

Appendix I

Terrestrial ecology and nature conservation

1. Terrestrial ecology and nature conservation

1.1 Introduction

- 1.1.1.1 This Appendix provides a baseline for the Longer Alternative Cable Routes (LACRs) known as LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02 that is comparable to that used within the **Preliminary Environmental Information Report (PEIR)**. This baseline has been used to inform the assessment provided in the **PEIR Supplementary Information Report (SIR)**.
- 1.1.1.2 Further detail is provided in **Section 2.2** on some of the embedded environmental measures that have been developed since **PEIR** stage (July – September 2022). These embedded measures refer both to ecological features that are present across all potential cable routing options and those that refer to specific locations. For example, specific measures that would be implemented across the large-scale and long running higher tier countryside stewardship scheme known as the Peppering Project (an area north of Warningcamp, within the PEIR Assessment Boundary)¹.

1.2 Baseline – Desk study methodology

- 1.2.1.1 A desk-based data-gathering exercise was undertaken to obtain existing information for the area crossed by LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02. Data relating to relevant statutory and non-statutory sites designated for their nature conservation importance, Habitats and Species of Principal Importance in England, legally protected and controlled species and other conservation notable species² that have been recorded over the previous 10 years (2012 to 2022) was gathered. **Table 1-1** lists the data compiled within the study area and associated areas of search. The 'study area' for this desk study comprises:
- land within LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02;
 - areas of search (measured from the boundaries of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02) for sites designated for their nature conservation interest at the international/national site network, national and local levels;
 - an area of search for legally protected and notable ecological features; and
 - an area of search for any legally controlled species.

¹ The Peppering Project is relevant for the route described in the PEIR and ACR-04 and ACR-05 described in the PEIR SIR.

² A conservation notable species is one that has some form of conservation designation (for example it is present on a red list) but has no specific legal protection.

- 1.2.1.2 This desk study was informed by data obtained from Sussex Biodiversity Records Centre (SxBRC) and Multi Agency Geographic Information for the Countryside (MAGIC) database (2022). The information gathered compliments the desk study report published at PEIR (see **Appendix 23.2: Terrestrial ecology desk study, Volume 4 of the PEIR**).

Table 1-1 Data gathered during the desk study for LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02

Ecological feature	Example/definition	Coverage of Study Area
Statutory sites designated under international conventions or the Habitats Regulations	Special Areas of Conservation (SAC), possible SAC (pSAC), Special Protection Areas (SPA), potential SPA (pSPA), Ramsar sites, proposed Ramsar sites and sites identified, or required, as compensatory measures for adverse effects on other HRA sites ³ .	<p>SACs and possible SACs were searched for inside and within 12km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02 to reflect recommendations in the Draft Sussex Bat Special Area of Conservation: Planning and Landscape Enhancement Protocol (also known as the “Draft Sussex Bat SAC Protocol”) (South Downs National Park Authority (SDNPA) and Natural England, 2018).</p> <p>SPAs, potential SPAs, Ramsar sites and proposed Ramsar sites were searched for inside and within 10km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) & LACR-02 reflecting the upper foraging distances of dark-bellied brent geese <i>Branta bernicla bernicla</i> (Summers & Critchley, 1990) and Bewick’s swan <i>Cygnus columbianus bewickii</i> (Robinson <i>et al.</i> 2004) from roost locations. These species were identified as the species with the largest foraging distances for terrestrial habitats for any SPA features within the wider area.</p>
Statutory sites designated under national legislation	Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs)).	SSSIs with bats listed on the citation were searched for inside and within 12km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02. NNRs and all other SSSIs were searched for inside and within 5km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02 following precedent for other large infrastructure projects.

³ Definition is reproduced from the draft ‘Overarching National Policy Statement for Energy (EN-1) – September 2021’

Ecological feature	Example/definition	Coverage of Study Area
		LNRs were searched for within 1km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02 reflecting the purpose of their designation.
Locally designated sites	In Sussex, these are termed as Local Wildlife Sites (LWS) or notable road verges.	LWS and notable road verges were searched for inside and within 2km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02.
Habitats of Principal Importance (HPI) and Species of Principal Importance (SPI)⁴, Red listed species and legally protected species	HPIs and SPIs, species recorded on The International Union for Conservation of Nature (IUCN) Red List of Threatened Species and/or local Red Lists ⁵ for the UK or relevant sub-units (e.g. regions or counties) and legally protected habitats and species include those listed on Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended), those included on Schedules 2 and 5 of the Habitats Regulations. Badger and Hedgerows are provided protection under the Protection of Badgers Act 1992 and the Hedgerows Regulations 1997 respectively.	HPI and SPI, Red listed species and Legally protected species were searched for inside and within 2km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02.

⁴ Habitats and Species of Principle Importance covered under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006

⁵ The IUCN red list provides taxonomic, conservation status and distribution information on taxa that have been globally evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those taxa that are facing a higher risk of global extinction - those listed as Critically Endangered, Endangered and Vulnerable (IUCN, 2021)

Ecological feature	Example/definition	Coverage of Study Area
Legally controlled species	Legally controlled species include those listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)	Legally controlled species searched for within 2km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02.
Bat roosting locations	Bat roost locations are considered separately from other species records in accordance with guidance.	Bat roosting locations were searched for within 2km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02.
Water body locations	Water bodies may support species within the groups listed above (for example legally protected great crested newts <i>Triturus cristatus</i>).	Water body locations were searched for inside and within 250m of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02.

1.3 Field Survey Methodology

- 1.3.1.1 Field surveys were undertaken in August 2022 to establish a high-level baseline. A Phase 1 habitat survey was undertaken to classify and map the habitats within and adjacent (within 50m) to LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02 (the Survey Area). The survey was 'extended' to identify the presence or potential presence of species of importance for nature conservation and/or species afforded legal protection. The survey followed the methods described in the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 habitat survey (2016).
- 1.3.1.2 The surveys were undertaken across the Survey Area, although where access to private land was not available, recording took place from Public Rights of Way (PRoW).
- 1.3.1.3 In addition, an area of 'good quality semi-improved grassland' identified in the Priority Habitat Inventory was subject to a National Vegetation Classification survey, following Rodwell (2006).

2. Results

2.1 Baseline – Desk Study Results

2.1.1.1 One Ramsar site, two SPAs and three SACs were identified through the desk study, none of which fall within LACR-01 (LACR-01a, LACR-01b and LACR-01c) or LACR-02. **Table 2-1** provides information on the designations. All of the designations listed in **Table 1-2** were identified within the **Appendix 23.2** of the **PEIR**. All of the European sites identified are located at greater distances to LACR-01 (LACR-01a, LACR-01b and LACR-01c) or LACR-02 than to the closest point of the PEIR Assessment Boundary.

