# 19/062 - WO064 Marine Modelling Studies - Lot 4 Galway Bay

Annex IV Risk Assessment

Uisce Éireann

January 2025

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## Quality Information

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# 1. Introduction

## 1.1 Background

AECOM was commissioned by Uisce Éireann to prepare Annex IV Risk Assessment, on their behalf. The report will support a Maritime Usage Licence under Schedule 7 Section 110 of the Marine Area Planning Act 2021 in relation to a Marine Modelling Study (MMS) being carried out in Galway Bay (Lot 4 Project). The licence is required to carry out marine surveys in Galway Bay within the Proposed Licence Areas shown in Appendix A, Maps A-D. The specific areas that will be subject to marine surveys (bathymetry surveys and Acoustic Doppler Current Profilers (ADCPs)) that are considered in this application are shown in, Appendix B, Figure 1.

Uisce Éireann are responsible for many continuous or intermittent discharges into the marine environment. Within the Galway Bay area, there are over 50 wastewater discharge points into the marine environment. At present, there are no hydrodynamic marine water quality models developed to support water quality assessments in the Proposed Licence Areas and Uisce Éireann now require this model to be developed, which is the purpose of the Lot 4 Project. The model will support the assessment of water quality for all discharges against environmental legislation criteria.

This Lot 4 Project will include four phases: scoping, marine surveys, calibration and validation and scenario analysis. The marine surveys will collect the necessary hydrodynamic data. This data will then be used for the calibration of a hydrodynamic model to support a water quality assessment in Proposed Licence Areas. This Annex IV report is prepared in relation to the scoping phase of the Lot 4 Project. The scoping phase includes three Work Packages (WPs) which will be carried out sequentially. This Annex IV report specifically fulfils WP 3 – Maritime Usage Licence (see below). All work packages are due to be completed in 2024.

- Work Package 1- Phase 1 Environmental Scoping Report;
- Work Package 2- Data Manual; and
- Work Package 3- Maritime Usage Licence.

## 1.2 Purpose of the Report

The purpose of this report is to identify and assess the potential impact from the Lot 4 Project on relevant Annex IV species, under Article 12 of the Habitats Directive (92/42/EEC), identified as potentially present in the area.

This risk assessment considers the potential effects of the marine surveys on Annex IV species in the context of relevant legislation and guidance (see Sections 0 and 1.5), assessing the need for a derogation licence (see Section 1.4 for explanation of derogation) and providing the information required by the National Parks and Wildlife Services (NPWS) and Minister for Housing, Local Government and Heritage (DHLGH) in support of any such applications. As such, all proposed works which have the potential to impact any relevant Annex IV species or other relevant protected species (as described in Section 0)), have been assessed.

## 1.3 Project Description

The Lot 4 Project involves conducting marine surveys within certain areas of the Proposed Licence Areas (Appendix A). These marine surveys will include ADCP surveys, bathymetric surveys and other passive water quality surveys (e.g. water sample collection from shore or vessel via a handheld passive sonde and/or Niskin bottle, water level/tidal monitoring using tide gauges fixed to an existing structure and CTD measurements from vessel or fixed to a tide gauge or ADCP). The passive water quality surveys are undertaken by extremely minimally disturbing/non-intrusive methods which will not impact any protected marine species and are therefore not considered further in this assessment.

The other marine survey activities will involve deploying, operating, and recovering ADCPs and a tidal gauge and the bathymetric surveys will use vessel mounted single beam or multibeam echo sounders (SBES/MBES) within certain areas of the Proposed Licence Areas.

The surveys are scheduled to commence at some point within a 60-month period from 1st April 2025. The survey duration will be a minimum of 35-days and a maximum 60 days (survey period). Within that survey period there will be 13-hour surveys over a spring tide and a neap tide. The bathymetric surveys may be undertaken during that survey period or as separate surveys but not before 1st April 2025. The data collected will be used for calibrating

a hydrodynamic model. The locations of the ADCP surveys and bathymetric surveys are shown on Appendix B, Figure 1.

### 1.3.1 ADCP Surveys

These surveys will be carried out in shallow waters, less than 100 m in depth, only. The ADCP surveys will contain no more than a single ADCP within each survey area (ADCP Area). The ADCP Areas total 10,452.12 ha. Conservatively, the individual footprint of each ADCP is considered to be less than 1 $m^2$. The ADCPs are placed on the seabed in order to measure water current velocities over a depth range using the doppler effect of sound waves scattered back from particles within the water column. There will be up to 26 ADCPs deployed, with 23 ADCPs being deployed on the seabed for the survey period. Three ADCPs will be suspended in the water column, via a vessel mounted method or alternatively via a passive impeller due to unsuitable seabed habitats present (Table 1) for the two 13-hour surveys.

The exact make and model of the ADCP equipment is not known at the time of writing this report. However, the operating frequency of any ADCP deployed will be >200 kHz (typically around 500 kHz for many models). The instrument emits “pings” of sound at a sampling rate of 1-minute average every 10 minutes. The list of ADCPs and their areas are shown in Table 1.

For the purposes on this NIS report the construction phase is defined as the deployment of ADCPs on the seabed/vessel-mounted, the operational phase is the operation of the ADCPs, and the decommissioning phase is the recovery of the ADCPs from the seabed/vessel. These are described in further detail below

#### 1.3.1.1 Deployment of ADCP Instruments

ADCPs will be deployed from the vessel's deck onto the seabed at predetermined locations (one ADCP placed within each Area) in water depths less than 100 m only. However, the exact placement location within each site is not known at the time of writing this report. They will be positioned based on available charts and habitat maps to ensure it is placed on suitable flat sandy habitats only. Deployment onto the seabed is carried out by lifting the ADCP survey instruments from the vessel's deck using a deck crane or A-frame with a winch and then carefully placing them on the seabed. The single vessel based ADCP deployment is caried out by lowering from a vessel or bridge either manually or using a mechanical winch and will be vessel mounted (i.e. will not be placed on the seabed).

#### 1.3.1.2 Operation of ADCP Instruments

During operation, the ADCPs will be left in place on the seabed/vessel for an approximate duration of the survey period to collect necessary data for calibrating the hydrodynamic model. To collect these data during operation, the ADCP survey instruments will emit periodic "pings" of sound into the water column. For the Lot 4 Project, the pings will have operating frequencies between 200 kHz to 500 kHz. The instrument is contained within a trawl resistant housing. A Conductivity Temperature Depth (CTD) sonde may be placed inside the housing.

#### 1.3.1.3 Recovery of ADCP Survey Instruments

To facilitate recovery, a hydrostatic release mechanism will be employed. When activated, it sends a ranging ping to the release mechanism. If successful, this mechanism releases a buoy connected to a recovery line. The vessel can then manoeuvre into position over the buoy and retrieve the ADCPs onto the boat using the crane. In cases where the hydrostatic release fails, the ADCPs are equipped with acoustic pingers that can be activated to assist in locating the ADCP instruments. Another attempt can then be made to activate the acoustic release. If this attempt also fails, the ADCP will be recovered using a grapple recovery method. If required, this involves dragging a line with a grapple attached across the seabed in the deployment area to catch the grapple line between the ADCPs and the grapple anchor.

**Table 1. List of ADCP areas within the Proposed Licence Areas**

| Site Reference | Site Name | Area (ha) | Comments |
|---|---|---|---|
| AADCP01 | Roundstone | 55.23 | |
| AADCP02 | Greatman's Bay Approaches | 20.70 | Vessel based survey (i.e. the ADCP will not be placed on the seabed). |
| AADCP03 | North Sound | 816.25 | Deeper water -40 mCD to -50 mCD, exposed location. |
| AADCP04 | Rossavel Harbour Approaches | 4.90 | |
| AADCP05 | Foul Sound | 20.00 | |
| AADCP06 | Gregory Sound | 82.74 | |
| AADCP07 | Carraroe | 23.70 | Likely to be a vessel-based survey if the seabed is mud and not suitable for placing an ADCP on the seabed. |
| AADCP08 | Killeany Bay | 38.76 | |
| BADCP01 | Galway Outfall | 1.01 | Location of the largest Uisce Éireann outfall in the Proposed Licence Areas |
| BADCP02 | Galway Approaches | 20.82 | |
| BADCP03 | South Bay | 1,173.85 | |
| BADCP04 | Ballyvaughn Bay | 40.58 | |
| BADCP05 | Black Head | 2,948.81 | |
| BADCP06 | Inverine Bank | 3,481.60 | |
| BADCP07 | South Sound | 151.13 | |
| BADCP08 | Spiddal | 211.41 | |
| BADCP09 | Kinvarra 1 | 42.96 | Vessel based survey (i.e. the ADCP will not be placed on the seabed). |
| BADCP10 | Kinvarra 2 | 5.70 | |
| CADCP01 | Liscannor Bay | 356.34 | |
| CADCP02 | Mal Bay | 778.54 | |
| CADCP03 | Kilmurray Ibrickane | 21.13 | |
| CADCP04 | Doonbeg | 20.92 | |
| CADCP05 | Lahinch & Ennistymon 1 | 69.82 | |
| CADCP06 | Lahinch & Ennistymon 2 | 58.88 | Vessel based survey (i.e. the ADCP will not be placed on the seabed). |
| DADCP01 | Kilkee Bay | 3.96 | |
| DADCP02 | Kilkee (Intrinsic Bay) | 2.39 | |

