Document 3.3 – 2010 Environmental Statement

ES Volume 2 – Appendix for Chapter 9

Wheelabrator Kemsley (K3 Generating Station) and Wheelabrator Kemsley North (WKN) Waste to Energy Facility DCO

September 2019 -Submission Version

PINS ref: EN010083

environmental statement technical appendices volume 2

Sustainable Energy Plant, Kemsley Paper Mill, Sittingbourne, Kent.

'DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT TO SERVE KEMSLEY PAPER MILL, COMPRISING WASTE FUEL RECEPTION, MOVING GRATE TECHNOLOGY, POWER GENERATION AND EXPORT FACILITY, AIR COOLED CONDENSERS, TRANSFORMER, BOTTOM ASH FACILITY, OFFICE ACCOMMODATION, VEHICLE PARKING, LANDSCAPING, DRAINAGE AND ACCESS.'

MARCH 2010

E.ON Energy from Waste

ST REGIS

Volume 2 of 4

Development of a Sustainable Energy Plant.

St Regis Paper Mill, Kemsley

On behalf of St. Regis Paper Mill Co.

Environmental Statement

Appendix 9.1:

Conservation site citations

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RPS Planning & Development

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type A

1.2 Site code UK9012011

1.3 Compilation date 198208

1.4 Update 199312

1.5 Relationship with other Natura 2000 sites

1.6 Respondent(s) International Designations, JNCC, Peterborough

1.7 Site name **The Swale**

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	198208
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	latitude
00 50 21 E	51 21 39 N

2.2 Site area (ha) 6514.71

2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
UK57	Kent	100.00%

2.6 Biogeographic region

Alpine	Atlantic	Boreal	Continental	Macaronesia	Mediterranean
	X				

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

		Population				Site assessment			
		Resident	Migratory						
Code	Species name		Breed	Winter	Stage	Population	Conservation	Isolation	Global
A046a	*Branta bernicla bernicla*			1961 I		C		C	
A149	*Calidris alpina alpina*			12394 I		B		C	
A162	*Tringa totanus*			1640 I		C		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	39.0
Salt marshes. Salt pastures. Salt steppes	5.0
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	1.0
Inland water bodies (standing water, running water)	2.0
Bogs. Marshes. Water fringed vegetation. Fens	
Heath. Scrub. Maquis and garrigue. Phygrana	
Dry grassland. Steppes	
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	
Other arable land	47.0
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	6.0
Total habitat cover	**100%**

4.1 Other site characteristics

Soil & geology:

Clay, Mud, Sand, Shingle

Geomorphology & landscape:

Coastal, Estuary, Floodplain, Intertidal sediments (including sandflat/mudflat), Shingle bar, Subtidal sediments (including sandbank/mudbank)

4.2 Quality and importance

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Branta bernicla bernicla (Western Siberia/Western Europe)	0.7% of the population 5 year peak mean 1991/92-1995/96
Calidris alpina alpina (Northern Siberia/Europe/Western Africa)	2.3% of the population in Great Britain 5 year peak mean 1991/92-1995/96

Tringa totanus (Eastern Atlantic - wintering)	0.9% of the population 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS

During the breeding season the area regularly supports:

Acrocephalus scirpaceus, Anas crecca , Anas platyrhynchos , Anas strepera , Charadrius hiaticula , Emberiza schoeniclus, Fulica atra , Gallinula chloropus , Haematopus ostralegus , Numenius arquata , Pluvialis squatarola , Tadorna tadorna , Tringa totanus , Vanellus vanellus .

Over winter the area regularly supports:

65588 waterfowl (5 year peak mean 01/04/1998)

Including:

Branta bernicla bernicla , Anas strepera , Anas crecca , Haematopus ostralegus , Charadrius hiaticula , Pluvialis squatarola , Calidris alpina alpina , Numenius arquata , Tringa totanus .

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4.3 Vulnerability

There is evidence of rapid erosion of intertidal habitat within the site due to natural processes and the effects of sea defences and clay extraction. Research on mudflat recharge using dredging spoil is being investigated as a means of countering the erosion.
The intertidal area is also vulnerable to disturbance from water borne recreation. This is being addressed as part of an estuary management plan.
The terrestrial part of the site depends on appropriate grazing and management of water quality and quantity. The availability of livestock may be affected by policy on BSE and there will be a need to investigate how this may be addressed through management agreements. The effects of abstraction on the availability of water for other land uses and drainage for arable cultivation will be addressed through the consent review process under the Habitats Regulations.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK01 (NNR)	16.1
UK04 (SSSI/ASSI)	100.0

KENT LOCAL WILDLIFE SITE

KWT File No: 919658

Site:	Milton Creek	**Site Ref. No:**	SW25
LPA:	Swale	**Central Grid Ref:**	TQ 919650
Parish:	NCP	**Category:**	Grassland, open water, scrub, saltmarsh
Owner:	Private		
Area:	67.35 ha	**Natural Area:**	Greater Thames Estuary
Date first notified:	1990		
		AONB:	No
Dates amended:	November 1996, 2006 (map only)	**Public rights of way:**	Yes

DESCRIPTION

A mosaic of habitats along the western edge of Milton Creek includes saltmarsh with sea purslane *Halimione portulacoides* and common saltmarsh-grass *Puccinellia maritima* co-dominant, although other species such as sea wormwood *Artemisia maritima*, sea lavender *Limonium vulgare*, sea aster *Aster tripolium* and scurvygrass *Cochlearia anglica* are quite common. A small amount of thrift *Armeria maritima* also occurs. Golden samphire *Inula crithmoides* is present along the banks all the way to Crown Quay.

There are larger areas of rougher, unmanaged grassland, some winter wet, with a variety of coarse grasses such as common reed *Phragmites australis*, reed canary-grass *Phalaris arundinacea*, cock's-foot *Dactylis glomerata* and a number of rush species. Much of this area has suffered disturbance in the recent past, and the ground is uneven with a large variety of coarse herbs associated with disturbance. Greek dock *Rumex cristatus* is a notable alien.

The northern area comprises much less disturbed unimproved pasture with ant hills present. Here are found finer grasses such as red fescue *Festuca rubra*, meadow barley *Hordeum secalinum* and meadow grass *Poa pratensis*. Divided sedge *Carex divisa*, a nationally scarce plant characteristic of damp, low-lying estuarine grassland, is abundant in the turf, together with herbs such as bird's-foot-trefoil *Lotus corniculatus*, meadow vetchling *Lathyrus pratensis* and strawberry clover *Trifolium fragiferum*.

The freshwater dykes in this section have a good aquatic and marginal flora and appear to be unpolluted. Sedges such as spiked sedge *Carex spicata*, false fox-sedge *C. otrubae* and both greater and lesser pond sedge *C. riparia* and *C. acutiformis* occur as well as divided sedge, and common spike-rush *Eleocharis palustris* is also found. Lesser water parsnip *Betula erecta* is common. Aquatics such as the crowfoots *Ranunculus trichophyllus* and *R. baudotii* are present, and a feature is the abundance of opposite-leaved pondweed [1] *Groenlandia densa*.

Scrubby hawthorn patches with sallow and blackthorn are scattered throughout the whole site. A larger area of scrub is present at the most northerly end below Kemsley Mill. Other habitats include large reedbeds along the railway line and elsewhere.

A fishing lake at TQ 916656 has been added to the site. This has a developing marginal vegetation which includes common reed and lesser bulrush *Typha angustifolia* in addition to water speedwell

Veronica catenata, water plantain *Alisma plantago-aguatica*, common spike-rush, false fox-sedge, purple loosestrife *Lythrum salicaria* and crowfoot. A notable plant is wood small-reed [1] *Calamagrostjs epigejos,* which is recorded in only 18 tetrads in the county. The lake has a good marshy grassland margin and is surrounded by hawthorn and sallow scrub. Little grebe is present in winter and breeding coot is also found.

A reedbed and small area of grazing marsh at TQ 916654 have also been added to the site. The reedbed is dominated by common reed, although sea club-rush *Bolboschoenus maritimus* and lesser bulrush are locally frequent. Surrounding grassy areas contain much meadow vetchling, grass vetchling *Lathyrus nissolia*, tufted vetch *Vicia cracca* and stone parsley *Sison amomum*, and a good-sized population of divided sedge occurs along the eastern margin. This reedbed supports breeding reed warblers, whitethroat and moorhen.

A narrow strip including the sea wall, saltmarsh and mudflats above Kemsley Mill is included in the site. The sea wall itself has a variety of herbs and good patches of scrub. Salsify *Tragopogon porrifolius* is a feature of this section.

Milton Creek is locally important for birds. The tidal creek with its exposed mudflats and saltings attracts many of the species found elsewhere in the River Swale SSSI, of which Milton Creek is an undesignated tributary. The site supports an interesting bird fauna, with several Red Data Book (RDB) species present during the winter. Redshank [2, 5, 7] is the dominant winter wader, with over 100 birds normally present. They form a high-tide roost at the mouth of the disused dock at TQ 915646 or on the saltings on the opposite bank. Shelduck [2, 5], teal [2,5,9] and shoveler [2,5] are also normally present, although there are generally less than 20 of these species. Other RDB species which occur are black-tailed godwit [3,5,9] and curlew [2]. Snipe and kingfisher have been recorded recently, and barn owl [2,4,5] feeds over the area and nests close by. Good numbers of goldfinch [2], linnet [3,6,8] and greenfinch are found in autumn. Breeding birds include all the common migrant warblers, cuckoo, skylark [3,6,8], meadow pipit and reed bunting [3,6,8], and stonechat [2] nests nearby.

Slow worm [4], grass snake [4] and marsh frog have been recorded, and rabbit and fox are also present.

Holly blue, common blue, wall brown and small heath butterflies and day-flying moths have all been observed.

[1] County Scarce. Atlas of Kent Flora. Philp, 1982.

[2] Birds of Conservation Concern - Amber List.

[3] Birds of Conservation Concern – Red List.

[4] Protected under the Wildlife and Countryside Act 1981.

[5] National Red Data Book.

[6] Priority Species UK Biodiversity Action Plan 1998.

[7] Kent Red Data Book Status 3. A. Waite (Ed.) 2000.

[8] Kent Red Data Book Status 2. A. Waite (Ed.) 2000.

[9] Kent Red Data Book Status 1. A. Waite (Ed.) 2000.

COUNTY: KENT **SITE NAME:** THE SWALE

DISTRICT: CANTERBURY/SWALE

Status: Site of. Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 as amended. Part of the site has been designated a National Nature Reserve under Section 16 of the National Parks and Access to the Countryside Act 1949 and part is a Local Nature Reserve under Section 21 of the National Park and Access to the Countryside Act 1949.

Local Planning Authorities: Canterbury City Council, Swale Borough Council

National Grid Reference: TR 000670 **Area:** 6568.45 (ha.) 16,230.58 (ac.)

Ordnance Survey Sheet 1:50,000: 178, 179 **1:10,000:** TQ 96, TQ 97 SE & SW, TR 06, TR 07 SE, SW, TR 16 NW

Date Notified (Under 1949 Act): 1968 **Date of Last Revision:** 1981

Date Notified (Under 1981 Act): 1984 **Date of Last Revision:** 1990

Other Information:
Parts of the site are listed in '*A Nature Conservation Review*' D A Ratcliffe (ed) CUP 1979. The Royal Society for the Protection of Birds manage part of the site as a nature reserve. The site has been extended to include Coldharbour and Ridham Marshes, and an additional part of the Oaze. Most of the site is also designated under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) and as a Special Protection Area under European Community Directive 79/409 on the Conservation of Wild Birds.

Reasons for Notification:
The Swale includes the largest remaining areas of freshwater grazing marsh in Kent and is representative of the estuarine habitats found on the north Kent coast. The habitats comprise chiefly mudflats, saltmarsh, and freshwater grazing marsh, the latter being intersected by extensive dykes and fleets. The area is particularly notable for the internationally important numbers of wintering and passage wildfowl and waders, and there are also important breeding populations of a number of bird species. Associated wit the various constituent habitats of the site are outstanding assemblages of plants and invertebrates.

The mudflats of the Swale are extremely rich in invertebrates, over 350 species having been recorded. Some of these, such as the polychaete worm *Clymenella torquata* are known from nowhere else in Britain, while other more widespread species are present at high densities and provide food for the huge numbers of birds, especially waders, which use the Swale.

The saltmarshes are among the richest for plant life in Britain with for example particularly good representation of the saltmarsh-grasses *Puccinellia* and the glassworts *Salicornia*. Other abundant species include sea aster *Aster tripolium*, sea lavender *Limonium vulgare*, sea purslane *Halimione portulacoides* and common cord-grass *Spartina anglica* while less-common plants include small cord-grass *Spartina maritima** and golden samphire Inula *crithmoides**. As well as providing feeding and roosting places for many birds, the saltmarshes are of entomological interest; for example, this is the habitat of the scarce ground lackey moth *Malacostoma castrensis**.

Also on the seaward side of the sea walls are smaller areas of other habitats. The harder substrates of shingle below high water mark in places support large mussel beds, which in turn attract different birds from those of the mudflats, such as turnstone *Arenaria interpres*. There are several areas of shell, or shell sand beach, notably at Shellness on Sheppey and at Castle Coote west of Seasalter.

These have an interesting calcareous flora with plants characteristic of both sand ant shingle beaches: sea kale *Crambe maritima**, yellow horned-poppy *Glaucium flavum*, marram grass *Ammophila arenaria* and sea rocket *Cakile maritima* occur for example. Where undisturbed these beaches attract breeding ringed plover *Charidrius hiaticula* and little tern *Sterna albifrons*.

The grazing marsh complexes, including seawalls, counterwalls, fleets, dykes, temporary runnels, etc. provide suitable conditions for a wide range of plants and animals. The grassland habitats range from the damp muddy areas near the dykes, where characteristic plants include divided sedge *Carex divisa** and small goosefoot *Chenopodium botryodes** to the dry seawalls and counterwalls which support several less-common in addition to many widespread plants. These less-common plants include the specially-protected hogs fennel *Peucedanum officinale*** and least lettuce *Lactuca saligna***, slender hare's-ear *Bupleurum tenuissimum**, sea clover *Trifolium squamosum** and sea barley *Hordeum marinum**, all of which are more abundant in the Thames estuary than elsewhere in Britain. The more level grassland is dominated by a variety of grasses including foxtails *Alopecuris*, bents *Agrostis*, rye-grass *Lolium* and fescues *Festuca* with various herbs such as clovers *Trifolium*, and buttercups *Ranunculus* also present.

The flora of the dykes and fleets varies according to the salinity. Those nearest the sea tend to be most brackish, and generally have sea club-rush *Scirpus maritimus*, common reed *Phragmites australis* and fennel pondweed *Potamogeton pectinatus* as the most abundant species. In the fresher water further inland there is a greater variety of species and plants such as branched bur-reed *Sparganium erectum* and reed-mace *Typha latifolia* may become dominant. Plants associated with the dykes include beaked tasselweed *Ruppia maritima* and soft hornwort *Ceratophyllum submersum**. There is also a good invertebrate community with beetles, dragon and damsel-flies, and flies especially well represented.

Other less extensive habitats in the Swale include water-filled disused clay-pits, and small patches of scrub and woodland. These provide additional variety and interest to the site, and in some cases also support uncommon plants or animals.

The bird interest of the Swale is centred on the large numbers of waders and wildfowl which use the area in winter, and on autumn and spring migrations. Several species: wigeon *Anas penelope*, teal *Anas-crecca* and grey plover *Pluvialis squatarola* regularly overwinter in numbers of international importance+. Others, including shoveler *Anas clypeata*, knot *Caladris canutus*, dunlin *Caladris alpina* and spotted redshank *Tringa erythropus* are regularly present in winter in nationally significant numbers+.

Many of the birds use more than one habitat, some for example feed on the mudflats at low tide and then move up to roost on the saltmarsh or on fields inland of the sea wall.

The commoner breeding dry-land birds include skylark *Alauda arvensis*, meadow pipit *Anthus pratensis* and yellow wagtail *Motacilla flava*, and among the wetland birds mallard *Anas platyrhynchos*, shelduck *Tadorna tadorna*, coot *Fulica atra*, moorhen *Gallinula chloropus*, lapwing *Vanellus vanellus* and redshank *Tringa totanus*. Scarcer breeding birds include teal *Anas crecca*, gadwall *Anas strepera*, *Anas clypeata* and pochard *Athyia ferina*. Garganey *Anas quercedula*, pintail *Anas acuta*, ruff *Philomachus pugnax* and black-tailed godwit *Limosa limosa* have bred, or attempted to do so in recent years.

+ *Wildfowl and Wader Counts* 1987--88, D G Salmon et al, Wildfowl Trust 1988.

* Species regarded as 'scarce' in Britain (recorded from 16--100 of the 10 x 10km squares in Britain).

** Species recorded as 'rare' in Britain (recorded from 1--15 10 x 10km squares) and listed in *British Red Data Books: 1. vascular Plants*, 2nd Ed F H Perring & L Farrell, RSNC 1983.

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD	MM	YY

Designation date

Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 31 August 1982

3. Country:

UK (England)

4. Name of the Ramsar site:

The Swale

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

Produced by JNCC: Version 3.0, 13/06/2008

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) a **GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:
e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 21 39 N 00 50 21 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Faversham

On the north Kent of coast within the greater Thames estuary.

Administrative region: Kent

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 6514.71

Min. -1
Max. 5
Mean 2

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

A complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. Rare wetland birds breed in important numbers. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

The site supports nationally scarce plants and at least seven British Red data book invertebrates.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
77501 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Common redshank , *Tringa totanus totanus*,	1712 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dark-bellied brent goose, *Branta bernicla bernicla*,	1633 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	2098 individuals, representing an average of 3.9% of the GB population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.

Species with peak counts in spring/autumn:

Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	917 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Eurasian wigeon , *Anas penelope*, NW Europe	15296 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	763 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	483 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)
Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	1504 individuals, representing an average of 4.2% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	alluvium, clay, mud, sand, shingle
Geomorphology and landscape	coastal, floodplain, shingle bar, subtidal sediments (including sandbank/mudbank), intertidal sediments (including sandflat/mudflat), estuary
Nutrient status	eutrophic
pH	no information
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	no information
Water permanence	usually permanent, usually seasonal / intermittent
Summary of main climatic features	Annual averages (Greenwich, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/greenwich.html) Max. daily temperature: 14.8° C Min. daily temperature: 7.2° C Days of air frost: 29.1 Rainfall: 583.6 mm Hrs. of sunshine: 1461.0

General description of the Physical Features:

The Swale is an estuarine area that separates the Isle of Sheppey from the Kent mainland. To the west it adjoins the Medway Estuary. It is a complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarshes and mudflats. The intertidal flats are extensive, especially in the east of the site. Locally there are large mussel *Mytilus edulis* beds formed on harder areas of substrate. There is much diversity both in the salinity of the dykes (which range from fresh to strongly brackish) and in the topography of the fields.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Swale is an estuarine area that separates the Isle of Sheppey from the Kent mainland. To the west it adjoins the Medway Estuary. It is a complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarshes and mudflats. The intertidal flats are extensive, especially in the east of the site.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Human-made wetland, Marine/coastal wetland

Code	Name	% Area
4	Seasonally flooded agricultural land	47.7
G	Tidal flats	38
H	Salt marshes	5.8
Other	Other	5.7
N	Rivers / streams / creeks: seasonal / intermittent	1.8
E	Sand / shingle shores (including dune systems)	1

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The intertidal flats are of fine, silty sediment. The saltmarsh is species rich, for example containing all southern species of *Puccinellia* and most *Salicornia* species. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites australis* and *Bolboschoenus maritimus*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

The site holds several nationally scarce plants, including: *Chenopodium chenopodioides*, *Peucedanum officinale*, *Bupleurum tenuissimum*, *Spartina maritima*, *Inula crithmoides*, *Carex divisa*, *Trifolium squamosum*, *Hordeum marinum*.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Mediterranean gull , *Larus melanocephalus*, Europe	13 apparently occupied nests, representing an average of 12% of the GB population (Seabird 2000 Census)

Black-headed gull , *Larus ridibundus*, N & C Europe	3835 apparently occupied nests, representing an average of 2.9% of the GB population (Seabird 2000 Census)
Little tern , *Sterna albifrons albifrons*, W Europe	20 apparently occupied nests, representing an average of 1% of the GB population (Seabird 2000 Census)
Species with peak counts in spring/autumn:	
Little egret , *Egretta garzetta*, West Mediterranean	29 individuals, representing an average of 1.7% of the GB population (5 year peak mean 1998/9-2002/3)
Whimbrel , *Numenius phaeopus*, Europe/Western Africa	98 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3 - spring peak)
Eurasian curlew , *Numenius arquata arquata*, N. a. arquata Europe (breeding)	1779 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , *Tringa erythropus*, Europe/W Africa	60 individuals, representing an average of 44.1% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	49 individuals, representing an average of 8.2% of the GB population (5 year peak mean 1998/9-2002/3)
Species with peak counts in winter:	
Little grebe , *Tachybaptus ruficollis ruficollis*, Europe to E Urals, NW Africa	147 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Greater white-fronted goose , *Anser albifrons albifrons*, NW Europe	973 individuals, representing an average of 16.8% of the GB population (5 year peak mean for 1996/7-2000/01)
Common shelduck , *Tadorna tadorna*, NW Europe	2437 individuals, representing an average of 3.1% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian teal , *Anas crecca*, NW Europe	3610 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian oystercatcher , *Haematopus ostralegus ostralegus*, Europe & NW Africa -wintering	4609 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Pied avocet , *Recurvirostra avosetta*, Europe/Northwest Africa	380 individuals, representing an average of 11.1% of the GB population (5 year peak mean 1998/9-2002/3)
European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	7522 individuals, representing an average of 3% of the GB population (5 year peak mean 1998/9-2002/3)
Northern lapwing , *Vanellus vanellus*, Europe - breeding	15129 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)
Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	3004 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	9017 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , *Philomachus pugnax*, Europe/W Africa	53 individuals, representing an average of 7.5% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

Bagous cylindrus, Erioptera bivittata, Lejops vittata, Peocilobothris ducalis, Philonthus punctus, Micronecta minutissima, Malchius vulneratus, Campsicnemus majus, Elachiptera rufifrons, Myopites eximia.

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23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
Traditional cultural
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

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24. Land tenure/ownership:

Ownership category	On-site	Off-site

Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	
National/Crown Estate	+	
Private	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Tourism	+	
Recreation	+	
Current scientific research	+	
Fishing: commercial	+	
Fishing: recreational/sport	+	
Marine/saltwater aquaculture	+	
Gathering of shellfish	+	
Bait collection	+	
Arable agriculture (unspecified)		+
Livestock watering hole/pond	+	
Grazing (unspecified)	+	
Hay meadows	+	
Hunting: commercial	+	
Hunting: recreational/sport	+	
Industrial water supply		+
Industry		+
Sewage treatment/disposal		+
Harbour/port	+	+
Flood control	+	
Transport route	+	
Non-urbanised settlements	+	

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Erosion	1		+		+

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	
Environmentally Sensitive Area (ESA)	+	+

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

Habitat.

ENSIS monitoring.
Hydrological monitoring of the grazing marsh.
MNCR Littoral and Sublittoral survey.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Swale NNR and Elmley NNR (both RSPB and Elmley Conservation Trust) all provide viewing facilities.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.

Yachting, jet-skiing and water-skiing mostly in the summer, bird watching throughout the year and angling and wildfowling during their legally permitted seasons. Disturbance from these activities is a current issue but it is addressed through negotiation relating to activities consented within the SSSI and information dissemination. There is no clear evidence of damage from any of these activities.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Anon. (2002) *North Kent Coastal Habitat Management Plan: Executive summary*. English Nature, Peterborough (Living with the Sea LIFE Project) www.english-nature.org.uk/livingwiththesea/project_details/good_practice_guide/HabitatCRR/ENRestore/CHaMPs/NorthKent/NorthKentCHaMP.pdf

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
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COUNTY: KENT SITE NAME: MEDWAY ESTUARY AND MARSHES

BOROUGH: ROCHESTER UPON MEDWAY/SWALE/GILLINGHAM

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: ROCHESTER UPON MEDWAY CITY COUNCIL, Swale Borough Council, Gillingham Borough Council

National Grid Reference: TQ 850 720 Area: 6,840.14 (ha.) 16,895.14 (ac.)

Ordnance Survey Sheet 1:50,000: 178 1:10,000: TQ 76 NE, TQ 77 SE, TQ 86 NW/NE, TQ 87, TQ 96 NW, TQ 97 SW

Date Notified (Under 1949 Act): 1968 Date of Last Revision: 1981

Date Notified (Under 1981 Act): 1984 Date of Last Revision: 1992

Other Information:
Previously known as the Medway Marshes SSSI, a former part of this site, north of the A228 to the Isle of Grain, is included with other SSSIs in the new South Thames Estuary and Marshes SSSI. Parts of the site are listed in *A Nature Conservation Review*, D A Ratcliffe (ed) Cambridge University Press 1977. The site has been extended to include adjacent areas of grazing marsh and estuarine habitats. The notification only extends to land above the Mean Low Water Mark (MLWM). The site is a candidate for designation under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), and as a Special Protection Area under European Commission Directive 79/409 on the Conservation of Wild Birds.

Reasons for Notification:
The Medway Estuary and Marshes form the largest area of intertidal habitats which have been identified as of value for nature conservation in Kent and are representative of the estuarine habitats found on the North Kent coast. A complex of mudflats and saltmarsh is present with in places grazing marsh behind the sea walls which is intersected by dykes and fleets. The area holds internationally important populations of wintering and passage birds and is also of importance for its breeding birds. An outstanding assemblage of plant species also occurs on the site.

The Medway Estuary is now believed to be the most important area in North Kent for wintering wildfowl with shelduck *Tadorna tadorna*, brent goose *Branta bernicla*, grey plover *Pluvialis squatarola*, ringed plover *Charadrius hiaticula*, pintail *Anas acuta*, dunlin *Calidris alpina*, and redshank *Tringa totanus* occurring in numbers of international significance. Also present in numbers of national significance are turnstone *Arenaria interpres*, black-tailed godwit *Limosa limosa*, curlew *Numenius arquata*, great crested grebe *Podiceps cristatus*, shoveler *Anas* *clypeata*, teal *Anas crecca*, wigeon *Anas penelope* and white-fronted goose *Anser albifrons.* Passage migrants include ruff *Philomachus pugnax*, whimbrel *Numenius phaeopus* and avocet *Recurvirostra avosetta.*

The Chetney Peninsula is among the most important wildfowl breeding areas in Kent. Breeding species include avocet, shelduck, shoveler, pochard *Athyia ferina*, mute swan *Cygnus olor*, tufted duck *Athyia fuligula*, teal *Anas crecca* and gadwall *Anas strepera.*

The saltmarsh, in addition to serving as a roosting area for waders at high tide, and supporting breeding birds such as redshank *Tringa totanus*, blackheaded gull *Larus ridibundus* and common tern *Sterna hirundo*, also has an interesting flora. The most abundant plants include sea aster *Aster tripolium*, sea lavender *Limonium vulgare*, cord-grass *Spartina anglica* and saltmarsh-grass *Puccinellia maritima*, but among the many others are several scarce species such as golden samphire *Inula crithmoides**, perennial glasswort *Salicornia perennis** and one-flowered glasswort *Salicornia pusilla**. The estuary is one of the best places in Britain for the study of glassworts.

The grazing marsh is a complex habitat of pasture, seawalls and counterwalls, and numerous dykes and fleets. Each of these has its own characteristic assemblage of plants and animals. Both breeding and wintering birds are of interest; the former include lapwing *Vanellus vanellus*, redshank, pochard, mallard *Anas platyrhynchos* and gadwall, while in winter large flocks of many wildfowl and wader species are present. The vegetation is primarily a mixture of several species of grass, but with a considerable variety of other plants, some uncommon, for example sea barley *Hordeum marinum**, slender hare's-ear *Bupleurum tenuissimum**, oak-leaved goose-foot *Chenopodium glaucum*** and sea clover *Trifolium squamosum**. The dykes and their margins usually have sea club-rush *Scirpus maritimus* as the most abundant plant, but here too rarities can be found, sometimes in quite large amounts: annual beard-grass *Polypogon monspeliensis**, small goose foot *Chenopodium botryodes**, golden dock *Rumex maritimus** and brackish water-crowfoot *Ranunculus baudotii** are examples of these.

In addition to the habitats already described, the site includes smaller areas of scrub, reedbeds and sand dune which add to the variety of interest. The shell sand beaches of the Isle of Grain are of particular interest in that they are the only examples of such habitat remaining so far up the Thames estuary. They have a distinctive flora including sand couch *Elymus farctus*, sea holly *Eryngium maritimum*, sea sandwort *Honkenya peploides*, sea rocket *Cakile maritima* and prickly saltwort *Salsola kali.*

+*Wildfowl and Wader Counts 1988–89*, D G Salmon et al, Wildfowl Trust, 1989.
*Nationally scarce species: recorded from 16–100 10 × 10km squares.
**Nationally rare species: recorded from 1–15 10 × 10 km squares in Britain, and listed in *British Red Data Books: 1 Vascular Plants*, F H Perring and L Farrell, RSNC 1983.

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type A

1.2 Site code UK9012031

1.3 Compilation date 199312

1.4 Update 199902

1.5 Relationship with other Natura 2000 sites

1.6 Respondent(s) International Designations, JNCC, Peterborough

1.7 Site name **Medway Estuary and Marshes**

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	199312
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	latitude
00 40 38 E	51 24 02 N

2.2 Site area (ha) 4684.36

2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
UK57	Kent	100.00%

2.6 Biogeographic region

Alpine	Atlantic	Boreal	Continental	Macaronesia	Mediterranean
	X				

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

		Population				Site assessment			
		Resident	Migratory						
Code	Species name		Breed	Winter	Stage	Population	Conservation	Isolation	Global
A054	*Anas acuta*			697 I		B		C	
A056	*Anas clypeata*			76 I		C		C	
A052	*Anas crecca*			1824 I		C		C	
A050	*Anas penelope*			4346 I		C		C	
A169	*Arenaria interpres*			561 I		C		C	
A046a	*Branta bernicla bernicla*			3205 I		B		C	
A149	*Calidris alpina alpina*			25936 I		B		C	
A143	*Calidris canutus*			541 I		C		C	
A137	*Charadrius hiaticula*			768 I		B		C	
A037	*Cygnus columbianus bewickii*			16 I		C		B	
A130	*Haematopus ostralegus*			3672 I		C		C	
A156	*Limosa limosa islandica*			957 I		B		C	
A160	*Numenius arquata*			1900 I		C		C	
A141	*Pluvialis squatarola*			3406 I		B		C	
A005	*Podiceps cristatus*			67 I		C		C	
A132	*Recurvirostra avosetta*		28 P			B		B	
A132	*Recurvirostra avosetta*			314 I		A		B	
A195	*Sterna albifrons*		28 P			C		C	
A193	*Sterna hirundo*		77 P			C		C	
A048	*Tadorna tadorna*			4465 I		B		C	
A164	*Tringa nebularia*			10 I		B		C	
A162	*Tringa totanus*			3690 I		B		C	

4. Site description:

4.1 General site character

Habitat classes	**% cover**
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	67.0
Salt marshes. Salt pastures. Salt steppes	15.0
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	
Inland water bodies (standing water, running water)	1.0
Bogs. Marshes. Water fringed vegetation. Fens	1.0
Heath. Scrub. Maquis and garrigue. Phygrana	
Dry grassland. Steppes	1.0
Humid grassland. Mesophile grassland	15.0
Alpine and sub-alpine grassland	
Improved grassland	
Other arable land	
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	**100%**

4.1 Other site characteristics

Soil & geology:

Alluvium, Mud, Shingle

Geomorphology & landscape:

Coastal, Estuary, Floodplain, Intertidal sediments (including sandflat/mudflat)

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

During the breeding season the area regularly supports:

Recurvirostra avosetta (Western Europe/Western Mediterranean - breeding)	6.2% of the GB breeding population 5 year mean, 1988-1992
Sterna albifrons (Eastern Atlantic - breeding)	1.2% of the GB breeding population 5 year mean, 1991-1995
Sterna hirundo (Northern/Eastern Europe - breeding)	0.6% of the GB breeding population Count,as at 1994

Over winter the area regularly supports:

Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe)	0.2% of the GB population 5 year peak mean 1991/92-1995/96
Recurvirostra avosetta (Western Europe/Western Mediterranean - breeding)	24.7% of the GB population 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Anas acuta (North-western Europe)	1.2% of the population 5 year peak mean 1991/92-1995/96
Anas clypeata (North-western/Central Europe)	0.8% of the population in Great Britain 5 year peak mean 1991/92-1995/96
Anas crecca (North-western Europe)	1.3% of the population in Great Britain 5 year peak mean 1991/92-1995/96
Anas penelope (Western Siberia/North-western/North-eastern Europe)	1.6% of the population in Great Britain 5 year peak mean 1991/92-1995/96
Arenaria interpres (Western Palearctic - wintering)	0.9% of the population in Great Britain 5 year peak mean 1991/92-1995/96
Branta bernicla bernicla (Western Siberia/Western Europe)	1.1% of the population 5 year peak mean 1991/92-1995/96
Calidris alpina alpina (Northern Siberia/Europe/Western Africa)	1.9% of the population 5 year peak mean 1991/92-1995/96

Calidris canutus (North-eastern Canada/Greenland/Iceland/North-western Europe)	0.2% of the population 5 year peak mean 1991/92-1995/96
Charadrius hiaticula (Europe/Northern Africa - wintering)	1.6% of the population 5 year peak mean 1991/92-1995/96
Haematopus ostralegus (Europe & Northern/Western Africa)	1% of the population in Great Britain 5 year peak mean 1991/92-1995/96
Limosa limosa islandica (Iceland - breeding)	12.9% of the population in Great Britain 5 year peak mean 1991/92-1995/96
Numenius arquata (Europe - breeding)	1.7% of the population in Great Britain 5 year peak mean 1991/92-1995/96
Pluvialis squatarola (Eastern Atlantic - wintering)	2% of the population 5 year peak mean 1991/92-1995/96
Tadorna tadorna (North-western Europe)	1.5% of the population 5 year peak mean 1991/92-1995/96
Tringa nebularia (Europe/Western Africa)	2.6% of the population in Great Britain No count period specified.
Tringa totanus (Eastern Atlantic - wintering)	2.1% of the population 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS

During the breeding season the area regularly supports:

Alcedo atthis, Anas platyrhynchos , Asio flammeus, Aythya ferina , Circus cyaneus, Falco columbarius, Gavia stellata , Phalacrocorax carbo , Vanellus vanellus .

Over winter the area regularly supports:

65496 waterfowl (5 year peak mean 01/04/1998)

Including:

Gavia stellata , Podiceps cristatus , Phalacrocorax carbo , Cygnus columbianus bewickii , Branta bernicla bernicla , Tadorna tadorna , Anas penelope , Anas crecca , Anas platyrhynchos , Anas acuta , Anas clypeata , Aythya ferina , Haematopus ostralegus , Recurvirostra avosetta , Charadrius hiaticula , Pluvialis squatarola , Vanellus vanellus , Calidris canutus , Calidris alpina alpina , Limosa limosa islandica , Numenius arquata , Tringa totanus , Tringa nebularia , Arenaria interpres .

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4.3 Vulnerability

There is evidence of rapid erosion of intertidal habitat within the site due to natural processes and the effects of sea defences and clay extraction. Research on mudflat recharge using dredging spoil is being investigated as a means of countering the erosion.
The intertidal area is also vulnerable to disturbance from water borne recreation. This is being addressed as part of an estuary management plan.
The terrestrial part of the site depends on appropriate grazing and management of water. The availability of livestock may be affected by policy on BSE and there will be a need to investigate how this may be addressed through management agreements. The effects of abstraction on the availability of water through abstraction for other land uses and drainage for arable cultivation will be addressed through the consent review process under the Habitats Regulations. Pressures from proposed transport and industrial developments are being addressed through the planning system and under the provisions of the Habitat Regulations.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK04 (SSSI/ASSI)	100.0

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY				Site Reference Number
Designation date				

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

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2. Date this sheet was completed/updated:

Designated: 15 December 1993

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3. Country:

UK (England)

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4. Name of the Ramsar site:

Medway Estuary and Marshes

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5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

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6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:
e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 24 02 N 00 40 38 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Canterbury

On the north coast of Kent, within the Greater Thames estuary.

Administrative region: Kent

10. Elevation (average and/or max. & min.) (metres)**:** **11. Area** (hectares)**:** 4696.74

Min.	-1
Max.	3
Mean	1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

A complex of rain-fed, brackish, floodplain grazing marsh with ditches, and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. Rare wetland birds breed in important numbers. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

The site supports a number of species of rare plants and animals. The site holds several nationally scarce plants, including sea barley *Hordeum marinum*, curved hard-grass *Parapholis incurva*, annual beard-grass *Polypogon monspeliensis*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, slender hare`s-ear *Bupleurum tenuissimum*, sea clover *Trifolium squamosum*, saltmarsh goose-foot *Chenopodium chenopodioides*, golden samphire *Inula crithmoides*, perennial glasswort *Sarcocornia perennis* and one-flowered glasswort *Salicornia pusilla*. A total of at least twelve British Red Data

Book species of wetland invertebrates have been recorded on the site. These include a ground beetle *Polistichus connexus*, a fly *Cephalops perspicuus*, a dancefly *Poecilobothrus ducalis*, a fly *Anagnota collini*, a weevil *Baris scolopacea*, a water beetle *Berosus spinosus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, the ground lackey moth *Malacosoma castrensis*, a horsefly *Atylotus latistriatuus*, a fly *Campsicnemus magius*, a solider beetle, *Cantharis fusca*, and a cranefly *Limonia danica*. A significant number of non-wetland British Red Data Book species also occur.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
47637 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	3103 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)
Common redshank , *Tringa totanus totanus*,	3709 individuals, representing an average of 1.4% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dark-bellied brent goose, *Branta bernicla bernicla*,	2575 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)
Common shelduck , *Tadorna tadorna*, NW Europe	2627 individuals, representing an average of 3.3% of the GB population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	1118 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/9-2002/3)
Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	540 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	3021 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	8263 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.

Species with peak counts in spring/autumn:

Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	721 individuals, representing an average of 2% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:
Atlantic

b) biogeographic regionalisation scheme (include reference citation):
Council Directive 92/43/EEC

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16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	alluvium, mud, shingle
Geomorphology and landscape	coastal, floodplain, intertidal sediments (including sandflat/mudflat), estuary
Nutrient status	eutrophic
pH	circumneutral
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	no information
Water permanence	usually permanent, usually seasonal / intermittent
Summary of main climatic features	Annual averages (Greenwich, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/greenwich.html) Max. daily temperature: 14.8° C Min. daily temperature: 7.2° C Days of air frost: 29.1 Rainfall: 583.6 mm Hrs. of sunshine: 1461.0

General description of the Physical Features:

The Medway Estuary feeds into and lies on the south side of the outer Thames estuary. It forms a single tidal system with the Swale and joins the Thames estuary between the Isle of Grain and Sheerness. It has a complex arrangement of tidal channels, which drain around large islands of saltmarsh and peninsulas of grazing marsh. The mudflats are rich in invertebrates and also support beds of *Enteromorpha* and some eelgrass *Zostera* spp. Small shell beaches occur, particularly in the outer part of the estuary. Grazing marshes are present inside the sea-walls around the estuary. The complex and diverse mixes of coastal habitats support important numbers of waterbirds throughout the year.

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17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Medway Estuary feeds into and lies on the south side of the outer Thames estuary. It forms a single tidal system with the Swale and joins the Thames estuary between the Isle of Grain and

Sheerness. It has a complex arrangement of tidal channels, which drain around large islands of saltmarsh and peninsulas of grazing marsh.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping, Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	58.3
H	Salt marshes	16.8
4	Seasonally flooded agricultural land	13.8
Other	Other	9.3
M	Rivers / streams / creeks: permanent	1.2
Tp	Freshwater marshes / pools: permanent	0.4
J	Coastal brackish / saline lagoons	0.2
E	Sand / shingle shores (including dune systems)	0.02

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The intertidal flats are of fine, silty sediment. The saltmarsh shows a transition from pioneer communities containing *Zostera* to high saltmarsh dominated by *Atriplex portulacoides*. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites australis* and *Bolboschoenus maritimus*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

The site holds several nationally scarce plants, including: *Hordeum marinum, Parapholis incurva, Polypogon monspeliensis, Puccinellia fasciculata, Bupleurum tenuissimum, Trifolium squamosum, Chenopodium chenopodioides, Inula crithmoides, Sarcocornia perennis, Salicornia pusilla*

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Mediterranean gull , *Larus melanocephalus*, Europe	10 apparently occupied nests, representing an average of 9.2% of the GB population (Seabird 2000 Census)
Black-headed gull , *Larus ridibundus*, N & C Europe	7050 apparently occupied nests, representing an average of 5.5% of the GB population (Seabird 2000 Census)
Sandwich tern , *Sterna (Thalasseus) sandvicensis sandvicensis*, W Europe	333 apparently occupied nests, representing an average of 3.1% of the GB population (Seabird 2000 Census)
Common tern , *Sterna hirundo hirundo*, N & E Europe	228 apparently occupied nests, representing an average of 2.2% of the GB population (Seabird 2000 Census)
Little tern , *Sterna albifrons albifrons*, W Europe	28 pairs, representing an average of 1.4% of the GB population (5 year mean 1991-1995)

Species with peak counts in spring/autumn:

Great cormorant , *Phalacrocorax carbo carbo*, NW Europe	271 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)
Little egret , *Egretta garzetta*, West Mediterranean	125 individuals, representing an average of 7.5% of the GB population (5 year peak mean 1998/9-2002/3)
Pied avocet , *Recurvirostra avosetta*, Europe/Northwest Africa	645 individuals, representing an average of 18.9% of the GB population (5 year peak mean 1998/9-2002/3)
Whimbrel , *Numenius phaeopus*, Europe/Western Africa	49 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian curlew , *Numenius arquata arquata*, N. a. arquata Europe (breeding)	3575 individuals, representing an average of 2.4% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	68 individuals, representing an average of 11.3% of the GB population (5 year peak mean 1998/9-2002/3)
Ruddy turnstone , *Arenaria interpres interpres*, NE Canada, Greenland/W Europe & NW Africa	600 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Northern shoveler , *Anas clypeata*, NW & C Europe	214 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian oystercatcher , *Haematopus ostralegus ostralegus*, Europe & NW Africa -wintering	3632 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	4500 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

A total of more than twelve British Red Data Book species of wetland invertebrates have been recorded on the site, including:

Polystichus connexus, Cephalops perspicuus, Peocilobothrus ducalis, Anagnota collini, Baris scolopacea, Berosus spinosus, Malachius vulneratus, Philonthus punctus, Malacostoma castrensis, Atylotus latistriatus, Campsicnemus magius, Cantharis fusca, Limonia danica, Lestes dryas, Hydrochus ignicollis, Hydrophilus piceus, Dicranomyia danica and *Lejops vittata*.

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23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

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24. Land tenure/ownership:

Ownership category	On-site	Off-site

Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
National/Crown Estate	+	
Private	+	+
Public/communal	+	+
Other	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Collection of non-timber natural products: (unspecified)	+	
Fishing: commercial	+	+
Fishing: recreational/sport	+	+
Gathering of shellfish	+	
Bait collection	+	
Permanent arable agriculture		+
Permanent arable agriculture	+	+
Livestock watering hole/pond	+	+
Grazing (unspecified)	+	+
Hunting: recreational/sport	+	+
Industrial water supply	+	
Industry		+
Sewage treatment/disposal	+	+
Harbour/port	+	+
Flood control	+	
Transport route	+	+
Urban development		+
Non-urbanised settlements		+
Military activities		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Water diversion for irrigation/domestic/industrial use	1		+	+	+
Dredging	1	Continued maintenance dredging for port facilities and jetties may be contributing to adverse effects, e.g. through removal of sediment from the estuary. Maintenance dredging is subject to regulation and will be assessed under a protocol currently being trialled by Defra.	+	+	+
Erosion	2		+		+
Eutrophication	2	The Medway shows symptoms of eutrophication, particularly growth of green algae which covers large areas of the intertidal mudflats in late summer. Studies by the Environment Agency also indicate that the waters in the Medway are hyper-nutrified for nitrogen and phosphorus.	+	+	+
Recreational/tourism disturbance (unspecified)	1		+		+
Transport infrastructure development	1	Construction of new road bridge on to Isle of Sheppey, resulting in loss of some designated habitat and disturbance during construction. Scheme was assessed under Habitats Regulations and compensatory habitat provided (outside current designated site).	+	+	+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Erosion - The North Kent Coastal Habitat Management Plan (CHaMP) has been produced (Anon. 2002). The Environment Agency is to produce a Shoreline Management Plan/Flood Defence Strategy for the in the Medway and Swale and decisions on future flood risk management will need to take into account the effects on features within the designated sites.
Large-scale trials of mudflat recharge to address erosion.

Eutrophication - Water quality and sources of nutrient inputs are subject to further investigation by the

Environment Agency as part of the Agency's review of consents under the Habitats Regulations. Stage 3 of the Review of Consents (appropriate assessment) is scheduled for completion by March 2006, at which point any consented discharges having an adverse effect on site integrity will be identified.
Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	
Environmentally Sensitive Area (ESA)	+	

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Intertidal invertebrates and biotopes are being surveyed as part of a project on behalf of English Nature and the Medway Swale Estuary Partnership. Additional surveys are being carried out by the Environment Agency and the water industry to investigate the effects of (off-site) water abstraction on the invertebrate communities and birds associated with (on-site) fresh water flows.

Habitat.

ENSIS monitoring.
Experimental mudflat recharge using dredging spoil.
MNCR littoral and sublittoral survey.
Kent Wildlife Habitat Survey, and North Kent Marshes Saltmarsh Survey (Kent County Council);
Botanical survey of sea walls in north Kent, and study of factors affecting the occurrence of nationally scarce plant species on sea walls in north Kent SSSIs (English Nature)

Other

A carrying capacity study (for recreational uses) is currently being funded by the Medway Swale Estuary Partnership.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Gillingham Riverside Country Park.
E.ON Oakham Marsh Nature Reserve
The Medway Wildlife Ranger Service provides information to recreational boat users during peak season.
The Medway Swale Estuary Partnership publications and website (www.medway-swale.org.uk) provide information on the environmental features and uses of the estuary.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.
Yachting, angling, wildfowling, jet skiing, waterskiing, birdwatching. Bird watching occurs throughout the year and wildfowling is restricted to the period September to February. The remaining activities occur year-round but are more prevalent in the summer months. Disturbance from these activities is a current issue but is being addressed through further research, negotiation and information dissemination. In this context, a River Leisure Usage Survey has been carried out by the Medway Swale Estuary Partnership, and the Partnership is funding a carrying capacity study for recreational uses. The Kent Coastal Network is also organising a stakeholders working group to consider the impacts and management of jet-skis within this and other coastal sites in Kent.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Anon. (2002) *North Kent Coastal Habitat Management Plan: Executive summary*. English Nature, Peterborough (Living with the Sea LIFE Project) www.english-nature.org.uk/livingwiththesea/project_details/good_practice_guide/HabitatCRR/ENRestore/CHaMPs/NorthKent/NorthKentCHaMP.pdf

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
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NATURA 2000
STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type A

1.2 Site code UK9012021

1.3 Compilation date 200003

1.4 Update

1.5 Relationship with other Natura 2000 sites

1.6 Respondent(s) International Designations, JNCC, Peterborough

1.7 Site name **Thames Estuary and Marshes**

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	200003
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	latitude
00 35 47 E	51 29 08 N

2.2 Site area (ha) 4838.94

2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
UK54	Essex	10.00%
UK57	Kent	90.00%

2.6 Biogeographic region

Alpine	Atlantic	Boreal	Continental	Macaronesia	Mediterranean
	X				

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

Code	Species name	Population: Resident	Migratory: Breed	Migratory: Winter	Migratory: Stage	Site assessment: Population	Conservation	Isolation	Global
A149	*Calidris alpina alpina*			29646 I		B		C	
A143	*Calidris canutus*			4848 I		C		C	
A137	*Charadrius hiaticula*				1324 I	B		C	
A082	*Circus cyaneus*			7 I		C		C	
A156	*Limosa limosa islandica*			1699 I		B		C	
A141	*Pluvialis squatarola*			2593 I		C		C	
A132	*Recurvirostra avosetta*			283 I		A		C	
A162	*Tringa totanus*			3251 I		B		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	57.3
Salt marshes. Salt pastures. Salt steppes	1.5
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	0.9
Inland water bodies (standing water, running water)	5.6
Bogs. Marshes. Water fringed vegetation. Fens	3.7
Heath. Scrub. Maquis and garrigue. Phygrana	
Dry grassland. Steppes	1.9
Humid grassland. Mesophile grassland	29.1
Alpine and sub-alpine grassland	
Improved grassland	
Other arable land	
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	**100%**

4.1 Other site characteristics

Soil & geology:

Alluvium, Mud, Shingle

Geomorphology & landscape:

Coastal, Estuary, Floodplain, Intertidal sediments (including sandflat/mudflat)

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Circus cyaneus	1% of the population in Great Britain Five year peak mean for 1993/94 to 1997/98

Recurvirostra avosetta (Western Europe/Western Mediterranean - breeding)	28.3% of the population in Great Britain Five year peak mean for 1993/93 to 1997/98

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Calidris alpina alpina (Northern Siberia/Europe/Western Africa)	2.1% of the population Five year peak mean for 1993/94 to 1997/98
Calidris canutus (North-eastern Canada/Greenland/Iceland/North-western Europe)	1.4% of the population Five year peak mean for 1993/94 to 1997/98
Limosa limosa islandica (Iceland - breeding)	2.4% of the population Five year peak mean for 1993/94 to 1997/98
Pluvialis squatarola (Eastern Atlantic - wintering)	1.7% of the population Five year peak mean for 1993/94 to 1997/98
Tringa totanus (Eastern Atlantic - wintering)	2.2% of the population Five year peak mean for 1993/94 to 1997/98

On passage the area regularly supports:

Charadrius hiaticula (Europe/Northern Africa - wintering)	2.6% of the population Five year peak mean for 1993/94 to 1997/98

ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS

Over winter the area regularly supports:

75019 waterfowl (5 year peak mean 21/03/2000)

Including:

Recurvirostra avosetta , *Pluvialis squatarola* , *Calidris canutus* , *Calidris alpina alpina* , *Limosa limosa islandica* , *Tringa totanus* .

4.3 Vulnerability

There is evidence of coastal squeeze and erosion of intertidal habitat within the site. English Nature is in discussion with the port authority on the role of port dredging in intertidal habitat loss. The intertidal area is also vulnerable to disturbance from water borne recreation. This is being addressed by information dissemination as part of an estuary management plan.

The terrestrial part of the site depends on appropriate grazing and management of water. The availability of livestock may be affected by changes in agricultural markets. Evidence suggests that the water supply to grazing marsh has decreased. A water level management plan may address this.

There has been great development pressure in recent years. Current implications of development include both direct landtake from the site and indirect disturbance and hydrological effects. These effects will be addressed through the Habitats Regulations 1994.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK04 (SSSI/ASSI)	100.0

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD	MM	YY						

Designation date — Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

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2. Date this sheet was completed/updated:

Designated: 31 March 2000

3. Country:

UK (England)

4. Name of the Ramsar site:

Thames Estuary and Marshes

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5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

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6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* ☐;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* ☐;

b) Describe briefly the type of boundary delineation applied:
e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 29 08 N 00 35 47 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Gravesend

Contains part of the north coast of Kent and part of the southern coast of Essex, straddling the Thames estuary.

Administrative region: Essex; Kent; Medway; Thurrock

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 5588.59

Min.	-2
Max.	20
Mean	1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

A complex of brackish, floodplain grazing marsh ditches, saline lagoons and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

The site supports one endangered plant species and at least 14 nationally scarce plants of wetland habitats. The site also supports more than 20 British Red Data Book invertebrates.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
45118 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	595 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	1640 individuals, representing an average of 4.6% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	1643 individuals, representing an average of 3.1% of the GB population (5 year peak mean 1998/9-2002/3)
Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	7279 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3)
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	15171 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)
Common redshank , *Tringa totanus totanus*,	1178 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation)**:**

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:
Atlantic

b) biogeographic regionalisation scheme (include reference citation):
Council Directive 92/43/EEC

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16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	alluvium, mud, shingle
Geomorphology and landscape	coastal, floodplain, intertidal sediments (including sandflat/mudflat), estuary
Nutrient status	eutrophic
pH	no information
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	no information
Water permanence	usually permanent, usually seasonal / intermittent
Summary of main climatic features	Annual averages (Greenwich, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/greenwich.html) Max. daily temperature: 14.8° C Min. daily temperature: 7.2° C Days of air frost: 29.1 Rainfall: 583.6 mm Hrs. of sunshine: 1461.0

General description of the Physical Features:

The marshes extend for about 15 km along the south side of the Thames estuary and also include intertidal areas on the north side of the estuary. To the south of the river, much of the area is brackish grazing marsh, although some of this has been converted to arable use. At Cliffe, there are flooded clay and chalk pits, some of which have been infilled with dredgings. Outside the sea-wall, there is a small extent of saltmarsh and broad intertidal mudflats.

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17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The marshes extend for about 15 km along the south side of the Thames estuary and also include intertidal areas on the north side of the estuary. To the south of the river, much of the area is brackish grazing marsh, although some of this has been converted to arable use. At Cliffe, there are flooded clay and chalk pits, some of which have been infilled with dredgings. Outside the sea-wall, there is a small extent of saltmarsh and broad intertidal mudflats.

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18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping, Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

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19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	49.6
4	Seasonally flooded agricultural land	38.6
Q	Saline / brackish lakes: permanent	4.2
Ss	Saline / brackish marshes: seasonal / intermittent	3.2
Other	Other	1.6
H	Salt marshes	1.3
E	Sand / shingle shores (including dune systems)	0.8
O	Freshwater lakes: permanent	0.7

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The intertidal flats are mostly fine, silty sediment, though in parts they are sandy. The saltmarsh shows a transition from pioneer communities containing *Zostera* to saltmarsh dominated by, for example, *Atriplex portulacoides*. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites communis* and *Bolboschoenus maritimus*. The saline lagoons have a diverse molluscan and crustacean fauna. Dominant plants in the lagoons include *Ulva* and *Chaetomorpha*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site:
Higher plants:
The site supports a population of the endangered least lettuce *Lactuca saligna*, and also supports several nationally scarce plants, including bulbous foxtail *Alopecurus bulbosus*, slender hare's-ear *Bupleurum tenuissimum*, divided sedge *Carex divisa*, saltmarsh goosefoot *Chenopodium chenopodioides*, sea barley *Hordeum marinum*, golden samphire *Inula crithmoides*, annual beard grass *Polypogon monspeliensis*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, stiff saltmarsh-grass *P. rupestris*, one-flowered glasswort *Salicornia pusilla*, clustered clover *Trifolium glomeratum*, sea clover *T. squamosum*, narrow-leaved eelgrass *Zostera angustifolia* and dwarf eelgrass *Z. noltei*.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds
Species currently occurring at levels of national importance:
Species with peak counts in spring/autumn:

Little grebe , *Tachybaptus ruficollis ruficollis*, Europe to E Urals, NW Africa	251 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Little egret , *Egretta garzetta*, West Mediterranean	54 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , *Philomachus pugnax*, Europe/W Africa	23 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	38 individuals, representing an average of 6.3% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Common shelduck , *Tadorna tadorna*, NW Europe	1238 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)
Gadwall , *Anas strepera strepera*, NW Europe	359 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	288 individuals, representing an average of 1.9% of the GB population (5 year peak mean 1998/9-2002/3)
Water rail , *Rallus aquaticus*, Europe	6 individuals, representing an average of 1.3% of the GB population (5 year peak mean 1998/9-2002/3)
Pied avocet , *Recurvirostra avosetta*, Europe/Northwest Africa	607 individuals, representing an average of 17.8% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , *Tringa erythropus*, Europe/W Africa	6 individuals, representing an average of 4.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site:

Invertebrates:

The endangered species *Bagous longitarsis* occurs on the site.

The following vulnerable species occur on the site: a groundbug *Henestaris halophilus*, a weevil *Bagous cylindrus*, a ground beetle *Polystichus connexus*, a cranefly *Erioptera bivittata*, a cranefly *Limnophila pictipennis*, a horse fly *Hybomitra expollicata*, a hoverfly *Lejops vittata*, a dancefly *Poecilobothrus ducalis*, a snail-killing fly *Pteromicra leucopeza*, a solitary wasp *Philanthus triangulum* and a damselfly *Lestes dryas*.

The following rare species occur on the site: a ground beetle *Anisodactylus poeciloides*, the water beetles *Aulacochthebius exaratus, Berosus fulvus, Cercyon bifenestratus, Hydrochus elongatus, H. ignicollis, Ochthebius exaratus* and *Hydrophilus piceus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, a fungus beetle *Telmatophilus brevicollis*, a fly *Campsicnemus magius*, a horsefly *Haematopota bigoti*, a soldier fly *Stratiomys longicornis* and a spider *Baryphyma duffeyi*.

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23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
Private	+	+
Public/communal	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Fishing: commercial	+	
Fishing: recreational/sport	+	
Gathering of shellfish	+	
Bait collection	+	
Arable agriculture (unspecified)		+
Permanent arable agriculture		+
Livestock watering hole/pond	+	+
Grazing (unspecified)	+	+
Permanent pastoral agriculture	+	+
Hunting: recreational/sport	+	
Industrial water supply		+
Industry		+
Sewage treatment/disposal	+	+
Harbour/port	+	+
Flood control	+	
Transport route	+	+
Urban development		+
Military activities	+	

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Dredging	1		+	+	+
Erosion	2		+		+
Eutrophication	2	Studies by the Environment Agency indicate that the waters in the Thames estuary are hyper-nutrified for nitrogen and phosphorus.	+	+	+
General disturbance from human activities	1		+		+

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors? Erosion - The North Kent Coastal Habitat Management Plan (CHaMP) has been produced. The Environment Agency is producing a Flood Defence Strategy for the Thames (Thames 2100) and decisions on future flood risk management will need to take into account the effects on features within the designated sites. Studies of sediment transport and hydrodynamics within Thames estuary. Investigation of beneficial use of dredgings for mudflat recharge and creation of compensatory habitat. Eutrophication - Water quality and sources of nutrient inputs are subject to further investigation by the Environment Agency as part of the Agency's review of consents under the Habitats Regulations. Stage 3 of the Review of Consents (appropriate assessment) is scheduled for completion by March 2006, at which point any consented discharges having an adverse effect on site integrity will be identified.
Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
Special Protection Area (SPA)	+	

Land owned by a non-governmental organisation for nature conservation	+	+
Management agreement	+	
Site management statement/plan implemented	+	
Environmentally Sensitive Area (ESA)	+	+

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl and Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Numbers of breeding waders have been monitored through the BTO/RSPB/English Nature/Defra survey Breeding Waders of Wet Meadows (2002).
Botanical surveys of vegetation of sea wall embankments and grazing marsh ditches have been carried out.
The distribution and extent of saltmarsh habitat has been mapped - North Kent Marshes Saltmarsh Survey (2002) (Blair-Myres 2003)
The RSPB monitors various species groups on its reserves within the site

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The RSPB manages a network of reserves within and adjacent to the site, which are promoted locally through existing community initiatives, and more widely through publications and via the internet. The site forms part of proposals for a north Kent ‘Regional Park’, being promoted to balance development in Kent Thameside (part of the Thames Gateway growth area). The Management Guidance for the Thames Estuary aims to increase awareness of conservation and is promoted by the Thames Estuary Partnership. The Thames Estuary Partnership has also produced the Tidal Thames Habitat Action Plan to raise awareness of and address biodiversity issues.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Yachting, angling, wildfowling, jet-skiing, water-skiing and birdwatching. Bird watching occurs throughout the year and wildfowling is restricted to the period September to February. The remaining activities occur year-round but are more prevalent in the summer months. Disturbance from these activities is a current issue but is being addressed through further research, negotiation and information dissemination.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**

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COUNTY: KENT SITE NAME: SOUTH THAMES ESTUARY AND MARSHES

BOROUGHS: GRAVESHAM, ROCHESTER UPON MEDWAY

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 as amended

Local Planning Authorities: GRAVESHAM BOROUGH COUNCIL, Rochester upon Medway Borough Council

National Grid Reference: TQ 770785 Area. 5449.14 (ha.) 13459.38 (ac.)

Ordnance Survey Sheet 1:50,000: 178 1:10,000: TQ 67 SE, NE
TQ 77 SW, NW, NE
TQ 87 NW, NE

Dates Notified (Under 1949 Act): 1951, 1968 Date of Last Revision: 1981

Date Notified (Under 1981 Act): 1984 Date of Last Revision: 1991

Other Information:
Parts of the site are listed in '*A Nature Conservation Review*', D A Ratcliffe (ed) CUP 1979. The site is also a candidate for designation under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) and as a Special Protection Area under European Community Directive 79/409 on the Conservation of Wild Birds. The site includes the former sites of Higham Marshes SSSI, Cliffe and Cooling Marshes SSSI and part of Medway Marshes SSSI. There are also four extensions to the existing SSSIs.

Reasons for Notification:
The South Thames Estuary and Marshes SSSI from Gravesend to the eastern end of the Isle of Grain forms a major component of the Greater Thames Estuary. The site consists of an extensive mosaic of grazing marsh, saltmarsh, mudflats and shingle characteristic of the estuarine habitats of the north Kent marshes. Freshwater pools and some areas of woodland provide additional variety and complement the estuarine habitats. The site supports outstanding numbers of waterfowl with total counts regularly exceeding 20,000. Many species regularly occur in nationally important[1] numbers and some species regularly use the site in internationally important[2] numbers. The breeding bird community is also of particular interest. The diverse habitats within the site support a number of nationally rare[3] and scarce[4] invertebrate species and an assemblage of nationally scarce plants.

Birds
The mudflats attract large numbers of feeding waders and wildfowl with the site being regularly used by redshank *Tringa totanus* in internationally important numbers. There is evidence from recent winter low-water counts that knot *Calidris canuta* and dunlin *Calidris alpina* exceed internationally important

numbers when feeding on the mudflats. These counts also indicate that avocet *Recurvirostra avosetta* and ringed plover *Charadrius hiaticula* regularly exceed nationally important numbers.

During the high tide period, waterfowl disperse to roosts in marshes in north Kent and Essex. Nevertheless, high tide counts for this site clearly reveal species regularly reaching nationally important numbers in winter including European white-fronted goose *Anser albifrons* spp *albifrons*, shelduck *Tadorna tadorna*, gadwall *Anas strepera*, teal *Anas crecca*, pintail *Anas acuta*, shoveler *Anas clypeata*, grey plover *Pluvialis squatarola*, curlew *Numenius arquata* and black-tailed godwit *Limosa limosa*. In addition, nationally important numbers of grey plover, curlew, black-tailed godwit, redshank and greenshank *Tringa nebularia* occur during autumn passage with redshank maintaining their nationally important numbers on spring passage.

During the breeding season the south Thames marshes support an outstanding assemblage of breeding birds including rare[5] species such as garganey *Anas querquedula*, pintail, avocet and bearded tit *Panurus biarmicus*.

Specially protected birds[6] found within the site include hen harrier *Circus cyaneus*, short-eared owl *Asio flammeus*, ruff *Philomachus pugnax*, common tern *Sterna hirundo*, avocet and golden plover *Pluvialis apricaria*.

Vegetation

The saltmarshes support characteristic vegetation dominated by the saltmarsh grasses *Puccinellia*, the glassworts *Salicornia*, sea aster *Aster tripolium*, sea lavender *Limonium vulgare* and sea purslane *Halimione portulacoides*, with nationally scarce plants such as golden samphire *Inula crithmoides*[4] and *Puccinellia fasciculata*[4].

The grazing marsh complexes, including seawalls, counterwalls, fleets, dykes, runnels and seasonally wet depressions provide suitable conditions for a wide range of plants and animals. The grassland habitats range from the damp muddy areas near the dykes, where characteristic plants include divided sedge *Carex divisa*[4], small goosefoot *Chenopodium botryodes*[4] and golden dock *Rumex maritimus*[4], to the dry seawalls and counterwalls which support scarce species in addition to many widespread plants. These scarce plants include slender hare's ear *Bupleurum tenuissimum*[4], sea clover *Trifolium squamosum*[4] and sea barley *Hordeum marinum*[4], all of which are more abundant in the Thames estuary than elsewhere in Britain. Some seasonally damp depressions in the grassland contain the bulbous foxtail grass *Alopecurus bulbosus*[4] whilst the more level turf is dominated by a variety of grasses including other foxtails *Alopecurus*, bents *Agrostis*, rye-grass *Lolium perenne* and fescues *Festuca*, with various herbs such as clovers *Trifolium* and buttercups *Ranunculus* also present. The rare and specially protected least lettuce *Lactuca saligna*[7] which was previously recorded on seawalls in this site may still survive.

The dykes and fleets which are an integral part of the grazing marsh have a range of salinities and consequently support an interesting range of plants. Those nearest the sea tend to be the most brackish, and generally have sea club-rush *Scirpus maritimus*, common reed *Phragmites australis* and fennel pondweed *Potamogeton pectinatus* as the most abundant species; some also include nationally scarce species such as brackish water-crowfoot *Ranunculus baudotii*[4]. In the freshwater dykes further inland there is a greater variety of species, plants such as branched bur-reed *Sparganium erectum* and reed-maces *Typha* spp. may become dominant. Nationally scarce plants associated with the dykes include soft hornwort *Ceratophyllum submersum*[4] with water soldier *Stratiotes aloides*[4] present in dykes near Higham.

The mudflats have beds of eelgrass including *Zostera angustifolia*[4] and *Z. noltii*[4] and the Allhallows region of the site has areas of vegetated shingle with the nationally scarce sea kale *Crambe maritima*[4] present.

Invertebrates

This site supports a diverse invertebrate fauna and includes nationally rare[3] beetles, flies and true bugs. The 'scarce emerald damselfly' *Lestes dryas*, listed in the British Red Data Book*, in the Cliffe area of the site. In addition, 100 nationally scarce species of invertebrate have been recorded including *Lejops vittata* (a hoverfly), *Saldula opacula* (a shorebug) and the dotted fan-foot moth *Macrochilo cribrumalis*, all of which are restricted to wetland, estuarine or grazing marsh habitats. The water beetle fauna is of particular interest and includes four species of *Bagous* (aquatic weevils), three species of *Berosus* and the great silver water beetle *Hydrophilus piceus*.

Notes

1 Nationally important numbers corresponds to more than 1% of the British population.

2 Internationally important numbers corresponds to more than 1% of the northwest European population.

3 Species regarded as nationally rare are recorded from 1–15 of the 10 × 10km squares in Britain.

4 Species regarded as nationally scarce are recorded from 16–100 of the 10 × 10km squares in Britain.

5 Listed in 'Red Data Birds in Britain', NCC/RSPB 1990.

6 Species listed on Annex 1 of the EEC Birds Directive (79/409/EEC).

7 Plants listed on Schedule 8 of the Wildlife and Countryside Act 1981.

Development of a Sustainable Energy Plant.

St Regis Paper Mill, Kemsley

On behalf of St. Regis Paper Mill Co.

Environmental Statement

Appendix 9.2:

Assessment of Air Quality Impacts on Nature Conservation Sites

Prepared by: Nicholas Betson Checked by: Rob Pilcher

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Notice to Interested Parties

To achieve the study objectives stated in this report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of e.g. species abundances or habitat management efficacy described in the report.

Document Information

Report title:	Assessment of Air Quality Impacts on Nature Conservation Sites
Client:	St Regis
Document ref:	JPP1804 Kemsley
Author(s):	Nicholas Betson
Report date:	November 2009

Checked by:	Guido Pellizzaro	02/12/09
Authorised by:	Rob Pilcher	03/12/09

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TABLES

0 SUMMARY

0.1 St Regis are looking to develop a Sustainable Energy Plant (SEP) and associated Ash Recycling Facility on a site at Kemsley Paper Mill, Sittingbourne, Kent.

0.2 The purpose of this report is to evaluate the impact of the proposed development on the statutory nature conservation sites within 10 km.

0.3 The potential impacts to sensitive ecological receptors have been assessed utilising the detailed dispersion model ADMS4.1. The most significant pollutants emitted from the process, in the context of ecological effects, are oxides of nitrogen (NO_x), sulphur dioxide (SO_2) and ammonia (NH_3). Contributions of air pollutant concentrations and deposition from the plant to designated ecological sites have been calculated based on dispersion modelling results and compared against relevant Environmental Quality Standards (critical levels and critical loads).

0.4 The significance of the predicted emissions of oxides of nitrogen (NO_x), sulphur dioxide (SO_2) and ammonia (NH_3) has been assessed in two stages. Firstly, if the background concentrations combined with the maximum predicted Process Contribution (PC) from the plant (i.e. the Predicted Environmental Concentration, PEC) do not exceed the critical load/level for a given habitat at a particular site, the impact is not considered to be significant. Secondly, if the background concentrations are already above the relevant critical level/load, the impact arising from predicted emissions due to the plant is not considered significant if the maximum Process Contribution is less than 1% of the relevant critical level/load for that site. If the Process Contribution is greater than 1% and the critical load/level is exceeded by the PEC, a potentially significant impact is identified

0.5 Based on the assessment of predicted contributions of NO_x, SO_2, NH_3 and acid and nitrogen deposition against the relevant critical levels and loads for terrestrial habitats, it is concluded that the proposed SEP facility with a stack height of 90 m is not predicted to have potentially significant impacts on any statutory or non-statutory designated site of conservation interest within 10 km as a result of emissions to air.

0.6 The PC NO_x at Milton Creek LWS is predicted to exceed 1% of the EQS and is also expected to be >1% of the current background levels. However, the background levels at this site are already very high (only just lower than the EQS), and given the decrease that has occurred in atmospheric NO_x as a result of legislation is likely to have been higher in the recent past. Therefore, the small increase in NO_x as a result of the operation of the SEP is considered unlikely to have any significant impact.

0.7 Although the PC acid deposition is predicted to be >1% of the EQS at the majority of Ramsar, SSSIs and LWSs within the assessment area, the habitats present within those sites are not considered to be sensitive to acid deposition. An indicator of this insensitivity is that as a result of the implementation of European Directives relating to air quality, the sites will have experienced much higher levels of acid deposition in the recent past than is predicted to occur with the operation of the

SEP but are still defined by Natural England as being in favourable condition. Therefore, no significant impacts are predicted on the Ramsar, SSSIs and LWSs as a result of acid deposition from the proposed SEP facility.

1 INTRODUCTION

1.1 St Regis are looking to develop a Sustainable Energy Plant (SEP) and associated Ash Recycling Facility on a site at Kemsley Paper Mill, Sittingbourne, Kent.

1.2 This assessment considers the effects of emissions to air from the proposed SEP on all statutory nature conservation sites within a 10 km radius. The aim of the assessment is to determine whether the proposed development is likely to have significant impacts on the conservation sites as a result of emissions to air.

2 DESCRIPTION OF CONSERVATION SITES

Statutory and Non-statutory Conservation Sites within 10 km

2.1 Four statutory sites, one Special Area of Conservation (SAC), three Special Protection Areas (SPAs) and five Sites of Special Scientific Interest (SSSIs), were identified within a 10km radius of the proposed SEP. One non-statutory site, a Local Wildlife Site (LWS), was located within 2km of the proposed SEP (Figure 2.1).

2.2 One of the SSSI (Sheppey Cliffs and Foreshore) is designated for geological reasons and is therefore not considered further in this assessment.

2.3 The features for which the Ramsar and SAC/SPAs are designated (both those that are a primary reason for selection of this site and those present as a qualifying feature) are listed in Table 2.1. The main habitat types (based on the UK Air Pollution Information System (APIS) habitat classifications) within the SSSI are listed in Table 2.2.

Table 2.1 Interest features of Ramsar, SAC and SPAs within 10 km of proposed SEP

Site	Interest Feature
The Swale Ramsar	Diverse assemblage of rare plants and animals, large numbers of wintering wildfowl and other species of international importance.
Medway Estuary and Marshes Ramsar	Diverse assemblage of rare plants and animals, large numbers of wintering wildfowl and other species of international importance.
Thames Estuary and Marshes Ramsar	Diverse assemblage of rare plants and invertebrates, large numbers of wintering wildfowl
Queensdown Warren SAC	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)
Swale SPA	Dark-bellied Brent Goose (Wintering)
	Gadwall (Wintering)
	Shelduck (Breeding)
	Teal (Wintering)
	Mallard (Breeding)
	Moorhen (Breeding)
	Common Coot (Breeding)
	Oystercatcher (Wintering)
	Ringed Plover (Wintering)
	Grey Plover (Wintering)
	Lapwing (Breeding)
	Dunlin (Wintering)
	Curlew (Wintering)
	Redshank (Breeding)
	Redshank (Wintering)
	Reed warbler (Breeding)
	Reed bunting (Breeding)
	Breeding bird assemblage
	Wintering bird assemblage (Wintering)
Medway Estuary and	Red-throated Diver (Wintering)

	Great-crested Grebe (Wintering)
	Great Cormarant (Wintering)
	Tundra Swan (Wintering)
	Dark-bellied Brent Goose (Wintering)
	Shelduck (Wintering)
	Wigeon (Wintering)
	Teal (Wintering)
	Mallard (Wintering)
	Northern Pintail (Wintering)
	Northern Shoveler (Wintering)
	Common Pochard (Wintering)
	Hen Harrier (Wintering)
	Merlin (Wintering)
	Oystercatcher (Wintering)
	Pied Avocet (Breeding)
	Pied Avocet (Wintering)
	Ringed Plover (Wintering)
	Grey Plover (Wintering)
	Red Knot (Wintering)
	Dunlin (Wintering)
	Black-tailed Godwit (Wintering)
	Curlew (Wintering)
	Redshank (Wintering)
	Greenshank (Wintering)
	Ruddy Turnstone (Wintering)
	Common Tern (Breeding)
	Little Tern (Breeding)
	Short-eared Owl (Breeding)
	Kingfisher (Breeding)
	Breeding bird assemblage
	Wintering bird assemblage (Wintering)
Thames Estuary and Marshes SPA	Hen Harrier (Wintering)
	Pied Avocet (Wintering)
	Ringed Plover (Wintering)
	Grey Plover (Passage)
	Red Knot (Wintering)
	Dunlin (Wintering)
	Black-tailed Godwit (Wintering)
	Common Redshank (Wintering)
	Wintering bird assemblage (Wintering)

Table 2.2 SSSIs and LWSs within 10 km of the proposed SEP, and the most relevant APIS habitat types.

Site	Designation	APIS habitat types (terrestrial only)
Queensdown Warren	SSSI	Calcareous grassland
The Swale	SSSI	Saltmarsh
		Grazing marsh
		Saltmarsh
		Shingle, rocks and cliffs

Site	Designation	APIS habitat types (terrestrial only)
Medway Estuary and Marshes	SSSI	Saltmarsh
		Grazing marsh
		Saltmarsh
		Alkaline fens and reedbeds
		Sand dunes
Thames Estuary and Marshes	SSSI	Alkaline fens and reedbeds
		Grazing marsh
		Saltmarsh
		Shingle, rocks and cliffs
Milton Creek	LWS	Alkaline fens and reedbeds
		Grazing marsh
		Saltmarsh

3 METHODOLOGY

3.1 The principal source of operational emissions to atmosphere will be gases exhausted from the stack after treatment in the flue gas treatment system. The combustion of waste during the operation of the SEP will give rise to atmospheric emissions of a number of pollutants in low concentrations which will be regulated under the Waste Incineration Directive (WID) 2000/76/EC [i]. The key pollutants of concern in this assessment are nitrogen oxides (NO_x), sulphur dioxide (SO_2), hydrogen chloride (HCl) and ammonia (NH_3) deposition to designated sites.

Overview of Dispersion Modelling Methodology

3.2 Although the SEP is based on a two line design, with each served by its own flue and chimney stack. However, these are only five metres apart and as such have been modelled as a single effective stack, in line with good practice guidance published by the Environment Agency. This has been referred to in this section as the SEP stack. The approach to the assessment of emissions from the SEP stack after treatment in the flue gas treatment system has involved a quantitative assessment of NO_x, SO_2 HCl and ammonia (NH_3) deposition on designated ecological sites within 10 km of the proposed facility utilising the "new generation" Gaussian dispersion model ADMS 4.1. No dispersion model is wholly accurate and all models will produce variations in results under certain conditions.

Dispersion Model Set-up

Meteorological Data

3.3 The most important meteorological parameters governing the atmospheric dispersion of pollutants are wind direction, wind speed and atmospheric stability as described below:

3.4 Wind direction determines the sector of the compass into which the plume is dispersed.

3.5 Wind speed affects the distance which the plume travels over time and can affect plume dispersion by increasing the initial dilution of pollutants and inhibiting plume rise.

3.6 Atmospheric stability is a measure of the turbulence of the air, and particularly of its vertical motion. It therefore affects the spread of the plume as it travels away from the source. New generation dispersion models, such as ADMS, use a parameter known as the Monin-Obukhov length that, together with the wind speed, describes the stability of the atmosphere.

3.7 For meteorological data to be suitable for dispersion modelling purposes, a number of meteorological parameters need to be measured on an hourly basis. These parameters include wind speed, wind direction, cloud cover and temperature. There are only a limited number of sites where the required meteorological measurements are made.

3.8 The closes meteorological station to the proposed site is Gravesend (approximately 40 km north west of the site). Dispersion model simulations were performed for emissions from the SEP using five years of data from Gravesend between 2004 and 2008. This meteorological station was recommended as the most representative by the Meteorological Office.

Terrain

3.9 The presence of elevated terrain can significantly affect (usually increase) ground level concentrations of pollutants emitted from elevated sources such as stacks, by reducing the distance between the plume centre line and ground level, as well as increasing turbulence and hence, plume mixing. Although terrain in the surrounding area is not considered likely to give rise to significant effects, terrain data have been included in the dispersion model for completeness.

Surface Roughness

3.10 The roughness of the terrain over which a plume passes can have a significant effect on dispersion by altering the velocity profile with height, and the degree of atmospheric turbulence. This is accounted for by a parameter called the surface roughness length.

3.11 To account for the mixed rural and urban nature of the immediate vicinity of the proposed site, a surface roughness length of 0.5 m has been assigned during the meteorological processing in ADMS.

Building Wake Effects

3.12 The movement of air over and around buildings generates areas of flow circulation, which can lead to increased ground level concentrations in the building wakes. Where building heights are greater than about 30 - 40% of the stack height, downwash effects can be significant. The dominant structure (i.e. that most likely to promote local turbulence) is Building B. The dimensions of the buildings included within the model are listed in Table 3.1.

Table 3.1 Building Dimensions Included Within the Dispersion Model

Building	National Grid Reference of Building Centre	Height (in AOD[a])	Length (m)	Width (m)	Angle (0) from North
Building B*	592168, 166606	49	51.4	45.8	45
Building A	592110, 166576	37	77.3	65.3	45
Deaerator	592033, 166422	25	25	9	90
Control Block	592028, 166392	15	30	36	0
GT House 1	592003, 166384	16	22	8	0
GT House 2	591987, 166378	16	22	8	0
Package Boilers	591949, 166368	13	35	35	0
PRW Storage Plant	51939, 166446	20	15	60	0
FBC Boiler House	591973, 166413	28	26	15	90
Fabric Filters	591922, 166421	18	10	4	90

Note: * Selected as the main building in ADMS

(a) Above Ordance Datum

Emissions Data

3.13 The proposed SEP will be specified to achieve the most stringent applicable limits on releases to air, based upon Annex V of the Waste Incineration Directive (2000/76/EC). Data on plant emission characteristics and concentrations have been provided by St Regis.

3.14 A stack height of 90m has been assumed for this assessment. The stack height would be subject to confirmation through further dispersion modelling and agreement with the EA during environmental permitting for the SEP proposals. The plant emission characteristics are summarised in Table 3.2.

Table 3.2 SEP Emissions Characteristics

Parameter	Unit	Value
Stack Height	m	90
Diameter	m	4
Efflux Velocity	$m.s^{-1}$	15.0
Efflux Temperature	°C	135
Volumetric Flow	$Am^3.s^{-1}$ (actual)	191
Volumetric Flow	$Nm^3.s^{-1}$ (1 atm, 0^OC, dry, 11% O_2)	157.4

3.15 Emission limits are specified in WID in the form of daily mean concentrations, half-hourly mean concentrations, mean concentrations over a period of between 30 minutes and 8 hours, or, for dioxins and furans, mean concentrations evaluated over a period of between six and eight hours. Short-term and long-term limits on emissions concentrations are specified for some substances.