Table 2-1 International/European sites designated for nature conservation

Site name	Designation	Designated features	Approximate distance and direction from closest points of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
Arun Valley (overlaps with Arun Valley SPA and SAC)	Ramsar	Wetland invertebrate and plant species, assemblage of wintering waterfowl.	5km north-west of LACR-01a, 1.9km west of LACR-02.
Arun Valley (overlaps with Arun Valley SPA and Ramsar site)	SAC	Ramshorn snail <i>Anisus vorticulus</i> .	5km north-west of LACR-01, 1.9km west of LACR-02.
Arun Valley (overlaps with Arun Valley Ramsar site and SAC)	SPA	Bewick's swan (non-breeding) Waterfowl assemblage (non-breeding): including shoveler <i>Anas clypeata</i> , teal <i>Anas crecca</i> , wigeon <i>Anas Penelope</i> and Bewick's swan.	5km north-west of LACR-01a, 1.9km west of LACR-02.
Duncton to Bignor Escarpment	SAC	Asperulo-Fagetum beech forests.	10.2km north-west of LACR-01a, 8.35km north-west of LACR-02.

Site name	Designation	Designated features	Approximate distance and direction from closest points of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
Solent and Dorset Coast	SPA	Sandwich tern <i>Sterna sandvicensis</i> (breeding), Common tern and Little tern.	5.5km south-west of LACR-01a, 8.5km south-west of LACR-02.
The Mens	SAC	Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrub layer (<i>Quercion robori-petraeae</i> or <i>Ilici-Fagenion</i>) and Barbastelle <i>Barbastella barbastellus</i> .	12km north-west of LACR-01a, 14.3km north-west of LACR-02.

2.1.2 Statutory nature conservation sites (national)

2.1.2.1 A total of six SSSIs were identified through the desk study. All six SSSIs are within 5km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02. Following a further search up to 12km from LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02, no SSSIs cited for one or more bat species were found. LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02 do not overlap with any SSSI.

2.1.2.2 **Table 2-2** provides information on the designated sites.

Table 2-2 Nationally designated sites for nature conservation

Site name	Designation	Designated features	Approximate distance and direction from closest points of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
Amberley Mount to Sullington Hill⁶	SSSI	Calcareous grassland Juniper <i>Juniperus communis</i> Fly honeysuckle <i>Lonicera xylosteum</i>	450m north-west of LACR-01b, 3.4km north-east of LACR-02.

⁶ Amberley Mount to Sullington Hill SSSI is also identified as groundwater dependent terrestrial ecosystems in **Chapter 27: Water environment, Volume 2** of the PEIR. This aspect of the SSSI will be considered alongside the designated features in all future assessment.

Site name	Designation	Designated features	Approximate distance and direction from closest points of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
		Adonis blue butterfly <i>Polyommatus bellargus</i>	
Arun Banks	SSSI	<i>Schoenoplectus lacustris</i> sub-species <i>tabernaemontani</i> x <i>triqueter</i> W5 – <i>Alnus glutinosa</i> – <i>Carex paniculate</i> woodland W6 – <i>Alnus glutinosa</i> – <i>Urtica dioica</i> woodland	2.9km north-west of LACR-02 (more than 5km from LACR-01a).
Arundel Park	SSSI	4Breeding bird assemblage – mixed: scrub, woodland CG2 <i>Festuca ovina</i> – <i>Avenula pratensis</i> lowland calcareous grassland CG3 – <i>Bromus erectus</i> lowland calcareous grassland Invertebrate assemblage Field cricket <i>Gryllus campestris</i> Cut-grass <i>Leersia oryzoides</i>	2.9km north-west of LACR-01a, 2km west of LACR-02.
Chanctonbury Hill	SSSI	Breeding bird assemblage Calcareous grassland Woodland Great crested newt	3.3km east of LACR-01c (more than 5km from LACR-02).
Chantry Mill	SSSI	EA – Aptian - Albian	1.7km north of LACR-01b (more than 5km from LACR-02).

Site name	Designation	Designated features	Approximate distance and direction from closest points of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
Cissbury Ring	SSSI	Breeding bird assemblage Calcareous grassland Adonis blue butterfly	3.5km south-east of LACR-01c (more than 5km from LACR-02).
Parham Park	SSSI	Lichens Invertebrate assemblage Woodland	3.5km north-west of LACR-01a, 4.8km north-west of LACR-02.
Sullington Warren	SSSI	Breeding bird assemblage Dry heath habitat	2.2km north of LACR-01b (more than 5km from LACR-02).

2.1.3 Non-statutory designated sites of nature conservation

2.1.3.1 The desk study identified five non-statutory designated sites of nature conservation within 2km of LACR-01 (LACR-01a, LACR-01b and LACR-01c) & LACR-02. **Table 2-3** provides information on these non-statutory designated sites of nature conservation.

Table 2-3 Non-statutory sites designated for nature conservation

Site name	Designation	Designated features	Approximate distance and direction from closest point of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
Arun Valley, Watersfield to Arundel	LWS	This section of the River Arun and its floodplain forms an extensive tract of wetland, a nationally declining habitat. Although many of the flood meadows have been improved, the wet grassland is important for breeding and	1.8km north of LACR-01a; 900m west of LACR-02.

Site name	Designation	Designated features	Approximate distance and direction from closest point of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
		<p>wintering waders and wildfowl. There is a good network of ditches, some of which are very important botanically. The site is important for birds, dragonflies, water beetles, snails and plants, and supports many rare and declining species. The unimproved meadows of Watersfield Brooks are of great botanical interest.</p>	
Clapham Wood	LWS	<p>1) Clapham Wood is an extensive, ancient semi-natural woodland on the undulating dip slope of the South Downs.</p> <p>2) The ground flora is rich and includes a number of interesting species. The wood was moderately affected by the storm of October 1987 and several large blocks of woodland were subsequently cleared for pasture. Much of the wood is not managed but some areas are still coppiced.</p> <p>3) Clapham Woods is an ancient woodland of County-wide importance.</p>	1.9km south-east of LACR-01c, more than 2km from LACR-02.

Site name	Designation	Designated features	Approximate distance and direction from closest point of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
Conyers Bank	LWS	<p>Conyers Bank is a small, isolated field of unimproved chalk grassland on a steep, north-facing hillside.</p> <p>Situated above the floodplain of the River Arun, it is surrounded by semi-natural woodland and improved water meadows. The site has a rich flora.</p>	More than 2km from LACR-01a, b or c, 1.1km north-west of LACR-02
Long Furlong and Church Hill	LWS	<p>Long Furlong is a steep north and west-facing slope between the A280 and Clapham Woods, supporting rich chalk grassland and scrub.</p> <p>Church Hill is a complex mosaic of chalk grassland, species-rich scrub and woodland.</p> <p>Long Furlong and Church Hill form a large piece of contiguous habitat, so have been included as one site.</p>	1.5km south-east of LACR-01c, more than 2km from LACR-02.
Poling Copse	LWS	<p>Poling Copse is a large block of ancient, semi-natural woodland on the Coastal Plain south of the South Downs, just to the east of Arundel.</p> <p>It consists predominantly of Oak-Hazel woodland, a type typical of base-poor soils in the area.</p>	500m north of LACR-01a. LACR-02 crosses Poling Copse LWS.