### 1.3.2 Bathymetric Surveys

The bathymetric surveys will include the use of SBES and/or MBES within the Proposed Licence Areas. These surveys will be carried out in shallow waters only, less than 100 m in depth. At the time of writing this report the exact number, make and models are not known but the operating characteristics for shallow water are well understood. It is therefore assumed that survey equipment will have an operating frequency of 200 kHz to 700 kHz for MBES and 200 kHz for SBES. The SBES/MBES will be vessel-mounted for a period of up to 28 days. The total area of bathymetric surveys is 19,481.02 ha. The list of bathymetric surveys and their areas are shown in Table 2.

**Table 2. List of Bathymetric survey areas within the Proposed Licence Areas**

| Site Reference | Site Name | Area (ha) |
|---|---|---|
| ABS01 | Roundstone | 225.76 |
| ABS02 | Carraroe Inner | 59.80 |
| ABS03 | Carraroe Outer | 523.63 |
| ABS04 | Killeany Bay | 604.36 |
| BBS01 | Ballyvaughn and Aughinish | 4,483.04 |
| BBS02 | Kinvarra | 600.69 |
| BBS03 | Mutton Island | 87.27 |
| CBS01 | Mal and Liscannor Bays | 12,888.58 |
| DBS01 | Kilkee | 7.89 |

### 1.3.3 Tide Gauges

Of the eighteen tide gauges within the Lot 4 Proposed Licence Areas A-D, it is anticipated that all will be attached to existing fixed structures such as navigation marks or quaysides. The proposed tide gauge within the Inagh River Estuary SAC (CTG02) will ideally be fixed to the Falls Hotel quayside, or the thrust block of the wastewater treatment plant outfall. However, if this is not possible then it may be necessary to install a thin metal pole (<100 mm diameter) into the bank / bed of the river close to the wastewater treatment plant and fix the tide gauge to that pole. The approximate location of this is shown in Table 3. It is located in the River Inagh but is beyond any saltmarsh habitat that is specifically protected as a qualifying feature of this SAC (NPWS, 2017). Installation of the tide gauge by this method will be avoided, but if it is necessary then care will be taken during removal to minimise any disturbance to the bank / bed of the river.

**Table 3. River Inagh tide gauge location**

| Site Reference | Site Name | Easting | Northing |
|---|---|---|---|
| CTG02 | River Inagh | 112484 | 188598 |

### 1.3.4 Survey Vessels

Survey vessels will be selected by the survey contractor. They will be selected based on suitability as a survey platform for the deployment and recovery of the different equipment. It is envisioned that two small vessels (up to 25 m in length) moving slowly (i.e., survey speeds of 4 knots and 10 – 15 knots whilst in transit) will be used at any one time during the marine surveys. The vessels may maintain their position either using an anchor or dynamic positioning depending on the size and type of vessel. Note, that dynamic positioning will not be used in shallow areas or when a vessel is close to the shore except for berthing operations at suitable docking facilities.

## 1.4 Legislative Context

All cetaceans (dolphins, whales, porpoises) and marine turtles in the Republic of Ireland are listed under Annex IV of the European union (EU) Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (known as the Habitats Directive). Listing under Annex IV requires Member States of the EU to strictly protect these species wherever they occur within the member states Exclusive Economic Zone (EEZ). In addition, some marine species (shown in Table 4) are also listed under Annex II of the Habitats Directive, which effectively means that Member States are required to designate Special Areas of Conservation (SAC) for the further protection of these species.

The Habitats Directive is transposed into Irish law by the European Communities (Bird and Natural Habitats) Regulations 2011 – 2021 (the 'Habitats Regulations'), which provide national legislation for the protection of Annex IV species. Under the Habitats Regulations it is an offence to:

- Deliberately capture, injure, or kill any Annex IV species;
- Deliberately disturb any Annex IV species, particularly during the period of breeding, rearing, hibernation, and migration; and,
- Damage or destroy any Annex IV species breeding site or resting place.

Disturbance is defined as an activity which impairs the ability of the Annex IV species to survive, breed, rear/nurture their young, to migrate or an activity which significantly affects the local distribution or abundance of the species.

Furthermore, under the Wildlife Acts 1976 to 2021[1] (the 'Wildlife Act') all cetaceans, seals and basking shark are protected species listed on the 5th Schedule. Under the Wildlife Act, it is an offence to hunt (except in some instances under licence or Ministerial permit), injure (except when hunting under such licence) or wilfully interfere with or destroy the breeding place of a protected species.

Ireland is also signatory to conservation agreements such as the Bonn Convention on Migratory Species (1983), the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992) and the Berne Convention on Conservation of European Wildlife and Natural Habitats (1979).

The protection afforded to relevant marine species in Ireland are summarised in Table 4:

**Table 4. Relevant marine species and their protection legislation.**

| Species / Species group | Legislation |
|---|---|
| **Annex IV species** | |
| All Cetaceans | • Annex IV<br>• Wildlife Act |
| Harbour porpoise (*Phocoena phocoena*); | • Annex IV and II<br>• Wildlife Act<br>• OSPAR |
| Bottlenose dolphin (*Tursiops truncatus* | • Annex IV and II<br>• Wildlife Acts |
| Loggerhead turtle (*Caretta caretta*) | • Annex IV and II<br>• Wildlife Act |
| Leatherback turtle (*Dermochelys coriacea*) | • Annex IV<br>• Wildlife Act |
| Hawksbill turtle (*Eretmochelys imbricata*) | • Annex IV and II<br>• Wildlife Act |
| Kemp's ridley turtle (*Lepidochelys kempii*) | • Annex IV and II<br>• Wildlife Act |
| European otter (*Luttra lutra*) | • Annex IV and II<br>• Wildlife Act |
| **Other relevant Non-Annex IV species** | |
| Harbour seal (*Phoca vitulina*) | • Annex II and V<br>• Wildlife Act |
| Grey seal (*Halichoerus grypus*) | • Annex II and V<br>• Wildlife Act |
| Basking shark (*Cetorhinus maximus*) | • Annex II<br>• Wildlife Act |

[1] The Wildlife Act

If the risk of injury or significant disturbance cannot be reduced to negligible levels with mitigation, then a derogation licence is required. In Ireland, all derogation licence applications must be submitted to the NPWS and may be granted by the DHLGH which would allow an otherwise illegal activity to go ahead in a controlled manner provided that:

- There is no satisfactory alternative; and
- The derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range.

Favourable conservation status is defined in the Habitats Directive as the following:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable element of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

## 1.5 Guidance

The DHLGH "*Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*"[2] published in 2014, and "*Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland*"[3] published in 2021 were provided as official guidelines and codes of practice under Regulation 71 of the Habitat Regulations. These guidelines have been used in this report to determine the content required for this Risk Assessment of Annex IV Species.

The new Maritime Area Regulatory Authority (MARA) guidance "*Obtaining a Licence to Carry Out Specified Maritime Usage in the Maritime Area under the Maritime Planning Act 2021. Applicant Technical Guidance Note*"[4] published in 2023 (updated in 2024) has been used in this report.

In the absence of any additional relevant Irish guidance, the UK Joint Nature Conservation Committee (JNCC) 2010 guidance "*The protection of marine European Protected Species from injury and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area*' is used in this report.

[2] https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf
[3] https://www.npws.ie/sites/default/files/files/strict-protection-of-certain-animal-and-plant-species.pdf

[4] https://www.maritimeregulator.ie/wp-content/uploads/2023/10/Licence-Technical-Guidance.pdf

# 2. Baseline Characterisation

## 2.1 Study Area

The study area has been determined at a scale that recognises the highly mobile and transient nature of marine Annex IV species and the potential implications of local impacts on wider populations. Given the wide-ranging nature of these species and their varying ecology, distribution and density, separate areas have been defined for each species or species groups.