3.16 For ecological receptors only annual deposition of the pollutants NO_x, SO_x, HCl and NH_3 are of concern. As such only the long term limits for these pollutants have been provided in Table 3.3.

Table 3.3 Concentrations and Mass Emissions of Released Pollutants

Pollutants	WID Daily Average Emission Limits	
	Concentration ($mg.Nm^{-3}$)	Mass Emission ($g.s^{-1}$)
SO_2	50	0.624
NO_x	200	2.495
HCl	10	0.125
NH_3 [(a)]	5	0.12

Notes:

(a) NH_3 is not a WID pollutant therefore, for the purposes of this assessment an emission limit of 5 $mg.Nm^{-3}$ (derived from the EA's BREF (Best Available Technique Reference) Document on Waste Incineration [[ii]) has been used.

Methodology for Assessing Effects on Vegetation and Ecosystems

3.17 The assessment of the effects of emissions to air from the proposed facility on European designated sites is required under the Habitats Regulations. Following good practice, and discussions with Natural England, all European and nationally designated sites within 10 km have been considered within this assessment. Due to the large area of some of these designations, a series of discrete receptors were included within the modelling to account for the geographic variation of predicted concentrations.

3.18 The assessment of impacts on ecological receptors has been undertaken assuming emissions from the stack at the Waste Incineration Directive (WID) long-term emission limits. This is a precautionary approach to the assessment of the potential effect of emissions from the plant on sensitive ecological receptors, and represents the worst-case scenario for contributions from the proposed WTP.

3.19 Habitats within each site may be affected through changes in:

- Ambient atmospheric pollutant concentrations; and
- Deposition of certain compounds.

3.20 The potential effects on habitats within protected sites are quantified by comparing the maximum Process Contributions (PC) and Predicted Environmental Concentrations (PEC) (incorporating a maximum background concentration) to empirically derived thresholds above which damage to vegetation is known to occur (Environmental Quality Standards: EQS).

3.21 Two EQSs are used to assess the potential effect of emissions on sensitive ecological receptors. These are:

- Critical levels; and
- Critical loads.

3.22 Critical load and critical level are quantitative estimates of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge. The critical load relates to the quantity of pollutant deposited from air to the ground, whereas the critical level is the gaseous concentration of a pollutant in the air.

Assessment of ambient atmospheric pollutant concentrations

3.23 Critical levels for the protection of vegetation and ecosystems are specified within relevant European Air Quality Directives and corresponding UK air quality regulations as outlined in the National Air Quality Strategy (NAQS). Process Contributions (PC) and Predicted Environmental Concentrations (PEC) of NO_x, SO_2 and NH_3 at each site have been calculated and compared with the relevant critical level: 30 $\mu g.m^{-3}$ in the case of NO_x, 20 $\mu g.m^{-3}$ in the case of SO_2 and 3 $\mu g\ m^{-3}$ in the case of NH_3. In addition, the Air Pollution Information System (www.apis.ac.uk) recommends an additional critical level for SO_2 of 10 $\mu g.m^{-3}$ for the protection of lichens, and of 1 $\mu g\ m^{-3}$ in the case of NH_3 for sites where lichens and bryophytes are an important component of the site.

3.24 Background NO_x, SO_2 and NH_3 concentrations at the designated site have been derived from the APIS website (www.apis.ac.uk). As they can vary across a site, particularly when sites are large; the highest background level was used in the assessment.

Assessment of pollution deposition

3.25 The most significant harmful effects of deposition on ecosystems are those known to result from:

- The deposition to land of nitrogen (N deposition), which contributes to the eutrophication of habitats; and
- The deposition of NO_X, SO_2, NH_3 and to a lesser extent HCl, which contribute to the acidification of habitats.

Acid deposition

3.26 The assessment of deposition accounts for NO_x, SO_2 and HCl emissions as a result of fuel burn, plus NH_3 from the selective catalytic reduction (SCR) system used to reduce NO_x emissions. NH_3 is not a WID pollutant. Therefore, for the purposes of this assessment an emission limit of 10 $mg.Nm^{-3}$ (derived from the EA's BREF (Best Available Technique Reference) Document on Waste Incineration has been used).

3.27 The methods used to calculate both wet and dry acid deposition can be found in Chapter 7 (Air Quality Assessment) of the EIA.

3.28 Background levels of acid deposition at each designated site have been derived from the APIS website (www.apis.ac.uk). They can vary across a site, particularly when sites are large; the highest background level for each ecological site has been used in the assessment.

Nitrogen deposition

3.29 Percentage contributions to nitrogen deposition have been derived from dispersion modelling using ADMS 4.1. Deposition rates were calculated using empirical methods recommended by the Environment Agency. Full details can be found in Chapter 7 of the EIA.

3.30 Background levels of N (nitrogen) deposition at each designated site have been derived from the APIS website (www.apis.ac.uk). They can vary across a site, particularly when sites are large; the highest background level for each ecological site has been used in the assessment.

Selection of critical loads for Ramsars, SSSIs and LWSs

3.31 The critical load for acid and N deposition depends on the habitat type potentially affected. APIS includes a number of broad habitat types for use in the searchable database of critical loads. The habitats within each site to be assessed therefore need to be assigned to one of these APIS habitat types. For the SSSI, this was done based on the information available in the site citation sheet (as described above).

3.32 The critical loads for acid deposition and N deposition can vary across a site. The lowest critical load for each ecological site has been used in the assessment.

3.33 Additionally, the citation for each designated site was investigated to determine what habitats occurred within the site. Subsequent to this, a corresponding APIS website habitat category was assigned.

3.34 Once the habitat was identified, APIS was further consulted to obtain the data for critical levels and background atmospheric concentrations of nitrogen oxides (NO_x) and sulphur dioxide (SO_2) and the critical load and deposition of nitrogen and acid for each corresponding habitat type at the OS grid reference of the designated site. The background levels all pollutants in the tables below are the maximum figures for that conservation site derived from APIS.

Site Relevant Critical Loads Assessment of SACs and SPAs

3.35 SACs and SPAs have been evaluated using the information in the Site Relevant Critical Loads tool in APIS (www.apis.ac.uk). An overview of each interest feature for each site is provided and critical loads (or critical load functions) are assigned to each feature if it is sensitive to either nutrient nitrogen or acidity. Furthermore, deposition data for nitrogen and sulphur at each site is provided.

3.36 To assess the significance of the predicted acid deposition against the relevant critical load function (CLF), the radial distance from the origin of the graph through the modelled deposition point to the critical function line is calculated. The distance from the origin to the modelled deposition point is divided by the radial distance to give a percentage.

3.37 The Site Relevant Critical Loads tool in APIS may also provide information on species sensitivity to acid and N deposition, and this information is referred to in the relevant evaluation sections where applicable

Ecological Evaluation Criteria

3.38 Maximum PC and PEC of NO_x, SO_2, NH_3, acid deposition and N deposition are compared against the relevant EQS for the relevant habitat type. Potentially significant impacts are predicted if the maximum PC exceeds 1% of the relevant EQS **and** the PEC exceeds the relevant EQS.

3.39 Also, in cases where the EQS was already exceeded by background deposition rates, the Environment Agency's guidance (EU Habitats and Birds Direction Handbook) states that: "Where the concentration within the emission footprint in any part of the European site(s) is less than 1% of the relevant long-term benchmark (EAL, Critical Level or Critical Load), the emission is not likely to have a significant effect alone or in combination, irrespective of the background levels".

3.40 When comparing the maximum PC within a site against the EQS, it has been assumed that the maximum PC level affects the whole site. This is a conservative approach to the assessment and ensures that the predicted effects represent a worst-case scenario.

4 AIR QUALITY IMPACTS OF THE PROPOSED WASTE TREATMENT PLANT ON NATURE CONSERVATION SITES

Ambient concentrations of NO_x, SO_2 and NH_3

4.1 The PC NO_x comprises <1% of the EQS and/or the PEC NO_x is not predicted to exceed the relevant EQS (critical level for NO_x) for all designated sites within the assessment area (Table 4.1) except Milton Creek LWS. Therefore, no significant impacts are predicted on these sites from increased concentrations of NO_x resulting from the operation of the SEP facility.

4.2 The EQS for NO_x is expected to be exceeded and the PC NO_x comprises >1% of that EQS at Milton Creek LWS. Further, the PC NO_x is expected to be >1% of the current background levels. Following European-wide industrial compliance with the requirements of the Large Combustion Plant Directive and Limitation of Sulphur in Liquid Fuels Directive, background levels of NO_x have fallen in recent years. Therefore, given the urban environment surrounding it (Sittingbourne, Kemsley and Merston), it is highly likely that the current background levels were very much higher in previous years with no adverse effects reported. Therefore, the small increase in NO_x as a result of the operation of the SEP is considered unlikely to have any significant impact.

4.3 The PC SO_2 comprises <1% of the EQS and/or the PEC SO_2 is not predicted to exceed the relevant EQS at any designated site within the assessment area (Table 4.2). Therefore, no significant impacts are predicted on these sites from increased concentrations of SO_2 resulting from the operation of the SEP facility.

4.4 The PEC NH_3 comprises <1% of the EQS and/or the PEC NH_3 is not predicted to exceed the relevant EQS at any designated site within the assessment area (Table 4.3). Therefore, no significant impacts are predicted on these sites from increased concentrations of NH_3 resulting from the operation of the SEP facility.

Acid deposition

Ramsar, SSSIs and LWSs

4.5 The PC acid deposition is predicted to comprise <1% of the EQS at the Thames Estuary & Marshes SSSI/Ramsar and Queensdown Warren SSSI (Table 4.5). At all other sites assessed, the PC acid deposition was >1% of the EQS. However, at all these remaining sites, the habitats present are not thought to be sensitive to acid deposition (www.apis.ac.uk), despite the apparent high deposition rates etc.

4.6 Further, following European-wide industrial compliance with the requirements of the Large Combustion Plant Directive and Limitation of Sulphur in Liquid Fuels Directive, background levels of acid deposition have declined in recent years - at the Swale and Medway Estuary and Marshes SPAs (which includes the respective SSSIs and Ramsar sites) they are predicted to decline from 1.74 and 1.96 $keq.ha^{-1}.year^{-1}$, respectively, in 2003 to 1.5 and 1.71 $keq.ha^{-1}.year^{-1}$ in 2010 (www.apis.ac.uk), a decline of 14% and 13%, respectively. Consequently, even when the SEP is in operation, predicted levels of acid deposition at the above sites (PEC of 1.63 and 1.717 $keq.ha^{-1}.year^{-1}$, respectively) will still be less than experienced at the sites in recent years.

4.7 Both sites are currently considered to be in favourable condition by Natural England (http://www.natureonthemap.org.uk/), with no evidence suggesting that the previously experienced levels of acid deposition had any adverse impacts. Therefore significant impacts on these sites as a result of increased levels of acid deposition resulting from the operation of the facility are considered very unlikely.

SAC and SPAs

4.8 The PC acid deposition comprises <1% of the minimum critical load function (CLF) for all of those features of interest that are sensitive to acid deposition at all SAC/SPAs (Table 4.5) within the assessment area. Therefore, no significant impacts are predicted on interest features of SAC/SPAs as a result of acid deposition from the proposed SEP facility.

Nitrogen deposition

Ramsar, SSSIs and LWSs

4.9 The PC N deposition comprises <1% of the EQS at all SSSIs and LWSs within the assessment area (Table 4.6). Therefore, no significant impacts are predicted on these sites from increased Nitrogen deposition resulting from the operation of the SEP facility.

SAC/SPAs

4.10 The majority of interest features are either insensitive to N deposition or sensitive indirectly via potential impacts on their habitats. However, the PC N deposition comprises <1% of the minimum EQS at all SAC/SPAs within the assessment area (Table 4.7). Therefore, no significant impacts are predicted on these sites from increased Nitrogen deposition resulting from the operation of the SEP facility.

Table 4.1 Maximum modelled concentration of nitrogen oxides ($\mu g.m^{-3}$) contributed by the SEP at conservation sites within 10 km

Designation	Site Name	Background Concentration	Maximum PC NO_x	Maximum PEC	EQS	Max PC as % of EQS	Breach of EQS	Max PC as % of Background
SINC	Milton Creek	29.50	0.77	30.27	30	2.57	Yes	2.61
SAC	Queendown Warren	25.80	0.07	25.87	30	0.22	No	0.25
SPA	Medway Estuary & Marshes	26.10	0.14	26.24	30	0.46	No	0.53
SPA	Thames Estuary & Marshes	19.10	0.05	19.15	30	0.16	No	0.25
SPA	The Swale	23.60	2.71	26.31	30	9.04	No	11.49
SSSI	Medway Estuary & Marshes	26.10	0.14	26.24	30	0.46	No	0.53
SSSI	Queendown Warren	25.80	0.07	25.87	30	0.22	No	0.25
SSSI	Thames Estuary & Marshes	19.10	0.05	19.15	30	0.16	No	0.25
SSSI	The Swale	23.60	2.71	26.31	30	9.04	No	11.49
RAMSAR	Medway Estuary & Marshes	26.10	0.14	26.24	30	0.46	No	0.53
RAMSAR	Thames Estuary & Marshes	19.10	0.05	19.15	30	0.16	No	0.25
RAMSAR	The Swale	23.60	2.71	26.31	30	9.04	No	11.49

Table 4.2 Maximum modelled concentration of sulphur dioxide ($\mu g.m^{-3}$) contributed by the SEP at conservation sites within 10 km

Designation	Site Name	Background Concentration	Maximum PC SO_2	Maximum PEC	EQS*	Max PC as % of EQS	Breach of EQS	Max PC as % of Background
SINC	Milton Creek	4.20	0.19	4.39	20	0.96	No	4.58
SAC	Queendown Warren	3.20	0.02	3.22	20	0.08	No	0.51
SPA	Medway Estuary & Marshes	4.50	0.03	4.53	20	0.17	No	0.77
SPA	Thames Estuary & Marshes	2.90	0.01	2.91	20	0.06	No	0.42
SPA	The Swale	4.50	0.68	5.18	20	3.39	No	15.07
SSSI	Medway Estuary & Marshes	4.50	0.03	4.53	20	0.17	No	0.77
SSSI	Queendown Warren	3.20	0.02	3.22	20	0.08	No	0.51
SSSI	Thames Estuary & Marshes	2.90	0.01	2.91	20	0.06	No	0.42
SSSI	The Swale	4.50	0.68	5.18	20	3.39	No	15.07
RAMSAR	Medway Estuary & Marshes	4.50	0.03	4.53	20	0.17	No	0.77

RAMSAR	Thames Estuary & Marshes	2.90	0.01	2.91	20	0.06	No	0.42
RAMSAR	The Swale	4.50	0.68	5.18	20	3.39	No	15.07

Table 4.3 Maximum modelled concentration of ammonia (µg.m-[3]) contributed by the SEP at conservation sites within 10 km

Designation	Site Name	Background Concentration	Maximum PC NH_3	Maximum PEC	EQS*	Max PC as % of EQS	Breach of EQS	Max PC as % of Background
SINC	Milton Creek	1.10	0.019	1.12	3	0.64	No	1.75
SAC	Queendown Warren	1.00	0.002	1.00	3	0.05	No	0.16
SPA	Medway Estuary & Marshes	1.00	0.003	1.00	3	0.12	No	0.35
SPA	Thames Estuary & Marshes	0.70	0.001	0.70	3	0.04	No	0.17
SPA	The Swale	1.10	0.068	1.17	3	2.26	No	6.17
SSSI	Medway Estuary & Marshes	1.00	0.003	1.00	3	0.12	No	0.35
SSSI	Queendown Warren	1.00	0.002	1.00	3	0.05	No	0.16
SSSI	Thames Estuary & Marshes	0.70	0.001	0.70	3	0.04	No	0.17
SSSI	The Swale	1.10	0.068	1.17	3	2.26	No	6.17
RAMSAR	Medway Estuary & Marshes	1.00	0.003	1.00	3	0.12	No	0.35
RAMSAR	Thames Estuary & Marshes	0.70	0.001	0.70	3	0.04	No	0.17
RAMSAR	The Swale	1.10	0.068	1.17	3	2.26	No	6.17

*A critical level of 1 $\mu g.m^{-3}$ is used for sites where lichens and bryophytes are an integral part of the habitat.

Table 4.4: Assessment of impacts on Rasmsar, SSSIs and LWSs within 10 km of the SEP due to acid deposition ($keqH.ha^{-1}.year^{-1}$)

Designation	Site Name	Habitat types	Background acid deposition	Maximum PC acid deposition	Maximum PEC acid deposition	Critical Load (EQS)[1]	Maximum PC as % of EQS	Exceedance of EQS	Max PC as % of background
LWS	Milton Creek	Alkaline fens and reedbeds	1.62	0.0628	1.68	0.75	8.37	Yes	3.88
		Grazing marsh	1.62	0.0628	1.68	0.75	8.37	Yes	3.88
		Saltmarsh	1.62	0.0628	1.68	0.75	8.37	Yes	3.88
SSSI	Medway Estuary & Marshes	Alkaline fens and reedbeds	1.47	0.0113	1.48	0.75	1.51	Yes	0.77
		Grazing marsh	1.47	0.0113	1.48	0.75	1.51	Yes	0.77

		Saltmarsh	1.47	0.0113	1.48	0.75	1.51	Yes	0.77
		Sand dunes	1.47	0.0113	1.48	0.75	1.51	Yes	0.77
SSSI	Queendown Warren	Calcareous grassland	1.56	0.0057	1.57	4.00	0.14	No	0.37
SSSI	Thames Estuary & Marshes	Alkaline fens and reedbeds	1.22	0.0039	1.22	4.00	0.10	No	0.32
		Grazing marsh	1.22	0.0039	1.22	4.00	0.10	No	0.32
		Saltmarsh	1.22	0.0039	1.22	4.00	0.10	No	0.32
		Shingle, rocks and cliffs	1.22	0.0039	1.22	4.00	0.10	No	0.32
SSSI	The Swale	Grazing marsh	1.62	0.2213	1.84	0.35	63.22	Yes	13.66
		Saltmarsh	1.62	0.2213	1.84	0.35	63.22	Yes	13.66
		Shingle, rocks and cliffs	1.62	0.2213	1.84	0.35	63.22	Yes	13.66
Ramsar	Medway Estuary & Marshes	Alkaline fens and reedbeds	1.47	0.0113	1.48	0.75	1.51	Yes	4.00
		Grazing marsh	1.47	0.0113	1.48	0.75	1.51	Yes	4.00
		Saltmarsh	1.47	0.0113	1.48	0.75	1.51	Yes	4.00
		Sand dunes	1.47	0.0113	1.48	0.75	1.51	Yes	4.00
Ramsar	Thames Estuary & Marshes	Alkaline fens and reedbeds	1.22	0.0039	1.22	4.00	0.10	No	4.00
		Grazing marsh	1.22	0.0039	1.22	4.00	0.10	No	4.00
		Saltmarsh	1.22	0.0039	1.22	4.00	0.10	No	4.00
		Shingle, rocks and cliffs	1.22	0.0039	1.22	4.00	0.10	No	4.00
Ramsar	The Swale	Grazing marsh	1.62	0.2213	1.84	0.35	63.22	Yes	4.00
		Saltmarsh	1.62	0.2213	1.84	0.35	63.22	Yes	4.00
		Shingle, rocks and cliffs	1.62	0.2213	1.84	0.35	63.22	Yes	4.00

Note: [1] Critical loads for acid deposition may vary across the site; the critical load stated is the lowest for the site, as determined from APIS at all receptor points. [2] This figure is based on the highest process contribution across the site and the lowest critical load across the site.

Table 4.5 Assessment of impacts SAC/SPAs within 10 km of the SEP due to acid deposition (keqH.ha^{-1}.year^{-1})

Site	Interest Feature	Sensitive to acid deposition?	Background N-deposition (2010)	Background S deposition (2010)	PC N-deposition	PC S deposition	PEC N-deposition	PEC S deposition	PC N+S deposition	Background N & S deposition	% of minimum / maximum CLF	PC N & S deposition as % of 2010 background
Queensdown Warren SAC	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)	Yes	1.32	0.71	0.0013	0.0019	1.321	0.712	0.003	2.03	0.07/0.07	0.16
Swale SPA	Dark-bellied Brent Goose (Wintering)	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Gadwall (Wintering)	No										
	Shelduck (Breeding)	No										
	Teal (Wintering)	No*										
	Mallard (Breeding)	No*										
	Moorhen (Breeding)	No*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Oystercatcher (Wintering)	No*										
	Ringed Plover (Wintering)	No										
	Grey Plover (Wintering)	No										
	Lapwing (Breeding)	No										
	Dunlin (Wintering)	No										
	Curlew (Wintering)	No										
	Redshank (Breeding)	No										
	Redshank (Wintering)	No										
	Reed warbler (Breeding)	No										
	Reed bunting (Breeding)	No										
	Breeding bird assemblage	Site-specific										
	Wintering bird assemblage (Wintering)	Site-specific										

Medway Estuary and Marshes SPA	Red-throated Diver (Wintering)	No										
	Great-crested Grebe (Wintering)	No										
	Great Cormarant (Wintering)	No*										
	Tundra Swan (Wintering)	No										
	Dark-bellied Brent Goose (Wintering)	No										
	Shelduck (Wintering)	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Wigeon (Wintering)	No										
	Teal (Wintering)	No										
	Mallard (Wintering)	No										
	Northern Pintail (Wintering)	No										
	Northern Shoveler (Wintering)	No*										
	Common Pochard (Wintering)	No										
	Hen Harrier (Wintering)	Yes	0.93	0.78	0.0027	0.0041	0.933	0.784	0.007	1.71	0.49/0.13	0.40
	Merlin (Wintering)	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Oystercatcher (Wintering)	No										
	Pied Avocet (Breeding)	No										
	Pied Avocet (Wintering)	No										
	Ringed Plover (Wintering)	No										
	Grey Plover (Wintering)	No										
	Red Knot (Wintering)	No										
	Dunlin (Wintering)	No										
	Black-tailed Godwit (Wintering)	No										
	Curlew (Wintering)	No										
	Redshank (Wintering)	No										
	Greenshank (Wintering)	No										

	Ruddy Turnstone (Wintering)	No										
	Common Tern (Breeding)	No										
	Little Tern (Breeding)	Yes	0.93	0.78	0.0027	0.0041	0.933	0.784	0.007	1.71	0.40/0.10	0.40
	Short-eared Owl (Breeding)	Yes	0.93	0.78	0.0027	0.0041	0.933	0.784	0.007	1.71	0.30/0.08	0.40
	Kingfisher (Breeding)	No*										
	Breeding bird assemblage	Site-specific	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Wintering bird assemblage (Wintering)	Site-specific										
	Hen Harrier (Wintering)	Yes	1.32	0.71	0.0009	0.0014	1.321	0.711	0.002	2.03	0.27/0.04	0.12
	Pied Avocet (Wintering)	No										
	Ringed Plover (Wintering)	No										
	Grey Plover (Passage)	No										
	Red Knot (Wintering)	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Dunlin (Wintering)	No										
Thames Estuary and Marshes SPA	Black-tailed Godwit (Wintering)	No										
	Common Redshank (Wintering)	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Wintering bird assemblage (Wintering)	Site-specfic										

*Those interest features marked with an asterisk are not sensitive in themselves, but their habitat may be.

Table 4.6 Assessment of impacts on SSSIs and LWS within 10 km of the SEP due to nitrogen deposition (kg eq.ha yr^{-1})

Designation	Site Name	Habitat types	Background Nitrogen deposition	Maximum PC nitrogen deposition	Maximum PEC nitrogen deposition	Critical Load (EQS)[1]	Maximum PC as % of EQS	Exceedance of EQS	Max PC as % of background
LWS	Milton Creek	Alkaline fens and reedbeds	17.60	0.0151	17.62	10	0.15	Yes	0.09
		Grazing marsh	17.60	0.0151	17.62	20	0.08	No	0.09
		Saltmarsh	17.60	0.0151	17.62	30	0.05	No	0.09

SSSI	Medway Estuary & Marshes	Alkaline fens and reedbeds	15.80	0.0027	15.80	1	0.27	Yes	0.02
		Grazing marsh	15.80	0.0027	15.80	20	0.01	No	0.02
		Saltmarsh	15.80	0.0027	15.80	20	0.01	No	0.02
		Sand dunes	15.80	0.0027	15.80	10	0.03	Yes	0.02
SSSI	Queendown Warren	Calcareous grassland	17.50	0.0014	17.50	10	0.01	Yes	0.01
SSSI	Thames Estuary & Marshes	Alkaline fens and reedbeds	19.10	0.0009	19.10	10	0.01	Yes	0.00
		Grazing marsh	19.10	0.0009	19.10	10	0.01	Yes	0.00
		Saltmarsh	19.10	0.0009	19.10	10	0.01	Yes	0.00
		Shingle, rocks and cliffs	19.10	0.0009	19.10	10	0.01	Yes	0.00
SSSI	The Swale	Grazing marsh	17.60	0.0531	17.65	20	0.27	No	0.30
		Saltmarsh	17.60	0.0531	17.65	30	0.18	No	0.30
		Shingle, rocks and cliffs	17.60	0.0531	17.65	10	0.53	Yes	0.30
Ramsar	Medway Estuary & Marshes	Alkaline fens and reedbeds	15.80	0.0027	15.80	1	0.27	Yes	35
		Grazing marsh	15.80	0.0027	15.80	20	0.01	No	30
		Saltmarsh	15.80	0.0027	15.80	30	0.01	No	40
		Sand dunes	15.80	0.0027	15.80	10	0.03	Yes	25
Ramsar	Thames Estuary & Marshes	Alkaline fens and reedbeds	19.10	0.0009	19.10	10	0.01	Yes	35
		Grazing marsh	19.10	0.0009	19.10	10	0.01	Yes	30
		Saltmarsh	19.10	0.0009	19.10	10	0.01	Yes	40
		Shingle, rocks and cliffs	19.10	0.0009	19.10	10	0.01	Yes	15
Ramsar	The Swale	Grazing marsh	17.60	0.0531	17.65	20	0.27	No	30
		Saltmarsh	17.60	0.0531	17.65	30	0.18	No	40
		Shingle, rocks and cliffs	17.60	0.0531	17.65	10	0.53	Yes	15

Table 4.7 Assessment of impacts on SACs and SPAs within 10 km of the SEP due to nitrogen deposition (kg eq.ha yr-1)

Site	Interest Feature	Sensitive to N deposition?	Background N deposition (2010)	Maximum PC N deposition	Maximum PEC N deposition	Minimum Critical Load (EQS)	Maximum Critical Load (EQS)	Maximum PC as % of minimum EQS	Exceed-ance of minimum EQS?	Max PC as % of 2010 back-ground
Queensdown Warren SAC	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)	Yes	14.80	0.0013	14.80	10	25	0.01	Yes	0.01
Swale SPA	Dark-bellied Brent Goose (Wintering)	No	12.90	0.0531	12.95	N/A	N/A	N/A	N/A	N/A
	Gadwall (Wintering)	No*	12.90	0.0531	12.95					
	Shelduck (Breeding)	No*	12.90	0.0531	12.95					
	Teal (Wintering)	No	12.90	0.0531	12.95					
	Mallard (Breeding)	No*	12.90	0.0531	12.95					
	Moorhen (Breeding)	No*	12.90	0.0531	12.95					
	Common Coot (Breeding)	No*	12.90	0.0531	12.95					
	Oystercatcher (Wintering)	No	12.90	0.0531	12.95					
	Ringed Plover (Wintering)	No	12.90	0.0531	12.95					
	Grey Plover (Wintering)	No	12.90	0.0531	12.95					
	Lapwing (Breeding)	No	12.90	0.0531	12.95					
	Dunlin (Wintering)	No	12.90	0.0531	12.95					
	Curlew (Wintering)	No*	12.90	0.0531	12.95					
	Redshank (Breeding)	No	12.90	0.0531	12.95					
	Redshank (Wintering)	No	12.90	0.0531	12.95					
	Reed warbler (Breeding)	No*	12.90	0.0531	12.95					
	Reed bunting (Breeding)	No*	12.90	0.0531	12.95					
	Breeding bird assemblage	Site-specific	12.90	0.0531	12.95					
	Wintering bird assemblage (Wintering)	Site-specific	12.90	0.0531	12.95					
	Red-throated Diver (Wintering)	No	13.00	0.0027	13.00	N/A	N/A	N/A	N/A	N/A

	Great-crested Grebe (Wintering)	No*	13.00	0.0027	13.00					
	Great Cormarant (Wintering)	No	13.00	0.0027	13.00					
	Tundra Swan (Wintering)	No	13.00	0.0027	13.00					
	Dark-bellied Brent Goose (Wintering)	No	13.00	0.0027	13.00					
	Shelduck (Wintering)	No*	13.00	0.0027	13.00					
Medway Estuary and Marshes SPA	Wigeon (Wintering)	No*	13.00	0.0027	13.00					
	Teal (Wintering)	No	13.00	0.0027	13.00					
	Mallard (Wintering)	No*	13.00	0.0027	13.00	N/A	N/A	N/A	N/A	N/A
	Northern Pintail (Wintering)	No	13.00	0.0027	13.00					
	Northern Shoveler (Wintering)	No*	13.00	0.0027	13.00					
	Common Pochard (Wintering)	No	13.00	0.0027	13.00					
	Hen Harrier (Wintering)	No*	13.00	0.0027	13.00					
	Merlin (Wintering)	No	13.00	0.0027	13.00					
	Oystercatcher (Wintering)	No	13.00	0.0027	13.00					
	Pied Avocet (Breeding)	Yes	13.00	0.0027	13.00	30	0.01	No	40	0.01
	Pied Avocet (Wintering)	Yes	13.00	0.0027	13.00	30	0.01	No	40	0.01
	Ringed Plover (Wintering)	No	13.00	0.0027	13.00					
	Grey Plover (Wintering)	No	13.00	0.0027	13.00					
	Red Knot (Wintering)	No	13.00	0.0027	13.00					
	Dunlin (Wintering)	No*	13.00	0.0027	13.00					
	Black-tailed Godwit (Wintering)	Yes	13.00	0.0027	13.00	30	0.01	No	40	0.01
	Curlew (Wintering)	No*	13.00	0.0027	13.00					
	Redshank (Wintering)	No	13.00	0.0027	13.00					
	Greenshank (Wintering)	No	13.00	0.0027	13.00					
	Ruddy Turnstone (Wintering)	No	13.00	0.0027	13.00					
	Common Tern (Breeding)	Site-specific	13.00	0.0027	13.00					
	Little Tern (Breeding)	No*	13.00	0.0027	13.00					
	Short-eared Owl (Breeding)	No*	13.00	0.0027	13.00					
	Kingfisher (Breeding)	Site-specific	13.00	0.0027	13.00					
	Breeding bird assemblage	Site-specific	13.00	0.0027	13.00					
	Wintering bird assemblage (Wintering)	Site-specific	13.00	0.0027	13.00					

Thames Estuary and Marshes SPA	Hen Harrier (Wintering)	No*	12.30	0.0009	12.30					
	Pied Avocet (Wintering)	Yes	12.30	0.0009	12.30	30	0.00	No	40	0.00
	Ringed Plover (Wintering)	No	12.30	0.0009	12.30	N/A	N/A	N/A	N/A	N/A
	Grey Plover (Passage)	No	12.30	0.0009	12.30					
	Red Knot (Wintering)	No	12.30	0.0009	12.30					
	Dunlin (Wintering)	No*	12.30	0.0009	12.30					
	Black-tailed Godwit (Wintering)	No	12.30	0.0009	12.30	30	0.00	No	40	0.00
	Common Redshank (Wintering)	No	12.30	0.0009	12.30	N/A	N/A	N/A	N/A	N/A
	Wintering bird assemblage (Wintering)	Site-specific	12.30	0.0009	12.30					

*Those interest features marked with an asterisk are not sensitive in themselves, but their habitat may be.

5 CONCLUSIONS

5.1 Based on the assessment of predicted contributions of NO_x, SO_2, NH_3 and acid and nitrogen deposition against the relevant critical levels and loads for terrestrial habitats, it is concluded that the proposed SEp facility with a stack height of 90 m is not predicted to have potentially significant impacts on any statutory or non-statutory designated site of conservation interest within 10 km as a result of emissions to air.

5.2 The PC NO_x at Milton Creek LWS is predicted to exceed 1% of the EQS and is also expected to be >1% of the current background levels. However, the background levels at this site are already very high (only just lower than the EQS), and given the decrease that has occurred in atmospheric NO_x as a result of legislation is likely to have been higher in the recent past. Therefore, the small increase in NO_x as a result of the operation of the SEP is considered unlikely to have any significant impact.

5.3 Although the PC acid deposition is predicted to be >1% of the EQS at the majority of Ramsar, SSSIs and LWSs within the assessment area, the habitats present within those sites are not considered to be sensitive to acid deposition. An indicator of this insensitivity is that as a result of the implementation of European Directives relating to air quality, the sites will have experienced much higher levels of acid deposition in the recent past than is predicted to occur with the operation of the SEP but are still defined by Natural England as being in favourable condition. Therefore, no significant impacts are predicted on the Ramsar, SSSIs and LWSs as a result of acid deposition from the proposed SEP facility.

5.4 No impacts are predicted from emissions to air by the operation of the SEP facility on any interest feature at any European designated site within the assessment area.

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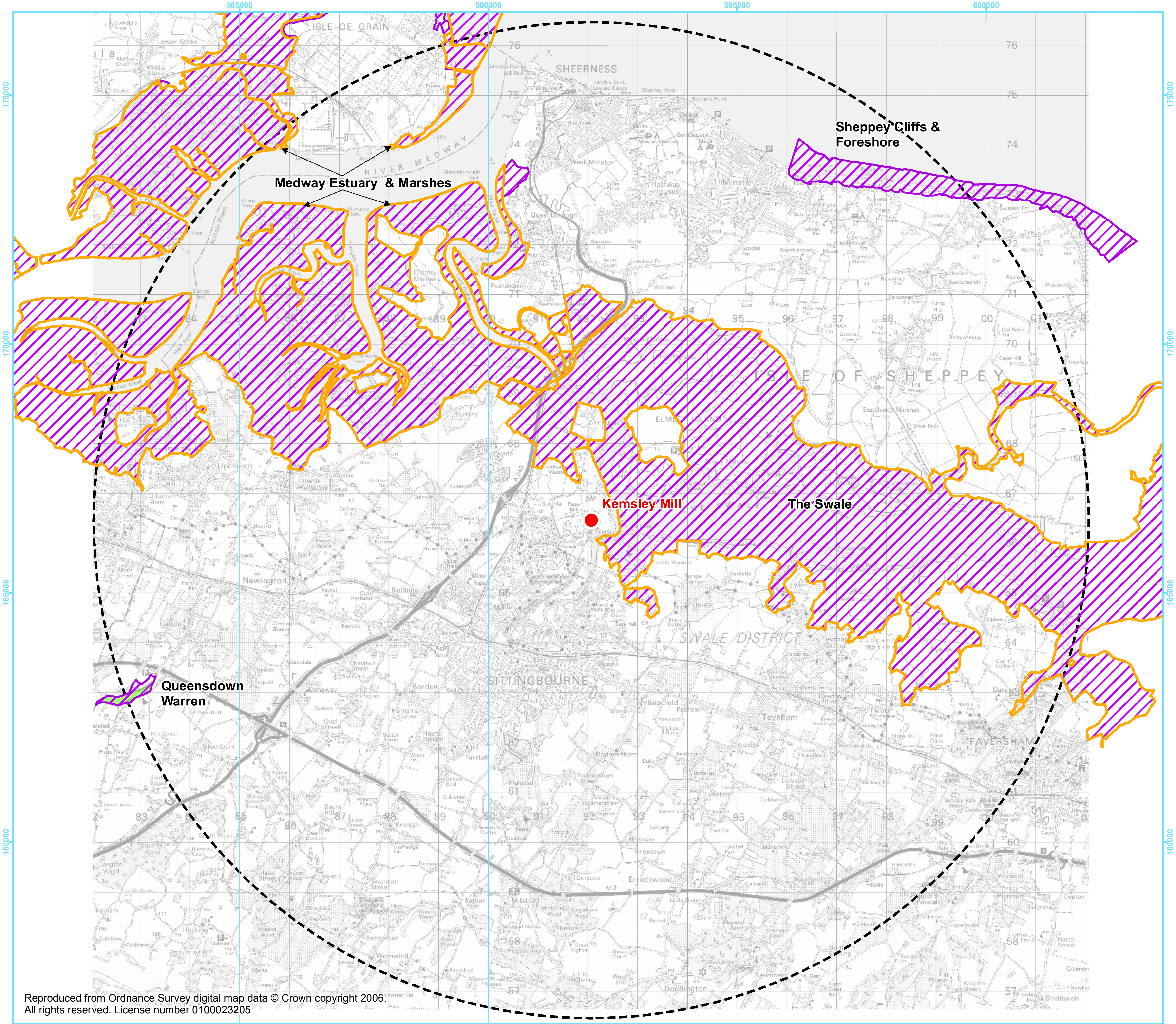
[i] Directive 2000/76/EC Of The European Parliament And Of The Council of 4 December 2000 on the incineration of waste

[ii] EA's BREF (Best Available Technique Reference) Document on Waste Incineration



Legend

- Site location
- 10km buffer
- Ramsar and Special Protection Area
- Site of Special Scientific Interest
- Special Area of Conservation

0 1 2 3 4 5 km

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Project: Kemsley Mill Impact Assessment

Title: Statutory sites within 10km from proposed Sustainable Energy Plant

Date: Oct 2007 Scale: 1:75,000 @A3

Drawn: KM Checked: JD

Drawing based upon: British National Grid

Job: JPP1732 Figure No: 3.1 Rev: B

Drawing Ref:

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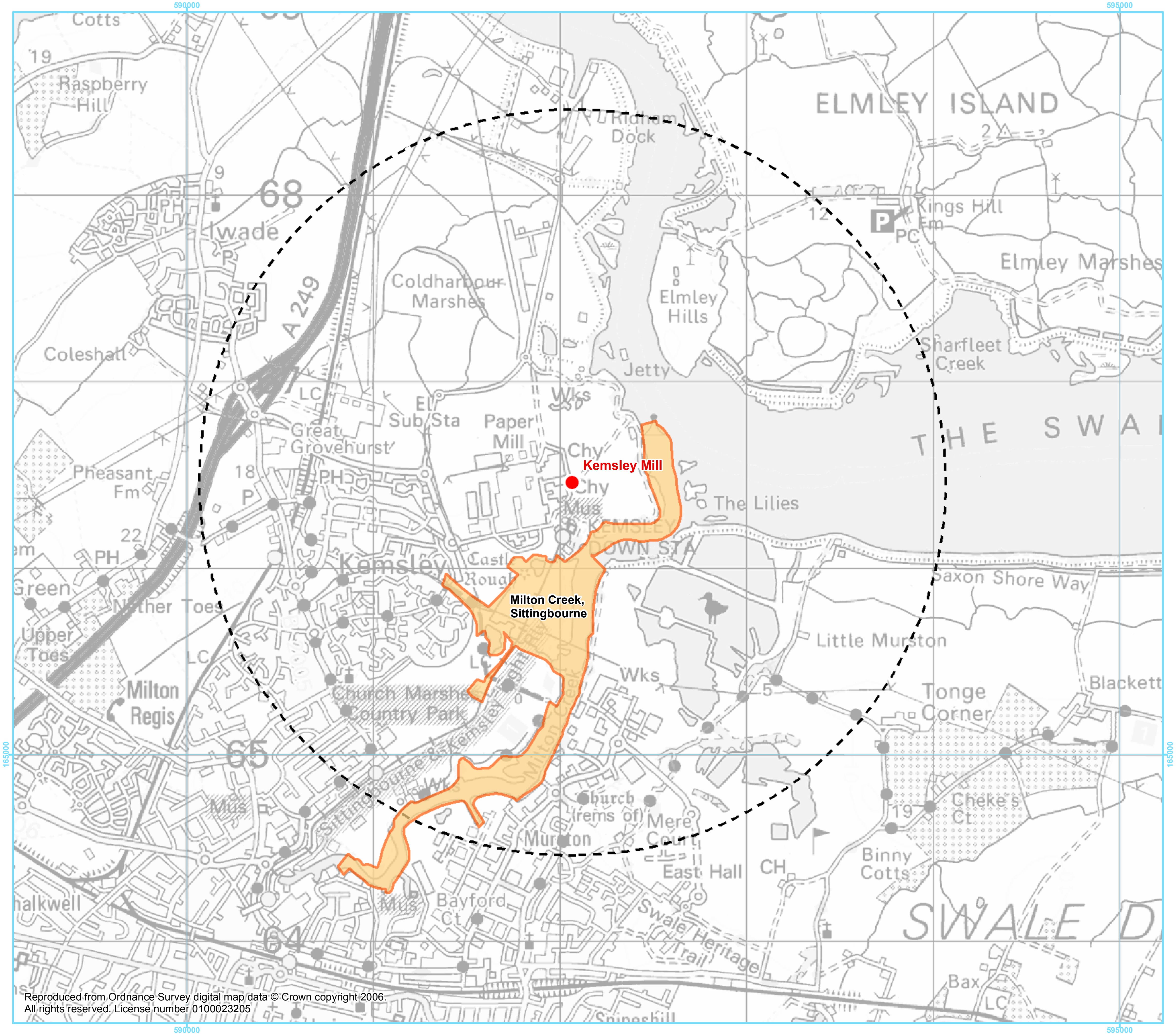

Drawing Ref:

Legend

- Site location
- 2km buffer
- Sites of Importance for Nature Conservation

0 250 500 750 1,000 1,250 m

RPS

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Project: Kemsley Mill Impact Assessment

Title: Non-statutory sites within 2km from proposed Sustainable Energy Plant

Date: Oct 2007 Scale: 1:20,000 @A3

Drawn: KM Checked: JD

Drawing based upon: British National Grid

Job: **JPP1732** Figure No: **3.2** Rev: **B**

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Development of a Sustainable Energy Plant.

St Regis Paper Mill, Kemsley

On behalf of St. Regis Paper Mill Co.

Environmental Statement

Appendix 9.3:

Bird Surveys 2009

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RPS Planning & Development

Notice to Interested Parties

To achieve the study objectives stated in this report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of e.g. species abundances or habitat management efficacy described in the report.

Document Information

Report title:	Kemsley Mill: Intertidal and breeding bird surveys 2009
Client:	Grovehurst Energy Ltd.
Document ref:	JPP1804-R-002b
Author:	Robin Ward & Alan Bull
Surveyors:	Alan Bull, Neal Gates & Rob Martin
Report date:	26th June 2009

Checked by:	Roger Buisson	[redacted]	30/06/09
Authorised by:	Roger Buisson	[redacted]	30/06/09

CONTENTS

TABLES

FIGURES

0 EXECUTIVE SUMMARY

0.1 RPS were commissioned by Grovehurst Energy Ltd. in 2009 to undertake ornithological surveys of a brownfield site to the east of Kemsley Paper Mill, Sittingbourne, to inform as considered necessary the proposed development of the site and the construction of a sustainable energy facility.

0.2 Kemsley Mill is located on the south bank of the Swale Estuary which is designated under European Law as a Special Protection Area. There is the potential for the proposed development to have an effect on the adjacent Swale SPA. As a result it is necessary to implement a study to assess the numbers and usage of the site by non-breeding waterbirds. The nature of the site and that of the proposed development also requires an evaluation to be undertaken as to the site importance for breeding birds and its immediate surrounds.

0.3 The area surveyed for breeding birds comprises of 6.5 hectares of land forming a large mound mainly covered in Blackthorn scrub with small open areas of grassland mixed with a few very shallow pools.

0.4 The aims and objectives of this study was within the study area to (i) undertake through the tidal cycle diurnal distributional intertidal counts of waterbirds during February – May 2009 and (ii) six surveys of breeding birds using the study area's terrestrial habitats during March – June 2009. Consideration is given to the implications of the development proposals in relation to the birds recorded during the study, based on an initial indication of the scheme proposals.

0.5 In February-May 2009, 36 species of waterbirds were recorded using the study area's intertidal habitats that are within the vicinity of Kemsley Mill. Of these, 19 were considered of conservation value as species listed on the designation for The Swale SPA, and Swale SSSI. Observations suggested these designated areas provided the main high water refuges for waterbirds using the study area; the majority of birds would relocate downstream with tidal inundation of the study area.

0.6 The diurnal counts of two species of waterbird, Avocet and Black-tailed Godwit during late winter 2008/09 (February-March), suggest the study area to be of national importance for this species. Significant proportions (>5%) of The Swale SPA populations for six waterbirds species were recorded (Shelduck, Avocet, Ringed Plover, Dunlin, Black-tailed Godwit and Redshank).

0.7 In late winter 2008/09 (February-March), diurnal counts of five species of waterbirds (Shelduck, Avocet, Ringed Plover, Dunlin and Black-tailed Godwit) in the study area exceeded 5% of the winter five-year peak mean counts for the Swale Estuary as published by the Wetland Bird Survey (2002/03 – 2006/07).

0.8 The numbers of waterbirds counted in spring 2009 (April-May), suggest the study area not to be of international or national importance for any species. However a significant proportion (>5%) of The Swale SPA population of one species Ringed Plover was counted.

0.9 The species present on the intertidal mudflats were primarily using the area for feeding. This is recognised as being an important activity in maintaining the birds in viable condition for migration and breeding. The species present on the areas of saltmarsh and the land adjoining Elmley were predominantly roosting.

0.10 In providing these conclusions it is acknowledged that it is based on one February-May period of targeted study.

0.11 A total of 55 species of birds were recorded during the breeding bird surveys. Of the species recorded 30 species were confirmed to be breeding and 5 species possibly breeding, resulting in a breeding bird assemblage of 35 species. The breeding bird assemblage is considered to be of no more than local importance.

0.12 Three specially protected (Annex 1/Schedule 1) species were recorded on the site (Marsh Harrier, Cetti's Warbler and Bearded Tit) along with six species on the Red List of Birds of Conservation Concern (Turtle Dove, Cuckoo, Skylark, Song Thrush, Starling and Linnet) and eight listed through Section 41 of the NERC Act as species of principal importance for biodiversity (Linnet, Skylark, Turtle Dove, Song Thrush, Dunnock, Cuckoo, Starling and Reed Bunting).

0.13 The population of two species within the survey area are considered to be of county importance based on the Local Wildlife Site designation criteria: Cetti's Warbler and Bearded Tit, with 4.5% and 3% of the county population respectively. The Marsh Harrier population within the study site is also approaching that of county importance.

1 INTRODUCTION

Background to the study

1.1 RPS were commissioned by Grovehurst Energy Ltd. in 2009 to undertake ornithological surveys of a brownfield site to the east of Kemsley Paper Mill, Sittingbourne, to inform as considered necessary the proposed development of the site and the construction of a sustainable energy facility. The ornithological surveys were to evaluate the importance of (1) the site for breeding birds and (2) the adjacent Swale Estuary for waterbirds within the potential zone of influence from the proposed development. This potential zone of influence from on-site activities, noise and visual impacts only, was taken to be 500 metres

Legislation

1.2 Where there is the potential of the proposed development to have an effect on the adjacent Swale SPA, for instance through the disturbance of waterbirds feeding, it is necessary to implement a study of the non-breeding waterbirds present. Kemsley Mill is immediately adjacent to the Swale Special Protection Area (SPA).

1.3 The legislative provisions for the protection of wild birds in the UK are contained primarily in Section 1- 7 of the Wildlife and Countryside Act (WCA) 1981 (as amended; Anon 1981). Under the WCA, a wild bird is defined as any bird of a species that is resident in or is a visitor to the European Territory of any member state in a wild state.

1.4 The Act affords legal protection to all birds, their nests and eggs, and further statutory protection is afforded to those species listed under Schedule 1 of the WCA, for which it is an offence to intentionally or recklessly disturb at, on or near an active nest of a species listed on the schedule.

Aims and objectives

Intertidal waterbird survey

1.5 The aims and objectives of the intertidal waterbird survey were to:

- Record the waterbird species, their abundance and distribution in the study area during February-May 2009.
- Consider the implications of the development proposals in relation to the birds recorded during the study based on an initial indication of the scheme.

1.6 The collected data will be presented to illustrate the spatial distributions and densities of species within the survey area. Analysis will consider species populations recorded during the surveys in comparison to species citations for the SPA in order to consider the relative importance of the survey area.

1.7 The distributional information gathered for the waterfowl will also be compared to the most recent Wetland Bird Survey bird data for the Swale Estuary, in order to put into context the birds present in the study area.

Survey of breeding birds

1.8 The aims and objectives of the survey for breeding birds were as follows:

- Carry out six surveys by an experienced ornithologist.
- Identify whether the site supported any specially protected species or species of particular conservation concern.
- Provide baseline information of the current status of the survey area in respect of breeding birds.
- Provide information considering any potential impacts of the development proposals to the breeding birds identified in the study area.

Study area

1.9 The proposed area of development is situated on what was once Kemsley Marshes, to the immediate east of Kemsley Paper Mill, situated adjacent to the Swale Estuary, Kent. Most of the site has been levelled with an aggregate of soil and stone to create a large expanse of bare ground. Recently large piles of spoil (earth and rubble) had been deposited across the site.

1.10 The exact development footprint was undecided at the time of survey, so the text relates to the entire survey area, which covered some 6.5 ha, and included the habitats immediately adjacent to the levelled site (Appendix B, Figure 1).

1.11 The site area has generally flat topography, except where the ground has been levelled which has created slight artificial slopes down to the surrounding area and in the areas of the spoil piles. A drainage ditch runs along the western boundary of the site in a north-south orientation and is connected to the marshland to the north of the site.

1.12 Much of the surrounding area to the north-east, east and south of the site has national designations for nature conservation associated with it.

1.13 Beyond Kemsley Marshes, the Knauf Drywall Ltd production facilities are located to the north, Kemsley Paper Mill to the west, an area of what was previously landfill to the south and the Swale Estuary to the east.

Designated sites within 2 km of Kemsley Mill

1.14 Table 1.1 presents the protected sites present on the Swale Estuary that lie within 2 km of Kemsley Mill. The Swale SSSI is listed as a component of the The Swale SPA. These sites are indicated in Appendix B, Figure 2, which presents their location in relation to Kemsley Mill.

Table 1.1: Designated sites within 2 km of the study area

Site name	Type	Approximate area (ha)	Condition summary	Interest Features (Source: Natural England 2008, JNCC 2006, JNCC 2008)	Distance from site (km)
The Swale	SPA Ramsar SSSI	6,515	Favourable	Supports nationally important populations of breeding Annex 1 species including Little Tern and Mediterranean Gull; wintering Annex 1 species including Avocet and Golden Plover. Supports populations of international importance of migratory Ringed Plover, Wigeon, Pintail, Shoveler, Grey Plover, Redshank and Black-tailed Godwit. - Also supports an assemblage of over 20,000 waterbirds.	0

1.15 There are other internationally and nationally designated sites that are located between 2 and 5 km from Kemsley Mill and therefore are less likely to be affected by the proposed development scheme. Those additional sites within 5km of Kemsley Mill are detailed in Table 1.2.

Table 1.2: Additional designated sites located within 5 km of Kemsley Mill

Site name	Type	Approximate area (ha)	Interest Features (Source: JNCC 2008)	Distance from site (km)
Medway Estuary and Marshes	SPA Ramsar SSSI	4,684	Supports nationally important populations of breeding Annex 1 species including Avocet and Little Tern; wintering Annex 1 Avocet. Supports populations of international importance of migratory Dark-bellied Brent Goose, Shelduck, Pintail, Ringed Plover, Grey Plover, Dunlin, Black-tailed Godwit and Redshank. Also supports an assemblage of over 20,000 waterbirds.	2.4

The Swale SPA

1.16 The Swale SPA is an estuarine area that separates the Isle of Sheppey from the mainland of Kent and adjoins the Medway Estuary to the west. It is a complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarshes and mudflats. The intertidal flats are extensive, especially in the east of the site.

1.17 Almost half of The Swale SPA includes the largest remaining areas of freshwater grazing marsh in Kent. This comprises a total area in excess of 3,100 ha. A diversity of grazing management regimes helps maintains the suitability of the grassland as winter feeding and breeding habitat for important numbers of wildfowl and waders.

1.18 Mudflats are the second most extensive habitat, with over 2,400 ha present. The intertidal mud provides foraging habitat for species such as Avocet, which feed on the invertebrates present in the mud. The Swale is of particular importance for breeding Avocet and for internationally important numbers of wintering species such as Dunlin, Grey Plover and Black-tailed Godwit, as well as the overall waterbird assemblage.

1.19 Saltmarsh habitat is less prevalent in the SPA than intertidal mud, although where present it provides important roost sites for birds.

1.20 The Swale Estuary is contiguous with one other substantial estuary in south-east England, the Medway (Table 1.2). It is known that there is significant movement between these two sites by several species (Musgrove *et al.* 2003).

1.21 The full original citation for the The Swale SPA is given in Table 1.3. This is based on peak mean data from 1991/2 to 1995/6 and is the currently presented citation referenced by JNCC (2006a).

Table 1.3: SPA cited species for The Swale SPA (based on original 1996 citation).

Cited species and reasons for qualifying	% of biogeographical population (5 year peak mean 1991/2-1995/6)
Article 4.2 - Over winter the area regularly supports:	
Dark-bellied Brent Goose *Pluvialis squatarola*	0.9% of the Western Siberia/Western Europe population
Dunlin *Calidris alpina alpina*	2.1% of the population in Great Britain
Redshank *Tringa totanus*	0.9% of the East Atlantic wintering population
Cited species and reasons for qualifying	
Article 4.2: An internationally important assemblage of birds - during the breeding season the area regularly supports: Reed Warbler, Teal , Mallard, Gadwall, Ringed Plover, Reed Bunting, Coot , Moorhen, Oystercatcher, Curlew, Grey plover, Shelduck, Redshank, Lapwing.	
Article 4.2: An internationally important assemblage of birds - over winter the area regularly supports: 65,588 waterbirds (5 year peak mean 01/04/1998) Including: Dark-bellied Brent Goose, Gadwall, Teal, Oystercatcher, Ringed Plover,Grey Plover, Dunlin Curlew, Redshank .	

2 METHODS

Breeding Birds

2.1 The survey methodology involved standard territory (registration) mapping techniques as detailed in Bibby *et al.* (2000). This method is based on the observation that many species during the breeding season are territorial. This is found particularly amongst passerines, where territories are often marked by conspicuous song, display, and periodic disputes with neighbouring individuals. Registrations of birds were recorded using standard British Trust for Ornithology (BTO) two letter species codes (BTO 2008). Specific codes were also used for singing, calling, movements between areas, flying, carrying food, nest building, aggressive encounters and other behaviour.

2.2 The expected outcome of this technique is that mapped registrations fall into clusters, approximately coinciding with territories. Where a species has closely packed territories (e.g. Reed Warbler), the mapping of simultaneously singing birds becomes essential. Territory boundaries are taken to be between such birds.

2.3 The study area was walked at a slow pace in appropriately fine weather in order to locate and identify all individual birds. All field boundaries and suitable breeding habitats were walked. Visits were undertaken early in the morning, generally between 05:30–10:00. The whole survey area was covered in each visit, using suitable optical equipment to observe bird behaviour. Survey routes were mapped and routes were alternated on each visit, to ensure that all areas were covered at various times of day across the duration of the survey.

2.4 Surveys were undertaken between April and June 2009 with a total of six survey visits taking place. The survey visits were as follows:

- 1st April
- 9th April
- 24th April
- 8th May
- 19th May
- 3rd June

2.5 The locations of birds were recorded directly into ESRI Arcpad GIS Software on handheld PDA devices, with a 1:10,000 scale Ordnance Survey base map of the study area (and adjacent land). The two ornithologists involved in surveys were proficient in the use of this method and equipment having undertaken such surveys on numerous occasions previously around the UK on coastal, estuarine and inland terrestrial and wetland sites. This is considered to be a robust and reliable method for recording birds and plotting their distribution.

2.6 A fresh master field map on the PDA was used on each survey visit. These were then used to create individual species master maps, following the completion of the surveys. This data analysis follows procedures detailed in Gilbert *et al.* (1998). From species master maps, the number of territories for each species was calculated. If there are eight or fewer (as in this case) survey visits during the period when a species is expected to be present, it is necessary to use at least two registrations of a bird, in the same area, as the minimum required to assume a breeding territory.

2.7 For late arriving migrants, e.g. Spotted Flycatcher, for which fewer potential contacts are possible, only one registration is required, which can also be applied to inconspicuous species, e.g. Lesser Spotted Woodpecker. A number of species are not territorial and are dealt with appropriately, e.g. Linnet, where data represent aggregations or loose colonies.

2.8 Standard registration mapping techniques were also used to record non-breeding species.

2.9 The following definitions have been used to identify the breeding status of the species recorded.

- **Confirmed Breeding**: Includes species for which territories were positively identified as a result of the number of registrations, the location of an active nest, the presence of recently fledged young or downy young.
- **Probable Breeding**: Includes a pair observed in suitable nesting habitat in breeding season, agitated behaviour or anxiety calls from adults, suggesting probable presence of nest or young nearby. Behaviour was observed on insufficient occasions to confirm the presence of a territory.
- **Possible Breeding**: Includes species observed in breeding season in suitable nesting habitats, singing male present (or breeding calls heard) in breeding season in suitable breeding habitat.
- **Non Breeding**: Fly-over species observed but suspected to be still on migration. Species observed but suspected to be summering non-breeder.

2.10 An assessment of the ornithological importance of the survey area was made by evaluating the species recorded as breeding against the following criteria:

- Annex I of the EU Birds Directive (EU 1979);
- Schedule I of the Wildlife and Countryside Act (1981, amended 1985);
- Species listed in Section 41 of the Natural Environment and Rural Communities Act 2006 as being of principal importance for the conservation of biodiversity in England (Anon 2006).
- Birds of Conservation Concern (BoCC) Red List (Eaton *et al.*, 2009);

- Birds of Conservation Concern (BoCC) Amber List (Eaton *et al*., 2009);

2.11 Annex I species are Species listed on Annex I of EC Directive 79/409/EEC on the Conservation of Wild Birds, requiring the UK Government to take special measures, including the designation of Special Protection Areas, to ensure the survival and reproduction of these species throughout their area of distribution.

2.12 The Wildlife and Countryside Act 1981, as amended, makes it an offence (with exception to species listed in Schedule 2, previously referred to as 'pest' species, now covered by a general licence) to:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while it is being built or in use; and
- take or destroy the eggs of any wild bird.

2.13 Special penalties exist for offences related to species listed on Schedule 1, for which there are additional offences of disturbing these birds at their nests, or their dependent young.

2.14 Species listed under Section 41 of the NERC Act 2006, are capable of being a material consideration in the making of planning decisions (ODPM 2005a). Planning Policy Statement 9 (PPS9; ODPM 2005b) states that 'Local Authorities should ensure that these species are protected from the adverse effects of development, where appropriate, by using planning conditions or obligations. In addition, Planning Authorities should refuse development where harm to the species or their habitats would result, unless the need for, and benefits of, the development clearly outweigh that harm'.

2.15 Species listed on the Birds of Conservation Concern (BoCC) Red List are those that have declined in numbers by 50% over the last 25 years, those that have shown an historical population decline between 1800 and 1995 and species that are of global conservation concern. The 52 species on the Red List are of the most urgent conservation concern.

2.16 Amber-listed species, of which there are currently 126, include those that have shown a moderate decline in numbers (25%-49%) over the last 25 years and those with total populations of less than 300 breeding pairs. Also included are those species which represent a significant proportion (greater than 20%) of the European breeding or wintering population, those for which at least 50% of the British population is limited to 10 sites or less, and those of unfavourable conservation status in Europe.

2.17 The remaining species are placed on the Green list, indicating that they are of low conservation priority.

Intertidal Waterbird Surveys

2.18 The aim was to undertake two surveys at low tide and two surveys at high tide each month. Each survey covered a six hour period (three hours either side of high/low tide).

2.19 A total of sixteen survey visits were undertaken during February to May. The survey dates and details are tabulated in Table 2.1

Table 2.1: Intertidal Waterbird Survey dates, tide times & heights and observers.

Date	Time of low tide	Tide height (m)	Time of high tide	Tide height (m)	Observers
5th February 2009	13.39	1.5			Rob Martin
11th February 2009			13.10	6.0	Neal Gates
18th February 2009	12.14	1.6			Neal Gates
23rd February 2009			11.55	5.3	Alan Bull
6th March 2009	13.33	1.6			Rob Martin
10th March 2009			12.08	5.8	Rob Martin
19th March 2009	11.25	1.7			Alan Bull
26th March 2009			12.33	5.6	Neal Gates
7th April 2009			11.58	5.6	Rob Martin
17th April 2008	11.50	1.6			Rob Martin
23rd April 2009			12.19	5.5	Alan Bull
30th April 2009	10.51	1.1			Rob Martin
1st May 2009	11.43	1.3			Rob Martin
8th May 2009			12.59	5.6	Rob Martin
18th May 2009	13.27	1.7			Rob Martin
21st May 2009			10.47	5.2	Alan Bull

2.20 The full extent of the intertidal survey area is shown in Appendix B, Figure 3.

2.21 Observations during the survey were made from the sea wall, which provided a suitable vantage point to observe all birds without causing undue disturbance. One experienced ornithologist, equipped with binoculars and telescopes of appropriate magnification, walked slowly along their section of the site once hourly. Observers retraced their route of the first count during the second count, the procedure thereafter repeated for the remaining counts of the survey. As the site was a linear area with good visibility, birds could be observed from distance to avoid disturbance and to ensure that if any moved they were not double-counted.

2.22 The location and extent of flocks and individual waterbirds were recorded directly into ESRI Arcpad GIS Software on handheld PDA devices, with a 1:10,000 scale Ordnance Survey base map of the study area (and adjacent land). A 50 m x 50 m grid was overlaid on top of the base map to assist with the distributional analysis. The distance from the recorder to a bird flocks was assessed through the use of this grid and through the use of landmarks present in the landscape and on the base map, which could be scaled as desired in the field. Birds were either plotted as individual counts at a location or as a flock, the extent of which could be plotted electronically directly onto the base map on the hand held PDAs. The ornithologists were proficient in the use of this method and equipment having undertaking such surveys on numerous occasions previously around the UK on coastal, estuarine and inland terrestrial and wetland sites. This is considered to be a robust and reliable method for recording birds and plotting their distribution.

2.23 On returning to the office the collected data, contained on flash memory cards, were down loaded into ESRI ArcGIS software and distribution maps produced.

2.24 In addition to the waterbirds recorded along the intertidal areas, any observations of high tide wader roosts and raptors such as harriers and owls on the surrounding terrestrial areas were recorded.

3 DEFINITIONS

3.1 The definition of waterbirds used in this study is in accordance with the Ramsar convention upon which the SPA citation was based (Ramsar 2007) i.e. "birds ecologically dependent on wetlands". At the broad level of taxonomic order this is as follows (species groups in bold are considered likely to be observed at Kemsley):

- penguins: *Sphenisciformes*.
- **divers**: *Gaviiformes*;
- **grebes**: *Podicipediformes*;
- wetland related pelicans, **cormorants**, darters and allies: *Pelecaniformes*;
- **herons**, **bitterns**, storks, ibises and spoonbills: *Ciconiiformes*;
- flamingos: *Phoenicopteriformes*:
- screamers, **swans**, **geese** and **ducks** (wildfowl): *Anseriformes*;
- wetland related **raptors**: *Accipitriformes* and *Falconiformes*;
- wetland related cranes, **rails** and **allies**: *Gruiformes*;
- Hoatzin: *Opisthocomiformes*;
- wetland related jacanas, **waders** (or shorebirds), **gulls**, skimmers and **terns**: *Charadriiformes;*
- coucals*: Cuculiformes;* and
- wetland related owls: *Strigiformes*;

This study surveyed for all waterbirds with the exception of gulls (*Laridae*) which were only counted when surveyors considered this would not be to the detriment of accurately surveying other species groups. The term waterfowl has the same meaning within the context of this study.

3.2 For the purposes of the analysis, the term 'spring' is used to indicate the general period of spring migration (April - June), and 'winter' the period November to March, these definitions as used by Wetland Bird Survey (WeBS).

3.3 For the purposes of the analysis, the tidal cycle is divided into four periods. The term 'low tide' is used to indicate the period two hours either side of low tide, 'high tide' the period two hours either side of high tide, and the two intervening periods 'flood' and 'ebb' that fall before and after high tide respectively. A high proportion of birds feed during low water when the position of the tideline (and thus food availability) is relative stable, resulting in relatively small changes in the distribution and numbers of foraging birds. Changes in bird distribution are most pronounced during the ebb and flood tides as availability of intertidal areas rapidly change and birds fly to/from high water roost sites.

4 RESULTS: SURVEY OF BREEDING BIRDS

4.1 A total of 55 species were recorded during the breeding bird survey. A full list of these species and scientific names can be found in Appendix A. Of the 55 species recorded, 30 species were confirmed to be breeding and 5 species were considered to be possibly breeding resulting in a breeding bird assemblage of 35 species with the remaining 20 species considered to be non-breeding records. A summary of the breeding status of these 55 species, with the numbers of territories identified (or thought likely in the case of probable and possible) is provided in Table 4.1.

Table 4.1: The breeding and conservation status of birds recorded at Kemsley Mill site in 2009

Species	Breeding Status	Number of Confirmed Territories	Annex I EU Birds Directive[1]	Schedule I Wildlife & Countryside Act 1981[2]	NERC Act Section 41 species[3]	Birds of Conservation Concern[4]
Greylag Goose	Non-breeding					Amber
Shelduck	Possible					Amber
Gadwall	Non-breeding					Amber
Mallard	Non-breeding					Amber
Tufted Duck	Non-breeding					Amber
Marsh Harrier	Confirmed	1	•	•		Amber
Kestrel	Non-breeding					Amber
Red-legged Partridge	Non-breeding					
Pheasant	Confirmed	1				
Moorhen	Possible					
Black-headed Gull	Non-breeding					Amber
Feral Pigeon	Non-breeding					
Stock Dove	Possible					Amber
Woodpigeon	Confirmed	7				

Species	Breeding Status	Number of Confirmed Territories	Annex 1 EU Birds Directive[1]	Schedule 1 Wildlife & Countryside Act 1981[2]	NERC Act Section 41 species[3]	Birds of Conservation Concern[4]
Collared Dove	Non-breeding					
Turtle Dove	Confirmed	1 - 2			•	Red
Cuckoo	Possible				•	Red
Swift	Non-breeding					Amber
Green Woodpecker	Non-breeding					Amber
Skylark	Probable	1			•	Red
Sand Martin	Non-breeding					Amber
Swallow	Non-breeding					Amber
Meadow Pipit	Confirmed	1				Amber
Yellow Wagtail	Non-breeding				•	Red
Grey Wagtail	Non-breeding					Amber
Pied Wagtail	Non-breeding					
Wren	Confirmed	17				
Dunnock	Confirmed	14			•	Amber
Robin	Confirmed	2				
Nightingale	Confirmed	1				Amber
Ring Ouzel	Non-breeding				•	Red
Blackbird	Confirmed	7				
Song Thrush	Confirmed	7			•	Red
Cetti's Warbler	Confirmed	6		•		
Sedge Warbler	Confirmed	7				
Reed Warbler	Confirmed	22				
Lesser Whitethroat	Confirmed	1				
Whitethroat	Confirmed	15				Amber
Garden Warbler	Confirmed	1				
Blackcap	Confirmed	1				
Bearded Tit	Confirmed	2		•		Amber
Long-tailed Tit	Possible					
Blue Tit	Confirmed	5				

Species	Breeding Status	Number of Confirmed Territories	Annex I EU Birds Directive[1]	Schedule I Wildlife & Countryside Act 1981[2]	NERC Act Section 41 species[3]	Birds of Conservation Concern[4]
Great Tit	Confirmed	3				
Magpie	Confirmed	3				
Rook	Non-breeding					
Carrion Crow	Confirmed	1				
Starling	Confirmed	1			•	Red
House Sparrow	Non-breeding				•	Red
Chaffinch	Confirmed	3				
Greenfinch	Confirmed	1				
Goldfinch	Confirmed	2				
Linnet	Confirmed	7			•	Red
Lesser Redpoll	Non-breeding				•	
Reed Bunting	Confirmed	5			•	Amber

Notes on Table 3.1:
1. Species included on Annex 1 of the EU Birds Directive (79/409/EEC).
2. Species protected by Schedule 1 of the Wildlife & Countryside Act 1981.
3. Species listed through Section 41 of the Natural Environment and Rural Communities Act 2006 as being of principal importance for the conservation of biodiversity in England
4. Species on the Birds of Conservation Concern Red list (Eaton *et al*., 2009).

5 RESULTS: WATERBIRD SPECIES SURVEYS

Abundance of Waterbirds

5.1 A total of 31 and 27 species of waterbirds (excluding gulls) were recorded using the intertidal study site in February–March 2009 and April-May 2009 respectively. A full list of species cited in this report together with vernacular and scientific names is included in Appendix A. Table 5.1 summarises the peak counts by month and season, for each species recorded during the survey visits.

5.2 The peak waterbirds counts recorded for February-March 2009 and April-May 2009 were 2,357 and 1,047 respectively.

5.3 Summation of the individual species maxima during a season, irrespective of the count in which they occurred, provides a total waterbird assemblage for the season. This represents the minimum number of individual waterbirds using the area during the duration of the survey period. The total waterbird assemblage as recorded by the surveys in February-March 2009 and April-May 2009 was 3,771 and 1,295 birds respectively.

Spatial and temporal distribution of intertidal waterbirds

5.4 The species, for which detailed accounts are given in this section, were chosen on the following criteria:

- A waterbird species cited as part of the interest feature of the Swale SPA (JNCC 2006). These are Dark-bellied Brent Goose, Shoveler, Teal, Oystercatcher, Ringed Plover, Grey Plover, Dunlin, Curlew and Redshank.

- A waterbird species cited as part of the interest feature of Swale Ramsar site (JNCC 2008) under (i) Ramsar criterion 6 (species/populations occurring at levels of international importance) and (ii) 'noteworthy fauna' as species outside the breeding season currently occurring at national levels. These species are in addition to those already mentioned, Little Grebe, Little Egret, White-fronted Goose, Shelduck, Wigeon, Pintail, Golden Plover, Lapwing, Knot, Ruff, Black-tailed Godwit, Whimbrel, Spotted Redshank and Greenshank.

- Those waterbird species that were considered part or wholly ecologically dependant upon the intertidal flats where their numbers exceeded a peak of 25 birds.

Of the remaining waterbird species observed (and listed in Appendix A), none were recorded in nationally important numbers.

Table 5.1: Peak counts of all waterbird species recorded by intertidal surveys of the study area in February – May 2009.

Month	February	March	Winter peak count	April	May	Spring peak count
Little Grebe	21	1	21	2	0	2
Great Crested Grebe	2	3	3	9	4	9
Cormorant	2	3	3	2	2	2
Little Egret	1	1	1	0	2	2
Grey Heron	1	0	1	0	0	0
Canada Goose	4	0	4	0	0	0
Dark-bellied Brent Goose	0	0	0	12	0	12
Shelduck	102	76	102	29	8	29
Wigeon	158	72	158	0	0	0
Gadwall	0	0	0	1	0	1
Teal	403	269	403	58	0	58
Mallard	0	2	2	2	4	4
Pintail	174	36	174	0	0	0
Shoveler	3	0	3	0	0	0
Tufted Duck	0	0	0	0	1	1
Red-breasted Merganser	10	7	10	0	0	0
Goldeneye	2	1	2	0	0	0
Moorhen	2	0	2	1	0	1
Oystercatcher	600	240	600	73	38	73
Avocet	80	60	80	18	15	18
Ringed Plover	28	4	28	4	1	4
Grey Plover	62	27	62	1	2	2

Month	February	March	Winter peak count	April	May	Spring peak count
Lapwing	48	0	48	0	0	0
Knot	35	8	35	10	0	10
Dunlin	223	1	223	0	0	0
Snipe	8	24	24	4	0	4
Black-tailed Godwit	1,500	675	1,500	919	0	919
Bar-tailed Godwit	0	1	1	1	0	1
Whimbrel	0	0	0	4	9	9
Curlew	51	156	156	40	10	40
Redshank	205	210	210	73	2	73
Greenshank	1	1	1	3	2	3
Green Sandpiper	3	1	3	2	0	2
Common Sandpiper	1	0	1	2	1	2
Turnstone	44	68	68	12	0	12
Mediterranean Gull	0	1	1	2	2	2
Black-headed Gull	49	95	95	130	186	186
Common Gull	2	1	2	2	0	2
Lesser Black-backed Gull	3	1	3	0	0	0
Herring Gull	2	4	4	3	5	5
Great Black-backed Gull	3	0	3	1	0	1
Common Tern	0	0	0	2	3	3
Peak Visit Count	**2,357**	**1,451**	**2,357**	**1,047**	**64**	**1,047**
Total waterbird assemblage Peak	**3,774**	**1,947**	**3,929**	**1,288**	**114**	**1,296**

Note:
Peak Visit Count represents the greatest number of waterbirds observed in a single count*.
Total Waterbird Assemblage Peak represents the total sum of all the species peak numbers*.
*excluding gulls *Laridae*

5.5 Monthly peak and mean diurnal counts for each hour of the tidal cycle are presented graphically for 13 species that fit the above criteria. The graphs provide a snapshot of the abundance and temporal distribution of the individual species by day. They are expected to highlight any notable changes that may be related to tidal state and changing months. The graphs show how the peak or mean number change from high tide, through the ebb to low tide and then back to high tide.

5.6 Spatial distribution figures for 14 of the selected species are presented for two diurnal tidal survey periods, these being when the intertidal flats are (i) in part or wholly exposed (during the ebb, low & flood tide periods; referred to as "low water period"), and (ii) inundated by the tide (at high tide; "high water period") [see Figures in Appendix C]. For the majority of waterbirds, these two tidal periods represent when and when not their intertidal feeding grounds are available respectively. Separate maps are provided for each of the two seasons, late winter and spring, when for some species different populations are known to be using the site e.g. Dunlin, and seasonal differences can exist in the food resources utilised.

5.7 The high water maps have been plotted using the maximum species count occurring in each of the grid squares from the surveys. Therefore they do not represent a total of individuals across the site but the peak usage of each 50 m x 50 m grid square by the target species. The maps show the spatial distribution of the individual target species. They are expected to highlight those areas that are important to the target species each season (or part of) surveyed when feeding areas are unavailable. For the remaining target species for which only small numbers of birds were recorded in the study area, their distribution is described briefly below.

5.8 The low water maps have been plotted using the peak summed counts of each tidal period (four hours either side of low tide) occurring in each of the grid squares from the surveys. Therefore they do not represent a total of individuals across the site but the peak of the total number of bird hours of use of each 50 m x 50 m grid square by the target species per period of tidal flat exposure i.e. four hours either side of low tide. The maps show the spatial distribution of the individual target species. They are expected to highlight those areas that are important to the target species each season (or part of) surveyed for foraging areas. For the remaining target species for which only small numbers of birds were recorded in the study area, their distribution is described briefly below.

5.9 Brief summary texts accompany the graphs and maps highlighting the key points from the available data for each species.

Little Grebe

(see figures 5.1, 5.2 and C.1-C.2)

5.10 The small numbers of birds present during February were present during all tidal states. A single and two birds only were recorded on single dates in March and April. Site usage notably peaked over the low water period.

5.11 All records of Little Grebe were from birds on water with site usage during the low water period concentrated within the stretch of the Elmley Reach immediately adjacent to the proposed development.

Figure 5.1: Peak numbers of Little Grebe at hourly intervals through the tidal cycle during February - May 2009

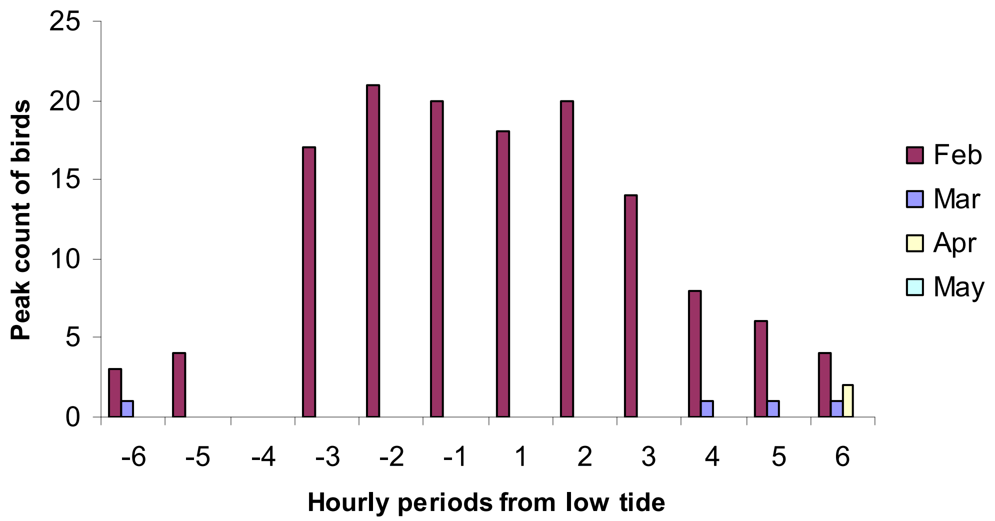
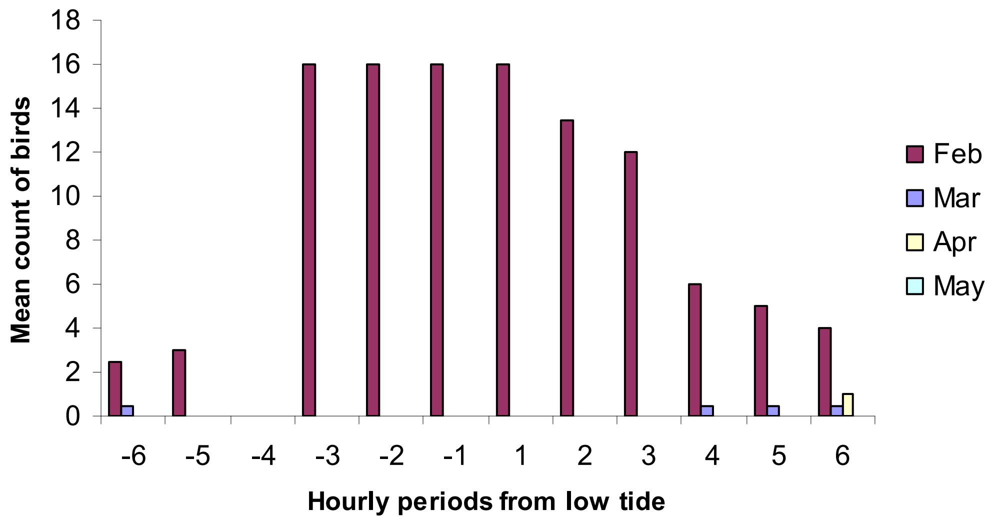


Figure 5.2: Mean numbers of Little Grebe at hourly intervals through the tidal cycle during February - May 2009



Little Egret

5.12 Little Egrets were recorded only on five out of the sixteen survey visits, one only during spring, and then numbering no more than two individuals. Recorded in February – March and early May, birds were present at times during high, ebb and low tides.

Dark-bellied Brent Goose

5.13 The only records of Dark-bellied Brent Goose were of twelve birds feeding on the intertidal flats during the ebb tide of 17th April.

Shelduck

(see figures 5.3, 5.4 and C.3-C.6)

5.14 From early February, Shelduck numbers declined from a peak of 102 birds through late winter to less than ten throughout the latter half of spring. Use of the study area by Shelduck was focused during the low water period, when mudflats were exposed allowing birds to forage. The vast majority of birds vacated the site over high tide to presumably roost elsewhere.

5.15 In late winter, Shelduck usage during the low water period was predominately distributed in the central part of the survey area on the eastern lower intertidal flats of Elmley Reach. In spring, the small numbers of birds present showed a much more dispersed pattern of usage across the study area in the low water period. At high tide, birds were focused around the saltmarsh islands, the Lilies and, in late winter, within the bay on the Elmley side opposite to the proposed development.