Site name	Designation	Designated features	Approximate distance and direction from closest point of LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02
		Sycamore woodland dominates on South Fields – a section which has probably regenerated on an old field.	
Sullington Hill	LWS	This stretch of the South Downs escarpment supports moderately species-rich chalk grassland on north and east-facing slopes. Some areas are maintained by grazing while others are no longer grazed and have become heavily scrub-invaded. The site includes small areas of semi-natural woodland.	Adjacent to LACR-01b and LACR-01c and more than 2km from LACR-02.
Warningcamp Hill and New Down	LWS	The steep, north-west facing slope of New Down supports herb-rich chalk grassland with extensive patches of Burnet Rose <i>Rosa pimpinellifolia</i> , an uncommon plant in West Sussex. Warningcamp Hill supports a very large population of the rare Small-flowered Buttercup <i>Ranunculus parviflorus</i> . The site also includes an old chalk pit and a small area of ancient, semi-natural woodland.	More than 2km from LACR-01 (LACR-01a, LACR-01b and LACR-01c). LACR-02 overlaps with this LWS

Habitats listed on the Priority Habitat Inventory and Ancient Woodland Inventory

- 2.1.3.2 Both LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02 cross areas of habitat listed on the Priority Habitat Inventory and Ancient Woodland Inventory. LACR-01a crosses an area of plantation on ancient woodland soils (PAWS) at Michelgrove Park and come close to a series of other woodland blocks, also listed as PAWS or ancient semi-natural woodland (ASNW). LACR-02 crosses several areas of PAWS including Poling Copse, Tenantry Copse, Upper and Lower Wepham Wood and Upper Oldfield Copse. It also runs close to two areas of ASNW known as Pheasant Rue and Beech Copse. All of this woodland, and others close to LACR-01 (LACR-01a, LACR-01b and LACR-01c) and LACR-02 are also noted as deciduous woodland on the Priority Habitat Inventory (although meta-data attached to the inventory record states confidence that they meet the criteria for either lowland beech and yew woodland or lowland mixed deciduous woodland priority habitat definitions is low).
- 2.1.3.3 LACR-01 and LACR-02 both also cross areas of 'good quality semi-improved grassland' (a definition in the Priority Habitat Inventory dataset). LACR-01b and LACR-01c cross this habitat close to Sullington Hill, although data gathered by field survey has categorised this area as improved grassland. LACR-01c also crosses another area of this habitat when adjacent to Long Furlong Lane. LACR-02 crosses this habitat at Barpham Hill.
- 2.1.3.4 The only other priority habitats close to, but not crossed by, the LACRs are:
- for LACR-01a floodplain and coastal grazing marsh within the Arun Valley; and
 - for LACR-01b and LACR-01c there is lowland calcareous grassland, which is located at Hallow Hill, Sullington Hill and adjacent to Coventry Plantation.

Legally protected and notable species

- 2.1.3.5 SxBRC provided a large number of records for the study area, with these reflecting the make-up of species identified in the desk-study centred on the original PEIR Assessment Boundary (**Appendix 23.2 of the PEIR**).
- 2.1.3.6 There are records of eight species of bat within the study area including barbastelle, serotine, whiskered bat, Natterer's bat, noctule, common pipistrelle, soprano pipistrelle and brown-long eared bat. Records of roosts are associated with buildings including churches, residential dwellings and farm buildings.
- 2.1.3.7 There are records of water vole along the Black Ditch, which runs parallel to LACR-01a when south of the A27. Dormouse has been recorded close to Angmering and Clapham, although there are no records within the woodlands crossed or adjacent to LACR-01a. Hedgehog and brown hare are also recorded in the area and appear to be relatively widely distributed.
- 2.1.3.8 There are records of great crested newts present close to LACR-01a when south of the A27 (within 50m). Other amphibians recorded in the study area include common toad, common frog, smooth newt and palmate newt.
- 2.1.3.9 All four species of common reptile (slow worm, grass snake, common lizard and adder) have been recorded in the study area.

- 2.1.3.10 A diverse array of invertebrates, many associated with calcareous grassland and woodland ride habitats, have been reported from the study area, alongside a long list of flora that is also characteristic of these habitats.
- 2.1.3.11 As would be expected for a study area that covers habitats associated with the Arun Valley, extensive woodland, calcareous grassland and arable farmland the list of birds both breeding and wintering in the area is large. The results gained are in keeping with those presented in **Appendix 23.2** of the **PEIR** and include a range of raptors, wildfowl, waders and passerines.

2.2 Field Survey Results

- 2.2.1.1 Phase 1 habitat survey data has been collected for LACR-01a, LACR-01b, LACR-01c and for LACR-02. Data was gathered in areas where access to private land was granted, and from Public Rights of Way (PRoW) and the public highway where it was not available. The land access available has been sufficient for assigning a Phase 1 habitat category to approximately 80% of the habitat along these routes and within 50m of them. Where habitat categories have not been assigned in the field, professional judgement has been used to assign habitat type based on satellite imagery. **Figure I.1.1** shows the areas of habitat assigned a category during field survey, whilst **Figure I.1.2** shows the Phase 1 habitat map.
- 2.2.1.2 Furthermore, an area identified between LACR-01c and an existing farm track identified as a potential temporary construction and permanent access highlighted in the Priority Habitats Inventory as supporting good quality semi-improved grassland (also known to be under higher tier Countryside Stewardship) was subject to a National Vegetation Classification (NVC) survey.
- 2.2.1.3 LACR-01a progresses from the route shown in the **PEIR** in an easterly direction, passing south of Lyminster and north of the Black Ditch and eventually reaching the A27 just to the west of Hammerpot. This section of LACR-01a is dominated by arable fields that are bounded by a mixture of native hedgerows, native species rich hedgerows and native species rich hedgerows with trees. In addition, there are a number of small blocks of woodland that divide fields when close to the A27. These woodland blocks are made up of species common in the area including pedunculate oak, ash, beech, goat willow, hawthorn and blackthorn.
- 2.2.1.4 As LACR-01a progresses north of the A27 it crosses a number of arable fields that are separated by tree lines and hedgerows supporting species that are common across the area including hawthorn, blackthorn, hazel, field maple, pedunculate oak, beech and ash. There is one area of semi-natural broadleaved woodland crossed by LACR-01a north-west of Norfolk House. This woodland is dominated by pedunculate oak and ash, with hazel, holly and hawthorn also present.
- 2.2.1.5 LACR-01a then reaches, towards its northern extent, plantation woodland, much of which is listed as Plantation on Ancient Woodland Sites (PAWS). These woodlands (known as Michelgrove Park) are largely made up of beech plantations with some silver birch, silver birch, holly, hazel and sycamore. Where the ground becomes steeper the woodland is more semi-natural and is dominated by pedunculate oak, beech and hazel.
- 2.2.1.6 LACR-01b runs through a series of arable fields and agriculturally improved pastures that are separated by a range of native hedgerows and tree lines. LACR-

01b is routed in close proximity to a number of habitats listed on the Priority Habitat Inventory including calcareous grassland and good quality semi-improved grassland. These features are generally associated with Harrow Hill (also known as the general location for a release of Eurasian curlew as part of a local reintroduction project).