For cetaceans, the study area has been delineated based on Management Units (MUs) in which the Proposed Licence Areas is located. These MUs have been defined separately for each species by the Inter Agency Marine Mammal Working Group (IAMMWG) (IAMMWG, 2023). They have established separate geographical MUs for the seven most common species in UK and Irish waters, defined according to biological population structure, movement and habitat use, and relevant management boundaries. An MU typically refers to a geographical area in which the animals of a particular species are found, and to which management of human activities is applied. The relevant study areas (MU) for each cetacean's species in which the Proposed Licence Areas is located is shown in Table 5.

There are currently no management units for pinnipeds, turtles or basking shark in Ireland. Therefore, Galway Bay as a whole has been considered as the initial study area for these species.

## 2.2 Key Data Sources

Detailed baseline conditions were established by undertaking a desktop review of publicly available information. No marine mammal field surveys or consultations with relevant organisations were undertaken.

A number of different initiatives have been carried out over the last 10 years to quantify the distribution and abundance of Annex IV species off the coast of Ireland. These data sources were used to inform the understanding of the relative importance and functionality of the study area in the regional context of Annex IV species populations in the Atlantic Sea off the west coast of Ireland. The key data sources used include, but are not limited to:

- The National Biodiversity Data Centre (NBDC) mapping system www.biodiversity.ie;
- The National Parks and Wildlife Service www.npws.ie;
- County Biodiversity Plans and Biodiversity Maps;
- Small Cetacean Abundance in the European Atlantic and North Sea (SCANS) data;
- ObSERVE programme https://www.gov.ie/en/publication/12374-observe-programme/;
- Irish Whale and Dolphin Group (IWDG) sightings data https://iwdg.ie/browsers/sightings.php;
- Aerial Thermal-Imaging survey of seals in Ireland (Morris and Duck, 2019), and
- Publicly available academic journals and online reports.

### Scans Data (I, II, and III)

The SCANS project is a large-scale ship and aerial based survey effort to quantify cetacean abundance and distribution in UK and European Atlantic Waters. It first began in 1994 (SCANS I) with boat-based line and aerial line transect surveys following methods of Hiby and Lovell 1998, initially in the North and Celtic seas. It has since evolved and has been repeated in This programme has evolved and was repeated in 2005 (Hammond, *et al.,* 2013) (i.e., SCANS-II) and 2016 (Hammond *et al.,* 2017), updated in 2021 (Hammond, *et al.,* 2021) (i.e., SCANS-III) and again in 2022 (SCANS IV) (Hammond *et al.,* 2022); however, as the data from the most recent survey effort is not yet available, the SCANS III data are therefore used in this report. Abundance estimates are divided into blocks. The SCANS-III survey only covered part of the Celtic and Irish Sea. The remaining part of the Celtic, Irish Sea and Irelands Atlantic Margin was not covered by SCANS-III but was covered by the ObSERVE programme. For this reason, the data collected in the ObSERVE programme was included in the SCANS-III report. The Proposed Licence Areas is located within the ObSERVE programme survey area.

It should be noted that SCANS surveys are conducted in the summer (predominantly July) and therefore data are representative of summer distributions only. It is understood that the densities of cetaceans around Ireland are likely greatest during this time period (Waggitt *et al.,* 2019). Therefore, the abundances presented in Table 5 are

considered to represent the worst-case scenario and indicate the greatest abundances likely to be encountered within the study area.

#### ObSERVE Programme

The ObSERVE aerial project is a major scientific programme established in October 2014 (Rogan *et al.,* 2018)). The main aim was to greatly improve the knowledge and understanding of protected offshore species and sensitive habitats through high quality, state-of-the-art data collection across Ireland's EEZ. The objective of the ObSERVE aerial project was to fill a potentially important spatial gap during the SCANS-III survey in 2016 (Hammond *et al.,* 2017), and to extend this effort into the winter months where possible.

Aerial survey track-lines, designed to be extensive and representative of a large study area, were split into 'stratums'. Surveys took place during both the summer and winter seasons for a survey line coverage of 16,802 km in 2015-16, and 20,295 km in 2016-17. The ObSERVE Aerial project represents the first time that the winter abundance and density of cetaceans and seabirds have been estimated in this region. The Proposed Licence Areas is located within ObSERVE stratum 7.

## 2.3 Annex IV Species

This section presents the Annex IV baseline within the study area.

### 2.3.1 Cetaceans

During the last 10 years several different initiatives to quantify the distribution and abundance of marine mammals have been carried out in the waters of the Irish EEZ (e.g. Berrow *et al.,* 2013; Wall *et al.,* 2013; Hammond *et al.,* 2017; Hammond *et al.,* 2021; Rogan *et al.,* 2018). More than 24 cetacean species are known to use the waters surrounding Ireland (Wall *et al.,* 2013; O'Brien *et al.,* 2009), with a few of these species only being identified through data from stranded sightings (NPWS 2023).

Cetaceans commonly found off the west coast of Ireland are harbour porpoise, bottlenose dolphin, common dolphin, and minke whale. Minke whales are considered to be seasonal visitors with all other species thought to be present year-round (Berrow, 2001; Berrow *et al.,* 2010; Berrow *et al.,* 2013; Wall *et al.,* 2006). Other seasonal visitors include the humpback whale (*Megaptera novaeangliae*) which has been sighted more frequently in recent years (Ryan *et al.,* 2015; Berrow *et al.,* 2010; IWDG sightings). The estimated abundance and density information for each of the four most common species within Stratum 7 are shown in Table 5.

Deeper-diving marine mammal species are unlikely to be found in close proximity to the Proposed Licence Areas due to the relatively shallow water depths (< 100 m). Whilst the rare or less commonly occurring cetacean species (e.g., Risso's dolphin (*Grampus griseus*), white-beaked dolphin (*Lagenorhynchus albirostris*), striped dolphin (*Stenella coeruleoalba*), fin whale (*Balaenoptera physalus*), and killer whale (*Orcinus orca*)), are not specifically assessed all cetacean hearing groups are represented and assessed and therefore, any mitigation measures put in place for the more common species is appropriate for all cetacean species.

The nearest European site designated for cetaceans is the Kilkieran Bay and Islands SAC, designated for harbour porpoise. The ADCP Area AADCP02 is located within this European site. The relevant European sites are shown in Appendix B, Figure 2.

**Table 5. Density and abundance estimate for the commonly occurring marine mammals within the relevant study area.**

| Common name | Relevant Management Unit (IAMMWG, 2023) | ObSERVE aerial surveys in Stratum 7 (Rogan *et al.,* 2018 and Hammond *et al.,* 2017)[5] | | |
|---|---|---|---|---|
| | | Abundance | 95% Confidence Level | Highest density estimate (Animals per km$^2$)[6] |
| Harbour porpoise | Celtic and Irish Seas (CIS) | 4,422.1 | 1,796.9 – 10,882.8 | 0.262 |
| Bottlenose dolphin | West Coast of Ireland (WCI) | 18,704 | 5,425 – 64,484 | 1.084 |
| Common dolphin | Celtic and Greater North Seas (CGNS) | 9,725.1 | 33,330.8 – 28,396.3 | 0.233 |
| Minke whale | Celtic and Greater North Seas (CGNS) | 1,714.3 | 764.6 – 3843.7 | 0.102 |

### 2.3.2 Sea Turtles

Four Annex IV turtle species are known to occur off the coast of Ireland. These species are:

- Loggerhead turtle (*Caretta caretta*);
- Leatherback turtle (*Dermochelys coriacea*);
- Hawksbill turtle (*Eretmochelys imbricata*); and
- Kemp's ridley turtle (*Lepidochelys kempii*).

The leatherback is the most frequently recorded species of turtle in Irish waters though overall, these species are rare visitors (Botterell *et al.,* 2020). While leatherback turtles typically migrate to tropical regions for breeding and their preferred nesting areas, they are known to migrate to the productive temperate waters of Ireland during the summer months to forage. During this time, they feed on jellyfish and pelagic tunicates (Doyle, 2007). This species has been recorded mainly off the western Irish coastline with sightings generally declining over the last decade (Botterell *et al.,* 2020). From 2000 to 2018, there were 198 documented sightings of leatherback turtles in Irish waters (NPWS, 2019). Most recently an observation of this species within the study area was recorded in Liscannor Bay in Co. Clare in September 2022 (NBDC, 2023).

There are no European sites designated for sea turtles within the Irish EEZ.

### 2.3.3 Otter

The European otter (*Lutra lutra*) is listed as an Annex IV species under the Habitats Directive. The European otter is largely a freshwater and terrestrial mammal. Individuals occupying coastal territories tend to remain within a 3 to 4 km area of coastline, where freshwater is also readily available for cleaning their fur after exposure to saltwater (Chanin, 2003). Therefore, due to the offshore nature of the ADCP surveys this terrestrial and coastal species is not considered to be relevant for the purposes of this report and is therefore, not considered further.

