Galway Harbour Company

Galway Harbour Extension

2022 Addendum to Natura Impact Statement to include Consideration of the Compensatory Measures, Accompanying Measures and Environmental Benefits

An Bord Pleanála (Ref: 61.PA 0033)

May 2022

TOBIN CONSULTING ENGINEERS

AQUAFACT APEM Group

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BACKGROUND

This section outlines the chronology of information submitted to date relevant to the Appropriate Assessment of the Galway Harbour Extension and compensatory measures now proposed.

A planning application, including an Environmental Impact Statement (EIS) and Natura Impact Statement (NIS), for a proposed Extension to Galway Harbour, was submitted to An Bord Pleanála (ABP) for consideration on January 10th 2014.

Subsequently, a Response to a Request for Further Information was submitted on 16th October 2014. The Response included documents outlining Errata and Addenda to the NIS and EIS (these documents were dated October 2014).

Following review of submissions on the Response to Further Information, some additional information was prepared in further Addendum/Errata documents to the NIS and EIS. That document presented the additional Addenda/Errata to the NIS, namely NIS Addendum/Errata Document of January 2015. Generally, the information presented in that NIS Addendum / Errata Document, was new information additional to that included in the NIS and NIS Addendum/Errata Documents, January and October 2014, respectively.

Having completed an Appropriate Assessment of the NIS, An Bord Pleanála (see in Appendix I, Statement of Appropriate Assessment pages 2 and 3), based on the findings of its specialist ecological consultant concluded that approval of the proposed development could not be considered under Article 6(3) of the Habitats Directive given that a significant adverse impact on the integrity of the Galway Bay Complex SAC would occur:

i) The direct and permanent loss of 5.93 ha of Intertidal habitat [1170] fucoid dominated reef habitat and [1140], mud and sand flat habitat in Galway Bay SAC will result in the conservation objective for these features not being met. The direct and permanent loss of a habitat, which is part of the conservation objective of the site, is in general a significant adverse effect on the integrity of the site

ii) The loss of perennial vegetation of 0.35 ha of stony bank [1220] due to the sheltering effect of the harbour extension will also have a significant adverse effect on the integrity of the SAC.

Although these two habitats are listed as Qualifying Interests for Galway Bay SAC, they are not listed as Priority habitats in the EU Habitats Directive.

Regarding the Inner Galway Bay SPA (4031), ABP's Appropriate Assessment concluded that while some adverse impacts are likely, a significant adverse effect on the integrity of the SPA will not, beyond reasonable scientific doubt, arise in view of the site's conservation objectives.

ABP decided, following the Appropriate Assessment carried out by it as referred to above, that, were the Galway Harbour Extension (GHE) to proceed, the application for same should proceed in accordance with the provisions of Article 6(4) of the Habitats Directive (Directive 92/43/EEC). The requirements of Article 6(4) include, in the circumstances that pertain in this case, a requirement to provide Compensatory Measures to ensure the overall coherence of Natura 2000 is protected.

Following the decision by ABP that the application should proceed under Article 6(4) of the Habitats Directive, an Addendum to the NIS was prepared in April 2019 that considered the overall project including the Compensatory Measures proposed as detailed in the Compensatory Measures Report of April 2019 (CMR) and includes the assessment of those measures in combination with the overall project along with the impacts of the historic development of the Galway Harbour Enterprise Park (GHEP) and any other relevant developments previously carried out in the area around the Northern part of Inner Galway Bay, approved or which have been the subject of applications for development consent.

As part of the CMR, a Compensatory Area at Tawin was identified and comprised Mweeloon Lagoon and the shoreline extending from Lurgan Island to Mweeloon Bay. This Compensatory Area is herein referred to as Mweeloon.

NIS ADDENDUM DOCUMENT – MAY 2022

This Addendum to the NIS has been prepared following discussion and consultation with the National Parks and Wildlife Service (NPWS) in relation to the Compensatory Measures proposed in connection with the proposed development herein of the Galway Harbour Extension.

Following interaction with the NPWS, it was agreed that Compensatory Measures as presented in the CMR should be revised.

The majority of the Compensatory Measures proposed for the Mweeloon Compensatory Area were retained. A second Compensatory Area is now added which is located to the western end of Tawin Island. This area is herein referred to as Tawin West. The Compensatory Measures at Mweeloon and Tawin West, which are proposed for the GHE project are detailed in the Compensatory Measures Plan (CMP) (dated May 31st, 2022).

This Addendum to the NIS considers the overall project, including the proposed Compensatory Measures detail in the CMP.

In addition to the Compensatory Measures to be implemented at Tawin West, the CMP details actions that will be undertaken by the GHC to supplement the proposed Compensatory Measures. These proposed actions are termed Accompanying Measures. This Addendum to the NIS includes a consideration of the Accompanying Measures and includes assessment of those measures in combination with the overall project including impacts of the historic development of the Galway Harbour Enterprise Park (GHEP) and any other approved relevant developments previously carried out in the northern part on Inner Galway Bay or which have been the subject of applications for development consent.

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No. 1 An Bord Pleanála: Statement of Appropriate Assessment (Article 6(3))

EXECUTIVE SUMMARY

Impacts of the Compensatory measures

The cumulative impacts of the Compensatory Measures for the habitats at Mweeloon and Tawin West have been designed to bring about a significant improvement of each habitat over time and thereby improve the overall functioning of the SAC and SPA as ecosystems. This is a positive, long-term impact.

Some negative impacts *e.g.,* repairing stone walls, replacing gates, removing aquaculture structures, have been identified but as they are short term *i.e.,* weeks, they are not considered as being significant. The positive impacts of these repairs will facilitate the implementation of "nature friendly" farming principles, reduced grazing levels/stocking densities and control of *Didemnum* all of which will have a long-term positive impact on the SAC. The biological diversity proposed to be lost to the GHE and that has been lost by the previous GHEP development within the Galway Bay SAC site will both be addressed respectively by the Compensatory Measures and Accompanying Measures as described in the CMP (and summarised in this Addendum to the NIS).

The removal of oyster trestles from parts of Mweeloon Bay will provide additional feeding space for intertidal waders and waterfowl, while the control of *Didemnum* at the same area will help to return the ecosystem to its previous form and function. These effects are seen as having a positive impact on the SAC.

Due to the lack of connectivity between the Compensatory Areas and the GHE / GHEP projects and other projects in Galway City and its environs, no cumulative impacts between these measures and those projects are predicted. Furthermore, as the GHC will own the lands at Mweeloon and Tawin West, no development on them will occur, thereby ensuring the protection of these elements of the Natura site into the future.

Summary

The GHE development will cause permanent loss and impacts including direct and indirect to Intertidal and stony bank habitats within the Galway Bay Complex SAC designated site. Regarding the Inner Galway Bay SPA, An Bord Pleanála's (ABP) Appropriate Assessment concluded that while some adverse impacts are likely, a significant adverse effect on the integrity of the SPA will not arise.

The GHE development proposed is the least damaging design alternative. No other feasible alternative exists that would not adversely affect the integrity of the designated site. There are Imperative Reasons of Overriding Public Interest including 'those of a social and economic nature' which require this development to proceed.

To provide all the necessary Compensatory Measures to ensure that the overall coherence of Natura 2000 is protected with regard to this proposed development, GHC has contracted the purchase of lands at Tawin West and Mweeloon, and the control of aquaculture licences at Mweeloon. Mweeloon and Tawin West lie within the Galway Bay SAC. The GHE site and the Compensatory Areas are inter-visible across the Inner Galway Bay SAC at *circa.* 4.5 and 4.7 km (*circa.* 2.5 nautical miles) due south, southeast of the GHE site, *circa.* 19 and 22 km by road.

The properties purchased by GHC contain areas of substandard habitats which GHC will manage on a long-term basis as part of the GHE development, to enhance and preserve the areas of habitats acquired by GHC as the Compensatory Measures for that development.

The proposed Compensatory Measures are technically feasible and will be effective. The implementation of the Compensatory Measures will be commenced prior to the commencement of the development as follows:

- Purchases of lands and of the control of aquaculture licences will be completed within 3 months of grant of a satisfactory permission, when the entire planning process will be deemed to be complete and final *i.e.,* Final Grant of Satisfactory Planning Permission (F.G.S.P.).

- Implementation of the management plans will commence within a further 3 months or as the working / growing / grazing seasons allow for all of the habitats.

- Improvement of Intertidal, stony bank and salt marsh is expected within the first two relevant seasons following commencement of management.

- Thereafter it will be a matter of maintaining and fine tuning that enhancement given the vagaries of different annual weather and storm conditions.

The Compensatory Measures sites, will be owned by GHC or of which control will be acquired by the GHC (in relation to the intertidal and marine areas), contain the habitats for which compensation is required. These habitats in those areas require enhancement and lend themselves to enhancement. The contracts to purchase the lands and control of the licences, subject to the grant of planning permission provide a temporary level of preservation from further development / reclamation to the habitats for the 3 years of the options agreed.

Part 2 (Compensatory Measures) of the CMP confirms that Compensatory Area will be provided at a rate of:

- 3: 1 for the loss / impact proposed by the GHE to Intertidal habitat and

- 2.41: 1 for the loss / impact proposed by the GHE to stony bank habitat.

Part 3 (Accompanying Measures) of the CMP confirms that losses, which previously arose due to the GHEP in the 1990's, will be compensated for at the following rates:

- salt marsh 1.96: 1.

- Intertidal 1.11: 1, and

- stony bank 1 :1

Part 4 (Additional Environmental Benefits) confirms that the Compensatory Areas contain other habitats, some of which are priority habitats including lagoons. In the greater Tawin Island area, the extent of lagoon habitat has been estimated at 265.5 ha. An area of 19.516 ha of priority lagoonal

habitat which will be enclosed by the GHC owned lands is of significant additional ecological and conservation interest. Anther habitat of ecological interest within the Compensatory Areas include the priority habitat Limestone Pavement (Habitat code 8240) (which under the Habitats Directive is listed as a Priority Habitat).

The Tawin West Compensatory Area includes an area of salt marsh vegetation, which is occasionally inundated by storm seawater and partially from a small, elongate anchialine pool which is located close to the centre of the purchase area. The management of activities on the lands will be of environmental benefit to the anchialine pool feature and vegetation in the area. The compensatory Area also supports a QI species for Galway Bay Complex SAC, otter – sprainting sites were observed at a number of locations along the north shore of the proposed Compensatory Area.

As well as supporting extensive areas of salt marsh, the Compensatory Area at Mweeloon supports populations of two locally rare plant species. Shingle areas contain populations of Yellow-horned poppy (*Glaucium flavum*) while salt marsh areas support populations of Sea purslane (*Atriplex portaculoides*).

The proposed Compensatory Measures, Accompanying Measures and Additional Environmental Benefits have been the subject of a Natura Impact Statement and are presented in this document. This NIS confirms that there are only minor short term (1 growing season) negative impacts of the proposed compensatory management plans on the Natura site. However, and of greater ecological and conservation significance, the report confirms that there are significant positive, long-term impacts arising from the proposed Compensatory Measures. These include the making fallow of parts of the Intertidal habitat that are currently being used to farm oysters and therefore, the removal of pressures associated with operating the farms *e.g.,* tractor access and the control of a non-native, invasive species, *Didemnum vexillum* that has infested the farms.

Recovery of stony bank and salt marsh vegetation will come about by controlling grazing and by the introduction of “nature friendly” farming principals. An essential aspect of the control of grazing is the repair of stone walls and damaged gates. This will contribute to the improvement of both habitats in terms of species composition and function.

Additionally, the measures also include for the purchase of lands at Mweeloon and Tawin West in the areas which will ensure that all aspects of the management plan can be successfully implemented. The purchase of these lands is considered to be a vitally important element of the management plan as it ensures the capacity to allow the successful restoration of habitat quality

A soil nutrient survey of both the area to be managed and the reference site will be carried out to determine the levels of Nitrogen and Phosphorous prior to the initiation of any element of the compensation plan. This will be used as the base line for future soil nutrient surveys to track changes in soil chemistry given the adoption of “nature friendly” farming principles.

Livestock using the lands are to be outside of the withdrawal period of 28 days for anthelmintics. This action will remove any potential for impact on coprophillic or coprophaegous species.

The prevention of removal of cobbles is an essential element for the protection of stony bank habitat.

The regular removal of anthropogenic litter will help to improve the condition of the habitats and their visual appearance.

The effects of these Compensatory Measures will be monitored by carrying out annual biological surveys of the habitats to document any changes in their extent and their characterising species. This report will undergo a third-party audit to ensure that the annual surveys and management proposals are independently reviewed and validated.

It is important that immediately following significant storm events, surveys need to be carried out to assess possible damage to habitats. Such extreme events can give rise to sudden and extensive changes to the physical, chemical and biological characteristics of Intertidal, stony bank and salt marsh habitats and it is important to document such changes directly after the event. This will also contribute to the recording of the natural recovery processes. In light of the possible changes due to storm events and results of the independent audit, the compensation management plan may need to be adjusted or modified.

It is concluded that, beyond reasonable scientific doubt, the impacts from the proposed Compensatory Measures, both alone and in combination with other activities, will not have any significant, negative effects on the Galway Bay SAC Natura 2000 site, its qualifying interests/special conservation interests and conservation objectives and will not have any adverse impact on the integrity of the Galway Bay SAC, over and above the impacts and effects previously set out in the NIS and addenda to same herein and will serve to compensate for the loss of and impacts on habitats within the SAC as previously identified *i.e.* .

- Direct and permanent loss of 5.93ha of [1170] fucoid dominated reef habitat and [1140] Mud and Sand Flat habitat of the Galway Bay Complex SAC and

- Loss of perennial vegetation of stony bank [1220] (0.35 ha) due to the sheltering effect of the harbour extension will also have a significant adverse effect on the integrity of the SAC.

Finally, as GHC will own the lands and have contracted to acquire control of the aquaculture licences on which and in the areas of which the compensatory and accompanying measures are proposed, the long-term protection of this part of Galway Bay SAC into the future is assured and will compensate generously for the losses proposed to arise from the GHE and which formerly arose from the GHEP.

1 INTRODUCTION

1.1 THE PROPOSED GALWAY HARBOUR EXTENSION (GHE)

The proposed GHE into deeper water to the south of the existing port will occupy a part of the Galway Bay Complex SAC. The immediate site of the proposed development is located adjacent to the existing Galway Harbour Enterprise Park [GHEP] in the townland of Renmore, Galway. The proposed development is shown in **Figure 1-1** which shows the development in the context of the existing Harbour, Galway City and Inner Bay.

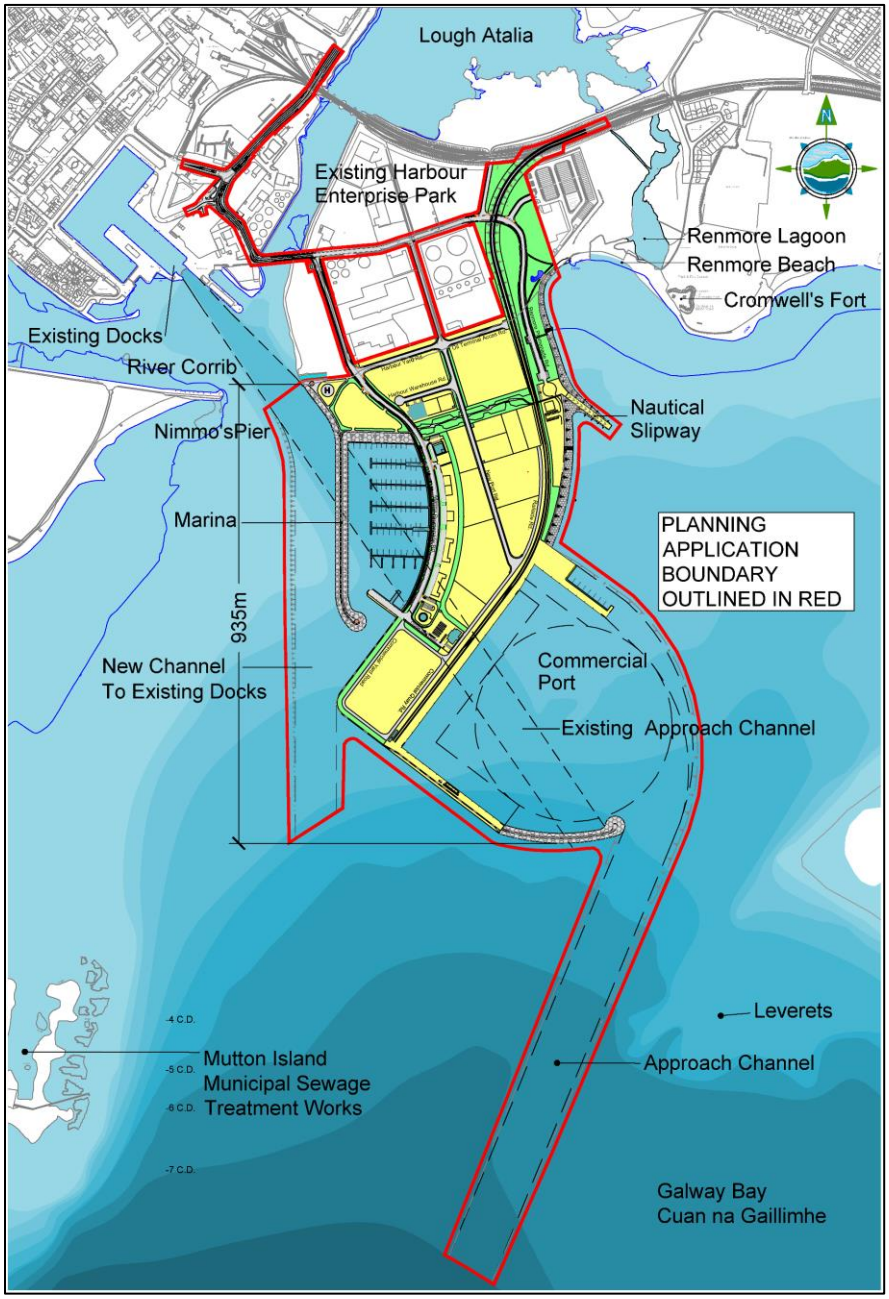

Figure 1-1: Proposed Galway Harbour Extension.

1.2 APPLICATION FOR APPROVAL UNDER ARTICLE 6(3) OF THE HABITATS DIRECTIVE

A Natura Impact Statement (NIS) (dated: 10th January 2014) was prepared for the GHE project and was submitted to An Bord Pleanála (ABP) which carried out an Appropriate Assessment (AA) of the project at that time (without consideration of any Compensatory Measures).

The conclusions of ABP's AA (see in Appendix I, Statement of Appropriate Assessment pages 2 and 3) were that approval of the proposed development could not be considered under Article 6(3) of the Habitats Directive given that a significant adverse impact on the integrity of the Galway Bay Complex Special Area of Conservation (SAC) (Site code: 000268) would occur *i.e.*:

i. the direct and permanent loss of 5.93 ha of Intertidal habitat [1170], fucoid dominated reef habitat and [1140] mud and sand flat habitat in Galway Bay SAC will result in the conservation objectives for these features not being met. The direct and permanent loss of a habitat, which is part of the conservation objectives of the site is, in general a significant adverse effect on the integrity of the site

ii. the loss of perennial vegetation of stony bank [1220] (0.35 ha) due to the sheltering effect of the harbour extension will also have a significant adverse effect on the integrity of the SAC.

The Intertidal and stony bank habitats to be lost or impacted due to the proposed GHE are shown in **Figure 1-2**. Although the two habitats to be lost or impacted are listed as Qualifying Interests for Galway Bay Complex SAC, they are not listed as Priority habitats in the EU Habitats Directive.

Regarding the Inner Galway Bay Special Protection Area (SPA) (Site code: 004031) and the nearby Lough Corrib SAC (000297), ABP's Appropriate Assessment concluded that, while some adverse impacts are likely, a significant adverse effect on the integrity of these Natura sites will not arise in view of the site's conservation objectives.

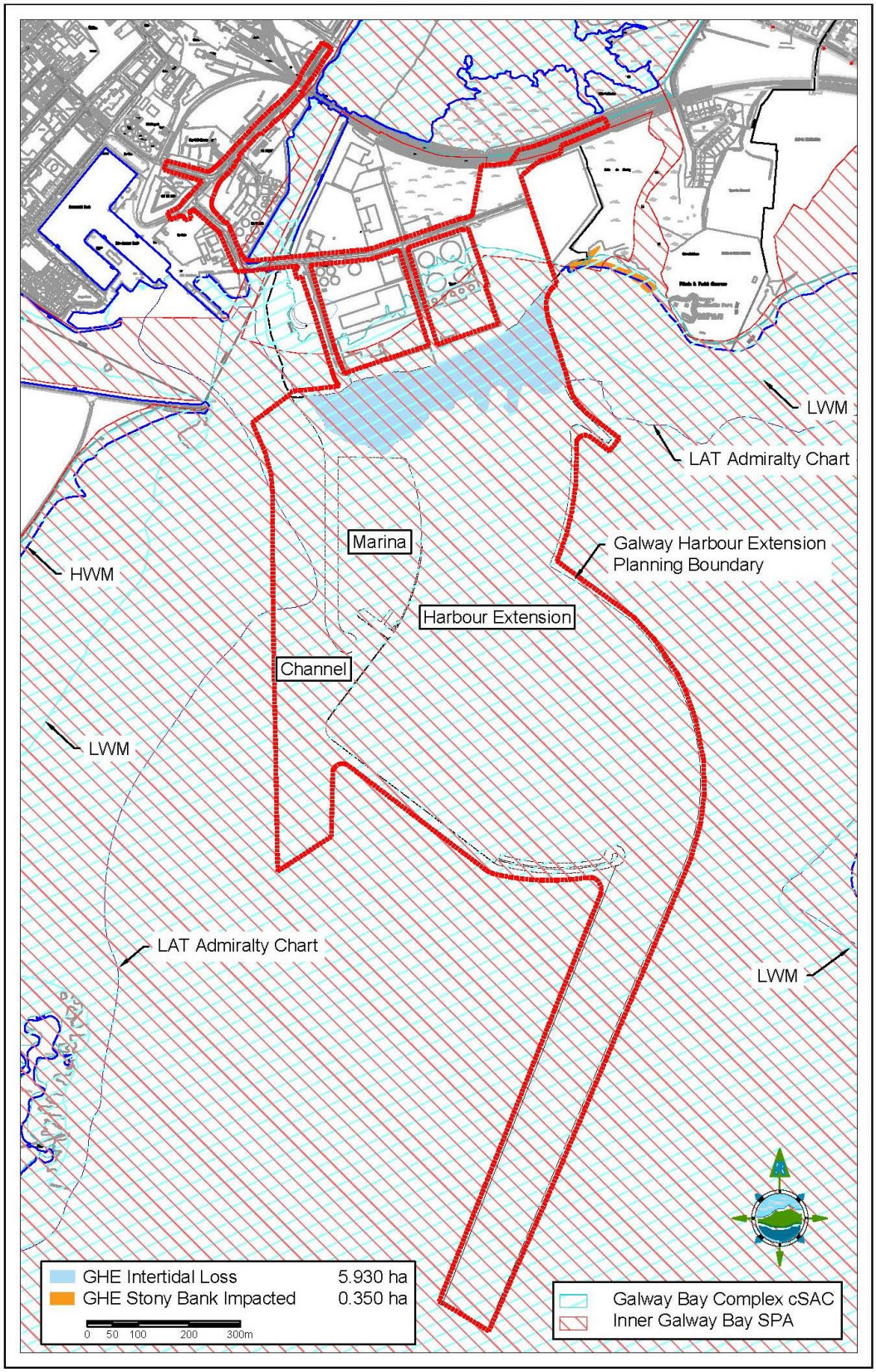

Figure 1-2: Habitats to be Lost or Impacted by GHE.

