

# APPENDIX A

## Survey Reports

## **A.1 INTERTIDAL SURVEY REPORT FOR CABLE CORRIDOR 2.1 YELL TO UNST: YELL LANDING POINT**





# **Phase 1 Intertidal Survey Report for Gutcher, Yell, Shetland (Route 2.1)**

**Version 1**

**Report to Intertek**

**Issued by Aquatera Ltd**

**P961 – October 2021**



**[www.aquatera.co.uk](http://www.aquatera.co.uk)**



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### Issue record

The version number is indicated on the front cover.

Version	Date	Details
V1	5 Oct 2021	First draft issued to client

Members of:





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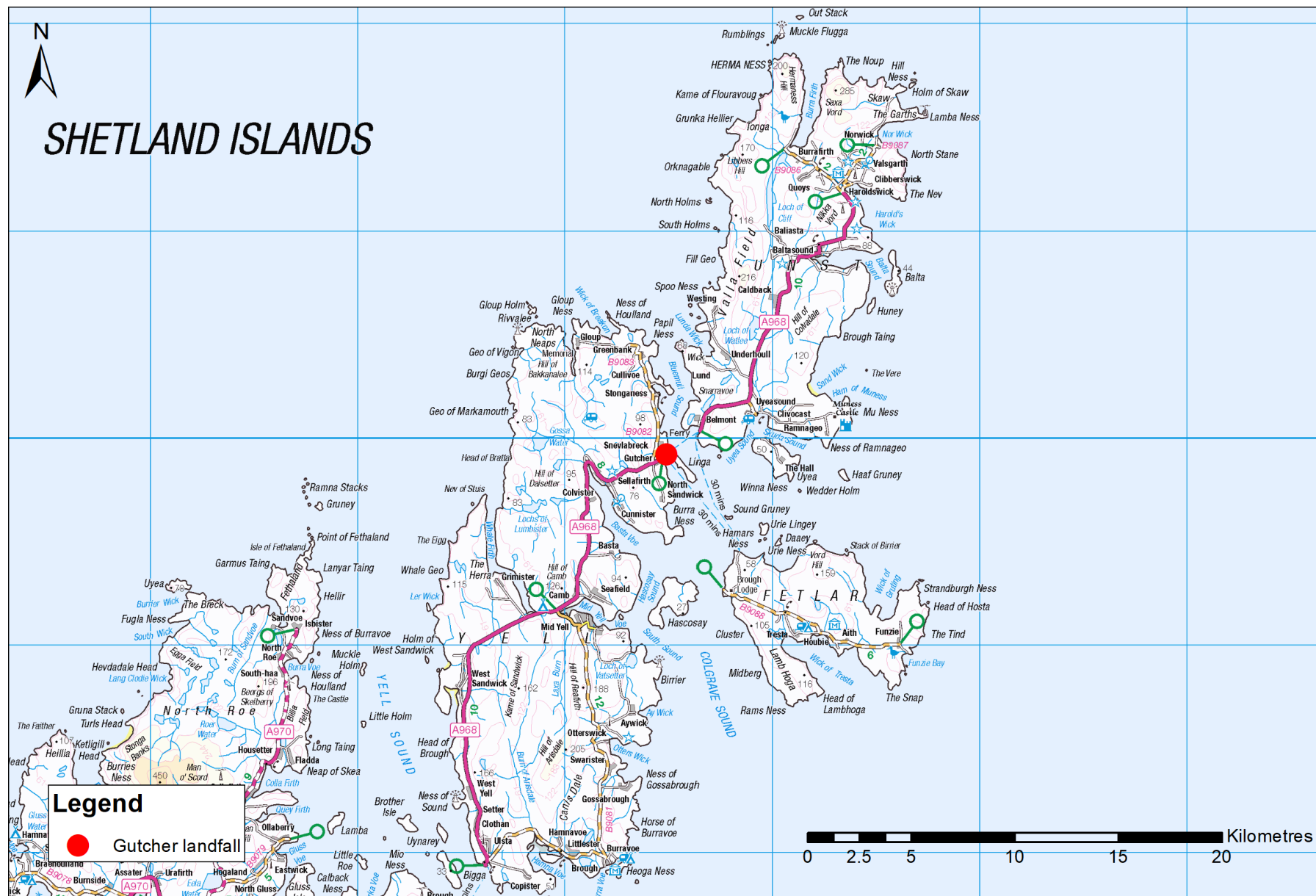
# 1 INTRODUCTION

Aquatera has been commissioned to carry out a Phase 1 intertidal survey of the shore at Gutcher on the northeast coast of Yell, Shetland (Figure 1.1). The area has been identified as a suitable location for the onshore landfall and onward connection for fibre optic cables as part of network improvements to connect a number of locations around Shetland.

The objectives of the survey were to:

- Identify and map biotopes present within the survey area;
- Identify and map the presence of any rare or protected species within the study area; and
- Provide target notes to describe key features of the shore

The survey was carried out by Duncan Clarke, a marine biologist experienced in intertidal biological survey and mapping.



**Figure 1.1** Location of the Gutcher, Shetland survey site (© Crown copyright and database rights 2021 OS 0100040827)



## 2 PHASE 1 INTERTIDAL SURVEY

### 2.1 INTRODUCTION

The survey took place on 21 September 2021, during low spring tides. The survey took place either side of low tide. Table 2.1 below outlines the survey conditions.

**Table 2.1 Survey details**

<b>Date</b>	21 September 2021
<b>Time at start</b>	15:50
<b>Time at finish</b>	17:00
<b>Low tide (hours)</b>	16:48 BST
<b>Tide height (m)</b>	0.7
<b>Lowest Astronomical Tide (m)</b>	0.2
<b>Mean Low Water Springs (m)</b>	0.6
<b>Type of access</b>	Foot
<b>Sea condition</b>	Calm nearshore, choppy offshore, moderate waves breaking on the shore
<b>Weather condition</b>	SW6; drizzle

### 2.2 METHODOLOGY

#### 2.2.1 Phase 1 survey method

The survey was carried out on foot using a variety of survey techniques that are described in the Countryside Council for Wales (CCW) report 'Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey' (Wyn *et al.*, 2000) and the 'Marine Nature Conservation Review Rationale and Methods' (Hiscock, 1996).

Prior to commencing the survey in the field, a wireframe map (a basic outline drawing of obvious features and/or changes in habitat) was produced to aid with the recording of biotopes.

Areas of sediment were dug and sampled at various intervals at the upper mid shore, mid shore, and lower shore. All samples were filtered through a 5 mm and 0.5 mm sieve. For both the sediment and rock areas, target notes and photographs were taken when there was a change in biotope type or zonation. An iPhone equipped with the ArcGIS app "Field Maps" was used to mark target points and tracks. All information was digitised to GIS using ArcMap 10, post survey. Maps were created using the guidance laid out in the CCW methodology.

Biotopes were assigned and described with reference to The Marine Habitat Classification for Britain and Ireland (v04.05) (Connor *et al.*, 2004) and the Joint Nature Conservation Committee (JNCC) website's online search facility.

All species names were taken from The World Register of Marine Species (WoRMS) website.

#### 2.2.2 Survey area

The proposed survey area comprised an approximate 630 m corridor. This was based on the provided areas of search for the proposed cable route with an additional 25 m added on to the east and west edges to allow for any movement



of the beach manhole (BMH) and cable within this corridor. The survey area extended from the splash zone down to the Lowest Astronomical Tide (LAT) (Figure 2.1)



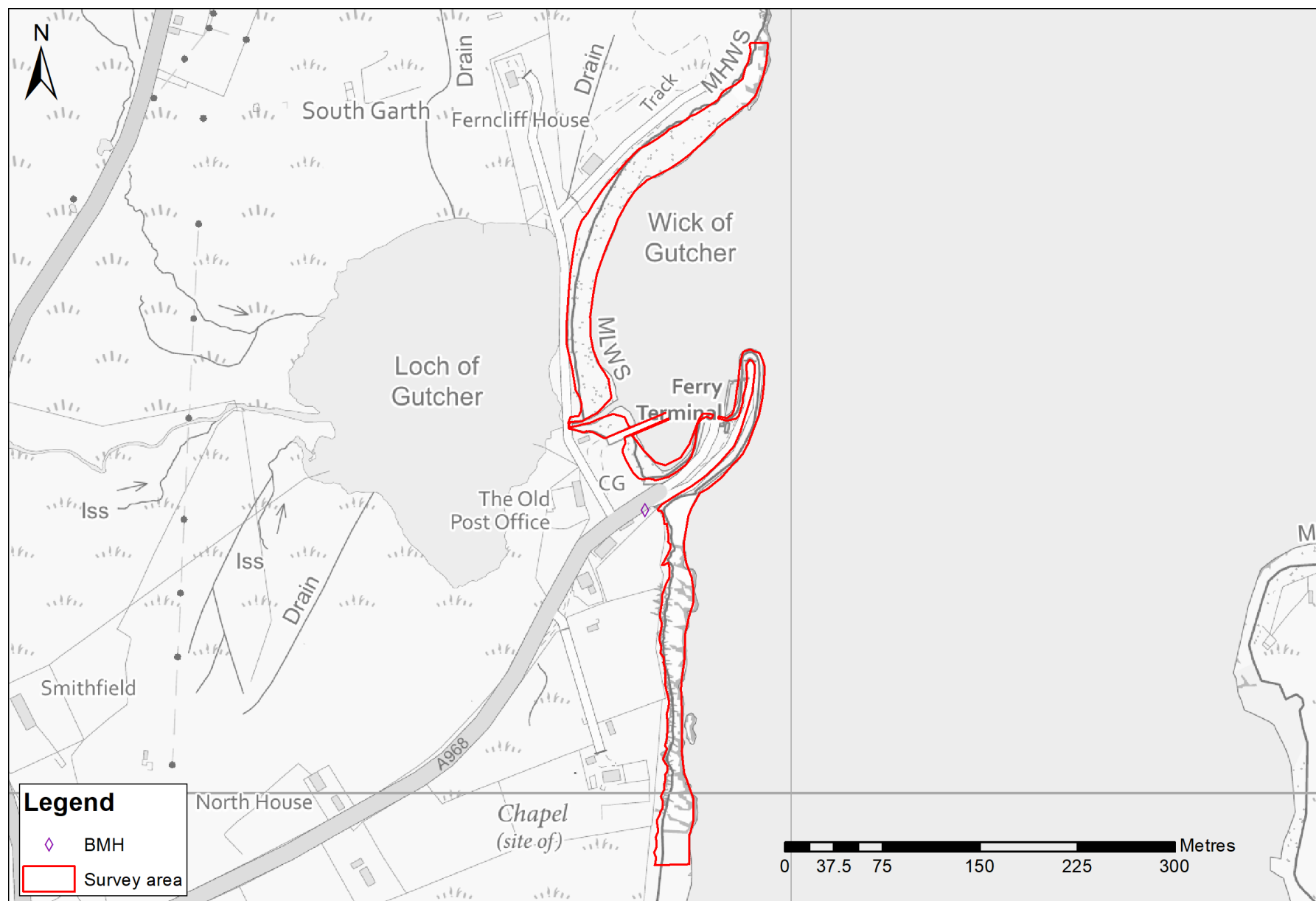


Figure 2.1 Survey area and proposed BMH location at Gutcher, Yell (© Crown copyright and database rights 2021 OS 0100040827)

### 2.2.3 Limitations of survey

Only one low tide window was available in which to complete the survey. However, it was possible to cover the entire survey area during the single survey period.

## 2.3 SURVEY FINDINGS

### 2.3.1 Site description

The site at Gutcher lies at the northeast of the island of Yell, the second most northerly of the inhabited Shetland islands. The site is the location of the ferry terminal which connects passengers and vehicles to Unst and Fetlar, with around 50 sailings a day. Gutcher is located on the western edge of Bluemull Sound, a strait of strong tidal currents separating Yell from the island of Unst. The topography of the land here allows the cable landing site to be out of the strong tidal currents and is relatively well sheltered when compared to other areas of the coastline. The southern end of the area of search is more exposed and open, but it is unlikely that the cable will make landfall in this area.

The survey area begins at the north end of the Wick of Gutcher, just below a quarry site. At this northern edge, the shore is backed by an artificial pile of excavated rock which lies above a mosaic of large barnacle covered boulders and fucoids seaweeds on the lower lying shore. Between this northern end of the shore and the ferry terminal the shore gradually grades from large rocks through to a shingle shore below the Loch of Gutcher. Just to the north of the small pier below the Old Post Office, the Loch of Gutcher discharge to the sea at low tide. In this area, the shore is made up of a mosaic of fucoids and muddy gravel. Between the small pier and the ferry terminal is a small, sheltered bay. The shore here is dominated by egg wrack (*Ascophyllum nodosum*) and filamentous green seaweeds. Around the ferry terminal the intertidal zone is comprised of artificial rock armouring, with little seaweed growth, and mainly inhabited by barnacles (*Semibalanus balanoides*). To the south of the ferry pier is a small cobble bay, the likely landing point for the cable, given the BMH location, followed by a rocky coast with larger boulders and emergent bedrock. This stretch of shore provides a habitat for typical rocky shore biotopes of lichens above fucoids seaweeds, with large boulders in the mid to lower shore dominated by barnacles (*S. balanoides*), limpets (*Patella vulgata*), and dogwhelks (*Nucella lapillus*).

### 2.3.2 Biotopes

A summary of biotopes recorded within the survey area is provided in Table 2.2, and a map of lifeforms is shown in Figure 2.2.

**Table 2.2 List of Biotopes found within the survey area**

Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.FLR.Lic.YG	Yellow and grey lichens on supralittoral rock	Splash zone of emergent bedrock, large boulders, and the rock armouring around the ferry terminal.	<i>Caloplaca</i> spp. <i>Ramalina siliquosa</i> Grey lichens <i>Verrucaria maura</i>
LR.FLR.Lic.Ver	<i>Verrucaria maura</i> on littoral fringe rock	Immediately below the LR.FLR.Lic.YG biotope.	<i>Semibalanus balanoides</i> <i>Littorina saxatilis</i> <i>Verrucaria maura</i>

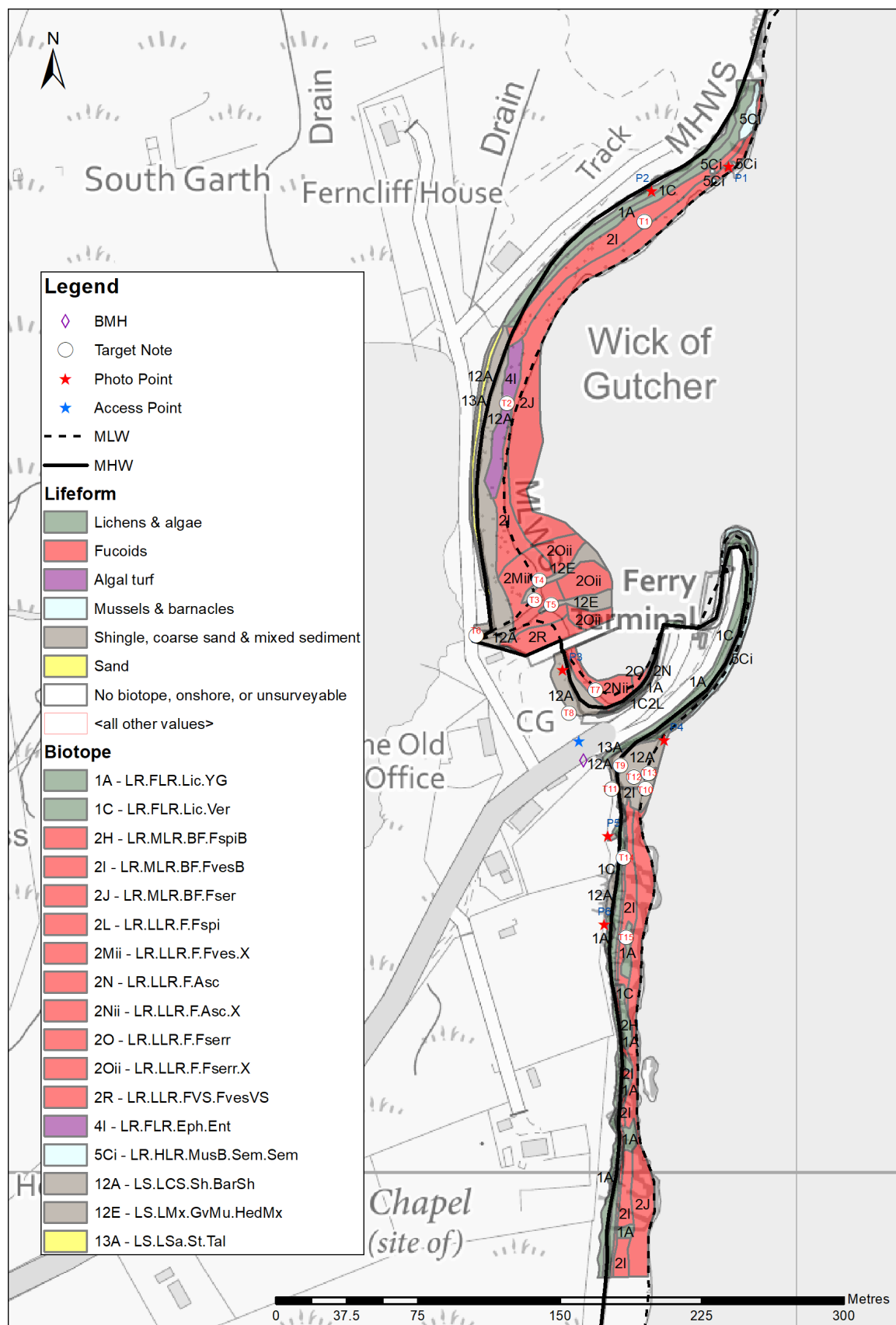


Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.MLR.BF.PelB	<i>Pelvetia canaliculata</i> and barnacles on moderately exposed littoral fringe rock	Forms a mosaic with and above the LR.MLR.BF.FspiB biotope on the southern stretch of rocky shore.	<i>Semibalanus balanoides</i> <i>Littorina saxatilis</i> <i>Pelvetia canaliculata</i> <i>Fucus spiralis</i> <i>Verrucaria maura</i>
LR.MLR.BF.FspiB	<i>Fucus spiralis</i> on exposed to moderately exposed upper eulittoral rock	Forms a mosaic with and below the LR.MLR.BF.FspiB biotope on the southern stretch of rocky shore.	<i>Semibalanus balanoides</i> <i>Littorina saxatilis</i> <i>Pelvetia canaliculata</i> <i>Fucus spiralis</i> <i>Verrucaria maura</i>
LR.MLR.BF.FvesB	<i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed upper eulittoral rock	Mid shore on rocks and boulders on both the northern and southern stretches of shore.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Fucus vesiculosus</i> <i>Ulva</i> spp. <i>Cladophora rupestris</i>
LR.MLR.BF.Fser	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock	Lower reaches of both the northern and southern rocky shore.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Fucus serratus</i> <i>Ulva</i> spp. <i>Cladophora rupestris</i>
LR.LLR.F.Fspi	<i>Fucus spiralis</i> on sheltered upper eulittoral rock	Thin bands on sections of the northern rocky shore and the rock armouring of the inner harbour area.	<i>Fucus spiralis</i> <i>Verrucaria maura</i>
LR.LLR.F.Fves.X	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata	Southern half of the northern rocky mid shore on cobbles and shingle. Forms a mosaic with the LS.LMx.GvMu.HedMx biotope.	<i>Actinia equina</i> <i>Littorina obtusata</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Asc	<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock	Rock armouring of the sheltered harbour area and vertical walls of the small pier.	<i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Asc.X	<i>Ascophyllum nodosum</i> on full salinity mid eulittoral mixed substrata	Sheltered harbour from the upper mid shore down to low water.	<i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i> <i>Ulva</i> spp.

Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.LLR.F.Fserr	<i>Fucus serratus</i> on sheltered lower eulittoral rock	Lower edges of the rock armouring on the sheltered harbour side.	<i>Fucus vesiculosus</i>
LR.LLR.F.Fserr.X	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata	Southern end of the northern section of shore below the outflow from the Loch of Gutter. Forms a mosaic with the LS.LMx.GvMu.HedMx biotope.	<i>Fucus serratus</i> <i>Ulva</i> spp.
LR.LLR.FVS.FvesVS	<i>Fucus vesiculosus</i> on variable salinity mid eulittoral boulders and stable mixed substrata	Permanently inundated shore from the outflow of the Loch of Gutter. Will experience periods of brackish to full salinity at high tide and brackish/freshwater conditions at low tide.	<i>Fucus vesiculosus</i>
LR.FLR.Rkp.G	Green seaweeds ( <i>Ulva</i> spp. and <i>Cladophora</i> spp.) in shallow upper eulittoral rockpools	High water pools on the emergent craggy bedrock of the southern rock shore. The formation of rocks creates a random mosaic of LR.FLR.Lic.YG, LR.FLR.Lic.Ver, LR.MLR.BF.PelB, LR.MLR.BF.FspiB, LR.FLR.Rkp.G, and LR.HLR.MusB.Sem.Sem.	<i>Patella vulgata</i> <i>Ulva</i> spp.
LR.FLR.Eph.Ent	<i>Enteromorpha</i> (now <i>Ulva</i> spp.) on freshwater-influenced and/or unstable upper eulittoral rock	Small patches on the southern stretch of rocky shore, with one large area on mid shore cobbles on the northern stretch of rocky shore.	<i>Ulva</i> spp.
LR.HLR.MusB.Sem.Sem	<i>Semibalanus balanoides</i> , <i>Patella vulgata</i> and <i>Littorina</i> spp. on exposed to moderately exposed ore vertical sheltered eulittoral rock	Large boulders and rocks at the northern edge of the northern rocky shore, large rocks, and boulders between the <i>Pelvetia canaliculata</i> and <i>Fucus spiralis</i> biotopes and the <i>Fucus vesiculosus</i> and <i>Fucus serratus</i> biotopes on the southern rocky shore. Also found on the mid to lower reaches of the rock armouring, on the more exposed sides of the pier.	<i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Nucella lapillus</i>
LS.LCS.Sh.BarSh	Barren littoral shingle	Beach backing for the southern half of the northern rocky shore, the sheltered harbour area, and small inlets and bays on the southern rocky shore.	None

Biotope code	Biotope description	Occurrence on site	Typical species on site
LS.LMx.GvMu.HedMx	<i>Hediste diversicolor</i> in littoral gravelly muddy sand and gravelly sandy mud	Forms a mosaic with LR.LLR.F.Fves.X, and LR.LLR.F.Fserr.X just to the north of the harbour area, below the Loch of Gutcher outflow.	<i>Hediste diversicolor</i>
LS.LSa.St.Tal	Talitrids on the upper shore and strandline	Found at the top of open sections of shore overlying the cobble shore.	Talitridae








**Figure 2.2** Lifeforms map of the Gutcher intertidal survey area (© Crown copyright and database rights 2021 OS 0100040827)




### 2.3.3 Target notes





Target Notes and corresponding photographs are shown in Table 2.3. The locations of each of the Target Notes is indicated on the lifeforms map (Figure 2.2). Figure 2.2 also shows the locations of additional photographs as shown in Section 2.7.

**Table 2.3 Target notes**

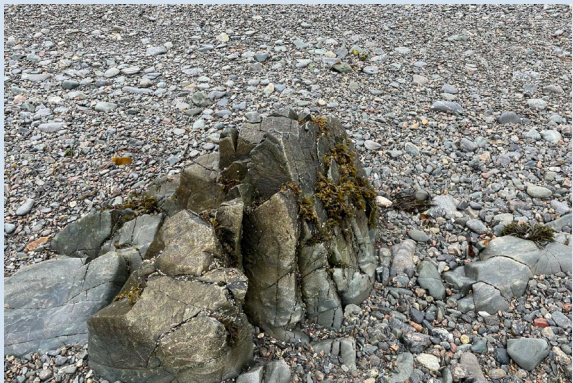

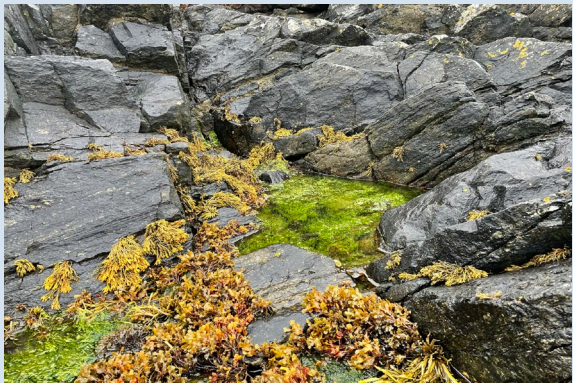

Target note No.	Description	Photograph
T1	Rock dumping below the quarry. Colonised by <i>Fucus vesiculosus</i> and barnacle mosaics.	
T2	Ephemeral green seaweeds on mid to lower shore rocks.	
T3	Test Dig 1 – LS.LMx.GvMu.HedMx	

Target note No.	Description	Photograph
T4	Test Dig 2 – LS.LMx.GvMu.HedMx	
T5	Test Dig 3 – LS.LMx.GvMu.HedMx	
T6	Outflow from the Loch of Gutcher	
T7	Harbour area	



Target note No.	Description	Photograph
T8	Boats moored to lamppost above high water	
T9	Cobble bay, likely landfall location	
T10	Outflow pipe	
T11	Access point for outflow pipe	



Target note No.	Description	Photograph
T12	Emergent bedrock on the mid shore	
T13	Large section of bedrock at low water. Mosaic of LR.HLR.MusB.Sem.Sem and LR.MLR.BF.Fser	
T14	Occasional rockpools with green seaweeds. LR.FLR.Rkp.G	
T15	Beadlet anemones ( <i>Actinia equina</i> ) in crevices	

### 2.3.4 Importance of Biotope types

There were no biotopes of conservation importance found within the survey area. The dog whelk (*Nucella lapillus*) is highlighted by OSPAR as a threatened/declining species and was found frequently on the intertidal rock. However, the dog whelk is a common species in the UK and is not protected under any other piece of legislation. No UK Biodiversity Action Plan (BAP) priority marine species, or species/habitats on the Scottish list of Priority Marine Features were recorded. The site, however, is a Special Protection Area for red-throated diver. The landward boundary for the SPA is Mean Low Water Springs meaning that the SPA overlaps very little of the intertidal zone. The laying of cable will have no impact on red-throated divers or their breeding activity. The shore north and south of the Wick of Gutcher are also designated as a geological Site of Special Scientific Interest (SSSI) due to the presence of lithologies strikingly similar to those found in parts of the Scottish Moine.

## 2.4 DISCUSSION

From a biological perspective, there are no reasons that would prevent the landing of a cable at the proposed location, or anywhere within the survey area. Geologically, as discussed above, sections of the area of search are designated as a SSSI. These areas are confined to the bedrock shore and cliffs found at the extreme north of the survey area and immediately south of the proposed cable landfall. Confining the limits of disturbance to the cobble bay immediately below the proposed BMH will minimise any negative impact on features of the SSSI.

## 2.5 RECOMMENDATIONS

A further Phase 2 intertidal survey is not required at this site. Disturbance to any bedrock features on the shore should be avoided.

## 2.6 REFERENCES

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- Wyn, G., Brazier, P., Birch, K., Bunker, A., Cooke, A., Jones, M., Lough, N., McMath, A. and Roberts, S. (2000). Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey. CCW, Bangor.



## 2.7 PHOTOGRAPHS

The locations of photo points are shown in Figure 2.2.







**Photo 1**      **Example of large barnacle covered boulders at the north end of the northern shore**



**Photo 2**      **The northern shore looking south**



**Photo 3**      **Zonation on the inner pier wall**



**Photo 4**      **Barnacles and seaweeds on the rock armouring**





**Photo 5      Shingle inlet with metal debris**



**Photo 6      The southern rocky shore looking south**



## A.2 INTERTIDAL SURVEY REPORT FOR CABLE CORRIDOR 2.1 YELL TO UNST: UNST LANDING POINT



# **Phase 1 Intertidal Survey Report for Belmont, Unst, Shetland (Route 2.1)**

**Version 1**

**Report to Intertek**

**Issued by Aquatera Ltd**

**P961 – October 2021**



**[www.aquatera.co.uk](http://www.aquatera.co.uk)**



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# 1 INTRODUCTION

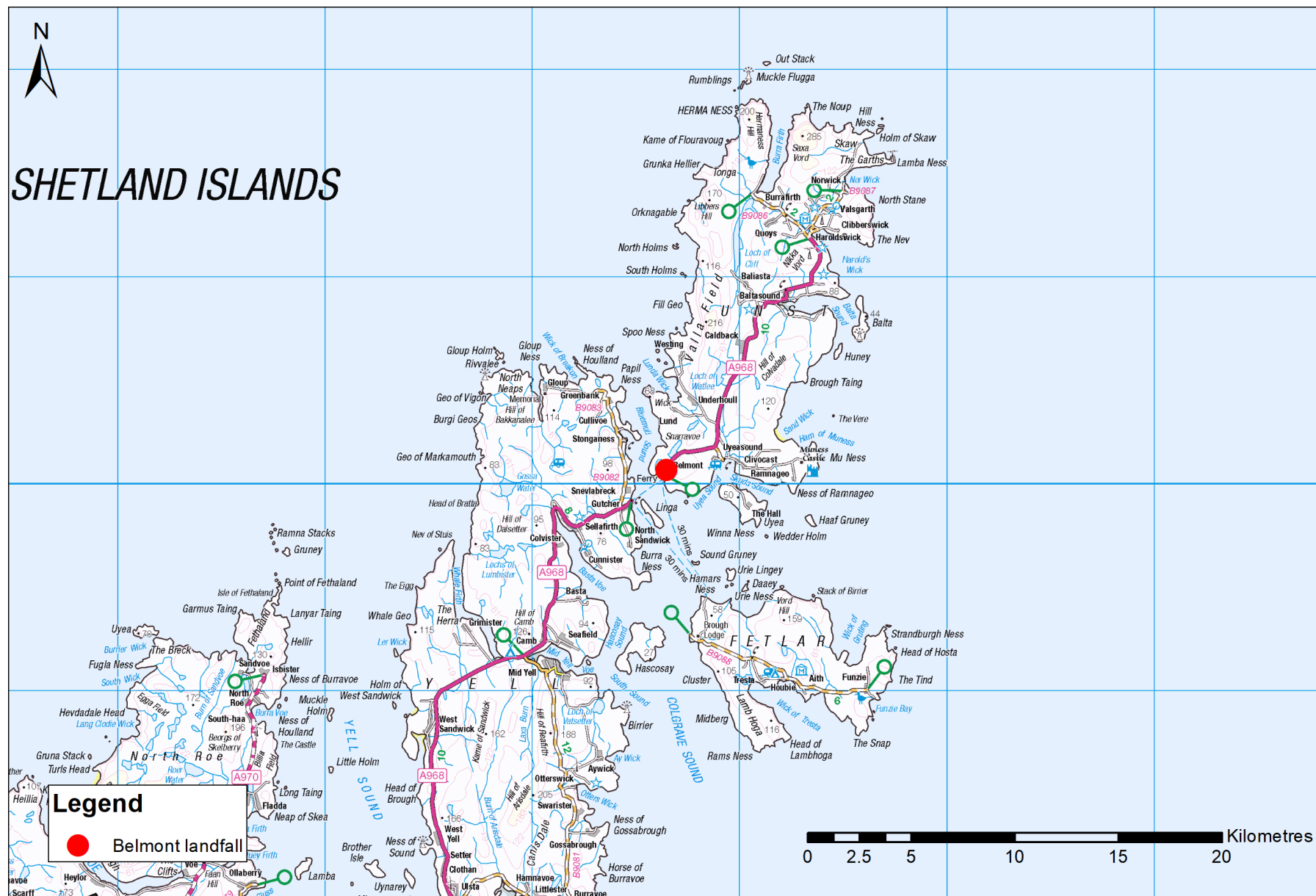
Aquatera has been commissioned to carry out a Phase 1 intertidal survey of the shore at Belmont on the southwest coast of Unst, Shetland (Figure 1.1). The area has been identified as a suitable location for the onshore landfall and onward connection for fibre optic cables as part of network improvements to connect a number of locations around Shetland.

The objectives of the survey were to:

- Identify and map biotopes present within the survey area;
- Identify and map the presence of any rare or protected species within the study area; and
- Provide target notes to describe key features of the shore

The survey was carried out by Duncan Clarke, a marine biologist experienced in intertidal biological survey and mapping.





**Figure 1.1** Location of the Belmont, Shetland survey site (© Crown copyright and database rights 2021 OS 0100040827)



## 2 PHASE 1 INTERTIDAL SURVEY

### 2.1 INTRODUCTION

The survey took place on 20 September 2021, during low spring tides. The survey took place either side of low tide. Table 2.1 below outlines the survey conditions.

**Table 2.1 Survey details**

<b>Date</b>	20 September 2021
<b>Time at start</b>	15:25
<b>Time at finish</b>	17:00
<b>Low tide (hours)</b>	16:14 BST
<b>Tide height (m)</b>	0.7
<b>Lowest Astronomical Tide (m)</b>	0.2
<b>Mean Low Water Springs (m)</b>	0.6
<b>Type of access</b>	Foot
<b>Sea condition</b>	Choppy, moderate waves breaking on the shore
<b>Weather condition</b>	S5; heavy rain

### 2.2 METHODOLOGY

#### 2.2.1 Phase 1 survey method

The survey was carried out on foot using a variety of survey techniques that are described in the Countryside Council for Wales (CCW) report 'Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey' (Wyn *et al.*, 2000) and the 'Marine Nature Conservation Review Rationale and Methods' (Hiscock, 1996).