- 2.2.1.7 LACR-01c also runs through a series of arable fields and agriculturally improved pastures that are separated by a range of native hedgerows and tree lines. There are also a number of thin belts of woodland north of Long Furlong Farm and at Blackpatch Covert.
- 2.2.1.8 The grassland adjacent to LACR-01c that was subject to NVC survey was identified as MG6a *Lolium perenne-Cynosurus cristatus* grassland *Anthoxanthum odoratum* sub-community. This community is common and widespread and therefore this area has been listed as an agriculturally improved grassland.
- 2.2.1.9 LACR-02 progresses mainly through arable fields when east of Clay Lane and south of Blakehurst Lane. There are a small number of native hedgerows in this area, although some fields no longer have a physical boundary separating them. Within this area is also Poling Copse (listed as PAWS) that is made up of hazel coppice with oak standards. As LACR-02 moves in an easterly direction through PAWS known as Tenantry Copse and Wepham Wood it runs along a tarmac track that is flanked on either side by grassed verges and low bunds prior to grading into beech plantation (with hazel coppice in a small number of areas) with little shrub. The ground flora in the area does have a number of ancient woodland indicators present including barren strawberry, bluebell and yellow pimpernel. LACR-02 then runs in a north-easterly direction through a pasture field before crossing Upper Oldfield Copse (further beech plantation) and entering arable land. Towards the eastern end of LACR-02 the route heads down a slope that has semi-natural woodland at the top and semi-improved calcareous grassland along its face. At the bottom of the slope is a further arable field.
- 2.2.1.10 The habitats recorded within the bounds of LACR-01a, LACR-01b, LACR-01c and LACR-02 are in keeping with those recorded elsewhere within the original PEIR Assessment Boundary and are fairly typical of the local landscape. **Figure I.1.2** provides a map of the habitats recorded.

3. Further detail on embedded environmental measures

3.1 Introduction

- 3.1.1.1 The design of the onshore part of the Proposed Development has continued to progress taking into consideration feedback from statutory consultation (Section 42) and technical engagement, further data generated from the ongoing onshore environmental survey programme and the formulation of a greater understanding of the technical details associated with the construction and operation of the Proposed Development. Part of this onshore design evolution process has focused on the design of embedded environmental measures that seek to avoid or reduce the predicted adverse effects. This Appendix describes the approaches to minimise effects on hedgerows and coastal and floodplain grazing marsh (and the wintering wildfowl and waders it supports), that were not described within the **PEIR**. These measures apply across all potential route options (including those assessed in the PEIR) and, as such are not differentiators within the assessments within the PEIR SIR. Their inclusion in the PEIR SIR is to provide a better understanding of the realistic worst-case scenario.
- 3.1.1.2 In addition, specific embedded environmental measures to be implemented across the Peppering Project⁷ area are also described. This is to enable better consideration of ACR-04 and ACR-05, as well as respond to requests for further information on mitigation in this area made by South Downs National Park Authority and Natural England during statutory consultation or technical engagement.
- 3.1.1.3 This Appendix does not seek to describe all environmental measures that will be described within the Environmental Statement. It focuses on those specific to key habitat issues raised regularly by stakeholders during technical engagement including hedgerow and coastal and floodplain grazing marsh losses/fragmentation (raised, by amongst others, Natural England, West Sussex County Council, South Downs National Park Authority and Sussex Wildlife Trust).

3.2 Hedgerows

- 3.2.1.1 The installation of approximately 40.25km of onshore electrical transmission cables for Rampion 2 between the landfall at Climping and the National Grid's 400kV Bolney Substation requires the crossing of a large number of hedgerows

⁷ The Peppering Project is a large scale, long running higher tier countryside stewardship scheme focused on providing hedgerows, conservation headlands, winter cover/pollinator strips and beetle banks amongst a patchwork cropping pattern. In addition, a predator control programme is implemented across the area to increase productivity of ground nesting birds (particularly grey partridge). Aims of the Peppering Project are to increase farmland bird numbers (with focus on grey partridge, lapwing, skylark and corn bunting), the diversity and abundance of a wide range of invertebrates and arable flora. Conventional farming takes place across 85% of the Peppering project area.

(number will depend on final design). Furthermore, hedgerows will be affected by the creation of temporary construction compounds and the development of temporary accesses for construction vehicles. The information below describes how each category of hedgerow will be managed during the construction, establishment and after care phases.

3.2.1.2 All hedgerows within the draft Development Consent Order (DCO) Limits will be numbered, outlined on a Vegetation Retention Plan (VRP) and tabulated. Each hedgerow will be assigned to one of the following categories:

- Retained hedgerows (no loss proposed, any pruning in keeping with typical management);
- Coppiced hedgerows (hedgerow retained but cut to 0.9m where visibility splays for highway access/egress required – allowed to regrow following closure of temporary construction access);
- Notched hedgerows (one or more sections removed from a single hedgerow – reinstated following construction);
- Temporarily lost hedgerows (hedgerows temporarily lost due to access, temporary construction compound establishment etc. restored following construction); and
- Permanently lost hedgerows (hedgerows lost within the permanent footprint of the proposed infrastructure).

3.2.1.3 In each section below, the proposed temporary construction activities in relation to hedgerows is described for each category. Descriptions include reference to hedgerows with standard trees as approach may alter.

3.2.2 Retained hedgerows

3.2.2.1 These are hedgerows that will be retained intact. Hedgerows will be retained in areas where it is possible to deliver the cable installation works effectively without vegetation removal. Retained hedgerows will be highlighted on the VRP. There are numerous stretches of hedgerow within the draft DCO Limits that will not be impacted by construction works.

3.2.2.2 The retained hedgerows in proximity of works will typically mark the edges of existing farm tracks that will be used for access, those that bound proposed temporary construction compounds and those that will be crossed as an incidental result of the use of trenchless crossing techniques to cross other constraints (e.g. roads and rivers). These hedgerows will be managed if necessary (e.g. pruning back of hedgerows bushing out impeding passing of a track), but only to the same degree as would be typically undertaken by a landowner.

3.2.2.3 Where standard trees are present, suitable root protection areas will be maintained in line with British Standard (BS) 5837:2012 '*Trees in Relation to Design, Demolition and Construction*' (British Standards Institution, 2012).

