

# ALCATEL SUBMARINE NETWORK

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## Havhingsten

### Appendix I2 - Marine Survey - Intertidal Survey report

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P2228\_R4693\_Rev0 App I2 | July 2019

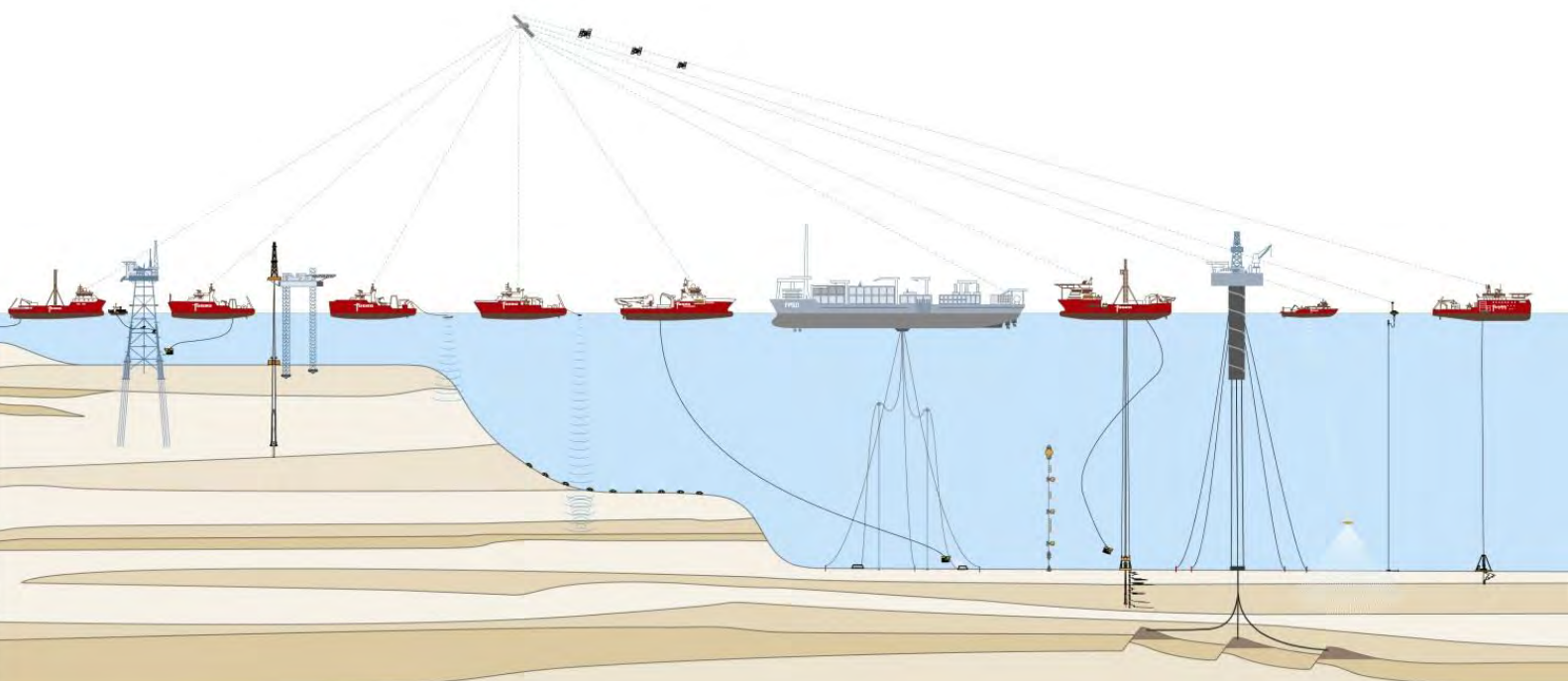
# Intertidal Habitat Report Havingsten Cable Route Survey Loughshinny, Ireland

Fugro Document No.: 181275-R-016(02)  
28 June 2019

Alcatel Submarine Networks UK Limited



Final report



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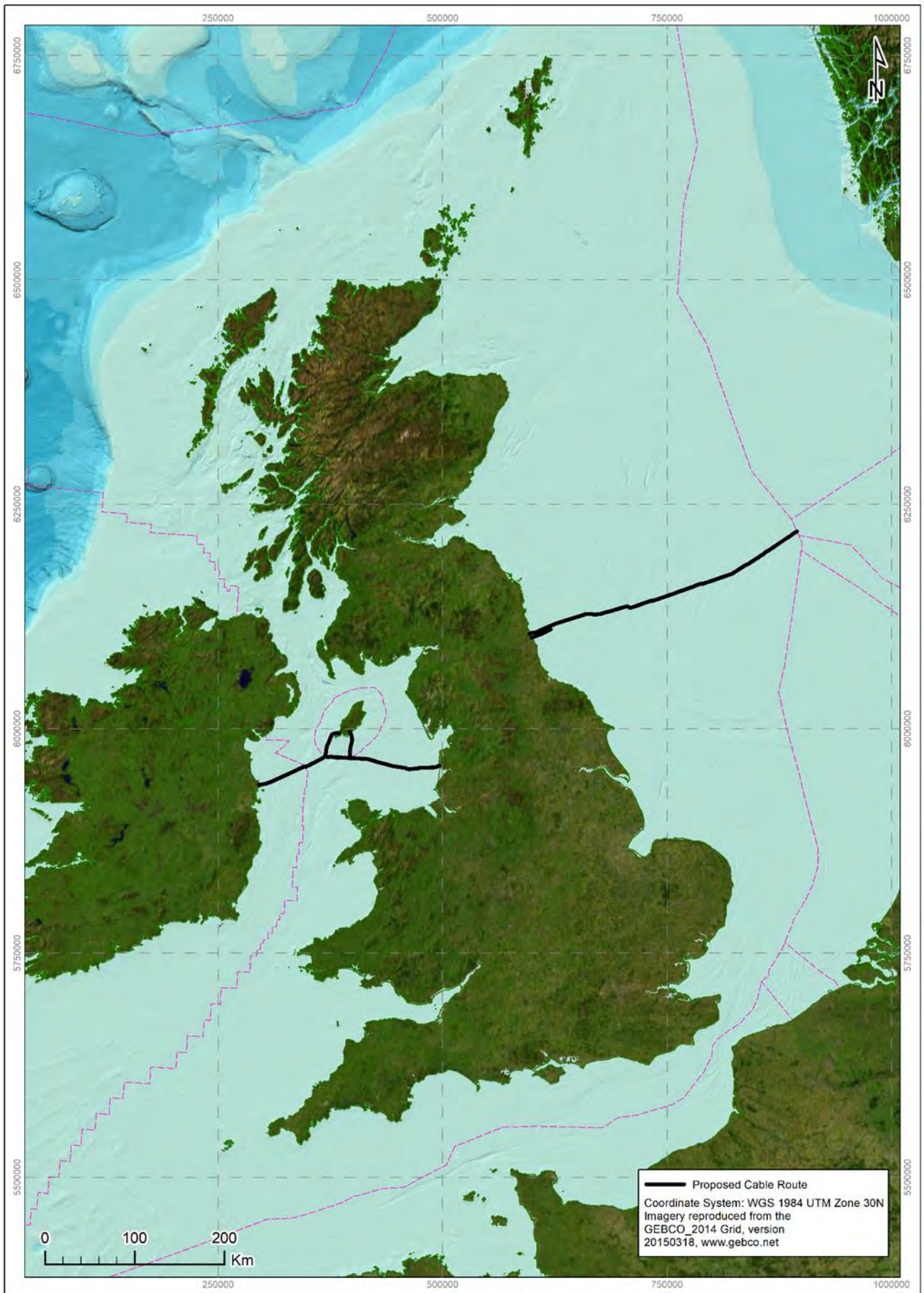
Final report

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## EXECUTIVE SUMMARY

### Introduction

On the instruction of Alcatel Submarine Networks UK Limited, Fugro performed intertidal surveys at six proposed cable landings. These were located at Seaton Sluice and Whitley Bay (UK east coast), Squires Gate Lane (UK west coast), Port Erin and Port Grenaugh (Isle of Man) and Loughshinny (Ireland).

The surveys were conducted on spring tide occasions between 18 and 22 February 2019. All coordinates detailed in this report are referenced to World Geodetic System 1984 (WGS84) Universal Transverse Mercator (UTM) Projection Zone 29 N Central Meridian.

### Survey Strategy

An intertidal habitat survey was required to record the distribution of intertidal sediments and associated conspicuous species. Further objectives were to conduct a fauna and flora survey of key intertidal species, to assist with the classification and mapping of intertidal biotopes within the survey area.

The modified Phase I walkover biotope mapping survey was conducted to record conspicuous intertidal fauna and flora and habitats within the survey area (500 m wide cable corridor).

The entire vertical profile of the shore was investigated, from the supralittoral zone to the low water spring tide level (where safe access allowed), as identified by standard Admiralty tidal predictions.

### Intertidal Habitats

Within the Loughshinny survey area, numerous biotopes were identified. Those on hard substrates were mainly classified by the macrofaunal and floral community, whereas biotopes of soft substrates were mainly classified by physical structure. Additionally, several small areas (< 25 m<sup>2</sup>) were identified and recorded as target notes. Biotopes recorded were typical of variably exposed shores from this region of the Irish coastline.

### Potentially Sensitive Habitats or Species

Four intertidal habitats of potential nature conservation interest were recorded during the survey of Loughshinny. Several areas of bedrock were potential stoney reef, protected as Annex I habitat under 'Bedrock reef' or 'Stony reef', with the latter listed as a priority habitat on the UK Biodiversity Action Plan (UKBAP) as 'Intertidal underboulder communities'. Additionally, the coastal sand dunes observed along the upper shore were potentially the Annex I habitat 'Shifting dunes along the shoreline with *Ammophila arenaria*', also referred to as 'white dunes', whilst soft boulders in the low shore to the east of the survey area were potentially a subsection of the UKBAP listed priority habitat 'Peat and clay exposures with piddocks'.

The herring gull (*Larus argentatus*), kittiwake (*Rissa* sp.) and fulmar (*Fulmarus glacialis*), observed within the survey area, are listed in 'the EC Birds Directive'.

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## ABBREVIATIONS

|       |   |
|-------|---|
| CM    | Central Meridian                        |
| EC    | European Commission                     |
| EUNIS | European Nature Information System      |
| GIS   | Geographical Information System         |
| JNCC  | Joint Nature Conservation Committee     |
| OSPAR | Oslo and Paris convention               |
| UKBAP | United Kingdom Biodiversity Action Plan |
| UTM   | Universal Transverse Mercator           |
| WGS84 | World Geodetic System 1984              |



## **1. INTRODUCTION**

### **1.1 Background**

On the instruction of Alcatel Submarine Networks UK Limited, Fugro performed intertidal surveys at six proposed cable landings. These were located at Seaton Sluice and Whitley Bay (UK east coast), Squires Gate Lane (UK west coast), Port Erin and Port Grenaugh (Isle of Man) and Loughshinny (Ireland).

The Havhingsten cable system is a planned subsea telecommunication network and the design spans nearly 920 km with initial landing points in four markets, including Denmark, England, Isle of Man and Ireland.

The intertidal surveys were required to obtain environmental data at the landfall locations to support the Permit in Principle applications. The surveys were conducted to establish whether any sensitive habitats are present within the cable route corridor, specifically habitats listed under Annex I of the European Commission (EC) Habitats Directive and habitats listed by the Oslo-Paris convention (OSPAR) as threatened and/or declining habitats (OSPAR, 2008).

This report presents the results of the intertidal survey conducted at Loughshinny, County Dublin, Ireland.

Appendix A outlines the guidelines for use of this report.

### **1.2 Scope of Work**

An intertidal habitat survey was required to record the distribution of intertidal sediments and associated conspicuous species. Further objectives were to conduct a fauna and flora survey of key intertidal species, to assist with the classification and mapping of intertidal biotopes within the survey area.

### **1.3 Coordinate Reference System**

All coordinates detailed in this report are referenced to World Geodetic System 1984 (WGS84) Universal Transverse Mercator (UTM) Projection Zone 29 N Central Meridian. Table 1.1 provides the detailed geodetics and projection parameters.



**Table 1.1: Project Geodetic Parameters, Havingsten Cable Route, Loughshinny**

| <b>Global Positioning System Geodetics Parameters</b> |  |
|---|--|
| Datum:  | World Geodetic System 1984 (WGS84)                       |
| Spheroid:   | World Geodetic System 1984                               |
| Semi major axis:                                      | 6378137.0  |
| Inverse flattening:                                   | 298.257223563  |
| <b>Project Projection Parameters</b>                  |  |
| Grid Projection:                                      | Universal Transverse Mercator (UTM), Northern Hemisphere |
| UTM Zone  | 29 N   |
| Central Meridian:                                     | -9.0   |
| Latitude of Origin:                                   | 0.0  |
| False Easting:  | 500000.0   |
| False Northing:                                       | 0.0  |
| Scale factor:   | 0.9996   |
| Units:  | Meter (1.0)  |

## 2. METHODS

### 2.1 Survey Methods

The intertidal habitat mapping survey was undertaken broadly following the Joint Nature Conservation Committee (JNCC) Marine Monitoring Handbook Procedural Guideline 3.1: In situ intertidal biotope recording (Wyn et al., 2001). The resolution of intertidal mapping using this method is between Phase 1 terrestrial mapping (JNCC, 2010) and the Marine Nature Conservation Review Phase 2 methods (Hiscock, 1996).

The modified Phase I walkover biotope mapping survey was conducted to record conspicuous intertidal fauna and flora and habitats within the survey area (500 m cable corridor).

The entire vertical profile of the shore was investigated, from the supralittoral zone to the low water spring tide level (where safe access allowed), as identified by standard Admiralty tidal predictions.

Colour aerial photographs covering the survey area were produced as field maps. Habitat boundaries were established and manually mapped onto field maps and any associated faunal and floral assemblages recorded. Photographs were captured within each biotope to facilitate detailed ground-truthing.

Target notes were used to record further information including features that were too small (< 5 m<sup>2</sup>) to be portrayed accurately on a map, features on vertical faces and fine scale biotopes that existed as mosaics. Target notes were also used to describe human activities, such as coastal protection measures, shore access and large items of anthropogenic debris. Additional photography stations were recorded at which still photographs were captured of the shore.

In-field determination of the substrate composition was undertaken to assist with biotope assessment and subsequent biotope code allocation. Descriptions are based on the Folk classification (Long, 2006), as presented within Table 2.1, which uses the descriptive terms ‘mud’, ‘sand’ and ‘gravel’ in combinations depending on the estimated proportions of each component. For example, a description of ‘muddy sand’ defines sediment that has sand as the principle component and a mud proportion of between > 10 % and < 50 %. Further descriptive terms have also been used to better describe the observations where necessary, for example terms such as ‘shell fragments’. In addition, to describe the larger sediment fractions, pebbles, cobbles and boulders were defined using the Wentworth classification. Any anthropogenic features evident were also recorded.

**Table 2.1: Sediment Particle Sizes and Classification Terms**

| Particle Size     | Corresponding Folk Class Used in Long (2006) Classification | Wentworth (1922) Classification |
|-------------------|---|---------------------------------|
| > 256 mm          | NA  | Boulder                         |
| > 64 to 256 mm    |   | Cobble                          |
| > 2 to 64 mm      | Gravel  | Gravel/pebble                   |
| > 62.5 µm to 2 mm | Sand  | Sand                            |
| > 4 to 62.5 µm    | Mud   | Silt                            |
| > 1 to 4 µm       |   | Clay                            |

Garmin GPSmap 78 hand held Global Positioning System units, accurate to 10 m but often achieving < 5 m accuracy, were used to geo-reference biotope boundaries, photographs and target notes.

## 2.2 Interpretation Methods

### 2.2.1 Habitats/Biotopes Classification

Following on shore assessment of the sediments and species present within the survey area, biotopes were classified and assigned to each distinct sediment/species association. To facilitate biotope identification, field maps, target notes and shore photographs were considered.

Habitats within the survey area have been classified in accordance with both the European Nature Information System (EUNIS) habitat classification and ‘the Marine Habitat Classification for Britain and Ireland – Version 15.03’ (JNCC, 2015). The EUNIS habitat classification has compiled habitat information from across Europe into a single database, whilst the JNCC classification categorises UK habitats. Both classifications systems are based around hierarchical analysis, where abiotic habitats are initially defined (upper levels) and biological communities are then linked to these (lower levels) to produce a biotope classification.

Table 2.2 summarises the EUNIS hierarchy, whilst Table 2.3 summarises the JNCC hierarchy, including an example of the coding system for an equivalent intertidal habitat.

The classification systems are designed to incorporate small-scale temporal variations (e.g. seasonal) into the biotope/habitat categories. However, biological communities and marine environments can be highly dynamic and temporally variable. Therefore, the biotopes and habitats identified by the current assessment are representative of the survey area at the time of sampling only.

**Table 2.2: EUNIS (2012) Biotope Classification Hierarchy Example**

| Level                            | Example Classification Name  | Example Classification Code |
|----------------------------------|--|-----------------------------|
| 1. Environment                   | Marine habitats  | A                           |
| 2. Broad habitat types           | Littoral rock and other hard substrata   | A1                          |
| 3. Habitat complexes             | High energy littoral rock  | A1.1                        |
| 4. Biotope complexes             | Mussel and/or barnacle communities   | A1.11                       |
| 5 & 6. Biotopes and sub-biotopes | <i>Semibalanus balanoides</i> on exposed to moderately exposed or vertical sheltered eulittoral rock | A1.113                      |

**Table 2.3: JNCC (2015) Biotope Classification Hierarchy Example**

| Level | Example Classification Name  | Example Classification Code |
|-------|--|-----------------------------|
| 1.    | Littoral rock  | LR                          |
| 2.    | High energy littoral rock  | LR.HLR                      |
| 3.    | Mussel and/or barnacle communities   | LR.HLR.MusB                 |
| 4.    | <i>Semibalanus balanoides</i> on exposed to moderately exposed or vertical sheltered eulittoral rock | LR.HLR.MusB.Sem             |

### 2.2.2 Biotope Mapping

For the biotope map, the basemap was a geo-referenced ESRI colour aerial photograph. This appears to have been taken during an intermediate tide state, in which the shore within the footprint of the proposed Loughshinny area was not completely exposed (Figure 3.1). During the survey, the tide was lower than depicted, as expected on a spring tide. The boundaries of each biotope, as indicated on each of the field maps, were subsequently digitized and incorporated within a geographical information system (GIS), generated using QGIS and ArcView, and overlaid onto the basemap as a series of polygons. Each polygon was attributed with the relevant biotope classification.

Target notes were plotted where appropriate (e.g. features that were too small (< 5 m<sup>2</sup>) to be portrayed accurately on a map or those on vertical faces) and overlaid onto the base map. Photograph stations were considered spatially to ground-truth biotopes.

Numerous other map resources were consulted prior to the survey and during data analysis. These included Ordnance Survey maps and both Google and Bing maps. These latter resources indicated that a degree of variation in beach levels has occurred within the survey area as some of the rock habitats evident on available aerial imagery were buried by varying thicknesses of soft sediment at the time of survey, indicating a degree of mobility and transience in intertidal biotopes at this location.

### 3. RESULTS

#### 3.1 Field Operations

The intertidal habitat survey was carried out over one day on 19 February 2019, during the low spring tide occasion, to allow access to the lowest reaches of the shore and to maximise the surveying time during the field visit. The temperature was approximately 7 °C, with cloudy skies of more than 20 % cloud cover. Winds were moderate, and the wind direction was approximately easterly. As identified by standard Admiralty tidal predictions, the lowest tide level was 0.44 m.

#### 3.2 Intertidal Habitats and Fauna

The Loughshinny survey area comprised a predominantly sandy shore enclosed to the west by layered limestone and shale bedrock extending directly from coastal cliffs, and to the east by a concrete pier used by creel fishermen. The folded sedimentary cliffs and bedrock present to the west of the survey area are reported to be of carboniferous age (Turner, 1951). An extended area of bedrock was emergent to the east of the pier. The lower shore to the east of the bay was comprised of mixed sediment (sand, pebbles, cobbles and boulders), while to the west, the lower shore was comprised of sandy sediments.

The flora observed comprised common rocky shore seaweed species in well recognised zonation patterns. Limited epifauna was observed, likely due to the season and sand scour. However, both epifauna and seaweed diversity and abundance were elevated on the layered limestone and shale bedrock and associated rockpools in the west of the survey area and on the mixed sediment and boulders on the lower shore to the east. A thin veneer of *Sabellaria spinulosa* tubes was observed on mixed sediments on the lower shore to the east of the survey area.

Piddock holes were observed in boulders in the lower shore from the centre to the east side of the bay. Seaweeds included several green and red ephemeral seaweeds, red turf forming seaweeds and several wracks. Coralline and several green and red seaweeds were present in rockpools. Kelp (*Laminaria digitata* and *Saccharina latissima*) was present on mixed sediments on the lower shore to the east of the survey area. Additionally, lug worm (*Arenicola marina*) casts and sand mason worm (*Lanice conchilega*) tubes were observed, the latter in high abundance in sandy sediments in the low shore.

The upper shore featured boulder sea defences upon which small white sand dunes have formed. A small area of gabion sea defence was present in the north-west of the bay. Several outflows were observed along the upper shore, through the boulder sea defences. To the north-east of the bay, a small area of bedrock was emergent, with cobbles and boulders to the west adjacent to the entry slip and boulder sea defences to the north.

Table 3.1 presents the habitat classification hierarchy for the habitats observed within the survey area, both those mapped as distinct habitats and those denoted as target notes. Figure 3.1 spatially presents the habitats observed across the survey area, with those < 25 m<sup>2</sup> or on vertical faces marked as target notes. Appendix B.1 presents that photographic log and Appendix B.2 presents specifics of each target note.

Table 3.1: Habitat Classifications, Havingsten Cable Route Survey, Loughshinny

| EUNIS (2012) Habitat Classification |  |  |  |   |   | Equivalent JNCC (2015) Classification  |
|-------------------------------------|--|--|--|---|---|--|
| Environment Level 1                 | Broad Habitat Level 2                        | Habitat Level 3                                | Biotope Complex Level 4                                      | Biotope Level 5   | Sub-biotope Level 6   |  |
| A<br>Marine                         | A1<br>Littoral rock and other hard substrata | A1.1<br>Littoral rock and other hard substrata | -  | -   | -   | LR<br>Littoral rock  |
|                                     |  |  | A1.11*<br>Mussel and/or barnacle communities                 | A1.113*<br><i>Semibalanus balanoides</i> on exposed to moderately exposed or vertical sheltered eulittoral rock | -   | LR.HLR.MusB.Sem*<br><i>Semibalanus balanoides</i> on exposed to moderately exposed or vertical sheltered eulittoral rock |
|                                     |  | A1.2<br>Moderate energy littoral rock          | A1.21*<br>Barnacles and fucoids on moderately exposed shores | -   | -   | LR.MLR.BF*<br>Barnacles and fucoids on moderately exposed shores   |
|                                     |  |  |  | A1.211*<br><i>Pelvetia canaliculata</i> and barnacles on moderately exposed littoral fringe rock                | -   | LR.MLR.BF.PeIB*<br><i>Pelvetia canaliculata</i> and barnacles on moderately exposed littoral fringe rock                 |
|                                     |  |  |  | A1.213<br><i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed mid eulittoral rock               | -   | LR.MLR.BF.FvesB<br><i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed mid eulittoral rock               |
|                                     |  |  |  | A1.214*<br><i>Fucus serratus</i> on moderately exposed lower eulittoral rock                                    | -   | LR.MLR.BF.Fser*<br><i>Fucus serratus</i> on moderately exposed lower eulittoral rock                                     |
|                                     |  |  |  |   | A1.2143<br><i>Fucus serratus</i> and piddocks on lower eulittoral soft rock | LR.MLR.BF.Fser.Pid<br><i>Fucus serratus</i> and piddocks on lower eulittoral soft rock                                   |

| EUNIS (2012) Habitat Classification |   |                                     |  |  |   | Equivalent JNCC (2015) Classification   |
|-------------------------------------|---|-------------------------------------|--|--|---|---|
| Environment Level 1                 | Broad Habitat Level 2   | Habitat Level 3                     | Biotope Complex Level 4                        | Biotope Level 5  | Sub-biotope Level 6   |   |
| A<br>Marine<br>continued            | A1<br>Littoral rock and<br>other hard<br>substrata<br>continued | A1.3<br>Low energy littoral<br>rock | A1.31<br>Fucoids on sheltered<br>marine shores | A1.311<br><i>Pelvetia canaliculata</i> on<br>sheltered littoral fringe rock                        | -   | LR.LLR.F.Pel<br><i>Pelvetia canaliculata</i> on sheltered<br>littoral fringe rock                                       |
|                                     |   |                                     |  | A1.312<br><i>Fucus spiralis</i> on sheltered<br>upper eulittoral rock                              | -   | LR.LLR.F.Fspi<br><i>Fucus spiralis</i> on sheltered upper<br>eulittoral rock  |
|                                     |   |                                     |  | A1.313<br><i>Fucus vesiculosus</i> on<br>moderately exposed to<br>sheltered mid eulittoral<br>rock | A1.3131<br><i>Fucus vesiculosus</i> on<br>full salinity moderately<br>exposed to sheltered<br>mid eulittoral rock | LR.LLR.F.Fves.FS<br><i>Fucus vesiculosus</i> on full salinity<br>moderately exposed to sheltered<br>mid eulittoral rock |
|                                     |   |                                     |  |  | A1.3132<br><i>Fucus vesiculosus</i> on<br>mid eulittoral mixed<br>substrata                                       | LR.LLR.F.Fves.X<br><i>Fucus vesiculosus</i> on mid eulittoral<br>mixed substrata  |
|                                     |   |                                     |  | A1.314*<br><i>Ascophyllum nodosum</i> on<br>very sheltered mid<br>eulittoral rock                  | A1.3141*<br><i>Ascophyllum nodosum</i><br>on full salinity mid<br>eulittoral rock                                 | LR.LLR.F.Asc.FS*<br><i>Ascophyllum nodosum</i> on full<br>salinity mid eulittoral rock                                  |
|                                     |   |                                     |  | A1.315<br><i>Fucus serratus</i> on<br>sheltered lower eulittoral<br>rock                           | A1.3152<br><i>Fucus serratus</i> on full<br>salinity lower eulittoral<br>mixed substrata                          | LR.LLR.F.Fserr.X<br><i>Fucus serratus</i> on full salinity lower<br>eulittoral mixed substrata                          |



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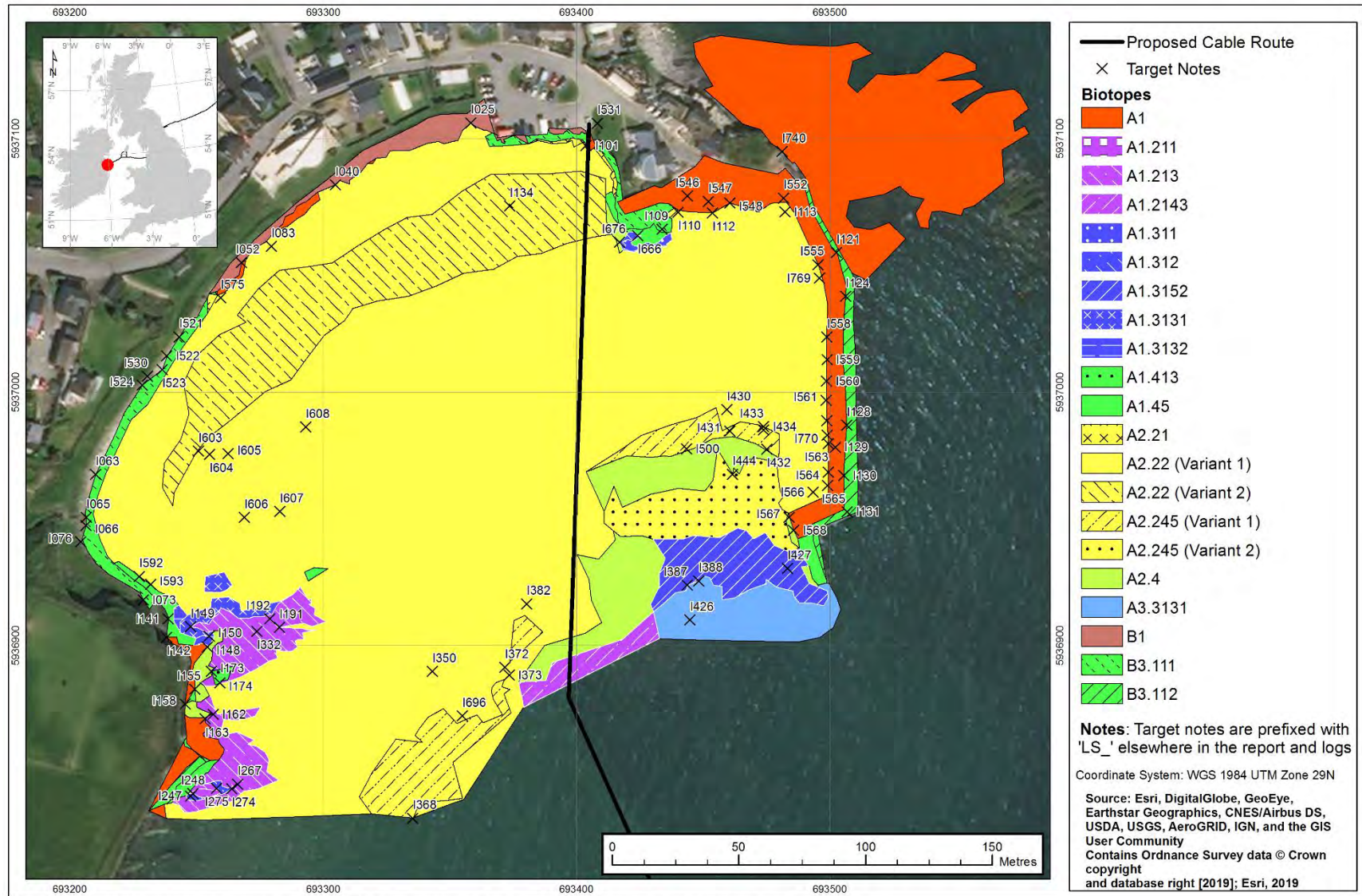
| EUNIS (2012) Habitat Classification |  |                                      |   |  |                     | Equivalent JNCC (2015) Classification   |
|-------------------------------------|--|--------------------------------------|---|--|---------------------|---|
| Environment Level 1                 | Broad Habitat Level 2                                  | Habitat Level 3                      | Biotope Complex Level 4   | Biotope Level 5  | Sub-biotope Level 6 |   |
| A<br>Marine<br>continued            | A1<br>Littoral rock and other hard substrata continued | A1.4<br>Features of littoral rock    | A1.41<br>Rockpools  | A1.413<br>Seaweeds in sediment-floored eulittoral rockpools  | -                   | LR.FLR.Rkp.SwSed<br>Seaweeds in sediment-floored eulittoral rockpools   |
|                                     |  |                                      |   | 1.421*<br>Green seaweeds ( <i>Enteromorpha</i> spp. and <i>Cladophora</i> spp.) in shallow upper shore rockpools | -                   | LR.FLR.Rkp.G*<br>Green seaweeds ( <i>Enteromorpha</i> spp. and <i>Cladophora</i> spp.) in shallow upper shore rockpools |
|                                     |  |                                      | A1.44*<br>Communities of littoral caves and overhangs   | A1.444*<br><i>Audouinella purpurea</i> and <i>Cladophora rupestris</i> on upper to mid-shore cave walls          | -                   | LR.FLR.Cvov.AudCla*<br><i>Audouinella purpurea</i> and <i>Cladophora rupestris</i> on upper to mid shore cave walls     |
|                                     |  |                                      | A1.45<br>Ephemeral green or red seaweed communities (freshwater or sand-influenced) on non-mobile substrata | -  | -                   | LR.FLR.Eph<br>Ephemeral green or red seaweed communities (freshwater or sand-influenced)                                |
|                                     | A2<br>Littoral sediment                                | A2.2<br>Littoral sand and muddy sand | A2.21<br>Strandline   | -  | -                   | LS.LSa.St<br>Strandline   |
|                                     |  |                                      |   | A2.211*<br>Talitrids on the upper shore and strand-line  | -                   | LS.LSa.St.Tal*<br>Talitrids on the upper shore and strand-line  |
|                                     |  |                                      | A2.22<br>Barren or amphipod-dominated mobile sand shores  | -  | -                   | LS.LSa.MoSa<br>Barren or amphipod-dominated mobile sand shores  |

