



Brims Tidal Array Ltd Project

Extended Phase 1 Habitat Survey

Scottish and Southern Energy Renewables and
OpenHydro

V2: 21st July 2014

Final Report

PB2561



**HASKONING UK LTD.
INDUSTRY & ENERGY**

10 Bernard Street
Leith
Edinburgh EH6 6PP
United Kingdom

+44 131 555 0506 Telephone
Fax

info@edinburgh.royalhaskoning.com E-mail
www.royalhaskoning.com Internet

Document title Brims Tidal Array Ltd Project
Extended Phase 1 Habitat Survey
Document short title Brims Extended Phase 1 Habitat Survey
Status Final Report
Date V2: 21st July 2014
Project name Brims Tidal Array Ltd
Project number PB2561
Client Scottish and Southern Energy Renewables
and OpenHydro
Reference 9W0993/R/304119/Edin

Drafted by Hannah Williams
Checked by Jen McMillan, Marcia Humes
Date/initials check JM, MH. 21/07/2014
Approved by Frank Fortune
Date/initials approval FF. 21/07/2014

SUMMARY

Royal HaskoningDHV has been commissioned by Scottish and Southern Energy renewables (SSER) and Open Hydro to undertake an Extended Phase 1 Habitat survey in relation to the proposed Brims Tidal Array Ltd (BTAL) project. The purpose of this study is to enable the project to proceed without contravening wildlife legislation.

An Extended Phase I Habitat Survey of the study area (**Figure 1.1**) was undertaken by two Royal HaskoningDHV ecologists' on 21st – 25th August 2012. This was preceded by a desk study of the area and its surrounds, drawing on a number of sources.

The survey aimed to record the habitats present within the study area, identify the potential for legally protected species to occur, make recommendations with regard to the planned work and identify any further specialist ecological surveys that may be necessary. The findings of the survey will be used to inform the EIA process for the project.

The survey identified actual and potential areas to support breeding birds. Areas to support bats were limited and generally of low value. Limited areas showed evidence of supporting otter.

Other protected species as outlined within the report are unlikely to be present from the conclusions drawn from desk and field studies, and no further surveys or mitigation is recommended for these species.

Japanese rose, a non-native invasive species was recorded in a number of locations in the study area.

Recommendations for further surveys and preliminary mitigation advice have been provided.

Further surveys may be required following further details or changes to the planned works.

CONTENTS

	Page
1 INTRODUCTION	1
1.1 Purpose of report	1
1.2 The proposed development	1
1.3 Scope of works	1
1.4 Conditions of survey	2
1.5 Study area	2
1.6 Limitations	2
INSERT FIG1.1	3
2 METHODOLOGY	4
2.1 Desk study	4
2.2 Field survey	4
3 RESULTS	5
3.1 Desk study	5
3.1.1 Statutory designated sites	5
3.1.2 Non statutory designated sites	5
3.1.3 Non-statutory designated sites may have some protection from development through national and local policies.	5
3.1.4 Protected and notable flora and fauna, and non-native invasive species	10
3.2 Field survey	12
3.2.1 Overview	12
3.2.2 Habitats	12
3.2.3 Boundaries	18
3.2.4 Groundwater dependant terrestrial ecosystems (GWDTEs)	19
3.2.5 Summary of habitats within the study area	19
3.2.6 Species	20
4 OVERVIEW OF DEVELOPMENT OPTIONS AND IDENTIFICATION OF POTENTIAL CONSTRAINTS	23
4.1 Potential impacts	23
4.2 Brims landfall development options	23
5 RECOMMENDATIONS	25
5.1 Pollution prevention	25
5.2 Habitats and flora	25
5.3 Protected and notable species	26
5.3.1 Otter	26
5.3.2 Bats	26
5.3.3 Nesting Birds	26
5.3.4 Invertebrates	27
5.3.5 Invasive non-native species	27
5.4 Resurvey	27

6	REFERENCES	27
7	APPENDICES	28
7.1	Appendix A: Phase 1 Habitat Survey Maps	28
7.2	Appendix B: Target Notes	31
7.3	Appendix C: Species List	34
7.4	Appendix D: Relevant legislation	37

1 INTRODUCTION

1.1 Purpose of report

Brims Tidal Array Ltd (BTAL) intends to install a tidal energy conversion array off the south coast of Hoy, Orkney Islands, Scotland. Royal HaskoningDHV were commissioned by SSER and OpenHydro to conduct onshore ecological studies in support of an Environmental Impact Assessment (EIA) for the proposed development. This document reports on the Extended Phase 1 Habitat Survey conducted by Royal HaskoningDHV which will be used to inform the EIA.

The purpose of this study is to identify where current project proposals may contravene wildlife legislation and enable the project to avoid this through design and appropriate mitigation. The aim of the survey is to record the habitats present within the study area, identify the potential for legally protected species to occur, make recommendations with regard to the planned work and identify any further specialist ecological surveys that may be necessary. The findings of the survey will be used to inform the EIA process.

1.2 The proposed development

BTAL is a 50-50 partnership between SSE Renewables UK Limited (SSER) and OpenHydro to jointly develop the Brims tidal site. The aim of the Project is to harness tidal energy to generate clean, renewable electricity on a commercial scale from the specific site within the Pentland Firth and Orkney Waters.

BTAL was awarded an Agreement for Lease by the Crown Estate in November 2008, which gives exclusive rights to develop the Brims site to the south of Hoy, Orkney with an installed capacity of up to 200MW.

The preferred technology to be installed on the site is OpenHydro's Open Centre Turbine (OCT). However, alternative technologies are also being considered as part of the consenting strategy.

Installation will require associated electrical infrastructure including an export cable coming ashore, landfall and onshore cable corridor to an onshore substation. BTAL's consent application will not include the onshore substation or onward connection to the grid, which is the responsibility of SHE-T and will be subject to its own application. The onshore substation is, however, likely to be located in the footprint of the onshore cable corridor area of search.

1.3 Scope of works

The Extended Phase I Habitat Survey is comprised of four components, which collectively enable a preliminary ecological assessment of the study area to be undertaken and include:

- a desktop review that summarises information on existing protected species records and nature conservation designations in the area;
- an assessment of the study areas' habitat composition derived from the walkover survey
- a protected species assessment that evaluates the likelihood of protected species and invasive species occurring within the study areas; and

- Digitised maps of habitats and target notes according to standard symbols (JNCC 2010).

1.4 Conditions of survey

The survey was completed by two experienced Royal HaskoningDHV ecologists from the 21st – 24th of August 2012. The weather was warm and sunny throughout, with some patches of cloud and a gentle breeze. It rained overnight and into the early morning on a number of days in the survey, however, overall, the conditions were favourable for the survey. Some access was restricted in the study area and is discussed in Limitations (section 1.6).

1.5 Study area

The Extended Phase 1 Habitat Survey was conducted over the area outlined in red in **Figure 1.1**. Hereafter, this area shall be referred to as the 'study area'.

1.6 Limitations

The following limitations applied to the survey.

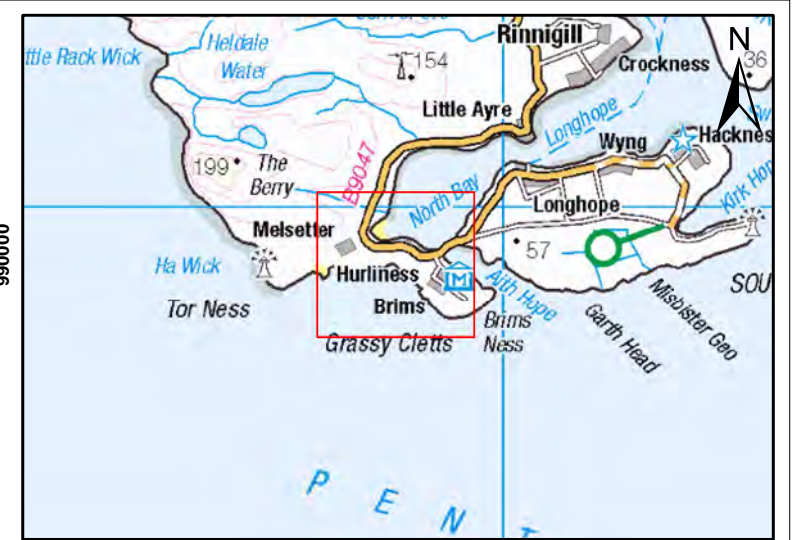
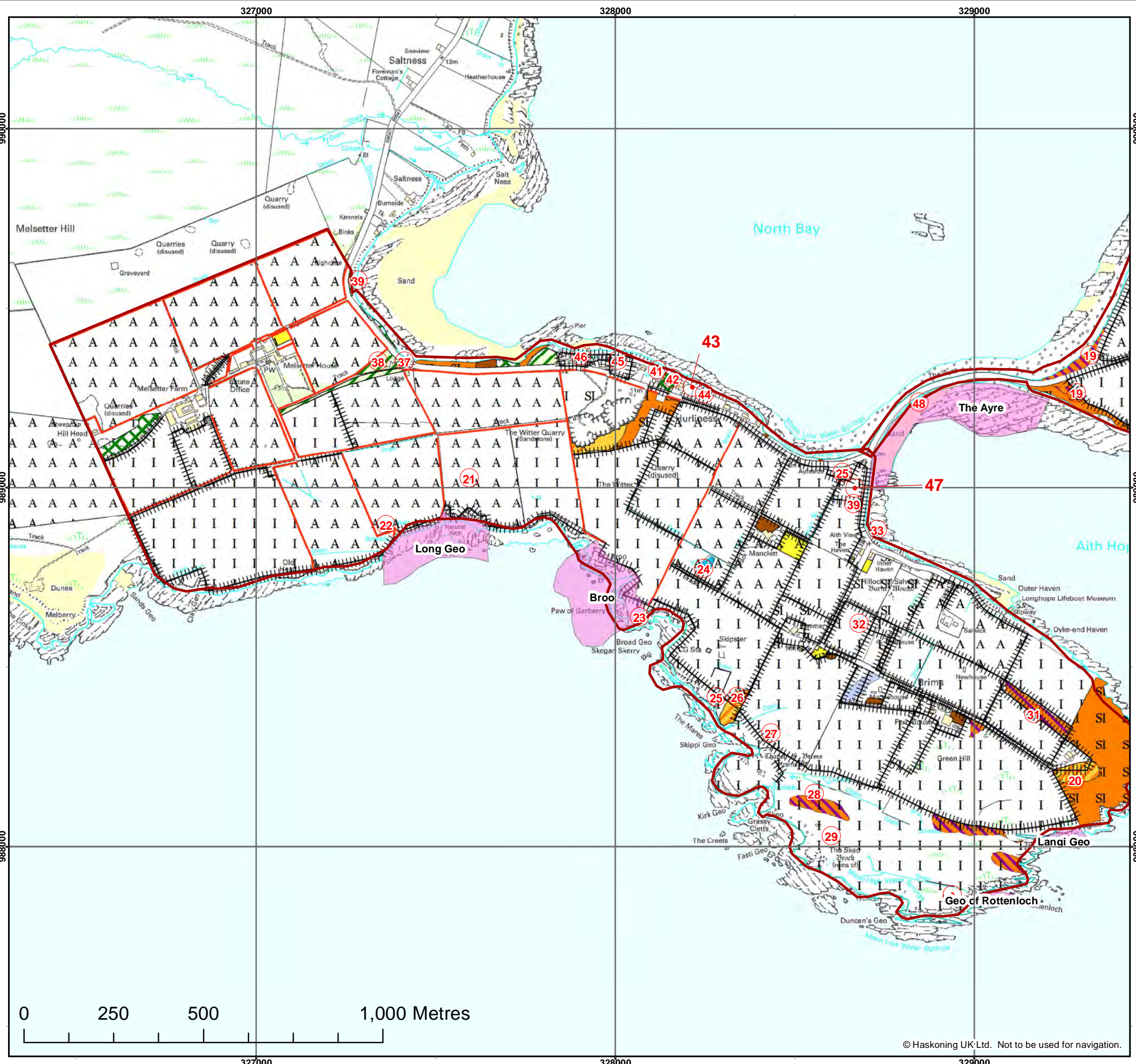
The existing species records collated during the desk study phase are predominantly derived from the national biodiversity network gateway. Some of these records have been provided at a low resolution (i.e. accuracy may only be to within 10km grid square). Additionally, many records are submitted by members of the public and volunteer groups. Therefore, it should not be taken as a definitive list of the species that occur in the local area.