5.16 The majority of birds were recorded foraging.

Figure 5.3: Peak numbers of Shelduck at hourly intervals through the tidal cycle during February - May 2009

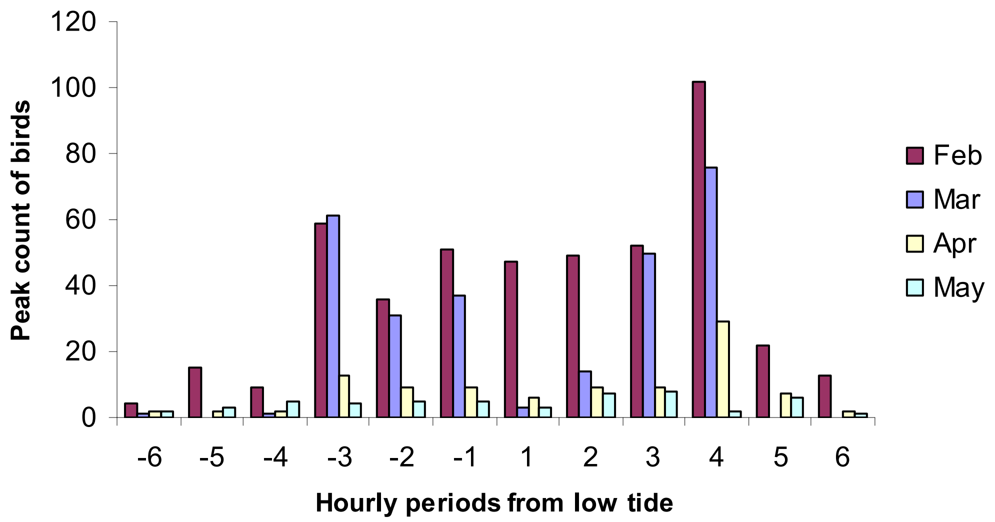
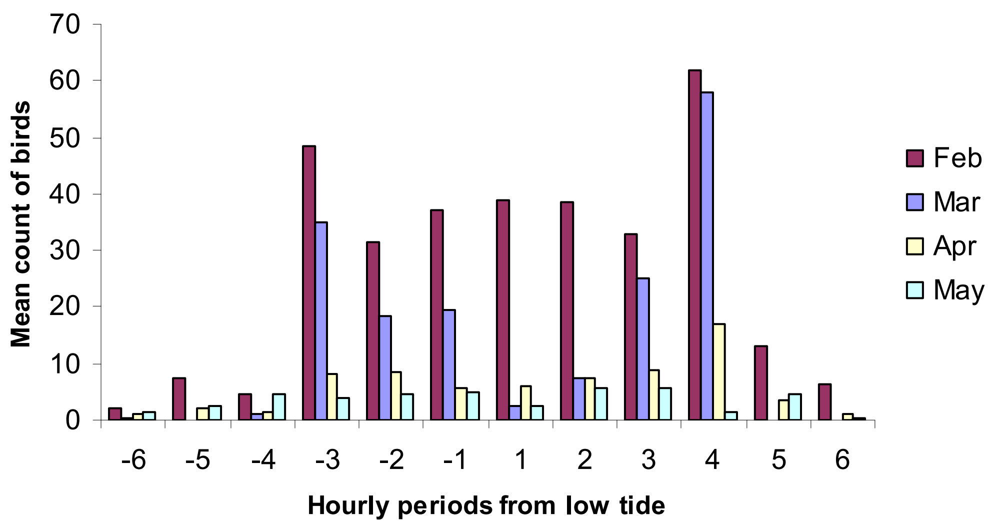


Figure 5.4: Mean numbers of Shelduck at hourly intervals through the tidal cycle during February - May 2009



Wigeon

(see figures 5.5, 5.6 and C.7-C.8)

5.17 Wigeon were only recorded using the study area in late winter, with numbers declining from early February. Within this period the study area was not consistently used with no birds present during two of the eight late winter surveys. Wigeon used the study area throughout the tidal period, with a clear differentiation in its use between the high and low water periods when most birds fed and roosted respectively.

5.18 Wigeon during the low water period were predominately distributed centrally in the survey area on the eastern lower intertidal flats of Elmley Reach and east side of the saltmarsh islands, the Lilies. At high water, birds were concentrated within the bay on the Elmley side opposite to the proposed development with some use also made of the saltmarsh islands, the Lilies.

Figure 5.5: Peak numbers of Wigeon at hourly intervals through the tidal cycle during February - May 2009

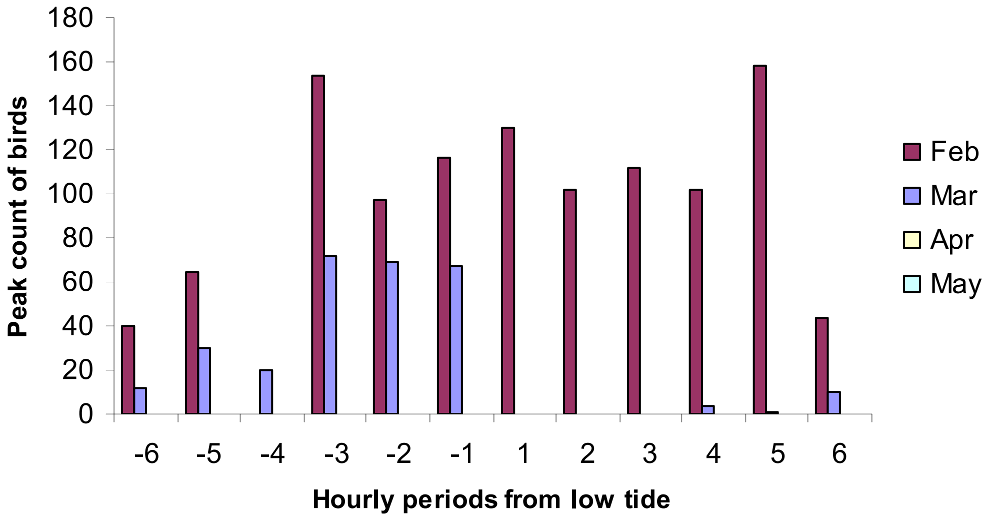
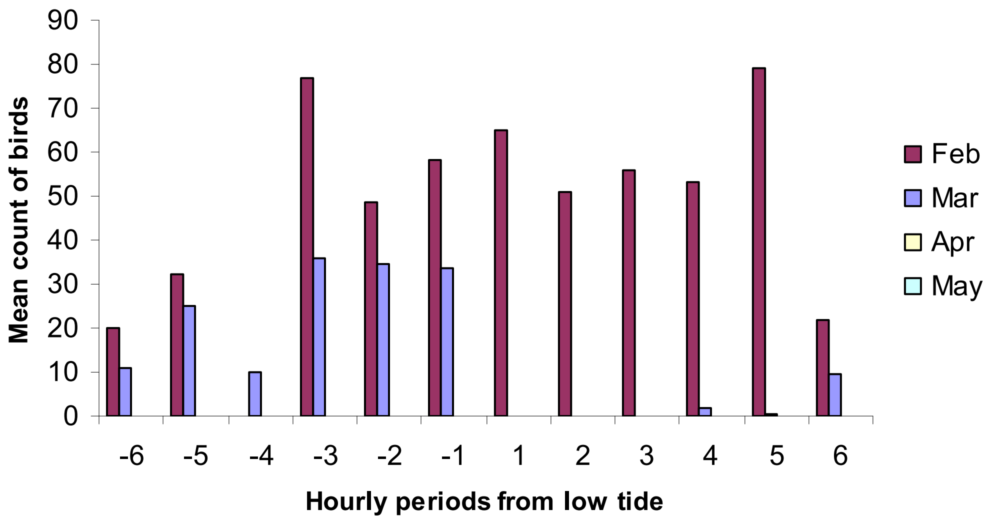


Figure 5.6: Mean numbers of Wigeon at hourly intervals through the tidal cycle during February - May 2009



Teal

(see figures 5.7, 5.8 and C.9-C.12)

5.19 Teal were recorded in the study area by all surveys throughout the late winter. Their numbers markedly declined after early March with no birds after mid April. Teal were present throughout the tidal cycle with smaller numbers recorded generally during high and ebb tides.

5.20 In late winter, Teal made widespread use of the study area's intertidal areas during the low water period, with a notable concentration along the length of Milton Creek. A shift away from the east side of Elmley Reach took place at high tide, with birds being dispersed along its west bank and the upper reaches of Milton Creek.

5.21 The majority of Teal recorded were of birds feeding irrespective of tidal state.

Figure 5.7: Peak numbers of Teal at hourly intervals through the tidal cycle during February - May 2009

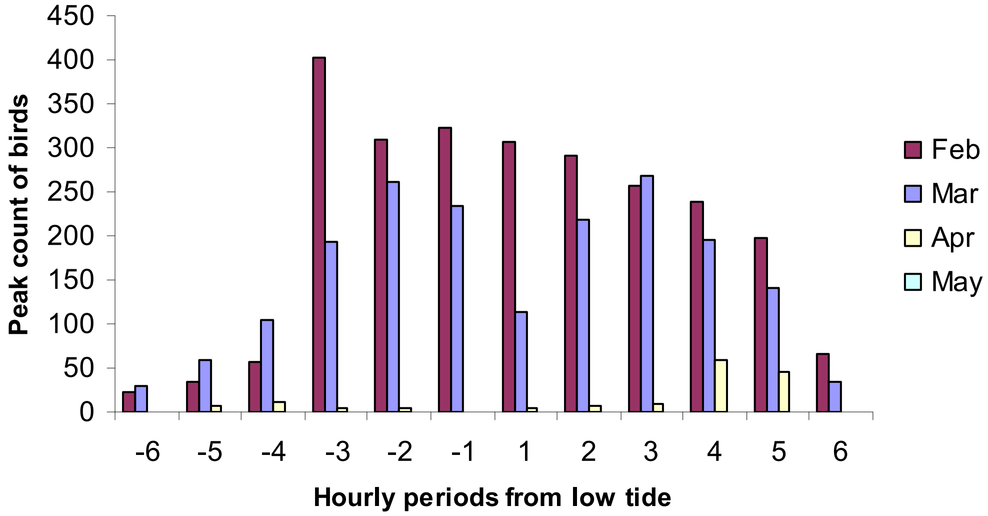
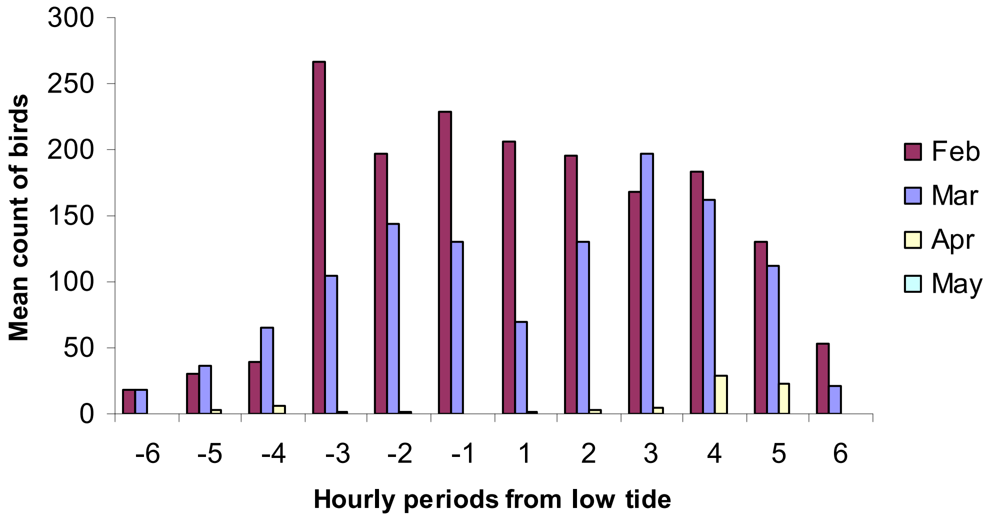


Figure 5.8: Mean numbers of Teal at hourly intervals through the tidal cycle during February - May 2009



Pintail

(see figures 5.9, 5.10 and C.13-C.14)

5.22 Pintail were intermittently recorded using the study area up until mid March. The species was not recorded during the three hour period immediately following high tide with most birds present during the low water period and the adjacent hour of ebb and flood tides.

5.23 The distribution of Pintail during low water period was almost entirely confined to the central part of eastern lower intertidal flats of Elmley Reach. The few birds that remained over high water were to be found using the bay on Elmley, opposite to the proposed development.

5.24 The majority of Pintail recorded were of birds roosting irrespective of tidal state.

Figure 5.9: Peak numbers of Pintail at hourly intervals through the tidal cycle during February - May 2009

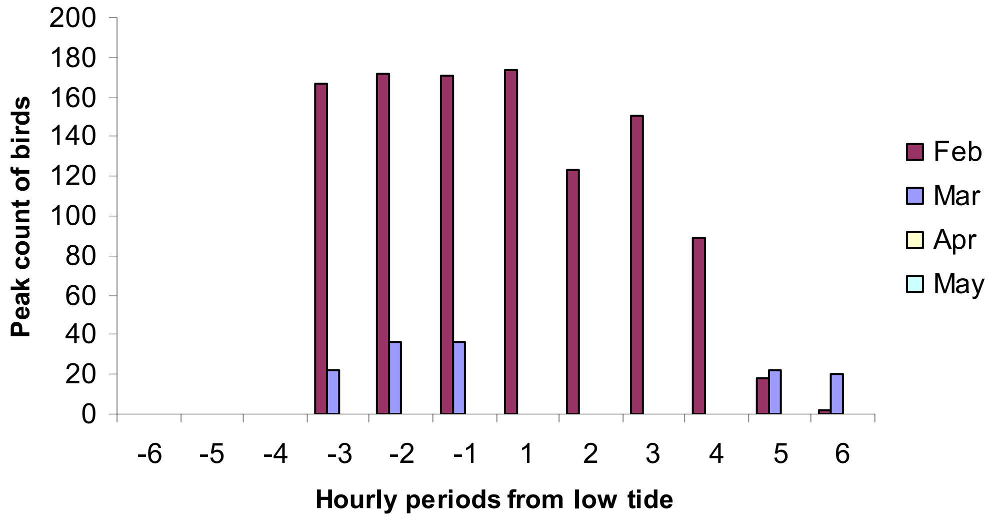
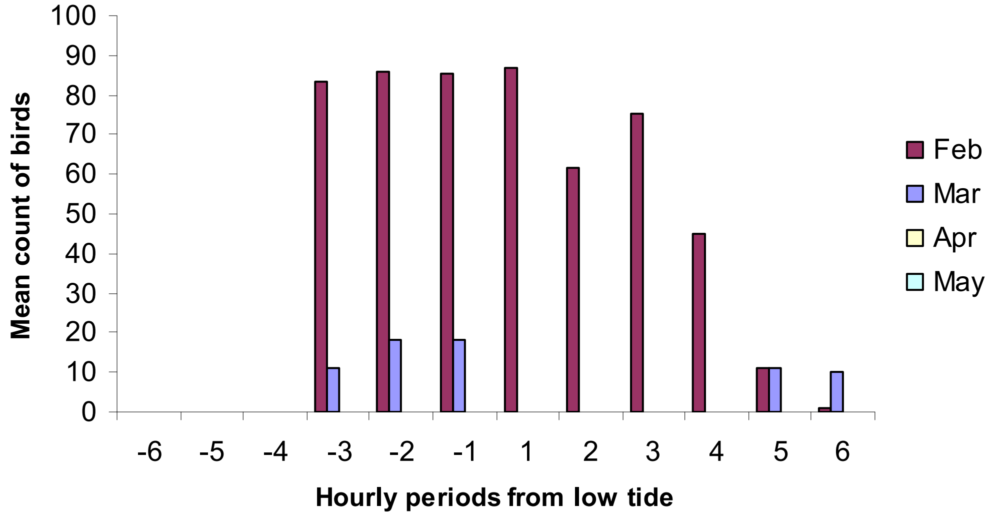


Figure 5.10: Mean numbers of Pintail at hourly intervals through the tidal cycle during February - May 2009



Shoveler

5.25 The only records of Shoveler were of three birds during the ebb tide of 5th February.

Oystercatcher

(see figures 5.11, 5.12 and C.15-C.18)

5.26 Oystercatcher were recorded in the study area by all surveys throughout the late winter and spring, with numbers declining through the period from a tidal maximum of 600 to 33 birds. Birds were present throughout the tidal cycle with the site predominately used as a roost over the high water period. Much smaller numbers of birds remained in the study area when intertidal flats became largely exposed allowing birds to forage.

5.27 Oystercatcher use of the intertidal flats was found to be widespread during the low water period with the only notable concentration being beside Elmley in late winter. At high tide, the principal roost site within the study area was located on the peninsula on Elmley opposite the proposed development site.

Figure 5.11: Peak numbers of Oystercatcher at hourly intervals through the tidal cycle during February - May 2009

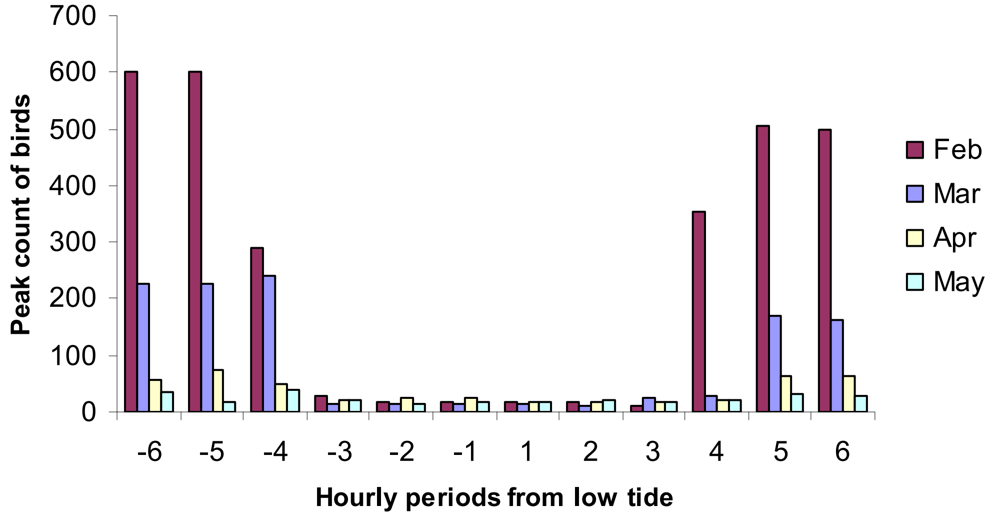
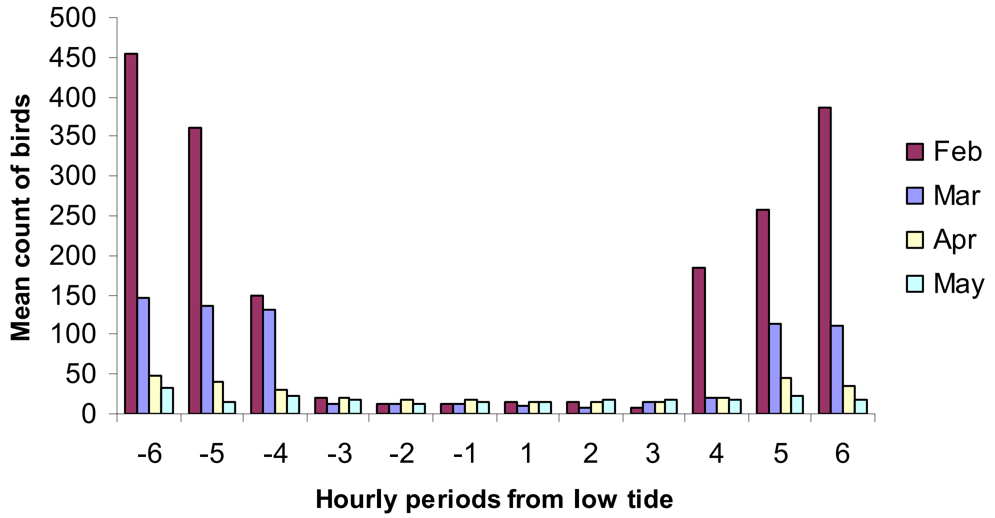


Figure 5.12: Mean numbers of Oystercatcher at hourly intervals through the tidal cycle during February - May 2009



Avocet

(see figures 5.13, 5.14 and C.19-C.22)

5.28 Avocet were recorded in the study area by all surveys throughout the late winter and into spring until the last survey over the high water period. Numbers declined through the period from a tidal maximum of 80 to less than 20 in spring.

5.29 A marked difference was found between late winter and spring in the use made of the study area by Avocet. In late winter, birds were using the study area throughout the tidal cycle with a tendency for more birds to occur at and around high tide. By the spring, the study area was little frequented at high tide, the vast majority of birds present over the low water period.

5.30 At low tide birds were widely distributed along the western side of Elmley Reach and along Milton Creek, with a marked concentration of bird activity in late winter in the central part of eastern lower intertidal flats of Elmley Reach. With tidal inundation of the flats at high tide, birds in late winter congregated to both feed and roost within the bay on Elmley, opposite the proposed development, and at the mouth of Milton Creek

Figure 5.13: Peak numbers of Avocet at hourly intervals through the tidal cycle during February - May 2009

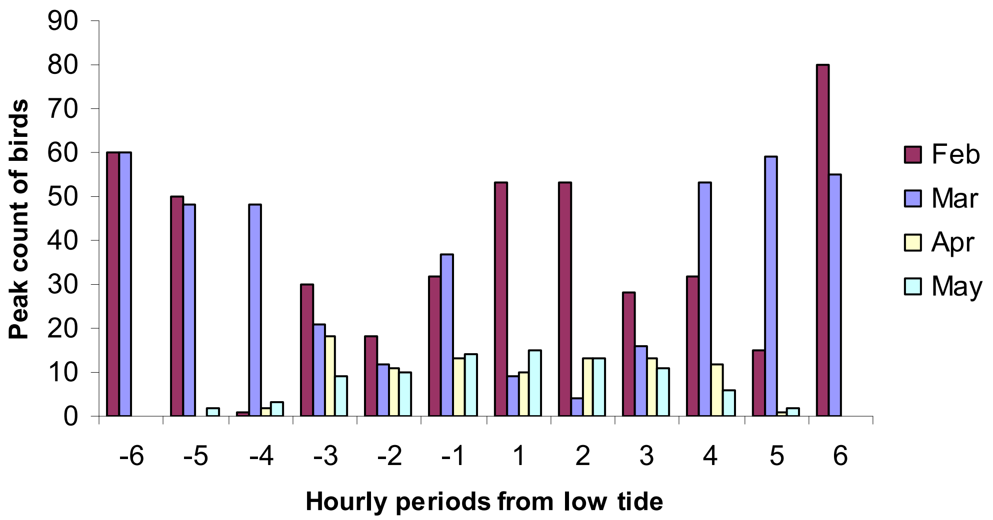
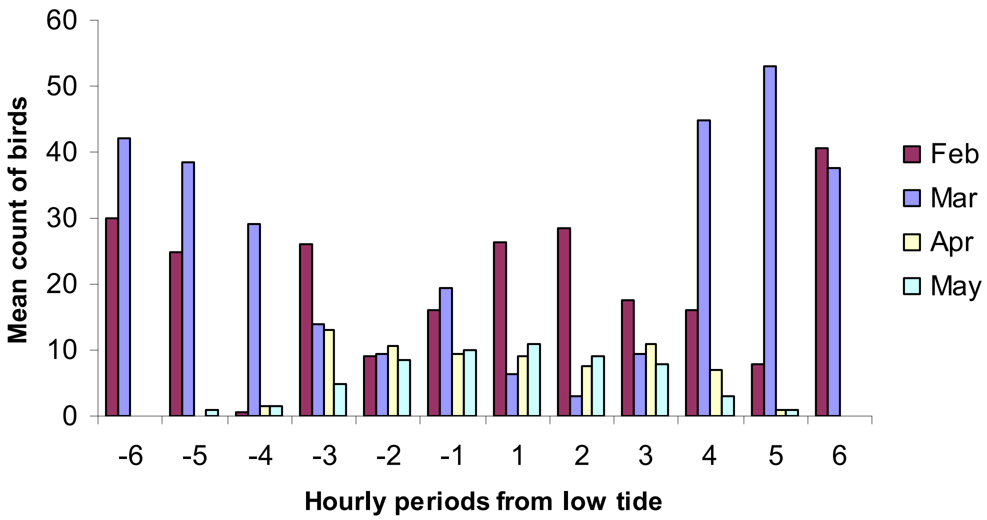


Figure 5.14: Mean numbers of Avocet at hourly intervals through the tidal cycle during February - May 2009



Ringed Plover

(see figures .C23-C.26)

5.31 Up to 28 Ringed Plover were recorded during the only survey in February to record the species, this being during the low water period. Thereafter, no more than four birds were recorded using the study area and then infrequently at ebb, flood and high tide only.

5.32 For both seasons, high tide usage of the study area was confined to in and around the bay on Elmley, opposite the proposed development site. With the exposure of intertidal flats available to the birds for foraging, the distribution shifted during low water to those intertidal flats to the north of the bay east of Elmley Reach, and those adjacent to the east side of The Lillies.

Grey Plover

(see figures 5.15, 5.16 and C.27-C.28)

5.33 In late winter, Grey Plover were recorded by all surveys, numbers fluctuating between counts with no discernible temporal pattern despite that suggested from the graphs. The vast majority of birds occurred during the low water period, a notably exception being a roost of 62 birds at high water, the overall peak count of the study.

5.34 Only one or two birds were recorded in the study area during spring, these on two dates in and around high tide.

5.35 Grey Plover use of the study area was found during the low water period to be widely distributed. Within the area however, the species usage was notably concentrated upon the intertidal flats along the east side of The Lillies and the eastern lower level flats of Elmley Reach, opposite the proposed site of development. At high tide, birds were to be found predominately within the bay on Elmley, opposite the proposed site of development, and around the saltmarsh islands, The Lillies.

Figure 5.15: Peak numbers of Grey Plover at hourly intervals through the tidal cycle during February - May 2009

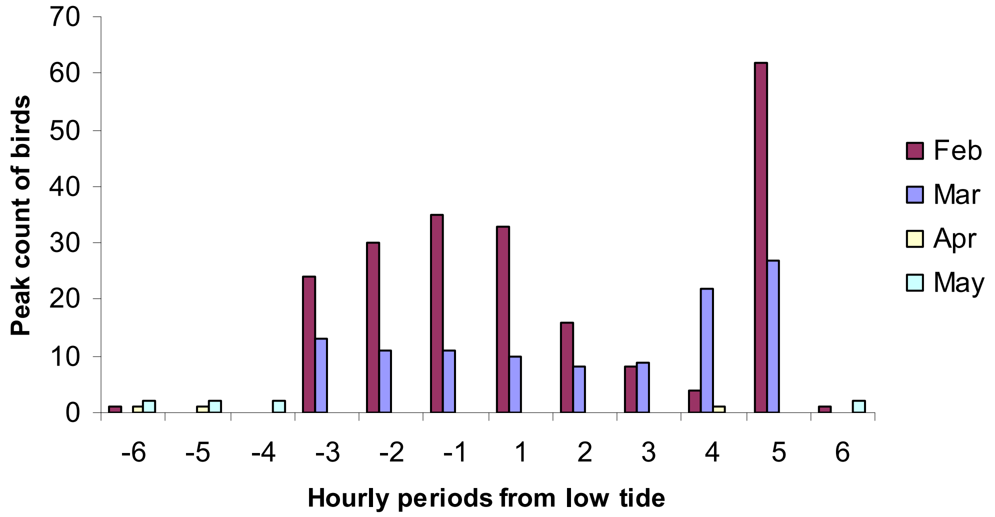
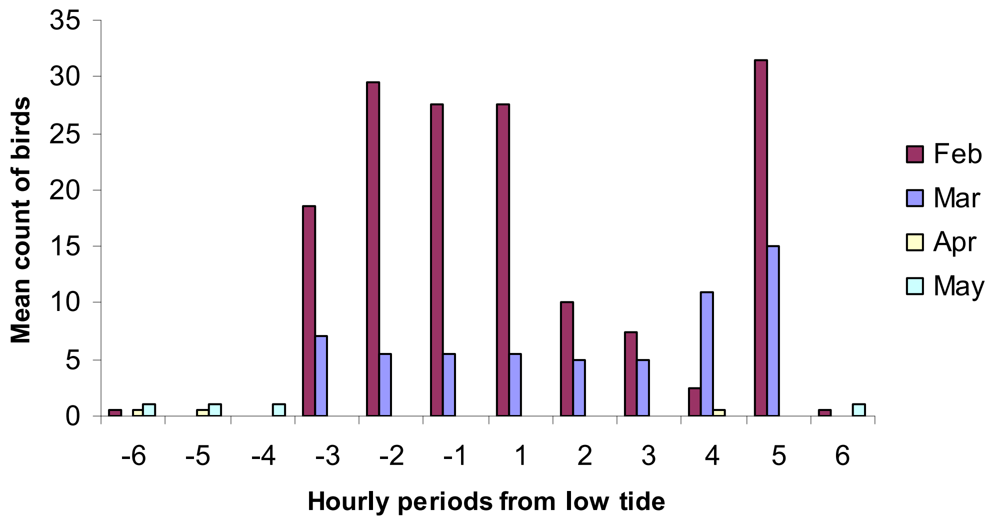


Figure 5.16: Mean numbers of Grey Plover at hourly intervals through the tidal cycle during February - May 2009



Lapwing

5.36 Lapwing were recorded on three dates in February; 5th, 11th and 18th. The maximum number recorded was 48 on the 18th February. Birds were observed on both the ebb and flood tides.

Knot

5.37 Knot were recorded on seven dates up until the beginning of April, with a peak count of 35 on the 5th February. Birds were recorded over both the ebb and flood tides.

Dunlin

(see figures 5.17, 5.18 and C.29-C.30)

5.38 Dunlin were recorded on five surveys in late winter with a peak count of 223 on the 23rd February. The majority of records were from the low water period, with the exception being the count on the 23rd February which was made just before the tidal mudflats were inundated with water. The birds were feeding on the last remaining sections of intertidal mud within the site boundary before they were forced off to their roost sites elsewhere.

5.39 Dunlin usage of the intertidal mudflats over the low water period was predominantly from the area around the peninsula at Elmley. Over high water the vast majority of usage was of the areas around the saltmarsh islands, the Lilies.

Figure 5.17: Peak numbers of Dunlin at hourly intervals through the tidal cycle during February - May 2009

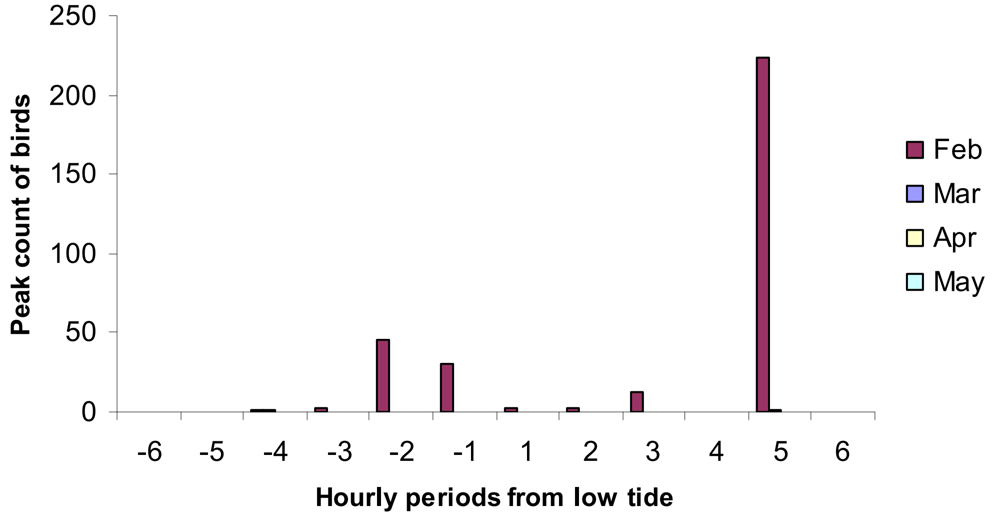
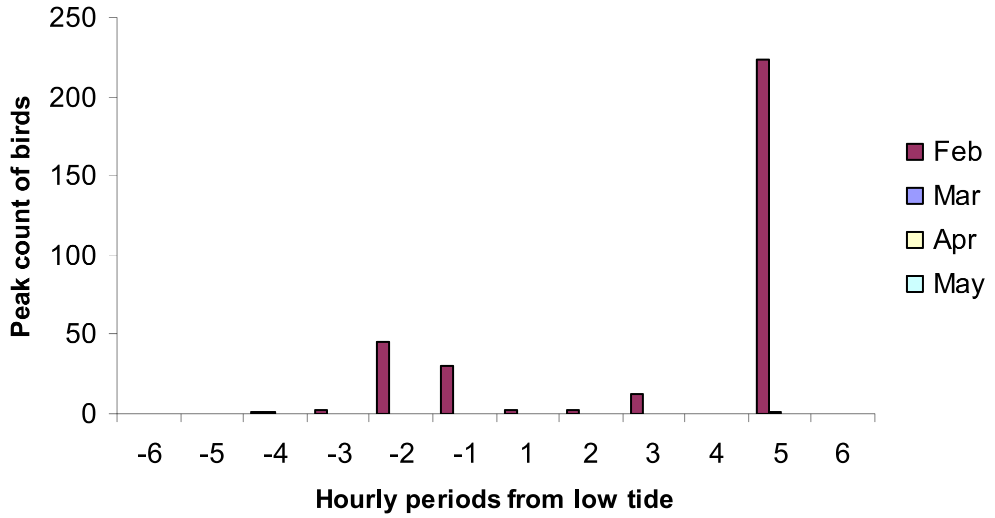


Figure 5.18: Mean numbers of Dunlin at hourly intervals through the tidal cycle during February - May 2009



Black-tailed Godwit

(see figures 5.19, 5.20 and C.31-C.34)

5.40 Black-tailed Godwit were recorded throughout the winter period with small numbers occurring in April. The peak count of 1500 was made over high water on

11th February. The site was used throughout the tidal cycle, although the largest numbers were recorded over the high water period.

5.41 Over the low water period the species was widely spread over the intertidal mudflats throughout the survey period. Roosts of birds were recorded from the peninsula at Elmley and the saltmarsh islands, the Lilies.

Figure 5.19: Peak numbers of Black-tailed Godwit at hourly intervals through the tidal cycle during February - May 2009

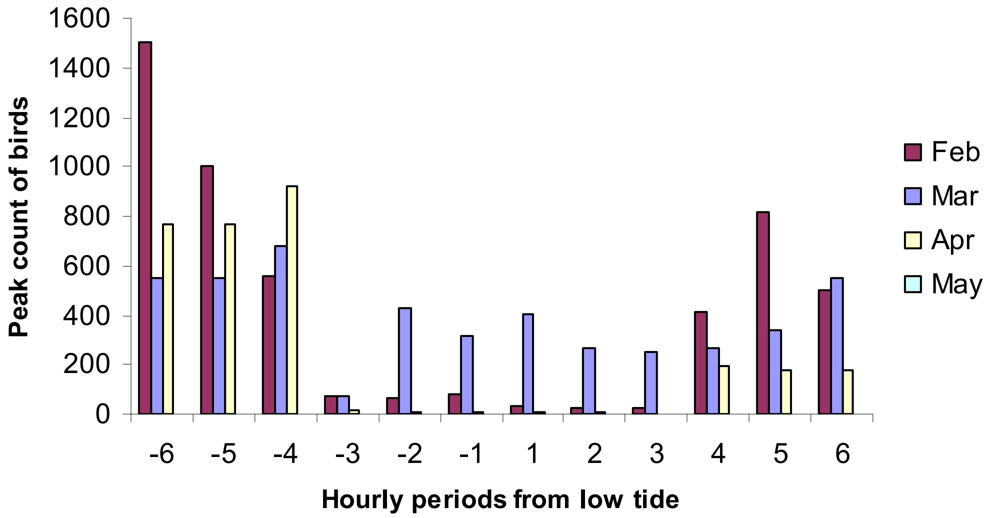
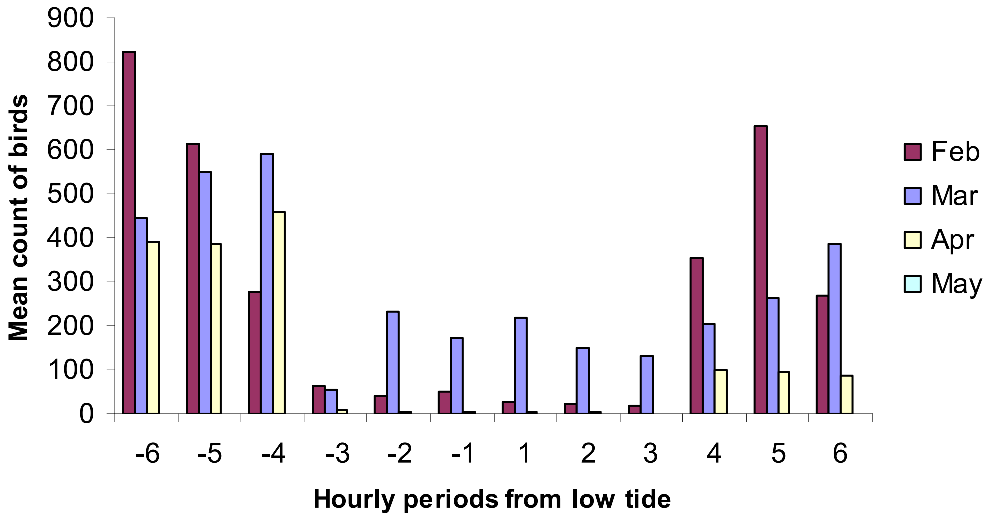


Figure 5.20: Mean numbers of Black-tailed Godwit at hourly intervals through the tidal cycle during February - May 2009



Whimbrel

5.42 Whimbrel were recorded on six dates in spring, with a peak count of 9 on the 8th May. The species shows no pattern in its temporal occurrence on the site with records throughout the tidal cycle.

Curlew

(see figures 5.21, 5.22 and C.35-C.38)

5.43 Curlew were recorded throughout the survey period and tidal cycle, with birds using the intertidal flats for feeding right up until inundation by water and the saltmarsh islands and peninsula at Elmley for roosting and feeding over the high water.

5.44 Curlew were widely distributed across the intertidal mudflats over low water, with roosting and feeding birds being recorded on the peninsula at Elmley and the slatmarsh islands, the Lilies over high water.

Figure 5.21: Peak numbers of Curlew at hourly intervals through the tidal cycle during February - May 2009

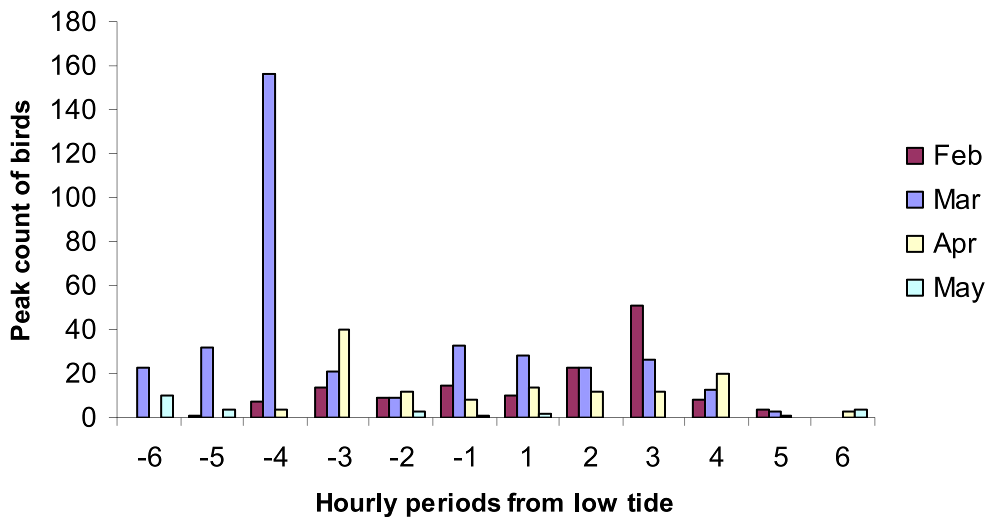
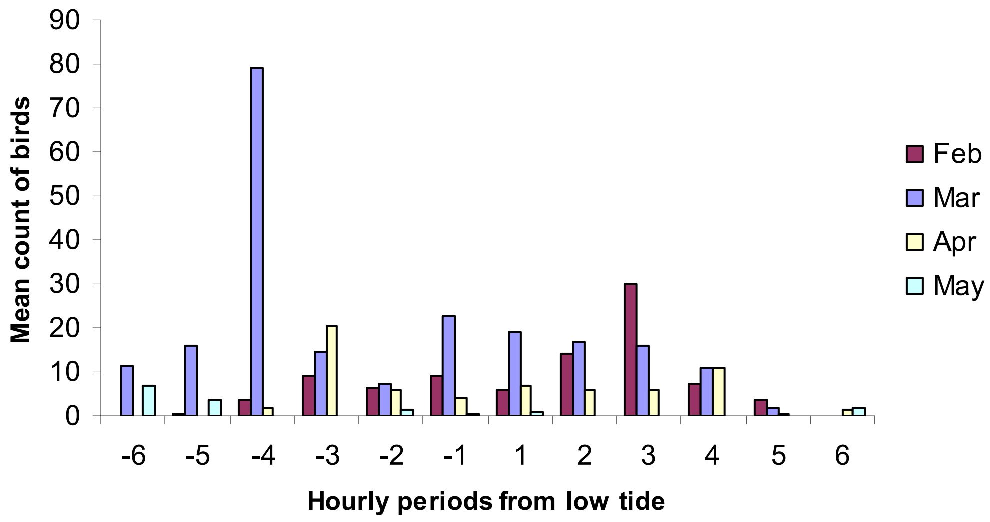


Figure 5.22: Mean numbers of Curlew at hourly intervals through the tidal cycle during February - May 2009



Redshank

(see figures 5.23, 5.24 and C.39-C.42)

5.45 Redshank were recorded throughout the survey period and tidal cycle, with birds using the intertidal flats for feeding right up until inundation by water.

5.46 Redshank were widely distributed across the intertidal mudflats over low water, with roosting and birds being recorded on the saltmarsh islands, the Lilies over high water.

Figure 5.23: Peak numbers of Redshank at hourly intervals through the tidal cycle during February - May 2009

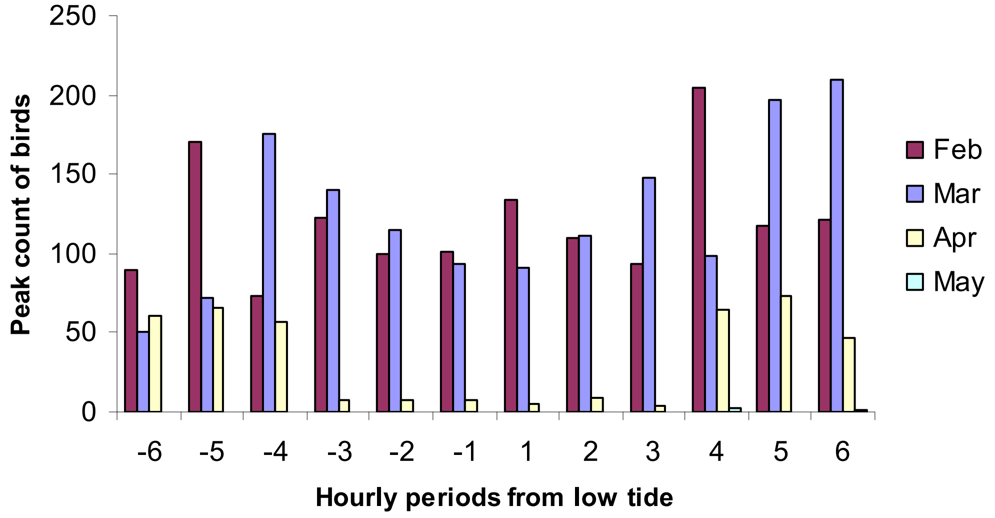
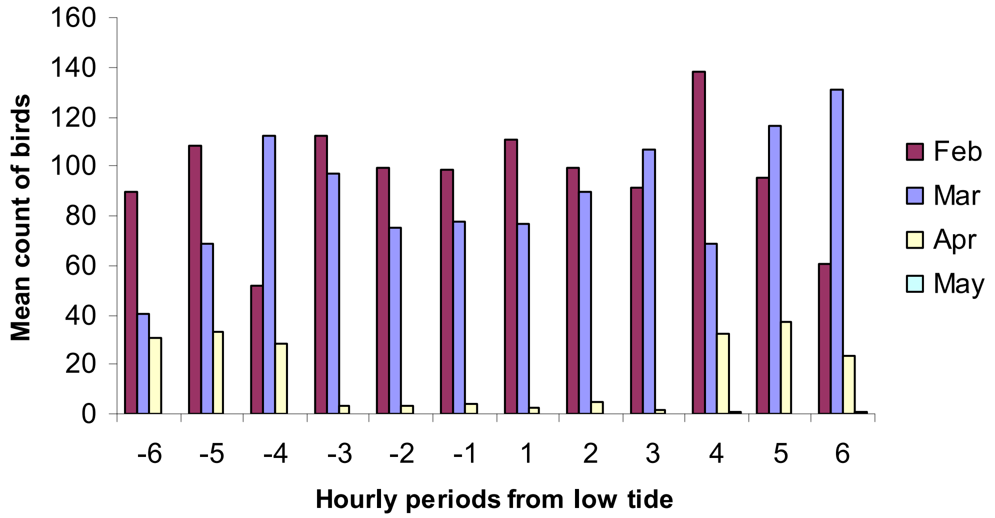


Figure 5.24: Mean numbers of Redshank at hourly intervals through the tidal cycle during February - May 2009



Greenshank

5.47 Greenshank were recorded on 8 dates, with the majority of records occurring during the spring. A peak count of 3 was made on the 30th April. Single birds were also recorded during the winter period on the 5th February and 6th March. The species shows no pattern in its temporal occurrence on the site with records throughout the tidal cycle.

Turnstone

(see figures 5.25, 5.26 and C.43-C.44)

5.48 Turnstone were recorded up until the end of April with a peak count of 68 on the 10th March. The species was recorded predominantly over the high water period in winter, with birds in early spring being recorded over the low water period as well.

5.49 Turnstone were predominantly recorded from around the peninsula at Elmley and saltmarsh islands, the Lilies.

Figure 5.25: Peak numbers of Turnstone at hourly intervals through the tidal cycle during February - May 2009

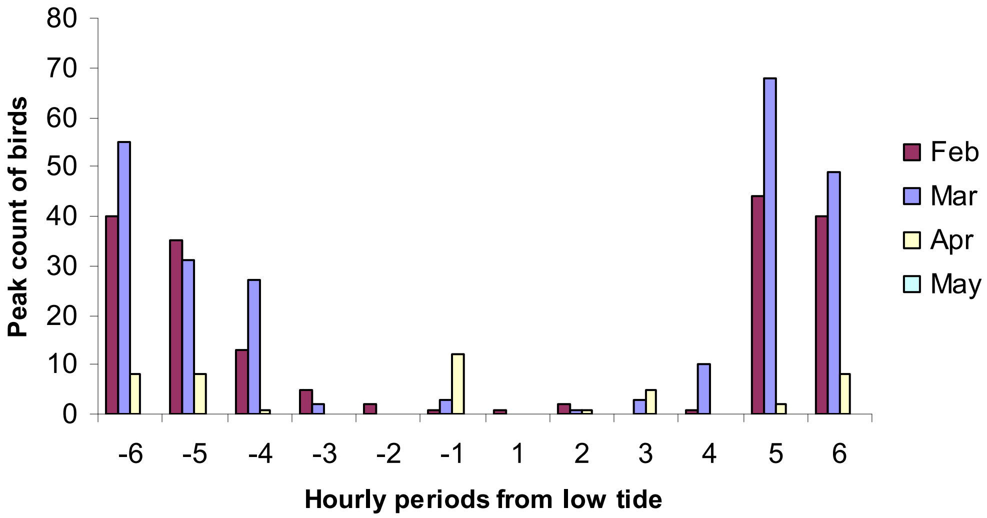
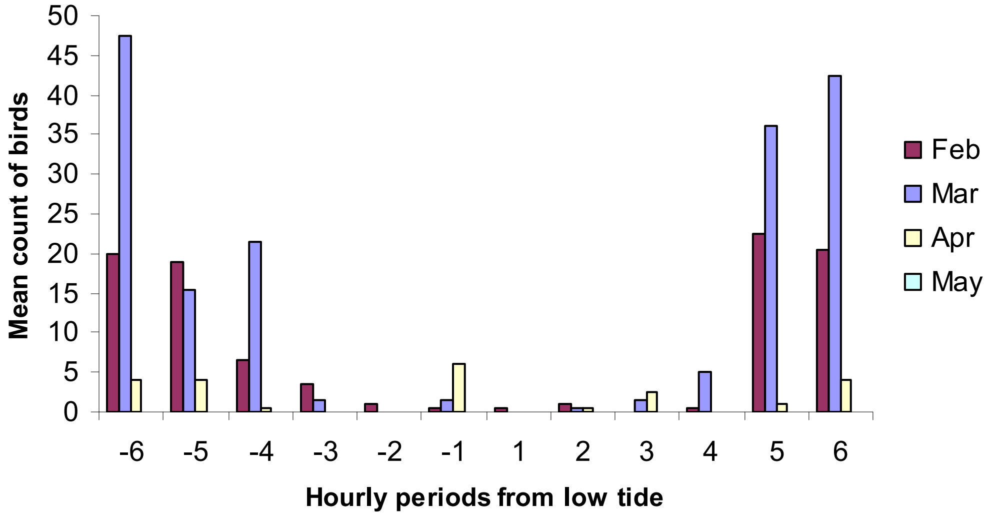


Figure 5.26: Mean numbers of Turnstone at hourly intervals through the tidal cycle during February - May 2009



6 EVALUATION: SURVEY OF BREEDING BIRDS

6.1 Of the 35 species identified as breeding or possibly breeding 15 are covered by one or more of the criteria listed in section 2.10. Table 3.1 summarises these 35 species together with the conservation status assigned to them. Territory locations of species on schedule 1 and the conservation concern red list (Figures B5-12) are listed in Appendix B.

Specially Protected Species

6.2 Three species were recorded breeding which are specially protected through Schedule One of the WCA: Marsh Harrier, Cetti's Warbler and Bearded Tit. Marsh Harrier is also afforded extra protection through Annex One of the Birds Directive.

Marsh Harrier

6.3 Marsh Harrier were recorded throughout the duration of the survey, with much breeding behaviour being observed. A male and female were observed displaying over the reedbed at the north of the site on survey dates in April and although the nest was not searched for, food drops and exchanges were observed between the birds in May and June, indicating that an active nest was present. Unfortunately due to the timing of the end of the surveys it was not possible to ascertain whether any young were successfully fledged.

Cetti's Warbler

6.4 Cetti's Warblers were recorded throughout the duration of the survey, with singing birds recorded during every visit. Cetti's Warbler is a secretive species to observe, inhabiting damp scrub and reedbed. The six Cetti's Warbler territories were located in the northern section of the breeding bird survey area, in scrub bordering the reedbed area.

Bearded Tit

6.5 Small numbers of Bearded Tits were recorded during every survey visit, with a maximum of four birds on visit 5. Bearded Tit is a difficult species to determine breeding activity owing to its often secretive nature within reedbeds and lack of song which makes it difficult to observe. Two territories were identified in the reedbed at the north of the site.

Other Species of Conservation Concern

6.6 Eight of the species recorded as breeding or probably breeding (Linnet, Skylark, Turtle Dove, Song Thrush, Dunnock, Cuckoo, Starling and Reed Bunting) are listed in Section 41 of the NERC Act 2006 as being of principal importance for the conservation of biodiversity in England. Species on this list are capable of being a material consideration in the making of planning decisions (ODPM 2005a). Planning Policy Statement 9 (PPS9; ODPM 2005b) states that 'Local Authorities should ensure that these species are protected from the adverse effects of development, where appropriate, by using planning conditions or obligations. In addition, Planning Authorities should refuse development where harm to the species or their habitats would result, unless the need for, and benefits of, the development clearly outweigh that harm'.

6.7 Six of the species recorded as breeding or probably/possibly breeding (Turtle Dove, Cuckoo, Skylark, Song Thrush, Starling and Linnet) are included on the BoCC Red List. Reasons for Red list status are given below.

- Turtle Dove. Severe (>50%) decline in UK breeding population over last 25 years. Severe (>50%) long-term decline in UK breeding population during the entire period used for assessments since the first BoCC review in 1969.
- Cuckoo. Severe (>50%) decline in UK breeding population over last 25 years. Severe (>50%) long-term decline in UK breeding population during the entire period used for assessments since the first BoCC review in 1969.
- Skylark. Severe (>50%) decline in UK breeding population over last 25 years. Categorised as a Species of European Conservation Concern.
- Song Thrush. Severe (>50%) long-term decline in UK breeding population during the entire period used for assessments since the first BoCC review in 1969.
- Starling. Severe (>50%) decline in UK breeding population over last 25 years. Severe (>50%) long-term decline in UK breeding population during the entire period used for assessments since the first BoCC review in 1969.
- Linnet. Severe (>50%) long-term decline in UK breeding population during the entire period used for assessments since the first BoCC review in 1969.

6.8 Nine of the species recorded as breeding or probably/possibly breeding (Shelduck, Marsh Harrier, Stock Dove, Meadow Pipit, Dunnock, Nightingale, Whitethroat, Bearded Tit and Reed Bunting) are included on the BoCC Amber List. Reasons for Amber list status are given below.

- Shelduck. At least 50% of the UK non-breeding population found in 10 or fewer sites. At least 20% of the European non-breeding population found in the UK.
- Marsh Harrier. UK wintering population of less than 900 pairs. At least 50% of the UK breeding population found in 10 or fewer sites.
- Stock Dove. At least 20% of the European breeding population found in the UK.
- Meadow Pipit. Moderate decline (25-49%) in UK breeding population over last 25 years. Moderate (25-49%) long-term decline in UK breeding population during the entire period used for assessments since the first BoCC review in 1969.

- Dunnock. Moderate (25-49%) decline in UK breeding population over last 25 years.
- Nightingale. Moderate (25-49%) decline in UK breeding population over last 25 years.
- Whitethroat. Moderate (25-49%) decline in UK breeding population over last 25 years.
- Bearded Tit. Moderate (25-49%) decline in UK breeding range over last 25 years.
- Reed Bunting. Moderate (25-49%) decline in UK breeding range over last 25 years.

6.9 Of the 20 species recorded as non-breeding, three (Yellow Wagtail, Ring Ouzel and House Sparrow) are present on the BoCC Red List and a further 11 species are present on the BoCC Amber List. Four of these (Kestrel, Swift, Green Woodpecker and House Sparrow) may be breeding adjacent to the site whilst the remaining 16 species are thought to use the site for foraging or were recorded as late-winter residents or spring over-shooting migrants.

6.10 Although the site supports a few species of conservation importance these are relatively few and are not considered to occur in breeding numbers of significant importance.

6.11 The number of species recorded in an area is a simple measure of diversity that can indicate its importance at each season of the year. Fuller (1980) gives the following breeding diversity criteria:

National	Regional	County	Local
85+	70-84	50-69	25-49

6.12 Based on Fuller's criteria, the breeding bird assemblage of the survey area is of Local importance. However, it should be noted that Fuller's analysis was developed in the 1970's. Since then species diversity has declined significantly (Eaton *et al.*, 2009). As a result, Fuller's thresholds are too high for today's breeding bird populations. However. despite these changes in bird populations, and whilst also giving consideration to the number of species of conservation interest, it is still considered most likely that the breeding bird assemblage at the site is of no more than of Local importance.

6.13 Further to Fuller's criteria, the Nature Conversancy Council (NCC, now JNCC, 1989) identifies localities as being eligible for SSSI selection and therefore of National importance through application of an index that takes account of the breeding assemblage in respect to habitat and geographical location. With a breeding bird assemblage of 35 species, the study area falls some way short of this status.

6.14 The threshold score for SSSI selection is 31 for lowland open water and its margins and 15 for scrub. The breeding bird assemblage present at the Kemsley scores 21 for lowland open water and its margins and 10 for scrub. This further confirms the assessment of the breeding bird community as of local importance.

6.15 In addition to evaluating a site based on its breeding bird assemblage, consideration has to be given to the value of the site for the population of individual species that it supports. This can be done by comparing the population present on site with the national and county breeding population for certain species. National population estimates are published in Baker et al. (2006). No breeding population on site approaches the 1% level of the national population.

6.16 At county level, breeding population estimates are dated with the last full Kent Atlas being undertaken in 1988-1994 (Henderson and Hodge 1998). For the nationally rarer breeding species population estimates are presented in the latest Rare Breeding Bird report (Holling and RBBP 2008) and for Nightingale the national survey undertaken in 1999 (Wilson *et al.* 2002). A Local Wildlife Site in Kent can be designated on the basis of regularly holding at least 2.5% of the Kent breeding population for any particular species (Kent Wildlife Trust 2006). The population of two species within the survey area can be considered to be of county importance based on this criteria: Cetti's Warbler and Bearded Tit, with 4.5% and 3% of the county population respectively. The Marsh Harrier population within the study site is also approaching that of county importance.

7 EVALUATION: WATERBIRD SPECIES SURVEYS

7.1 The study area lies within the Swale SPA, where the SPA citation species are within the protection of the EU Birds Directive. It is therefore appropriate to consider the importance to birds of the study area as a whole in the context of the Swale SPA waterbird assemblage.

Late winter waterbird populations

7.2 Table 7.1 summarises the maximum counts recorded for key species which were either cited as part of the Swale SPA (in italics) or were frequently recorded. Data are also provided for the 1% threshold criteria, and the latest 5-year peak means for the SPA. The 1% criterion is used to assess the importance of wetlands. A wetland is considered internationally important if it regularly supports 1% of a species biogeographic (in this case NW Europe) population. A wetland in Britain is considered of national importance if it regularly supports 1% of the total numbers in Britain (Austin *et al.* 2008).

7.3 The waterbird data presented in the Swale SPA citation originates from Wetland Bird Survey (WeBS) monthly coordinated 'core' counts made during high tide periods, principally from September to March. WeBS is a joint scheme run by the British Trust for Ornithology (BTO), the Wildfowl & Wetlands Trust (WWT), Royal Society for the Protection of Birds (RSPB) and Joint Nature Conservation Committee (JNCC) to monitor non-breeding waterfowl in the UK. The scheme aims to identify population sizes, to determine trends in numbers and distribution, and to identify important sites for waterbird (Austin *et al.* 2008).

7.4 A total of 30 species of waterbirds were recorded using the intertidal study site during February-March 2009. Of these, ten species were of conservation value due to their presence as species listed on the designation for Swale SPA and Swale SSSI. These species are (with the SPA species in italics): Wigeon, *Teal, Shoveler, Oystercatcher, Ringed Plover, Grey Plover,* Knot, *Dunlin, Curlew,* and *Redshank*.

Spring waterbird populations

7.5 Table 7.2 summarises the peak spring counts recorded for key species which were either cited as part of the Swale SPA (in italics) or were frequently recorded. Data are also provided for the 1% threshold criteria, and where available the SPA 5-year peak means listed in the citation.

7.6 For the majority of waterbirds, 1% thresholds for identifying wetland sites of national importance in Britain are only available for wintering populations. Due to the respective species phenologies, it is appropriate to apply these same thresholds in the assessment of wetlands of national importance using spring count data for all waterfowl with the exception of waders (Austin *et al.* 2008). In many wader species, substantial spring passage occurs through Britain which may largely comprise of a different subspecies or biographical population to that of the wintering population. For a small number of wader species e.g. Ringed Plover, 1% thresholds had previously been derived and published for this passage period e.g.

Musgrove et al. 2007. However, the most recent guidance from WeBS and the statutory agencies, as published in Austin et al 2008, no longer provides separate 1% passage threshold criteria for any species; no explanation is given. Therefore for all wader species, the following evaluation uses the 1% national thresholds for wintering populations.

7.7 A total of 27 species of waterbirds were recorded using the study site in April-May 2009. Of these, eight species were of conservation value due to their presence as species listed on the designation for Swale SPA and Swale SSSI. These species are (with the SPA species in italics): *Dark-bellied Brent Goose, Teal, Oystercatcher, Ringed Plover, Grey Plover,* Knot, *Curlew* and *Redshank*.

Table 7.1: Comparison of peak waterbird counts in February-March 2009 as recorded during RPS Intertidal waterbird surveys, with latest SPA winter population estimates and current 1% thresholds for national and international importance.

Species	Peak count during February - March 2009 at Kemsley study area		5yr Peak mean for Swale SPA (2002/03-2006/07)	Great Britain 1% Threshold	International 1% Threshold
	Number of birds	% of SPA population			
Little Grebe	21	31.3	67	78	4,000
Dark-bellied Brent Goose	0	0	1,754	981	2,000
Shelduck	102	4.8	2,114	782	3,000
Wigeon	158	0.9	18,521	4,060	15,000
Teal	403	8.3	4,812	1,920	5,000
Pintail	174	22.0	790	279	600
Oystercatcher	*600*	*12.2*	*4,910*	*3,200*	*10,200*
Avocet	80	13.4	595	50	730
Ringed Plover	*28*	*8.5*	*(328)*	*330*	*730*
Grey Plover	*62*	*3.9*	*1,576*	*530*	*2,500*
Dunlin	*223*	*2.4*	*9,202*	*5,600*	*13,300*
Black-tailed Godwit	*1,500*	*105.3*	*1,425*	*150*	*470*
Curlew	156	13.0	1,201	1,500	8,500
Redshank	*210*	*18.7*	*1,127*	*1,200*	*2,800*
Turnstone	68	15.7	434	500	1,500
Total waterbird assemblage	3,929	5.1		-	-
Total SPA waterbird assemblage			76,323	-	-

Note:

Swale SPA citation species are shown in italic.

Where a count is enclosed by parentheses this indicates that it was considered incomplete i.e. those parts of the site not visited typically holds at least 25% of the species in question.

Table 7.2: Comparison of peak waterbird counts in April-May 2009 as recorded during RPS Intertidal waterbird surveys, with latest SPA spring population estimates and current 1% thresholds for national and international importance.

Species	Peak count during April - May 2009 at Kemsley study area		5yr spring Peak mean for Swale SPA (2002/03-2006/07)	Great Britain 1% Threshold	International 1% Threshold
	Number of birds	% of SPA population			
Little Grebe	2	9.1	(22)	78	4,000
Dark-bellied Brent Goose	12	63	19	981	2,000
Shelduck	28	7.4	379	782	3,000
Teal	58	22.7	(256)	1,920	5,000
Oystercatcher	*73*	*3.3*	*2,187*	*3,200*	*10,200*
Avocet	18	9.7	185	50	730
Ringed Plover	*4*	*4.9*	*82*	*330*	*730*
Grey Plover	*2*	*0.4*	*(570)*	*530*	*2,500*
Dunlin	*0*	*0*	*(2702)*	*5,600*	*13,300*
Black-tailed Godwit	*919*	*210*	*438*	*150*	*470*
Curlew	40		(581)	1,500	8,500
Redshank	*73*		*(527)*	*1,200*	*2,800*
Turnstone	12		(276)	500	1,500
Total waterbird assemblage	1,296	16.0%		-	-
Total SPA waterbird assemblage			8,084	-	-

Note:

Swale SPA citation species are shown in italic.

Where a count is enclosed by parentheses this indicates that it was considered incomplete i.e. those parts of the site not visited typically holds at least 25% of the species in question.

The importance of the intertidal study area as a discrete wetland for supporting internationally and national important waterbird populations in winter

7.8 The four most numerous waterbirds recorded using the study area during February-March 2009 were in descending order Black-tailed Godwit, Oystercatcher, Teal and Dunlin (excluding gull species).

7.9 The peak number of Black-tailed Godwit recorded in the study area during February – March 2009 (1,500) equates to 3.2% of the international population and 10% of the national population. This means during late winter 2008/09 the study area at Kemsley has supported **Internationally Important numbers of Black-tailed Godwit**.

7.10 Of the remaining waterbird species recorded at Kemsley, the peak count during February – March 2009 of only one species equated to, or exceeded, the 1% national winter population estimates for Great Britain. The peak count of Avocet at Kemsley during February - March 2009 (80) equates to 2.3% of the latest available estimate of the national wintering population of 3,500 birds. Furthermore, the peak count exceeded 50 birds, a minimum qualifying threshold for the designation of sites of national importance where 1% of the national population is less than 50 birds (Austin *et al.* 2008). However, the latter estimate of national wintering population is based on data from 1994/95 – 1998/99 (Rehfisch *et al.* 2003). Avocet is a species whose British wintering population has undergone a large increase in recent years (Banks *et al.* 2006), The five year mean peak winter maxima (2002/03-2006/07) recorded by WeBS is 5,659 birds; WeBS does not cover 100% of the population of the species. These data would suggest that the peak count of Avocet at Kemsley during February - March 2009 equates to no more than 1.4% whilst noting that coverage by WeBS of those sites supporting Avocet is extensive. Irrespective of the data used, during February - March 2009 the study area at Kemsley has supported **Nationally Important numbers of Avocet**.

7.11 No other waterbird species recorded during February-March 2009 at the Kemsley study area represented 1% or more of the international or national population estimates for Great Britain for assessing wintering populations.

The importance of the study area as a discrete wetland for supporting internationally and national important waterbird populations in spring

7.12 The four most numerous waterbirds recorded using the study area in April-May 2009 were in descending order, Black-tailed Godwit, Redshank, Oystercatcher and Teal.

7.13 The peak number of Black-tailed Godwit recorded in the study area during April – May 2009 (919) equates to 2.0% of the international population and 6.1% of the national population. This means during spring 2009 the study area at Kemsley has supported **Internationally Important numbers of Black-tailed Godwit**.

7.14 Of the remaining waterbird species recorded in April-May 2009 at the Kemsley study area none represented 1% or more of the international or national population estimates for Great Britain.

The importance to birds of the intertidal study area in the context of the Swale SPA in winter

7.15 The peak number of Black-tailed Godwit recorded in the study area during February-March 2009 (1,500) equates to 105% of the Swale SPA population, the five-year winter peak mean as derived from the latest available WeBS data (an estimation in line with recommendations of the Ramsar Convention; Ramsar Convention Bureau 1988). However, the latter site population estimate is based on data from 2002/03 – 2006/7. In this respect it is important to note that the British non-breeding population of Black-tailed Godwits are of the Icelandic breeding race i*slandica.* The population of this subspecies has in recent years substantially increased. This has led to a recent increase in the 1% international criterion for the species from 350 to 470 – a 34% increase – following a three yearly review (Wetlands International 2006). Published annual indices for the British non-breeding Black-tailed Godwit population for the period up until winter 2006/07 shows a continuing trend of increase. Closer scrutiny of the underlying WeBS data from which the SPA population estimate was derived shows a peak count of 1,782 birds in November 2004.

7.16 The peak number of twelve other waterbird species recorded in the study area during February-March 2009 represent between 31.3% and 2.4% of the Swale SPA population, as estimated by the latest WeBS five-year winter peak mean (2002/03-2006/07). For all other species the proportion occurring within the study area is less than 1% of the Swale SPA population.

7.17 Considering the total waterbird assemblage, the study area at Kemsley supported a peak number of birds of 3,929 between February and March 2009. This represents 5.1% of the 76,323 individual waterfowl for the Swale SPA as estimated by the latest WeBS five-year winter peak mean (2002/03-2006/07).

The importance to birds of the study area in the context of the Swale SPA in spring

7.18 The peak number of Black-tailed Godwit recorded in the study area during April-May 2009 (919) equates to 210% of the Swale SPA population, the five-year spring peak mean as derived from the latest available WeBS data (an estimation in line with recommendations of the Ramsar Convention; Ramsar Convention Bureau 1988).

7.19 The peak number of ten other waterbird species recorded in the study area during April-May 2009 represent between 63% and 3.3% of the Swale SPA population, as estimated by the latest WeBS five-year winter peak mean (2002/03-2006/07). It should however be noted that for several species, the Swale SPA spring population comprises of small numbers of the site's wintering population yet to emigrate to the breeding grounds. So for example, the twelve Dark-bellied Brent Geese recorded by the study at Kemsley represents 63% of the Swale SPA population in spring but no more than 0.7% of the site's wintering population of which they are likely a residual of. For all other species the proportion occurring within the study area is less than 1% of the Swale SPA population in spring.

7.20 Considering the total waterbird assemblage, the study area at Kemsley supported a peak number of birds of 1,296 between April and May 2009. This represents 16% of the 8,084 individual waterfowl for the Swale SPA as estimated by the latest WeBS five-year spring peak mean (2003-2007).

Comparison of WeBS data with RPS Intertidal Waterbird Surveys

7.21 Coverage of the intertidal study site by RPS waterbird surveys was only possible for the late winter period and spring. Within the most recent five years, monthly count coverage by WeBS exists at high tide for the period September 2002 – March 2007 and at low water during winter 2001/02 (November-February). To provide some assessment of how representative the RPS waterbird survey data is of the winter period as a whole, tables 7.3, 7.4 and 7.5 provide a summary of the available WeBS data. It should be noted however that the corresponding WeBS count sectors extend well beyond the area of coverage of the RPS intertidal study, the respective count areas and sectors being shown in Figure B.4. Furthermore, the Elmley Marshes WeBS high water count sector includes substantial areas of grazing marshes and freshwater which influences the species composition and numbers e.g. Coot & wildfowl. Numbers of birds counted by WeBS can therefore be expected to be higher than those recorded by the RPS intertidal survey, in some cases markedly so e.g. Wigeon that often favour grazing marshes. The WeBS data are most appropriately considered in the context of how representative the RPS intertidal surveys findings are of when wintering waterbird usage peaks in the study area.

7.22 At low tide in late winter, the RPS waterbird survey counts for all but one species (Teal) listed on the designation for Swale SPA and Swale SSSI, represented no more than 77% of the peak numbers recorded by the WeBS low tide counts of winter 2001/02. For Teal, the RPS waterbird surveys peak late winter count was up to 134% of the numbers recorded by the WeBS low tide counts of winter 2001/02 within the corresponding count sectors. It should be noted the individual mudflat counts for the WeBS low tide counts can not necessarily be summated for a total count and particularly in respect to the peak counts. Although WeBS low tide count methodology state simultaneous counts of all sections within a site are preferable, they are not compulsory (Musgrove et al. 2003).

7.23 Table 7.2 presents for key species the raw monthly totals for WeBS Low Tide Count data for the winter 2001/2002 for Swale Estuary. For the winter season of the survey, numbers of ten of the fourteen key species peaked in early/mid winter.

A similar proportion of the key species are also shown in Table 7.3 to peak numerically when considering wintering populations using at high tide the two WeBS Core Count sectors within which is the RPS intertidal study area. It is therefore unlikely that the RPS intertidal waterbird survey has provided for the majority of species considered, an assessment of the site's importance at the time of peak winter usage.

Table 7.3: Peak low water counts of key waterbirds species recorded by intertidal surveys of the study area by WeBS (winter2001/02) and RPS (Feb-March 2009).

Species	Peak low water count during Feb - March 2009 at Kemsley study area	WeBS peak low water counts Nov-Feb 2001/02			
		DS003	DS004	DS005	DS007
Little Grebe	21	5	0	50	10
Great Crested Grebe	0	5	0	6	0
Little Egret	21	1	0	3	0
Dark-bellied Brent Goose	0	0	0	1	0
Shelduck	51	51	4	300	62
Wigeon	130	168	0	40	105
Gadwall	1	0	0	6	0
Teal	323	18	82	240	2
Mallard	0	3	0	70	0
Pintail	174	2	0	68	80
Shoveler	0	0	0	40	64
Pochard	0	0	0	184	0
Tufted Duck	0	0	0	8	0
Red-breasted Merganser	7	0	0	0	0
Goldeneye	2	0	0	14	0
Coot	0	7	0	144	0
Oystercatcher	19	4	4	60	26
Avocet	53	3	0	16	0
Ringed Plover	28	1	0	58	7
Grey Plover	35	35	11	116	113
Lapwing	0	32	0	600	50
Knot	8	0	0	35	3
Dunlin	46	143	11	450	765

Species	Peak low water count during Feb - March 2009 at Kemsley study area	WeBS peak low water counts Nov-Feb 2001/02			
		DS003	DS004	DS005	DS007
Snipe	8	0	0	49	2
Black-tailed Godwit	425	12	5	74	582
Bar-tailed Godwit	0	15	0	0	5
Curlew	33	10	9	22	56
Spotted Redshank	0	0	7	1	0
Redshank	115	46	78	250	13
Greenshank	1	0	0	0	0
Turnstone	3	4	0	1	2

Note:
The data are taken from the period two hours either side of low tide.
The individual WeBS sector counts for a species can not be summated for a total as the individual peak counts may be in different months. The raw WeBS data were not made available to allow such a summation.

Table 7.4: WeBS Low Tide Count data for the winter 2001/2002 for Swale Estuary: Raw monthly totals for species counted for the whole site

Species	Nov	Dec	Jan	Feb	Maximum count	Month of maximum count
Little Grebe	22	26	64	33	64	Jan
Great Crested Grebe	26	17	4	311	311	Feb
Black-necked Grebe	1	.	.	.	1	Nov
Cormorant	21	46	2	51	51	Feb
Little Egret	14	19	3	5	19	Dec
Grey Heron	14	6	2	4	14	Nov
Mute Swan	3	3	20	2	20	Jan
Canada Goose	1	.	.	.	1	Nov
Barnacle Goose	.	.	.	9	9	Feb
Dark-bellied Brent Goose	.	472	106	1690	1690	Feb
Light-bellied Brent Goose	.	.	.	12	12	Feb
Shelduck	776	1538	977	2039	2039	Feb
Wigeon	407	580	603	1187	1187	Feb
Gadwall	.	.	.	6	6	Feb
Teal	261	533	692	586	692	Jan
Mallard	264	93	102	150	264	Nov
Pintail	4	68	503	94	503	Jan
Shoveler	31	55	166	5	166	Jan
Pochard	.	133	.	184	184	Feb
Tufted Duck	.	6	.	8	8	Feb
Eider	1	2	.	1	2	Dec
Common Scoter	.	.	.	2	2	Feb
Goldeneye	1	14	3	14	14	Dec,Feb
Red-breasted Merganser	4	21	2	12	21	Dec
Water Rail	.	.	2	.	2	Jan
Moorhen	1	3	2	2	3	Dec
Coot	30	58	197	60	197	Jan
Oystercatcher	3684	6085	350	5106	6085	Dec
Avocet	117	118	16	21	118	Dec
Ringed Plover	206	156	17	40	206	Nov

Species	Nov	Dec	Jan	Feb	Maximum count	Month of maximum count
Golden Plover	490	176	109	2335	2335	Feb
Grey Plover	880	1567	228	1225	1567	Dec
Lapwing	376	1280	109	1941	1941	Feb
Knot	465	474	1110	1007	1110	Jan
Sanderling	47	8	.	.	47	Nov
Dunlin	6932	9189	3978	6127	9189	Dec
Snipe	82	31	3	7	82	Nov
Black-tailed Godwit	426	323	275	1580	1580	Feb
Bar-tailed Godwit	337	247	95	383	383	Feb
Curlew	589	830	247	1174	1174	Feb
Spotted Redshank	.	7	1	.	7	Dec
Redshank	1262	1777	529	1570	1777	Dec
Common Sandpiper	1	.	.	.	1	Nov
Turnstone	387	389	26	178	389	Dec
Re-established Greylag	.	.	1	16	16	Feb

Note:
Swale SPA citation species are shown in italic.
Gulls excluded

Table 7.5: Five-year mean monthly WeBS Core Counts of key waterbirds species recorded for the sectors Elmley Marshes and Murston-Conyer at high tide

	Sector	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Little Grebe	Murston	4	18	30	**46**	28	22	10
	Elmley	11	20	**6**	5	5	0	4
Great Crested Grebe	Murston	12	11	**12**	9	3	5	7
	Elmley	21	27	13	13	**14**	3	9
Little Egret	Murston	6	24	**11**	3	3	2	2
	Elmley	37	30	**12**	7	4	3	1
Cormorant	Murston	6	8	7	**22**	11	10	13
	Elmley	19	62	**41**	36	25	5	17
White-fronted Goose	Murston	0	0	0	0	0	0	0
	Elmley	0	0	2	13	**121**	0	0
Dark-bellied Brent Goose	Murston	0	0	1	0	75	**90**	0
	Elmley	0	11	13	5	33	14	**43**
Mute Swan	Murston	2	5	3	0	2	3	**5**
	Elmley	28	41	31	**89**	48	3	7
Shelduck	Murston	18	188	106	269	227	**272**	79
	Elmley	95	534	411	691	**994**	565	545
Wigeon	Murston	65	133	**502**	309	166	439	31
	Elmley	217	3,805	6,878	7,527	**13,038**	6,211	2,803
Gadwall	Murston	0	1	6	6	**16**	6	4
	Elmley	3	8	4	6	**25**	9	14
Teal	Murston	15	22	41	96	71	**134**	59
	Elmley	1,717	2,181	**1,669**	1,659	2,511	307	321
Mallard	Murston	28	25	13	22	**30**	23	14
	Elmley	368	423	407	650	**725**	184	120
Pintail	Murston	0	0	1	4	12	**48**	10
	Elmley	59	193	250	451	**706**	175	166
Shoveler	Murston	0	18	14	**14**	6	10	7
	Elmley	50	76	100	134	**158**	71	107
Pochard	Murston	4	3	27	57	**164**	70	17
	Elmley	0	0	7	0	2	7	**36**
Tufted Duck	Murston	0	3	9	17	**32**	18	11
	Elmley	2	5	3	5	8	12	**37**
Red-breasted Merganser	Murston	0	0	4	**12**	2	8	4
	Elmley	0	0	2	0	**3**	2	2
Coot	Murston	20	24	69	107	108	**142**	29
	Elmley	22	14	9	74	86	69	**131**
Oystercatcher	Murston	60	86	77	57	**84**	63	49
	Elmley	588	689	573	616	**638**	376	487
Avocet	Murston	4	9	15	23	**31**	12	19
	Elmley	43	285	91	67	135	142	**432**
Ringed Plover	Murston	0	5	0	0	0	0	**3**
	Elmley	210	146	91	**101**	76	47	59
Golden Plover	Murston	0	89	**207**	60	190	146	120
	Elmley	45	541	448	709	**2,566**	107	433
Grey Plover	Murston	19	51	66	45	**72**	46	33
	Elmley	702	621	555	497	**614**	194	479
Lapwing	Murston	210	283	**752**	553	620	364	43
	Elmley	1,017	950	1,985	2,745	**6,287**	921	463
Knot	Murston	0	0	**95**	79	16	16	28

	Sector	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
	Elmley	27	52	162	443	**1,002**	133	395
Dunlin	Murston	200	268	870	**1,850**	1,125	1,235	269
	Elmley	41	2,354	1,153	2,203	**2,778**	1,703	1,422
Ruff	Murston	0	0	0	0	0	0	0
	Elmley	9	1	0	0	1	3	**4**
Snipe	Murston	0	1	2	**4**	2	1	1
	Elmley	5	2	3	11	13	3	**17**
Black-tailed Godwit	Murston	110	185	135	185	**303**	218	291
	Elmley	148	138	387	265	343	120	**526**
Bar-tailed Godwit	Murston	0	1	0	2	**2**	0	0
	Elmley	32	79	18	72	73	**179**	5
Whimbrel	Murston	2	1	0	0	0	0	0
	Elmley	3	0	0	0	0	0	0
Curlew	Murston	23	24	28	26	**67**	18	22
	Elmley	315	312	383	176	345	284	**413**
Spotted Redshank	Murston	0	0	0	0	0	0	0
	Elmley	24	7	**2**	1	0	0	0
Redshank	Murston	190	210	140	**154**	126	116	76
	Elmley	294	408	219	**329**	167	93	187
Greenshank	Murston	26	32	**2**	1	1	1	1
	Elmley	4	2	0	0	0	0	0
Turnstone	Murston	0	14	**20**	19	12	18	3
	Elmley	100	85	66	**66**	34	17	34

Note:

Swale SPA citation species are shown in italic.

The figures in bold are peak winter counts (November - March).

8 CONCLUSIONS

Breeding birds

8.1 The survey of breeding birds recorded 55 species over the six visits at the Kemsley Mill Site. Of the species recorded 30 were confirmed as breeding, 5 species were possibly breeding and 20 were considered as non-breeders.