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#### 2.2.2 Survey area

The proposed survey area comprised an approximate 760 m corridor. This was based on the provided areas of search for the proposed cable route with an additional 25 m added on to the west edge to allow for any movement of the beach



manhole (BMH) and cable within this corridor. The survey area extended from the splash zone down to the Lowest Astronomical Tide (LAT) (Figure 2.1)



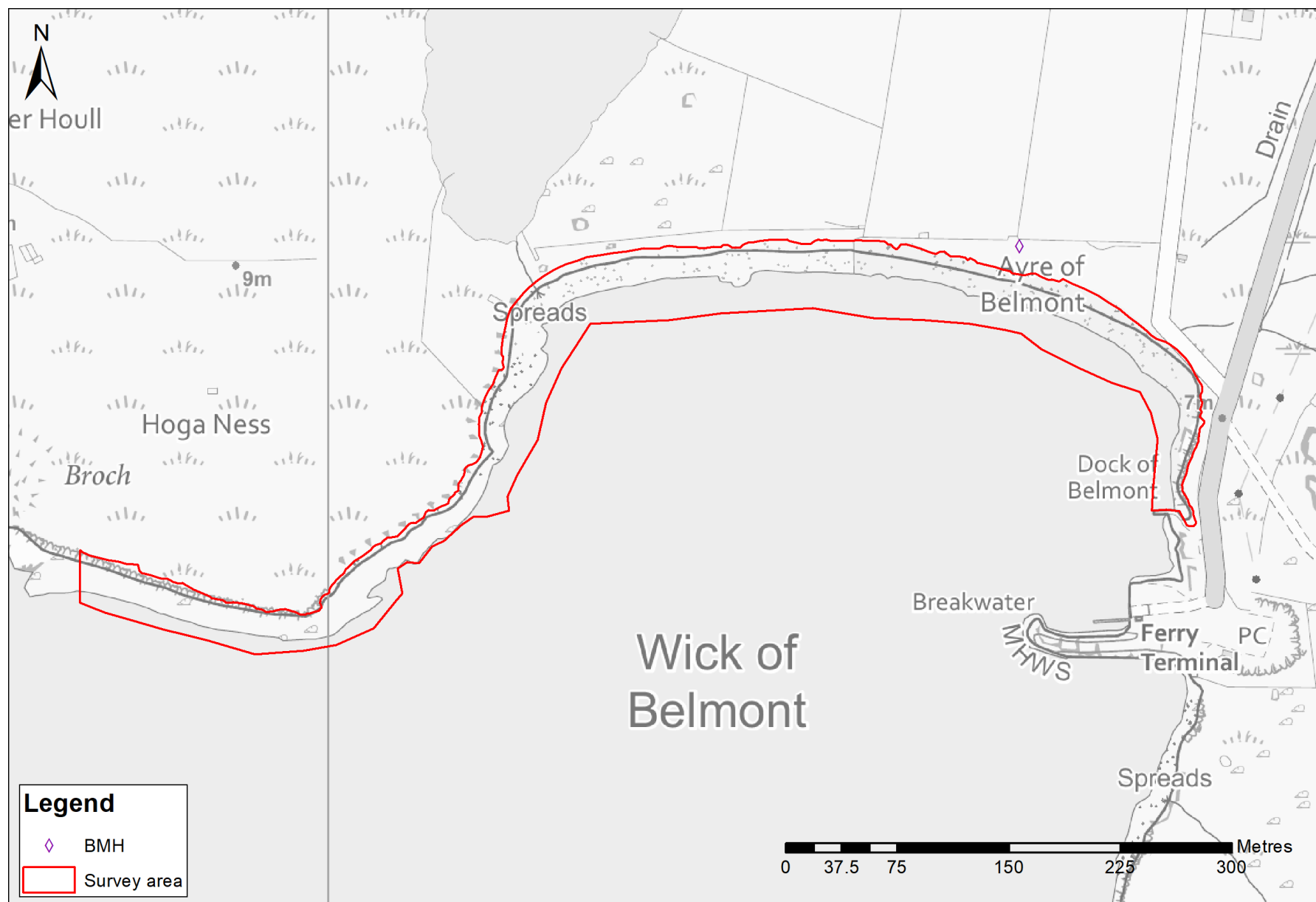


Figure 2.1 Survey area and proposed BMH location at Belmont, Unst (© Crown copyright and database rights 2021 OS 0100040827)

### 2.2.3 Limitations of survey

Only one low tide window was available in which to complete the survey. However, it was possible to cover the entire survey area during the single survey period.

## 2.3 SURVEY FINDINGS

### 2.3.1 Site description

The site at Belmont lies at the southwest of the island of Unst, the northernmost of the inhabited Shetland islands. The site is the location of the ferry terminal which connects passengers and vehicles to Yell and Fetlar, with around 50 sailings a day. Belmont is located on the on the eastern edge of Bluemull Sound, a strait of strong tidal currents separating Unst from the island of Yell. The topography of the land here allows the cable landing site to be out of the strong tidal currents and is relatively well sheltered when compared to other areas of the coastline.

The survey area starts just north of the ferry terminal with sloping bedrock cliffs on the eastern shore. As the shore bends round to the west, the shore is predominantly dominated by cobbles, with furoid seaweeds only found at mid to low water. This cobble bay is occasionally broken by sections of emergent bedrock, providing more stable anchorage for seaweeds, allowing them to flourish higher up the shore. This main section of shore has a shore section of low-lying land behind the shore, which quickly becomes an eroding cliff beach backing for the majority. At the western edge there is a small section of sloping beach backing where the loch empties into the sea. To the west of this, the shore becomes more exposed in nature, with the shore changing from one of cobbles and occasional bedrock, to composed of bedrock and large boulders.

### 2.3.2 Biotopes

A summary of biotopes recorded within the survey area is provided in Table 2.2, and a map of lifeforms is shown in Figure 2.2.

**Table 2.2 List of Biotopes found within the survey area**

Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.FLR.Lic.YG	Yellow and grey lichens on supralittoral rock	Splash zone where large stable bedrock occurs.	<i>Caloplaca</i> spp. <i>Ramalina siliquosa</i> Grey lichens <i>Verrucaria maura</i>
LR.FLR.Lic.Ver	<i>Verrucaria maura</i> on littoral fringe rock	Occurs on littoral fringe bedrock and boulders mainly on the east and west shores, directly below the yellow and green lichen biotope.	<i>Verrucaria maura</i>
LR.MLR.BF.Fser	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock	Low water mark on the western rocky shore below either LR.LLR.F.Fves.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Nucella lapillus</i> <i>Mastocarpus stellatus</i> <i>Fucus serratus</i>



Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.LLR.F.Pel	<i>Pelvetia canaliculata</i> on sheltered littoral fringe rock	Eastern and western rocky shore below LR.FLR.Lic.Ver. Also found on the main shore on areas of exposed bedrock.	<i>Pelvetia canaliculata</i> <i>Verrucaria maura</i>
LR.LLR.F.Fspi	<i>Fucus spiralis</i> on sheltered upper eulittoral rock	Eastern and western rocky shore directly below LR.LLR.F.Pel.	<i>Fucus spiralis</i> <i>Verrucaria maura</i>
LR.LLR.F.Fspi.X	<i>Fucus spiralis</i> on full salinity upper eulittoral mixed substrata	Thin bands on the main cobble shore above the LR.LLR.F.Fves.X biotope.	<i>Fucus spiralis</i>
LR.LLR.F.Fves	<i>Fucus vesiculosus</i> on moderately exposed to sheltered mid eulittoral rock	Emergent bedrock on the main cobble dominated shore and the mid, western rocky shore.	<i>Actinia equina</i> <i>Patella vulgata</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Fves.X	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata	Majority of the main cobble shore above the LR.LLR.F.Fserr.X biotope.	<i>Actinia equina</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Asc	<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock	Eastern mid rocky shore.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Asc.X	<i>Ascophyllum nodosum</i> on full salinity mid eulittoral mixed substrata	Small embayment behind the Dock of Belmont.	<i>Littorina obtusata</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Fserr	<i>Fucus serratus</i> on sheltered lower eulittoral rock	Eastern lower rocky shore below the LR.LLR.F.Asc biotope and emergent bedrock on the main shore below the LR.LLR.F.Fves biotope.	<i>Actinia equina</i> <i>Patella vulgata</i> <i>Nucella lapillus</i> <i>Fucus serratus</i>
LR.LLR.F.Fserr.X	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata	Main cobble shore below the LR.LLR.F.Fves.X biotope.	<i>Fucus serratus</i> <i>Ulva</i> spp.

Biotope code	Biotope description	Occurrence on site	Typical species on site
IR.MIR.KR.Ldig	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock	Sublittoral fringe around the entire survey area. Not fully surveyed.	<i>Laminaria digitata</i>
LR.FLR.Eph.Ent	<i>Enteromorpha</i> (now <i>Ulva</i> ) spp. on freshwater influenced and/or unstable upper eulittoral rock	Large area below the burn running out from the Loch of Belmont	<i>Ulva</i> spp.
LR.HLR.MusB.Sem.Sem	<i>Semibalanus balanoides</i> , <i>Patella vulgata</i> and <i>Littorina</i> spp. on exposed to moderately exposed or vertical sheltered eulittoral rock	Bedrock and large boulders on the western rocky shore.	<i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Nucella lapillus</i>
LS.LCS.Sh.BarSh	Barren littoral shingle	Mid to upper shore of the main stretch of the survey area.	None
LS.LMx.GvMu.HedMx	<i>Hediste diversicolor</i> in littoral gravelly muddy sand and gravelly sandy mud	Small patch of mixed sediment below freshwater run off from.	<i>Hediste diversicolor</i>
LS.LSa.St.Tal	Talitrids on the upper shore and strand-line	Strand-line of decaying seaweeds at the high-water mark of the cobble shore.	Talitridae



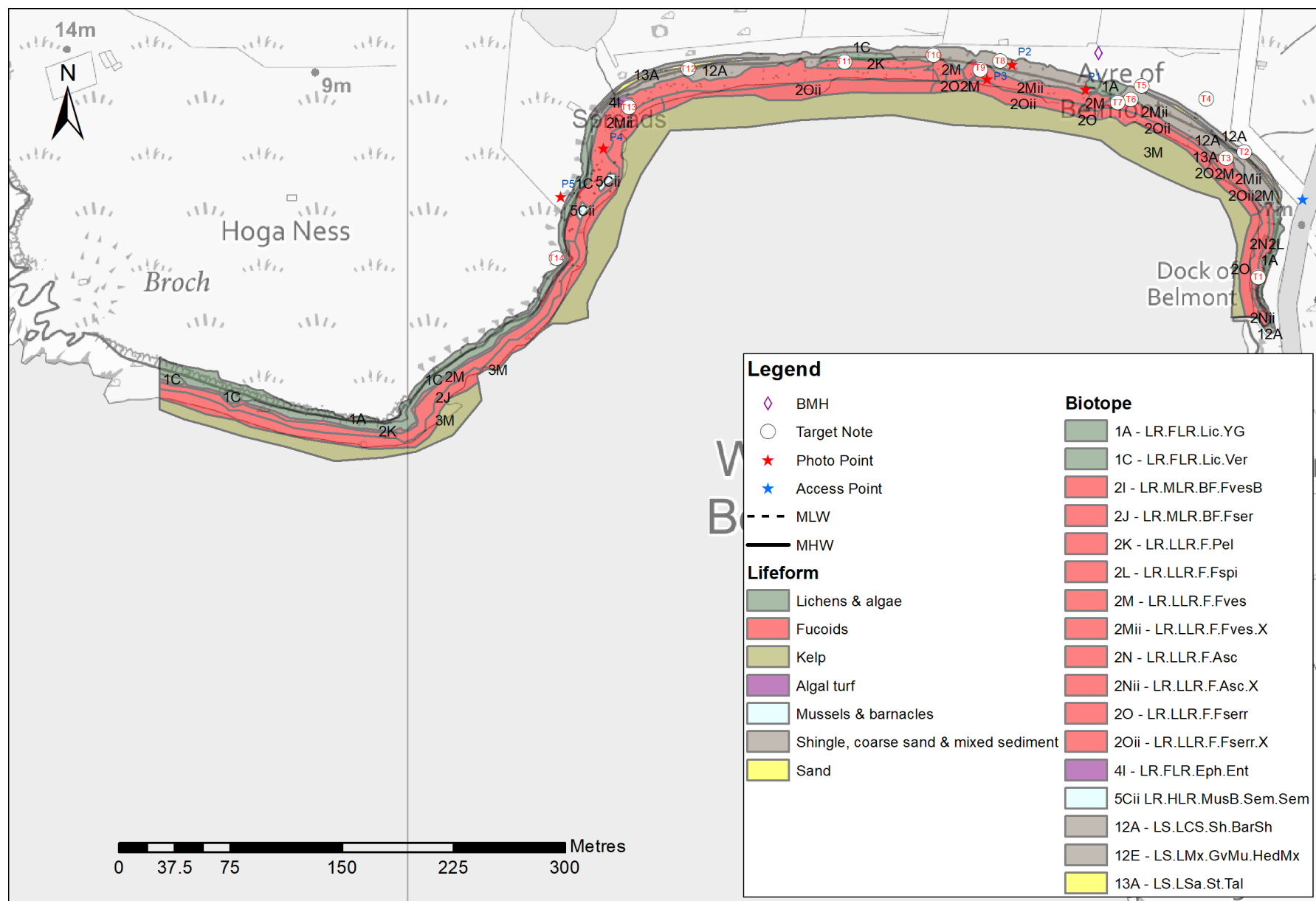





Figure 2.2 Lifeforms map of the Belmont intertidal survey area (© Crown copyright and database rights 2021 OS 0100040827)





### 2.3.3 Target notes





Target Notes and corresponding photographs are shown in Table 2.3. The locations of each of the Target Notes is indicated on the lifeforms map (Figure 2.2). Figure 2.2 also shows the locations of additional photographs as shown in Section 2.7.

**Table 2.3 Target notes**

Target note No.	Description	Photograph
T1	Eastern rocky shore with zonation pattern of yellow and grey lichens, <i>Verrucaria maura</i> , <i>Pelvetia canaliculata</i> , <i>Fucus spiralis</i> , <i>Ascophyllum nodosum</i> , and <i>Fucus serratus</i> .	
T2	Drainage pipe outlets, or buried fish farm cage.	
T3	Large patch of what appeared to be artificially dumped rocks.	
T4	Remnants of fish farm cages.	

Target note No.	Description	Photograph
T5	Transition from low lying beach backing to eroded cliff beach backing.	
T6	Thin band of <i>Fucus spiralis</i> above a mix of <i>Fucus vesiculosus</i> and <i>Ascophyllum nodosum</i> .	
T7	Emergent bedrock.	
T8	Rock armouring below cliff.	



Target note No.	Description	Photograph
T9	Large emergent bedrock	
T10	Fence line consisting of wooded poles and fishing net.	
T11	Mosaic of <i>Pelvetia canaliculata</i> and <i>Fucus spiralis</i> on upper shore rocks.	
T12	Gap between cliffs.	

Target note No.	Description	Photograph
T13	Ephemeral green seaweeds below burn outflow.	
T14	More exposed coast characterised by bedrock and large boulders.	

### 2.3.4 Importance of Biotope types

There were no biotopes of conservation importance found within the survey area. The dog whelk (*Nucella lapillus*) is highlighted by OSPAR as a threatened/declining species and was found occasionally on the intertidal rock. However, the dog whelk is a common species in the UK and is not protected under any other piece of legislation. No UK Biodiversity Action Plan (BAP) priority marine species, or species/habitats on the Scottish list of Priority Marine Features were recorded. The site, however, is a Special Protection Area for red-throated diver. The landward boundary for the SPA is Mean Low Water Springs meaning that the SPA overlaps very little of the intertidal zone. The laying of cable will have no impact on red-throated divers or their breeding activity.

## 2.4 DISCUSSION

From a biological perspective, there are no reasons that would prevent the landing of a cable at the proposed location, or anywhere within the survey area.

## 2.5 RECOMMENDATIONS

A further Phase 2 intertidal survey is not required at this site. It may be beneficial to run the cable to the east of the cliffs where the shore backing meets the beach as a gentle slope, preventing further damage to the already eroding cliffs.

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## 2.7 PHOTOGRAPHS

The locations of photo points are shown in Figure 2.2.







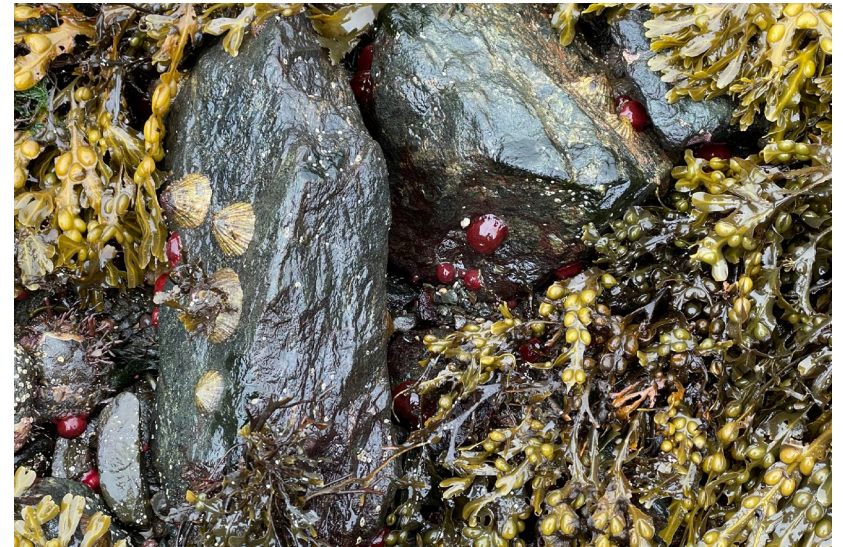
**Photo 1** Shore backing directly below the BMH



**Photo 2** Cliffs with occasional rock armouring



**Photo 3** Example of emergent bedrock on the cobble beach



**Photo 4** Beadlet anemones (*Actinia equina*) and common limpets (*Patella vulgata*) amongst bladder wrack (*Fucus vesiculosus*)





**Photo 5**      **Example of the shore type on the eastern rocky shore**



## **A.3 INTERTIDAL SURVEY REPORT FOR CABLE CORRIDOR 2.2 SHETLAND TO YELL: SHETLAND LANDING POINT**



# **Phase 1 Intertidal Survey Report for Mossbank, Delting, Shetland (Route 2.2)**

**Version 1**

**Report to Intertek**

**Issued by Aquatera Ltd**

**P961 – October 2021**



**[www.aquatera.co.uk](http://www.aquatera.co.uk)**



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# 1 INTRODUCTION

Aquatera has been commissioned to carry out a Phase 1 intertidal survey of the shore at Mossbank on the east coast of the parish of Delting, Shetland (Figure 1.1). The area has been identified as a suitable location for the onshore landfall and onward connection for fibre optic cables as part of network improvements to connect a number of locations around Shetland.