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 HAVINGSTEN CABLE ROUTE SURVEY, LOUGHSHINNY, IRELAND  
 INTERTIDAL HABITAT REPORT



| EUNIS (2012) Habitat Classification |  |   |   |  |  | Equivalent JNCC (2015) Classification  |
|-------------------------------------|--|---|---|--|--|--|
| Environment Level 1                 | Broad Habitat Level 2  | Habitat Level 3                                       | Biotope Complex Level 4   | Biotope Level 5  | Sub-biotope Level 6  |  |
| A<br>Marine<br>continued            | A2<br>Littoral sediment<br>continued                                       | A2.2<br>Littoral sand and<br>muddy sand<br>continued  | A2.24<br>Polychaete/bivalve<br>dominated muddy sand<br>shores                               | A2.245<br><i>Lanice conchilega</i> in littoral<br>sand   | -  | LS.LSa.MuSa.Lan<br><i>Lanice conchilega</i> in littoral sand   |
|                                     |  | A2.4<br>Littoral mixed<br>sediments                   | -   | -  | -  | Ls.LMx<br>Littoral mixed sediments   |
|                                     | A3<br>Infralittoral rock<br>(and other hard<br>substrata)                  | A3.3<br>Low energy<br>infralittoral rock              | A3.31<br>Silted kelp communities<br>(sheltered infralittoral<br>rock)                       | A3.313<br><i>Laminaria saccharina</i> on<br>very sheltered infralittoral<br>rock                     | A3.3131<br><i>Laminaria saccharina</i><br>and <i>Laminaria digitata</i><br>on sheltered sublittoral<br>fringe rock | IR.LIR.K.Lsac.Ldig<br><i>Laminaria saccharina</i> and<br><i>Laminaria digitata</i> on sheltered<br>sublittoral fringe rock |
| B<br>Coastal<br>habitats            | B1<br>Sand dunes   | B1.3  | B1.32   | B1.321<br>Atlantic white dunes   | -  | -  |
|                                     | B3<br>Rock cliffs, ledges<br>and shores,<br>including the<br>supralittoral | B3.1 Supralittoral<br>rock (lichen or splash<br>zone) | B3.11<br>Lichens or small green<br>seaweeds on<br>supralittoral and littoral<br>fringe rock | -  | -  | LR.FLR.Lic*<br>Lichens or small green algae on<br>supralittoral and littoral fringe rock                                   |
|                                     |  |   |   | B3.111<br>Yellow and grey lichens on<br>supralittoral rock   | -  | LR.FLR.Lic.YG<br>Yellow and grey lichens on<br>supra-littoral rock surfaces  |
|                                     |  |   |   | B3.112<br><i>Prasiola stipitata</i> on nitrate-<br>enriched supralittoral or<br>littoral fringe rock | -  | LR.FLR.Lic.Pra<br><i>Prasiola stipitata</i> on nitrate-enriched<br>supralittoral or littoral fringe rock                   |
|                                     |  |   |   | B3.113*<br><i>Verrucaria maura</i> and<br>sparse barnacles on<br>exposed littoral fringe rock        | -  | LR.FLR.Lic.Ver.B*<br><i>Verrucaria maura</i> and sparse<br>barnacles on exposed littoral fringe<br>rock                    |

**Notes:**  
 EUNIS = European Nature Information System  
 JNCC = Joint Nature Conservation Committee  
 \* = Biotopes recorded exclusively as target notes (< 25 m<sup>2</sup>)



Map Document: (V:\E\181275\_Havingsten\_HabitatAssessment\3\_Plots\2\_Draft\181275\_BiotopeMaps\181275\_Nearshore\_Biotope\181275\_Loughshinny\_Havingsten\_Biotope\_In\_Text\_Landscape\_08052019\_1.mxd)  
 24/06/2019 - 15:12:56

Figure 3.1: Biotope map, Havingsten cable route, Loughshinny

### 3.2.1 Littoral Rock (and Other Hard Substrata) (A1/LR)

The broad habitat 'Littoral rock' includes rock habitats (e.g. bedrock, boulders and cobbles) that occur in both the intertidal and the splash zone (JNCC, 2015).

Within the Loughshinny survey area, several areas of upper shore bare rock and artificial surfaces (e.g. seawalls, groynes) and a large area observed to the east outwith Loughshinny Bay, were designated as the broad habitat 'Littoral rock' (A1/LR). Hard substrata that was designated as 'Littoral rock' featured a lack of epifauna or flora. Small areas (< 25 m<sup>2</sup>), that could not be classified further than 'Littoral rock', were recorded as target notes (Appendix B.2).

Figure 3.2 presents example photographs of this habitat, within the Loughshinny survey area.

Within the Loughshinny survey area, some areas of this broad habitat were characteristic of more fine scale classification. For example, areas of solitary boulders (< 25 m<sup>2</sup>) to the west of the survey area was classified further as the biotope complex 'Barnacles and fucoids on moderately exposed shores' (A1.21/LR.MLR.BF) or as the biotope '*Semibalanus balanoides* on exposed to moderately exposed or vertical sheltered eulittoral rock' (A1.113/LR.HLR.MusB.Sem). Areas were classified as the former due to the presence of a mosaic of fucoids and barnacles, with associated limpets (*Patella vulgata*), whilst areas were classified as the latter due to a dominance of the barnacle *S. balanoides*, with associated limpets (*P. vulgata*) and mussels (*Mytilus* juv.). Additionally, areas of solitary boulders (< 25 m<sup>2</sup>), in the central part of the sandy shore, and faces of upper shore bedrock were classified as the biotope '*Pelvetia canaliculata* and barnacles on moderately exposed littoral fringe rock' (A1.211/LR.MLR.BF.PeIB), due to an abundant canopy of channelled wrack (*Pelvetia canaliculata*), and undercanopy flora and fauna typical of this biotope (the red seaweed *Catenella caespitosa*, barnacle *S. balanoides*, limpets *P. vulgata*, winkles *Littorina saxatilis* and black tar lichen *Verrucaria maura*). These were recorded as target notes (Appendix B.2). Figure 3.3 presents example photographs of the biotope '*Pelvetia canaliculata* and barnacles on moderately exposed littoral fringe rock', within the Loughshinny survey area.

Several other littoral rock habitats and biotopes have been further categorised, dependent on their physical structure, degree of wave exposure and biological community and are discussed further in the following sections.

#### 3.2.1.1 *Fucus vesiculosus* and Barnacle Mosaics on Moderately Exposed Mid Eulittoral Rock (A1.213/LR.MLR.BF.FvesB)

The biotope '*Fucus vesiculosus* and barnacle mosaics on moderately exposed mid eulittoral rock' occurs on exposed to moderately exposed mid eulittoral bedrock and boulders. This biotope is usually dominated by a mosaic of the barnacle *S. balanoides* and bladder wrack *F. vesiculosus*. The limpet *P. vulgata* and the dog whelk *Nucella lapillus* are often present. The anemone *Actinia equina* and small individuals of the mussel *Mytilus edulis* may occur in crevices. The undercanopy flora and fauna includes red seaweeds (e.g. *Corallina officinalis*, *Mastocarpus stellatus* and *Osmundea pinnatifida*) and winkles (e.g. *Littorina* spp., including *Littorina littorea*) (JNCC, 2015).

To the west of the survey area, on layered limestone and shale bedrock extending from coastal cliffs to sand, this biotope was observed on middle shore bedrock (Figure 3.1) with a relatively sparse canopy

of *F. vesiculosus* (Figure 3.4). The undercanopy flora and fauna was sparse but included red seaweeds (e.g. *Chondrus crispus*, *Rhodothamniella floridula*, *Osmundea* sp.) and pink encrusting (Corallinales), green seaweeds (*Ulva* spp. including *Ulva lactuca*), limpets (*Patella* spp. including *P. vulgata*), dog whelks (*N. lapillus*), barnacles (*S. balanoides* and *Austrominius modestus*), winkles (*Littorina* sp.), mussels (*Mytilus* sp. including *M. edulis*).

Figure 3.4 presents example photographs of this habitat, within the Loughshinny survey area.

### 3.2.1.2 *Fucus serratus* and Piddocks on Lower Eulittoral Soft Rock (A1.2143/LR.MLR.BF.Fser.Pid)

The sub-biotope '*Fucus serratus* and piddocks on lower eulittoral soft rock' occurs on the lower eulittoral zone, on soft rock shores (e.g. chalk or limestone). This sub-biotope is characterised by the wrack *Fucus serratus* and rock-boring fauna including the piddocks *Barnea* spp., *Pholas dactylus* and *Hiatella arctica*, the latter of which can occur in dense aggregations. Burrowing polychaetes (e.g. *Polydora* spp.) can also occur in high abundance. The undercanopy fauna includes red seaweeds, such as *Gelidium pusillum*, *O. pinnatifida*, *Palmaria palmata*, *Lomentaria articulata* and *R. floridula*, but also calcareous seaweeds such as *C. officinalis* and coralline crusts including *Phymatolithion lenormandii*. The anemone *A. equina* and the mussel *M. edulis* can occupy empty piddock holes. The barnacle *S. balanoides* and the limpet *P. vulgata* often colonise rock surfaces. The dog whelk *N. lapillus*, the winkles *L. littorea* and *Littorina obtusata/mariae* and the top shell *Steromphala cineraria* may also occur (JNCC, 2015).

Within the Loughshinny survey area, this sub-biotope was observed in the sublittoral fringe on the south of the survey area (Figure 3.1). Some small areas (25 m<sup>2</sup>) of this sub-biotope were recorded outwith the mapped area as target notes (Appendix B.2). A sparse canopy of serrated wrack *Fucus serratus* was observed. Boulders were covered by a dense red seaweed turf (*R. floridula*) and were colonised by rock-boring fauna including piddocks. Red seaweeds (*Polysiphonia* sp., *C. crispus* and *P. palmata*), coralline seaweeds (*P. lenormandii*), green seaweeds (*Cladophora rupestris* and *U. lactuca*), fan worms (*Spirobranchus* sp.) and bryozoan (Bryozoa) also occurred. Sparse specimens of ross worms (*Sabellaria spinulosa*) and winkle (*L. ?mariae*) were also observed.

Figure 3.5 presents example photographs of this habitat, within the Loughshinny survey area.

On the bedrock to the west of the survey area, the upper canopy of a small area (< 25 m<sup>2</sup>) was dominated by the serrated wrack *F. serratus*, whilst the under canopy featured the barnacle *S. balanoides*. No piddocks were observed and this was classified as the higher-level biotope '*Fucus serratus* on moderately exposed lower eulittoral rock' (A1.214/LR.MLR.BR.Fser).

### 3.2.1.3 *Pelvetia canaliculata* on Sheltered Littoral Fringe Rock (A1.311/LR.LLR.F.Pel)

The biotope '*Pelvetia canaliculata* on sheltered littoral fringe rock' occurs on lower littoral fringe hard substrate (bedrock, stable boulders and mixed substrata) in sheltered to extremely sheltered conditions dominated by the channelled wrack *P. canaliculata*. The undercanopy flora and fauna include a crust of the black tar lichen *V. maura* or, on very sheltered shores, the non-calcified red seaweeds *Hildenbrandia rubra*. The spiral wrack *Fucus spiralis* can be present in lower parts of the biotope. The red seaweed *Catenella caespitosa* and the green seaweed *Ulva* spp. can be present. A low abundance

of barnacles may be present on more exposed shores. The winkle *L. saxatilis* and a variety of amphipods may also occur (JNCC, 2015).

Within the Loughshinny survey area, this biotope was observed on small patches of upper shore on bedrock to the east and at the base of the cliff to the west (Figure 3.1). The channelled wrack (*P. canaliculata*) composed the upper canopy. The undercanopy flora included green seaweed turf (*Ulva* sp.), red seaweeds (*Porphyra* sp.) and spiral wrack (*F. spiralis*).

Figure 3.3 presents example photographs of this habitat, within the Loughshinny survey area.

#### 3.2.1.4 *Fucus spiralis* on Sheltered Upper Eulittoral Rock (A1.312/ LR.LLR.F.Fspi)

The biotope '*Fucus spiralis* on sheltered upper eulittoral rock' occurs on sheltered upper eulittoral bedrock. This biotope is typically dominated by the spiral wrack *F. spiralis*, usually overlying the black tar lichen *V. maura*. Occasionally, channelled wrack *P. canaliculata* and the encrusting red seaweed *H. rubra* are also present. The undercanopy flora includes the limpet *P. vulgata*, the winkles *L. saxatilis* and *L. littorea* and the barnacle *S. balanoides*. The ephemeral green seaweed *Ulva intestinalis* may be present (JNCC, 2015).

Within the Loughshinny survey area, this biotope was observed in bands below the channelled wrack (*P. canaliculata*) and on upper bedrock to the west and east of the bay (Figure 3.1). The upper canopy was comprised of the spiral wrack *F. spiralis*. The undercanopy flora included the green seaweed *Ulva* sp. and the red seaweed *C. caespitosa*. The fauna observed included barnacles (*S. balanoides*).

Figure 3.6 presents example photographs of this habitat, within the Loughshinny survey area.

#### 3.2.1.5 *Fucus vesiculosus* on Full Salinity Moderately Exposed to Sheltered Mid Eulittoral Rock (A1.3131/LR.LLR.F.Fves.FS)

The sub-biotope '*Fucus vesiculosus* on full salinity moderately exposed to sheltered mid eulittoral rock' occurs on moderately exposed to sheltered mid eulittoral bedrock and large boulders. This sub-biotope is dominated by a dense canopy of the bladder wrack *F. vesiculosus*. In localised shelter, the knotted wrack *Ascophyllum nodosum* may be present in low abundance. The red seaweed *M. stellatus* and the serrated wrack *F. serratus* may be present in damp crevices. The crab *Carcinus maenas* may be present in pools, crevices or under boulders. The undercanopy fauna includes a sparse covering of the barnacle *S. balanoides* and the limpet *P. vulgata*, with the mussel *M. edulis* present in crevices. The winkles *L. littorea* and *L. saxatilis* and the dog whelk *N. lapillus* are present on hard substrate, whilst the winkle *L. obtusata/mariae* can be present on the canopy fronds. The calcareous tube-forming polychaete *Spirorbis spirorbis* can occur epiphytically on the fronds (JNCC, 2015).

Within the Loughshinny survey area, this sub-biotope was observed on sheltered to mid eulittoral moderately exposed rock to the west of the survey area (Figure 3.1) and on the vertical surface of the pier. Some small areas (< 25 m<sup>2</sup>) were recorded outwith the mapped area as target notes (Appendix B.2). This sub-biotope was dominated by the bladder wrack *F. vesiculosus*. The flora observed included the green seaweeds *Ulva* sp. and the red seaweeds *Porphyra* sp. The fauna observed included barnacles *S. balanoides*. Figure 3.7 presents example photographs of this habitat, within the Loughshinny survey area

To the west of the survey area, the knotted wrack *A. nodosum* dominated the midshore bedrock in a small area (< 25 m<sup>2</sup>). Due to the dominance of *A. nodosum*, this small area was characteristic of the sub-biotope '*Ascophyllum nodosum* on full salinity mid eulittoral rock' (A1.3141/LR.LLR.F.Asc.FS). This was recorded as a target note (Appendix B.2).

#### 3.2.1.6 *Fucus vesiculosus* on Mid Eulittoral Mixed Substrata (A.1.3132/LR.LLR.F.Fves.X)

The sub-biotope '*Fucus vesiculosus* on mid eulittoral mixed substrata' occurs on very sheltered to very sheltered mid eulittoral mixed sediment (pebbles, cobbles and boulders) overlaying sediment in fully marine conditions. This sub-biotope is dominated by the bladder wrack *F. vesiculosus*. The knotted wrack *A. nodosum* may occasionally be present on larger boulders. Ephemeral seaweeds such as *U. intestinalis* may be present. The barnacle *S. balanoides*, the limpet *P. vulgata*, the dog whelk *N. lapillus*, the mussel *M. edulis* and the winkles *L. saxatilis* may be present on the hard substrata. Winkles, particularly *L. littorea* and *L. obtusata/mariae*, occur on seaweeds. The polychaetes *A. marina* and *L. conchilega* may be present in sediment, while a variety of gastropods and the crab *C. maenas* occur on and under cobbles (JNCC, 2015).

Within the Loughshinny survey area, this sub-biotope was observed on mid eulittoral mixed sediment adjacent to sand to the west of the survey area (Figure 3.1). This sub-biotope supported a canopy of the bladder wrack *F. vesiculosus*. The flora and fauna were sparse but included green seaweed (*Ulva* spp.) and the knotted wrack *A. nodosum*, with the polychaete *L. conchilega* in sand between the rocks.

Figure 3.7 presents example photographs of this habitat, within the Loughshinny survey area.

#### 3.2.1.7 *Fucus serratus* on Full Salinity Lower Eulittoral Mixed Substrata (A1.3152/LR.LLR.F.Fser.X)

The sub-biotope '*Fucus serratus* on full salinity lower eulittoral mixed substrata' occurs on sheltered to extremely sheltered full salinity lower eulittoral mixed sediment (pebbles, cobbles, boulders overlaying sediment). This sub-biotope is dominated by a dense canopy of the serrated wrack *F. serratus*. The red seaweed *M. stellatus*, the knotted wrack *A. nodosum* and the green seaweeds *Ulva* spp. and *Cladophora* spp. can be present. Coralline crusts (e.g. *Lithothamnion* spp.) can occur on cobbles and boulders. The crab *C. maenas* and winkles such as *L. littorea* and *L. obtusata/mariae* may occur amongst the pebbles and cobbles. The mussel *M. edulis* may also be present. The barnacle *S. balanoides*, the limpet *P. vulgata* and the tube-forming polychaetes *Spirobranchus triqueter* and *Spirorbis* spp. can colonise hard substrates. *Spirorbis* spp. can also occur on the *F. serratus* fronds. Sediment between the loose substrata may support infauna including the polychaete *A. marina* (JNCC, 2015).

Within the Loughshinny survey area, this sub-biotope was observed on lower shore mixed sediment (pebbles, cobbles and boulders) with a moderate canopy of *F. serratus* (Figure 3.1). The undercanopy flora and fauna were sparse, but included green seaweeds (*Ulva* spp., including *U. lactuca*), pink encrusting seaweeds (Corallinaceae including *P. lenormandii*), red seaweeds (Rhodophyta including *C. crispus*, *Rhodothamniella* sp. and *Polysiphonia* sp.), sponges (Porifera including *Halichondria* sp.), fan worms (*Spirobranchus* sp.), ross worms (*S. spinulosa*), barnacles (*S. balanoides*) and dog whelks (*N. lapillus*).

Figure 3.8 presents example photographs of this habitat, within the Loughshinny survey area.

#### 3.2.1.8 Rockpools (A1.41/LR.FLR.Rkp)

The biotope complex 'Rockpools' occurs within depressions in the bedrock producing 'pools' on the retreat of the tide, which are permanently submerged and not directly affected by height on the shore. This biotope complex encompasses four main rockpool biotopes, although it is accepted that an enormous variety of rockpool communities exist (JNCC, 2015).

Within the Loughshinny survey area, rockpools were present on the bedrock to the west of the survey area (Figure 3.1). Rockpools that could not be classified further than the biotope complex 'Rockpools' were less than 25 m<sup>2</sup> and therefore denoted as target notes (Appendix B.2).

Figure 3.9 presents example photographs of this habitat, within the Loughshinny survey area.

Several rockpools were characteristic of more fine scale classification. For example, a small pool (< 5 m<sup>2</sup>) on upper shore bedrock to the west of the survey area was dominated by the green seaweed *Ulva* sp., with the green seaweed *Chaetomorpha melagnoiium* also present. This was representative of the biotope 'Green seaweeds (*Enteromorpha* spp. and *Cladophora* spp.) in shallow upper shore rockpools' (A1.421/LR.FLR.Rkp.G) and was denoted as a target note (Appendix B.2). Figure 3.9c presents example photographs of this habitat, within the Loughshinny survey area.

Only one rockpool biotope was of sufficient size to map and is discussed further in the following subsection.

#### **Seaweeds in Sediment-Floored Eulittoral Rockpools (A1.413/LR.FLR.Rkp.Swsed)**

The biotope 'Seaweeds in sediment-floored eulittoral rockpools' occurs in rockpools with sedimentary (mud, sand, gravel) bottoms, which support scour-tolerant seaweeds. Rockpools communities vary with depth of pool and sediment composition. In pools with large areas of sand, infaunal species such as *A. marina* and *L. conchilega* often occur. The seagrass *Zostera* spp. may occur in some pools where stable sand is present. Shallow rockpools with cobble and pebble floors and an underlying layer of sediment, support red seaweeds communities of *C. crispus*, *M. stellatus*, *Ceramium* spp., *C. officinalis* with green seaweeds such as *Cladophora* spp. and *Ulva* spp. often present (JNCC, 2015).

Within the Loughshinny survey area, this biotope was observed in the upper shore to the west of the survey area, on bedrock adjacent to sand (Figure 3.1). Some small areas of this biotope (< 25 m<sup>2</sup>) were reported elsewhere within the survey area and were recorded as target notes (Appendix B.2). The flora observed included red seaweeds *Dumontia* sp. and *C. crispus*, the green seaweed *Cladophora* sp. and the coralline crust *Phymatolithon lenormandii*. The tube building polychaete *L. conchilega* was also observed.

Figure 3.9d presents example photographs of this habitat, within the Loughshinny survey area.



3.2.1.9 *Audouinella purpurea* and *Cladophora rupestris* on Upper to Mid Shore Cave Walls (A1.444/LR.FLR.Cvov.AudCla)

The biotope '*Audouinella purpurea* and *Cladophora rupestris* on upper to mid shore cave walls' occurs on steeply sloping or vertical faces of upper to mid shore caves, which are partially sheltered from direct wave action. This biotope is characterised by a dense mat of the turf forming red seaweed *Rhodochorton purpurea* (previously *Audouinella purpurea*). Patches of the green seaweed *C. rupestris* may occur. Epifaunal is generally sparse, comprised of a low abundance of the limpet *Patella* spp., the wrinkle *L. saxatilis* and the barnacles *S. balanoides* (JNCC, 2015).

Within the Loughshinny survey area, the biotope '*Audouinella purpurea* and *Cladophora rupestris* on upper to mid shore cave walls' was observed at the base of the cliffs to the west of the survey area, within a shallow cave (Figure 3.1). Within the Loughshinny survey area, a small area (25 m<sup>2</sup>) of this biotope was recorded as a target note (Appendix B.2). This was characterised by a dense turf of *R. purpurea* with sparse associated fauna, including the barnacle *S. balanoides*, the limpets *P. vulgata* and the wrinkles *L. saxatilis*.

Figure 3.10 presents example photographs of this habitat, within the Loughshinny survey area.

3.2.1.10 Ephemeral Green or Red Seaweeds (Freshwater or Sand-Influenced) on Non-Mobile Substrata (A1.45/LR.FLR.Eph)

The biotope complex 'Ephemeral green or red seaweed communities (freshwater or sand-influenced) on non-mobile substrata' occurs on disturbed littoral bedrock and mixed sediments throughout the intertidal zone. *Ulva* spp. is generally the dominant green seaweed, whilst *Porphyra purpurea* and *R. floriculata* are generally the dominant red seaweeds. The wrinkle *Littorina* spp., the limpet *P. vulgata* and the barnacle *S. balanoides* may also occur in low abundance (JNCC, 2015).

Within the Loughshinny survey area, this biotope complex was observed on the bedrock and mixed sediment (pebbles, cobbles and boulders) at the base of the cliff to the west of the survey area, on the emergent bedrock to the east of the survey area adjacent to the pier, at the end of the pier and on vertical surfaces of the pier (Figure 3.1). Some small areas of this biotope complex (< 25 m<sup>2</sup>) were observed outwith the mapped areas and were recorded as target notes (Appendix B.2). The flora was dominated by green seaweeds (*Ulva* spp.) and red seaweeds (*Porphyra* spp.), with some small patches of *F. vesiculosus* and *P. canaliculata* reported on boulders and cobbles.

Figure 3.11 presents example photographs of this habitat, within the Loughshinny survey area.



