point during this period.

Construction materials are also anticipated to be brought to site via barge and was considered within the original ES. There is a potential for otters foraging or commuting in the water to be hit by construction vessels or disturbed by underwater noise. Information provided by Marine Traffic (2020) identifies moderate levels of commercial and recreational vessels off the coastline at Millport. Farland Point faces the Hunterston channels, which is a major shipping route. A review of the Marine Scotland MAPS NMPI shows that the area around Millport is relatively high for vessel numbers, with between 20 and 50 vessels within Millport Bay every week, up to 150 vessels each week travelling east past Great Cumbrae Island, and more than 150 a week passing east of the island (Marine Scotland, 2019). This gives an indication that any otters in the area will be accustomed to high vessel presence, although it is noted that as the temporary slipway will create a new marine access point, the existing vessels do not currently come close to the shore along this stretch of coastline. The vessels used in construction activities are generally slow moving with noise emitted at a low frequency and there will be one or two per day, but not every day. This risk of collision is anticipated to be low magnitude, due to otter's habitualisation to the existing local levels of vessel movements in the wider areas, and the low speeds that any construction vessels would be travelling in the vicinity of the coastline, and otters are considered to be of low sensitivity to underwater noise. Overall, the potential impacts associated with vessels is anticipated to be of **minor adverse** significance.

On Great Cumbrae, potential effects arising from changes in noise are considered in Section 16 Noise and Vibration, including embedded mitigation measures to minimise effects from construction phase road traffic and best practice and policy measures to minimise effects of construction noise. Measures to reduce the impacts of noise and vibration will be included in the CEMP.

Section 19 Air Quality discusses potential impacts from dust and particulate matter from construction activities and trackout. .

Additional mitigation is identified within the original ES and **Section 13.5.1** of this SEIAR to manage the impacts to otter during the works which will be implemented at Farland Point, including pre construction survey, otter protection plan and measures to protect otters on site. .

Pre construction surveys for otter will be undertaken at Farland Point and will record any activity with 200m of the proposed works. Pre construction otter surveys will also be undertaken across the footprint of the rest of the proposed scheme, including a winter survey of the Eileans to ascertain the location of

potential holts assumed during previous surveys when vegetation was high and precise location(s) was unconfirmed.

An Otter Protection Plan will be developed for the project, in consultation with NatureScot, which will include for works at the temporary slipway and compound area. This will include for otter-proof fencing around the compound area and measures to minimise disturbance onto the intertidal area and foreshore through fencing. Construction of the slipway and compound area will be supervised by the EcoW. Construction work will be undertaken during agreed daylight working hours wherever possible to minimise the requirement for artificial lighting on the site. Deliveries to the slipway are not tidally dependant and will be schedules to avoid dawn / dusk to minimise disturbance to otters, who are known to exhibit crepuscular activity along this coastline. Where artificial light is required, lights will be directed away from the coastal area and watercourses to allow otters to migrate through the area undisturbed. If necessary, a licence to disturb otters will be applied for from NatureScot for the construction works at Farland Point and on the Eileans.

Following the implementation of the best practice measures and Otter Protection Plan to minimise adverse impacts to otters where possible, the impacts to otter are assessed to be **minor adverse** during the period of construction.

13.5.2.4 Construction Impact 4: Disturbance of foraging bats

No trees or buildings with roosting potential will be disturbed as part of the works. The compound area at Farland Point is on the edge of a wider area of suitable habitat for foraging bats. Deliveries to the compound and works within the compound will be undertaken during daylight hours where possible to minimise the need for artificial lighting. Embedded mitigation includes for sensitive lighting regimes if artificial lighting is required, and lighting will be directed away from the coast. There is no change to the assessment made for foraging bats in the original ES and, following the embedded and additional mitigation already stated in **Section 13.5.1**, residual impacts are assessed to be **negligible**.

13.5.2.5 Construction Impact 5: Spread on non-native invasive species

One small stand of Japanese knotweed is recorded within the footprint at the compound area, adjacent to the road. More, larger, stands of Japanese knotweed are also recorded in the wider area but will not be disturbed as part of the works. Imported rock for the slipway will come from Glensanda Quarry (or other quarry) which minimises the risk of bringing invasive plant material to site. As already assessed, the impacts of spread of invasive non native species (INNS) are anticipated to be at worst case **moderate adverse** in significance.

As part of the mitigation already included within the original ES, a pre-construction survey will be undertaken and an Invasive Species Management Plan will be developed and agreed with NatureScot prior to construction commencing. Any INNS present on site will be managed in line with the Code of Practice on Non-Native Species, 2012. The ISMP be developed in accordance with the advice on SEPA's INNS Webpage and the guidance document on Biosecurity and management of invasive non-native species for construction sites and Controlled Activities. The ISMP will also include for the treatment and removal of the Japanese knotweed outside but adjacent to the footprint of the compound area at Farland Point, to reduce the risk of the species spreading to the compound area and enhance biodiversity at the site. The ISMP will be submitted alongside the CEMP. These management measures will reduce the risk of spread of non native species to **minor adverse.**

13.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 13-2**. The Table demonstrates that all impacts are still considered to be **worst case minor adverse**.

Table 13-2 Potential impacts identified for terrestrial ecology

Potential Impact	Receptor	Importance	Magnitude	Significance	Summary of Mitigation Measures	Residual Impact	Change to original assessment
Construction							
Impact 1: Temporary or permanent habitat loss	Amenity grassland	Negligible	High	Minor adverse	Topsoil management, surface water management, use of existing hardstanding where possible, geotextiles.	Negligible	No change
	Trees	Negligible	Medium	Minor adverse	Tree RPAs will be defined and works will be avoided within these.	Negligible	No change
	Eileans grasslands	Low	Medium	Minor adverse	Reduced access onto islands in the bay.	Negligible	No change
	Farland Point SWT	Medium	Medium	Moderate adverse	Maintenance of drainage and habitat restoration	Minor adverse	New impact
Impact 2: Habitat loss, disturbance or killing of reptiles	Reptiles	Medium	Low	Minor adverse	Precautionary methods (habitat manipulation).	Negligible	No change
Impact 3: Habitat loss, disturbance or killing of otter	Otter	High	Up to Medium	Up to Major adverse	Pre-construction survey. Agreement with SNH, Potential EPS licence. Minimising works on the islands in the bay, Best practice guidance, sensitive lighting regime, ECoW, and ramps in trenches.	Minor adverse	No change to assessment. Licence will be sought for works at Farland Point. Deliveries will be timed for daylight hours wherever possible and access will be restricted to the shore
Impact 4: Disturbance of foraging bats	Bats	Medium	Low	Minor adverse	Sensitive lighting regime	Negligible	No change
Impact 5: Spread on non-native	Non-native invasive species	Medium	Medium	Moderate adverse	Pre-construction survey;	Minor adverse	No change Removal of Japanese

Potential Impact	Receptor	Importance	Magnitude	Significance	Summary of Mitigation Measures	Residual Impact	Change to original assessment
invasive species					Invasive Species Management Plan (if required); and Fencing off of identified stands.		knotweed at Farland Point.
Operation							
Impact 1: Habitat loss, disturbance or killing of otter	Otter	Medium	Negligible	Minor adverse	None	Minor adverse	No change
Impact 2: Spread on non-native invasive species	Non-native invasive species	Medium	Low	Minor adverse	Pre-construction survey; Invasive Species Management Plan (if required); and Fencing off of identified stands.	Negligible	No change
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

13.7 Additional mitigation measures

Additional mitigation measures to minimise impacts on terrestrial ecology, beyond those already considered within the original ES, include measures to manage water drainage, preparation on an Otter Protection Plan (and licence if needed), supervision of the construction of the compound and temporary slipway by an EcoW and management of barge deliveries to avoid dawn and dusk where possible. The EcoW will liaise with SWT on any further mitigation to aid restoration of the habitats within the compound area.

Japanese knotweed will be removed from Farland Point as habitat enhancement as part of the works.

13.8 Cumulative effects

Cumulative impacts with otter may occur with works for the Millburn FPS. Limited evidence of otter have been recorded along the Millburn but all downstream of the project near to the coast, and no INNS have been recorded within the Millburn FPS footprint to date. Construction activities for the Millburn project will be managed through a Construction Management Plan with pollution prevention control measures and best practice to minimise the risks of accidents and effects upon the environment, in agreement with relevant stakeholders, and as such there is not anticipated to be a change in the severity of significance from the projects being constructed cumulatively.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that the two ECoWs for both projects remain in communication and update each other with any ecology related

matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

13.9 Summary and Conclusion

All potential impacts on terrestrial ecology are assessment to be minor adverse or less. Additional mitigation measures to minimise impacts on terrestrial ecology, beyond those already considered within the original ES, include measures to manage water drainage, preparation on an Otter Protection Plan, supervision of the construction of the compound and temporary slipway by an EcoW and management of barge deliveries during daylight hours where possible. The Japanese knotweed stand adjacent to the compound area at Farland Point will also be treated. No further additional mitigation is required.

14 GROUND CONDITIONS AND CONTAMINATION

This Section of the SEIAR sets out the outcome of additional ground condition and contamination assessments and provides new and updated information on temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 17 of the original ES**. Where the assessment has not changed it is referenced accordingly.

14.1 Response to consultee comments

Table 14-1 details consultation responses from stakeholders in response to ground conditions and contamination. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 14-1 Consultee comments related to Ground Conditions and Contamination

Consultee	Summary of Comment	Summary Response
SEPA	Groundwater vulnerability at Kames Bay SSSI is categorised as '4a -vulnerable to those pollutants not readily adsorbed or transformed' on a scale of 1 low to 5 high'. Although ground investigation was carried out by BAM Ritchies between 18 January and 02 February 2017 (consisting of four cable percussion boreholes up to 2.7mbgl, eight dug inspection pits up to 1.7mbg and 26 trial pits up to 2.4 mbgl identifying groundwater strikes in seven of the trial pits, all deeper than 1mbgl and two shallower than 2mbgl.), groundwater levels and flow have not been characterised as part of the EIA. The resultant desk study concludes that "groundwater flow in the vicinity of the town of Millport is likely to be dominated by flow from the centre of the island radially towards the coast…with local flow likely to be modified by the presence of dykes and faults, and also structures such as quay walls".	N/A
	For infrastructure involving development on a sensitive receptor (e.g., a SSSI or abstraction) and/or excavation below a depth of 1m within 250m of sensitive receptors, we consider that mitigation measures alone may not adequately protect sensitive receptors. Therefore, applicants must provide detailed qualitative and/or quantitative risk assessments to demonstrate the proposals will not have a significant impact on the groundwater flow and groundwater quality feeding identified sensitive receptors through the proposed design, construction and operation of the infrastructure.	detailed qualitative / quantitative risk assessments will be provided in advance of the works commencing for agreement with SEPA
	The EIA takes a bespoke assessment approach to considering risks to the groundwater environment and associated receptors. These risks have been considered in Section 17 and 18 of the ES. With regard to groundwater abstractions, it is reported that historically there were around 10 drinking water wells between 50m and 100m inland of the high-water mark suggesting that groundwater at a short distance from the shore is relatively fresh. However,	N/A

Consultee	Summary of Comment	Summary Response
	Section 17.5.4 of the ES indicates only three of the wells were remaining in 1896 and assumes these remaining wells are no longer used for abstraction. SEPA agrees that it seems plausible that there are no private water supplies as the town is on a mains water supply, there are no CAR-authorised groundwater abstractions or records with The Drinking Water Quality Regulator (DWQR), within a kilometre of Millport. SEPA also note that the 1957 Ordnance Survey Map supplied by RHDHV on 08 April 2020 shows no wells.	
	Figure 5-1 in Appendix 18.1 of the ES shows that the existing sea wall at Kames Bay is likely to be the dominant control on the discharge of groundwater flow into sands of Kames Bay. With regard to ground water quality, SEPA agree that the impacts to the superficial and bedrock aquifers during the construction of the FPS are likely to be insignificant, particularly as any impact will be localised and acknowledge that best practice will be followed in relation to storage of oil and fuels, managing excavated soils, pollution plans and incident responses.	N/A
	Abstraction of groundwater in quantities greater that 10m^3/day will require a CAR permit depending on the scope and duration of the works.	no ground water abstraction will take place

14.2 Updated Policy Context

There has been no update to the information provided within **Section 17 of the original ES**.

14.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 17.4 of the original ES**, supported by expert judgement.

14.4 Updated Baseline Conditions

The proposed works at Farland Point are on superficial geology of raised marine deposit (Holocene) with bedrock geology of kelly burn sandstone intersected by microgabbro and Trachytic Dinantian dykes.

A number of small natural drainage ditches are present at Farland Point, draining across wet heath / marshy grassland mosaic habitat towards the coast.

It is assumed that groundwater flow is likely to be dominated by flow from the centre of the island radially towards the coast. More locally, the flow is likely to be modified by the presence of dykes and faults. Groundwater levels, particularly close to the coast, are likely to be tidally influenced.

14.5 Updated Assessment of Effects

14.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the original ES**.

Embedded mitigation relevant to ground conditions and contamination are detailed in **Section 17 of the original ES**, and include reduction of footprint, drainage within the design of flood prevention structures,

consultation and best practice, including a CEMP relation to storage of oil and fuels, managing excavated soils, pollution plans and incident responses.

14.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact the ornithology assessment are detailed below:

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES.

No other design changes will change the impacts assessed for ground conditions and contamination in the original ES.

14.5.2.1 Construction Impact 1: Impact to Human Health, including Construction Workers and the General Public during Excavations

The changes to the project description do not chance the assessment made within the original ES for this impact.

14.5.2.2 Construction Impact 2: Groundwater Quality in the Moderately Productive Bedrock Aquifers during Construction Activities

No excavation works will occur at the temporary compound area at Farland Point and therefore there is not a pathway for exposure of construction workers or the general public to contaminated sources, contamination of bedrock aquifers or deterioration of groundwater quality during the construction period. There is therefore **no change to the impacts** assessed within the original ES.

14.5.2.3 Construction Impact 3: Impact to Groundwater Quality in the Raised Beach Deposits Superficial Aquifer during Construction Activities (Excavation)

The changes to the project description do not chance the assessment made within the original ES for this impact.

14.5.2.4 Construction Impact 4: Impact on the Firth of Clyde during construction activities due to groundwater migration

The changes to the project description do not chance the assessment made within the original ES for this impact.

14.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 14-2**. The Table demonstrates that all impacts are still considered to be **worst case negligible**.

Table 14-2 Potential Impacts Identified for Ground Conditions and Contamination

Potential Impact	Receptor	Value	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Potential changes from original assessment
Construction							
Impact 1: Impact to Human Health, including Construction Workers and the General Public during Excavations.	Construction Workers and the General Public	High	Negligible	Minor Adverse (Not Significant)	None	Minor Adverse (Not Significant)	No change
Impact 2: Impact to Groundwater Quality in the Moderately Productive Bedrock Aquifers during Construction Activities	Moderately Productive Bedrock Aquifers	Medium	Low	Minor Adverse (Not Significant)	Stockpiles should be sealed during construction to reduce infiltration.	Minor Adverse (Not Significant)	No change
Impact 3: Impact to Groundwater Quality in the Raised Beach Deposits Superficial Aquifer during Construction Activities (Excavation)	Raised Beach Deposits Superficial Aquifer	Medium	Low	Minor Adverse (Not Significant)	Stockpiles should be sealed during construction to reduce infiltration.	Minor Adverse (Not Significant)	No change
Impact 4: Impact on the Firth of Clyde during construction activities due to groundwater migration	Firth of Clyde	No plausible pathway.					No change
Operation							
There are no potential impacts on human health or the water environment during the operation of the proposed scheme with embedded mitigation measures.							
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

14.7 Additional Mitigation measures

No additional mitigation measures are proposed.

14.8 Cumulative effects

Further to the information provided in the original ES, the Millburn FPS will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an Environmental Impact Assessment Screening Report (RPSGroup, Jan 2021) detailing commitments to good site practice, adherence to best practice guidelines and a CMP to minimise risk. Any contaminated materials found will be treated separately to normal waste, and any waste material will be disposed of, offsite, at designated / licenced disposal sites / facilities as required. Care will be taken to protect waterways. As a result, no ground condition or contamination impacts are expected to occur while both projects are constructed.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any contamination related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

15 WATER RESOURCES AND FLOOD RISK

This Section of the SEIAR sets out the outcome of additional water resources and flood risk assessments and provides new and updated information within the footprint of the temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 18 of the original ES**. Where the assessment has not changed it is referenced accordingly.