The objectives of the survey were to:

- Identify and map biotopes present within the survey area;
- Identify and map the presence of any rare or protected species within the study area; and
- Provide target notes to describe key features of the shore

The survey was carried out by Duncan Clarke, a marine biologist experienced in intertidal biological survey and mapping.



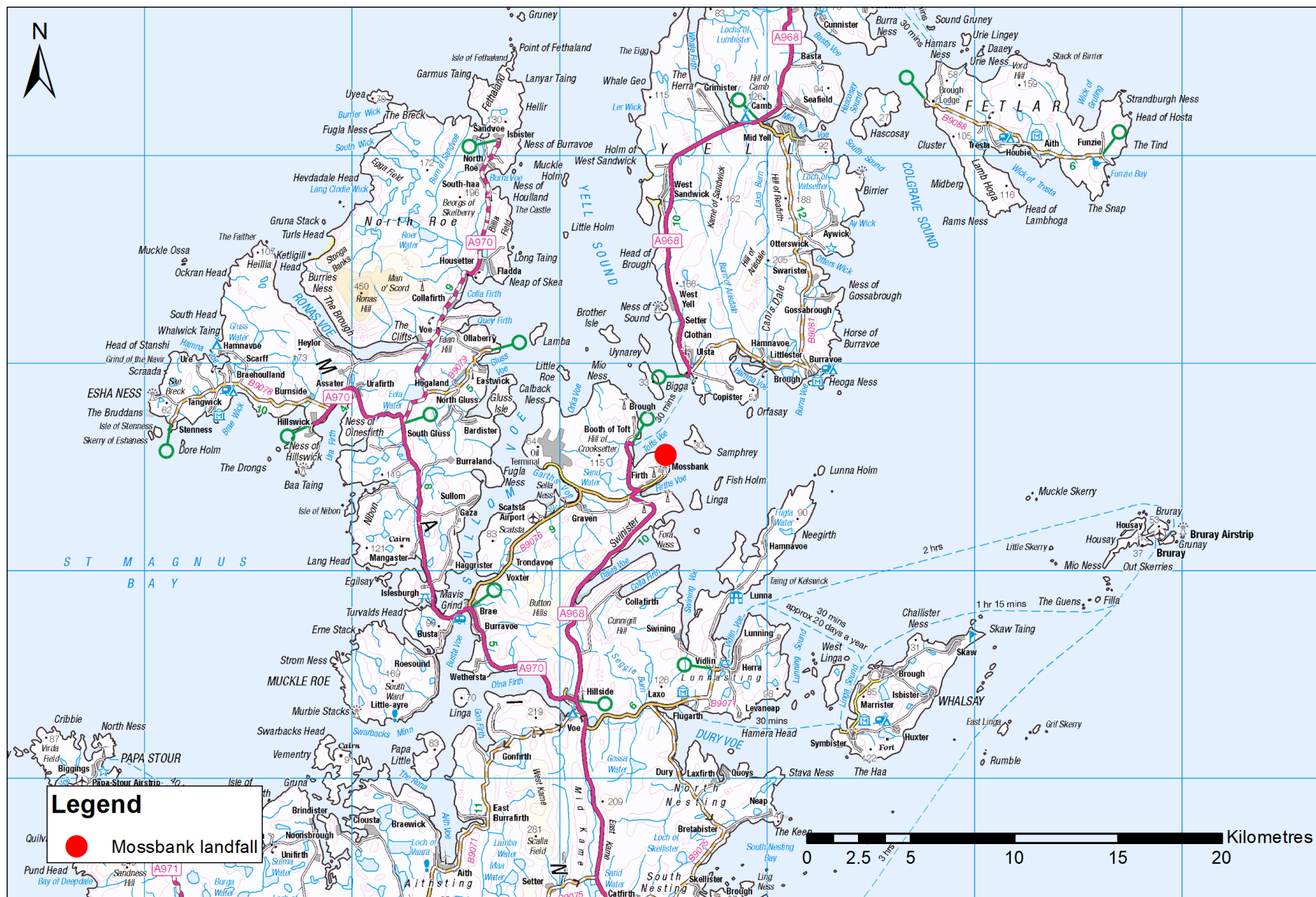


Figure 1.1 Location of the Mossbank, Shetland survey site (© Crown copyright and database rights 2021 OS 0100040827)



## 2 PHASE 1 INTERTIDAL SURVEY

### 2.1 INTRODUCTION

The survey took place on 24 September 2021, during low spring tides. The survey took place either side of low tide. Table 2.1 below outlines the survey conditions.

**Table 2.1 Survey details**

<b>Date</b>	24 September 2021
<b>Time at start</b>	06:00
<b>Time at finish</b>	07:30
<b>Low tide (hours)</b>	06:11 BST
<b>Tide height (m)</b>	0.4
<b>Lowest Astronomical Tide (m)</b>	-0.1
<b>Mean Low Water Springs (m)</b>	0.4
<b>Type of access</b>	Foot
<b>Sea condition</b>	Choppy
<b>Weather condition</b>	W7; Heavy rain

### 2.2 METHODOLOGY

#### 2.2.1 Phase 1 survey method

The survey was carried out on foot using a variety of survey techniques that are described in the Countryside Council for Wales (CCW) report 'Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey' (Wyn *et al.*, 2000) and the 'Marine Nature Conservation Review Rationale and Methods' (Hiscock, 1996).

Prior to commencing the survey in the field, a wireframe map (a basic outline drawing of obvious features and/or changes in habitat) was produced to aid with the recording of biotopes.

Areas of sediment were dug and sampled at various intervals at the upper mid shore, mid shore, and lower shore. All samples were filtered through a 5 mm and 0.5 mm sieve. For both the sediment and rock areas, target notes and photographs were taken when there was a change in biotope type or zonation. An iPhone equipped with the ArcGIS app "Field Maps" was used to mark target points and tracks. All information was digitised to GIS using ArcMap 10, post survey. Maps were created using the guidance laid out in the CCW methodology.

Biotopes were assigned and described with reference to The Marine Habitat Classification for Britain and Ireland (v04.05) (Connor *et al.*, 2004) and the Joint Nature Conservation Committee (JNCC) website's online search facility.

All species names were taken from The World Register of Marine Species (WoRMS) website.

#### 2.2.2 Survey area

The proposed survey area comprised an approximate 630 m corridor. This was based on the provided areas of search for the proposed cable route with an additional 25 m added on to the east and west edges to allow for any movement



of the beach manhole (BMH) and cable within this corridor. The survey area extended from the splash zone down to the Lowest Astronomical Tide (LAT) (Figure 2.1)



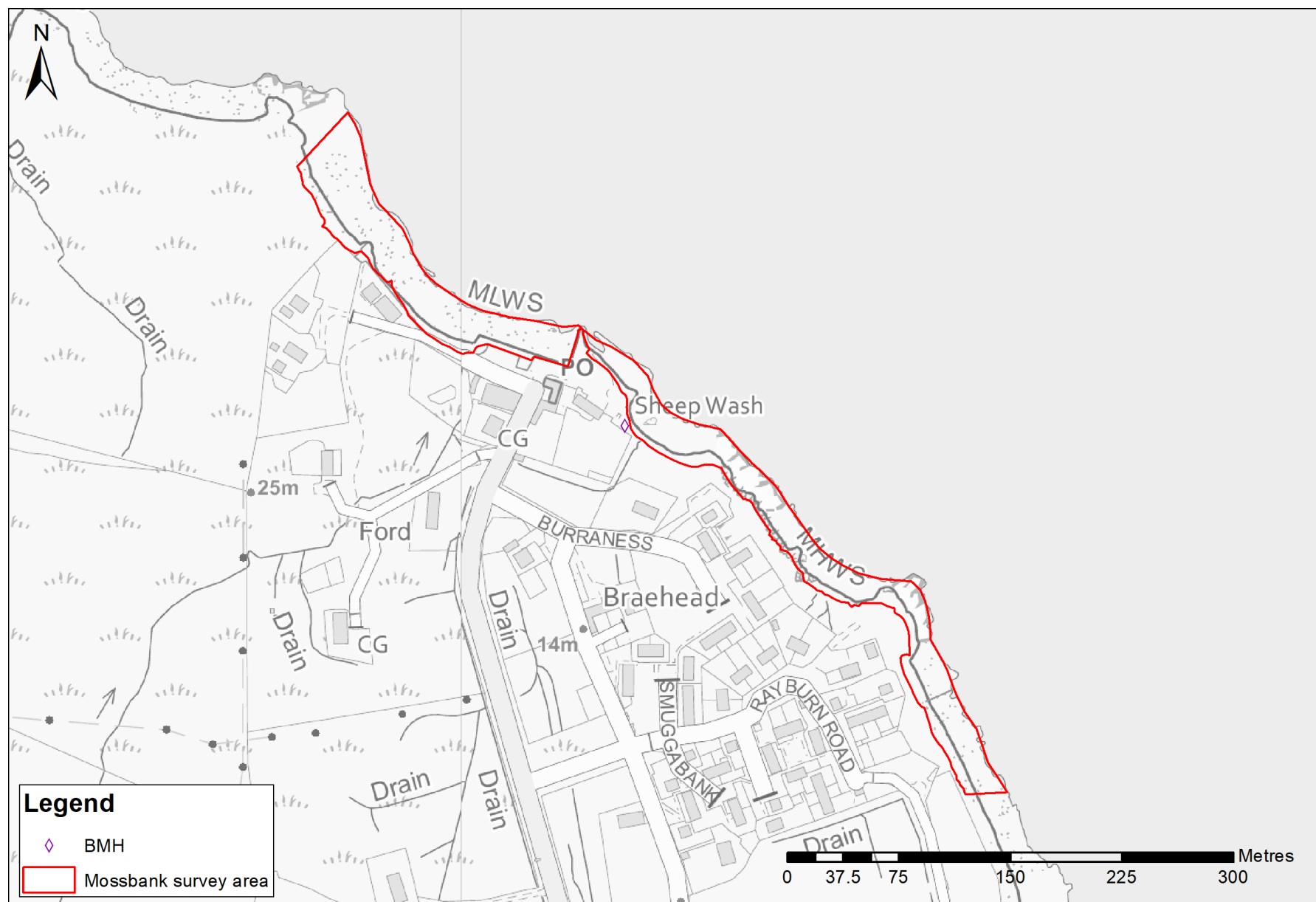


Figure 2.1 Survey area and proposed BMH location at Mossbank, Delting (© Crown copyright and database rights 2021 OS 0100040827)

### 2.2.3 Limitations of survey

Only one low tide window was available in which to complete the survey. However, it was possible to cover the entire survey area during the single survey period. Due to the time of year and the spring tide times, the survey started before sunrise with minimal light available for the first 15 minutes.

## 2.3 SURVEY FINDINGS

### 2.3.1 Site description

The survey area lies at the northern end of the settlement of Mossbank and is a section of shore already used for the landing of several electrical cables.

The northern section of the shore is centred around a small pier which is backed by rock armouring to the north and immediately south. The shore below the rock armouring is predominantly comprised of a mixture of cobble shore and medium boulders with a covering of seaweeds on the mid to lower shore and barnacles on the larger boulders. There are a few examples of bedrock outcrops on the upper shore which support the growth of channelled wrack *Pelvetia canaliculata*.

To the south of the pier, the shore becomes more naturally composed of steep craggy bedrock, with occasional embayments of cobbles. These cobble bays are mainly barren until the lower shore, where a covering of green seaweeds and the red seaweed *Porphyra purpurea* cover the sand-scoured cobbles above a mosaic of *Fucus serratus* and sediment pockets. The bedrock is typically zoned from the splash zone to low water by yellow and green lichens (LR.FLR.Lic.YG), *Verrucaria maura* (LR.FLR.Lic.Ver), Channelled wrack (LR.LLR.F.Pel), barnacles (LR.HLR.MusB.Sem.Sem), and kelp (IR.MIR.KR.Ldig).

### 2.3.2 Biotopes

A summary of biotopes recorded within the survey area is provided in Table 2.2, and a map of lifeforms is shown in Figure 2.2.

**Table 2.2 List of Biotopes found within the survey area**

Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.FLR.Lic.YG	Yellow and grey lichens on supralittoral rock	Upper shore splash zone of bedrock and rock armouring.	<i>Caloplaca</i> spp. <i>Ramalina siliquosa</i> Grey lichens
LR.FLR.Lic.Ver	<i>Verrucaria maura</i> on littoral fringe rock	Bedrock, immediately below the LR.FLR.Lic.YG biotope.	<i>Verrucaria maura</i>
LR.MLR.BF.FspiB	<i>Fucus spiralis</i> on exposed to moderately exposed upper eulittoral rock	Upper shore rocks on the north-western edge of the survey area.	<i>Semibalanus balanoides</i> <i>Fucus spiralis</i> <i>Verrucaria maura</i>



Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.MLR.BF.FvesB	<i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed upper eulittoral rock	Mid shore mosaics of <i>F. vesiculosus</i> and <i>Semibalanus balanoides</i> on mid shore bedrock.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i> <i>Ulva</i> spp.
LR.MLR.BF.Fser	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock	Lower shore stable bedrock below the LR.MLR.BF.FvesB biotope.	<i>Patella vulgata</i> <i>Fucus serratus</i> <i>Ulva</i> spp. <i>Cladophora rupestris</i>
LR.LLR.F.Pel	<i>Pelvetia canaliculata</i> on sheltered littoral fringe rock	Forms a mosaic with the LR.FLR.Lic.Ver biotope on stable sheltered sides of the bedrock.	<i>Pelvetia canaliculata</i> <i>Verrucaria maura</i>
LR.LLR.F.Fspi	<i>Fucus spiralis</i> on sheltered upper eulittoral rock	Rock armouring immediately west of the pier and below the car park.	<i>Fucus spiralis</i>
LR.LLR.F.Fves	<i>Fucus vesiculosus</i> on moderately exposed to sheltered mid eulittoral rock	Small patches on sheltered bedrock and boulders.	<i>Actinia equina</i> <i>Patella vulgata</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Fves.X	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata	Cobbles and gravel on the mid shore to the west of the pier.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Fserr.X	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata	Lower shore cobbles and gravel at spring low tides on sections of the shore backed by barren cobble beaches.	<i>Fucus serratus</i> <i>Ulva</i> spp. <i>Cladophora rupestris</i>
IR.MIR.KR.Ldig	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock	Sublittoral rocks along the majority of the shore, only exposed at extreme low tides.	<i>Laminaria digitata</i>
LR.FLR.Rkp.G	Green seaweeds ( <i>Ulva</i> spp. and <i>Cladophora</i> spp.) in shallow upper shore rockpools	Upper shore bedrock within both the LR.FLR.Lic.YG and LR.FLR.Lic.Ver biotopes.	<i>Ulva</i> spp. <i>Cladophora</i> spp.



Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.FLR.Rkp.Cor	Coralline crust-dominated shallow eulittoral rockpools	Found on mid shore bedrock mainly within the LR.FLR.Lic.Ver biotope and above the LR.HLR.MusB.Sem.Sem biotope.	<i>Actinia equina</i> <i>Patella vulgata</i> Corallinaceae <i>Cladophora rupestris</i>
LR.FLR.Eph.Ent	<i>Enteromorpha</i> (now <i>Ulva</i> ) spp. on freshwater-influenced and/or unstable upper eulittoral rock	Found below areas of freshwater run off on the upper shore.	<i>Ulva</i> spp.
LR.FLR.Eph.EntPor	<i>Porphyra purpurea</i> and <i>Enteromorpha</i> (now <i>Ulva</i> ) spp. on sand-scoured mid or lower eulittoral rock	Mid to low cobbles below the LS.LCS.Sh.BarSh biotope and above the LR.LLR.F.Fserr.X biotope.	<i>Porphyra purpurea</i> <i>Ulva</i> spp.
LR.HLR.MusB.Sem.Sem	<i>Semibalanus balanoides</i> , <i>Patella vulgata</i> and <i>Littorina</i> spp. on exposed to moderately exposed ore vertical sheltered eulittoral rock	Found on the mid to lower reaches of the steeper bedrock sections of the shore between the LR.FLR.Lic.Ver and IR.MIR.KR.Ldig biotopes.	<i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Nucella lapillus</i>
LS.LCS.Sh.BarSh	Barren littoral shingle	Several small bays occurring between the bedrock outcrops.	None

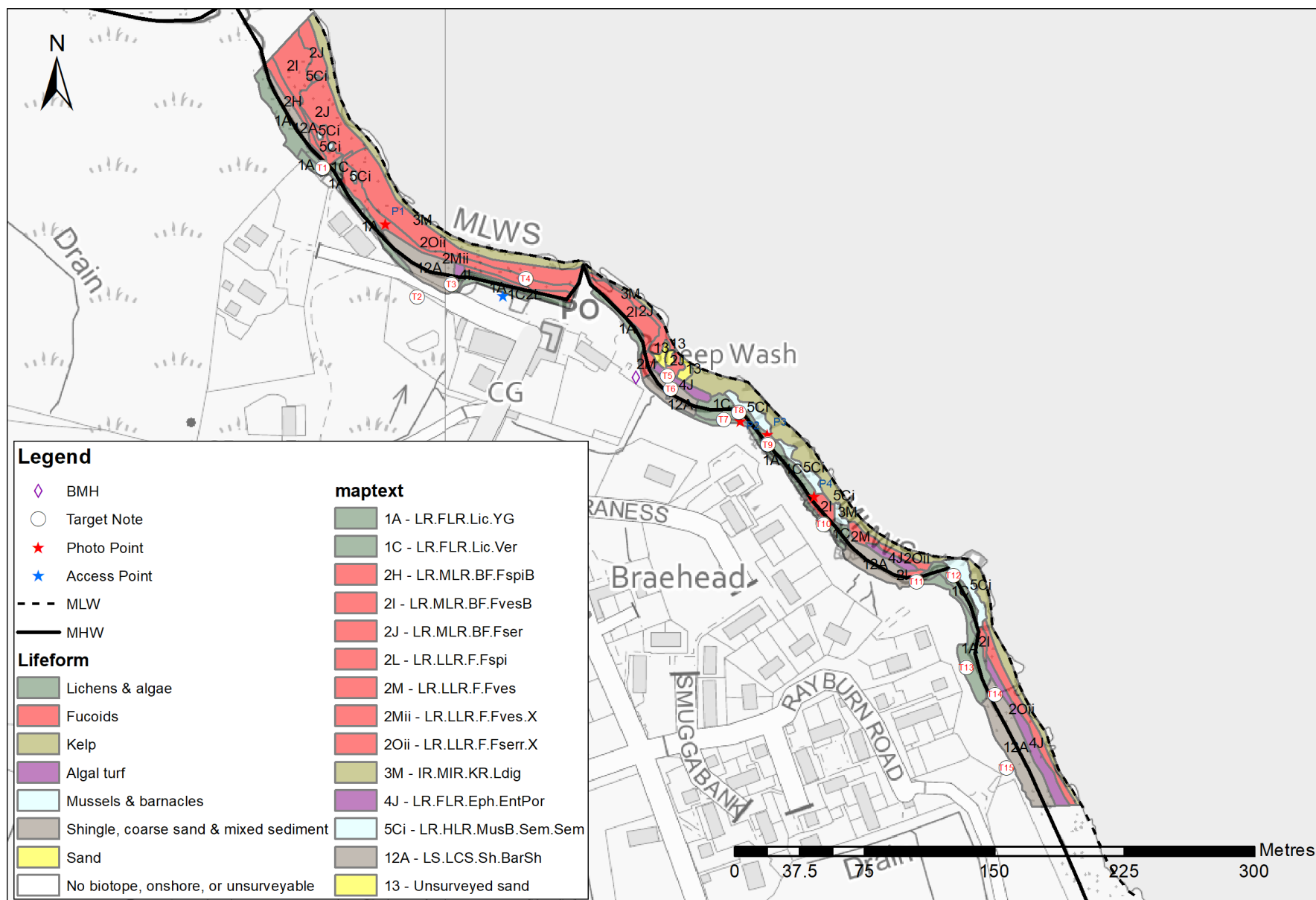





Figure 2.2 Lifeforms map of the Mossbank intertidal survey area (© Crown copyright and database rights 2021 OS 0100040827)


### 2.3.3 Target notes





Target Notes and corresponding photographs are shown in Table 2.3. The locations of each of the Target Notes is indicated on the lifeforms map (Figure 2.2). Figure 2.2 also shows the locations of additional photographs as shown in Section 2.7.

**Table 2.3 Target notes**



Target note No.	Description	Photograph
T1	Bedrock seam divided with a fence line. <i>Verrucaria maura</i> covered rocks with patches of <i>Pelvetia canaliculata</i> .	
T2	Electricity cable landing marker.	
T3	Outflow from burn.	



Target note No.	Description	Photograph
T4	Outflow pipe	
T5	Proposed landfall site. Cobble bay with patches of large barnacle covered rocks.	
T6	Strip of concrete, possible covering an outflow pipe.	
T7	Green seaweed rockpools.	

Target note No.	Description	Photograph
T8	Coralline encrusted rockpool.	
T9	Small gulley between bedrock with furoid domination.	
T10	Freshwater runoff with ephemeral greens below	
T11	Eroding cliffs with evidence of dumping.	



Target note No.	Description	Photograph
T12	Large coralline rockpool.	
T13	Large section of rock armouring.	
T14	Outflow pipe.	
T15	Electricity cable landing marker.	

### 2.3.4 Importance of Biotope types

There were no biotopes of conservation importance found within the survey area. The dog whelk (*Nucella lapillus*) is highlighted by OSPAR as a threatened/declining species and was found frequently on the intertidal rock. However, the dog whelk is a common species in the UK and is not protected under any other piece of legislation. No UK Biodiversity Action Plan (BAP) priority marine species, or species/habitats on the Scottish list of Priority Marine Features were recorded.

## 2.4 DISCUSSION

From a biological perspective, there are no reasons that would prevent the landing of a cable at the proposed location, or anywhere within the survey area.

## 2.5 RECOMMENDATIONS

A further Phase 2 intertidal survey is not required at this site.

## 2.6 REFERENCES

- Bunker, F. StP. D., Maggs, C. A., Brodie, J. A. and Bunker, A. R. (2017). Seaweeds of Britain and Ireland. Second Edition. Wild Nature Press, Plymouth.
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## 2.7 PHOTOGRAPHS

The locations of photo points are shown in Figure 2.2.





**Photo 1** The northern shore north of the pier



**Photo 2** *Pelvetia canaliculata* on upper shore rocks stained with the lichen *Verrucaria maura*



**Photo 3** The barnacle dominated biotope LR.HLR.MusB.Sem.Sem with occasional coralline rockpools (LR.FLR.Rkp.Cor)



**Photo 4** Example of the zonation patterns on the craggy rocky shore

## A.4 INTERTIDAL SURVEY REPORT FOR CABLE CORRIDOR 2.2 SHETLAND TO YELL: YELL LANDING POINT





## **Phase 1 Intertidal Survey Report for Burravoe, Yell, Shetland (Route 2.2)**

**Version 1**

**Report to Intertek**

**Issued by Aquatera Ltd**

**P961 – October 2021**



**[www.aquatera.co.uk](http://www.aquatera.co.uk)**



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Members of:







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# 1 INTRODUCTION

Aquatera has been commissioned to carry out a Phase 1 intertidal survey of the shore at Burravoe on the south coast of Yell, Shetland (Figure 1.1). The area has been identified as a suitable location for the onshore landfall and onward connection for fibre optic cables as part of network improvements to connect a number of locations around Shetland.

The objectives of the survey were to:

- Identify and map biotopes present within the survey area;
- Identify and map the presence of any rare or protected species within the study area; and
- Provide target notes to describe key features of the shore

The survey was carried out by Duncan Clarke, a marine biologist experienced in intertidal biological survey and mapping.

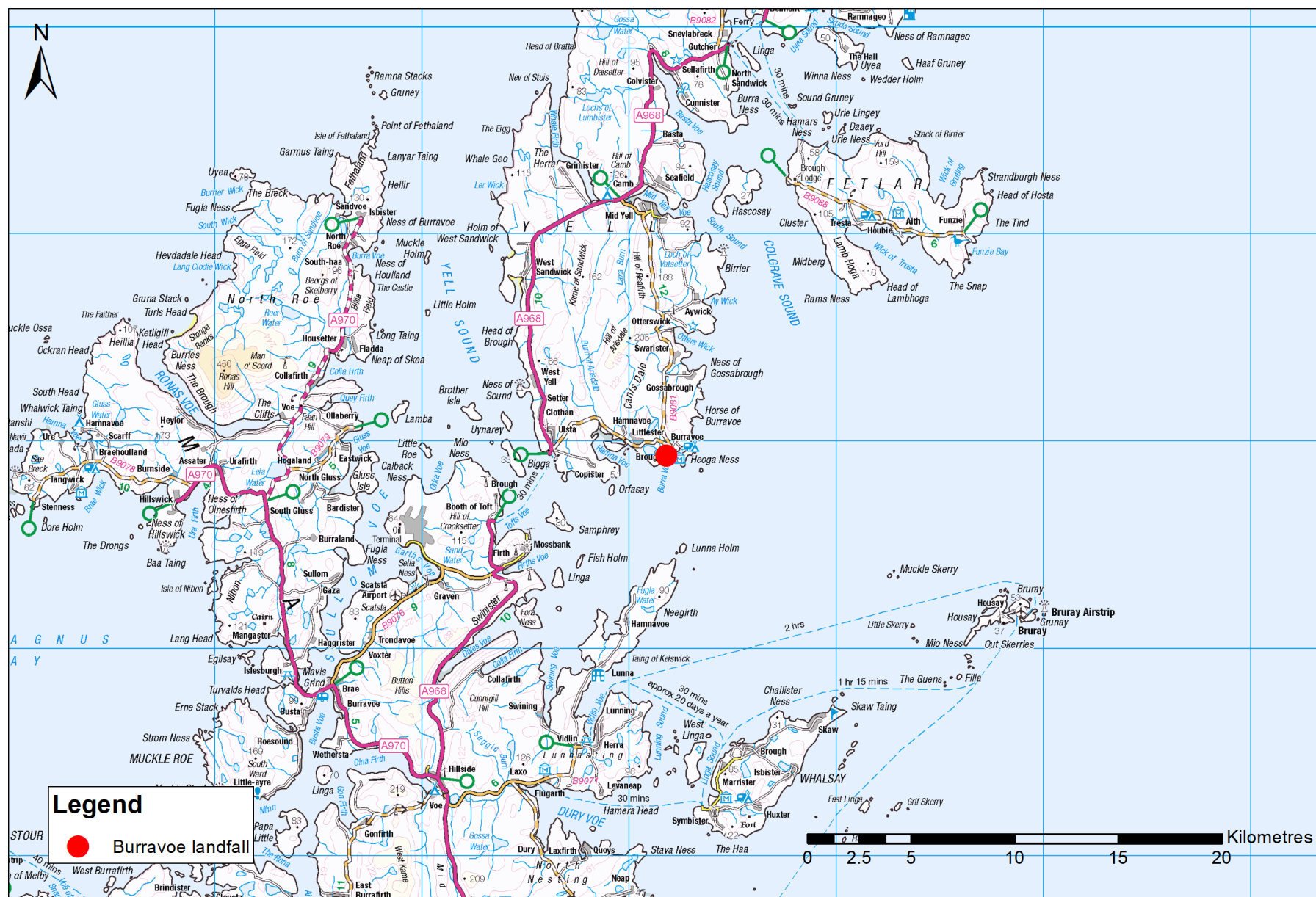


Figure 1.1 Location of the Burravoe, Shetland survey site (© Crown copyright and database rights 2021 OS 0100040827)



## 2 PHASE 1 INTERTIDAL SURVEY

### 2.1 INTRODUCTION

The survey took place on 22 September 2021, during low spring tides. The survey took place either side of low tide. Table 2.1 below outlines the survey conditions.

**Table 2.1 Survey details**

<b>Date</b>	22 September 2021
<b>Time at start</b>	17:00
<b>Time at finish</b>	18:30
<b>Low tide (hours)</b>	18:08 BST
<b>Tide height (m)</b>	0.5
<b>Lowest Astronomical Tide (m)</b>	-0.2
<b>Mean Low Water Springs (m)</b>	0.4
<b>Type of access</b>	Foot
<b>Sea condition</b>	Calm
<b>Weather condition</b>	SW4; Dry, rain at end of survey

### 2.2 METHODOLOGY

#### 2.2.1 Phase 1 survey method

The survey was carried out on foot using a variety of survey techniques that are described in the Countryside Council for Wales (CCW) report 'Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey' (Wyn *et al.*, 2000) and the 'Marine Nature Conservation Review Rationale and Methods' (Hiscock, 1996).

Prior to commencing the survey in the field, a wireframe map (a basic outline drawing of obvious features and/or changes in habitat) was produced to aid with the recording of biotopes.

Areas of sediment were dug and sampled at various intervals at the upper mid shore, mid shore, and lower shore. All samples were filtered through a 5 mm and 0.5 mm sieve. For both the sediment and rock areas, target notes and photographs were taken when there was a change in biotope type or zonation. An iPhone equipped with the ArcGIS app "Field Maps" was used to mark target points and tracks. All information was digitised to GIS using ArcMap 10, post survey. Maps were created using the guidance laid out in the CCW methodology.

Biotopes were assigned and described with reference to The Marine Habitat Classification for Britain and Ireland (v04.05) (Connor *et al.*, 2004) and the Joint Nature Conservation Committee (JNCC) website's online search facility.

All species names were taken from The World Register of Marine Species (WoRMS) website.

#### 2.2.2 Survey area

The proposed survey area comprised an approximate 760 m corridor. This was based on the provided areas of search for the proposed cable route with an additional 25 m added on to the east and west edges to allow for any movement





of the beach manhole (BMH) and cable within this corridor. The survey area extended from the splash zone down to the Lowest Astronomical Tide (LAT) (Figure 2.1)



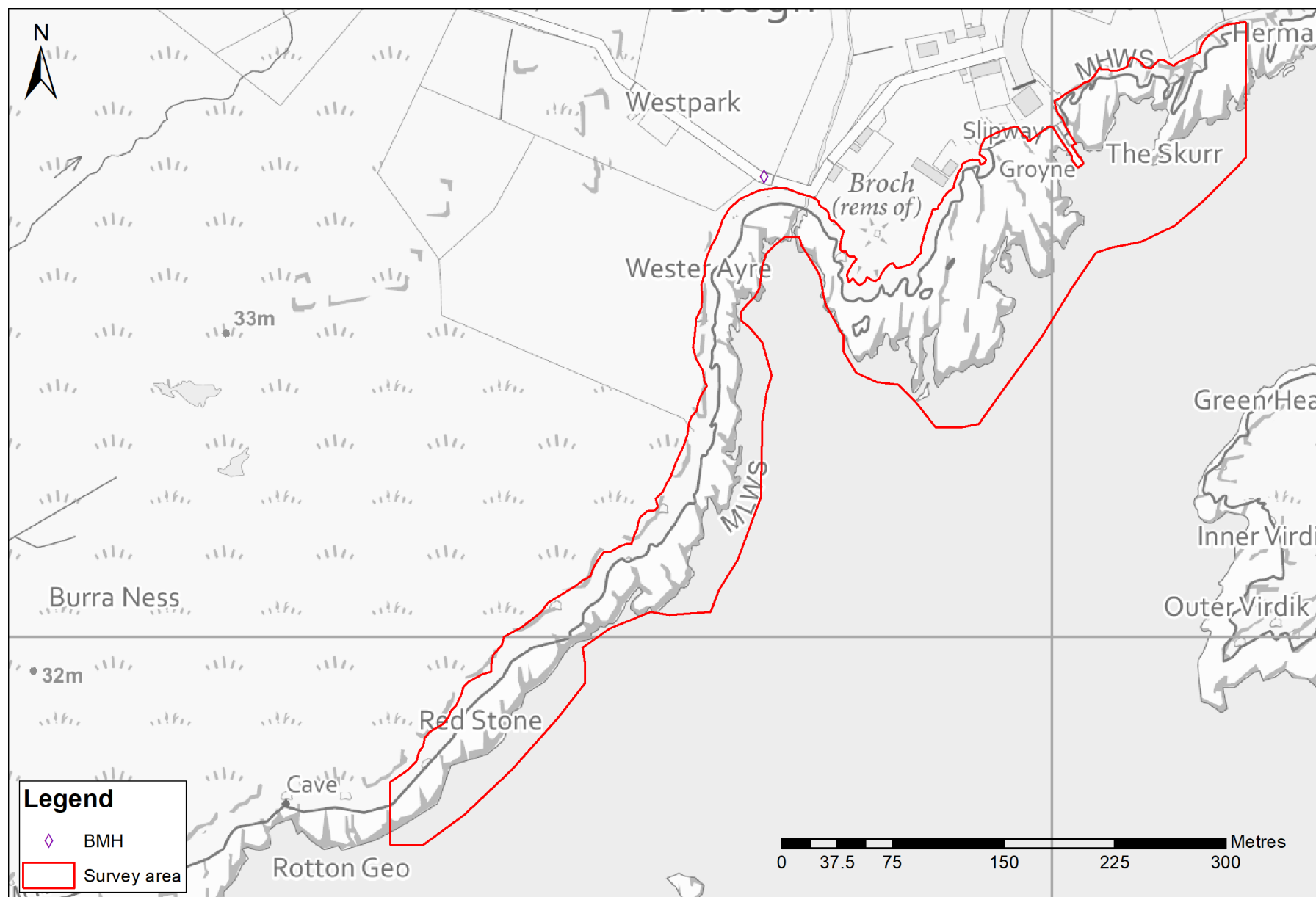


Figure 2.1 Survey area and proposed BMH location at Burravoe, Yell (© Crown copyright and database rights 2021 OS 0100040827)

### 2.2.3 Limitations of survey

Only one low tide window was available in which to complete the survey. However, it was possible to cover the entire survey area during the single survey period.

## 2.3 SURVEY FINDINGS

### 2.3.1 Site description

The survey area lies below and to the west of a small settlement at Burravoe. Directly below the settlement is a small pier area and slipway with a sheltered rocky shore to the east. This sheltered shore is comprised of a mix of large bedrock outcrops and shingle and cobble bays backed by grass faced small sloping cliffs. Immediately west of the pier, the shore is defined by fewer shingle and cobble bays and artificial rock armouring below a small farm. Continuing west, the rocky shore is solely comprised of steep bedrock as the shore bends around to the north around the remnants of a broch. These steep rocks continue round to a small cobble bay, the proposed landfall site for the cable. The mid and lower shore here is covered with a thick layer of washed-up kelps and backed by a stone wall and agricultural land. Continuing south and west, the shore transitions from the cobble bay to large furoid covered boulders to a lichen and barnacle covered craggy bedrock shore. This section shore appears far more exposed with mosaics of barnacles and occasional mussels with the kelp *Himanthalia elongata* replacing *Fucus serratus* at low water.