Any ecological survey is limited by natural factors such as the time of year, behaviour and migration patterns. The list of plants and animals compiled during the walkover survey is therefore not exhaustive. In addition time constraints did not always make it possible to identify vegetation to species level.

The Witter Quarry at Hurliness was not accessed due to health and safety reasons, but was observed from neighbouring field boundaries. A large area of broad-leaved woodland could not be accessed (Target Note 38, **Appendix B**). The landowner was approached to gain access, however, the timing was unsuitable. Instead, the woodland was remotely surveyed from the road as best as possible.

It rained overnight on a number of the survey days, which may have washed off some field signs (such as paw-prints and faeces) of protected and notable species and thus made them harder to detect.

These limitations aside, the results of the ecological survey are considered sufficient to allow an evaluation of potential constraints and the potential for negative impacts from the proposed development.



Legend:

- Study Area
- Potential landfall options
- Target Notes
- Broad-leaved woodland - plantation
- Coniferous woodland - plantation
- Parkland and scattered trees - coniferous
- Scrub - dense/continuous
- Fence
- Wall
- Improved grassland
- Poor semi-improved grassland
- Neutral grassland - semi-improved
- Acid grassland - semi-improved
- Marshy grassland
- Amenity grassland
- Arable
- Bracken - continuous
- Dry dwarf shrub heath - acid
- Dry heath/acid grassland
- Wet heath/acid grassland
- Ephemeral/short perennial
- Other tall herb and fern - non ruderal
- Swamp and fen
- Running water
- Standing open water
- Dry ditch

JNCC Phase 1 Classification

Client:	Project:
BTAL	Brims Tidal Array

Title:

Extended Phase 1 Survey Results

Figure:	A1	Drawing No:	
Revision:	01	Date:	07/11/12
Drawn:	HW	Checked:	JT
Size:	A3	Scale:	1:15000

Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONING DHV ENVIRONMENT ENERGY
10 BERNARD STREET
LEITH
EDINBURGH
EH6 6PP
+44 (0)131 555 0506
www.royalhaskoningdhv.com

2 METHODOLOGY

All place names within this document are taken from Ordnance Survey maps, either 1:25000 scale or 1:10000 as these maps are used in the figures presented in this report.

2.1 Desk study

The Scottish Natural Heritage (SNH)'s Sitelink (gateway.snh.gov.uk/sitelink) website was reviewed for information on statutory designated sites of nature conservation importance within 5km of the study area boundary.

Information on locally designated sites was obtained from the Orkney Islands Council website (www.orkney.gov.uk).

The National Biodiversity Network (NBN) Gateway (www.nbngateway.co.uk) website was reviewed for records of notable or protected species within 1km of the study area. Notable species include those which are listed in a Red Data book or are identified in the UK Biodiversity Action Plan (BAP) or the Orkney Local BAP (LBAP).

Records of protected and notable species were requested from Orkney Biodiversity Records Centre (OBRC) and records within the study area are reported.

Distances of designated sites to the closest point of the study area were measured.

2.2 Field survey

An Extended Phase I Habitat Survey of the study area was undertaken.

A Phase I Habitat Survey is a standardised method of recording habitat types and characteristic vegetation, as set out in the 'Handbook for Phase I Habitat Survey – a technique for Environmental Audit' (JNCC, 2010). This survey method can be 'extended' in accordance with the 'Guidelines for Baseline Ecological Assessment' (Institute of Environmental Assessment, 1995) to include an assessment of the potential for notable or protected fauna to occur in, or adjacent to the study area.

During the survey, the main habitats within the site boundary were mapped and are shown in **Appendix A**. Target notes (TN) (**Appendix B**) are used to provide details of characteristic habitats and species composition and highlight any features of ecological interest, where the target note is duplicated on the map, this is where the same description of that target note applies. A full species list is provided in **Appendix C**. Species were identified using standard references books, primarily Rose (1991). Finally, relevant legislation relating to the wildlife observed during the survey is contained within **Appendix D**.

The list of notable invasive plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) is extensive and these plants are found in a range of different habitats, including aquatic habitats. The Extended Phase 1 Habitat Survey checked, in particular, for the presence of Japanese knotweed, giant knotweed, hybrid knotweed, giant hogweed, rhododendron and Himalayan balsam.

3 RESULTS

3.1 Desk study

3.1.1 Statutory designated sites

Statutory designated sites include Natura 2000 sites Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), established under the EC habitats and Birds Directives. Sites of Special Scientific Interest are designated under the Wildlife and Countryside Act 1981 (as amended), with improved provisions for the sites introduced by the Nature Conservation (Scotland) Act 2004.

There are no statutory designated sites within the study area.

The following statutory sites were found within 5km of the study area; these are presented in **Figure 3.1** and further detail is provided in **Table 3.1**:

- Hoy SAC, SPA and SSSI
- Switha SPA and SSSI

3.1.2 Non statutory designated sites

3.1.3 Non-statutory designated sites may have some protection from development through national and local policies.

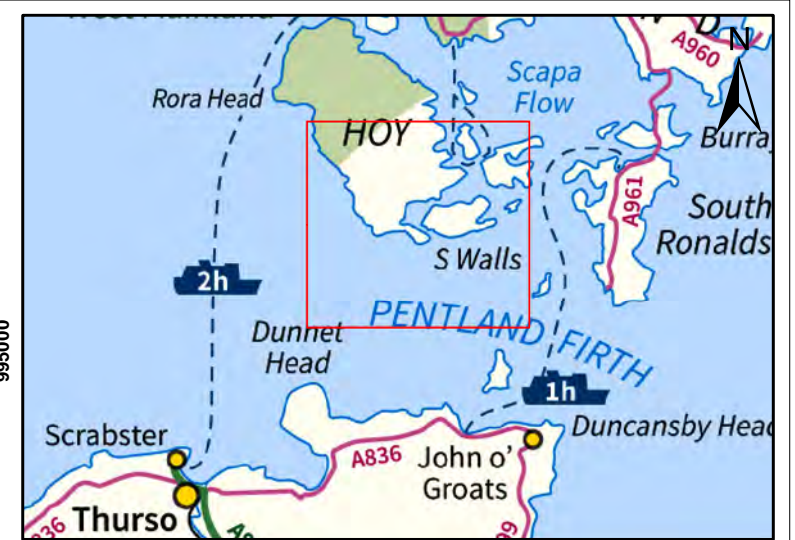
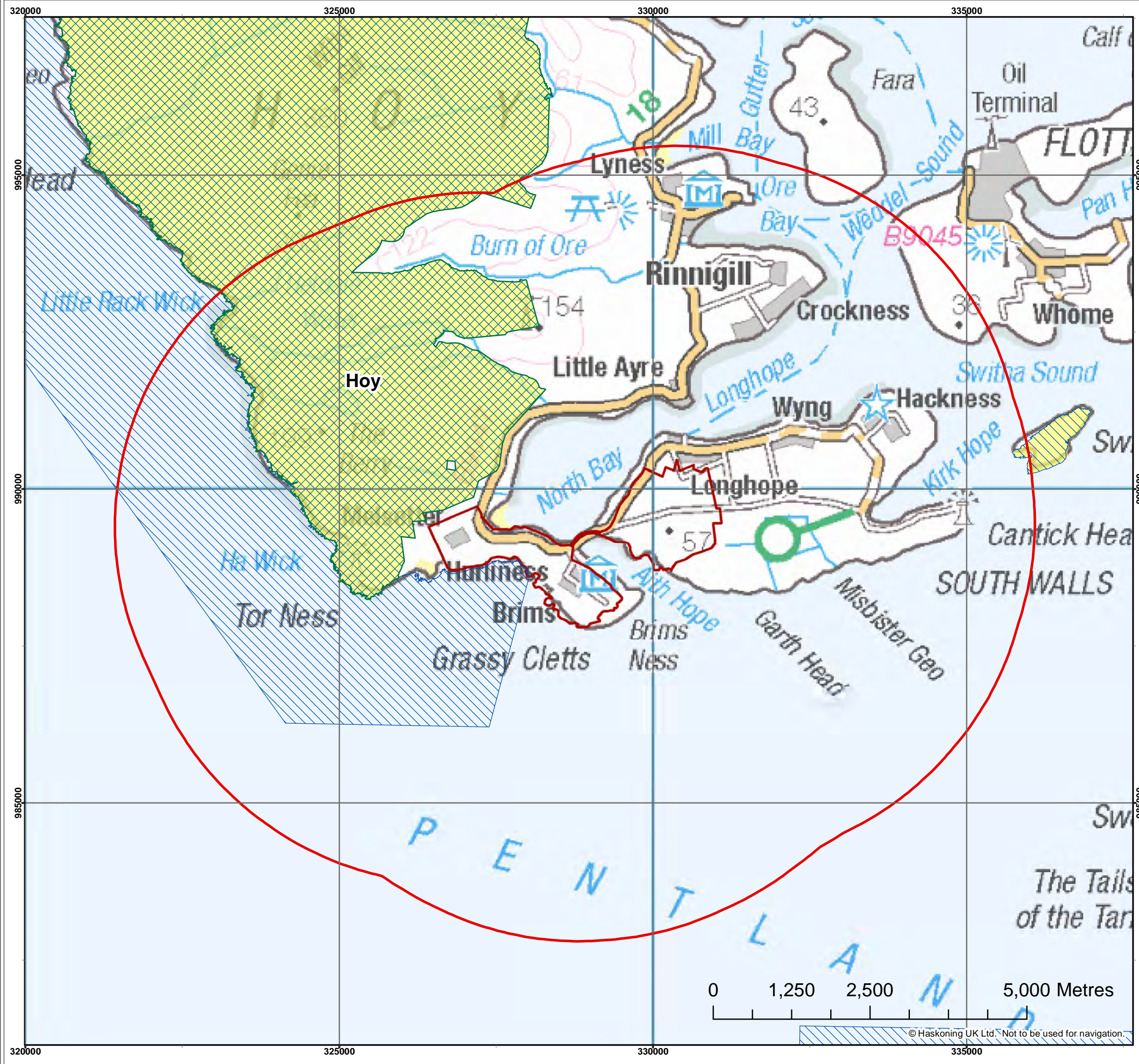
There are three LNCS within the study area; these are presented in **Figure 3.2** further detail is provided in **Table 3.2**.

1. Brims, North Walls
2. Aith Head, South Walls
3. Fea Heath, South Walls

A further two sites are located within 1km of the study area:

1. Loch of Greenhill, South Walls
2. Quoy, South Walls

No RSPB reserves were identified within 1km of the study area.