15.1 Response to consultee comments

Table 15-1 below details consultation responses from stakeholders in response to water resources and flood risk. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 15-1 Consultee comments related to Water Resources and Flood Risk

Consultee	Summary of Comment	Summary Response
Response to original ES		
SEPA	According to the Intergovernmental Panel on Climate Change (IPCC) Special Report on the Ocean and Cryosphere in a Changing (IPCC, 2019) and the UK Climate Projections 2018 (UKCP18) Marine report[15] there is risk of increased rates of sea level rise this century. As a result, a range of structural and non-structural measures should be considered for the proposed scheme to ensure its future adaptation potential in a high-end climate change scenario (advised as a rise of up to 2m this century). Adaptation planning should assess implications of the scheme on the ability of the shoreline to adjust to rising sea levels and impacts on the amenity value of Millport beach.	adaptability of the scheme to sea level rise of up to 2m this century has been considered in developing the design of the proposed scheme
	SEPA satisfied with underpinning work to assess coastal flood risk and benefits of scheme.	N/A
	Whilst SEPA support the commitment to adaptive design (in line with the 'managed adaptive' approach to climate change resilience advocated by Scottish Government appraisal guidance) further engagement on adaptation potential is encouraged	The design report for the scheme will address design for climate resilience
	SEPA understand that dewatering is unlikely to be required (Table 18-4 of the ES); however, should this change this must be undertaken in compliance with General Binding Rules 2 and 15 of CAR	N/A

[15] *https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-marine-report-updated.pdf*

Consultee	Summary of Comment	Summary Response
	SEPA welcome the intention to prepare a Construction Environmental Management Plan (CEMP) and site-specific Biosecurity Plan, and intend to condition their requirements on any permissions granted prior to commencement of the scheme. The CEMP should describe the methods and techniques to be employed to ensure compliance with legislation, good practice and mitigation measures identified in the ES. It should also incorporate detailed pollution prevention and mitigation measures for all construction elements capable of causing pollution (including intended collection, containment, treatment and disposal of contaminated site drainage and any site-specific Construction Method Statements).	A CEMP will be submitted for approval prior to commencement of construction

15.2 Updated Policy Context

There has been no update to the information provided within **Section 18 of the original ES**.

15.3 Updated Assessment Methodology

No geotechnical work has been undertaken to date at Farland Point. This assessment follows the general impact assessment methodology as described in **Section 18.4 of the original ES**, supported by expert judgement.

15.4 Updated Baseline Conditions

The proposed works at Farland Point are on superficial geology of raised marine deposit (Holocene) with bedrock geology of kelly burn sandstone intersected by microgabbro and Trachytic Dinantian dykes.

A number of small natural drainage ditches are present at Farland Point, draining across wet heath / marshy grassland mosaic habitat towards the coast.

It is assumed that groundwater flow is likely to be dominated by flow from the centre of the island radially towards the coast. More locally, the flow is likely to be modified by the presence of dykes and faults. Groundwater levels, particularly close to the coast, are likely to be tidally influenced.

15.5 Updated Assessment of Effects

15.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the original ES**.

Embedded mitigation relevant to water resources and flood risk are detailed in **Section 18 of the original ES**, and include reduction of footprint, drainage within the design of flood prevention structures, consultation and best practice, including a CEMP relation to storage of oil and fuels, managing excavated soils, pollution plans and incident responses.

As part of best practice, the design of the compound area at Farland Point will include the following as embedded mitigation:

- Existing drainage will be maintained (i.e. plastic pipes in the natural drainage ditches within the wetter habitat to flow water towards the sea);
- No additional drainage will be added (i.e. the area would still be damp under matting and not dry out);
- No excavation will take place to maintain the seedbank and avoid mixing soils, no risk of release of contamination within soils etc;
- Areas which could attribute to pollution events (fuel storage etc) will be bunded and managed through the CEMP and associated plans; and
- Following construction, removal of materials and restoration of terrestrial habitats.

15.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact the ornithology assessment are detailed below:

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES. Direct impacts upon Farland Point LNCS were not previously assessed and this is considered as a new impact.

No other design changes will change the impacts assessed for water resources and flood risk in the original ES.

15.5.2.1 Construction Impact 1: Impacts on groundwater quality and Kames Bay SSSI

The changes to the project description do not chance the assessment made within the original ES for this impact.

15.5.2.2 Construction Impact 2: Impact on groundwater quantity and Kames Bay SSSI

The changes to the project description do not chance the assessment made within the original ES for this impact.

15.5.2.3 New Construction Impact 3: Impact on groundwater quantity and quality at Farland Point

Farland Point is considered of **medium** value and the footprint of the temporary slipway and compound is considered to be of **medium** sensitivity, supporting habitats which are sensitive to changes in surface hydrology. Habitat change is anticipated over the short term within the footprint of the compound area, but is not expected to extend beyond the footprint as the wet heath / marshy grassland mosaic habitat is located in the middle of the footprint, transitioning to drier grassland and scrub habitat towards the peninsular. Groundwater is expected to flow towards the coast from the footprint of the proposed compound area. Dewatering and excavation works are not proposed as part of the construction methodology, The drainage management as part of the embedded mitigation will seek to maintain the natural drainage function of the footprint, enabling the impacts to be reversed upon removal of the compound and recoverability of the habitats. The magnitude is therefore considered to be **low**. The landside elements of the proposed Scheme were originally assessed to be structurally small with limited potential to impact the groundwater flow regime or ground water quality. The location of the temporary slipway and associated compound area at Farland Point will not significantly increase the footprint of the proposed Scheme. Following adherence to the other embedded mitigation measures, including best

practice and CEMP, the impacts to groundwater and surface water at Farland Point are anticipated to be **minor adverse** in significance. No further mitigation is required.

15.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 15-2**. The Table demonstrates that all impacts are still considered to be worst case minor adverse.

Table 15-2 Potential Impacts Identified for Water Resources and Flood Risk

Potential Impact	Receptor	Value	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change to impact
Construction							
Impact 1: Impacts on groundwater quality and Kames Bay SSSI	Groundwater and Kames Bay SSSI	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)	No change
Impact 2: Impact on groundwater quantity and Kames Bay SSSI	Groundwater and Kames Bay SSSI	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)	No change
Impact 3: Impact on groundwater quantity and quality at Farland Point	Groundwater and Farland Point	Medium	Low	Minor adverse (not significant)	N/A	Minor adverse (not significant)	New Impact
Operation							
Impact 1: Impact on groundwater quality and Kames Bay SSSI due to flood protection structures	Groundwater and Kames Bay SSSI	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)	No change
Impact 2: Impact on groundwater quantity and Kames Bay SSSI due to flood protection structures	Groundwater and Kames Bay SSSI	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)	No change
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

15.7 Additional Mitigation measures

No additional mitigation measures are proposed.

15.8 Cumulative effects

Further to the information provided in the original ES, the Millburn FPS will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an Environmental Impact Assessment Screening Report (RPSGroup, 2021) detailing commitments to good site practice, adherence to best practice guidelines and a CMP to minimise risk. Care will be taken to protect waterways. Both projects are inherently designed to manage flood risk within the area. As a result, no water resource or flood risk impacts are expected to occur while both projects are constructed.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any water resource related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

15.9 Summary and Conclusion

All potential impacts on offshore and coastal ornithology are assessment to be **minor adverse**. No further additional mitigation is required.

16 NOISE AND VIBRATION

This Section of the SEIAR sets out the outcome of additional noise and vibration assessments and provides new and updated information on temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 19 of the original ES**. Where the assessment has not changed it is referenced accordingly.

16.1 Response to consultee comments

Table 16.1 details consultation responses from stakeholders regarding noise and vibration. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 16.1Consultee comments related to noise and vibration

Consultee	Summary of Comment	Summary Response
Field Studies Council	Concerns raised regarding potential for disturbance of otters due to noise and vibration emissions from activities associated with the proposed compound	This impact is outside of the scope of this Section and has been addressed in **Section 13 Terrestrial Ecology** of this SEIAR.
	Concerns raised regarding potential for disturbance of residents and events in the Millport FSC centre due to noise and vibration emissions from activities associated with the proposed compound	Additional mitigation measures have been identified to control construction noise impacts upon this receptor.

16.2 Updated Policy Context

There has been no update to the information provided within **Section 19 of the original ES**.

16.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 19.5 of the original ES**, supported by expert judgement. **Section 19.6 of the original ES** explains the receptor sensitivity and impact magnitude descriptions, as well as how the significance of impacts is determined. This information has not been updated.

16.4 Updated Baseline Conditions

The proposed temporary slipway and compound area is located on the edge of Farland Point LNCS, and approximately 30m from the Millport FSC Centre. The Millport FSC Centre includes residential and educational facilities and hosts events, including an annual symposium, weddings, conferences and visiting executives. The centre is a medium sensitivity receptor which was not included in the original ES.

There is no further update to the baseline conditions of the Proposed Scheme described in the original ES.

16.5 Updated Assessment of Effects

16.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the ES**.

Embedded mitigation relevant to noise and vibration are detailed in **Section 19 of the original ES**, the majority of these are unaltered by the design changes and do not need to be updated. The embedded mitigation measure relating to control of construction phase road traffic noise has been updated to the following: "*Earth fill and topsoil will be delivered by barge, RoRo or LoLo to Farland Point minimising the amount of construction traffic required to travel through Millport. This will reduce the impacts experienced by a larger proportion of medium sensitivity receptors located within Millport related to an increase of road traffic noise".*

The following additional embedded mitigation measures have been introduced to control construction noise and vibration impacts on the Millport FSC Centre:

- No activities at the compound during limited key programmable events such as a wedding, major conferences etc
- Deliveries by barge will be timed to be in the day and avoid dawn and dusk (also because of mitigation to otter disturbance)
- Acoustic barriers will be erected along the compound boundary facing the FSC centre to minimise disturbance from general compound activities

16.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact the noise and vibration assessment are detailed below:

Materials delivery and storage

The location of the temporary slipway and compound area has changed from what was assessed within the original ES. Direct impacts upon the Millport FSC Centre were not previously assessed and this is considered as a new impact.

This change has also altered the distribution of road traffic associated with the construction of the proposed development; hence, it has been necessary to update the construction traffic noise impact assessment.

No other design changes will change the impacts assessed for noise and vibration in the original ES.

16.5.2.1 Construction Impact 1: Construction Phase Noise

Noise from construction activities associated with the Scheme have the potential to impact on the Millport FSC Centre. The new slipway will be made of crushed rock and no excavation works or concreting are planned. The works to construct the slipway are minimal and not expected to generate much audible noise.

A maximum of two or three barge deliveries would be expected at the delivery compound per day. The site would be used for delivery of mainly pre-cast and wet concrete to the island. One or two fork-lifts would be required on the site to unload from barges, move to storage and load onto HGVs for transport to the footprint of the Scheme. In line with health and safety requirements for the compound, reversing of vehicles would be minimised and controlled.

The proposed embedded mitigation measures described in this SEIAR, along with the best practice measures described in **Section 19 of the original ES**, should control construction noise impacts on the Millport FSC Centre to no greater than minor magnitude. The receptor is of medium sensitivity, so the impact significance is minor i.e. not significant.

Mitigation

Whilst significant construction noise impacts on Millport FSC Centre are not anticipated, noise monitoring is proposed as an additional potential mitigation option. If Millport FSC Centre do report some significant disturbance due to construction noise issues, then noise monitoring will be undertaken to identify the activities causing the impacts and the associated noise emissions. The outcome of the monitoring will be used to amend working practices as required to reduce the associated impacts.

Residual effect

The impact magnitude is expected to be no greater than **minor adverse** i.e. not significant.

16.5.2.2 Construction Impact 2: Construction Phase Vibration

No perceptible vibration emissions are anticipated from the construction activities associated with the temporary slipway and compound area. Hence, impacts are of **negligible** magnitude, equating to negligible significance i.e. not significant.

16.5.2.3 Construction Impact 3: Construction Phase Traffic Noise

An updated assessment has been undertaken of the noise impacts that may arise due to construction traffic flows, based on traffic flow data supplied by the Scheme transport consultants. Calculations have been undertaken for all links on which traffic flow data have been supplied.

The road traffic noise levels, with and without the Scheme construction traffic, has been calculated in terms of the Basic Noise Level (BNL), as defined in the Department of Transport/Welsh Office publication Calculation of Road Traffic Noise. The magnitude of construction traffic noise impact has been identified

from the change in calculated BNL due to construction traffic using the criteria set out in **Table 19-32 of the ES**.

Table 16-2 Calculated BNL – 2021 Baseline + Growth vs. 2021 Baseline + Growth + Average Construction Traffic

Link Name	2021 Baseline + Growth BNL ($L_{A10,18hr}$ dB)	2021 Baseline + Growth + Average Construction Traffic BNL ($L_{A10,18hr}$ dB)	Overall Change ($L_{A10,18hr}$ dB)	Impact Magnitude
B896 - West Bay Road	42.2	42.2	0.0	Negligible
B896 - West Bay Road	43.0	43.3	0.4	Negligible
B896 - Cardiff Street	56.1	56.2	0.1	Negligible
B896 - Stuart Street / Guidlford Street	55.3	55.4	0.1	Negligible
B896 - Glasgow Street	56.1	56.3	0.1	Negligible
B896 - Kelburn Street	56.1	56.3	0.2	Negligible
B896 - Kames Bay	48.2	49.0	0.8	Negligible
B896 - Marine Parade (north)	48.9	49.7	0.8	Negligible
Golf Road	42.8	43.1	0.3	Negligible
B896 - Marine Parade (south)	48.2	49.1	0.9	Negligible
B896	53.4	53.7	0.3	Negligible
A78 - Galloway Street	66.4	66.4	0.0	Negligible
A78 - Main Street	67.8	67.8	0.0	Negligible

Table 16.3 shows that all impacts are of negligible magnitude, hence the impact significance is **negligible** i.e. not significant.

16.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 16.3**. The Table demonstrates that all impacts are considered to be worst case minor adverse.

Table 16.3 Potential Impacts Identified for noise and vibration

Potential Impact	Receptor	Significance	Examples of Potential Mitigation Measures	Residual Impact	Potential changes from original assessment
Construction					
Impact 1: Construction Phase Noise	Human	Negligible to Major (Activity and scenario dependent).	Best Practice Measures (BPM) as embedded mitigation. Temporary, demountable absorptive noise screens in proximity to noisiest activity and plant.	Negligible (Not significant)	Minor (Not significant) impact upon Millport FSC Centre
Impact 2: Construction	Human	Negligible to Major (Activity and scenario dependent).	Best Practice Measures (BPM) as embedded mitigation.	Minor (Not significant)	Negligible (not significant) impact upon

Potential Impact	Receptor	Significance	Examples of Potential Mitigation Measures	Residual Impact	Potential changes from original assessment
Phase Vibration					Millport FSC Centre
Impact 3: Construction Phase Road Traffic	Human	Negligible to Minor (Not significant in EIA terms)	Traffic Management Plan	Negligible (Not significant)	No change
Operation					
No significant noise impacts are likely during the operational phase of the proposed scheme.					
Decommissioning					
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.					

16.7 Additional Mitigation measures

Whilst significant construction noise impacts on Millport FSC Centre are not anticipated, noise monitoring is proposed as an additional potential mitigation option. If Millport FSC Centre do report some significant disturbance due to construction noise issues, then noise monitoring will be undertaken to identify the activities causing the impacts and the associated noise emissions. The outcome of the monitoring will be used to amend working practices as required to reduce the associated impacts.

16.8 Cumulative effects

Further to the information provided in the original ES, the Millburn FPS will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an EIA Screening Report (RPSGroup, 2021) detailing that the construction phase noise is expected to be small scale, localised, temporary and short term during the construction phase. Construction activities for the Millburn project will be managed through a Construction Management Plan. As a result, no cumulative noise and vibration impacts are expected to occur while both projects are constructed.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any construction noise and vibration related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

17 TRAFFIC AND TRANSPORT

This Section of the SEIAR sets out the outcome of additional transport assessments and provides new and updated information on the site compound and materials storage areas.

It was originally planned for delivery of materials to be by barge to Keppel Pier or Millport Pier (Quayhead) but it will now be to a temporary slipway near to the FSC centre (**Figure 1**). This Section therefore identifies

any new or altered significant effects which could arise as a result of the altered locations from that presented in **Section 20 of the original ES**. Where the assessment has not changed it is referenced accordingly.

17.1 Response to consultee comments

There have been no further consultee comments on traffic and transport matters since the submission of the original ES.

17.2 Updated Policy Context

There has been no update to the information provided within **Section 8 of the original ES**.