## 2.4 Other Non-Annex IV Species

Although basking sharks and pinnipeds are not Annex IV species, these species are Annex II listed and information has been provided below as any proposed mitigation measures will also be appropriate/relevant to these protected species.

### 2.4.1 Pinnipeds

Two pinniped species are recorded in Ireland: the harbour seal (*Phoca vitulina*) and the grey seal (*Halichoerus grypus*). Both species are found throughout the Irish coastline, with several breeding haul-out sites for harbour

[5] Corrected design-based density estimates from the ObSERVE surveys (Stratum 7) were used if available, otherwise preference was given to design-based estimates then corrected model-based estimates (depending on what was available for each species).
[6] On a pre-cautionary basis, the highest estimated density value recorded across the four seasons were used in this report

seals located along the west coast of Ireland, particularly along the Kerry, Galway, Mayo, and Donegal coasts (Morris and Duck, 2019).

A study of the number and distributions of these species around Ireland split the Irish coast into regions and study area blocks (Marris and Duck, 2019). The Proposed Licence Areas falls within the West Region Areas 1, 2, 3 and 4. The total combined count of harbour seals found in these areas in 2017/2018 was 1,008 individuals with a majority occurring in Area 3 (Inner Galway Bay). The total number of grey seals recorded in these Areas combined in 2017/2018 was 332 individuals with a majority occurring in Area 4 (Outer Galway Bay North). This corresponds with the total grey seal and harbour seal usage as identified by Russell *et al.,* 2017 which shows these species to use the inner and outer Galway Bay.

The nearest SAC designated for seals is Galway Bay Complex SAC. Six ADCP Areas are located within this designated site (BADCP02, BADCP01, BADCP03, BADCP04, BBS01 and BBS02).

### 2.4.2 Fish Species: Basking Shark

Sightings of basking shark in Irish waters have been recorded mainly between April and November (Berrow and Heardman, 1994). While sightings are generally rare, they are understood to migrate through Irish waters and peak basking shark abundance being associated with peak plankton density (Sims and Quayle, 1998).

Unlike other nearby regions (e.g. Isle of Man, southwest England and northwest Scotland), the west coast of Ireland is not a known 'Hotspot' for basking sharks but this may be due to a lack of scientific focused research in the region. However, the NBDC map viewer indicates that a number of basking sharks have been recorded in Galway Bay with sightings off the coasts of Co. Galway and Co. Clare in 2020. The 2023 basking shark survey season recorded a total of 5 individuals within the study area. This comprised two individuals being recorded off the Aran Islands in March 2023 and three individuals recorded off the cliff of Moher in Co. Clare in May and June 2023. It is worth noting that while distribution patterns of basking sharks in Ireland and the UK have been relatively well studied, there are no estimates of population density or abundance for basking sharks worldwide (Sims, 2008).

No SACs are currently designated for basking sharks in Ireland.

## 2.5 Summary

Based on the information provided in Section 2.3 and 2.4 the protected species that will be considered further in the risk assessment (Section 3) due to their relatively common presence and/or sensitivity to underwater sound disturbance within the study area are:

- cetaceans (particularly harbour porpoise, bottlenose dolphin, common dolphin, and minke whale); and
- pinnipeds (including harbour seal and grey seal).

Those species that will not be considered further in the risk assessment (Section 3) due to their rarity on the west coast of Ireland, and/or having low sensitivity to underwater sound disturbance, are:

- sea turtles; and
- fish species, including basking shark.

# 3. Risk Assessment

## 3.1 Pathways Scoped out from Further Assessment

Based on the project description in Section 1.3, all three marine survey instrument types will operate in shallow waters (<100 m) and all will operate at high frequency (i.e. 200 kHz and above) (Table 4), outside the hearing ranges of all cetaceans and seals (see hearing range for marine mammal groups in Table 6 below). Consequently, there is no possibility of causing any hearing-related injury or behavioural disturbance to marine mammals due to the underwater sounds produced by these ADCP instruments.

**Table 6. Functional marine mammal hearing groups and auditory bandwidth and potential species within the study area**

| Cetacean hearing group | Species groups | Estimated auditory bandwidth[7] | Key species potentially present in survey area |
|---|---|---|---|
| Low frequency | Baleen whales | 7 Hz to 35 kHz | Minke whales |
| High frequency | Dolphins, toothed and beaked whales | 150 Hz to 160 kHz | Bottlenose dolphin<br>White beaked dolphin |
| Very high frequency | True porpoise and some small whales | 275 Hz to 160 kHz | Harbour porpoise |
| Pinnipeds in water | Seals | 50 Hz to 86 kHz | Grey seal |

Therefore, the pathway concerned with the effect of underwater sound from ADCP, SBES and MBES survey activities has been scoped out from further assessment.

## 3.2 Pathways Scoped in or Further Assessment

Based on the project description in Section 1.3, the following key pathways have been identified to have potential impacts on Annex IV species and/or pinnipeds in the study area:

- Increased underwater sound emitted by the vessels' engines during the marine surveys causing behavioural disturbance; and
- Increased collision risk with vessels used during the marine surveys.

## 3.3 Impact Assessment – Increased Underwater Sound Emitted by the Vessels' Engines during the Marine Surveys

Underwater sound from anthropogenic activities (including vessel engine noise) can negatively impact marine mammals. In cetaceans it can influence their ability to echolocate, communicate and in extreme cases, such as during underwater explosions or military sonar or seismic surveys, it can cause physical harm (including through disorientation leading to beaching) and trauma to the auditory apparatus) (Southall, *et al.,* 2007). Sound can cause certain cetacean species to change their behaviour and may result in increased alertness, modification of vocalisations, interruption, or cessation of feeding or social interactions, alteration of movement or diving behaviour, and temporary or permanent habitat abandonment. Seals also produce a diversity of sounds, though generally over a lower and more restricted bandwidth (generally from 50 Hz to several tens of kHz) (Table 6). Their sounds are used primarily in social and reproductive interaction, both in water and air (Southall, *et al.,* 2007).

Cetaceans produce and receive sound over a wide range of frequencies for communication, orientation, predator avoidance and foraging (Tyack, 2008). For the determination of the impact of underwater sound on cetaceans they have been classified into three functional hearing groups (low, high and very high frequency) based on their peak hearing. Different species will be sensitive to different frequencies. There are four species of cetacean commonly occurring in the ObSERVE Stratum 7 in which the Proposed Licence Areas is located. These species are at an abundance high enough for animal density estimates to have been determined (Table 2). These species are:

- Harbour porpoise - Very high frequency;

[7] Source: Southall et al. (2007); NMFS (2018); and Southall et al. (2019).

- Bottlenose dolphin – High frequency;
- Common dolphin – High frequency; and
- Minke whale – Low frequency.

Bottlenose dolphin and common dolphin are the most common cetacean species in the study area. These are high frequency hearing dolphin species but are generally much less sensitive to underwater sound to very high frequency species such as harbour porpoise, which is also present in the study area at much lower abundances (Table 5). Therefore, there is potential for animals in each of three functional hearing groups to be present in the vicinity of the Proposed Licence Areas during the marine surveys.

The impact of underwater sound in marine mammals can cause physical or auditory injury however, due to the relatively low level intensity of the sound source, and the fact the sound is continuous in nature (rather than high intensity impulsive sounds) it is unlikely that underwater sound emitted by the vessels engine during the marine surveys will cause any physical or auditory injury. This is also because both the survey vessels and animals will be mobile and animals are unlikely to remain close to the sound source for very long.

However, underwater sound from vessels can result in a range of behavioural responses in marine mammals, as well as avoidance, to chronic levels of underwater sound (Erbe *et al.,* 2019). Behavioural responses to increases in underwater sound are highly variable and context-specific, ranging from increased alertness, alteration of vocal behaviour, interruption to feeding or social interaction, alteration of movement or diving behaviour, temporary or permanent habitat abandonment. Minor or temporary behavioural responses are often simply evidence that an animal has heard a sound. Anthropogenic underwater sound may also partially or entirely reduce the audibility of signals of interest such as those used for communication and prey detection.

As discussed in Section 1.3, the marine surveys will involve the use of two small vessels (up to 25 m in length) within the Proposed Licence AreasThe vessel engines will emit underwater sound during the marine surveys which have the potential to cause behavioural disturbance in Annex IV species in the vicinity of the vessels.