Figure 3.2: Example photographs of 'littoral rock (and other hard substrata)' (A1/LR), Havingsten cable route, Loughshinny



Figure 3.3: Example photographs of ‘*Pelvetia canaliculata* and barnacles on moderately exposed littoral fringe rock’ (A1.211/LR.MLR.BF.PeIB) and ‘*Pelvetia canaliculata* on sheltered littoral fringe rock’ (A1.311/LR.LLR.F.Pel), Havingsten cable route, Loughshinny



Figure 3.4: Example photographs of 'Fucus vesiculosus and barnacle mosaics on moderately exposed mid eulittoral rock' (A1.213/LR.MLR.BF.FvesB), 'Havingsten cable route, Loughshinny

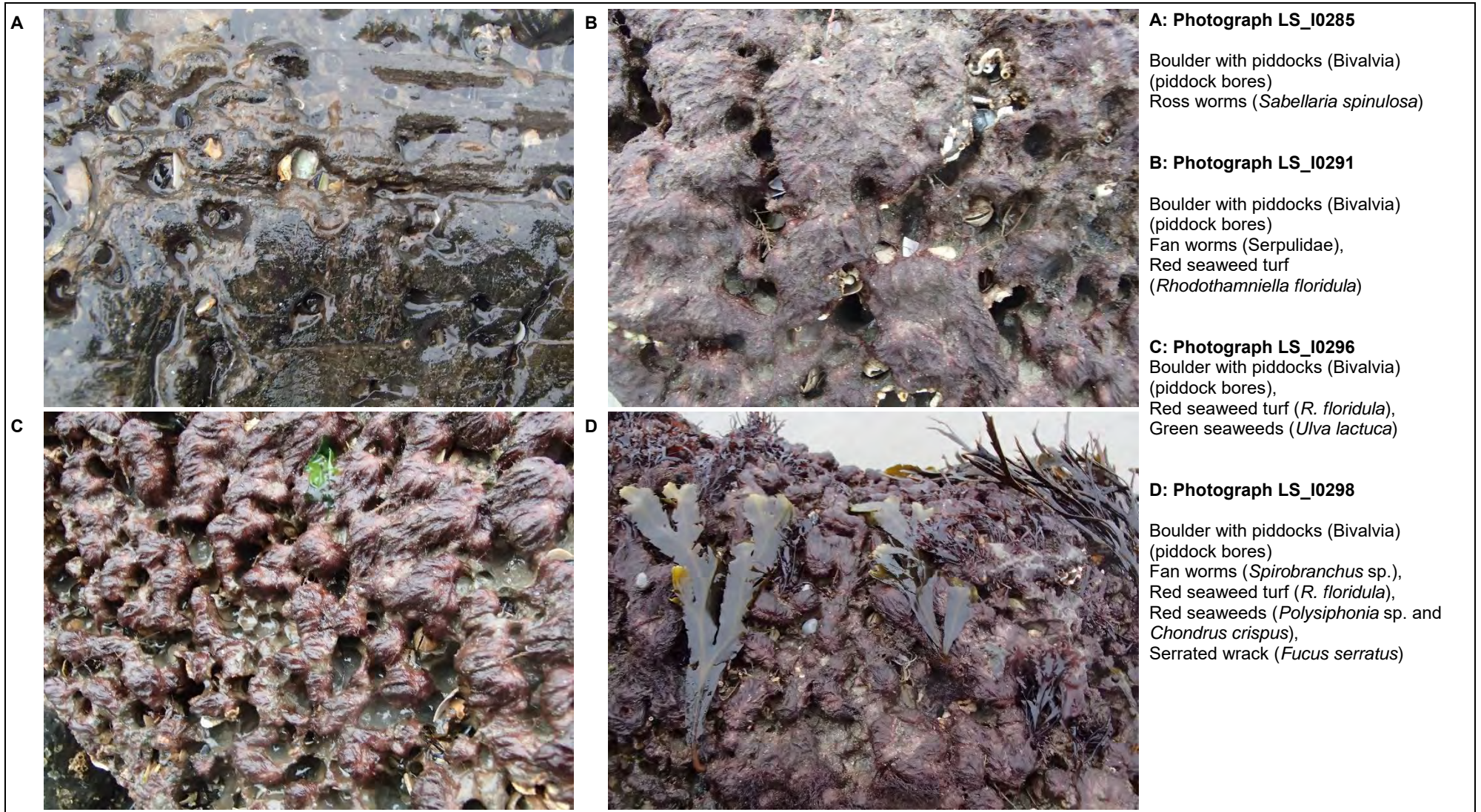


Figure 3.5: Example photographs of ‘*Fucus serratus* and piddocks on lower eulittoral soft rock’ (A1.2143/LR.MLR.BF.Fser.Pid), Havingsten cable route, Loughshinny

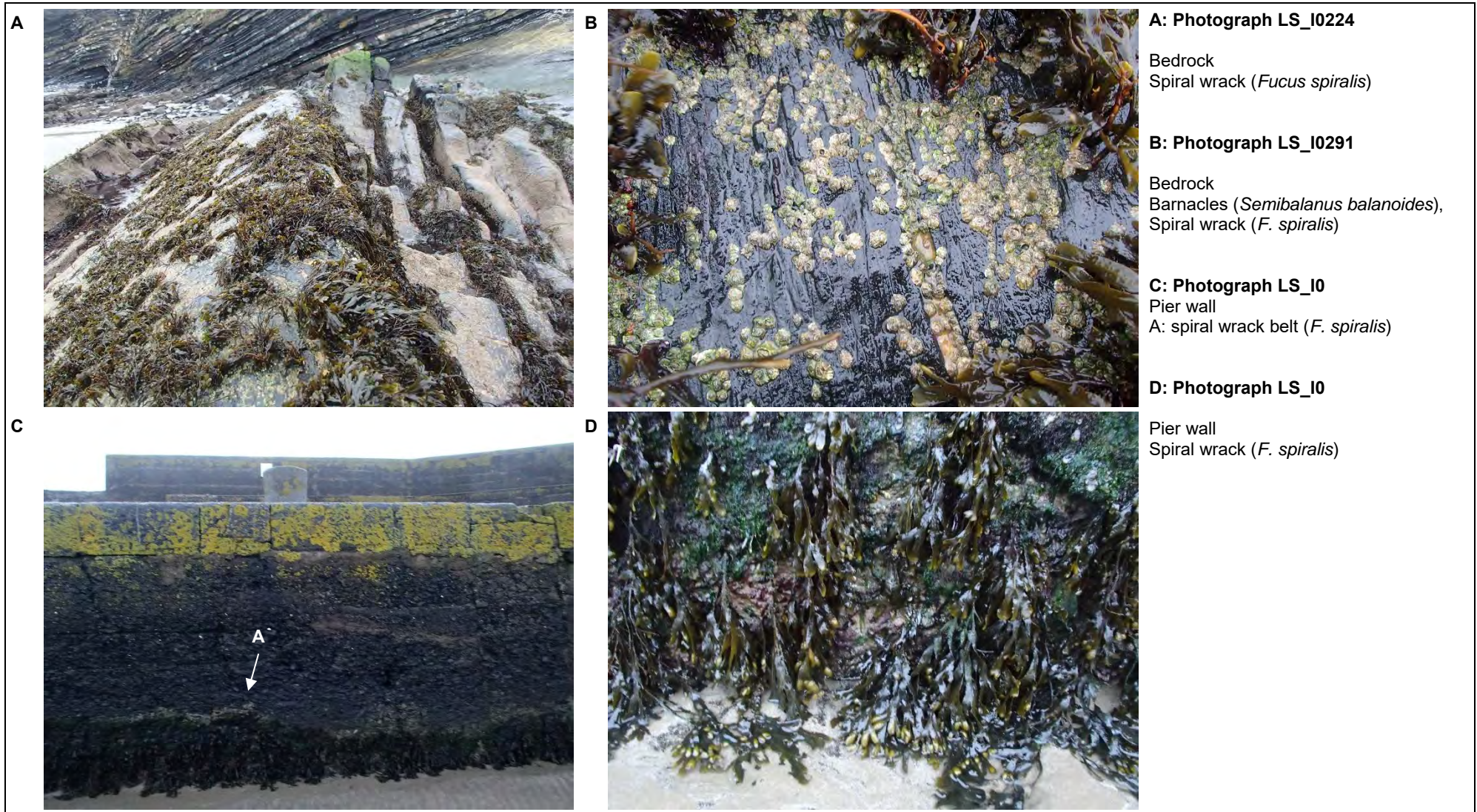


Figure 3.6: Example photographs of '*Fucus spiralis* on sheltered upper eu littoral rock' (A1.312/ LR.LLR.F.Fspi), Havingsten cable route, Loughshinny



Figure 3.7: Example photographs of '*Fucus vesiculosus* on full salinity moderately exposed to sheltered mid eulittoral rock' (A1.3131/LR.LLR.F.Fves.FS) and '*Fucus vesiculosus* on mid eulittoral mixed substrata' (A.1.3132/LR.LLR.F.Fves.X), Havingsten cable route, Loughshinny

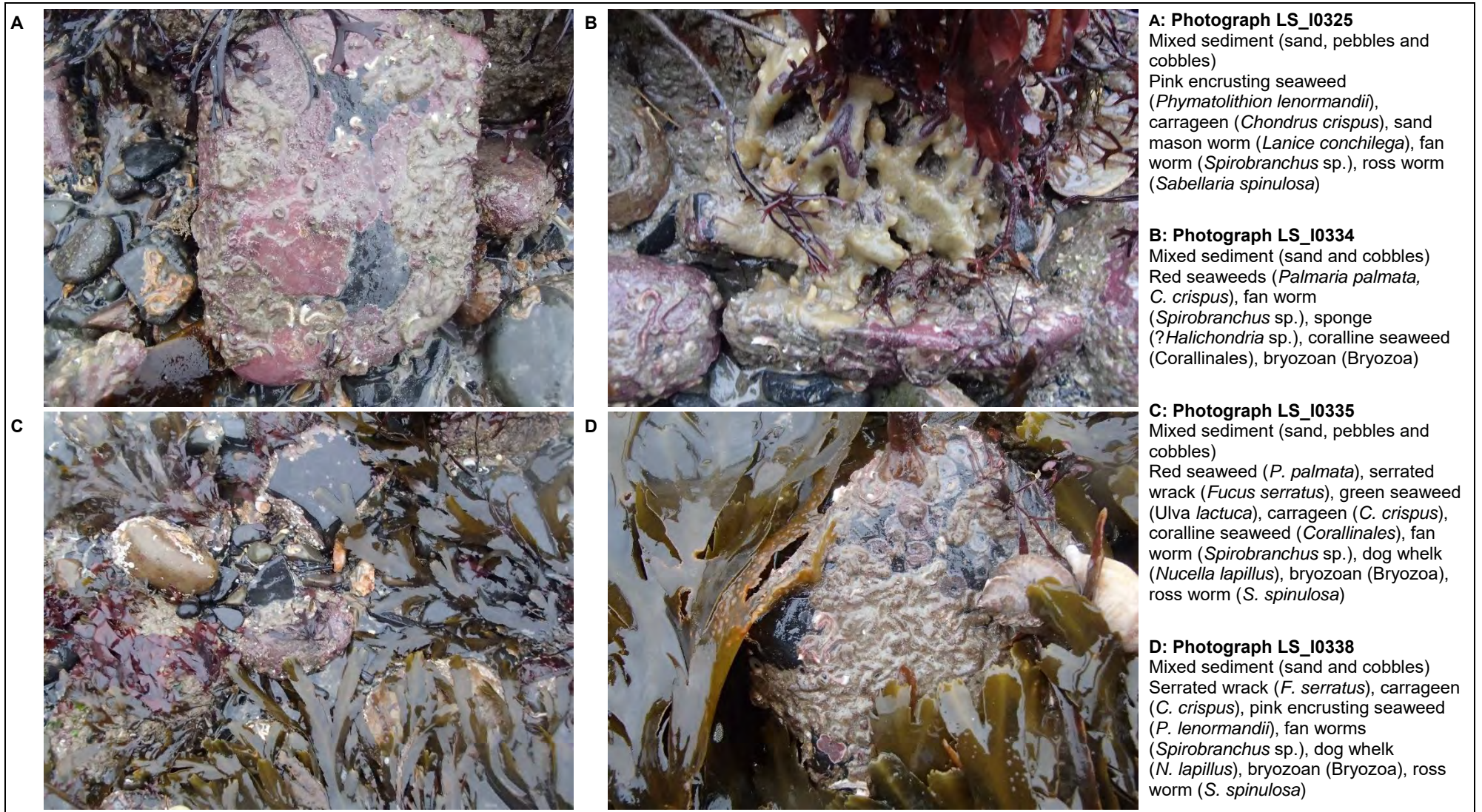


Figure 3.8: Example photographs of ‘*Fucus serratus* on full salinity lower eulittoral mixed substrata’ (A1.3152/LR.LLR.F.Fser.X), Havingsten cable route, Loughshinny





Figure 3.9: Example photographs of 'rockpools' (A1.41/LR.FLR.Rkp), Havingsten cable route, Loughshinny

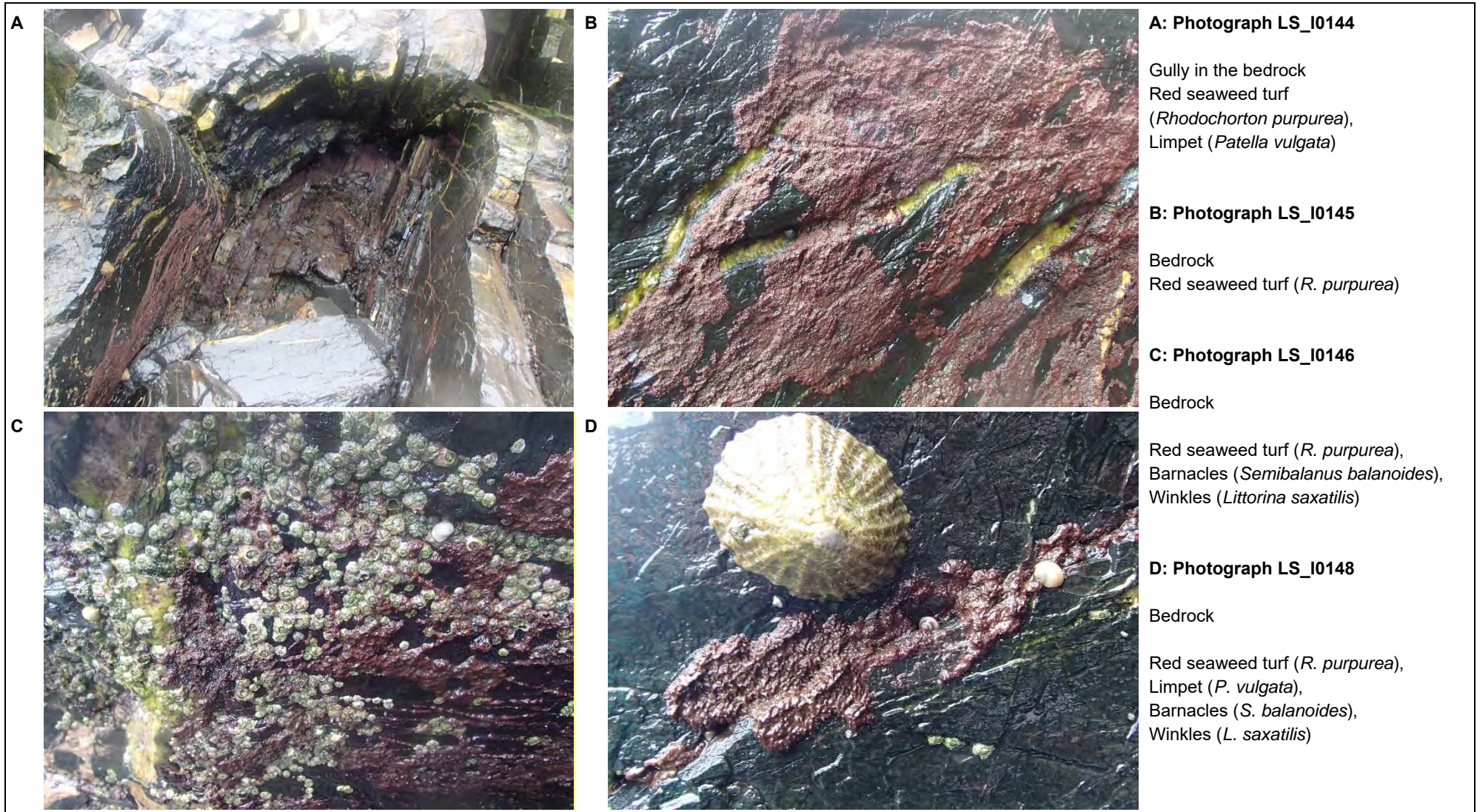


Figure 3.10: Example photographs of ‘littoral caves and overhangs’ (A1.44/LR.FLR.Cvov), Havingsten cable route, Loughshinny

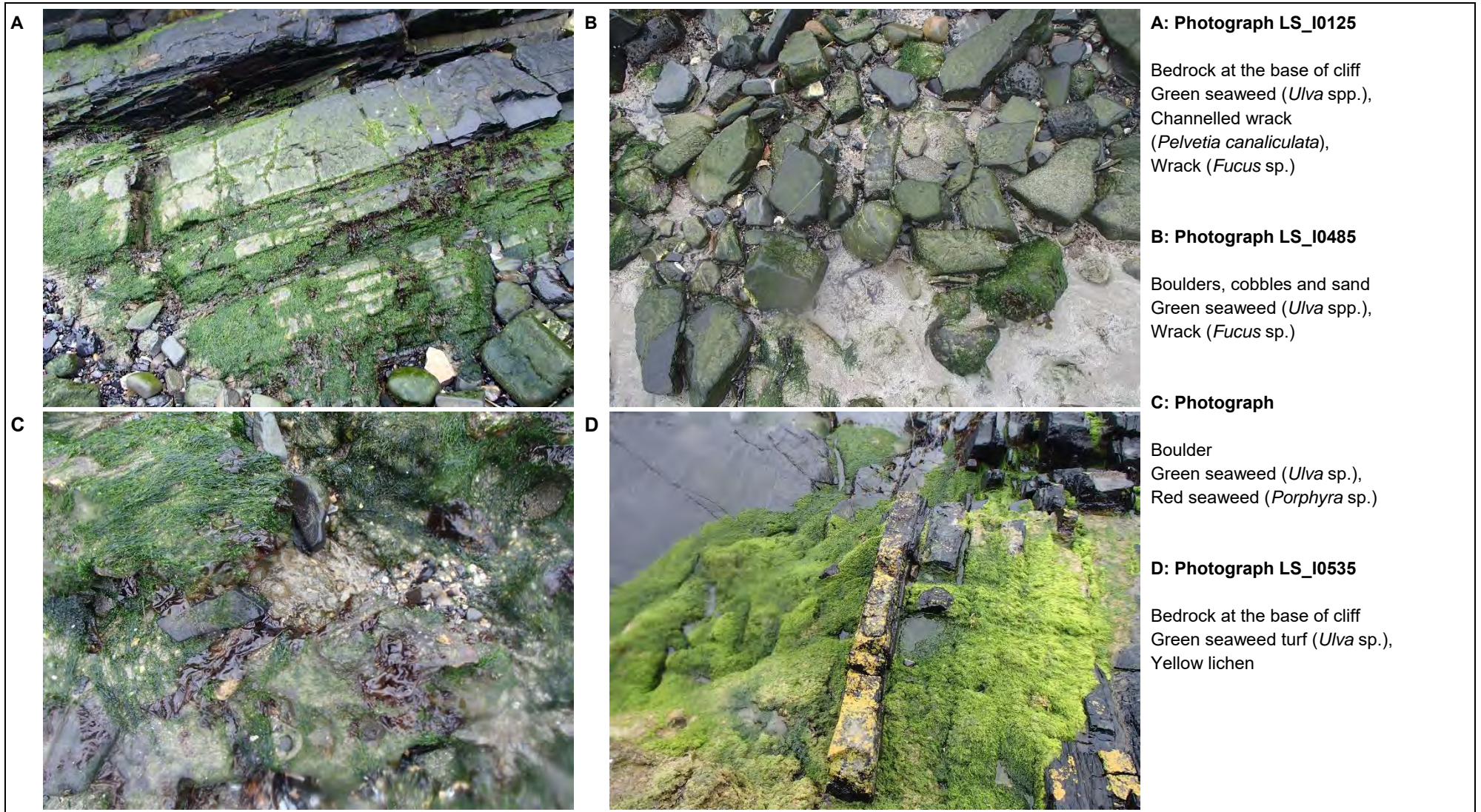


Figure 3.11: Example photographs of ‘ephemeral green or red seaweeds (freshwater or sand-influenced) on non-mobile substrata’ (A1.45/LR.FLR.Eph), Havingsten cable route, Loughshinny

### 3.2.2 Littoral Sediment (A2/LS)

The broad habitat 'Littoral sediment' includes habitats of mud, sand, pebbles and cobbles and any combination of these that occur within the intertidal zone. Littoral sediments support infaunal communities tolerant to some degree of drainage as the tide retreats. Littoral sediment is further defined based on particle size descriptions, with the soft sediment biotopes present within the Loughshinny survey area outlined in the subsequent sections of this report.

#### 3.2.2.1 Strandline (A2.21/LS.LSa.St)

The biotope complex 'Strandline' comprises shifting line of decomposing seaweed and debris, typically deposited at the upper extreme of sedimentary and (some rocky) shores at high tide. Ephemeral bands of seaweed can shelter communities of sand hoppers (JNCC, 2015).

Within the Loughshinny survey area, this biotope complex was observed on the upper shore at the base of the boulder sea defences, adjacent to the two main entrances to the beach (Figure 3.1). Within the majority of the strandline no fauna was observed.

Figure 3.12a to 3.12c present example photographs of this habitat, within the Loughshinny survey area.

Within the 'Strandline' biotope complex, immediately west of the carpark slip, a small area (< 25 m<sup>2</sup>) featured a community of sandhoppers (talitrid amphipods) underneath decaying drift seaweed. This small area was characteristic of more fine scale classification, and was representative of the biotope 'Talitrids on the upper shore and strand-line' (A2.211/LS.LSa.St.Tal).

Figure 3.12d presents an example photograph of this habitat, within the Loughshinny survey area.

#### 3.2.2.2 Barren or Amphipod-Dominated Mobile Sand Shores (A.22/LS.LSa.MoSa)

The biotope complex 'Barren or amphipod-dominated mobile sand shores' consists of clean mobile sands (fine to coarse gravel sand), with little very fine sand and no mud. Shell fragments, pebbles and cobbles may occasionally occur on the surface. The sands have low water retention and are subject to drying out between tides, particularly on steep upper shores. This biotope complex generally supports a limited range of species, ranging from barren, highly mobile sands to more stable clean sands supporting infaunal communities of isopods, amphipods and a limited range of polychaetes (JNCC, 2015).

Within the Loughshinny survey area, this biotope complex was separated into two distinct variations. Variant 1 comprised of sandy sediments, while variant 2 consisted of coarse sand with pebbles and cobbles. The majority of the upper and lower shore were comprised of variant 1, whilst a coarser band of sediment in the upper mid shore was comprised of variant 2 (Figure 3.1). Within the Loughshinny area, a small area of variant 2 was less than 25 m<sup>2</sup> and recorded as a target note (Appendix B.2). A few solitary boulders were present in the mid shore to the west of the shore, within variant 1. No fauna was observed in either variant of this biotope complex.

Figure 3.13 presents example photographs of both variants of this habitat, within the Loughshinny survey area.

### 3.2.2.3 Lanice conchilega in Littoral Sand (A2.245/LS.LSa.MuSa.Lan)

The biotope 'Lanice conchilega in littoral sand' (A2.245/LS.LSa.MuSa.Lan) occurs on flats of medium fine to muddy sand flats, generally on the lower shore but also on waterlogged mid shores. The sand mason worm *L. conchilega* can also occur on the lower part of predominantly rocky shores, where patches of sand or muddy sand occur between scattered boulders, cobbles and pebbles. The sediment supports dense populations of the sand mason *L. conchilega* and other polychaetes that are tolerant of sand scour or sediment surface mobility, (e.g. the polychaetes *Anaitides mucosa*, *Aricidea minuta*, *Eumida sanguinea*, *Nephtys hombergii*, *Pygospio elegans*, *Scoloplos armiger* and *Tharyx* spp.) (JNCC, 2015).

Within the Loughshinny survey area, this biotope was further separated into two distinct variations. Variant 1 comprised of sandy sediments, while variant 2 consisted of mixed sediment with pebbles, cobbles and shell fragments. Variant 1 was observed in the low shore to the west of the bay and in the mid shore to the east of the bay, above a region of mixed sediments, while variant 2 was observed in the lower shore to the east of the bay, adjacent to the pier (Figure 3.1). Within this biotope (variants 1 and 2), a high abundance of the sand mason worm *L. conchilega* was observed. No other fauna was recorded.

Figure 3.14 presents example photographs of both variants of this habitat, within the Loughshinny survey area.

### 3.2.2.4 Littoral Mixed Sediment (A2.4/LS.LMx)

The biotope complex 'Littoral mixed sediment' comprises shores of mixed sediments ranging from muds with gravel and sand to gravels, sands and mud in more even proportions. Mixed sediments are generally poorly sorted. Stable large cobbles or boulders may occur. Large rocks support epibiota such as fucoids with green seaweeds more commonly present on rocky and boulder shores. Mixed sediments that are predominantly muddy tend to support infaunal communities, similar to those of muddy shores (JNCC, 2015).

Within the Loughshinny survey area, this biotope complex was observed on the upper bedrock to the west of the survey area, and in the lower shore to the south of the survey area adjacent to the pier (Figure 3.1). Some small areas (25 m<sup>2</sup>) of this biotope complex were recorded outwith the mapped area as target notes (Appendix B.2). Flora and fauna were generally very sparse and varied with position on the shore. On the upper shore, the occasional green seaweed (*Ulva* spp.) was observed. On the lower shore, pink encrusting seaweeds (Corallinales), red seaweeds (Chlorophyta) and fan worms (*Spirobranchus* spp.) were observed.

Figure 3.15 presents example photographs of this habitat, within the Loughshinny survey area.



Figure 3.12: Example photographs of ‘Strandline’ (A2.21/LS.LSa.St) and ‘Talitrids on upper shore and strand-line’ (A2.211/LS.Sa.St.Tal), Havingsten cable route, Loughshinny



Figure 3.13: Example photographs of 'barren or amphipod-dominated mobile sand shores' (A.22/LS.LSa.MoSs), Havingsten cable route, Loughshinny



Figure 3.14: Example photographs of 'Lanice conchilega in littoral sand' (A2.245/LS.LSa.MuSa.Lan), Havingsten cable route, Loughshinny





Figure 3.15: Example photographs of 'littoral mixed sediment' (A2.4/LS.LMx), Havingsten cable route, Loughshinny

### 3.2.3 Infralittoral Rock (and Other Hard Substrata) (A3/IR)

#### 3.2.3.1 Laminaria saccharina and Laminaria digitata on Sheltered Sublittoral Fringe Rock (A3.3131/IR.LIR.K.Lsac.Ldig)

The sub-biotope '*Laminaria saccharina* and *Laminaria digitata* on sheltered sublittoral fringe rock' occurs on sheltered bedrock and boulders in the sublittoral fringe. This sub-biotope is characterised by a mixed canopy of the kelps *L. digitata* and *S. latissima* (previously *Laminaria saccharina*). Red undercanopy seaweeds include *C. crispus*, *Dumontia contorta*, *Bonnemaisonia hamifera* and *Plocamium cartilagineum*, in addition to encrusting coralline seaweeds and non-calcified red crusts. The brown seaweeds *Chorda filum*, Ectocarpaceae and *F. serratus* and green seaweeds *Ulva* spp. may be present. The tube-building polychaete *Spirobranchus triqueter* may be present. The sponge *Halichondria panicea* may be present in cracks and crevices, with a variety of mobile crustaceans (e.g. *C. maenas*), the gastropod *S. cineraria* and the starfish *Asterias rubens* common under boulders (JNCC, 2015).

Within the Loughshinny survey area, this sub-biotope was observed on lower shore mixed sediment (pebbles, cobbles and boulders) to the east of the survey area (Figure 3.1). A moderate canopy of *L. digitata* and *S. latissima* was observed. The undercanopy flora and fauna included snakelocks anemones (*Anemonia viridis*), pink encrusting seaweeds (Corallinales), red seaweeds (*C. crispus* and *P. palmata*), serrated wrack (*F. serratus*), green seaweed (*Ulva* sp.), fan worms (*Spirobranchus* sp.) and ross worms (*S. spinulosa*).

Figure 3.16 presents example photographs of this habitat, within the Loughshinny survey area.

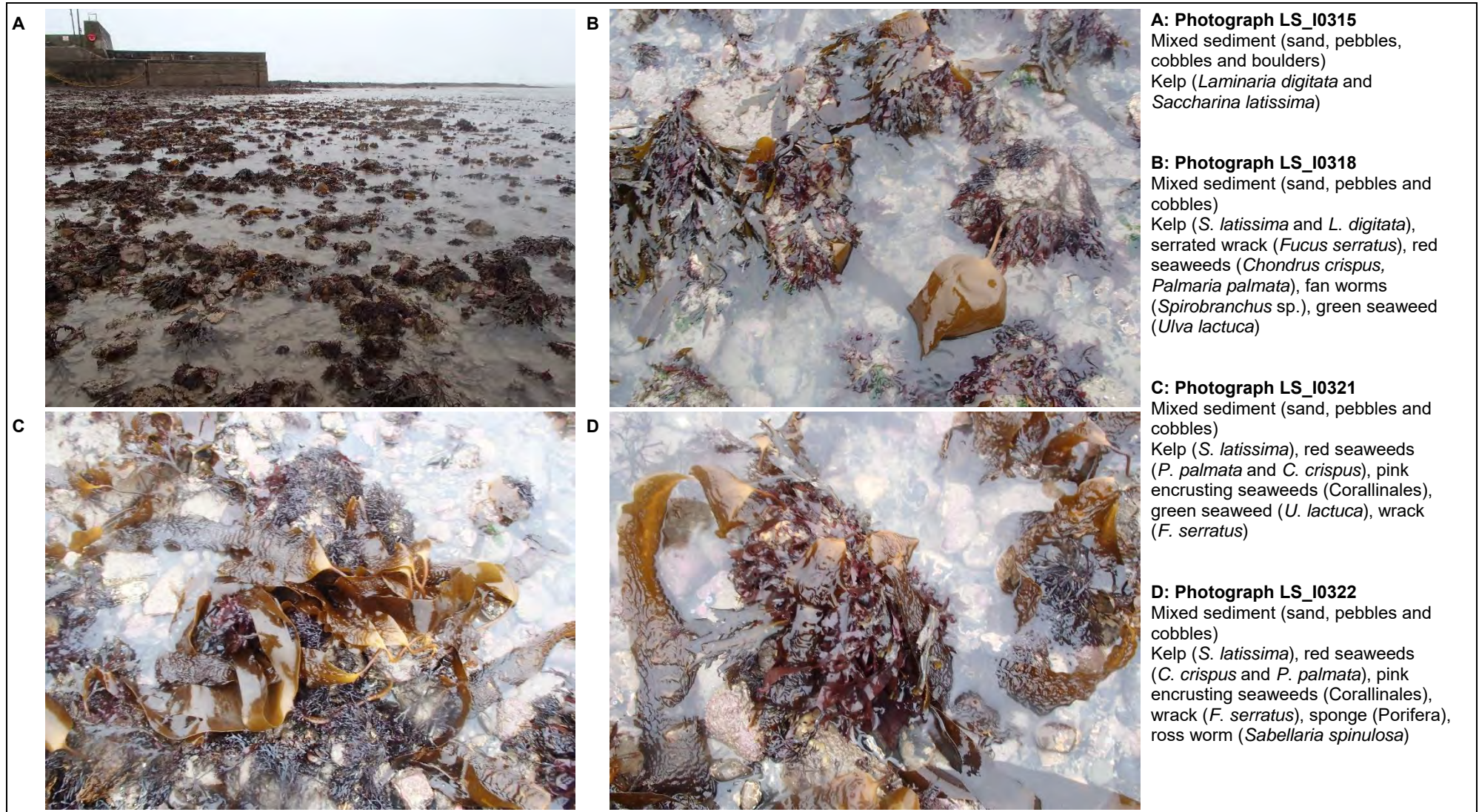


Figure 3.16: Example photographs of ‘*Laminaria digitata* and *Laminaria saccharina* on sheltered sublittoral fringe rock’ (A3.3131/IR.LIR.K.Lsac.Ldig), Havingsten cable route, Loughshinny

### 3.2.4 Coastal Habitats (B)

Coastal habitats are those above the spring high tide limit (or above mean water level in non-tidal waters) occupying coastal features and characterised by their proximity to the sea. This environment includes coastal dunes and wooded coastal dunes, beaches and cliffs, free-draining supralittoral habitats adjacent to marine habitats that are generally exclusively affected by spray or splash, strandlines characterised by terrestrial invertebrates and moist and wet coastal dune slacks and dune-slack pools.

#### 3.2.4.1 Atlantic White Dunes (B1.321)

The biotope 'Atlantic white dunes' comprises sand-covered marine shorelines, formed by wind and wave action. These include gently sloping beaches and beach-ridges, formed by waves, longshore drift and storms, as well as dunes, formed by aeolian deposits and sometimes re-formed by waves. Where vegetation occurs, these are dominated by marram grass (*A. arenaria*). Other vegetation may be present, including the sea holly (*Eryngium maritimum*), sea spurge (*Euphorbia paralias*) and morning glory (*Calystegia soldanella*) (EUNIS, 2012).

Within the Loughshinny survey area, small white sand dunes were present upon boulder sea defences along the upper shore (Figure 3.1). The sand dunes were generally less than 5 m in width and less than 1.5 m in height. Dune formation was restricted to the landward side by anthropogenic activity (e.g. carpark, lawn, path) and stabilised to seaward by boulders, suggesting that this was a poor example of the habitat as it was heavily anthropogenically influenced.