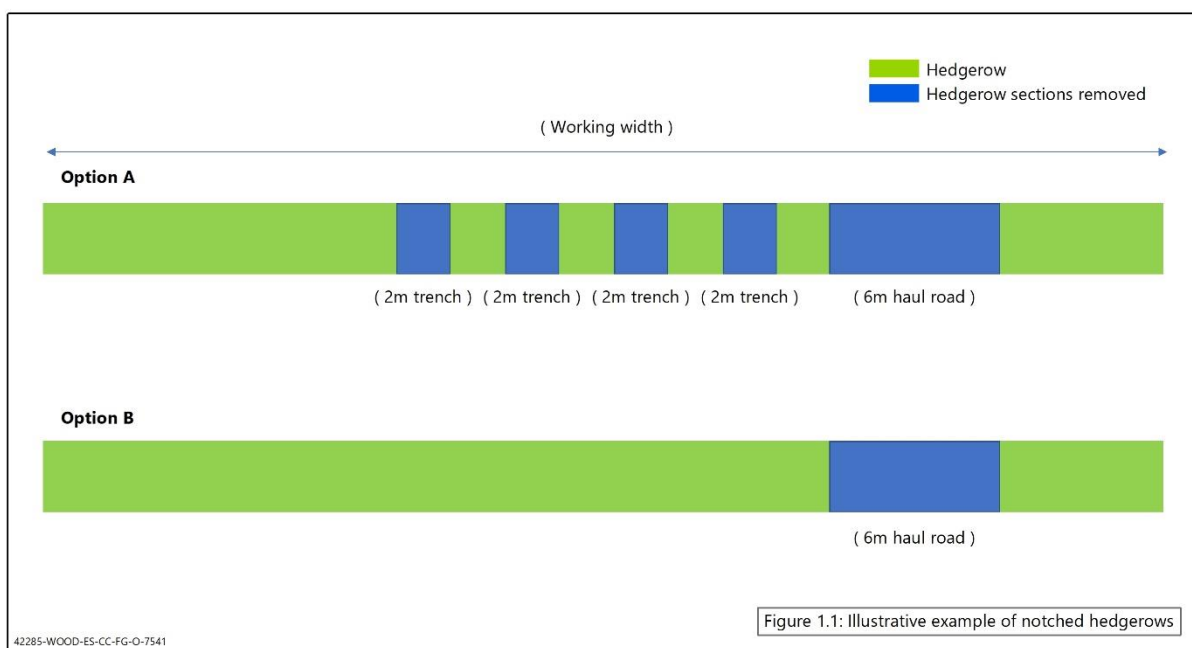
3.2.3 Coppiced hedgerows

- 3.2.3.1 Where visibility at temporary construction access points to or from the public highway is compromised, and where it is appropriate to do so in line with advice from the local highways authority, hedgerows will be retained but reduced in height to 0.9m; these will be shown on the VRP.
- 3.2.3.2 Where standard trees are within the hedgerow, and it is deemed necessary to remove them for traffic safety reasons, these will be highlighted in the VRP.

3.2.4 Notched temporary displacement of hedgerows

- 3.2.4.1 Where hedgerows are crossed by the onshore electrical transmission cables and/or the temporary construction haul road these will be notched. This is defined as removing one or more short sections within the same hedgerow with the majority being retained within the onshore cable construction working corridor. The two notching options are shown in **Graphic 3-1** below. With Option A representing typical hedgerow crossings and Option B representing hedgerows deemed “important” in line with the Hedgerows Regulations 1997 or those with particularly prominent standard trees.

Graphic 3-1 Illustrative example of notched hedgerows



- 3.2.4.2 Each hedgerow crossing using Option A would comprise up to five notches (up to four onshore cable trenches each measuring 2m wide and one temporary construction haul road crossing measuring 6m wide) equating to a total of 14m. Where Option B is employed, cable ducts will be tunnelled with only a single 6m notch removed for the temporary construction haul road.
- 3.2.4.3 In order to maintain composition and promote habitat connectivity the hedgerow plants from within, notches will be lifted with a tree spade, maintained and then

returned to their original positions. This will provide a rapid hedgerow reinstatement that gives structure earlier than would be expected for a standard planting regime. Success rates for transplantation are expected to be high (based on previous project experience) and in excess of 80%. However, if some transplants are unsuccessful (see below) the woody framework that will be left will promote habitat connectivity, whilst also being a framework on which new plantings can be supported.

- 3.2.4.4 Each hedgerow would be pruned at the notches back to hard wood, and reduced in height to approximately 1m, to reduce the strain on the hedge prior to its translocation. A temporary receptor trench (within the immediate vicinity of the hedgerow and inside the proposed working area) would be prepared prior to a tree spade of suitable size being used to move each part of the hedge from its current position to its temporary one. The notching and removal of hedgerow would take place between October and March⁸ (other than in areas waterlogged during this period when works would need to take place as and when construction is possible and other issues such as active birds' nests can be suitably managed) with any gaps not immediately within active construction works being closed with temporary fencing as necessary. This timing allows hedgerows to be relocated at a time of year when the chances of success (i.e. survival of translocated hedge plants) are highest.
- 3.2.4.5 Following construction activity, the hedgerow lengths will be moved back to their original positions in the first winter period available (between October and March). The hedgerow to be replaced will be assessed at this period to determine whether it should be replaced with no additional planting (this would be the case where the section appears healthy) or with additional planting (if the section is either dead or shows limited prospects). In all instances the hedgerow will be replaced in order to ensure that the gaps are filled by natural material that will promote connectivity.
- 3.2.4.6 Monitoring would take place over the following spring/summer (April through August; minimum of two visits at least two months apart) to determine whether additional plantings are required at any of the restored notched hedgerows. Where additional planting is required, this will take place in the first winter period following identification of need. Additional checks over the following five spring/summer periods would take place to ensure that any failures are rectified with additional planting.
- 3.2.4.7 Hedgerows that are considered “important” under the definition in the Hedgerows Regulations 1997 or contain mature standard trees of particular note (to be determined on a case-by-case basis) within the working width a notch will be created to take the temporary construction haul road only (see Option B in **Graphic 3-1**). The onshore cable ducts would be tunnelled underneath to minimize the amount of temporary loss. The tunnelling will be achieved by hand digging beneath the hedgerow (at typical duct depth of 1.2m) prior to the duct being pushed through (using an excavator) and connected to adjacent lengths of ducting (exact technique may vary dependent on ground conditions etc).

⁸ Works would only take place in March, if necessary, with the schedule being set to achieve completion by end of February.

- 3.2.4.8 The VRP will show the hedgerows that will be notched by the temporary construction haul road and the onshore cable trenches and those notched by the temporary construction haul road separately (i.e. Option A or Option B).

3.2.5 **Temporarily lost hedgerows**

- 3.2.5.1 Some hedgerows will be temporarily lost due to access works and temporary construction compounds. The hedgerows will be removed and, latterly, reinstated with new planting following the completion of construction. The VRP will show the hedgerows that will be temporarily lost.

3.2.6 **Permanently lost hedgerows**

- 3.2.6.1 Some hedgerows (including with standard trees) will be lost to the permanent development at the onshore substation. The VRP will show the hedgerows that will be permanently lost.