17.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 8.4 of the original ES**, and the traffic and transport specific assessment detailed in **Section 20.4** of **Section 20** of the original ES, and supported by expert judgement. A baseline year of 2021 has been used in this SEIAR. Assessing the start of construction (2022) against a baseline year of 2021 is considered worst case in terms of traffic assessment. The impacts associated with the generated construction traffic will be assessed against a lower traffic baseline dataset of 2021 and thus would increase any potential impacts.

17.4 Updated Baseline Conditions

There is no update to the baseline conditions of the Proposed Scheme described in **Section 20.5 of the original ES**.

17.5 Updated Assessment of Effects

This Section establishes the Realistic SEIAR worst case (daily traffic demand) scenario for each key impact category, forming the basis for the subsequent assessment.

17.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the original ES**.

Embedded mitigation relevant to Traffic and Transport are detailed in **Section 20 of the original ES**, However, with the SEIAR design changes presented in **Section 1.5** of this SEIAR the following **Table 17-1** has been updated accordingly.

Table 17-1 Embedded Mitigation Measures for Traffic and Transport

Parameter	Mitigation Measures Embedded Into the Scheme Design
Delivery of Plant and Materials (concrete) by barge	To reduce the traffic impact on the public highway and specifically on the Largs to Cumbrae Slip ferry crossing, delivery of plant and concrete materials (either pre-cast or materials for in-situ concrete) by barge is proposed. Deliveries by barge, RoRo or LoLo for the SEIAR are proposed to arrive on the east of the island of Great Cumbrae, at Farland Point.

Delivery of earth fill by barge	Earth fill and topsoil will be delivered by barge, RoRo or LoLo to Farland Point minimising the amount of construction traffic required to travel through Millport. This will reduce the impacts experienced by a larger proportion of high value receptors located within Millport related to an increase of traffic.
Construction Vehicle Speeds	It is proposed to implement an advisory 20mph speed limit to construction HGVs throughout the town of Millport (West of Farland Point) to the 50m west of the junction of Milburn Street and West Bay Road. This measure will help minimise the likelihood of HGVs impacting on pedestrians during periods of use.

17.5.2 Potential Changes to Original Assessment

A summary of the design changes that would impact on the original ES traffic and transport assessment are detailed below:

Materials delivery and storage
The construction of the temporary slipway and associated compound at Farland Point forms part of the embedded mitigation for traffic and transport on Great Cumbrae, by minimising the use of the public highway for movement of plant and construction materials and avoiding the Largs – Cumbrae Slip ferry crossing.

As a result of the relocated slipway and compound, the distribution and assignment of construction vehicles onto the traffic and transport study area have been amended.

Construction programme
Although the programme has changed, the construction works are still intended to begin in 2022. Therefore, there has been a change to the original ES peak construction year of assessment.

Ground raising
The volume of earth fill for ground raising has significantly reduced from 6,500m^3 to 2,000m^3. The reduction will have a positive impact for traffic and transport by reducing the total required HGV movements from the slipway to each of the respective onshore scheme areas.

17.5.2.1 Construction Programme

The construction programme details have been amended slightly to those presented within the original ES. Notwithstanding construction is due to begin in 2022 and can still be considered a worst case scenario for assessment purposes.

17.5.2.2 Traffic distribution

HGV Distribution
For the purposes of this SEIAR, the proposed location of the temporary slipway at Farland Point (located on Link 12) is adopted for all material deliveries. Once materials and plant have landed on Great Cumbrae, the HGVs will transfer the materials to the respective Onshore Scheme Areas with the following distribution assumptions applied as detailed in **Table 17-2**.

Table 17-2 Material Distribution Assumptions

Parameter	From	To	Via
Aggregates for onsite batching plant. Aggregates Other materials	Barge	Farland Point	-
In-situ concrete	Farland Point	Onshore Scheme Areas	Link 12

		Links 1,4,5,6,7,8,10,11 and 16)	
Pre-cast concrete Surfacing materials	Farland Point	Onshore Scheme Areas Links 1,4,5,6,7,8,10,11 and 16)	Link 12
Earth fill	Farland Point	Onshore Scheme Areas Onshore Scheme Areas (Links 7 and 8)	Link 12

Construction Staff Distribution

All construction staff distribution details are as presented within the original ES (refer to paragraphs 159 to 162).

17.5.2.3 Traffic Demand (Construction)

For this SEIAR option the main compound and associated concrete batching plant are proposed to be located at Farland Point on Link 12. Thus, creating the worst case maximum traffic demand originating from the east of Millport with construction vehicles heading to the onshore working areas within Millport. Whereas, the original ES provided the worst case maximum traffic demand originating from the west of Millport.

HGV Traffic Demand and Assignment

The traffic demand has been assigned in accordance with the methodology set out in the original ES (paragraph 172 to 175).

Following the original ES methodology for traffic demand, **Appendix 20.7 (of the original ES)** has been updated (as Appendix B –) to include Design Change 6: Reduction in Earth Fill requirements and Design Change 3: Temporary Slipway.

The updated traffic demand has been assigned in accordance with the methodology set out in the Original ES (paragraph 172 to 175).

Appendix C –provides all 14 Peak Activity Weeks (PAWs) HGV SEIAR movements individually distributed and assigned to the highway network based on the associated construction activities. **Table 17-3** provides a summary of the top 14 SEIAR PAWs with the highest daily HGV movements highlighted (orange).

Table 17-3 shows that the maximum traffic assigned for each highway link generally occurs within the top 2 SEIAR PAWs with the exception of links 5 (PAW 9) and 6 (PAW 3). The 'Peak' row details the peak daily HGV construction movements. This method has the advantage of ensuring that the short term peak impact on all links is assessed and is therefore appropriate for screening traffic and transport effects.

To provide context to the short term impacts associated with the peak daily HGV flows, **Table 17-3** also presents the medium to longer term impacts associated with the average daily HGV movements and is provided for comparison reasons only.

Staff Traffic Demand and Assignment

All staff traffic demand and assignment details are as presented within the original ES (refer to paragraphs 180 to 171) with the exception of paragraph 183 which is replaced by the following paragraph.

Appendix D details the distribution and final assignment of construction workers to and within the traffic and transport study area.

17.5.2.4 Comparison of SEIAR and the original ES Traffic Assignments

To determine the scope of the SEIAR assessment, a comparison of the revised traffic assignments associated with relocating the material delivery locations from the original ES locations, is provided in **Table 17-4**, **Table 17-5** and **Table 17-6**.

The following can be observed from **Table 17-4**, **Table 17-5** and **Table 17-6**:

Links 1 to 8 all show reduced levels of traffic demand in the SEIAR option when compared to the original ES traffic demand. Thus, there is potential for any impacts identified within the original ES to be of a lesser significance and any resultant mitigation measures originally proposed could be reduced in scope or withdrawn entirely.

Link 12 shows an increased level of traffic demand when compared to the original ES. Thus, there is potential for an increase in impact significance on these links.

Links 9, 10, 11 and 13 to 17 all show no change in the level of traffic demand within the SEIAR option compared to the original ES and thus, any impacts, mitigation measures and residual impacts would be identical to those presented in the original ES.

Accordingly Links 1 to 8 and 12 are scoped in for further assessment for this SEIAR.

Royal HaskoningDHV

Table 17-3 SEIAR Peak Activity Week Summary Matrix (Daily HGV movements)

Peak Activity Week	Programme Week	Links																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Week 46	0	8	8	16	16	16	42	42	0	5	5	46	4	4	4	8	2
2	Week 47	0	13	13	26	26	26	42	42	0	13	13	46	4	4	4	13	2
3	Week 59	0	0	0	0	2	36	36	36	0	0	0	40	4	4	4	0	2
4	Week 60	0	0	0	0	0	34	34	34	0	0	0	38	4	4	4	0	2
5	Week 16	0	0	0	0	0	0	0	32	0	0	0	36	4	4	4	0	2
6	Week 41	0	7	7	14	14	14	30	30	0	7	7	34	4	4	4	7	2
7	Week 42	0	7	7	14	14	14	30	30	0	7	7	30	4	4	4	7	2
8	Week 48	0	6	6	9	9	9	25	25	0	3	3	25	4	4	4	6	2
9	Week 65	0	0	0	0	26	26	26	26	0	0	0	30	4	4	4	0	2
10	Week 34	0	0	0	0	0	0	22	22	0	0	0	26	4	4	4	0	2
11	Week 57	0	0	0	0	22	22	22	22	0	0	0	26	4	4	4	0	2
12	Week 26	0	0	0	20	20	20	20	20	0	0	0	24	4	4	4	0	2
13	Week 38	0	0	0	0	0	0	16	16	0	0	0	20	4	4	4	0	2
14	Week 40	0	0	0	0	0	0	16	16	0	0	0	20	4	4	4	0	2
Peak		0	13	13	26	26	36	42	42	0	13	13	46	4	4	4	13	2
Average		0	8	8	17	17	22	28	28	0	7	7	32	4	4	4	8	2
% reduction from Peak		-	37%	37%	37%	36%	40%	34%	33%	-	46%	46%	32%	0%	0%	0%	37%	0%
Average Duration (weeks)		0	5	5	6	9	10	13	14	0	5	5	14	14	14	14	5	14

Table 17-4 Comparison of Peak Daily HGV Movements

Material Delivery Options	Links																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
The Original ES	36	26	26	36	36	54	62	52	0	13	13	52	4	4	4	13	2
SEIAR Option	0	13	13	26	26	36	42	42	0	13	13	46	4	4	4	13	2
Increase or Decrease	-36	-13	-13	-10	-10	-18	-20	-10	0	0	0	-6	0	0	0	0	0
Key																	
	Reduction in traffic from the original ES																
	Increase in traffic from the original ES																
	No change in traffic from the original ES																

Table 17-5 Comparison of Peak Employee Movements

Material Delivery Options	Links																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
The Original ES	18	16	16	16	16	16	14	12	10	2	2	10	10	10	10	2	5
SEIAR Option	0	2	12	12	12	14	16	18	10	2	2	18	10	10	10	2	5
Increase or Decrease	-18	-14	-4	-4	-4	-2	+2	+6	0	0	0	+8	0	0	0	0	0
Key																	
	Reduction in traffic from the original ES																
	Increase in traffic from the original ES																
	No change in traffic from the original ES																

Table 17-6 Comparison of Peak Daily Movements (Total)

Material Delivery Options	Links																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
The Original ES	54	42	42	52	52	70	76	64	10	15	15	62	14	14	14	15	7
SEIAR Option	0	15	25	38	38	50	58	60	10	15	15	64	14	14	14	15	7
Increase or Decrease	-54	-27	-17	-14	-14	-20	-18	-4	0	0	0	+2	0	0	0	0	0
Key																	
	Reduction in traffic from the original ES																
	Increase in traffic from the original ES																
	No change in traffic from the original ES																

17.5.2.5 Traffic Impact Screening

With reference to the GEART Rule 1[16] and Rule 2[17] a revised screening process has been undertaken for the traffic and transport study area to identity the scoped in links that are likely to have a change (increase or decrease) in traffic flows that would require further impact assessment.

Table 17-7 summarises the total daily peak vehicle movements (i.e. arrivals and departures) of all materials, personnel and plant for the peak worst case scenario. The table also provides a comparison of the peak daily construction flows with the forecast background daily traffic flows for 2021 (assumed worst case realistic start of construction and in keeping with the original ES). Cells highlighted blue indicate GEART Rule 1 or Rule 2 screening thresholds have been met.

Table 17-7 Link Screening (Construction)

Link	Description	Link sensitivity	Background 2021 Flows (24hr AADT*)		2021 Peak Daily construction Vehicle Movements		Percentage Increase	
			All Vehicles	HGVs	All Vehicles	HGVs	All Vehicles	HGVs
1	B896 - West Bay Road	Medium	272	20	0	0	0.0%	0.0%
2	B896 - West Bay Road	Medium	272	20	15	13	5.5%	64.5%
3	B896 - Cardiff Street	Medium	1,301	96	25	13	1.9%	13.5%
4	B896 - Stuart Street/Guildford Street	High	1,301	96	38	26	2.9%	27.0%
5	B896 - Glasgow Street	High	1,301	96	38	26	2.9%	27.0%
6	B896 - Kelburn Street	Medium	1,301	96	50	36	3.8%	37.3%
7	B896 - Kames Bay	Low	476	35	58	42	12.2%	119.4%
8	B896 - Marine Parade (north)	Low	476	35	60	42	12.6%	119.4%
12	B896 - Marine Parade (south)	Low	476	35	64	46	13.5%	130.7%
*	Annual Average Daily Traffic Flows (i.e. seven days a week)							
	Links likely to exceed GEART screening thresholds							

It is noted from **Table 17-7** that seven of the 9 links (Links 2, 4, 5 6, 7, 8 and 12) are above the GEART screening thresholds during the Peak worst case scenario of the SEIAR option and are therefore taken forward for further assessment.

17.5.2.6 Construction Impact 1: Severance

With reference to it is noted that the daily change in total traffic for all links for the Peak worst case scenario is less than the 30% change in total traffic threshold whereby GEART suggests negative impacts may be experienced.

[16] *Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%)*

[17] *Rule 2: Include any other specifically sensitive areas where traffic flows (or HGV component) are predicted to increase by 10% or more.*

Thus, the magnitude of effect upon all links is therefore assessed as negligible on low to high sensitivity links giving a maximum impact of short term and infrequent **negligible** to **minor adverse**.

Mitigation
There is no mitigation applicable for this impact

Residual Impact
The impact remains as a short term and infrequent **negligible** to **minor adverse** impact.

17.5.2.7 Construction Impact 2: Pedestrian Amenity

GEART suggest that a threshold of a doubling of total traffic flow or the HGV component may lead to negative impact upon pedestrian amenity.

The links (Link 2, 4, 5 and 6) which experience traffic flow significantly below the 100% threshold as identified by **Table 17-7** results in a magnitude of effect as very low on low to high sensitive links giving impact significance on all links of **negligible** to **minor adverse**.

The links (Links 7,8, and 12) identified by **Table 17-7** as being greater than the 100% GEART impact thresholds whereby GEART suggests negative impacts may be experienced are assessed further in Table 17-7**Table 17-8**

Table 17-8 Pedestrian Amenity Assessment - SEIAR Peak Worst Case Scenario

Link	Link Description	2021 HGV Base Flows		HGV Flow Increase	Magnitude of Effect	Link sensitivity	Impact Significance
		Base	Base + Const				
7	B896 - Kames Bay	35	77	119.4%	Low	Medium	Minor Adverse
8	B896 - Marine Parade (north)	35	77	119.4%	Low	Low	Minor Adverse
12	B896 - Marine Parade (south)	35	81	130.7%	Low	Low	Minor Adverse

The magnitude of effect upon all links assessed as low to medium on low to medium sensitive links giving a maximum impact of short term and infrequent **minor adverse**.

Mitigation
There is no mitigation applicable for this impact.

Residual impact
The impact remains as a short term and infrequent **minor adverse** impact.

17.5.2.8 Construction Impact 3: Road Safety

Within the original ES baseline environment, it was identified that there are no inherent safety issues on the majority of the highway network. For all links within the SEIAR Option, road safety has not been assessed further. An appropriate road crossing safety system could be used to ensure safety of pedestrians crossing the road at Farland Point area if required.

17.5.2.9 Construction Impact 4: Driver Delay

Within the original ES assessment, particular concern with regards to driver delay was raised during scoping consultation and focused on the Largs Ferry Terminal. Thus, for all links within the SEIAR Option, the impact of Driver Delay is considered under Impact 5: Ferry Capacity

17.5.2.10 Construction Impact 4: Ferry Capacity

Within the original ES, particular concern with regards to ferry capacity and driver delay was raised during scoping consultation and focused on the requirement for construction traffic to utilise the ferry crossing with the potential to introduce delays to tourists, commuters and school children who frequently use the ferry service.

The original ES focused on the construction traffic demand that were assigned to Links 13, 14 and 15. As shown in **Table 17-6,** the traffic demand for links 13, 14 and 15 have not changed from the original ES and thus Ferry Capacity has not been assessed further and the findings in the original ES are unchanged.

17.5.2.11 Construction Impact: Temporary Road and Footway Closures

Details of road and footway closures required within the SEIAR are identical to those presented within Section 5 Project Description of the original ES, with the exception of mitigation measures proposed for Link 1 West Bay Street. During the SEIAR option, construction vehicles are not assigned to Link 1, thus no mitigation is required to reduce impacts.

17.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 17-9.** The Table demonstrates that the SEIAR option reduces the residual impacts on the roads within Millport Town.