Within the Loughshinny survey area, vegetation characteristic of sand dunes and other coastal habitats were recorded within this biotope. Flora included marram grass (*Ammophila* sp.), morning glory (*C. soldanella*), sea plantain (*Plantago maritima*), ribwort plantain (*Plantago lanceolata*), bucks-horn plantain (*Plantago coronopus*), common mallow (*Malva sylvestris*), sea beet (*Beta vulgaris* spp. *maritima*), chamomile (*Chamaemelum nobile*), dandelion (*Taraxacum officinale*) and clover (? *Trifolium* sp.).

Figure 3.17 presents example photographs of this habitat, within the Loughshinny survey area.

#### 3.2.4.2 Lichens or Small Green Algae on Supralittoral and Littoral Fringe Rock (B3.11/LR.FLR.Lic)

The biotope complex 'Lichens or small green algae on supralittoral and littoral fringe rock' typically forms a distinct zone or band of lichens in the 'splash' zone on the supralittoral and littoral fringe rock. Yellow and grey lichens (e.g. *Xanthoria parietina*, *Caloplaca marina*, *Caloplaca thallicola* or *Ramalina* sp.) dominate the supralittoral rock with a distinctive black band of tar lichen *V. maura* occurring below in the littoral fringe. Small green seaweeds (e.g. *Prasiola stipitata*, *Blidingia minima*, *Ulothrix flacca*, *Urospora penicilliformis* and *Urospora wormskioldii*) can occur within this biotope complex. Fauna includes the wrinkle *L. saxatilis* (JNCC, 2015).

Within the Loughshinny survey area, the biotope complex 'Lichens or small green algae on supralittoral and littoral fringe rock' was assigned to small areas (< 25 m<sup>2</sup>) of filamentous green seaweed (likely *Ulothrix* spp., *Urospora* spp. and *Blidingia* spp.). These were located on the vertical surface of the pier and recorded as target notes (Appendix B.2).

Additionally, some areas of 'Lichens or small green algae on supralittoral and littoral fringe rock' within the Loughshinny survey area were characteristic of more fine scale classification. A small area (< 25 m<sup>2</sup>) was classified further as the biotope 'Verrucaria maura and sparse barnacles on exposed littoral fringe rock' (B3.113/LR.FLR.Lic.Ver.B) due to the complete cover of the black tar lichen *V. maura*. This was recorded as a target note (Appendix B.2).

More fine scale biotopes assigned to larger areas (> 25 m<sup>2</sup>) are discussed in the following subsections.

#### **Yellow and Grey Lichens on Supralittoral Rock (B3.111/LR.FLR.Lic.YG)**

The biotope 'yellow and grey lichens on supralittoral rock' occurs on vertical to gently sloping hard substrata (e.g. bedrock, boulders) in the supralittoral zone of most rocky shores. This biotope is characterised by a community of yellow and grey lichens, including the orange sea lichen *Caloplaca marina*, the rim lichen *Tephromela atra*, the cartilage lichens *Ramalina* spp. and the common orange lichen *Xanthoria parietina*. The black tar lichen *V. maura* may also occur (JNCC, 2015).

Within the Loughshinny survey area, this biotope was observed on the upper reaches of the boulder sea defences, on upper shore bedrock and on sections of the pier to the east of the survey area, on vertical and upper surfaces (Figure 3.1). Within the Loughshinny survey area, some small areas of this biotope were less than 25 m<sup>2</sup> and therefore recorded as target notes (Appendix B.2). Within this biotope, black tar lichen *V. maura*, orange foliose lichens *Xanthoria* sp., orange crustose lichens *Caloplaca* sp., and grey and brown foliose lichens *Parmelia* sp. were recorded.

Figure 3.18 presents example photographs of this habitat, within the Loughshinny survey area.

#### **Prasiola stipitata on Nitrate-Enriched Supralittoral or Littoral Fringe Rock (B3.112/LR.FLR.Lic.Pra)**

The biotope 'Prasiola stipitata on nitrate-enriched supralittoral or littoral fringe rock' occurs on exposed to moderately exposed hard substrata (e.g. bedrock, boulders) in the supralittoral zone and littoral fringe. This biotope receives nitrate enrichment and is characterised by the ephemeral green seaweed *P. stipitata* or *Prasiola* spp. (JNCC, 2015).

Within the Loughshinny survey area, this biotope was observed on the upper bedrock to the west of the survey area near the cliff base (below nesting bird's area). Nesting fulmars (*Fulmar glacialis*) were observed in holes and ledges in the upper region of this cliff, providing nitrates through their guano. This biotope was also observed on the external edge of Loughshinny Pier, likely associated with nitrate from roosting birds (Figure 3.1). Within the Loughshinny survey area, some small areas of this biotope (< 25 m<sup>2</sup>) were recorded as target notes (Appendix B.2). Within this biotope, green seaweeds dominated, particularly characteristic turfs of *Prasiola* spp. including *P. stipitata*.

Figure 3.19: presents example photographs of this habitat, within the Loughshinny survey area.



Figure 3.17: Example photographs of 'Atlantic white dunes' (B1.321), Havingsten cable route, Loughshinny



Figure 3.18: Example photographs of 'yellow and grey lichens on supralittoral rock' (B3.111/LR.FLR.Lic.YG), Havingsten cable route, Loughshinny



Figure 3.19: Example photographs of '*Prasiola stipitata* on nitrate-enriched supralittoral or littoral fringe rock' (B3.112/LR.FLR.Lic.Pra), Havingsten cable route, Loughshinny



### 3.2.5 Potential Sensitive Habitats and Species

Several intertidal habitats of nature conservation interest were potentially recorded during the current survey. Table 3.2 summarises the potentially sensitive habitats within the survey area. These will be discussed in Sections 3.2.5.1 to 3.2.5.4.

**Table 3.2: Summary of Potential Sensitive Habitat and Species, Havingsten Cable Route, Loughshinny**

| Species/Habitat   | Legislation                          | Description  | Designation/Status                                 |
|---|--------------------------------------|--|--|
| Stony reef  | Council Directive 92/43/EEC*         | 'Bedrock reef'   | Annex I habitat                                    |
|   |                                      | 'Stony reef'   | Annex I habitat                                    |
|   | UK Post-2010 Biodiversity Framework† | 'Intertidal underboulder communities'  | Priority habitat                                   |
| Peat and clay exposures   | UK Post-2010 Biodiversity Framework  | 'Peat and clay exposures with piddocks'  | Priority habitat                                   |
|   |                                      |  | Habitat Features of Conservation Importance (FOCI) |
| Coastal sand dunes  | Council Directive 92/43/EEC*         | 'Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes') | Annex I habitat                                    |
| <b>Notes:</b><br>* = Council Directive 92/43/EEC is commonly referred to as 'The Habitats Directive'<br>† = Also listed in Section 41 of the Natural Environmental and Rural Communities (NERC) Act, 2006 |                                      |  |  |

It should also be noted that the ross worm *S. spinulosa* was identified within the biotope '*Fucus serratus* on moderately exposed lower eulittoral rock' and sub-biotope '*Laminaria saccharina* and *Laminaria digitata* on sheltered sublittoral fringe rock'. However, they were present a thin veneer or as individual worm tubes and had not accumulated to biogenic reef morphology so are not considered to be of conservation importance in the survey area.

#### 3.2.5.1 Bedrock Reef

Annex I reef is defined by the Habitats Directive (European Commission, 2013) as "*rocky marine habitats or biological concretions that rise from the seabed. They are generally subtidal but may extend as an unbroken transition into the intertidal zone, where they are exposed to the air at low tide. Intertidal areas are only included within this Annex I type where they are connected to subtidal reefs*".

Within the Loughshinny survey area, several areas of emergent bedrock that were topographically distinct from the surrounding substrate were present in the upper to lower shore to the west of the survey area and to the east of the survey area adjacent to the pier. Bedrock to the east of Loughshinny Bay extended from the subtidal zone to the upper shore and may have the potential to be bedrock reef.

Areas of emergent bedrock featured a more diverse community of both seaweeds and epifauna than the surrounding soft or mixed sediments. Numerous biotopes and sub-biotopes were assigned to the bedrock present within the survey area, ranging from 'Ephemeral green or red seaweeds (freshwater or sand-influenced) on non-mobile substrata' (Section 3.2.1.10) in the upper shore to '*Fucus vesiculosus* and barnacle mosaics on moderately exposed mid eulittoral rock' (Section 3.2.1.5) in the mid shore. Bedrock to the east of Loughshinny bay featured a band of kelp on the lower shore.

Figure 3.20 spatially displays potential bedrock reef within the survey area.

#### 3.2.5.2 Stony Reef/Intertidal Underboulder Communities

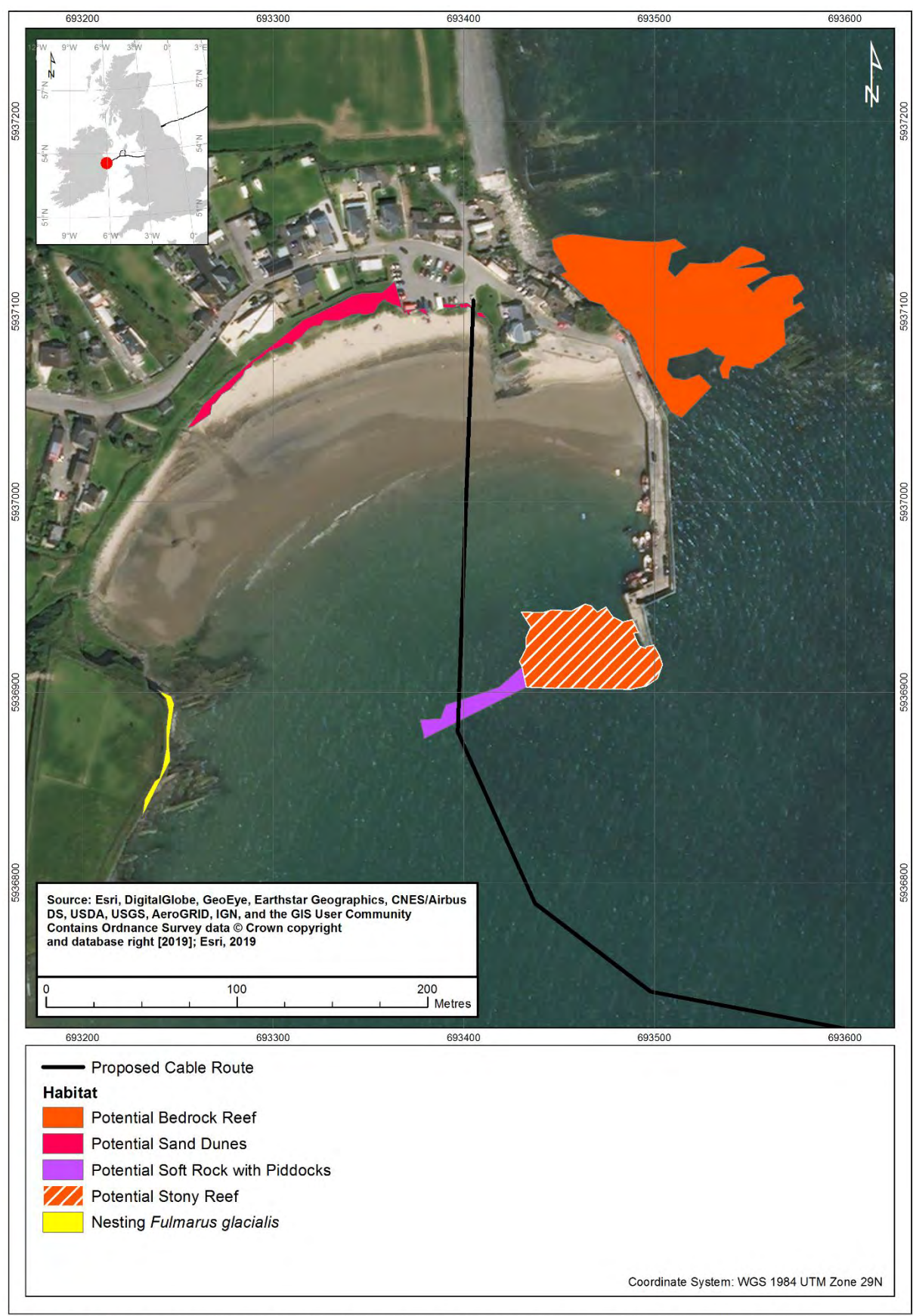
Stony reefs are said to comprise “*hard compact substrata (typically boulders and cobbles), which are generally greater than 64 mm in size. They arise from the seafloor (are topographically distinct from surrounding seafloor)*” (Irving, 2009).

‘Intertidal underboulder communities’ are listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006 and are a UK Biodiversity Action Plan (BAP) priority habitat. This feature description relates to underboulder communities, which may feature elevated biodiversity as a result of variable interstitial spaces, micro-niches, shade and moisture conditions as well as the comparative shelter from wave exposure (JNCC 2008, updated 2011). The UK BAP priority habitat descriptions state that “*boulders with a limited underboulder community are not included in this UK BAP habitat, as may occur for example where boulders are embedded in sediment, in low salinity conditions, and where boulders experience high levels of mobility and scour*” (JNCC 2008, updated 2011).

Solitary boulders were occasionally present in the upper and mid shore, within sandy sediment. A distinct area of boulders in mixed sediment was present, near the bedrock to the west of survey area. Several parameters are included in the assessment of stony reef. Percentage cover is one such parameter with a requirement for 10% or more of the seabed substratum to be composed of boulders (Irving, 2009). Boulders comprised less than 10 % of the substrata in the upper and mid shore, where they were not considered representative of the Annex I habitat ‘stony reefs’ or the priority habitat ‘Intertidal underboulder communities’.

Boulders within lower shore mixed sediment occasionally comprised more than 10 % of the substrata, where they may constitute the Annex I ‘Stony reefs’ as defined by the Habitats Directive (European Commission, 2013). In the lower shore, boulders were included within the sub-biotopes ‘*Laminaria digitata* and *Laminaria saccharina* on sheltered sublittoral fringe rock’ (A3.3131/IR.LIR.K.Lsac.Ldig; Section 3.2.3.1) and ‘*Fucus serratus* and piddocks on lower eulittoral soft rock’ (A1.2143/LR.MLR.BR.Fer.Pid; Section 3.2.1.7). Whilst these sub-biotopes featured an increased richness of fauna and flora in comparison to the surrounding soft and mixed sediments, neither abundance or richness was notably elevated. Consequently, it is not considered to be an excellent example of the Annex I habitat ‘stony reefs’ or the priority habitat ‘Intertidal underboulder communities’ and is unlikely to be of conservational value.

Figure 3.20 spatially displays potential stony reef within the survey area. Within Loughshinny survey area, the sensitive habitat ‘stony reefs’ was potentially located adjacent to the area of the proposed cable route.



Map Document: (V:\E181275\_Havingsten\_HabitatAssessment3\_Plots\2\_Draft\181275\_Biotopemaps\181275\_Nearshore\_Biotopemaps\181275\_Loughshinny\_Havingsten\_Sensitive\_Habitats\_In\_Text.mxd)  
 24/06/2019 - 15:26:58

Figure 3.20: Potentially sensitive habitats and species map

### 3.2.5.3 Peat and Clay Exposures

Peat and clay exposures with piddocks are classified as a United Kingdom Biodiversity Action Plan (UKBAP) listed priority habitat ('Peat and clay exposures with piddocks') and a Marine Conservation Zone (MCZ) Habitat Feature of Conservational Interest (FOCI) ('Peat and clay exposures'). Piddocks are elongated burrowing bivalves and include *P. dactylus*, *B. candida* and *B. parva*. These are capable of boring into the soft peat and clay, creating a unique and fragile habitat (UKBAP, 2008). Peat and clay exposures with either existing or historical evidence of piddock activity are unusual communities of limited extent.

Within the Loughshinny survey area, boulders with piddock boreholes were present in the sublittoral fringe in the south of the survey area. These were classified as features of the sub-biotope '*Fucus serratus* and piddocks on lower eu littoral soft rock' (LR.MLR.BF.Fser.Pid/A1.2143).

Figure 3.20 spatially displays potential 'Peat and clay exposures with piddocks' within the survey area. Within the Loughshinny survey area, the priority habitat 'Peat and clay exposures with piddocks' was potentially located within the area of the proposed cable route.

### 3.2.5.4 Coastal Sand Dunes

Sand dunes are complex and dynamic habitats, which occur in hostile environmental conditions, such as unstable substrate and exposure to wind and salt spray, and can display unique vegetation communities and specialised plant species (JNCC, 2004).

Coastal dunes are of ecological and economic value, the former associated with provision of habitat for many animals, especially nesting seabirds, the latter associated with tourism and fishing. They also provide shelter of inland areas from intense storms (Delaney et al., 2013). Although dunes include some of the most natural and pristine habitats in Ireland, sand dunes are highly vulnerable to some anthropogenic activities, such as offshore developments and terrestrial land management, which may interfere with sediment dynamics and alter the process of coastal erosion (Delaney et al., 2013).

Within Loughshinny survey area, there is the potential that the upper shore areas of sand dunes may constitute Annex I 'Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')' (2120) as defined by the Habitats Directive (European Commission, 2013). Dune formation was restricted to the landward extent by anthropogenic structures (e.g. carpark, lawn, path) and stabilised to seaward by boulders, suggesting that this was a poor example of the habitat as it was heavily anthropogenically influenced. Due to the limited extension and the species poor flora and fauna, this habitat was unlikely to be of conservation value.

### 3.2.5.5 Bird Observations

Several species of birds were recorded within the survey area: fulmar (*Fulmarus glacialis*), pale-bellied brent geese (*Branta bernicla hrota*), eurasian oystercatcher (*Haematopus ostralegus*), turnstone (*Arenaria interpres*), great black-backed gulls (*Larus marinus*), kittiwake (*Rissa* sp.) and herring gulls (*Larus argentatus*). A solitary grey heron was also observed (*Ardea cinerea*). Fulmar were nesting in the sedimentary upper reaches of the cliffs to the west of survey area, where several breeding pairs were recorded.

The herring gull (*Larus argentatus*), kittiwake (*Rissa* sp.) and fulmar (*Fulmarus glacialis*) are listed in ‘the EC Birds Directive’. Under the Birds of Conservation Concern in Ireland 2014 to 2019 (2014 update), kittiwake (*Rissa* sp.) and herring gull (*Larus argentatus*) are red listed, whilst fulmar (*Fulmar glacialis*), great black backed gull (*Larus marinus*), oystercatcher (*Haematopus ostralegus*), turnstone (*Arenaria interpres*) and brent goose (*Branta bernicla hrota*) are on the amber list.

Table 3.3 summarises the birds observed within the survey area, along with their respective protective status. Figure 3.21 presents example photographs of bird specimens recorded within the Loughshinny survey area. Figure 3.20 spatially displays where nesting Fulmar was observed within the survey area.

**Table 3.3: Summary of Birds Observed with Protection Status, Havingsten Cable Route, Loughshinny**

| Species/Habitat   | Legislation            | Designation/Status          |
|---|------------------------|-----------------------------|
| Fulmar<br>( <i>Fulmar glacialis</i> )   | Directive 2009/147/EC* | Annex II: migratory species |
| Kittiwake<br>( <i>Rissa tridactyla</i> )^   | Directive 2009/147/EC* | Annex II: migratory species |
| Herring gull<br>( <i>Larus argentatus</i> )   | Directive 2009/147/EC* | Annex II: migratory species |
| <b>Notes:</b><br>* = Directive 2009/147/EC on the conservation of wild birds is commonly referred to as ‘the EC Birds Directive’<br>^ = During the present survey kittiwake ( <i>Rissa</i> sp.) was identified exclusively at genus level |                        |                             |



Figure 3.21: Example photographs of birds recorded, Havingsten cable route, Loughshinny

#### 4. CONCLUSIONS

Within the Loughshinny survey area, numerous biotopes were identified dependent on their substrate type, exposure and biota. Biotopes of hard substrates were largely classified dependent on the macrofaunal and floral community, whilst biotopes of soft substrates were largely classified dependent on physical structure. Biotopes recorded were typical of variably exposed shores from this region of the Irish coastline.

Several sensitive habitats of potential conservation interest were potentially located within the survey area in proximity to the proposed cable route. Sensitive habitats potentially observed within the current survey, included the Annex I habitats 'Shifting dunes along the shoreline with *Ammophila arenaria*', 'bedrock reef' and 'stony reef', and a subsection of the UKBAP listed priority habitat 'Peat and clay exposures with piddocks'. Whilst boulders were present within the survey area, due to lack of notable understorey fauna and flora, the priority habitat 'Intertidal underboulder communities' is unlikely to be of conservational value at this site.

Several areas of emergent bedrock that were topographically distinct from the surrounding substrate were present within the survey area. To the west of the survey area, these did not extend into the subtidal and so are unlikely to represent Annex 1 'bedrock reef'. However, to the east of Loughshinny Bay, bedrock extended into the subtidal and may have conservational value.

Small white sand dunes, present upon boulder sea defences on the upper shore, may represent Annex I 'Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')' under the Habitats Directive. Due to the limited extension as a result of anthropogenic activities and the species poor flora and fauna, this habitat was unlikely to be of conservation value.

The priority habitat 'Peat and clay exposures with piddocks' was potentially observed in the sublittoral fringe to the south of the survey area.

Several species of birds were recorded within the survey area. However, only the herring gull (*Larus argentatus*), kittiwake (*Rissa* sp.) and fulmar (*Fulmarus glacialis*) are listed in 'the EC Birds Directive'.

No other potentially sensitive habitats or species were observed within the current survey.