- Legend:
- Study Area
 - Study area 5km buffer
 - Special Area of Conservation (SAC)
 - Special Protection Area (SPA)
 - Site of Special Scientific Interest (SSSI)

Source: © Scottish Natural Heritage Contains Ordnance Survey data © Crown copyright and database right (2014)

Client:	Project:
BTAL	Brims Tidal Array

Title: **Brims Tidal Array**
Statutory Nature Conservation Designations

Figure: **3.1** Drawing No:

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
00	24/09/12	HW	JT	A3	1:60000
01	16/07/14	JE	JM	A3	1:60000

Co-ordinate system: British National Grid

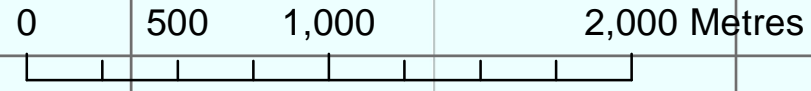
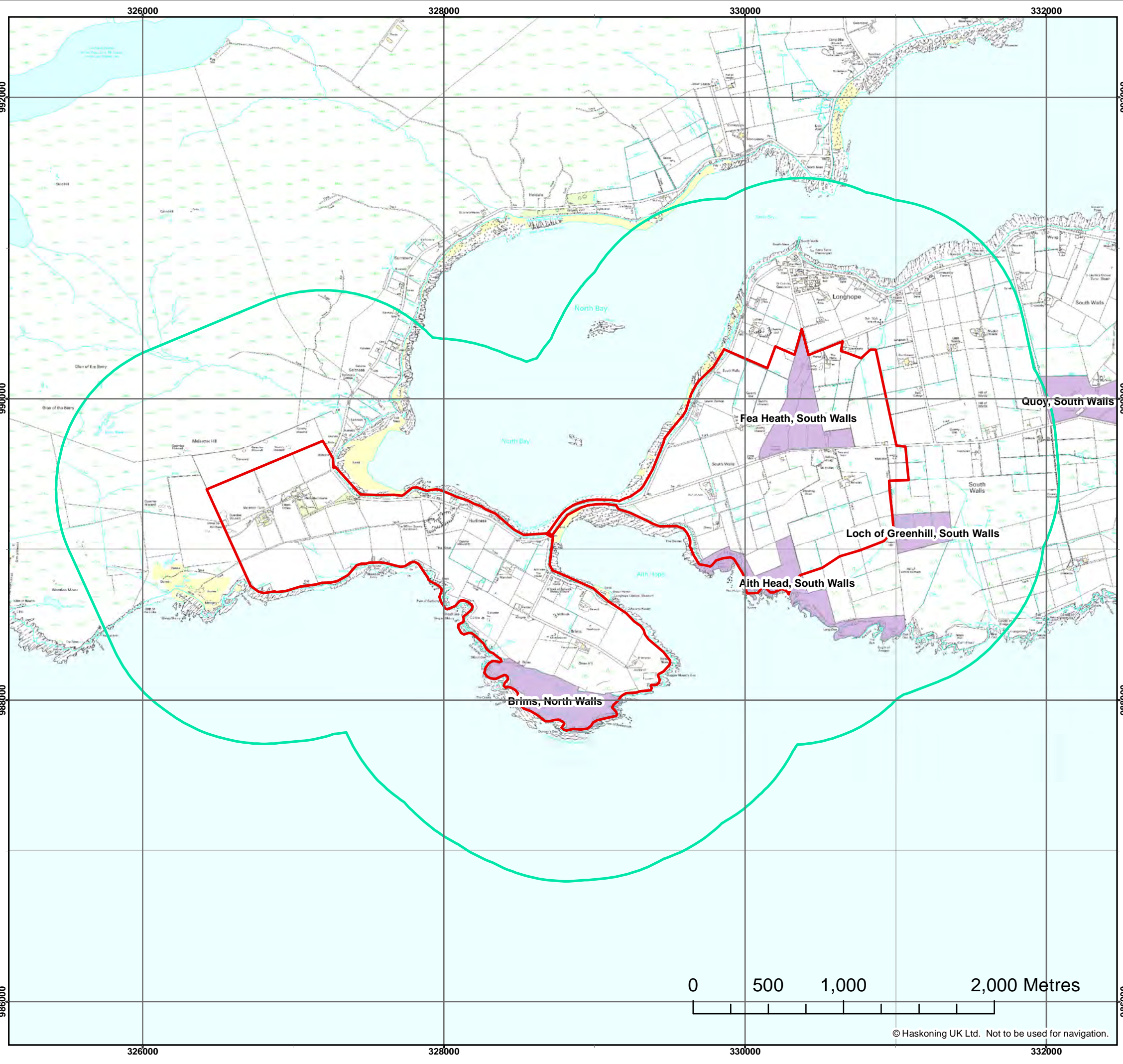


Royal HaskoningDHV
Enhancing Society Together

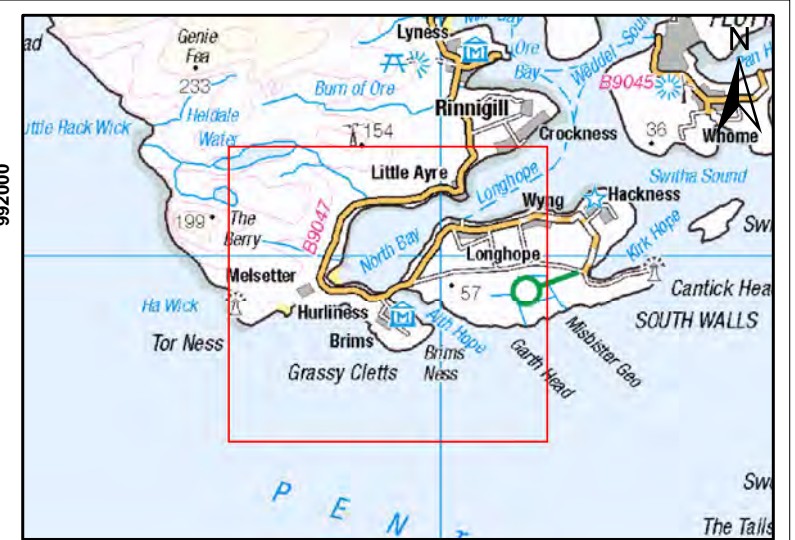
ROYAL HASKONING DHV
ENVIRONMENT ENERGY
10 BERNARD STREET
LEITH
EDINBURGH
EH6 6PP
+44 (0)131 555 0506
www.royalhaskoningdhv.com



© Haskoning UK Ltd. Not to be used for navigation.



© Haskoning UK Ltd. Not to be used for navigation.



Legend:

- Study Area
- Study area 1km buffer
- Local Nature Conservation Site (LNCS)

Client: <p style="text-align: center;">BTAL</p>	Project: <p style="text-align: center;">Brims Tiday Array</p>
--	--

Title:

Brims Tidal Array
Non Statutory Nature Conservation Designations

Figure:	3.2	Drawing No:			
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
00	24/09/12	HW	JT	A3	1:25000
01	16/07/14	JE	JM	A3	1:25000

Co-ordinate system: British National Grid

**Royal
HaskoningDHV**
Enhancing Society Together

**ROYAL HASKONING DHV
ENVIRONMENT ENERGY**
10 BERNARD STREET
LEITH
EDINBURGH
EH6 6PP
+44 (0)131 555 0506
www.royalhaskoningdhv.com

Table 3.1 Statutory Designated Sites within 5km of the Study Area

Name	Grid reference	Area / ha	Distance and direction from study areas/ km	Notified features
Hoy SAC, SPA & SSSI SSSI Same area as terrestrial component of SPA	HY 225010	SSSI: 9499.7	0.16 north-west	<p>SAC: Alkaline fens , alpine and boreal heaths, blanket bogs* , calcareous rocky slopes with chasmophytic vegetation European dry heaths , natural dystrophic lakes and ponds Northern Atlantic wet heaths with <i>Erica tetralix</i>, petrifying springs with tufa formation (<i>Cratoneurion</i>)*, vegetated sea cliffs of the Atlantic and Baltic coasts *priority habitat</p> <p>SPA: Atlantic puffin (<i>Fratercula arctica</i>), arctic skua (<i>Stercorarius parasiticus</i>), breeding**, black-legged kittiwake (<i>Rissa tridactyla</i>), fulmar (<i>Fulmarus glacialis</i>), breeding**, great black-backed gull (<i>Larus marinus</i>), breeding**, great skua (<i>Stercorarius skua</i>), breeding**, guillemot (<i>Uria aalge</i>), breeding**, peregrine (<i>Falco peregrinus</i>), breeding**, red-throated diver (<i>Gavia stellata</i>), breeding** **Also a SSSI notified feature</p> <p>SSSI: Bogs: Blanket bog, freshwater habitats: dystrophic loch, uplands: upland assemblage, woodland: upland oak woodland; birds: breeding bird assemblage, seabird colony, breeding. Also notified for geological interest.</p>
Switha SPA and SSSI	ND 363907	57.39	4.70 east	SPA and SSSI: Birds: Greenland barnacle goose (<i>Branta leucopsis</i>).

Table 3.2 Non-Statutory Designated Sites within 1km of the Study Area

Name	Grid reference	Area / ha	Distance and direction from study area/ km	Special features	
				Habitats	Wildlife
Brims	ND 287880	19	Wholly within	Lowland meadow* Maritime heath Lowland fens* Maritime cliff and slope* Maritime grassland	Curlew* Lapwing* Redshank Common gull Skylark*
Aith Head	ND 303988	21	Partially within	Upland heath* Maritime heath Maritime cliff and slope* Maritime grassland	Breeding birds of prey* <i>Hieracium maritimum</i> (a hawkweed)
Fea Heath	ND 303989	19	Wholly within	Upland heath*	Curlew* Lapwing* Redshank Arctic tern* Snipe Great skua Skylark*
Loch of Greenhill	ND 311989	8	Immediately east	Upland heath* Lowland fen*	Breeding waders and gulls*
Quoy	ND 323899	23	0.980 east	Upland heath* Lowland meadows* Lowland fens*	Curlew* Lapwing* Snipe

*nationally important habitats and species

3.1.4 Protected and notable flora and fauna, and non-native invasive species

The following records were searched for on the NBN gateway:

- Wildlife and Countryside Act 1981 Schedule 1 (birds which are protected by special penalties) Schedule 5 (animals which are protected), 8 (plants which are protected) and 9 (non-native invasive species).
- The Conservation of Habitats and Species Regulations 1994 Schedule 2 (animals which are protected) and 4 (plants which are protected)
- UK BAP designated species

Wildlife and Countryside Act 1981 (as amended)

Schedule 1: Birds which are protected by special penalties

Three records for corncrake *Crex crex* within 1km of the study area were provided by NBN between April and July 2005. The records come from the RSPB corncrake national surveys.

A number of records were provided by OBRC within the study area between 2011 and 2003 for peregrine, hen harrier *Circus cyaneus*, merlin *Falco columbarius*, great northern diver *Gavia immer*, red-throated diver, long-tailed duck *Clangula hyemalis*, and redwing *Turdus iliacus*. One each of whimbrel *Numenius phaeopus*, crossbill *Loxia curvirostra*, golden oriole *Oriolus oriolus*, and brambling *Fringilla montifringilla* were recorded in 2008. One record each of Slavonian grebe *Podiceps auritus* and snow bunting *Plectrophenax nivalis* in 2007 was provided.

One record was provided of white-tailed eagle in 2009. This species has additional protection from harassment and their nesting sites are also protected since they re-use their nests.

Schedule 5: Animals which are protected

No records were found for any animals listed on schedule 5 within 1km of the study area, common toad has been recorded elsewhere in Orkney.

No records were provided of species on Schedule 8 or 9 of the Act.

The Conservation (Natural Habitat, & c.) Regulations 1994 (as amended).

Species protected by schedules 2 and 4 of the Conservation (Natural Habitat, & c.) Regulations 1994 (as amended) are known as European Protected Species (EPS).

Records for otter were found throughout the Orkney Islands from NBN, and three records for otter were provided by OBRC within the study area, in South Walls. These records are from 1965-1985.

The majority of records of bats provided by OBRC are located at Melsetter House, which is also a known maternity roost at Melsetter House (Marcia Humes pers comm). One other record provided for bat was located near Longhope, South Walls.

The remaining animals listed on schedule 2 have not been recorded (in NBN) as far north as Orkney and are considered unlikely to be present on the islands.

UKBAP, Scottish Biodiversity List and Orkney LBAP

NBN and OBRC provided records of UKBAP, Scottish Biodiversity List and LBAP species; see **Table 3.3** below.