17.7 Additional Mitigation measures

No additional mitigation measures are proposed. An appropriate road crossing safety system could be used to ensure safety of pedestrians crossing the road at Farland Point area if required

17.8 Cumulative effects

Further to the information provided in the original ES, the Millburn Flood protection scheme will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an Environmental Impact Assessment Screening Report (RPSGroup, 2021) detailing that the construction phase traffic for the project is not expected to be significant (small in scale). No changes to traffic levels or traffic flows are anticipated post construction phase. Construction activities for the Millburn project will be managed through a Construction Management Plan. As a result, no cumulative traffic and transport impacts are expected to occur while both projects are constructed.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any traffic or transport related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

Table 17-9 Potential Impacts Identified for Traffic and Transport for SEIAR Option

Potential Impact	Receptor	Value	Magnitude	Significance	Summary of Mitigation Measures	Residual Impact	Change to original assessment
Construction							
Impact 1: Severance	Links 2, 4, 5, 6, 7, 8, 12 and 16	Low to High	Very Low	Negligible to Minor Adverse	None required	Negligible to Minor Adverse	No change
	Link 1	Medium	Very Low	Negligible	None required	Negligible	Reduction in impact significance
Impact 2: Pedestrian Amenity	Links 7, 8 and 12	Low to Medium	Low	Minor Adverse	None required	Minor Adverse	No change
	Link 1	N/A	N/A	N/A	None required	Negligible	Reduction in impact significance thus removal of mitigation measures required for Link 1
	Link 2	Medium	Very Low	Negligible	None required	Negligible	Reduction in impact significance
	Links 4 and 5	High	Very Low	Minor Adverse	None required	Minor Adverse	No change
	Link 10, 11 and 16	N/A	N/A	N/A	Community Engagement	Minor Adverse	No change
Impact 3: Road Safety	Not assessed du to no inherent safety issues being present on the highway network						No change. An appropriate road crossing safety system could be used to ensure safety of pedestrians crossing

Potential Impact	Receptor	Value	Magnitude	Significance	Summary of Mitigation Measures	Residual Impact	Change to original assessment
							the road at Farland Point area if required
Impact 4: Driver Delay	See Impact 5: Ferry Capacity						No change
Impact 5: Ferry Capacity	Ferry capacity and ferry terminal junctions	High	Very Low	Minor Adverse	None required	Minor Adverse	No change
Impact 6: Temporary Road and Footway Closures	West Bay (Link 1), Marine Parade (link 8), Stuart Street (link 4), Glasgow Street (link 5), Kelburn Street (link 6) and Kames Bay (link 7)	High	Very Low	Minor Adverse	None required	Minor Adverse	No change
	Milburn Street (link 10), Crichton Street (link 11)	High	Low	Moderate Adverse	Single lane road closure (northbound lane) on Millburn Street between the junction of West Bay Road to the junction of parking restrictions on the southbound Crawford Street, with associated temporary lane. Identifying alternative parking locations on West Bay Road and Crawford Street for impacted residents. Identifying mobility impaired / vulnerable residents currently residing in Milburn Street and Crichton Street	Minor Adverse	No change

Potential Impact	Receptor	Value	Magnitude	Significance	Summary of Mitigation Measures	Residual Impact	Change to original assessment
					allowing a system of temporary vehicle access or to drop off and pick up service if required. Commitment to keep existing pedestrian routes open and accessible throughout the construction duration thus minimising impacts to local residents. Commitment to temporarily lift road closures and parking restrictions when not required during the construction programme.		
	Clyde Street (link 16)	High	Low	Moderate adverse	Pedestrian/ Vehicle Management System	Minor Adverse	No change
Operation							
Operation not assessed as traffic movements will be negligible.							No change
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							No change

17.9 Summary and conclusion

All potential impacts on traffic and transport are assessment to be minor adverse or less. No further additional mitigation is required. An appropriate road crossing safety system could be used to ensure safety of pedestrians crossing the road at Farland Point area if required

18 AIR QUALITY

This Section of the SEIAR sets out the outcome of additional air quality assessments and provides new and updated information on temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 21 of the original ES**. Where the assessment has not changed it is referenced accordingly.

18.1 Response to consultee comments

There has been no further comments raised for air quality matters. Relevant consultation prior to the submission of the ES is discussed within the original ES.

18.2 Updated Policy Context

There has been no update to the information provided within **Section 21 of the original ES**.

18.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 21.4 of the ES**, supported by expert judgement.

18.4 Updated Baseline Conditions

There is no update to the baseline conditions of the Proposed Scheme described in the original ES or otherwise.

Updated Assessment of Effects

18.5 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description** of the ES. Embedded mitigation relevant to air quality are detailed in **Section 21 of the original ES**, and include:

- The vast majority of material and plant deliveries will be undertaken by barge, which will reduce the number of Heavy Duty Vehicles (HDVs) leaving the Scheme Area, and the transportation of dust / dirt onto the public road network;
- Fencing will be erected around each working area as required. This will act as a barrier and minimise the amount of dust transported from working areas to nearby receptors (e.g. residential housing);
- Whenever possible, construction vehicle movements will be limited to within the site boundary;

- Earth fill and top soil will be delivered to the pier to the east of Millport (now to the temporary compound at Farland Point) to minimise the amount of traffic required to travel through Millport;
- Only miscellaneous deliveries will be undertaken via the ferry from Largs; and
- Employee traffic has been assigned to all likely origins Link 9 (i.e. Golf Road) from holiday home site. And both routes into Largs and via the ferry. Employees are assigned to 8 seater minibuses.

Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact the air quality assessment are detailed below:

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES.

No other design changes will change the impacts assessed for air quality in the original ES.

18.5.1.1 Construction Impact 1: Dust and Particulate Matter

A qualitative assessment of construction phase dust and particulate matter (PM_{10}) emissions was carried out in the original ES in accordance with Institute of Air Quality Management (IAQM) guidance (IAQM, 2016). The changes from the original assessment do not fundamentally change the approach, or outcomes to the assessment. The only aspects which do change are the addition of the Farland Point LNCS as an ecological receptor, and the FSC Millport as a human receptor.

However, the addition of these receptors does not change the sensitivity of the area to dust and PM_{10} (Step 2B of the IAQM guidance, **paragraph 84 of chapter 21 of the original ES**), and therefore the risk of impacts in Step 2C (**Table 21-18 of the original ES**).

Step 3 of the IAQM guidance identifies appropriate site-specific mitigation, related to the risk of impacts identified in Step 2C. Therefore, the mitigation measures listed in the original ES under paragraphs 89 and 90 remain valid following the updates to the proposed scheme. For expedience, the mitigation measures are also listed below:

Communications
- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a CEMP, which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.

Dust Management
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to North Ayrshire Council when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.

- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.
- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the CEMP, record inspection results, and make an inspection log available to North Ayrshire Council when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Avoid bonfires and burning of waste materials.

Measures Specific to Earthworks and Construction

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.

Measures Specific to Non Road Mobile Machinery (NRMM)

Non Road Mobile Machinery (NRMM) and plant would be well maintained. If any emissions of dark smoke occurs, then the relevant machinery should stop immediately, and any problem rectified. In addition, the following controls should apply to NRMM:

- All NRMM should use fuel equivalent to ultralow sulphur diesel (fuel meeting the specification within EN590:2004).
- All NRMM should comply with regulation (EU) 2016/1628 of the European Parliament and of the Council.
- All NRMM should be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting).
- The ongoing conformity of plant retrofitted with DPF, to a defined performance standard, should be ensured through a programme of onsite checks.

- Fuel conservation measures should be implemented, including instructions to (i) throttle down or switch off idle construction equipment; (ii) switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded and (iii) ensure equipment is properly maintained to ensure efficient fuel consumption.

18.5.1.2 Construction Impact 2: Road Traffic Emissions

The number of daily trips generated by the proposed scheme across the road network during construction are anticipated to be similar or less for each road link than in the original ES. The maximum increase in traffic on any road link per day (Link 7: B896 – Kames Bay) was anticipated to be an increase in AADT of 76 vehicles, of which 62 would be HDVs

Therefore, the daily increase in traffic flows would be of a lesser magnitude than the criteria for increases in traffic flows above which a detailed assessment may be required (detailed in **Table 21-12 of the original ES**). Therefore, the proposed scheme was considered to have an insignificant impact on local air quality at both human and ecological receptors and a detailed impact assessment of air quality was not undertaken.

18.5.1.3 Construction Impact 3: Shipping Vessel Emissions

It was anticipated in the original ES that the number of shipping vessel trips generated by the proposed scheme was unlikely to have a significant impact on local air quality. The changes to the proposed scheme are not considered to change the outcomes of the assessment. This is due to the low background pollutant concentrations within the study area, and the low number of deliveries to the scheme area, or the short duration of more frequent deliveries.

Therefore, construction phase air quality impacts relating to shipping vessel emissions are were considered to be **not significant**.

18.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 18.1**. The Table demonstrates that all impacts are still considered to be **not significant**.

Table 18.1 Potential Impacts Identified for air quality

Potential Impact	Receptor	Significance	Examples of Potential Mitigation Measures	Residual Impact	Changes to original assessment
Construction					
Impact 1: Construction dust and particulate matter	Human receptors within 350m of the site	N/A	Best practice dust minimisation and suppression techniques as detailed in Section 18.5.1.1.	Not significant	No change
	Ecological receptors (i.e. Kames Bay SSSI and Farland Point LNCS) within 50m of the site				No change
Impact 2: Construction phase road traffic emissions	Human and ecological receptors.	Not significant.	Not required.	Not significant.	No change

Potential Impact	Receptor	Significance	Examples of Potential Mitigation Measures	Residual Impact	Changes to original assessment
Impact 3: Construction phase shipping vessel emissions	Human and ecological receptors.	Not significant.	Not required.	Not significant.	No change
Operation					
No significant air quality impacts are likely during the operational phase of the proposed scheme.					
Decommissioning					
For the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase (i.e. not significant).					

18.7 Additional Mitigation measures

No additional mitigation measures following the changes to the original ES are required.

18.8 Cumulative effects

Further to the information provided in the original ES, the Millburn FPS will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an Environmental Impact Assessment Screening Report (RPSGroup, 2021) detailing that the construction phase noise is expected to be small scale, localised, temporary and short term during the construction phase. Construction activities for the Millburn project will be managed through a CMP. As a result, no cumulative air quality impacts are expected to occur while both projects are constructed.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any construction noise and vibration related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

19 SEASCAPE AND LANDSCAPE VISUAL IMPACT

This Section of the SEIAR sets out the outcome of additional seascape and landscape visual impact assessments and provides new and updated information on temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects which could arise as a result of the changes from that presented in **Section 22 of the original ES**. Where the assessment has not changed it is referenced accordingly.

19.1 Response to consultee comments

Table 19-1 details consultation responses from stakeholders in response to seascape and landscape visual impact. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 19-1 Consultee comments related to Seascape and Landscape Visual Impacts

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Response to ES		
Scottish Natural Heritage (SNH)	SNH advise that this proposal does not raise landscape issues of national interest in terms of: a. significant adverse effects on the integrity and objectives of designation of a National Scenic Area b. significant adverse effects on Special Landscape Qualities of a National Park c. significant adverse effects on the qualities of a Wild Land Area d. landscape issues in the wider countryside	N/A
North Ayrshire Council Planning Team	The Environmental Impact Statement finds that the offshore protection works would have a significant visual impact on the coastal zone. The offshore works would be visible from numerous properties with an outlook onto Millport Bay. It is clear that the offshore breakwater has been designed to minimise the visual impact as far as possible, however, given the nature if the proposed works, some visual impact is inevitable. The choice of location, linking existing rock outcrops is provide wave energy dissipation and protect the Stuart Street area from flooding up to the 1 in 200 year flood event without a need to enhance the height of the existing flood walls which would be detrimental to the views and enjoyment of the scenery. In addition, the rock armour design would integrate the breakwater into the rocky islets and the crest height of the breakwater would be no higher than the adjoined islets. Millport Bay is notable for its shallow and rocky character and the breakwater would be in-keeping with this character. The height of the breakwater is not considered likely to restrict any views from Millport out to sea.	N/A
	These include two rock armour revetments. The revetments would be located on a rocky foreshore. They would be located below the level of the existing promenade, streets and surrounding building, and therefore their visual impact is likely to be limited.	N/A
	The majority of these works include the repair or replacement of existing elements. The main visible elements will be that in some places existing masonry revetments will be replaced by concrete revetments. While the masonry revetments have a minor positive impact on the appearance of the Conservation Area, they are have come to the end of their lifespan, and it is considered that for the purpose of flood protection, concrete is a more suitable material. In addition, in some areas metal guard rails along the promenade are to be replaced with approx. 1m high concrete crest walls. The impact of this change is likewise considered to be minor to the overall appearance of the Conservation Area.	N/A
	New approx. 1m high concrete flood walls will be erected along the majority of the seafront at Millport. Given the height of the flood walls, the visual impact is likely to be limited. In some areas of the seafront where the aspect is more open, the flood walls are likely to have a moderate effect on the appearance of the area. The flood walls would not impede any views from Millport out to sea. While concrete is not the most suitable material for a Conservation Area, it is by far the most practical material. Concrete flood walls are common throughout seaside towns in Scotland, including many historic towns, and it is not considered that they would detract from the appearance of the Conservation Area.	N/A
	A number of grassed areas between the road and the promenade are to be raised in levels. The majority of these grassed areas have an existing seaward slope, and thus the raising would not take them significantly above the levels of the surrounding footways. In addition, the raising is to be gradual and there would be no steep slopes or mounds which would detract from the appearance of the area. A condition is required to ensure a landscaping plan is submitted for these grassed areas.	A Landscaping Plan will be submitted to North Ayrshire Council Planning Department for agreement prior to construction

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	None of the ancillary operations are considered likely to have a significant visual impact outside the construction phase. A number of conditions are required for further details of a number of these elements	N/A
	In summary, it is considered that the proposed Scheme would be acceptable in land use and Planning terms, and that The Scheme would contribute to the strategic aims of the LDP, namely to protect against flooding and the negative impacts of climate change and therefore encourage investment and regeneration in Millport. Under the powers of the Flood Risk Management (Scotland) Act 2009, Scottish Ministers are permitted to attach relevant Planning Conditions to any deemed consent as they see fit. In light of the above assessment, it is therefore recommended that the following conditions should be considered by Scottish Ministers:	N/A
	1. That prior to the commencement of the works, the applicant shall submit for the written approval of North Ayrshire Council as Planning Authority, final details of the external finishes of the breakwaters, revetments, crest walls, flood walls, access ramps and access steps. Thereafter, the development shall progress in accordance with such details as may be approved.	These details shall be submitted to North Ayrshire Council Planning Department for agreement prior to construction
	2. That prior to the commencement of the works, the applicant shall submit for the written approval of North Ayrshire Council as Planning Authority, a scheme of landscaping and planting for the works to the grassed areas at Glasgow Street and Kames Bay, which shall include details of species, planting densities, soil treatment and aftercare and shall include indications of all existing trees and hedgerows on the land and details of any to be retained together with measures for their protection in the course of the development. All planting, seeding or turfing comprised in the approved details of landscaping shall be carried out in the first planting season and seeding seasons following completion of the development, whichever is the sooner; and any trees or plants which, within a period of five years from the completion of the development die, are removed or become seriously damaged or diseased shall be replaced in the next planting season with others of a similar size and species, unless North Ayrshire Council as Planning Authority gives written consent to any variation.	A Landscaping Plan will be submitted to North Ayrshire Council Planning Department for agreement prior to construction
	3. That prior to the commencement of the works, the applicant shall submit details of the location and layout of the temporary site compound and materials storage area for the written approval of North Ayrshire Council as Planning Authority. Thereafter the site compound and materials storage area shall be erected in accordance with such details as may be approved and shall be removed within 4 weeks of the conclusion of development works	These details shall be submitted to North Ayrshire Council Planning Department for agreement prior to construction.
	4. That should any additional access steps to the foreshore be required, full details shall be submitted for the written approval of North Ayrshire Council as Planning Authority prior to the commencement of the works. Thereafter, the development shall proceed in accordance with such details as may be approved	A Landscaping Plan will be submitted to North Ayrshire Council Planning Department for agreement prior to construction
	5. That should any additional handrails be required, full details shall be submitted for the written approval of North Ayrshire Council as Planning Authority prior to the commencement of the works. Thereafter, the development shall proceed in accordance with such details as may be approved	A Landscaping Plan will be submitted to North Ayrshire Council Planning Department for agreement prior to construction
	6. That prior to the commencement of works, full details of the location and design of the interpretation boards and signage shall be submitted for the written approval of North Ayrshire Council as Planning Authority. Thereafter, the development shall proceed in accordance with such details as may be approved.	A Landscaping Plan will be submitted to North Ayrshire Council Planning Department for agreement prior to construction
	7. That prior to the commencement of the works, a Construction Environmental Management Plan shall be prepared and submitted for the written approval of	A CEMP will be submitted to North Ayrshire Council

Consultee	Summary of Comment	Further information / clarification required in SEIAR
	North Ayrshire Council as Planning Authority detailing mitigation measures against the potential impacts associated with construction. Thereafter, the development shall progress in accordance with such a Plan as may be approved.	Planning Department for agreement prior to construction

19.2 Updated Policy Context

There has been no update to the information provided within **Section 22 of the original ES**.