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## APPENDICES

- A. GUIDELINES ON USE OF REPORT**
  
- B. PHOTOGRAPHIC LOG**
  - B.1 LOUGHSHINNY PHOTOGRAPHIC LOG
  - B.2 LOUGHSHINNY TARGET NOTES



**A. GUIDELINES ON USE OF REPORT**

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**B. PHOTOGRAPHIC LOG**

**B.1 LOUGHSHINNY PHOTOGRAPHIC LOG**

| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0001                            | 53.547165 | -6.080752 | 693 401.5   | 5 937 105.4  | -           | -         | Sand dune/Saltmarsh plant, marram grass ( <i>Ammophila</i> sp.), sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )  |
| LS_I0002                            | 53.547132 | -6.080759 | 693 401.2   | 5 937 101.7  | 270         | W         | View across small white dune downshore towards cliffs  |
| LS_I0003                            | 53.547132 | -6.080759 | 693 401.2   | 5 937 101.7  | -           | -         | Sand dune/Saltmarsh plant, marram grass ( <i>Ammophila</i> sp.), common mallow ( <i>Malva sylvestris</i> ), sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )                       |
| LS_I0004                            | 53.547132 | -6.080759 | 693 401.2   | 5 937 101.7  | -           | -         | Sand dune/Saltmarsh plant and lichen boulder, marram grass ( <i>Ammophila</i> sp.), sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> ) and common mallow ( <i>Malva sylvestris</i> ) |
| LS_I0005                            | 53.547132 | -6.080759 | 693 401.2   | 5 937 101.7  | -           | -         | Sand dune/Saltmarsh plant, marram grass ( <i>Ammophila</i> sp.), sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> ) and common mallow ( <i>Malva sylvestris</i> )                    |
| LS_I0006                            | 53.547132 | -6.080759 | 693 401.2   | 5 937 101.7  | -           | -         | Lichen boulder   |
| LS_I0007                            | 53.547132 | -6.080759 | 693 401.2   | 5 937 101.7  | 270         | W         | View across small white dune across shore with boulders underneath   |
| LS_I0008                            | 53.547176 | -6.081379 | 693 359.9   | 5 937 104.9  | 0           | N         | View up dune   |
| LS_I0009                            | 53.547176 | -6.081379 | 693 359.9   | 5 937 104.9  | 180         | S         | View down shore (high tide)  |
| LS_I0010                            | 53.547176 | -6.081379 | 693 359.9   | 5 937 104.9  | 90          | E         | View across shore down end of sea defence  |
| LS_I0011                            | 53.547176 | -6.081379 | 693 359.9   | 5 937 104.9  | 270         | W         | View across shore from end of sea defence along dunes  |
| LS_I0012                            | 53.547189 | -6.081403 | 693 358.3   | 5 937 106.3  | 0           | N         | View up dune (bottom of path)  |
| LS_I0013                            | 53.547189 | -6.081403 | 693 358.3   | 5 937 106.3  | -           | -         | Sand dune/Saltmarsh plant, chamomile ( <i>Chamaemelum nobile</i> )   |
| LS_I0014                            | 53.547189 | -6.081403 | 693 358.3   | 5 937 106.3  | -           | -         | Sand dune/Saltmarsh plant dandelion ( <i>Taraxacum officinale</i> ), marram grass ( <i>Ammophila</i> sp.) and chamomile ( <i>Chamaemelum nobile</i> )                                      |
| LS_I0015                            | 53.547189 | -6.081403 | 693 358.3   | 5 937 106.3  | 315         | NW        | View up and across dune (plants)   |
| LS_I0016                            | 53.547163 | -6.081456 | 693 354.9   | 5 937 103.2  | -           | -         | Sand dune/Saltmarsh plant  |
| LS_I0017                            | 53.547163 | -6.081456 | 693 354.9   | 5 937 103.2  | -           | -         | Sand dune/Saltmarsh plant  |
| LS_I0018                            | 53.547128 | -6.0816   | 693 345.5   | 5 937 099.0  | -           | -         | Sand dune/Saltmarsh plant  |
| LS_I0019                            | 53.547123 | -6.081666 | 693 341.2   | 5 937 098.2  | 315         | NW        | View up and across dune (dune grass)   |
| LS_I0020                            | 53.547079 | -6.081917 | 693 324.7   | 5 937 092.6  | 315         | NW        | View up and across dune (plant)  |
| LS_I0021                            | 53.547079 | -6.081917 | 693 324.7   | 5 937 092.6  | -           | -         | Sand dune/Saltmarsh plant  |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0022                            | 53.546989 | -6.082224 | 693 304.8   | 5 937 081.8  | 315         | NW        | View up dune (bottom of steps)  |
| LS_I0023                            | 53.546989 | -6.082224 | 693 304.8   | 5 937 081.8  | 90          | E         | View across shore along bottom of dune  |
| LS_I0024                            | 53.546989 | -6.082224 | 693 304.8   | 5 937 081.8  | 180         | S         | View down shore (high tide)   |
| LS_I0025                            | 53.546989 | -6.082224 | 693 304.8   | 5 937 081.8  | 270         | W         | View across shore along bottom of dune  |
| LS_I0026                            | 53.546727 | -6.082801 | 693 267.8   | 5 937 051.1  | 315         | NW        | View up dune (bottom of steps)  |
| LS_I0027                            | 53.546727 | -6.082801 | 693 267.8   | 5 937 051.1  | 180         | S         | View down shore (high tide)   |
| LS_I0028                            | 53.546727 | -6.082801 | 693 267.8   | 5 937 051.1  | 45          | NE        | View across shore along bottom of dune  |
| LS_I0029                            | 53.546727 | -6.082801 | 693 267.8   | 5 937 051.1  | 135         | SE        | View across shore along bottom of dune  |
| LS_I0030                            | 53.546615 | -6.082954 | 693 258.2   | 5 937 038.2  | 270         | W         | Water outflow   |
| LS_I0031                            | 53.546615 | -6.082954 | 693 258.2   | 5 937 038.2  | 90          | E         | Signage above water outflow   |
| LS_I0032                            | 53.546615 | -6.082954 | 693 258.2   | 5 937 038.2  | 0           | N         | View up to outflow  |
| LS_I0033                            | 53.546615 | -6.082954 | 693 258.2   | 5 937 038.2  | 180         | S         | View down shore over sand   |
| LS_I0034                            | 53.546615 | -6.082954 | 693 258.2   | 5 937 038.2  | 315         | NW        | View over dunes and boulders  |
| LS_I0035                            | 53.546615 | -6.082954 | 693 258.2   | 5 937 038.2  | 45          | NE        | View over dunes and boulders  |
| LS_I0036                            | 53.546622 | -6.083003 | 693 254.9   | 5 937 038.9  | 135         | SE        | View across sand below outflow from top   |
| LS_I0037                            | 53.546537 | -6.083119 | 693 247.6   | 5 937 029.1  | 45          | NE        | View over dunes and boulders  |
| LS_I0038                            | 53.546537 | -6.083119 | 693 247.6   | 5 937 029.1  | 225         | SW        | View over grass and boulders  |
| LS_I0039                            | 53.546307 | -6.083395 | 693 230.4   | 5 937 002.8  | -           | -         | Sand dune/ Saltmarsh plant, morning glory ( <i>Calystegia soldanella</i> )          |
| LS_I0040                            | 53.546307 | -6.083395 | 693 230.4   | 5 937 002.8  | -           | -         | Sand dune/Saltmarsh plant, morning glory ( <i>Calystegia soldanella</i> )           |
| LS_I0041                            | 53.546307 | -6.083395 | 693 230.4   | 5 937 002.8  | -           | -         | Sand dune/Saltmarsh plant, morning glory ( <i>Calystegia soldanella</i> )           |
| LS_I0042                            | 53.546307 | -6.083395 | 693 230.4   | 5 937 002.8  | -           | -         | Sand dune/Saltmarsh plant, sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> ) |
| LS_I0043                            | 53.545858 | -6.083794 | 693 206.0   | 5 936 951.8  | 180         | S         | View through fenced area above larger outflow                                       |
| LS_I0044                            | 53.545847 | -6.083787 | 693 206.5   | 5 936 950.6  | 0           | N         | View up to base of land flow from bottom  |
| LS_I0045                            | 53.545818 | -6.083791 | 693 206.4   | 5 936 947.3  | 0           | N         | View through fenced area above larger outflow                                       |
| LS_I0046                            | 53.545546 | -6.083468 | 693 229.0   | 5 936 918.0  | 225         | SW        | View of edge of limestone and shale cliff   |
| LS_I0047                            | 53.545546 | -6.083468 | 693 229.0   | 5 936 918.0  | -           | -         | Close up of black layers in cliff   |
| LS_I0048                            | 53.545546 | -6.083468 | 693 229.0   | 5 936 918.0  | -           | -         | Close up of black layers in cliff   |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0049                            | 53.545546 | -6.083468 | 693 229.0   | 5 936 918.0  | -           | -         | Plant on cliff  |
| LS_I0050                            | 53.545546 | -6.083468 | 693 229.0   | 5 936 918.0  | -           | -         | Plant on cliff  |
| LS_I0051                            | 53.545512 | -6.083434 | 693 231.4   | 5 936 914.3  | -           | -         | Black, yellow and grey lichen   |
| LS_I0052                            | 53.545512 | -6.083434 | 693 231.4   | 5 936 914.3  | -           | -         | Black, yellow and grey lichen   |
| LS_I0053                            | 53.545512 | -6.083434 | 693 231.4   | 5 936 914.3  | 315         | NW        | View across lichen zone   |
| LS_I0054                            | 53.545512 | -6.083434 | 693 231.4   | 5 936 914.3  | 45          | NE        | View down lichen zone (high tide)   |
| LS_I0055                            | 53.545668 | -6.083775 | 693 208.1   | 5 936 930.7  | 270         | W         | View to cliffs across grass   |
| LS_I0056                            | 53.545668 | -6.083775 | 693 208.1   | 5 936 930.7  | 0           | N         | View across shore from grass (high tide)                                  |
| LS_I0057                            | 53.545668 | -6.083775 | 693 208.1   | 5 936 930.7  | 90          | E         | View across bay from grass (high tide)                                    |
| LS_I0058                            | 53.545668 | -6.083775 | 693 208.1   | 5 936 930.7  | 180         | S         | View to headland cliffs   |
| LS_I0059                            | 53.545668 | -6.083775 | 693 208.1   | 5 936 930.7  | -           | -         | Close up of grass   |
| LS_I0060                            | 53.545762 | -6.083826 | 693 204.3   | 5 936 941.0  | 315         | NW        | Corner of sea defence (boulders in cages)                                 |
| LS_I0061                            | 53.545762 | -6.083826 | 693 204.3   | 5 936 941.0  | 270         | W         | View from sea defence (boulders in cages) to cliffs                       |
| LS_I0062                            | 53.545762 | -6.083826 | 693 204.3   | 5 936 941.0  | 0           | N         | View from sea defence (boulders in cages) across shore                    |
| LS_I0063                            | 53.545891 | -6.083733 | 693 209.9   | 5 936 955.6  | -           | -         | Yellow lichen on boulders   |
| LS_I0064                            | 53.545891 | -6.083733 | 693 209.9   | 5 936 955.6  | 45          | NE        | View of lichen zone across shore  |
| LS_I0065                            | 53.54674  | -6.082574 | 693 282.8   | 5 937 053.2  | 0           | N         | View to emergent boulders under dunes (3 m × 50 cm)                       |
| LS_I0066                            | 53.54684  | -6.0825   | 693 287.2   | 5 937 064.5  | 67.5        | ENE       | View down emergent boulder strip  |
| LS_I0067                            | 53.547058 | -6.081997 | 693 319.5   | 5 937 090.1  | 0           | N         | View of set of emergent boulders (ca. 2 m × 50 cm)                        |
| LS_I0068                            | 53.547137 | -6.08132  | 693 364.0   | 5 937 100.7  | 202.5       | SSW       | View of edge of sea defence to sea with a metal structure ca. 3 m due S   |
| LS_I0069                            | 53.547104 | -6.081127 | 693 377.0   | 5 937 097.6  | 270         | W         | Narrow pebble/cobble strip  |
| LS_I0070                            | 53.547104 | -6.081127 | 693 377.0   | 5 937 097.6  | -           | -         | Pebble/cobbles on sand  |
| LS_I0071                            | 53.547092 | -6.080722 | 693 403.8   | 5 937 097.3  | -           | -         | View back across cobble strip showing elevated proportion of dead seaweed |
| LS_I0072                            | 53.547133 | -6.080691 | 693 405.7   | 5 937 102.0  | 202.5       | SSW       | Slip corner   |
| LS_I0073                            | 53.54711  | -6.080641 | 693 409.1   | 5 937 099.6  | -           | -         | White dune vegetation   |
| LS_I0074                            | 53.546952 | -6.080544 | 693 416.3   | 5 937 082.3  | -           | -         | Lichen on boulders  |
| LS_I0075                            | 53.546806 | -6.08034  | 693 430.4   | 5 937 066.6  | 22.5        | NNE       | View across fairly barren rock dump                                       |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0076                            | 53.546806 | -6.08034  | 693 430.4   | 5 937 066.6  | 247.5       | WSW       | View across fairly barren rock dump   |
| LS_I0077                            | 53.546806 | -6.08034  | 693 430.4   | 5 937 066.6  | 157.5       | SSE       | View across fairly barren rock dump to lichen covered bedrock   |
| LS_I0078                            | 53.546784 | -6.080289 | 693 433.9   | 5 937 064.3  | -           | -         | Lichen covered bedrock  |
| LS_I0079                            | 53.546842 | -6.080191 | 693 440.1   | 5 937 071.0  | -           | -         | Mixed sediment (sand, pebbles, cobbles, boulders) ca. 3 m × 1.5 m wide                                      |
| LS_I0080                            | 53.546842 | -6.080128 | 693 444.3   | 5 937 071.2  | 270         | W         | View to house over small patch of mixed sediment  |
| LS_I0081                            | 53.546842 | -6.080128 | 693 444.3   | 5 937 071.2  | 90          | E         | View to pier  |
| LS_I0082                            | 53.546828 | -6.079555 | 693 482.3   | 5 937 071.2  | 90          | E         | View to pier from bottom of steps - yellow lichen (0.5 m strip)   |
| LS_I0083                            | 53.54682  | -6.079653 | 693 475.9   | 5 937 070.0  | 0           | N         | View to wall from sand  |
| LS_I0084                            | 53.54682  | -6.079653 | 693 475.9   | 5 937 070.0  | -           | -         | Lichen on wall  |
| LS_I0085                            | 53.546998 | -6.079495 | 693 485.5   | 5 937 090.2  | 67.5        | ENE       | View down other side of pier at high tide, from top of pier   |
| LS_I0086                            | 53.546998 | -6.079495 | 693 485.5   | 5 937 090.2  | 337.5       | NNW       | View up bank from top of pier   |
| LS_I0087                            | 53.546998 | -6.079495 | 693 485.5   | 5 937 090.2  | 270         | W         | View across lough from top of pier  |
| LS_I0088                            | 53.546998 | -6.079495 | 693 485.5   | 5 937 090.2  | 157.5       | SSE       | View down pier from top of pier   |
| LS_I0089                            | 53.546695 | -6.079287 | 693 500.7   | 5 937 057.1  | 180         | S         | View down pier highlighting lichen  |
| LS_I0090                            | 53.546554 | -6.079209 | 693 506.5   | 5 937 041.6  | 180         | S         | View down pier with yellow lichen on upper surface (followed by green) and green seaweeds on lower          |
| LS_I0091                            | 53.546554 | -6.079209 | 693 506.5   | 5 937 041.6  | -           | -         | Green seaweeds on lower ledge   |
| LS_I0092                            | 53.546554 | -6.079209 | 693 506.5   | 5 937 041.6  | -           | -         | Green seaweeds on lower ledge   |
| LS_I0093                            | 53.546554 | -6.079209 | 693 506.5   | 5 937 041.6  | -           | -         | Green seaweeds upper ledge – <i>Prasiola</i> sp. (associated with bird faeces)                              |
| LS_I0094                            | 53.546554 | -6.079209 | 693 506.5   | 5 937 041.6  | -           | -         | Green seaweeds upper ledge – <i>Blidingia</i> sp./ <i>Ulothrix</i> sp. (associated with bird faeces)        |
| LS_I0095                            | 53.546401 | -6.079236 | 693 505.4   | 5 937 024.5  | -           | -         | Edge of green seaweeds on upper surface - <i>Prasiola</i> sp. and <i>Blidingia</i> sp./ <i>Ulothrix</i> sp. |
| LS_I0096                            | 53.546401 | -6.079236 | 693 505.4   | 5 937 024.5  | -           | -         | Sea pink  |
| LS_I0097                            | 53.546889 | -6.081191 | 693 373.7   | 5 937 073.5  | 270         | W         | Birds   |
| LS_I0098                            | 53.546889 | -6.081191 | 693 373.7   | 5 937 073.5  | -           | -         | Sand with rope and pebbles  |
| LS_I0099                            | 53.546889 | -6.081191 | 693 373.7   | 5 937 073.5  | 270         | W         | View across sand  |
| LS_I0100                            | 53.546889 | -6.081191 | 693 373.7   | 5 937 073.5  | 0           | N         | View up beach   |
| LS_I0101                            | 53.546889 | -6.081191 | 693 373.7   | 5 937 073.5  | 90          | E         | View to little house  |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0102                            | 53.546889 | -6.081191 | 693 373.7   | 5 937 073.5  | 180         | S         | View to sea - note pebbles  |
| LS_I0103                            | 53.546798 | -6.081736 | 693 338.0   | 5 937 061.9  | -           | -         | Sand with pebbles and ?cobble   |
| LS_I0104                            | 53.546562 | -6.082423 | 693 293.6   | 5 937 033.8  | -           | -         | Sand with pebbles   |
| LS_I0105                            | 53.546387 | -6.082854 | 693 265.8   | 5 937 013.1  | -           | -         | Coarse sand with pebbles  |
| LS_I0106                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 0           | N         | ? Turnstone ( <i>Arenaria interpres</i> )   |
| LS_I0107                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 0           | N         | Gull ( <i>Larus</i> sp.)  |
| LS_I0108                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 0           | N         | Gull ( <i>Larus</i> sp.)  |
| LS_I0109                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0110                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0111                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0112                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0113                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0114                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0115                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0116                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0117                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 270         | W         | Nesting Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0118                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 180         | S         | View across bare/ <i>Ulva</i> sp. covered mixed sediment (pebbles to boulders)  |
| LS_I0119                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 0           | N         | Turnstone ( <i>Arenaria interpres</i> )   |
| LS_I0120                            | 53.545581 | -6.083358 | 693 236.1   | 5 936 922.1  | 0           | N         | Turnstone ( <i>Arenaria interpres</i> )   |
| LS_I0121                            | 53.545476 | -6.083324 | 693 238.9   | 5 936 910.6  | 270         | W         | View of green area  |
| LS_I0122                            | 53.545476 | -6.083324 | 693 238.9   | 5 936 910.6  | -           | -         | Green seaweed ( <i>Ulva</i> spp.)   |
| LS_I0123                            | 53.545476 | -6.083324 | 693 238.9   | 5 936 910.6  | -           | -         | Yellow-green seaweeds ( <i>Vaucheria</i> sp.)   |
| LS_I0124                            | 53.545476 | -6.083324 | 693 238.9   | 5 936 910.6  | -           | -         | Moss  |
| LS_I0125                            | 53.545404 | -6.083212 | 693 246.6   | 5 936 902.9  | -           | -         | Green seaweed ( <i>Ulva</i> spp.) on base of cliff, channelled wrack ( <i>Pelvetia canaliculata</i> ), wrack ( <i>Fucus</i> sp.)                      |
| LS_I0126                            | 53.545378 | -6.083182 | 693 248.7   | 5 936 900.0  | -           | -         | Red seaweeds ( <i>Porphyra</i> sp.), green seaweed ( <i>Ulva</i> spp.), channelled wrack ( <i>Pelvetia canaliculata</i> ), wrack ( <i>Fucus</i> juv.) |



| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0127                            | 53.545378 | -6.083182 | 693 248.7   | 5 936 900.0  | -           | -         | Channeled wrack ( <i>Pelvetia canaliculata</i> ), red seaweeds ( <i>Catenella</i> sp., <i>Rhodothamniella</i> sp.), green seaweed ( <i>Ulva</i> sp.)  |
| LS_I0128                            | 53.545378 | -6.083182 | 693 248.7   | 5 936 900.0  | -           | -         | Spiral wrack ( <i>Fucus spiralis</i> ), red seaweeds ( <i>Catenella</i> sp., <i>Rhodothamniella</i> sp.), green seaweeds ( <i>Ulva</i> sp.)   |
| LS_I0129                            | 53.545378 | -6.083182 | 693 248.7   | 5 936 900.0  | -           | -         | Green seaweeds ( <i>Ulva</i> sp., <i>Cladophora ?rupestris</i> ), red seaweeds ( <i>Catenella</i> sp., <i>Rhodothamniella floridula</i> , <i>Porphyra</i> sp.), spiral wrack ( <i>F. spiralis</i> ), knotted wrack ( <i>Ascophyllum nodosum</i> ) |
| LS_I0130                            | 53.545378 | -6.083182 | 693 248.7   | 5 936 900.0  | -           | -         | Green seaweeds ( <i>Ulva</i> sp., <i>Cladophora ?rupestris</i> ), red seaweeds ( <i>Rhodothamniella floridula</i> , <i>Porphyra</i> sp.), spiral wrack ( <i>F. spiralis</i> ), knotted wrack ( <i>Ascophyllum nodosum</i> )                       |
| LS_I0131                            | 53.54537  | -6.083098 | 693 254.3   | 5 936 899.4  | -           | -         | Small rockpool  |
| LS_I0132                            | 53.54537  | -6.083098 | 693 254.3   | 5 936 899.4  | -           | -         | Small rockpool  |
| LS_I0133                            | 53.54537  | -6.083098 | 693 254.3   | 5 936 899.4  | -           | -         | Small rockpool 2  |
| LS_I0134                            | 53.54537  | -6.083098 | 693 254.3   | 5 936 899.4  | -           | -         | Small rockpool 2  |
| LS_I0135                            | 53.545445 | -6.083193 | 693 247.7   | 5 936 907.5  | -           | -         | Shallow rockpool - sand influenced  |
| LS_I0136                            | 53.545445 | -6.083193 | 693 247.7   | 5 936 907.5  | -           | -         | View across shallow rockpool  |
| LS_I0137                            | 53.545445 | -6.083193 | 693 247.7   | 5 936 907.5  | -           | -         | Shallow rockpool - sand influenced, knotted wrack ( <i>Ascophyllum</i> sp.) in barnacle zone  |
| LS_I0138                            | 53.545445 | -6.083193 | 693 247.7   | 5 936 907.5  | -           | -         | Shallow rockpool – Red seaweeds ( <i>Dumontia</i> sp., <i>Chondrus crispus</i> ), green seaweed ( <i>Chaetomorpha melagnoiium</i> )   |
| LS_I0139                            | 53.545445 | -6.083193 | 693 247.7   | 5 936 907.5  | -           | -         | Shallow rockpool - Anemone ( <i>Actinia equina</i> ), green seaweed ( <i>Cladophora</i> sp.)  |
| LS_I0140                            | 53.545445 | -6.083193 | 693 247.7   | 5 936 907.5  | -           | -         | Shallow rockpool - Anemone ( <i>Actinia equina</i> ), green seaweed ( <i>Cladophora</i> sp.)  |
| LS_I0141                            | 53.545445 | -6.083193 | 693 247.7   | 5 936 907.5  | -           | -         | Brown seaweed ( <i>Scytosiphon</i> sp.)   |
| LS_I0142                            | 53.545408 | -6.083085 | 693 255.0   | 5 936 903.6  | -           | -         | Feather duster worm (Sabellida)   |
| LS_I0143                            | 53.545408 | -6.083085 | 693 255.0   | 5 936 903.6  | -           | -         | Feather duster worm (Sabellida)   |
| LS_I0144                            | 53.545223 | -6.083183 | 693 249.3   | 5 936 882.8  | 247.5       | WSW       | View into gully   |
| LS_I0145                            | 53.545223 | -6.083183 | 693 249.3   | 5 936 882.8  | -           | -         | Red turf ( <i>Rhodochorton purpurea</i> )   |
| LS_I0146                            | 53.545223 | -6.083183 | 693 249.3   | 5 936 882.8  | -           | -         | Barnacles ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina saxatilis</i> ) and red seaweeds ( <i>Rhodochorton purpurea</i> )  |
| LS_I0147                            | 53.545223 | -6.083183 | 693 249.3   | 5 936 882.8  | -           | -         | Barnacle ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina saxatilis</i> ) and red seaweeds ( <i>Rhodochorton purpurea</i> )   |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0148                            | 53.545223 | -6.083183 | 693 249.3   | 5 936 882.8  | -           | -         | Limpets ( <i>Patella vulgata</i> ), winkle ( <i>Littorina saxatilis</i> ), barnacles ( <i>Semibalanus balanoides</i> ), red turf ( <i>Rhodochorton purpurea</i> )   |
| LS_I0149                            | 53.545223 | -6.083183 | 693 249.3   | 5 936 882.8  | -           | -         | Winkle ( <i>Littorina saxatilis</i> ), red turf ( <i>Rhodochorton purpurea</i> )  |
| LS_I0150                            | 53.545223 | -6.083183 | 693 249.3   | 5 936 882.8  | -           | -         | Winkle ( <i>Melaraphe</i> sp?)  |
| LS_I0151                            | 53.545172 | -6.083245 | 693 245.5   | 5 936 877.0  | -           | -         | Green seaweed ( <i>Ulva</i> sp.) patch (4 m × 1 m) along base of cliff  |
| LS_I0152                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | View across boulders to bedrock and across lough  |
| LS_I0153                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | View down bedrock to sea  |
| LS_I0154                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | View across bedrock   |
| LS_I0155                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | View up bedrock edge to cliff and green areas   |
| LS_I0156                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | Coralline seaweeds ( <i>Corallina officinalis</i> ), pink encruster, red seaweeds (? <i>Ceramium</i> , <i>Chondrus</i> sp.)   |
| LS_I0157                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | Fan worms ( <i>Spirobranchus</i> sp.), barnacles ( <i>A. modestus</i> ), coralline seaweeds ( <i>Corallina officinalis</i> ), carrageen ( <i>Chondrus crispus</i> ), green seaweed ( <i>Cladophora</i> sp.), fucoid ( <i>Fucus</i> sp.), pink encrusting seaweeds |
| LS_I0158                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | Red seaweeds ( <i>Osmundea</i> sp. pool, pits, <i>Chondrus crispus</i> ), pink encrusting seaweeds, coralline seaweeds ( <i>Corallina officinalis</i> )   |
| LS_I0159                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | Red seaweeds ( <i>Dumontia</i> sp., <i>Chondrus crispus</i> ), coralline seaweeds ( <i>Corallina officinalis</i> ), green ( <i>Chaetomorpha melagonium</i> ), fucoid ( <i>Fucus</i> sp.)  |
| LS_I0160                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | Red seaweeds ( <i>Dumontia</i> sp., <i>Chondrus crispus</i> , <i>Osmundea</i> sp.), coralline seaweeds ( <i>Corallina officinalis</i> ), green seaweeds ( <i>Chaetomorpha melagonium</i> ), fucoid ( <i>Fucus</i> sp.),   |
| LS_I0161                            | 53.545116 | -6.083129 | 693 253.4   | 5 936 871.1  | -           | -         | Brown seaweed ( <i>Halidry siliquosa</i> )  |
| LS_I0162                            | 53.545242 | -6.083032 | 693 259.3   | 5 936 885.3  | -           | -         | Bedrock edge and rockpool   |
| LS_I0163                            | 53.545242 | -6.083032 | 693 259.3   | 5 936 885.3  | -           | -         | Rockpool - sand ingress - limited flora (reds)  |
| LS_I0164                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | 0           | N         | View back across sand   |
| LS_I0165                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | 90          | E         | View to pier  |
| LS_I0166                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | 180         | S         | View out of lough   |
| LS_I0167                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | 270         | W         | View to cliffs  |
| LS_I0168                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | 180         | S         | View across rockpool  |
| LS_I0169                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | 180         | S         | View across rockpool  |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0170                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Lots of small pools  |
| LS_I0171                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Lots of small pools  |
| LS_I0172                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Lots of small pools  |
| LS_I0173                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Lots of small pools  |
| LS_I0174                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Brown seaweeds ( <i>Dictyota dichotoma</i> )   |
| LS_I0175                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Brown seaweeds ( <i>Dictyota dichotoma</i> )   |
| LS_I0176                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Green seaweeds ( <i>Cladophora</i> sp.), orange sponge   |
| LS_I0177                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Carrageen ( <i>Chondrus crispus</i> ), coralline seaweeds ( <i>Corallina officinalis</i> )           |
| LS_I0178                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Carrageen ( <i>Chondrus crispus</i> ), coralline seaweeds ( <i>Corallina officinalis</i> )           |
| LS_I0179                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Barnacles ( <i>Semibalanus balanoides</i> )  |
| LS_I0180                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Barnacles ( <i>Semibalanus balanoides</i> )  |
| LS_I0181                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Barnacles ( <i>Semibalanus balanoides</i> )  |
| LS_I0182                            | 53.545429 | -6.082663 | 693 282.9   | 5 936 907.1  | -           | -         | Barnacles ( <i>Semibalanus balanoides</i> ), limpets ( <i>Patella depressa</i> )                     |
| LS_I0183                            | 53.545461 | -6.08272  | 693 278.9   | 5 936 910.5  | -           | -         | Knotted wrack ( <i>Ascophyllum</i> sp.) on bedrock (2 m × 2 m)                                       |
| LS_I0184                            | 53.545461 | -6.08272  | 693 278.9   | 5 936 910.5  | 270         | W         | View across bedrock, over rockpools, to cliffs   |
| LS_I0185                            | 53.545443 | -6.082386 | 693 301.1   | 5 936 909.4  | -           | -         | View back over bedrock to cliff  |
| LS_I0186                            | 53.545507 | -6.082484 | 693 294.4   | 5 936 916.3  | -           | -         | Mussels ( <i>Mytilus edulis</i> )  |
| LS_I0187                            | 53.545507 | -6.082484 | 693 294.4   | 5 936 916.3  | -           | -         | Area of mussels ( <i>Mytilus edulis</i> )  |
| LS_I0188                            | 53.545589 | -6.082483 | 693 294.0   | 5 936 925.4  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )  |
| LS_I0189                            | 53.545589 | -6.082483 | 693 294.0   | 5 936 925.4  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )  |
| LS_I0190                            | 53.545589 | -6.082483 | 693 294.0   | 5 936 925.4  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )  |
| LS_I0191                            | 53.545589 | -6.082483 | 693 294.0   | 5 936 925.4  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )  |
| LS_I0192                            | 53.545589 | -6.082483 | 693 294.0   | 5 936 925.4  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )  |
| LS_I0193                            | 53.545589 | -6.082483 | 693 294.0   | 5 936 925.4  | 90          | E         | View across area of boulders   |
| LS_I0194                            | 53.545143 | -6.082885 | 693 269.5   | 5 936 874.7  | -           | -         | Barnacles ( <i>Austrominius modestus</i> ), coralline seaweeds ( <i>Phymatolithion lenormandii</i> ) |
| LS_I0195                            | 53.545143 | -6.082885 | 693 269.5   | 5 936 874.7  | -           | -         | Barnacles ( <i>Austrominius modestus</i> ), coralline seaweeds ( <i>Phymatolithion lenormandii</i> ) |
| LS_I0196                            | 53.545143 | -6.082885 | 693 269.5   | 5 936 874.7  | -           | -         | Barnacles ( <i>Austrominius modestus</i> ), coralline seaweeds ( <i>Phymatolithion lenormandii</i> ) |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0197                            | 53.545143 | -6.082885 | 693 269.5   | 5 936 874.7  | -           | -         | Barnacles ( <i>Austrominius modestus</i> , <i>Semibalanus balanoides</i> ), wrinkle ( <i>Littorina</i> sp.)  |
| LS_I0198                            | 53.545143 | -6.082885 | 693 269.5   | 5 936 874.7  | -           | -         | Barnacles ( <i>Austrominius modestus</i> )   |
| LS_I0199                            | 53.545143 | -6.082885 | 693 269.5   | 5 936 874.7  | -           | -         | Barnacles ( <i>Austrominius modestus</i> )   |
| LS_I0200                            | 53.545143 | -6.082885 | 693 269.5   | 5 936 874.7  | -           | -         | Barnacles ( <i>Austrominius modestus</i> )   |
| LS_I0201                            | 53.545119 | -6.082832 | 693 273.1   | 5 936 872.2  | 315         | NW        | Fulmar ( <i>Fulmarus glacialis</i> )   |
| LS_I0202                            | 53.545119 | -6.082832 | 693 273.1   | 5 936 872.2  | 315         | NW        | Fulmar ( <i>Fulmarus glacialis</i> )   |
| LS_I0203                            | 53.545119 | -6.082832 | 693 273.1   | 5 936 872.2  | 315         | NW        | View to Fulmar ( <i>Fulmarus glacialis</i> )   |
| LS_I0204                            | 53.545119 | -6.082832 | 693 273.1   | 5 936 872.2  | 225         | SW        | View across shore - zonation: lichen, black, barnacles   |
| LS_I0205                            | 53.545119 | -6.082832 | 693 273.1   | 5 936 872.2  | 225         | SW        | View across shore - zonation: lichen, black, barnacles   |
| LS_I0206                            | 53.545119 | -6.082832 | 693 273.1   | 5 936 872.2  | 270         | W         | View to Fulmar ( <i>Fulmarus glacialis</i> )   |
| LS_I0207                            | 53.545119 | -6.082832 | 693 273.1   | 5 936 872.2  | 270         | W         | View to Fulmar ( <i>Fulmarus glacialis</i> )   |
| LS_I0208                            | 53.545119 | -6.082832 | 693 273.1   | 5 936 872.2  | -           | -         | Red seaweeds ( <i>Porphyra</i> sp. (bagged); <i>Rhodothamniella floridula</i> ), wrinkle ( <i>Littorina littorea</i> ), barnacles ( <i>A. modestus</i> ), green seaweeds ( <i>U. lactuca</i> )     |
| LS_I0209                            | 53.544819 | -6.083396 | 693 237.1   | 5 936 837.3  | 22.5        | NNE       | View across green seaweeds ( <i>Prasiola</i> sp., <i>Ulva</i> sp.) strip   |
| LS_I0210                            | 53.544819 | -6.083396 | 693 237.1   | 5 936 837.3  | 90          | E         | View down shore across bedrock and green seaweeds ( <i>Ulva</i> sp.) fucoid ( <i>Fucus</i> sp.) to barnacles   |
| LS_I0211                            | 53.544845 | -6.083233 | 693 247.8   | 5 936 840.6  | 90          | E         | View across shallow upper shore rockpool zone  |
| LS_I0212                            | 53.544845 | -6.083233 | 693 247.8   | 5 936 840.6  | 90          | E         | Fulmars ( <i>Fulmarus glacialis</i> )  |
| LS_I0213                            | 53.544845 | -6.083233 | 693 247.8   | 5 936 840.6  | 90          | E         | Fulmars ( <i>Fulmarus glacialis</i> )  |
| LS_I0214                            | 53.544845 | -6.083233 | 693 247.8   | 5 936 840.6  | 90          | E         | Fulmars ( <i>Fulmarus glacialis</i> )  |
| LS_I0215                            | 53.544853 | -6.08322  | 693 248.6   | 5 936 841.6  | -           | -         | Shallow upper shore rockpool zone: green seaweeds ( <i>Ulva</i> sp., <i>Chateomorpha melagonium</i> )  |
| LS_I0216                            | 53.544853 | -6.08322  | 693 248.6   | 5 936 841.6  | -           | -         | Shallow upper shore rockpool zone: green seaweeds ( <i>Ulva</i> sp., <i>Chateomorpha melagonium</i> )  |
| LS_I0217                            | 53.544853 | -6.08322  | 693 248.6   | 5 936 841.6  | -           | -         | Shallow upper shore rockpool zone: green seaweeds ( <i>Ulva</i> sp., <i>Chateomorpha melagonium</i> )  |
| LS_I0218                            | 53.544853 | -6.08322  | 693 248.6   | 5 936 841.6  | -           | -         | Shallow upper shore rockpool zone: pink encrusting seaweeds, limpets ( <i>Patella</i> sp.), wrinkle ( <i>Littorina</i> sp.), coralline seaweeds ( <i>Corallina officinalis</i> )                   |
| LS_I0219                            | 53.544853 | -6.08322  | 693 248.6   | 5 936 841.6  | -           | -         | Shallow upper shore rockpool zone: pink encrusting seaweeds, green seaweeds ( <i>Ulva</i> sp.), red seaweeds ( <i>Gelidium pusillum</i> ), coralline seaweeds ( <i>Phymatolithion lenormandi</i> ) |
| LS_I0220                            | 53.544853 | -6.08322  | 693 248.6   | 5 936 841.6  | -           | -         | Upper shore fauna: channelled wrack ( <i>Pelvetia canaliculata</i> ), green seaweeds ( <i>Ulva</i> sp.)  |