1.3 APPLICATION FOR APPROVAL UNDER ARTICLE 6(4) OF THE HABITATS DIRECTIVE AND THE DEVELOPMENT OF COMPENSATORY MEASURES

ABP invited Galway Harbour Company (GHC) to confirm if it wished the project to be considered for approval under Article 6(4) of the Directive. GHC confirmed it wished to proceed on that basis and commenced the preparation of proposals for Compensatory Measures to address the impacts on the integrity of the Galway Bay Complex SAC.

The EU Guidance Document on Article 6 of the Habitats Directive (EU, 2018[1], 2021[2]) was followed in the identification of and proposed implementation of Compensatory Measures particularly with regard to the concept of "the biological improvement of substandard habitat within an existing designated site…". Tight coordination and cooperation with the Natura Authorities was exercised in the search for the appropriate form of compensation and in the preparation of the proposed Compensatory Measures.

Following an extensive review of published literature / aerial photography, terrestrial / marine surveys, interaction with landowners and oyster farmers and consultation with the National Parks and Wildlife Services (NPWS) and ABP, a Compensatory Area was identified at Mweeloon and Tawin West on Tawin Island. Tawin Island is a headland that is located in the middle of Inner Galway Bay. The Compensatory Areas are in two parts of the headland at Mweeloon and Tawin West and all of the compensatory habitats in both areas lie within two Natura 2000 sites:

i. the Galway Bay Complex SAC (IE000268) and

ii. the Inner Galway Bay SPA (IE004031)

The Compensation Area at Mweeloon relative to the Galway Bay Complex SAC and the Inner Galway Bay SPA and GHE at Renmore is shown in **Figure 1-3**. The habitats identified within the Compensatory Area included Intertidal habitats, stony bank and salt marsh habitats that lie within Galway Bay Complex SAC. The Compensatory Measures proposed for the area were presented in the CMR (dated 19th April 2019).

Following the NPWS review of the CMR and discussions held at a series of consultation meetings, NPWS outlined that the Compensatory Measures relating to Intertidal habitats at Mweeloon were acceptable (subject to minor revisions) and the habitat areas suitable for inclusion as compensatory habitat. The Compensatory Measures are included in full in Section 2 of the final CMP (dated 31/05/2022) and summarised in **Section 3.1** below.

[1] Commission Notice Managing Natura 2000 sites – The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. (https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/EN_art_6_guide_jun_2019.pdf)

[2] Commission Notice on the Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC of the 28th of September 2021 (https://ec.europa.eu/environment/nature/natura2000/management/pdf/methodological-guidance_2021-10/EN.pdf).

NPWS outlined that the stony bank habitat at Mweeloon was not suitable as a compensatory habitat. NPWS recommended that as an alternative to the stony bank at Mweeloon, Compensatory Measures should be developed for an area of stony bank habitat located to the western end of Tawin Island. This area is herein referred to as Tawin West. The Tawin West Compensatory Area is shown in **Figure 1-3**. The Compensatory Measures developed for the proposed stony bank habitat at Tawin West are included in full in Section 2 of the final CMP and summarised in **Section 3.1** below.

While the NPWS indicated that the stony bank habitat at Mweeloon should not form part of the Compensatory habitats, it was agreed that the habitats could be included as part of the Accompanying Measures programme. Specifically, it was agreed that for the stony bank habitat at Mweeloon GHC would undertake a series of actions that will complement the measures programme. The actions, which are referred to as Accompanying Measures, will help improve the Conservation Status of the stony bank habitat at Mweeloon. Following discussions with NPWS, it was further agreed that Atlantic Salt Meadows at Mweeloon could be included as part of the Accompanying Measures of the CMP. The Accompanying Measures for salt marsh and stony bank habitat at Mweeloon are presented in full in Section 3 of the CMP and summarised in **Section 1** of the CMP. It should be noted that the stony bank and salt marsh, and part of the intertidal habitat at Mweeloon which will be subject to Accompanying Measures have been allocated to address historic loss associated with the Galway Harbour Enterprise Park (GHEP).

In addition to the Compensatory Measures and Accompanying Measures, the final CMP also details additional environmental benefits in the Tawin West and Mweeloon areas. These environmental benefits are outlined in Section of the CMP and summarised in **Section 3.3** below.

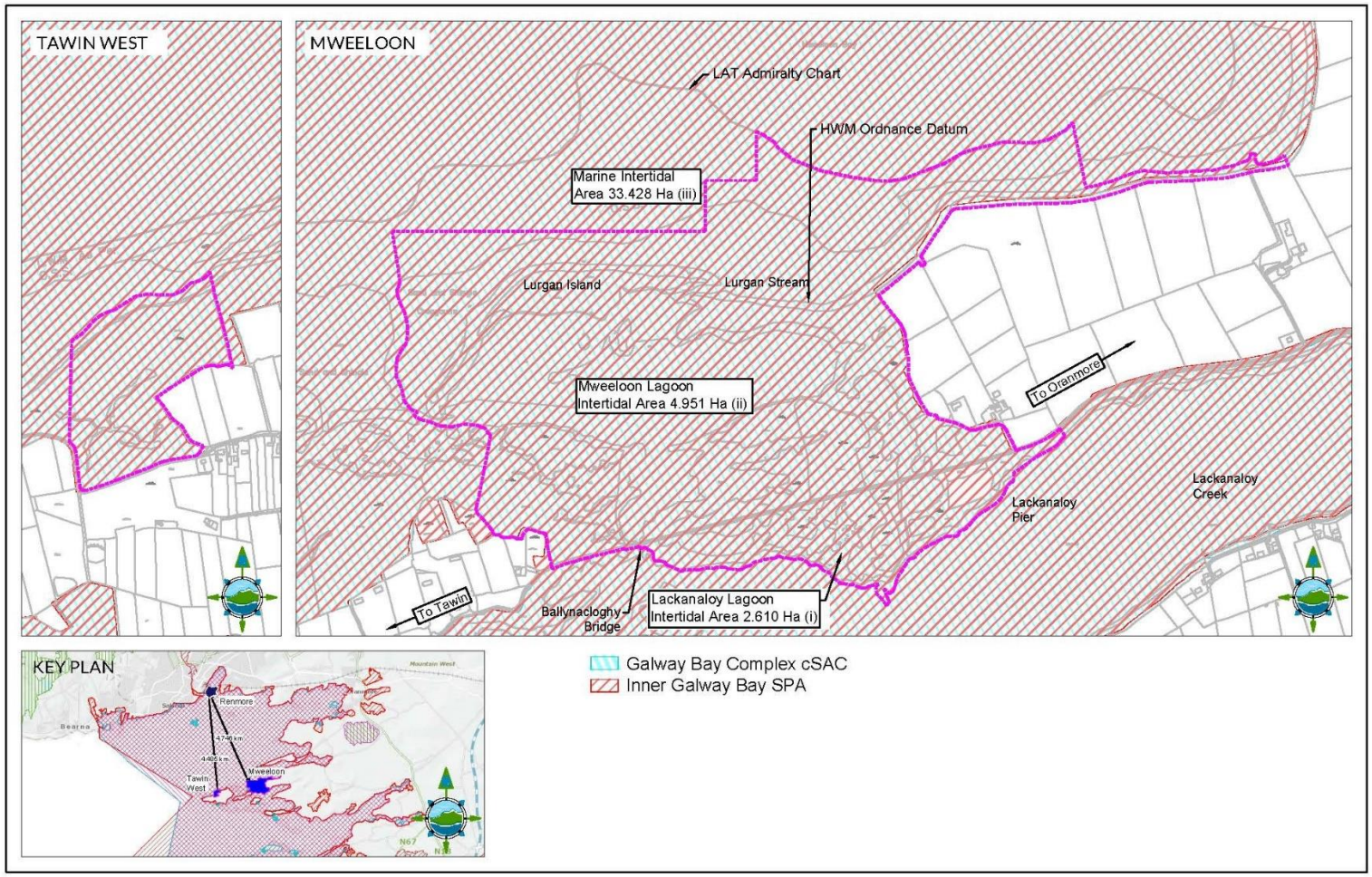

Figure 1-3: Compensatory Areas at Mweeloon and Tawin West relative to the Galway Bay Complex SAC, the Inner Galway Bay SPA and site of the proposed GHE at Renmore.

1.4 PURPOSE OF THIS REPORT

This Addendum to the NIS considers whether the Compensatory Measures and Accompanying Measures (collectively referred to herein as Compensatory Measure activity) proposed for the Galway Harbour Extension (GHE) project and presented in the Compensatory Measures Plan (CMP) (dated 13/05/2022) alone, or in combination with other projects or plans and in particular the development and operation of the GHE of which these compensatory measures form part, will have adverse effects on the integrity of a European site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. It should be noted that the CMP also includes detail of Additional Environmental Benefits that will be derived from the Compensatory Measures activity. The Additional Environmental Benefits will result in positive effects on the surrounding environment and are described further in this assessment

The assessment provides a description of the proposed Compensatory Measure activity, a description of the receiving environment, it identifies the Natura 2000 sites within and close to the potential impact zone and it considers the potential for adverse effects on the conservation objectives and qualifying interests within the affected Natura 2000 site(s).

This report has been prepared in accordance with the current guidance:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG 2009, Revised February 2010),
- Marine Natura Impact Statements in Irish Special Areas of Conservation – A Working Document. April 2012 (DAHG, 2012),
- EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (EC, 2007),
- Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2002) and
- EU (2018). Managing Natura 2000 sites – The provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC.
- EU (2021). Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

1.5 STRUCTURE OF THIS REPORT

The reminder of this report is laid out as follows:

- **Section 2** - outlines the Appropriate Assessment procedure
- **Section 3** - describes the Compensatory Measure activity proposed

- **Section 4** - covers the Stage 1 Appropriate Screening phase which provides a description of the receiving environment, identification of the relevant Natura 2000 sites and their Qualifying Interests (QIs) / Special Conservation Interests (SCIs) and a Screening Assessment and Screening Statement.

1.6 STATEMENT OF AUTHORITY

This report has been prepared by Dr. James Forde (B.Sc., M.Sc., Ph.D., MCIEEM) and reviewed by Dr. Brendan O'Connor (B.Sc., Ph.D., MCIEEM).

Dr. James Forde has a Ph.D. in Marine Ecology and is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). James has over fifteen years' experience in marine research and environmental consultancy. James specialises in marine ecology and has a full appreciation of the objectives and mechanisms of national and international environmental legislation and policy.

James' academic research has focused on benthic habitats and communities, and techniques used to assess ecological impacts under European environmental legislation including the Habitats Directive, Environmental Impact Assessment (EIA) Directive and the Water Framework Directive.

As part of James' consultancy work, he has delivered assessment reports to meet the provisions of the Habitats Directive and EIA Directive to accompany planning applications for a wide range of developments including pier and harbour enhancement projects, coastal defence projects, aquaculture, flood relief schemes and large-scale energy infrastructure projects.

James was a member of the International Union for Conservation of Nature (IUCN) expert working group for marine red-list habitats for the North Atlantic and has collaborated with international experts on the designation of sensitive marine habitats including *Ostrea edulis* beds, *Mytilus edulis* beds, seagrass meadows and offshore biogenic and geogenic reef habitats. James has collaborated with national experts on the assessment of deep-water reef habitats in Irish waters to support Ireland's national assessment of reef as required under Article 17 of the Habitats Directive. Recently James has also worked with national experts on the classification of lagoon habitats, a Habitats Directive Annex I priority habitat.

Dr. Brendan O'Connor is the ecology lead for the Galway Harbour Extension and its Compensatory Measures Plan and has had full responsibility for all ecological surveys and reporting. He is expert in ecological matters and the full spectrum of environmental assessment techniques, methodologies, and statutes. Professionally, he is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a member of the CIEEM.

Brendan has 40 years of experience in the field of marine science and has published ca 95 scientific papers and numerous reports specialising in the biology and ecology of sea-floor communities. Brendan is an internationally recognised polychaete taxonomist and has led numerous international workshops in polychaete taxonomy including workshops as part of the UK BEQUALM/NMBAQC. He has 33 publications on marine invertebrate taxa including descriptions of new species, revisions of families and additions to the European and Irish fauna.

As Managing Director of AQUAFACT APEM Group, Brendan has been responsible for all aspects of management including the design, execution and reporting of numerous desk studies, surveys, assessments, and environmental outputs including AA screenings, Natura Impact Statements and EIARs.

2 ARTICLE 6 APPROPRIATE ASSESSMENT

2.1 REQUIREMENT FOR ARTICLE 6 APPROPRIATE ASSESSMENT

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on EU Member States to establish the Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SACs), and Special Protection Areas (SPAs). SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests (QIs) and special conservation interests (SCIs) of the sites and for these the conservation objectives of the site are derived.

The Birds and Habitats Directives set out various procedures and obligations in relation to nature conservation management in Member States in general and of the Natura 2000 sites and their habitats and species, in particular. A key protection mechanism is the requirement to consider the possible nature conservation implications of any plan or project on the Natura 2000 site network before any decision is made to allow that plan or project to proceed. Not only is every new plan or project captured by this requirement but each plan or project, when being considered for approval at any stage, must take into consideration the possible effects it may have, in combination with other plans and projects, when going through the process known as Appropriate Assessment (AA).

The obligation to undertake Appropriate Assessment (AA) derives from Article 6(3) and 6(4) of the Habitats Directive and both involve a number of steps and tests that need to be applied in sequential order. Article 6(3) is concerned with the strict protection of sites while Article 6(4) is the procedure for allowing derogation from this strict protection in certain restricted circumstances.

Each step in the assessment process precedes and provides a basis for other steps. The results at each step must be documented and recorded carefully so there is full traceability and transparency of the decisions made.

There is a proposal to expand Galway Harbour by extending it southwards into Galway Bay (**Figure 1-1** and **Figure 1-3** above) which is a both a Special area of Conservation (SAC) and a Special Protection Area (SPA).

2.2 APPROPRIATE ASSESSMENT PROCESS

The Commission's methodological guidance (EC, 2002) promotes a four-stage process to complete the AA and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The four stages are summarised diagrammatically in **Figure 2-1** below and described in turn in **Section 2.2.1** through **Section 2.2.4**.

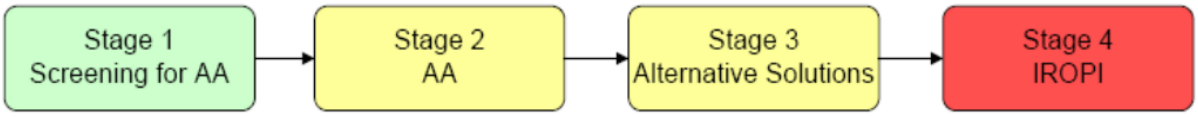

Figure 2-1: Stages in the AA process (Source: DEHLG, 2009).

2.2.1 Stage 1. Screening for Appropriate Assessment

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

i. Whether a plan or project is directly connected to or necessary for the management of the site, and

ii. Whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.

If the effects are deemed to be significant, potentially significant, uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2 *i.e.,* the preparation of an NIS. Screening should be undertaken without the inclusion of mitigation unless potential impacts clearly can be avoided through the modification or redesign of the plan or project, in which case the screening process is repeated on the altered plan. The greatest level of evidence and justification is needed in circumstances where the process ends at the screening stage on grounds of no impact.

2.2.2 Stage 2. Natura Impact Statement (NIS),

This stage considers whether the plan or project, alone or in combination with other projects or plans, will have an adverse effect on the integrity of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The proponent of the plan or project is required where Stage 2 applies to submit a Natura Impact Statement (NIS), *i.e.,* the report of a targeted professional scientific examination of the plan or project and the relevant Natura 2000 sites, to identify and characterise any possible implications for the site in view of the site's conservation objectives, taking account of in combination effects. This should provide information to enable the competent authority to carry out the Appropriate Assessment. If the assessment is negative, *i.e.,* adverse effects on the integrity of a site cannot be excluded, then the process must proceed to Stage 4, or the plan or project should be abandoned. The AA is carried out by the competent authority and is supported by this document.

2.2.3 Stage 3. Alternative Solutions

This stage examines any alternative solutions or options that could enable the plan or project to proceed without adverse effects on the integrity of a Natura 2000 site. The process must return to Stage 2 as alternatives will require Appropriate Assessment in order to proceed, demonstrating that all reasonable alternatives have been considered and assessed, and that the least damaging option has been selected, is necessary to progress to Stage 4.

In the NIS for the GHE project, the alternative solutions process was examined and no solution could be found that did not adversely affect the 2 Natura sites in question and, on foot of the ABP AA, it was determined that the GHE project could not be considered under Article 6(3) and hence this Stage 4 process was commenced.

2.2.4 Stage 4. Imperative Reasons of Overriding Public Interest (IROPI)/Derogation

Stage 4 is the main derogation process of Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project that will have adverse effects on the integrity of a Natura 2000 site to proceed in cases where it has been established that no less damaging alternative solution exists. The extra protection measures for Annex I priority habitats come into effect when making the IROPI case.

Compensatory Measures must be proposed and assessed and this is the main purpose of the current Addendum to the NIS and assesses same in combination with the main development of the GHE and other relevant plans and projects, including the historic development of the GHEP.

The Commission must be informed of the Compensatory Measures by the NPWS. Compensatory measures must be practical, implementable, likely to succeed, proportionate and enforceable, and they must be approved by the Minister.

3 PROPOSED COMPENSATORY MEASURES, ACCOMPANYING MEASURES AND ADDITIONAL ENVIRONMENTAL BENEFITS

3.1 COMPENSATORY MEASURES

As outlined in **Section 1.1**, to compensate for the Intertidal and stony bank habitats to be lost or impacted, Compensatory Measures have been developed for two distinct Compensatory Areas at Tawin. The first Compensatory Area is located to the east of Tawin Island and comprises Mweeloon Lagoon and the Shoreline / Intertidal area extending from Lurgan Island to Mweeloon Bay (see **Figure 1-3**). This area is herein referred to as Mweeloon. The second Compensatory Area is located to the western end of Tawin Island (see **Figure 1-3**). This area is herein referred to as Tawin West.

The Compensatory Measures[3] which are presented in detail in the Compensatory Measures Plan form two interrelated plans: an Intertidal Management Plan at Mweeloon and a Land Management Plan at Tawin West. Overall, the objectives of the Compensatory Measures within the Plans are to positively affect habitat conservation status by reducing and / or removing aquaculture and both agricultural and littering pressures acting on habitats of the Galway Bay Complex SAC. Specifically, the measures are designed to help achieve Favourable Conservation Condition targets which have been set for habitat attributes. The Intertidal Management Plan at Mweeloon and the Land Management Plan at Tawin West are summarised in **Section 3.1.1** and **Section 1.2.3** respectively.

3.1.1 Intertidal Management Plan at Mweeloon

3.1.1.1 Aim

At the Mweeloon Compensatory Area, an Intertidal Management Plan will be implemented. The Plan includes measures to compensate for the impacts associated with GHE that will result in:

- Direct and Permanent Loss of 5.93ha of [1170] fucoid dominated reef habitat and [1140] Mud and sand flat habitat of the Galway Bay Complex SAC.

The spatial extent of the Intertidal habitat at Renmore to be lost or impacted due to the proposed GHE is shown in **Figure 3-1**. The Compensatory Measures in the Intertidal Management Plan relate to 27.331 ha of Intertidal habitat at Mweeloon (see **Figure 3-1**). Of this 27.331 ha Intertidal habitat, an area of 17.790 ha[4] is set as compensation against the impacted area of 5.930 ha (equating to a compensatory ratio of 3: 1 *i.e.,* 17.790 ha: 5.930 ha).

[3] 17.790 ha (65%) of the 27.331 ha of intertidal at Mweeloon is allocated for the Compensatory Measures. 0.844 ha (75%) of the 1.124 ha of stony bank at Tawin West is allocated for the Compensatory Measures.

[4] The Intertidal area not included as Compensatory Habitat measures 9.451 ha. This area of Intertidal habitat is put forward to address the historic loss of this habitat type due to the GHEP during the 1990s.