3.3 **Ancient Woodland**

- 3.3.1.1 Ground works within woodland listed on the Ancient Woodland Inventory, or areas less than 2ha in extent that have the qualities of ancient woodland but are not listed, have been avoided by ground works for all onshore cable route options other than with regards LACR-02. Other than the area that could be lost should LACR-02 be taken forward, all other ancient woodland would have a 25m stand-off imposed to protect from indirect effects associated with temporary construction activities including tree root damage, pollution events, hydrological change or soil compaction.
- 3.3.1.2 Where ancient woodland would be crossed using a trenchless crossing technique, a minimum drill depth of at least 6m would be maintained to ensure tree root systems would be avoided (Crow, 2005) with the launch and retrieval compounds being located at more than 25m from the woodland edge. Access to the woodland would be required to enable the drill head to be monitored from the surface. However, this would be done using hand-held equipment and undertaken on foot. No trees would be removed to enable the monitoring to take place, with only the shrub layer requiring strimming should it block access (e.g. if bramble required cutting back to enable walking access). Habitat survey of the potential areas that could be subject to trenchless crossing demonstrate that strimming is unlikely, as most are commercial plantations with little or no shrub layer present.

3.4 **Coastal and Floodplain Grazing Marsh**

- 3.4.1.1 Coastal and floodplain grazing marsh occurs within the Arun and Adur Valley on the alignment of the onshore cable corridor. This habitat varies in its make-up and includes both improved and semi-improved grassland and boundary ditches. The Priority Habitat Inventory has been used to classify which fields fall within this category, modified by the results of field survey (e.g., where grassland has been lost to arable production the priority habitat definition is no longer met).
- 3.4.1.2 In order to minimise damage to these habitats and disturbance to the wildfowl and wading birds that use them during the winter period, no works will be undertaken

between October and February inclusive. This will avoid the time when this habitat may be at its most waterlogged, and therefore more prone to damage by excavation/access works, and when wildfowl and wading birds are mainly present.

- 3.4.1.3 It should be noted that sections of this habitat will be crossed trenchlessly, particularly around the crossings of the River Arun (and adjacent railway), River Adur and the Black Ditch.

3.5 The Peppering Project

- 3.5.1.1 The Peppering Project covers an area of arable farmland approximately 17km² in extent. This area can be considered in two parts, the first referred to as West Peppering has been both farmed and managed for nature conservation since 2002 (circa 1,000ha in extent), whilst East Peppering is newly acquired with habitat creation beginning in winter 2022/23 (circa 700ha in extent). The onshore cable corridor shown at PEIR stage, and potential modifications ACR-04 and ACR-05 run through both the East and West Peppering Project areas, towards their southern extent. The information provided below relevant to the Peppering Project are included to enable consideration of ACR-04 and ACR-05 in light of the evolution of environmental measures that has occurred since the publication of the original PEIR, and to provide the further information requested by stakeholders for this area (notably South Downs National Park Authority and natural England). The information is also relevant to the consideration of LACR-01a, LACR-01b, LACR-01c and LACR-02 when comparing the potential effects between options.
- 3.5.1.2 The farmland within West Peppering is conventionally farmed across approximately 85% of its area. The remaining circa 15% of the area is specifically managed for nature conservation using common techniques (e.g., conservation headlands, hedgerow planting, winter bird seed mixes, pollinator seed mixes etc.) to encourage birds, invertebrates and arable flora. These measures are largely delivered through higher tier Countryside Stewardship. There is a difference, however, between the Peppering Project and other farmland under stewardship; this is:
- The scale on which habitat creation and management has (and will be) delivered (i.e. landscape scale);
 - The length of time over which the measures have been implemented consistently on West Peppering (20+ years);
 - The implementation of a complex crop rotation that ensures that neighbouring fields grow different crops to provide heterogeneity in the landscape; and
 - The employment of game keepers to undertake active predator control across the area (thereby increasing productivity of a range of bird species).
- 3.5.1.3 The results of this management have been a large increase in the number and distribution of birds listed as red or amber on the Birds of Conservation Concern (including grey partridge, lapwing, yellowhammer and corn bunting), a diverse and abundant invertebrate community (with over 550 species recorded including large numbers of UK Red Data Book species) and a diversity of arable flora.

- 3.5.1.4 Given the numbers and distribution of habitats and species of principal importance across this area (that are in excess of those in surrounding areas) has led Rampion Extension Development Limited (RED) to devise focused mitigation for the Peppering Project.
- 3.5.1.5 Within the onshore cable corridor (within the original PEIR Assessment Boundary) there are 16 existing hedgerows, eight proposed hedgerows (to be planted in the winter of 2022/23 in East Peppering), a beetle bank, a strip of scrub with standard trees and a shelter belt. In between these features are arable and improved pasture fields with many supporting conservation headlands, wild bird cover mixes etc. (noting these are managed on a two-yearly cycle, including in their location).
- 3.5.1.6 Of the 16 extant hedgerows, 15 would be retained by using the existing well-developed network of farm tracks present and trenchless techniques. The remaining hedgerow would need to have a temporary construction access point created (6m).
- 3.5.1.7 Of the eight proposed hedgerows, five would need to have a temporary construction access point created (6m). This is a worst case based on a lack of knowledge on where new field gates may be established.
- 3.5.1.8 The scrub line (circa 4m wide) and shelter belt would each require a 6m swathe cut through them to enable temporary construction access. The cable ducts would be installed trenchlessly.
- 3.5.1.9 The beetle bank would be retained in-situ.
- 3.5.1.10 Conservation headlands, rough grass strips and wild bird cover / pollinator strips would be temporarily lost at hedgerow crossings. If it is assumed that at each hedgerow crossing these habitats are present on one side (as per typical management practice in the area) and each strip is 16m wide then the loss would be under 1.2ha (noting that this is spread across a length of the onshore cable corridor in excess of 6km when crossing the Peppering Project and a typical field with a boundary of circa 1.25km supporting around 2ha of this habitat type).
- 3.5.1.11 Access to the temporary construction working area (from field gate to works) would be situated within the cropped area, as opposed to the habitat managed for nature conservation.
- 3.5.1.12 The hedgerows and other associated wildlife habitats of the Peppering Project with ACR-04 and ACR-05 would be approached in the same manner as those described above, with details provided following the selection of the preferred onshore cable route within the DCO Application.

4. References

British Standards Institution, (2012). British Standard (BS) 5837:2012: 'Trees in Relation to Design, Demolition and Construction. London

Crow, P., (2005). *Forestry Commission Information Note: The influence of soils and species on tree root depth*. Forestry Commission, Edinburgh.

Joint Nature Conservation Committee, (2018). *Conservation designations for UK taxa*. (online). Available at: <https://jncc.gov.uk/our-work/conservation-designations-for-uk-taxa/> (Accessed: 20 August 2022).

Department of Energy & Climate change, (2011). *Overarching National Policy Statement for Energy (EN-1)*. (online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 20 August 2022)

IUCN, (2021). *The IUCN Red List of Threatened Species*. (online) Available at: <https://www.iucnredlist.org/> (Accessed: 20 August 2022).

Natural England and Department for Environment, Food and Rural Affairs, (2022). *Multi Agency Geographic Information for the Countryside (MAGIC) mapping*. (online) Available from: <https://magic.defra.gov.uk/> (Accessed: 20 August 2022).

Protection of Badgers Act 1992. (online) Available at: <https://www.legislation.gov.uk/ukpga/1992/51/contents> (Accessed: 20 August 2022).