8.2 Three species recorded (Marsh Harrier, Cetti's Warbler and Bearded Tit) are Annex I or protected under Schedule 1 of the Wildlife and Countryside Act 1981.

8.3 Two of the species recorded as confirmed breeding (Linnet and Reed Bunting) are listed in Section 41 of the NERC Act 2006 as being of principal importance for the conservation of biodiversity in England. Six of the species recorded as breeding or probably/possibly breeding (Turtle Dove, Cuckoo, Skylark, Song Thrush, Starling and Linnet) are included on the BoCC Red List. Nine of the species recorded as breeding or probably/possibly breeding (Shelduck, Marsh Harrier, Stock Dove, Meadow Pipit, Dunnock, Nightingale, Whitethroat, Bearded Tit and Reed Bunting) are included on the BoCC Amber List.

8.4 All wild bird nests and their eggs are protected under the WCA. It is therefore a requirement that the development proposals avoid disturbance or harm to any birds breeding on the site. This can most easily be achieved by clearing habitats within the development area with the potential to support nesting birds outside of the breeding season (March – August inclusive).

8.5 The breeding bird assemblage is considered to be of no more than local importance, however the population of two species within the survey area can be considered to be of county importance: Cetti's Warbler and Bearded Tit, with 4.5% and 3% of the county population respectively. The Marsh Harrier population within the study site is also approaching that of county importance.

8.6 The local planning authority, following the requirements of PPS9, is likely to require evidence of how, in planning the proposed development, account has been taken of the conservation interest features that have been found on site.

8.7 If negative impacts are likely, such as the loss of suitable breeding habitats, appropriate mitigation should be proposed to decrease the severity of the impacts. In the event that the footprint of the proposed development encroaches onto important habitat features being utilised by breeding birds of conservation importance, adequate compensation will need to be provided.

8.8 It is considered that with the implementation of appropriate mitigation through timing of works and with appropriate creation of new habitat, this will help to minimise the impacts to the breeding bird assemblage of the site and surrounding general area.

Waterbirds

8.9 The data presented in this study provides a robust record of the abundance, behaviour and spatial distribution of waterbirds present during the months of February 2009 to May 2009. The findings identify the intertidal area adjacent to Kemsley to be used by waterbird populations of significant conservation value.

8.10 A total of 36 species of waterbird (excluding gulls and terns) were recorded using the survey area within the vicinity of Kemsley in February 2009 – May 2009, overall site usage peaking in February. Of these, 19 species were of conservation value due to their presence as species listed on the designation for the Swale Estuary SPA. These species are: Little Grebe, Little Egret, Dark-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Oystercatcher, Ringed Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Whimbrel, Curlew, Redshank and Greenshank.

8.11 The species present on the intertidal mudflats were primarily using the area for feeding. This is recognised as being an important activity in maintaining the birds in viable condition for migration and breeding. The species present on the areas of saltmarsh and the land adjoining Elmley were predominantly roosting.

8.12 The diurnal counts of two species of waterbird, Avocet and Black-tailed Godwit during late winter 2008/09 (February-March), suggest the study area to be of national importance for this species. Significant proportions (>5%) of The Swale SPA populations for six waterbirds species were recorded (Shelduck, Avocet, Ringed Plover, Dunlin, Black-tailed Godwit and Redshank).

8.13 In February-March 2009 and April-May 2009, the total waterbird assemblage (3,929 and 1,296 birds respectively) was greater than 5% of the citation figure (for winter) and the latest WeBS five year spring peak mean (2003-2007). Consequently representing a significant proportion (5.1% and 16% respectively) of the SPA waterbird community.

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10 APPENDICIES

Appendix A: Systematic list of all species common and scientific name recorded during 2009 bird surveys.

Common Name	Scientific Name
Little Grebe	*Tachybaptus ruficollis*
Great Crested Grebe	*Podiceps cristatus*
Cormorant	*Phalacrocorax carbo*
Little Egret	*Egretta garzetta*
Grey Heron	*Ardea cinerea*
Greylag Goose	*Anser anser*
Canada Goose	*Branta canadensis*
Dark-bellied Brent Goose	*Branta bernicla*
Shelduck	*Tadorna tadorna*
Wigeon	*Anas Penelope*
Gadwall	*Anas strepera*
Teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Pintail	*Anas acuta*
Shoveler	*Anas clypeata*
Tufted Duck	*Aythya fuligula*
Red-breasted Merganser	*Mergus serrator*
Goldeneye	*Bucephala clangula*
Marsh Harrier	*Circus aeruginosus*
Kestrel	*Falco tinnunculus*
Red-legged Partridge	*Alectoris rufa*
Pheasant	*Phasianus colchicus*
Moorhen	*Gallinula chloropus*
Oystercatcher	*Haematopus ostralegus*
Avocet	*Recurvirostra avosetta*
Ringed Plover	*Charadrius hiaticula*
Grey Plover	*Pluvialis squatarola*
Lapwing	*Vanellus vanellus*
Knot	*Calidris canutus*
Dunlin	*Calidris alpina*
Snipe	*Gallinago gallinago*
Black-tailed Godwit	*Limosa limosa*
Bar-tailed Godwit	*Limosa lapponica*
Whimbrel	*Numenius phaeopus*
Curlew	*Numenius arquata*
Redshank	*Tringa totanus*
Greenshank	*Tringa nebularia*
Green Sandpiper	*Tringa ochropus*
Common Sandpiper	*Actitis hypoleucos*
Turnstone	*Arenaria interpres*
Mediterranean Gull	*Larus melanocephalus*
Black-headed Gull	*Larus ribidundus*
Common Gull	*Larus canus*
Lesser Black-backed Gull	*Larus fuscus*
Herring Gull	*Larus argentatus*
Great Black-backed Gull	*Larus marinus*
Common Tern	*Sterna hirundo*

Feral Pigeon	*Columba livia*
Stock Dove	*Columba oenas*
Woodpigeon	*Columba palumbus*
Collared Dove	*Streptopelia decaocto*
Turtle Dove	*Streptopelia turtur*
Cuckoo	*Cuculus canorus*
Swift	*Apus apus*
Green Woodpecker	*Picus viridis*
Skylark	*Alauda arvensis*
Sand Martin	*Riparia riparia*
Swallow	*Hirundo rustica*
Meadow Pipit	*Anthus pratensis*
Yellow Wagtail	*Motacilla flava*
Grey Wagtail	*Motacilla cinerea*
Pied Wagtail	*Motacilla alba*
Wren	*Troglodytes troglodytes*
Dunnock	*Prunella modularis*
Robin	*Erithacus rubecula*
Nightingale	*Luscinia megarhynchos*
Ring Ouzel	*Turdus torquatus*
Blackbird	*Turdus merula*
Song Thrush	*Turdus philomelos*
Cetti's Warbler	*Cettia cetti*
Sedge Warbler	*Acrocephalus schoenobaenus*
Reed Warbler	*Acrocephalus scirpaceus*
Lesser Whitethroat	*Sylvia curruca*
Whitethroat	*Sylvia communis*
Garden Warbler	*Sylvia borin*
Blackcap	*Sylvia atricapilla*
Bearded Tit	*Panurus biarmicus*
Long-tailed Tit	*Aegithalos caudatus*
Blue Tit	*Parus caeruleus*
Great Tit	*Parus major*
Magpie	*Pica pica*
Rook	*Corvus frugilegus*
Carrion Crow	*Corvus corone*
Starling	*Sturnus vulgaris*
House Sparrow	*Passer domesticus*
Chaffinch	*Fringilla coelebs*
Greenfinch	*Carduelis chloris*
Goldfinch	*Carduelis carduelis*
Linnet	*Carduelis cannabina*
Lesser Redpoll	*Carduelis cabaret*
Reed Bunting	*Emberiza schoeniclus*

Appendix B: Maps detailing the study site and selected breeding bird territories

Legend

- Proposed development layout
- Breeding bird survey boundary (2009)

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

RPS
Willow Mere House Compass Point Business Park Stocks Bridge Way
St. Ives Cambridgeshire PE27 5JL
T 01480 302751 F 01480 466911 E rpscm@rpsgroup.com

Client: G.E.L

Project: Kemsley Mill ES

Title: The site survey boundary at Kemsley Mill

Scale: 1:5,000 @A3

0 40 80 120 160 200 m

Projection: British National Grid Datum: OSGB36

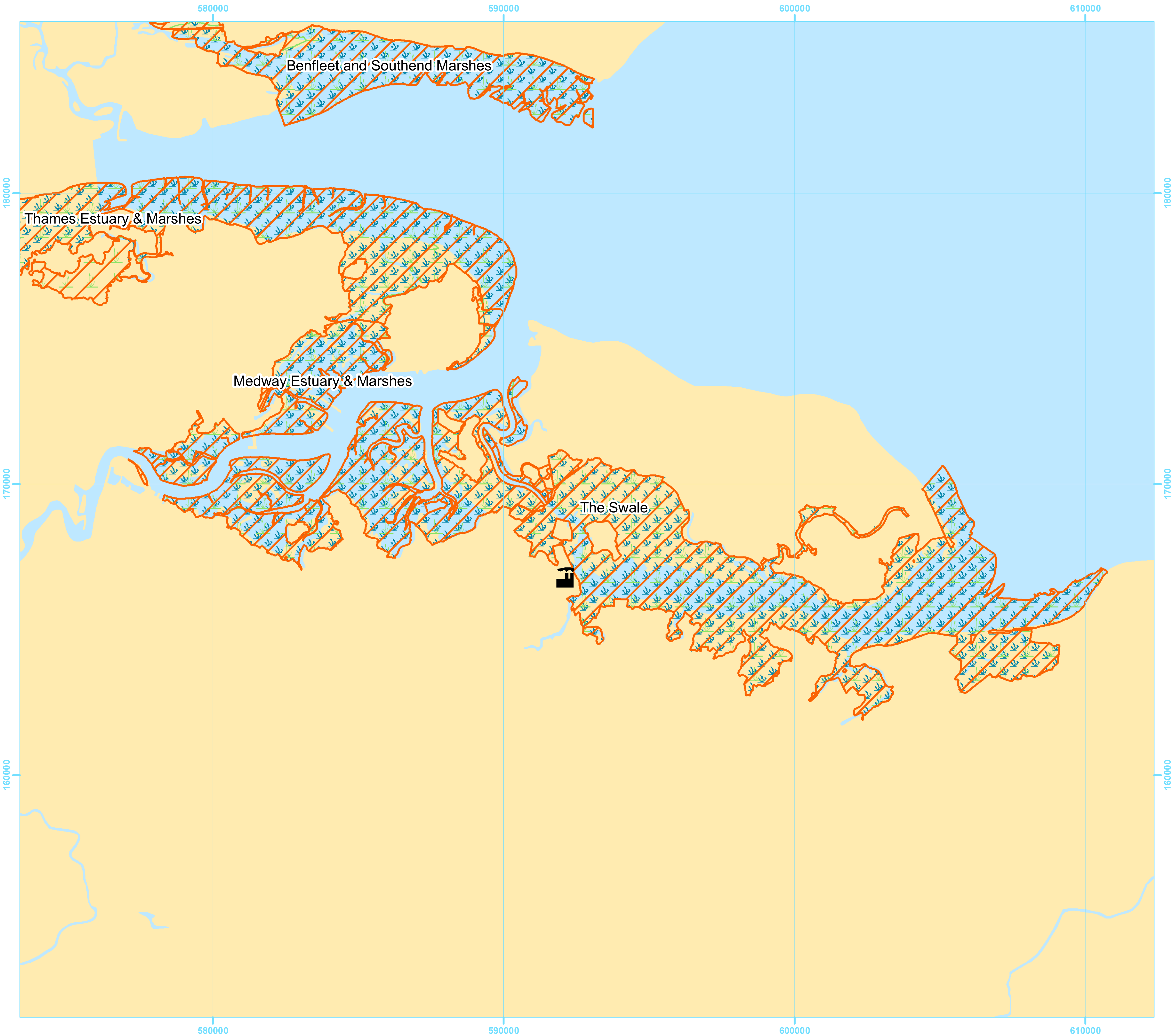
Date: 25/06/2009 Drawn: NE Checked: RW

Job Ref: **JPP1804** Figure No: **B.1** Revision: **A**

www.rpsgroup.com

Project Ref: o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_InteridalBirds2009_surveymap.mxd

Map copyright details



Legend

- Kemsley Mill
- Site of Special Scientific Interest
- Ramsar
- Special Protection Area

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009; Natural England 2006

Status: **FINAL**

RPS

Willow Mere House Compass Point Business Park Stocks Bridge Way
St. Ives Cambridgeshire PE27 5JL
T 01480 302751 F 01480 466911 E rpscm@rpsgroup.com

Client: G.E.L

Project: Kemsley Mill ES

Title: Location of sites designated for their ornithological interests in the vicinity of Kemsley

Scale: 1:130,000 @A3

0 1 2 3 4 5 km

Projection: British National Grid Datum: OSGB36

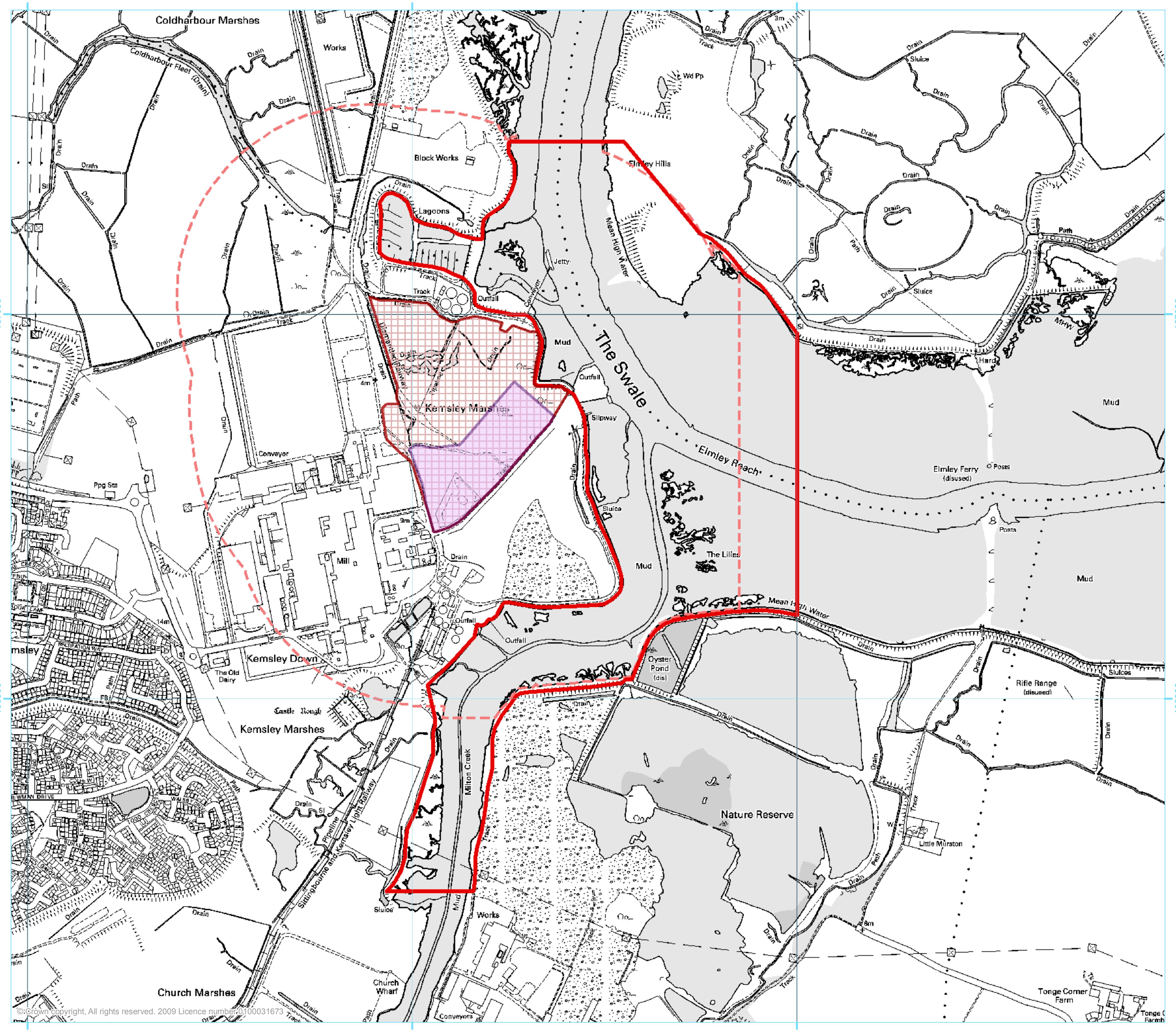
Date: 25/06/2009 Drawn: NE Checked: RW

Job Ref: **JPP1804** Figure No: **B.2** Revision: **A**

www.rpsgroup.com

Project Ref: o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_Intertidal_designated_site.mxd

Map copyright details



Legend

- Proposed development layout
- Potential zone of influence of proposed development from on-site activities
- Intertidal study area (RPS 2009)
- Breeding bird survey boundary (2009)

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

RPS
Willow Mere House Compass Point Business Park Stocks Bridge Way
St. Ives Cambridgeshire PE27 5JL
T 01480 302751 F 01480 466911 E rpscm@rpsgroup.com

Client: G.E.L

Project: Kemsley Mill ES

Title: The full extent of the intertidal survey area

Scale: 1:10,000 @A3

0 50 100 150 200 250 500 m

Projection: British National Grid Datum: OSGB36

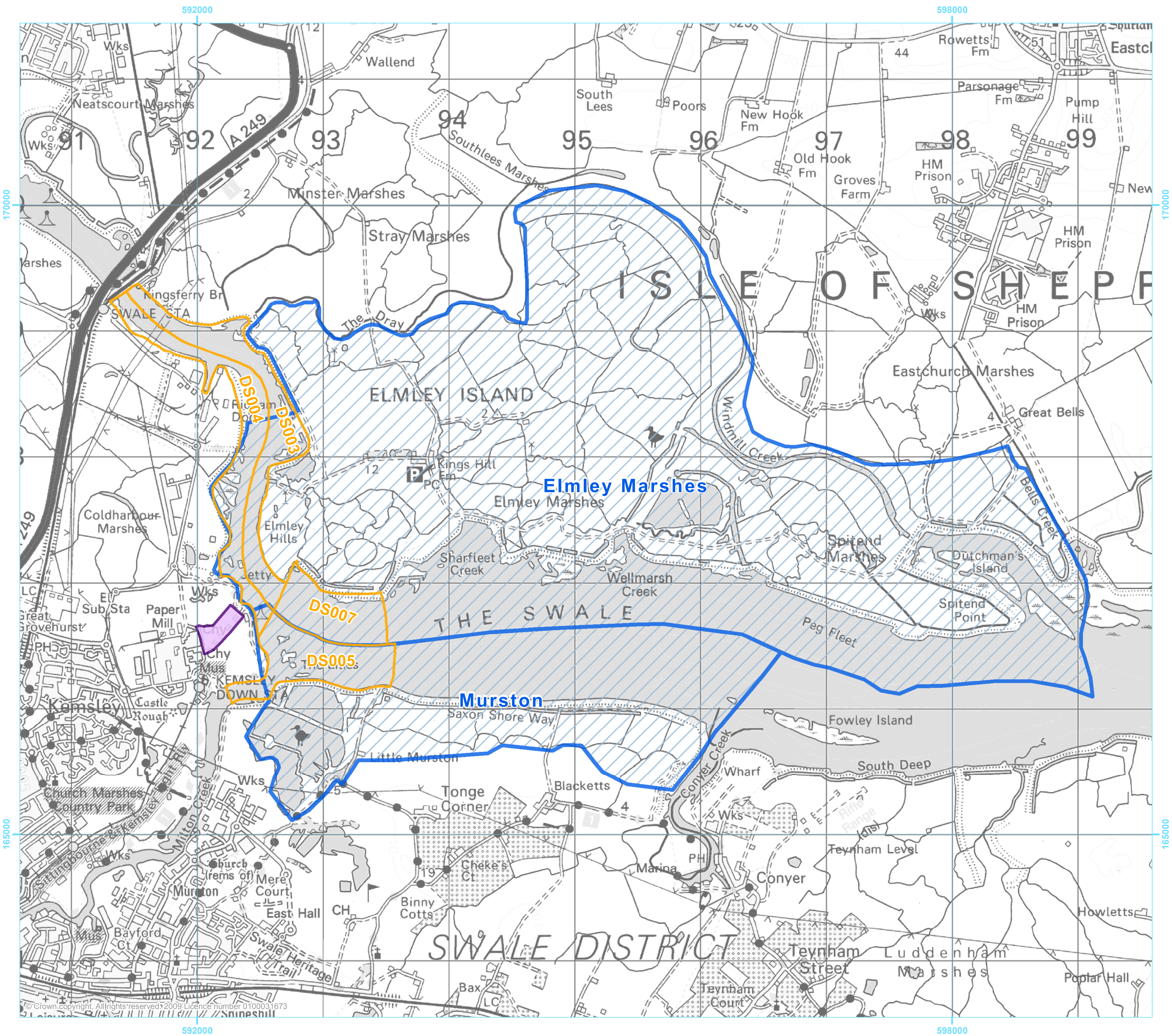
Date: 25/06/2009 Drawn: NE Checked: RW

Job Ref: **JPP1804** Figure No: **B.3** Revision: **A**

www.rpsgroup.com

Project Ref: o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_IntertidalBirds2009_surveymap.mxd

Map copyright details



Legend

- Proposed development layout
- WeBS low tide count sector (*with label*)
- WeBS core count sector (*with label*)

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009; WeBS

Status: **Final**

RPS

Willow Mere House Compass Point Business Park Stocks Bridge Way
St. Ives Cambridgeshire PE27 5JL
T 01480 302751 F 01480 466911 E rpscm@rpsgroup.com

Client: G.E.L

Project: Kemsley Mill ES

Title: The WeBS high tide and low tide count sectors boundaries

Scale: 1:30,000 @A3

0 100 200 300 400 500 1,000 m

Projection: British National Grid Datum: OSGB36

Date: 25/06/2009 Drawn: NE Checked: RW

Job Ref: **JPP1804** Figure No: **B.4** Revision: **A**

www.rpsgroup.com

Project Ref: o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_WeBS.mxd

Map copyright details

Figure B.5. Marsh Harrier territories

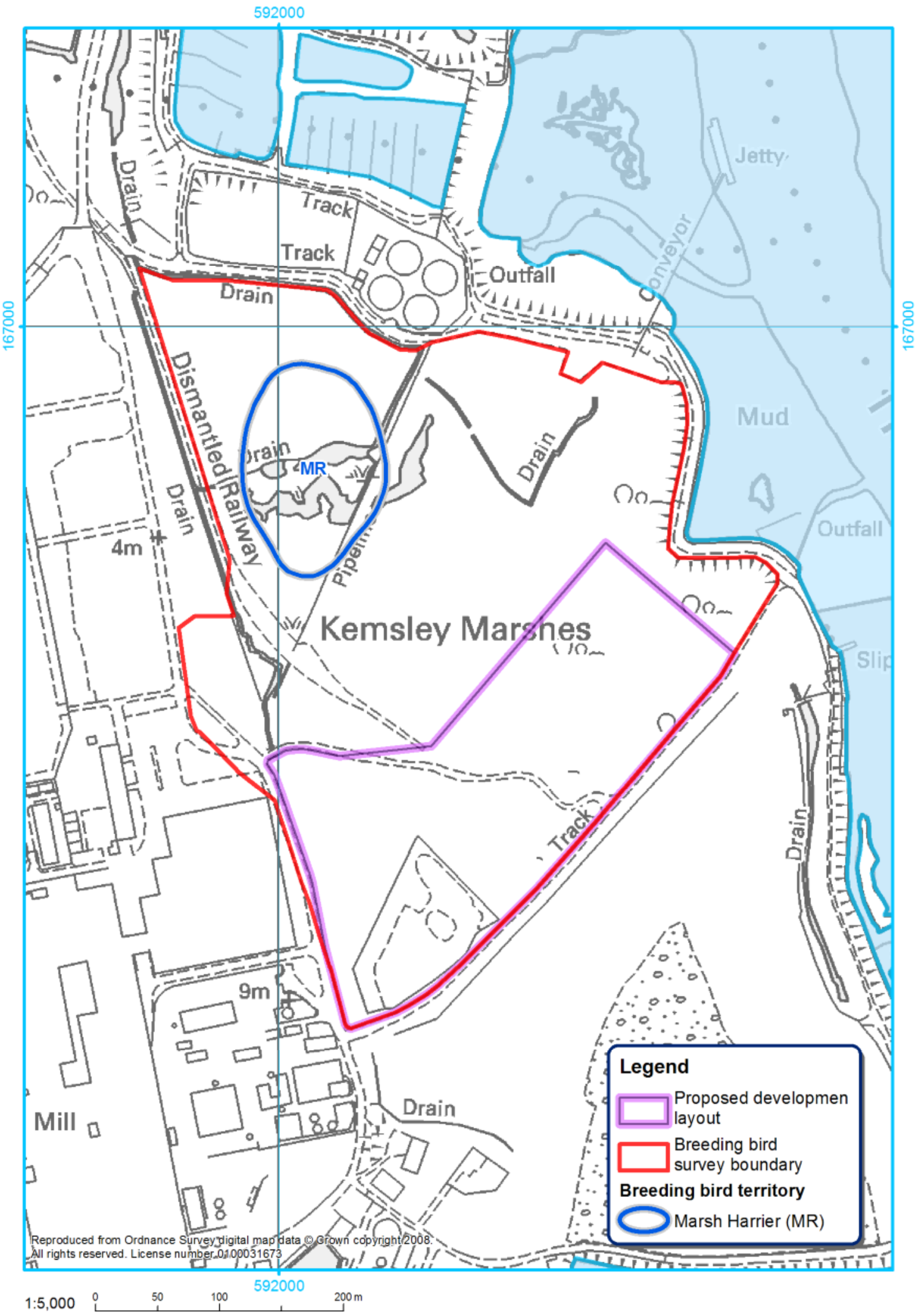


Figure B.6. Cetti's Warbler territories

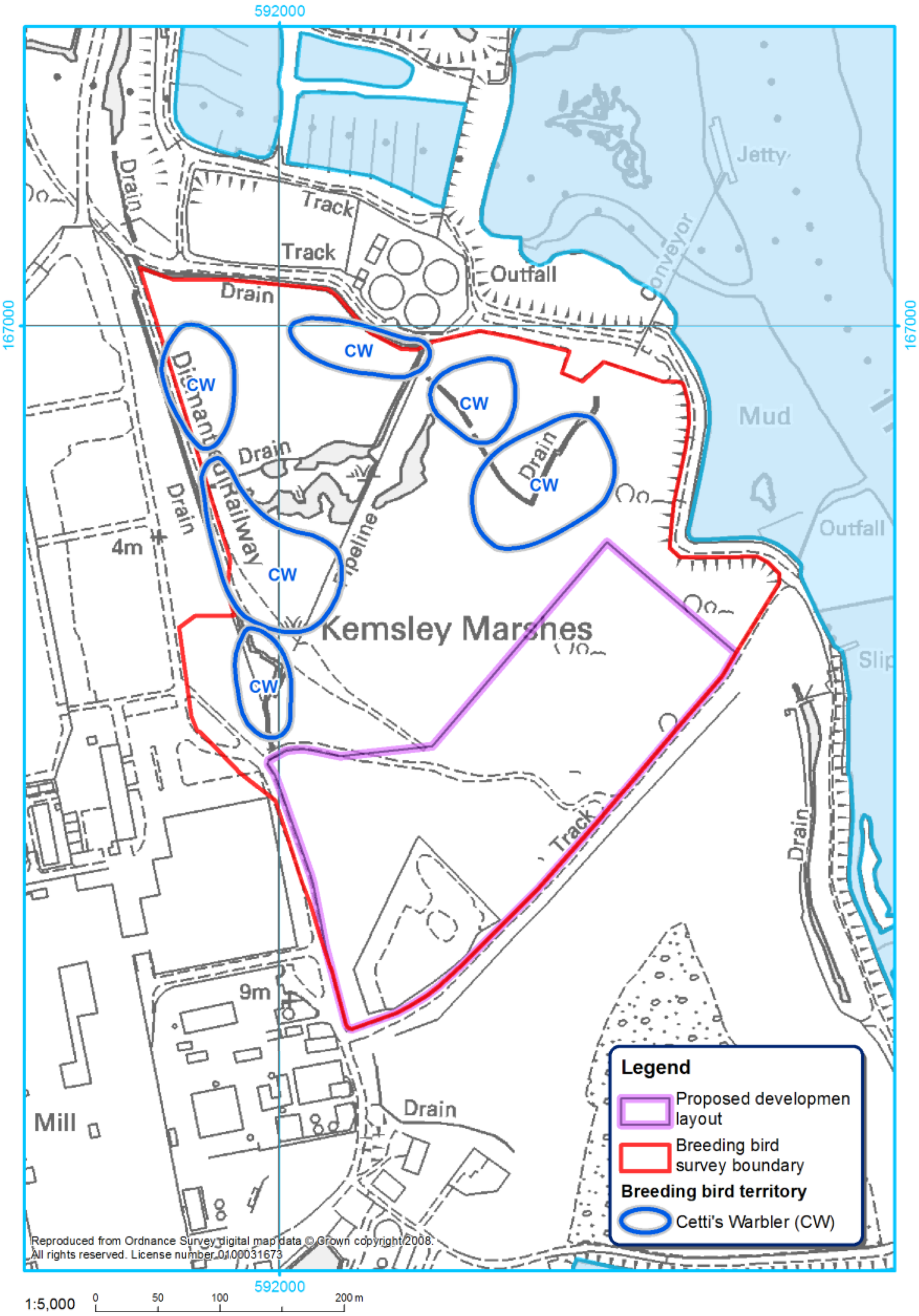


Figure B.7. Bearded Tit territories

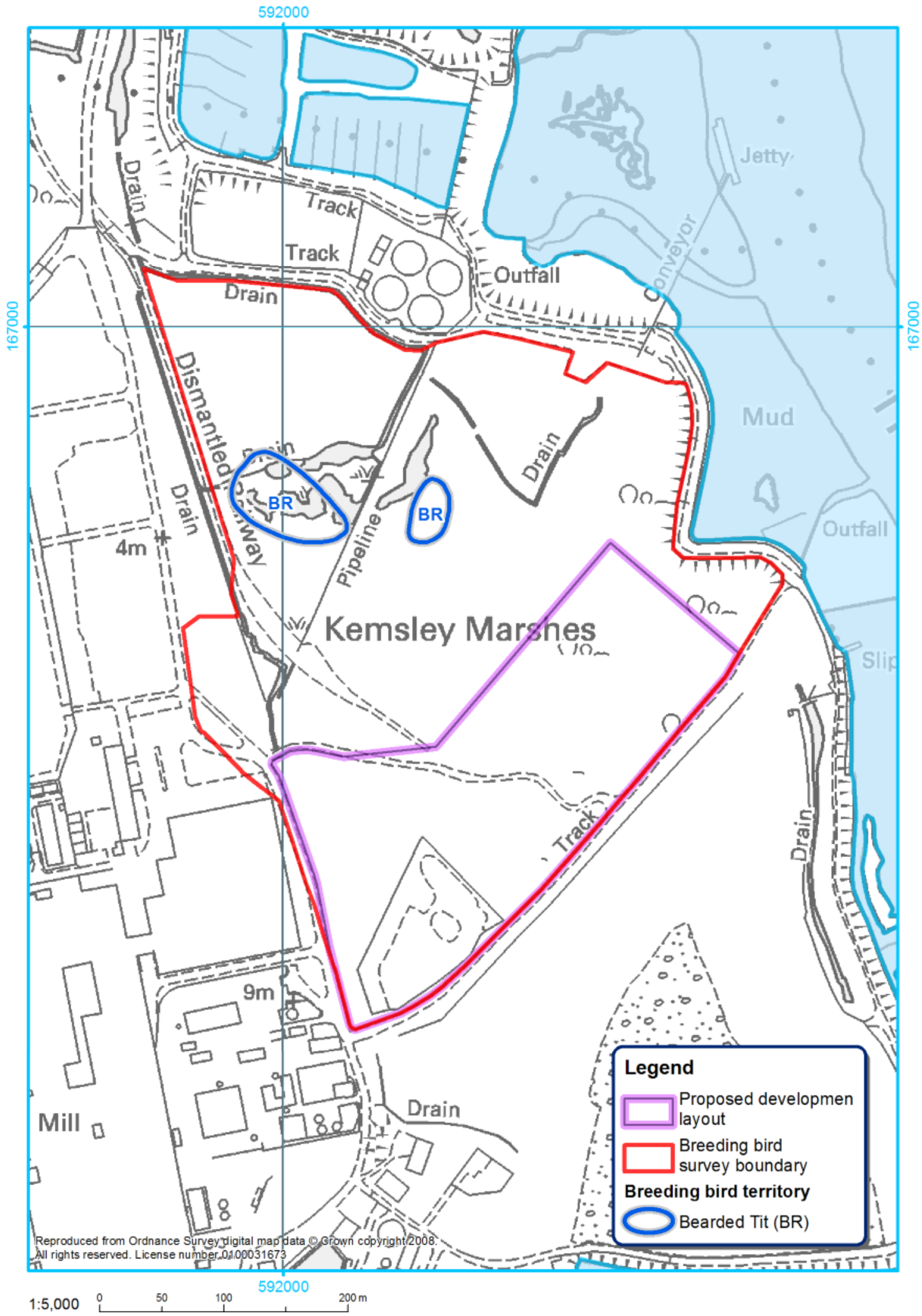


Figure B.8. Turtle Dove territories

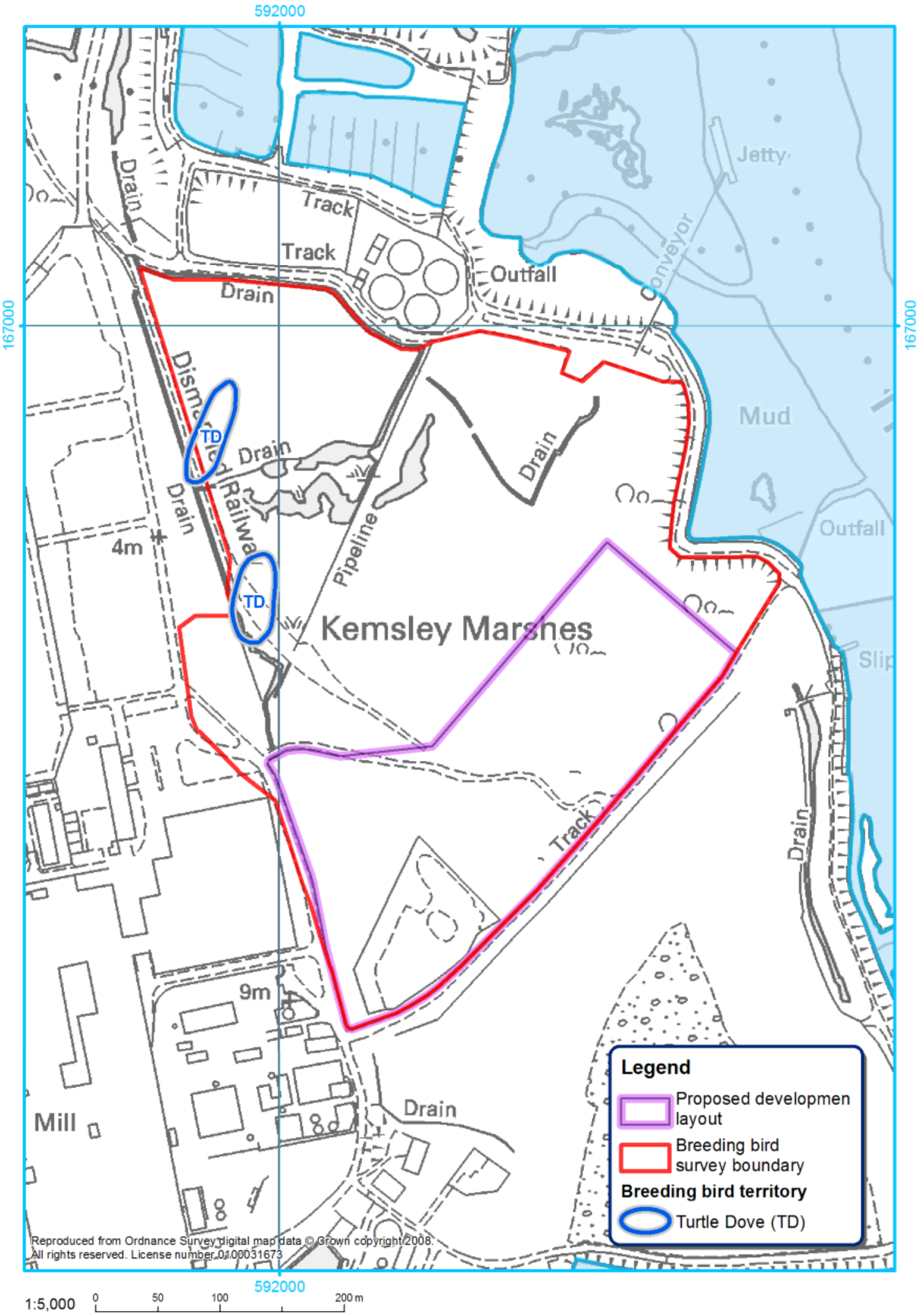


Figure B.9. Skylark territories

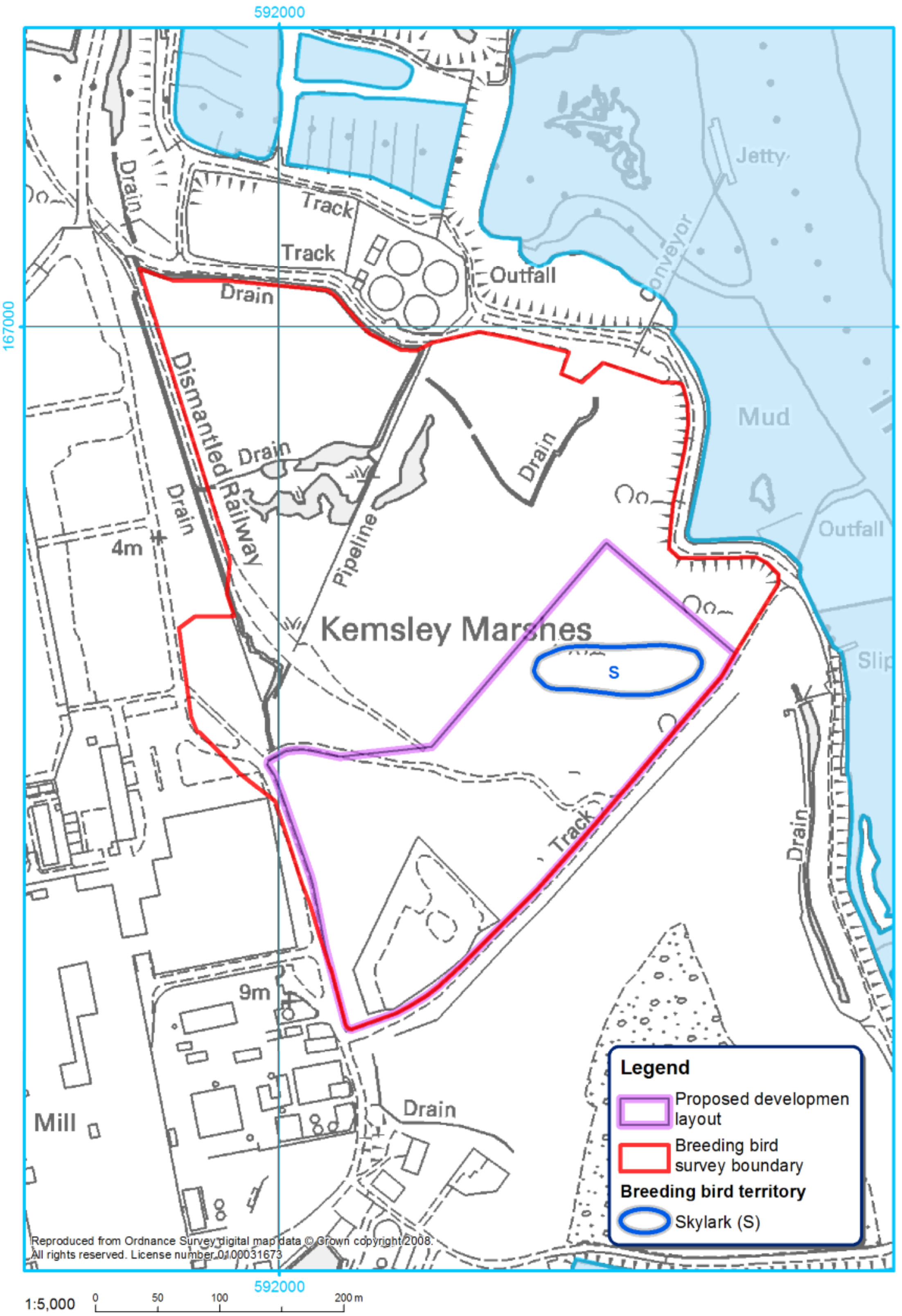


Figure B.10. Song Thrush territories

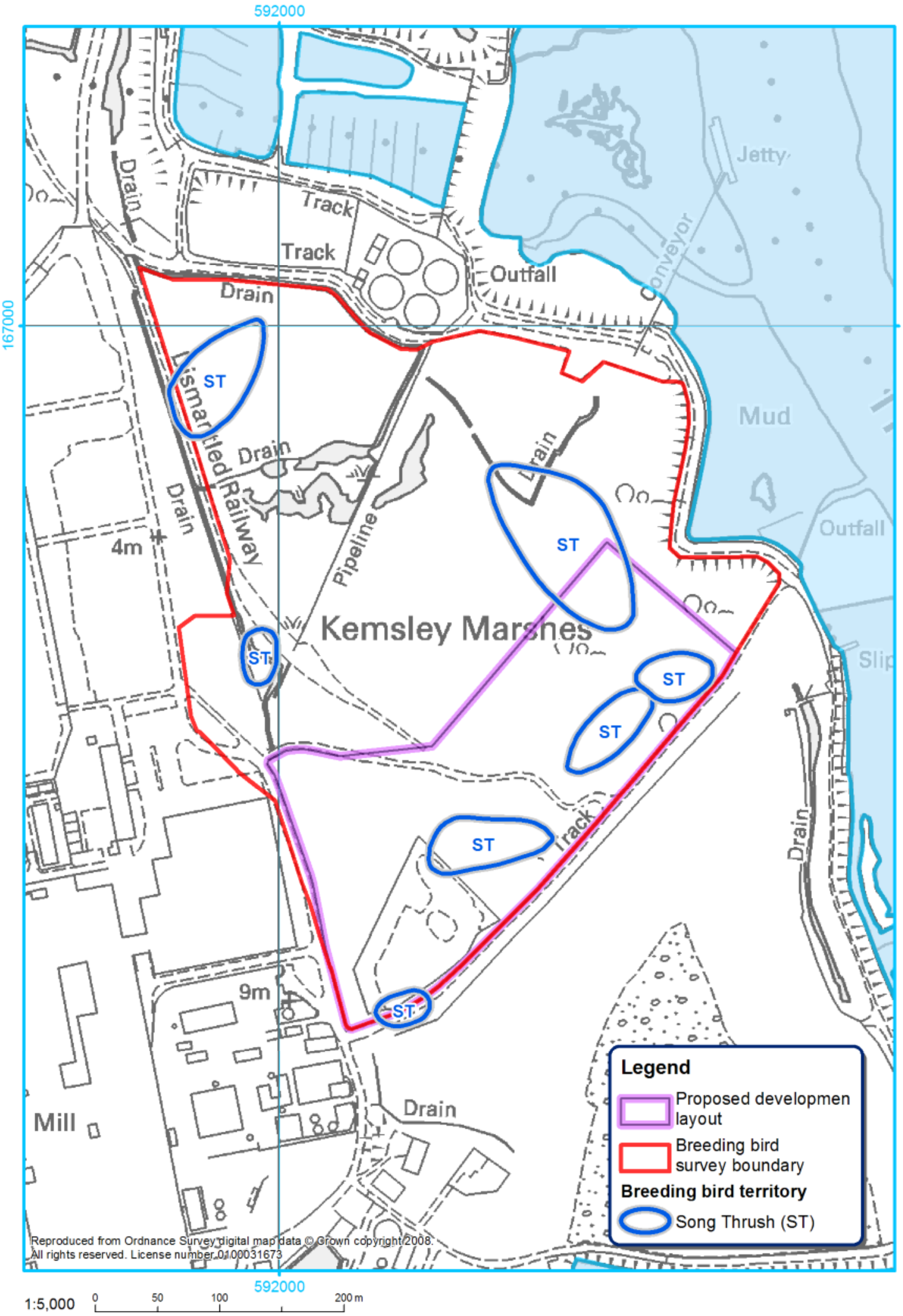


Figure B.11. Starling territories

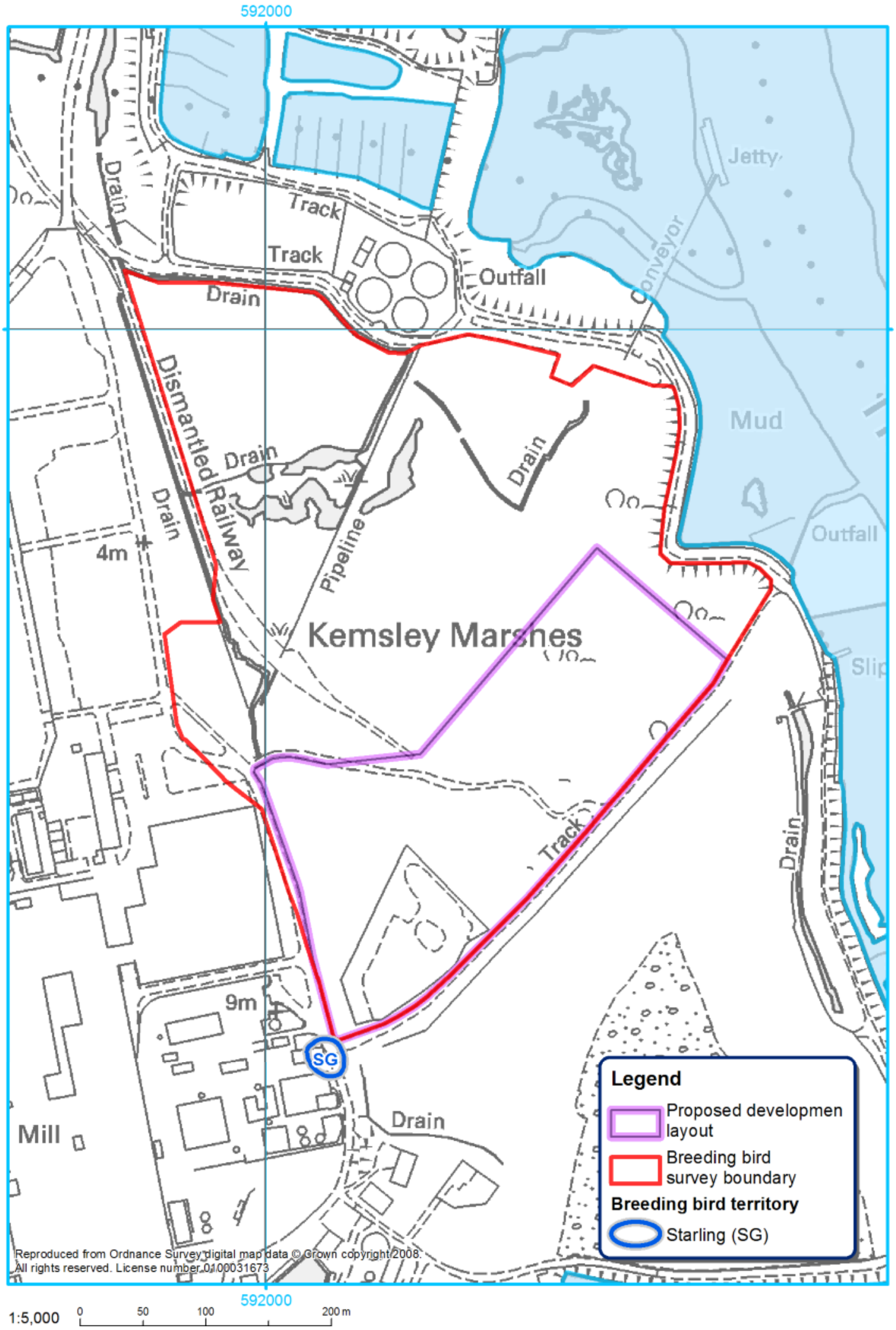
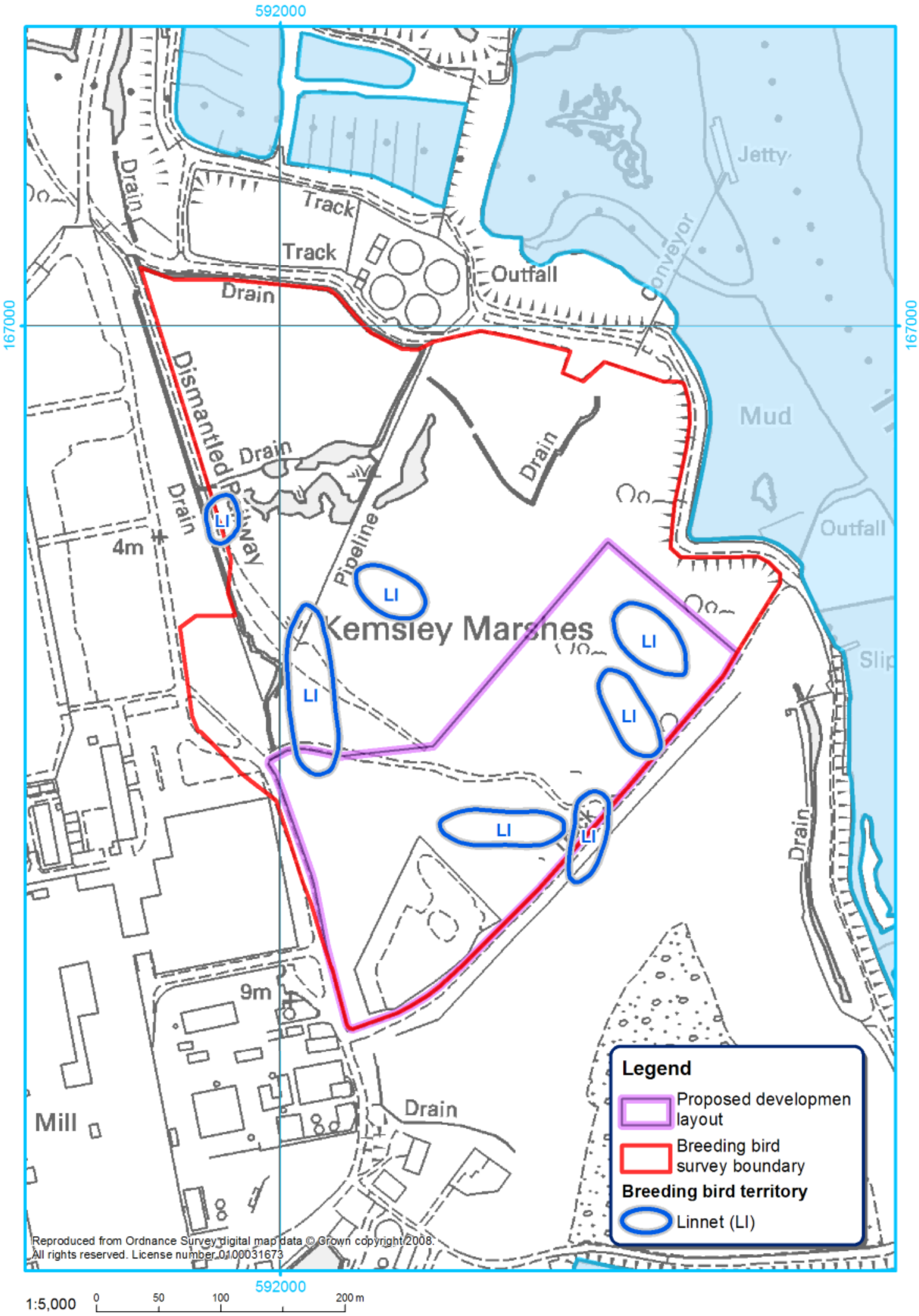


Figure B.12. Linnet territories



Appendix C: Distribution maps of key waterbird species recorded at Kemsley.

Figure C.1. Spatial distribution of Little Grebe over high water February-March 2009

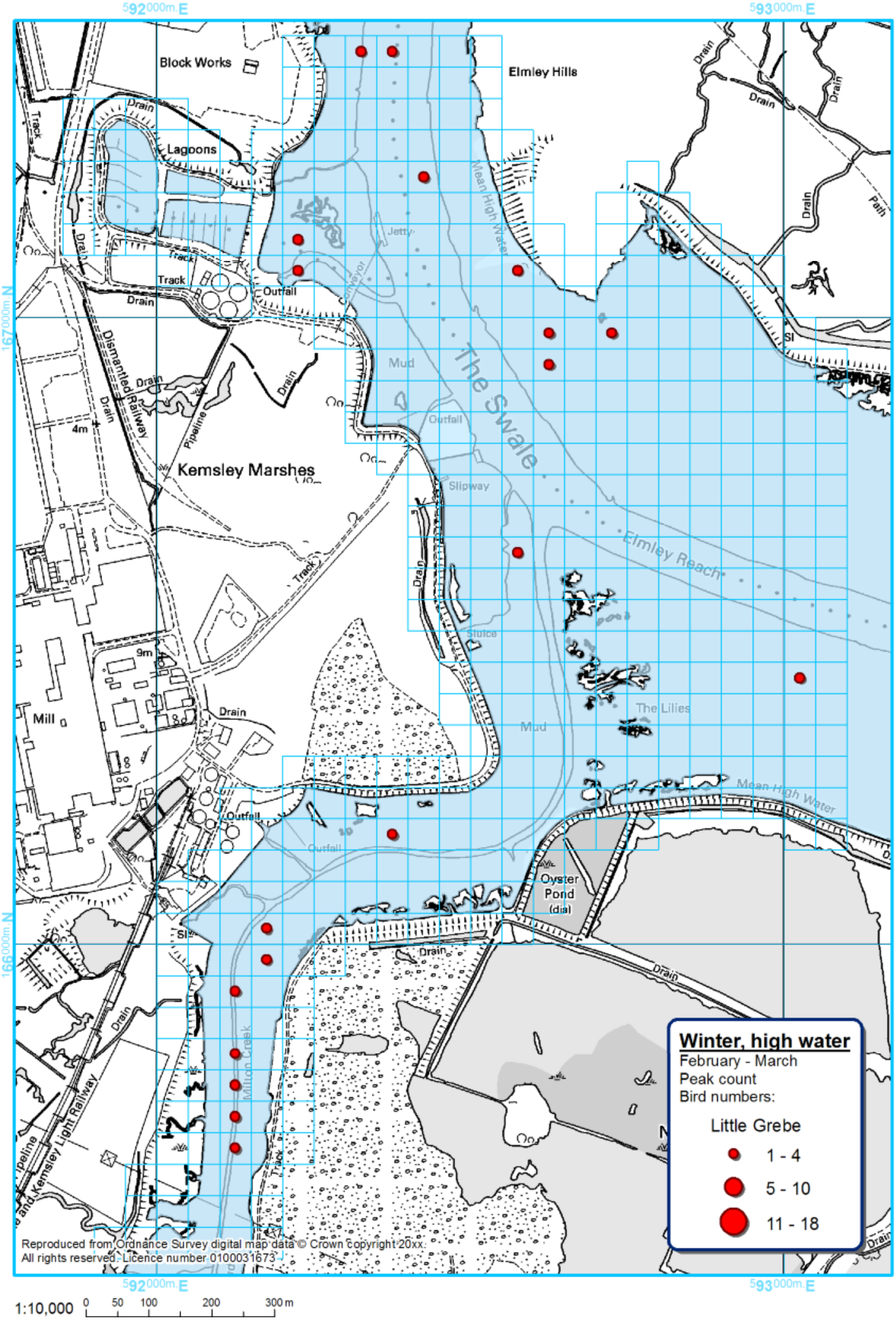


Figure C.2. Spatial distribution of Little Grebe over low water February-March 2009