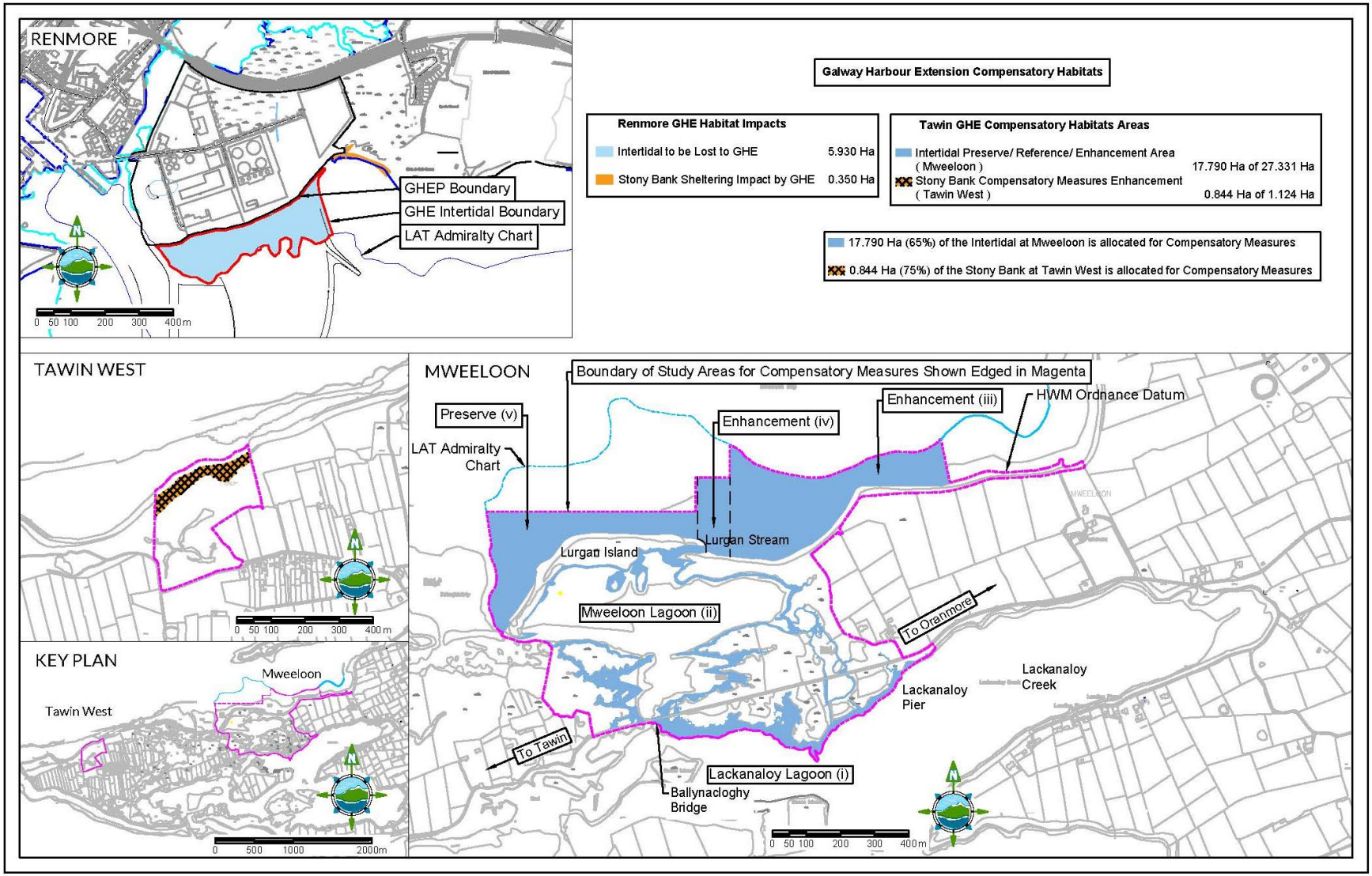

Figure 3-1: GHE Intertidal and stony bank Habitat Area Impacted at Renmore and Compensatory Areas at Tawin.

3.1.1.2 Objectives and Compensatory Measures

A central part of the Intertidal Management Plan is that GHC has acquired the control of two aquaculture licences within the Compensatory Area (Site ref: T09/376B and T09/377A). The Qualifying Feature habitats in the Compensatory Area which overlap or are adjacent the aquaculture licenses in question include:

1. 1140 Tidal mudflats and sandflats
2. 1170 Reefs
3. 1160 Large shallow inlets and bays

The Conservation Objective for 1140 tidal mudflats and sandflats, 1170 reefs and 1160 large shallow inlets and bays is to maintain favourable conservation condition which is defined by the habitat attributes and targets set out in **Table 3.1**.

The four main objectives of the Intertidal Management Plan are:

1. Control of the non-native, invasive tunicate *Didemnum vexillum* (Didemnum) in Mweeloon.
2. Fallowing of parts of Mweeloon Bay that are used for oyster cultivation.
3. Implementation of "nature friendly[5]" farming practices that besides having beneficial effects on terrestrial habitats, may also have beneficial effect on intertidal marine ecology.
4. Collection and disposal of anthropogenic litter and rubbish within the Compensatory Area

Details of the Compensatory Measures comprising the Intertidal Management Plan for Objectives 1 through 4 are described in detail in Section 2.1.5 through Section 2.1.6 of the CMP. The Compensatory Measures are listed in this document in **Table 4.1 (p.62)**.

Table 3.1: Habitats, Measure and Target (NPWS 2013)[6]

Habitat	Attribute	Measure	Target
1140 Tidal Mudflats and Sandflats	1) Habitat Area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
	2) Community Distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sandy mud community complex; and Intertidal sand community complex
1170 Reefs	1) Distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes.

[5] Farming practices appropriate to the Conservation Objectives of the Galway Bay Complex SAC *e.g.* reduced stocking densities and the discontinuation of fertilizer

[6] NPWS (2013) Conservation Objectives: Galway Bay complex SAC 000268 Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Habitat	Attribute	Measure	Target
	2) Habitat Area	Hectares	The permanent habitat area is stable, subject to natural processes
	3) Community extent	Hectares	Maintain the extent of the *Mytilus*-dominated reef community, subject to natural processes.
	4) Community structure: *Mytilus* density	Individual per sqm	Conserve the high quality of the *Mytilus*-dominated reef community, subject to natural processes
	5) Community structure	Biological composition	Conserve the following community types in a natural condition: Fucoid dominated community complex; *Laminaria* dominated community complex; and Shallow sponge-dominated community complex
1160 Large Shallow Inlets and Bays	1) Habitat Area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
	2) Community extent	Hectares	Maintain the extent of the *Zostera*-dominated community complex and the maërl-dominated community, subject to natural processes
	3) Community structure: *Zostera* density	Shoots per sqm	Conserve the high quality of *Zostera*-dominated communities, subject to natural processes
	4) Community structure	Community composition	Conserve the high quality of the maërl-dominated community, subject to natural processes
	5) Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Intertidal sand community complex; Fine to medium sand with bivalves community complex; Sandy mud to mixed sediment community complex; Mixed sediment dominated by Mytilidae community complex; Shingle; Fucoid-dominated community complex; *Laminaria*-dominated community complex; and Shallow sponge-dominated community complex

3.1.2 Land Management Plan at Tawin West

The Compensatory Area at Tawin West comprises a range of coastal habitats which occur to the south of a shingle coastline along the eastern shore of Galway Bay. An area of vegetated stony bank habitat occurs directly behind the shingle shoreline. This stony bank area supports a well-developed grassland flora with few areas of bare shingle rock exposed. The aim of the Land Management Plan at Tawin West is to compensate for "*the loss of perennial vegetation of stony banks due to the sheltering effect of the GHE*". The management will improve the status of the stony bank habitat in the area which currently has a high cover of negative plant species.

The Land Management Plan includes measures to compensate for the impacts associated with GHE that will result in:

- 0.35 ha of stony bank [1220] to suffer "the loss of perennial vegetation of stony bank due to the sheltering effect of the GHE".

The spatial extent of the stony bank [1220] at Renmore to suffer loss due to the proposed GHE is shown in **Figure 3-1**. The Compensatory Measures in the Land Management Plan relate to 1.124 ha of stony bank habitat at Mweeloon (see **Figure 3-1**). Of this 1.124 ha of stony bank habitat at Tawin West, an area of 0.844 ha[7] is set as compensation against the impacted area of 0.350 ha (equating to a compensatory ratio of 2.411: 1 *i.e.,* 0.844 ha: 0.350 ha).

The Conservation Objective for 1220 stony banks is to maintain Favourable Conservation Condition which is defined by the habitat attributes and targets that are set out in **Table 3.2**.

The key measures to be implemented at the Tawin West Compensatory Area to compensate for the loss of 1220 stony bank habitat are detailed in this document in **Table 4.2**. Specifically, the Compensatory Measures proposed in the plan will help improve the Conservation Status of the stony bank habitat area at Tawin West.

Table 3.2: Habitats, Measure and Target for stony bank habitat (NPWS 2013)[8]

Habitat	Attribute	Measure	Target
1220 stony bank	1) Habitat Area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession
	2) Habitat Distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
	3) Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
	4) Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	5) Vegetation composition: typical species and subcommunities	Percentage cover at a representative sample of monitoring stops	Maintain the typical vegetated shingle flora including the range of subcommunities within the different zones. Typical species include Sea Sandwort (*Honckenya peploides*), Sea Beet (*Beta vulgaris ssp maritima*), Rock Samphire (*Crithmum maritimum*), Sea Mayweed (*Tripleurospermum maritimum*), Yellow-horned Poppy (*Glaucium flavum*) and Sea Campion (*Silene uniflora*)
	6) Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover

[7] The stony bank area not included as Compensatory Habitat measures 0.280 ha. This area of stony bank habitat is put forward to address historic loss of this habitat type due to the GHEP during the 1990s.

[8] NPWS (2013) Conservation Objectives; Galway Bay Complex SAC 000268. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

3.2 ACCOMPANYING MEASURES

3.2.1 Mweeloon and Tawin West Land Management Plans

3.2.2 Galway Harbour Enterprise Park

The development of the GHEP in the mid-1990s resulted in the loss of areas of Intertidal, stony bank and salt marsh habitat. The areas of habitat lost due to the GHEP are:

- 7.390 ha of salt marsh habitat
- 8.580 ha of Intertidal habitat
- 0.280 ha of stony bank habitat

Details on how the historic loss of salt marsh habitat, stony bank and Intertidal habitat is addressed below.

3.2.2.1 Salt marsh and stony bank habitat

The terrestrial area at Mweeloon and Tawin West comprises shingle coastline, stony bank habitat and well-developed coastal grassland which grades into salt marsh vegetation.

3.2.2.2 Aim

The aim of the Land Management Plans is to improve the status of salt marsh habitat 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) and 1220 stony bank habitats at Mweeloon and salt marsh habitat 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) at Tawin West.

The Accompanying Measures proposed in the Plan will help manage pressures affecting the habitats and improve the Conservation Status of the habitats area at Mweeloon and Tawin West.

The total area of salt marsh habitat at Mweeloon is 11.381 ha and 3.087 ha at Tawin West (see **Figure 3-2**) therefore a total area of 14.468 ha is put forward to address the loss of 7.390 ha of salt marsh habitat due to the GHEP.

The total area of stony bank habitat at Mweeloon is 3.11 ha (see **Figure 3-3**). The total area of stony bank habitat at Tawin West is 1.124 ha, 0.280 ha of which is not included as Compensatory Habitat measures but is put forward to address historic loss of 0.280 ha of this habitat type due to the GHEP (see **Figure 3-3**).

3.2.2.3 Objectives/ Measures

The Accompanying Measures to be implemented at the Mweeloon and Tawin West are detailed in **Table 4.3**. The Accompanying Measures will help improve the conservation status of the salt marsh and stony bank habitats.

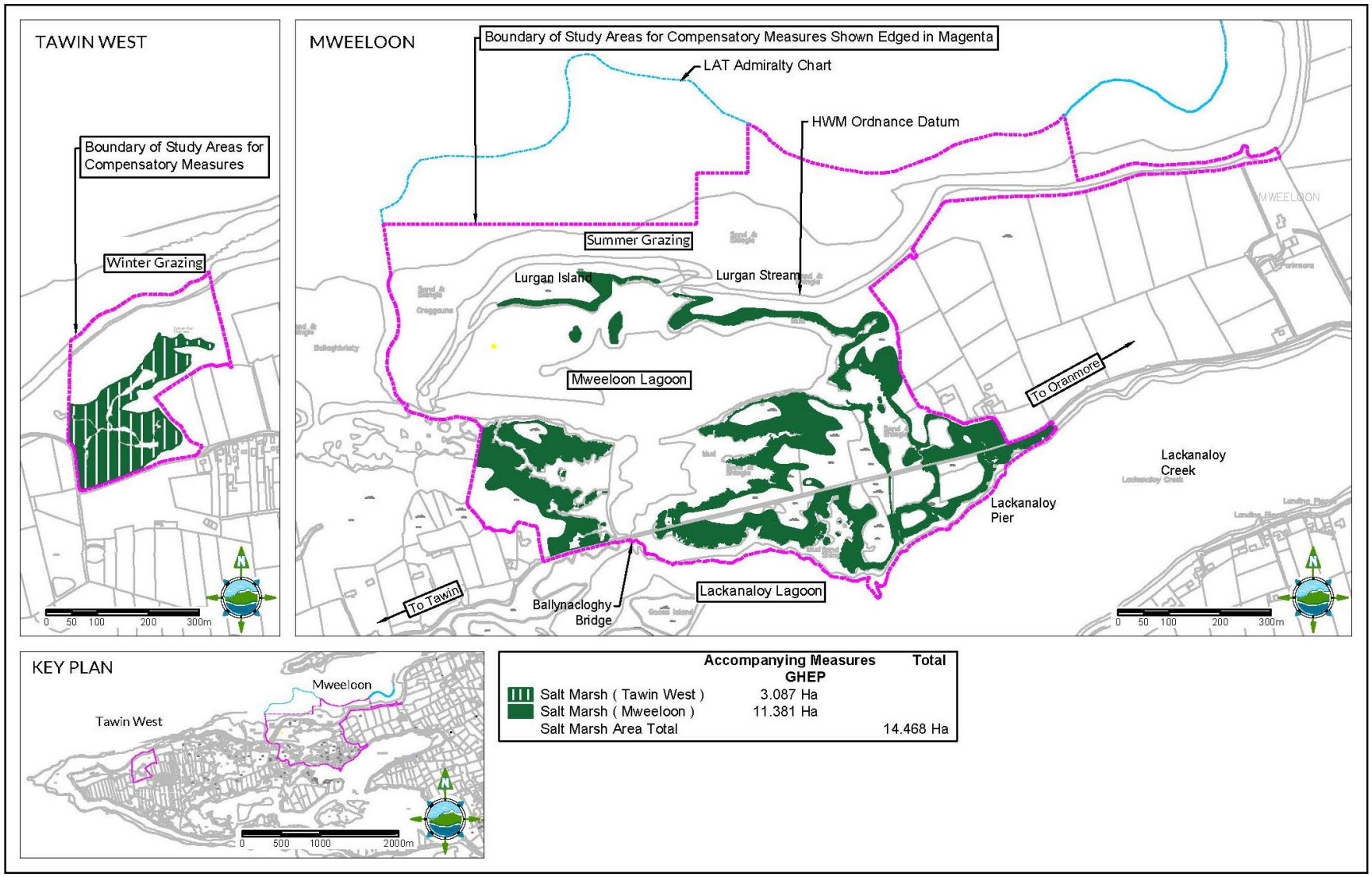

Figure 3-2: Salt marsh Management Areas.

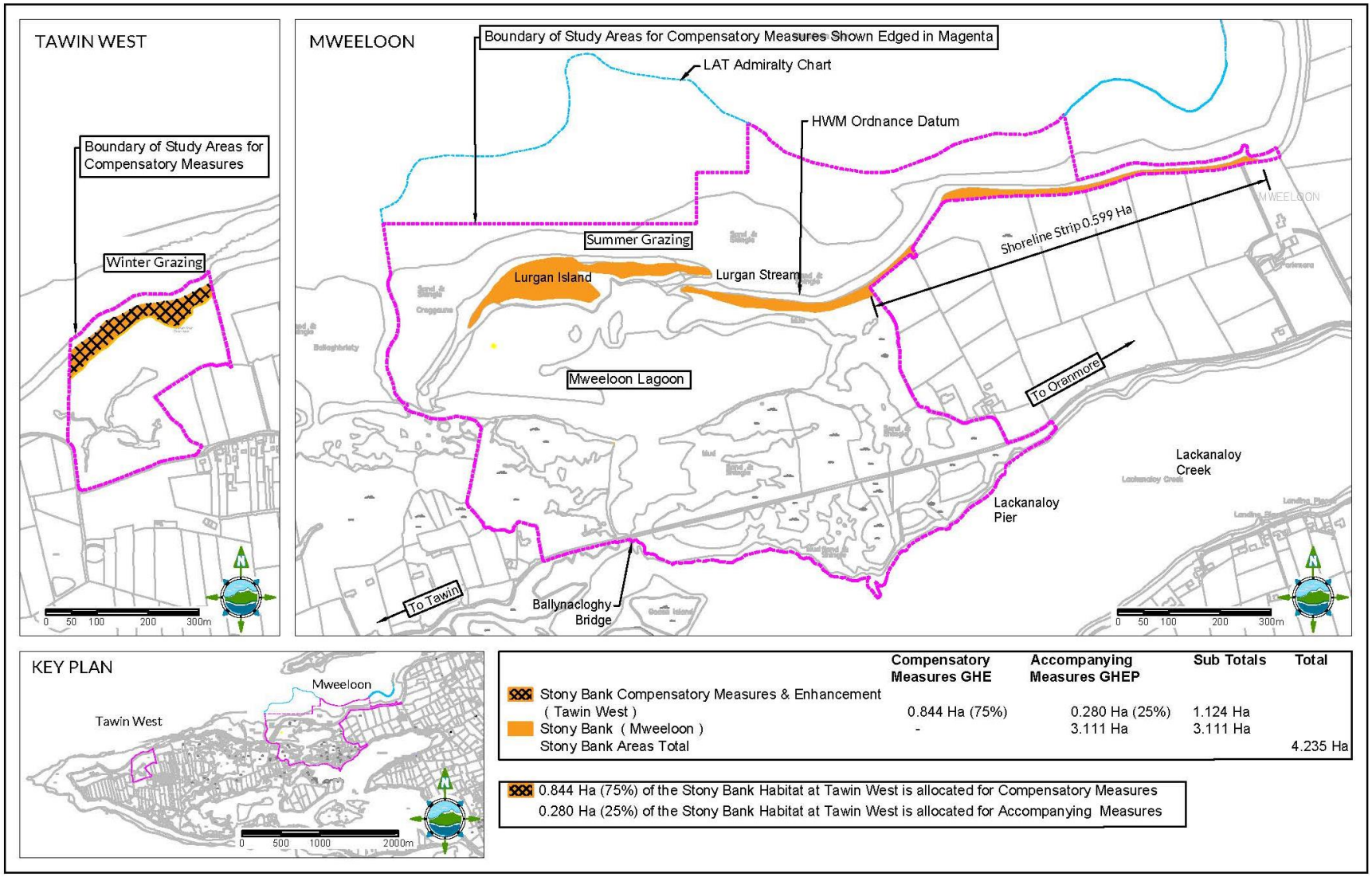

Figure 3-3: stony bank Management Areas.

Table 3.3: Habitats, Measure and Target for Atlantic salt marsh habitat (NPWS 2013)[9]

Habitat	Attribute	Measure	Target
1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	1) Habitat Area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House – 2.33ha, Seaweed Point – 1.41ha, Roscam West and South – 3.30ha, Oranmore North – 4.24ha, Kilcaimin – 6.82ha, Tawin Island – 53.85ha, Tyrone House Dunbulcaun Bay – 9.83ha, Kileenaran – 15.37ha, Kinvara West – 13.33ha, Scanlan's Island – 4.13ha.
	2) Habitat Distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
	3) Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions
	4) Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession
	5) Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
	6) Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	7) Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
	8) Vegetation structure: vegetation cover	Percentage over at a representative sample of monitoring stops	Maintain more than 90% area outside creeks vegetated
	9) Vegetation composition: typical species and subcommunities	Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009)
	10) Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	There is currently no Common Cordgrass (*Spartina anglica*) in this SAC. Prevent establishment of cordgrass

[9] NPWS (2013) Conservation Objectives: Galway Bay Complex SAC 000268. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

3.2.3 Intertidal habitat

The Compensatory Measures in the Intertidal Management Plan relate to 27.331 ha of Intertidal habitat at Mweeloon, of which 17.790 ha is set as compensation for Intertidal area impacted by the GHE (see **Figure 3-4**). The remaining habitat area 9.541 ha which is not included as Compensatory Habitat measures is put forward to address historic loss of 8.580 ha of this habitat type due to the GHEP. The Accompanying Measures[10] proposed are the same as the compensatory measures as outlined for the Intertidal habitats in **Section 3.1.1.**

[10] 9.541 ha (35%) of the 27.331 ha of intertidal at Mweeloon is allocated for the Accompanying Measures.

0.280 ha (25%) of the 1.124 ha of stony bank at Twain West is allocated for the Accompanying Measures.