Table 3.3. Biodiversity records provided by OBRC

Species common name	UKBAP	Scottish Biodiversity List	LBAP	Source
Heather		✓	✓	OBRC
Eyebright			✓	OBRC
Purple ramping-fumitory	✓	✓	✓	OBRC
Procumbent pearlwort		✓		OBRC
Northern marsh orchid	✓			OBRC
Scottish primrose		✓		OBLAP
Hedgehog	✓		✓	NBN
Ghost moth	✓			OBLAP
Dusky Brocade	✓			OBLAP
<i>Toninia sedifolia</i> (lichen)	✓			OBLAP

The approach taken by the Orkney LBAP was to create action plans to conserve priority habitats. Priority species were selected from the Scottish Biodiversity List and incorporated into the plans for the priority habitats. This has been done to focus actions and provide a holistic approach to conserving a range of species.

Table 3.3 presents a breakdown of habitats and species for which action plans have been prepared within the National Biodiversity Action Plans, which have been identified as present in Orkney by the Orkney LBAP and which are potentially relevant to the study area.

Table 3.3. National biodiversity action plan habitats and species potentially relevant to the study area.

Scottish BAP species		National BAP habitats
Insects: <i>Bombus distinguendus</i> Great yellow bumblebee <i>Bombus muscorum</i> Heath carder bee Birds: <i>Aythya ferina</i> Pochard <i>Aythya marila</i> Scaup <i>Calidris alpina</i> Dunlin <i>Carduelis cannabina</i> Linnet <i>Cygnus cygnus</i> Whooper	Mammals: <i>Lutra lutra</i> European otter Stoneworts: <i>Chara baltica</i> Baltic stonewort <i>Chara canescens</i> Bearded stonewort <i>Chara curta</i> Lesser bearded stonewort <i>Chara rudis</i> Rugged stonewort <i>Tolypella nidifica</i> Bird's nest stonewort	Road verges Sand dunes Eutrophic standing water Strandline Mesotrophic standing water Coastal vegetated shingle Saltmarsh Saline lagoons Seagrass meadows Aeolianite

swan <i>Falco tinnunculus</i> Kestrel <i>Gavia stellata</i> Red-throated diver <i>Larus ridibundus</i> Black-headed gull <i>Limosa lapponica</i> Bar-tailed godwit <i>Numenius arquata</i> Curlew <i>Sterna hirundo</i> Common tern <i>Sterna paradisaea</i> Arctic tern <i>Vanellus vanellus</i> Lapwing	Vascular plants: <i>Ruppia cirrhosa</i> Spiral Tasselweed Purple ramping-fumitory Snails: <i>Theodoxus fluviatilis</i>	
---	--	--

3.2 Field survey

3.2.1 Overview

The study area was predominantly arable and pastoral fields. Arable fields were predominantly silage fields, which were being cut at the time of survey. Pastoral fields were grazed by cows and sheep. Other prevalent habitats included dry heath and dry heath/acid grassland, and semi-improved grasslands, ranging from species-poor to quite species-rich. Few standing waters or running waters were recorded, although many fields were bordered by drains or ditches. Very few ditches were recorded with running water. Deciduous and coniferous woodland was rare. Other habitats noted here tended to be rare, discrete and be small in area.

3.2.2 Habitats

The main habitats are shown in **Appendix A**.

Broad-leaf plantation woodland

A large area of broadleaf woodland was recorded near Melsetter House in the north-west of the study area (TN 38). It was not possible to access the woodland since the landowner did not permit access at the time. The woodland was assessed from the roadside and neighbouring field boundaries. The woodland included dominant sycamore *Acer pseudoplatanus*, white willow *Salix alba*, wych elm *Ulmus glabra*, with a ground flora of common nettle *Urtica dioica*, false oat grass *Arrhenatherum elatius*, cock's-foot *Dactylis glomerata*, common hogweed *Heracleum sphondylium*, bush vetch *Vicia sepum*, ground elder *Aegopodium podagraria* and fern sp.

A 50m stretch of broadleaf plantation woodland (TN 39) was recorded north along the road of Melsetter House. The canopy consisted of abundant sycamore, ash *Fraxinus excelsior*, wych elm, a fruit tree species *Rosa sp*, with ground flora of false oat grass, yellow oat grass *Trisetum flavescens* common hogweed and common nettle.

A small area of broadleaf plantation woodland was recorded along the road near West Hurliness. Semi-mature to mature sycamore was dominant, with grey alder *Alnus incana* occasional. The ground flora included common hogweed, woodrush *Luzula sp.* and fern.

Dense scrub

A small area of dense scrub was recorded along the road near Olijaren. The area was viewed from the road since the vegetation was too dense to penetrate. Species included common alder *Alnus glutinosa*, birch *Betula sp.* grey willow *Salix cinerea*, rowan *Sorbus aucuparia*, Japanese rose *Rosa rugosa*, white willow, bracken *Pteridium aquilinum*.

Scattered coniferous trees

Scattered coniferous trees were recorded in the north-east of the study area (TN 2) near a disused quarry. Norway spruce *Picea abies* was dominant, with occasional whitebeam *Sorbus aria*, rowan willow *Salix sp.*, sycamore and downy birch *Betula pubescens*.

Tall ruderal

A small area consisting of a mosaic of tall ruderal species and improved grassland species was recorded near Ayreside, near the western side of the causeway.

Improved grassland

A large proportion of the study area was classified as improved grassland, being either cow or sheep grazed, or recently ungrazed (**Plate 1**).

Some fields were very large, where fences have been taken down since the last ordnance survey of the area.

Species typically included dominant perennial rye-grass *Lolium perenne*, frequent Yorkshire fog *Holcus lanatus*, annual meadow grass *Poa annua*, white clover *Trifolium repens*, red clover *Trifolium pratense*, creeping buttercup *Ranunculus repens*, bulbous buttercup *Ranunculus bulbosus* and occasional common ragwort *Senecio jacobaea*, broad-leaved dock *Rumex obtusifolius*, creeping thistle *Cirsium arvense*, soft rush *Juncus effusus*, compact rush *Juncus conglomeratus*.

The most extensive area of improved grassland extended from the Mares to Langi Geo and along the coast (TN 29). The area was sheep grazed and contained a few small patches with species associated with marshy grassland and heathland. These patches are not large enough to be mapped or change the classification of the area from improved grassland. Species recorded in these areas included Yorkshire fog, annual meadow grass, marsh thistle *Cirsium palustre*, glaucous sedge *Carex flacca*, soft rush, tufted hair grass *Deschampsia cespitosa*, common cat's-ear *Hypochaeris radicata*, creeping buttercup, spear thistle, *Cirsium vulgare* silverweed *Potentilla anserina*, tormentil *Potentilla erecta*.



Plate 1 Improved grassland and arable habitats characteristic of the study area.

Semi-improved neutral grassland

A number of areas were recorded with semi-improved grassland (**Appendix A**).

A small section was recorded adjacent to the road near Oljaren. Species included bird's-foot trefoil *Lotus corniculatus*, false oat grass, cock's-foot, bush vetch, meadow vetchling *Lathyrus pratensis* creeping buttercup, common hogweed and fescue *Festuca* sp. and occasional white willow. The area had wetter areas interspersed with meadowsweet *Filipendula ulmaria* and soft and compact rushes.

An area adjacent to the Loch of Greenhill included devil's-bit scabious, *Succisa pratensis* self-heal *Prunella vulgaris*, daisy *Bellis perennis*, common sorrel *Rumex acetosa*, fescue, common cat's-ear *Hypochaeris radicata*, creeping soft grass *Holcus mollis*, sweet vernal grass *Anthoxanthum odoratum*, bulbous buttercup, ribwort plantain *Plantago lanceolata*, white clover, tormentil, eyebright *Euphrasia officinalis* agg, hay rattle *Rhinanthus minor*, common ragwort, crested dog's-tail *Cynosaurus cristatus*, mat grass *Nardus stricta* compact rush.

Poor-semi-improved grassland

Some areas were slightly more diverse than the species associated with improved grassland, but not diverse enough to be considered as semi-improved grassland. These areas typically where comprised of the following:

Abundant to frequent perennial rye-grass *Lolium perenne*, Yorkshire fog *Holcus lanatus*, annual meadow grass *Poa annua*, false-oat grass, with occasional or locally occasional sweet vernal grass, crested dog's-tail, fescue and mat grass. Forbs included frequent

white clover, red clover, ribwort plantain, creeping buttercup bulbous buttercup and occasional common ragwort broad-leaved dock, creeping thistle soft rush, compact rush, meadow vetchling, and rare devil's bit scabious, bird's-foot trefoil and eyebright.

Marshy grassland

A small area of marshy grassland was recorded near West Hurliness adjacent to the road. Species included abundant meadowsweet and silverweed, frequent broad-leaved dock, common cat's-ear, meadow vetchling, red clover, ribwort plantain, *Holcus* sp., creeping buttercup, eyebright, common sorrel, daisy, fescue and self-heal. Locally frequent were cock's-foot and hay rattle.

Dry dwarf shrub heath

Heathland was prevalent across the study area (**Plate 2**). Coastal dry heath is a UKBAP priority habitat.



Plate 2 Dry heath at Fea Heath LNCS

The most extensive areas of heathland were found along the coast (TN 11 and 12) and between The Knave and Inner Head. This area is a local nature conservation site (LNCS), and is called Aith Head, South Walls.

Species recorded in this area included abundant ling heather *Calluna vulgaris*, bird's-foot trefoil, tormentil, sweet vernal grass, cross-leaved heath *Erica tetralix*, crowberry *Empetrum nigrum*, bearberry *Arctostaphylos uva-ursi*, Yorkshire fog, common sorrel, ribwort plantain, white clover, devil's-bit scabious, marsh thistle, common cat's-ear, fescue, wild angelica (*Angelica sylvestris*), meadow vetchling, common bent (*Agrostis capillaris*), false oat grass, tufted hair grass, creeping buttercup, and bush vetch.

A large area of heathland was recorded near a disused quarry in the far east of the study area. This area is also designated as an LNCS and is called Fea Heath, South Walls. Species recorded here included abundant ling heather, bell heather, cross-leaved heath, frequent crowberry, bearberry, bog asphodel *Narthecium ossifragum*, eyebright, tormentil, compact rush, sweet vernal grass, mat grass, fescue, common sorrel, occasional common butterwort *Pinguicula vulgaris*, lousewort *Pedicularis sp.*, harebell *Campanula rotundifolia* and locally frequent carnation sedge *Carex panacea* and bog cotton *Eriophorum sp.* This area included wetter areas of heath with crowberry and rushes being more abundant, however sphagnum mosses were not seen.

A medium area of heathland was recorded at the top of a field near Brims Ness. Species included tormentil, ling heather, bell heather, cross-leaved heath, crowberry, bearberry, bird's-foot trefoil, sweet vernal grass, *Holcus sp.*, mat grass, devil's-bit scabious, ribwort plantain, common sorrel, red clover, moss spp., common cat's-ear. Heath spotted orchid was locally frequent (**Plate 3**).

A small area of dry heath was recorded at the top of the Witter Quarry and adjacent to dry heath/acid grassland mosaic habitat.



Plate 3 Heath spotted orchid locally frequent at Brims Ness.

Dry heath/acid grassland mosaic

A number of areas were comprised of a mosaic of dry heath (**Plate 4**) and semi-improved grassland.

Large areas of this habitat were recorded most often adjacent to semi-improved grassland and dry heath. Large areas were recorded adjacent to dry heath in the LNCS stretching between the Knave and the Inner coast. Species recorded in these areas

included: eyebright, kidney vetch *Anthyllis vulneraria*, common cat's-ear, Yorkshire fog, ribwort plantain, common sorrel, ling heather, bell heather, devil's-bit scabious, sweet vernal grass, rough meadow grass *Poa trivialis*, red clover, cross-leaved heath, compact rush, *Juncus sp.*, common butterwort, tormentil, wild angelica, lichen spp., moss spp. locally abundant meadowsweet.

A small area of this habitat was recorded at the top of the Witter Quarry in the south of the site.



Plate 4. Dry heath and acid grassland mosaic near the coast.