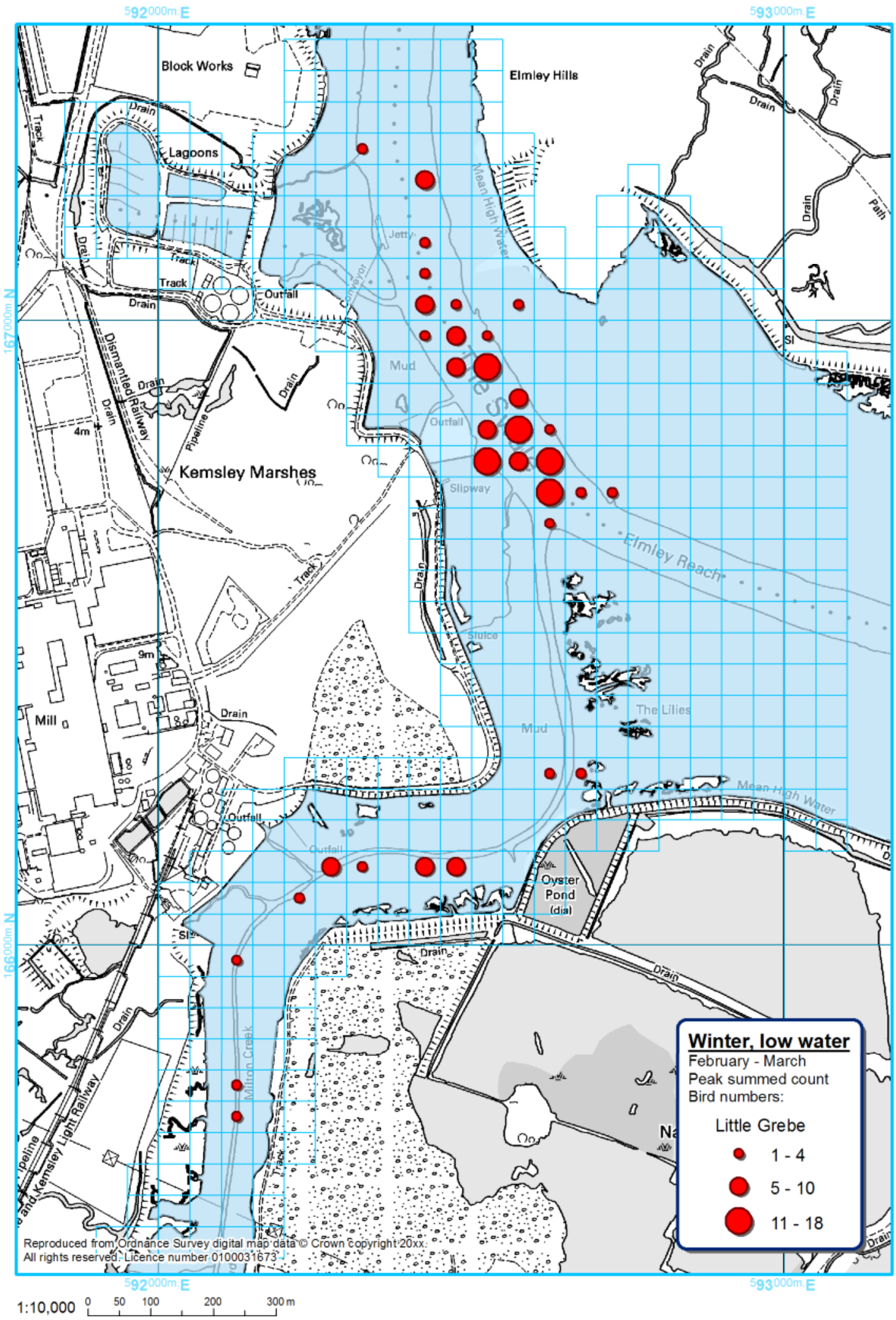


Figure C.3. Spatial distribution of Shelduck over high water February-March 2009

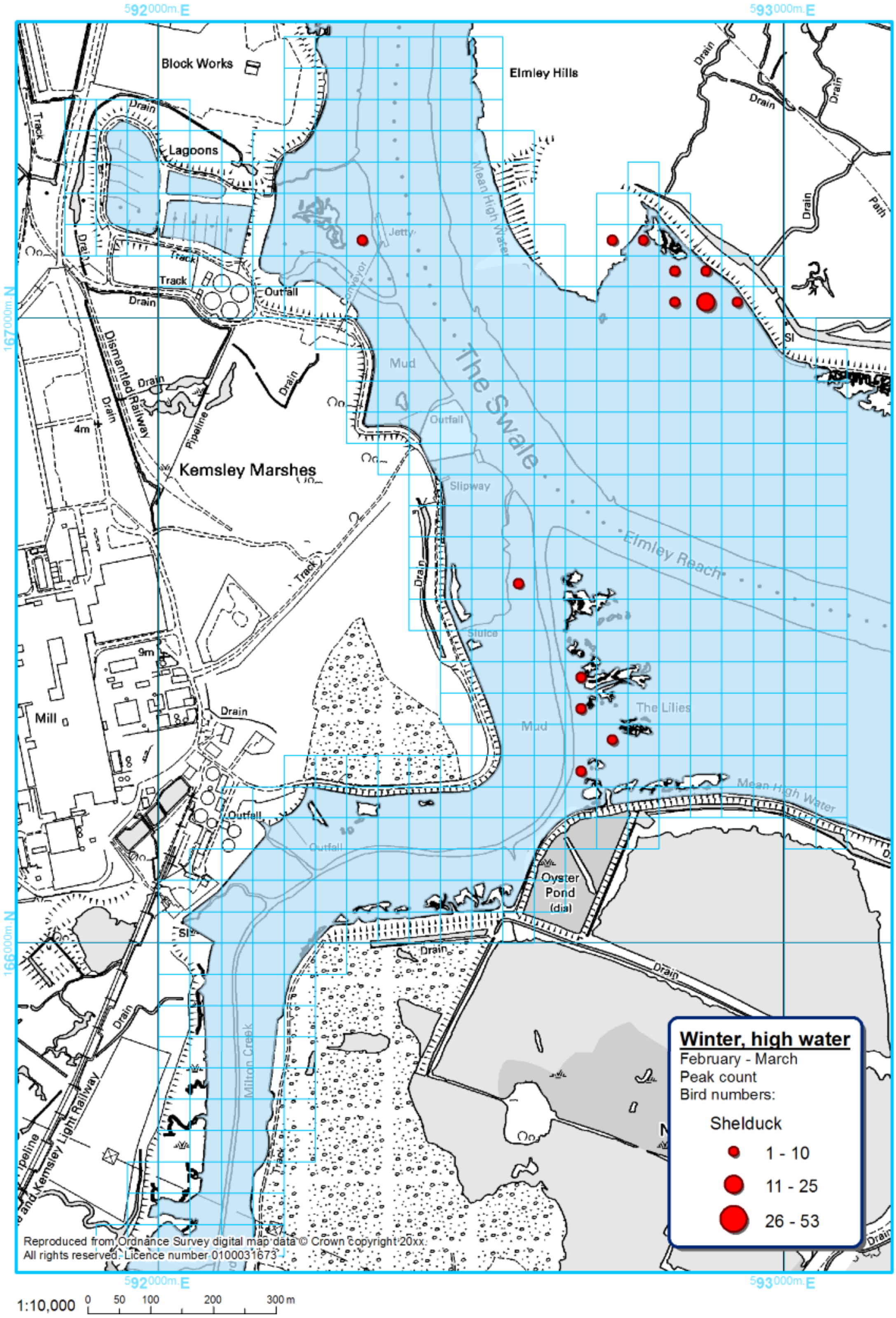


Figure C.4. Spatial distribution of Shelduck over low water February-March 2009

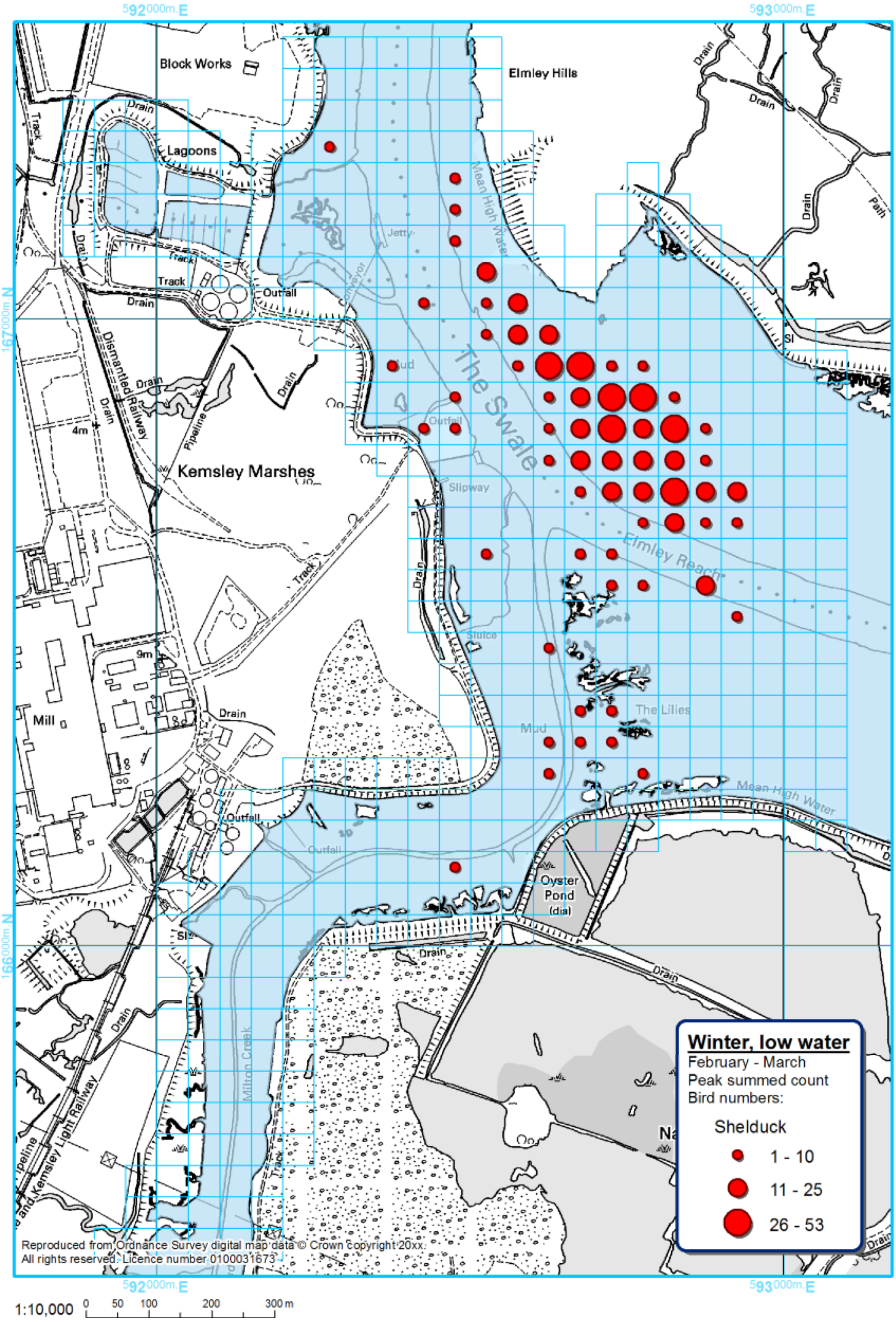


Figure C.5. Spatial distribution of Shelduck over high water April-May 2009

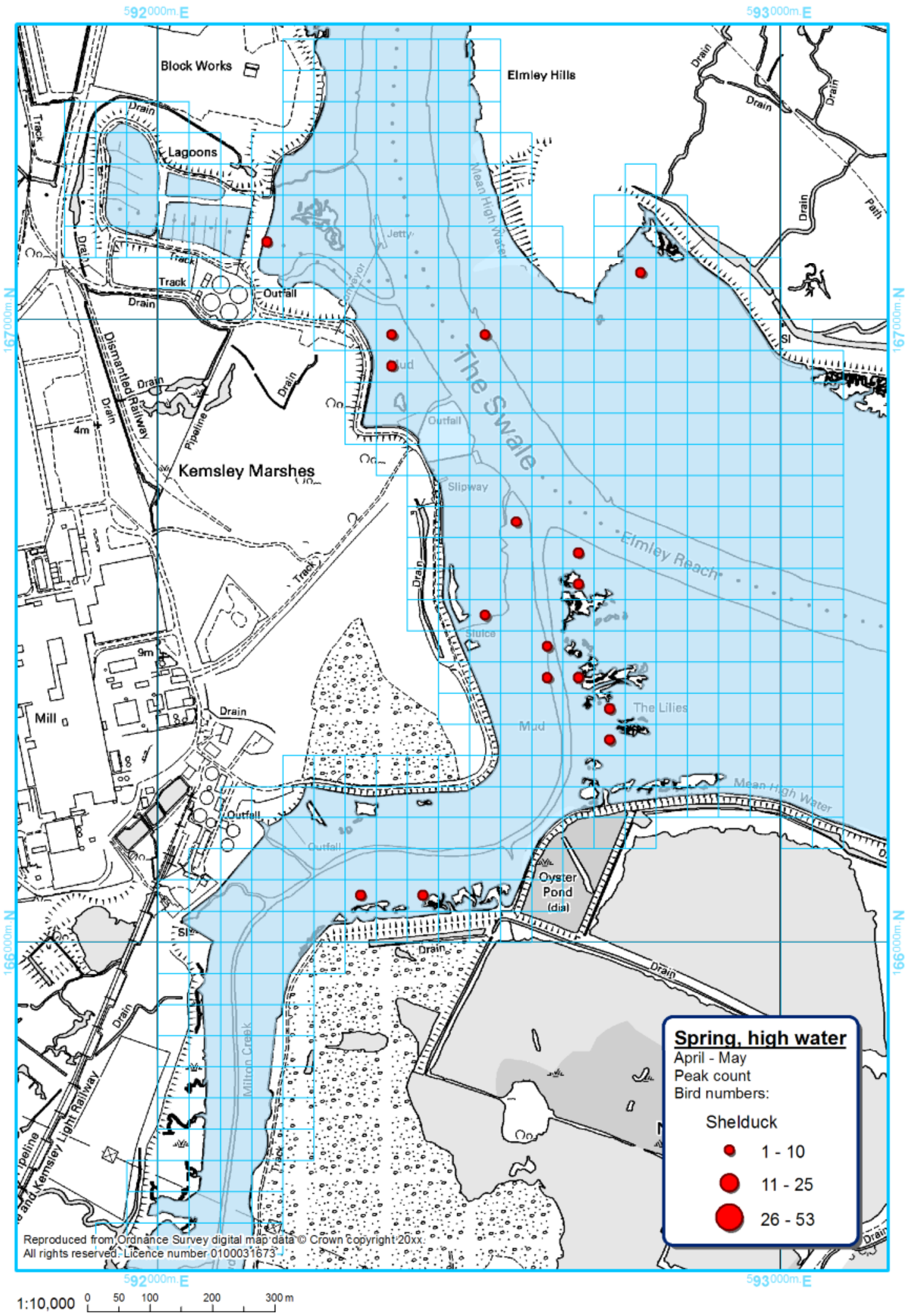


Figure C.6. Spatial distribution of Shelduck over low water April-May 2009

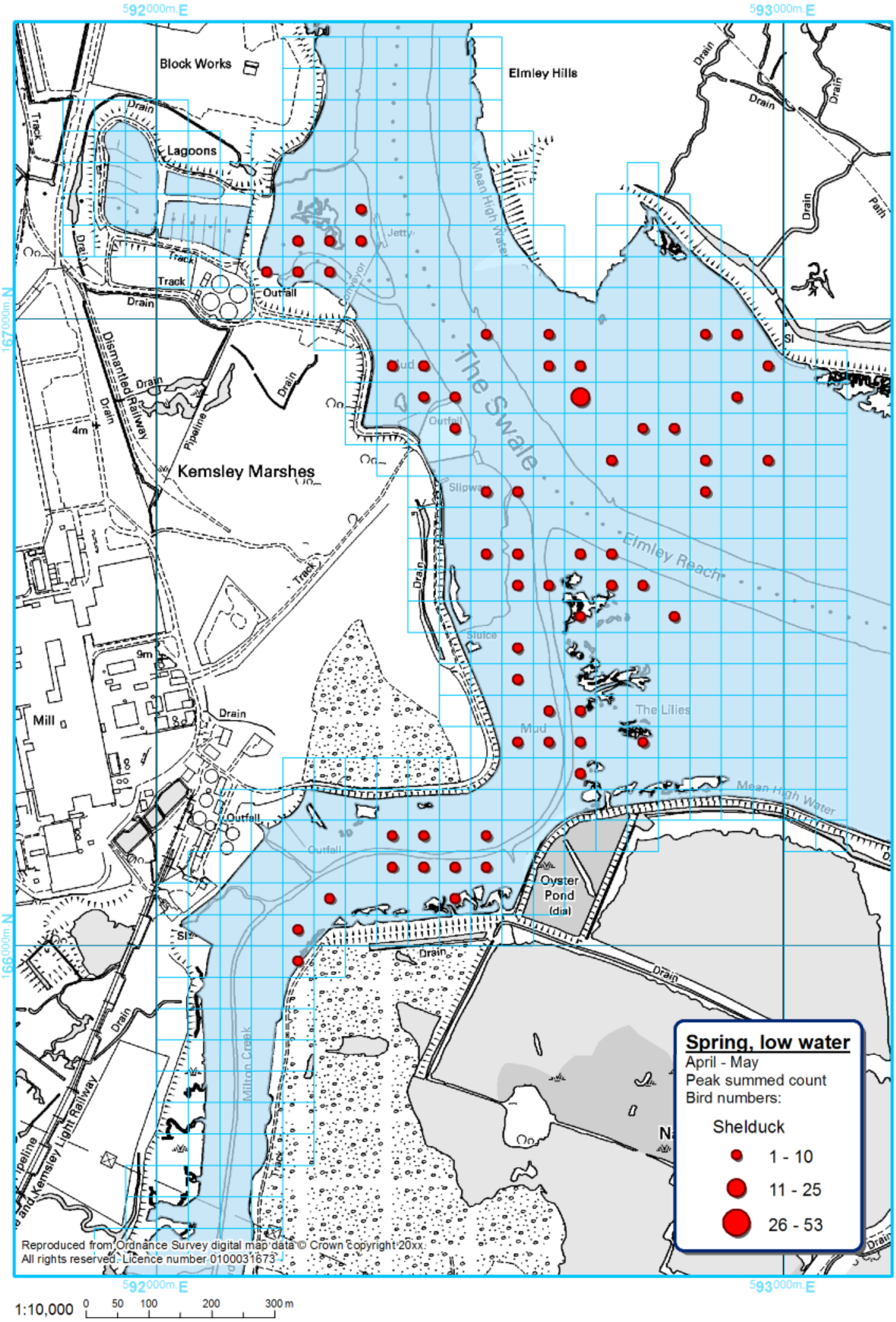


Figure C.7. Spatial distribution of Wigeon over high water February-March 2009

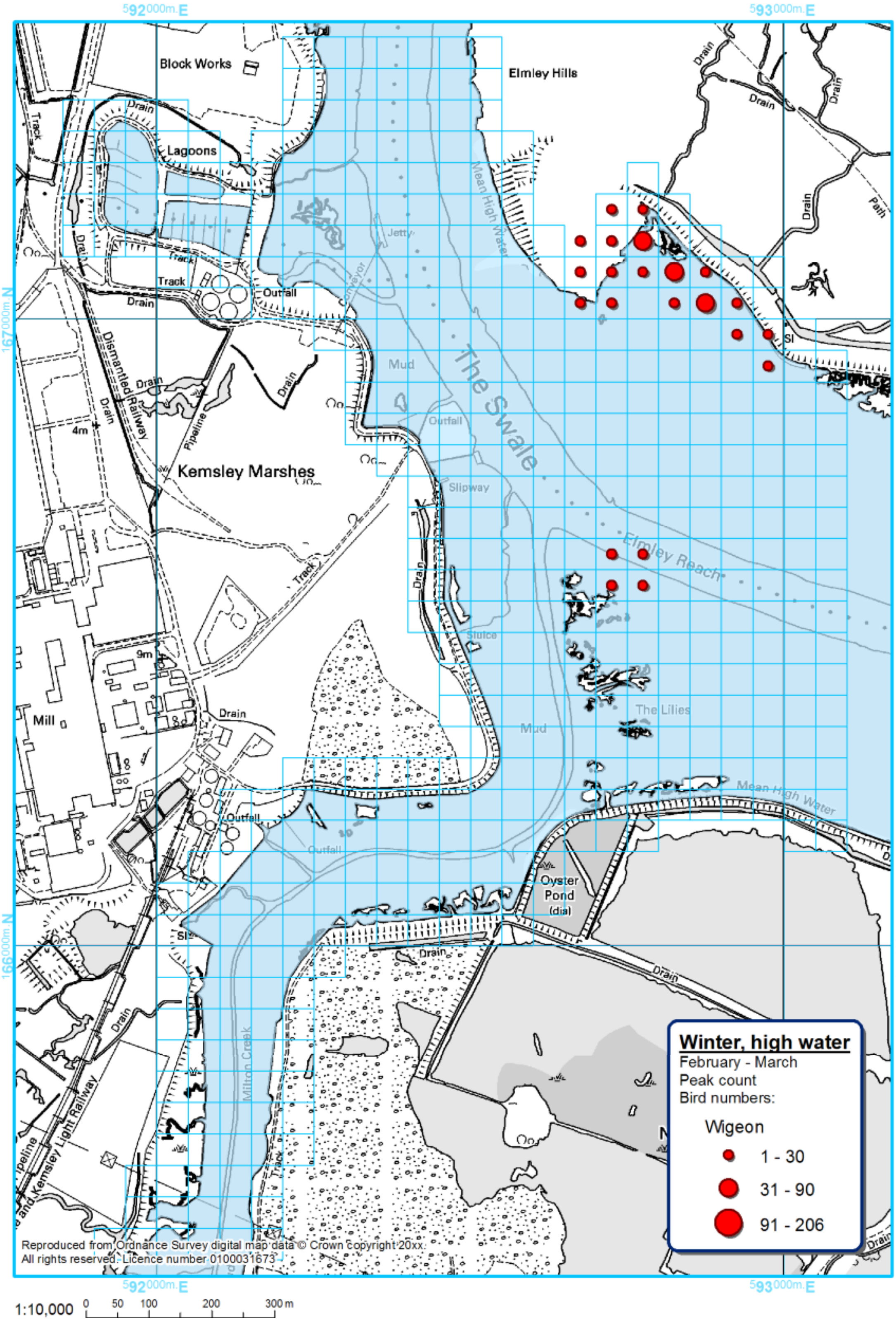


Figure C.8. Spatial distribution of Wigeon over low water February-March 2009

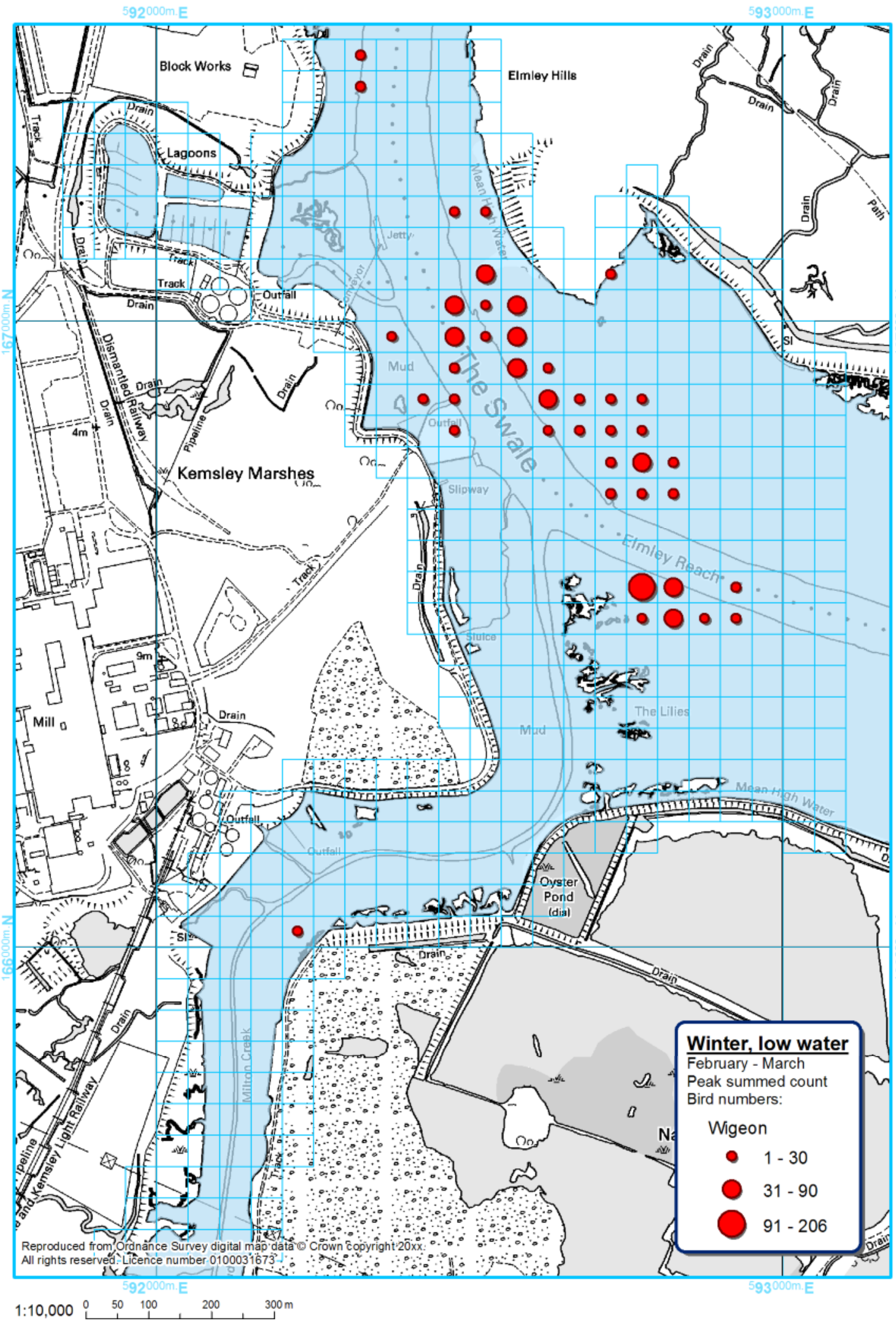


Figure C.9. Spatial distribution of Teal over high water February-March 2009

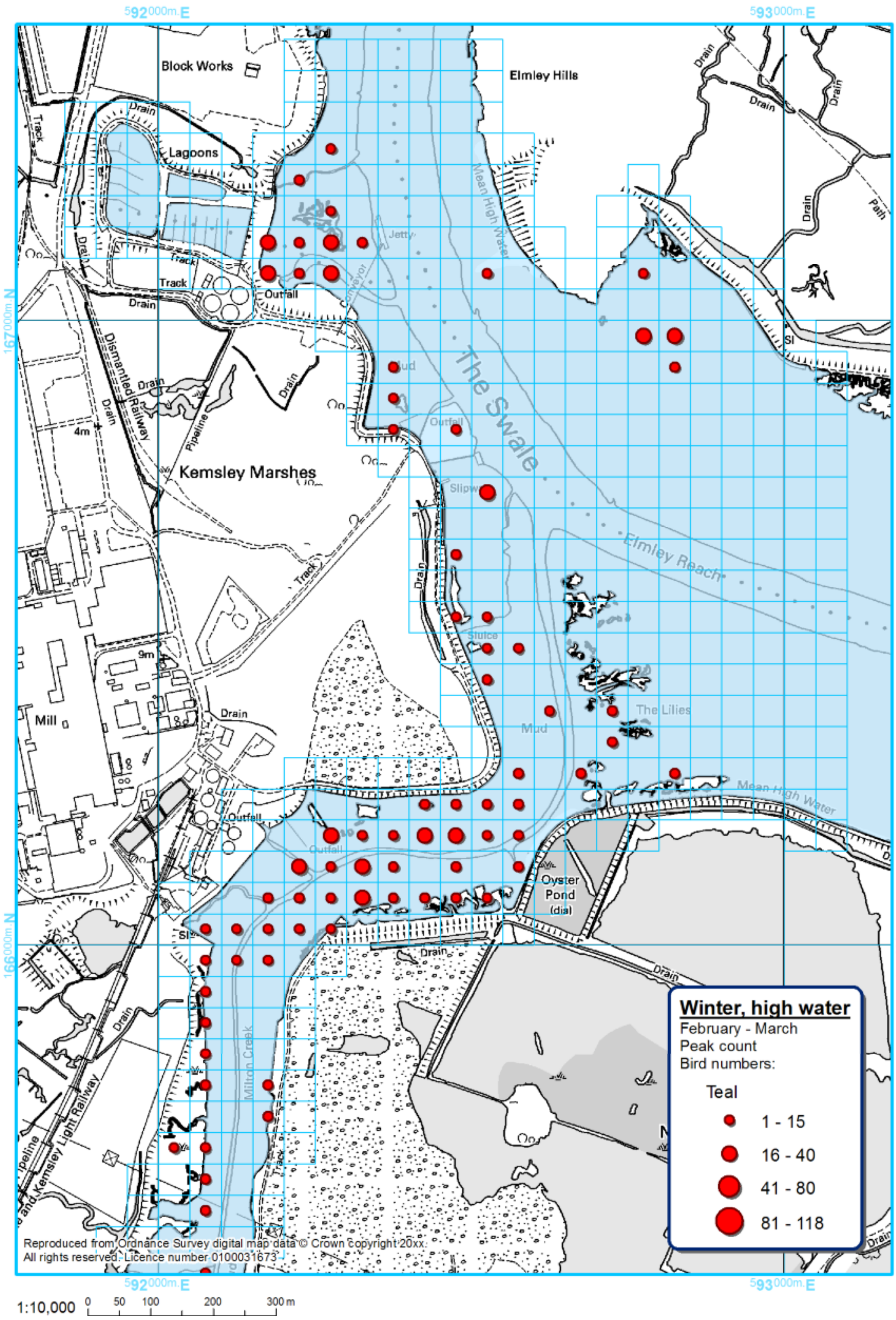


Figure C.10. Spatial distribution of Teal over low water February-March 2009

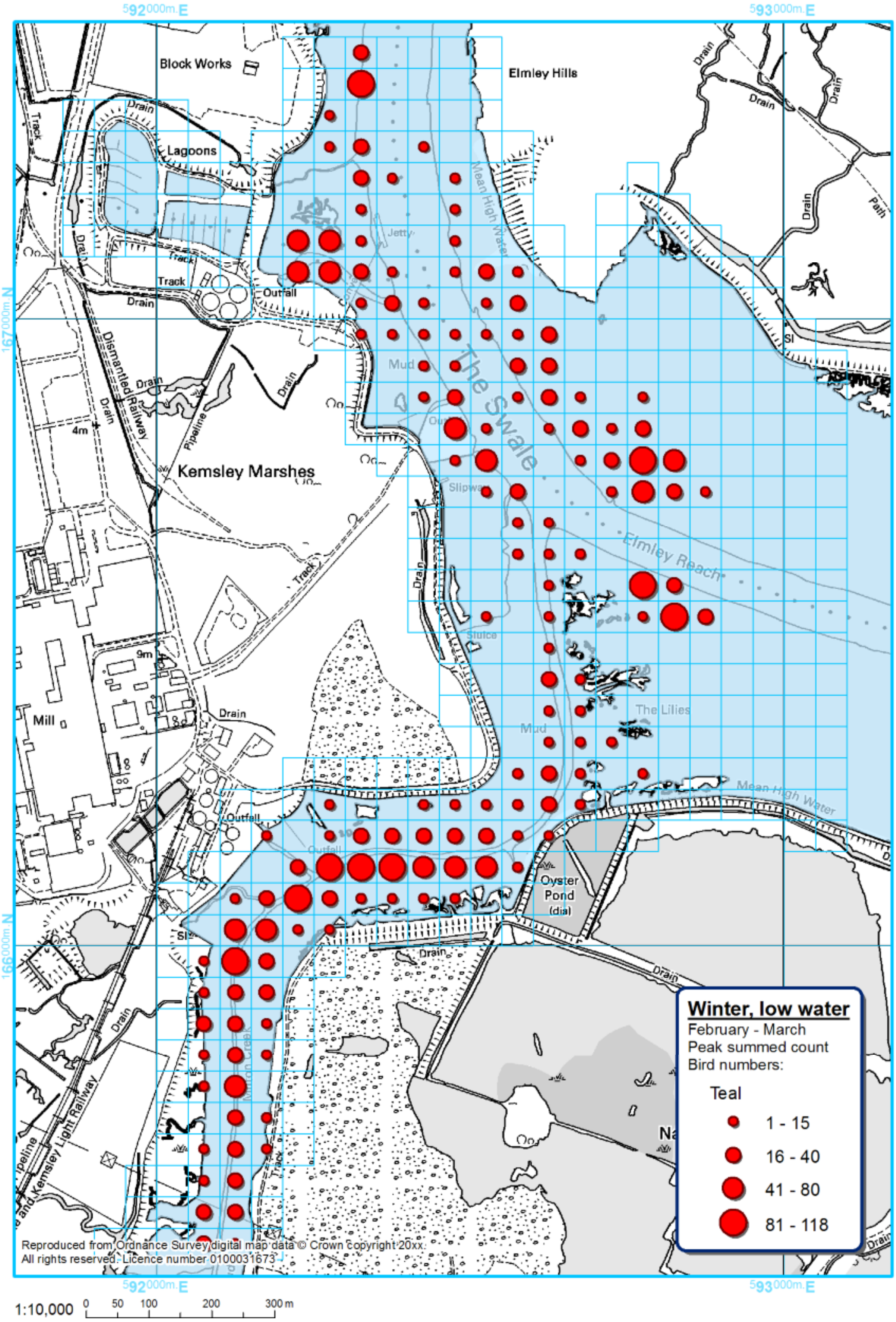


Figure C.11. Spatial distribution of Teal over high water April-May 2009

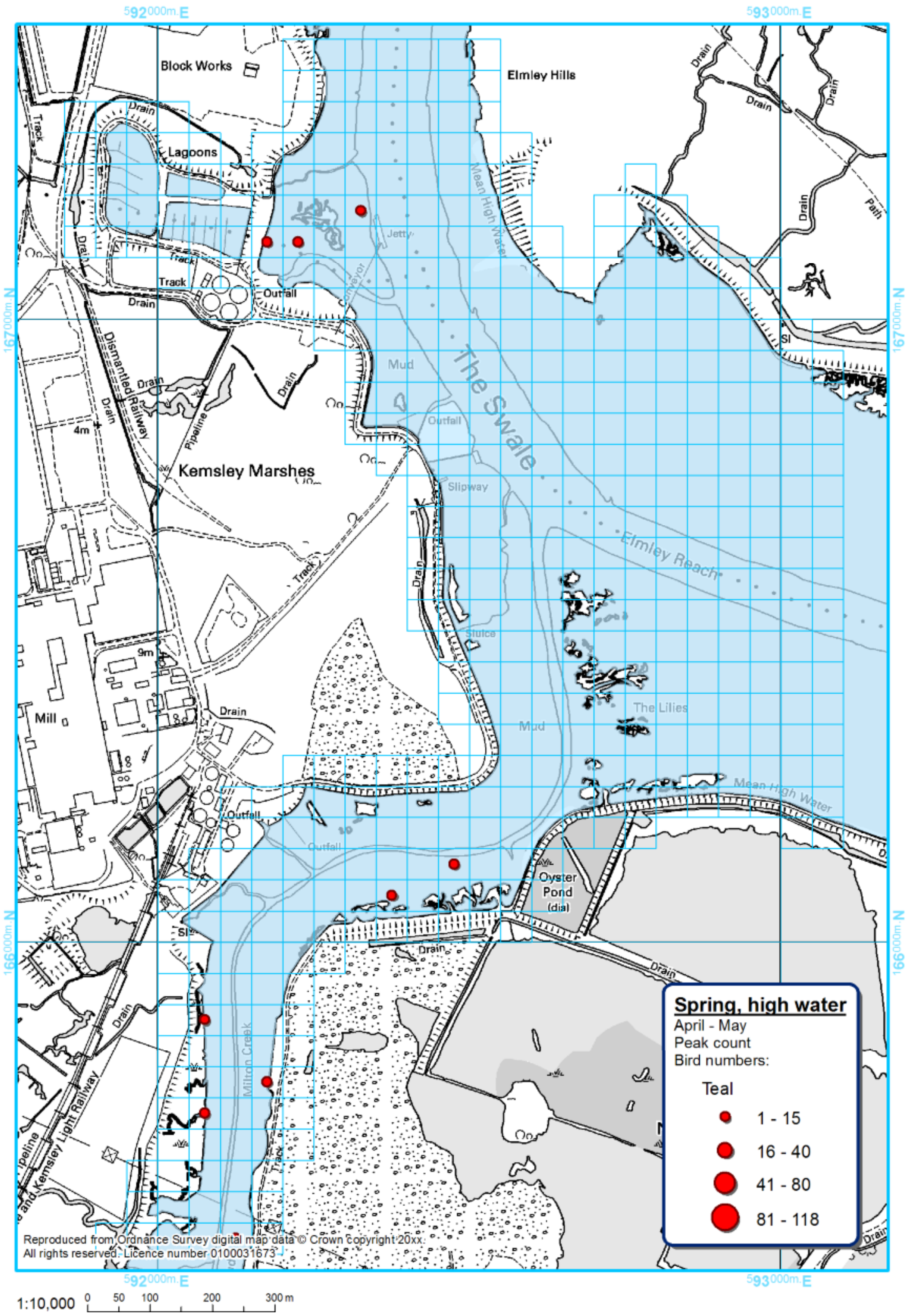


Figure C.12. Spatial distribution of Teal over low water April-May 2009

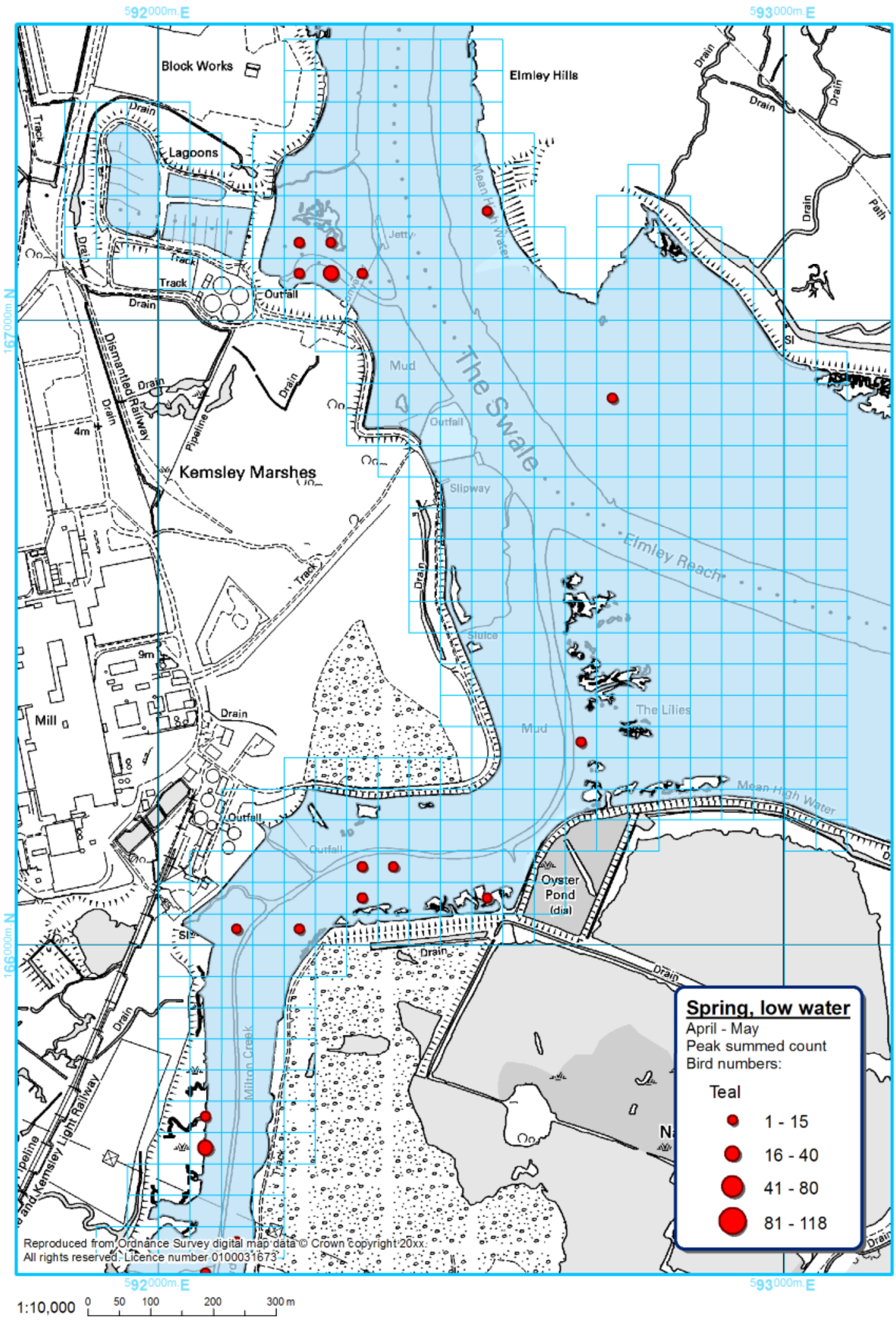


Figure C.13. Spatial distribution of Pintail over high water February-March 2009

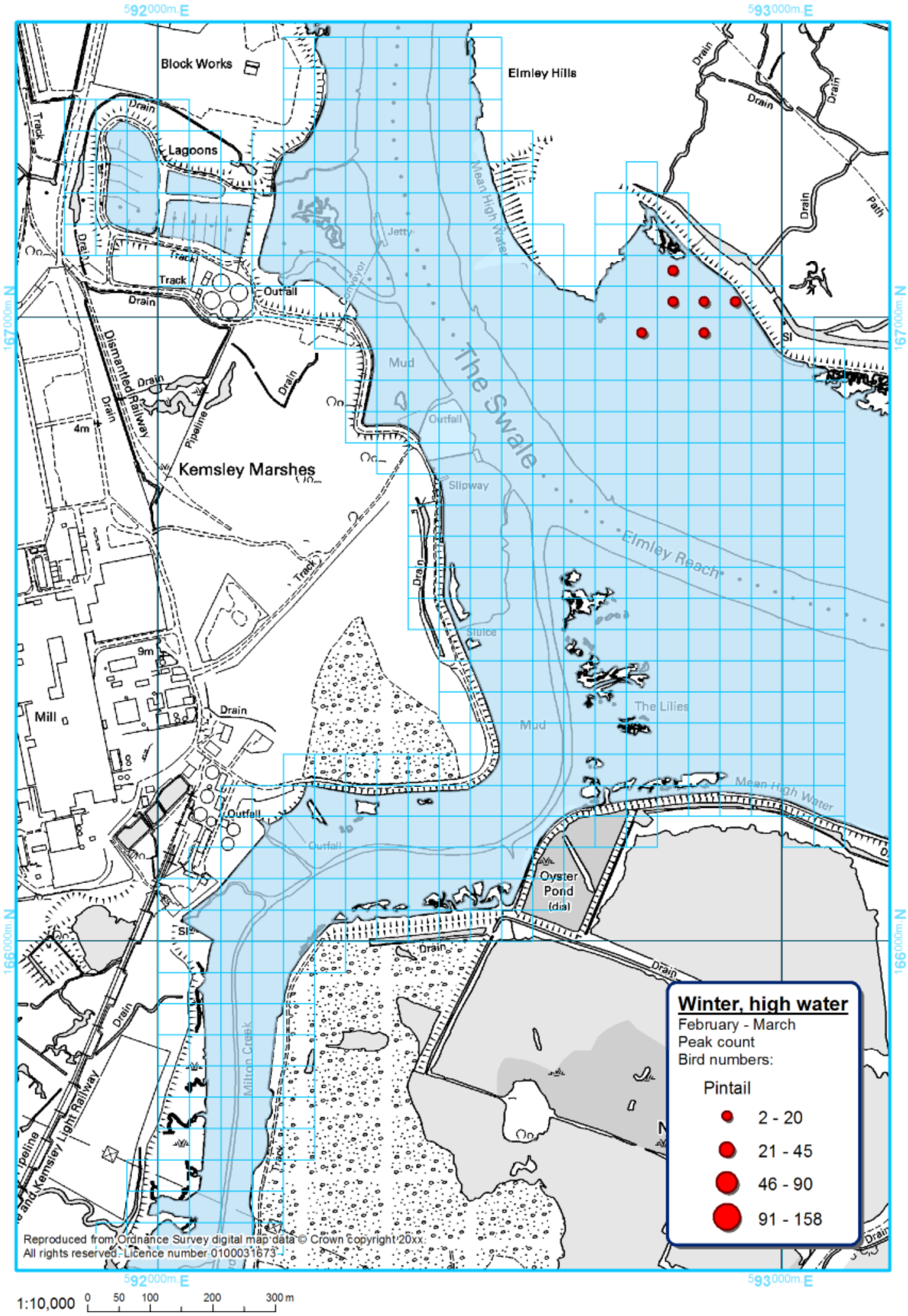


Figure C.14. Spatial distribution of Pintail over low water February-March 2009

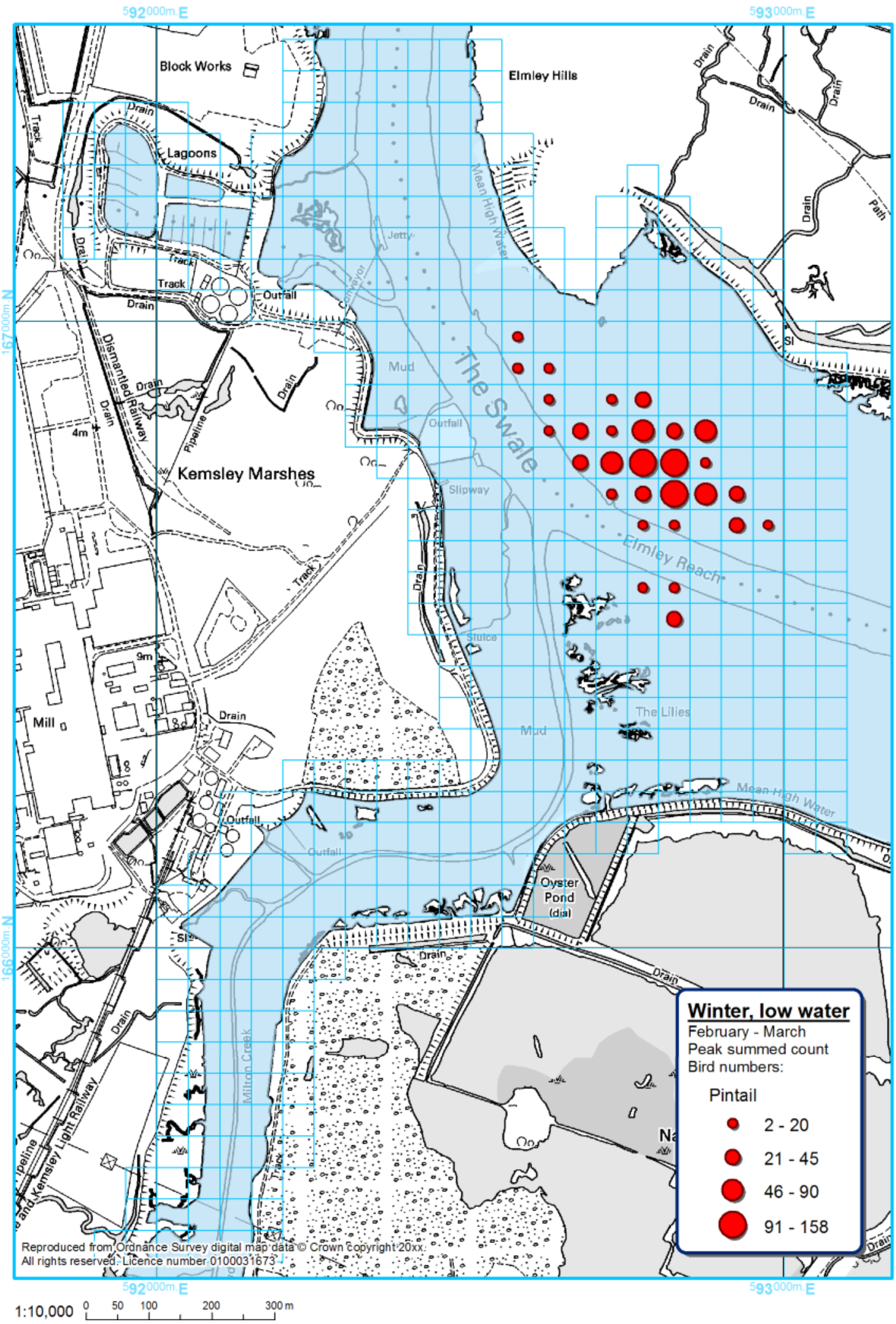


Figure C.15. Spatial distribution of Oystercatcher over high water February-March 2009

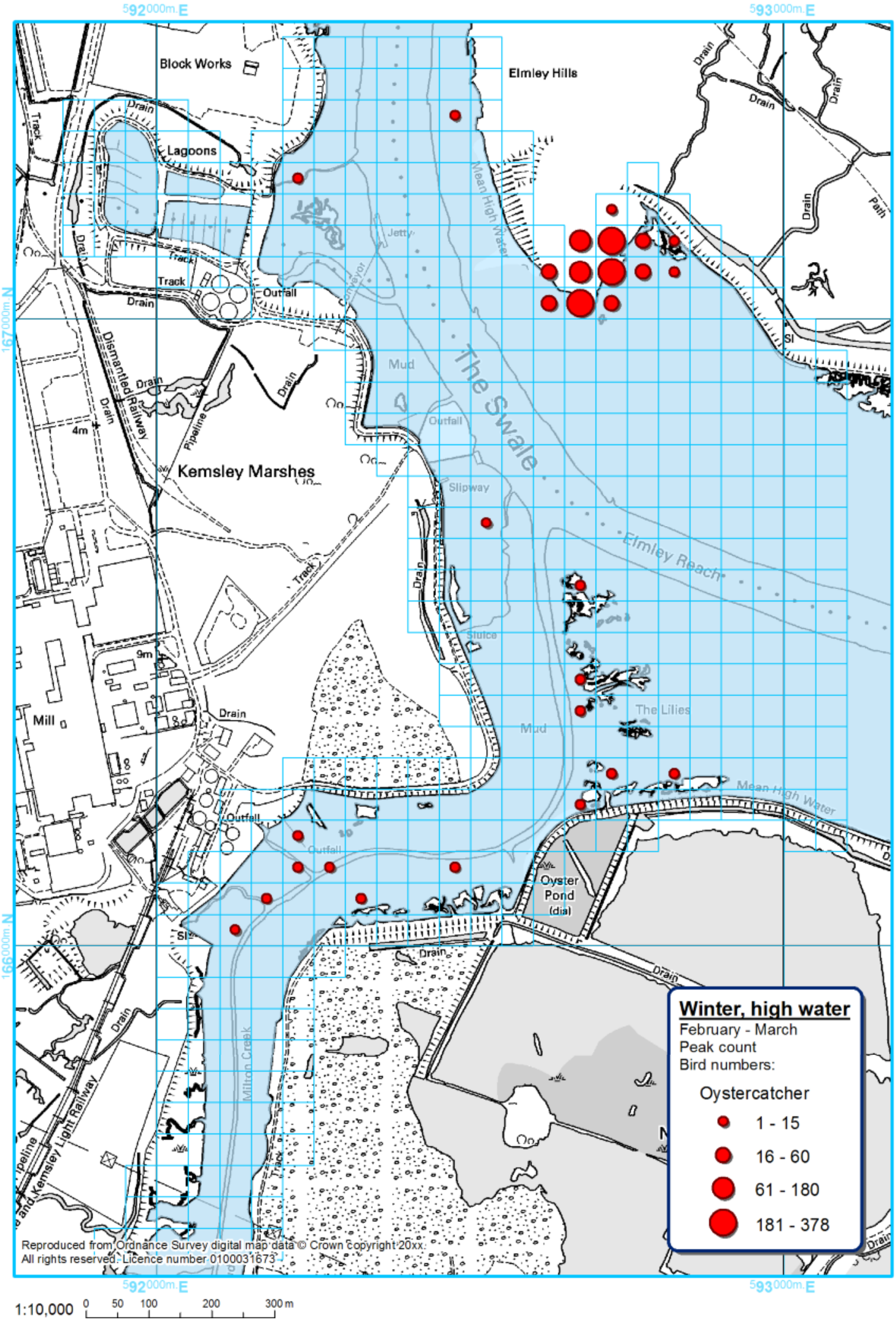


Figure C.16. Spatial distribution of Oystercatcher over low water February-March 2009

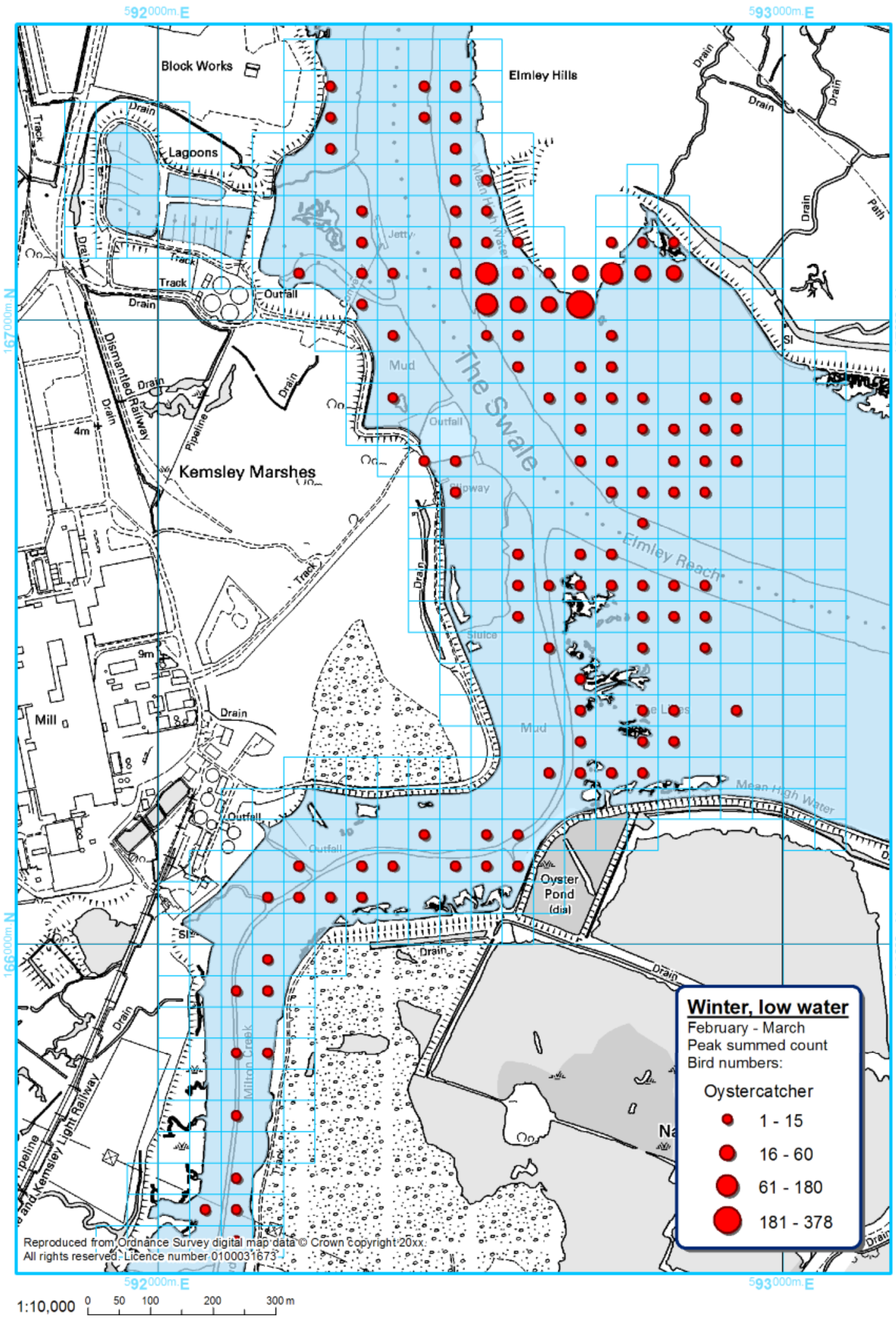


Figure C.17. Spatial distribution of Oystercatcher over high water April-May 2009

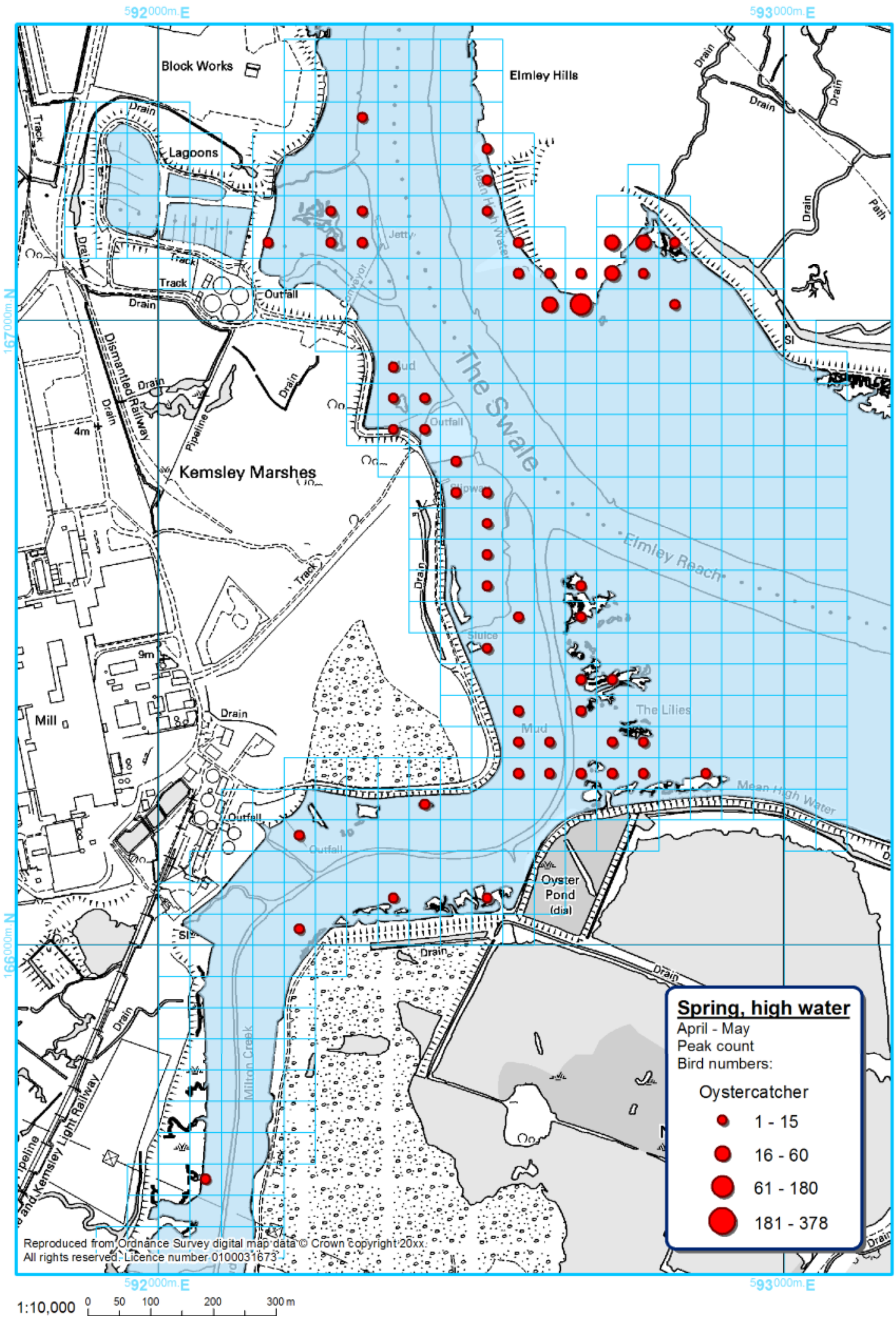


Figure C.18. Spatial distribution of Oystercatcher over low water April-May 2009

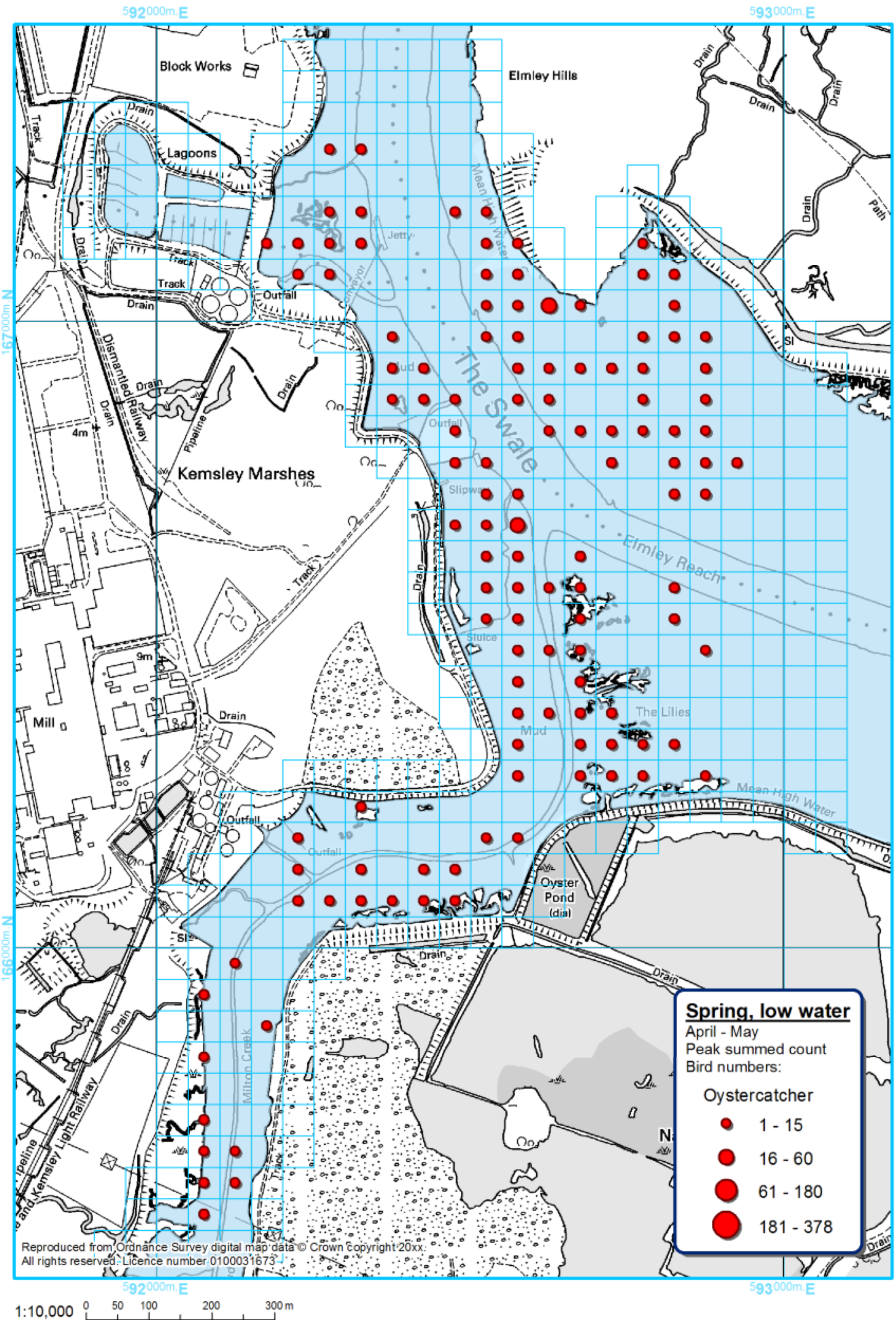


Figure C.19. Spatial distribution of Avocet over high water February-March 2009

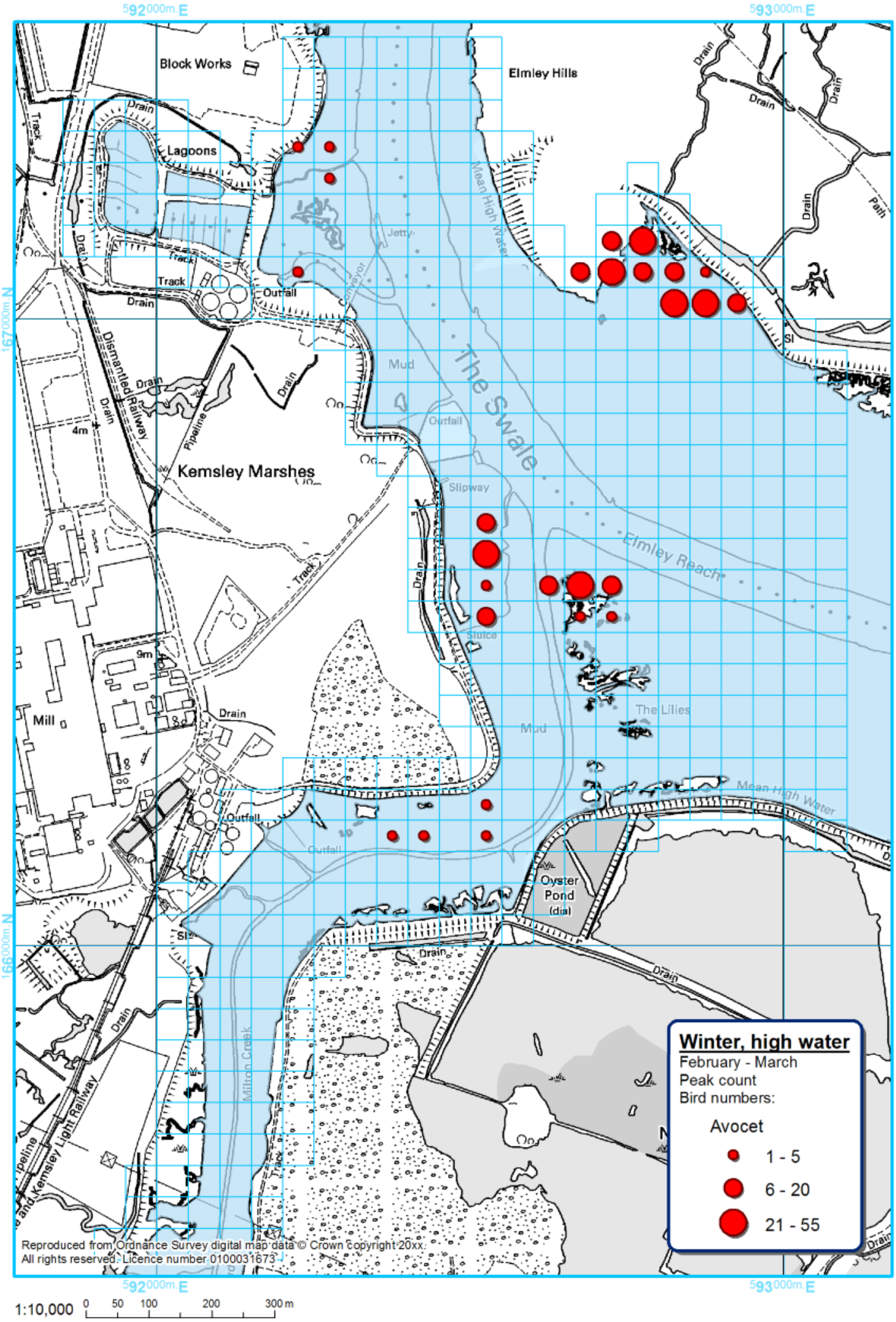


Figure C.20. Spatial distribution of Avocet over low water February-March 2009

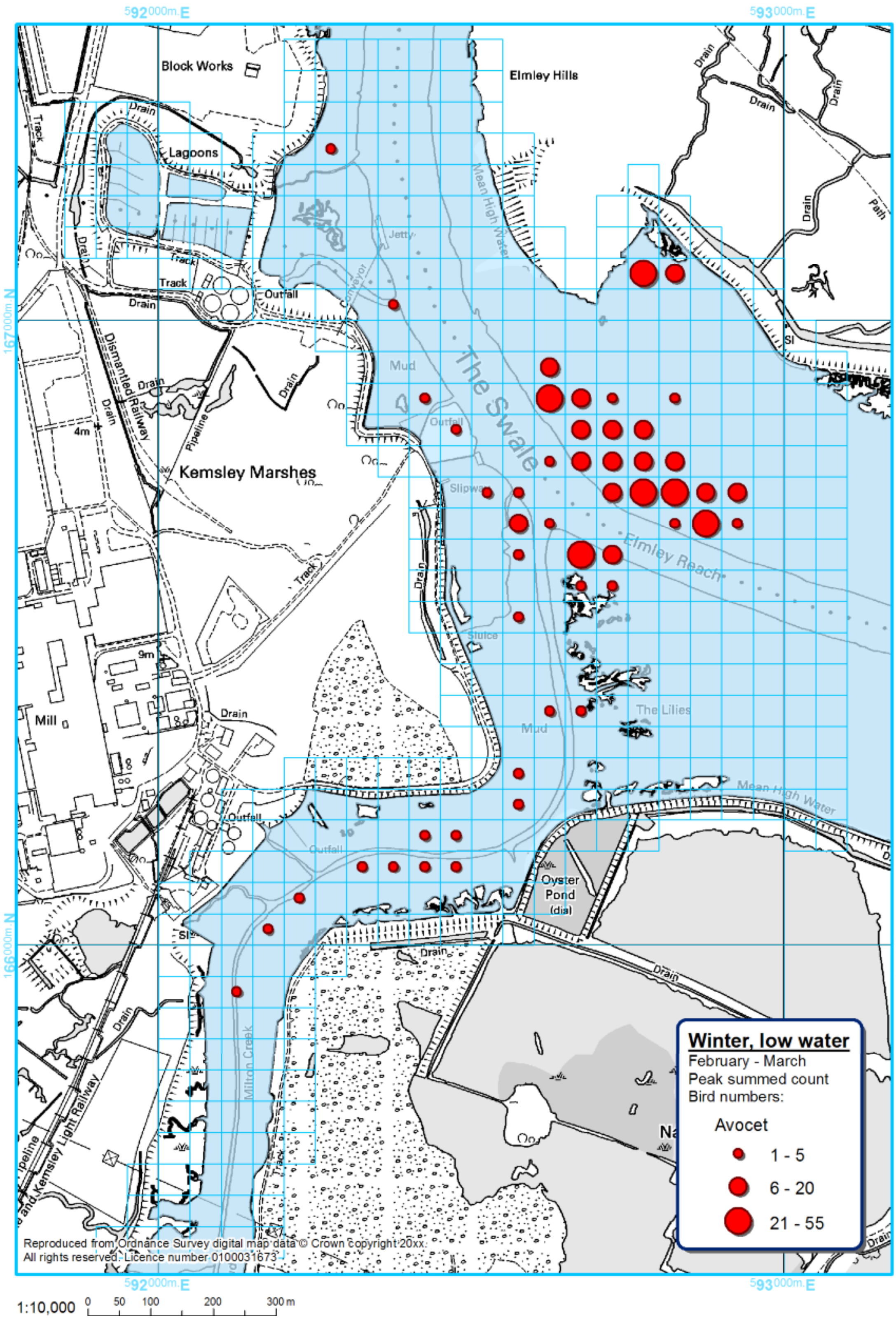


Figure C.21. Spatial distribution of Avocet over high water April-May 2009

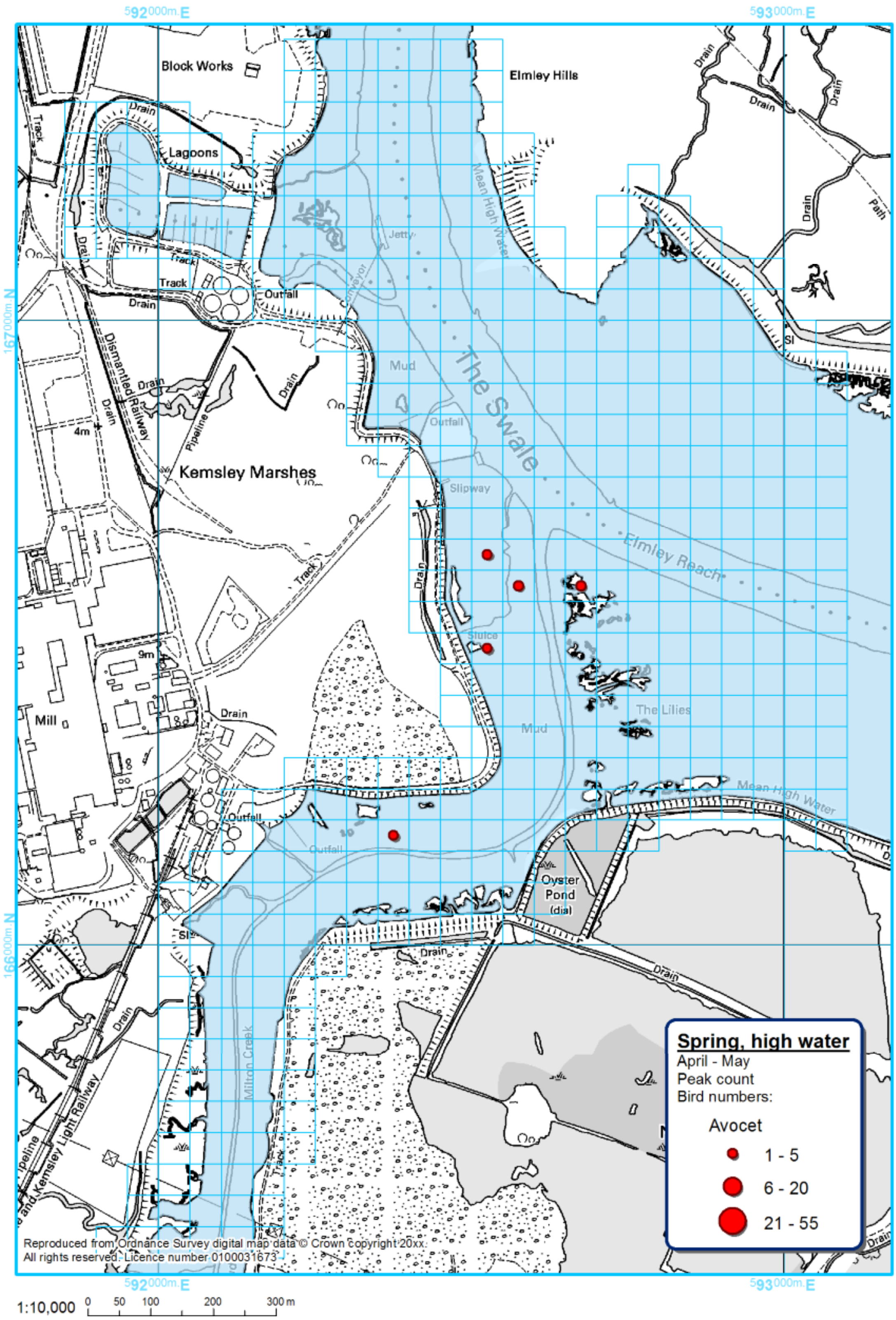


Figure C.22. Spatial distribution of Avocet over low water April-May 2009

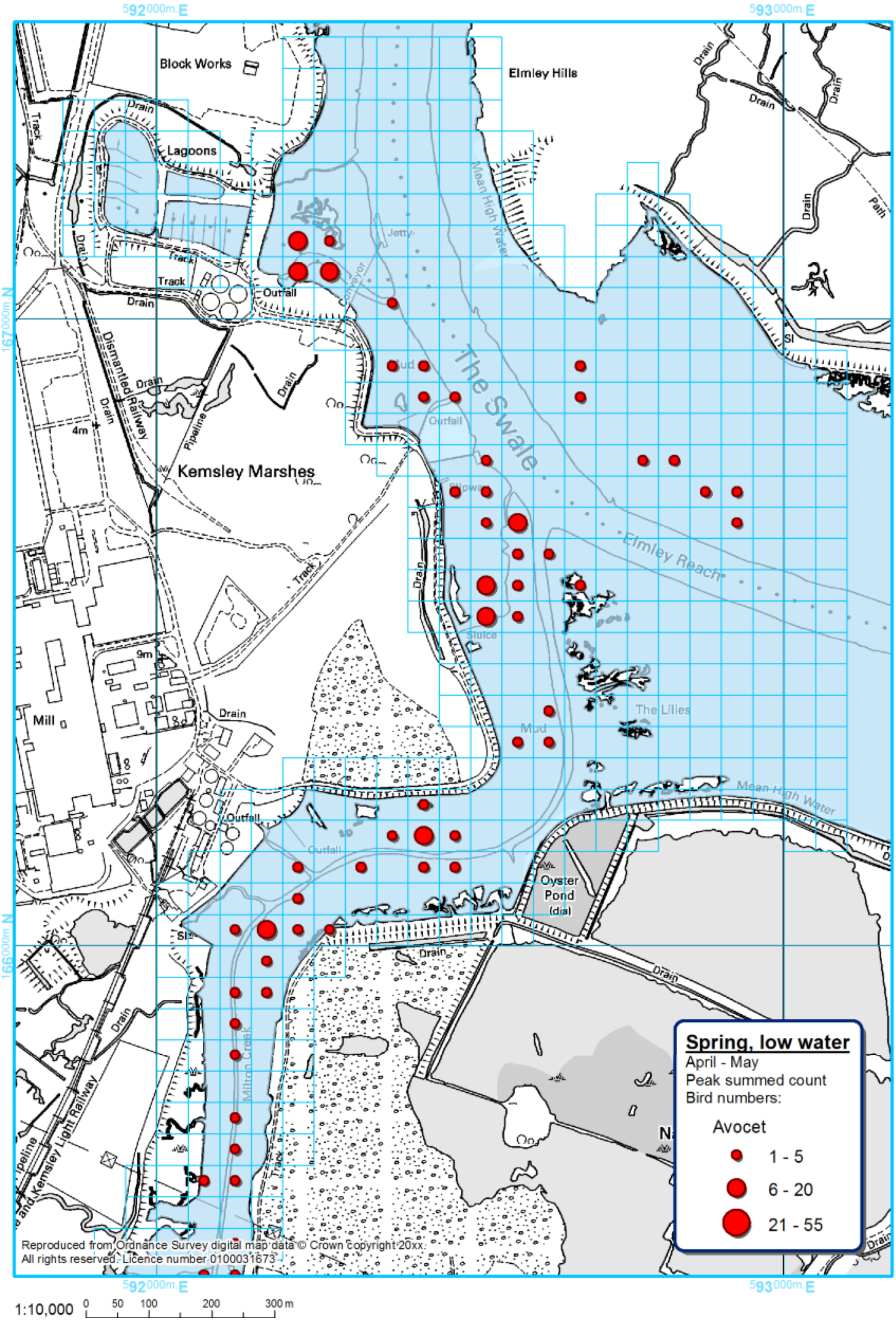


Figure C.23. Spatial distribution of Ringed Plover over high water February-March 2009

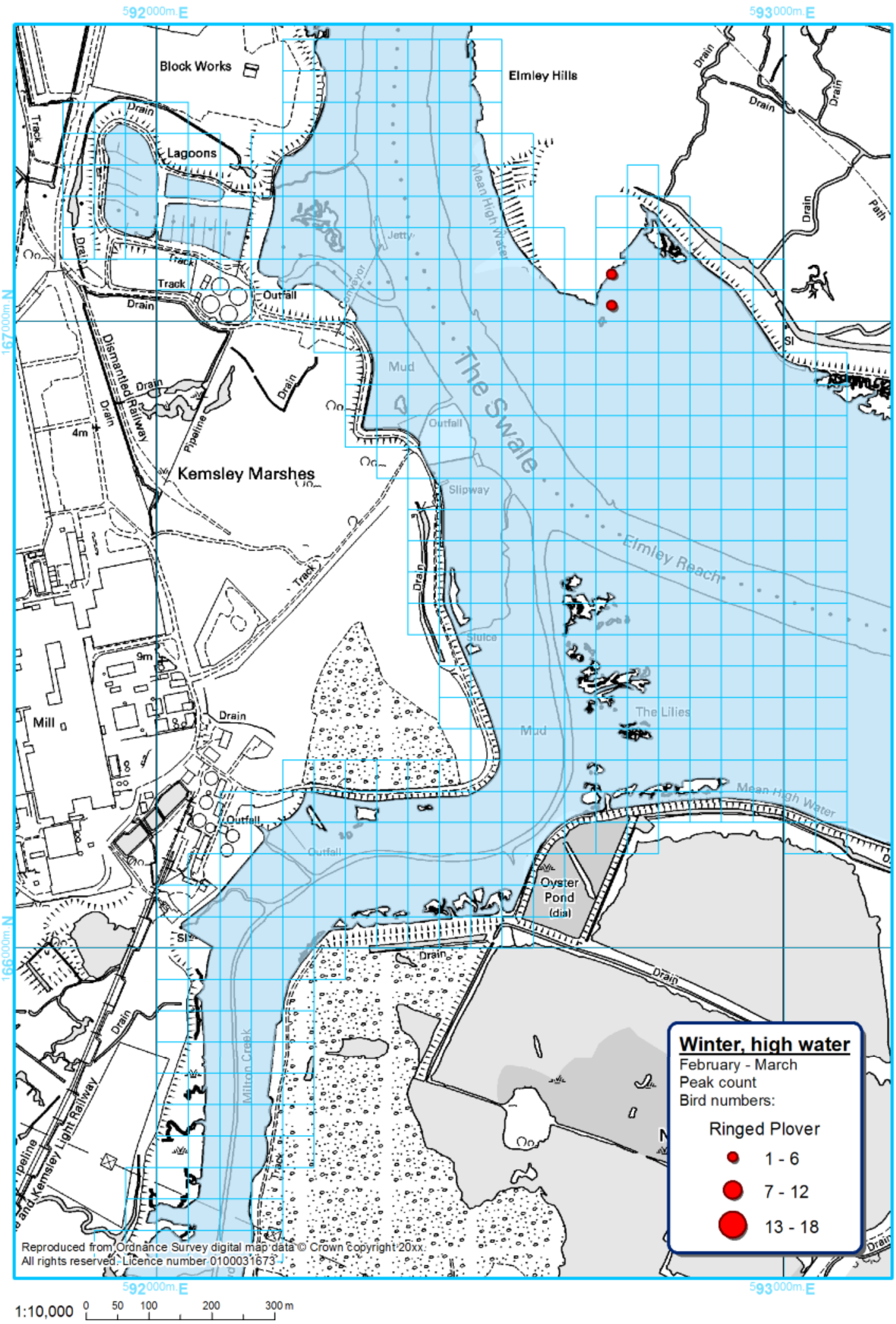


Figure C.24. Spatial distribution of Ringed Plover over low water February-March 2009

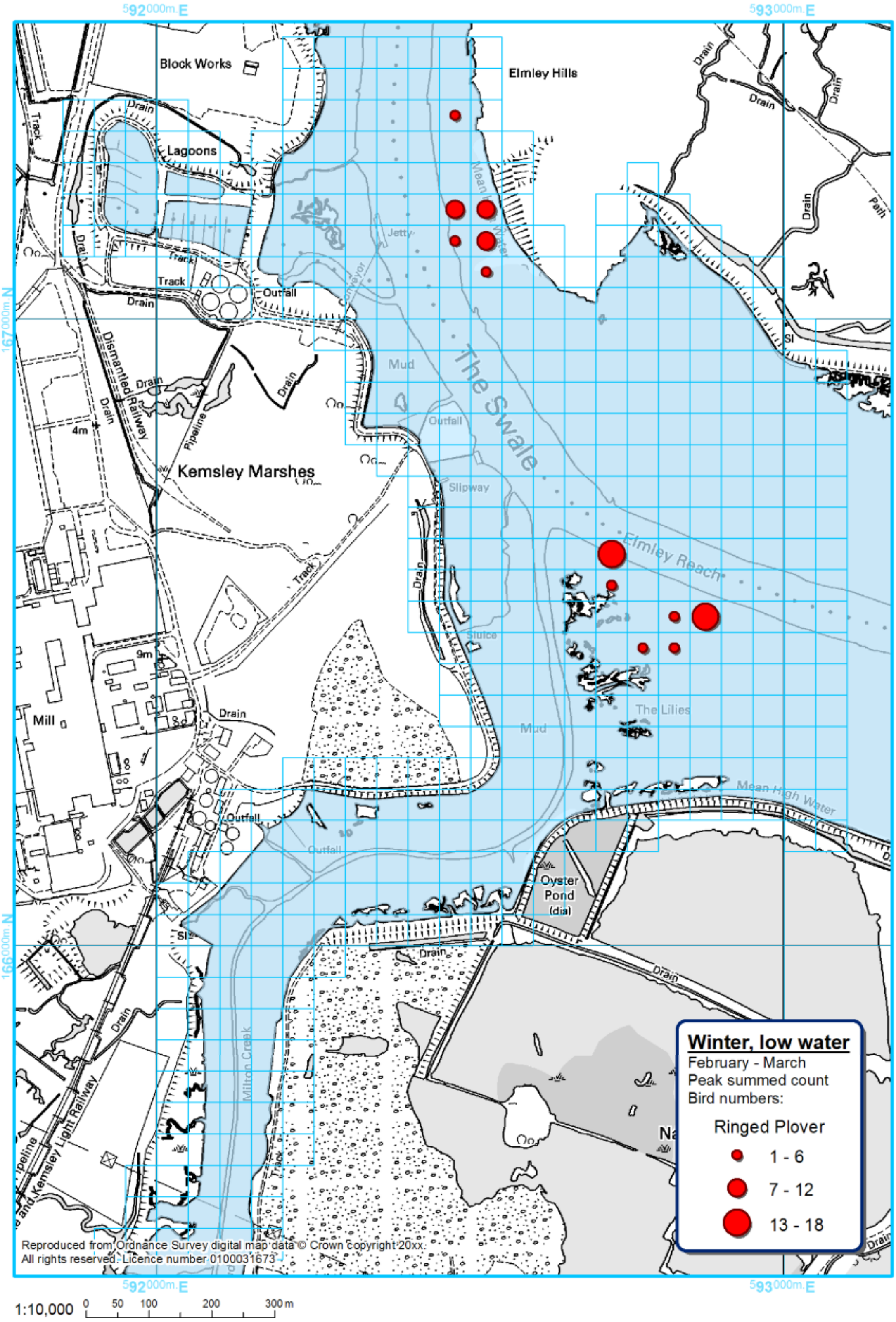


Figure C.25. Spatial distribution of Ringed Plover over high water April-May 2009

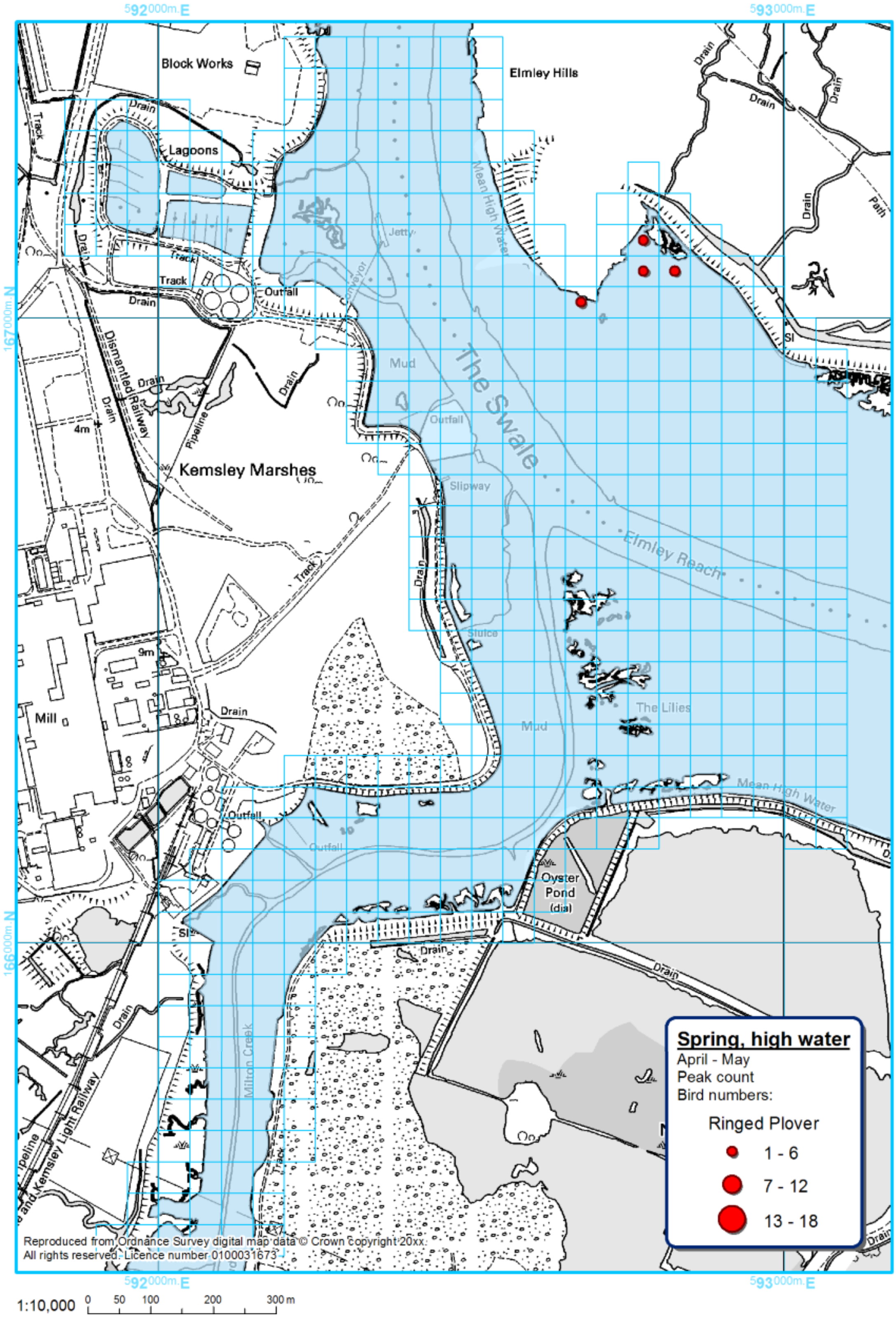


Figure C.26. Spatial distribution of Ringed Plover over low water April-May 2009

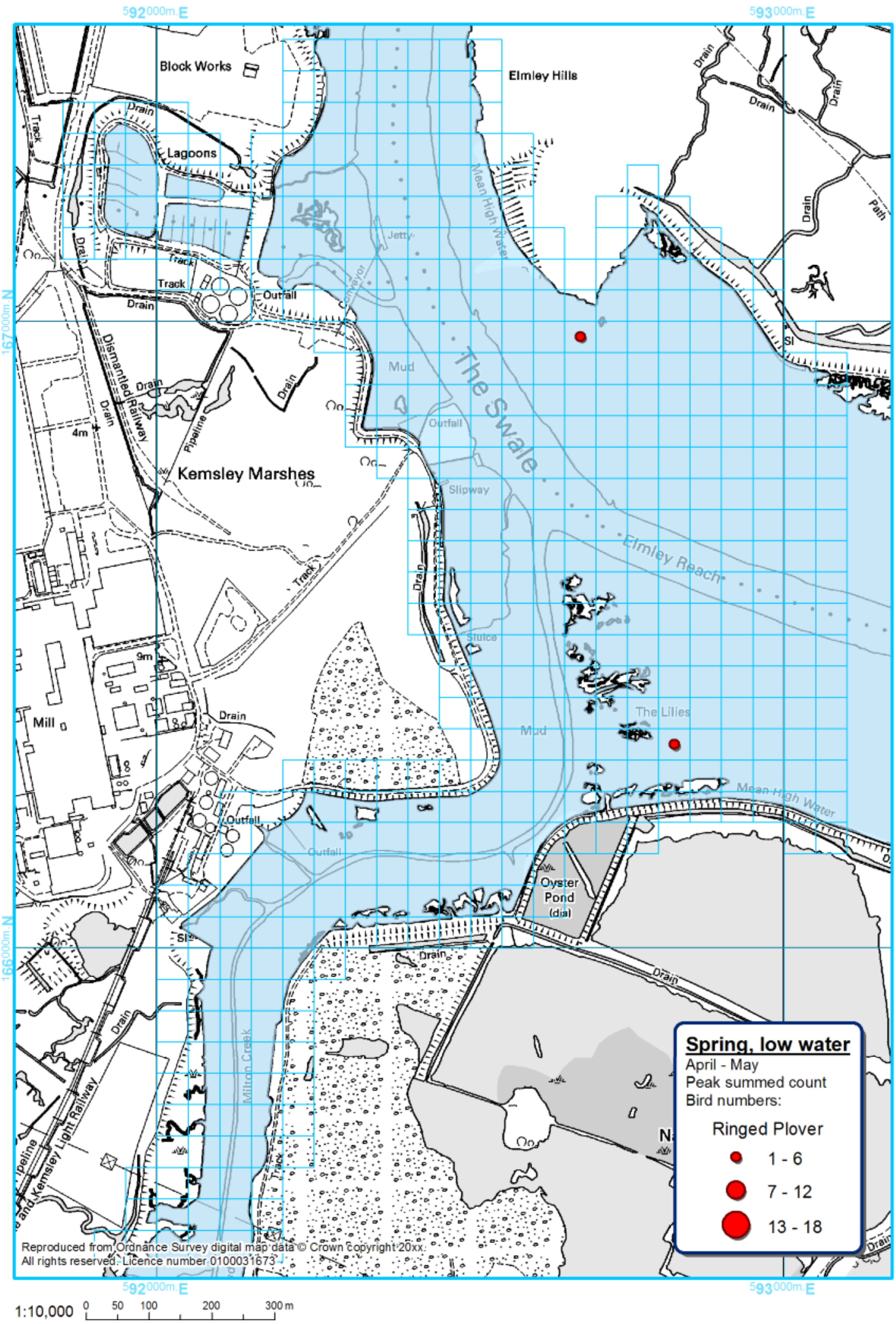


Figure C.27. Spatial distribution of Grey Plover over high water February-March 2009

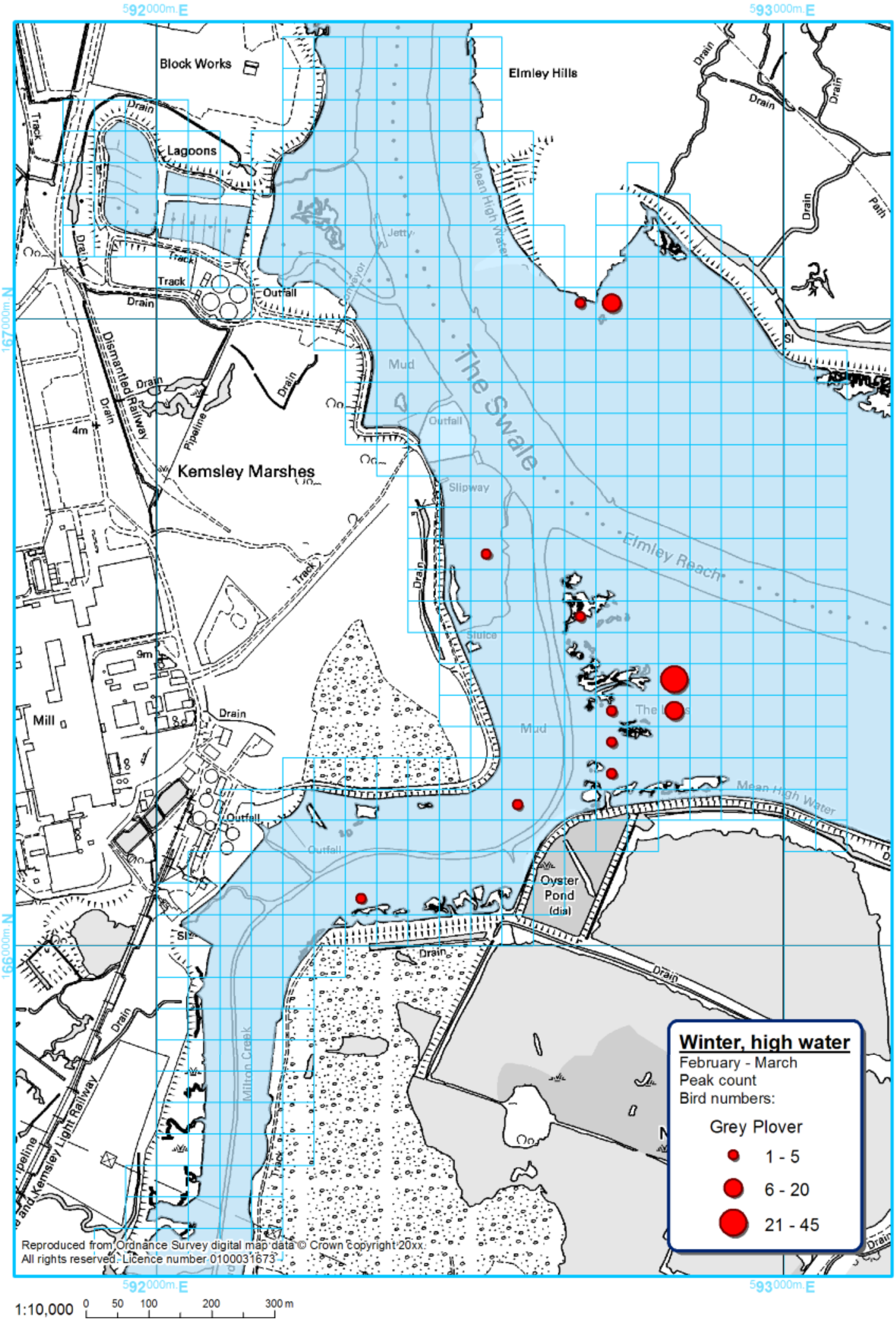


Figure C.28. Spatial distribution of Grey Plover over low water February-March 2009

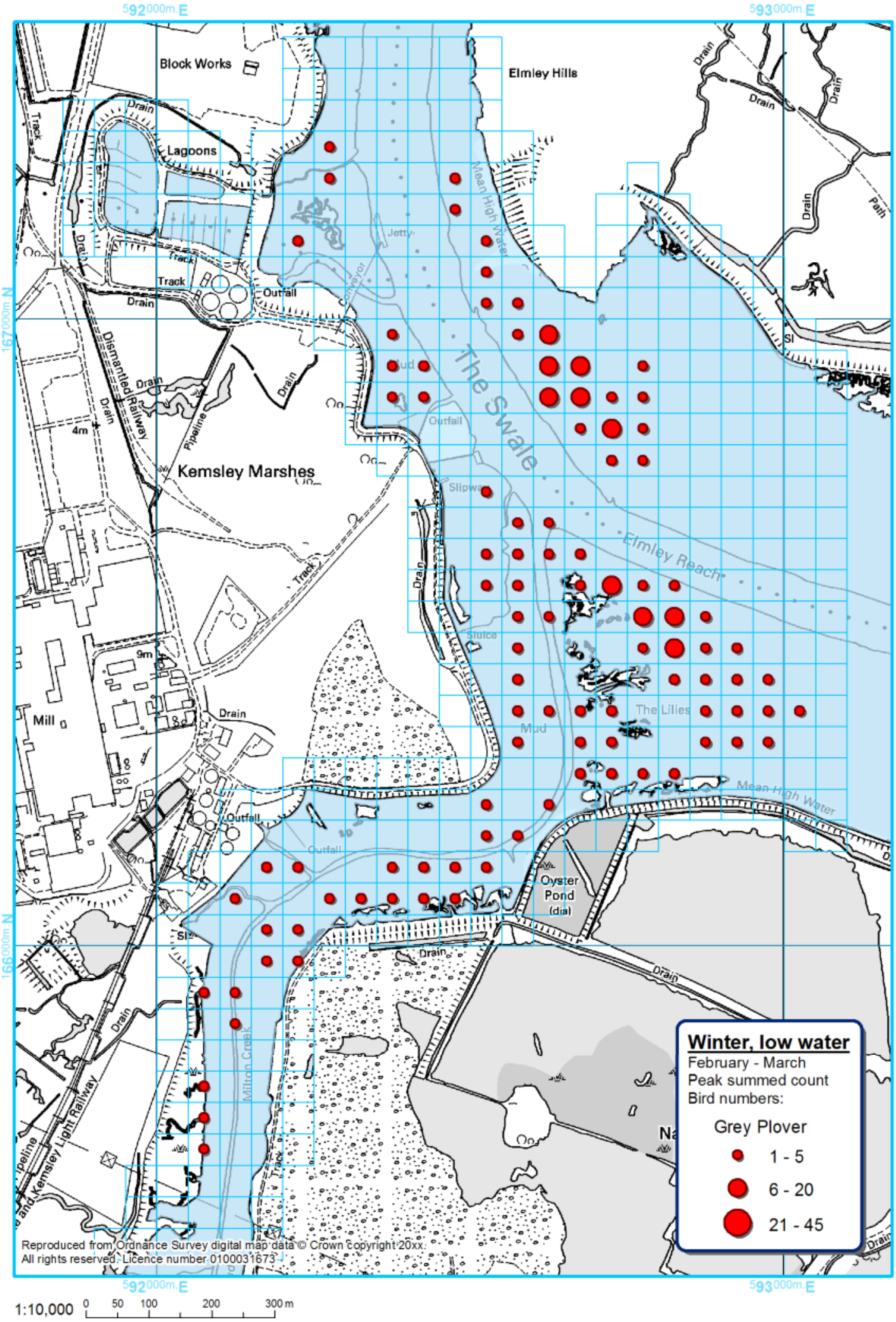


Figure C.29. Spatial distribution of Dunlin over high water February-March 2009

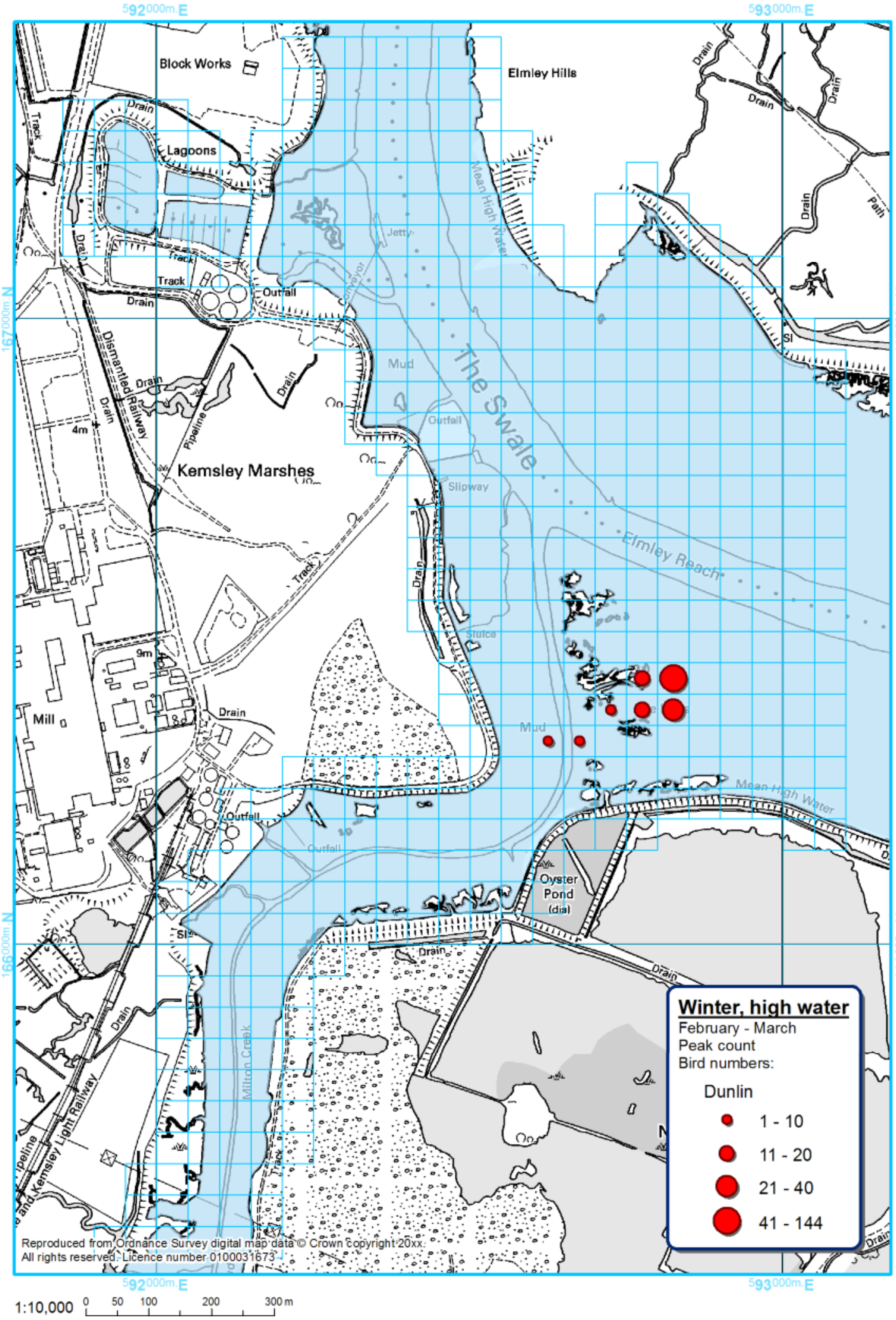


Figure C.30. Spatial distribution of Dunlin over low water February-March 2009

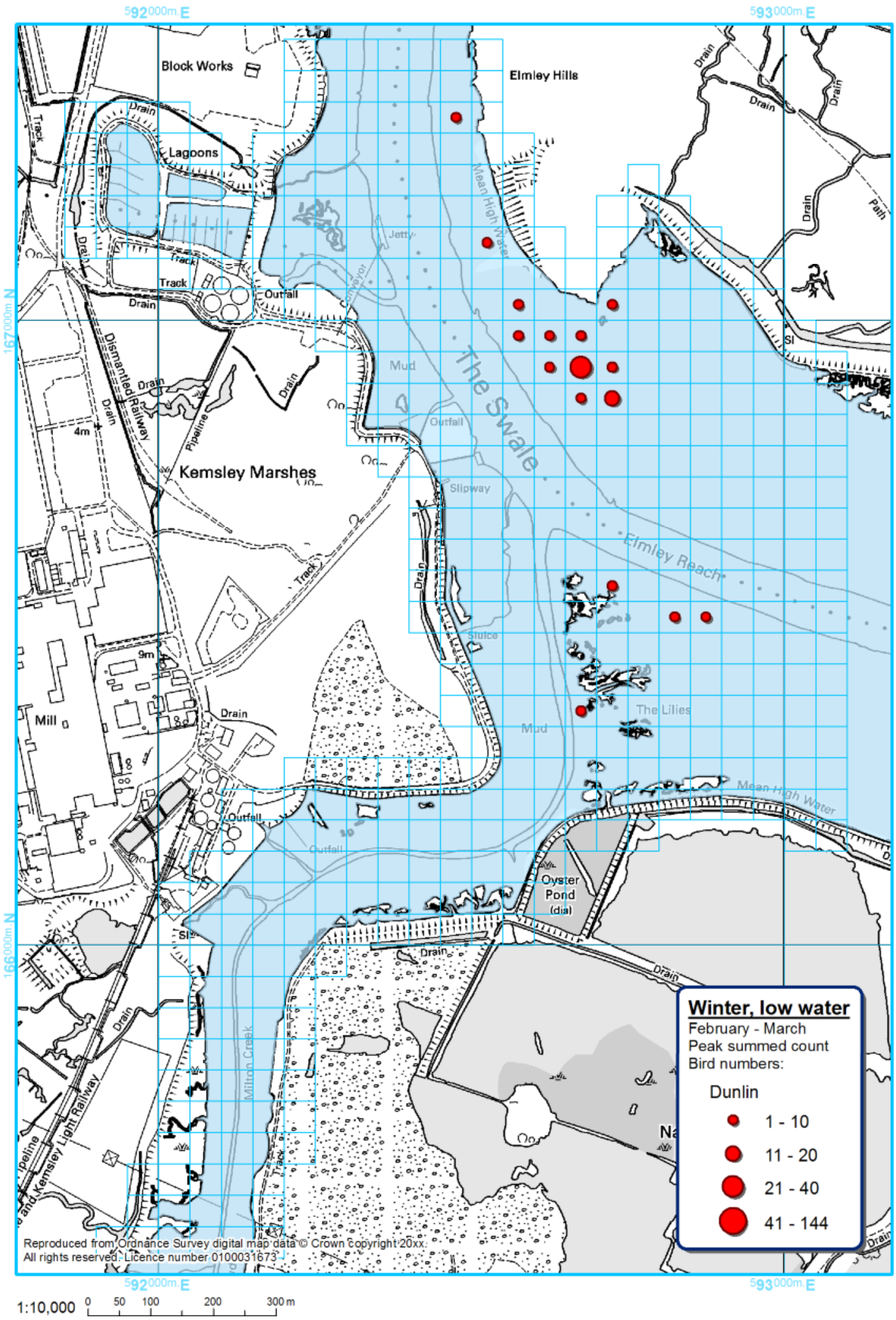


Figure C.31. Spatial distribution of Black-tailed Godwit over high water Feb-March 2009