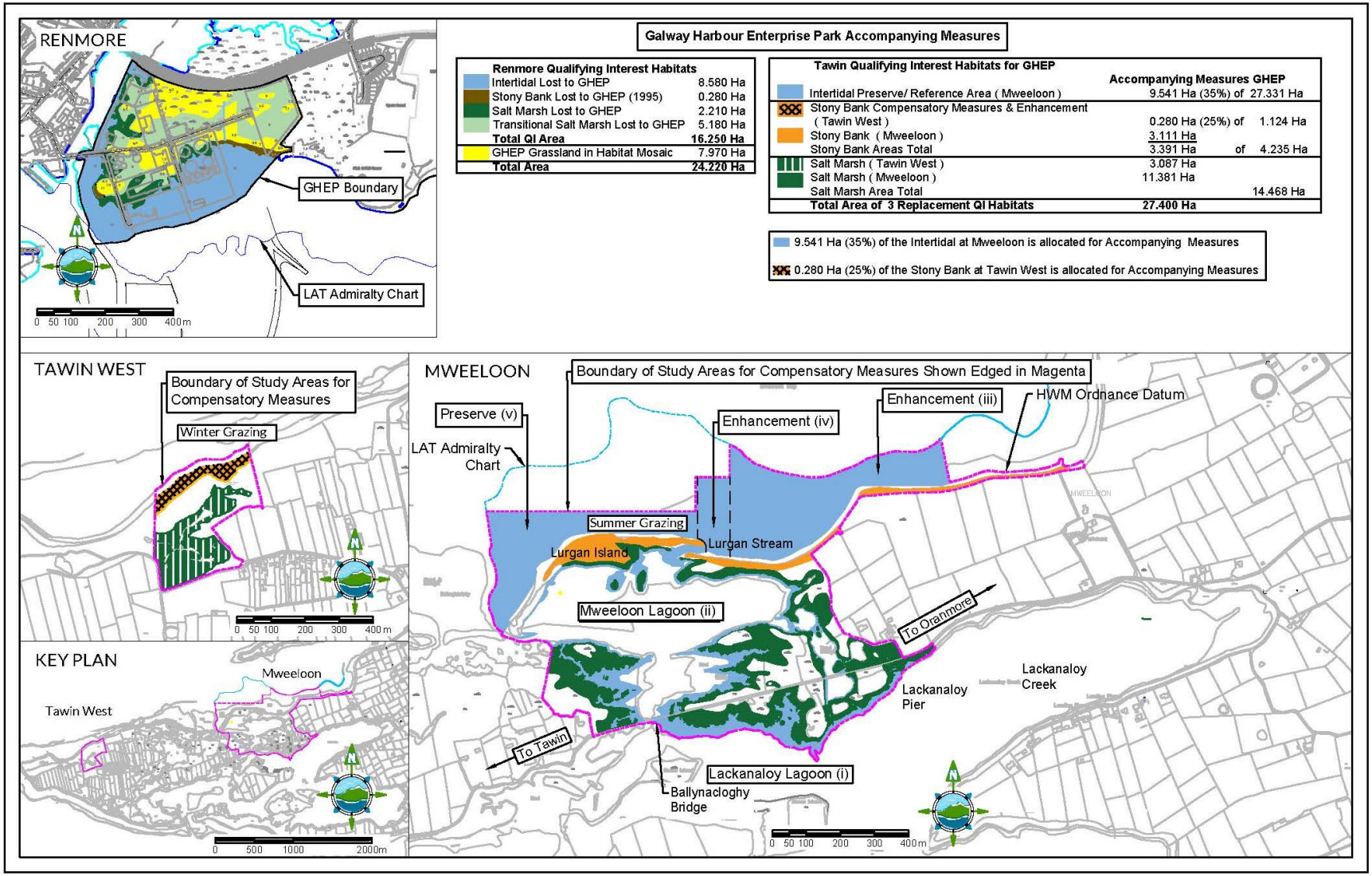

Figure 3-4: Combined Intertial, stony bank and salt marsh Areas within the Study Areas.

3.3 ADDITIONAL ENVIRONMENTAL BENEFITS

3.3.1 Lagoon Habitat at Mweeloon

The area around Mweeloon comprises terrestrial and marine habitats including Intertidal and Subtidal marine habitats, stony bank, salt marsh and grasslands. Except for two cilled openings to the open sea on the north shore on either side of Lurgan Island and two openings to the south under Ballynacloghy Bridge and a lesser culvert to the east, the marine waters within Mweeloon are land locked and, in ecological terms, are definable as a lagoon under the EU “Habitats” Directive (1992).

Prior to this finding, the various Tawin lagoons were defined as Intertidal Muds and sands that dry out at low water and both the Admiralty chart of the area and the Ordnance Survey map show exposed seabed habitat being present at low water. Observations made during the course of the fieldwork carried out during the development of Compensatory Measures for the GHE show that this is not the case and that the area in question comprises lagoon habitat.

Lagoons are listed as Priority habitats in the EU “Habitats” Directive (EU, 1992) and this status requires that they are afforded special protection. This habitat type is not listed on the NWPS site description for the water body at Mweeloon nor indeed is the extensive area of Tawin Island at large as shown on **Figure 3-5**. In the greater Tawin Island area, the extent of this habitat has been estimated at 265.5 ha. The Mweeloon Lagoon area is shown in navy within the Compensatory Areas at Mweeloon and Tawin West outlined in magenta. The fact that there is 19.516 ha of priority lagoonal habitat which will be enclosed by the GHC owned lands is of significant additional ecological and conservation interest. The estimated extent of 265.5 ha of lagoonal habitat at Tawin Island is of considerably high National interest as statistically, it significantly adds 10.9% to the overall area of the habitat on a National scale.

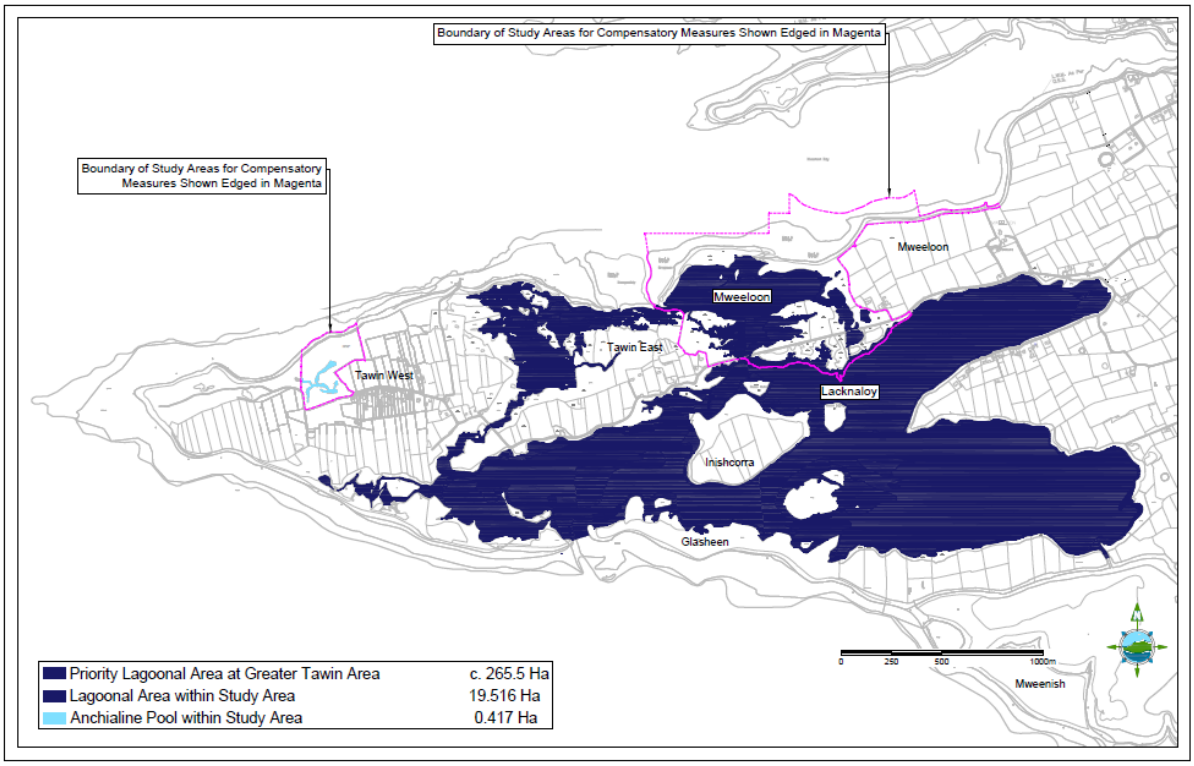

Figure 3-5: Extent of Priority Lagoon Habitat at Mweeloon relative to the Compensatory Areas at Mweeloon and Tawin West.

3.3.2 Protection of Limestone Pavement, Salicornia *and other annuals colonizing mud and sand and Other QIs and Rare Species*

In addition to the dominant Atlantic salt marsh habitat at Mweeloon, there are other habitats on this proposed compensatory site and these are areas of two other EU Annex I habitats, namely limestone pavement (Habitat code 8240) and *Salicornia* and other annuals colonising mud and sand (Habitat code 1310). Limestone pavement [8240], which is listed as a Priority Habitat in the Habitats Directive, was not previously recorded for the greater Tawin area before this study (see **Figure 3-6**) and its occurrence at Mweeloon gives further additional high conservation status to the proposed area. [Refer to Photograph in **Figure 3-8**].

Much of the limestone pavement habitat is found in association with salt marsh species such as *Festuca rubra* and *Artemisia maritima*. This co-occurrence of salt marsh and limestone pavement habitats is very rare in Ireland and its occurrence at Mweeloon gives the area further additional ecological interest and value.

The limestone pavement transitions to areas of calcareous grass land and coastal grassland above sea flood level. The lesser perched lagoons, the limestone pavement and the transitional pavement areas will be protected from land reclamation, removal of feature out-cropping rock and change-over to intensive agriculture by the compensatory measures proposed. Those measures will see the lands and the habitats protected, preserved and enhanced, all of which is enabled by the land purchases

agreed to allow the provision of these lands as the Compensatory Measures for the proposed GHE and previous GHEP developments.

Another QI habitat for Galway Bay cSAC is *Salicornia* and other annuals colonising mud and sand [1310]. This habitat is typically found along the lower reaches of Atlantic salt marsh where the substrate is generally muddy and the habitat experiences long periods of inundation by tides. The vegetation is normally sparse with the main species accompanying *Salicornia europaea* (Glasswort or Samphire) being *Suaeda maritima* and the grass *Puccinellia maritima*. This habitat is common at Mweeloon and is present along the upper Intertidal sections of much of the lagoonal habitat of Tawin.

The salt marsh vegetation at the Tawin West Compensatory Area is subject to regular partial tidal inundation via underground seawater seepage through the limestone bedrock with seawater collecting in a small, elongate anchialine pool located close to the centre of the compensatory area (see **Figure 3-7** and **Figure 3-8**). The management of activities on the lands will be of environmental benefit to the anchialine pool feature and vegetation in the area.

A QI species for Galway Bay cSAC, Otter, is also known to be present at the site – sprainting sites were observed at a number of locations along the north shore of the proposed compensatory area.

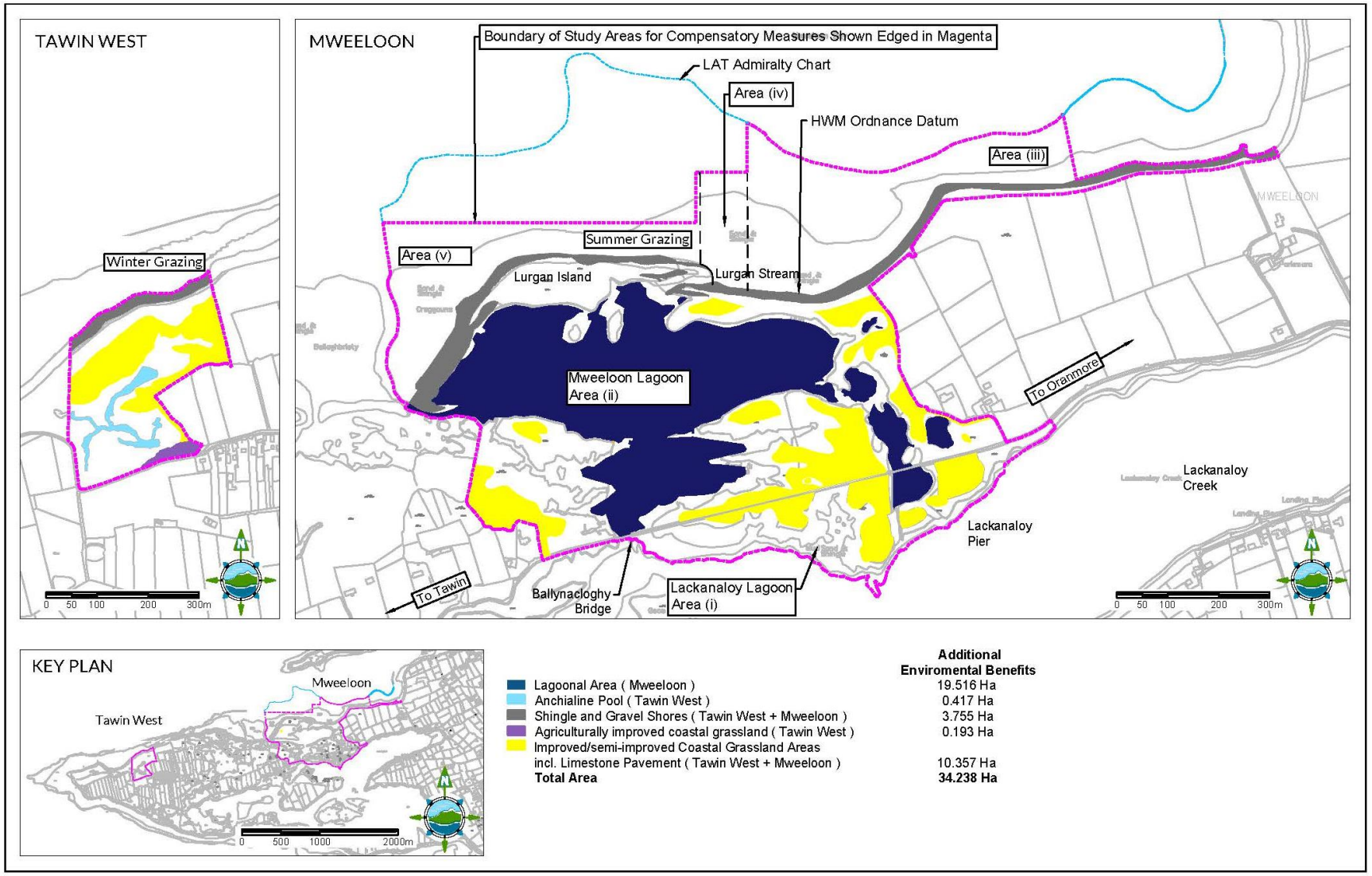

Figure 3-6: Additional Environmental Benefits - Habitat Areas.

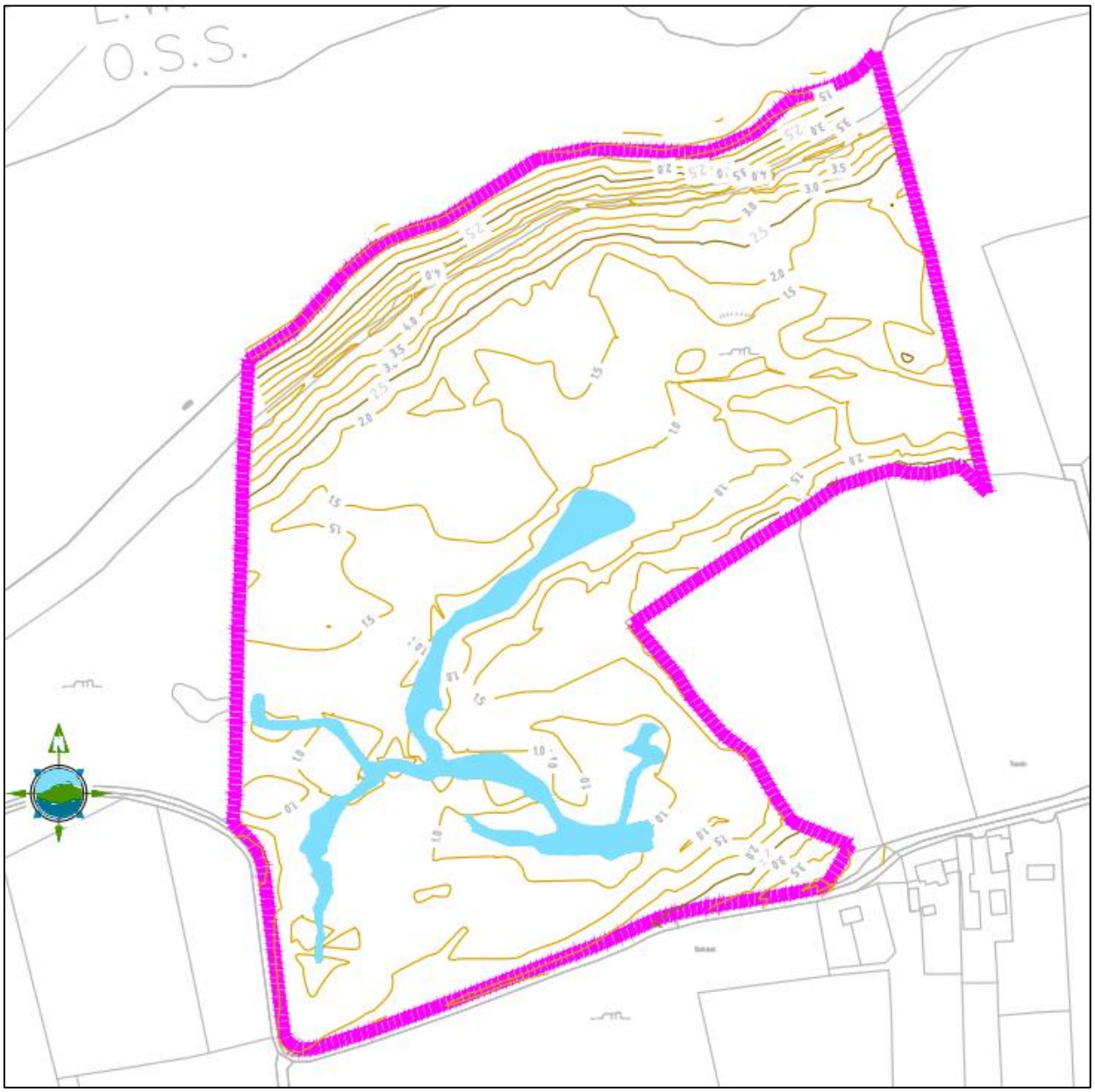

Figure 3-7: Contour mapping at Tawin West. Extent of anchialine pool shown in blue.

Figure 3-8: Limestone pavement and salt marsh complex at Mweeloon showing undamaged habitat. Note the abundance of *Artemisia maritima* (Wormwood) at this location.

3.3.3 Locally rare plant species

Mweeloon supports a population of two locally rare plant species. Shingle areas contain populations of Yellow-horned Poppy (*Glaucium flavum*) while salt marsh areas support populations of Sea Purslane (*Atriplex portaculoides*). Both of these species have a very restricted distribution in Ireland generally and are particularly rare along the west coast of Ireland. The populations of the species which occur at Mweeloon are among the most northerly known along the west coast. These populations will be surveyed as part of the future management of the site using rare plant monitoring protocol devised by NPWS. The extent of the populations will be surveyed and mapped using GPS and a number of permanent monitoring quadrats will be established. In these quadrats, the number of plants will be counted and other important data such as associated vegetation and degree of disturbance will be recorded. Using these data, it will be possible to determine the effects of management on the species and this will enable the better protection of these rare species within the site. This research will increase the understanding of the ecology and management of these rare coastal species which could be applied to other populations of the species elsewhere in Ireland in the future.

4 STAGE 1: SCREENING FOR APPROPRIATE ASSESSMENT

4.1 RECEIVING ENVIRONMENT

4.1.1.1 Marine Habitats

Marine habitats proposed as Compensatory habitats are only present at the Mweeloon Compensatory Area. At Mweeloon shoreline transects that were surveyed as part of a quantitative survey fall into two main groups *i*.e., those that are outside the lagoon and those that are inside it.

The first group includes the sixteen shoreline transects that face north into Galway Bay. The coast here experiences full daily symmetrical tidal variation including the longer lunar variations of the Spring and Neap cycles. These shores show the full range of zonation associated with such tidal conditions. At low water Spring tide, the length of the exposed shore is up to *ca* 200m particularly at the eastern end of Lurgan Island. The supratidal habitat along the entire length of this northern shore is comprised of limestone boulders and cobbles interspersed with gravel. The profile of this habitat is very steep but shallows rapidly as it continues into the upper shore habitat. The shore profile continues to level out with distance from the shore and by mid tide, it has flattened out considerably. Lower shore substrates at these sites are a sandy shell substrate with bivalves such as oysters (*Ostrea edulis*) and clams (*Tapes* and *Dosinia*). Small amounts of live maerl (*Lithothamnion* sp.) can also be found at low water. Although some intravariation in lichen and algal species was recorded in these sixteen transects *e.g.,* some lacked *Pelvetia* or *Ascophyllum*, overall, the typical zonation pattern was recorded on these shores with lichen species occurring in the supratidal and high shore levels followed by *Pelvetia, Fucus spiralis, F. vesiculosus, Ascophyllum* and finally, *F. serratus.* Band width of these algae can be tens of meters in extent. These algal species are also all found at the Renmore site where the proposed harbour extension is planned. At the western end of Lurgan Island where the outflow from Mweeloon Lagoon via Oileanbeag Stream fans out to a width of *ca* 100m, this zonation pattern is far less clear as there is always some level of water that covers the substrate.

With regard to invertebrate taxa, they too show the classic zonation with isopods (*Ligia*) occurring under stones above high water and talitrid amphipods present in rotting weed at the High-Water mark, littorinid gastropods and amphipods in the *Pelvetia* zone, other littorinid species, limpets and dog whelks and barnacle species at mid shore levels and echinoderms and bivalves at low water.