All Annex IV species that could be present in Irish waters are highly mobile. Thus, any risk to individuals from underwater sound is often considered to be small on the assumption that affected animals will leave the area Nevertheless, the marine survey is of relatively short duration, particularly at the local scale because the vessel will be continuously moving. Therefore, any behavioural responses will be very short-term and temporary and not expected to have a significant impact for individuals or populations of Annex IV species. In addition, Annex IV species are likely to be habituated, to some extent, to vessel noise and movement in a busy sea area such as the waters off the west coast of Ireland (MMO, 2014).

Overall, the risk of the short-term presence of survey vessels causing underwater sounds levels significantly over and above that caused by the usual vessel activity within the area, is considered very low. Therefore, any impact from the noise of the survey vessel is expected to be **not significant.**

## 3.4 Impact Assessment – Increased Collision Risk with Vessels

Vessel movements during the marine surveys have the potential for collisions with marine mammals. This could result in physical injury, such as propeller injuries, and in the worst-case, mortality (Schoeman, *et al.,* 2020). The exact size and number of vessels deployed is subject to the appointment of the survey contractor, however, it is assumed that two vessels will be required; one to deploy and recover the ADCPs and one to vessel-mount and tow the SBES and/or MBES in the Lot 4 Proposed Licence. The ADCP and bathymetric marine surveys are expected to be completed using vessels which are considered to be small (<25 m).

Marine mammals, particularly cetaceans, are fast swimming, agile species, with rapid reflexes and good sensory capabilities (Hoelzel, 2002). The most lethal and serious injuries to cetaceans are believed to be caused by large ships, typically 80 m and longer, as well as vessels travelling faster than 14 knots (Laist, *et al.,* 2001). It is envisioned that the vessels required for the marine surveys will be less than 25 m in length and slow moving (i.e., survey speeds of 4 knots and 10 – 15 knots whilst in transit).

Marine mammals are reasonably resilient to minor strikes and collisions (Wilson, *et al.,* 2007). However, a direct strike from a sharp object such as rotating propeller blades has potential to cause lethal injury to marine mammals. Cases of seal injuries thought to be caused by propellers and thrusters (for dynamic positioning of vessels) have been recorded in the UK (Bexton, *et al.,* 2012). However, evidence suggests that a large proportion of these injuries can be attributed to alternative, natural mechanism for injury such as grey seal infanticide and cannibalism, which may also cause ‘spiral/corkscrew’ lacerations comparable to those produced by ship propellors (Brownlow*, et al.,*

2016). Marine mammals possess a thick subdermal layer of blubber or fat deposits which provides a level of protection to their vital organs meaning they are reasonably resilient to minor strikes and collisions.

Overall, the likelihood of the survey vessel colliding with marine mammals is predicted to be low. The addition of the two small survey vessels within the Proposed Licence Areas will not result in a significant increase in vessel traffic. In addition, the vessels will be slow moving, meaning that individual marine mammals can easily avoid the vessel, greatly reducing the risk of collision. The density of most cetaceans and seals within the survey area is estimated to be low (Table 5), further reducing any remaining risk. In Irish waters, the issue of injury through collision is not currently thought to be of major concern and so there are no specific mitigation measures recommended by the DHLGH (2014) or JNCC (2010) guidance.

Therefore, effects to marine mammals from collisions with survey vessels are predicted to be **not significant**.

## 3.5 Assessment of Potential Offence

The assessment of potential effects for underwater sound from the survey vessel and the potential for any collisions risk strikes concluded the following:

- The operating frequencies of the marine instruments are outside the hearing range of all Annex IV cetacean species and pinnipeds and therefore, there is no possibility of any lethal effect, physical injury, auditory injury and/or behavioural disturbance as a result of underwater sound emitted during the marine surveys.
- Vessel movement sounds will be within the hearing range and may cause some disturbance but this is thought to be negligible.
- The risk of collision with marine vessels associated with the marine survey work is very low and is therefore unlikely to result in the harassment, disturbance, injuring or killing of any Annex IV species.

The marine surveys are therefore, not considered to result in any significant effect and are unlikely to be detrimental to the maintenance of the range of Annex IV populations at a favourable conservation status in their natural range. Furthermore, any displacement of Annex IV species or potential for collision with vessels is considered to be extremely unlikely. **Therefore, a derogation licence will not be required**.

## 3.6 Consideration of Designated Sites

Three relevant European sites (i.e., SACs designated for marine mammals) have been identified within the study area. These SACs have been assessed in the adjoining Appropriate Assessment Screening Report (AECOM, 2023) which concluded that **no likely significant effects are predicted to occur on any European sites either alone or in-combination with any other plans or projects.**

# 4. Mitigation Measures

The marine ADCP sound sources are outside the hearing range of all marine mammals, and are therefore, not considered to have any potential to cause any lethal effect, physical injury, auditory injury and/or behavioural disturbance to Annex IV species. Nevertheless, as detailed by DAHLG (2014) mitigation measures concerned with minimising the risk of injury to marine mammals, are required as standard for any single beam or multibeam echo sounding activities (SBES/MBES). Therefore, the following measures will be adopted, as described below:

While the marine surveys are not considered to have the potential to cause lethal effects, physical injuries, auditory harm, or behavioural disturbances to marine mammals as a result of underwater sound emissions during the marine survey, a set of industry-standard mitigation measures, as outlined by DHLGH (2014), are recommended to further minimise the risk of injury to marine mammals during marine surveys. These measures are applicable to all SBES, MBES, side scan sonar and sub-bottom profilers surveys within bays, inlets or estuaries and within 1,500 m of the entrance of enclosed bays/inlets/estuaries. Where applicable, these measures will be adopted and described below.

## 4.1 Pre-Start Monitoring

A qualified and experienced marine mammal observer will be designated to monitor marine mammals and record all relevant events using standardised data forms provided by DHLGH within the DHLGH (2014) guidance note. To enable continuous monitoring, including during situations when visual observation is hindered by weather conditions or sea state, a proven Passive Acoustic Monitoring (PAM) system and skilled operator(s) will be employed for pre-start monitoring during such instances.

As the marine surveys will be carried out in shallow waters (< 100 m), the marine mammal observer shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone. If a marine mammal is sighted within 500 meters (monitored zone) of the sound source (i.e. the vessel) during the 30 minutes leading up to the scheduled start time, operations will be postponed until a consecutive 30-minute period without any marine mammal sightings has passed. If the marine mammals remain in the vicinity, the survey vessel may adjust its course to ensure that the animals are outside the monitored zone when the soft start/ramp-up procedure begins. The marine mammal observer will employ a distance measuring stick or reticule binoculars to determine distances to marine mammals, and all PAM detections will be presumed to originate from animals[8] within the monitored zone.

## 4.2 Ramp-Up Procedure

A ramp-up (i.e., soft start) is the gradual increase in power output over a predetermined duration. This method will be applied where possible, including during any testing of acoustic sources, where the output peak sound pressure level from any source exceeds 170 dB re: 1µPa @1m:

- If the equipment allows, begin with a lower energy start-up (peak sound pressure level not exceeding 170 dB re: 1µPa @1m), gradually increasing to the necessary maximum output over 20 minutes.
- This controlled energy increase should occur in consistent stages for a steady and gradual rise.
- If the equipment cannot follow steps (a) and (b), turn the device on and off in a consistent sequential pattern over 20 minutes before reaching the full necessary output.

In all situations, once the ramp-up process begins, there's no requirement to pause or cease the procedure even if conditions deteriorate or marine mammals enter the Monitored Zone (a radial distance of 500 meters from the sound source). Efforts will be made to minimise any delays between the ramp-up procedure and the commencement of the survey line or station to reduce unnecessary noise as much as possible.

## 4.3 Breaks in Sound Output

If there is a break in sound output from any of the marine instruments for a period of greater than 30 minutes (e.g. due to equipment failure, shut-down, survey line/station change), all pre-start monitoring measures (marine mammal observer check) and ramp-up (where this is possible) will recommence prior to re-starting.

[8] This relates to cetaceans only.

## 4.4 Reporting

Full reporting from the marine mammal observer on the operations and mitigation undertaken must be provided to the DHLGH to facilitate reporting under Article 17 of the EC Habitats Directive and future improvements to guidance (DAHG, 2014).

# 5. Conclusion

This assessment of the potential impacts on marine Annex IV species from the Lot 4 project concluded that:

- There is no potential for lethal effects, physical injury, auditory injury and/or behavioural disturbance to relevant marine mammals as a result of underwater sound generated by the ADCP and bathymetric acoustic equipment used during the marine surveys;
- Increased underwater sound from movement of the survey vessels engines themselves during the marine surveys causing auditory injury or behavioural disturbance is considered to be not significant; and,
- The potential for collision risk is considered to be negligible.