Coastal grassland

A small area of coastal grassland was present near the coast at The Mares (TN 23). This area was dominated by fescue, but also had many species typical of improved grassland present.

Strandline vegetation

A small linear stretch of strandline vegetation (TN 48) runs from east to west along the north and south of the Ayre (and adjacent to the causeway). The substrate consisted of pebbles and sand. Typical species included lyme grass *Leymus arenarius*, false-oat grass, curled dock *Rumex crispus* and broad-leaved dock, hawk's-beard *Hieracium sp.*, orache *Atriplex prostrata* agg, mayweed *Tripleurospermum sp.* and sea plantain *Plantago maritima*.

This habitat is considered to fall within the description for Vegetated Shingle, a UKBAP priority habitat.

Arable

Arable fields were the predominant habitat type along with improved grassland. A large proportion of these fields was being managed for silage, and was being cut at the time of survey.

Ephemeral

Small areas of ephemeral habitat were recorded near Gallow Tuag and Mucklehouse.

Buildings

Farm buildings were present throughout the study area. A number of buildings were inspected for bat roost and bird nesting potential (TN 10 and TN 17), standing out as having features expected to attract these species. These are discussed in more detail in the associated species section (3.2.4).

Running water

One drain was identified that appeared to be running (TN 39). It was shallow (<20cm deep) and slow-flowing. The banks were vegetated by herbs associated with fertiliser run-off (including rank grasses, common nettle, common hogweed, broad-leaved dock).

Standing water

Numerous drains were found within the study area with very shallow levels of standing water (<20cm). Again the banks of these bodies of water were dominated by vegetation associated with fertiliser run-off as these bodies were predominantly surrounded by agricultural land.

3.2.3 Boundaries

Fence

The majority of field boundaries and land parcels were bounded by fences. These fences were usually made of wooden posts with wire or barbed wire. These features are of no ecological value.

Stone wall

Dry stone wall was a frequent field boundary found in the study area. These features have ecological value for nesting birds, insects and spiders as well as lichens, mosses and certain vascular plants.

Dry ditch

There were many dry ditches throughout the study area. These were predominantly located adjacent or through agricultural fields. They were characterised by either herbs associated with fertiliser run-off or marshy grassland species.

3.2.4 Groundwater dependant terrestrial ecosystems (GWDTEs)

The guidance 'A Functional Wetland Typology for Scotland' (Sniffer, 2009) groundwater dependant terrestrial ecosystems (GWDTEs) was used to identify potential habitats dependent on groundwater.

Marginal vegetation alongside watercourses was generally composed of tall ruderal species associated within fertiliser run-off. Small discrete patches of marshy grassland were found throughout the study area within improved grassland fields, and few small patches of wet heath and swamp and fen were found.

3.2.5 Summary of habitats within the study area

Table 3.4 provides a summary of the habitats found within the study area along with information concerning their importance with regard to UK BAP plans and their dependence on groundwater.

Table 3.4. Summary of habitats within the study area.

Phase 1 classification (JNCC, 2010)	EC Habitats Directive UK Interest features JNCC	UKBAP priority habitat (Brig 2008)	Groundwater Dependant Terrestrial Ecosystem (Sniffer 2009)
Fen	N/A	Lowland fen	yes
Swamp	N/A	N/A	yes
Wet heath acid grassland mosaic	N/A	Lowland heathland	yes
Dry heath acid grassland mosaic	European dry heath	Lowland heathland	no
Improved grassland	N/A	N/A	no
Marshy grassland	N/A	N/A	yes
Coastal grassland	N/A	N/A	no
Strandline vegetation	N/A	Vegetated shingle	no
Semi improved neutral grassland	N/A	Lowland meadows	no

Phase 1 classification (JNCC, 2010)	EC Habitats Directive UK Interest features JNCC	UKBAP priority habitat (Brig 2008)	Groundwater Dependant Terrestrial Ecosystem (Sniffer 2009)
Tall ruderal	N/A	N/A	<i>no</i>
Arable land	N/A	Arable field margins	<i>no</i>
Running water	N/A	N/A	<i>no</i>
Standing water	N/A	N/A	<i>no</i>
Amenity grassland	N/A	N/A	<i>no</i>
Deciduous plantation	N/A	N/A	<i>no</i>
Scattered coniferous trees	N/A	N/A	<i>no</i>
Ephemeral	N/A	N/A	<i>no</i>
Drystone wall	N/A	N/A	<i>no</i>
Dry ditch	N/A	N/A	<i>no</i>

3.2.6 Species

Otter

A dedicated otter survey was undertaken at the same time as the extended phase 1 survey and is discussed in a separate report (*Royal HaskoningDHV 2012: Brims Tidal Array Ltd Otter Survey Report 2012*). The study area encompasses the intertidal zone. The report should be read in conjunction with this report.

Inland no freshwater streams were identified. Many drains were found throughout the study area but these were either dry or stagnant and considered to be of poor value to otters.

Bats

All bat species are protected from killing and injury under The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Their roosts are also fully protected from destruction, damage or disturbance under this legislation. It is also an offence to deliberately or recklessly harass a bat, or disturb a bat at a roost deliberately or recklessly obstruct access to a roost.

The soprano pipistrelle *Pipistrellus pygmaeus* is listed as priority species on the UKBAP and is a priority species on the Orkney LBAP.

OBRC provided records for bats within the study area at Melsetter House, which is also where a maternity roost is known to exist (Marcia Humes pers comm), as well as Longhope, South Walls.

The potential of the buildings and the woodlands to support bat roosts were assessed on a scale from high potential through to minimal; depending on the features present, the location, proximity to foraging areas etc.

A number of farm buildings were present within the study area. Target notes were taken of particular ecological interest, (TN 9, 10 and 17). These buildings were quite dilapidated, having multiple entry and exit points, holes in brick work, tiles and window frames. Birds were seen nesting at TN 9 and TN10. No bat field signs were seen. The surrounding habitat was of improved grassland and poor semi-improved grassland.

The buildings were quite exposed and are likely to be subject to very windy conditions. It is expected that the bat potential of these buildings will be low.

Small areas of woodland were recorded at TN 38 and TN 39. These woodlands were generally very dense, and little over 5m in canopy height. These woodlands were both surrounded by arable and improved grassland, with very few other woodland in close proximity.

The woodland at TN 38 appeared to be of greater maturity than the woodland at TN 39. Access could not be gained to the woodland at the time, therefore it could not be ascertained what the structure of the woodland was like inside of if there were any features of value to roosting bats. However, this woodland covered the greatest area compared to other woodland recorded within the study area increasing the probability of bat roosts being present due to its area. This woodland was also in closest proximity to the records obtained for bats and the known roost at Melsetter House.

The trees the woodland at TN 39, were semi-mature – mature, with few features of value to roosting bats such as holes, natural fissures, cracks or flaking bark. Neither was ivy recorded in these woodlands. It is therefore expected that these woodlands are of more value for commuting and foraging rather than for roosts.

Birds

A dedicated bird survey was undertaken by Aquatera (2012), and should be read in conjunction with this report. Here, incidental sightings of birds are discussed along with the results of the desk study.

All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended) and those species listed on Schedule 1 receive additional protection from disturbance whilst nesting.

Corncrake is listed under schedule 1 of the Act, as well as being listed alongside curlew and arctic skua as priority species on the Orkney LBAP and Scottish Biodiversity List.

Many of the trees, woodlands, areas of scrub and the buildings within the site provide potential nesting habitat for a range of birds, with arable margins and grassland providing foraging habitat. In addition, areas of tall grassland could potentially support ground-nesting species such as corncrake. However, whilst records for this species were provided, they are located more than 1.5km from the nearest site development option. The species was not recorded by the recent dedicated bird survey in 2012, however this was undertaken during the daytime.

Swallows *Hirundo rustica* and house sparrow *Passer domesticus* were observed on a number of occasions in farmland throughout the study area. Large groups of geese were observed resting and foraging in farmland areas.

Cormorant *Phalacrocorax carbo*, arctic skua, fulmar and curlew *Numenius arquata* were observed on the coast. A dead greater black-backed gull was also observed near the coast.

Hoy SAC, SPA and SSSI is close to the study area and designated for overwintering birds. Switha SPA and SSSI was also identified within 5km of the study area. Arctic skua is a qualifying feature of Hoy SPA and SSSI, and was identified on numerous occasions near the coast during the survey. The site is also designated generally for its breeding bird assemblage and seabird colony. Greenland barnacle goose, which is a qualifying feature of Switha, was not identified during the survey. There are also other designations and RSPB reserves across Orkney. Therefore there is potential for other overwintering birds to utilise the habitat within the study area.

Reptiles

Reptiles are partially protected under section 9(5) of the Wildlife and Countryside Act (1981). All reptile species are listed as priority species for conservation on the UKBAP.

No information was available for reptiles from NBN gateway, nor were records provided by OBRC; terrestrial reptiles are not considered to be present in Orkney.

Invertebrates

A brief assessment for invertebrate interest was carried out during the walkover survey. Good terrestrial and aquatic invertebrate habitat was present in grasslands, heathland and along road verges and dry stone walls, including broken parts of walls forming piles.

Tortoiseshell butterflies were observed on a couple of occasions (TN 3 and TN 22)

Invasive non-native species

Japanese rose is recognised under Section 14(2) of the Wildlife and Countryside Act 1981 (as amended) to where it is an offence to “plant or otherwise cause to grow in the wild” any plant listed in Schedule 9, Part II of the Act. Japanese rose was added to the schedule in 2010 by the Wildlife and Countryside Act 1981 (Variation of Schedule 9) (England and Wales) Order 2010. However is not listed under Scottish legislation. Japanese rose is also noted by the Great Britain non-native species secretariat.

Japanese rose was recorded in numerous locations across the study area (TN 33, 35, 37, 42 and 43).

4 OVERVIEW OF DEVELOPMENT OPTIONS AND IDENTIFICATION OF POTENTIAL CONSTRAINTS

4.1 Potential impacts

The potential impacts from this proposed development on terrestrial habitats and species in the area include:

- Habitat loss and damage of habitats of conservation importance through construction in the onshore cable corridor;
- Injury and killing of protected species through construction in the onshore cable corridor;
- Disturbance and displacement of protected species from resting places, commuting and foraging areas due to construction activities in the onshore cable corridor.

Recommendations are provided in section 5.

4.2 Brims landfall development options

The potential landfall development options were evaluated for their ecological value, as detailed in **Table 4.2**.

Most of the sites were surrounded by either arable or improved grassland habitat. These habitats are considered to be of low ecological value as they are generally very species-poor and homogenous. Due to the high cliffs at some of the options and the difficulty of accessing these cliffs, not all habitats may have been recorded.

Table 4.1 Terrestrial habitats and species of interest and possible constraints for each potential landfall option

Landfall Option	Species/ Habitats of conservation importance.	Potential constraints
Long Geo	This landfall option has only arable land at the top of it, which is of low ecological value, however may provide resources for ground-nesting birds such as corncrake.	Potential damage and disturbance, injury or killing to ground-nesting birds.
Geo of Rottenloch	This option is surrounded by improved and marshy grassland. Improved grassland is of low ecological value, marshy grassland	Construction activities at this location should avoid disturbance to wetland hydrology features or breeding birds. (see bird report).

Landfall Option	Species/ Habitats of conservation importance.	Potential constraints
	may provide resources for corncrake.	
Langi Geo	This option is surrounded by improved and marshy grassland. Improved grassland is of low ecological value, marshy grassland may provide resources for corncrake.	Construction activities at this location should avoid disturbance to wetland hydrology features or breeding birds. (see bird report, Aquatera 2012).
The Ayre	Habitats identified in this area included strandline and intertidal habitat (see intertidal report, Royal HaskoningDHV 2012). It is a rare habitat within the study area. This habitat is a priority UKBAP habitat.	Potential damage and destruction of habitat of local and national value.
The Clevis	This option is surrounded by improved grassland of low ecological value and within 100m of semi-improved grassland, of higher ecological value.	This option is surrounded by improved grassland of low ecological value and within 100m of semi-improved grassland, of higher ecological value.