The second group are the 56 that are located inside Mweeloon Lagoon. As the marine habitat within Tawin is a lagoon, tidal conditions are very different that those described above and as noted in Section 3.2 above. Even under low water Spring tide conditions, water levels only fall to *ca* -1.5m below high water at most. Also, in this inner area, salt marsh (with typical floral species such as *Limonium, Salicornia, Aster, Suede* and *Beta* being present) predominates in the supratidal and high-water shore levels. Of special note is the presence of extensive stands of *Artemisia absinthium* which is present throughout the headland. Due to the restricted tidal conditions described above, the full suite and spatial extent of zonation present in the outer open sea shoreline does not occur inside the lagoon *e.g., F. serratus* is not exposed and, in some locations, neither *F. spiralis* nor *F. vesiculosus* are exposed. Furthermore, algal band width is never more than a few meters in extent. The lagoonal specialists, *Ruppia cirrhosa* and *Idotea chelipes,* were recorded at one location. The inner lagoonal shores can be differentiated by their substrates *i.e.,* mud, gravel/sand, stones, exposed bed rock.

At the two locations to the east and west of Lurgan Island where sea water enters and leaves Mweeloon Lagoon at Lurgan Stream and Oileanbeg Stream, dense populations of mussels (*Mytilus edulis*) were observed.

There is some aquaculture Oyster *(Magallana (Crassostrea)*) production being carried out off the north shore of Mweeloon and access to the production and/or spat collection site is via tractor along the shore from the east. The trestles on which the oysters are grown have localised impacts on the seabed ecology by shading the seabed from direct sunlight and thereby reducing algal growth, causing minor alteration in oceanography and, therefore, affecting intertidal ecology and faeces from the oysters falling on the seabed and causing changes in sedimentary conditions. The passage of tractors along the seashore crushes sea weeds. Animals that live on stones or in the sediment also can be crushed.

Given the fact that intertidal communities are exposed to a wide range of physical and chemical variability *i.e.,* large variations in Winter and Summer temperatures and salinities and high levels of perturbation due to wind and wave action and violent storm surges during exceptional hurricane events, their sensitivity to impacts is low and their recoverability is high.

The extent of intertidal habitat both on the perimeter of Mweeloon Lagoon and on the foreshore to the north extending out to the Study Area Boundary / LAT datum is 27.331 ha.

4.1.1.2 Terrestrial Habitats (Mweeloon and Tawin West)

Mweeloon

At the Mweeloon site, the main species of the vegetated stony bank areas is the tall grass species *Arrhenatherum elatius* with *Festuca rubra*, *Galium verum, Plantago lanceolata* and *Trifolium repens* also locally common. On a small area of a high shingle ridge, where a skeletal calcareous soil occurs, there is development of species-rich calcareous grassland vegetation characterised by the occurrence of rarer, base-demanding plant species such as *Thymus polytrichus, Carlina vulgaris, Sesleria caerulea, Campanula rotundifolia, Koeleria macrantha* and *Linum catharticum*. The occurrence of calcareous grassland vegetation on vegetated shingle is very rare.

Along the northern shore of the island, there is a wide shingle beach with a narrow band of pioneer shingle vegetation. This species-poor shingle vegetation is generally dominated by large shingle and is typically dominated by *Raphanus raphanistrum* subsp. *maritimus* with frequent *Festuca rubra* and *Arrhenatherum elatius.* During the survey the attractive, yellow-horned poppy *Glaucium flavum* was noted growing on shingle substrate. Along the Atlantic coast of Ireland, this species is very rare, and the shingle beaches of Inner Galway Bay are the most northerly sites known along the west coast.

With regard to salt marsh [1330 and 1410], vegetation generally occurs as a relatively narrow fringe which lies between dry meadow (GS2) vegetation on shallow soil and intertidal. This dry meadow vegetation is typically dominated by coarse grass species such as *Holcus lanatus, Dactylis glomerata* and *Anthoxanthum odoratum*. Although the fringe of salt marsh vegetation present is generally relatively narrow (typically 10 to 20 metres wide) there is good zonation of vegetation evident throughout ranging from pioneer salt marsh on stony soils characterised by *Salicornia* sp*. and Suaeda maritima* to mid-upper marsh characterised by species such as *Artemisia maritima*, *Festuca rubra, Juncus gerardii* and *Armeria maritima.* The main type of vegetation noted during the initial survey of

vegetation is a relatively species-poor middle marsh community which tends to be dominated by a low-growing sward of *Plantago maritima* and *Aster tripolium.* Upper salt marsh areas which are less frequently inundated by sea water tend to be dominated by *Festuca rubra, Juncus gerardii* with frequent *Agrostis stolonifera*. The majority of the salt marsh habitat occurring at Mweeloon is comprised of Atlantic salt meadows [1330].

At Mweeloon, the upper limit of salt marsh vegetation is usually indicated by the presence of the tall, silver-grey species Wormwood (*Artemisia maritima)*. In Ireland, this species has a restricted distribution which is largely confined to Galway Bay, the Shannon estuary, and a few scattered locations on the Irish Sea coast, north of Dublin. The site also contains a small population of the shrubby species *Atriplex portulacoides* which is very rare on the west coast of Ireland.

Tawin West

The area at Tawin West comprises an area of vegetated stony bank habitat occurring on a south-facing slope along the north-western shore of Tawin Island (Grid reference M 309195) and salt marsh. The stony bank area measures approximately 310 metres long and the width varies between 15 and 50 metres, with a total area of approximately 1.12 hectares. Limestone shingle shoreline adjoins to the north and to the south the habitat grades into coastal grassland on flat ground dominated by *Festuca rubra*, *Agrostis stolonifera* and the moss *Rhytidiadelphus squarrosus*. Further to the south there is a shallow saline waterbody, fringed by salt marsh vegetation, which is subject to tidal influence via an underground hydrological connection.

The substrate of the stony bank area comprises a shallow (5 to 15cm), mineral-rich organic soil which overlies rounded limestone shingle. The stony bank area and adjoining salt marsh are grazed by livestock and grazing has been intensive in the past. As a result of this history of relatively intensive management the stony bank vegetation contains a high cover of weedy grassland species.

No rare plant species were recorded within the survey area; however, *Glaucium flavum* (Yellow horned poppy) was noted growing in areas of stony bank habitat immediately to the east and west of the survey area. This species is considered to be declining in Ireland (Wyse Jackson *et al.,* 2016) and, as noted above, Tawin Island is the most northerly known location for this species on the west coast of Ireland (BSBI maps).

The vegetation also contains a number of plant species which are considered to be typical of improved agricultural conditions most notably *Cirsium vulgare* (Spear thistle), *Lolium perenne* (Perennial ryegrass) and *Urtica dioica* (Common nettle). From a conservation assessment point of view these species are termed ‘Negative species’. Species indicative of semi-improved grassland habitats such as *Cynosurus cristatus* (Crested dog’s-tail), *Cerastium* (Chickweed species), *Dactylis glomerata* (Cocks foot) and *Holcus lanatus* (Yorkshire fog) also occur albeit at a lower level of cover.

4.2 IDENTIFICATION OF RELEVANT NATURA 2000 SITES

Adopting a precautionary principle, the SACs and the SPAs within 15km of the development site were included in this assessment. The SACs and SPAs are described below.

4.2.1 Identification of Relevant Natura 2000 Sites

4.2.1.1 SACs within 15 km of Mweeloon and Tawin

Adopting a precautionary principle, the Natura 2000 sites within 15km of the development sites were included in this assessment. All are listed below.

- Galway Bay Complex SAC (IE000268)
- Lough Corrib SAC (IE000297)
- Lough Fingall Complex SAC (IE000606)
- East Burren Complex SAC (IE001926)
- Rahasane Turlough SAC (IE000322)
- Castle Taylor Complex SAC (IE000242)
- Caherglassaun Turlough SAC (IE000238)
- Kiltiernan Turlough SAC (IE001285)
- Ardrahan Grassland SAC (IE002244)
- Inner Galway Bay SPA (IE004031)
- Lough Corrib SPA (IE004042)
- Creganna Marsh SPA (IE004142)
- Rahasane Turlough SPA (IE004089)

While the 13 Natura 2000 sites within 15km of the Mweeloon and Tawin West sites, given the nature, scale and time required to repair the stone walls, hang the gates and put up the fencing, it was considered that “no pathway” exists by which the proposed Compensatory Measures could impact upon any designated sites, other than the Galway Bay Complex SAC (IE000268). The Qualifying Interests (QIs) for Galway Bay SAC Complex (IE000268) are listed below:

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Coastal lagoons [1150]
- Large shallow inlets and bays [1160]
- Reefs [1170]
- Perennial vegetation of stony banks [1220]

- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- *Salicornia* and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Turloughs [3180]
- *Juniperus* communis formations on heaths or calcareous grasslands [5130]
- Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]
- Alkaline fens [7230]
- *Lutra lutra* (Otter) [1355]
- *Phoca vitulina* (Harbour Seal) [1365]

Of these QIs, the following 5 marine QIs occur at the proposed management site:

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Coastal lagoons [1150]
- Large shallow inlets and bays [1160]
- Reefs [1170]
- *Phoca vitulina* (Harbour Seal) [1365]

The Conservation Objectives for these 5 QIs are presented below.

- Mudflats and sandflats not covered by seawater at low tide [1140]

Conservation Objectives for : Galway Bay Complex SAC [000268]

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated using OSi data as 744ha
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sandy mud community complex; and Intertidal sand community complex. See map 7	Based on intertidal surveys undertaken in 2009 and 2010 (RPS, 2012). See marine supporting document for further information

- Coastal lagoons [1150]

Conservation Objectives for : Galway Bay Complex SAC [000268]

1150 Coastal lagoons

To restore the favourable conservation condition of Coastal lagoons in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area 76.7ha. See map 4	Areas calculated from spatial data derived from Oliver, 2007. Site codes IL037, IL038, IL039, IL046, IL047, IL048, IL049, IL050, IL051, IL052. NB there may be more, as yet unmapped, lagoons within this SAC. See lagoon supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 4 for mapped lagoons	Sites IL037, IL038, IL039, IL046, IL047, IL048, IL049, IL050, IL051, IL052 in Oliver, 2007. NB there may be more, as yet unmapped, lagoons within this SAC. See lagoon supporting document for further details
Salinity regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	The lagoons in the site vary from oligohaline to euhaline. See lagoon supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	Most of the lagoons listed for this site are considered to be shallow; however, Aughinish lagoon and Lough Atalia do have deeper (at least 3m) parts. See lagoon supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	The lagoons within this site exhibit a variety of barrier types including cobble/shingle, karst and artificial embankment/causeway. Several are recorded as having sluices. See lagoon supporting document for further details
Water quality: Chlorophyll *a*	µg/L	Annual median chlorophyll *a* within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges 0.1mg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to at least 2m depth	For shallow lagoons, it is expected that macrophytes should extend to their deepest points. See lagoon supporting document for further details
Typical plant species	Number and m²	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Typical animal species	Number	Maintain listed lagoon specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Negative indicator species	Number and % cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutrient levels increase the threat of accelerated encroachment by reedbeds. See lagoon supporting document for further details

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- Large shallow inlets and bays [1160]

Conservation Objectives for : Galway Bay Complex SAC [000268]

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of Large shallow inlets and bays in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area was estimated as 10,825ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive
Community extent	Hectares	Maintain the extent of the *Zostera*-dominated community complex and the maërl-dominated community, subject to natural processes. See map 7	Based on 2006 diver observation and dropdown camera data (MERC, 2006). See marine supporting document for further details
Community structure: *Zostera* density	Shoots per m²	Conserve the high quality of *Zostera*-dominated communities, subject to natural processes	2006 diver observation and dropdown camera data (MERC, 2006). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the maërl-dominated community, subject to natural processes	2006 diver observation and dropdown camera data (MERC, 2006). See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Intertidal sand community complex; Fine to medium sand with bivalves community complex; Sandy mud to mixed sediment community complex; Mixed sediment dominated by Mytilidae community complex; Shingle; Fucoid-dominated community complex; *Laminaria*-dominated community complex; and Shallow sponge-dominated community complex. See map 7	Based on intertidal and subtidal surveys undertaken in 2009 and 2010 (Aquafact, 2010a, b; RPS, 2012). See marine supporting document for further information

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- Reefs [1170]

Conservation Objectives for : Galway Bay Complex SAC [000268]

1170 Reefs

To maintain the favourable conservation condition of Reefs in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes. See map 6 for mapped distribution	Based on information from 2009 and 2010 intertidal survey data and 2009 subtidal survey data (Aquafact, 2010a, b; RPS, 2012). See marine supporting document for further details
Habitat area	Hectares	The permanent habitat area is stable, subject to natural processes. See map 6	Habitat area estimated as 2773ha using 2009 and 2010 intertidal survey data and 2009 subtidal survey data (Aquafact, 2010a, b; RPS, 2012)
Community extent	Hectares	Maintain the extent of the *Mytilus*-dominated reef community, subject to natural processes. See map 7	Area established from 2009 intertidal survey (RPS, 2012)
Community structure: *Mytilus* density	Individuals per m^2	Conserve the high quality of the *Mytilus*-dominated reef community, subject to natural processes	Based on intertidal survey 2009 (RPS, 2012) and intertidal walkover 2012
Community structure	Biological composition	Conserve the following community types in a natural condition: Fucoid-dominated community complex; *Laminaria*-dominated community complex; and Shallow sponge-dominated community complex See map 7	Reef mapping based on information from 2009 subtidal reef survey (Aquafact, 2010b) and 2009 and 2010 intertidal surveys (RPS, 2012). See marine supporting document for further details

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- *Phoca vitulina* (Harbour Seal) [1365]

Conservation Objectives for : Galway Bay Complex SAC [000268]

1365 Harbour seal *Phoca vitulina*

To maintain the favourable conservation condition of Harbour Seal in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 12	See marine supporting document for further details
Breeding behaviour	Breeding sites	Conserve breeding sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish breeding populations, review of data summarised by Summers et al. (1980), Warner (1983), Harrington (1990), Doyle (2002), Lyons (2004), and unpublished NPWS records. See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	Conserve moult haul-out sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish populations, review of data from Doyle (2002), Lyons (2004), Cronin et al. (2004), NPWS (2010, 2011, 2012) and unpublished NPWS records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	Conserve resting haul-out sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish populations, review of data from Doyle (2002), Lyons (2004) and unpublished NPWS records. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour seal population at the site	See marine supporting document for further details

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With regard to the terrestrial QIs, the following 5 QIs occur in the location where it proposed to repair the stone walls, hang the gates and put up the fencing:

- Perennial vegetation of stony bank [1220]
- Atlantic salt meadows (*Juncatalia maritimi*) [1330]
- Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]
- *Salicornia* and other annuals colonising mud and sand [1310]
- Otter [1355]

The Conservation Objectives for these 5 QIs are presented below.

Conservation Objectives for : Galway Bay Complex SAC [000268]

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Current area unknown. It was recorded from Rinville Point, Tawin Point and coastline from Blackhead to Carrickada during the National Shingle Beach Survey (Moore and Wilson, 1999), but the extent was not mapped. Two areas of vegetated shingle were recorded during the Coastal Monitoring Project (Ryle et al., 2009): Bishopsquarter - 0.18ha and Barna (Whitestrand) - 0.45ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8 for mapped locations	Full distribution unmapped at present, although the habitat has been recorded at Rinville Point, Tawin Point and coastline from Blackhead to Carrickada (Moore and Wilson, 1999). It has also been recorded from Barna and Bishopquarter by Ryle et al. (2009). See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	The Galway Bay shoreline supports good examples of shingle beaches along the more exposed shores to the south and west of Galway city and to the north-east of Finnavara, County Clare. Shingle features are relatively stable in the longterm (Moore and Wilson, 1999). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones. Typical species include sea sandwort (*Honckenya peploides*), sea beet (*Beta vulgaris* ssp *maritima*), rock samphire (*Crithmum maritimum*), sea mayweed (*Tripleurospermum maritimum*), yellow-horned poppy (*Glaucium flavum*) and sea campion (*Silene uniflora*)	Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999). Negative indicators include non-native species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

Conservation Objectives for : Galway Bay Complex SAC [000268]

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House - 2.33ha, Seaweed Point - 1.41ha, Roscam West and South - 3.30ha, Oranmore North - 4.24ha, Kilcaimin - 6.82ha, Tawin Island - 53.85ha, Tyrone House-Dunbulcaun Bay - 9.83ha, Kileenaran - 15.37ha, Kinvara West - 13.33ha, Scanlan's Island - 4.13ha. See map 9	Based on data from Saltmarsh monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). Ten sub-sites that supported Atlantic salt meadow were mapped (114.612ha) and additional areas of potential saltmarsh (149.18ha) were identified by an examination of aerial photographs, giving a total estimated area of 263.80ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 9 for known distribution	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). The efficiency of sediment circulation throughout a saltmarsh depends on the creek pattern. Creeks and pans are well developed at both Tawin Island and Kileenaran. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% area outside creeks vegetated	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009)	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	There is currently no common cordgrass (*Spartina anglica*) in this SAC. Prevent establishment of cordgrass	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). McCorry and Ryle, 2009). See coastal habitats supporting document for further details

Conservation Objectives for : Galway Bay Complex SAC [000268]

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)

To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) in Galway Bay Complex, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Extent of this habitat in the SAC is currently unknown. Areas are likely to be small and often in mosaic with other habitats such as limestone pavement and scrub (Dwyer et al., 2007; internal NPWS files). Dwyer et al. (2007) surveyed a number of sub-sites in 2006. The Irish semi-natural grasslands survey undertook survey work in Counties Clare and Galway in 2012 and additional information is likely to be available for this SAC following data analysis
Habitat distribution	Occurrence	No decline, subject to natural processes	Full distribution of this habitat in this SAC is currently unknown- see note above
Vegetation composition: broadleaf herb: grass ratio	Percentage	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2010)
Vegetation composition: typical species	Number	At least 7 positive indicator species present, including 2 "high quality" species	List of positive indicator species, including high quality species, identified by O'Neill et al. (2010)
Vegetation composition: negative indicator species	Percentage	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%. Non-native invasive species, absent or under control	List of negative indicator species identified by O'Neill et al. (2010)
Vegetation structure: sward height	Percentage	30-70% of sward 5-40cm high	Attribute and target based on O'Neill et al. (2010)
Vegetation structure: woody species and bracken (*Pteridium aquilinum*)	Percentage	Cover of bracken (*Pteridium aquilinum*) and woody species (except juniper (*Juniperus communis*)) not more than 5% cover	Attribute and target based on O'Neill et al. (2010)
Physical structure: bare ground	Percentage	Not more than 10% bare ground	Attribute and target based on O'Neill et al. (2010)

Conservation Objectives for : Galway Bay Complex SAC [000268]

1310 Salicornia and other annuals colonising mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House - 0.067ha, Seaweed Point - 0.003ha, Roscam West and South - 0.023ha, Kilcaimin - 0.015, Kileenaran - 0.007ha, Kinvara West - 0.017ha, Scanlan's Island - 0.117ha, Tawin Island - 1.098ha. See map 9	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Habitat recorded at eight of the ten sub-sites surveyed and mapped, giving a total estimated area of 1.347ha. N.B. Further unsurveyed areas may be present within this site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 9 for known distribution	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). *Salicornia* is an annual species, so its distribution can vary significantly from year to year. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore, natural circulation of sediments and organic matter, without any physical obstructions	Sediment supply is particularly important for pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain, or where necessary restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). Creeks deliver sediment throughout saltmarsh system. Creeks and pan structures well developed at Kileenaran and Tawin Island. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for details
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the range of species-poor communities with typical species listed in SMP (McCorry and Ryle, 2009)	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	There is currently no common cordgrass (*Spartina anglica*) in this SAC. Prevent establishment of cordgrass	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details

Conservation Objectives for : Galway Bay Complex SAC [000268]

1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in the west is estimated at 70% (Bailey and Rochford, 2006).
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 262ha above high water mark (HWM); 14ha along river banks/around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 2040ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 4km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 21ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 11	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

Limestone pavement (8240)

Limestone pavement (8240) which is listed as a Priority Habitat in the EU Habitats Directive is not listed as occurring in this part of the Galway Bay Complex SAC was recorded within the proposed management area. Given the high conservation status of this habitat, this is a significant ecological addition to the Mweeloon site. The conservation objectives for this habitat (taken from the Conservation Objectives for the nearby Blackhead - Poulsallagh SAC, site code 000020) are presented below.

8240 Limestone pavements

To maintain the favourable conservation condition of Limestone pavements in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to natural processes	Limestone pavements occurs in intimate association with other Annex I habitats in this SAC: Alpine and Boreal heaths (4060); *Juniperus communis* formations on heaths or calcareous grasslands (5130); Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (6210); Petrifying springs with tufa formation (Cratoneurion) (7220). Therefore, these habitats cannot easily be mapped or considered separately. Conservation objectives for all these habitats should be used in conjunction with each other as appropriate. Wilson and Fernandez (2013) mapped the indicative area of limestone pavement, including associated habitats as 5,572ha (map 6). Four sites within the SAC were surveyed in detail as part of the national survey of limestone pavement and associated habitats (Wilson and Fernandez, 2013). This survey should be consulted for further details
Habitat distribution	Occurrence	No decline. Map 6 shows indicative distribution, including associated habitats	See notes for area above. Based on data from Wilson and Fernandez (2013). This habitat is split into exposed pavement and wooded pavement. In this SAC, the area of wooded pavement is relatively small
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present	Positive indicator species for exposed and wooded pavement are listed in Wilson and Fernandez (2013)
Vegetation composition: bryophyte layer	Percentage at a representative number of monitoring stops	Bryophyte cover at least 50% on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Collective cover of negative indicator species on exposed pavement not more than 1%	Negative indicator species listed in Wilson and Fernandez (2013). Negative indicator species for wooded pavement overlap with non-native species (below)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: scrub	Percentage at a representative number of monitoring stops	Scrub cover no more than 25% of exposed pavement	Attribute and target based on Wilson and Fernandez (2013). This SAC has very little scrub cover compared with areas further inland
Vegetation composition: bracken cover	Percentage at a representative number of monitoring stops	Bracken (*Pteridium aquilinum*) cover no more than 10% on exposed pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation structure: woodland canopy	Percentage at a representative number of monitoring stops	Canopy cover on wooded pavement at least 30%	Wooded limestone pavement in this SAC is mostly low-growing hazel (*Corylus avellana*) woodland, some of which can be classified as Atlantic hazel woodland, an internationally rare woodland type. Despite its low stature it is nonetheless an important habitat for woodland species. Attribute and target based on Wilson and Fernandez (2013)
Vegetation structure: dead wood	Occurrence in a representative number of monitoring stops	Sufficient quantity of dead wood on wooded pavement to provide habitat for saproxylic organisms	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem

Physical structure: disturbance	Occurrence in a representative number of monitoring stops	No evidence of grazing pressure on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	Includes red-data and other rare or localised species as well as archaeological and geological features, which often support distinctive species

4.2.1.2 SPAs within 15 km of Mweeloon and Tawin

The SPAs that are within 15 km of Mweeloon and Tawin are:

- Inner Galway Bay SPA (IE004031)
- Lough Corrib SPA (IE004042)
- Creganna Marsh SPA (IE004142)
- Rahasane Turlough SPA (IE004089)

With regard to these 4 listed SPAs, they are all aquatic habitats, and their Species of Conservation Interests (SCIs) are all aquatic species. With regard to Lough Corrib, Creganna Marsh and Rahasane Turlough SPA, due to distances involved, it is considered very likely that only a minor proportion of any SCI population would fly to the area at Mweeloon and Tawin West where Compensatory Measures will be carried out. For this reason, they were not considered any further.