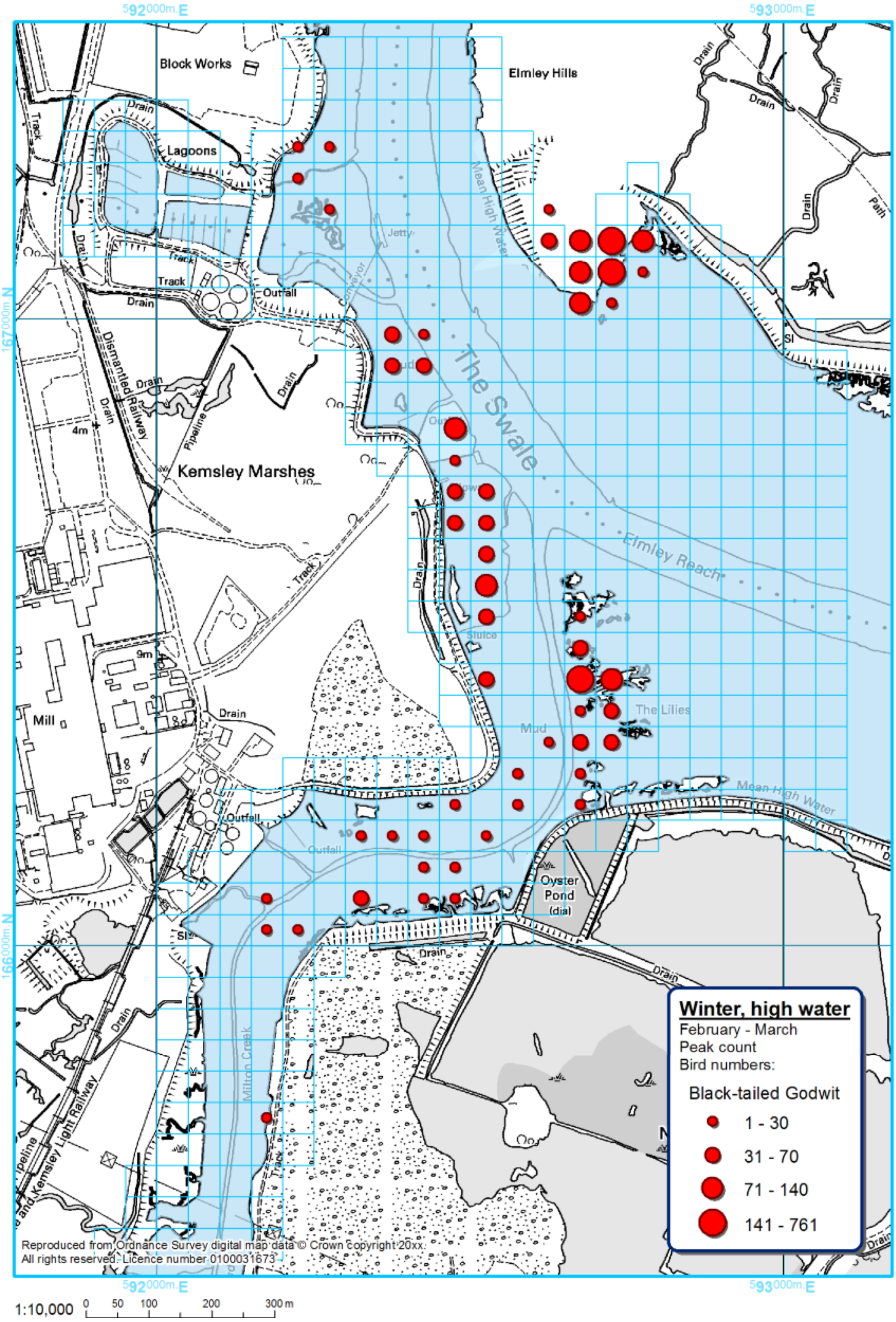


Figure C.32. Spatial distribution of Black-tailed Godwit over low water February-March 2009

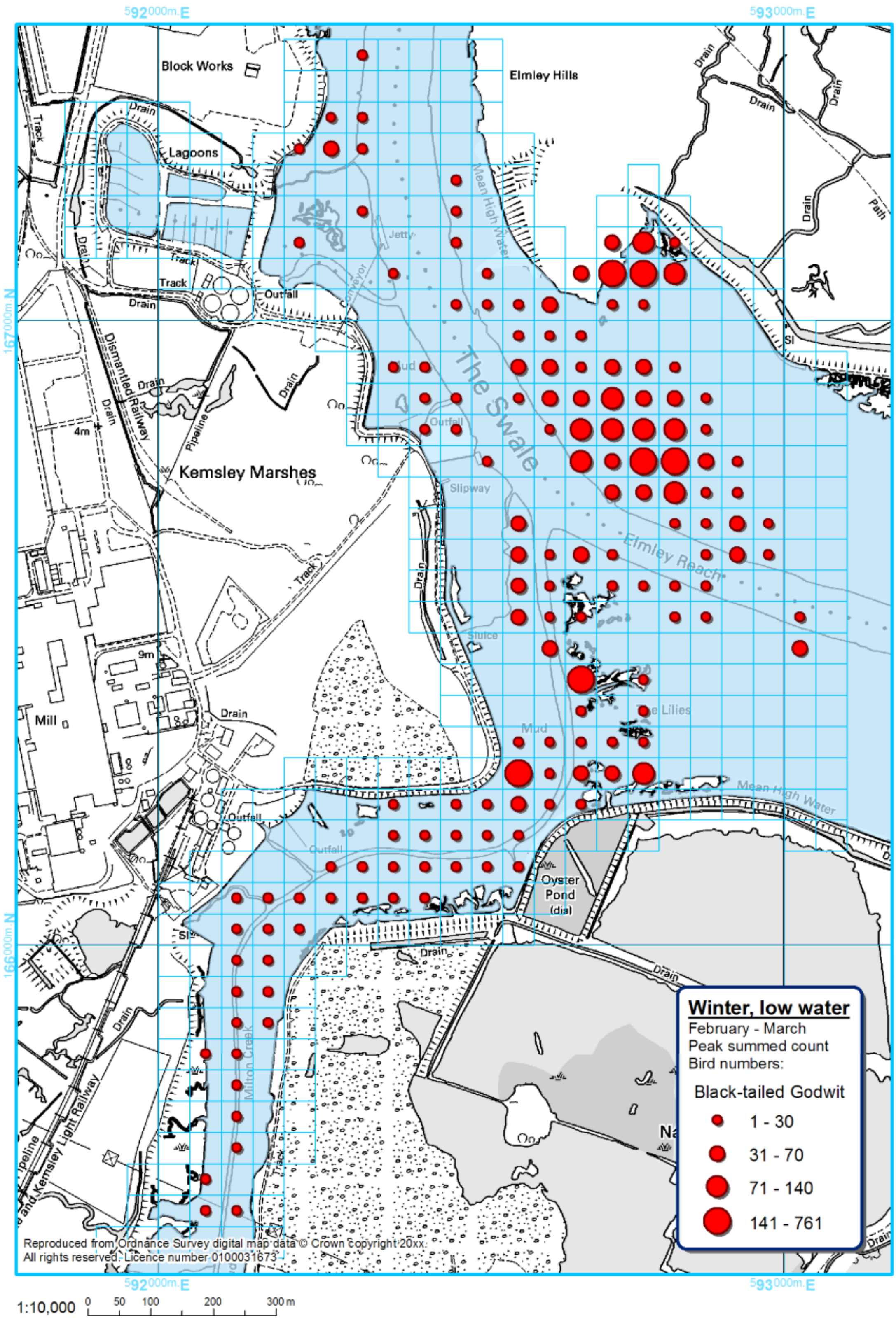


Figure C.33. Spatial distribution of Black-tailed Godwit over high water April-May 2009

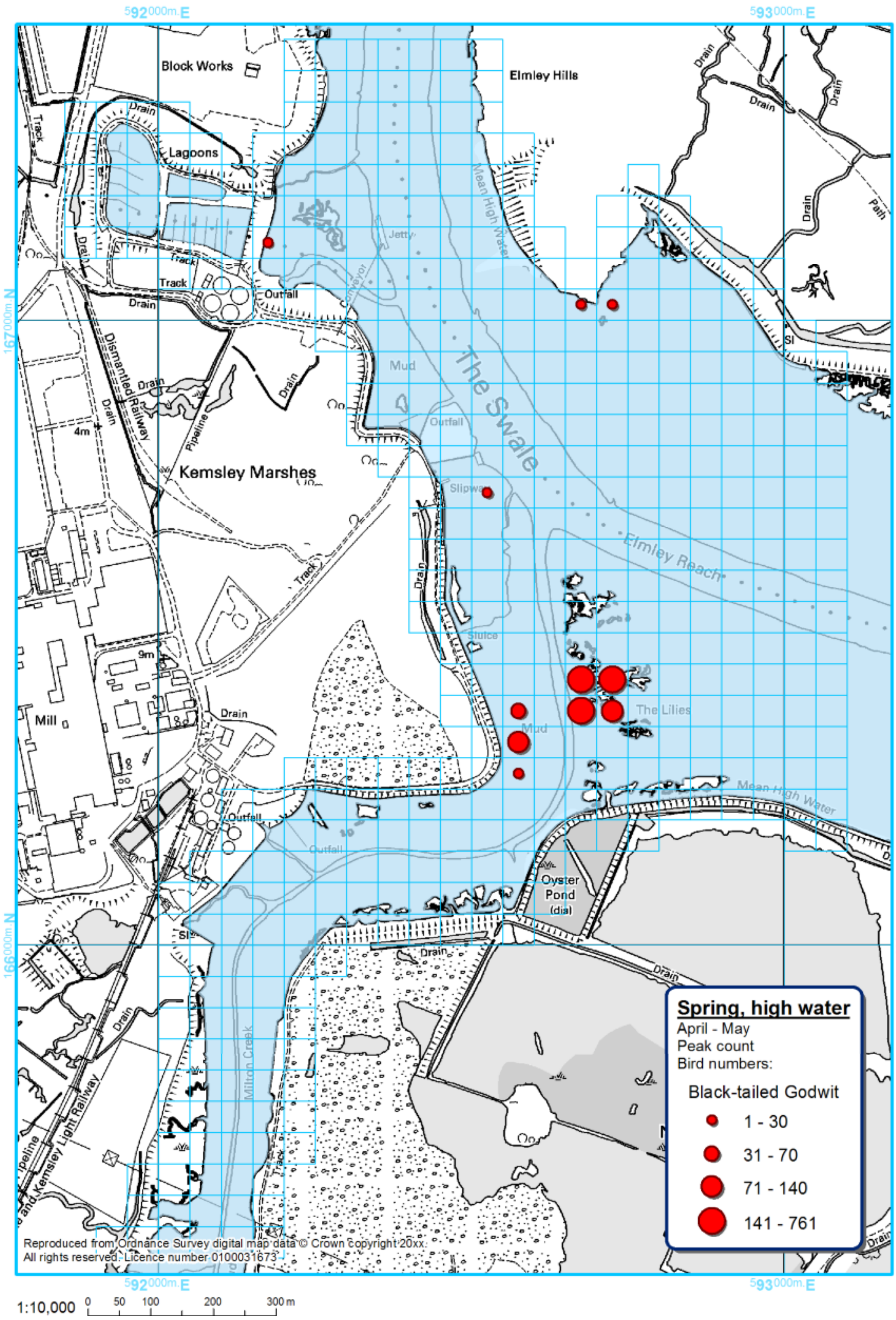


Figure C.34. Spatial distribution of Black-tailed Godwit over low water April-May 2009

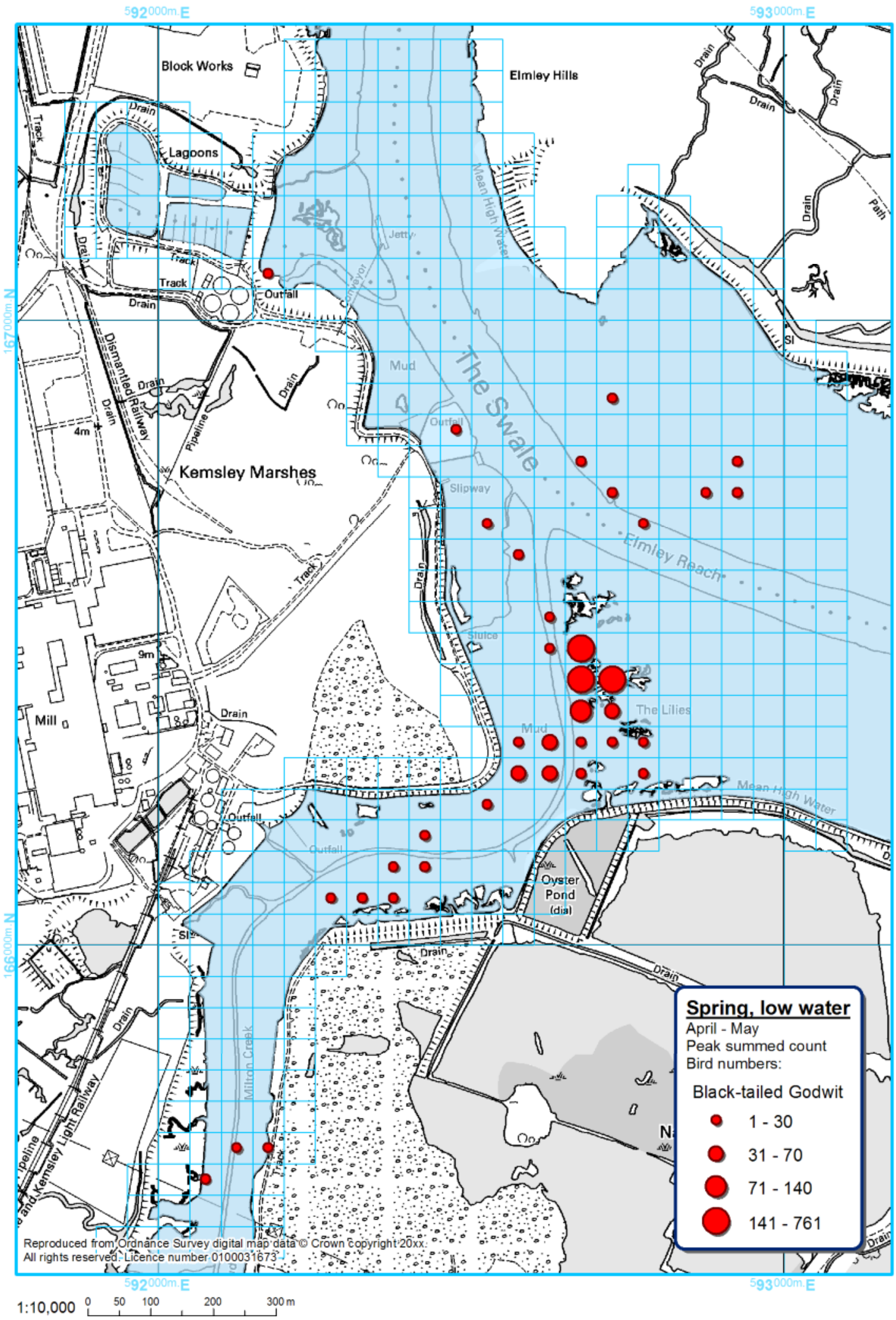


Figure C.35. Spatial distribution of Curlew over high water February-March 2009

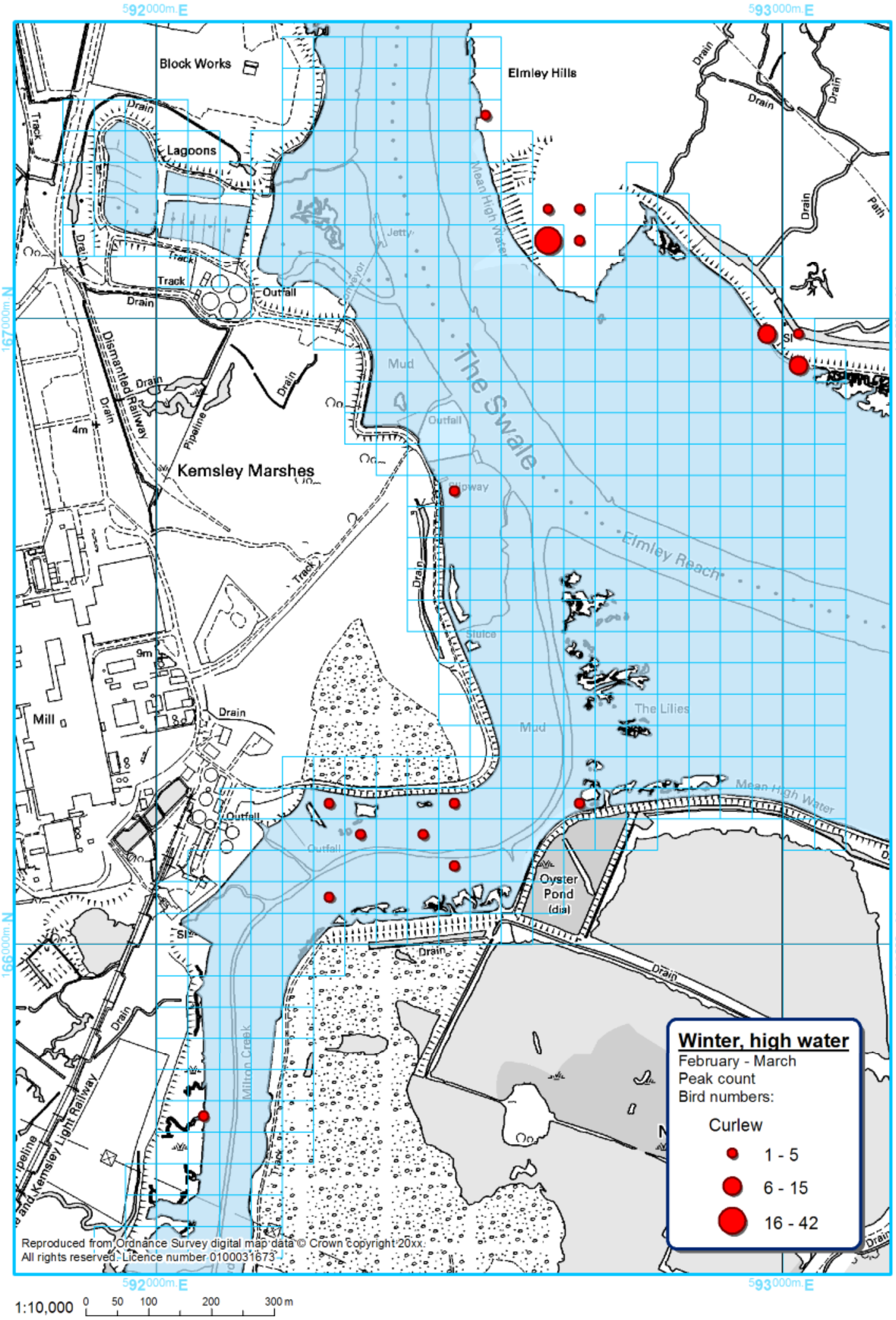


Figure C.36. Spatial distribution of Curlew over low water February-March 2009

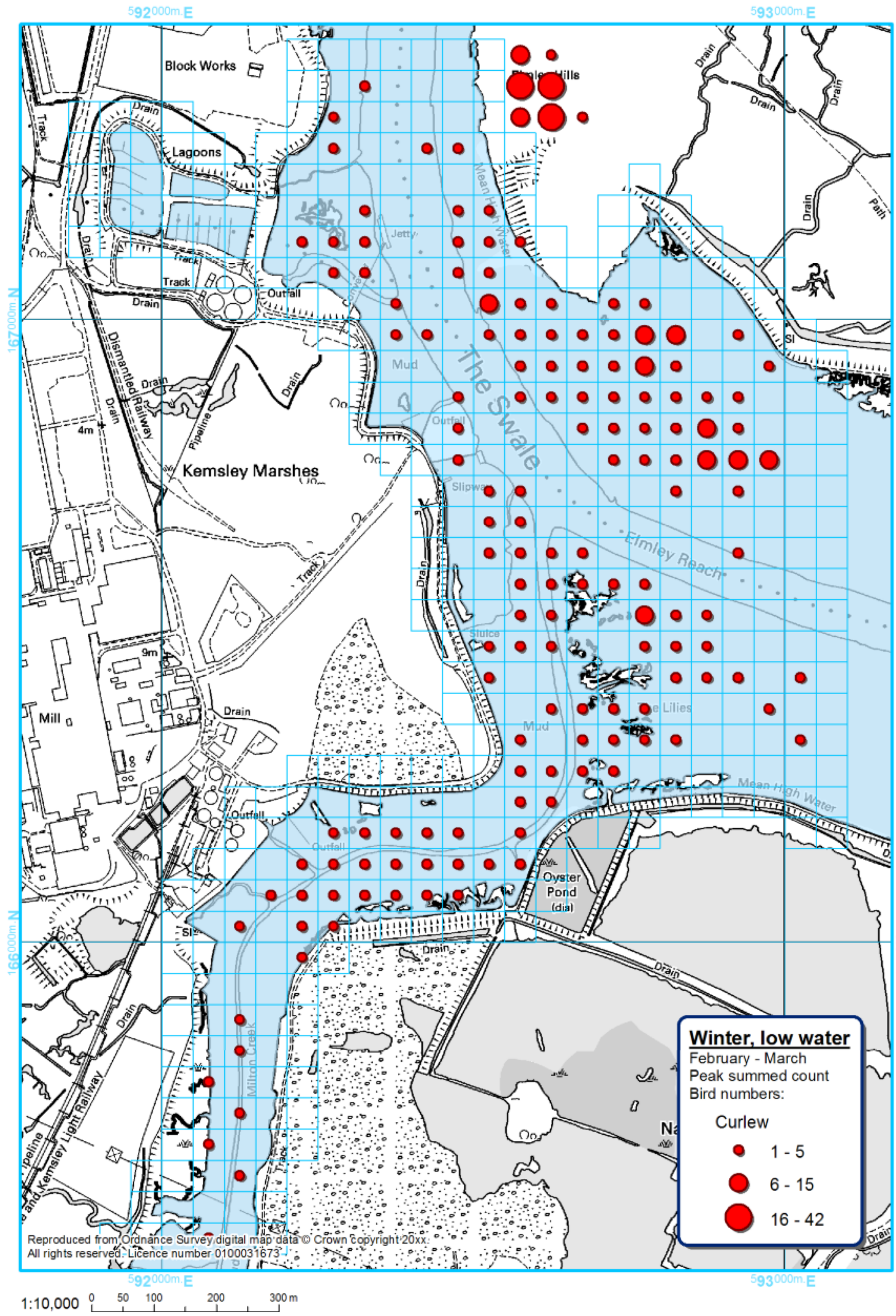


Figure C.37. Spatial distribution of Curlew over high water April-May 2009

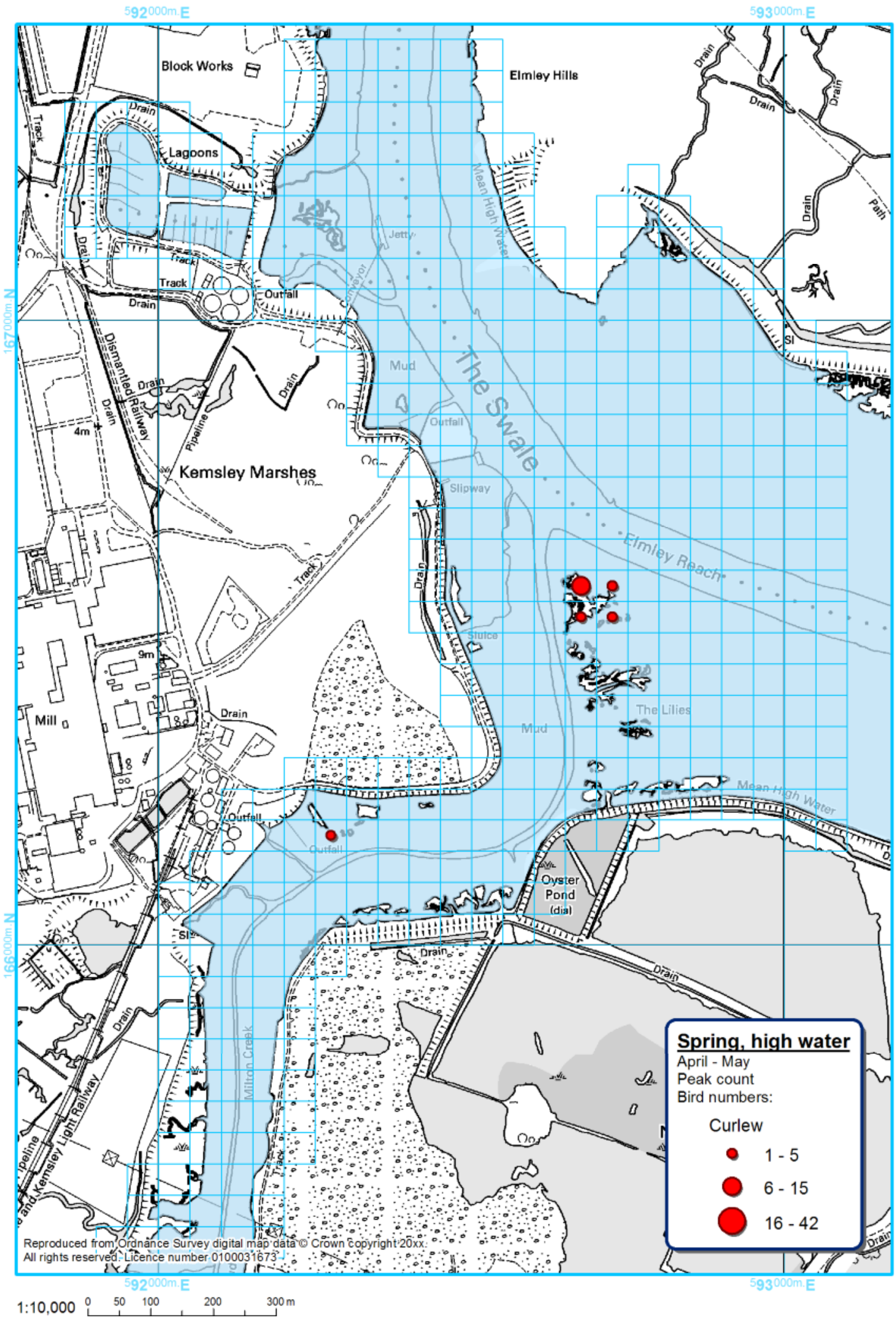


Figure C.38. Spatial distribution of Curlew over low water April-May 2009

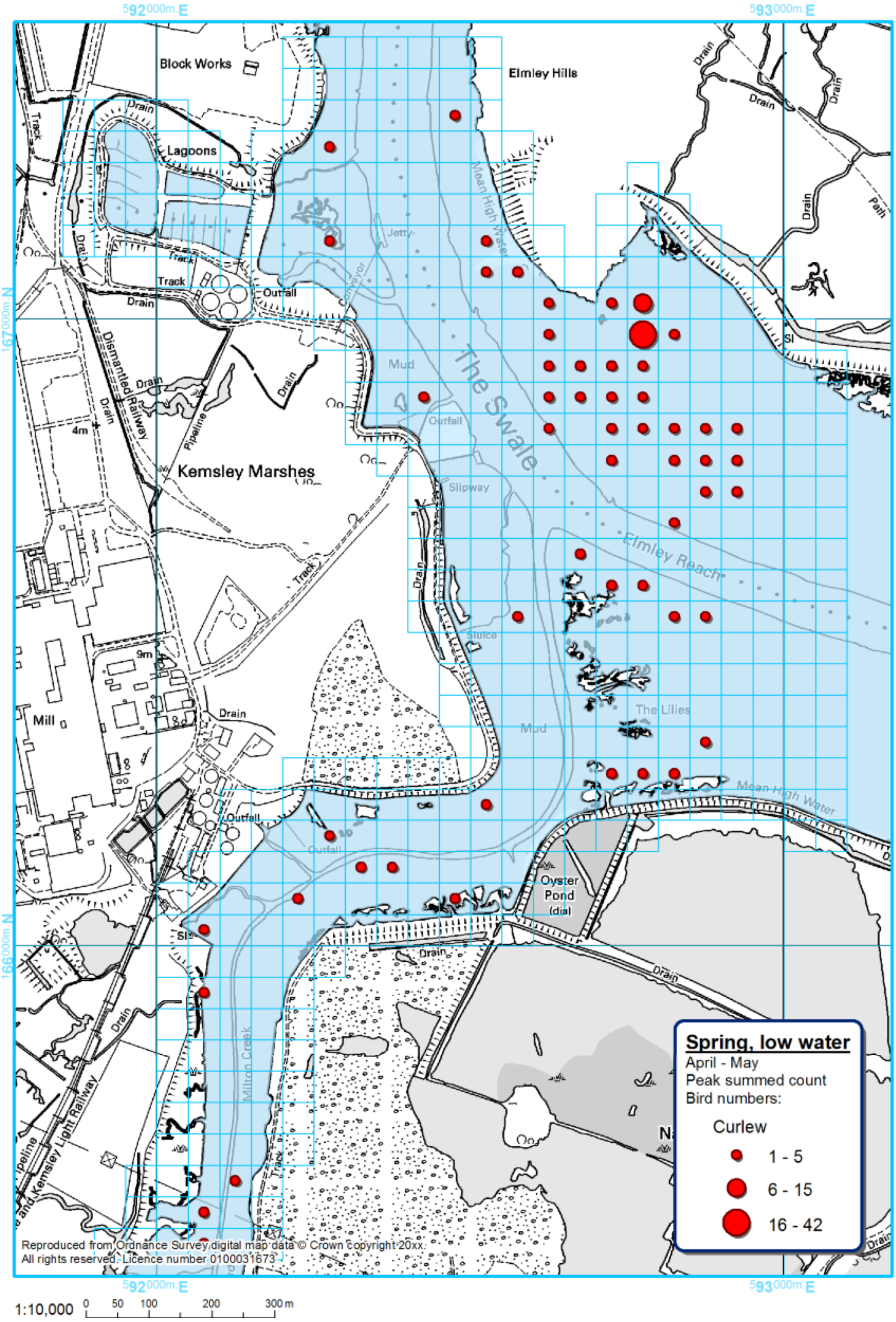


Figure C.39. Spatial distribution of Redshank over high water February-March 2009

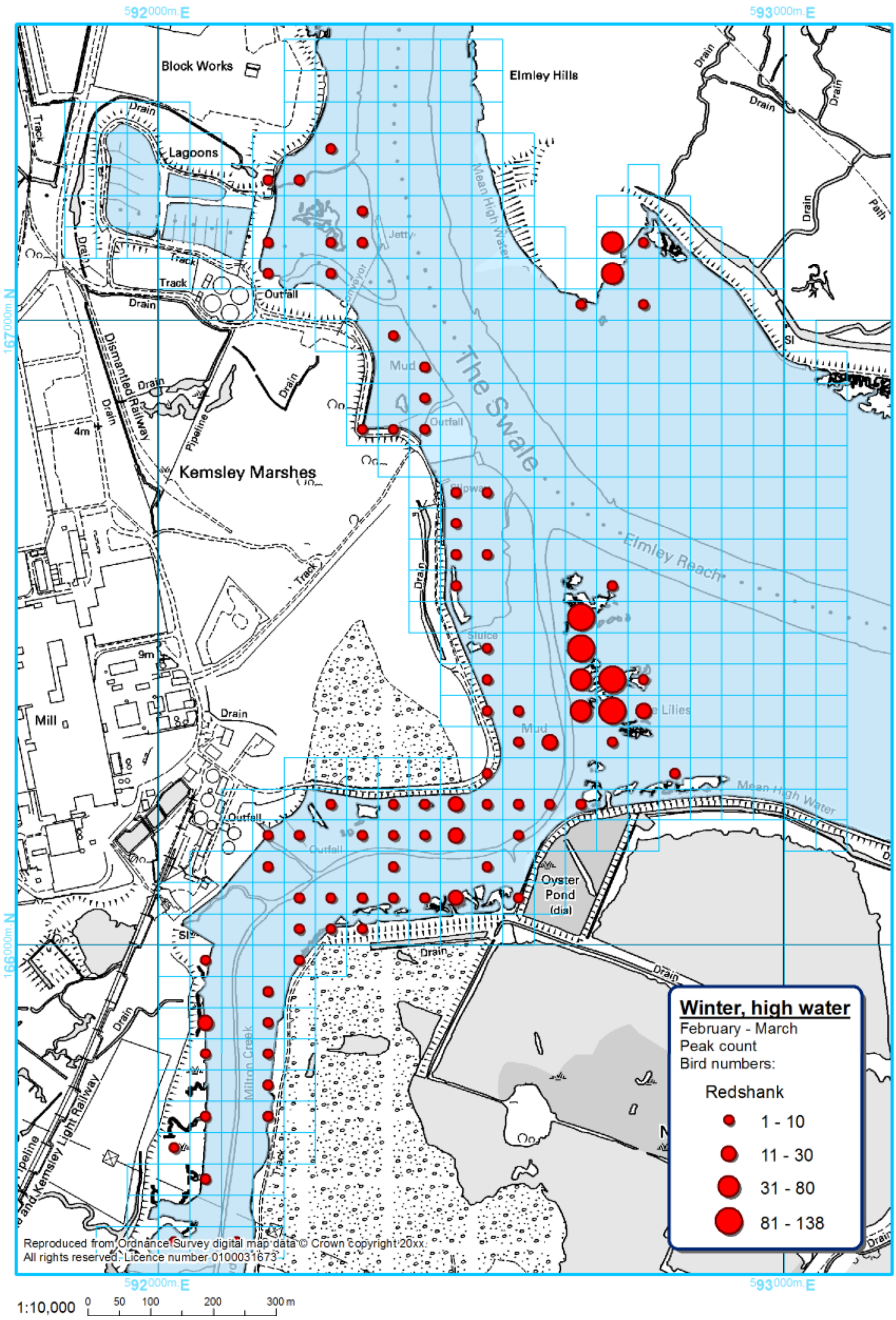


Figure C.40. Spatial distribution of Redshank over low water February-March 2009

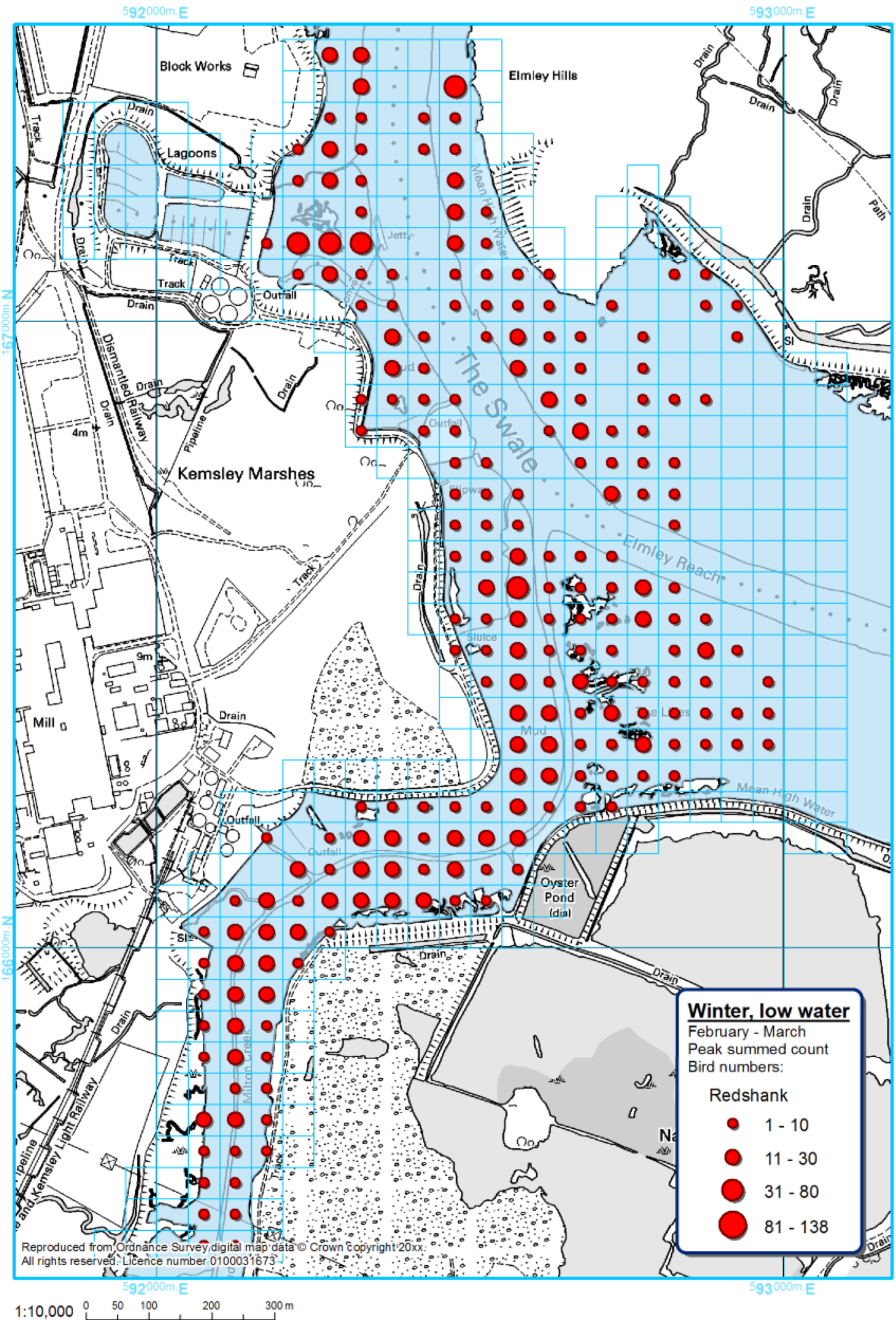


Figure C.41. Spatial distribution of Redshank over high water April-May 2009

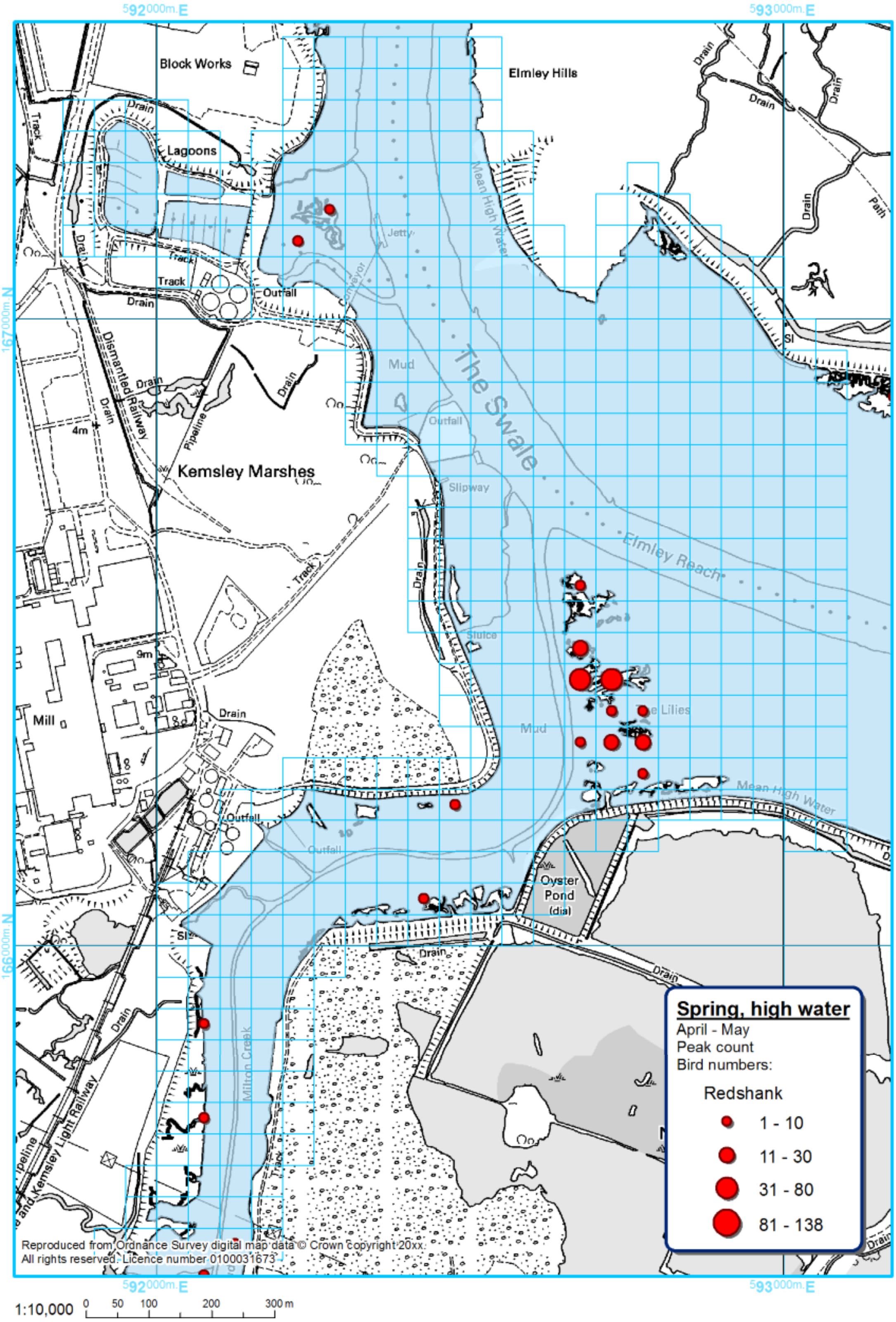


Figure C.42. Spatial distribution of Redshank over low water April-May 2009

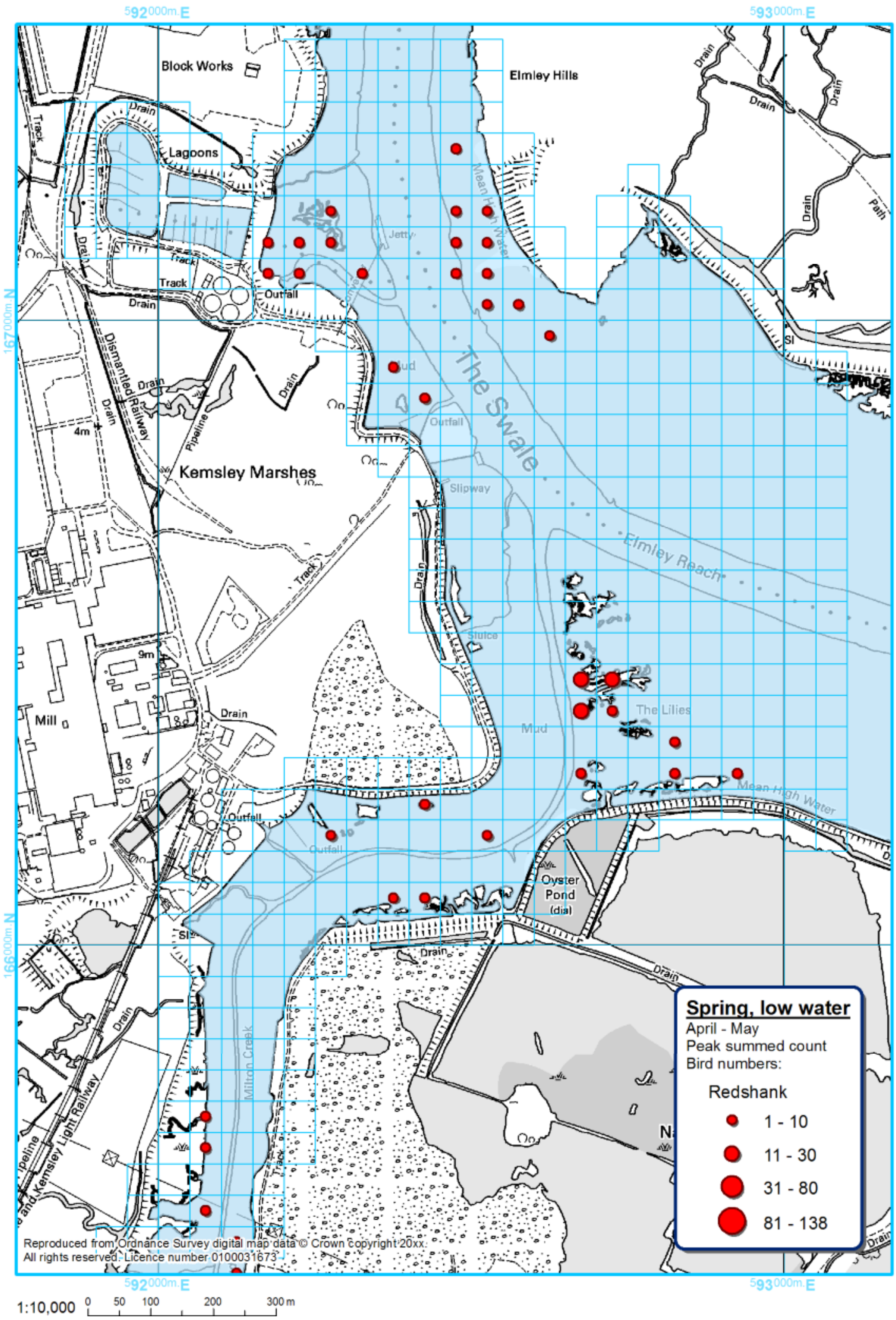


Figure C.43. Spatial distribution of Turnstone over high water February-March 2009

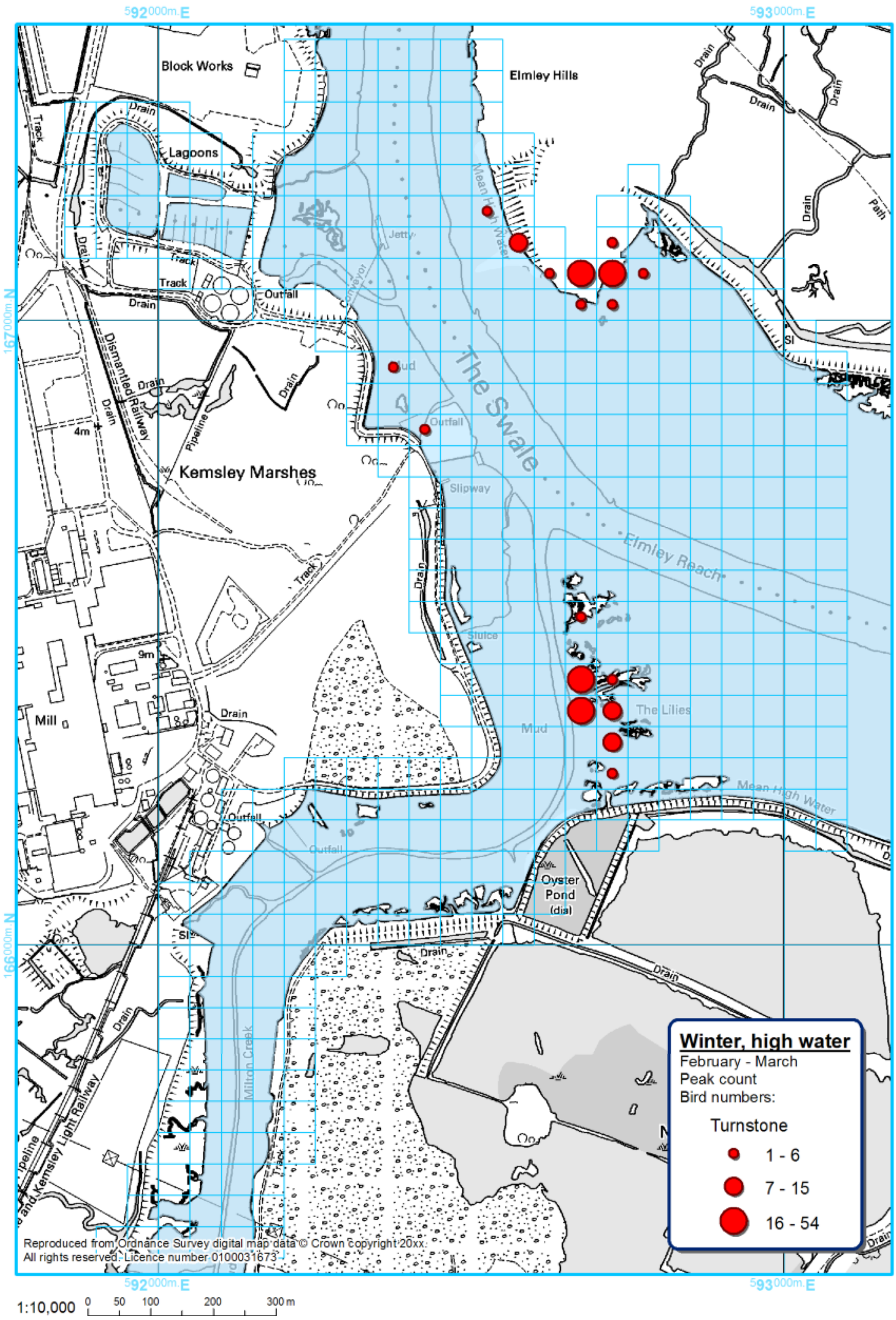
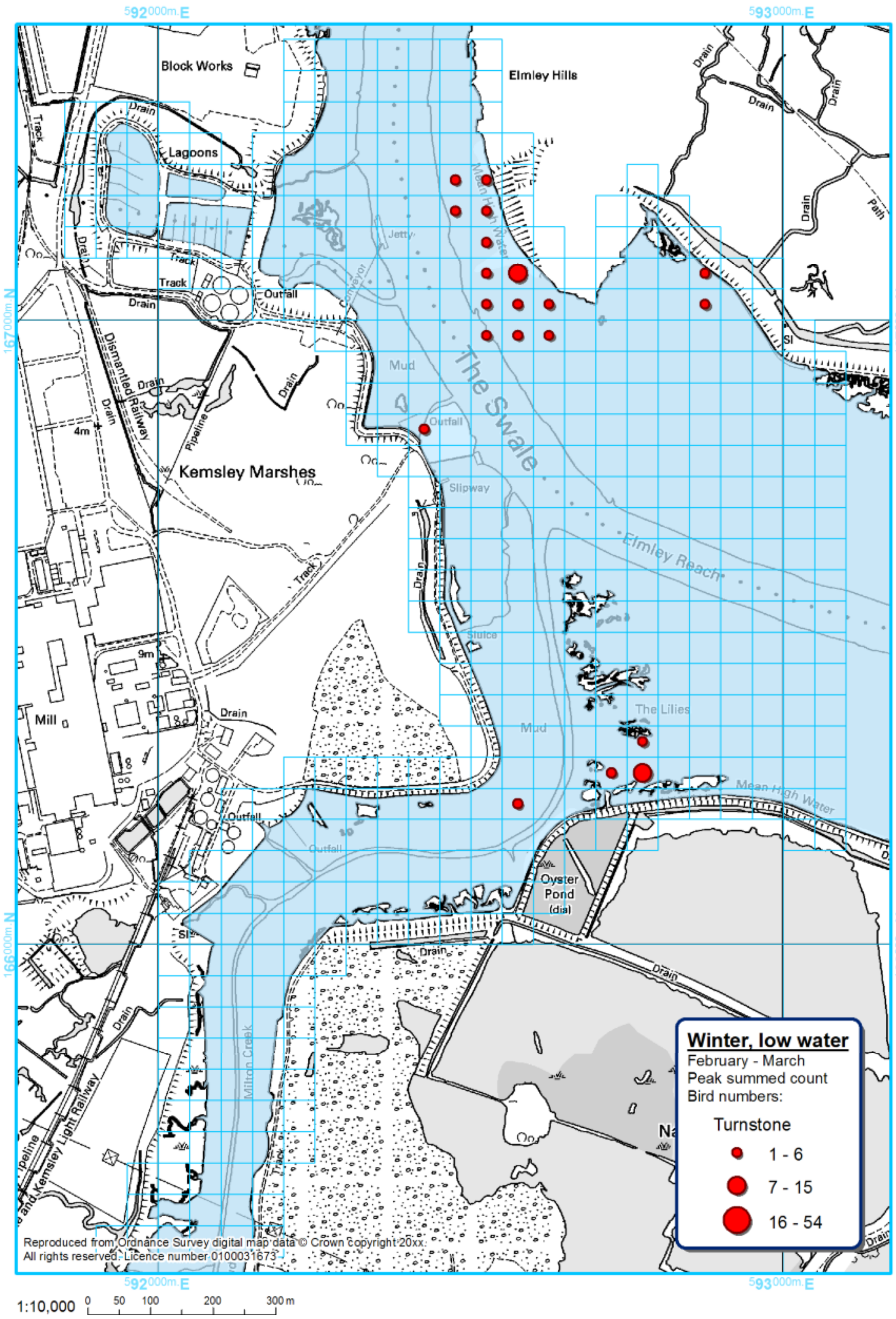


Figure C.44. Spatial distribution of Turnstone over low water February-March 2009



Development of a Sustainable Energy Plant.

St Regis Paper Mill, Kemsley

On behalf of St. Regis Paper Mill Co.

Environmental Statement

Appendix 9.4:

Legislation and Policy

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RPS Planning & Development

Notice to Interested Parties

To achieve the study objectives stated in this report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of e.g. species abundances or habitat management efficacy described in the report.

Document Information

Report title:	Appendix 9.4 Ecology Legislation and Policy
Client:	St Regis
Document ref:	JPP1804-R-006a
Author(s):	Nicholas Betson
Report date:	12/09

Checked by:	Sophie Smith	05/01/10
Authorised by:		

CONTENTS

0 INTRODUCTION

0.1 The following report provides an overview of the legislation and policy, at National, Regional and Local scales, relevant to the proposed Sustainable Energy Plant, Kemsley, Sittingbourne. It should be read in conjunction with Chapter 9 – Ecology and Nature Conservation of the Environmental Statement.

1 BIODIVERSITY LEGISLATION

1.1 Current key legislation relating to ecology includes the Wildlife and Countryside Act, 1981 (as amended), the Conservation (Natural Habitats, etc.) Regulations, 1994 (as amended) which transpose the EU Habitats Directive into UK law, the Countryside and Rights of Way Act, 2000, and the Natural Environment and Rural Communities Act, 2006.

Conservation (Natural Habitats etc.) Regulations, 1994 (as amended)

1.2 The Conservation (Natural Habitats, etc.) Regulations, 1994 ('Habitats Regulations') transpose Council Directive 79/409/EEC on the conservation of wild birds ('Birds Directive') and Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora ('Habitats Directive') into national law (in conjunction with the Wildlife and Countryside Act, see below).

1.3 Regulation 39 of the Habitats Regulations makes it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2 (European protected species of animals), or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4 (European protected species of plant). Development that would contravene the protection afforded to European protected species requires a derogation (in the form of a licence) from the provisions of the Habitats Directive.

1.4 Regulation 48(1) states: "A competent authority, before deciding to undertake, or give consent, permission or other authorisation for a plan or project which (a) is likely to have a significant effect on a European site in Great Britain (either alone or in a combination of projects), and (b) is not directly connected with or necessary to the management of the Site, shall make an appropriate assessment of the Site in view of the Site's conservation objectives."

Wildlife and Countryside Act, 1981 (as amended)

1.5 The Wildlife and Countryside Act, 1981 (as amended) is the principal mechanism for the legislative protection of wildlife in Great Britain. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and the European Union Directives on the Conservation of Wild Birds (79/409/EEC) and Natural Habitats and Wild Fauna and Flora (92/43/ FFC) are implemented in Great Britain.

The Countryside and Rights of Way Act, 2000

1.6 The Wildlife and Countryside Act has been updated by the Countryside and Rights of Way Act, 2000 (CRoW Act). The CRoW Act amends the law relating to nature conservation and protection of wildlife. In relation to threatened species it strengthens the legal protection and adds the word "reckless" to the offences of damaging, disturbing, or obstructing access to any structure or place a protected species uses for shelter or protection, and disturbing any protected species whilst it is occupying a structure or place it uses for shelter or protection.

The Natural Environment and Rural Communities Act, 2006

1.7 The Natural Environment and Rural Communities Act, 2006 states that every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. Biodiversity action plans provide a framework for prioritising conservation actions for biodiversity.

1.8 Section 40 places a duty on public authorities to conserve biodiversity - for the first time. This section states that (1) Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity, and (3) Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat. This change is significant as it places a duty on all Local Authorities to conserve wider biodiversity in addition to the statutory protection given to certain sites and species.

1.9 Section 41 of the Natural Environment and Rural Communities Act requires the Secretary of State to publish a list of species of flora and fauna and habitats considered to be of principal importance for the purpose of conserving biodiversity. The list, a result of the most comprehensive analysis ever undertaken in the UK, currently contains 1149 species, including for example Hedgehog *(Erinaceus europaeus)*, and 65 habitats that have been listed as priorities for conservation action. This list will be used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006 "*to have regard*" to the conservation of biodiversity in England, when carrying out their normal functions.

2 NATIONAL PLANNING POLICY

Planning Policy Statement 9: Biodiversity and Geological Conservation, 2005

2.1 Planning Policy Statement 9 on biodiversity and geological conservation gives guidance on how the Government's policies for the conservation and enhancement of biological diversity should be reflected in land use planning. In particular, Paragraph 1.ii) states that:

2.2 "Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; and to biodiversity and geological interests within the wider environment".

2.3 The Government's Circular Biodiversity and Geological Conservation -Statutory Obligations and their Impact within the Planning System (ODPM, 2005b) accompanies PPS9 (ODPM, 2005a). This document outlines obligations set by PPS9. The key obligation with respect to UK and local BAPs for habitats and species is:

2.4 "The potential effects of a development, on habitats or species listed as priorities in the UK Biodiversity Action Plan (BAP), and by Local Biodiversity Partnerships, together with policies in the England Biodiversity Strategy, are capable of being a material consideration in the preparation of regional spatial strategies and local development documents and the making of planning decisions."

UK Biodiversity Action Plan, 1994

2.5 National priorities for biodiversity have been set out in the UK Biodiversity Action Plan (JNCC 2009). Key achievements include developing costed, quantifiable targets for actions, establishing effective systems for handling data, promoting public awareness and public involvement, monitoring progress and broadening the biodiversity constituency. This recommends that local Biodiversity Action Plans should be produced through the involvement of a wide range of local stakeholders. The UK Steering Group on Biodiversity has established a number of priorities to be addressed through Local Biodiversity Action Plans:

- increase the overall populations and natural ranges of native species and the quality and range of wildlife habitats and ecosystems;
- enhance internationally important and threatened species, habitats and ecosystems;
- enhance species, habitats and natural and managed ecosystems that are characteristic of local areas; and,
- enhance the biodiversity of natural and semi-natural habitats where this has been lost over recent decades.

2.6 The role of local BAPs is to translate national and regional targets into effective action as well as protecting and enhancing locally important species and habitats.

3 REGIONAL PLANNING POLICY

3.1 The Medway Towns form part of the Thames Gateway priority area for regeneration established in the Regional Planning Guidance (RPG9) for the South East (Government Office for the South East, 1994). The Thames Gateway Planning Framework published as a supplement to RPG9 (Department of the Environment, 1995), identified the main development opportunities. The Site falls within the Swale development area, where economic redevelopment is considered to be the main planning issue.

3.2 The Regional Spatial Strategy (RSS) for South East England was published on 6 May 2009, and sets out the preferred way forward for development until 2026 (South East England Regional Assembly, 2006). The broad objective of this RSS (called the "South East Plan") is to contribute to the achievement of sustainable development. It provides a broad development strategy for the region that will inform preparation of Local Development Documents and other plans, strategies and programmes that have a bearing on land use activities.

3.3 The South East Plan incorporates a number of policies that apply to all aspects of the RSS within the framework of the overall vision and core strategy. These polices are described as 'cross-cutting' and are divided into Part A – Cross-cutting Issue Policies, and Part B – Cross-cutting Spatial Policies.

Part A – Cross-cutting Issue Policies

3.4 There is one cross-cutting Issue Policy relevant to the Proposal Site Ecology.

Policy CC1: Sustainable Development

3.5 The principal objective of the Plan is to achieve and maintain sustainable development in the region through the promotion of a number of measures. Including 'Living within environmental limits'. This can be achieved by using natural resources (including land, water and energy) efficiently and with care, thereby minimising waste, pollution and greenhouse gases and reducing impact to biodiversity.

3.6 "Living within environmental limits" is a central theme of Government policy for sustainable development. In response to concerns that the proposed scale and location of growth could exceed the environmental capacity of a region, or that environmental limits could be breached in some areas, Regional Assemblies have commissioned studies to develop methods to assist spatial planning to take environmental capacity issues into account.

3.7 The concepts of 'environmental capacity' and 'environmental limits' are essentially very similar; both refer to the amount of development the environment can accommodate. The latter term relates better to current national policy and is broadly in common with Defra's Action Plan for embedding an Ecosystems Approach into decision-making. What this means in practice to industrial uses like the proposed development is the need to demonstrate clear strategies for reducing their environmental impacts as well as maintaining, managing and enhancing their environmental features.

Part B - Cross-cutting Spatial Policies

3.8 One cross-cutting Spatial Policy is relevant to the Proposal Site ecology.

Policy CC12: Character of the environment and quality of life

3.9 Actions and decisions associated with development and the use of land should actively encourage the conservation, and where appropriate the enhancement of the character, distinctiveness, and sense of place of settlements and landscapes throughout the region. Opportunities for creating a high quality environment should be sought, based on a shared vision that places emphasis on good design, innovation, sustainability and achieving a high quality of life.

3.10 One policy within the South East Plan is specifically relevant to the Kent Thames gateway and ecology.

Policy KTG10: Green initiatives

3.11 In order to take forward "Greening the Gateway", development and management of green spaces and areas requiring flood management should be co-ordinated. Provision should be made for green grid networks, and enhancement of landscapes, habitats, heritage and the environment. Development should be of the highest standards of design, and adopt best practice in the use of sustainable techniques".

Ecology Policies

3.12 Two polices within the draft South East Plan also have a direct bearing on the ecology and landscape of the Kemsley Mill site:

- Policy NRM4: Conservation and Improvement of Biodiversity; and
- Policy C3: Landscape and Countryside Management.

3.13 Policy NRM4 states that in the development and implementation of plans and strategies, local authorities and other bodies shall avoid a net loss of biodiversity as well as actively pursue opportunities to achieve a net gain across the region.

3.14 This should be achieved by:

- providing the highest level of protection for nationally and internationally designated sites and ensuring damage to county wildlife sites and locally important wildlife and geological sites is avoided wherever possible;
- ensuring that unavoidable damage to wildlife interest is minimised through mitigation, that any damage is compensated for, and that such measures are monitored; and
- identifying areas of opportunity for biodiversity improvement including large scale habitat restoration, enhancement and re-creation in the areas of strategic importance.

3.15 Policy C3 states that outside nationally designated landscapes, positive and high quality management of the open countryside should be encouraged and supported by local authorities and other organisations through a combination of planning policies, grant aid and other measures.

3.16 This is in order to:

- protect and enhance its distinctive qualities;
- encourage the sustainable management of land and habitats in ways which contribute to landscape conservation and renewal;
- avoid fragmentation of landscapes and habitats, as well as encourage linking up of habitats; and
- support local economies and social wellbeing of communities through development proposals to meet local needs.

Kent Biodiversity Action Plan

3.17 The Kent Biodiversity Action Plan (Kent Biodiversity Action Plan Steering Group, 1997) identifies habitats and species of conservation importance with the aim of enabling the conservation and enhancement of biodiversity in Kent and so contributes to the maintenance of national and global biodiversity.

4 LOCAL PLANNING POLICY

4.1 Local planning authorities are required to draw up development plans (known now as local development frameworks) to guide the location and design of types of development. Local Authority Development Plans must carry National and Regional planning polices through to the local level.

4.2 The local development plan with relevance to the ecology of the Proposal Site is the Swale Borough Local Plan, 2008.

Swale Borough Local Plan

4.3 The Swale Borough Local Plan (Swale Borough Council 2008) sets out the strategic planning framework for the protection of the environment, major transport priorities and the scale, pattern and broad location of new development. The Local plan was adopted in February 2008 and supersedes the Swale Borough Local Plan 2000 and forms part of the statutory development plan for the Borough.

Ecology

4.4 The Swale Borough Local Plan includes policies that are relevant to the ecology of the Site and these are detailed below:

- SP1: Sustainable development;
- SP2: Environment;

- E2: Pollution; and
- E21: Sustainable design and build.

4.5 Policy SP1 deals with sustainable development. The policy requires all developments to:

- avoid detrimental impact on the long term welfare of areas of environmental importance, minimise their impact generally upon the environment, including those factors contributing to global climate change, and seek out opportunities to enhance environmental quality;
- promote the more efficient use of previously-developed land, the existing building stock, and other land within urban areas for urban and rural regeneration; and
- promote ways to reduce energy and water use and increase use of renewable resources, including locally sourced and sustainable building materials.

4.6 Under Policy SP2, developments are required to avoid adverse environmental impact. Where the development will result in adverse impacts the Council requires these impacts to be minimized and mitigated or provide appropriate compensation measures for those impacts that cannot be prevented or adequately mitigated against.

4.7 Under Policy E2 development proposals will not be permitted that would, individually or cumulatively, give rise to pollution significantly adversely affecting flora and fauna, rural areas; and water supply sources, groundwater aquifers, or local hydrology.

4.8 Policy E21 requires the use of innovative and high quality low-impact design and build techniques, and incorporates sustainable design and build measures. Development proposals should ideally meet the Building Research Establishment Environmental Assessment Method (BREEAM) standard of 'good' as a minimum.

Local Development Framework

4.9 Swale Borough Council are currently preparing a revised Local Development Scheme which will set out the Council's proposals for preparing a number of Local Development Documents (LDDs) over the next five years.

4.10 Whilst it is not yet clear what polices the revised LDF will have of relevance to the Proposal Site, some topic papers to inform the LDF are available. Topic Paper 3: The Natural Environment (Swale Borough Council 2009) identifies the need to carefully assess impacts to biodiversity, in particular their impact to European habitats, from new developments projects around the Medway/Swale estuary.

4.11 It is anticipated that the revised LDF will have policies in line with those in the RSS.

Swale Biodiversity Action Plan

4.12 The Swale Biodiversity Action Plan (Kent Wildlife Trust, 2008) identifies habitats and species of conservation importance with the aim of enabling the conservation and enhancement of biodiversity within the Swale Borough and so contributes to the maintenance of national and global biodiversity. The Swale BAP priority habitats found at Kemsley include Built-up areas and Gardens, with Priority species including birds and bats.

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RPS

Development of a Sustainable Energy Plant.

St Regis Paper Mill, Kemsley

On behalf of St. Regis Paper Mill Co. & Eon Energy from Waste

Environmental Statement

Appendix 9.5:

Intertidal bird surveys 2009-2010

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Notice to Interested Parties

To achieve the study objectives stated in this report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of e.g. species abundances or habitat management efficacy described in the report.

Document Information

Report title:	Kemsley Mill: Intertidal bird surveys October 2009 - January 2010
Client:	Grovehurst Energy Ltd.
Document ref:	JPP1804-R-003d
Author:	Robin Ward, Neal Gates, Rob Martin & Alan Bull
Surveyors:	Alan Bull, Neal Gates & Rob Martin
Report date:	February 2010

Checked by:	Roger Buisson	[redacted]	25/02/10
Authorised by:	Roger Buisson	[redacted]	25/02/10

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0 EXECUTIVE SUMMARY

0.1 RPS were commissioned by Grovehurst Energy Ltd. in 2009 to undertake ornithological surveys of a brownfield site to the east of Kemsley Paper Mill, Sittingbourne, to inform as considered necessary the proposed development of the site and the construction of a sustainable energy facility.

0.2 Kemsley Mill is located on the south bank of The Swale Estuary which is designated under European Law as a Special Protection Area. There is the potential for the proposed development to have an effect on the adjacent Swale SPA. As a result it is necessary to implement a study to assess the numbers and usage of the site by non-breeding waterbirds.

0.3 The aims and objectives of this study was within the study area to undertake through the tidal cycle diurnal distributional intertidal counts of waterbirds during November 2009 – January 2010. Consideration is given to the implications of the development proposals in relation to the birds recorded during the study, based on an indication of the scheme proposals.

0.4 A total of 44 species of waterbird (excluding gulls and terns) were recorded using the survey area within the vicinity of Kemsley in October 2009 – January 2010, with overall site usage peaking in January. Of these, 9 species were of conservation value due to their presence as species listed on the designation for The Swale Estuary SPA. These species are: Dark-bellied Brent Goose, Gadwall, Teal, Oystercatcher, Ringed Plover, Grey Plover, Knot, Dunlin and Redshank.

0.5 The distribution of waterbirds recorded within the study site during the early – mid winter period was similar to that recorded during the previous late winter period. High tide roosts were again recorded from the peninsula at Elmley, opposite the proposed development and on the saltmarsh islands The Lilies. The species present on the intertidal mudflats were primarily using the area for feeding. This is recognised as being an important activity in maintaining the birds in viable condition for migration and breeding. The species present on the areas of saltmarsh and the land adjoining Elmley were predominantly roosting.

0.6 The diurnal counts of Black-tailed Godwit during winter 2009/10 (November – January) suggest that the study site has been of international importance for the species. The site has also been of national importance for Black-tailed Godwit during the late autumn of 2009 (October). Diurnal counts of Avocet during winter 2009/10 (November –January) have shown that the site has been of national importance for the species. Significant proportions (>5%) of The Swale SPA populations for six of the cited waterbirds species were recorded (Teal, Oystercatcher, Ringed Plover, Grey Plover, Dunlin and Redshank).

0.7 In October 2009 and November 2009-January 2010, the total waterbird assemblage (3,467 and 7,962 birds respectively) was greater than 10% of the citation figure (for winter) and the latest WeBS five year autumn peak mean (2003-2007). Consequently representing a significant proportion (10.7% and 12.1% respectively) of the SPA waterbird community in both periods.

0.8 The data for collected for the late autumn (October 2009) and early – mid winter (November 2009 – January 2010) periods do not suggest any marked changes in the numbers, species composition and distribution of waterbirds using the study area to that previous observed in the late winter (February – March 2009) and spring (April – May 2009) periods.

0.9 The data gathered during the surveys in October 2009 – January 2010 completes the baseline for intertidal monitoring of waterbirds likely to be in the zone of influence from the proposed development.

0.10 The results of the intertidal waterbird surveys during October-January do not alter the Valued Ecological Receptors identified in the Environmental Statement and the outcomes of the assessments of construction and operational impacts on them. Therefore the assessments made within the Environmental Statement are accurate.

1 INTRODUCTION

Background to the study

1.1 RPS were commissioned by Grovehurst Energy Ltd. in 2009 to undertake ornithological surveys of a brownfield site to the east of Kemsley Paper Mill, Sittingbourne, to inform as considered necessary the proposed development of the site and the construction of a sustainable energy facility. The ornithological surveys were to evaluate the importance of the adjacent Swale Estuary for waterbirds within the potential zone of influence from the proposed development. This potential zone of influence from on-site activities, noise and visual impacts only, was taken to be 500 metres.

Legislation

1.2 Where there is the potential of the proposed development to have an effect on the adjacent Swale Special Protection Area SPA, for instance through the disturbance of waterbirds feeding, it is necessary to implement a study of the non-breeding waterbirds present. Kemsley Mill is immediately adjacent to The Swale SPA.

1.3 The legislative provisions for the protection of wild birds in the UK are contained primarily in Section 1- 7 of the Wildlife and Countryside Act (WCA) 1981 (as amended; Anon 1981). Under the WCA, a wild bird is defined as any bird of a species that is resident in or is a visitor to the European Territory of any member state in a wild state.

Aims and objectives

1.4 The aims and objectives of the intertidal waterbird survey were to:

- Record the waterbird species, their abundance and distribution in the study area during October 2009 - January 2010, to supplement the data already gathered in February-May 2009.
- Consider the implications of the development proposals in relation to the birds recorded during the period October 2009 – January 2010.

1.5 The collected data will be presented to illustrate the spatial distributions and densities of species within the survey area. Analysis will consider species populations recorded during the surveys in comparison to species citations for the SPA in order to consider the relative importance of the survey area.

1.6 The distributional information gathered for the waterfowl will also be compared to the most recent Wetland Bird Survey bird data for The Swale Estuary, in order to put into context the birds present in the study area.

Study area

1.7 The proposed area of development is situated on what was once Kemsley Marshes, to the immediate east of Kemsley Paper Mill, situated adjacent to The Swale Estuary, Kent. Most of the site has been levelled with an aggregate of soil and stone to create a large expanse of bare ground. Recently large piles of spoil (earth and rubble) had been deposited across the site.

1.8 The exact development footprint was undecided at the time of the original surveys, so for consistency the study area for the surveys considered in this report follow the boundaries used in February-May 2009. The text relates to the entire survey area, which covered some 6.5 ha, and included the habitats immediately adjacent to the levelled site (Appendix B, Figure 1).

1.9 The site area has generally flat topography, except where the ground has been levelled which has created slight artificial slopes down to the surrounding area and in the areas of the spoil piles. A drainage ditch runs along the western boundary of the site in a north-south orientation and is connected to the marshland to the north of the site.

1.10 Much of the surrounding area to the north-east, east and south of the site has national designations for nature conservation associated with it.

1.11 Beyond Kemsley Marshes, the Knauf Drywall Ltd production facilities are located to the north, Kemsley Paper Mill to the west, an area of what was previously landfill to the south and The Swale Estuary to the east.

Designated sites within 2 km of Kemsley Mill

1.12 Table 1.1 presents the protected sites present on The Swale Estuary that lie within 2 km of Kemsley Mill. The Swale SSSI is listed as a component of The Swale SPA. These sites are indicated in Appendix B, Figure 2, which presents their location in relation to Kemsley Mill.

Table 1.1: Designated sites within 2 km of the study area

Site name	**Type**	**Approximate area (ha)**	**Condition summary**	**Interest Features** (Source: Natural England 2008, JNCC 2006, JNCC 2008)	**Distance from site (km)**
The Swale	SPA Ramsar SSSI	6,515	Favourable	Supports nationally important populations of breeding Annex 1 species including Little Tern and Mediterranean Gull; wintering Annex 1 species including Avocet and Golden Plover. Supports populations of international importance of migratory Ringed Plover, Wigeon, Pintail, Shoveler, Grey Plover, Redshank and Black-tailed Godwit. - Also supports an assemblage of over 20,000 waterbirds.	0

1.13 There are other internationally and nationally designated sites that are located between 2 and 5 km from Kemsley Mill and therefore are less likely to be affected by the proposed development scheme. Those additional sites within 5km of Kemsley Mill are detailed in Table 1.2.

Table 1.2: Additional designated sites located within 5 km of Kemsley Mill

Site name	**Type**	**Approximate area (ha)**	**Interest Features** (Source: JNCC 2008)	**Distance from site (km)**
Medway Estuary and Marshes	SPA Ramsar SSSI	4,684	Supports nationally important populations of breeding Annex 1 species including Avocet and Little Tern; wintering Annex 1 Avocet. Supports populations of international importance of migratory Dark-bellied Brent Goose, Shelduck, Pintail, Ringed Plover, Grey Plover, Dunlin, Black-tailed Godwit and Redshank. Also supports an assemblage of over 20,000 waterbirds.	2.4

The Swale SPA

1.14 The Swale SPA is an estuarine area that separates the Isle of Sheppey from the mainland of Kent and adjoins the Medway Estuary to the west. It is a complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarshes and mudflats. The intertidal flats are extensive, especially in the east of the site.