19.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 22.4 of the original ES**, supported by expert judgement. The Zone of Theoretical Influence (ZTI) has not been updated for the additional construction works at Farland Point, which will be small in nature and have limited visual receptors.

19.4 Updated Baseline Conditions

Farland Point consists of low lying coastal fringe of low lying and scrub habitat with areas of broadleaved woodland to the south of the temporary compound footprint. A small existing compound are is present, immediately to the north east of the proposed temporary compound area, with the B896 immediately to the north. The FSC centre is located immediately on the road on the other side of the B896 slightly to the north of the proposed compound area. There are no landscape designations are Farland Point. The footprint of the compound is not within the boundary or within sight of the Millport Conservation Area.

The key receptors of the temporary compound will be those travelling through the landscape:

- Local recreation route:
  - walkers on foot at Farland Point;
- Sailing route:
  - sea users – private/recreational kayakers and sailors coming close to shore in front of the compound area; and
- Transport route:
  - travellers on the B896

Farland Point Walk (partly overlapped by Cumbrae Cycle Route 1, Core Paths NC1, NC1a, NC2, NC41, NC77 and NC82, and Inner Circle Walk) is locally promoted.

19.5 Updated Assessment of Effects

This section establishes the realistic SEIAR worst case scenario for each key impact category, forming the basis for the subsequent assessment.

19.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description of the original ES**.

The use of Farland Point as a local barge delivery and storage area is mitigation to minimise impacts on the Largs ferry and vehicles on the B896/B899. **Section 22.6.2 of the original ES** details mitigation for landscape and seascape receptors during construction, including local fencing, reinstatement and construction working hours. Design of the scheme and been considered and adapted alongside considerable consultation with the community could and NAC Planning department to work within the parameters and objectives of the Millport Conservation Area and minimise undesired impacts wherever possible.

19.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact benthic ecology assessment are detailed below:

Materials delivery and storage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES.

No other design changes will change the impacts assessed for seascape landscape and visual assessment in the original ES.

Visual effects : Farland Point Walk and NC82 and NC41 Core Paths and Cumbrae Cycle Route 1
The temporary slipway and construction compound at Farland Point would be in place for approximately 12 months. The footprint is within the great Cumbrae Special Landscape Area (**Figure 22.4 of the original ES**). Farland Point as a receptor is locally designated for nature conservation and locally important for walking, dog walking etc, and Farland Point Walk (**Figure 22.5 in the original ES**) was assessed within the original ES to be of high sensitivity on account of their High to Medium value as recreational routes and the High susceptibility of the people using these routes, mostly walkers and cyclists, whose attention would be focused on the landscape and seascape around them..

Views of construction activity would include HGV movements, barge deliveries and storage of materials at the compound area. Deliveries would take place once or twice a day, but not every day. Views of the compound area would be visible during a small part of the Farland Point Walk and recreational boat users would also experience views. The people experiencing these views are also likely to have experienced other components of the proposed Scheme being constructed as part of their journey.

Works at the compound with be of low magnitude. The magnitude on visual change for the footprint of the compound area is considered to be low at the north eastern limited of the walk, and upon local walkers at Farland Point and sea users (kayakers, sailors etc) who may come close to the coast. Farland Point Walk was considered within the original ES as a receptor due to overlooking much of the construction footprint of the main proposed scheme. The magnitude of change assessed on this receptor in the original ES across the whole of the scheme would range from Medium to Negligible and the resulting level of effect would be **Substantial / Moderate** and **Significant** (from and near the pier due to the proposed offshore breakwater only) to **Moderate to Slight** and **Not Significant** (from the remainder of the route). The nature of these effects would be permanent, indirect and neutral to positive. The magnitude of change for the works at at Farland Point are conserved to be low, with the nature of the effects at the compound area being temporary, direct and negative, reversible altering to neutral / positive post works. This is considered to be within the parameters of the assessment made within the original ES on Farland Point Walk.

Visual effects: B896

The overall sensitivity of road users on the B896 is assessed to be medium, as discussed in the original ES. Views would be transitory and the magnitude of the effect of change would be low, resulting in a **Slight and Not Significant** effect. The nature of the effects at the compound area being temporary, direct and negative, reversible altering to neutral / positive post works.

Visual effects: sailing/ferry routes

There are a number of yachts and small vessels used recreationally in Millport Bay and around the island, which are already considered within the original ES. The magnitude of would be Negligible, and the resulting level of effect would be **Slight and Not Significant**. The nature of these effects would be permanent, indirect and neutral for permeant aspects of the scheme. The effects from the construction works at the temporary slipway and compound area would be temporary, direct and negative, reversible altering to neutral / positive post works.

Fencing will be used to screen the works from the footpath and the road at Farland Point, to mitigate for noise effects, otters and spread of INNS. This fencing will also be beneficial to screen the compound area from visual receptors during the construction works.

19.6 Summary

A summary of the seascape, landscape and visual effects are provided in **Table 19-2**.

Table 19-2 Summary of seascape, landscape and visual effects

Receptor	Sensitivity	Construction Effects		Operation Effects		Change from original assessment
		Magnitude	Level of Effect	Magnitude	Level of Effect	
Landscape Effects – Landscape Character						
LCT 61 - Coastal Fringe with Agriculture	Medium to Low	High to Zero	**Substantial / Moderate** to None	Low to Zero	Slight to None	No change
Landscape Effects - Landscape Designations						
Great Cumbrae Special Landscape Area	Medium	Medium to Zero	Moderate to None	Low to Zero	Slight to None	No change
Millport Conservation Area	High-Medium	High-Medium to Zero	**Substantial / Moderate** to None	Low to Zero	Slight to None	No change
Coastal Zone (Developed Coast)	Medium	High to Zero	**Substantial / Moderate** to None	High to Zero	**Substantial / Moderate** (offshore breakwater) to None	No change
Seascape Effects - Seascape Character						
Millport Coastal Character Area	Medium	High to Zero	**Substantial / Moderate** to None	High to Zero	**Substantial / Moderate** (offshore breakwater) to None	No change
Visual Effects - Viewpoints						
VP1 – Milburn Street	High	High to Medium	**Substantial to Substantial / Moderate**	Low	Moderate	No change
VP2 – Chricton Street	High	High	**Substantial**	Low	Moderate	No change
VP3 – Clyde Street	High	High	**Substantial**	Medium-Low to Low	Moderate	No change
VP4 – Millport Pier	High to High-Medium	High to High-Medium	**Substantial to Substantial / Moderate**	Medium (offshore breakwater)	**Substantial / Moderate** (offshore breakwater)	No change

Receptor	Sensitivity	Construction Effects		Operation Effects		Change from original assessment
		Magnitude	Level of Effect	Magnitude	Level of Effect	
				Low to Negligible (remainder of the proposed scheme)	Moderate to Slight (remainder of the proposed scheme)	No change
VP5 – Stuart Street	High	High	**Substantial**	Low	Moderate	No change
VP6 – Guildford Street	High	High to High-Medium	**Substantial to Substantial / Moderate**	Medium-Low to Negligible	Moderate to Slight / Negligible	No change
VP7 – Glasgow Street	High	High to High-Medium	**Substantial to Substantial / Moderate**	Low to Negligible	Moderate to Slight	No change
VP8 – Kelburn Street	High	High to High-Medium	**Substantial to Substantial / Moderate**	Low to Negligible	Moderate to Slight	No change
VP9 – Farland Hill	High	Low to Negligible	Moderate / Slight to Slight	Negligible	Slight to Negligible	No change
Visual Effects - Settlements						
Millport	High	High to Zero	**Substantial** to None	Low to Zero	Moderate to No View	No change
Visual Effects – Transport Routes						
B896	Medium	High to Zero	**Substantial / Moderate** to None	Medium-Low to Negligible	Moderate to Slight / Negligible	No change
Visual Effects – Recreational Routes						
Cumbrae Cycle Route 1 (partly overlapped by B896, Core Paths NC1, NC1a, NC2, NC77, NC74 and NC82)	High	High-Medium to Zero	**Substantial to Substantial / Moderate** to None	Medium-Low to Negligible	Moderate to Slight	No change
Inner Circle Walk (partly overlapped by B896, Cumbrae Cycle Routes 1 and 2 and Core Paths NC2 and NC86)	High	High-Medium to Zero	**Substantial to Substantial / Moderate** to None	Low to Negligible	Moderate to Slight	No change
Farland Point Walk (partly overlapped by B896, Cumbrae Cycle Route 1, Core Paths NC1, NC1a, NC2, NC41, NC77 and NC82, and Inner Circle Walk)	High	High-Medium to Zero	**Substantial to Substantial / Moderate** to None	Medium to Negligible	**Substantial / Moderate** (offshore breakwater) to Slight	No change
Fintray Bay Walk (partly overlapped by B896, Cumbrae Cycle Route 1, Core Paths NC1, NC74 and Targets Walk)	High	High-Medium to Zero	**Substantial to Substantial / Moderate** to None	Medium to Negligible	**Substantial / Moderate** (offshore breakwater) to Slight	No change
Visual Effects – Recreational and Tourist Destinations						
Millport Promenade	High	High to Zero	**Substantial** to None	Medium to Negligible	**Substantial / Moderate** (offshore breakwater) to Slight	No change
Crocodile Rock	High	Medium-Low	Moderate	Low	Moderate	No change
Visual Effects – Sailing / Ferry Routes						
Waverley Steam Paddler	High	Negligible	Slight	Negligible	Slight	No change

Receptor	Sensitivity	Construction Effects		Operation Effects		Change from original assessment
		Magnitude	Level of Effect	Magnitude	Level of Effect	
Recreational Yachts and Small Vessels	High	High-Medium to Negligible	**Substantial to Substantial / Moderate** to Negligible	High-Medium to Negligible	**Substantial to Substantial / Moderate** (offshore breakwater) to Negligible	No change

19.7 Additional mitigation measures

Fencing will be installed around the compound area for multiple purposes (as mitigation for noise, otters and spread of INNS) which will aid in screening the temporary compound area from users of the B896 and Farland Point.

In response to the consultation comments raised by North Ayrshire Council Planning Department, a Landscaping Plan will be prepared for the grassed areas between the road and the promenade at Millport. This will be submitted to the Planning Department for agreement prior to construction.

19.8 Cumulative effects

Further to the information provided in the original ES, the Millburn FPS will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an EIA Screening Report (RPS Group, 2021) detailing that any landscape impacts for the project are not expected to be significant (small in scale) and will be temporary and localised during construction. No changes to landscape receptors are anticipated post construction phase as the diversion channel will be underground. Construction activities for the Millburn project will be managed through a Construction Management Plan. As a result, no cumulative landscape impacts are expected to occur while both projects are constructed.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any landscape related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

19.9 Summary and Conclusion

All potential impacts on benthic ecology are assessment to be worst case substantial / moderate. The erection of fencing and construction of the temporary slipway at Farland Point LNCS will be supervised by the EcoW. No further additional mitigation is required.

20 TOURISM AND RECREATION

This Section of the SEIAR sets out the outcome of additional tourism and recreation assessments and provides new and updated information on temporary works at the site compound and temporary slipway for delivery and storage of material. This Section therefore identifies any new or altered significant effects

which could arise as a result of the changes from that presented in **Section 23 of the original ES**. Where the assessment has not changed it is referenced accordingly.

20.1 Response to consultee comments

Table 20-1 details consultation responses from stakeholders in response to tourism and recreation. Relevant consultation prior to the submission of the ES is discussed within the original ES.

Table 20-1 Consultee comments related to Tourism and Recreation

Consultee	Summary of Comment	Further information / clarification required in SEIAR
Response to ES		
SEPA	SEPA welcome the embedded mitigation to ensure that dredging and offshore construction works will avoid the bathing water season as per Section 7.6.1.1of the ES. This should suitably minimise the risk to bathing water quality.	n/a
Response to PAC		
Millport FSC Centre	Concerns raised regarding potential for disturbance of residents and events in the Millport FSC centre due to noise and vibration emissions from activities associated with the proposed compound	Additional mitigation measures have been identified in **Section 16 Noise and Vibration** to control construction noise impacts upon this receptor.

20.2 Updated Policy Context

There has been no update to the information provided within **Section 23 of the original ES**.

20.3 Updated Assessment Methodology

This assessment follows the general impact assessment methodology as described in **Section 23.4 of the original ES**, supported by expert judgement.

20.4 Updated Baseline Conditions

The proposed temporary slipway and compound area is located on the edge of Farland Point LNCS, and approximately 30m from the Millport FSC centre.

As well as providing residential educational facilities, the FSC centre hosts a number of events throughout the year, including an annual symposium, weddings, conferences and visiting executives. The roadside pavement and footpath that runs down the south east edge of the proposed compound area is used regularly for centre activities and by members of the public to access Farland Park for recreation including dog walking.

There is no further update to the baseline conditions of the proposed scheme described in the original ES.

20.5 Updated Assessment of Effects

This Section establishes the realistic SEIAR worst case scenario for each key impact category, forming the basis for the subsequent assessment.

20.5.1 Embedded Mitigation

A full account of embedded mitigation measures is contained in **Section 5 Project Description** of the original ES.

A number of embedded mitigation measures are described in **Section 23.6.2 of the original ES** to minimise adverse impacts on tourism and recreation receptors.

These include delivery of construction plant and material by barge to reduce traffic on the public highway and the Largs to Cumbrae Slip ferry crossing, along with designing the scheme in ongoing consultation with the local community, improving access in the post construction phase and restricting certain construction activities during the summer period.

No additional embedded mitigation is proposed.

20.5.2 Potential Changes to Original Assessment

A summary of the design changes from the original ES that would impact benthic ecology assessment are detailed below:

Materials delivery and stoage
The location of the temporary slipway and compound area has changed from what was assessed within the original ES. Direct impacts upon Farland Point LNCS were not previously assessed and this is considered as a new impact.

No other design changes will change the impacts assessed for tourism and recreation in the original ES.

20.5.2.1 Construction Impact 1: Disturbance to tourism and recreation users and local businesses during construction activities

The construction of the temporary slipway forms part of the embedded mitigation for tourism and recreation on Great Cumbrae, by minimising the use of the public highway for movement of plant and construction materials, and avoiding the Largs – Cumbrae Slip ferry crossing. A number of sites were considered for the temporary slip, and the location at Farland Point was chosen in conjunction with consultation with the local community. No concerns were raised to using this location by the local community during the PAC process.

Temporary impacts of noise, dust and visual impacts will occur at Farland Point during construction, which may affect people using the site for recreation, including groups using the FSC centre. This is considered to be reversable upon completion of the works. The duration of impact on tourism and recreation receptors is medium term, during the construction phase over approximately 12 months. The proposed mitigation measures outlined in the original ES will reduce the impacts on the local economy. The sensitivity of tourism and recreational receptors to these impacts is therefore assessed to be low to medium, and the magnitude of impact assessed as medium, resulting in **moderate adverse** impacts. As discussed in **Section 16 Noise and Vibration**, acoustic barriers will be used to enclose the temporary compound area to minimise impacts on the activities at the FSC centre, and the contractor will be informed of any key events at the FSC centre (such as weddings, conferences etc) around which works at the temporary can be programmed to temporarily cease. Mitigation detailed within the original ES will also be applicable for the construction works at the temporary slipway, including programming and notification of works, to reduce impacts to **minor adverse** in significance.

20.6 Summary

A summary of the potential impacts and proposed mitigation is presented in **Table 20-2**. The Table demonstrates that all impacts are still considered to be worst case minor adverse.