ABP's AA of the GHE proposal concluded that, with regard to the Inner Galway Bay SPA (004031) while some minor, short term adverse impacts are likely, a significant adverse effect on the integrity of the SPA will not arise in view of the site's conservation objectives. No significant impacts on any other SPAs will arise from the GHE or the measures considered herein.

Regarding the Inner Galway Bay SPA (0040231), the SCIs are the following:

- [A003] Great Northern Diver *Gavia immer* *
- [A017] Cormorant *Phalacrocorax carbo*
- [A028] Grey Heron *Ardea cinerea*
- [A046] Brent Goose *Branta bernicla hrota* *
- [A050] Wigeon *Anas penelope*
- [A052] Teal *Anas crecca*
- [A056] Shoveler *Anas clypeata*
- [A069] Red-breasted *Merganser Mergus serrator*
- [A137] Ringed Plover *Charadrius hiaticula*

- [A140] Golden Plover *Pluvialis apricaria*
- [A142] Lapwing *Vanellus vanellus* *
- [A149] Dunlin *Calidris alpina alpina* *
- A157] Bar-tailed Godwit *Limosa lapponica* *
- [A160] Curlew *Numenius arquata* *
- [A162] Redshank *Tringa totanus*
- [A169] Turnstone *Arenaria interpres*
- [A179] Black-headed Gull *Chroicocephalus ridibundus*
- [A182] Common Gull *Larus canus*
- [A191] Sandwich Tern *Sterna sandvicensis* +
- [A193] Common Tern *Sterna hirundo* +

* Winter visitor

\+ Summer visitor

One habitat (and its component birds) is also listed for the Inner Galway Bay SPA:

- [A999] Wetlands & Waterbirds

Most of these species *i.e.,* Heron, Brent Goose, Widgeon, Teal, Shoveler, Ringed Plover, Dunlin, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull and Common Gull forage or roost on the seashore. Great Northern Diver, Cormorant, Red-breasted Merganser, Sandwich Tern and Common Tern feed exclusively by diving in the sea. Brent Goose, Lapwing and Curlew may also feed on pasture fields. Given the preference for living in/near the sea, these species cannot be impacted by the repairs to gates and stone wall. Additionally, as it is planned to carry out such repairs in the Summer, species that migrate to Ireland in the Winter *e.g.,* Brent Goose and Widgeon and those that migrate away from the shore in the late Spring to breed, *e.g.,* Curlew, Lapwing, Bar-tailed Godwit, cannot be affected by such repairs.

The removal of oyster trestles and control of *Didemnum vexillum* at oyster farms is predicted to have a positive effect on Wetlands and Waterbirds [A999].

The conservation objectives for the SCIs of Inner Galway Bay SPA (004031) are:

Conservation Objectives for : Inner Galway Bay SPA [004031]

A003 Great Northern Diver *Gavia immer*

To maintain the favourable conservation condition of Great Northern Diver in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by great northern diver, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A028 Grey Heron *Ardea cinerea*

To maintain the favourable conservation condition of Grey Heron in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing and intensity of use of areas used by grey heron, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A046 Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Goose in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing and intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A017 **Cormorant *Phalacrocorax carbo***

To maintain the favourable conservation condition of Cormorant in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	This attribute applies to breeding cormorant. Measure based on standard survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2013) provides population data for this species. A recent survey of Deer Island (conducted in 2010) estimated 128 AONs at this colony, which represents an approximate decline of 38% since 1985
Productivity rate	Mean number	No significant decline	This attribute applies to breeding cormorant. Measure based on standard survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2013) provides population data for this species
Distribution: breeding colonies	Number; location; area (hectares)	No significant decline	This attribute applies to breeding cormorant. Cormorant colonies are usually sited on flat or rocky islets or sea stack tops, less often on cliffs (Walsh et al., 1995). Deer Island is a traditional breeding colony in this SPA
Prey biomass available	Kilogrammes	No significant decline	This attribute applies to breeding cormorant. Key prey items: fish (mostly benthic), some crustaceans. Key habitats: cormorants use sandy areas as well as rocky and vegetated substrates. Foraging range: max. 50km, mean max. 31.67km, mean 8.46km (BirdLife International Seabird Database (Birdlife International, 2013))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	This attribute applies to breeding cormorant. Seabird species make extensive use of the marine waters adjacent to their breeding colonies. Foraging range: max. 50km, mean max. 31.67km, mean 8.46km (BirdLife International Seabird Database (Birdlife International, 2013))
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding cormorant population	This attribute applies to breeding cormorant. Cormorant colonies are usually sited on flat or rocky islets or sea stack tops, less often on cliffs (Walsh et al., 1995). Deer Island is a traditional breeding site
Population trend	Percentage change	Long term population trend stable or increasing	This attribute applies to non-breeding cormorant. Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by cormorant, other than that occurring from natural patterns of variation	This attribute applies to non-breeding cormorant. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A050 Wigeon *Anas penelope*

To maintain the favourable conservation condition of Wigeon in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by wigeon, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A052 Teal *Anas crecca*

To maintain the favourable conservation condition of Teal in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by teal, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A056 Shoveler *Anas clypeata*

To maintain the favourable conservation condition of Shoveler in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by shoveler, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A069 Red-breasted Merganser *Mergus serrator*

To maintain the favourable conservation condition of Red-breasted Merganser in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing and intensity of use of areas by red-breasted merganser, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of theconservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A142 Lapwing *Vanellus vanellus*

To maintain the favourable conservation condition of Lapwing in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by lapwing, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives

Conservation Objectives for : Inner Galway Bay SPA [004031]

A149 Dunlin *Calidris alpina alpina*

To maintain the favourable conservation condition of Dunlin in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A160 Curlew *Numenius arquata*

To maintain the favourable conservation condition of Curlew in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A162 Redshank *Tringa totanus*

To maintain the favourable conservation condition of Redshank in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of area	There should be no significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A169 Turnstone *Arenaria interpres*

To maintain the favourable conservation condition of Turnstone in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	There should be no significant decrease in the range, timing or intensity of use of areas by turnstone, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A179 Black-headed Gull *Chroicocephalus ridibundus*

To maintain the favourable conservation condition of Black-headed Gull in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	There should be no significant decrease in the range, timing and intensity of use of areas used by black-headed gull other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A182 Common Gull *Larus canus*

To maintain the favourable conservation condition of Common Gull in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range,timing or intensity of use of areas by the common gull, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A191 Sandwich Tern *Sterna sandvicensis*

To maintain the favourable conservation condition of Sandwich Tern in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). Hannon et al. (1997) and Mitchell et al. (2004) provide summary population information. The Seabird Monitoring Programme (SMP) online database (JNCC, 2013) provides population data for this species
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2013) provides population data for this species
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline	Typical sandwich tern breeding sites are located on low-lying offshore islands or islets in bays or brackish lagoons on spits or remote mainland dunes (Cramp, 1985). Wide fluctuations between years in both breeding numbers and colony locations are known to occur for this species (Mitchell et al., 2004)
Prey biomass available	Kilogrammes	No significant decline	Key prey items: Mostly energy-rich fish, some crustaceans and occasionally insects and rag worms. Key habitats: sandwich tern forage in/over shallow marine waters such as bays, inlets and outflows, gullies, shoals, inshore waters, reefs, and sandbanks; also more open waters nearshore and offshore, including open sea. Foraging range: max. 70km, mean max. 42.3km, mean 14.7km (BirdLife International Seabird Database (Birdlife International, 2013))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	Seabird species can make extensive use of the marine waters adjacent to their breeding colonies. Foraging range: Max 70km, mean max 42.3km, mean 14.7km (Birdlife International Seabird Database (Birdlife International, 2013))
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding sandwich tern population	Typical sandwich tern breeding sites are located on low-lying offshore islands or islets in bays or brackish bagoons on spits or remote mainland dunes (Cramp, 1985)

Conservation Objectives for : Inner Galway Bay SPA [004031]

A193 Common Tern *Sterna hirundo*

To maintain the favourable conservation condition of Common Tern in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). Hannon et al. (1997) and Mitchell et al. (2004) provide summary population information. The Seabird Monitoring Programme (SMP) (JNCC, 2013) provides population data for this species
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) (JNCC, 2013) provides population data for this species
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline	Common tern breeding colonies can be sited in both coastal and inland areas using a wide variety of habitats including sandy, rocky or well-vegetated islands in estuaries, lakes and rivers. This species can also use man-made subtrates (Del Hoyo et al., 1996)
Prey biomass available	Kilogrammes	No significant decline	Key prey items: Small fish, crustaceans, insects and occasionally squid. Key habitats: common tern forage in/over shallow coastal waters, bays, inlets, shoals, tidal-rips, drift lines, beaches, saltmarsh creeks, lakes, ponds, or rivers. Foraging range: max. 37km, mean max. 33.81km, mean 8.67km (BirdLife International Seabird Database (Birdlife International, 2013))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	Seabird species can make extensive use of marine waters adjacent to their breeding colonies. Foraging range: max. 37km, mean max. 33.81km, mean 8.67km (BirdLife International Seabird Database (Birdlife International, 2013))
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding little tern population	Breeding colonies can be sited in both coastal and inland areas using a wide variety of habitats including sandy, rocky or well vegetated islands in estuaries, lakes and rivers. This species can also use man-made subtrates (Del Hoyo et al., 1996)

Conservation Objectives for : Inner Galway Bay SPA [004031]

A999 Wetlands

To maintain the favourable conservation condition of wetland habitat in Inner Galway Bay SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 13,267ha, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 13,267ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document

4.3 PROPOSED COMPENSATORY MEASURES, ACCOMPANYING MEASURES AND ADDITIONAL ENVIRONMENATL BENEFITS

4.3.1 Description of the Proposed Compensatory Measures at Mweeloon

As outlined in **Section 3.1**, to compensate for the Intertidal to be lost or impacted, Compensatory Measures have been developed at the Mweeloon Compensatory Area. The Compensatory Measures are listed in **Table 4.1**.

Table 4.1: Compensatory Measures for Intertidal habitats at Mweeloon

Measure	
1	**Control of *Didemnum*** Carry out on an on-going basis a programme to control the colonial non-native tunicate [marine invertebrate] *Didemnum vexillum* at Mweeloon Lagoon. **Direct linkage to habitat attribute:** **1140 Tidal Mudflats and Sandflats** 2) Community Distribution - Conserve the following community types in a natural condition: Intertidal sandy mud community complex **1170 Reefs** 5) Community structure - Conserve the following community types in a natural condition: fucoid dominated community complex **1160 Large Shallow Inlets and Bays** 5) Community distribution - Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Fine to medium sand with bivalves community complex; Shingle; fucoid dominated community complex
2	**Repair/ Maintain Fences and Gates** GHC will repair / maintain fences and gates along the boundary of the land purchase areas in the Compensatory Area to prevent trespass. As GHC will own the land, it will put padlocks on external gates and only allow individuals who lease the land for approved agricultural purposes access to them, thereby preventing any potential for removal of cobbles *etc*. in the future. The land leases will contain conditions regarding the nature and use of same accordingly. **Direct linkage to habitat attribute:** **1160 Large shallow inlets and bays** 5) Community distribution - Shingle;
3	**Signage** Information signs will also be erected at selected locations along the site boundaries to inform the public of the objective of the project and warn against trespass and the removal of material from the shore.
4	**Cease Construction of Drainage Channels** Prevent the construction of and cease the maintenance of any land drainage channels.

Measure	
5	**Cease Aquaculture** Complete the purchase of the control of licences for aquaculture on the foreshore within 3 months of Final Grant of Satisfactory Planning Permission (F.G.S.P). with a view to removing the oyster trestles within 12 months and on a permanent basis, resulting in a permanent fallowing of aquaculture operations at these particular sites. **Direct linkage to habitat attribute:** **1140 Tidal mudflats and sandflats** 2) Community Distribution - Conserve the following community types in a natural condition: Intertidal sandy mud community complex **1170 Reefs** 5) Community structure - Conserve the following community types in a natural condition: fucoid dominated community complex **1160 Large Shallow Inlets and Bays** 5) Community distribution - Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Fine to medium sand with bivalves community complex; Shingle; fucoid dominated community complex
6	**Control Tractor Access** Tractors are used to access the aquaculture installations over Intertidal areas and in doing so, they damage algae and both epibenthic and infaunal species. Tractor access will be controlled by: The fallowing of aquaculture will reduce tractor use, Restricting access route to along the highest part of the shoreline but below the stony bank habitat as per aquaculture licences, Tractor access will only be required for remaining active aquaculture licenced areas. **Direct linkage to habitat attribute:** **1140 Tidal mudflats and sandflats** 2) Community Distribution - Conserve the following community types in a natural condition: Intertidal sandy mud community complex **1170 Reefs** 5) Community structure - Conserve the following community types in a natural condition: fucoid dominated community complex **1160 Large Shallow Inlets and Bays** 5) Community distribution - Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Fine to medium sand with bivalves community complex; Shingle; fucoid dominated community complex
7	**Nature friendly Farming Practices** The implementation of “nature friendly” farming practices that besides having beneficial effect on terrestrial habitats, will also have beneficial effect on intertidal marine ecology. These measures include controls on the use of anthelmintic drugs with expiry of the withdrawal period before treated livestock are brought onto the lands at Mweeloon, no herbicide and no fertiliser.
8	**Removal of anthropogenic litter and rubbish** Regular removal of anthropogenic litter and rubbish. Removal will occur every 3 months and directly after a Force 9 or greater storm event. Litter and rubbish will be removed to recycling / licensed disposal site.

Measure	
9	**Annual Review of the implementation of the Compensatory Measures Plan will be undertaken** Annual Reports on the Implementation of the Compensatory Measures Plan will be prepared and submitted to the Planning Authority and to NPWS/ DHLGH. The Annual Report will include a section describing monitoring activities, results and any recommendations arising for the adaptation of the Compensatory Measures, in view of the monitoring results. It is proposed that Annual Meetings with the Planning Authority and NPWS/DHLGH will be convened to discuss the Annual Reports and any modifications/ adaptations that are recommended, for their approval. If matters of significance arise in the intervening months that may warrant more immediate amendment of a compensatory measure, approval of same will be sought by correspondence or by an extraordinary meeting, the latter on request. **Compensatory Measures Plan Implementation** It is expected that the implementation of the CMP will be overseen by Galway City Council ("GCC") as the planning authority for the Galway Harbour Extension The envisaged implementation approach is that an annual report will be prepared by Galway Harbour Company ("GHC") and their specialist team in relation to the monitoring and management of the compensatory measures areas, adjacent areas of accompanying measures and additional environmental benefits, all in line with the CMP. This annual report will be submitted to GCC. The planning authority (GCC) is expected to determine the methodology and procedures for implementation, including the circulation of the annual report to the relevant stakeholders, one of which will be NPWS, and perhaps Galway County Council and others as GCC consider appropriate. It is envisaged that the implementation will include an annual meeting of all of the stakeholders, including GHC, and will allow for more frequent meetings if required. The implementation is expected to include site visits at appropriate seasonal times by the relevant stakeholders. For example, there may be a site visits in early Spring and again in September before and after the appropriate growing seasons on the lands. The annual report will then be submitted to GCC before the year end in order to allow time for GCC, NPWS and other relevant stakeholders to review the findings and make recommendations as required ahead of the next spring season

4.3.2 Description of the Proposed Compensatory Measures at Tawin West

As outlined in **Section 3.1**, to compensate for the stony bank to be lost or impacted, Compensatory Measures have been developed at the Tawin West Compensatory Area. The Compensatory Measures are listed in **Table 4.2**.

Table 4.2: Compensatory Measures for stony bank at Tawin West

Measure	
1	**Repair/ Maintain Fences and Gates** GHC will erect / maintain a fence and 2 gates along the boundary of the land purchase area in the Tawin West Compensatory Area and repair / maintain the existing fences / stone walls on the seaward boundary and boundaries with adjacent lands to prevent trespass and control stock. As GHC will own the land, it will put padlocks on external gates and only allow individuals who lease the land for approved agricultural purposes access to them, thereby preventing any potential for removal of cobbles *etc*. in the future. The land leases will contain conditions regarding the nature and use of same accordingly.
2	**Signage** Information signs will be erected at selected locations along the site boundaries to inform the public of the objective of the project and warn against trespass and the removal of material from the shore.
3	**Grazing** Regulating grazing will reduce overgrazing and dunging and to a lesser extent, poaching of the habitat. There will be no grazing between the April 1st and August 31st. A light grazing regime will be implemented between the September 1st and the March 31st at a grazing intensity of between 0.5 to 1.0 LU per hectare. These measures will promote the flowering/ seed set and growth of plant species which will benefit insect species. The lands outside of the areas of stony bank habitats within the Compensatory Area at Tawin West comprise coastal grassland and salt marsh habitat. These areas will be subject to the same grazing regime outlined above which will benefit both the vegetation and birds of the area. **Direct linkage to stony bank habitat attribute** 4) Vegetation structure: zonation - Occurrence 5) Vegetation composition: typical species and sub-communities. 6) Vegetation composition: negative indicator species
4	**Inspections** Walkover inspections to be carried out at regular intervals (approximately every month) in order to monitor grazing and the development of vegetation throughout the year. This will ensure that potential problems such as localized poaching will be identified at an early stage and the appropriate management measures can be taken.
5	**Control Use of Anthelmintic Drugs** Animals to be brought onto the lands will be treated in advance so that they will be outside of the recommended anthelmintic 28 day withdrawal periods.
6	**Control Vehicle Access** By minimizing tractor access and confining unavoidable access to very limited occasions *e.g.,* removal of sick or dying livestock.
7	**Nature friendly Farming Practices** The implementation of "nature friendly" farming practices that besides having beneficial effect on terrestrial habitats, are likely to have beneficial effect on intertidal marine ecology. These measures include: controls on the use of anthelmintic drugs with expiry of the withdrawal period before treated livestock are brought onto the lands at Mweeloon, no herbicide and no fertiliser.