**Therefore, this risk assessment concludes that the marine surveys will not significantly affect the favourable conservation status of any Annex IV species as defined by the Habitats Directive and corresponding Habitats Regulations and a derogation licence will not be required for the marine surveys.**

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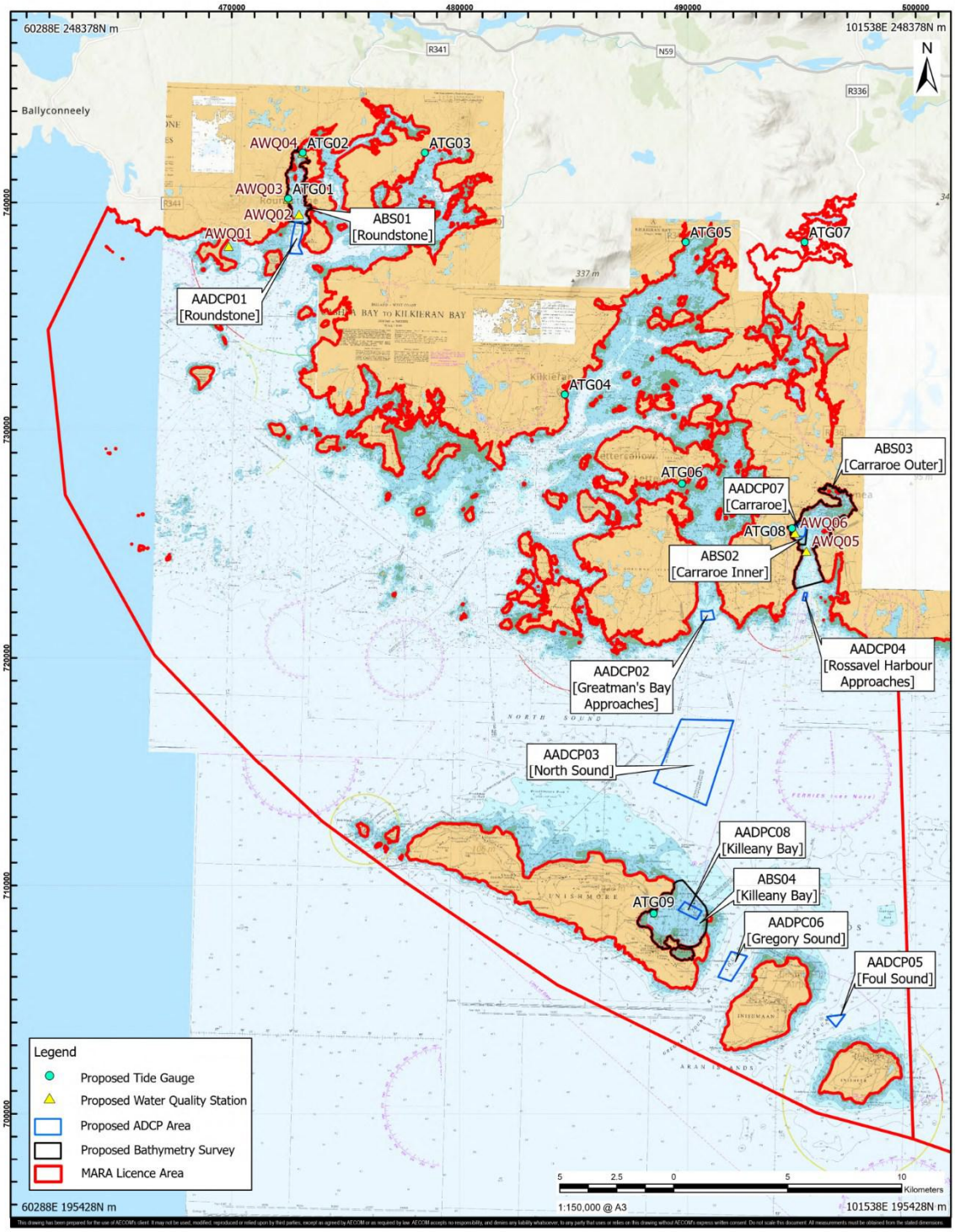
# Appendix A Site Layout Plans




CLIENT: Uisce Éireann Irish Water

TITLE: Site Layout Map A

DRAWING NUMBER: MUL240033-201

REVISION: Revision No 1

Date: 20/01/2025

PROJECTION: Irish Transverse Mercator (ITM)

MARA FILE REFERENCE: MUL240033

DATA SOURCES: Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, TomTom, Garmin, Foursquare, , METI/NASA, GeoTechnologies, Inc.

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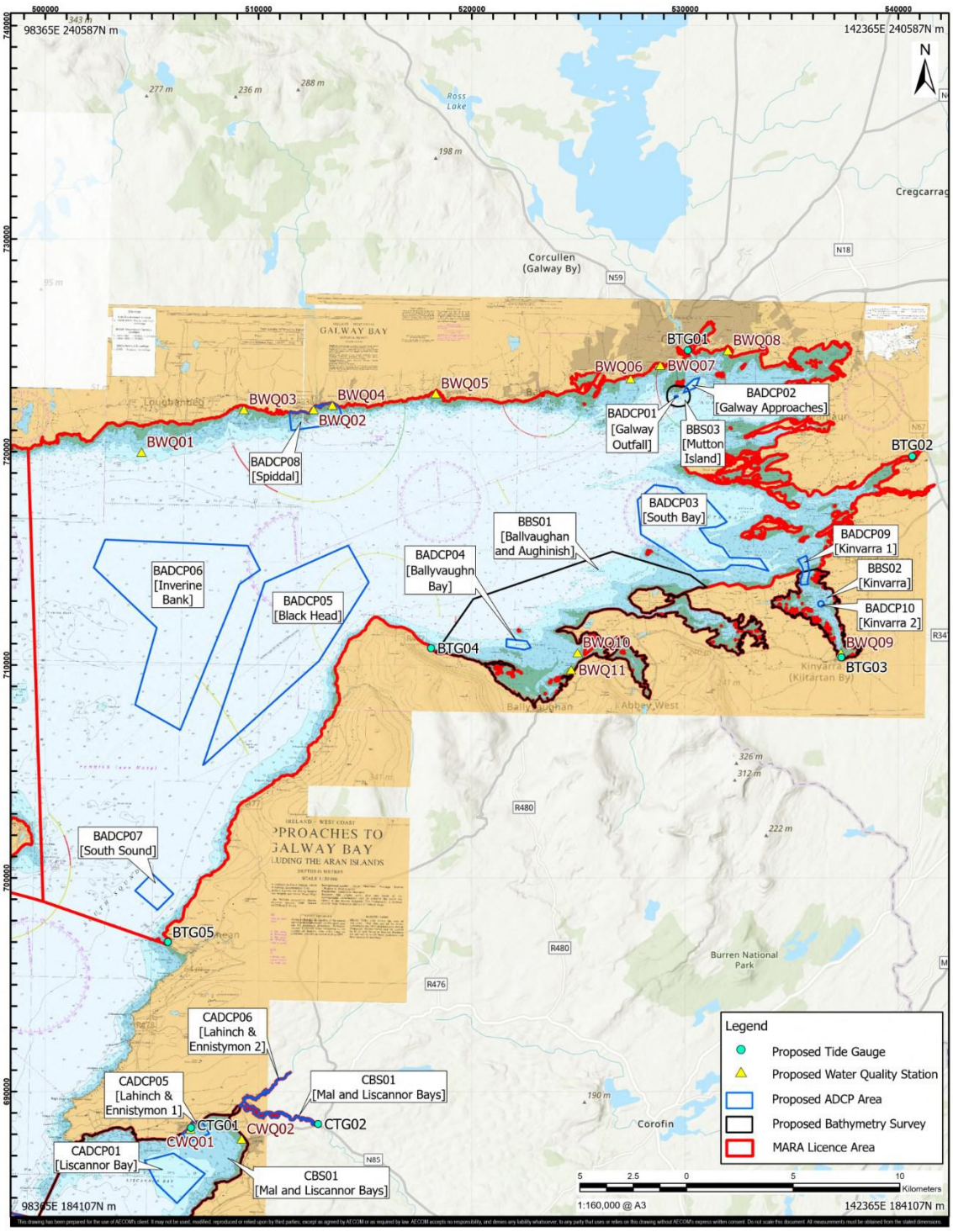
## Map A Site Layout Plan




CLIENT
Uisce Éireann Irish Water

TITLE
Site Layout Map B

DRAWING NUMBER
MUL240033-202

REVISION
Revision No 1

Date
20/01/2025

PROJECTION
Irish Transverse Mercator (ITM)