5 RECOMMENDATIONS

5.1 Pollution prevention

Water bodies are sensitive to pollution. It is recommended that any works likely to affect water bodies adheres to construction best practice guidelines, in particular the Pollution Prevention Guidelines, accessible from:

www.sepa.org.uk/about_us/publications/guidance/ppgs.aspx, and consultation with the Scottish Environment Protection Agency (SEPA).

5.2 Habitats and flora

The proposed works should be designed to avoid all impacts on important habitats wherever possible. In particular, this includes the semi-improved grassland and heathland, woodlands and watercourses and ground-water dependent terrestrial ecosystems as well as the designated LNCS sites.

If construction were to take place in areas identified as semi-improved grassland, heathland or GWDTEs, National Vegetation Classification surveys may be necessary. Consultation with SEPA would be required to confirm requirements. Where it is not possible to avoid these habitats, these should be re-instated to their existing condition or better following construction.

Should impacts on trees be unavoidable, an Arboricultural Survey is recommended for all trees / groups of trees to be removed, in accordance with the principles of British Standard (BS) 5837:2005 'Trees in Relation to Construction'.

An area of woodland is in close proximity to one of the proposed substation locations (TN 39). If there is potential for root damage to any mature trees during construction, prior to any works taking place in the area, the Root Protection Area (RPA) should be fenced with temporary fencing, in line with guidance from BS 5387.

Should any trees require felling, then a licence may be required from Forestry Commission Scotland, this usually requires compensatory planting of trees as a condition. Compensatory planting schemes should aim to improve the existing value of the study area through increasing the species diversity. Species of local provenance are recommended. Felling of trees should take place outside of the nesting bird season (April to August inclusive).

A 'no build' buffer of 10m should be placed either side of water bodies (including ditches and drains, burns, ponds, lochs and coastline), in order to minimise risk of pollution to the watercourses (SEPA 2007).

If there are any impacts on stone walls during the works, the stone should be retained in-situ and replaced on completion.

Finally, an Environmental Management Plan (EMP) should be prepared and approved by SNH prior to construction. In addition, it is recommended an Environmental Clerk of Works is present on site during construction.

5.3 Protected and notable species

5.3.1 Otter

For recommendations regarding otter, please see the separate report produced (Royal HaskoningDHV 2012 *Brims Tidal Array Ltd Project: Otter Survey Report 2012*).

5.3.2 Bats

The habitat in the study area for bats was considered to be of low value, with few features of woodland, running or standing water, hedges and individual trees. However, some of the buildings seen may support bats, and a known maternity roost has been located at Melsetter House.

Currently the nearest option to this roost being considered for siting the cable corridor is called Melsetter, though this does not include Melsetter House, which is located approximately 500m from the edge of the Long Geo landfall option area. Therefore, it is unlikely the bats will be affected by anything other than potential disturbance (such as noise and lighting, the latter of which may be required if construction takes place in winter months) from construction activities. This should be considered further within the EIA should this option be taken forward.

Any trees or buildings that will be affected by the works, which have been identified in this report as having bat roost potential, should be avoided. If this is not possible, then an external tree inspection or internal and external building inspection should be undertaken by a suitably qualified Ecologist in advance of construction works.

If at any stage, bats or any evidence of bats are detected, all works in the area should cease and advice should be sought from an Ecologist. It may be necessary to consult with SNH prior to resuming clearance within the area.

5.3.3 Nesting Birds

Separate bird surveys have been undertaken to establish any further constraints to the project by Aquatera (2012).

Any works to buildings, in particular old farm buildings should be conducted outside of the breeding season where possible; this is the same for any vegetation clearance or works to trees or stone walls. The bird breeding season takes place from April to August inclusive. If this is not possible, an ecologist should check the area prior to clearance for active nests. Any active nests should be left in-situ with an appropriate buffer within which no further clearance should be undertaken until the nest is no longer occupied.

For corncrake, if the breeding season cannot be avoided, then surveys should be undertaken prior to construction. The surveys should be conducted at night-time, based on the methodology given in Green and Gibbons (2000) Similarly any active nests found should be left in-situ with an appropriate buffer within which no further clearance should be undertaken until the nest is no longer occupied.

5.3.4 Invertebrates

The predominant habitat within the study area is comprised of agricultural farmland of a nationally common type which would support a common assemblage of invertebrate species. Therefore no further surveys are recommended for these areas.

5.3.5 Invasive non-native species

Although Japanese rose is not listed in schedule 9 in Scotland, it is still recognised elsewhere as an invasive species. Therefore as a precautionary approach, should the works affect any of the areas with Japanese rose, best practice guidance should be implemented to prevent the spread of the plant during the works.

The new Code of Practice on Non Native Species by the Scottish Ministers was recently published (July 2012). The document provides guidance on the handling of non-native species and it is recommended that this guidance is followed along with the relevant waste regulations.

Additional, more specific guidance for the management of non-native invasive plant species is provided on the Business Gateway website:
<http://www.business.scotland.gov.uk/>

5.4 Resurvey

The result of the survey are considered to be valid for 3 years. If the EIA has not been undertaken within 3 years of the surveys, conducted summer 2012, requirements for potential resurvey should be discussed with Scottish Natural Heritage.

6 REFERENCES

Aquatera 2012. Brims Bird Survey Report.

Brig 2008. UK Biodiversity Action Plan Priority Habitat Descriptions UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008. (Updated July 2010) available at: http://jncc.defra.gov.uk/PDF/UKBAP_PriorityHabitatDesc-Rev2010.pdf accessed 26.5.2012

GB Non-native species secretariat, 2011. Japanese Rose, *Rosa rugosa*. Accessed 29/08/2012. Available at: <https://secure.fera.defra.gov.uk/nonnativespecies/factsheet/downloadFactsheet.cfm?speciesId=3041>

JNCC, 2010. Handbook for Phase 1 habitat survey - a technique for environmental audit, ISBN 0 86139 636 7

Green, R.E. & Gibbons, D.W. 2000. The status of the Corncrake *Crex crex* in Britain in 1998. *Bird Study* 47: 129–137

Rose, F., 1991. *The Wild Flower Key, British Isles – N.W. Europe*. The Penguin Group

Royal HaskoningDHV, 2012. Brims Tidal Array Ltd Intertidal Survey Report.

Royal HaskoningDHV, 2012. Brims Tidal Array Otter Survey Report.

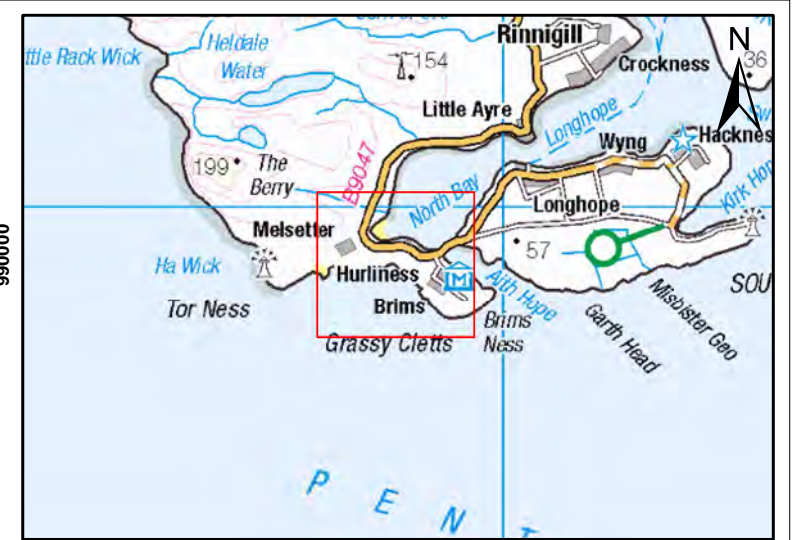
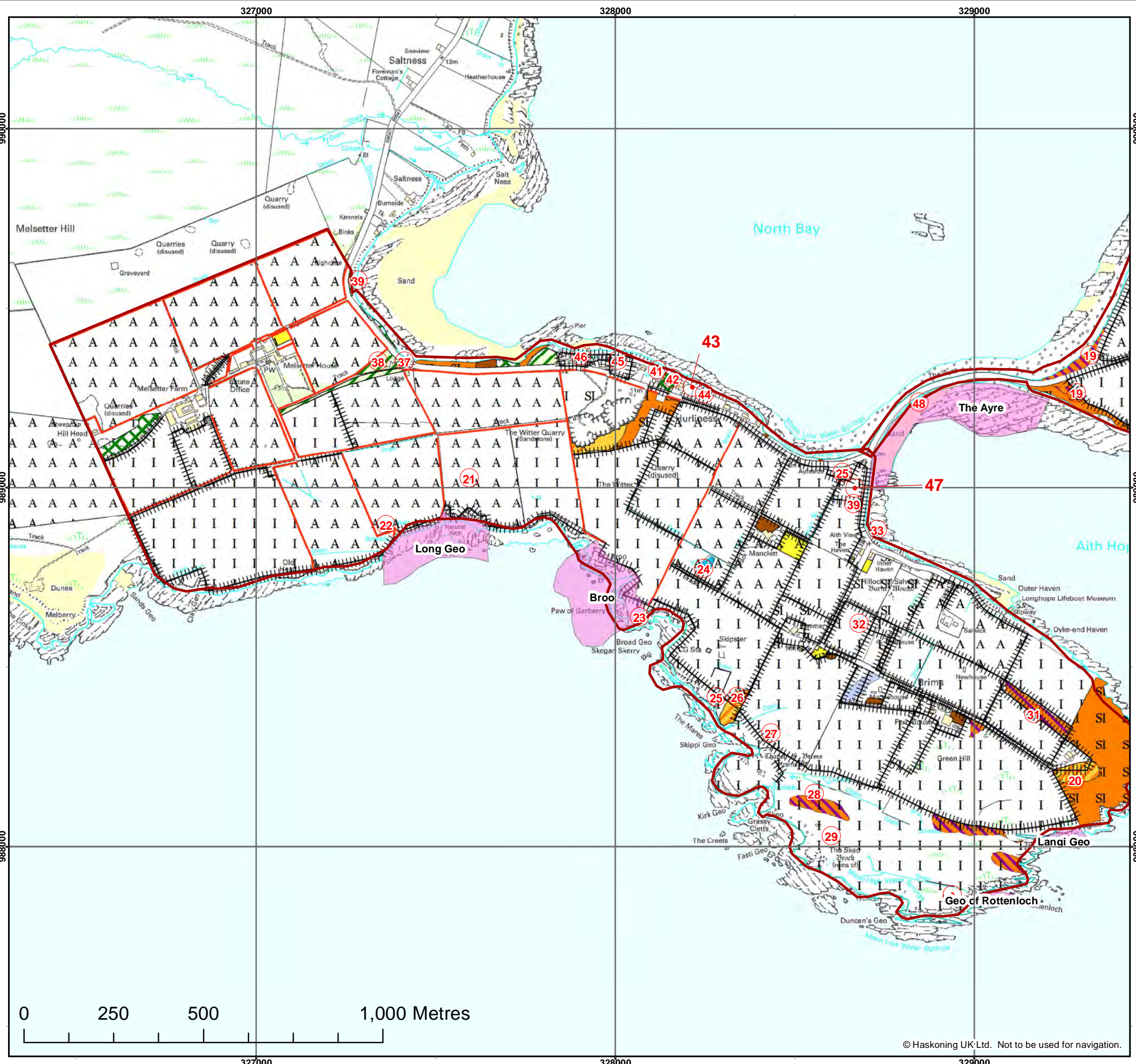
SEPA 2007. Pollution Prevention Guidelines. Works and maintenance in or near water: PPG5

SNIFFER 2009. WFD95: A Functional Wetland Typology for Scotland. Available at: http://www.sniffer.org.uk/files/7213/4183/8004/SnifferWFD95_FinalProjectReport.pdf