8	**Herbicide** Cease use of herbicide.
9	**Fertilizer** Cease the use of fertilizer on the lands and reduce dunging in this habitat by repair of animal fencing and control of livestock access to the lands. By ceasing fertilizing and supplementary feeding on the lands, the stony bank areas will return to a natural state and nitrogen and phosphorous soil contents will return to natural levels. **Direct linkage to stony bank habitat attribute** 4) Vegetation structure: zonation - Occurrence 5) Vegetation composition: typical species and sub-communities. 6) Vegetation composition: negative indicator species
10	**Eliminate winter and supplementary feeding** Eliminate winter feeding of livestock and supplementary feeding and specifically the use of ring feeders. This will stop related poaching and rutting of lands at feeding sites and around gates. However, should it become apparent that grazing animals are losing condition before the site has been grazed to an optimal level, options for nutritional supplements may be considered for the welfare of the livestock. Any proposal to permit supplementary feed on the site must be agreed in writing with NPWS/ DHLGH **Direct linkage to stony bank habitat attribute** 4) Vegetation structure: zonation - Occurrence 5) Vegetation composition: typical species and sub-communities. 6) Vegetation composition: negative indicator species
11	**Removal of anthropogenic litter and rubbish** Regular removal of anthropogenic litter and rubbish. Removal will occur every 3 months and directly after a Force 9 or greater storm event.
12	**Surveys** Annual survey to be undertaken will monitor stony bank and salt marsh vegetation at Tawin West. The results/observations of these surveys will inform ongoing habitat management. Monitoring surveys will follow the approach outlined in Martin *et al*. (2017) and McCorry and Ryle (2009). Long-term tide level monitoring to be conducted using water level recorders in the anchialine pool area at Tawin west.
13	**Turf stripping** This method may be used over small areas, typically <1 sqm, to remove small dense patches of agricultural grass species, such as *Lolium perenne*. Stripping of the vegetation would expose a shallow stony, dry soil which would favour the colonization and growth of a more natural stony bank flora. No turf stripping will be undertaken without the prior agreement of NPWS/ DHLGH. **Direct linkage to stony bank habitat attribute** 4) Vegetation structure: zonation - Occurrence 5) Vegetation composition: typical species and sub-communities. 6) Vegetation composition: negative indicator species

14	In recognition of local concerns that a breach of the stony banks, within the compensatory measures area, may occur that would result in flooding damage to local homes, consideration is to be given to appropriate long term protection measures that would not affect the Conservation Objectives of the SAC. If a breach in the stony bank occurs, management actions *i.e.,* sensitive reconstruction of the stony bank that will have no long term negative effects on site mobility and the Conservation Objectives may be considered as a temporary short-term measure, subject to agreement with NPWS/DHLGH. The detailed long-term monitoring and assessments of the existing geological features and habitats which will be undertaken will establish the potential implications of the management options on the site. Management actions will be subject to appropriate approvals with input provided by NPWS. Any medium-longer term proposed management actions will be submitted to the Planning Authority and NPWS/DHGLG as part of the Annual Review process. Depending on the nature of the proposed management actions, statutory approvals may also be required, such as planning permission or Ministerial Consent, all of which are subject to the requirements of the Habitats Directive, including appropriate assessment.
15	**Annual Review of the implementation of the Compensatory Measures Plan will be undertaken** Annual Reports on the Implementation of the Compensatory Measures Plan will be prepared and submitted to the Planning Authority and to NPWS/ DHLGH. The Annual Report will include a section describing monitoring activities, results and any recommendations arising for the adaptation of the Compensatory Measures, in view of the monitoring results. Annual Meetings with the Planning Authority and NPWS/DHLGH will be convened to discuss the Annual Reports and any modifications/ adaptations that are recommended, for their approval. If matters of significance arise in the intervening months that may warrant more immediate amendment of a compensatory measure, approval of same will be sought by correspondence or by an extraordinary meeting, the latter on request. **Compensatory Measures Plan Implementation** It is expected that the implementation of the CMP will be overseen by Galway City Council ("GCC") as the planning authority for the Galway Harbour Extension The envisaged implementation approach is that an annual report will be prepared by Galway Harbour Company ("GHC") and their specialist team in relation to the monitoring and management of the compensatory measures areas, adjacent areas of accompanying measures and additional environmental benefits, all in line with the CMP. This annual report will be submitted to GCC. The planning authority (GCC) is expected to determine the methodology and procedures for implementation, including the circulation of the annual report to the relevant stakeholders, one of which will be NPWS, and perhaps Galway County Council and others as GCC consider appropriate. It is envisaged that the implementation will include an annual meeting of all of the stakeholders, including GHC, and will allow for more frequent meetings if required. The implementation is expected to include site visits at appropriate seasonal times by the relevant stakeholders. For example, there may be a site visits in early Spring and again in September before and after the appropriate growing seasons on the lands. The annual report will then be submitted to GCC before the year end in order to allow time for GCC, NPWS and other relevant stakeholders to review the findings and make recommendations as required ahead of the next spring season

4.3.3 Accompanying Measures

As outlined in **Section 3.2**, the Compensatory Measures in the Intertidal Management Plan relate to 27.331 ha of Intertidal habitat at Mweeloon, of which 17.790 ha is set as compensation for Intertidal area impacted by the GHE (see **Figure 3-4**). The remaining habitat area 9.541 ha which is not included as Compensatory Habitat measures is put forward to address historic loss of 8.580 ha of this habitat type due to the GHEP as part of the Accompanying Measures. The Accompanying Measures are listed in **Table 4.3**.

Table 4.3: Accompanying Measures for terrestrial habitats at Mweeloon

Accompanying Measures	
1	**Repair/ Maintain Fences and Gates** GHC will repair / maintain fences and (repair / replace) gates along the boundary of the land purchase areas in the Mweeloon Compensatory Area to prevent trespass and within the lands to facilitate livestock management and control grazing. As GHC will own the land, it will put padlocks on external gates and only allow individuals who lease the land for approved agricultural purposes access to them, thereby preventing any potential for removal of cobbles *etc*. in the future. The land leases will contain conditions regarding the nature and use of same accordingly.
2	**Signage** Information signs will also be erected at selected locations along the site boundaries to inform the public of the objective of the project and warn against trespass and the removal of material from the shore.
3	**Cease construction of drainage channels** Prevent the construction of and cease the maintenance of any land drainage channels. **Direct linkage to Atlantic salt meadow habitat attribute** 4) Physical structure: creeks and pans; Occurrence 5) Physical structure: flooding regime; Hectares flooded; frequency

4	**Grazing** Regulating grazing will reduce over grazing and dunging and to a lesser extent, poaching[11] of the habitat. Following extensive consultation and discussions with the current owners and leasees of the lands at Mweeloon a light grazing regime between the May 1st and October 31st at a grazing intensity of between 0.5 to 1.0 LU per hectare will be implemented. Grazing during these months will be closely monitored. As the areas at Mweeloon and Tawin West will be subject to different grazing regimes, the results of the vegetation monitoring will provide important comparative information regarding the ecological management of vegetation in salt marsh and stony bank areas. The areas to be grazed at Mweeloon and Tawin West will be compared and will therefore act as reference areas to each other. This will ensure that potential problems such as localized poaching will be identified at an early stage and the appropriate management measures can be taken. Vegetation surveys will take place annually in mid-May and early August in order to reveal the vegetation composition and the degree of flowering. Walkover inspections will be carried out at regular intervals (approximately every month) in order to monitor grazing and the development of vegetation throughout the year. The lands outside of the areas of salt marsh and stony bank habitats at Mweeloon comprise coastal grassland. These areas will be subject to the same grazing regimes which will benefit the vegetation of the area. **Direct linkage to Atlantic salt meadow habitat attribute** 6) Vegetation structure: zonation, Occurrence 7) Vegetation structure: vegetation height – Centimetres 8) Vegetation structure: vegetation cover, Percentage over at a representative sample of monitoring stops 9) Vegetation composition: typical species and sub-communities: Percentage over at a representative sample of monitoring stops **Direct linkage to stony bank habitat attribute** 4) Vegetation structure: zonation – Occurrence 5) Vegetation composition: typical species and sub-communities. 6) Vegetation composition: negative indicator species
7	**Inspections** Walkover inspections to be carried out at regular intervals (approximately every month) in order to monitor grazing and the development of vegetation throughout the year. This will ensure that potential problems such as localized poaching will be identified at an early stage and the appropriate management measures can be taken.
8	**Control Use of anthelmintic drugs** Animals to be brought onto the lands will be treated in advance so that they will be outside of the recommended anthelmintic 28 day withdrawal periods.
9	**Control Vehicle Access** By minimizing tractor access and confining unavoidable access to very limited occasions *e.g.,* removal of sick or dying livestock.

[11] Poaching is the name for damage done to grass and the underlying soil by livestock which has been allowed to stand and walk on it for prolonged periods in wet conditions

10	**Nature friendly Farming Practices** The implementation of "nature friendly" farming practices that besides having beneficial effect on terrestrial habitats, will be likely to have beneficial effect on intertidal marine ecology. These measures include: controls on the use of anthelmintic drugs with expiry of the withdrawal period before treated livestock are brought onto the lands at Mweeloon, no herbicide and no fertiliser.
11	**Herbicide** Cease use of herbicide. **Direct linkage to Atlantic salt meadow habitat attribute** 6) Vegetation structure: zonation, Occurrence 7) Vegetation structure: vegetation height – Centimetres 8) Vegetation structure: vegetation cover, Percentage over at a representative sample of monitoring stops 9) Vegetation composition: typical species and sub-communities: Percentage over at a representative sample of monitoring stops
12	**Fertilizer** Cease the use of fertilizer on the lands and curtail dunging in this habitat by repair of animal fencing. By ceasing fertilizing and supplementary feeding on the lands, the salt marsh areas will return to a natural state and nitrogen and phosphorous soil contents will return to natural levels. **Direct linkage to Atlantic Salt Meadow habitat attribute** 6) Vegetation structure: zonation, Occurrence 7) Vegetation structure: vegetation height – Centimetres 8) Vegetation structure: vegetation cover, Percentage over at a representative sample of monitoring stops 9) Vegetation composition: typical species and sub-communities: Percentage over at a representative sample of monitoring stops **Direct linkage to stony bank habitat attribute** 4) Vegetation structure: zonation – Occurrence 5) Vegetation composition: typical species and sub-communities. 6) Vegetation composition: negative indicator species

13	**Eliminate winter and supplementary feeding** Eliminate winter feeding of livestock and supplementary feeding and specifically the use of ring feeders. This will stop related poaching and rutting of lands at feeding sites and around gates. **Direct linkage to Atlantic Salt Meadow habitat attribute** 6) Vegetation structure: zonation, Occurrence 7) Vegetation structure: vegetation height - Centimetres 8) Vegetation structure: vegetation cover, Percentage over at a representative sample of monitoring stops 9) Vegetation composition: typical species and sub-communities: Percentage over at a representative sample of monitoring stops **Direct linkage to stony bank habitat attribute** 4) Vegetation structure: zonation - Occurrence 5) Vegetation composition: typical species and sub-communities. 6) Vegetation composition: negative indicator species
14	**Removal of anthropogenic litter and rubbish** Regular removal of anthropogenic litter and rubbish. Removal will occur every 3 months and directly after a Force 9 or greater storm event.
15	**Vegetation surveys** The set of annual surveys to be undertaken will monitor stony bank and salt marsh vegetation at Mweeloon. The results/observations of these surveys will inform ongoing habitat management. Monitoring surveys will follow the approach outlined in Martin *et al.* (2017) and McCorry and Ryle (2009).
16	**Stony bank surveys** The spatial extent of the stony bank habitat at Lurgan Island and east of the Lurgan stream will be surveyed annually and also after significant storm events.
17	**Future Assessment and Monitoring Studies** Detailed shoreline topographical surveys and bathymetric surveys and photographic surveys of the sea defence units and ongoing monitoring of level and displacement of these units. Detailed hydrodynamic and sediment transport modelling studies of the local and wider area, sediment sampling and distribution analysis, storm event analysis and the possible seeding of tracer sediments to identify and track movement of the shingle. Long-term tide level monitoring to be conducted using water level recorders, one, within the Mweeloon Lagoon, a second in the southern lagoonal area south of the Tawin causeway road and a third in the open sea near Mweeloon Bay.

18	**Stony bank and sea defences** The stony bank and sea defences at Lurgan Island act as a barrier between the open sea and Mweeloon lagoon, helping preserve the ecosystem function of this priority habitat by maintaining existing water regime and circulation of sediment and organic matter. A breach of the stony bank and sea defences at Lurgan Island could expose the inner lagoon area to greater flooding impact and to storm waves and much increased flow through Ballynacloghy Bridge into the larger lagoon to the south. To counter any breach and potential impacts to the lagoon and adjacent salt marsh habitats, management actions including sensitive works on the stony bank and sea defences may be indicated. Detailed long-term monitoring and assessments will be undertaken to establish the potential implications of any management options (such as retaining, repairing, enhancing or removing) on the site and the Conservation Objectives of each of the relevant qualifying interests. Any proposed management actions will be submitted to the Planning Authority and NPWS/ DHGLG as part of the Annual Review process. It will be for NPWS/DHLGH to decide on any prioritisation of the Conservation Objectives for qualifying interests, should conflicting management actions be indicated. Depending on the nature of the proposed management actions, statutory approvals may also be required, such as planning permission or Ministerial Consent, all of which are subject to the requirements of the Habitats Directive, including appropriate assessment.
19	**Annual Review of the implementation of the Compensatory Measures Plan will be undertaken** Annual Reports on the Implementation of the Compensatory Measures Plan will be prepared and submitted to the Planning Authority and to NPWS/ DHLGH. The Annual Report will include a section describing monitoring activities, results and any recommendations arising for the adaptation of the Compensatory Measures, in view of the monitoring results. Annual Meetings with the Planning Authority and NPWS/DHLGH will be convened to discuss the Annual Reports and any modifications/ adaptations that are recommended, for their approval. If matters of significance arise in the intervening months that may warrant more immediate amendment of a compensatory measure, approval of same will be sought by correspondence or by an extraordinary meeting, the latter on request. **Compensatory Measures Plan Implementation** It is expected that the implementation of the CMP will be overseen by Galway City Council ("GCC") as the planning authority for the Galway Harbour Extension The envisaged implementation approach is that an annual report will be prepared by Galway Harbour Company ("GHC") and their specialist team in relation to the monitoring and management of the compensatory measures areas, adjacent areas of accompanying measures and additional environmental benefits, all in line with the CMP. This annual report will be submitted to GCC. The planning authority (GCC) is expected to determine the methodology and procedures for implementation, including the circulation of the annual report to the relevant stakeholders, one of which will be NPWS, and perhaps Galway County Council and others as GCC consider appropriate. It is envisaged that the implementation will include an annual meeting of all of the stakeholders, including GHC, and will allow for more frequent meetings if required. The implementation is expected to include site visits at appropriate seasonal times by the relevant stakeholders. For example, there may be a site visits in early Spring and again in September before and after the appropriate growing seasons on the lands. The annual report will then be submitted to GCC before the year end in order to allow time for GCC, NPWS and other relevant stakeholders to review the findings and make recommendations as required ahead of the next spring season

4.4 LIKELY EFFECTS OF THE COMPENSATORY MEASURES AND COMPLEMENTARY MEASURES AT MWEELOON AND TAWIN WEST

All aspects of these Compensatory Measures and Accompanying Measures have been designed to improve SAC and SPA habitat quality at Mweeloon and Tawin West and not to negatively impact them, or any other habitat/species and because of this, the likely effects of the proposed Compensatory Measures will have a positive effect on the receiving environment. All of the habitats proposed for Compensatory Measures lie within the SAC and SPA designations.

4.4.1 Marine Habitats

The marine Intertidal habitat along the southern shore of Mweeloon Bay is used as an area for the cultivation of Pacific oysters (*Magallana (Crassostrea) pacifica)* (see Figure 7 below). These aquaculture activities all give rise to negative impacts on the Intertidal habitat in the following ways:

- The trestles on which the oysters are grown have localised impacts on the seabed ecology by shading the seabed from direct sunlight and thereby reducing algal growth and causing minor alterations in oceanography and therefore affecting intertidal ecology. Faeces from the oysters falling on the seabed cause changes in sedimentary conditions.

- The passage of tractors along the seashore crushes seaweed. Animals that live on stones or in the sediment are also crushed.

The invasive, non-native tunicate species *Didemnum vexillum* occurs at some of the oyster farms (see **Figure 4-1** and **Figure 4-2** below).

Figure 4-1: Oyster trestles northeast off Lurgan, Tawin.

Figure 4-2: *Didemnum vexillum* at the aquaculture site.

4.4.2 Terrestrial Habitats

the terrestrial habitats in this area are being seasonally damaged by over stocking (trampling, poaching, dunging), supplementary feeding (trampling, poaching, dunging) and rutting by farm machinery. In order to minimise these impacts and control livestock grazing/access in the future, it is necessary to rebuild and maintain damaged stone walls and fence network and form / replace missing and damaged gates (see **Figure 4-3** to **Figure 4-6** below).

Implementation: In the late Spring/Summer after lands have been purchased. The repair and maintenance activities of wall, gates and fences may give rise to minor impacts on some of the QIs of the Galway Bay Complex SAC.

Figure 4-3: Poaching, trampling and rutting of salt marsh at Mweeloon.

Figure 4-4: Damage to salt marsh due to tracking by farm vehicles and poaching.

Figure 4-5: Collapsed stone wall that requires rebuilding.

Figure 4-6: Gates in need of repair.

Rebuilding and maintenance of the dry-stone wall network, the replacement of damaged gates and fencing in the area have the potential to negatively impact stony bank, calcareous grasslands, *Salicornia* muds and salt marsh habitats during the construction phase.

All the required agricultural work will be carried out by Farms Relief Services (FRS). FRS Farm Relief Services offers an array of services to help farmers on their farms.

The rebuilding of stone walls will require two people (one either side of the wall) who will walk along the walls and replace stones or rebuild walls by hand that have significantly collapsed or have been broken down by stock. No mortar will be used and no machinery will be required.

A repair and/or gating of a total of 10 gateway openings are planned. Again, two people will carry out the required work. Materials *e.g.,* shovel, gate posts, a dry mix of gravel and cement and water will be brought on site in the transport box of a small quad bike. For the gate posts, they will be erected by digging out a hole of *ca* 50 x 50 x 50 cms either side of where the gate is to be hung, placing the gate post, in the hole and filling the hole with quick setting concrete that will be mixed in a bucket The material that has been dug out to create the hole will be taken away using the same small quad bike for final disposal to a landfill site. Once the concrete has set, the gate will be brought to the site by hand and hung.

The fencing at Mweeloon and also at Tawin West will be erected by two people using a small quad bike to carry materials, equipment and any spoil arising. Wooden posts will be driven by hand into the ground as tested by crowbar. Where not possible to drive the post, a hole will be dug by hand to receive the post and surplus material will be taken away using the quad bike for final disposal to a landfill. Four strands of barbed wire will be fixed to them using u shaped galvanised staples and a hammer. Repair of stone walls will be by hand carried out by two people, one on either side of the wall.

It is estimated that the above works will take 4 weeks and they will be carried out in a period of dry weather in the summer months.

The lands at the southwestern section of Lurgan have historically undergone coastal defence works and in order to protect the lagoon within Mweeloon, repair to this sea defence wall may be required in the future. It is now agreed that such work if required will be subject to due approval process including AA and so is not included in this NIS

A breach of the stony bank and sea defences at Lurgan Island could expose the inner lagoon area to greater flooding impact and to storm waves and much increased flow through Ballynacloghy Bridge into the larger lagoon to the south. To counter any breach and potential impacts to the lagoonal and adjacent salt marsh habitats, management actions including sensitive works of the stony bank and sea defences may be indicated. Detailed long-term monitoring and assessments will be undertaken to establish the potential implications of any management options (such as retaining, repairing, enhancing or removing) on the site and the conservation objectives of each of the relevant qualifying interests. Any proposed management actions will be submitted to the Planning Authority and NPWS/DHGLG as part of the Annual Review process. It will be for NPWS/DHLGH to decide on any prioritisation of the conservation objectives for qualifying interests, should conflicting management actions be indicated. Depending on the nature of the proposed management actions, statutory approvals may also be required, such as planning permission or Ministerial Consent, all of which are subject to the requirements of the Habitats Directive, including appropriate assessment.

In recognition of local concerns that a breach of the stony banks, within the compensatory measures area, may occur that would result in flooding damage to local homes, consideration is to be given to appropriate long term protection measures that would not affect the Conservation Objectives of the SAC. If a breach in the stony bank occurs, management actions *i.e.,* sensitive reconstruction of the stony bank that will have no long-term negative effects on site mobility and the Conservation Objectives may be considered as a temporary short-term measure, subject to agreement with NPWS/DHLGH.

The detailed long-term monitoring and assessments of the existing geological features and habitats which will be undertaken will establish the potential implications of the management options on the site. Management actions will be subject to appropriate approvals with input provided by NPWS.

Any medium-longer term proposed management actions will be submitted to the Planning Authority and NPWS/DHGLG as part of the Annual Review process. Depending on the nature of the proposed management actions, statutory approvals may also be required, such as planning permission or Ministerial Consent, all of which are subject to the requirements of the Habitats Directive, including appropriate assessment.

All of the proposed surveys and repairs to fences, walls and gates will require notification to and permission from the National Parks and Wildlife Service.

4.4.3 Galway Bay Complex SAC – Marine Habitats and Species

Regarding the marine environment, given the fact that the oyster trestles are already accessed on a fortnightly basis, the activity of turning the bags to help control the non-native *Didemnum* will have no additional impact on the conservation status Intertidal habitat. Furthermore, the eradication of *Didemnum*, either by turning the bags or spraying with acetic acid (vinegar) by hand is considered as a positive impact of the conservation objectives for this QI of the Natura site. Following treatment and the return of the rising tide, the acetic acid will be quickly diluted and will not have any impact on surrounding the flora and fauna at the trestle location.

If a breach in the stony bank occurs, management actions i.e., sensitive reconstruction of the stony bank that will have no long-term negative effects on the site and the Conservation Objectives of the SAC, may be considered as a temporary short-term measure, subject to agreement with NPWS/DHLGH. Potential management actions are further described in **Section 4.4.2** above.

As there are no seal haul out sites at Mweeloon and Tawin West, the Compensatory Measures will not impact on *Phoca vitulina*, the Harbour Seal [1365].

The removal of oyster trestles will allow the intertidal flora and fauna return to their “pre-aquaculture” status and this habitat will recover its form and function status.

4.4.4 Galway Bay Complex SAC - Terrestrial Habitats

In relation to the terrestrial environment, as the rebuilding of the stone walls will only require two people walking along either side of the wall, there will be minimal short-term impact on the ecology of the habitat along the edges of the wall.

Regarding the erection of gate posts and placement of gates, soil and stones that have been dug out to create the hole where the post will be fixed will be taken off site to a licenced land fill and cannot therefore have any impact of the local habitat. All materials and tools required to put the gates in place will be brought to site on a small quad bike. This will minimise the potential impact of accessing the work site. Concrete will be mixed in a bucket on site and will therefore have no impact on the habitat.

As the quad bike will also be used to bring fencing posts and barbed wire to site, impact on the habitats will be minimised.

It is planned to carry out all these works during a dry summer period. This will further limit the impacts of the quad bike and other construction activities.

Examined in their entirety, the combined effects of the proposed compensatory plans for the Intertidal, stony bank and salt marsh habitat at Mweeloon and Tawin will have a positive effect on those and other SAC QI habitats in the area.

4.4.5 Inner Galway Bay SPA – Bird Species and Habitat

Regarding the repair of walls and gates, carrying out the works in the summer months means that some wildfowl *e.g.,* Brent Geese, Teal, that migrate to Ireland for the Winter months and some species that move upland/migrate out of Ireland to breed *i.e*., Curlew, Lapwing and Bar-tailed Godwit, will not be present at the site when such repairs are being carried out.

Regarding the use of acetic acid to control *Didemnum*, following treatment and the return of the rising tide, the acetic acid will be quickly diluted and will not have any impact on SCIs of the SPA.

The removal of oyster trestles from parts of the SPA will provide SCIs of the Inner Galway Bay SPA an additional feeding area.