### 2.3.2 Biotopes

A summary of biotopes recorded within the survey area is provided in Table 2.2, and a map of lifeforms is shown in Figure 2.2.

**Table 2.2 List of Biotopes found within the survey area**

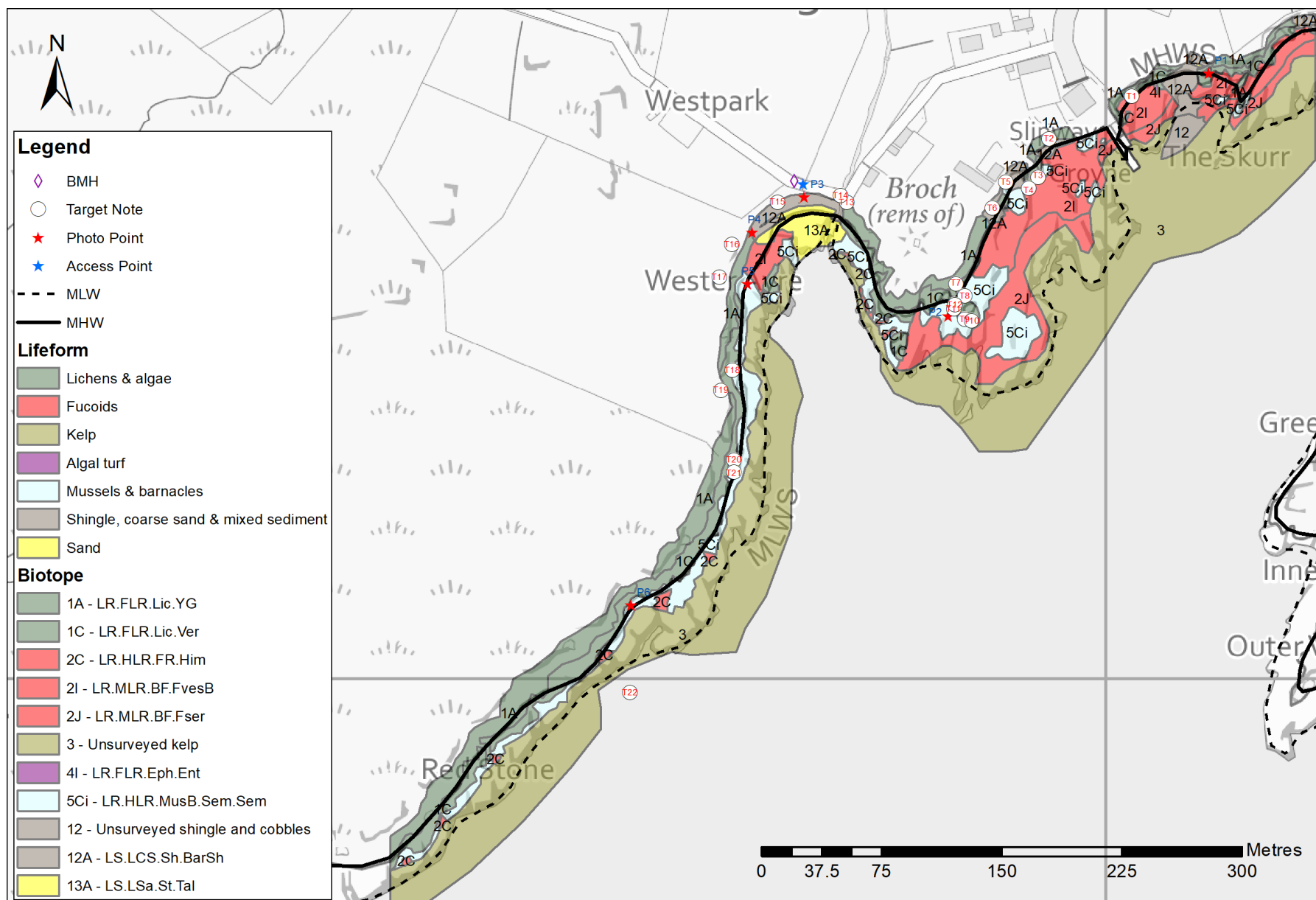
Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.FLR.Lic.YG	Yellow and grey lichens on supralittoral rock	Splash zone rocks backing the majority of the survey area.	<i>Caloplaca</i> spp. <i>Ramalina siliquosa</i> <i>Verrucaria maura</i> <i>Xanthoria</i> spp. Grey lichens
LR.FLR.Lic.Ver	<i>Verrucaria maura</i> on littoral fringe rock	Rocks immediately below the LR.FLR.Lic.YG.	<i>Verrucaria maura</i>
LR.HLR.FR.Him	<i>Himanthalia elongata</i> and red seaweeds on exposed to moderately exposed lower eulittoral rock	Gullies between rocks below the broch and on the southern rocky shore. Not fully surveyed as inaccessible.	<i>Himanthalia elongata</i> <i>Fucus serratus</i>
LR.MLR.BF.PelB	<i>Pelvetia canaliculata</i> and barnacles on moderately exposed littoral fringe rock	Occurs sporadically in more sheltered areas between the LR.FLR.Lic.Ver and LR.HLR.MusB.Sem.Sem biotopes.	<i>Pelvetia canaliculata</i> <i>Verrucaria maura</i>



Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.MLR.BF.FvesB	<i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed upper eulittoral rock	Flat areas of rock and boulders on the northern rocky shore and on the western sheltered rocks of the cable landing bay.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i> <i>Ulva</i> spp. <i>Cladophora rupestris</i>
LR.MLR.BF.Fser	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock	Lower shore on the northern rocky shore. Also present as a very thin zone on the southern rocky shore between the barnacles and the kelp.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Nucella lapillus</i> <i>Fucus serratus</i>
LR.FLR.Rkp.FK	Fucoids and kelp in deep eulittoral rock pools	Rocky outcrop below the broch.	<i>Halidrys siliquosa</i> <i>Fucus serratus</i>
LR.FLR.Rkp.G	Green seaweeds ( <i>Ulva</i> spp. and <i>Cladophora</i> spp.) in shallow upper eulittoral rockpools	Scattered on the upper shore rocks at various locations throughout the survey area.	<i>Patella vulgata</i> <i>Ulva</i> spp.
LR.FLR.Rkp.Cor	Coralline crust-dominated shallow eulittoral rockpools	Numerous examples on the rocky shore below the broch.	<i>Actinia equina</i> <i>Patella vulgata</i> <i>Corallina officinalis</i> <i>Codium</i> sp.
LR.FLR.Eph.Ent	<i>Enteromorpha</i> (now <i>Ulva</i> spp.) on freshwater-influenced and/or unstable upper eulittoral rock	Below areas of freshwater run off particularly on the northern rocky shore below drains from the Burravoe settlement.	<i>Ulva</i> spp.
LR.HLR.MusB.Sem.Sem	<i>Semibalanus balanoides</i> , <i>Patella vulgata</i> and <i>Littorina</i> spp. on exposed to moderately exposed ore vertical sheltered eulittoral rock	The majority of the steep sided rocky shore from below the broch to the southern extent of the survey area.	<i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Nucella lapillus</i> <i>Littorina obtusata</i> <i>Mytilus edulis</i> <i>Ulva</i> spp.
LS.LCS.Sh.BarSh	Barren littoral shingle	Small embayments south of the Burravoe settlement and the bay at the proposed cable landfall.	None

Biotope code	Biotope description	Occurrence on site	Typical species on site
LS.LSa.St.Tal	Talitrids on the upper shore and strand-line	High water strandlines at the top of the cobble bays and also forming a dense mat of decaying seaweed from the upper shore down to low water at proposed cable laying bay.	Talitridae







**Figure 2.2** Lifeforms map of the Burravoe intertidal survey area (© Crown copyright and database rights 2021 OS 0100040827)







### 2.3.3 Target notes


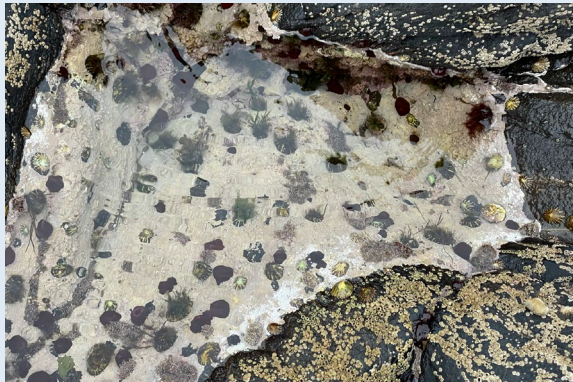


Target Notes and corresponding photographs are shown in Table 2.3. The locations of each of the Target Notes is indicated on the lifeforms map (Figure 2.2). Figure 2.2 also shows the locations of additional photographs as shown in Section 2.7.

**Table 2.3 Target notes**

Target note No.	Description	Photograph
T1	Green seaweed rockpools	
T2	Rock armouring	
T3	Pipe buried under seaweeds	
T4	Outflow pipe	


Target note No.	Description	Photograph
T5	Artificial wall at back of shore	
T6	Bedrock sided cobble bay	
T7	Seaweed rockpool	
T8	Rockpool with <i>Fucus serratus</i>	
T9	Rockpool with <i>Halidrys siliquosa</i>	



Target note No.	Description	Photograph
T10	Small gullies with sparse fucoids and <i>Actinia equina</i>	
T11	Coralline rockpools with small mussels	
T12	Green seaweed rockpools	
T13	Ropes and fishing net from fence line east of burn to the shore	



Target note No.	Description	Photograph
T14	Burn entering the bay on the eastern side	
T15	Rock armouring below stone wall	
T16	Drainage outlet	
T17	Drainage outlet	

Target note No.	Description	Photograph
T18	Large rockpool	
T19	Outlet pipe and gorge	
T20	Deep green seaweed rockpool surrounded by <i>Pelvetia canaliculata</i>	
T21	Patch of small mussels and columnar barnacles	
T22	Numerous creel buoys offshore	



### 2.3.4 Importance of Biotope types

There were no biotopes of conservation importance found within the survey area. The dog whelk (*Nucella lapillus*) is highlighted by OSPAR as a threatened/declining species and was found frequently on the intertidal rock. However, the dog whelk is a common species in the UK and is not protected under any other piece of legislation. No UK Biodiversity Action Plan (BAP) priority marine species, or species/habitats on the Scottish list of Priority Marine Features were recorded.

## 2.4 DISCUSSION

From a biological perspective, there are no reasons that would prevent the landing of a cable at the proposed location, or anywhere within the survey area.

## 2.5 RECOMMENDATIONS

A further Phase 2 intertidal survey is not required at this site.

## 2.6 REFERENCES

- Bunker, F. StP. D., Maggs, C. A., Brodie, J. A. and Bunker, A. R. (2017). Seaweeds of Britain and Ireland. Second Edition. Wild Nature Press, Plymouth.
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## 2.7 PHOTOGRAPHS

The locations of photo points are shown in Figure 2.2.





**Photo 1** The northern rocky shore looking southwest towards the pier



**Photo 2** *Actinia equina* and *Codium* sp. in a coralline floored rockpool



**Photo 3** The proposed landfall bay



**Photo 4** The top of the shore at the proposed landfall site





**Photo 5** The rocky shore just south of the proposed landfall



**Photo 6** Example of a gully with *Himanthalia elongata* below barnacles

## **A.5 INTERTIDAL SURVEY REPORT FOR CABLE CORRIDOR 2.3 SHETLAND TO SANDAY: SHETLAND LANDING POINT**





# **Phase 1 Intertidal Survey Report for Levaneap, Nesting, Shetland (Route 2.8)**

**Version 1**

**Report to Intertek**

**Issued by Aquatera Ltd**

**P961 – October 2021**



**[www.aquatera.co.uk](http://www.aquatera.co.uk)**



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V1	8 Oct 2021	First draft issued to client

Members of:





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# 1 INTRODUCTION

Aquatera has been commissioned to carry out a Phase 1 intertidal survey of the shore at Levaneap on the east coast of the Parish of Nesting, Shetland (Figure 1.1). The area has been identified as a suitable location for the onshore landfall and onward connection for fibre optic cables as part of network improvements to connect a number of locations around Shetland.

The objectives of the survey were to:

- Identify and map biotopes present within the survey area;
- Identify and map the presence of any rare or protected species within the study area; and
- Provide target notes to describe key features of the shore

The survey was carried out by Duncan Clarke, a marine biologist experienced in intertidal biological survey and mapping.



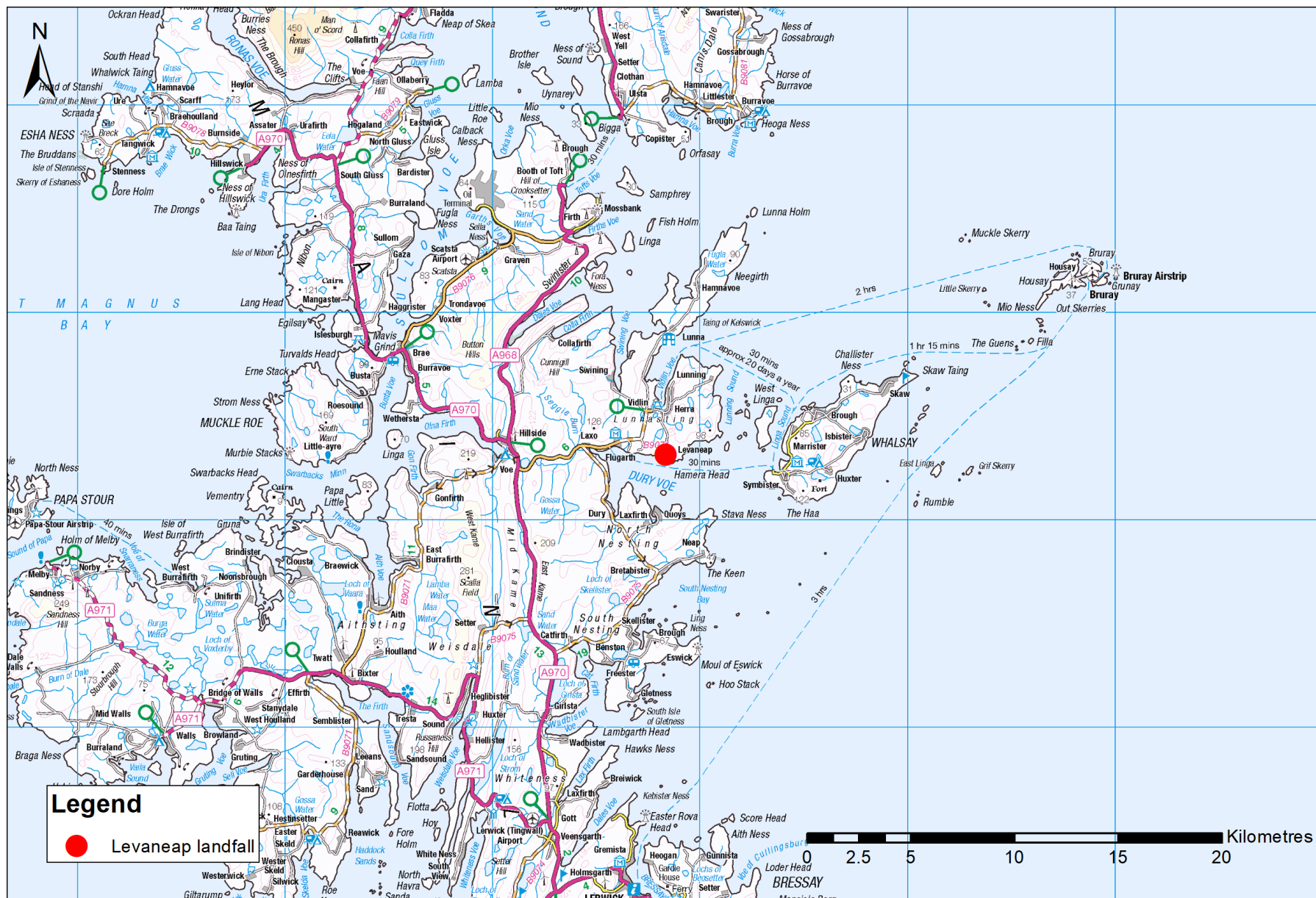


Figure 1.1 Location of the Levaneap, Shetland survey site (© Crown copyright and database rights 2021 OS 0100040827)

## 2 PHASE 1 INTERTIDAL SURVEY

### 2.1 INTRODUCTION

The survey took place on 23 September 2021, during low spring tides. The survey took place either side of low tide. Table 2.1 below outlines the survey conditions.

**Table 2.1 Survey details**

<b>Date</b>	23 September 2021
<b>Time at start</b>	06:30
<b>Time at finish</b>	08:00
<b>Low tide (hours)</b>	06:48 BST
<b>Tide height (m)</b>	0.2
<b>Lowest Astronomical Tide (m)</b>	-0.4
<b>Mean Low Water Springs (m)</b>	0.3
<b>Type of access</b>	Foot
<b>Sea condition</b>	Rough seas
<b>Weather condition</b>	Gales W8; Heavy rain easing throughout survey

### 2.2 METHODOLOGY

#### 2.2.1 Phase 1 survey method

The survey was carried out on foot using a variety of survey techniques that are described in the Countryside Council for Wales (CCW) report 'Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey' (Wyn *et al.*, 2000) and the 'Marine Nature Conservation Review Rationale and Methods' (Hiscock, 1996).