Robinson, J. A., Colhoun, K., McElwaine, J. G., and Rees, E. C., (2004). *Bewick's swan *Cygnus columbianus bewickii* (Northwest Europe population) in Britain and Ireland 1960/61 – 1999/2000*. Waterbird Review Series, The Wildfowl & Wetlands Trust/Joint Nature Conservation Committee, Slimbridge.

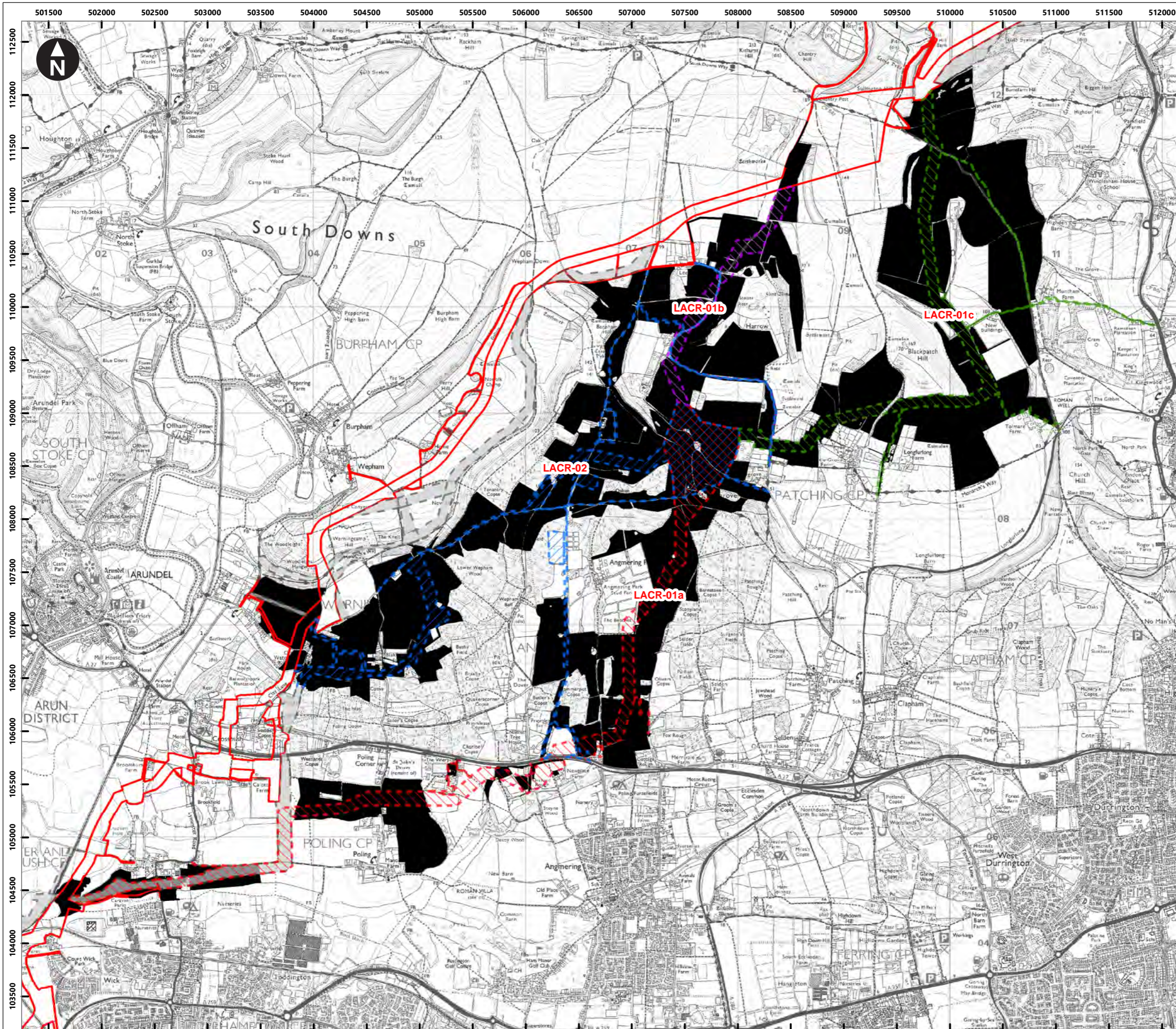
South Downs National Park Authority and Natural England (Undated). *Draft Sussex Bat Special Area of Conservation. Planning and Landscape Scale Enhancement Protocol*. (online) Available at: <https://www.southdowns.gov.uk/wp-content/uploads/2018/04/TLL-15-Draft-Sussex-Bat-SAC-Protocol.pdf> (Accessed: 20 August 2022).

Summers, R. W., and Critchley, C. N. R., (1990). *Use of Grassland and Field Selection by Brent Geese *Branta bernicla**. Journal of Applied Ecology 27, pp. 834-846.

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. (online) Available at: <https://www.legislation.gov.uk/ukdsi/2019/9780111176573> (Accessed: 20 August 2022)

The Hedgerow Regulations 1997. (online) Available at: <http://www.legislation.gov.uk/uksi/1997/1160/contents/made> (Accessed: 20 August 2022).

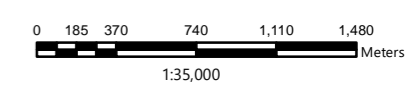
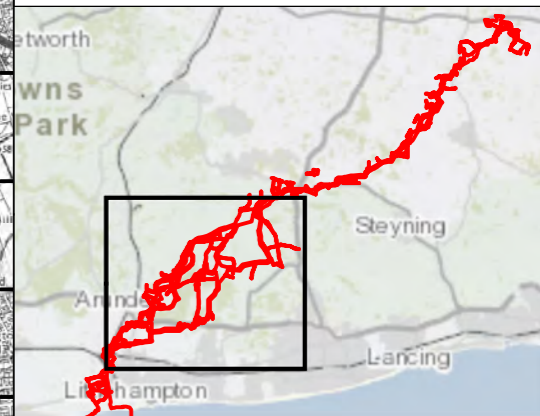
Wildlife & Countryside Act 1981. (online) Available at: <http://www.legislation.gov.uk/ukpga/1981/69> (Accessed: 20 August 2022).