SNH The Orkney Vole, A Management Guide. Accessed 30/08/2012, Available at: <http://www.snh.org.uk/pdfs/about/OrkneyVole1.pdf>

7 APPENDICES

7.1 Appendix A: Phase 1 Habitat Survey Maps



Legend:

- Study Area
- Potential landfall options
- Target Notes
- Broad-leaved woodland - plantation
- Coniferous woodland - plantation
- Parkland and scattered trees - coniferous
- Scrub - dense/continuous
- Fence
- Wall
- Improved grassland
- Poor semi-improved grassland
- Neutral grassland - semi-improved
- Acid grassland - semi-improved
- Marshy grassland
- Amenity grassland
- Arable
- Bracken - continuous
- Dry dwarf shrub heath - acid
- Dry heath/acid grassland
- Wet heath/acid grassland
- Ephemeral/short perennial
- Other tall herb and fern - non ruderal
- Swamp and fen
- Running water
- Standing open water
- Dry ditch

JNCC Phase 1 Classification

Client:	Project:
BTAL	Brims Tidal Array

Title:

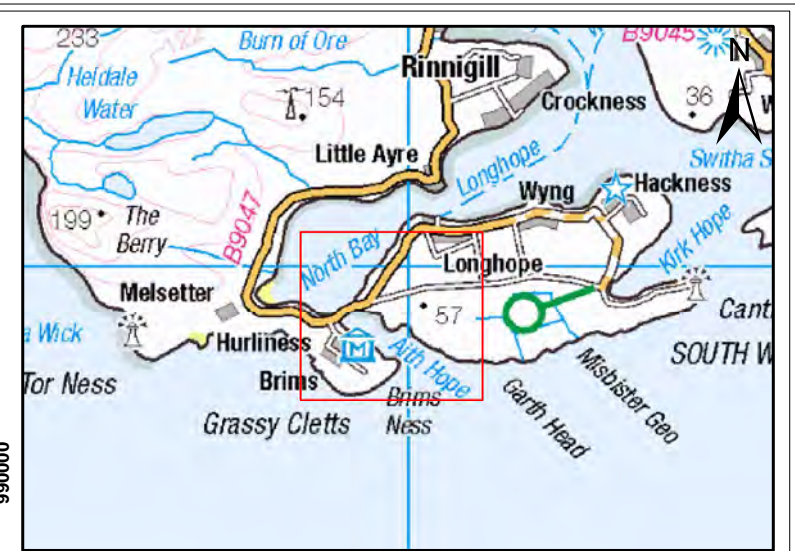
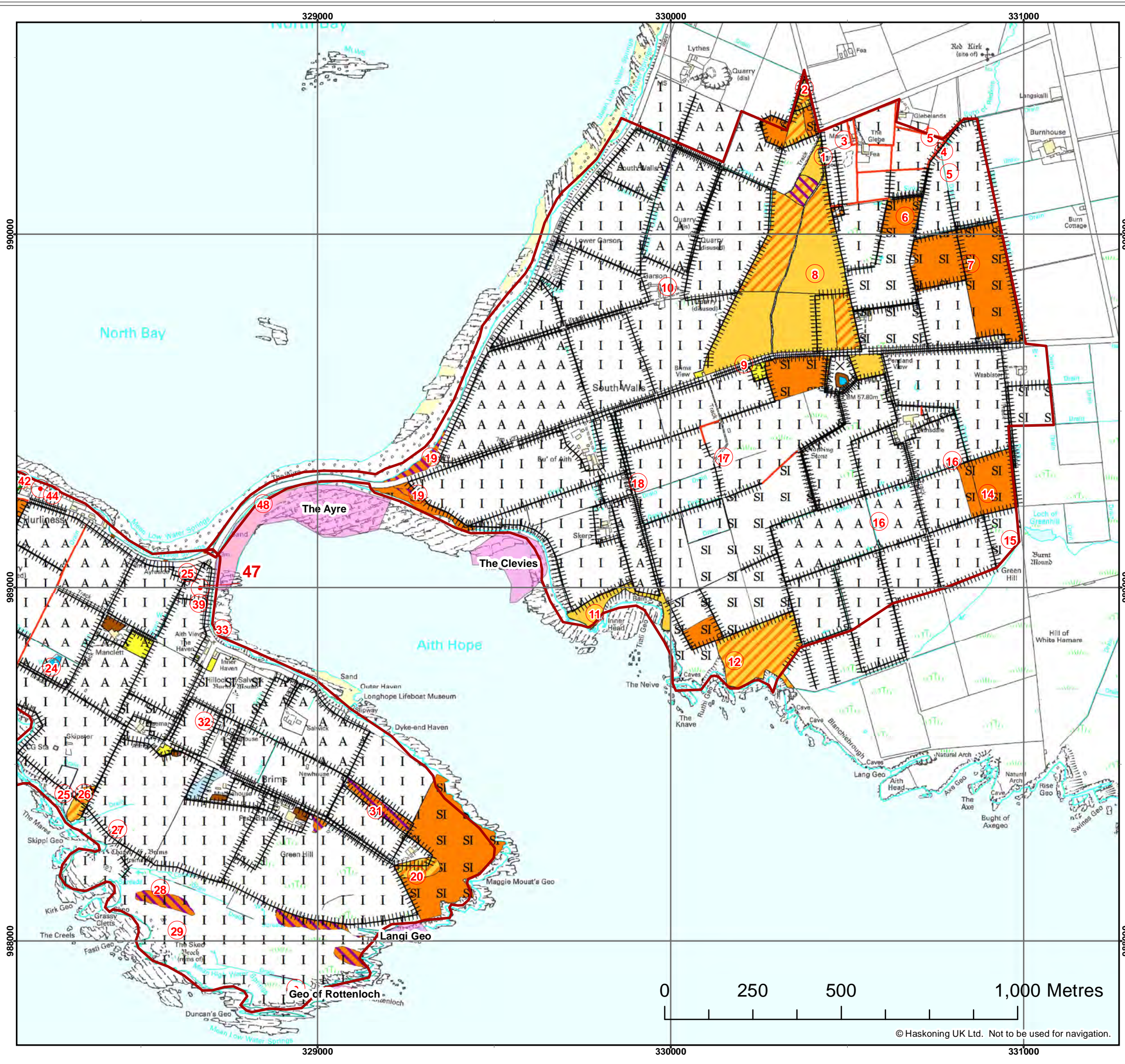
Extended Phase 1 Survey Results

Figure:	A1	Drawing No:			
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/11/12	HW	JT	A3	1:15000

Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONING DHV ENVIRONMENT ENERGY
10 BERNARD STREET
LEITH
EDINBURGH
EH6 6PP
+44 (0)131 555 0506
www.royalhaskoningdhv.com



Legend:

- Study Area
- Potential landfall options
- Target Notes
- Fence
- Wall
- I Improved grassland
- SI Poor semi-improved grassland
- Neutral grassland - semi-improved
- Acid grassland - semi-improved
- Marshy grassland
- Amenity grassland
- A Arable
- Bracken - continuous
- Broad-leaved woodland - plantation
- Coniferous woodland - plantation
- Parkland and scattered trees - coniferous
- Scrub - dense/continuous
- Dry dwarf shrub heath - acid
- Dry heath/acid grassland
- Wet heath/acid grassland
- X Ephemeral/short perennial
- Other tall herb and fern - non ruderal
- Swamp and fen
- Running water
- Standing open water
- Dry ditch

JNCC Phase 1 Classification

Client:	Project:
BTAL	Brims Tidal Array

Title:

Extended Phase 1 Survey Results

Figure:	A2	Drawing No:			
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/11/12	HW	JT	A3	1:15000
02	16/07/14	JE	JM	A3	1:15000

Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONING DHV ENVIRONMENT ENERGY
10 BERNARD STREET
LEITH
EDINBURGH
EH6 6PP
+44 (0)131 555 0506
www.royalhaskoningdhv.com

7.2 Appendix B: Target Notes

Target Note Number	Target Note
1	Patch of gorse
2	Scattered trees over heathland. With dominant spruce sp., also grey alder, rowan, willow sp., sycamore, downy birch
3	Tortoiseshell butterfly
4	Drain, very overgrown, unlikely to be used by otter. Almost dry. Vegetated with broad-leaved dock, bush vetch, common hogweed, marsh marigold, spear thistle, white clover, creeping buttercup, soft rush, <i>Holcus sp.</i> , crested dog's-tail, cock's-foot, perennial rye-grass
5	Bottom of drain, overgrown and stagnant.
6	Neutral grassland, heavily grazed by sweet vernal grass, crested dog's-tail, perennial rye-grass
7	Ragged robin
8	Fea Heath LNCS. Ling heather, bell heather, cross-leaved heath, frequent crowberry, bearberry, bog asphodel (<i>Narthecium ossifragum</i>), eyebright, tormentil, compact rush, sweet vernal grass, mat grass, fescue sp., common sorrel, occasional common butterwort (<i>Pinguicula vulgaris</i>), lousewort (<i>Pedicularis sp.</i>), harebell and locally frequent carnation sedge (<i>Carex panacea</i>) and bog cotton (<i>Eriophorum sp.</i>). Eyebright appearing to be of two species on road verge.
9	Group of re-used military buildings storing hay. Surrounded by improved and poor semi-improved grassland. Multiple entry and exit points for birds and bats. Quite open inside - few enclosed areas/ crevices for bats. Of low value to bats. Bird's nesting - swallow.
10	Dilapidated farmhouse buildings. Not accessed internally for health and safety reasons. Inspected externally only. Multiple opportunities for bats to roost and for bird nests. Bird nests were seen here. Multiple tiles missing, holes in walls and window frames. No bat field signs seen.
11	Dry heath. Ling heather, bird's-foot trefoil, tormentil, sweet vernal grass, cross-leaved heath, crowberry, bearberry, Yorkshire fog, common sorrel, ribwort plantain, white clover, devil's-bit scabious, marsh thistle, common cat's-ear, fescue sp., wild angelica, meadow vetchling, common bent, false oat grass, tufted hair grass, creeping buttercup, bush vetch
12	Dry heath/semi-improved grassland mix. Eyebright, kidney vetch, common cat's-ear, Yorkshire fog, ribwort plantain, common sorrel, ling heather, bell heather, devil's-bit scabious, sweet vernal grass, rough meadow grass, red clover, cross-leaved heath, compact rush, <i>Juncus sp.</i> butterwort, tormentil, wild angelica, lichen spp., moss spp. locally abundant meadowsweet.
13	High proportion of devil's-bit scabious, perhaps a calcareous indicator. High proportion of meadowsweet in patches.
14	Semi-improved neutral grassland with self-heal, devil's-bit scabious, daisy, common sorrel, fescue sp., common cat's-ear, creeping soft grass, sweet vernal grass, mat grass, bulbous buttercup, ribwort plantain, white clover, tormentil, eyebright, hay rattle, common ragwort, crested dog's-tail, compact rush
15	Ditch. Coded as dry ditch, but some water stagnant. Considered unsuitable for otter.
16	Dried up ephemeral pond with marginal vegetation including spike rushes
17	Dilapidated buildings/ ruins, with many cracks and crevices. Up on a hill and exposed