Prior to commencing the survey in the field, a wireframe map (a basic outline drawing of obvious features and/or changes in habitat) was produced to aid with the recording of biotopes.

Areas of sediment were dug and sampled at various intervals at the upper mid shore, mid shore, and lower shore. All samples were filtered through a 5 mm and 0.5 mm sieve. For both the sediment and rock areas, target notes and photographs were taken when there was a change in biotope type or zonation. An iPhone equipped with the ArcGIS app "Field Maps" was used to mark target points and tracks. All information was digitised to GIS using ArcMap 10, post survey. Maps were created using the guidance laid out in the CCW methodology.

Biotopes were assigned and described with reference to The Marine Habitat Classification for Britain and Ireland (v04.05) (Connor *et al.*, 2004) and the Joint Nature Conservation Committee (JNCC) website's online search facility.

All species names were taken from The World Register of Marine Species (WoRMS) website.

#### 2.2.2 Survey area

The proposed survey area comprised an approximate 625 m corridor. This was based on the provided areas of search for the proposed cable route with an additional 25 m added on to the east and west edges to allow for any movement

of the beach manhole (BMH) and cable within this corridor. The survey area extended from the splash zone down to the Lowest Astronomical Tide (LAT) (Figure 2.1)





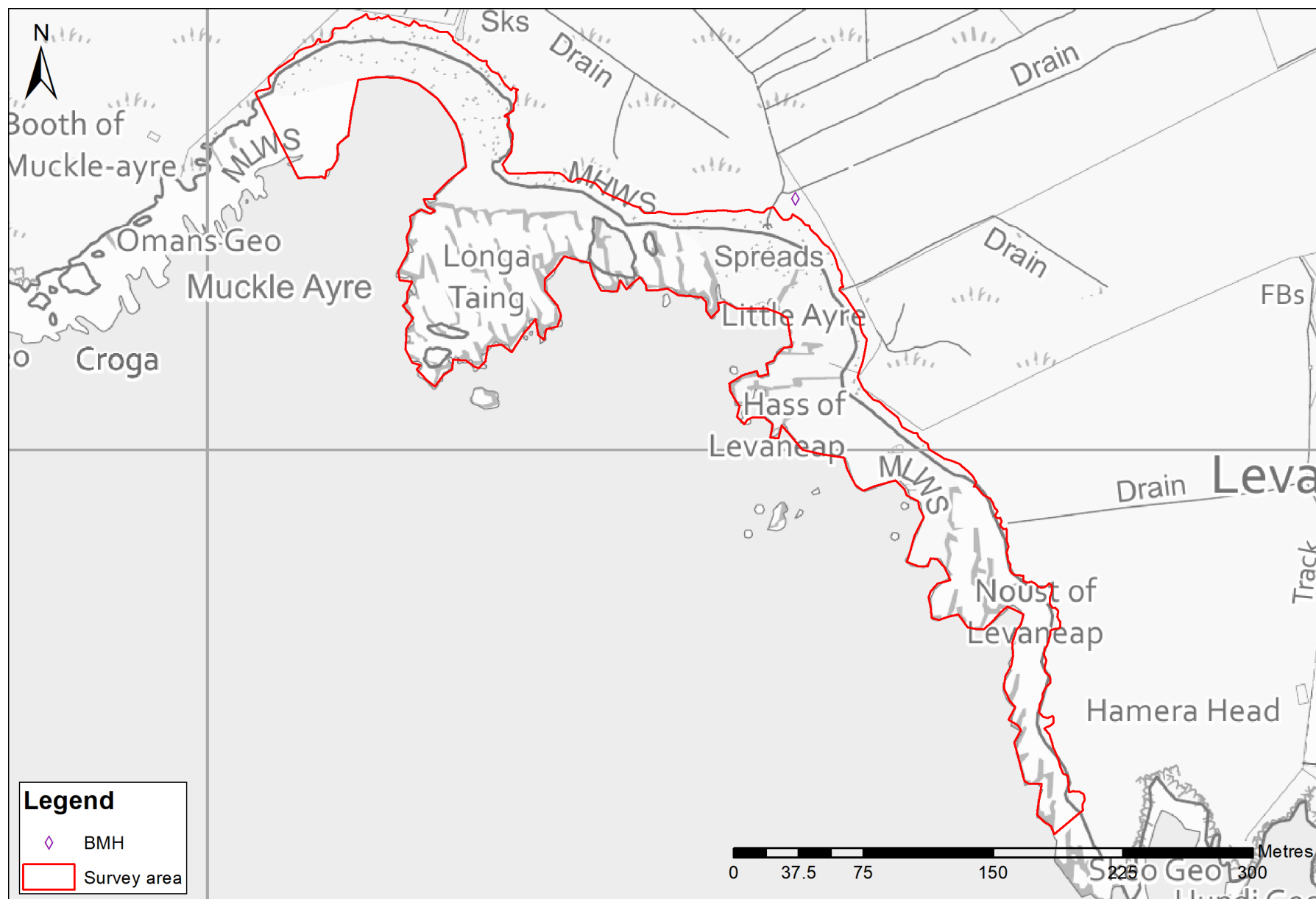


Figure 2.1 Survey area and proposed BMH location at Levaneap, Nesting (© Crown copyright and database rights 2021 OS 0100040827)

### 2.2.3 Limitations of survey

Only one low tide window was available in which to complete the survey. However, it was possible to cover the entire survey area during the single survey period. The weather during the survey was poor, with heavy rain and force 8 gales. This meant that certain areas of the shore could not be investigated in great detail and biotope identification had to be determined from a distance.

## 2.3 SURVEY FINDINGS

### 2.3.1 Site description

The shore at Leveaneap lies below agricultural grazing land in the eastern half and heath and bogland in the western half. The shore here is craggy with a mixture of cobbles and bedrock at the top of the shore with large extending intertidal areas of furoid seaweeds with emergent lichen covered bedrock islands. At the west end of the survey area and below the proposed BMH, the shore is composed of mobile cobbles flanked by bedrock on either side. The site is relatively sheltered, being on the north coast of Dury Voe, and this is evident from the dense furoid coverage on larger stable rocks and the abundance of the egg wrack *Ascophyllum nodosum*. At the southern end of the survey area, the shore backing changes to larger steeper cliffs and bedrock, with occasional steep sided cobble bays forming in eroded sections of the shore.

### 2.3.2 Biotopes

A summary of biotopes recorded within the survey area is provided in Table 2.2, and a map of lifeforms is shown in Figure 2.2.

**Table 2.2 List of Biotopes found within the survey area**

Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.FLR.Lic.YG	Yellow and grey lichens on supralittoral rock	Splash zone upper reaches of all bedrock. This forms the shore backing in the eastern half and as emergent islands of bedrock from the upper to lower shore in the western half.	<i>Caloplaca</i> spp. <i>Ramalina siliquosa</i> <i>Verrucaria maura</i> Grey lichens
LR.FLR.Lic.Ver	<i>Verrucaria maura</i> on littoral fringe rock	Occurs as a band immediately below the LR.FLR.Lic.YG biotope.	<i>Verrucaria maura</i>
LR.MLR.BF.FvesB	<i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed upper eulittoral rock	Mid to low lying stable bedrock and boulders.	<i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i> <i>Ulva</i> spp.



Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.MLR.BF.Fser	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock	Lower shore rocks and boulders	<i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Nucella lapillus</i> <i>Mastocarpus stellatus</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Pel	<i>Pelvetia canaliculata</i> on sheltered littoral fringe rock	Upper shore on the lower reaches of sheltered bedrock below the LR.FLR.Lic.Ver biotope.	<i>Pelvetia canaliculata</i> <i>Verrucaria maura</i>
LR.LLR.F.Fspi	<i>Fucus spiralis</i> on sheltered upper eulittoral rock	Sporadic patches on the upper shore often just below or as a mosaic with LR.LLR.F.Pel biotope.	<i>Patella vulgata</i> <i>Pelvetia canaliculata</i> <i>Fucus spiralis</i> <i>Verrucaria maura</i>
LR.LLR.F.Fves.X	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata	Mid shore in areas of the survey area where the biotope is underlain by cobbles and gravel.	<i>Actinia equina</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Asc	<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock	Upper mid shore on the sheltered far western edge of the survey area.	<i>Actinia equina</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.LLR.F.Asc.X	<i>Ascophyllum nodosum</i> on full salinity mid eulittoral mixed substrata	Upper mid shore of the central survey area on top of cobbles and gravel.	<i>Actinia equina</i> <i>Littorina obtusata</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i>
LR.HLR.MusB.Sem.Sem	<i>Semibalanus balanoides</i> , <i>Patella vulgata</i> and <i>Littorina</i> spp. on exposed to moderately exposed ore vertical sheltered eulittoral rock	Vertical sides of large boulders and bedrock below the LR.LLR.F.Pel biotope, and above the LR.MLR.BF.Fser biotope.	<i>Semibalanus balanoides</i> <i>Patella vulgata</i> <i>Nucella lapillus</i>
LS.LCS.Sh.BarSh	Barren littoral shingle	Shore backing on the western shore and in small embayments on the eastern shore.	None
LS.LSa.St.Tal	Talitrids on the upper shore and strand-line	Seaweed strandlines on top of the LS.LCS.Sh.BarSh biotope.	Talitridae

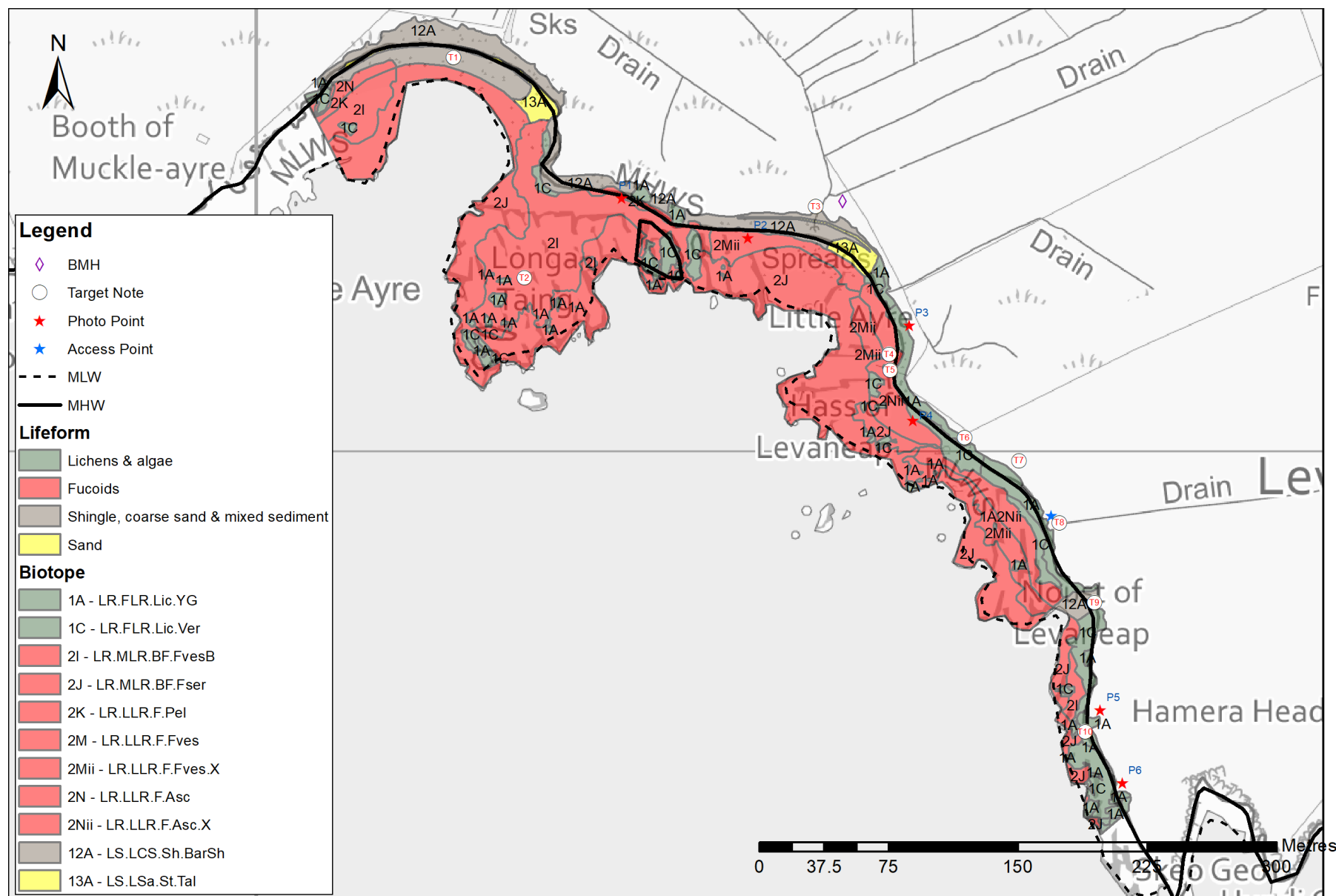




Figure 2.2 Lifeforms map of the Levaneap intertidal survey area (© Crown copyright and database rights 2021 OS 0100040827)

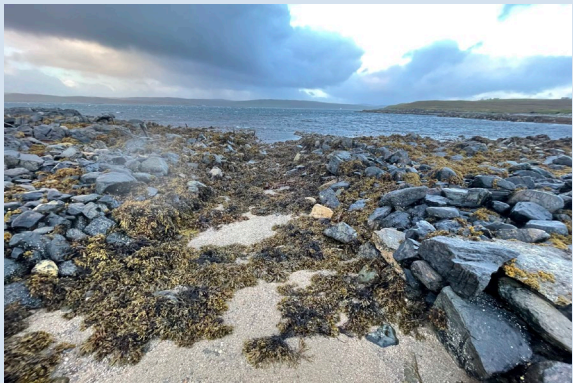



### 2.3.3 Target notes


Target Notes and corresponding photographs are shown in Table 2.3. The locations of each of the Target Notes is indicated on the lifeforms map (Figure 2.2). Figure 2.2 also shows the locations of additional photographs as shown in Section 2.7.

**Table 2.3 Target notes**

Target note No.	Description	Photograph
T1	Cobble bay at the western end of the survey area.	
T2	Extensive peninsula of intertidal coast consisting of a mosaic of furoid biotopes with lichen covered emergent bedrock islands and barnacle covered vertical boulders.	
T3	Large bore outflow pipe.	



Target note No.	Description	Photograph
T4	Gravel channel between boulders.	 A photograph showing a wide, shallow channel of light-colored gravel and sand, flanked by large, dark grey boulders. The channel leads towards a body of water under a cloudy sky.
T5	Sheep fence dividing shore down to low water.	 A photograph of a stone wall and a wire fence running along a grassy shore. The wall is built from large, dark grey stones, and the fence is made of wire and wooden posts. The sea is visible in the background under a blue sky with some clouds.
T6	Fresh water runoff.	 A photograph showing a small stream of water flowing over a rocky, grassy slope. The water is clear and appears to be running down the face of a hill. A stone wall is visible in the foreground.
T7	Small, sheltered stone wall.	 A photograph of a low, dry stone wall built from large, grey stones. The wall is situated on a grassy area near the sea. The water is calm, and the sky is overcast.
T8	Drainage ditch	

Target note No.	Description	Photograph
T9	Cobble bay with sloping banks, sided by bedrock.	

### 2.3.4 Importance of Biotope types

There were no biotopes of conservation importance found within the survey area. The dog whelk (*Nucella lapillus*) is highlighted by OSPAR as a threatened/declining species and was found frequently on the intertidal rock. However, the dog whelk is a common species in the UK and is not protected under any other piece of legislation. No UK Biodiversity Action Plan (BAP) priority marine species, or species/habitats on the Scottish list of Priority Marine Features were recorded.

## 2.4 DISCUSSION

From a biological perspective, there are no reasons that would prevent the landing of a cable at the proposed location, or anywhere within the survey area.

## 2.5 RECOMMENDATIONS

A further Phase 2 intertidal survey is not required at this site.

## 2.6 REFERENCES

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## 2.7 PHOTOGRAPHS

The locations of photo points are shown in Figure 2.2.







**Photo 1** Example of the mosaic of fucoids and rock biotopes



**Photo 2** The proposed landfall site from the west



**Photo 3** The proposed landfall site from the east



**Photo 4** Patch of spiral wrack (*Fucus spiralis*)





**Photo 5**      **The rocky shore at the south-eastern end of the survey area**



**Photo 6**      **The shore from the southern extent of the survey area**

## **A.6 INTERTIDAL SURVEY REPORT FOR CABLE CORRIDOR 2.3 SHETLAND TO SANDAY: SANDAY LANDING POINT**



# **Phase 1 Intertidal Survey Report for Scuthvie Bay, Sanday, Orkney (Route 2.3)**

**Version 1**

**Report to Intertek**

**Issued by Aquatera Ltd**

**P961 – September 2021**



**[www.aquatera.co.uk](http://www.aquatera.co.uk)**



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# 1 INTRODUCTION

Aquatera has been commissioned to carry out a Phase 1 intertidal survey of the shore at Scuthvie Bay in Sanday, Orkney (Figure 1.1). The area has been identified as a suitable location for the onshore landfall and onward connection for fibre optic cables as part of network improvements to connect a number of Orkney islands.

The objectives of the survey were to:

- Identify and map biotopes present within the survey area;
- Identify and map the presence of any rare or protected species within the study area; and
- Provide target notes to describe key features of the shore

The survey was carried out by Duncan Clarke of Aquatera Ltd, an experienced marine biologist accompanied by a second biologist to assist with species identification and recording of notes.