Table 20-2 Potential Impacts Identified for tourism and recreation for SEIAR Option

Potential Impact	Receptor	Value	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change from original assessment
Construction							
Impact 1:	Disturbance to tourism and recreation users and local businesses during construction activities	Medium	Medium	Moderate adverse	Contractor required to minimise impacts on tourism through their programming of the works, e.g. restricting location of works undertaken during the summer and key events at the FSC centre. Written notification of the works and relevant information to all residents and local businesses. Appropriate notification and signage for any transport diversions. Scheme information noticeboards. Acoustic barriers at Farland Point	Minor adverse	No change to assessment, additional mitigation of acoustic barriers at Farland Point and avoiding work at the compound area during key FSC centre events
Operation							
Impact 1:	Disturbance to tourism and recreation users and local businesses after construction	Medium	High	Major adverse	Proposed scheme developed taking into account consultation feedback regarding visual impact and access.	Minor adverse	N/A
Impact 2:	Improved access to	Low	Low	Minor beneficial	Not applicable, as impact is beneficial.	Minor beneficial	N/A

Potential Impact	Receptor	Value	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact	Change from original assessment
	beach and foreshore						
Impact 3:	Improved conditions for recreational activities, including watersports	Medium	High	Major beneficial	Not applicable, as impact is beneficial.	Major beneficial	N/A
Impact 4:	Enhanced amenity value	Medium	High	Major beneficial	Not applicable, as impact is beneficial.	Major beneficial	N/A
Decommissioning							
The temporary slipway will be removed on completion of the construction works, so will not require decommissioning at a later date. As a flood prevention scheme, the proposed scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

20.7 Additional Mitigation Measures

As discussed in **Section 16 Noise and Vibration**, works at the temporary slipway and compound area will be managed around key events at the FSC centre and acoustic barriers will be used to minimise noise disturbance.

An appropriate road crossing safety method will be put in place to support pedestrians crossing Marine Parade at Farland Point if required.

20.8 Cumulative effects

Further to the information provided in the original ES, the Millburn FPS will commence construction Summer 2022 and therefore overlap with the construction period for the proposed scheme.

The Millburn FPS produced an Environmental Impact Assessment Screening Report (RPSGroup, 2021). The report recommends that the community in Millport are consulted with throughout design phases of the Millburn FPS, in advance of decisions being made. This is to ensure that the people that have to live with the scheme find it acceptable and to ascertain busier than usual times for the area which may inform timings of works. As a result, no cumulative tourism and recreation impacts are expected to occur while both projects are constructed.

Both flood schemes are being managed by North Ayrshire Council. It is recommended that both projects remain in communication and update each other with any traffic or transport related matters which may arise during the development, to minimise cumulative impacts and to understand any potential local change in baseline environment.

20.9 Summary and Conclusion

All potential impacts on tourism and recreation are assessment to be minor adverse or less. Works at the temporary slipway and compound area will be managed around key events at the FSC centre and acoustic barriers will be used to minimise noise disturbance. An appropriate road crossing safety method will be put in place to support pedestrians crossing Marine Parade at Farland Point if required. No further additional mitigation is required.

21 CONCLUSIONS

Subsequent to the original ES, Table 21.1identifies the new impacts identified in the environmental impact assessment, following the detailed design and subsequent changes to project description. Overall, no new impacts are assessed to be significant, following mitigation.

Table 21.1 Additional impacts not included in the Original ES

Impact	Receptor	Value / Sensitivity	Magnitude	Significance	Mitigation	Residual Impact	Potential change from original assessment
Marine geology, oceanography and physical processes							
Impact 3: Impacts to coastal processes due to construction of temporary slipway	Farland Point LNCS	Low	Negligible	Negligible	N/A	Negligible	New Impact
Water and sediment quality							
Impact 2: Deposition of mobilised sediments on the sea bed causing a deterioration in sediment quality	Millport Bay Bathing Water and Largs Channel (Fairlie Roads) coastal water body	Medium	Negligible	Minor Adverse	n/a	Minor Adverse	No change. WID is no longer required and material to be excavated is known to be coarse the likelihood of mobilising sediments will be reduced from the original assessment
Benthic ecology							
Impact 1: Direct habitat loss	Farland Point	High	Low	Minor adverse	Supervision by ECoW	Minor adverse	New impact
Terrestrial ecology							
Impact 1: Temporary or permanent habitat loss	Farland Point	Medium	Medium	Moderate adverse	Maintenance of drainage and habitat restoration	Minor adverse	New impact
Impact 3: Habitat loss, disturbance or killing of otter	Otter	High	Up to Medium	Up to Major adverse	Pre-construction survey. Agreement with SNH, Potential EPS licence. Minimising works on the islands in the bay, Best practice guidance, sensitive lighting	Minor adverse	No change to assessment. Licence will be sought for works at Farland Point. Deliveries will be timed for daylight hours wherever possible and access will be restricted to the shore

					regime, ECoW, and ramps in trenches.		
Impact 5: Spread on non-native invasive species	Non-native invasive species	Medium	Medium	Moderate adverse	Pre-construction survey; Invasive Species Management Plan (if required); and Fencing off of identified stands.	Minor adverse	No change Removal of Japanese knotweed at Farland Point.
Water resources and flood risk							
Impact 3: Impact on groundwater quantity and quality at Farland Point	Ground water and Farland Point	Medium	Low	Minor adverse (not significant)	N/A	Minor adverse (not significant)	New Impact
Traffic and transport							
Impact 1: severance	Link 1	Medium	Very Low	Negligible	None required	Negligible	Reduction in impact significance
Impact 2: Pedestrian Amenity	Link 1	N/A	N/A	N/A	None required	Negligible	Reduction in impact significance thus removal of mitigation measures required for Link 1
Impact 2: Pedestrian Amenity	Link 2	Medium	Very Low	Negligible	None required	Negligible	Reduction in impact significance
Impact 3: Road Safety	Not assessed du to no inherent safety issues being present on the highway network						No change. An appropriate road crossing safety system could be used to ensure safety of pedestrians crossing the road at Farland Point area if required

21.1 Additional mitigation

Further to the mitigation stated in the original ES, additional mitigation will be implemented at the temporary compound at Farland Point to minimise environmental impacts.

The erection of fencing and construction of the temporary slipway at Farland Point LNCS will be supervised by the EcoW measures will be taken to manage water drainage. Although it is not currently anticipated that intertidal habitat restoration will be required within the slipway footprint, all introduced materials will be removed and a contingency plan will be made in case the baseline changes.

To minimise potential impacts to breeding birds, the EcoW will undertake a walkover of the footprint of the temporary slipway and associated compound to ensure no late nesting birds are still breeding when the compound is established in mid August.

An otter pre construction survey will be undertaken, along with preparation on an Otter Protection Plan (and licence if needed), supervision of the construction of the compound and temporary slipway by an EcoW and management of barge deliveries to avoid dawn and dusk where possible. The EcoW will liaise with SWT and NatureScot on any further mitigation to aid restoration of the habitats within the compound area.

Japanese knotweed adjacent to the compound area at Farland Point will be removed as habitat enhancement as part of the works.

To minimise potential impacts on seals within the bay, a precautionary approach would be to carry out the excavation and rock placement works between September and December as there is limited numbers of grey seals in the area and no evidence of grey seal pupping locally. Best practice measures will be undertaken, such as adherence to the Scottish Marine Wildlife Watching Code www.nature.scot/marinecode.

The following additional embedded mitigation measures have been introduced to control construction impacts on the Millport FSC Centre:

- No activities at the compound during limited key programmable events such as a wedding, major conferences etc
- Deliveries by barge will be timed to be in the day and avoid dawn and dusk (also because of mitigation to otter disturbance)
- Acoustic barriers will be erected along the compound boundary facing the FSC centre to minimise disturbance from general compound activities
- An appropriate road crossing safety system could be used to ensure safety of pedestrians crossing the road at Farland Point area if required.

In response to the consultation comments raised by North Ayrshire Council Planning Department, a Landscaping Plan will be prepared for the grassed areas between the road and the promenade at Millport. This will be submitted to the Planning Department for agreement prior to construction.

In response to records of rats on the Eileans, a rodent eradication programme will be planned, using techniques recommended in the UK rodent eradication best practice toolkit (Thomas et al, 2017) and will be complimented by vegetation removal of scrub encroachment and provision of tern nest boxes to enhance biodiversity and increase nesting opportunities for roseate terns on the islands.

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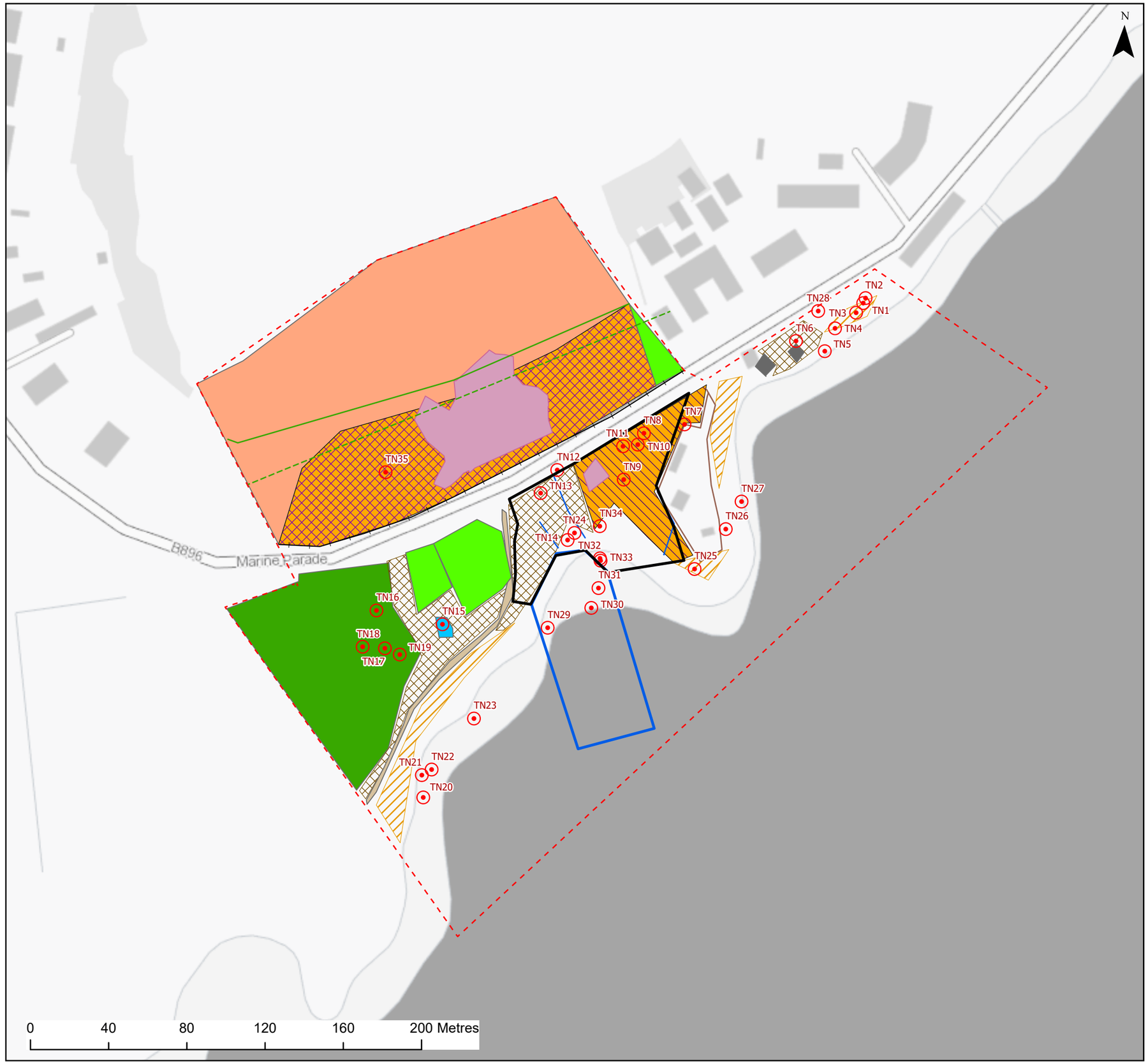
Appendix A – Terrestrial & Benthic Ecology

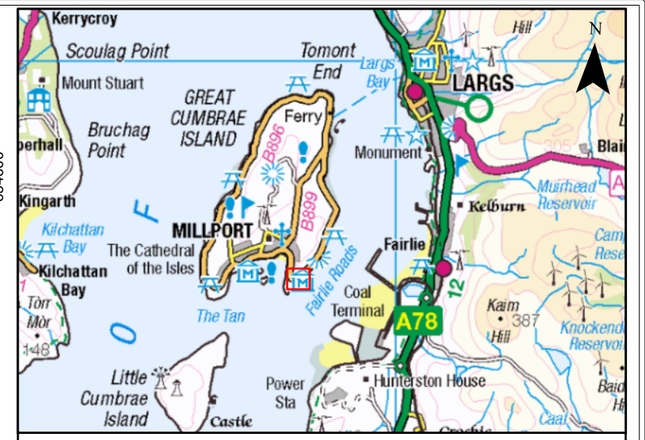
Target notes of the Extended Phase 1 Habitat Survey and intertidal survey, undertaken November 2021, are presented in Table A1. A description of the survey and methods used is described within the relevant sections of the SEIAR. A map of the habitats is presented in Figure A1.

Table A1 Target notes of ecology survey (November 2021)

Target Note	Description
TN1	grass verge top of shore against marine Parade, crested dogs tail, thistle, ribwort plantain, sea ivory, *Xanthoria parietina* and *Ochrolechia parella*
TN2	waste water outfall
TN3	Otter lay up. feeding remains claws and crabs and old spraints under Rock outcrop. no fresh signs
TN4	Otter lay up and spraint (dry)
TN5	fresh water small stream under rocks
TN6	pipe half buried running parallel to shore likely to pump station
TN7	willow tree
TN8	small rhododendron stand
TN9	wet underfoot with rush, cross heather ling, bramble, yellow rattle, tormentil, small rowan tree, bilberry raspberry ash sycamore rosebay willowherb
TN10	small rhododendron
TN11	very small Japanese knotweed stand 1.5 m high 0.5m across
TN12	ash tree
TN13	dryer underfoot scrub with more rosebay bramble rose, bracken, tormentil, goat willow, broom sycamore
TN14	coastal margin with sea may weed, tormentil, thrift, dock ribwort plantain, yellow flag iris, rabbit droppings
TN15	fresh water pool with willows and potential coot behind undergrowth on the water
TN16	sycamore and cherry tree, gorse and dry underfoot
TN17	campfire area
TN18	rowan tree and bird feeders and wooden shed
TN19	Leylandii and *Phragmites australis*
TN20	Classic rocky shore on sandstone bedrock *Verucaria maura, Pelvetia canaliculata* and fucoid zones (*Fucus spiralis, Fucus vesiculosis and Fucus serratus*) with *Cladophora rupestris*, supporting beadlet anemone *Actinia equina*, limpet *Patella vulgata*, dog whelk *Nucella lapillus* , *Littorina littorea Chthamalus montagui* and amphipods.
TN21	upper shore rock pools with dense *Ulva intestinalis*
TN22	rocky overhangs but similar species to open coast
TN23	as before but with more rockpools, generally with *Cladophora rupestris* and *Pelvetia canaliculata* and spiralis zone
TN24	*Crambe maritima* with *Potentilla anserina* in strandline
TN25	freshwater pools in front of compound
TN26	pipes and outflows from compound
TN27	same zonation as before on bed rock and boulders. butterbur and crowberry around compound at top of shore

TN28	plaque
TN29	shallow shore of sandy pebbly cobble substrate with occasional boulders. Low shore *Fucus serratus*, *Chondrus crispus Laminaria digitata Chthamalus montagui*, *Nucella lapillus*, *Patella vulgata*, *Idotea*, *Littorina littorea, Cladophora rupestris, Ulva lactuca, Actinia equina*, *Polysiphonia* indet *Dilsea carnosa*
TN30	bedrock slab with red sandstone rocks, common *Patella vulgata*, with *Chondrus crispus Cladophora rupestris, Polysiphonia*, small *Mytilus edulis* in crevices *Actinia equina*, *Cancer pagurus Corallina officinalis* and filamentous red in rockpools with *Laminaria digitata Fucus serratus* with *Electra spp Dilsea carnosa* M*embranoptera alata*
TN31	Small *Mytilus edulis* in crevices, *Ascophylum nodosum*, *Patella vulgata*, *Actinia equina Chthamalus montagui*, *Nucella lapillus*, *Mastocarpus stellatus Cladophora rupestris Fucus spiralis*
TN32	*Pelvetia canaliculata* leading to lichens above
TN33	rockpools and *Armeria Maritima* above Upper shore
TN34	large *Rosa rugosa* stand 10m across and 2m high
TN35	boggy mosaic, *Polytrichum commune*, tormentil, ling, hard rush, bramble, cross leaf heather, young sycamore sapling, cow parsley *Anthriscus sylvestris*, bilberry *Vaccinium myrtillus* soft rush *juncus effuses*, yellow flag iris *Iris pseudacorus* gorse, yellow rattle, sphagnum spp., rose indet., ranunculus spp., horsetail *Equisetum arvense*, ash, *potamgeton* spp., thistle *Cirsium vulgare*, rowan, hawthorn *Crataegus monogyna*, cottonester spp