Examined in their entirety, the combined effects of the proposed compensatory plans on the SCIs for the Inner Galway Bay SPA at Mweeloon and Tawin West will have a positive effect on those species in the area.

4.5 CUMULATIVE IMPACTS OF THE COMPENSATORY MEASURES AND ACCOMPANYING MEASURES AT MWEELOON AND TAWIN WITH OTHER PLANS ON PROJECTS

This section considers the potential for cumulative impacts arising from the proposed Compensatory Measures in association with other plans and projects within a 15km radius of the site of the proposed Compensatory Measures at Mweeloon and Tawin, including the interaction between potential impacts on different environmental receptors arising from the proposed Compensatory Measures.

4.5.1 Cumulative Assessment

It must be pointed out at the outset that all aspects of the proposed Compensatory Measures have been designed to and will improve habitat quality at Mweeloon and Tawin West and have been designed to avoid and will not negatively impact any other habitat/species. Additionally, no aspects of any of these measures have any long-term emissions associated with them *e.g*., wastewater, surface water loadings, emissions to air or noise. Given the planned reduction in farm animal stocking densities, the proposed Compensatory Measures will bring about a reduction in greenhouse gas emissions.

The statutory plans which have been considered include the Galway City Development Plan, the Galway County Development Plan, the Barna Local Area Plan and the Oranmore Local Area Plan.

The settlements that lie within the 15km radius of Mweeloon include Galway City, Barna, Oranmore, Clarinbridge, Kilcolgan and Kinvara all of which are subject to the statutory Development Plans and LAPs listed above.

It is important to note that in terms of the treatment of wastewater, the most significant settlements within the 15 km radius, which are Galway City, Oranmore and Barna, all are serviced by the Mutton Island wastewater treatment system.

4.5.1.1 Galway County Development Plan 2015-2021

The Galway County Development Plan 2015-2021 is accompanied by a Strategic Environmental Assessment (SEA) and a Natura Impact Report (NIR). The SEA concludes that:

'In summary the Plan represents a pragmatic recognition and continuation of established patterns and trends of development in County Galway. These have been modified to take account of significant environmental sensitivities that exist over very large portions of the County with a view to stabilising both environmental conditions and the populations of those communities who continue to sustain these communities.

By complying with appropriate mitigation measures – including those which have been integrated into the Plan – potential adverse environmental effects which could arise as a result of implementing this scenario would be likely to be avoided, reduced or offset.'

The NIR concludes the following:

'The risks to the safeguarding and integrity of the qualifying features and conservation objectives of the Natura 2000 network have been addressed by the inclusion of the mitigation measures that will prioritise the avoidance of impacts in the first place and mitigate impacts where these cannot be avoided. In addition, all lower-level plans and projects arising through the implementation of the Plan will themselves be subject to Appropriate Assessment when further details of design and location are known. Having incorporated mitigation measures, it is considered that the Plan will not have a significant effect on the integrity of the Natura 2000 Network.'

4.5.1.2 Draft Galway City Development Plan 2017-2023

The Draft Galway City Development Plan 2017-2023 is accompanied by Strategic Environmental Assessment (SEA) and a Natura Impact Report (NIR). The SEA concludes that:

'The policies and objectives of the Development Plan were assessed in respect of sustainability and specifically against the SEO. A matrix was used to rate the impact of policies and objectives, as having potential positive, indirectly positive, neutral, uncertain, negative, or indirectly negative impacts on the SEO. The results of the assessment demonstrate that the Development Plan will not have a significant negative impact on the environment: Where there is a potential impact, it is predominately positive or neutral. Uncertain potential impacts arise for example with specific projects, which depends on factors such as layout and design. Uncertain potential impacts have also been identified for policies relating to the development of large greenfield sites at Ardaun and Murrough, redevelopment proposals within the city, transportation and green network proposals, coastal protection and flood mitigation measures. Where potential impacts occur, they are mitigated by policies, specific objectives, development management standards and monitoring to ensure there is no deterioration in environmental quality'

The NIR concludes the following:

'An assessment on the potential cumulative and in-combinations effects of the Draft Plan concluded that through the implementation of the overarching policies and objectives of the Plan no negative in-combination effects from other plans and projects to European Sites are expected through the implementation of the Plan. Having incorporated mitigation measures, the NIR concluded that it is

considered that the Galway City Development Plan 2017-2023 will not have a significant adverse effect on the integrity of the European sites.'

The measures proposed will not have any cumulative impacts or in combination impacts from those objectives and policies contained in the Draft Development Plan.

4.5.1.3 Oranmore Local Area Plan 2012-2018

The **Oranmore Local Area Plan 2012-2018** is accompanied by Strategic Environmental Assessment (SEA) and a Natura Impact Report (NIR). The SEA concludes that:

'Subject to the full and proper implementation of the mitigation measures outlined, including appropriate site level investigations, it is considered that significant adverse impacts on the environment will be avoided'.

The NIR concludes the following:

'It is considered that the adoption of the LAP will not result in likely significant effects to the conservation management or integrity of Natura 2000 sites, either individually or in combination with other plans and projects.

The relevant development plan for the settlement of Barna is a variation to the Galway County Development 2015-2021 (Variation 2a) and therefore the findings of the SEA and NIR for the County Development Plan are relevant to this Variation also.

Development projects within the 15km radius of Mweeloon and Tawin West which have been considered are those which have been recently carried out; those permitted but not yet carried out and those that are in the planning process. These projects include residential, office, retail and infrastructure developments among which are the GHE and GHEP. The impacts of single houses outside of the settlements have also been considered.

There are a number of one-off single house developments in the Tawin headland and wider area, some of which have been completed and some of which are on-going. However, due to the relatively low number in the vicinity of the headland and the greater separation distances between others and the headland, the potential for a cumulative effect to occur between these projects and the proposed Compensatory Measures at Tawin headland is not considered significant.

No other plans or projects are in place for the proposed Compensatory Measures area at Mweeloon and Tawin West. Also, as the Compensatory Measures include purchase of the land, GHC, as owners of the land, can ensure that there is no development on these lands in the future.

The implementation of the compensatory Management Plans themselves will not have any significant impacts on any of the qualifying interests of the Galway Bay SAC or the Inner Galway Bay SPA Natura 2000 sites and, taking that into account they cannot have any cumulative impact with any other planned proposals in those Natura 2000 sites.

Due to the distances involved between where any of the above developments have been carried out or are due to be carried out, including the proposed GHE and the completed GHEP and also the small spatial and temporal extent of the proposed Compensatory Measures, there are no cumulative impacts arising from the proposed compensation plans at Mweeloon and Tawin West with any other completed or planned development.

4.5.2 Cumulative Impacts Conclusion

The potential for a cumulative effect between any / all of these developments as described in **Section 4.5.1** in tandem with the proposed Compensatory Measures at Mweeloon and Tawin for both the SAC and the SPA has been taken into account and as there is:

1. No connectivity between any of these sites and the area at Mweeloon and Tawin West,

2. There are no emissions arising from the proposed Compensatory Measures that could bring about an in-combination effect and

3. Other than short term, temporal effects of the repair aspects of the Compensatory Measures, the Measures have been designed to have long term positive impacts on the environment,

it can be concluded that there are no cumulative impacts arising from the full suite of Compensatory Measures at Mweeloon and Tawin West in combination with GHE and GHEP and any other plans or projects in the Galway, Barna or Oranmore areas.

4.6 ASSESSMENT OF EFFECT ON NATURA 2000 SITE INTEGRITY

4.6.1 Galway Bay Complex SAC

4.6.1.1 Mud flats and sand flats not covered by sea at low water [1140]

Based on the conservation objectives listed above and in light of what the construction works entail and methodologies that will be used, it is concluded that the proposed works at Mweeloon and Tawin West, alone or in combination with other activities, will not pose any threat to either the Intertidal habitat and, as a result, the conservation objectives and overall integrity of the SAC will not be impacted by the proposed works.

4.6.1.2 Perennial vegetation of stony banks [1220]

Based on the conservation objectives listed above and in light of what construction works entail and methodologies that will be used, it is concluded that the proposed works at Mweeloon and Tawin West, alone or in combination with other activities, will not pose any threat to the perennial vegetation of stony bank habitat and, as a result, the conservation objectives and overall integrity of the SAC will not be impacted by the proposed works.

4.6.1.3 Atlantic salt marsh (Glauco-Puccinellietalia maritimae) [1330]

Based on the conservation objectives listed above and in light of what the repair works entail and methodologies that will be used, it is concluded that the proposed repair works at Mweeloon and Tawin West, alone or in combination with other activities, will not pose any threat to the Atlantic salt marsh habitat and, as a result, the conservation objectives and overall integrity of the SAC will not be impacted by the proposed works.

4.6.1.4 Semi-natural dry grasslands and scrubland facies in Calcareous substrates (Festuco-Bromatalia important orchid sites [6210]

Based on the conservation objectives listed above and in light of the repair works entail and methodologies that will be used, it is concluded that the proposed works at Mweeloon and Tawin West,

alone or in combination with other activities, will not pose any threat to the semi-dry grassland habitat and, as a result, the conservation objectives and overall integrity of the SAC will not be impacted by the proposed works.

4.6.1.5 Salicornia and other annuals colonising muds and sand [1310]

As no works are planned to take place within this habitat type, it is concluded that the proposed works at Mweeloon and Tawin West, alone or in combination with other activities, will not pose any threat to the *Salicornia* habitat and, as a result, the conservation objectives and overall integrity of the SAC will not be impacted by the proposed works.

4.6.1.6 Limestone pavement [8240]

It is concluded that as no works are planned to take place within this habitat type, the proposed works at Mweeloon and Tawin West, alone or in combination with other activities, will not pose any threat to the Limestone Pavement habitat and, as a result, the conservation objectives for this habitat. The overall integrity of the SAC will not be impacted by the proposed works.

4.6.1.7 Lagoon [1150]

It is concluded that as no works are planned to take place within this habitat type, the proposed works at Mweeloon and Tawin West, alone or in combination with other activities, will not pose any threat to the lagoonal habitat and, as a result, the conservation objectives for this habitat. The overall integrity of the SAC will not be impacted by the proposed works.

4.6.1.8 Otter [1355]

As the works will only occur in day light hours, the chances of otters passing through the site at those times is very low. Disturbance therefore to otter during the construction phase is considered negligible. Post-completion of the proposed works, the re-hanging of gates and erection of barbed wire fencing will not restrict connectivity. The lowest fence wire will be kept 150mm above ground to allow unimpeded otter movement.

Based on the conservation objectives listed above and in light of what construction works entail and methodologies that will be used, it is concluded that the proposed works at Mweeloon and Tawin West, alone or in combination with other activities, will not pose any threat to otter and, as a result, the conservation objectives and overall integrity of the SAC will not be impacted by the proposed works.

4.6.1.9 Harbour Seal [1365]

As there are no seal haul out sites present at Mweeloon or Tawin West, it is concluded that the proposed work, alone or in combination with other activities, will not pose any threat to seals and, as a result, the conservation objectives and overall integrity of the SAC will not be impacted.

4.6.2 Inner Galway Bay SPA

The removal of oyster trestles and the control of *Didemnum* are seen as having a positive impact on the SCIs for this SPA.

4.7 CONCLUSION

The impacts from the proposed works, both alone and in combination with other activities including the GHE and GHEP, housing and office developments, student accommodation, roadworks, local one-

off housing etc, will not have any significant, negative effects on either the Galway Bay SAC or the Inner Galway Bay SPA Natura 2000 sites, their qualifying interests/special conservation interests, or conservation objectives.

Of much more significance is the fact that the proposed works will have significant positive beneficial, long-term effects on the area where they will be carried out. These include the leaving fallow of parts of the Intertidal habitat that are currently being used to farm oysters and therefore, the removal of pressures associated with operating the farm *e.g.,* tractor access, the control of a non-native, invasive species, *Didemnum vexillum,* that has infested the farms and the recovery of stony bank and salt marsh vegetation by controlling grazing and the introduction of "nature friendly" farming principals.

There are other ecologically significant positive aspects to the targeting of the sites at Mweeloon and Tawin West and these are that:

- Two priority habitats, limestone pavement and lagoon, that had previously not been known from that part of the Galway Bay SAC, were recorded during biological survey work and these will benefit from the proposed compensatory and accompanying measures,

- The area of lagoon at Tawin represents an additional ca 10% of this priority habitat on a national scale and

- The rare, Yellow-horned Poppy (*Glaucium flavum*) was recorded at the site.

The removal of oyster trestles and the control of *Didemnum* are seen as having a positive impact on the SCIs for this SPA.

Finally, as GHC will own the lands, the long-term protection of this part of Galway Bay SAC into the future is assured.

The Compensatory Measures Plan and this Addendum to the NIS include the full details of the proposed Compensatory measures for the GHE including the historic impacts associated with the development of the GHEP.

5 REFERENCES

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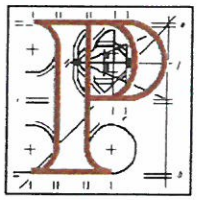
Appendix 1

An Bord Pleanála: Statement of Appropriate Assessment (Article 6(3))

An Bord Pleanála



STATEMENT OF APPROPRIATE ASSESSMENT
(ARTICLE 6(3))

An Bord Pleanála had regard to the documentation submitted by the applicant which included a comprehensive list of Natura 2000 sites potentially coming within the influence of the proposed port extension. The Board agreed with the screening assessment and conclusion reached in the report of the specialist ecological consultant (Mr. Bastreri of Thomson Unicomarine, appointed to assist the Board's inspector) that the following sites:

- Galway Bay Complex SAC (site code 000268),
- Inner Galway Bay SPA (site code 004031) and
- Lough Corrib SAC (Site code 000297)

are the relevant European sites for which there is a likelihood of significant effects, requiring a 'stage II' assessment, and that other sites can be discounted from further consideration, owing to the separation distances involved and lack of likelihood of significant effects arising.

The Board considered the Natura impact statement and all other relevant submissions – including further information submitted by the applicant in response to a request by An Bord Pleanála, and further submissions made in the course of the oral hearing - and carried out an appropriate assessment of the implications of the proposed development for European sites listed above in view of the sites' conservation objectives. The Board considered that the information before it was adequate to allow the carrying out of an appropriate assessment.

In completing the assessment the Board considered, in particular, the

i) likely direct and indirect impacts arising from the proposed development both individually or in combination with other plans or projects, including the reclamation of land in this area carried out by the Galway Harbour Company in the mid-1990s to create the Galway Harbour Enterprise Park (planning permission reference 95/68),

ii) mitigation measures which are included as part of the current proposal,

iii) conservation objectives for these European sites, and

iv) submissions of the National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht, and of the other participants in the case including at the oral hearing.

In completing the AA, the Board accepted and adopted the appropriate assessment carried out in the report of the specialist ecological consultant appointed by the Board in respect of the potential effects of the proposed development on the aforementioned European sites, having regard to the sites' conservation objectives.

The conclusions of the specialist ecological consultant in relation to impacts on the integrity of the European sites can be summarised as follows (Table, and text below):

Table – Summary of impacts on the Integrity of Natura 2000 sites.

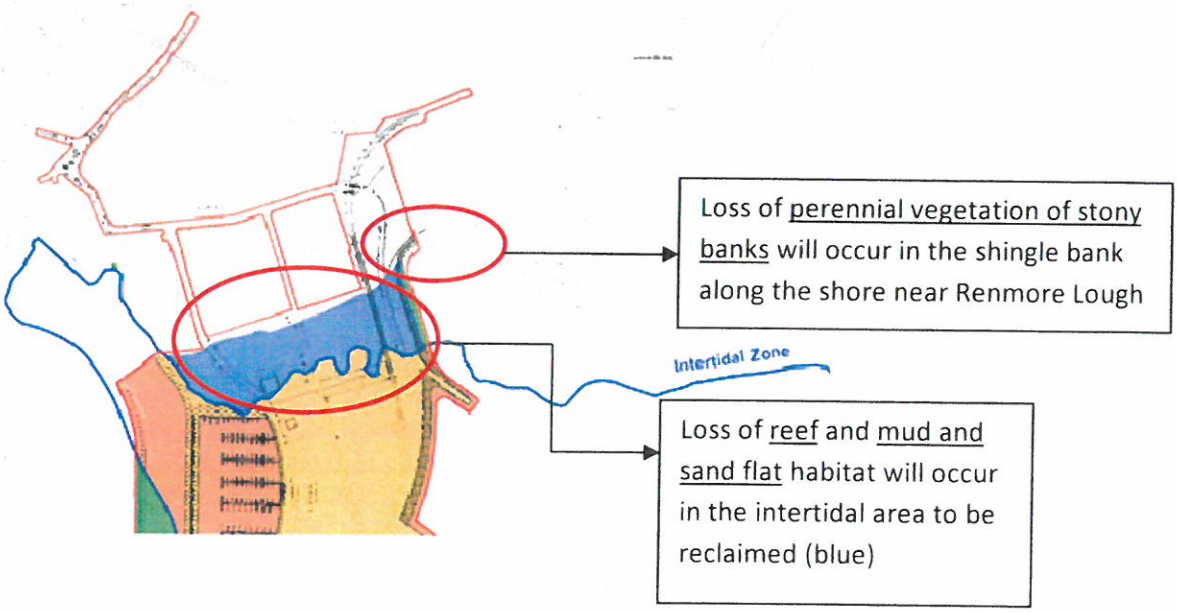
Natura 2000 site	Conclusion
Galway Bay Complex SAC Site code 000268	The integrity of the European site will be affected by the proposed development, specifically: • The direct and permanent loss of fucoid-dominated reef habitat [1170] and mud and sand flat habitat [1140] in Galway Bay Complex cSAC will result in the conservation objective for these features not being met. The direct and permanent loss of a habitat, which is part of the conservation objective of the site, is in general a significant adverse effect on the integrity of the site. • The loss of perennial vegetation of stony banks [1220] due to the sheltering effect of the harbour extension will also have a significant adverse effect on the integrity of the cSAC.
Inner Galway Bay SPA Site code 004031	While some adverse impacts are likely, a significant adverse effect on the integrity of the SPA will not arise in view of the site's conservation objectives.
Lough Corrib SAC Site code 000297	While some adverse impacts are likely, a significant adverse effect on the integrity of the SAC will not arise in view of the site's conservation objectives.

Impacts arising on the integrity of the Galway Bay Complex SAC

The '**fucoid dominated reef**' habitat (Annex 1 habitat) and the '**mud and sand flat not covered by sea-water at low tide**' habitat that will be permanently removed by the proposed land reclamation are located in the inter-tidal zone directly adjacent to the existing Galway Harbour Enterprise Park. The **5.93 hectares** involved is clearly marked on the application drawings. There is a combination of reef habitat and mud and sand flat habitat occurring in this zone. The total area of reef habitat occurring in the SAC is 1227 hectares. Therefore in a 'worst case' scenario, the loss of 5.93 hectares would represent approximately 0.5% of the total area of the reef habitat that occurs within the European site.

The habitat supporting **perennial vegetation of stony banks** is found adjacent to the Galway Harbour Enterprise Park, beside Renmore Lough, and comprises a low shingle bank running along the shore. The shingle bank has been affected by recent storms but may be expected to recover. The proposed development will lead to changes in the hydrological regime at local level, sheltering the stony bank that forms the south boundary of Renmore Lough, which in turn will prevent storm and wave surges from accessing the stony banks, leading to increased colonisation by terrestrial vegetation. Therefore the proposed harbour expansion is expected to lead to a loss of the habitat. The total area of this habitat affected is approximately **0.35 hectares** of which approximately **0.2 hectares** lies within the boundary of the SAC.

Figure – indicative location of habitats where adverse impacts on integrity of the SAC will arise.



The assessment carried out by Mr Bastreri concluded that although there are certain **priority habitats** present within the Galway Bay SAC - including Lough Atalia and Renmore Lough which comprise coastal lagoon habitat - the proposed harbour extension project will not lead to negative implications arising for the conservation objectives relating to these priority habitats. The Board adopted this conclusion.

Impacts on the Inner Galway Bay SPA

Significant consideration has been given in the course of the application (including at the oral hearing) to potential impacts on the conservation interests (bird species) of the Inner Galway Bay SPA. Having analysed the issues involved, the Board's specialist ecological consultant Mr. Bastreri concluded as follows:

- Loss of intertidal and subtidal habitat, underwater noise and vibration and disturbance during construction are likely to have a moderate adverse impact on many of the bird species that are qualifying features of the SPA.
- Disturbance caused by an increase in shipping traffic during operation are likely to have a moderate adverse impact on some of the bird species that are qualifying features of the SPA.

He does not include the SPA in those sites whose integrity will be adversely affected by the proposed development.

The Board also gave consideration to the impacts arising, in particular the potential impacts on bird species owing to increased shipping movements associated with the proposed harbour extension once operational. Notwithstanding the extensive written and oral submissions made in relation to this matter, there remain conflicting views taken by the specialist ecologists representing the applicant and the NPWS in the course of the case. The Board took the view that some disagreement in relation to this aspect of the appropriate assessment was understandable given the nature, scope and duration of the project and the availability of information on the receiving environment. The matter has already been the subject of a 'further information request' and extensive exchanges at the oral hearing, and the Board considered that further surveying or analysis was unlikely to resolve this lack of agreement in view of the current understanding of the behaviour of marine birds.

Having examined the matter, the Board considered that Mr Bastreri's report represents the best scientific advice available, and that it takes a conservative approach in concluding a 'likely moderate adverse' impact owing to disturbance. The Board agreed with Mr. Bastreri that such an impact, if it were to arise, would not comprise a significant adverse effect on the integrity of the SPA in view of the site's conservation objectives.

Appropriate Assessment Conclusion

The Board concluded that approval of the proposed development could not be considered under article 6(3) of the Habitats Directive, given that a significant adverse impact on the integrity of the Galway Bay SAC would occur.

The Board then proceeded to examine whether it should consider applying article 6(4) of the Directive to this project.

September 2015

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