	to wind. Surrounded by improved/ poor-semi-improved grassland, of minimal value to bats.
18	Drain, almost dry and overgrown with rank grasses, tall ruderal species and iris.
19	Marshy grassland with high proportion of swamp vegetation including iris, common reed, reed canary grass, false-oat grass.
20	Large field with heathland and grassland as coded on map. Heath-spotted orchid found in north-west of field. Also tormentil, ling heather, bell heather, cross-leaved heath, bird's-foot trefoil, sweet vernal grass, mat grass, devil's-bit scabious, fescue sp., ribwort plantain, common sorrel, red clover, moss sp., common cat's-ear, <i>Holcus sp.</i>
21	Improved grassland, in the process of being cut for silage. Code changed to J1.1 (arable)
22	Tortoiseshell butterfly
23	H8.4 (coastal grassland) - possibility as fescue sp., dominant grass species, but generally species-poor and adjacent to improved grassland with many typical improved grassland species also present in this area.
24	Standing water - but almost dried up, perhaps an ephemeral pond.
25	See target note 23
26	Grassland with small area of basic flush - with a high proportion of sedge and moss species, including common sedge and scorpidium sp.
27	Fence damaged intermittently
28	Eyebright appearing to be of two species
29	Area of improved grassland with Yorkshire fog, annual meadow grass, marsh thistle, glaucous sedge, soft rush, tufted hair grass, common cat's-ear, creeping buttercup, spear thistle, silverweed, tormentil. Also patched of damper areas along drains, where iris and watermint are present. Patches of heathland are occasional, including bell heather and ling heather. Locally frequent are eyebright sp., and devil's-bit scabious.
30	See target note 29
31	Improved grassland with scattered patches of marshy grassland
32	Recently cut for silage.
33	A line of Japanese rose along the road verge.
34	Stagnant drain almost dried up.
35	Mix/mosaic of tall ruderal species and improved grassland species, with patches of Japanese rose.
36	Plantation of dominant sycamore trees, with occasional alder. Ground flora of frequent woodrush, common hogweed and fern sp.
37	A linear stretch of Japanese rose extending along the road verge.
38	Plantation broadleaf woodland. Sycamore white willow, wych elm. Ground flora of creeping buttercup, common nettle, false oat grass, cock's-foot, common hogweed, bush vetch, ground elder, fern sp.
39	Plantation broadleaf woodland with sycamore, ash, wych elm, fruit tree sp., false-oat grass, yellow oat grass, common hogweed, common nettle. Drain with shallow, slow flowing water towards the coast. Appears to be directed underneath road but does not re-appear on the otherwise of the road.
40	Burnt gorse. Quite dense, with small patches of semi-improved grassland at bottom of hill. Including redshank, pineappleweed, common chickweed, common cat's-ear, <i>Holcus sp.</i> , red clover, house sparrow.

41	Area of semi-improved /poor semi-improved grassland with wetter areas interspersed of meadowsweet and rush species including soft rush and compact rush. Bird's-foot trefoil, false-oat grass, white willow, cock's-foot, bush vetch, meadow vetchling, creeping buttercup, common hogweed, fescue sp.
42	Area of dense scrub, with common alder, birch sp., grey willow, rowan, Japanese rose, white willow, bracken and false oat grass. Viewed from the road.
43	Appears to be an overgrown garden, with Japanese rose, white willow, sycamore, rushes, rank grasses and meadowsweet, also with other exotic garden species.
44	An area similar to that of TN 42
45	Similar to TN 41. A horse-grazed field with horse and pony. Very trampled, with only small patches of meadowsweet growing tall.
46	Damp area of abundant meadowsweet, silverweed, frequent meadow vetchling, red clover, ribwort plantain, <i>Holcus sp.</i> , creeping buttercup, eyebright sp., hay rattle, common sorrel, fescue, occasional common hogweed, broad-leaved dock, false-oat grass, common cat's-ear, self-heal, daisy, locally frequent cock's-foot. Can be classed as marshy grassland.
47	Improved grassland with patches of rushes making up about 10% of the area.
48	Strandline vegetation of lyme grass, <i>Leymus arenarius</i> false-oat grass, curled dock <i>Rumex crispus</i> and broad-leaved dock, hawk's-beard <i>Hieracium sp.</i> , orache <i>Atriplex prostrata</i> agg, mayweed <i>Tripleurospermum sp.</i> sea plantain <i>Plantago maritima</i> .

7.3 Appendix C: Species List

Common Name	Scientific Name
lichen	-
sycamore	<i>Acer pseudoplatanus</i>
ground elder	<i>Aegopodium podagraria</i>
Tortoiseshell	<i>Aglais urticae</i>
common bent	<i>Agrostis capillaris</i>
alder	<i>Alnus glutinosa</i>
grey alder	<i>Alnus incana</i>
wild angelica	<i>Angelica sylvestris</i>
sweet vernal grass	<i>Anthoxanthum odoratum</i>
kidney vetch	<i>Anthyllis vulneraria</i>
bearberry	<i>Arctostaphylos uva-ursi</i>
false oat grass	<i>Arrhenatherum elatius</i>
orache	<i>Atriplex prostrata agg.</i>
daisy	<i>Bellis perennis</i>
downy birch	<i>Betula pubescens</i>
birch	<i>Betula sp.</i>
moss	<i>Bryophyta spp</i>
ling heather	<i>Calluna vulgaris</i>
marsh marigold	<i>Caltha palustris</i>
harebell	<i>Campanula rotundifolia</i>
glaucous sedge	<i>Carex flacca</i>
common sedge	<i>Carex nigra</i>
carnation sedge	<i>Carex panacea</i>
creeping thistle	<i>Cirsium arvense</i>
marsh thistle	<i>Cirsium palustre</i>
spear thistle	<i>Cirsium vulgare</i>
crested dog's-tail	<i>Cynosaurus cristatus</i>
cock's-foot	<i>Dactylis glomerata</i>
heath-spotted orchid	<i>Dactylorhiza maculata ssp ericetorum</i>
tufted hair grass	<i>Deschampsia cespitosa</i>
spike-rush	<i>Eleocharis sp.</i>
crowberry	<i>Empetrum nigrum</i>
bell heather	<i>Erica cinerea</i>
cross-leaved heath	<i>Erica tetralix</i>
bog cotton	<i>Eriophorum sp.</i>
eyebright	<i>Euphrasia officinalis agg</i>
fescue	<i>Festuca sp.</i>
meadowsweet	<i>Filipendula ulmaria</i>
common hogweed	<i>Heracleum sphondylium</i>

swallow	<i>Hirundo rustica</i>
hawk's-beard	<i>Hieracium sp.</i>
Yorkshire Fog	<i>Holcus lanatus</i>
creeping soft grass	<i>Holcus mollis</i>
Holcus sp.	<i>Holcus sp.</i>
common cat's-ear	<i>Hypochaeris radicata</i>
yellow-flag iris	<i>Iris pseudacorus</i>
compact rush	<i>Juncus conglomeratus</i>
soft rush	<i>Juncus effusus</i>
meadow vetchling	<i>Lathyrus pratensis</i>
lyme grass	<i>Leymus arenarius</i>
perennial rye-grass	<i>Lolium perenne</i>
bird's-foot trefoil	<i>Lotus corniculatus</i>
woodrush	<i>Luzula sp.</i>
ragged robin	<i>Lychnis flos-cuculi</i>
pineappleweed	<i>Matricaria discoidea</i>
water mint	<i>Mentha aquatica</i>
mat grass	<i>Nardus stricta</i>
bog asphodel	<i>Narthecium ossifragum</i>
house sparrow	<i>Passer domesticus</i>
lousewort	<i>Pedicularis sp.</i>
redshank	<i>Persicaria maculosa</i>
reed canary grass	<i>Phalaris arundinacea</i>
common reed	<i>Phragmites communis</i>
Spruce	<i>Picea sp.</i>
common butterwort	<i>Pinguicula vulgaris</i>
ribwort plantain	<i>Plantago lanceolata</i>
sea plantain	<i>Plantago maritima</i>
annual meadow grass	<i>Poa annua</i>
rough meadow grass	<i>Poa trivialis</i>
silverweed	<i>Potnetilla anserina</i>
tormentil	<i>Potnetilla erecta</i>
self-heal	<i>Prunella vulgaris</i>
bracken	<i>Pteridium aquilinum</i>
bulbous buttercup	<i>Ranunculus bulbosus</i>
creeping buttercup	<i>Ranunculus repens</i>
hay rattle	<i>Rhinanthus minor</i>
Japanese rose	<i>Rosa rugosa</i>
Fruit tree	<i>Rosa sp.</i>
common sorrel	<i>Rumex acetosa</i>
curled dock	<i>Rumex crispus</i>
broad-leaved dock	<i>Rumex obtusifolius</i>
white willow	<i>Salix alba</i>

grey willow	<i>Salix cinerea ssp oleifolia</i>
willow	<i>Salix sp.</i>
hook-moss	<i>Scorpidium sp.</i>
common ragwort	<i>Senecio jacobaea</i>
rowan	<i>Sorbus aucuparia</i>
common chickweed	<i>Stellaria media</i>
devil's-bit scabious	<i>Succisa pratensis</i>
red clover	<i>Trifolium pratense</i>
white clover	<i>Trifolium repens</i>
mayweed	<i>Tripleurospermum sp.</i>
yellow oat grass	<i>Trisetum flavescens</i>
gorse	<i>Ulex europaeus</i>
wych elm	<i>Ulmus glabra</i>
common nettle	<i>Urtica dioica</i>
bush vetch	<i>Vicia sepum</i>

7.4 Appendix D: Relevant legislation

Relevant European Protected Species – bats & otters

Otters and all bats in Scotland are European Protected Species (EPS) and as such are afforded full protection under The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) in respect of:

- deliberately or reckless:
- capturing, injuring or killing of an animal;
- disturbance of animals*;
- harassment
- taking or destroying the eggs of such an animal;
- damaging or destroying a breeding site or resting place of such an animal;

*Deliberate disturbance of animals includes in particular any disturbance which is likely-

- to disturb such an animal while it is occupying a structure or place which it uses for shelter or protection
- to disturb such an animal while it is rearing or otherwise caring for its young
- to disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;
- to disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young

There are provisions in the legislation to allow actions to take place under licence, which would otherwise contravene the law. These licences can be obtained from Scottish Natural Heritage.

Nesting birds

All wild bird species in the UK are protected under the Wildlife and Countryside Act (1981) (as amended) and it is an offence to:

- 1) damage or destroy wild bird eggs/nests; or
- 2) kill/injure/take any wild birds.

Schedule 1 of the Act contains a list of bird species for which all offences carry harsher penalties and for which extra protection makes it an offence to:

- 1) Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.

Schedule 5 Invertebrates

Some species of invertebrate are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), making it an offence to

- 1) Intentionally kill, injure or take the species from the wild; and
- 2) Trade the species (i.e. sell, barter, exchange, transport for sale, and advertise to sell, or to buy).

Invasive weeds

Under Section 14 of the Wildlife and Countryside Act 1981 (as amended) it is an offence to plant or otherwise cause to grow in the wild any plant which is included in Schedule 9 (this includes Japanese knotweed, rhododendron, giant hogweed, few-flowered leek, Himalayan balsam).

Relevant Designated Sites

Special Area of Conservation (SAC) and Special Protection Area (SPA)

These sites are designated under the Conservation of Habitats and Species Regulations (2010), EC Directive on the conservation of natural habitats and of wild fauna and flora (92/42/EEC) and EC Directive on the conservation of wild birds (79/409/EEC). These sites are called Natura sites.

These sites are managed by Scottish Natural Heritage through their Site Condition Monitoring Programme. Formal Appropriate Assessment is required before undertaking, or giving consent, permission or other authorisation for a plan or project which is likely to have a significant effect on such a site.

Sites of Special Scientific Interest (SSSI)

SSSIs are those areas of land and water (to the seaward limits of local authority areas) that Scottish Natural Heritage (SNH) considers to best represent our natural heritage - its diversity of plants, animals and habitats, rocks and landforms, or a combinations of such natural features. These sites are designated by SNH under the Nature Conservation (Scotland) Act 2004, affording them protection by law.

Local Wildlife Sites (LWS) and Local Nature Conservation Sites (LNCS)

Many LNCS and LWS are identified and proposed by local conservation organisations such as the [Scottish Wildlife Trust](#), following surveys of local authority areas. Local authorities assess proposed sites and decide whether to adopt them as LNCS or LWS in their planning documents. Local authorities assess proposed sites and decide whether to adopt them as LNCS/LWS in their planning documents. The main purpose of LNCS/LWS is to flag-up to planners and developers where there are natural feature of some merit. In this way it gives planners and developers early indication of sensitive sites and opportunities for enhancing the local environment.