Legend

- Target Notes
- Compound
- Slipway
- Survey Area

Phase 1 Habitat

- G2: Running water
- J2.1.2: Intact hedge - species-poor
- J2.2.2: Defunct hedge - species-poor
- J2.4: Fence
- J3.6: Buildings
- A1.1.1: Broadleaved woodland - semi-natural
- A2.2: Scrub - scattered
- B1.2: Acid grassland - semi-improved (Good Quality)
- B5: Marsh/marshy grassland
- C1.1: Bracken - continuous
- D6: Wet heath/acid grassland
- G1: Standing open water
- J3.6: Buildings
- J4: Bare ground
- Japanese knotweed
- Rhododendron

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Client:	Project:
North Ayrshire Council	Millport Coastal Flood Protection Scheme SEIAR Report

Title:

Phase 1 Habitat Survey

Figure: A1

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	16/12/2021	GC	JM	A3	1:2,000

Co-ordinate system: British National Grid

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Appendix B – Construction Programme with Traffic Assignment

Activity	Timescale (weeks)	Comments	Method of Transport	Destination	Material Quantary / Volume	Units	Volume to tonne conversion Factor	HGV Capacity	HGV capcity Units	Total HGV deliveries	Peak deliveries per day (Roundup up whole vehicle)
Mobilisation											
										Total Deliveries	0
Materials Supply											
Rock armour	25	Rock armour delivered by barge, assume transferred to jack-up barge at sea, as required	Barge	Barge							
Rock armour deliveries	18		Barge	Barge							
Precast concrete	10	Assume delivered by barge to Millport Eastern Loading Area - just-in-time to minimise storage	Barge to Eastern Loading Area - All deliveries contained within individual Onshore Scheme Area locations.	Barge							
										Total Deliveries	0
Offshore Breakwaters	18	No onshore elements	Barge	Barge							
										Total Deliveries	0
Clyde Street Rock Revetement											
Works to SW assets	4	Break out concrete, fix formwork and reinforcement, replace sewer pipe surround, pour concrete	n/a	n/a							
Drill & fix dowels for toe	3	Drill rock foreshore, grout dowels into holes. Ground staff, no vehicles.	n/a	n/a							
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	150.28	m3	2.2	20	t	16.53	0.0
Cast toe beam	4	Fix formwork, cast concrete (2 week period). Pump concrete from grass area at corner Clyde / Miller St	By road from batching plant to Clyde Street	Compound to Onshore Scheme Area	150.28	m3	-	6	m3	26.00	3.0
FLOAT											
Underlayer supplied/moved to Chricton Street	1	Assume temporary stockpile, end tipped by barge at Crichton St.	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	63.00	m3	2.2	20	t	6.93	2.0
Temporary causeway for access	2	Excavator and dumper to form causeway using underlayer, from Crichton St to end Clyde St.	Barge								
Shape underlayer	4	Excavator to work from causeway to shape underlayer, working backwards, then placing rock armour	Barge								
Place rock armour	5	Individual placement by excavator from temporary causeway - Assume 30m/day? 150m	Barge								
FLOAT	3										
										Total Deliveries	0
Crichton Street (breakwater)											
Drill & fix dowels for toe	3	Drill rock foreshore, grout dowels into holes. Ground staff, no vehicles.	n/a								
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	42	m3	2.2	20	t	4.6	0.0
Cast toe beam	4	Fix formwork, cast concrete (1 week). Pump concrete from Crichton St.	By road from Batching Plant to Crichton Street	Compound to Onshore Scheme Area	42	m3	-	6	m3	7.0	2.0
FLOAT	2										
Underlayer supplied/moved to Crichton Street	2	Assume temporary stockpile, end tipped by barge at breakwater location.	Barge								
Place underlayer	1	Excavator to place/shape underlayer from foreshore. May need dumper.	Barge								
Place rock armour	3	Individual placement by excavator from temporary causeway	Barge								
Works to existing access / jetty	2	Not sure what's needed here. Mainly hand-led plant, may need occasional concrete load. (2 day delivery split over 5 weeks)	By road from Batching Plant to Chricton Street	Compound to Onshore Scheme Area	23	m3	-	6	m3	3.8	2.0
										Total Deliveries	0
Marine Parade											
Excavate	1	Excavator + dumper	n/a								
Prepare	1	Small roller	n/a								
Place precast units	1	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	80	units (10.8t each)	-	1		80.0	16.0
FLOAT	1										
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	41.4375	m3	2.2	20	t	4.6	0.0
Tie-ins (cast in-situ work)	1	Concrete deliveries + pump	By road from Batching Plant to Marine Parade.	Compound to Onshore Scheme Area	41.4375	m3	-	6	m3	6.9	2.0
Reinstate - general fill	1	Excavator + dumper + small roller	n/a								
Reinstate - surfacing	1	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	148.75	m3	1.8	20	t	13.4	3.0
										Total Deliveries	0
Stuart Street											
Excavate & prepare	1	Excavator + dumper + small roller	n/a								
Drill & fix dowels	3	Hand held drill	n/a								
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	74.3	m3	2.2	20	t	8.2	0.0
Encase existing wall	2	Supply & fix formwork (1 week). Supply & pump concrete (1 week).	By road from Batching Plant to Stuart Street.	Compound to Onshore Scheme Area	74.3	m3	-	6	m3	12.4	3.0
FLOAT	1										
Reinstate surfacing	1	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	67.5	m3	1.8	20	t	6.1	2.0
										Total Deliveries	0
Garrison											
Excavate	1	Excavator + dumper									
Prepare	1	Small roller									
Place precast units	1	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	71	units (9.2t each)	-	2	n/a	35.5	8.0
Delivery of aggregates for batching plant	1	Deliveries over 2 days	Delivered to To Farland Point by barge.	To Farland Point	31.331	m3	2.2	20	t	3.4	0.0
Tie-ins (cast in-situ work)	1	Concrete deliveries + pump	By road from Batching Plant to Garrison.	Compound to Onshore Scheme Area	31.331	m3	-	6	m3	5.2	2.0
FLOAT	1										
Reinstate - general fill	1	Excavator + dumper + small roller	n/a				-				
Reinstate - surfacing	1	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	150	m3	1.8	20	t	13.5	3.0
										Total Deliveries	0
Glasgow Street											
Strip Top Soil	1	Excavator + dumper	n/a								
Excavate	1	Excavator + dumper	n/a								
Prepare	1	Small roller	n/a								
Place precast units	1	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	47	units	-	2		23.5	5.0
Delivery of aggregates for batching plant	1	Deliveries over 1 day	Delivered to To Farland Point by barge.	To Farland Point	19.725	m3	2.2	20	t	2.2	0.0
Tie-ins (cast in-situ work)	1	Concrete deliveries + pump	By road from Batching Plant to Glasgow Street	Compound to Onshore Scheme Area	19.725	m3	-	6	m3	3.3	1.0
FLOAT	1	Tarmac wagon + small roller	n/a								
Reinstate - Earth Fill	1	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Glasgow Street.	Not required	0	m3	1.8	20	t	0.0	0.0
Top soil	1	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Glasgow Street.	Not required	0	m3	1.8	20	t	0.0	0.0
Seeding	1		n/a								
										Total Deliveries	0
Kames Bay - E											
Strip Top Soil	1	Excavator + dumper	n/a								
Excavate/fill & prepare	2	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	156	m3	1.8	20	t	14.0	2.0
Delivery of aggregates for batching plant	1	All deliveries in 2 days	Delivered to To Farland Point by barge.	To Farland Point	52	m3	2.2	20	t	5.7	0.0
Cast toe	1	Concrete deliveries + pump (75% off concrete material)	By road from Batching Plant to Kames Bay - E	Compound to Onshore Scheme Area	39	m3	-	6	m3	6.5	2.0
Place precast units	2	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	123	units	-	2		61.5	7.0
FLOAT	2										
Tie-ins (cast in-situ work)	2	Concrete deliveries + pump (25% off concrete material) (1 week	By road from Batching Plant to Kames Bay - E	Compound to Onshore Scheme Area	13	m3	-	6	m3	2.2	1.0
Reinstate surfacing	1	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	280	m3	1.8	20	t	25.2	6.0
Reinstate - Earth Fill	2	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Kames Bay	Compound to Onshore Scheme Area	800	m3	1.8	20	t	72.0	8.0
Top soil	1	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Kames Bay	Compound to Onshore Scheme Area	400	m3	1.8	20	t	36.0	8.0
Seeding	1		n/a								
										Total Deliveries	0
Kames Bay - W											
Strip Top Soil	1	Excavator + dumper	n/a								
Excavate/fill & prepare	2	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	156	m3	2.2	20	t	17.2	4.0
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	52	m3	2.2	20	t	5.7	0.0
Cast toe	1	Concrete deliveries + pump (75% off concrete material)	By road from Batching Plant to Kames Bay W	Compound to Onshore Scheme Area	39	m3	-	6	m3	6.5	2.0
Place precast units	2	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	123	units	-	2	-	61.5	7.0
FLOAT	2										
Tie-ins (cast in-situ work)	2	Concrete deliveries + pump (25% off concrete material) (1 week)	By road from Batching Plant to Kames Bay W	Compound to Onshore Scheme Area	13	m3	-	6	m3	2.2	1.0
Reinstate surfacing	1	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	280	m3	1.8	20	t	25.2	5.0
Reinstate - Earth Fill	2	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Kames Bay	Compound to Onshore Scheme Area	800	m3	1.8	20	t	72.0	8.0
Top soil	1	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Kames Bay	Compound to Onshore Scheme Area	400	m3	1.8	20	t	36.0	8.0
Seeding	1		n/a								
										Total Deliveries	0
Crichton Street (revetment)											
Break out existing	1	Excavator + hydraulic breaker	n/a								
Excavate for toe	2	Excavator + hydraulic breaker	n/a								
Delivery of aggregates for batching plant	1	All deliveries in 2 days	Delivered to To Farland Point by barge.	To Farland Point	52.5	m3	2.2	20	t	5.8	0.0
Cast toe (assume in-situ)	1	Concrete deliveries + pump (75% off concrete material)	By road from Batching Plant to Chrichton Stret	Compound to Onshore Scheme Area	39.375	m3	-	6	m3	6.6	2.0
Fill/ prepare surfaces	1	Excavator + small roller	n/a								
Place precast units	2	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	132	units	-	2	-	66.0	7.0
FLOAT	1										
Tie-ins (cast in-situ work)	2	Concrete deliveries + pump (25% of concrete material)	By road from Batching Plant to Chrichton Stret	Compound to Onshore Scheme Area	13.125	m3	-	6	m3	3.0	3.0

Indicative Weekly Programme

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

29.06.21 06.07.21 13.07.21 20.07.21 27.07.21 03.08.21 10.08.21 17.08.21 24.08.21 30.08.21 06.09.21 13.09.21 20.09.21 27.09.21 04.10.21 11.10.21 18.10.21 25.10.21 01.11.21 08.11.21 15.11.21 22.11.21 29.11.21 06.12.21 13.12.21 20.12.21 27.12.21 03.01.22 10.01.22 17.01.22 24.01.22 31.01.22 07.02.22 14.02.22 21.02.22 28.02.22 07.03.22 14.03.22 21.03.22 28.03.22 04.04.22 11.04.22 18.04.22 25.04.22 02.05.22 09.05.22 16.05.22 23.05.22 30.05.22 06.06.22 13.06.22 20.06.22 27.06.22 04.07.22 11.07.22 18.07.22 25.07.22 01.08.22 08.08.22 15.08.22 22.08.22 29.08.22 05.09.22 12.09.22 19.09.22 26.09.22 03.10.22 10.10.22 17.10.22 24.10.22 31.10.22 07.11.22 14.11.22 21.11.22 28.11.22 05.12.22 12.12.22 19.12.22 26.12.22 02.01.23 09.01.23 16.01.23 23.01.23 30.01.23 06.02.23 13.02.23 20.02.23 27.02.23 06.03.23 13.03.23 20.03.23 27.03.23 03.04.23 10.04.23 17.04.23 24.04.23 01.05.23 08.05.23 15.05.23 22.05.23 29.05.23

Activity	Timescale (weeks)	Comments	Method of Transport	Destination	Material Quantaty / Volume	Units	Volume to tonne conversion Factor	HGV capcity Units	Total HGV deliveries	Peak deliveries per day (Roundup up whole vehicle)
Crichton Street (wall)										
Excavate	1	Excavator + dumper	n/a							
Prepare	1	Small roller	n/a							
Place precast units	2	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	42	units (10.8t each)	-	1	42	5
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	145.125	m3	2.2	20	t 16.0	0.0
Tie-ins (cast in-situ work)	1	Concrete deliveries + pump	By road from Batching Plant to Chrichton Street	Compound To Onshore Scheme Area	145.125	m3	2.2	6	m3 24.1875	5.0
Reinstate - surfacing	1	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	135	m3	1.8	20	m3 12.15	3.0
									Total Deliveries	
Kelburn Street										
Strip topsoil Kelburn	1	Excavator + dumper	n/a							
Earth fill - Kelburn	1	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Kelburn Street.	Not required	0	m3	1.8	20	t 0.0	0.0
Topsoil - Kelburn	1	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Kelburn Street	Not required	0	m3	1.8	20	t 0.0	0.0
Seeding - Kelburn	2	Spring	n/a							
									Total Deliveries	
Millburn Street										
Excavate	1	Excavator + dumper	n/a							
Prepare	1	Small roller	n/a							
Place precast units	2	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area location by road.	Compound to Onshore Scheme Area	49	units (10.8t each)	-	1	- 49.0	5.0
Delivery of aggregates for batching plant	1	Deliveries over 1 day	Delivered to To Farland Point by barge.	To Farland Point	25.594	m3	2.2	20	t 2.8	0.0
FLOAT	1									
Reinstate - general fill	1	Excavator + dumper	n/a							
Works to existing access	2	Hydraulic breaker, Concrete deliveries + pump (5 days)	By road from Batching Plant to Milburn Street.	Compound to Onshore Scheme Area	25.594	m3	-	6	m3 4.3	1.0
Reinstate - surfacing	1	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	62.5	m3	1.8	20	t 5.6	2.0
Top soil	1	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Milburn Street	Not required	0	m3	1.8	20	t 0.0	0.0
Seeding	1	n/a	n/a							
									Total Deliveries	
West Bay Road										
Excavate	1	Excavator + dumper								
Prepare	1	Small roller								
Place precast units	1	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	33	units (10.8t each)	-	1	- 33	7
Delivery of aggregates for batching plant	1	Deliveries over 1 day	Delivered to To Farland Point by barge.	To Farland Point	17.0625	m3	2.2	20	t 1.9	0.0
FLOAT	2									
Works to existing access	1	Hydraulic breaker Concrete deliveries + pump	By road from Batching Plant to West Bay Road	Compound to Onshore Scheme Area	17.0625	m3		6	m3 2.84375	1
Reinstate - surfacing	1	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	87.5	m3	1.8	20	t 7.875	2.0
									Total Deliveries	
Cross House - revetment										
Break out existing	1	Excavator + hydraulic breaker	n/a							
Excavate for toe	2	Excavator + hydraulic breaker	n/a							
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	126	m3	2.2	20	t 13.9	0.0
Cast toe (assume in-situ)	1	Concrete deliveries + pump (60% off concrete material)	By road from batching Plant to Cross House	Compound to Onshore Scheme Area	75.6	m3	-	6	m3 12.60	3.00
Fill / prepare Hacos	1	Concrete deliveries + pump (20% off concrete material)	By road from Batching Plant to Cross House	Compound to Onshore Scheme Area	25.2	m3	-	6	m3 4.2	1
Place precast units	2	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	332	units (7.2t each)	-	2	- 166	17
FLOAT	2									
Tie-ins (cast in-situ work)	2	Concrete deliveries + pump (20% off concrete material) (1 week)	By road from batching Plant to Cross House	Compound to Onshore Scheme Area	25.2	m3	-	6	m3 4.20	1.00
Fill to raise promenade	1	Excavator + dumper + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	630	m3	1.8	20	t 56.7	12.0
Promenade surfacing	2	Tarmac wagon + small roller	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	587.5	m3	1.8	20	t 52.875	6.0
									Total Deliveries	
Cross House - wall (east)										
Strip Top Soil	1	Excavator + dumper	n/a							
Excavate	1	Excavator + dumper	n/a							
Prepare	1	Small roller	n/a							
Place precast units	1	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	40	units (15.26t each)	-	1	- 40.0	8.0
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	73.5	m3	2.2	20	t 8.1	0.0
FLOAT	1									
Tie-ins (cast in-situ work)	1	Concrete deliveries + pump	By road from Batching Plant to Cross House	Compound to Onshore Scheme Area	28.4075	m3	-	6	m3 4.7	1.0
Reinstate (earth fill)	1	Excavator + dumper	n/a	Not required						
Top soil	1	Excavator + dumper (1 day delivery)	Delivered to To Farland Point by barge. Onward journey by road to Cross House	Not required	0	m3	1.8	20	t 0.0	0.0
Seeding	1		n/a							
									Total Deliveries	
Cross House - wall (west)										
Strip Top Soil	1	Excavator + dumper	n/a							
Excavate	1	Excavator + dumper	n/a							
Prepare	1	Small roller	n/a							
Place precast units	1	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	35	units (15.2t each)	-	1	- 35.0	7.0
Delivery of aggregates for batching plant	1	Deliveries over 3 days	Delivered to To Farland Point by barge.	To Farland Point	28.4075	m3	2.2	20	t 3.1	0.0
FLOAT	2									
Tie-ins (cast in-situ work)	1	Concrete deliveries + pump	By road from Batching Plant to Cross House	Compound to Onshore Scheme Area	28.4075	m3	-	6	m3 4.7	1.0
Reinstate (earth fill)	2	Excavator + dumper	n/a	Not required						
									Total Deliveries	
Cross House - wall (garden wall / house)										
Excavate	1	Excavator + dumper	n/a							
Prepare	1	Small roller	n/a							
Tie-ins (cast in-situ work)	1	Concrete deliveries + pump (contained within Wall west and east)	By road from Batching Plant to Cross House	Compound to Onshore Scheme Area	28.4075	m3	-	6	m3 4.7	1.0
Reinstate (general fill)	1	Excavator + dumper	n/a							
Top soil	1	Excavator + dumper	Delivered to To Farland Point by barge. Onward journey by road to Cross House	Not required	0	m3	1.8	20	t 0.0	0.0
Seeding	1		n/a							
									Total Deliveries	
Cross House - wall (garden wall / house)										
Excavate	1	Excavator + dumper	n/a							
Prepare	1	Small roller	n/a							
Place precast units (Garden Wall)	1	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	16	units (15.2t each)	-	1	16	4
Place precast units (House)	1	Mobile crane	Delivered to To Farland Point by barge. Onward journey to Onshore Scheme Area locations by road.	Compound To Onshore Scheme Area	14	units (7.56t each)	-	2	7	2
FLOAT	2									
Tie-ins (cast in-situ work)	1	Concrete deliveries + pump (contained within Wall west and east)	n/a							
Reinstate (general fill)	1	Excavator + dumper	n/a							
Masonary cladding	3	Materials delivery, possibly by road.ferry due to timing. Small plant only.	By Ferry to Cross House	Larg to Compound	n/a	n/a	-	n/a	30	2
Top soil	1	Excavator + dumper	Delivered within Cross House Wall (East) deliveries.	Not required	n/a					
Seeding	1		n/a							
									Total Deliveries	
Ancillary Items	3	Materials delivery, possibly by road/ferry due to timing. Small plant only	By Ferry to Cross House	Larg to Compound	n/a	n/a	-	n/a	60	2
									Total Deliveries	
Snagging	3	Small plant only	n/a							
									Total Deliveries	
General Float	4									