MARA FILE REFERENCE
MUL240033

DATA SOURCES
Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

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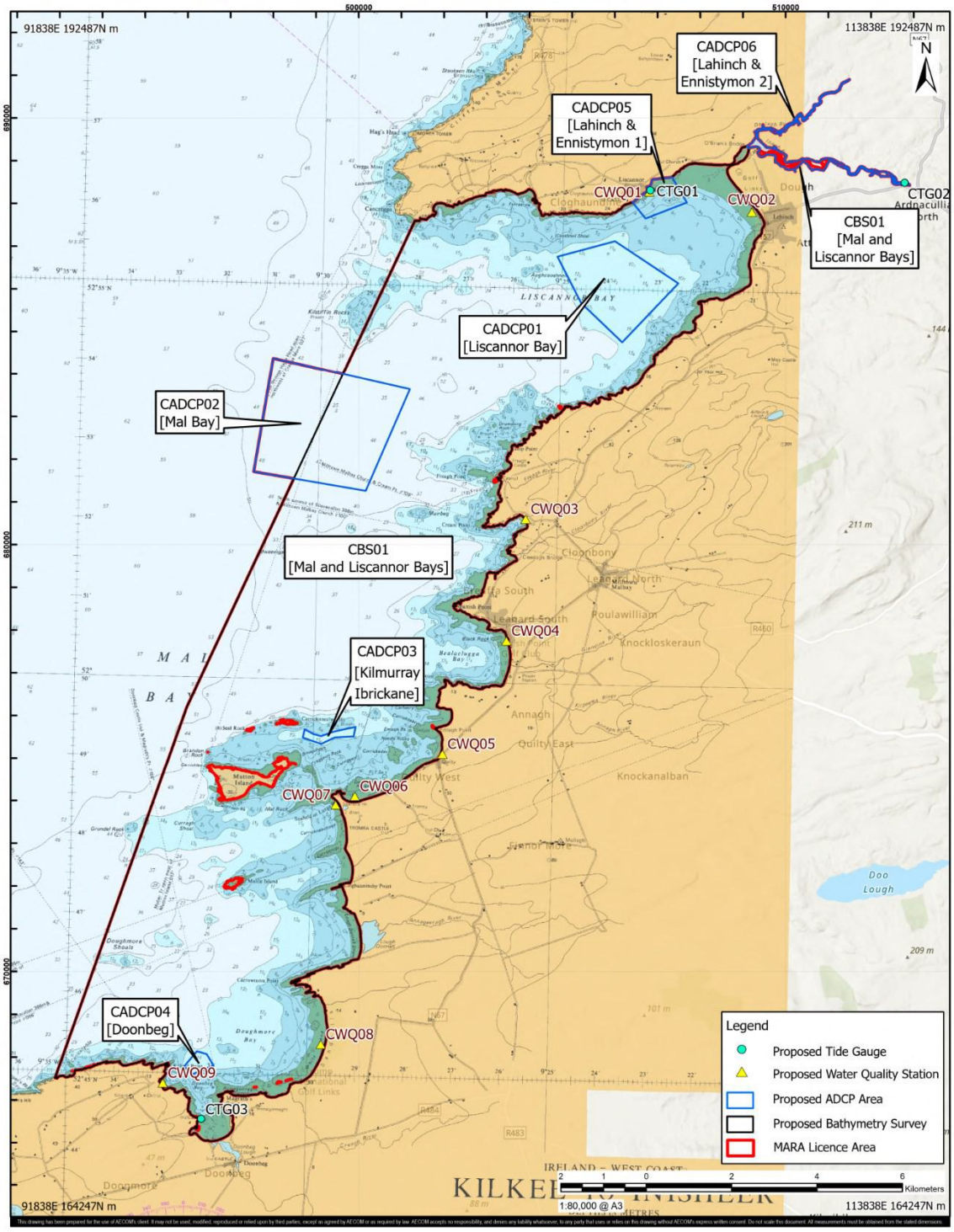
## Map B Site Layout Plan




CLIENT
Uisce Éireann Irish Water

TITLE
Site Layout Map C

DRAWING NUMBER
MUL240033-203

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Date
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MARA FILE REFERENCE
MUL240033

DATA SOURCES
Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, TomTom, Garmin, Foursquare, , METI/NASA, GeoTechnologies, Inc.

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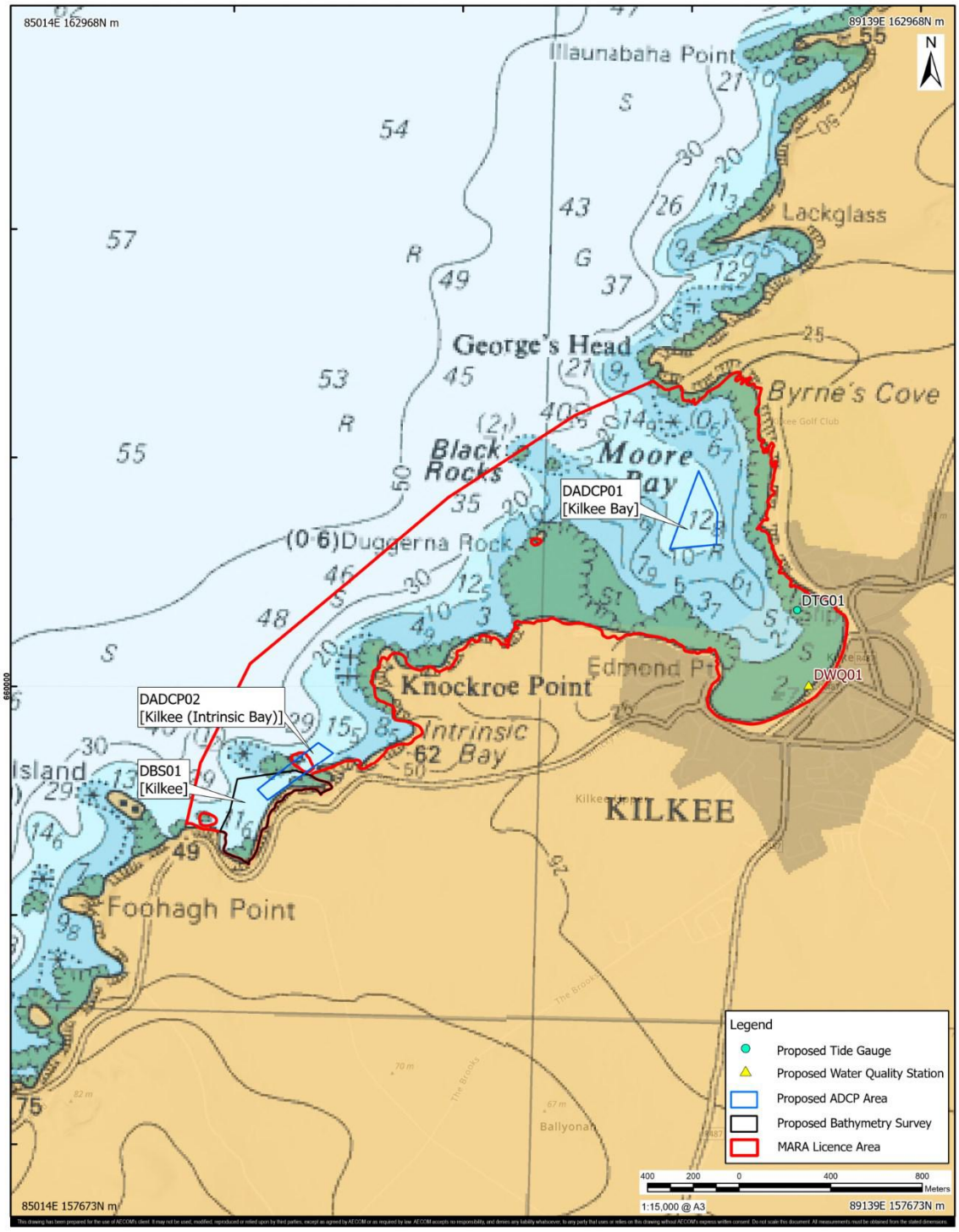
## Map C Site Layout Plan




CLIENT
Uisce Éireann
Irish Water

TITLE
Site Layout Map D

DRAWING NUMBER
MUL240033-204

REVISION
Revision No 1

Date
20/01/2025

PROJECTION
Irish Transverse Mercator (ITM)