1.15 Almost half of The Swale SPA includes the largest remaining areas of freshwater grazing marsh in Kent. This comprises a total area in excess of 3,100 ha. A diversity of grazing management regimes helps maintains the suitability of the grassland as winter feeding and breeding habitat for important numbers of wildfowl and waders.

1.16 Mudflats are the second most extensive habitat, with over 2,400 ha present. The intertidal mud provides foraging habitat for species such as Avocet, which feed on the invertebrates present in the mud. The Swale is of particular importance for breeding Avocet and for internationally important numbers of wintering species such as Dunlin, Grey Plover and Black-tailed Godwit, as well as the overall waterbird assemblage.

1.17 Saltmarsh habitat is less prevalent in the SPA than intertidal mud, although where present it provides important roost sites for birds.

1.18 The Swale Estuary is contiguous with one other substantial estuary in south-east England, the Medway (Table 1.2). It is known that there is significant movement between these two sites by several species (Musgrove *et al.* 2003).

1.19 The full original citation for The Swale SPA is given in Table 1.3. This is based on peak mean data from 1991/2 to 1995/6 and is the currently presented citation referenced by JNCC (2006a).

Table 1.3: SPA cited species for The Swale SPA (based on original 1996 citation).

<table>
<tr><th>Cited species and reasons for qualifying</th><th>% of biogeographical population
(5 year peak mean 1991/2-1995/6)</th></tr>
<tr><td>Article 4.2 - Over winter the area regularly supports:

Dark-bellied Brent Goose
Pluvialis squatarola

Dunlin
Calidris alpina alpina

Redshank
Tringa totanus</td><td>

0.9% of the Western Siberia/Western Europe population

2.1% of the population in Great Britain

0.9% of the East Atlantic wintering population</td></tr>
<tr><td colspan="2">Cited species and reasons for qualifying</td></tr>
<tr><td colspan="2">Article 4.2: An internationally important assemblage of birds - during the breeding season the area regularly supports: Reed Warbler, Teal , Mallard, Gadwall, Ringed Plover, Reed Bunting, Coot , Moorhen, Oystercatcher, Curlew, Grey plover, Shelduck, Redshank, Lapwing.</td></tr>
<tr><td colspan="2">Article 4.2: An internationally important assemblage of birds - over winter the area regularly supports: 65,588 waterbirds (5 year peak mean 01/04/1998) Including: Dark-bellied Brent Goose, Gadwall, Teal, Oystercatcher, Ringed Plover, Grey Plover, Dunlin Curlew, Redshank .</td></tr>
</table>

2 METHODS

Intertidal Waterbird Surveys

2.1 The aim was to undertake two surveys at low tide and two surveys at high tide each month. Each survey covered a six hour period (three hours either side of high/low tide).

2.2 A total of sixteen survey visits were undertaken between October 2009 and January 2010. The survey dates and details are tabulated in Table 2.1

Table 2.1: Intertidal Waterbird Survey dates, tide times & heights and observers.

Date	Time of low tide	Tide height (m)	Time of high tide	Tide height (m)	Observers
2nd October 2009			12:14	5.4	Rob Martin
9th October 2009	10:13	1.0			Alan Bull
20th October 2009			14:31	6.0	Rob Martin
23rd October 2009	10:06	1.1			Rob Martin
2nd November 2009			12:06	5.6	Rob Martin
10th November 2009	12:12	1.1			Rob Martin
17th November 2009			12:31	5.7	Alan Bull
24th November 2009	10:50	1.4			Rob Martin
2nd December 2009			12:00	5.7	Rob Martin
8th December 2009	10:59	0.7			Rob Martin
9th December 2009	11:56	0.8			Rob Martin
16th December 2009			12:19	5.5	Rob Martin
8th January 2010	12:15	0.9			Rob Martin
14th January 2010			12:10	5.4	Rob Martin
26th January 2010	14:29	1.5			Rob Martin
29th January 2010			11:40	5.6	Rob Martin

2.3 The full extent of the intertidal survey area is shown in Appendix B, Figure 3.

2.4 Observations during the survey were made from the sea wall, which provided a suitable vantage point to observe all birds without causing undue disturbance. One experienced ornithologist, equipped with binoculars and telescope of appropriate magnification, walked slowly along the seawall once hourly. Observers retraced their route of the first count during the second count, the procedure thereafter repeated for the remaining counts of the survey. As the site was a linear area with good visibility, birds could be observed from distance to avoid disturbance and to ensure that if any moved they were not double-counted.

2.5 The location and extent of flocks and individual waterbirds were recorded directly into ESRI Arcpad GIS Software on handheld PDA devices, with a 1:10,000 scale Ordnance Survey base map of the study area (and adjacent land). A 50 m x 50 m grid was overlaid on top of the base map to assist with the distributional analysis. The distance from the recorder to a bird flocks was assessed through the use of this grid and through the use of landmarks present in the landscape and on the base map, which could be scaled as desired in the field. Birds were either plotted as individual counts at a location or as a flock, the extent of which could be plotted electronically directly onto the base map on the hand held PDAs. The ornithologists were proficient in the use of this method and equipment having undertaking such surveys on numerous occasions previously around the UK on coastal, estuarine and inland terrestrial and wetland sites. This is considered to be a robust and reliable method for recording birds and plotting their distribution.

2.6 On returning to the office the collected data, contained on flash memory cards, were then downloaded into ESRI ArcGIS software and distribution maps produced.

2.7 In addition to the waterbirds recorded along the intertidal areas, any observations of high tide wader roosts and raptors such as harriers and owls on the surrounding terrestrial areas were recorded.

2.8 Unfortunately the accidental damage of a memory card subsequent to the 10th November 2009 visit resulted in the loss of data for this visit. It was not realised that these data were inaccessible until it was too late to schedule an additional visit. Consequently only one low tide count can be reported for the month of November 2009.

3 DEFINITIONS

3.1 The definition of waterbirds used in this study is in accordance with the Ramsar convention upon which the SPA citation was based (Ramsar 2007) i.e. "birds ecologically dependent on wetlands". At the broad level of taxonomic order this is as follows (species groups in bold are considered likely to be observed at Kemsley):

- penguins: *Sphenisciformes*.
- **divers**: *Gaviiformes*;
- **grebes**: *Podicipediformes*;
- wetland related pelicans, **cormorants**, darters and allies: *Pelecaniformes*;
- **herons**, **bitterns**, storks, ibises and spoonbills: *Ciconiiformes*;
- flamingos: *Phoenicopteriformes*:
- screamers, **swans**, **geese** and **ducks** (wildfowl): *Anseriforme*s;
- wetland related **raptors**: *Accipitriformes* and *Falconiformes*;
- wetland related cranes, **rails** and **allies**: *Gruiformes*;
- Hoatzin: *Opisthocomiformes*;
- wetland related jacanas, **waders** (or shorebirds), **gulls**, skimmers and **terns**: *Charadriiformes;*
- coucals*: Cuculiformes;* and
- wetland related owls: *Strigiformes*;

3.2 This study surveyed for all waterbirds with the exception of gulls (*Laridae*) which were only counted when surveyors considered this would not be to the detriment of accurately surveying other species groups. The term waterfowl has the same meaning within the context of this study.

3.3 For the purposes of the analysis, the term 'autumn' is used to indicate the general period of autumn migration (July - October), and 'winter' the period November to March, these definitions as used by Wetland Bird Survey (WeBS). This report therefore does not fully cover each period but supplements the gaps in the dataset for the survey undertaken in February-May 2009.

3.4 For the purposes of the analysis, the tidal cycle is divided into four periods. The term 'low tide' is used to indicate the period two hours either side of low tide, 'high tide' the period two hours either side of high tide, and the two intervening periods 'flood' and 'ebb' that fall before and after high tide respectively. A high proportion of birds feed during low water when the position of the tideline (and thus food availability) is relative stable, resulting in relatively small changes in the distribution and numbers of foraging birds. Changes in bird distribution are most pronounced during the ebb and flood tides as availability of intertidal areas rapidly change and birds fly to/from high water roost sites.

4 RESULTS

Abundance of Waterbirds

4.1 A total of 33 and 43 species of waterbirds (excluding gulls) were recorded using the intertidal study site in October 2009 and between November and January 2010 respectively. A full list of species cited in this report together with vernacular and scientific names is included in Appendix A. Table 4.1 summarises the peak counts by month and season, for each species recorded during the survey visits.

4.2 The peak waterbird counts (excluding gulls) recorded for October 2009 and November to January 2010 were 2,211 and 4,319 respectively.

4.3 Summation of the individual species maxima during a season, irrespective of the count in which they occurred, provides a total waterbird assemblage for the season. This represents the minimum number of individual waterbirds using the area during the duration of the survey period. The total waterbird assemblage as recorded by the surveys in October 2009 and between November 2009 and January 2010 was 3,467 and 7,962 birds respectively.

Spatial and temporal distribution of intertidal waterbirds

4.4 The species, for which detailed accounts are given in this section, were chosen on the following criteria:

- A waterbird species cited as part of the interest feature of The Swale SPA (JNCC 2006). These are Dark-bellied Brent Goose, Gadwall, Teal, Oystercatcher, Ringed Plover, Grey Plover, Dunlin, Curlew and Redshank.
- A waterbird species cited as part of the interest feature of Swale Ramsar site (JNCC 2008) under (i) Ramsar criterion 6 (species/populations occurring at levels of international importance) and (ii) 'noteworthy fauna' as species outside the breeding season currently occurring at national levels. These species are in addition to those already mentioned, Little Grebe, Little Egret, Shelduck, Wigeon, Pintail, Shoveler, Avocet, Golden Plover, Lapwing, Knot, Ruff, Black-tailed Godwit, Whimbrel, Spotted Redshank and Greenshank.
- Those waterbird species that were considered part or wholly ecologically dependant upon the intertidal flats where their numbers exceeded a peak of 25 birds. These species are in addition to those already mentioned, Coot and Snipe.

4.5 Of the remaining waterbird species observed (and listed in Appendix A), none were recorded in nationally important numbers.

Table 4.1: Peak counts of all waterbird species recorded by intertidal surveys of the study area between October 2009 – January 2010.

Month	October	Autumn peak count	November	December	January	Winter peak count
Great Northern Diver	0	0	0	0	1	1
Little Grebe	5	5	9	16	26	26
Great Crested Grebe	5	5	6	14	6	14
Cormorant	7	7	18	6	1	18
Shag	0	0	0	1	0	1
Little Egret	23	23	11	5	3	11
Grey Heron	4	4	4	3	2	4
Mute Swan	1	1	0	1	0	1
Canada Goose	0	0	1	0	0	1
Dark-bellied Brent Goose	0	0	24	12	22	24
Shelduck	110	110	107	257	194	257
Wigeon	216	216	79	214	766	766
Gadwall	0	0	0	0	4	4
Teal	139	139	88	518	549	549
Mallard	13	13	5	2	3	5
Pintail	10	10	0	74	218	218
Shoveler	0	0	0	0	5	5
Pochard	0	0	0	0	1	1
Tufted Duck	0	0	0	0	1	1
Scaup	0	0	0	1	0	1
Red-breasted Merganser	1	1	1	8	14	14
Goldeneye	0	0	0	2	0	2

Month	October	Autumn peak count	November	December	January	Winter peak count
Water Rail	0	0	1	0	0	1
Moorhen	16	16	19	10	4	19
Coot	0	0	0	2	43	43
Oystercatcher	583	583	693	847	709	847
Avocet	46	46	28	61	52	61
Ringed Plover	55	55	3	40	12	40
Golden Plover	192	192	0	16	0	16
Grey Plover	98	98	15	62	47	62
Lapwing	383	383	485	432	553	553
Knot	67	67	1	283	940	940
Dunlin	537	537	61	1,447	1,678	1,678
Snipe	1	1	0	28	25	28
Black-tailed Godwit	329	329	550	750	1,246	1,246
Bar-tailed Godwit	5	5	8	8	11	11
Whimbrel	2	2	0	0	0	0
Curlew	49	49	50	41	14	50
Spotted Redshank	1	1	1	0	0	1
Redshank	463	463	357	297	263	357
Greenshank	9	9	13	6	1	13
Green Sandpiper	3	3	2	1	1	2
Turnstone	88	88	51	68	35	68
Black-headed Gull	86	86	37	128	75	128
Common Gull	10	10	3	9	8	9
Lesser Black-backed Gull	1	1	2	0	1	2

Month	**October**	**Autumn peak count**	**November**	**December**	**January**	**Winter peak count**
Herring Gull	4	4	4	3	3	4
Great Black-backed Gull	3	3	1	3	2	3
Black Tern	4	4	0	0	0	0
Kingfisher	2	2	1	2	1	2
Peak Visit Count	**2,211**	**2,211**	**1,347**	**3,416**	**4,319**	**4,319**
Total waterbird assemblage Peak	**3,467**	**3,467**	**2,694**	**5,535**	**7,475**	**7,962**

Note:
Peak Visit Count represents the greatest number of waterbirds observed in a single count*.
Total Waterbird Assemblage Peak represents the total sum of all the species peak numbers*.
*excluding gulls *Laridae*

4.6 Monthly peak and mean diurnal counts for each hour of the tidal cycle are presented graphically for 19 of the species that fit the above criteria. The graphs provide a snapshot of the abundance and temporal distribution of the individual species by day. They are expected to highlight any notable changes that may be related to tidal state and changing months. The graphs show how the peak or mean number change from high tide, through the ebb to low tide and then back to high tide.

4.7 Spatial distribution figures for 20 of the selected species are presented for two diurnal tidal survey periods, these being when the intertidal flats are (i) in part or wholly exposed (during the ebb, low & flood tide periods; referred to as "low water period"), and (ii) inundated by the tide (at high tide; "high water period") [see Figures in Appendix C]. For the majority of waterbirds, these two tidal periods represent when and when not their intertidal feeding grounds are available respectively. Separate maps are provided for each of the two seasons, autumn and winter, when for some species different populations are known to be using the site e.g. Dunlin, and seasonal differences can exist in the food resources utilised.

4.8 The high water maps have been plotted using the maximum species count occurring in each of the grid squares from the surveys. Therefore they do not represent a total of individuals across the site but the peak usage of each 50 m x 50 m grid square by the target species. The maps show the spatial distribution of the individual target species. They are expected to highlight those areas that are important to the target species each season (or part of) surveyed when feeding areas are unavailable. For the remaining target species for which only small numbers of birds were recorded in the study area, their distribution is described briefly below.

4.9 The low water maps have been plotted using the peak summed counts of each tidal period (four hours either side of low tide) occurring in each of the grid squares from the surveys. Therefore they do not represent a total of individuals across the site but the peak of the total number of bird hours of use of each 50 m x 50 m grid square by the target species per period of tidal flat exposure i.e. four hours either side of low tide. The maps show the spatial distribution of the individual target species. They are expected to highlight those areas that are important to the target species each season (or part of) surveyed for foraging areas. For the remaining target species for which only small numbers of birds were recorded in the study area, their distribution is described briefly below.

4.10 Brief summary texts accompany the graphs and maps highlighting the key points from the available data for each species.

Little Grebe

(see figures 4.1, 4.2 and C.1-C.4)

4.11 Little Grebe were present during all tidal states and numbers of birds present was largely independent of tidal state. Numbers increased from the autumn peak of 5 in October 2009 into the winter period, with the highest peak count of 26 in January. Mean numbers present regardless of tidal state were similar in December and January, 8.8 and 9.4 respectively.

4.12 As an aquatic forager all records were from birds on water and individuals were recorded foraging throughout the tidal cycle, though most frequently over the high tide period.

4.13 All records of Little Grebe were from birds on water with site usage during the low water period concentrated within the stretch of the Elmley Reach immediately adjacent to the proposed development. Birds were also noted away from the estuary on the pools at the sewage works north of the proposed development site.

Figure 4.1: Peak numbers of Little Grebe at hourly intervals through the tidal cycle during October 2009 - January 2010

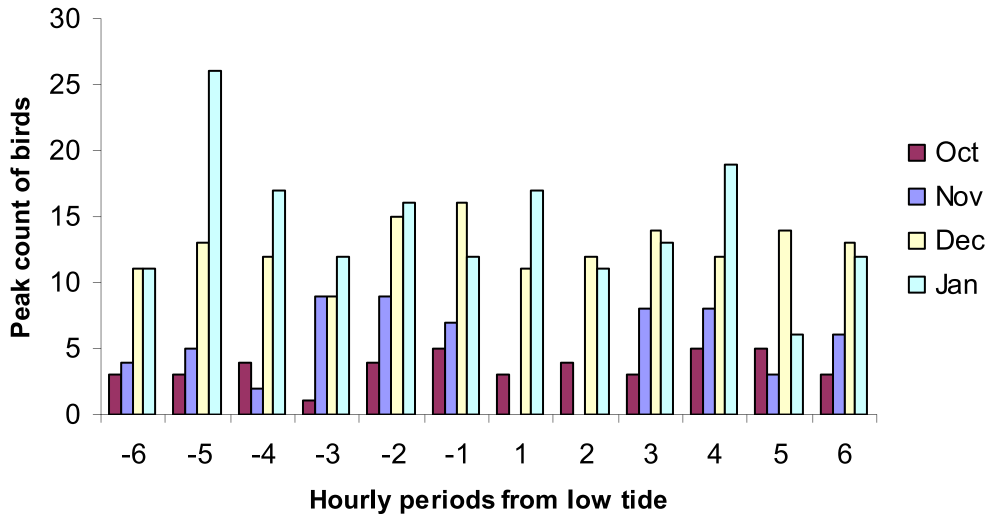
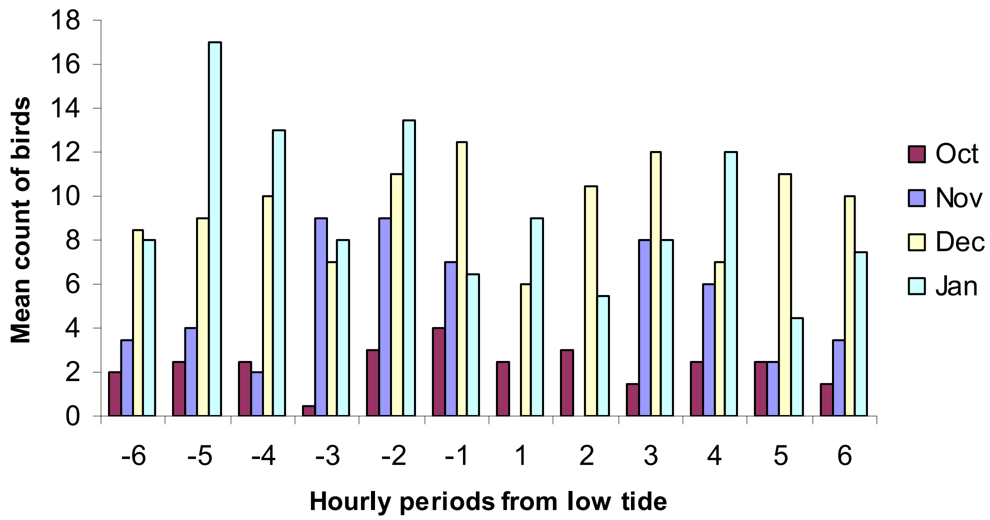


Figure 4.2: Mean numbers of Little Grebe at hourly intervals through the tidal cycle during October 2009 - January 2010



Little Egret

(see figures 4.3, 4.4 and C.5-C.8)

4.14 Little Egrets were present in greatest numbers during October with a peak count of 23 recorded. Birds were recorded on all survey visits, though numbers decreased in the winter period with peak counts of 5 in December and 3 in January.

4.15 Birds were recorded at all tidal states, with most observed feeding, often on the saltmarsh islands, The Lilies, and the fringe of saltmarsh along Milton Creek and around Grovehurst Jetty. A high tide roost occurred of up to 18 individuals in October, though 16 were also noted roosting at low tide.

Figure 4.3: Peak numbers of Little Egret at hourly intervals through the tidal cycle during October 2009 - January 2010

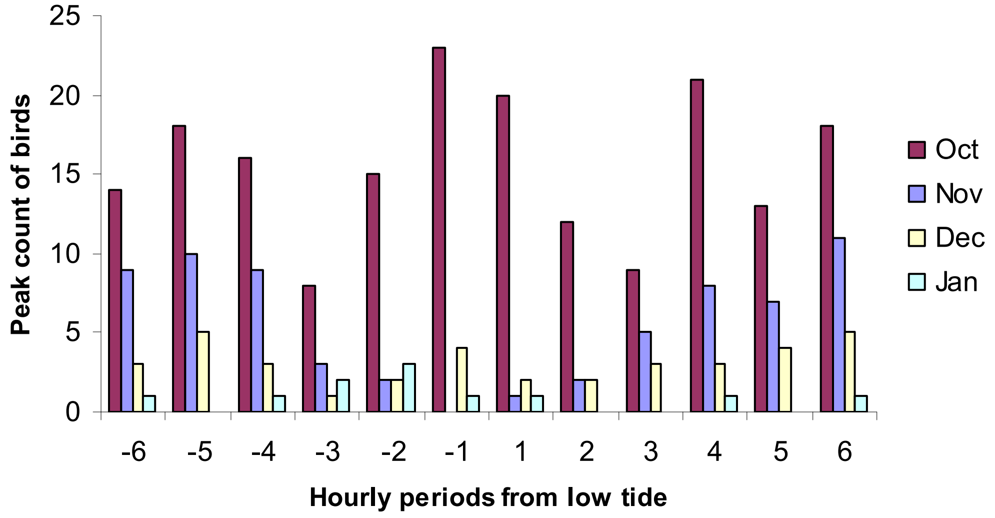
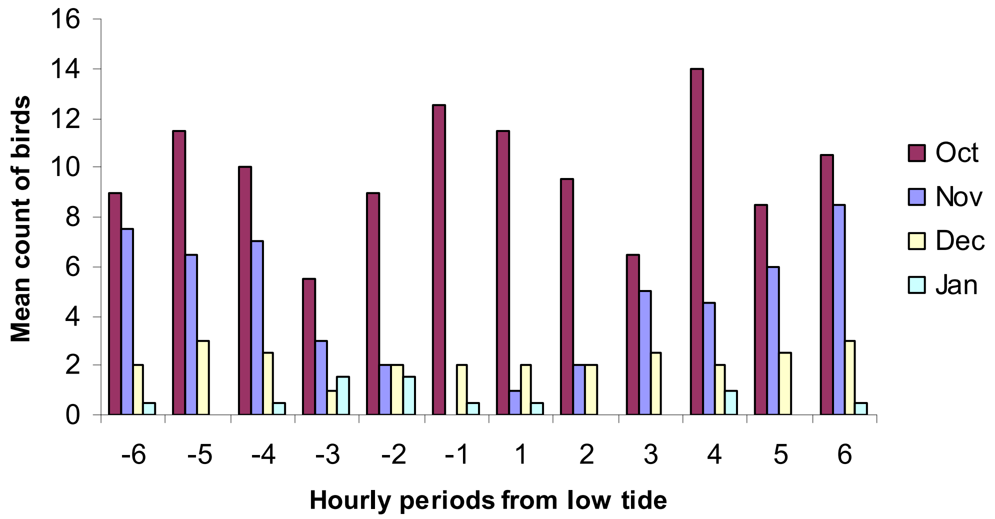


Figure 4.4: Mean numbers of Little Egret at hourly intervals through the tidal cycle during October 2009 - January 2010



Dark-bellied Brent Goose

(see figures 4.5, 4.6 and C.9-C10)

4.16 Only recorded on four of the 15 survey visits, in small groups of 4-24 individuals. Birds were only recorded in November, December and January, with the peak count in November.

4.17 Dark-bellied Brent Goose were only present during the high tide visits, and were mostly recorded as swimming.

Figure 4.5: Peak numbers of Dark-bellied Brent Goose at hourly intervals through the tidal cycle during October 2009 - January 2010

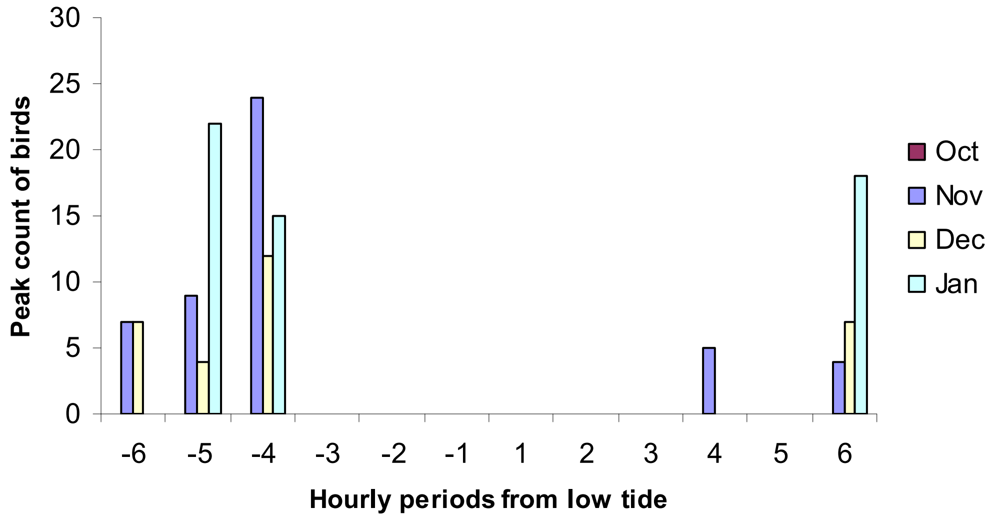
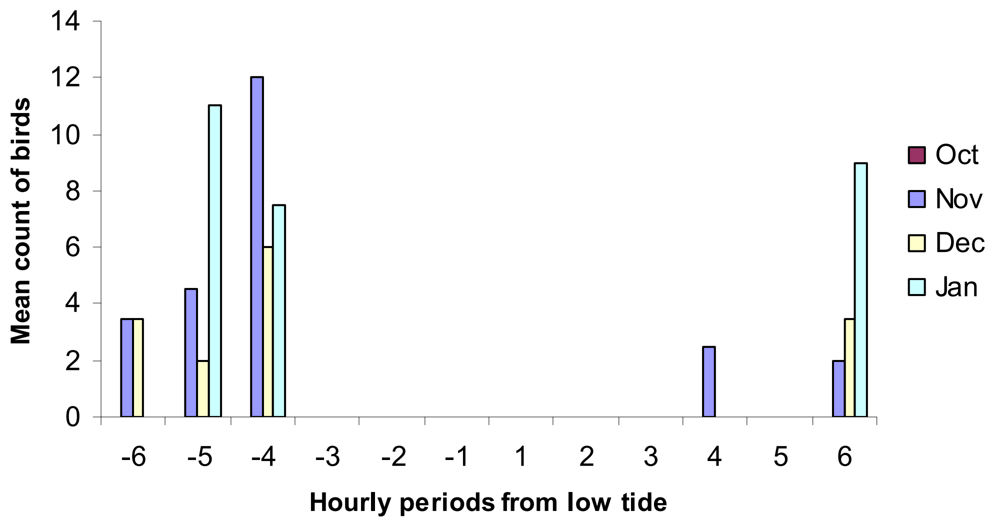


Figure 4.6: Mean numbers of Dark-bellied Brent Goose at hourly intervals through the tidal cycle during October 2009 - January 2010



Shelduck

(see figures 4.7, 4.8 and C.11-C.14)

4.18 Shelduck were recorded on all visits during the current survey period. During the autumn (October) numbers peaked at 110 birds. During the winter period peak numbers increased to 257 in December and 194 in January. Mean numbers regardless of tidal state were similar between October and November, 45 and 38 respectively, but considerably higher in December and January, 90 and 67.2 respectively.

4.19 Birds were found throughout the tidal cycle, though abundance at each state varied by month. In October numbers were similar throughout the cycle, but with a distinct peak over low tide. For the three winter months more birds were present during the high tide period including the two peak counts mentioned above.

4.20 In October, Shelduck usage throughout the tidal cycle was predominately distributed within the bay on the Elmley side opposite the proposed development with smaller numbers spread elsewhere across the intertidal areas. In winter, the birds present showed a much more dispersed pattern of usage across the study area throughout the tidal cycle, with concentrations occurring in the bay on the Elmely side and around the saltmarsh islands, The Lilies.

4.21 The majority of birds were recorded either foraging or roosting. Neither activity was restricted to a particular tidal state, though foraging was more frequently recorded during low tide and, conversely, roosting was more frequent over high tide as feeding areas became inundated.

Figure 4.7: Peak numbers of Shelduck at hourly intervals through the tidal cycle during October 2009 - January 2010

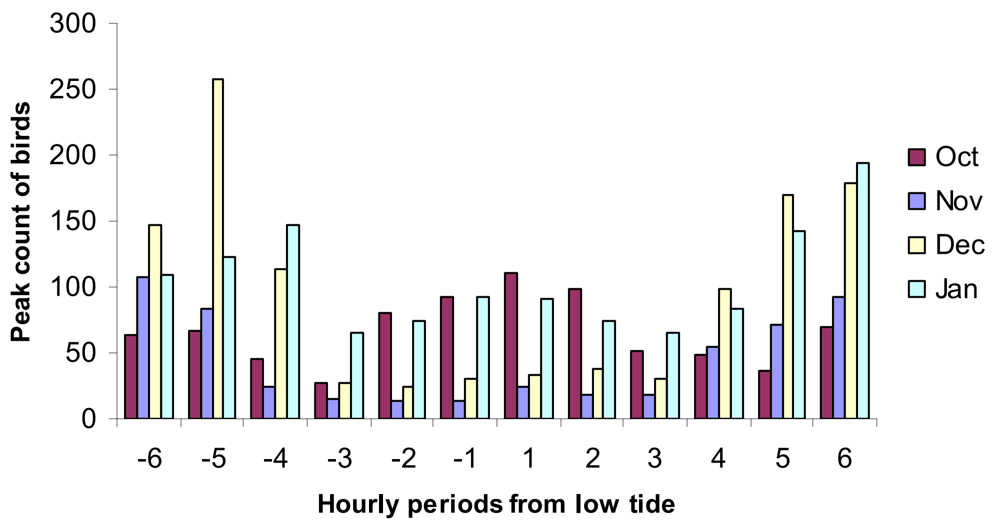
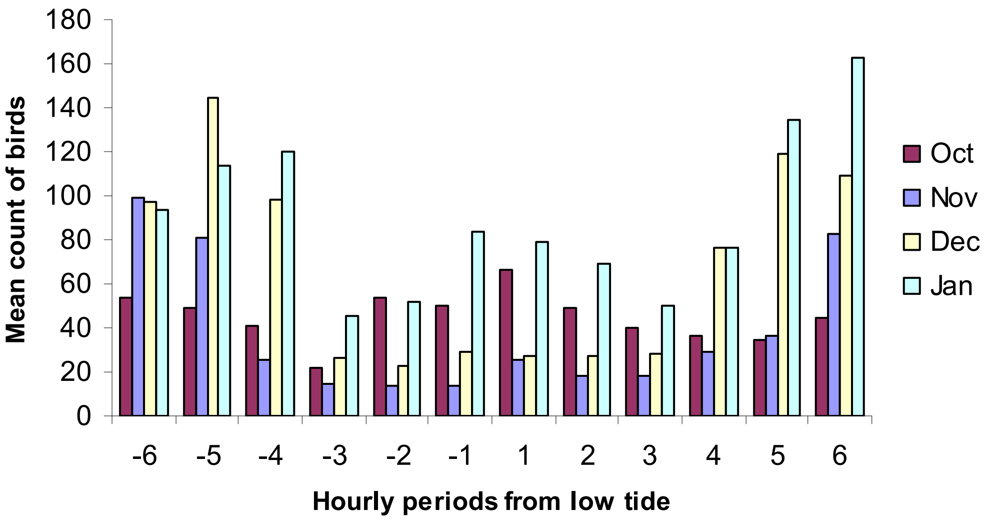


Figure 4.8: Mean numbers of Shelduck at hourly intervals through the tidal cycle during October 2009 - January 2010



Wigeon

(see figures 4.9, 4.10 and C.15-C.18)

4.22 Wigeon were recorded using the study area on every visit throughout the autumn and winter period. Very few birds were present at the beginning of October, with a peak count of 5 for the first half of the month. Numbers increased rapidly to an October peak of 216. Counts were similar in November and December, but greatly increased in January, with a peak count of 766. Mean numbers reflected this January influx, 128.5 compared with 66.1 for December.

4.23 Wigeon used the study area throughout the tidal period, with a clear differentiation in its use between the high and low water periods when most birds fed and roosted respectively.

4.24 Wigeon during the low water period were predominately distributed on the eastern lower intertidal flats of Elmley Reach. At high water, birds were concentrated within the bay on the Elmley side opposite to the proposed development with some use also made of the saltmarsh islands, The Lilies.

Figure 4.9: Peak numbers of Wigeon at hourly intervals through the tidal cycle during October 2009 - January 2010

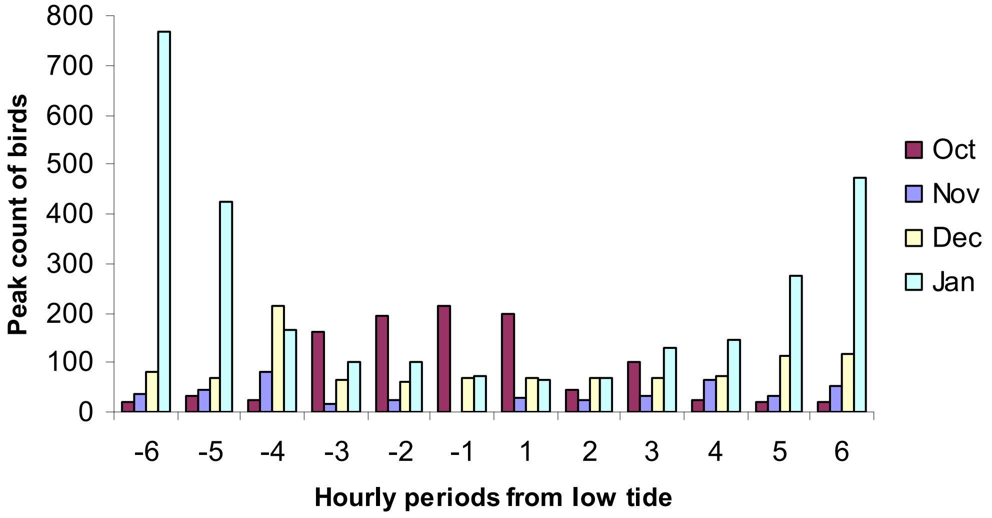
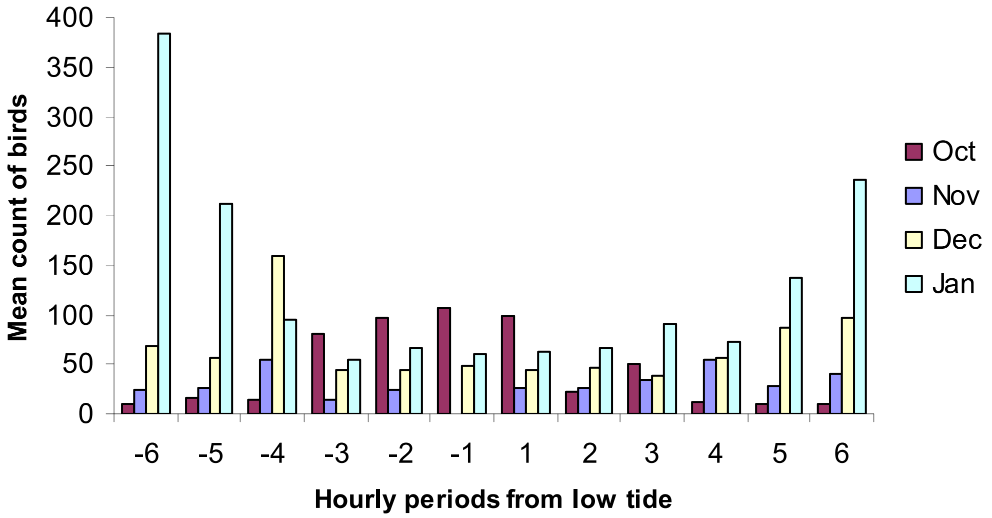


Figure 4.10: Mean numbers of Wigeon at hourly intervals through the tidal cycle during October 2009 - January 2010



Gadwall

4.25 Gadwall were only recorded in January during the present survey period, in small numbers of between one and four.

Teal

(see figures 4.11, 4.12 and C.19-C.22)

4.26 Teal were recorded in the study area by all visits throughout the survey period. Teal were present throughout the tidal cycle with smaller numbers recorded generally during high and ebb tides.

4.27 Teal made widespread use of the study area's intertidal areas throughout the tidal cycle, with notable concentrations along the length of Milton Creek and by the outfall from the sewage works to the north.

4.28 The majority of Teal recorded were of birds feeding irrespective of tidal state, though large numbers were recorded roosting on the flow tide after birds had been feeding during the ebb tide. Roosts were also occassionally noted over the high tide period.

Figure 4.11: Peak numbers of Teal at hourly intervals through the tidal cycle during October 2009 - January 2010

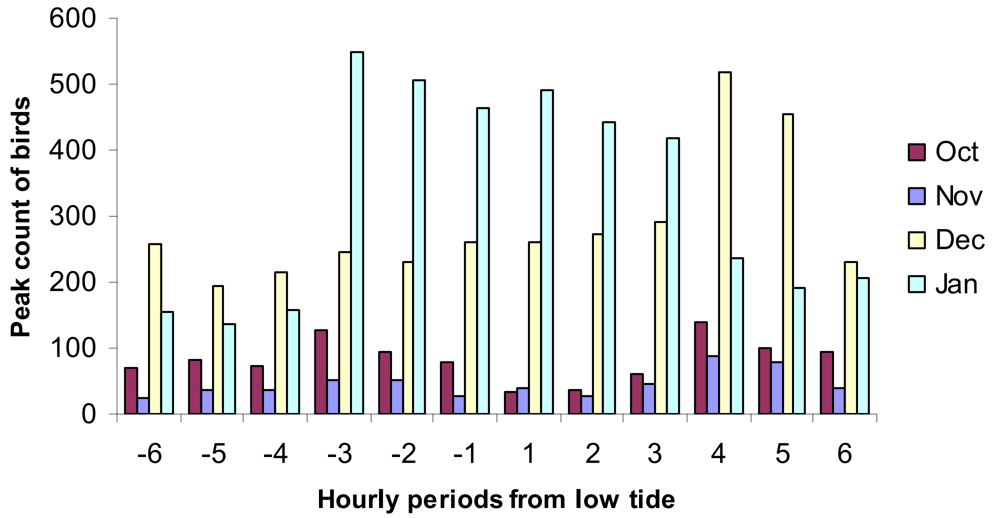
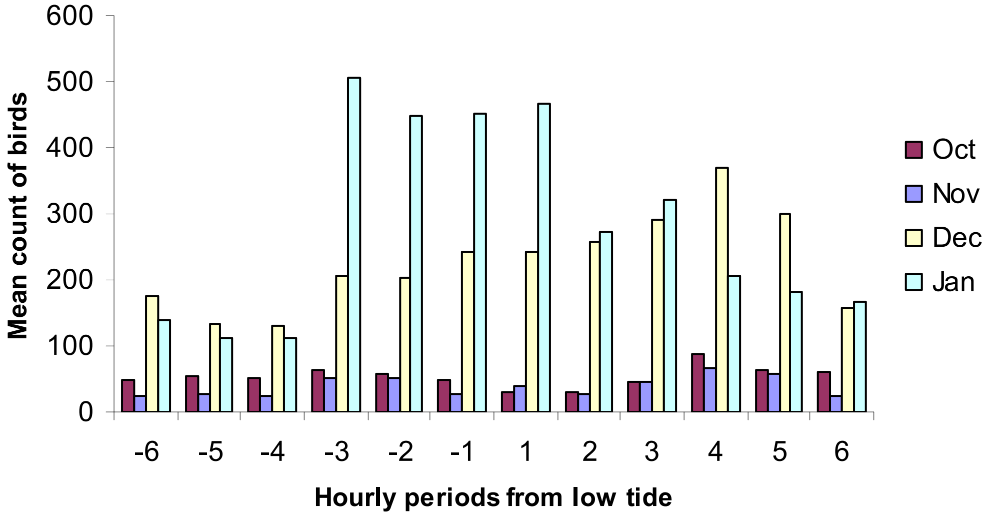


Figure 4.12: Mean numbers of Teal at hourly intervals through the tidal cycle during October 2009 - January 2010



Pintail

(see figures 4.13, 4.14 and C.23-C.25)

4.29 Pintail were intermittently recorded during the winter period, with peaks counts of 74 in December and 218 in January, but none recorded in November. Few birds were present during October, with a peak of just 10. While the October birds were recorded during low tide, the large numbers in December and January were birds present over the high tide period.

4.30 When Pintail were present over high water they were to be found using the bay on Elmley, opposite to the proposed development. Birds observed during the low water period were around the central part of the eastern lower intertidal flats of Elmley Reach and the saltmarsh islands, The Lilies.

4.31 The majority of Pintail recorded were of birds roosting irrespective of tidal state.

Figure 4.13: Peak numbers of Pintail at hourly intervals through the tidal cycle during October 2009 - January 2010

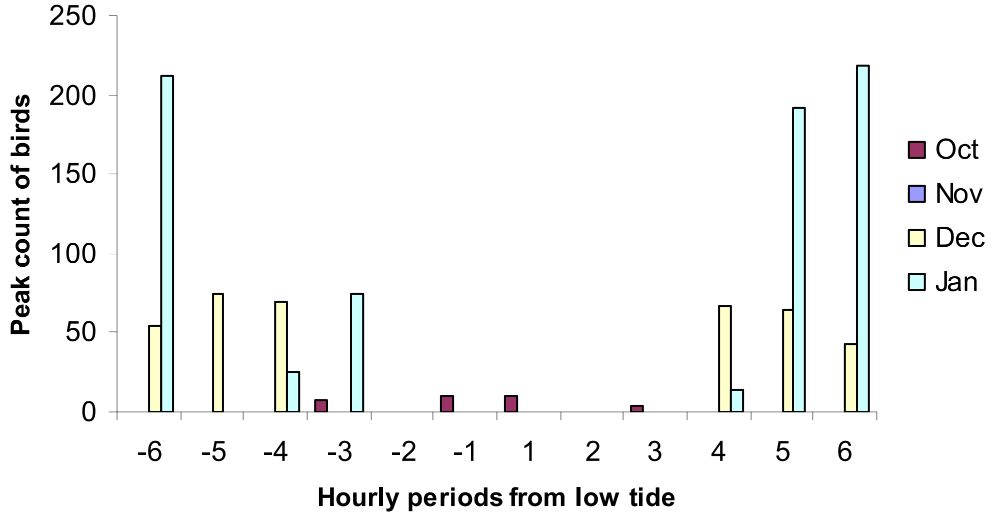
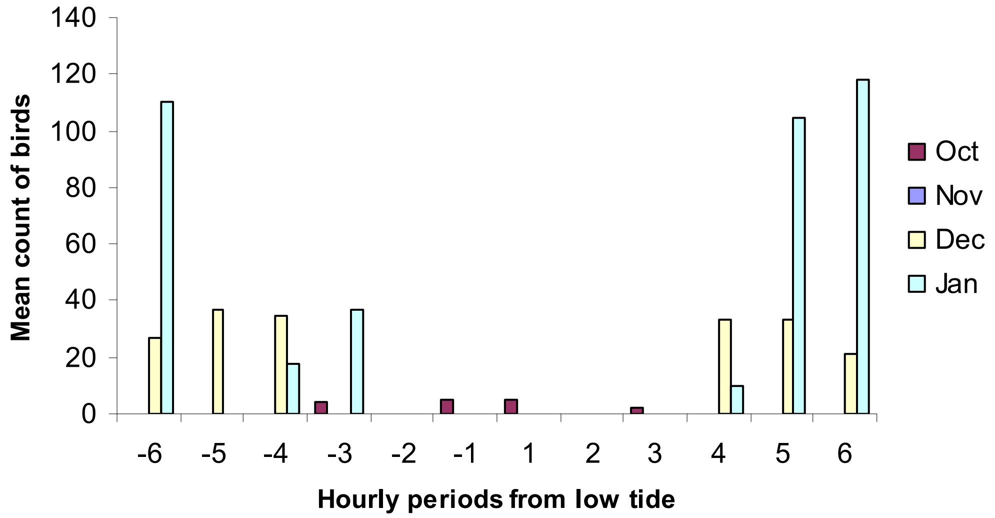


Figure 4.14: Mean numbers of Pintail at hourly intervals through the tidal cycle during October 2009 - January 2010



Shoveler

4.32 The only records of Shoveler were of two birds roosting during the ebb tide of 8th January and five birds swimming during the high tide period on 14th January. These were present in the bay adjacent to Elmley, opposite to the proposed development.

Coot

4.33 Coot were recorded on seven dates in December and January with a peak count of 43 on the 8th January.

4.34 Coot were observed in the main channel of the Elmley Reach and from the lagoons at the sewage works.

Oystercatcher

(see figures 4.15, 4.16 and C.26-C.29)

4.35 Oystercatcher were recorded in the study area by all surveys throughout the autumn and winter, with numbers increasing from October then remaining reasonably stable during the winter period with a tidal maximum of between 693 and 790. During the winter period birds were present throughout the tidal cycle with the site predominately used as a roost over the high water period. Much smaller numbers of birds remained in the study area when intertidal flats became largely exposed allowing birds to forage. However, in October a greater number of birds were present during the low tide period with comparatively little fluctuation in numbers during the tidal cycle. This was due to a large number of Oystercatcher roosting over the low tide period during this month.

4.36 Oystercatcher use of the intertidal flats was found to be widespread during the low water period with the only notable concentration being beside Elmley in both October and January. At high tide, the principal roost site within the study area was located on the peninsula on Elmley opposite the proposed development site.

Figure 4.15: Peak numbers of Oystercatcher at hourly intervals through the tidal cycle during October 2009 - January 2010

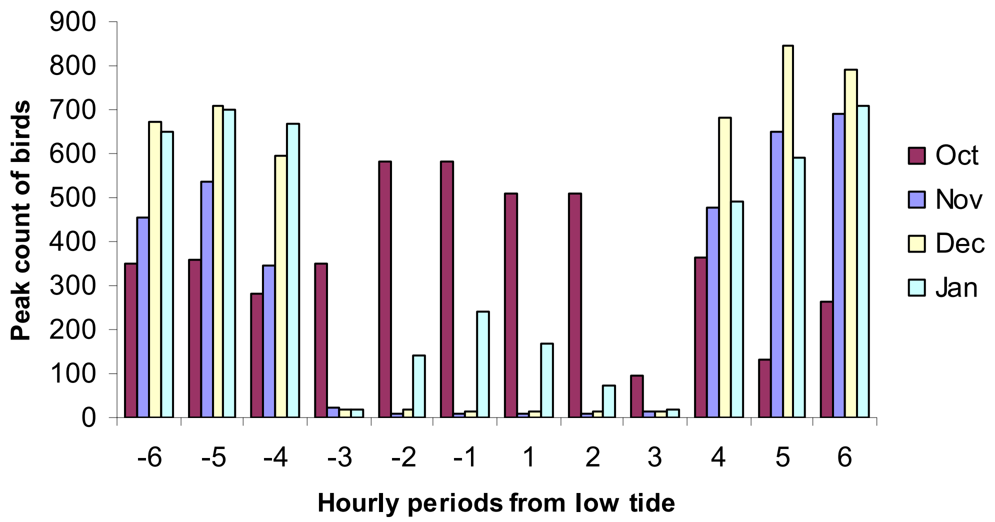
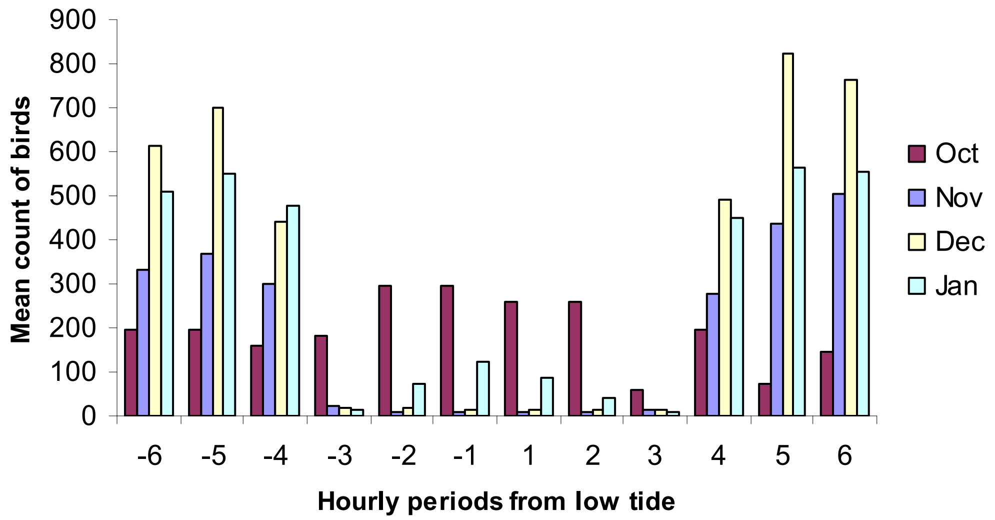


Figure 4.16: Mean numbers of Oystercatcher at hourly intervals through the tidal cycle during October 2009 - January 2010



Avocet

(see figures 4.17, 4.18 and C.30-C.33)

4.37 Avocet were recorded in the study area by all surveys in October and all but one visit (in November) during the winter. Few birds were recorded during the November visits, with a mean count of just 2.8, but numbers increased for December and January with peak counts of 61 and 52 respectively. The mean count during October was 8.4, whereas in December and January it increased to 23 and 22.5.

4.38 Few birds were recorded during low tide between October and December, but in January birds were present in similar numbers throughout the tidal cycle, with most of these birds recorded as roosting during low tide. Prior to January, birds were split fairly equally between feeding and roosting, without clear differentiation between high and low tide. The behaviour of the birds is most likely dependent on the height of the tide above chart datum as to whether suitable foraging habitat remains accessible during the high tide period.

4.39 At low tide birds were mainly distributed along the eastern side of Elmley Reach and along Milton Creek, with a marked concentration of bird activity in the central part of eastern lower intertidal flats of Elmley Reach. With tidal inundation of the flats at high tide, birds congregated to both feed and roost within the bay on Elmley, opposite the proposed development, and occasionally at the mouth of Milton Creek.

Figure 4.17: Peak numbers of Avocet at hourly intervals through the tidal cycle during October 2009 - January 2010

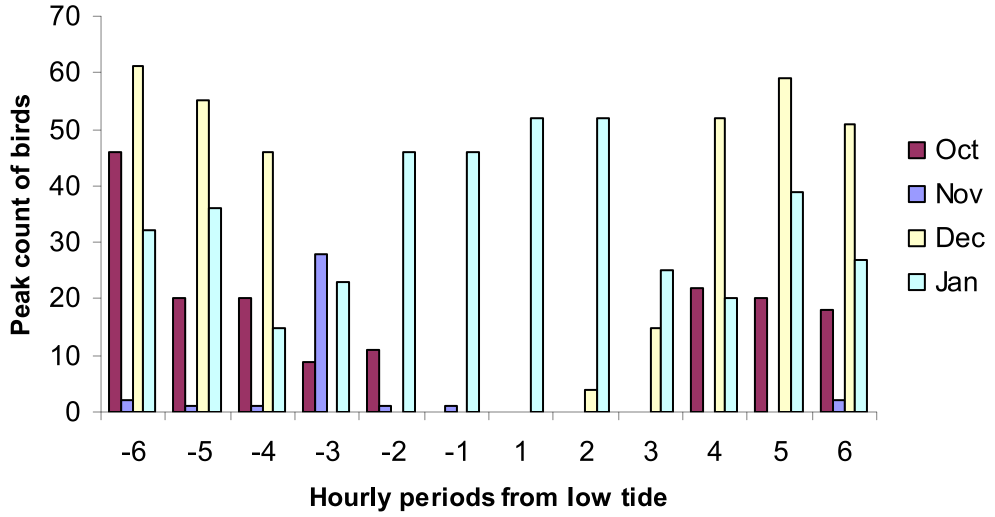
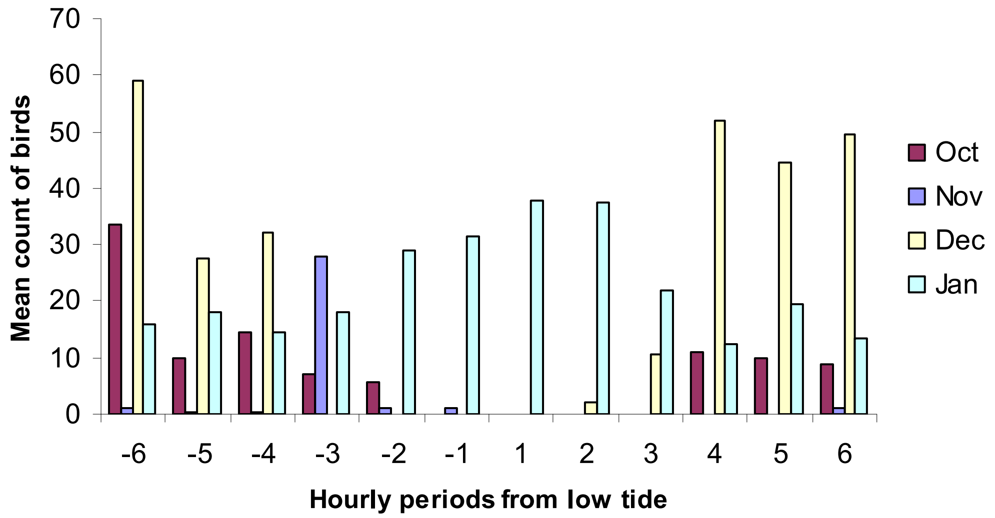


Figure 4.18: Mean numbers of Avocet at hourly intervals through the tidal cycle during October 2009 - January 2010



Ringed Plover

(see figures 4.19, 4.20 and C34-C.36)

4.40 In October Ringed Plover were regularly recorded during the low tide period, with a peak count of 55 individuals. These were mostly recorded roosting.

4.41 During the winter period usage by Ringed Plover was erratic, with up to three birds present on one of the November visits and a peak count of 12 in January, when the species was recorded on three visits. In December Ringed Plover were present on two visits, with a peak count of 40 birds. The species was only found during the high tide period, and individuals were either feeding or roosting in approximately equal numbers.

4.42 For both seasons, through the tide usage of the study area was confined to in and around the bay on Elmley, opposite the proposed development site.

Figure 4.19: Peak numbers of Ringed Plover at hourly intervals through the tidal cycle during October 2009 - January 2010

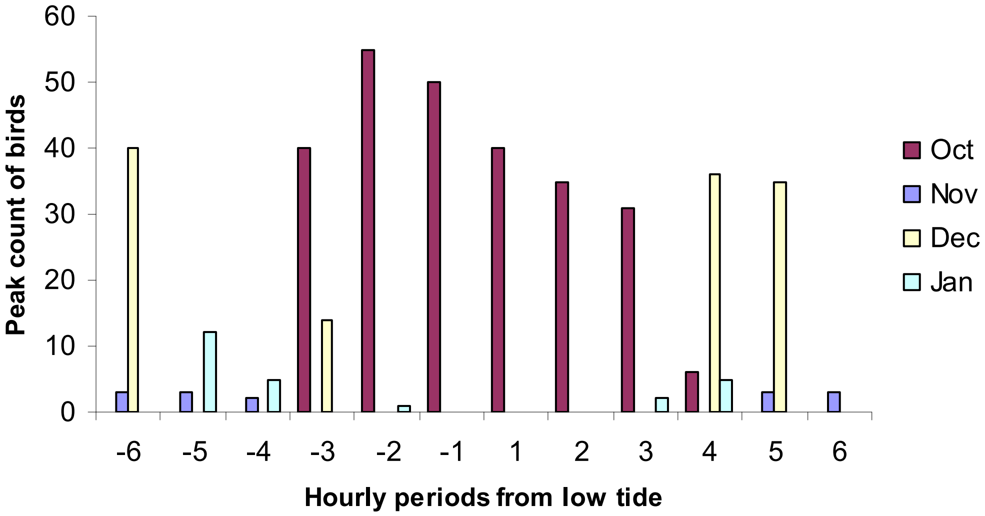
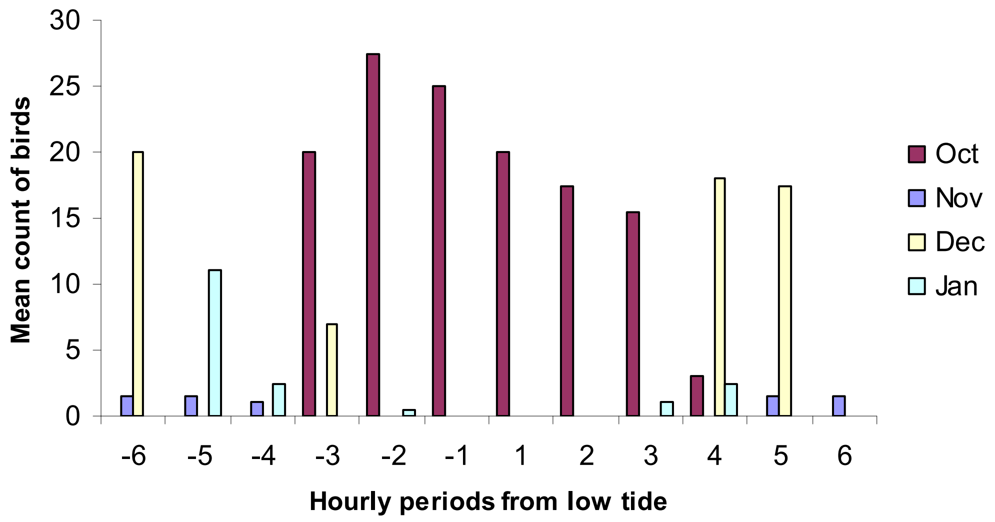


Figure 4.20: Mean numbers of Ringed Plover at hourly intervals through the tidal cycle during October 2009 - January 2010



Golden Plover

4.43 Golden Plover were only recorded on two occassions during the survey period. 192 were present, mostly roosting, on the ebb tide of 2nd October and 16 were present feeding during the ebb tide of 2nd December.

4.44 Both groups were on the Elmley side of The Swale, opposite the proposed development site, and are likely to have been disturbed from the Elmley nature reserve.

Grey Plover

(see figures 4.21, 4.22 and C.37-C.40)

4.45 In autumn, Grey Plover were recorded on three of the four visits, with a peak count of 98 individuals, which occurred during the ebbing tide. Most birds during the month occurred over the high tide period, with the majority recorded feeding except for a roost of 76 birds.

4.46 Over the winter birds were recorded on every visit, with larger numbers of birds present in December and January than in November, with peak counts of 62 and 47 respectively in the former and 15 in the latter. However, there is little difference in the numbers of birds present during low tide over this period. The main difference is the presence of up to 59 individuals feeding during the ebb and flow tides and subsequently joining the roost around the peninsular at Elmley.

4.47 Grey Plover use of the study area was found during the low water period to be widely distributed. Within the area however concentrations were noted upon the intertidal flats along the east side of The Lilies and the eastern lower level flats of Elmley Reach, opposite the proposed site of development. At high tide, birds were to be found predominately within the bay on Elmley, opposite the proposed site of development, and around the saltmarsh islands, The Lilies.

Figure 4.21: Peak numbers of Grey Plover at hourly intervals through the tidal cycle during October 2009 - January 2010

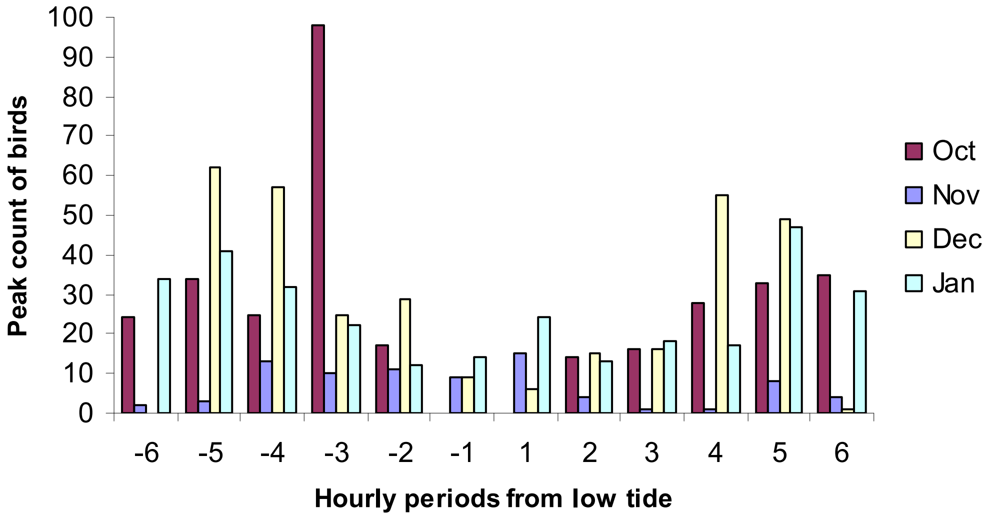
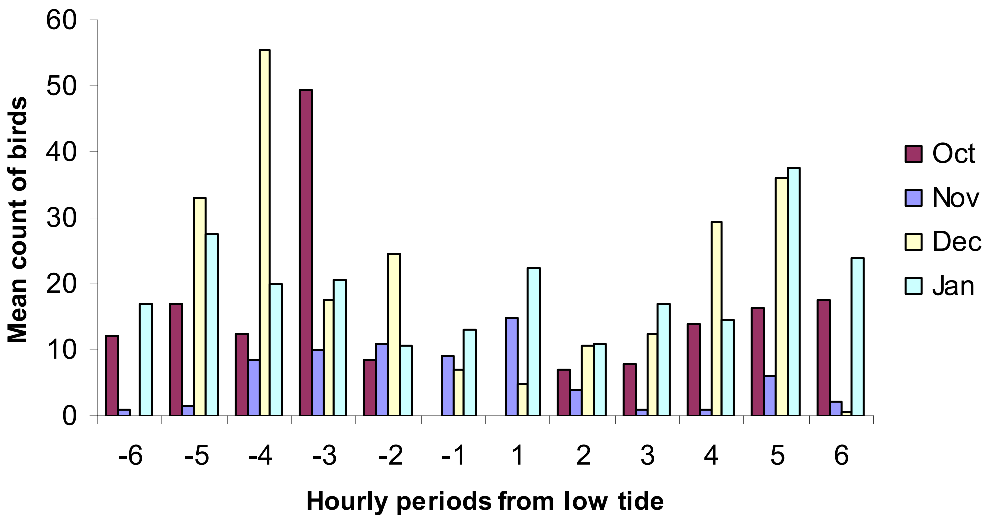


Figure 4.22: Mean numbers of Grey Plover at hourly intervals through the tidal cycle during October 2009 - January 2010



Lapwing

(see figures 4.23, 4.24 and C.41-C.44)

4.48 Lapwing were recorded on all visits in October and most visits through the winter period. The October peak was 383, and peak counts through the winter were between 432 and 553. All of the peak counts are from the low tide period and largely consist of roosting birds. Few birds were recorded over the high tide period, and very few birds were recorded feeding except for in January, when up to 295 were feeding on the flow tide.

4.49 Lapwing largely utilised the intertidal mudflats on the Elmley side of The Swale, especially the rocky areas exposed at low tide. Smaller numbers were occasionally found in similar habitat to the west of Grovehurst Jetty.

Figure 4.23: Peak numbers of Lapwing at hourly intervals through the tidal cycle during October 2009 - January 2010

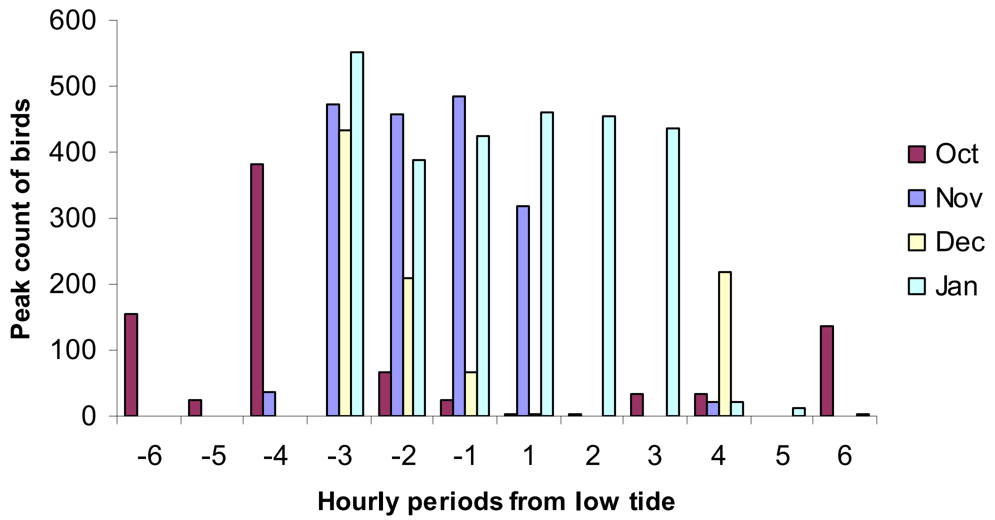
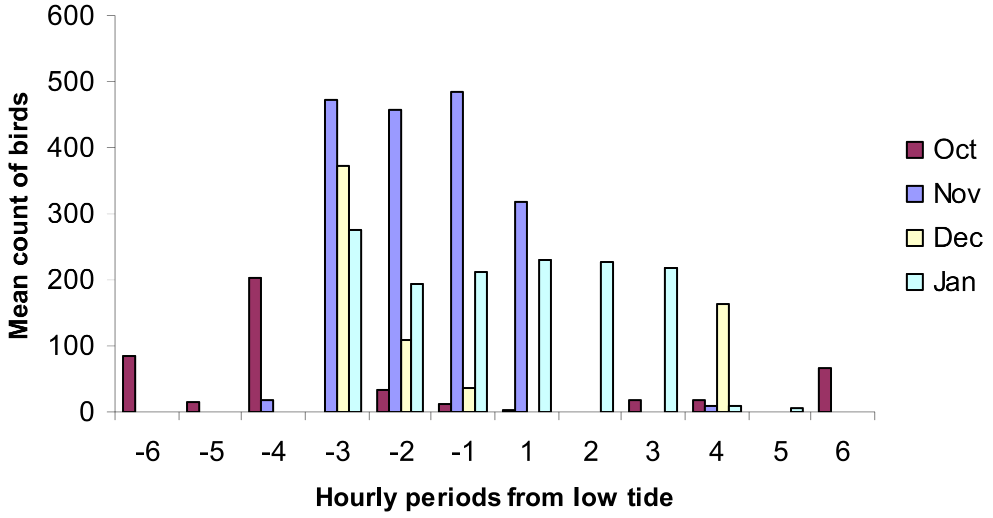


Figure 4.24: Mean numbers of Lapwing at hourly intervals through the tidal cycle during October 2009 - January 2010



Knot

(see figures 4.25, 4.26 and C.45-C.47)

4.50 Knot were recorded on only one visit in October, when 67 birds were observed feeding on the ebb tide. During the winter Knot used the site erratically. In January, Knot used the peninsula at Elmley as a high tide roost, with a peak count of 940 on the 14th, but the peak on the 29th January was only 40 birds.

4.51 Knot also occassionally used the intertidal mudflats to the east of The Lilies to feed during the ebb and flood tide in both December and January, with a peak count of 623 on the flood tide in January.

4.52 Few Knot were present at low tide. A maximum of only 7 individuals were recorded feeding during the low tide period, on one day in January.

Figure 4.25: Peak numbers of Knot at hourly intervals through the tidal cycle during October 2009 - January 2010

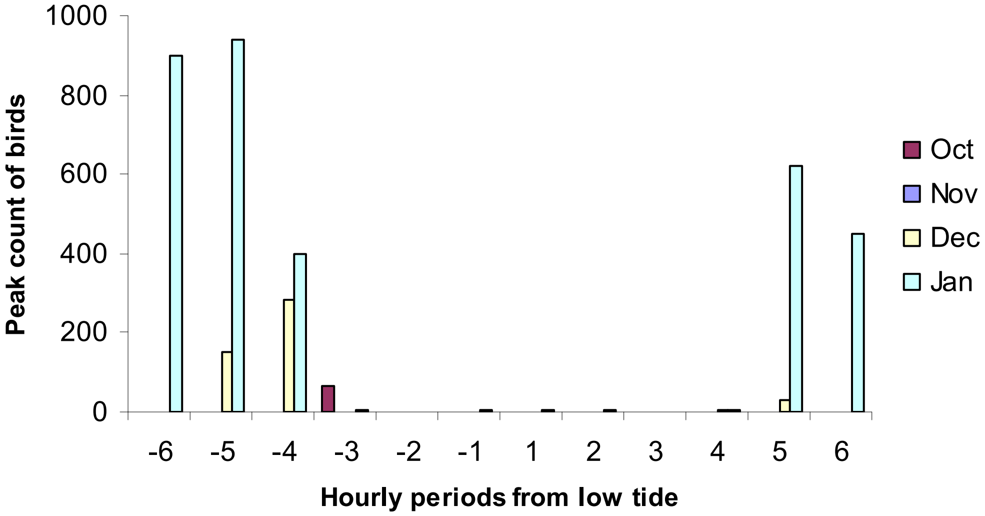
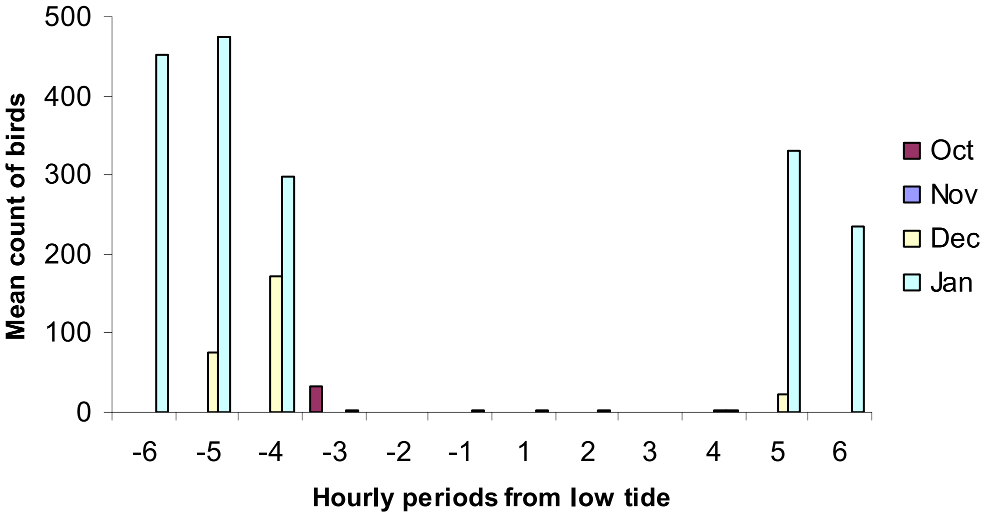


Figure 4.26: Mean numbers of Knot at hourly intervals through the tidal cycle during October 2009 - January 2010



Dunlin

(see figures 4.27, 4.28 and C.48-C.51)

4.53 The majority of records of Dunlin were from the low water period, with the exception being the count on the 23rd February which was made just before the tidal mudflats were inundated with water. The birds were feeding on the last remaining sections of intertidal mud within the site boundary before they were forced off to their roost sites elsewhere.

4.54 Dunlin usage of the intertidal mudflats over the low water period was predominantly from the area around the peninsula at Elmley. Over high water the vast majority of usage was of the areas around the saltmarsh islands, The Lilies and around the peninsula at Elmley.

Figure 4.27: Peak numbers of Dunlin at hourly intervals through the tidal cycle during October 2009 - January 2010

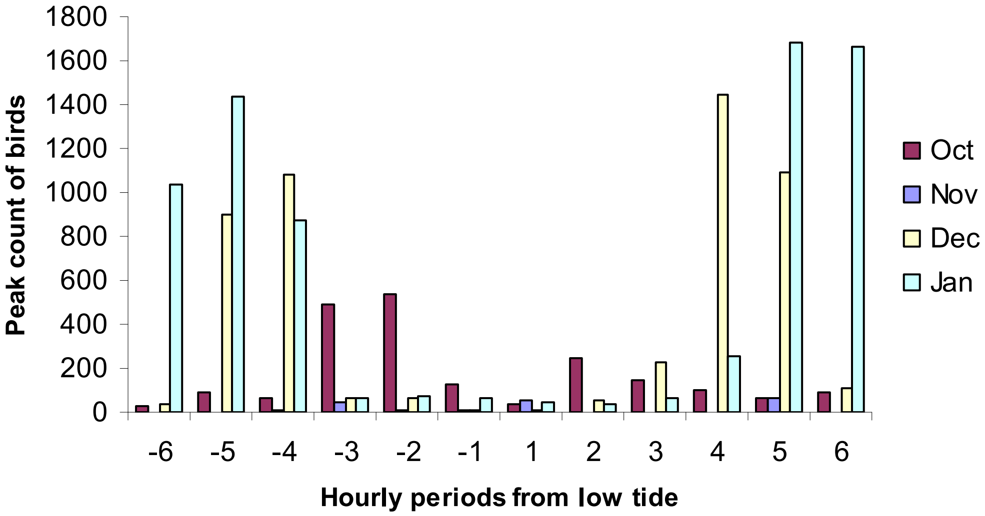
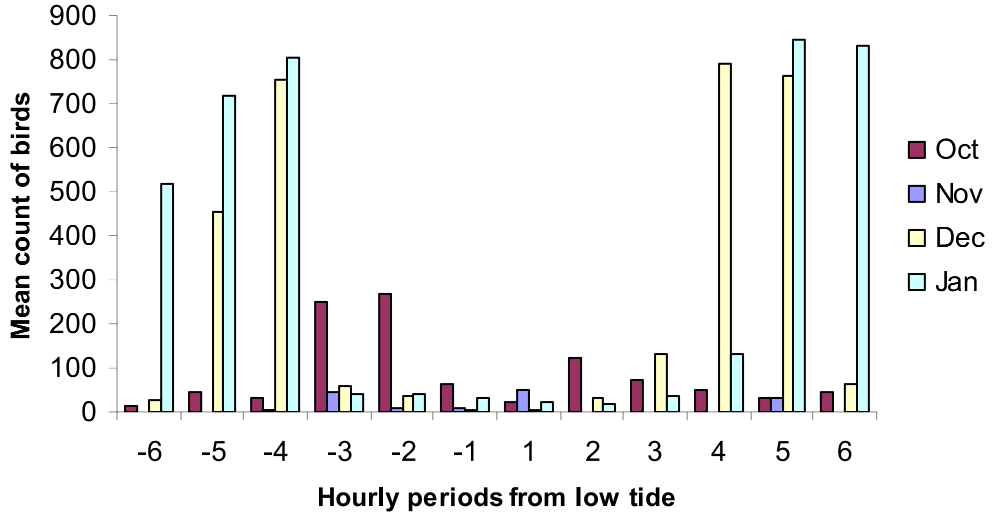


Figure 4.28: Mean numbers of Dunlin at hourly intervals through the tidal cycle during October 2009 - January 2010



Snipe

4.55 Snipe were recorded throughout the survey period primarily over the low tide period with the peak count of 25 on the 29th January 2010 over the flooding tide.

4.56 The majority of records of Snipe came from the saltmarsh around the outfall to the north of the proposed development site and the saltmarsh islands, The Lilies.

Black-tailed Godwit

(see figures 4.29, 4.30 and C.52-C.55)

4.57 Black-tailed Godwit were recorded throughout the survey period. The peak count of 1,246 was made over high water on 29th January 2010. The site was used throughout the tidal cycle, although the largest numbers were recorded over the high water period.

4.58 Over the low water period the species was widely spread over the intertidal mudflats throughout the survey period. Roosts of birds were recorded from the peninsula at Elmley and the saltmarsh islands, The Lilies.

Figure 4.29: Peak numbers of Black-tailed Godwit at hourly intervals through the tidal cycle during October 2009 - January 2010

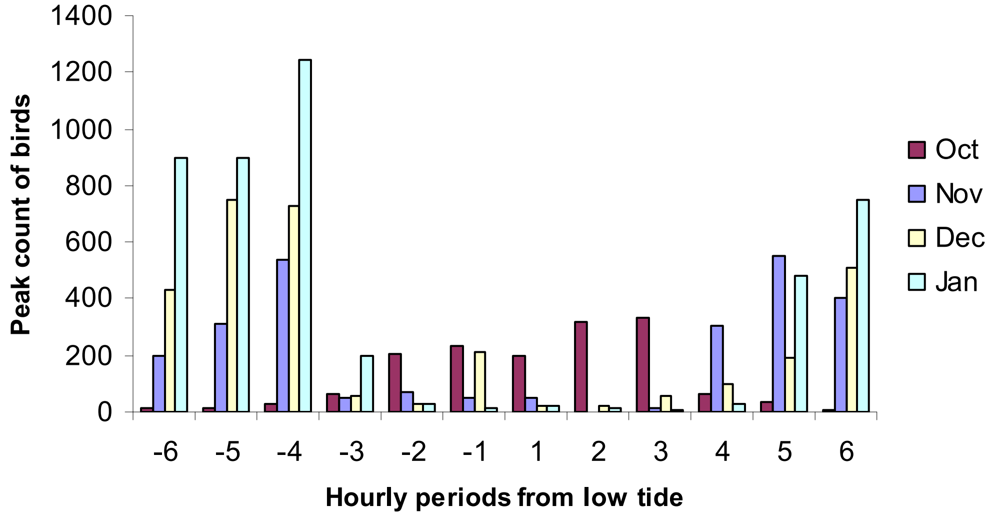
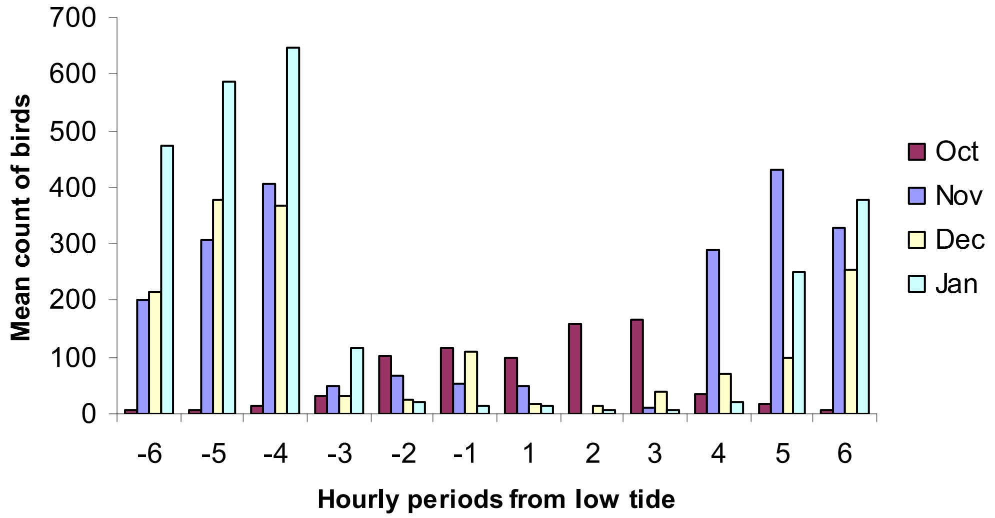


Figure 4.30: Mean numbers of Black-tailed Godwit at hourly intervals through the tidal cycle during October 2009 - January 2010



Whimbrel

4.59 Whimbrel were only recorded on one date; the 2nd October 2009, over the high tide.

Curlew

(see figures 4.31, 4.32 and C.56-C.59)

4.60 Curlew were recorded throughout the survey period and tidal cycle, with birds using the intertidal flats for feeding right up until inundation by water and the saltmarsh islands and peninsula at Elmley for roosting and feeding over the high water.

4.61 Curlew were widely distributed across the intertidal mudflats over low water, with roosting and feeding birds being recorded on the peninsula at Elmley and the saltmarsh islands, The Lilies over high water.