Total Daily HGV Deliveries

Total Daily HGV Movements

Top 14 Peak Activity Weeks

Key

Minimal or no traffic associated with work activity

Materials delivered from Eastern Loading Area to Onshore Scheme Area

Materials delivered from mainland (Largs) via Ferry Crossing to Main Compound

Appendix C – PAW

Peak Activity Week 1

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*	10	5	PAW 1		5	5	5	5	5	5	5		5	5	5				5	
Chricton Street*		n/a																		
Clyde Street*	16	3	PAW 1		3	3	3	3	3	3	3				3				3	
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay	7	13	PAW 1							13	13				13					
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	8	8	8	8	8	21.04	21.04	0	5	5	21.04	0	0	0	8	0
		Total Daily HGV Movements		0	8	8	16	16	16	42.08	42.08	0	5	5	42.08	0	0	0	8	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 1												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 1	Peak Daily HGV Delivery	Peak Activity Week no	Links																	
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Week 1 Daily HGV Deliveries	23	PAW 1	0	8	8	8	8	8	21	21	0	5	5	23	2	2	2	8	1
Total Peak Week 1 Daily HGV Movements	46		0	8	8	16	16	16	42	42	0	5	5	46	4	4	4	8	2

Key

* one way movements due to one way road system

Peak Activity Week 2

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*	10	5	PAW 2		5	5	5	5	5	5	5		5	5	5				5	
Chricton Street*	11	8	PAW 2		8	8	8	8	8	8	8		8	8	8				8	
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay	7	8	PAW 2							8	8				8					
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	13	13	13	13	13	21	21	0	13	13	21	0	0	0	13	0
		Total Daily HGV Movements		0	13	13	26	26	26	42	42	0	13	13	42	0	0	0	13	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Main Compound / Batching Plant	13	2	PAW 2												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 2	Peak Daily HGV Delivery	Peak Activity Week no	Links																	
			1	2*	3*	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Total Peak Activity Week 2 Daily HGV Deliveries	23	PAW 2	0	13	13	13	13	13	21	21	0	13	13	23	2	2	2	13	1
Total Peak Activity Week 2 Daily HGV Movements	46		0	13	13	26	26	26	42	42	0	13	13	46	4	4	4	13	2

Key

* one way movements due to one way road system

Peak Activity Week 3

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links															
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House	5	1	PAW 3					1	1	1	1				1					
Kelburn Street	6	17	PAW 3						17	17	17				17					
Kames Bay		n/a																		
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	0	0	0	1	18	18	18	0	0	0	18	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	0	2	36	36	36	0	0	0	36	0	0	0	0	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links															
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 3												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 3	Peak Daily HGV Delivery	Peak Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 3 Daily HGV Deliveries	20	PAW 3	0	0	0	0	1	18	18	18	0	0	0	20	2	2	2	0	1
Total Peak Activity Week 3 Daily HGV Movements	40		0	0	0	0	2	36	36	36	0	0	0	40	4	4	4	0	2

Key

* one way movements due to one way road system

Peak Activity Week 4

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street	6	17	PAW 4						17	17	17				17					
Kames Bay		n/a																		
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	0	0	0	0	17	17	17	0	0	0	17	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	0	0	34	34	34	0	0	0	34	0	0	0	0	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 4												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 4	Peak Daily HGV Delivery	Peak Activity Week no	Links																	
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 4 Daily HGV Deliveries	19	PAW 4	0	0	0	0	0	17	17	17	0	0	0	19	2	2	2	0	1
Total Peak Activity Week 4 Daily HGV Movements	38		0	0	0	0	0	34	34	34	0	0	0	38	4	4	4	0	2

Key

* one way movements due to one way road system

Peak Activity Week 5

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay		n/a																		
Marine Parade	8	16	PAW 5								16				16					
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	16	0	0	0	16	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	0	0	0	0	32	0	0	0	32	0	0	0	0	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 5												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 5	Peak Daily HGV Delivery	Peak Activity Week no	Links																	
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 5 Daily HGV Deliveries	18	PAW 5	0	0	0	0	0	0	0	16	0	0	0	18	2	2	2	0	1
Total Peak Activity Week 5 Daily HGV Movements	36		0	0	0	0	0	0	0	32	0	0	0	36	4	4	4	0	2

Key

* one way movements due to one way road system

Peak Activity Week 6

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*	11	7	PAW 6		7	7	7	7	7	7	7		7	7	7				7	
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay	7	8	PAW 6							8	8				8					
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	7	7	7	7	7	15	15	0	7	7	15	0	0	0	7	0
		Total Daily HGV Movements		0	7	7	14	14	14	30	30	0	7	7	30	0	0	0	7	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound	13	2	PAW 6												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 6	Peak Daily HGV Delivery	Peak Activity Week no	Links																	
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 6 Daily HGV Deliveries	17	PAW 6	0	7	7	7	7	7	15	15	0	7	7	17	2	2	2	7	1
Total Peak Activity Week 6 Daily HGV Movements	34		0	7	7	14	14	14	30	30	0	7	7	34	4	4	4	7	2

Key

* one way movements due to one way road system

Peak Activity Week 7

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*	11	7	PAW 7		7	7	7	7	7	7	7		7	7	7				7	
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay	7	8	PAW 7							8	8				8					
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	7	7	7	7	7	15	15	0	7	7	15	0	0	0	7	0
		Total Daily HGV Movements		0	7	7	14	14	14	30	30	0	7	7	30	0	0	0	7	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2														2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	0	2

Totals Peak Activity Week 7	Peak Daily HGV Delivery	Peak Activity Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 7 Daily HGV Deliveries	9	PAW 7	0	7	7	7	7	7	15	15	0	7	7	15	2	2	2	7	1
Total Peak Activity Week 7 Daily HGV Movements	18		0	7	7	14	14	14	30	30	0	7	7	30	4	4	4	7	2

Key

* one way movements due to one way road system

Peak Activity Week 8

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*	11	3	PAW 8		3	3	3	3	3	3	3		3	3	3				3	
Clyde Street*	16	3	PAW 8		3	3	3	3	3	3	3				3				3	
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay	7	8	PAW 8							8	8				8					
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	6	6	6	6	6	14	14	0	3	3	14	0	0	0	6	0
		Total Daily HGV Movements		0	6	6	9	9	9	25	25	0	3	3	25	0	0	0	9	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 8													2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	0	2

Totals Peak Activity Week 8	Peak Daily HGV Delivery	Peak Activity Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 8 Daily HGV Deliveries	16	PAW 8	0	6	6	6	6	6	14	14	0	3	3	14	2	2	2	6	1
Total Peak Activity Week 8 Daily HGV Movements	32		0	6	6	9	9	9	25	25	0	3	3	25	4	4	4	9	2

Key

* one way movements due to one way road system

Peak Activity Week 9

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links															
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House	5	13	PAW 9					13	13	13	13				13					
Kelburn Street		n/a																		
Kames Bay		n/a																		
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	0	0	0	13	13	13	13	0	0	0	13	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	0	26	26	26	26	0	0	0	26	0	0	0	0	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links															
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 9												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 9	Peak Daily HGV Delivery	Peak Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 9 Daily HGV Deliveries	15	PAW 9	0	0	0	0	13	13	13	13	0	0	0	15	2	2	2	0	1
Total Peak Activity Week 9 Daily HGV Movements	30		0	0	0	0	26	26	26	26	0	0	0	30	4	4	4	0	2

Key

* one way movements due to one way road system

Peak Activity Week 10

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay	7	11	PAW 10							11	11				11					
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	0	0	0	0	0	11	11	0	0	0	11	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	0	0	0	22	22	0	0	0	22	0	0	0	0	0

Largs to Main Compound

	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 10												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 10

	Peak Daily HGV Delivery	Peak Activity Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 10 Daily HGV Deliveries	13	PAW 10	0	0	0	0	0	0	11	11	0	0	0	13	2	2	2	0	1
Total Peak Activity Week 10 Daily HGV Movements	26		0	0	0	0	0	0	22	22	0	0	0	26	4	4	4	0	2

Key

* one way movements due to one way road system

Peak Activity Week 11

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links															
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House	5	11	PAW 11					11	11	11	11				11					
Kelburn Street		n/a																		
Kames Bay		n/a																		
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	0	0	0	11	11	11	11	0	0	0	11	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	0	22	22	22	22	0	0	0	22	0	0	0	0	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links															
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 11												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 11	Peak Daily HGV Delivery	Peak Activity Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 11 Daily HGV Deliveries	13	PAW 11	0	0	0	0	11	11	11	11	0	0	0	13	2	2	2	0	1
Total Peak Activity Week 11 Daily HGV Movements	26		0	0	0	0	22	22	22	22	0	0	0	26	4	4	4	0	2

Key

* one way movements due to one way road system

Peak Activity Week 12

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street	4	10	PAW 12				10	10	10	10	10				10					
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay		n/a																		
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	0	0	10	10	10	10	10	0	0	0	10	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	20	20	20	20	20	0	0	0	20	0	0	0	0	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 12												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 12	Peak Daily HGV Delivery	Peak Activity Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 12 Daily HGV Deliveries	12	PAW 12	0	0	0	10	10	10	10	10	0	0	0	12	2	2	2	0	1
Total Peak Activity Week 12 Daily HGV Movements	24		0	0	0	20	20	20	20	20	0	0	0	24	4	4	4	0	2

Key

* one way movements due to one way road system

Peak Activity Week 13

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay	7	8	PAW 13							8	8				8					
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	0	0	0	0	0	8	8	0	0	0	8	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	0	0	0	16	16	0	0	0	16	0	0	0	0	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links																
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 13												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 13	Peak Daily HGV Delivery	Peak Activity Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 13 Daily HGV Deliveries	10	PAW 13	0	0	0	0	0	0	8	8	0	0	0	10	2	2	2	0	1
Total Peak Activity Week 13 Daily HGV Movements	20		0	0	0	0	0	0	16	16	0	0	0	20	4	4	4	0	2

Key

* one way movements due to one way road system

Peak Activity Week 14

Main Compound to Onshore Scheme Area	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links															
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
West Bay Road		n/a																		
Millburn Street*		n/a																		
Chricton Street*		n/a																		
Clyde Street*		n/a																		
Stuart Street		n/a																		
Glassgow Street clifton Street to College Street		n/a																		
Cross House		n/a																		
Kelburn Street		n/a																		
Kames Bay	8	8	PAW 14							8	8				8					
Marine Parade		n/a																		
		Total Peak HGV Deliveries		0	0	0	0	0	0	8	8	0	0	0	8	0	0	0	0	0
		Total Daily HGV Movements		0	0	0	0	0	0	16	16	0	0	0	16	0	0	0	0	0

Largs to Main Compound	Destination Link	Peak Daily HGV Delivery	Peak Activity Week no	Links															
				1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Main Compound / Batching Plant	13	2	PAW 14												2	2	2	2		1
		Total Peak HGV Deliveries		0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1
		Total Daily HGV Movements		0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	2

Totals Peak Activity Week 14	Peak Daily HGV Delivery	Peak Activity Week no	Links																
			1	2*	3*	4	5	6	7	8	9	10*	11*	12	13	14	15	16*	17
Total Peak Activity Week 14 Daily HGV Deliveries	10	PAW 14	0	0	0	0	0	0	8	8	0	0	0	10	2	2	2	0	1
Total Peak Activity Week 14 Daily HGV Movements	20		0	0	0	0	0	0	16	16	0	0	0	20	4	4	4	0	2

Key

* one way movements due to one way road system

Appendix D – Employee Assignment

Employee Accomodation to Main Compound (Link 12)

Notes		Origin Link	Total Worker Vehicles (one-way)	Links															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Total Employees	37	9	5.0			5	5	5	5	5	5	5			5					
Car-share Ratio	1	14	5.0												5	5	5			3
Mini Bus Ratio	8	15	5.0												5	5		5		3
Total Vehicles*	5.0																			
			Totals Employee Vehicles (one-way)	0	0	5	5	5	5	5	5	5	0	0	5	5	5	5	0	3
* Rounded up to nearest whole vehicle			Totals Employee Vehicles (two-way)	0	0	10	10	10	10	10	10	10	0	0	10	10	10	10	0	5

Main Compound (Link 12) to Onshore Scheme Area (Worst Case Scenario)

Gang ID	Total Vehicles Per Gang	Destination Link	Gang	Links															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Onshore Gang 1/2/3	1	16	Onshore Gang 1/2/3		1	1	1	1	1	1	1		1	1	1				1	
Onshore Gang 1	1	6	Onshore Gang 3						1	1	1				1					
Onshore Gang 2	1	7	Onshore Gang 2							1	1				1					
Onshore Gang 3	1	8	Onshore Gang 1								1				1					
			Total Daily Employee Vehicles (one-way)	0	1	1	1	1	2	3	4	0	1	1	4	0	0	0	1	0
			Total Daily Employee Vehicles (two-way)	0	2	2	2	2	4	6	8	0	2	2	8	0	0	0	2	0

Total Employee movements

	Links																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Total Daily Employee Vehicle Daily Movements (one-way)	0	1	6	6	6	7	8	9	5	1	1	9	5	5	5	1	3
Total Daily Employee Vehicle Daily Movements (two-way)	0	2	12	12	12	14	16	18	10	2	2	18	10	10	10	2	5