MARA FILE REFERENCE
MUL240033

DATA SOURCES
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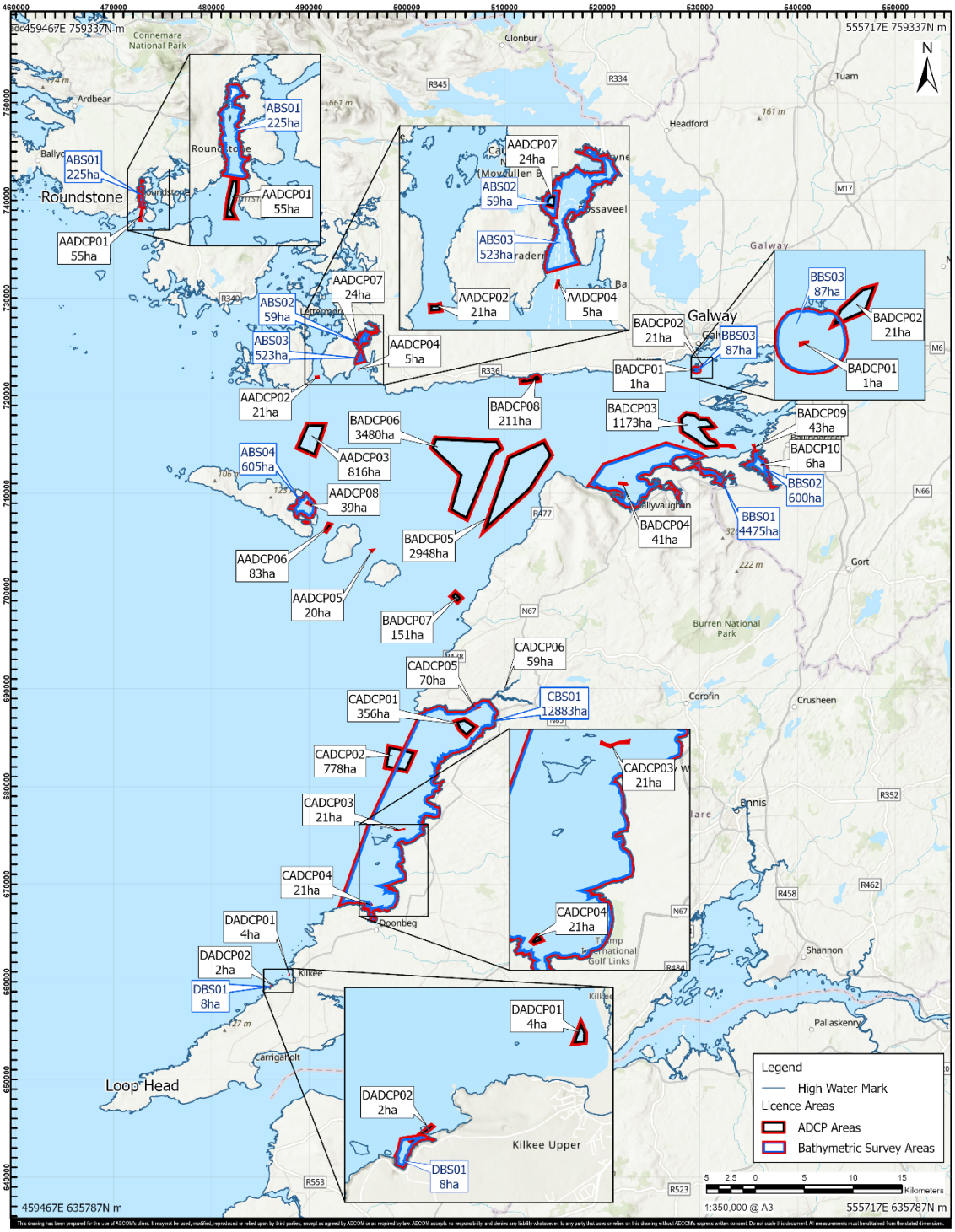
## Map D Site Layout Plan

# Appendix B Figures




CLIENT
Uisce Éireann Irish Water

TITLE

DRAWING NUMBER
Figure 1

REVISION
Revision No 1

Date
20/01/2025

PROJECTION
Irish Transverse Mercator (ITM)

MARA FILE REFERENCE
MUL240033

DATA SOURCES
High Water Mark (HWM) as defined by the CBS was sourced as recommended in the MARA Technical Guidance V7: Tailte Eireann Surveying Open Data Portal https://data-osi.opendata.arcgis.com/

Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, TomTom, Garmin, Foursquare, , METI/NASA, GeoTechnologies, Inc.

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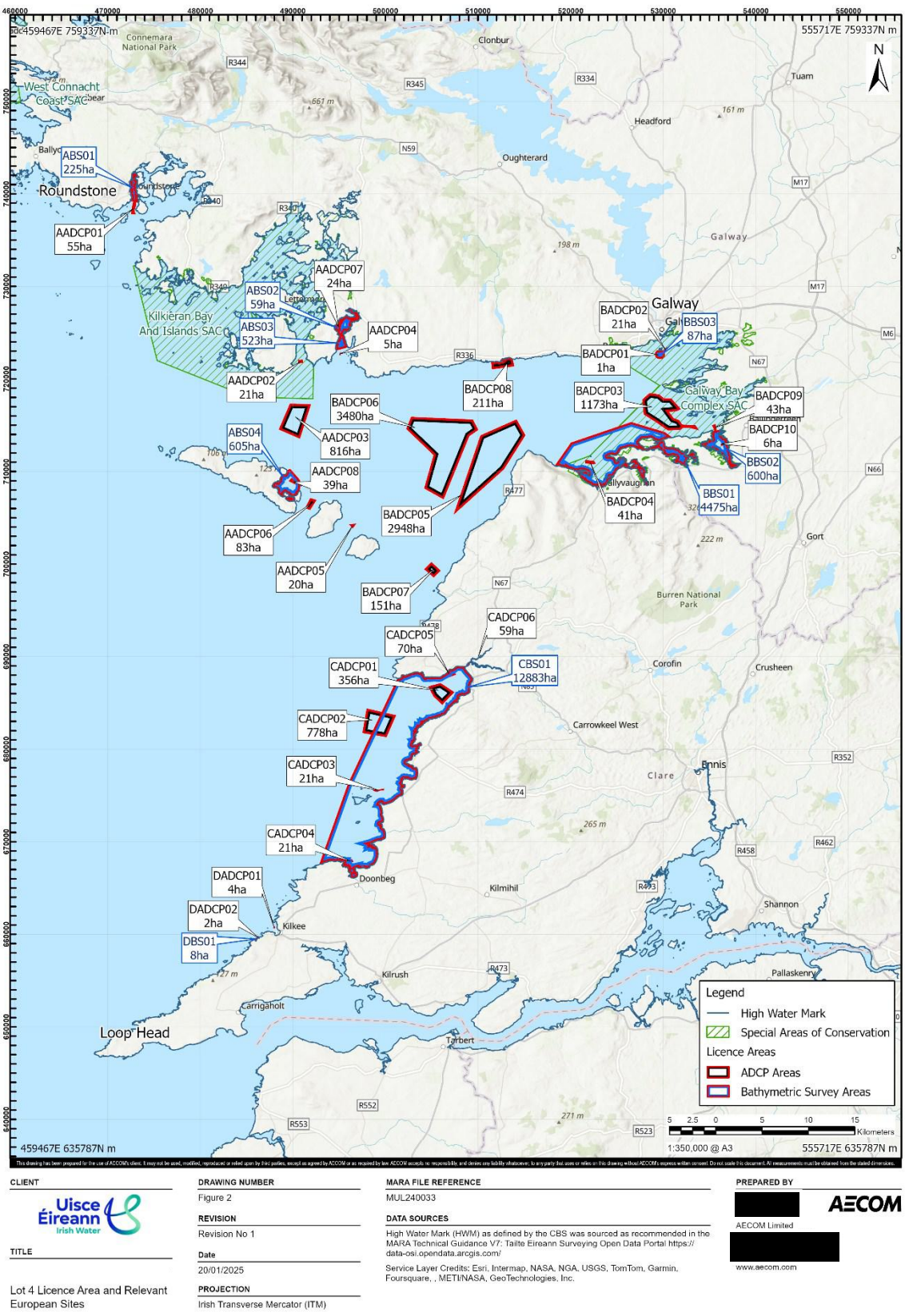
**Figure 1. Proposed Surveys**




CLIENT
Uisce Éireann Irish Water

TITLE
Lot 4 Licence Area and Relevant European Sites

DRAWING NUMBER
Figure 2

REVISION
Revision No 1

Date
20/01/2025

PROJECTION
Irish Transverse Mercator (ITM)

MARA FILE REFERENCE
MUL240033

DATA SOURCES
High Water Mark (HWM) as defined by the CBS was sourced as recommended in the MARA Technical Guidance V7: Tailte Eireann Surveying Open Data Portal https://data-osi.opendata.arcgis.com/

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**Figure 2. Proposed Surveys and Relevant European Sites**