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020
 © Crown copyright and database rights 2022 Ordnance Survey 0100031673

Key

- PEIR Assessment Boundary
- New areas of land affected (LACR-01a)
- New areas of land affected (LACR-01b)
- New areas of land affected (LACR-01c)
- New areas of land affected (LACR-02)
- New areas of land affected (assessed separately)
- Phase 1 - Line**
- Phase 1 Surveyed
- Phase 1 - Area**
- Phase 1 Surveyed

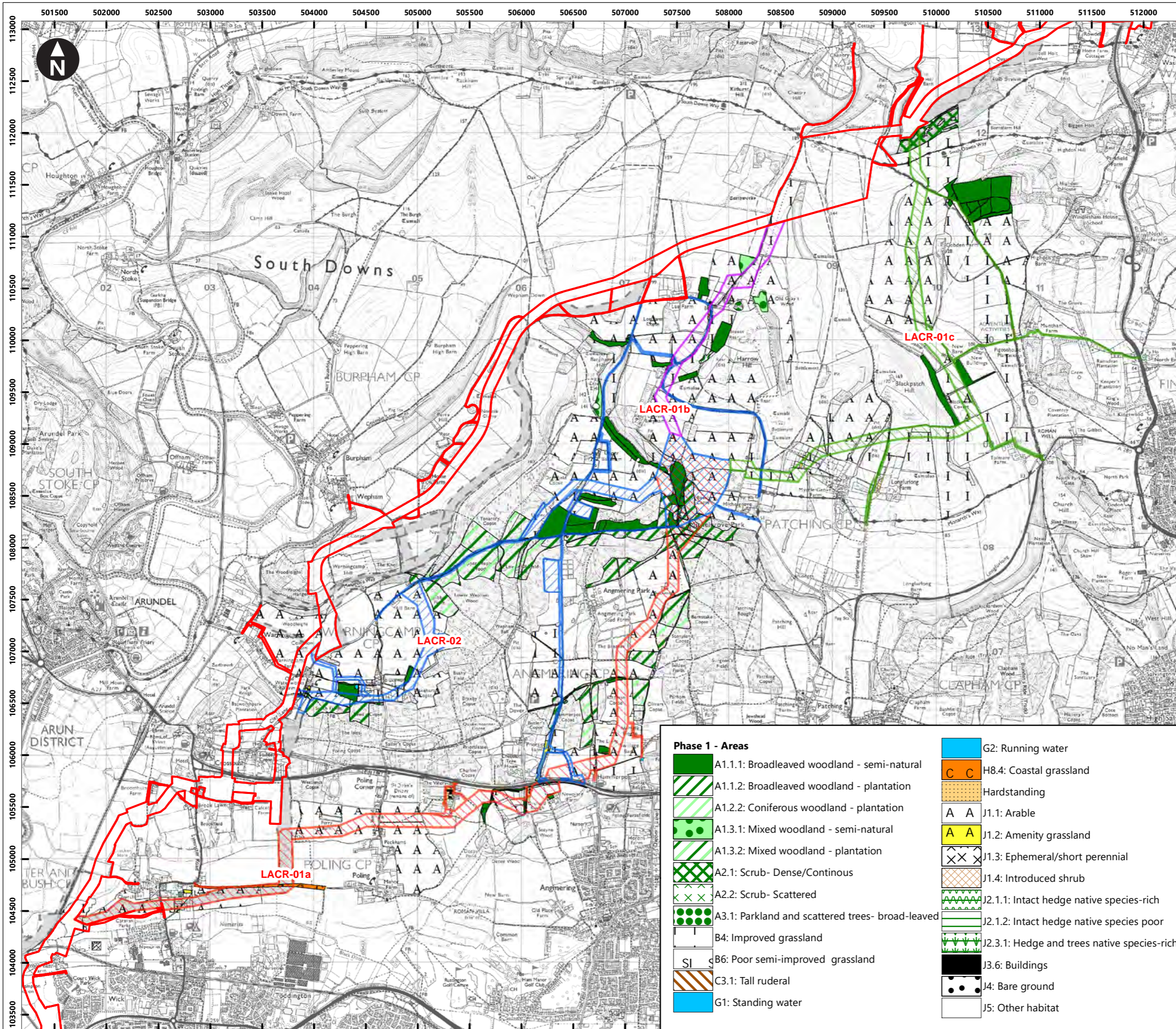


Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure I.1.1. Areas subject to Phase 1 habitat survey (LACR-01a, LACR-01b, LACR-01c, LACR-02)

System Identifier: 42285-WOOD-PE-CC-FG-O-2914				Version: 2.0
Company: WSP	Drawn By: SHEPS	Chk/Prvd: NULTA	Drawn Date: 12/10/2022	Status: FINAL



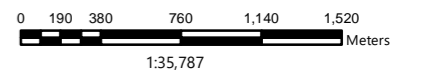
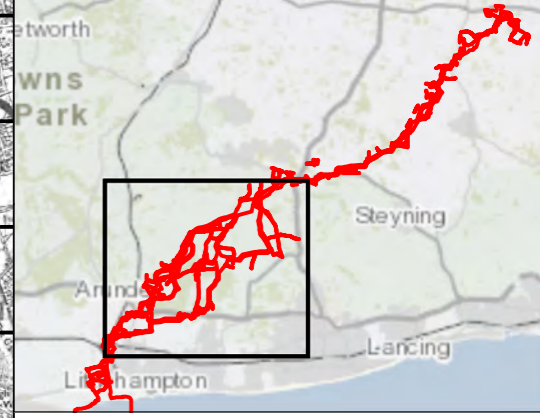
Service Layer Credits: Contains OS data © Crown Copyright and database right 2020
 © Crown copyright and database rights 2022 Ordnance Survey 0100031673

Key

- PEIR Assessment Boundary
- New areas of land affected (LACR-01a)
- New areas of land affected (LACR-01b)
- New areas of land affected (LACR-01c)
- New areas of land affected (LACR-02)
- New areas of land affected (assessed separately)

Phase 1 - Line

- A3.1: Parkland and scattered trees- broad-leaved
- A3.2: Parkland and scattered trees- coniferous
- ~~~~~ J2.1.1: Intact hedge native species-rich
- J2.1.2: Intact hedge native species poor
- ~~~~~ J2.2.1: Defunct hedge native species-rich
- - - J2.2.2: Defunct hedge native species poor
- ~~~~~ J2.3.1: Hedge and trees native species-rich
- J2.5: Wall
- - - J2.6: Dry ditch



Phase 1 - Areas

- A1.1.1: Broadleaved woodland - semi-natural
- A1.1.2: Broadleaved woodland - plantation
- A1.2.2: Coniferous woodland - plantation
- A1.3.1: Mixed woodland - semi-natural
- A1.3.2: Mixed woodland - plantation
- A2.1: Scrub- Dense/Continuous
- A2.2: Scrub- Scattered
- A3.1: Parkland and scattered trees- broad-leaved
- B4: Improved grassland
- B6: Poor semi-improved grassland
- C3.1: Tall ruderal
- G1: Standing water

- G2: Running water
- H8.4: Coastal grassland
- Hardstanding
- A A J1.1: Arable
- A A J1.2: Amenity grassland
- X X X J1.3: Ephemeral/short perennial
- J1.4: Introduced shrub
- ~~~~~ J2.1.1: Intact hedge native species-rich
- J2.1.2: Intact hedge native species poor
- ~~~~~ J2.3.1: Hedge and trees native species-rich
- J3.6: Buildings
- J4: Bare ground
- J5: Other habitat

Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure I.1.2. Phase 1 habitat map (LACR-01a, LACR-01b, LACR-01c, LACR-02)

System Identifier: 42285-WOOD-PE-CC-FG-O-5933	Version: 2.0			
Company: WSP	Drawn By: SHEPS	Chk/Prvrd: NULTA	Drawn Date: 12/10/2022	Status: FINAL