## 2 PHASE 1 INTERTIDAL SURVEY

### 2.1 INTRODUCTION

The survey took place on 26 June 2021, during low spring tides. The survey took place either side of low tide. Table 2.1 below outlines the survey conditions.

**Table 2.1 Survey details**

<b>Date</b>	26 June 2021
<b>Time at start</b>	05:30
<b>Time at finish</b>	08:50
<b>Low tide (hours)</b>	06:31 BST
<b>Tide height (m)</b>	0.6
<b>Lowest Astronomical Tide (m)</b>	0.3
<b>Mean Low Water Springs (m)</b>	0.9
<b>Type of access</b>	Foot
<b>Sea condition</b>	Calm
<b>Weather condition</b>	Good – overcast and still

### 2.2 METHODOLOGY

#### 2.2.1 Phase 1 survey method

The survey was carried out on foot using a variety of survey techniques that are described in the Countryside Council for Wales (CCW) report 'Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey' (Wyn *et al.*, 2000) and the 'Marine Nature Conservation Review Rationale and Methods' (Hiscock, 1996).

Prior to commencing the survey in the field, a wireframe map (a basic outline drawing of obvious features and/or changes in habitat) was produced to aid with the recording of biotopes.

Areas of sediment were dug and sampled at various intervals at the upper mid shore, mid shore, and lower shore. All samples were filtered through a 5 mm and 0.5 mm sieve. For both the sediment and rock areas, target notes and photographs were taken when there was a change in biotope type or zonation. An iPhone 12 along with the ArcGIS app "Field Maps" was used to mark target points and tracks. All information was digitised to GIS using ArcMap 10, post survey. Maps were created using the guidance laid out in the CCW methodology.

Biotopes were assigned and described with reference to The Marine Habitat Classification for Britain and Ireland (v04.05) (Connor *et al.*, 2004) and the Joint Nature Conservation Committee (JNCC) website's online search facility.

All species names were taken from The Marine Life Information Network (MarLIN) and the Algaebase website for certain species of seaweed which were not listed on the MarLIN site.



### 2.2.2 Survey area

The proposed survey area comprised an approximate 900 m corridor. This was based on the provided areas of search for the proposed cable route with an additional 30 m area added on to the north-western edge, and an additional 250 m added on to the south-eastern edge of the area of search due to the final BMH's location being closer to the south-eastern extent of the initial search corridor. The survey area extended from the splash zone down to the Lowest Astronomical Tide (LAT) (Figure 2.1)



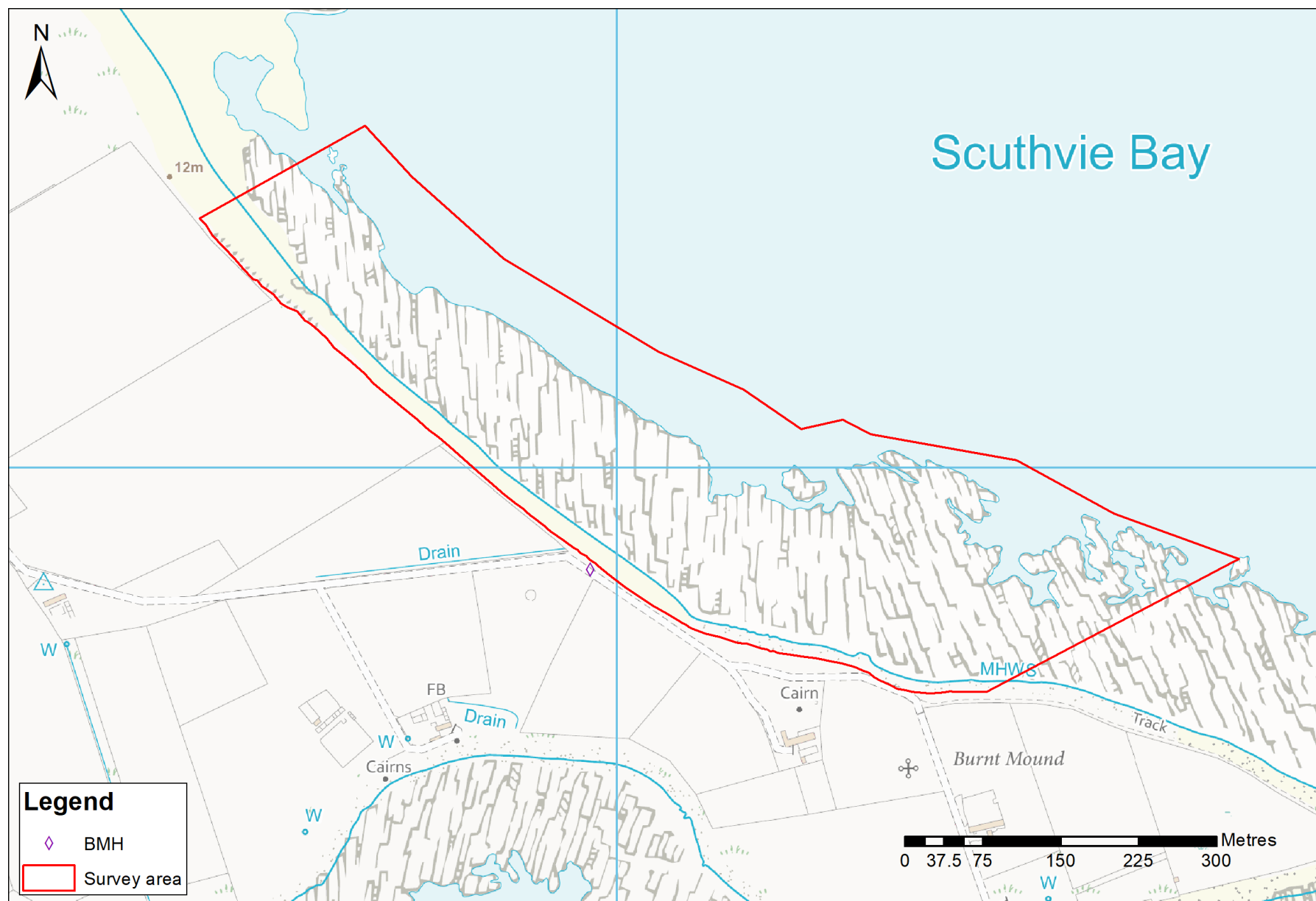


Figure 2.1 Survey area and proposed BMH location at Scuthvie Bay, Sanday (© Crown copyright and database rights 2021 OS 0100040827)

### 2.2.3 Limitations of survey

Only one low tide window was available in which to complete the survey however, it was possible to cover the entire survey area during the single survey period.

## 2.3 SURVEY FINDINGS

### 2.3.1 Site description

The site at Scuthvie, at first glance, appears to a sandy shore, backed by dunes and eroding sandy cliffs with an area of exposed bedrock to the east. However, with the retreating tide, large outcrops of seaweed-covered rocks appear emerging from the sand on the mid to lower shore.

The beach faces north-northeast and is exposed to wind and waves from this direction, with no landfall interruptions until Shetland. Due to the shape of the coastline, the shore is sheltered from all other directions.

The entire shore is backed by eroding sand cliffs or sand dunes, with the dunes more prevalent to the west of the proposed BMH and increasing in size as you head further west. These sand formations provide nesting sites for Northern fulmars *Fulmarus glacialis*. Below the dunes, the beach is littered with a strandline of seaweeds, predominantly *Laminaria digitata* and below the cliffs, a strandline is also found, but with an upper shore composed of barren cobbles.

The main shore is predominantly sandy, with deeper, barren sand at the top of the shore and polychaete-dominated sands below of varying depths above the underlying bedrock. At various points on the shore, the bedrock emerges from the sediment. Depending on the elevation above mean low water and the height above the sand, a variety of seaweeds are able to colonise, with *Fucus spiralis*, and *Fucus vesiculosus* on the upper and mid shore, grading into *Fucus serratus* on the lower shore and kelps at the lowest parts of the beach. The kelps are predominantly a mix of *Laminaria digitata* and *Saccorhiza polyschides* the latter of which is a sand scour tolerant species and fits with the sand scouring and mobile sediments found in the water column.

Of those rocks found on the mid to lower shore, the species present is affected by the level of sand scouring, with sand tolerant species such as *Rhodothamniella floridula*, *Ulva* spp., and Ectocarpacae found at the bottom of the rocks against the sand, and the furoid seaweeds appearing above on the less sand affected rock.

To the east of the proposed BMH, the shore is characterised by a rocky shore, with flatter more sheltered bedrock providing opportunities for species less tolerant of sand scouring. The shore here shows classical zonation patterns with a band of *Fucus spiralis* on the upper shore, moving down through *Fucus vesiculosus*, *Fucus serratus* and *Laminaria digitata*.

The exposed nature of this coast means that certain areas of the shore experienced large amounts of washed-up tangle (*Laminaria digitata*), which in some areas seemed to have been present for a long time as these areas were evident from large amounts of decaying material.

### 2.3.2 Biotopes

A summary of biotopes recorded within the survey area is provided in Table 2.2, and a map of lifeforms is shown in Figure 2.2.



**Table 2.2 List of Biotopes found within the survey area**

Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.MLR.BF.PelB	<i>Pelvetia canaliculata</i> and barnacles on moderately exposed littoral fringe rock	Occurs in small patches on the upper reaches of the eastern rocky shore where the bedrock is elevated to height suitable for colonisation.	<i>Pelvetia canaliculata</i> <i>Verrucaria maura</i>
LR.MLR.BF.FspiB	<i>Fucus spiralis</i> on exposed to moderately exposed upper eulittoral rock	Occurs as a large band on the upper bedrock of the eastern rocky shore and also on exposed rocks emerging from the sand of the upper shore of the sandy beach.	<i>Littorina obtusata</i> <i>Fucus spiralis</i> <i>Fucus vesiculosus</i> <i>Pelvetia canaliculata</i> <i>Hildenbrandia rubra</i> <i>Verrucaria maura</i>
LR.MLR.BF.FvesB	<i>Fucus vesiculosus</i> and barnacles on moderately exposed mid eulittoral rock	On the eastern rocky shore, found as a band below the <i>F. spiralis</i> . Also found on emergent rocks from the sandy bay.	<i>Halichondria panicea</i> <i>Actinia equina</i> <i>Semibalanus balanoides</i> <i>Carcinus maenas</i> <i>Patella vulgata</i> <i>Littorina littorea</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Mytilus edulis</i> <i>Mastocarpus stellatus</i> <i>Osmundea pinnatifida</i> <i>Ascophyllum nodosum</i> <i>Fucus vesiculosus</i> <i>Ulva</i> spp. <i>Cladophora rupestris</i>



Biotope code	Biotope description	Occurrence on site	Typical species on site
LR.MLR.BF.Fser	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock	Found on the lower reaches of the eastern rocky shore bedrock and emergent rocks on the lower areas of the sandy beach.	<i>Halichondria panicea</i> <i>Actinia equina</i> <i>Carcinus maenas</i> <i>Patella vulgata</i> <i>Littorina obtusata</i> <i>Nucella lapillus</i> <i>Mytilus edulis</i> <i>Rhodothamniella floridula</i> <i>Corallina officinalis</i> <i>Chondrus crispus</i> <i>Mastocarpus stellatus</i> <i>Osmundea pinnatifida</i> <i>Heterosiphonia plumosa</i> <i>Plumaria plumosa</i> <i>Furcellaria lumbricalis</i> <i>Fucus serratus</i> <i>Ulva</i> spp. <i>Cladophora rupestris</i>
IR.HIR.KSed.Sac	<i>Saccorhiza polyschides</i> and other opportunistic kelps on disturbed sublittoral fringe rock	Found on sand-scoured rocks at extreme low water. Not fully surveyed.	<i>Alaria esculenta</i> <i>Laminaria digitata</i> <i>Saccorhiza polyschides</i>
IR.MIR.KR.Ldig	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock	Potential alternative biotope to IR.HIR.KSed.Sac. Not fully surveyed.	<i>Alaria esculenta</i> <i>Laminaria digitata</i> <i>Saccorhiza polyschides</i>
LR.MLR.BF.Rho	<i>Rhodothamniella floridula</i> on sand-scoured lower eulittoral rock	Occurs on the lower areas of the emergent rock formations found within the sandy beach.	<i>Rhodothamniella floridula</i>
LR.FLR.Eph.Ent	<i>Enteromorpha</i> (now <i>Ulva</i> ) spp. on freshwater-influenced and/or unstable upper eulittoral rock	Found on smaller, sand-scoured, boulders where fucoids and other seaweed species are not able to take hold.	<i>Ulva</i> spp.
LS.LCS.Sh.BarSh	Barren littoral shingle	Occurs on the upper shore on the eastern half of the survey area below the eroding sand cliffs, as opposed to the sand dunes.	None

Biotope code	Biotope description	Occurrence on site	Typical species on site
LS.LSa.St.Tal	Talitrids on the upper shore strand line	Found scattered along the upper shore and also as a large decaying mass of kelp stipes on the mid to upper shore between the eastern sand beach and the western rocky shore.	Talitridae
LS.LSa.MoSa.BarSa	Barren littoral coarse sand	Found on the upper shore of the sandy beach above and below the strandline and above the polychaete dominated sediments.	None
LS.LSa.FiSa.Po	Polychaetes in littoral fine sand	Present in areas of sediment below the barren upper shore sand. Depth of sand varies due to close proximity of bedrock to the surface.	<i>Pygospio elegans</i> <i>Malacoceros fuliginosus</i> <i>Capitella capitata</i> <i>Arenicola marina</i>



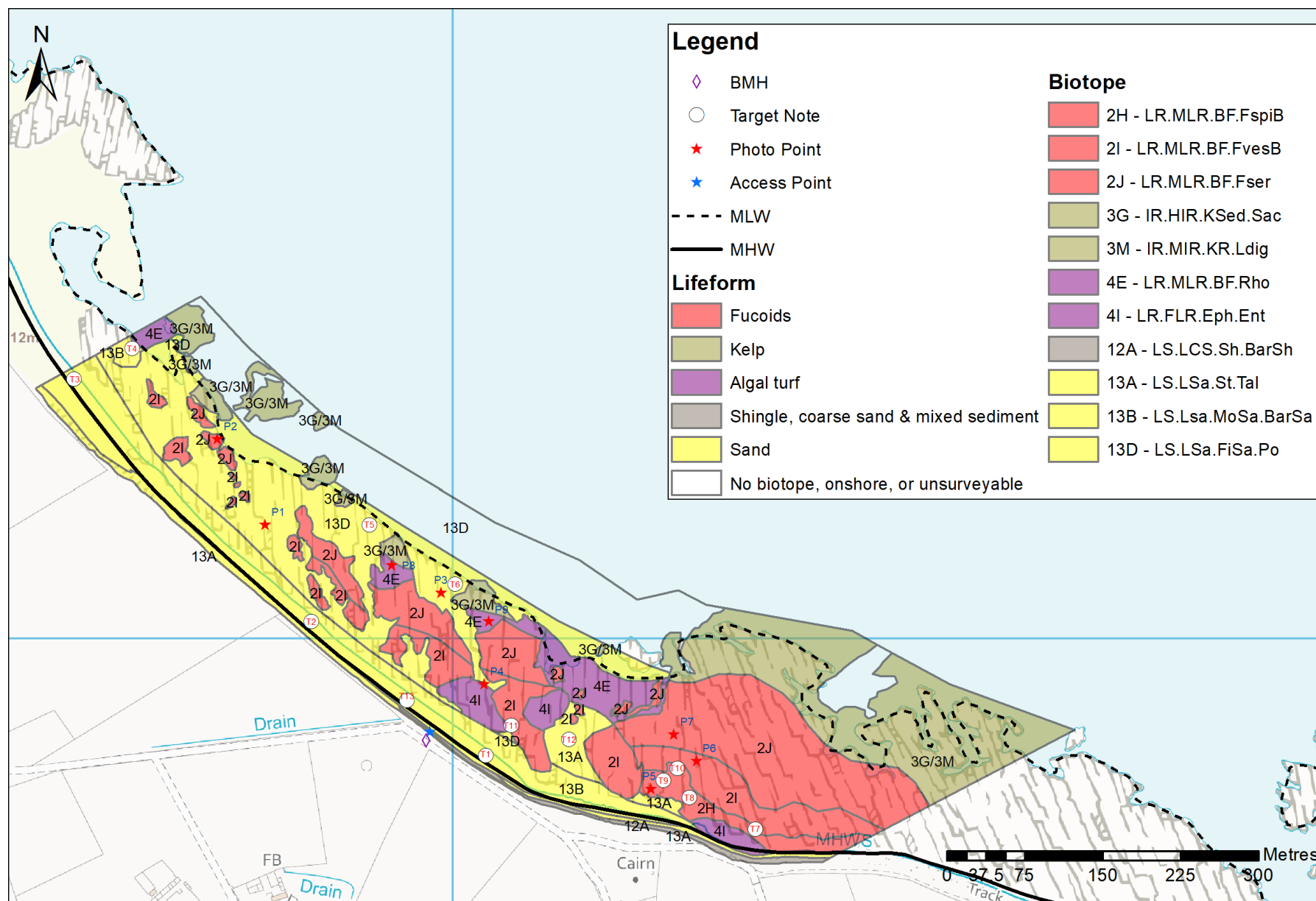


Figure 2.2 Lifeforms map of the Scuthvie Bay intertidal survey area (© Crown copyright and database rights 2021 OS 0100040827)