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 INTERTIDAL HABITAT REPORT



| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0221                            | 53.544853 | -6.08322  | 693 248.6   | 5 936 841.6  | -           | -         | Upper shore/sheltered shore fauna: limpets ( <i>Patella</i> sp.), knotted wrack ( <i>Ascophyllum nodosum</i> ), spiral wrack ( <i>Fucus spiralis</i> )  |
| LS_I0222                            | 53.544853 | -6.08322  | 693 248.6   | 5 936 841.6  | 90          | E         | View across shallow rockpool  |
| LS_I0223                            | 53.544865 | -6.082987 | 693 264.0   | 5 936 843.5  | -           | -         | Spiral wrack ( <i>Fucus spiralis</i> ) strip surrounded by bladder wrack ( <i>Fucus vesiculosus</i> )   |
| LS_I0224                            | 53.544865 | -6.082987 | 693 264.0   | 5 936 843.5  | 270         | W         | View across spiral wrack ( <i>Fucus spiralis</i> ) zone to green seaweeds ( <i>Prasiola</i> sp.) patch  |
| LS_I0225                            | 53.544865 | -6.082987 | 693 264.0   | 5 936 843.5  | 270         | W         | View across spiral wrack ( <i>Fucus spiralis</i> ) zone to green seaweeds ( <i>Prasiola</i> sp.) patch  |
| LS_I0226                            | 53.544865 | -6.082987 | 693 264.0   | 5 936 843.5  | 270         | W         | View across spiral wrack ( <i>Fucus spiralis</i> ) zone to green seaweeds ( <i>Prasiola</i> sp.) patch  |
| LS_I0227                            | 53.544865 | -6.082987 | 693 264.0   | 5 936 843.5  | -           | -         | Barnacles ( <i>Semibalanus balanoides</i> )   |
| LS_I0228                            | 53.544865 | -6.082987 | 693 264.0   | 5 936 843.5  | -           | -         | Barnacles ( <i>Chthalamus stellatus</i> and <i>Semibalanus balanoides</i> )   |
| LS_I0229                            | 53.544865 | -6.082987 | 693 264.0   | 5 936 843.5  | -           | -         | Barnacles ( <i>Chthalamus stellatus</i> and <i>Semibalanus balanoides</i> )   |
| LS_I0230                            | 53.544868 | -6.083077 | 693 258.0   | 5 936 843.6  | -           | -         | Green seaweeds ( <i>Prasiola stipitata</i> )  |
| LS_I0231                            | 53.545176 | -6.083152 | 693 251.6   | 5 936 877.7  | 112.5       | ESE       | View down barnacle and bladder wrack ( <i>Fucus vesiculosus</i> ) zone: dog whelk ( <i>Nucella lapillus</i> ), limpets ( <i>Patella</i> sp.)  |
| LS_I0232                            | 53.545176 | -6.083152 | 693 251.6   | 5 936 877.7  | 180         | S         | View across zonation: barnacles, lichens  |
| LS_I0233                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | 0           | N         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch, view across sand  |
| LS_I0234                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | 112.5       | ESE       | Within barnacle/furoid ( <i>Fucus</i> sp.) patch, view towards pier   |
| LS_I0235                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | 180         | S         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch, view to outer bay   |
| LS_I0236                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | 270         | W         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch, view to cliffs  |
| LS_I0237                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | 180         | S         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch, view to outer bay   |
| LS_I0238                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | -           | -         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch – limpets ( <i>Patella vulgata</i> ), bladder wrack ( <i>Fucus vesiculosus</i> ), barnacles ( <i>Semibalanus balanoides</i> ), red turf ( <i>Osmundea</i> sp.), pink encrusting seaweeds |
| LS_I0239                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | -           | -         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch – limpets ( <i>Patella vulgata</i> ), bladder wrack ( <i>Fucus vesiculosus</i> ), barnacles ( <i>Semibalanus balanoides</i> ), red turf ( <i>Osmundea</i> sp.), pink encrusting seaweeds |
| LS_I0240                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | -           | -         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch – limpets ( <i>Patella vulgata</i> ), bladder wrack ( <i>Fucus vesiculosus</i> ), barnacles ( <i>Semibalanus balanoides</i> ), red turf ( <i>Osmundea</i> sp.), pink encrusting seaweeds |
| LS_I0241                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | -           | -         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch – barnacles ( <i>Semibalanus balanoides</i> )  |

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 INTERTIDAL HABITAT REPORT



| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0242                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | -           | -         | Within barnacle/furoid ( <i>Fucus</i> sp.) patch – barnacles ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina</i> sp.)   |
| LS_I0243                            | 53.545419 | -6.0828   | 693 273.8   | 5 936 905.6  | -           | -         | Within barnacle/ furoid ( <i>Fucus</i> sp.) patch – barnacles ( <i>Semibalanus balanoides</i> ), pink encrusting seaweeds, mussels ( <i>Mytilus edulis</i> )                                 |
| LS_I0244                            | 53.545245 | -6.083154 | 693 251.2   | 5 936 885.3  | -           | -         | Bouldery mixed sediment with minimal bladder wrack ( <i>Fucus vesiculosus</i> ) and green seaweeds ( <i>Ulva</i> sp.)  |
| LS_I0245                            | 53.545245 | -6.083154 | 693 251.2   | 5 936 885.3  | -           | -         | Bouldery mixed sediment  |
| LS_I0246                            | 53.545245 | -6.083154 | 693 251.2   | 5 936 885.3  | -           | -         | Bouldery mixed sediment  |
| LS_I0247                            | 53.545245 | -6.083154 | 693 251.2   | 5 936 885.3  | -           | -         | Bouldery mixed sediment  |
| LS_I0248                            | 53.545379 | -6.083144 | 693 251.2   | 5 936 900.3  | -           | -         | Channeled wrack ( <i>Pelvetia</i> sp.) and green seaweeds ( <i>Ulva</i> sp.)   |
| LS_I0249                            | 53.545379 | -6.083144 | 693 251.2   | 5 936 900.3  | -           | -         | Channeled wrack ( <i>Pelvetia</i> sp.) and green seaweeds ( <i>Ulva</i> sp.)   |
| LS_I0250                            | 53.545379 | -6.083144 | 693 251.2   | 5 936 900.3  | -           | -         | Channeled wrack ( <i>Pelvetia</i> sp.) and green seaweeds ( <i>Ulva</i> sp.), spiral wrack ( <i>Fucus spiralis</i> ), red seaweeds ( <i>Porphyra</i> sp.)                                    |
| LS_I0251                            | 53.545379 | -6.083144 | 693 251.2   | 5 936 900.3  | -           | -         | Channeled wrack ( <i>Pelvetia</i> sp.) and green seaweeds ( <i>Ulva</i> sp.)   |
| LS_I0252                            | 53.545403 | -6.083165 | 693 249.7   | 5 936 902.9  | 90          | E         | View across <i>Pelvetia</i> zone: channelled wrack ( <i>Pelvetia</i> sp.) and green seaweeds ( <i>Ulva</i> sp.), spiral wrack ( <i>Fucus spiralis</i> ), red seaweeds ( <i>Porphyra</i> sp.) |
| LS_I0253                            | 53.545403 | -6.083165 | 693 249.7   | 5 936 902.9  | 180         | S         | View across bare bouldery mixed sediment area  |
| LS_I0254                            | 53.545403 | -6.083165 | 693 249.7   | 5 936 902.9  | 0           | N         | View across bouldery mixed sediment with bladder wrack ( <i>Fucus vesiculosus</i> ) and some green seaweeds ( <i>Ulva</i> sp.)   |
| LS_I0255                            | 53.545403 | -6.083165 | 693 249.7   | 5 936 902.9  | 270         | W         | View across bedrock (barnacles) to pier  |
| LS_I0256                            | 53.545475 | -6.083139 | 693 251.1   | 5 936 911.0  | -           | -         | Bouldery mixed sediment with furoid ( <i>Fucus</i> sp.) and green seaweeds ( <i>Ulva</i> sp.)  |
| LS_I0257                            | 53.545475 | -6.083139 | 693 251.1   | 5 936 911.0  | -           | -         | Bouldery mixed sediment with furoid ( <i>Fucus</i> sp.), knotted wrack ( <i>Ascophyllum nodosum</i> ) and green seaweeds ( <i>Ulva</i> sp.)  |
| LS_I0258                            | 53.545475 | -6.083139 | 693 251.1   | 5 936 911.0  | -           | -         | Bouldery mixed sediment with furoid ( <i>Fucus</i> sp.) and green seaweeds ( <i>Ulva</i> sp.)  |
| LS_I0259                            | 53.545475 | -6.083139 | 693 251.1   | 5 936 911.0  | -           | -         | Bouldery mixed sediment with furoid ( <i>Fucus</i> sp.) and green seaweeds ( <i>Ulva</i> sp.)  |
| LS_I0260                            | 53.545475 | -6.083139 | 693 251.1   | 5 936 911.0  | -           | -         | Bouldery mixed sediment with furoid ( <i>Fucus</i> sp.) and green seaweeds ( <i>Ulva</i> sp.)  |
| LS_I0261                            | 53.545566 | -6.083103 | 693 253.1   | 5 936 921.2  | 90          | E         | View across bedrock and sand with furoid ( <i>Fucus</i> sp.)   |
| LS_I0262                            | 53.545589 | -6.083018 | 693 258.6   | 5 936 924.0  | -           | -         | Bladder wrack ( <i>Fucus vesiculosus</i> ), red seaweeds ( <i>Rhodothamniella</i> sp.), barnacles  |

| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0263                            | 53.545589 | -6.083018 | 693 258.6   | 5 936 924.0  | -           | -         | Bladder wrack ( <i>Fucus vesiculosus</i> ), red seaweeds ( <i>Rhodothamniella</i> sp.), barnacles, <i>Ulva lactuca</i>  |
| LS_I0264                            | 53.545589 | -6.083018 | 693 258.6   | 5 936 924.0  | -           | -         | Bladder wrack ( <i>Fucus vesiculosus</i> ), red seaweeds ( <i>Rhodothamniella</i> sp.), barnacles, green seaweeds ( <i>Ulva</i> sp.), winkle ( <i>Littorina littorea</i> )  |
| LS_I0265                            | 53.545589 | -6.083018 | 693 258.6   | 5 936 924.0  | -           | -         | Bladder wrack ( <i>Fucus vesiculosus</i> ), red seaweeds ( <i>Rhodothamniella</i> sp.), green seaweeds ( <i>Ulva</i> sp.)   |
| LS_I0266                            | 53.545589 | -6.083018 | 693 258.6   | 5 936 924.0  | 90          | E         | Birds including oystercatcher ( <i>Haematopus ostralegus</i> ), great black-backed gull ( <i>Larus marinus</i> ), herring gull  |
| LS_I0267                            | 53.545589 | -6.083018 | 693 258.6   | 5 936 924.0  | 90          | E         | Birds including oystercatcher ( <i>Haematopus ostralegus</i> ), great black-backed gull ( <i>Larus marinus</i> ), herring gull ( <i>Larus argentatus</i> ), kittiwake ( <i>Rissa</i> sp.), ?dunlin ( <i>Calidris</i> sp.) |
| LS_I0268                            | 53.545589 | -6.083018 | 693 258.6   | 5 936 924.0  | 90          | E         | Birds including great black-backed gull ( <i>Larus marinus</i> ), herring gull ( <i>Larus argentatus</i> ), kittiwake ( <i>Rissa</i> sp.)   |
| LS_I0269                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ) and limpets ( <i>Patella vulgata</i> )   |
| LS_I0270                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | 315         | NW        | Boulder: barnacles ( <i>Semibalanus balanoides</i> ) and limpets ( <i>Patella vulgata</i> )   |
| LS_I0271                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ), limpets ( <i>Patella vulgata</i> ) and dog whelks ( <i>Nucella lapillus</i> )   |
| LS_I0272                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina</i> sp.) and limpets ( <i>Patella</i> sp.)  |
| LS_I0273                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina</i> sp.) and limpets ( <i>Patella vulgata</i> )   |
| LS_I0274                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina</i> sp.) and limpets ( <i>Patella vulgata</i> )   |
| LS_I0275                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ), limpets ( <i>Patella vulgata</i> ) and dog whelks ( <i>Nucella lapillus</i> )   |
| LS_I0276                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ), limpets ( <i>Patella vulgata</i> ), dog whelks ( <i>Nucella lapillus</i> ) and anemone ( <i>Actinia equina</i> )  |
| LS_I0277                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ), limpets ( <i>Patella vulgata</i> ), dog whelks ( <i>Nucella lapillus</i> ), mussels ( <i>Mytilus edulis</i> ) and sand mason worm ( <i>Lanice conchilega</i> )      |
| LS_I0278                            | 53.545251 | -6.081764 | 693 343.2   | 5 936 889.8  | -           | -         | Boulder: barnacles ( <i>Semibalanus balanoides</i> ), limpets ( <i>Patella vulgata</i> ), rock wrack ( <i>Fucus ?vesiculosus</i> ), green seaweeds ( <i>Ulva</i> sp./ <i>Blidingia</i> sp.)                               |
| LS_I0279                            | 53.544734 | -6.081917 | 693 335.4   | 5 936 831.9  | 225         | SW        | View across bare sand   |



| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0280                            | 53.544734 | -6.081917 | 693 335.4   | 5 936 831.9  | 270         | W         | View up the shore   |
| LS_I0281                            | 53.544798 | -6.081618 | 693 354.9   | 5 936 839.8  | 315         | NW        | View across sand mason worm ( <i>Lanice conchilega</i> ) patch  |
| LS_I0282                            | 53.544798 | -6.081618 | 693 354.9   | 5 936 839.8  | 315         | NW        | View across sand mason worm ( <i>Lanice conchilega</i> ) patch  |
| LS_I0283                            | 53.545255 | -6.081333 | 693 371.7   | 5 936 891.4  | -           | -         | Piddock Boulder 1: Piddocks, fan worms ( <i>Spirobranchus</i> sp.), barnacles   |
| LS_I0284                            | 53.545255 | -6.081333 | 693 371.7   | 5 936 891.4  | -           | -         | Piddock Boulder 1: Piddocks, fan worms ( <i>Spirobranchus</i> sp.), barnacles   |
| LS_I0285                            | 53.545255 | -6.081333 | 693 371.7   | 5 936 891.4  | -           | -         | Piddock Boulder 1: Piddocks, ross worms ( <i>Sabellaria spinulosa</i> )   |
| LS_I0286                            | 53.545255 | -6.081333 | 693 371.7   | 5 936 891.4  | -           | -         | Piddock Boulder 1: fan worms ( <i>Spirobranchus</i> sp.)  |
| LS_I0287                            | 53.545255 | -6.081333 | 693 371.7   | 5 936 891.4  | -           | -         | Piddock Boulder 1: fan worms ( <i>Spirobranchus</i> sp.)  |
| LS_I0288                            | 53.545227 | -6.081308 | 693 373.5   | 5 936 888.3  | -           | -         | Piddock Boulder 1: piddocks and red turf ( <i>Rhodothamniella</i> sp.), fan worms ( <i>Spirobranchus</i> sp.) and barnacles ( <i>A. modestus</i> )  |
| LS_I0289                            | 53.545227 | -6.081308 | 693 373.5   | 5 936 888.3  | -           | -         | Piddock Boulder 1: piddocks and red turf ( <i>Rhodothamniella</i> sp.), fan worms ( <i>Spirobranchus</i> sp.)   |
| LS_I0290                            | 53.545227 | -6.081308 | 693 373.5   | 5 936 888.3  | -           | -         | Piddock Boulder 1: piddocks and red seaweed turf ( <i>Rhodothamniella</i> sp.), carrageen ( <i>Chondrus crispus</i> )   |
| LS_I0291                            | 53.545227 | -6.081308 | 693 373.5   | 5 936 888.3  | -           | -         | Piddock Boulder 1: piddocks and red seaweed turf ( <i>Rhodothamniella</i> sp.)  |
| LS_I0292                            | 53.545161 | -6.081372 | 693 369.6   | 5 936 880.8  | -           | -         | Sand mason worm ( <i>Lanice conchilega</i> )  |
| LS_I0293                            | 53.545161 | -6.081372 | 693 369.6   | 5 936 880.8  | -           | -         | Sand mason worm ( <i>Lanice conchilega</i> )  |
| LS_I0294                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | -           | -         | Piddock boulder 2: piddocks, red seaweeds ( <i>Rhodothamniella</i> sp., <i>Polysiphonia</i> sp., <i>Chondrus crispus</i> ), fan worms ( <i>Spirobranchus</i> sp.), rock wrack ( <i>Fucus ?vesiculosus</i> ), green seaweeds ( <i>Cladophora rupestris</i> ) |
| LS_I0295                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | -           | -         | Piddock boulder 2: piddocks, red turf ( <i>Rhodothamniella</i> sp.)   |
| LS_I0296                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | -           | -         | Piddock boulder 2: piddocks, red turf ( <i>Rhodothamniella</i> sp.), barnacles, green seaweeds ( <i>Ulva lactuca</i> )  |
| LS_I0297                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | -           | -         | Piddock boulder 2: piddocks, red seaweeds ( <i>Rhodothamniella</i> sp., <i>Chondrus crispus</i> , <i>Polysiphonia</i> sp.), fan worms ( <i>Spirobranchus</i> sp.), rock wrack ( <i>Fucus ?vesiculosus</i> ), green seaweeds ( <i>Cladophora rupestris</i> ) |
| LS_I0298                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | -           | -         | Piddock boulder 2: piddocks, red seaweeds ( <i>Rhodothamniella</i> sp., <i>Polysiphonia</i> sp., <i>Chondrus crispus</i> ), fan worms ( <i>Spirobranchus</i> sp.), serrated wrack ( <i>Fucus serratus</i> )   |



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 INTERTIDAL HABITAT REPORT



| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0299                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | -           | -         | Piddock boulder 2: piddocks, red seaweeds ( <i>Rhodothamniella</i> sp., <i>Polysiphonia</i> sp., <i>Chondrus crispus</i> ), fan worms ( <i>Spirobranchus</i> sp.), fucoids ( <i>Fucus</i> sp.), bryozoan, green seaweeds ( <i>Ulva lactuca</i> ), sponge (Porifera), coralline seaweeds ( <i>Phymatolithion lenormandii</i> ) |
| LS_I0300                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | -           | -         | Piddock boulder 2: piddocks, red seaweeds ( <i>Rhodothamniella</i> sp., <i>Polysiphonia</i> sp., <i>Chondrus crispus</i> ), fan worms ( <i>Spirobranchus</i> sp.), fucoids ( <i>Fucus</i> sp.), green seaweeds ( <i>Ulva lactuca</i> ), sponge (Porifera)   |
| LS_I0301                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | -           | -         | Piddock boulder 2: piddocks, red seaweeds ( <i>Rhodothamniella</i> sp., <i>Polysiphonia</i> sp., <i>Chondrus crispus</i> ), fan worms ( <i>Spirobranchus</i> sp.), fucoids ( <i>Fucus</i> sp.), bryozoan (Bryozoa), green seaweeds ( <i>Ulva lactuca</i> ), sponge (Porifera)   |
| LS_I0302                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | 0           | N         | View across Piddock boulder 2   |
| LS_I0303                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | 0           | N         | View across Piddock boulder 2   |
| LS_I0304                            | 53.545265 | -6.081051 | 693 390.4   | 5 936 893.3  | 45          | NE        | View across Piddock boulder 2   |
| LS_I0305                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | 0           | N         | Piddock boulder 3: serrated wrack ( <i>Fucus serratus</i> ), red turf ( <i>Rhodothamniella</i> sp.), fan worms ( <i>Spirobranchus</i> sp.)  |
| LS_I0306                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | 0           | N         | View across Piddock boulder 3   |
| LS_I0307                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | 180         | S         | View across Piddock boulder 3   |
| LS_I0308                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | -           | -         | Piddock boulder 3: serrated wrack ( <i>Fucus serratus</i> ), red turf ( <i>Rhodothamniella</i> sp.)   |
| LS_I0309                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | -           | -         | Piddock boulder 3: serrated wrack ( <i>Fucus serratus</i> ), red turf ( <i>Rhodothamniella</i> sp.)   |
| LS_I0310                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | -           | -         | Piddock boulder 3: serrated wrack ( <i>Fucus serratus</i> ), red turf ( <i>Rhodothamniella</i> sp.), fan worms ( <i>Spirobranchus</i> sp.)  |
| LS_I0311                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | -           | -         | Piddock boulder 3: serrated wrack ( <i>Fucus serratus</i> ), red turf ( <i>Rhodothamniella</i> sp.), fan worms ( <i>Spirobranchus</i> sp.)  |
| LS_I0312                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | -           | -         | Piddock boulder 3: barnacles, fan worms ( <i>Spirobranchus</i> sp.)   |
| LS_I0313                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | -           | -         | Piddock boulder 3: barnacles, fan worms ( <i>Spirobranchus</i> sp.)   |
| LS_I0314                            | 53.545477 | -6.081187 | 693 380.4   | 5 936 916.5  | -           | -         | Piddock boulder 3: serrated wrack ( <i>Fucus serratus</i> ), red seaweed turf ( <i>Rhodothamniella</i> sp.), carrageen ( <i>Chondrus crispus</i> )  |
| LS_I0315                            | 53.54543  | -6.080435 | 693 430.4   | 5 936 913.3  | 90          | E         | View across kelp zone towards pier  |
| LS_I0316                            | 53.54543  | -6.080435 | 693 430.4   | 5 936 913.3  | 0           | N         | View from kelp zone up shore across mixed sediment  |

| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0317                            | 53.545494 | -6.080301 | 693 439.0   | 5 936 920.8  | -           | -         | Kelp ( <i>Saccharina latissima</i> ), red seaweeds ( <i>Chondrus crispus</i> , <i>Palmaria palmata</i> , <i>Phymatolithion lenormandii</i> ), fan worm ( <i>Spirobranchus</i> sp.), red seaweeds ( <i>Polysiphonia</i> sp.), green seaweeds ( <i>Ulva lactuca</i> ), ross worm (? <i>Sabellaria spinulosa</i> ) |
| LS_I0318                            | 53.545501 | -6.080234 | 693 443.4   | 5 936 921.7  | -           | -         | Kelps ( <i>Saccharina latissima</i> , <i>Laminaria digitata</i> ), serrated wrack ( <i>Fucus serratus</i> ), red seaweeds ( <i>Chondrus crispus</i> , <i>Palmaria palmata</i> ), fan worm ( <i>Spirobranchus</i> sp.), green seaweeds ( <i>Ulva lactuca</i> )   |
| LS_I0319                            | 53.54552  | -6.080227 | 693 443.8   | 5 936 923.9  | -           | -         | Anthropogenic debris - engine, kelp ( <i>Laminaria digitata</i> ), red seaweeds ( <i>Palmaria palmata</i> , <i>Chondrus crispus</i> ), serrated wrack ( <i>Fucus serratus</i> ), green seaweeds ( <i>Ulva lactuca</i> ), bryozoan (Bryozoa), pink encrusting seaweeds   |
| LS_I0320                            | 53.54552  | -6.080227 | 693 443.8   | 5 936 923.9  | -           | -         | Anthropogenic debris - engine, kelp ( <i>Laminaria digitata</i> ), red seaweeds ( <i>Palmaria palmata</i> , <i>Chondrus crispus</i> ), serrated wrack ( <i>Fucus serratus</i> ), green seaweeds ( <i>Ulva lactuca</i> ), bryozoan (Bryozoa), pink encrusting seaweeds   |
| LS_I0321                            | 53.545533 | -6.080158 | 693 448.3   | 5 936 925.5  | -           | -         | Kelp ( <i>Saccharina latissima</i> ), red seaweeds ( <i>Palmaria palmata</i> , <i>Chondrus crispus</i> ), pink encrusting seaweeds, green seaweeds ( <i>Ulva lactuca</i> ), serrated wrack ( <i>Fucus serratus</i> )  |
| LS_I0322                            | 53.545533 | -6.080158 | 693 448.3   | 5 936 925.5  | -           | -         | Kelp ( <i>Saccharina latissima</i> ), red seaweeds ( <i>Palmaria palmata</i> , <i>Chondrus crispus</i> ), pink encrusting seaweeds, serrated wrack ( <i>Fucus serratus</i> ), ross worms (? <i>Sabellaria spinulosa</i> ), sponge (Porifera)  |
| LS_I0323                            | 53.545533 | -6.080158 | 693 448.3   | 5 936 925.5  | -           | -         | Anemone ( <i>Anemonia viridis</i> )   |
| LS_I0324                            | 53.545533 | -6.080158 | 693 448.3   | 5 936 925.5  | -           | -         | Anemone ( <i>Anemonia viridis</i> )   |
| LS_I0325                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Ross worms ( <i>Sabellaria spinulosa</i> ), coralline seaweeds ( <i>Phymatolithion lenormandii</i> ), fan worms ( <i>Spirobranchus</i> sp.), carrageen ( <i>Chondrus crispus</i> ), sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0326                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Red encrusting seaweeds, snails ( <i>Gibbula cineraria</i> ), coralline seaweeds ( <i>Phymatolithion lenormandi</i> ), carrageen ( <i>Chondrus crispus</i> ), fan worms ( <i>Spirobranchus</i> sp.), green seaweeds ( <i>Ulva lactuca</i> )   |
| LS_I0327                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Snails ( <i>Gibbula cineraria</i> ), coralline seaweeds ( <i>Phymatolithion lenormandi</i> ), red seaweeds ( <i>Chondrus crispus</i> , <i>Palmaria palmata</i> ), fan worms ( <i>Spirobranchus</i> sp.)   |
| LS_I0328                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Coralline seaweeds ( <i>Phymatolithion lenormandi</i> ), carrageen ( <i>Chondrus crispus</i> ), fan worms ( <i>Spirobranchus</i> sp.), barnacles  |
| LS_I0329                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Ross worms ( <i>Sabellaria spinulosa</i> )  |
| LS_I0330                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Ross worms ( <i>Sabellaria spinulosa</i> ) and fan worms ( <i>Spirobranchus</i> sp.)  |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0331                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Anemone ( <i>Sagartia</i> sp.), snails ( <i>Gibbula cineraria</i> ), hydroids (Hydrozoa)  |
| LS_I0332                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ), ross worms ( <i>Sabellaria spinulosa</i> ), fan worms ( <i>Spirobranchus</i> sp.), coralline seaweeds ( <i>Phymatolithion lenormandi</i> )   |
| LS_I0333                            | 53.545396 | -6.08022  | 693 444.8   | 5 936 910.1  | -           | -         | Ross worms ( <i>Sabellaria spinulosa</i> ), sponge (Porifera), green seaweeds ( <i>Ulva lactuca</i> ), fan worms ( <i>Spirobranchus</i> sp.)  |
| LS_I0334                            | 53.545564 | -6.079625 | 693 483.5   | 5 936 930.4  | -           | -         | Red seaweeds ( <i>Palmaria palmata</i> and <i>Chondrus crispus</i> ), fan worm ( <i>Spirobranchus</i> sp.), sponge (? <i>Halicondria</i> sp.), pink encrusting seaweeds, bryozoan (Bryozoa)   |
| LS_I0335                            | 53.545564 | -6.079625 | 693 483.5   | 5 936 930.4  | -           | -         | Red seaweeds ( <i>Palmaria palmata</i> and <i>Chondrus crispus</i> ), serrated wrack ( <i>Fucus serratus</i> ), green seaweeds ( <i>Ulva lactuca</i> ), fan worms ( <i>Spirobranchus</i> sp.), dog whelks ( <i>Nucella lapillus</i> ), pink encrusting seaweeds, bryozoan (Bryozoa), ross worms ( <i>Sabellaria spinulosa</i> ) |
| LS_I0336                            | 53.545564 | -6.079625 | 693 483.5   | 5 936 930.4  | -           | -         | Red seaweeds ( <i>Palmaria palmata</i> and <i>Chondrus crispus</i> ), serrated wrack ( <i>Fucus serratus</i> ), fan worms ( <i>Spirobranchus</i> sp.), pink encrusting seaweeds, bryozoan (Bryozoa), ross worms ( <i>Sabellaria spinulosa</i> )   |
| LS_I0337                            | 53.545564 | -6.079625 | 693 483.5   | 5 936 930.4  | -           | -         | Anemone ( <i>Anemonia viridis</i> )   |
| LS_I0338                            | 53.545564 | -6.079625 | 693 483.5   | 5 936 930.4  | -           | -         | Fan worms ( <i>Spirobranchus</i> sp.), dog whelks ( <i>Nucella lapillus</i> ), serrated wrack ( <i>Fucus serratus</i> ), carrageen ( <i>Chondrus crispus</i> ), bryozoan (Bryozoa), pink encrusting seaweeds, ross worms ( <i>Sabellaria spinulosa</i> )  |
| LS_I0339                            | 53.545739 | -6.079785 | 693 472.1   | 5 936 949.4  | -           | -         | Bare mixed rock with sand mason worms ( <i>Lanice</i> sp.)  |
| LS_I0340                            | 53.545739 | -6.079785 | 693 472.1   | 5 936 949.4  | -           | -         | Bare mixed rock with sand mason worms ( <i>Lanice</i> sp.)  |
| LS_I0341                            | 53.545739 | -6.079785 | 693 472.1   | 5 936 949.4  | -           | -         | Bare mixed rock with sand mason worms ( <i>Lanice</i> sp.)  |
| LS_I0342                            | 53.545739 | -6.079785 | 693 472.1   | 5 936 949.4  | 270         | W         | View across bare mixed rock with sand mason worms ( <i>Lanice</i> sp.) to cliffs  |
| LS_I0343                            | 53.545739 | -6.079785 | 693 472.1   | 5 936 949.4  | 270         | W         | View across bare mixed rock with sand mason worms ( <i>Lanice</i> sp.) to cliffs  |
| LS_I0344                            | 53.545739 | -6.079785 | 693 472.1   | 5 936 949.4  | 0           | N         | View up beach   |
| LS_I0345                            | 53.545739 | -6.079785 | 693 472.1   | 5 936 949.4  | 90          | E         | View across bare mixed rock to pier   |
| LS_I0346                            | 53.545739 | -6.079785 | 693 472.1   | 5 936 949.4  | 180         | S         | View down shore across fucoids ( <i>Fucus</i> sp.) and Kelp   |
| LS_I0347                            | 53.545594 | -6.079794 | 693 472.1   | 5 936 933.3  | 45          | NE        | Focus on pier: view up from serrated wrack ( <i>Fucus serratus</i> )  |
| LS_I0348                            | 53.545594 | -6.079794 | 693 472.1   | 5 936 933.3  | 135         | SE        | Focus on pier: view down from serrated wrack ( <i>Fucus serratus</i> )  |
| LS_I0349                            | 53.546058 | -6.079734 | 693 474.0   | 5 936 985.0  | 225         | SW        | View across <i>Lanice</i> on sand to <i>Lanice</i> on coarse sand to <i>Lanice</i> on gravel  |
| LS_I0350                            | 53.546058 | -6.079734 | 693 474.0   | 5 936 985.0  | 225         | SW        | View across <i>Lanice</i> on sand to <i>Lanice</i> on coarse sand to <i>Lanice</i> on gravel  |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0351                            | 53.546064 | -6.079893 | 693 463.4   | 5 936 985.3  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ) on sand  |
| LS_I0352                            | 53.546064 | -6.079893 | 693 463.4   | 5 936 985.3  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ) on sand  |
| LS_I0353                            | 53.546064 | -6.079893 | 693 463.4   | 5 936 985.3  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ) on sand  |
| LS_I0354                            | 53.546064 | -6.079893 | 693 463.4   | 5 936 985.3  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ) on sand  |
| LS_I0355                            | 53.545928 | -6.079923 | 693 462.1   | 5 936 970.1  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ) on coarse sand/gravel  |
| LS_I0356                            | 53.545928 | -6.079923 | 693 462.1   | 5 936 970.1  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ) on coarse sand/gravel  |
| LS_I0357                            | 53.545928 | -6.079923 | 693 462.1   | 5 936 970.1  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ) on coarse sand/gravel  |
| LS_I0358                            | 53.545928 | -6.079923 | 693 462.1   | 5 936 970.1  | -           | -         | Sand mason worms ( <i>Lanice conchilega</i> ) on coarse sand/gravel  |
| LS_I0359                            | 53.545906 | -6.079931 | 693 461.6   | 5 936 967.6  | -           | -         | Anthropogenic debris   |
| LS_I0360                            | 53.545906 | -6.079931 | 693 461.6   | 5 936 967.6  | -           | -         | Anthropogenic debris   |
| LS_I0361                            | 53.545906 | -6.079931 | 693 461.6   | 5 936 967.6  | -           | -         | Anthropogenic debris   |
| LS_I0362                            | 53.546117 | -6.080638 | 693 413.8   | 5 936 989.1  | 0           | N         | View up beach  |
| LS_I0363                            | 53.546117 | -6.080638 | 693 413.8   | 5 936 989.1  | 90          | E         | View to pier   |
| LS_I0364                            | 53.546117 | -6.080638 | 693 413.8   | 5 936 989.1  | 180         | S         | View down shore, across sand to mixed gravel and across outer bay  |
| LS_I0365                            | 53.546117 | -6.080638 | 693 413.8   | 5 936 989.1  | 270         | W         | View to pier   |
| LS_I0366                            | 53.546117 | -6.080638 | 693 413.8   | 5 936 989.1  | -           | -         | Sand   |
| LS_I0367                            | 53.546908 | -6.080634 | 693 410.5   | 5 937 077.1  | 202.5       | SSW       | View down shore  |
| LS_I0368                            | 53.546908 | -6.080634 | 693 410.5   | 5 937 077.1  | 202.5       | SSW       | View down shore  |
| LS_I0369                            | 53.546608 | -6.079366 | 693 495.9   | 5 937 047.2  | 90          | E         | View to pier   |
| LS_I0370                            | 53.546608 | -6.079366 | 693 495.9   | 5 937 047.2  | 90          | E         | Spiral wrack ( <i>Fucus spiralis</i> ) zone  |
| LS_I0371                            | 53.546608 | -6.079366 | 693 495.9   | 5 937 047.2  | 90          | E         | Red seaweeds ( <i>Catenella</i> sp.)/ green seaweeds ( <i>Ulva</i> sp.) zone   |
| LS_I0372                            | 53.546608 | -6.079366 | 693 495.9   | 5 937 047.2  | 90          | E         | Lichen zone  |
| LS_I0373                            | 53.546608 | -6.079366 | 693 495.9   | 5 937 047.2  | 90          | E         | Spiral wrack ( <i>Fucus spiralis</i> ), bladder wrack ( <i>Fucus vesiculosus</i> ) and knotted wrack ( <i>Ascophyllum</i> sp.) |
| LS_I0374                            | 53.546462 | -6.079395 | 693 494.6   | 5 937 030.9  | 90          | E         | View to pier with outflow and tunnel   |
| LS_I0375                            | 53.54603  | -6.079413 | 693 495.4   | 5 936 982.8  | 90          | E         | View to pier steps   |
| LS_I0376                            | 53.54603  | -6.079413 | 693 495.4   | 5 936 982.8  | 90          | E         | View to pier steps   |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0377                            | 53.54603  | -6.079413 | 693 495.4   | 5 936 982.8  | 90          | E         | Fucoid ( <i>Fucus</i> sp.), barnacles ( <i>Semibalanus</i> sp.) and green seaweeds ( <i>Ulva</i> sp.)         |
| LS_I0378                            | 53.54603  | -6.079413 | 693 495.4   | 5 936 982.8  | 90          | E         | Fucoid ( <i>Fucus</i> sp.), barnacles ( <i>Semibalanus balanoides</i> ) and green seaweeds ( <i>Ulva</i> sp.) |
| LS_I0379                            | 53.54603  | -6.079413 | 693 495.4   | 5 936 982.8  | 90          | E         | Green seaweeds ( <i>Blidingia</i> sp./ <i>Ulothrix</i> sp.)   |
| LS_I0380                            | 53.54603  | -6.079413 | 693 495.4   | 5 936 982.8  | 90          | E         | Fucoids ( <i>Fucus</i> sp.)   |
| LS_I0381                            | 53.545776 | -6.083208 | 693 245.2   | 5 936 944.2  | 270         | W         | View to outflow   |
| LS_I0382                            | 53.545776 | -6.083208 | 693 245.2   | 5 936 944.2  | 0           | N         | Across sand   |
| LS_I0383                            | 53.545776 | -6.083208 | 693 245.2   | 5 936 944.2  | 90          | E         | Down beach  |
| LS_I0384                            | 53.545776 | -6.083208 | 693 245.2   | 5 936 944.2  | 180         | S         | To cliffs   |
| LS_I0385                            | 53.546506 | -6.082649 | 693 278.9   | 5 937 026.9  | 0           | N         | View to outflow   |
| LS_I0386                            | 53.546586 | -6.082848 | 693 265.3   | 5 937 035.3  | 0           | N         | View to small black pipes outflow   |
| LS_I0387                            | 53.547157 | -6.080752 | 693 401.5   | 5 937 104.5  | -           | -         | Saltmarsh plants, sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )                                    |
| LS_I0388                            | 53.547157 | -6.080752 | 693 401.5   | 5 937 104.5  | 270         | W         | View to Sand dunes upper edge- Carpark  |
| LS_I0389                            | 53.547164 | -6.080998 | 693 385.2   | 5 937 104.6  | -           | -         | Saltmarsh plant, sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )                                     |
| LS_I0390                            | 53.547164 | -6.080998 | 693 385.2   | 5 937 104.6  | -           | -         | Rock dump- Sand dunes upper edge-Carpark  |
| LS_I0391                            | 53.547132 | -6.081252 | 693 368.5   | 5 937 100.3  | -           | -         | Saltmarsh plant, sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )                                     |
| LS_I0392                            | 53.547195 | -6.081288 | 693 365.9   | 5 937 107.3  | -           | -         | Saltmarsh plant   |
| LS_I0393                            | 53.547272 | -6.081318 | 693 363.5   | 5 937 115.7  | -           | -         | Saltmarsh plant-rock dump   |
| LS_I0394                            | 53.547222 | -6.081421 | 693 356.9   | 5 937 109.9  | 225         | SW        | Path through sand dunes   |
| LS_I0395                            | 53.547223 | -6.081577 | 693 346.6   | 5 937 109.6  | -           | -         | Saltmarsh plants  |
| LS_I0396                            | 53.547223 | -6.081577 | 693 346.6   | 5 937 109.6  | 180         | S         | Path through sand dunes   |
| LS_I0397                            | 53.547215 | -6.081653 | 693 341.6   | 5 937 108.5  | 225         | SW        | Path through sand dunes   |
| LS_I0398                            | 53.547189 | -6.08173  | 693 336.6   | 5 937 105.4  | -           | -         | Saltmarsh plants (? <i>Ammophila</i> sp.)   |
| LS_I0399                            | 53.547189 | -6.08173  | 693 336.6   | 5 937 105.4  | -           | -         | Saltmarsh plants Dandelion ( <i>Taraxacum officinale</i> )  |
| LS_I0400                            | 53.547141 | -6.081914 | 693 324.7   | 5 937 099.6  | -           | -         | Sand dunes upper edge - Clover (? <i>Trifolium</i> sp.)   |
| LS_I0401                            | 53.547141 | -6.081914 | 693 324.7   | 5 937 099.6  | -           | -         | Goosetongue plant ( <i>Plantago maritima</i> )  |
| LS_I0402                            | 53.547107 | -6.082053 | 693 315.6   | 5 937 095.4  | -           | -         | Ribwort plantain ( <i>Plantago lanceolata</i> )   |
| LS_I0403                            | 53.547107 | -6.082053 | 693 315.6   | 5 937 095.4  | -           | -         | Saltmarsh burnt   |

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|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0404                            | 53.54701  | -6.082276 | 693 301.3   | 5 937 084.0  | -           | -         | Ribwort plantain ( <i>Plantago lanceolata</i> )   |
| LS_I0405                            | 53.54701  | -6.082276 | 693 301.3   | 5 937 084.0  | 225         | SW        | View of the shore - saltmarsh plants  |
| LS_I0406                            | 53.546929 | -6.082463 | 693 289.3   | 5 937 074.5  | -           | -         | Sand dunes upper edge - Common mallow ( <i>Malva sylvestris</i> )   |
| LS_I0407                            | 53.546929 | -6.082463 | 693 289.3   | 5 937 074.5  | 180         | S         | Sand dunes upper edge - Common mallow ( <i>Malva sylvestris</i> )   |
| LS_I0408                            | 53.546814 | -6.082706 | 693 273.7   | 5 937 061.0  | -           | -         | Dandelion ( <i>Taraxacum officinale</i> )   |
| LS_I0409                            | 53.546727 | -6.082868 | 693 263.4   | 5 937 050.9  | -           | -         | Stairs through sand dunes   |
| LS_I0410                            | 53.546651 | -6.082961 | 693 257.5   | 5 937 042.2  | -           | -         | Sand dunes upper edge- Saltmarsh plants sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )  |
| LS_I0411                            | 53.546587 | -6.083044 | 693 252.3   | 5 937 034.9  | -           | -         | Sand dunes upper edge (debris tire)   |
| LS_I0412                            | 53.546473 | -6.083191 | 693 243.1   | 5 937 021.8  | 0           | N         | Sand dunes upper edge end - Interruption concrete foundation  |
| LS_I0413                            | 53.546408 | -6.083269 | 693 238.3   | 5 937 014.4  | -           | -         | Saltmarsh plants sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )   |
| LS_I0414                            | 53.54636  | -6.083299 | 693 236.5   | 5 937 008.9  | -           | -         | Bucks-horn plantain ( <i>Plantago coronopus</i> )   |
| LS_I0415                            | 53.54636  | -6.083299 | 693 236.5   | 5 937 008.9  | -           | -         | Saltmarsh plants, morning glory ( <i>Calystegia soldanella</i> )  |
| LS_I0416                            | 53.54636  | -6.083299 | 693 236.5   | 5 937 008.9  | -           | -         | Saltmarsh plant sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )  |
| LS_I0417                            | 53.54636  | -6.083299 | 693 236.5   | 5 937 008.9  | 225         | SW        | View to dumprocks and saltmarsh plants sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> ), morning glory ( <i>Calystegia soldanella</i> ) |
| LS_I0418                            | 53.546308 | -6.083421 | 693 228.6   | 5 937 002.8  | -           | -         | Saltmarsh plants sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> ), morning glory ( <i>Calystegia soldanella</i> )                       |
| LS_I0419                            | 53.546212 | -6.083537 | 693 221.4   | 5 936 991.8  | -           | -         | Dumprocks and saltmarsh plants sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )   |
| LS_I0420                            | 53.546212 | -6.083537 | 693 221.4   | 5 936 991.8  | -           | -         | Chamomile ( <i>Chamaemelum nobile</i> ) and sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )  |
| LS_I0421                            | 53.545994 | -6.083751 | 693 208.2   | 5 936 967.0  | -           | -         | Dreinage pipe   |
| LS_I0422                            | 53.545893 | -6.083783 | 693 206.6   | 5 936 955.7  | -           | -         | Chamomile ( <i>Chamaemelum nobile</i> ) and sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )  |
| LS_I0423                            | 53.545853 | -6.083816 | 693 204.5   | 5 936 951.2  | 270         | W         | View through fenced area  |
| LS_I0424                            | 53.545849 | -6.083895 | 693 199.3   | 5 936 950.5  | 315         | NW        | View through fenced area, ditch above land flow   |
| LS_I0425                            | 53.545849 | -6.083895 | 693 199.3   | 5 936 950.5  | -           | -         | Stairs gate   |
| LS_I0426                            | 53.545849 | -6.083895 | 693 199.3   | 5 936 950.5  | -           | -         | Landflow (end of sand dunes upper edge)   |
| LS_I0427                            | 53.546338 | -6.083389 | 693 230.6   | 5 937 006.2  | 315         | NW        | Saltmarsh plants - Sand dunes beyond the path   |
| LS_I0428                            | 53.547169 | -6.080648 | 693 408.4   | 5 937 106.1  | 225         | SW        | View to the shore in front of carpark   |
| LS_I0429                            | 53.547083 | -6.080603 | 693 411.8   | 5 937 096.7  | 225         | SW        | Saltmarsh plant sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )  |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0430                            | 53.547083 | -6.080603 | 693 411.8   | 5 937 096.7  | 225         | SW        | View to saltmarsh plant- Boulders-Sea sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> ) |
| LS_I0431                            | 53.547052 | -6.080572 | 693 413.9   | 5 937 093.3  | -           | -         | Saltmarsh plant sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )                       |
| LS_I0432                            | 53.546995 | -6.080533 | 693 416.8   | 5 937 087.1  | -           | -         | Common mallow ( <i>Malva sylvestris</i> )  |
| LS_I0433                            | 53.546894 | -6.080518 | 693 418.2   | 5 937 075.9  | -           | -         | House- Rock dump covered by lichens  |
| LS_I0434                            | 53.547082 | -6.080676 | 693 406.9   | 5 937 096.4  | -           | -         | Saltmarsh plant sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )                       |
| LS_I0435                            | 53.547041 | -6.080554 | 693 415.2   | 5 937 092.1  | -           | -         | Saltmarsh plant sea beet ( <i>Beta vulgaris</i> subsp. <i>maritima</i> )                       |
| LS_I0436                            | 53.546887 | -6.080551 | 693 416.1   | 5 937 075.0  | 180         | S         | House corner- Rock dump covered by lichens   |
| LS_I0437                            | 53.546852 | -6.080442 | 693 423.5   | 5 937 071.4  | 45          | NE        | House corner- Rock dump covered by lichens   |
| LS_I0438                            | 53.546878 | -6.080299 | 693 432.8   | 5 937 074.7  | 270         | W         | House corner- Rock dump  |
| LS_I0439                            | 53.546941 | -6.080329 | 693 430.5   | 5 937 081.6  | 270         | W         | House corner- Rock dump  |
| LS_I0440                            | 53.546898 | -6.080132 | 693 443.8   | 5 937 077.4  | -           | -         | Wall   |
| LS_I0441                            | 53.546876 | -6.080007 | 693 452.2   | 5 937 075.3  | -           | -         | Dead seaweeds  |
| LS_I0442                            | 53.546876 | -6.080007 | 693 452.2   | 5 937 075.3  | -           | -         | Whelk eggs dead seaweeds   |
| LS_I0443                            | 53.546867 | -6.079881 | 693 460.6   | 5 937 074.6  | -           | -         | Dead seaweeds  |
| LS_I0444                            | 53.546829 | -6.079713 | 693 471.9   | 5 937 070.8  | -           | -         | Dead seaweeds, tubeworms ( <i>Spirorbis</i> sp.)   |
| LS_I0445                            | 53.546856 | -6.079645 | 693 476.2   | 5 937 074.0  | -           | -         | Dead seaweeds, tubeworms ( <i>Spirorbis</i> sp.)   |
| LS_I0446                            | 53.546862 | -6.079622 | 693 477.7   | 5 937 074.8  | -           | -         | View to shore-corner with pier   |
| LS_I0447                            | 53.546862 | -6.079622 | 693 477.7   | 5 937 074.8  | -           | -         | Pier stairs  |
| LS_I0448                            | 53.546877 | -6.07956  | 693 481.8   | 5 937 076.6  | -           | -         | Pier   |
| LS_I0449                            | 53.546636 | -6.07937  | 693 495.5   | 5 937 050.3  | -           | -         | Yellow and black lichens   |
| LS_I0450                            | 53.546378 | -6.079336 | 693 498.9   | 5 937 021.7  | -           | -         | Yellow and black lichens   |
| LS_I0451                            | 53.546001 | -6.079353 | 693 499.5   | 5 936 979.7  | -           | -         | Pier stairs  |
| LS_I0452                            | 53.5459   | -6.079359 | 693 499.5   | 5 936 968.5  | -           | -         | Pier- Green lichens  |
| LS_I0453                            | 53.545852 | -6.079367 | 693 499.2   | 5 936 963.1  | -           | -         | Pier- Green lichens  |
| LS_I0454                            | 53.545831 | -6.079455 | 693 493.5   | 5 936 960.5  | -           | -         | Pier- Green lichens  |
| LS_I0455                            | 53.545699 | -6.07958  | 693 485.8   | 5 936 945.5  | -           | -         | Pier- Green lichens  |
| LS_I0456                            | 53.545656 | -6.079466 | 693 493.6   | 5 936 941.1  | -           | -         | Pier   |

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|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0457                            | 53.545656 | -6.079466 | 693 493.6   | 5 936 941.1  | -           | -         | Seaweed turf ( <i>Prasiola</i> sp.) on the wall of the pier                                   |
| LS_I0458                            | 53.545656 | -6.079466 | 693 493.6   | 5 936 941.1  | -           | -         | Ruddy turnstone birds ( <i>Arenaria interpres</i> )   |
| LS_I0459                            | 53.545656 | -6.079466 | 693 493.6   | 5 936 941.1  | -           | -         | Ruddy turnstone birds ( <i>Arenaria interpres</i> )   |
| LS_I0460                            | 53.545656 | -6.079466 | 693 493.6   | 5 936 941.1  | -           | -         | Ruddy turnstone birds ( <i>Arenaria interpres</i> )   |
| LS_I0461                            | 53.545656 | -6.079466 | 693 493.6   | 5 936 941.1  | -           | -         | Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0462                            | 53.545656 | -6.079466 | 693 493.6   | 5 936 941.1  | -           | -         | Fulmar ( <i>Fulmarus glacialis</i> )  |
| LS_I0463                            | 53.546605 | -6.082933 | 693 259.6   | 5 937 037.2  | -           | -         | Discharge- Rock dump- End of sand dunes   |
| LS_I0464                            | 53.546655 | -6.08302  | 693 254.1   | 5 937 030.8  | -           | -         | Rock dump - Yellow lichens  |
| LS_I0465                            | 53.546505 | -6.083077 | 693 250.5   | 5 937 025.7  | -           | -         | Rock dump - Yellow lichens  |
| LS_I0466                            | 53.546441 | -6.083167 | 693 244.9   | 5 937 018.3  | -           | -         | Rock dump - Yellow and black lichens  |
| LS_I0467                            | 53.546187 | -6.083496 | 693 224.2   | 5 936 989.2  | -           | -         | Rock dump - Yellow and black lichens  |
| LS_I0468                            | 53.545998 | -6.083665 | 693 213.9   | 5 936 967.7  | -           | -         | Lower edge of rock dump - Dead seaweeds   |
| LS_I0469                            | 53.54592  | -6.083717 | 693 210.8   | 5 936 958.9  | -           | -         | Rock dump bored   |
| LS_I0470                            | 53.54592  | -6.083717 | 693 210.8   | 5 936 958.9  | -           | -         | Rock dump - Lichens   |
| LS_I0471                            | 53.545856 | -6.083748 | 693 209.0   | 5 936 951.7  | -           | -         | Rock dump - water landflow  |
| LS_I0472                            | 53.545856 | -6.083748 | 693 209.0   | 5 936 951.7  | -           | -         | Lower edge of rock dump- Lichens and Ulva   |
| LS_I0473                            | 53.545766 | -6.083711 | 693 211.9   | 5 936 941.8  | -           | -         | Lower edge of rock dump- Lichens and Ulva   |
| LS_I0474                            | 53.545766 | -6.083711 | 693 211.9   | 5 936 941.8  | -           | -         | Rock dump -Lichens - Small rock pool with sand mason worms ( <i>Lanice conchilega</i> ) tubes |
| LS_I0475                            | 53.545706 | -6.083673 | 693 214.7   | 5 936 935.2  | -           | -         | Rock dump - sand mason worms ( <i>Lanice conchilega</i> ) tubes                               |
| LS_I0476                            | 53.545706 | -6.083673 | 693 214.7   | 5 936 935.2  | -           | -         | Rock dump - sand mason worm tubes ( <i>Lanice conchilega</i> ) tubes                          |
| LS_I0477                            | 53.545706 | -6.083673 | 693 214.7   | 5 936 935.2  | -           | -         | Rock dump - sand mason worm tubes ( <i>Lanice conchilega</i> )                                |
| LS_I0478                            | 53.545706 | -6.083673 | 693 214.7   | 5 936 935.2  | -           | -         | Rock dump - sand mason worm tubes ( <i>Lanice conchilega</i> )                                |
| LS_I0479                            | 53.545706 | -6.083673 | 693 214.7   | 5 936 935.2  | -           | -         | Rock dump - sand mason worm tubes ( <i>Lanice conchilega</i> )                                |
| LS_I0480                            | 53.545706 | -6.083673 | 693 214.7   | 5 936 935.2  | -           | -         | Rock dump - sand mason worm tubes ( <i>Lanice conchilega</i> )                                |
| LS_I0481                            | 53.545686 | -6.083605 | 693 219.3   | 5 936 933.2  | -           | -         | Boulders covered by green seaweed turf ( <i>Ulva</i> sp.)                                     |
| LS_I0482                            | 53.545686 | -6.083605 | 693 219.3   | 5 936 933.2  | -           | -         | Boulders covered by green seaweed turf ( <i>Ulva</i> sp.)                                     |



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|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
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| LS_I0483                            | 53.545686 | -6.083605 | 693 219.3   | 5 936 933.2  | -           | -         | Lower edge of rock dump- Boulders covered by green seaweed turf ( <i>Ulva</i> sp.), sand mason worms ( <i>Lanice conchilega</i> ) tubes, carrageen (? <i>Chondrus crispus</i> ), anthropogenic debris (rope)  |
| LS_I0484                            | 53.545647 | -6.083521 | 693 225.0   | 5 936 929.0  | -           | -         | Rock covered by green seaweed ( <i>Ulva</i> sp.), red seaweed ( <i>Porphyra</i> sp.), snail ( <i>Littorina</i> sp.)?  |
| LS_I0485                            | 53.545647 | -6.083521 | 693 225.0   | 5 936 929.0  | -           | -         | Boulders/ Cobbles covered by green seaweed turf ( <i>Ulva</i> sp.), spiral wrack ( <i>Fucus spiralis</i> ?)   |
| LS_I0486                            | 53.54563  | -6.083486 | 693 227.4   | 5 936 927.2  | -           | -         | Boulders covered by barnacles ( <i>Semibalanus balanoides</i> ), limpets ( <i>Patella vulgata</i> ), spiral wrack ( <i>Fucus spiralis</i> ?)  |
| LS_I0487                            | 53.5456   | -6.08342  | 693 231.9   | 5 936 924.1  | -           | -         | Boulders covered by channeled wrack ( <i>Pelvetia canaliculata</i> ), red seaweeds ( <i>Gelidium pusillum</i> ), spiral wrack (? <i>Fucus spiralis</i> ), barnacles ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina</i> sp.)?  |
| LS_I0488                            | 53.5456   | -6.08342  | 693 231.9   | 5 936 924.1  | -           | -         | Boulders covered by rock wrack (? <i>Fucus spiralis</i> ), red seaweeds ( <i>Gelidium pusillum</i> ), barnacles ( <i>Balanus balanoides</i> ), winkle ( <i>Littorina</i> sp.)   |
| LS_I0489                            | 53.545574 | -6.08337  | 693 235.4   | 5 936 921.3  | -           | -         | Boulders/ Cobbles covered by green seaweeds ( <i>Ulva</i> sp.) and red seaweeds ( <i>Porphyra</i> sp.)  |
| LS_I0490                            | 53.545574 | -6.08337  | 693 235.4   | 5 936 921.3  | -           | -         | Boulders/ Cobbles covered by green seaweeds ( <i>Ulva</i> sp.) and red seaweeds ( <i>Porphyra</i> sp.), channeled wrack ( <i>Pelvetia canaliculata</i> )  |
| LS_I0491                            | 53.545552 | -6.083299 | 693 240.2   | 5 936 919.1  | -           | -         | Green seaweed turf ( <i>Ulva</i> sp.)- cliff base   |
| LS_I0492                            | 53.545392 | -6.083194 | 693 247.8   | 5 936 901.6  | -           | -         | Green seaweed turf ( <i>Ulva</i> sp.), spiral wrack (? <i>Fucus spiralis</i> ) - Cliff base- Cobbles stripe at the bottom   |
| LS_I0493                            | 53.545392 | -6.083194 | 693 247.8   | 5 936 901.6  | -           | -         | Rock pool feather duster worm (Sabellida), sand worms ( <i>Lanice conchilega</i> ), carrageen ( <i>Chondrus crispus</i> )   |
| LS_I0494                            | 53.545392 | -6.083194 | 693 247.8   | 5 936 901.6  | -           | -         | Rock pool feather duster worm (Sabellida), sand worms ( <i>Lanice conchilega</i> ), carrageen ( <i>Chondrus crispus</i> )   |
| LS_I0495                            | 53.545739 | -6.08322  | 693 244.5   | 5 936 940.1  | -           | -         | View to shoreline- solitary boulders  |
| LS_I0496                            | 53.546066 | -6.083104 | 693 250.7   | 5 936 976.8  | -           | -         | Solitary boulder covered by rock wrack (? <i>Fucus spiralis</i> ), channeled wrack ( <i>Pelvetia canaliculata</i> ), barnacles ( <i>Semibalanus balanoides</i> ), limpets ( <i>Patella vulgata</i> ), red seaweeds ( <i>Gelidium</i> sp?), dog whelks ( <i>Nucella lapillus</i> ) |
| LS_I0497                            | 53.546066 | -6.083104 | 693 250.7   | 5 936 976.8  | 45          | NE        | Solitary boulder covered rock wrack (? <i>Fucus spiralis</i> ), channeled wrack ( <i>Pelvetia canaliculata</i> )/ red seaweeds (? <i>Gelidium</i> sp.)  |
| LS_I0498                            | 53.546066 | -6.083104 | 693 250.7   | 5 936 976.8  | -           | -         | Solitary boulder covered rock wrack (? <i>Fucus spiralis</i> ), channeled wrack ( <i>Pelvetia canaliculata</i> )/ red seaweeds (? <i>Gelidium</i> sp.), barnacles, limpets ( <i>Patella vulgata</i> )   |
| LS_I0499                            | 53.546053 | -6.083037 | 693 255.2   | 5 936 975.5  | -           | -         | Rock pool- barnacles, sand mason worms ( <i>Lanice conchilega</i> ) tubes   |

| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0500                            | 53.546052 | -6.082927 | 693 262.5   | 5 936 975.7  | -           | -         | Solitary boulder covered by spiral wrack (? <i>Fucus spiralis</i> ), barnacles, dog whelks ( <i>Nucella lapillus</i> )                             |
| LS_I0501                            | 53.546052 | -6.082927 | 693 262.5   | 5 936 975.7  | -           | -         | Solitary boulder covered by spiral wrack (? <i>Fucus spiralis</i> ), barnacles, dog whelks ( <i>Nucella lapillus</i> )                             |
| LS_I0502                            | 53.546052 | -6.082927 | 693 262.5   | 5 936 975.7  | -           | -         | Solitary boulder covered by spiral wrack (? <i>Fucus spiralis</i> ), barnacles, dog whelks ( <i>Nucella lapillus</i> )                             |
| LS_I0503                            | 53.546052 | -6.082927 | 693 262.5   | 5 936 975.7  | -           | -         | Solitary boulder covered by mussels ( <i>Mytilus</i> juv.) and barnacles ( <i>Semibalanus balanoides</i> ), dog whelks ( <i>Nucella lapillus</i> ) |
| LS_I0504                            | 53.546052 | -6.082927 | 693 262.5   | 5 936 975.7  | -           | -         | Solitary boulder covered by mussels ( <i>Mytilus</i> juv.) and barnacles ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina</i> sp.)         |
| LS_I0505                            | 53.545824 | -6.082846 | 693 268.9   | 5 936 950.6  | -           | -         | Solitary boulder covered by green seaweeds ( <i>Ulva</i> sp.), barnacles ( <i>Semibalanus balanoides</i> )   |
| LS_I0506                            | 53.545824 | -6.082846 | 693 268.9   | 5 936 950.6  | -           | -         | Solitary boulder covered by barnacles ( <i>Semibalanus balanoides</i> ) and limpets ( <i>Patella vulgata</i> )                                     |
| LS_I0507                            | 53.545824 | -6.082846 | 693 268.9   | 5 936 950.6  | -           | -         | Solitary boulder covered by green seaweeds ( <i>Ulva</i> sp.), barnacles ( <i>Semibalanus balanoides</i> ), winkle ( <i>Littorina littorea</i> )   |
| LS_I0508                            | 53.54584  | -6.082633 | 693 283.0   | 5 936 952.9  | -           | -         | Solitary boulder covered by green seaweeds ( <i>Ulva</i> sp.) and red seaweed ( <i>Porphyra</i> sp.)   |
| LS_I0509                            | 53.54584  | -6.082633 | 693 283.0   | 5 936 952.9  | -           | -         | Solitary boulder covered by green seaweeds ( <i>Ulva</i> sp.) and red seaweed ( <i>Porphyra</i> sp.)   |
| LS_I0510                            | 53.546135 | -6.082459 | 693 293.1   | 5 936 986.2  | -           | -         | Sand mason worm tubes ( <i>Lanice conchilega</i> )/Gravelly sand- Boulder covered by green seaweeds ( <i>Ulva</i> sp.)                             |
| LS_I0511                            | 53.546135 | -6.082459 | 693 293.1   | 5 936 986.2  | -           | -         | Sand mason worm tubes ( <i>Lanice conchilega</i> )/Gravelly sand- Boulder covered by green seaweeds ( <i>Ulva</i> sp.)                             |
| LS_I0512                            | 53.546135 | -6.082459 | 693 293.1   | 5 936 986.2  | -           | -         | Sand mason worm tubes ( <i>Lanice conchilega</i> )/Gravelly sand- Boulder covered by green seaweeds ( <i>Ulva</i> sp.)                             |
| LS_I0513                            | 53.545921 | -6.08326  | 693 241.1   | 5 936 960.2  | -           | -         | Gravel with sand mason tubes ( <i>Lanice conchilega</i> )  |
| LS_I0514                            | 53.545921 | -6.08326  | 693 241.1   | 5 936 960.2  | -           | -         | View of shore gravelly sand with pebbles and cobbles   |
| LS_I0515                            | 53.546109 | -6.083051 | 693 254.1   | 5 936 981.7  | -           | -         | Lower edge gravelly sand with pebbles and cobbles  |
| LS_I0516                            | 53.546263 | -6.082689 | 693 277.3   | 5 936 999.8  | 0           | N         | Lower edge gravelly sand with pebbles and cobbles  |
| LS_I0517                            | 53.546263 | -6.082689 | 693 277.3   | 5 936 999.8  | -           | -         | Gravelly sand with pebbles and cobbles   |
| LS_I0516                            | 53.546456 | -6.082334 | 693 300.0   | 5 937 022.2  | -           | -         | Lower edge gravelly sand with pebbles and cobbles  |
| LS_I0517                            | 53.546544 | -6.082151 | 693 311.7   | 5 937 032.5  | 315         | NW        | Lower edge gravelly sand with pebbles and cobbles  |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0518                            | 53.546569 | -6.082009 | 693 321.0   | 5 937 035.7  | -           | -         | Lower edge gravelly sand with pebbles and cobbles   |
| LS_I0519                            | 53.546666 | -6.081305 | 693 367.2   | 5 937 048.4  | -           | -         | Lower edge gravelly sand with pebbles and cobbles   |
| LS_I0520                            | 53.546948 | -6.081471 | 693 354.9   | 5 937 079.3  | 180         | S         | Upper edge gravelly sand with pebbles and cobbles   |
| LS_I0521                            | 53.546868 | -6.081655 | 693 343.1   | 5 937 069.9  | -           | -         | Upper edge gravelly sand with pebbles and cobbles   |
| LS_I0522                            | 53.546541 | -6.082841 | 693 266.0   | 5 937 030.3  | 315         | NW        | View shore-water outflow- End of sand dunes   |
| LS_I0523                            | 53.546516 | -6.08279  | 693 269.5   | 5 937 027.7  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )   |
| LS_I0524                            | 53.546516 | -6.08279  | 693 269.5   | 5 937 027.7  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )   |
| LS_I0525                            | 53.546516 | -6.08279  | 693 269.5   | 5 937 027.7  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )   |
| LS_I0526                            | 53.546516 | -6.08279  | 693 269.5   | 5 937 027.7  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )   |
| LS_I0527                            | 53.546516 | -6.08279  | 693 269.5   | 5 937 027.7  | -           | -         | Pale-bellied Brent geese ( <i>Branta bernicla hrota</i> )   |
| LS_I0528                            | 53.544987 | -6.083166 | 693 251.5   | 5 936 856.6  | -           | -         | Cliff base-Rock covered by yellow lichens   |
| LS_I0529                            | 53.544987 | -6.083166 | 693 251.5   | 5 936 856.6  | -           | -         | Cliff base-Rock covered by yellow lichens   |
| LS_I0530                            | 53.544987 | -6.083166 | 693 251.5   | 5 936 856.6  | -           | -         | Cliff base-Rock covered by yellow lichens   |
| LS_I0531                            | 53.544987 | -6.083166 | 693 251.5   | 5 936 856.6  | -           | -         | Up to the cliff-Nesting fulmars ( <i>Fulmarus glacialis</i> )   |
| LS_I0532                            | 53.545038 | -6.083262 | 693 245.0   | 5 936 862.0  | -           | -         | Rock covered by yellow lichens and green seaweeds ( <i>Ulva</i> sp.)  |
| LS_I0533                            | 53.545022 | -6.083259 | 693 245.2   | 5 936 860.2  | -           | -         | Rock covered by green seaweeds ( <i>Ulva</i> sp.)   |
| LS_I0534                            | 53.545022 | -6.083259 | 693 245.2   | 5 936 860.2  | -           | -         | Rock covered by green seaweeds ( <i>Ulva</i> sp.) and yellow lichens on the top edge of a rock  |
| LS_I0535                            | 53.545056 | -6.083244 | 693 246.1   | 5 936 864.1  | -           | -         | Rock covered by green seaweeds ( <i>Ulva</i> sp.) and yellow lichens on the top edge of a rock  |
| LS_I0536                            | 53.545056 | -6.083244 | 693 246.1   | 5 936 864.1  | -           | -         | Rock covered by green seaweeds ( <i>Ulva</i> sp.), plants   |
| LS_I0537                            | 53.545056 | -6.083244 | 693 246.1   | 5 936 864.1  | -           | -         | Saltmarsh plants  |
| LS_I0538                            | 53.545056 | -6.083244 | 693 246.1   | 5 936 864.1  | -           | -         | Cliff base - Rock covered by yellow lichens and green seaweeds ( <i>Ulva</i> sp.), saltmarsh plants   |
| LS_I0539                            | 53.545056 | -6.083244 | 693 246.1   | 5 936 864.1  | -           | -         | Herring gull ( <i>Larus</i> sp.), gulls (?)   |
| LS_I0540                            | 53.545056 | -6.083244 | 693 246.1   | 5 936 864.1  | -           | -         | Herring gull ( <i>Larus</i> sp.)  |
| LS_I0541                            | 53.546726 | -6.080263 | 693 435.9   | 5 937 057.9  | -           | -         | Lower edge- Rocks covered by green seaweeds ( <i>Ulva</i> sp.), channeled wrack ( <i>Pelvetia canaliculata</i> )  |
| LS_I0542                            | 53.546726 | -6.080263 | 693 435.9   | 5 937 057.9  | -           | -         | View to Bedrock-Dumprock zonation lower zone green seaweeds ( <i>Ulva</i> sp.), spiral wrack ( <i>F. spiralis</i> ) and channeled wrack ( <i>Pelvetia canaliculata</i> ), upper zone yellow lichens |
| LS_I0543                            | 53.546725 | -6.080335 | 693 431.1   | 5 937 057.6  | -           | -         | Bedrock covered by channeled wrack ( <i>Pelvetia canaliculata</i> ) and green seaweeds ( <i>Ulva</i> sp.)   |

| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0544                            | 53.546824 | -6.080552 | 693 416.3   | 5 937 068.0  | -           | -         | Patch of Sand with gravel and pebbles in the middle of bedrock   |
| LS_I0545                            | 53.546868 | -6.080588 | 693 413.7   | 5 937 072.8  | 135         | SE        | View to shore rock dump and house  |
| LS_I0546                            | 53.546755 | -6.080367 | 693 428.9   | 5 937 060.8  | 225         | SW        | View to zonation green seaweeds and yellow lichens zones   |
| LS_I0547                            | 53.546768 | -6.080371 | 693 428.6   | 5 937 062.3  | 225         | SW        | Line green seaweeds ( <i>Ulva</i> sp.) and yellow lichens zones  |
| LS_I0548                            | 53.546744 | -6.080545 | 693 417.1   | 5 937 059.1  | 45          | NE        | Line green seaweeds ( <i>Ulva</i> sp.) and yellow lichens zones/Small rockpool   |
| LS_I0549                            | 53.546744 | -6.080545 | 693 417.1   | 5 937 059.1  | -           | -         | Rock covered by green seaweeds ( <i>Ulva</i> sp.) and channeled wrack ( <i>Pelvetia canaliculata</i> )<br>Small rockpool |
| LS_I0550                            | 53.545881 | -6.08064  | 693 414.8   | 5 936 962.9  | 135         | SE        | View to Upper edge - sand mason worms ( <i>Lanice conchilega</i> ) on mixed sediment sandy gravel/pebbles and cobbles    |
| LS_I0550                            | 53.545805 | -6.080595 | 693 418.1   | 5 936 954.6  | -           | -         | View to Upper edge - sand mason worms ( <i>Lanice conchilega</i> ) on mixed sediment sandy gravel/pebbles and cobbles    |
| LS_I0551                            | 53.545805 | -6.080595 | 693 418.1   | 5 936 954.6  | -           | -         | Mistake  |
| LS_I0553                            | 53.545805 | -6.080595 | 693 418.1   | 5 936 954.6  | -           | -         | Upper edge - sand mason worms ( <i>Lanice conchilega</i> ) on mixed sediment gravelly sand/pebbles and cobbles           |
| LS_I0554                            | 53.545805 | -6.080595 | 693 418.1   | 5 936 954.6  | -           | -         | Upper edge - sand mason worms ( <i>Lanice conchilega</i> ) on mixed sediment gravelly sand/pebbles and cobbles           |
| LS_I0555                            | 53.545805 | -6.080595 | 693 418.1   | 5 936 954.6  | -           | -         | Upper edge - sand mason worms ( <i>Lanice conchilega</i> ) on mixed sediment gravelly sand/pebbles and cobbles           |
| LS_I0556                            | 53.545752 | -6.080708 | 693 410.9   | 5 936 948.4  | -           | -         | Upper edge - sand mason worms ( <i>Lanice conchilega</i> ) on mixed sediment gravelly sand/pebbles and cobbles           |
| LS_I0557                            | 53.545731 | -6.079625 | 693 482.7   | 5 936 949.0  | -           | -         | Upper edge - sand mason worms ( <i>Lanice conchilega</i> ) on mixed sediment gravelly sand/pebbles and cobbles           |
| LS_I0558                            | 53.545731 | -6.079625 | 693 482.7   | 5 936 949.0  | -           | -         | Upper edge - sand mason worms ( <i>Lanice conchilega</i> ) on mixed sediment gravelly sand/pebbles and cobbles           |
| LS_I0559                            | 53.545089 | -6.081598 | 693 354.9   | 5 936 872.2  | -           | -         | Boulder covered by barnacles and limpets ( <i>Patella vulgata</i> )  |
| LS_I0560                            | 53.545025 | -6.08154  | 693 359.1   | 5 936 865.2  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0561                            | 53.545025 | -6.08154  | 693 359.1   | 5 936 865.2  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0562                            | 53.545025 | -6.08154  | 693 359.1   | 5 936 865.2  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0563                            | 53.544925 | -6.081667 | 693 351.1   | 5 936 853.8  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |  |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|--|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments   |
| LS_I0564                            | 53.544925 | -6.081667 | 693 351.1   | 5 936 853.8  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0565                            | 53.544925 | -6.081667 | 693 351.1   | 5 936 853.8  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0566                            | 53.545028 | -6.081885 | 693 336.2   | 5 936 864.6  | -           | -         | Mistake  |
| LS_I0567                            | 53.544897 | -6.082072 | 693 324.4   | 5 936 849.6  | -           | -         | Boulder covered by red seaweed turf ( <i>Rhodothamniella floridula</i> ) and barnacles   |
| LS_I0568                            | 53.544897 | -6.082072 | 693 324.4   | 5 936 849.6  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0569                            | 53.544897 | -6.082072 | 693 324.4   | 5 936 849.6  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0570                            | 53.544897 | -6.082072 | 693 324.4   | 5 936 849.6  | -           | -         | Upper edge of sandy sediments with sand mason worms ( <i>Lanice conchilega</i> )   |
| LS_I0571                            | 53.545438 | -6.081203 | 693 379.5   | 5 936 912.1  | -           | -         | Boulder covered by red seaweed turf ( <i>Rhodothamniella floridula</i> ), serrated wrack ( <i>Fucus serratus</i> ), barnacles and limpets ( <i>Patella vulgata</i> ), piddocks |
| LS_I0572                            | 53.545438 | -6.081203 | 693 379.5   | 5 936 912.1  | -           | -         | Boulder covered by red seaweed turf ( <i>Rhodothamniella floridula</i> ), serrated wrack ( <i>Fucus serratus</i> ), barnacles and piddocks                                     |
| LS_I0573                            | 53.545438 | -6.081203 | 693 379.5   | 5 936 912.1  | -           | -         | Boulder covered by red seaweed turf ( <i>Rhodothamniella floridula</i> ), serrated wrack ( <i>Fucus serratus</i> ), barnacles and piddocks                                     |
| LS_I0574                            | 53.545381 | -6.081272 | 693 375.2   | 5 936 905.6  | -           | -         | Boulder bored by piddocks  |
| LS_I0575                            | 53.545381 | -6.081272 | 693 375.2   | 5 936 905.6  | -           | -         | Boulder bored by piddocks  |
| LS_I0576                            | 53.545181 | -6.081326 | 693 372.5   | 5 936 883.2  | -           | -         | Boulder bored by piddocks  |
| LS_I0577                            | 53.545131 | -6.081234 | 693 378.9   | 5 936 877.9  | -           | -         | Boulder bored by piddocks  |
| LS_I0578                            | 53.545131 | -6.081234 | 693 378.9   | 5 936 877.9  | -           | -         | Boulder bored by piddocks  |
| LS_I0579                            | 53.545202 | -6.081094 | 693 387.8   | 5 936 886.1  | -           | -         | Boulder bored by piddocks covered by red seaweed turf ( <i>Rhodothamniella floridula</i> )   |
| LS_I0580                            | 53.545202 | -6.081094 | 693 387.8   | 5 936 886.1  | -           | -         | Boulder bored by piddocks  |
| LS_I0581                            | 53.545202 | -6.081094 | 693 387.8   | 5 936 886.1  | -           | -         | Boulder bored by piddocks  |
| LS_I0582                            | 53.545202 | -6.081094 | 693 387.8   | 5 936 886.1  | -           | -         | Ruddy turnstone bird ( <i>Arenaria interpres</i> )   |
| LS_I0583                            | 53.545202 | -6.081094 | 693 387.8   | 5 936 886.1  | -           | -         | Mistake  |
| LS_I0584                            | 53.545555 | -6.08081  | 693 405.0   | 5 936 926.2  | -           | -         | Boulder bored by piddocks - no alive specimens visible   |
| LS_I0585                            | 53.545555 | -6.08081  | 693 405.0   | 5 936 926.2  | -           | -         | Boulder bored by piddocks - no alive specimens visible   |
| LS_I0586                            | 53.545625 | -6.080749 | 693 408.7   | 5 936 934.1  | -           | -         | Cobbles bored by piddocks - no alive specimens visible   |
| LS_I0587                            | 53.545625 | -6.080749 | 693 408.7   | 5 936 934.1  | -           | -         | Cobbles bored by piddocks - no alive specimens visible, fan worm tubes ( <i>Spirobranchus</i> sp.)   |
| LS_I0588                            | 53.54584  | -6.080255 | 693 440.5   | 5 936 959.4  | -           | -         | Cobbles bored by piddocks - no alive specimens - Sand mason worm tube ( <i>Lanice conchilega</i> )   |

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| Geodetic Parameters: WGS84 UTM 29 N |           |           |             |              |             |           |   |
|-------------------------------------|-----------|-----------|-------------|--------------|-------------|-----------|---|
| Photo Number                        | Latitude  | Longitude | Easting [m] | Northing [m] | Bearing [°] | Direction | Comments  |
| LS_I0589                            | 53.54584  | -6.080076 | 693 452.3   | 5 936 959.9  | -           | -         | Cobbles bored by piddocks - no alive specimens  |
| LS_I0590                            | 53.54584  | -6.080076 | 693 452.3   | 5 936 959.9  | -           | -         | Cobbles bored by piddocks - no alive specimens - sand mason worm tubes ( <i>Lanice conchilega</i> ) |
| LS_I0591                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | Cobbles bored by piddocks - no alive specimens  |
| LS_I0592                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore   |
| LS_I0593                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore   |
| LS_I0594                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore sand  |
| LS_I0595                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore-sand mason worms ( <i>Lanice</i> sp.)   |
| LS_I0596                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore   |
| LS_I0597                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore from end of the pier- cobbles   |
| LS_I0598                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore from end of the pier- cobbles   |
| LS_I0599                            | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore from end of the pier- cobbles   |
| LS_I600                             | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore - cobbles   |
| LS_I601                             | 53.546197 | -6.080369 | 693 431.3   | 5 936 998.8  | -           | -         | View of the shore - cobbles   |
| LS_I602                             | 53.546831 | -6.080673 | 693 408.3   | 5 937 068.4  | -           | -         | Cobbles bored by piddocks - no alive specimens  |
| LS_I603                             | 53.546831 | -6.080673 | 693 408.3   | 5 937 068.4  | -           | -         | Cobbles bored by piddocks - no alive specimens  |
| LS_I604                             | 53.546831 | -6.080673 | 693 491.7   | 5 936 924.8  | -           | -         | Cobbles bored by piddocks - no alive specimens  |
| LS_I605                             | 53.547042 | -6.079556 | 693 481.3   | 5 937 094.9  | -           | -         | View to shore beyond the pier   |
| LS_I606                             | 53.547042 | -6.079556 | 693 481.3   | 5 937 094.9  | -           | -         | View to shore beyond the pier   |
| LS_I607                             | 53.547042 | -6.079556 | 693 481.3   | 5 937 094.9  | -           | -         | View to shore beyond the pier   |
| LS_I608                             | 53.547042 | -6.079556 | 693 481.3   | 5 937 094.9  | -           | -         | View to shore beyond the pier   |
| LS_I609                             | 53.547042 | -6.079556 | 693 481.3   | 5 937 094.9  | -           | -         | View to shore beyond the pier   |

## B.2 LOUGHSHINNY TARGET NOTES

| Waypoint | Latitude  | Longitude | Notes  | Biotope          |
|----------|-----------|-----------|--|------------------|
| LS_I025  | 53.547189 | -6.081403 | Bottom of path   | -                |
| LS_I040  | 53.546989 | -6.082224 | Bottom of main steps   | -                |
| LS_I052  | 53.546727 | -6.082801 | Bottom of steps  | -                |
| LS_I063  | 53.545998 | -6.083722 | Base of outflow  | -                |
| LS_I065  | 53.545847 | -6.083787 | Case of outflow  | -                |
| LS_I066  | 53.545818 | -6.083791 | Western end of fence above larger outflow  | -                |
| LS_I073  | 53.545546 | -6.083468 | Edge of limestone and shale layered cliff  | -                |
| LS_I076  | 53.545762 | -6.083826 | Corner of sea defence (boulders in cages)  | -                |
| LS_I083  | 53.54678  | -6.08262  | Yellow and grey lichens on supralittoral rock (emergent boulders with lichen under dunes – 3 m × 50 cm)        | LR.FLR.Lic.YG    |
| LS_I101  | 53.547092 | -6.080722 | Talitrids on the upper shore and strandline  | LS.LSa.St.Tal    |
| LS_I109  | 53.546784 | -6.080289 | Lichens ( <i>Verrucaria maura</i> ) covered bedrock  | LR.FLR.Lic.Ver.B |
| LS_I110  | 53.546842 | -6.080191 | Mixed sediment (sand, pebbles, cobbles, boulders) ca. 3 m × 1.5 m wide   | LS.LMx           |
| LS_I112  | 53.546835 | -6.079985 | Outer edge of bottom slip - covered by mobile sands  | -                |
| LS_I113  | 53.546828 | -6.079555 | Outer edge of bottom of steps  | -                |
| LS_I121  | 53.546676 | -6.079258 | Bottom step  | -                |
| LS_I124  | 53.54652  | -6.079213 | Other edge of green seaweed patch on walkway (now extends up whole wall)                                       | LR.FLR.Eph       |
| LS_I128  | 53.546063 | -6.079239 | Vertical distribution - Green seaweed extends down wall  | LR.FLR.Eph       |
| LS_I129  | 53.545987 | -6.079313 | Vertical distribution - Green seaweed extends down wall  | LR.FLR.Eph       |
| LS_I130  | 53.545885 | -6.079269 | Vertical distribution - Green seaweed extends down wall  | LR.FLR.Eph       |
| LS_I131  | 53.545757 | -6.079257 | Vertical distribution - Green seaweed extends down wall  | LR.FLR.Eph       |
| LS_I134  | 53.546889 | -6.081191 | Anthropogenic debris (rope on sand with pebbles)   | -                |
| LS_I141  | 53.545476 | -6.083324 | Vertical distribution - Green seaweed on cliff (fresh water influence?)  | LR.FLR.Eph       |
| LS_I142  | 53.545411 | -6.083337 | Vertical distribution - Green seaweed on cliff (fresh water influence?)  | LR.FLR.Eph       |
| LS_I148  | 53.54537  | -6.083098 | Small rockpool - Area of small rockpools   | LR.FLR.Rkp       |
| LS_I149  | 53.545445 | -6.083193 | Shallow rockpool - sev. small totalling ca. 1.5 × 3.0 m - Seaweeds in sediment-floored eulittoral rockpools    | LR.FLR.Rkp.SwSed |
| LS_I150  | 53.545408 | -6.083085 | Several small < 1m <sup>2</sup> rockpools, with Sabellidae - Seaweeds in sediment-floored eulittoral rockpools | LR.FLR.Rkp.SwSed |

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| Waypoint | Latitude  | Longitude | Notes   | Biotope                 |
|----------|-----------|-----------|---|-------------------------|
| LS_I155  | 53.545223 | -6.083183 | Gully in base of cliff - Littoral caves and overhangs with features of <i>Audouinella purpurea</i> and <i>Cladophora rupestris</i> on upper to mid shore cave walls as also barnacles but not <i>Cladophora</i> | LR.FLR.CvOv.AudCla      |
| LS_I158  | 53.545172 | -6.083245 | Vertical distribution - <i>Ulva</i> sp. patch (4 m × 1 m) along base of cliff   | LR.FLR.Eph              |
| LS_I162  | 53.545131 | -6.083079 | Border of cliff base and bedrock - both littoral rock   | LR                      |
| LS_I163  | 53.545116 | -6.083129 | Area of rockpools   | LR.FLR.Rkp              |
| LS_I173  | 53.545283 | -6.08308  | Border between bedrock edge, top of sand and boulders with <i>Ulva</i> sp. above  | LR.FLR.Eph              |
| LS_I174  | 53.545242 | -6.083032 | Large shallow rockpool  | LR.FLR.Rkp              |
| LS_I191  | 53.545429 | -6.082663 | Area of rockpools in barnacles  | LR.FLR.Rkp              |
| LS_I192  | 53.545461 | -6.08272  | <i>Ascophyllum nodosum</i> on full salinity mid eulittoral rock <i>Ascophyllum</i> sp. on bedrock (2 m × 2 m)   | LR.LLR.F.Asc.FS         |
| LS_I247  | 53.544845 | -6.083233 | Shallow upper shore rockpool zone   | LR.FLR.Rkp              |
| LS_I248  | 53.544853 | -6.08322  | Rockpools   | LR.FLR.Rkp/LR.FLR.Rkp.G |
| LS_I267  | 53.54488  | -6.082951 | Serrated wrack ( <i>Fucus serratus</i> ) (1 m × 1 m patch in gully/crevice) – <i>Fucus serratus</i> on moderately exposed lower eulittoral rock   | LR.MLR.BF.Fser          |
| LS_I274  | 53.544865 | -6.082987 | Zonation: <i>Prasiola</i> sp., <i>Pelvetia</i> sp., <i>F. spiralis</i> , <i>F. vesiculosus</i>  | LR.FLR.Lic.Pra          |
| LS_I275  | 53.544868 | -6.083077 | <i>Prasiola</i> sp. surrounded by <i>Pelvetia</i> sp. (1 m × 1 m patch)   | LR.FLR.Lic.Pra          |
| LS_I332  | 53.545419 | -6.0828   | Rockpools   | LR.FLR.Rkp              |
| LS_I350  | 53.545251 | -6.081764 | Boulder surrounded by sand  | LR                      |
| LS_I368  | 53.544734 | -6.081917 | <i>Lanice conchilega</i> patch meets sea  | LS.LSa.MuSa.Lan         |
| LS_I372  | 53.545255 | -6.081333 | Piddock boulder 1   | LR.MLR.BF.Fser.Pid      |
| LS_I373  | 53.545227 | -6.081308 | Piddock Boulder 1: Piddocks and <i>Rhodothamniella floridula</i>  | LR.MLR.BF.Fser.Pid      |
| LS_I382  | 53.545477 | -6.081187 | Piddock boulder 3   | LR.MLR.BF.Fser.Pid      |
| LS_I387  | 53.54552  | -6.080227 | Anthropogenic debris - engine   | -                       |
| LS_I388  | 53.545533 | -6.080158 | Kelp zone variable  | -                       |
| LS_I426  | 53.545396 | -6.08022  | <i>Sabellaria spinulosa</i>   | -                       |
| LS_I427  | 53.545564 | -6.079625 | <i>Sabellaria spinulosa</i>   | -                       |
| LS_I430  | 53.546136 | -6.079949 | Anchor/Weight/Boat rope 1   | -                       |
| LS_I431  | 53.54606  | -6.079936 | Anchor/Weight/Boat rope 2   | -                       |
| LS_I432  | 53.54599  | -6.079719 | Anchor/Weight/Boat rope 3   | -                       |



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| Waypoint | Latitude  | Longitude | Notes   | Biotope       |
|----------|-----------|-----------|---|---------------|
| LS_I433  | 53.54607  | -6.079735 | Anchor/Weight/Boat rope 4   | -             |
| LS_I434  | 53.546058 | -6.079734 | Anthropogenic debris and <i>Lanice conchilega</i> on different substrates | -             |
| LS_I444  | 53.545906 | -6.079931 | Anthropogenic debris on coarse sand/gravel with <i>Lanice conchilega</i>  | -             |
| LS_I500  | 53.546003 | -6.080198 | Anchor/Weight/Boat chain  | -             |
| LS_I521  | 53.546473 | -6.083191 | Concrete foundation stripe  | LR            |
| LS_I522  | 53.546408 | -6.083269 | Concrete foundation stripe  | LR            |
| LS_I523  | 53.54636  | -6.083299 | Saltmarsh plants  | -             |
| LS_I524  | 53.546308 | -6.083421 | Saltmarsh plants  | -             |
| LS_I530  | 53.546338 | -6.083389 | Saltmarsh plants beyond the path  | -             |
| LS_I531  | 53.547169 | -6.080648 | Carpark   | -             |
| LS_I546  | 53.546898 | -6.080132 | Slipway   | -             |
| LS_I547  | 53.546876 | -6.080007 | Slipway   | -             |
| LS_I548  | 53.546867 | -6.079881 | Wall  | -             |
| LS_I552  | 53.546877 | -6.07956  | Vertical distribution - Yellow and black lichens                          | LR.FLR.Lic.YG |
| LS_I555  | 53.546636 | -6.07937  | Vertical distribution - Yellow and black lichens                          | LR.FLR.Lic.YG |
| LS_I558  | 53.546378 | -6.079336 | Vertical distribution - Yellow and black lichens                          | LR.FLR.Lic.YG |
| LS_I559  | 53.546298 | -6.07934  | Vertical distribution - Yellow and black lichens                          | LR.FLR.Lic.YG |
| LS_I560  | 53.546222 | -6.079348 | Vertical distribution - Yellow and black lichens                          | LR.FLR.Lic.YG |
| LS_I561  | 53.546154 | -6.079355 | Vertical distribution - Yellow and black lichens                          | LR.FLR.Lic.YG |
| LS_I562  | 53.546082 | -6.079356 | Vertical distribution - Yellow and black lichens                          | LR.FLR.Lic.YG |
| LS_I563  | 53.546001 | -6.079353 | Vertical distribution - Green lichens/small green seaweed                 | LR.FLR.Lic    |
| LS_I564  | 53.5459   | -6.079359 | Vertical distribution - Green lichens/small green seaweed                 | LR.FLR.Lic    |
| LS_I565  | 53.545852 | -6.079367 | Vertical distribution - Green lichens/small green seaweed                 | LR.FLR.Lic    |
| LS_I566  | 53.545831 | -6.079455 | Vertical distribution - Green lichens/small green seaweed                 | LR.FLR.Lic    |
| LS_I567  | 53.545745 | -6.079604 | Vertical distribution - Green lichens/small green seaweed                 | LR.FLR.Lic    |
| LS_I568  | 53.545699 | -6.07958  | Vertical distribution -Green lichens/small green seaweed                  | LR.FLR.Lic    |
| LS_I575  | 53.546605 | -6.082933 | Discharge – Rock dump - End of sand dunes                                 | -             |
| LS_I592  | 53.54563  | -6.083486 | Boulders covered by barnacles and fucoids                                 | LR.MLR.BF     |
| LS_I593  | 53.5456   | -6.08342  | Boulders covered by barnacles and fucoids                                 | LR.MLR.BF     |

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| Waypoint | Latitude  | Longitude | Notes   | Biotope                                |
|----------|-----------|-----------|---|--|
| LS_I603  | 53.546066 | -6.083104 | Solitary boulder covered bladder wrack ( <i>Fucus vesiculosus</i> ), channeled wrack ( <i>Pelvetia canaliculata</i> )   | LR.MLR.BF.PelB                         |
| LS_I604  | 53.546053 | -6.083037 | Solitary boulder covered bladder wrack ( <i>Fucus vesiculosus</i> ), channeled wrack ( <i>Pelvetia canaliculata</i> )   | LR.MLR.BF.PelB                         |
| LS_I605  | 53.546052 | -6.082927 | Solitary boulder covered by mussels ( <i>Mytilus</i> juv.) and barnacles ( <i>Semibalanus balanoides</i> )  | LR.HLR.MusB.Sem                        |
| LS_I606  | 53.545824 | -6.082846 | Solitary boulder covered by barnacles ( <i>Semibalanus balanoides</i> ) and limpets ( <i>Patella vulgata</i> )  | LR.HLR.MusB.Sem                        |
| LS_I607  | 53.54584  | -6.082633 | Solitary boulder covered by green seaweed ( <i>Ulva</i> sp.) and red seaweed ( <i>Porphyra</i> sp.)   | LR.FLR.Eph                             |
| LS_I608  | 53.546135 | -6.082459 | Solitary boulder covered by green seaweed ( <i>Ulva</i> sp.)  | LR.FLR.Eph                             |
| LS_I666  | 53.546765 | -6.080436 | Patch of sand with gravel and pebbles   | LS.Lsa.MoSa variant 2                  |
| LS_I676  | 53.546744 | -6.080545 | Small rockpool/rock covered by green seaweeds ( <i>Ulva</i> sp.) and channeled wrack ( <i>Pelvetia canaliculata</i> )   | LR.FLR.Rkp                             |
| LS_I696  | 53.545089 | -6.081598 | Boulder covered by barnacles and limpets ( <i>Patella vulgata</i> )   | LR.MLR.BF                              |
| LS_I740  | 53.547042 | -6.079556 | Path down to bedrock area   | -                                      |
| LS_I769  | 53.546588 | -6.079365 | Vertical zonation: red seaweeds ( <i>Catenella</i> sp.), bladder wrack ( <i>Fucus vesiculosus</i> )/spiral wrack ( <i>Fucus spiralis</i> ), knotted wrack ( <i>Ascophyllum</i> sp.) | LR.FLR.Lic.YG/LR.FLR.Eph/LR.LLR.F.Fspi |
| LS_I770  | 53.546031 | -6.079358 | Vertical zonation: small green algae, spiral wrack ( <i>Fucus spiralis</i> ), green seaweed ( <i>Ulva</i> sp.)  | LR.FLR.Lic/LR.FLR.Eph/LR.LLR.F.Fspi    |