Figure 4.31: Peak numbers of Curlew at hourly intervals through the tidal cycle during October 2009 - January 2010

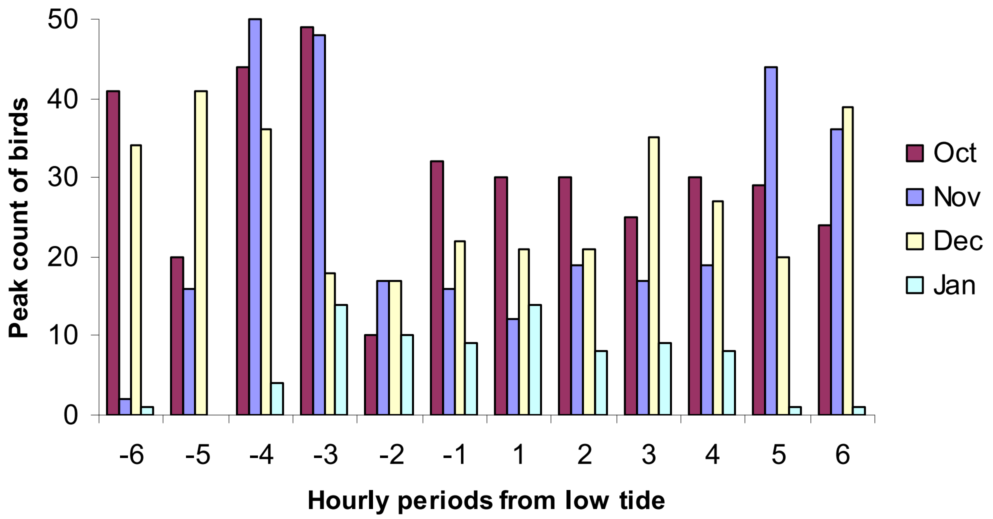
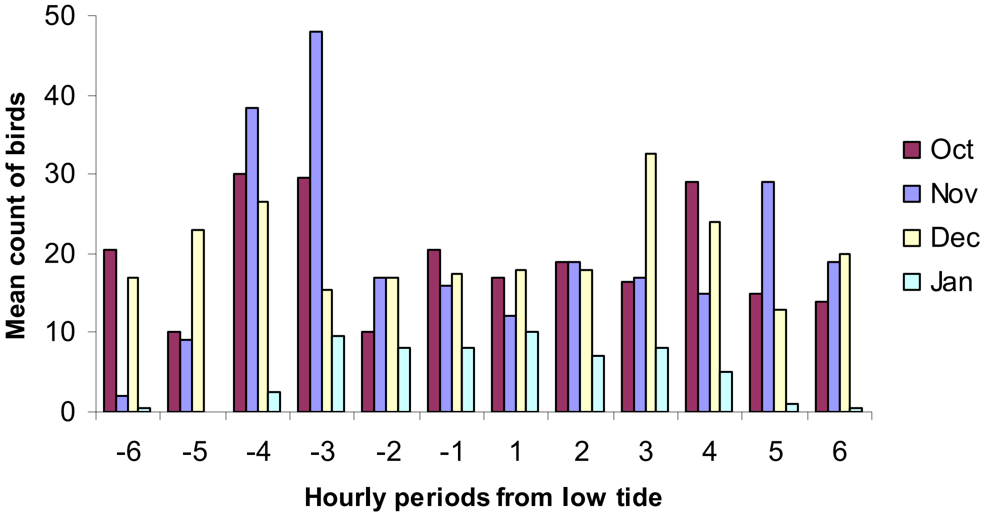


Figure 4.32: Mean numbers of Curlew at hourly intervals through the tidal cycle during October 2009 - January 2010



Spotted Redshank

4.62 Spotted Redshank were recorded on two dates; the 20th October 2009 and 17th November 2009. All records referred to single birds and occurring over both high and low water periods.

Redshank

(see figures 4.33, 4.34 and C.60-C.63)

4.63 Redshank were recorded throughout the survey period and tidal cycle, with birds using the intertidal flats for feeding right up until inundation by water.

4.64 Redshank were widely distributed across the intertidal mudflats over low water, with roosting and birds being recorded on the saltmarsh islands, The Lilies over high water.

Figure 4.33: Peak numbers of Redshank at hourly intervals through the tidal cycle during October 2009 - January 2010

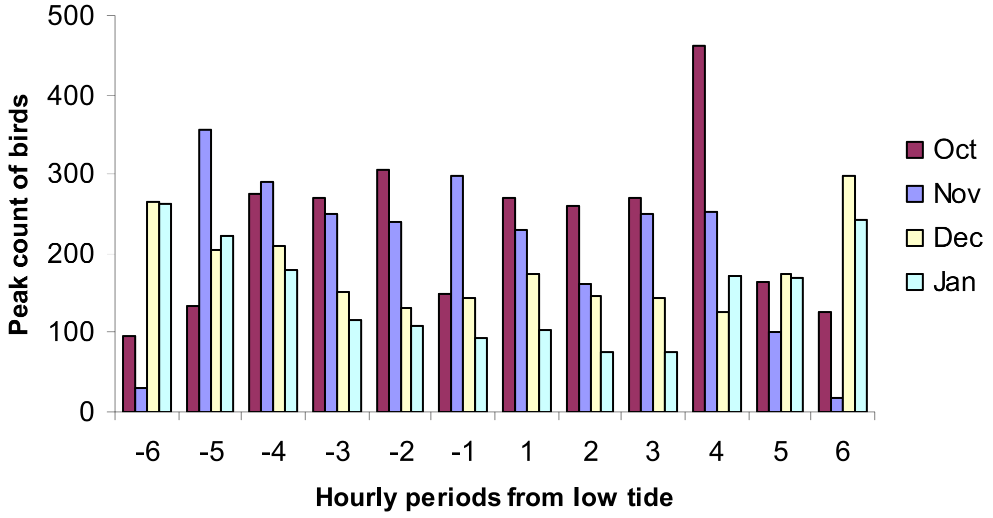
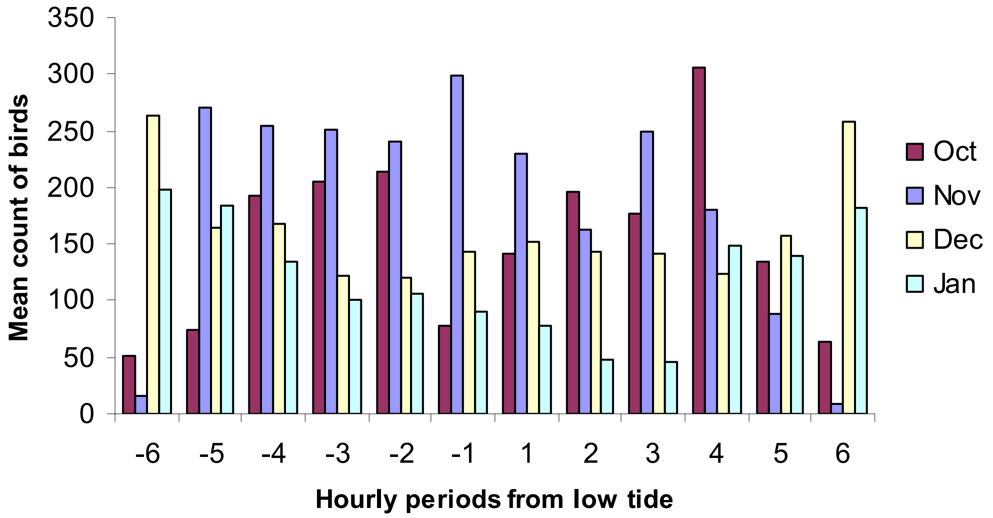


Figure 4.34: Mean numbers of Redshank at hourly intervals through the tidal cycle during October 2009 - January 2010



Greenshank

(see figures 4.35, 4.36 and C.64-C.67)

4.65 Greenshank were recorded on 9 dates, with records occurring in all months. A peak count of 13 was made on the 2nd November. The species showed no pattern in its temporal occurrence on the site with records throughout the tidal cycle.

4.66 Greenshank were solely recorded from Milton Creek area through out the tidal cycle in both October and November-January.

Figure 4.35: Peak numbers of Greenshank at hourly intervals through the tidal cycle during October 2009 - January 2010

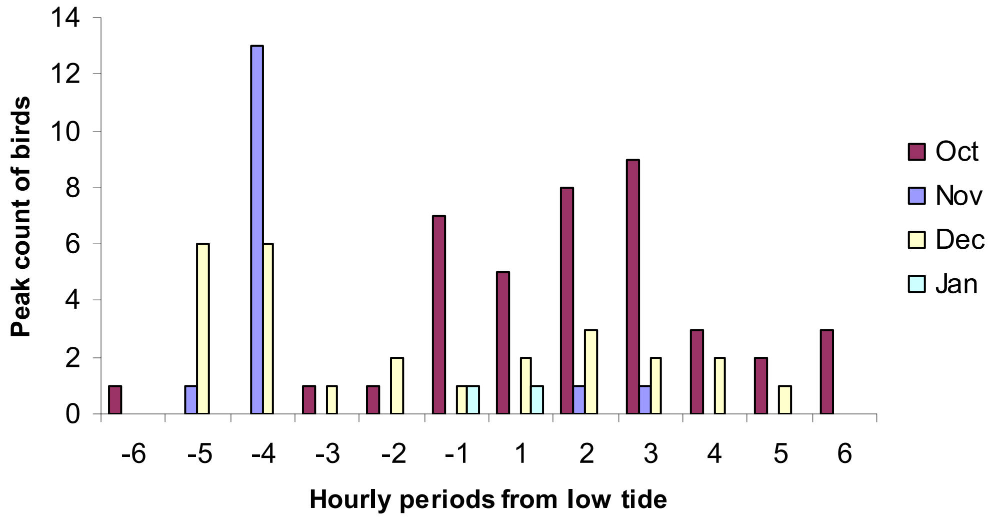
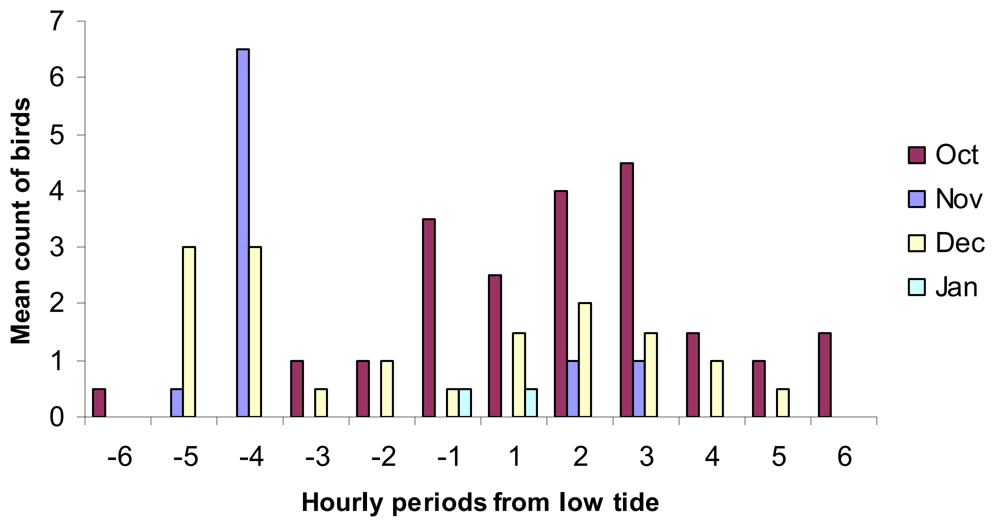


Figure 4.36: Mean numbers of Greenshank at hourly intervals through the tidal cycle during October 2009 - January 2010



Turnstone

(see figures 4.37, 4.38 and C.68-C.71)

4.67 Turnstone were recorded in all months with a peak count of 88 on the 20th October. The species was recorded solely over the high water period in October, with birds in November-January being mainly recorded over the low water period.

4.68 Turnstone were predominantly recorded from around the peninsula at Elmley and saltmarsh islands, The Lilies.

Figure 4.37: Peak numbers of Turnstone at hourly intervals through the tidal cycle during October 2009 - January 2010

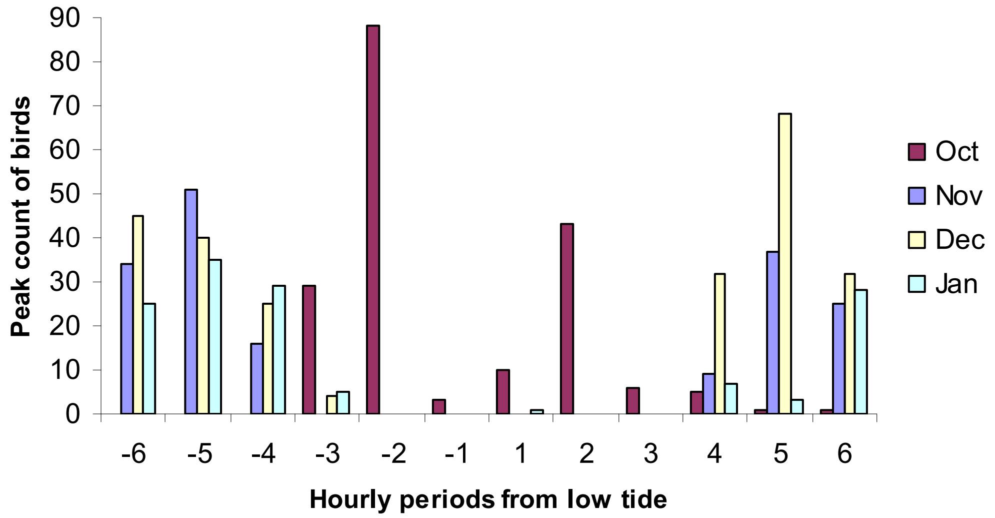
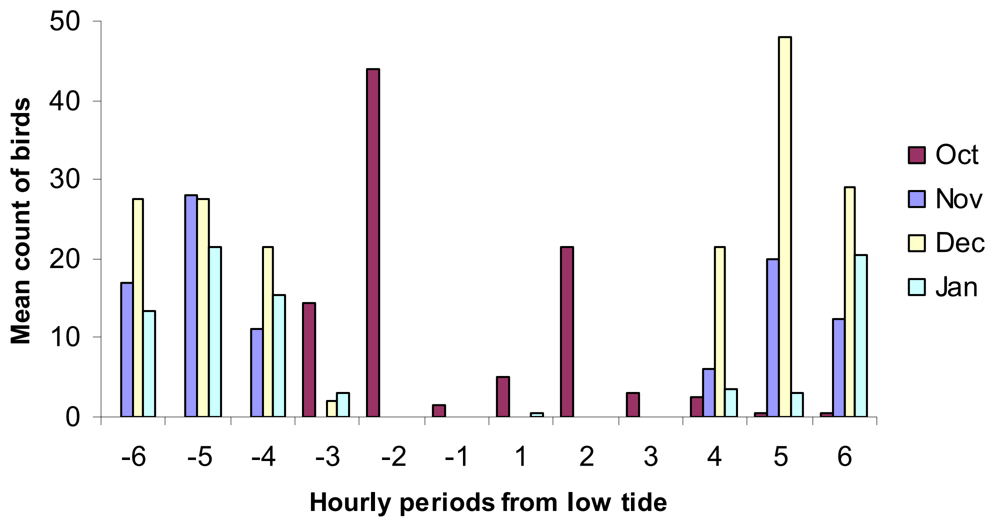


Figure 4.38: Mean numbers of Turnstone at hourly intervals through the tidal cycle during October 2009 - January 2010



5 EVALUATION

5.1 The study area lies within The Swale SPA, where the SPA citation species are within the protection of the EU Birds Directive. It is therefore appropriate to consider the importance to birds of the study area as a whole in the context of The Swale SPA waterbird assemblage.

Late autumn waterbird populations

5.2 Table 5.1 summarises the maximum counts recorded for key species which were either cited as part of The Swale SPA (in italics) or were frequently recorded. Data are also provided for the 1% threshold criteria, and the latest 5-year peak means for the SPA. The 1% criterion is used to assess the importance of wetlands. A wetland is considered internationally important if it regularly supports 1% of a species biogeographic (in this case NW Europe) population. A wetland in Britain is considered of national importance if it regularly supports 1% of the total numbers in Britain (Austin *et al.* 2008).

5.3 The waterbird data presented in The Swale SPA citation originates from Wetland Bird Survey (WeBS) monthly coordinated 'core' counts made during high tide periods, principally from September to March. WeBS is a joint scheme run by the British Trust for Ornithology (BTO), the Wildfowl & Wetlands Trust (WWT), Royal Society for the Protection of Birds (RSPB) and Joint Nature Conservation Committee (JNCC) to monitor non-breeding waterfowl in the UK. The scheme aims to identify population sizes, to determine trends in numbers and distribution, and to identify important sites for waterbird (Austin *et al.* 2008).

5.4 For the majority of waterbirds, 1% thresholds for identifying wetland sites of national importance in Britain are only available for wintering populations. Due to the respective species phenologies, it is appropriate to apply these same thresholds in the assessment of wetlands of national importance using autumn count data for all waterfowl with the exception of waders (Austin *et al.* 2008). In many wader species, substantial autumn passage occurs through Britain which may largely comprise of a different subspecies or biographical population to that of the wintering population. For a small number of wader species e.g. Ringed Plover, 1% thresholds had previously been derived and published for this passage period e.g. Musgrove et al. 2007. However, the most recent guidance from WeBS and the statutory agencies, as published in Austin et al 2008, no longer provides separate 1% passage threshold criteria for any species; no explanation is given. Therefore for all wader species, the following evaluation uses the 1% national thresholds for wintering populations.

5.5 A total of 33 species of waterbirds were recorded using the study site in October 2009. Of these, 10 species were of conservation value due to their presence as species listed on the designation for Swale SPA and Swale SSSI. These species are (with the SPA species in italics): Wigeon, *Teal, Oystercatcher, Ringed Plover, Grey Plover, Dunlin,* Knot, *Curlew*, *Redshank and* Spotted Redshank.

Table 5.1: Comparison of peak waterbird counts in October 2009 as recorded during RPS Intertidal waterbird surveys, with latest SPA autumn population estimates and current 1% thresholds for national and international importance.

Species	Peak count during October 2009 at Kemsley study area		5yr autumn Peak mean for Swale SPA (2002/03-2006/07)	Great Britain 1% Threshold	International 1% Threshold
	Number of birds	% of SPA population			
Little Grebe	5	9.3	54	78	4,000
Little Egret	23	20.4	113	?	1,300
Dark-bellied Brent Goose	*0*	-	*710*	*981*	*2,000*
Shelduck	110	10.1	1,090	782	3,000
Wigeon	0	-	4,851	4,060	15,000
Gadwall	0	-	35	171	600
Teal	139	3.9	3,586	1,920	5,000
Pintail	0	-	208	279	600
Shoveler	0	-	123	148	400
Coot	0	-	(294)	1,730	17,500
Oystercatcher	583	13.6	4,285	3,200	10,200
Avocet	46	10.1	456	50	730
Ringed Plover	55	8.5	645	330	730
Golden Plover	192	14.8	1,296	2,500	9,300
Grey Plover	98	5.3	1,834	530	2,500
Lapwing	0	-	2,462	20,000	20,000
Knot	0	-	312	2,800	4,500
Dunlin	*537*	*10.3*	*5,237*	*5,600*	*13,300*
Snipe	1	3.1	32	?	20,000
Black-tailed Godwit	329	22.6	1,453	150	470
Whimbrel	2	3.6	(55)	+	6,800
Curlew	49	3.4	1,441	*1,500*	*8,500*
Spotted Redshank	1	4	25	+	900
Redshank	*463*	*31.1*	*1,487*	*1,200*	*2,800*
Greenshank	9	19.1	47	50	2,300

Species	Peak count during October 2009 at Kemsley study area		5yr autumn Peak mean for Swale SPA (2002/03-2006/07)	Great Britain 1% Threshold	International 1% Threshold
	Number of birds	% of SPA population			
Turnstone	88	18.3	(480)	500	1,500
Total waterbird assemblage	3,467	10.7		-	-
Total SPA waterbird assemblage			32,548	-	-

Note:

Swale SPA citation species are shown in italic.

Where a count is enclosed by parentheses this indicates that it was considered incomplete i.e. those parts of the site not visited typically holds at least 25% of the species in question.

+ Population too small for meaningful figure to be obtained.

? Population size not accurately known.

Winter waterbird populations

5.6 Table 5.2 summarises the peak autumn counts recorded for key species which were either cited as part of The Swale SPA (in italics) or were frequently recorded. Data are also provided for the 1% threshold criteria, and where available the SPA 5-year peak means listed in the citation.

5.7 A total of 43 species of waterbirds were recorded using the intertidal study site during November 2009 - January 2010. Of these, 13 species were of conservation value due to their presence as species listed on the designation for Swale SPA and Swale SSSI. These species are (with the SPA species in italics): *Dark-bellied Brent Goose,* Wigeon, *Gadwall, Teal,* Shoveler*, Oystercatcher, Ringed Plover, Grey Plover, Dunlin,* Knot, *Curlew, Redshank* and Spotted Redshank.

Table 5.2: Comparison of peak waterbird counts in November 2009 - January 2010 as recorded during RPS Intertidal waterbird surveys, with latest SPA winter population estimates and current 1% thresholds for national and international importance.

Species	Peak count during November 2009 - January 2010 at Kemsley study area		5yr winter peak mean for Swale SPA (2002/03-2006/07)	Great Britain 1% Threshold	International 1% Threshold
	Number of birds	% of SPA population			
Little Grebe	26	38..8	67	78	4,000
Little Egret	11	26.8	41	?	1,300
Dark-bellied Brent Goose	24	1.4	*1,754*	*981*	*2,000*
Shelduck	257	12.2	2,114	782	3,000
Wigeon	766	4.1	18,521	4,060	15,000
Gadwall	4	3.1	129	171	600
Teal	549	11.4	4,812	1,920	5,000
Pintail	218	27.6	790	279	600
Shoveler	5	1.6	315	148	400
Coot	43	7.3	593	1,730	17,500
Oystercatcher	847	17.3	4,910	3,200	10,200
Avocet	61	10.3	595	50	730
Ringed Plover	40	12.2	(328)	330	730
Golden Plover	16	0.2	9,188	2,500	9,300
Grey Plover	*62*	*3.9*	1,576	530	2,500
Lapwing	553	3.6	15,470	20,000	20,000
Knot	940	28.2	3,331	2,800	4,500
Dunlin	*1,678*	*18.2*	*9,202*	*5,600*	*13,300*
Snipe	28	26.2	107	-	20,000
Black-tailed Godwit	*1,246*	*87.4*	1,425	150	470
Whimbrel	0	-	0	+	6,800
Curlew	50	4.2	1,201	*1,500*	*8,500*
Spotted Redshank	1	33.3	3	+	900

Species	**Peak count during November 2009 - January 2010 at Kemsley study area**		**5yr winter peak mean for Swale SPA (2002/03-2006/07)**	**Great Britain 1% Threshold**	**International 1% Threshold**
	Number of birds	**% of SPA population**			
Redshank	*357*	*31.7*	*1,127*	*1,200*	*2,800*
Greenshank	13	433.3	3	50	2,300
Turnstone	68	15.7	434	500	1,500
Total waterbird assemblage	7,962	10.4		**-**	**-**
Total SPA waterbird assemblage			76,323	**-**	**-**

Note:

Swale SPA citation species are shown in italic.

Where a count is enclosed by parentheses this indicates that it was considered incomplete i.e. those parts of the site not visited typically holds at least 25% of the species in question.

The importance of the study area as a discrete wetland for supporting internationally and national important waterbird populations in autumn

5.8 The four most numerous waterbirds (excluding gull species) recorded using the study area in October were in descending order, Oystercatcher, Dunlin, Redshank and Black-tailed Godwit.

5.9 The peak number of Black-tailed Godwit recorded in the study area during October 2009 (919) equates to 6.1% of the national population. This means during October 2009 the study area at Kemsley has supported **Nationally Important numbers of Black-tailed Godwit**.

5.10 Of the remaining waterbird species recorded in October 2009 at the Kemsley study area none represented 1% or more of the international or national population estimates for Great Britain.

The importance of the intertidal study area as a discrete wetland for supporting internationally and national important waterbird populations in winter

5.11 The four most numerous waterbirds (excluding gull species) recorded using the study area during November 2009 – January 2010 were in descending order Dunlin, Black-tailed Godwit, Knot, and Oystercatcher.

5.12 The peak number of Black-tailed Godwit recorded in the study area during November 2009 – January 2010 (1,246) equates to 2.7% of the international population (Wetlands International 2006) and 8.3% of the national population. This means during late winter 2008/09 the study area at Kemsley has supported **Internationally Important numbers of Black-tailed Godwit**.

5.13 Of the remaining waterbird species recorded at Kemsley, the peak count during November 2009 – January 2010 of only one species equated to, or exceeded, the 1% national winter population estimates for Great Britain. The peak count of Avocet at Kemsley during November 2009 – January 2010 (61) equates to 1.7% of the latest available estimate of the national wintering population of 3,500 birds. Furthermore, the peak count exceeded 50 birds, a minimum qualifying threshold for the designation of sites of national importance where 1% of the national population is less than 50 birds (Austin *et al.* 2008). However, the latter estimate of national wintering population is based on data from 1994/95 – 1998/99 (Rehfisch *et al.* 2003). Avocet is a species whose British wintering population has undergone a large increase in recent years (Banks *et al.* 2006). The five year mean peak winter maxima (2003/04-2007/08) recorded by WeBS is 6,110 birds; WeBS does not cover 100% of the population of the species. These data would suggest that the peak count of Avocet at Kemsley during February - March 2009 equates to no more than 1.0% whilst noting that coverage by WeBS of those sites supporting Avocet is extensive. Irrespective of the data used, during November 2009 –

January 2010 the study area at Kemsley has supported **Nationally Important numbers of Avocet**.

5.14 No other waterbird species recorded during November 2009 – January 2010 at the Kemsley study area represented 1% or more of the international or national population estimates for Great Britain for assessing wintering populations.

The importance to birds of the study area in the context of The Swale SPA in late autumn

5.15 The peak count of Redshank recorded in the study area during October 2009 (463) equates to 31.1% of The Swale SPA population, the five-year autumn peak mean as derived from the latest available WeBS data (an estimation in line with recommendations of the Ramsar Convention; Ramsar Convention Bureau 1988).

5.16 The peak number of Black-tailed Godwit recorded in the study area during October 2009 (329) equates to 22.6% of The Swale SPA population, the five-year spring peak mean as derived from the latest available WeBS data (an estimation in line with recommendations of the Ramsar Convention; Ramsar Convention Bureau 1988).

5.17 The peak number of 16 other waterbird species recorded in the study area during April-May 2009 represent between 20.4% and 3.4% of The Swale SPA population, as estimated by the latest WeBS five-year winter peak mean (2002/03-2006/07). It should however be noted that for several species, The Swale SPA autumn population comprises of small numbers of early arriving individuals which are part of the site's larger wintering population. So for example, the 192 Golden Plover recorded by the study at Kemsley represents 14.8% of The Swale SPA population in autumn but no more than 2.1% of the site's wintering population of which they are likely to be a component of. For all other species the proportion occurring within the study area is less than 1% of The Swale SPA population in spring.

5.18 Considering the total waterbird assemblage, the study area at Kemsley supported a peak number of birds of 3,467 in October 2009. This represents 10.7% of the 32,548 individual waterfowl for The Swale SPA as estimated by the latest WeBS five-year autumn peak mean (2003-2007).

The importance to birds of the intertidal study area in the context of The Swale SPA in winter

5.19 The peak number of Greenshank recorded in the study area during November 2009 – January 2010 (13) equates to 433.3% of The Swale SPA population, the five-year winter peak mean as derived from the latest available WeBS data (an estimation in line with recommendations of the Ramsar Convention; Ramsar Convention Bureau 1988). However looking at the underlying WeBS data all the peak counts during the winter have occurred in November. Furthermore the peak count of 13 recorded during the intertidal surveys was made on the 2nd November, when this is considered against the Autumn 5 year mean peak then the peak RPS count only represents 27.7% of The Swale SPA population. The peak autumn count within this five year period of 56 was made in October. This is therefore probably a more relevant criteria against which to assess this particular count.

5.20 The peak number of Black-tailed Godwit recorded in the study area during November 2009 – January 2010 (1,246) equates to 87.4% of The Swale SPA population, the five-year winter peak mean as derived from the latest available WeBS data (an estimation in line with recommendations of the Ramsar Convention; Ramsar Convention Bureau 1988). However, the latter site population estimate is based on data from 2002/03 – 2006/7. In this respect it is important to note that the British non-breeding population of Black-tailed Godwits are of the Icelandic breeding race *islandica.* The population of this subspecies has in recent years substantially increased. This has led to a recent increase in the 1% international criterion for the species from 350 to 470 – a 34% increase – following a three yearly review (Wetlands International 2006). Published annual indices for the British non-breeding Black-tailed Godwit population for the period up until winter 2006/07 shows a continuing trend of increase. Closer scrutiny of the underlying WeBS data from which the SPA population estimate was derived shows a peak count of 1,782 birds in November 2004.

5.21 The peak number of 22 other waterbird species recorded in the study area during November 2009 – January 2010 represent between 38.8% and 1.4% of The Swale SPA population, as estimated by the latest WeBS five-year winter peak mean (2002/03-2006/07). For all other species the proportion occurring within the study area is less than 1% of The Swale SPA population.

5.22 Considering the total waterbird assemblage, the study area at Kemsley supported a peak number of birds of 7,962 between November 2009 and January 2010. This represents 10.4% of the 76,323 individual waterfowl for The Swale SPA as estimated by the latest WeBS five-year winter peak mean (2002/03-2006/07).

Comparison of WeBS data with RPS Intertidal Waterbird Surveys

5.23 The further RPS waterbird surveys of the intertidal study site covered the late autumn- early winter period. Within the most recent five years, monthly count coverage by WeBS exists at high tide for the period September 2002 – March 2007 and at low water during winter 2001/02 (November-February). To provide some assessment of how representative the RPS waterbird survey data is of the winter period as a whole, tables 5.3, 5.4 and 5.5 provide a summary of the available WeBS data. It should be noted however that the corresponding WeBS count sectors extend well beyond the area of coverage of the RPS intertidal study, the respective count areas and sectors being shown in Figure B.4. Furthermore, the Elmley Marshes WeBS high water count sector includes substantial areas of grazing marshes and freshwater which influences the species composition and numbers e.g. Coot & wildfowl. Numbers of birds counted by WeBS can therefore be expected to be higher than those recorded by the RPS intertidal survey, in some cases markedly so e.g. Wigeon that often favour grazing marshes. The WeBS data are most appropriately considered in the context of how representative the RPS intertidal surveys findings are of when wintering waterbird usage peaks in the study area.

5.24 At low tide in late winter, the RPS waterbird survey counts for all but three species (Teal, Oystercatcher and Redshank) listed on the designation for Swale SPA and Swale SSSI, represented no more than 86% of the peak numbers recorded by the WeBS low tide counts of winter 2001/02. For Teal Oystercatcher and Redshank, the RPS waterbird surveys peak late winter count was up to 229%, 400% and 119% respectively of the numbers recorded by the WeBS low tide counts of winter 2001/02 within the corresponding count sectors. It should be noted the individual mudflat counts for the WeBS low tide counts can not necessarily be summated for a total count and particularly in respect to the peak counts. Although WeBS low tide count methodology state simultaneous counts of all sections within a site are preferable, they are not compulsory (Musgrove et al. 2003).

5.25 Table 5.4 presents the raw monthly totals for WeBS Low Tide Count data for the winter 2001/2002 for Swale Estuary. For the winter season of the survey, numbers of nine of the 13 species listed on the designation for Swale SPA and Swale SSSI peaked in early/mid winter. A similar proportion of the key species are also shown in Table 5.5 to peak numerically when considering wintering populations using at high tide the two WeBS Core Count sectors within which is the RPS intertidal study area. It is therefore likely that the RPS intertidal waterbird surveys have now provided for the majority of species considered, an assessment of the site's importance at the time of peak winter usage.

Table 5.3: Peak low water counts of key waterbirds species recorded by intertidal surveys of the study area by WeBS (winter 2001/02) and RPS (November 2009-January 2010).

Species	Peak low water count during November 2009 - January 2010 at Kemsley study area	WeBS peak low water counts Nov-Feb 2001/02			
		DS003	DS004	DS005	DS007
Little Grebe	19	5	0	50	10
Little Egret	5	1	0	3	0
Dark-bellied Brent Goose	0	0	0	1	0
Shelduck	93	51	4	300	62
Wigeon	128	168	0	40	105
Gadwall	2	0	0	6	0
Teal	549	18	82	240	2
Pintail	74	2	0	68	80
Shoveler	2	0	0	40	64
Coot	43	7	0	144	0
Oystercatcher	240	4	4	60	26
Avocet	52	3	0	16	0
Ringed Plover	14	1	0	58	7
Grey Plover	29	35	11	116	113
Lapwing	553	32	0	600	50
Knot	7	0	0	35	3
Dunlin	230	143	11	450	765
Snipe	18	0	0	49	2
Black-tailed Godwit	209	12	5	74	582
Curlew	48	10	9	22	56
Spotted Redshank	0	0	7	1	0
Redshank	298	46	78	250	13

Species	Peak low water count during November 2009 - January 2010 at Kemsley study area	WeBS peak low water counts Nov-Feb 2001/02			
		DS003	DS004	DS005	DS007
Greenshank	3	0	0	0	0
Turnstone	5	4	0	1	2

Note:
The data are taken from the period three hours either side of low tide.
The individual WeBS sector counts for a species can not be summated for a total as the individual peak counts may be in different months. The raw WeBS data were not made available to allow such a summation.

Table 5.4: WeBS Low Tide Count data for the winter 2001/2002 for Swale Estuary: Raw monthly totals for species counted for the whole site

Species	Nov	Dec	Jan	Feb	Maximum count	Month of maximum count
Little Grebe	22	26	64	33	64	Jan
Great Crested Grebe	26	17	4	311	311	Feb
Black-necked Grebe	1	.	.	.	1	Nov
Cormorant	21	46	2	51	51	Feb
Little Egret	14	19	3	5	19	Dec
Grey Heron	14	6	2	4	14	Nov
Mute Swan	3	3	20	2	20	Jan
Canada Goose	1	.	.	.	1	Nov
Barnacle Goose	.	.	.	9	9	Feb
Dark-bellied Brent Goose	.	472	106	1690	1690	Feb
Light-bellied Brent Goose	.	.	.	12	12	Feb
Shelduck	776	1538	977	2039	2039	Feb
Wigeon	407	580	603	1187	1187	Feb
Gadwall	.	.	.	6	6	Feb
Teal	261	533	692	586	692	Jan
Mallard	264	93	102	150	264	Nov
Pintail	4	68	503	94	503	Jan
Shoveler	31	55	166	5	166	Jan
Pochard	.	133	.	184	184	Feb
Tufted Duck	.	6	.	8	8	Feb
Eider	1	2	.	1	2	Dec
Common Scoter	.	.	.	2	2	Feb
Goldeneye	1	14	3	14	14	Dec,Feb
Red-breasted Merganser	4	21	2	12	21	Dec
Water Rail	.	.	2	.	2	Jan
Moorhen	1	3	2	2	3	Dec
Coot	30	58	197	60	197	Jan
Oystercatcher	3684	6085	350	5106	6085	Dec
Avocet	117	118	16	21	118	Dec
Ringed Plover	206	156	17	40	206	Nov

Species	Nov	Dec	Jan	Feb	Maximum count	Month of maximum count
Golden Plover	490	176	109	2335	2335	Feb
Grey Plover	880	1567	228	1225	1567	Dec
Lapwing	376	1280	109	1941	1941	Feb
Knot	465	474	1110	1007	1110	Jan
Sanderling	47	8	.	.	47	Nov
Dunlin	6932	9189	3978	6127	9189	Dec
Snipe	82	31	3	7	82	Nov
Black-tailed Godwit	426	323	275	1580	1580	Feb
Bar-tailed Godwit	337	247	95	383	383	Feb
Curlew	589	830	247	1174	1174	Feb
Spotted Redshank	.	7	1	.	7	Dec
Redshank	1262	1777	529	1570	1777	Dec
Common Sandpiper	1	.	.	.	1	Nov
Turnstone	387	389	26	178	389	Dec
Re-established Greylag	.	.	1	16	16	Feb

Note:
Swale SPA citation species are shown in italic.
Gulls excluded

Table 5.5: Five-year mean monthly WeBS Core Counts of key waterbirds species recorded for the sectors Elmley Marshes and Murston-Conyer at high tide

	Sector	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Little Grebe	Murston	4	18	30	**46**	28	22	10
	Elmley	11	20	**6**	5	5	0	4
Great Crested Grebe	Murston	12	11	**12**	9	3	5	7
	Elmley	21	27	13	13	**14**	3	9
Little Egret	Murston	6	24	**11**	3	3	2	2
	Elmley	37	30	**12**	7	4	3	1
Cormorant	Murston	6	8	7	**22**	11	10	13
	Elmley	19	62	**41**	36	25	5	17
White-fronted Goose	Murston	0	0	0	0	0	0	0
	Elmley	0	0	2	13	**121**	0	0
Dark-bellied Brent Goose	Murston	0	0	1	0	75	**90**	0
	Elmley	0	11	13	5	33	14	**43**
Mute Swan	Murston	2	5	3	0	2	3	**5**
	Elmley	28	41	31	**89**	48	3	7
Shelduck	Murston	18	188	106	269	227	**272**	79
	Elmley	95	534	411	691	**994**	565	545
Wigeon	Murston	65	133	**502**	309	166	439	31
	Elmley	217	3,805	6,878	7,527	**13,038**	6,211	2,803
Gadwall	Murston	0	1	6	6	**16**	6	4
	Elmley	3	8	4	6	**25**	9	14
Teal	Murston	15	22	41	96	71	**134**	59
	Elmley	1,717	2,181	**1,669**	1,659	2,511	307	321
Mallard	Murston	28	25	13	22	**30**	23	14
	Elmley	368	423	407	650	**725**	184	120
Pintail	Murston	0	0	1	4	12	**48**	10
	Elmley	59	193	250	451	**706**	175	166
Shoveler	Murston	0	18	14	**14**	6	10	7
	Elmley	50	76	100	134	**158**	71	107
Pochard	Murston	4	3	27	57	**164**	70	17
	Elmley	0	0	7	0	2	7	**36**
Tufted Duck	Murston	0	3	9	17	**32**	18	11
	Elmley	2	5	3	5	8	12	**37**
Red-breasted Merganser	Murston	0	0	4	**12**	2	8	4
	Elmley	0	0	2	0	**3**	2	2
Coot	Murston	20	24	69	107	108	**142**	29
	Elmley	22	14	9	74	86	69	**131**
Oystercatcher	Murston	60	86	77	57	**84**	63	49
	Elmley	588	689	573	616	**638**	376	487
Avocet	Murston	4	9	15	23	**31**	12	19
	Elmley	43	285	91	67	135	142	**432**
Ringed Plover	Murston	0	5	0	0	0	0	**3**
	Elmley	210	146	91	**101**	76	47	59
Golden Plover	Murston	0	89	**207**	60	190	146	120
	Elmley	45	541	448	709	**2,566**	107	433
Grey Plover	Murston	19	51	66	45	**72**	46	33
	Elmley	702	621	555	497	**614**	194	479
Lapwing	Murston	210	283	**752**	553	620	364	43
	Elmley	1,017	950	1,985	2,745	**6,287**	921	463
Knot	Murston	0	0	**95**	79	16	16	28

	Sector	Sep	Oct	Nov	Dec	Jan	Feb	Mar
	Elmley	27	52	162	443	**1,002**	133	395
Dunlin	Murston	200	268	870	**1,850**	1,125	1,235	269
	Elmley	41	2,354	1,153	2,203	**2,778**	1,703	1,422
Ruff	Murston	0	0	0	0	0	0	0
	Elmley	9	1	0	0	1	3	**4**
Snipe	Murston	0	1	2	**4**	2	1	1
	Elmley	5	2	3	11	13	3	**17**
Black-tailed Godwit	Murston	110	185	135	185	**303**	218	291
	Elmley	148	138	387	265	343	120	**526**
Bar-tailed Godwit	Murston	0	1	0	2	**2**	0	0
	Elmley	32	79	18	72	73	**179**	5
Whimbrel	Murston	2	1	0	0	0	0	0
	Elmley	3	0	0	0	0	0	0
Curlew	Murston	23	24	28	26	**67**	18	22
	Elmley	315	312	383	176	345	284	**413**
Spotted Redshank	Murston	0	0	0	0	0	0	0
	Elmley	24	7	**2**	1	0	0	0
Redshank	Murston	190	210	140	**154**	126	116	76
	Elmley	294	408	219	**329**	167	93	187
Greenshank	Murston	26	32	**2**	1	1	1	1
	Elmley	4	2	0	0	0	0	0
Turnstone	Murston	0	14	**20**	19	12	18	3
	Elmley	100	85	66	**66**	34	17	34

Note:

Swale SPA citation species are shown in italic.

The figures in bold are peak winter counts (November - March).

6 CONCLUSIONS

6.1 The data presented in this study provides a robust record of the abundance, behaviour and spatial distribution of waterbirds present during the months of October 2009 to January 2010. The findings identify the intertidal area adjacent to Kemsley to be used by waterbird populations of significant conservation value.

6.2 A total of 44 species of waterbird (excluding gulls and terns) were recorded using the survey area within the vicinity of Kemsley in October 2009 – January 2010, overall site usage peaking in January. Of these, 9 species were of conservation value due to their presence as species listed on the designation for The Swale Estuary SPA. These species are: Dark-bellied Brent Goose, Gadwall, Teal, Oystercatcher, Ringed Plover, Grey Plover, Knot, Dunlin and Redshank.

6.3 The species present on the intertidal mudflats were primarily using the area for feeding. This is recognised as being an important activity in maintaining the birds in viable condition for migration and breeding. The species present on the areas of saltmarsh and the land adjoining Elmley were predominantly roosting.

6.4 The diurnal counts of Black-tailed Godwit during winter 2009/10 (November – January) suggest that the study site has been of international importance for the species. The site has also been of national importance for Black-tailed Godwit during the late autumn of 2009 (October). Diurnal counts of Avocet during winter 2009/10 (November – January) have shown that the site has been of national importance for the species. Significant proportions (>5%) of The Swale SPA populations for six of the cited waterbirds species were recorded (Teal, Oystercatcher, Ringed Plover, Grey Plover, Dunlin and Redshank).

6.5 In October 2009 and November 2009-January 2010, the total waterbird assemblage (3,467 and 7,962 birds respectively) was greater than 10% of the citation figure (for winter) and the latest WeBS five year autumn peak mean (2003-2007). Consequently representing a significant proportion (10.7% and 12.1% respectively) of the SPA waterbird community in both periods.

7 SUPPLEMENTARY EVIDENCE FOR ENVIRONMENTAL STATEMENT

Waterbird populations

7.1 The initial RPS intertidal waterbird surveys undertaken in February-March 2009 recorded a total of 33 species of waterbird during the late winter. Surveys of the early and mid winter periods recorded a total of 43 waterbird species. It should be noted the latter surveys covered an additional month to the former. In both periods the species of conservation value due to their listing on the designation for Swale SPA and Swale SSSI are considered, then the species are similar. The only additional species recorded in November – January which were not recorded in February - March are Dark-bellied Brent Goose, Gadwall and Spotted Redshank. These four species were recorded in only low numbers.

7.2 The total number of waterbird species recorded was slightly lower during October 2009 and April-May 2009 with 33 and 27 species respectively. The species of conservation value recorded includes the same species as recorded during the winter period.

7.3 These results support and confirm that the assessment of the waterbird populations undertaken in the Environmental Statement is accurate.

The importance of the intertidal study area as a discrete wetland for supporting internationally and national important waterbird populations

7.4 The initial RPS intertidal waterbird surveys undertaken in February-March 2009 showed that the study site had supported internationally important numbers of Black-tailed Godwit during the late winter period. The surveys undertaken during November 2009-January 2010 confirm that in early and mid winter the site has also supported internationally important numbers of Black-tailed Godwit.

7.5 Avocet numbers recorded during the surveys undertaken in February-March 2009 showed that the study site has been of national importance to the species in late winter. The surveys in November 2009-January 2010 confirm that the in early and mid winter the site has also been of national importance to Avocet.

7.6 These results support and confirm that the assessment given to the importance of the study area as a discrete wetland and the assessment of the importance of populations occurring within were accurately described in the Environmental Statement.

The importance to birds of the study area in the context of The Swale SPA

7.7 The initial RPS surveys undertaken in late winter (February-March 2009) showed that the study site has supported 105% of The Swale SPA Black-tailed Godwit population (based on the latest five-year winter peak mean from WeBS data). The surveys during early and mid winter (November 2009-January 2010) also show that the study site has been used by 87.4 % of The Swale SPA population. Although this figure is slightly lower it still represents a significant proportion of The Swale SPA population.

7.8 The peak early – mid winter count of Greenshank represented 433.3% of The Swale SPA population (as derived from the latest available WeBS data). However when this count is considered against perhaps the more relevant autumn 5 year peak mean then the peak count only equates to 27.7% of the autumn population for The Swale SPA.

7.9 The initial RPS surveys undertaken in the late winter (February-March 2009) recorded the study area as supporting 5.1% of the waterbird assemblage for The Swale SPA (as estimated by the latest available WeBS five-year winter peak mean 2002/03-2006/07). The waterbird assemblage recorded during the early – mid winter period (November 2009-January 2010) represented a slightly higher proportion of The Swale SPA (10.4%). However looking at the underlying WeBS data the majority of the peak monthly counts each year on The Swale occur in January. It is therefore not surprising that the early – mid winter period surveys recorded slightly a slightly higher waterbird assemblage.

7.10 These results support and confirm that the assessment given in the Environmental Statement as to the importance of the study site in the context of The Swale SPA are accurate.

The species composition and distribution of waterbirds utilising the study area

7.11 The four most numerous waterbirds recorded using the study area during the surveys undertaken in late winter (February-March 2009) were in descending order (excluding gull species) Black-tailed Godwit, Oystercatcher, Teal and Dunlin. The respective species list for the surveys undertaken in early and mid winter (November 2009-January 2010) were: Dunlin, Black-tailed Godwit, Knot, and Oystercatcher. The composition of the species involved is fairly similar with Teal having been replaced by Redshank the only change in species.

7.12 In both the autumn (October only) and spring periods the most numerous species recorded were similar to those in winter. The five species involved were (in no particular order) Black-tailed Godwit, Redshank, Oystercatcher, Teal and Dunlin.

7.13 The distribution of waterbirds recorded within the study site during the early – mid winter period was similar to that recorded during the previous late winter period. High tide roosts where again recorded from the peninsula at Elmley, opposite the proposed development and on the saltmarsh islands The Lilies. When the intertidal flats where exposed the main concentrations of feeding waterbirds where observed in the bay at Elmley, on the lower reaches of the flats on the east side of Elmley reach and along Milton Creek.

7.14 The data for October 2009 does not suggest any marked changes in the distribution of waterbirds using the study area to that previous observed.

7.15 These results support and confirm that the assessment given to the composition of the waterbird assemblage in the Environmental Statement is accurate.

Implications for the impact assessment

7.16 The data gathered during the surveys in October 2009 to January 2010 completes the baseline for intertidal monitoring of waterbirds likely to be in the zone of influence from the proposed development.

7.17 The results of the intertidal waterbird surveys during October-January do not alter the Valued Ecological Receptors identified in the Environmental Statement and the outcomes of the assessments of construction and operational impacts on them. Therefore the assessments made within the Environmental Statement are accurate.

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9 APPENDICIES

Appendix A: Systematic list of all species common and scientific name recorded during intertidal surveys.

Common Name	Scientific Name
Great Northern Diver	*Gavia immer*
Little Grebe	*Tachybaptus ruficollis*
Great Crested Grebe	*Podiceps cristatus*
Cormorant	*Phalacrocorax carbo*
Shag	*Phalacrocorax aristotelis*
Little Egret	*Egretta garzetta*
Grey Heron	*Ardea cinerea*
Mute Swan	*Cygnus olor*
Canada Goose	*Branta canadensis*
Dark-bellied Brent Goose	*Branta bernicla*
Shelduck	*Tadorna tadorna*
Wigeon	*Anas Penelope*
Gadwall	*Anas strepera*
Teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Pintail	*Anas acuta*
Shoveler	*Anas clypeata*
Pochard	*Aythya farina*
Tufted Duck	*Aythya fuligula*
Scaup	*Aythya marila*
Red-breasted Merganser	*Mergus serrator*
Goldeneye	*Bucephala clangula*
Water Rail	*Rallus aquaticus*
Moorhen	*Gallinula chloropus*
Coot	*Fulica atra*
Oystercatcher	*Haematopus ostralegus*
Avocet	*Recurvirostra avosetta*
Ringed Plover	*Charadrius hiaticula*
Golden Plover	*Pluvialis apricaria*
Grey Plover	*Pluvialis squatarola*
Lapwing	*Vanellus vanellus*
Knot	*Calidris canutus*
Dunlin	*Calidris alpina*
Snipe	*Gallinago gallinago*
Black-tailed Godwit	*Limosa limosa*
Bar-tailed Godwit	*Limosa lapponica*
Whimbrel	*Numenius phaeopus*
Curlew	*Numenius arquata*
Spotted Redshank	*Tringa erythropus*
Redshank	*Tringa tetanus*
Greenshank	*Tringa nebularia*
Green Sandpiper	*Tringa ochropus*
Turnstone	*Arenaria interpres*
Black-headed Gull	*Larus ribidundus*
Common Gull	*Larus canus*
Lesser Black-backed Gull	*Larus fuscus*
Herring Gull	*Larus argentatus*

Great Black-backed Gull	*Larus marinus*
Black Tern	*Chlidonias niger*
Kingfisher	*Alcedo atthis*

Appendix B: Maps detailing the study site

Figure B.1. The site survey boundary at Kemsley Mill.

Figure B.2. Designated Sites within 2 km of Kemsley Mill

Figure B.3. The full extent of the intertidal survey area

Figure B.4. The WeBS high tide and low tide count sectors boundaries

Appendix C: Distribution maps of key waterbird species recorded at Kemsley.

Figure C.1: Spatial distribution of Little Grebe over high water , Oct 2009

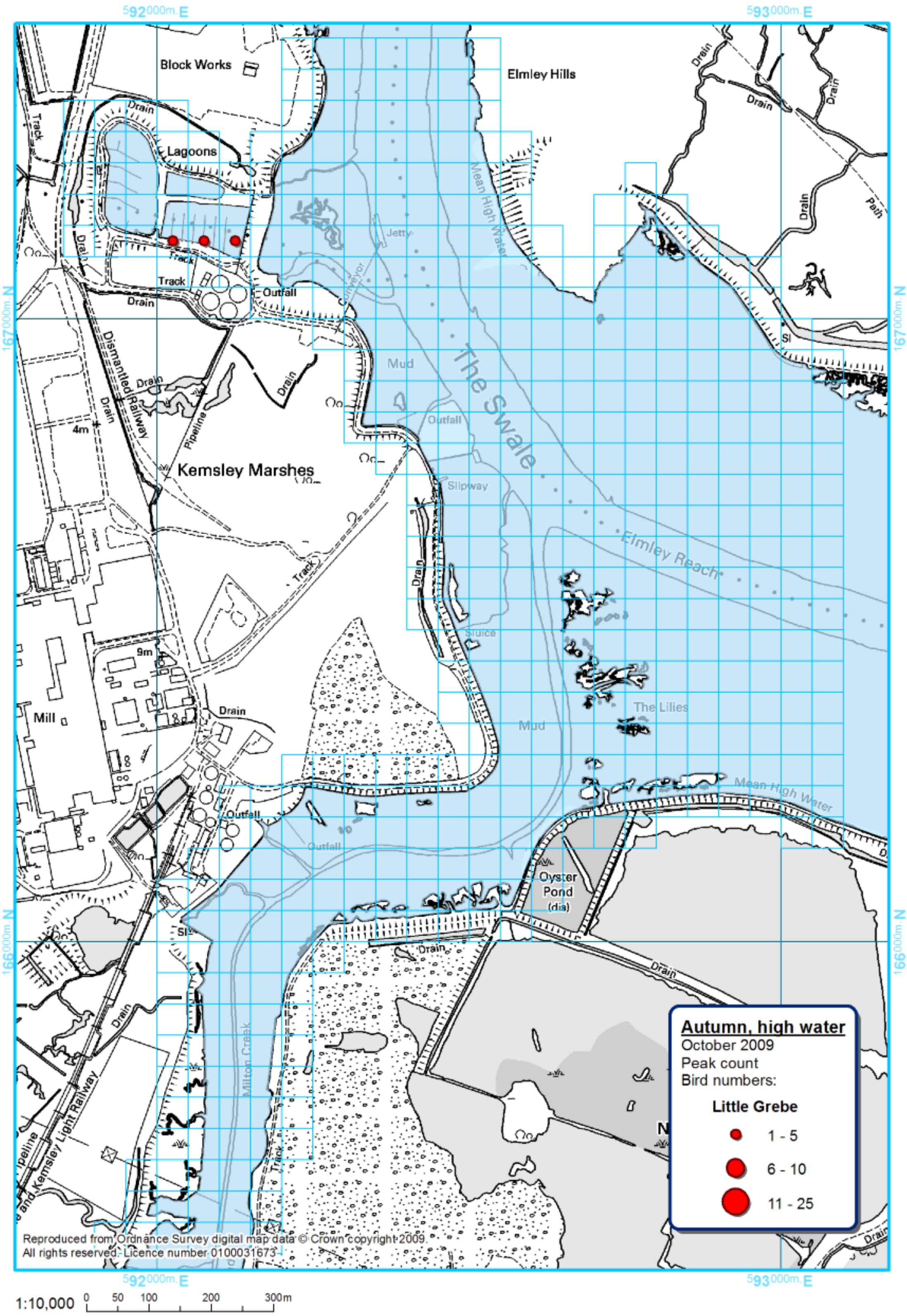


Figure C.2: Spatial distribution of Little Grebe over low water , Oct 2009

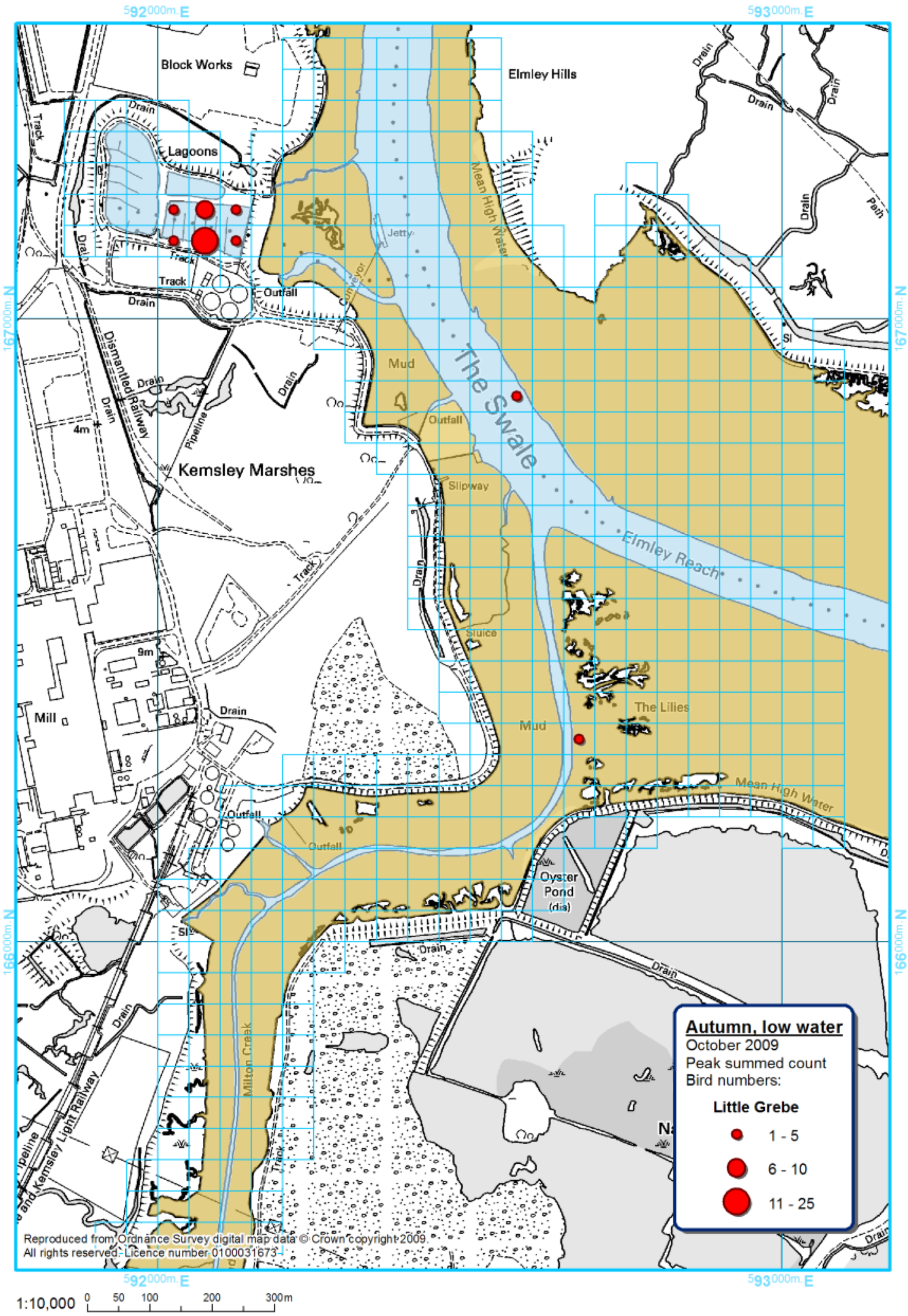


Figure C.3: Spatial distribution of Little Grebe over high water, Nov 2009 - Jan 2010

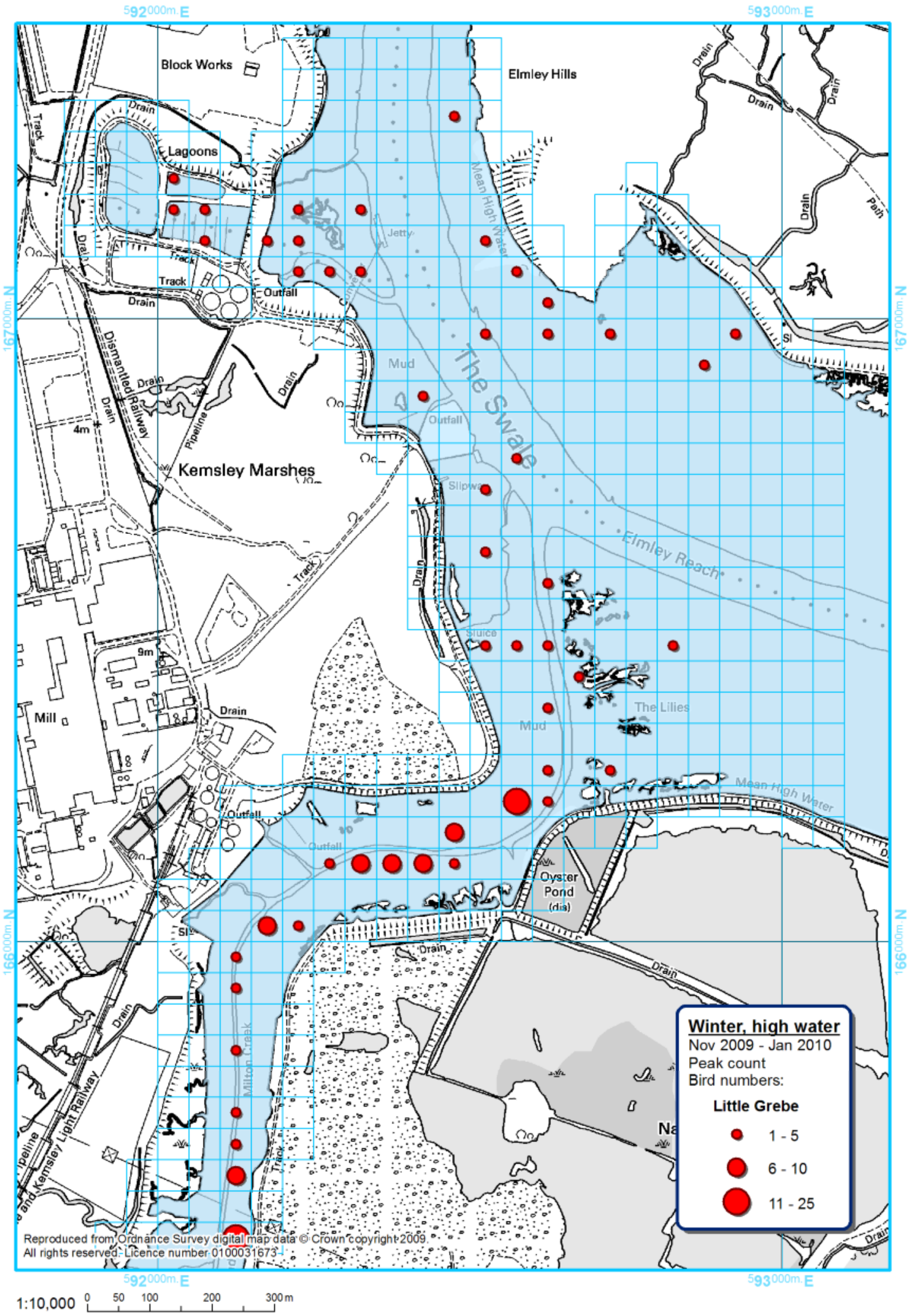


Figure C.4: Spatial distribution of Little Grebe over low water, Nov 2009 - Jan 2010

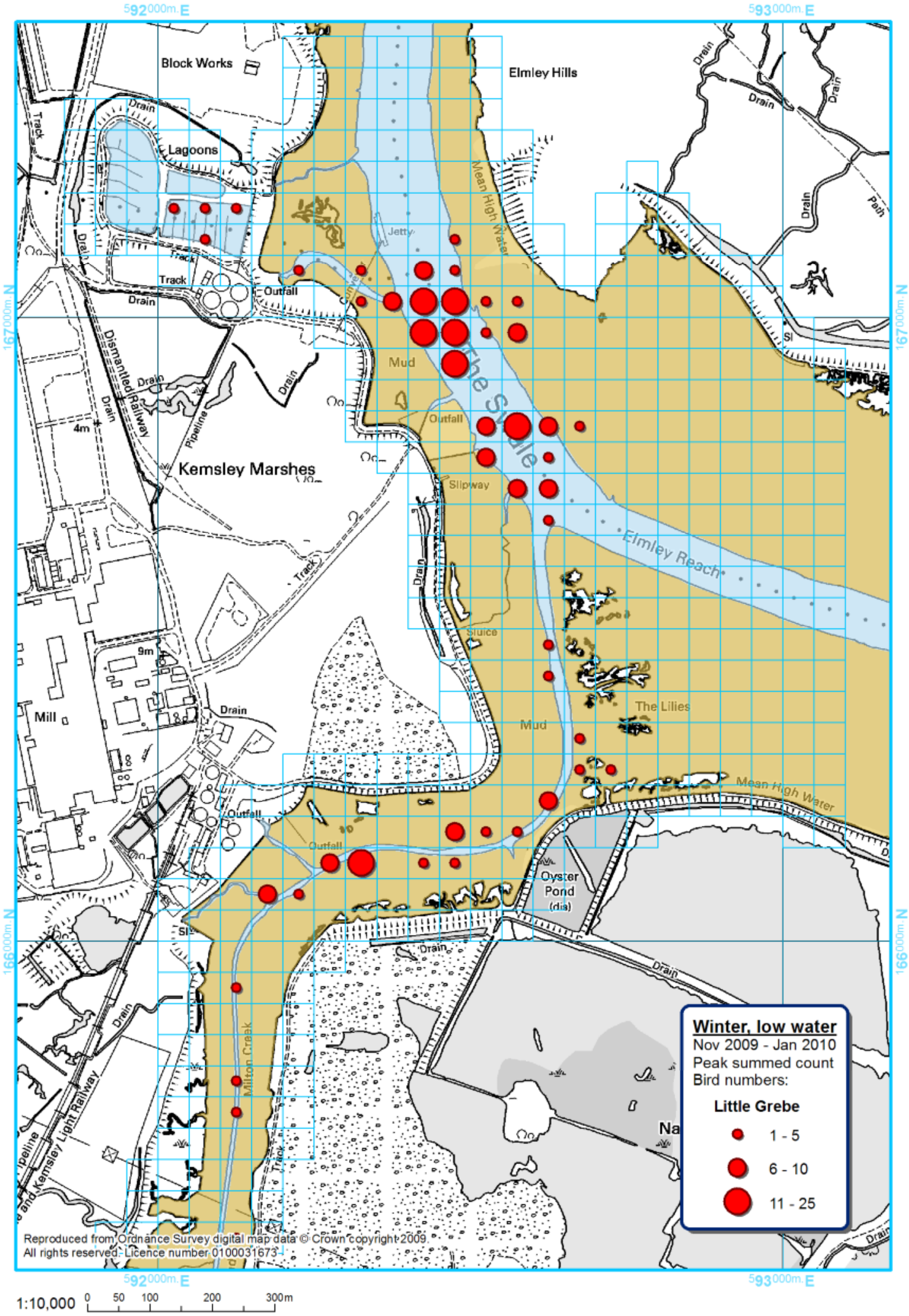


Figure C.5: Spatial distribution of Little Egret over high water , Oct 2009

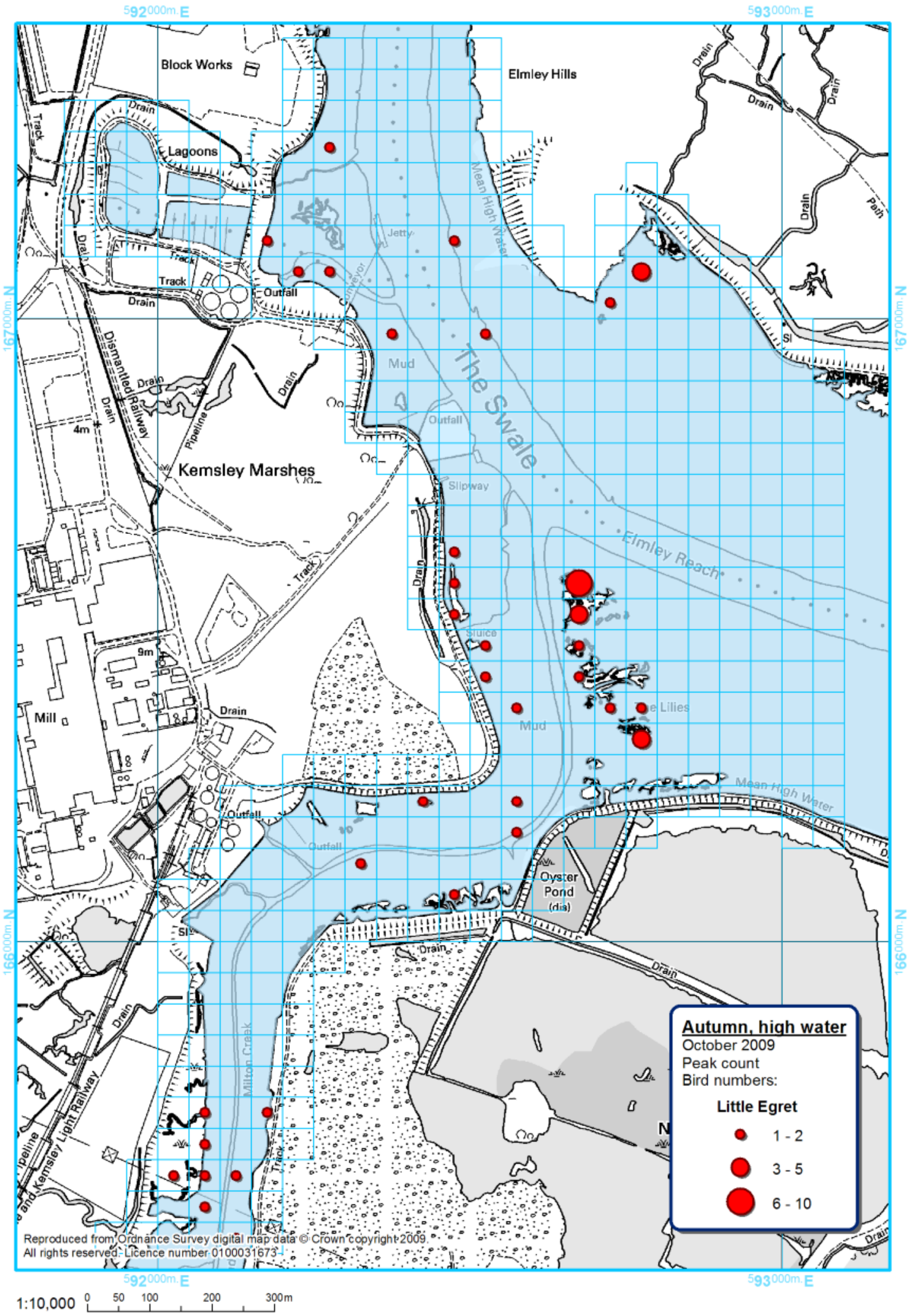


Figure C.6: Spatial distribution of Little Egret over low water , Oct 2009

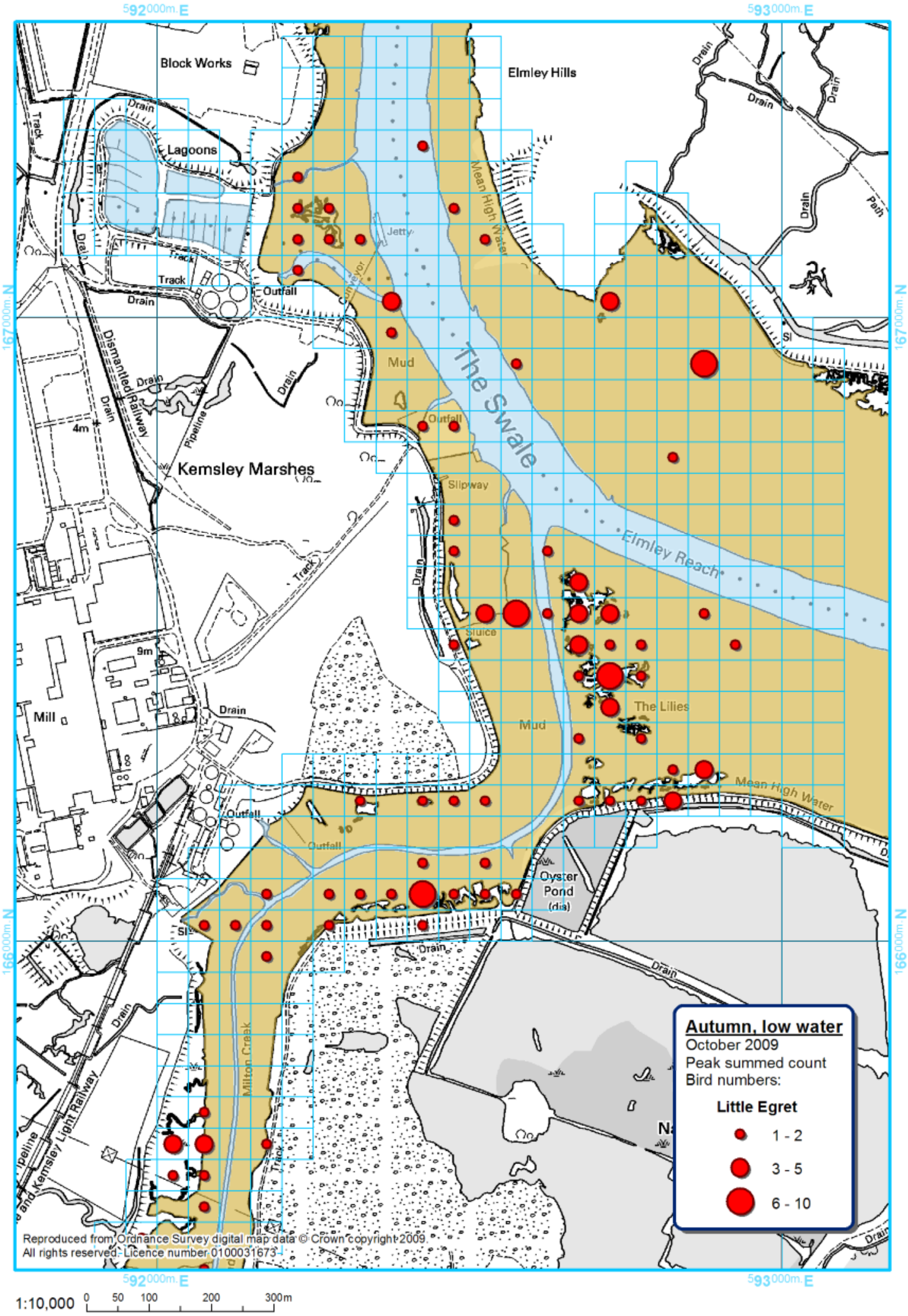


Figure C.7: Spatial distribution of Little Egret over high water, Nov 2009 - Jan 2010

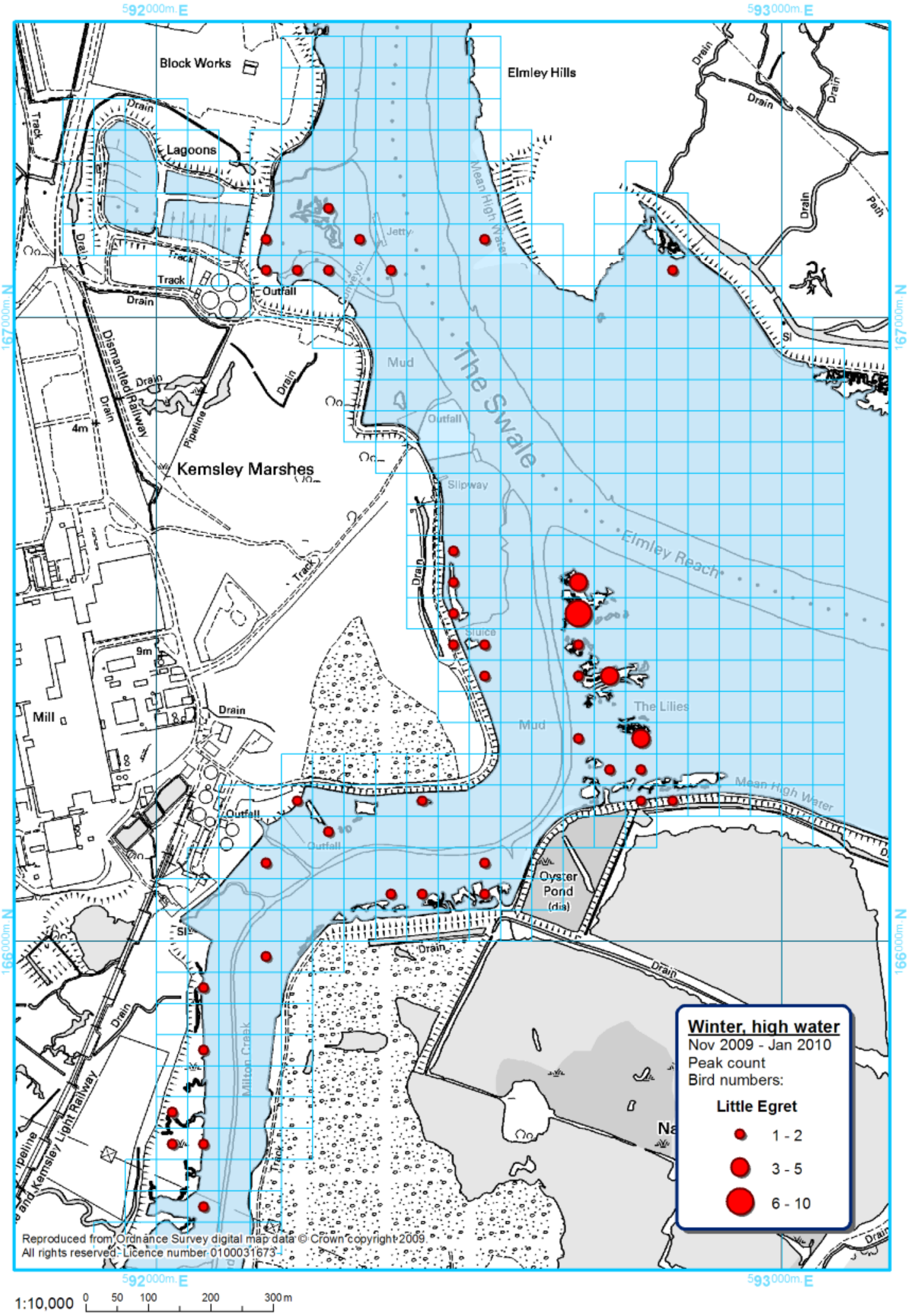


Figure C.8: Spatial distribution of Little Egret over low water, Nov 2009 - Jan 2010

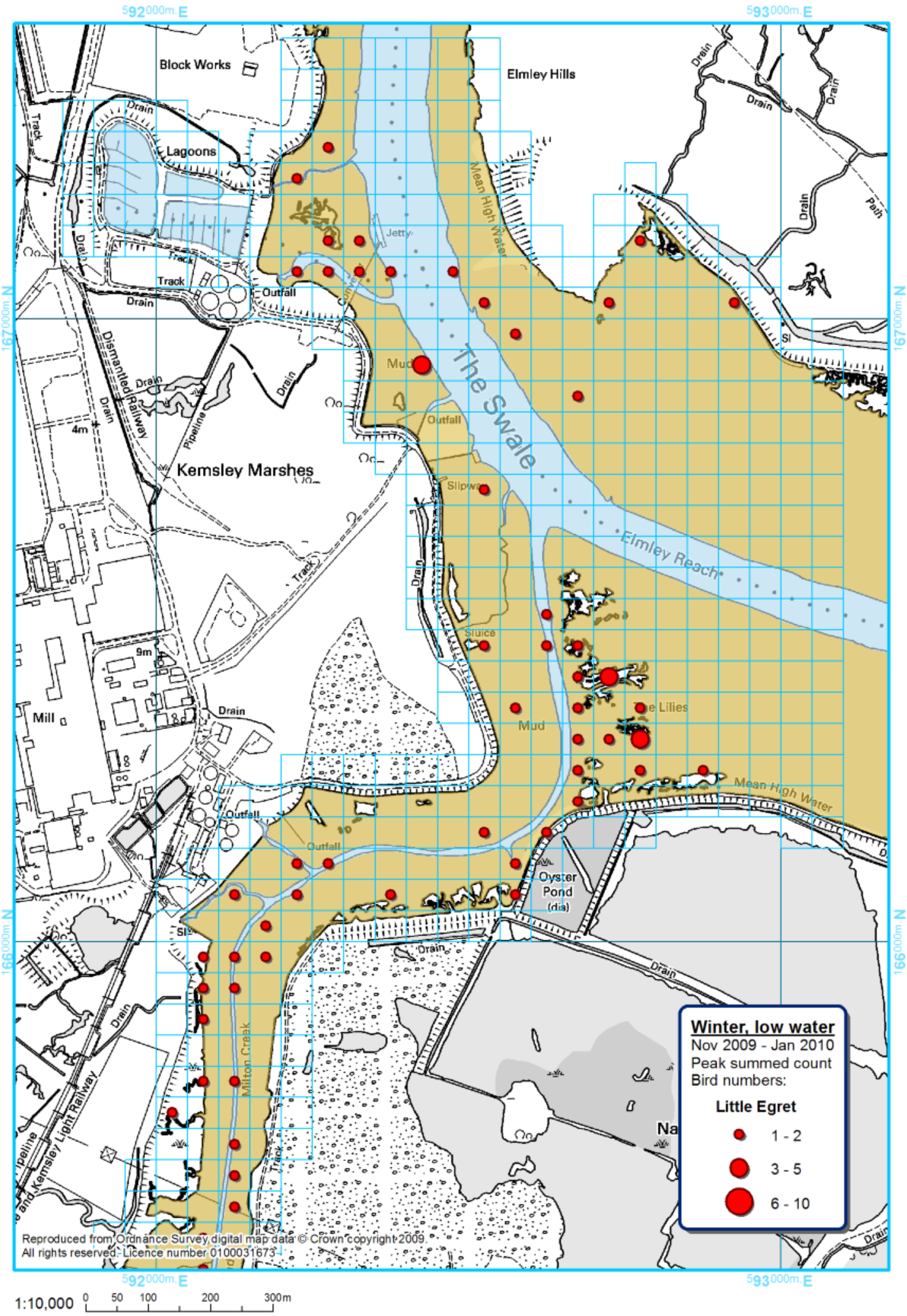


Figure C.9: Spatial distribution of Brent Goose over high water , Nov 2009 – Jan 2010

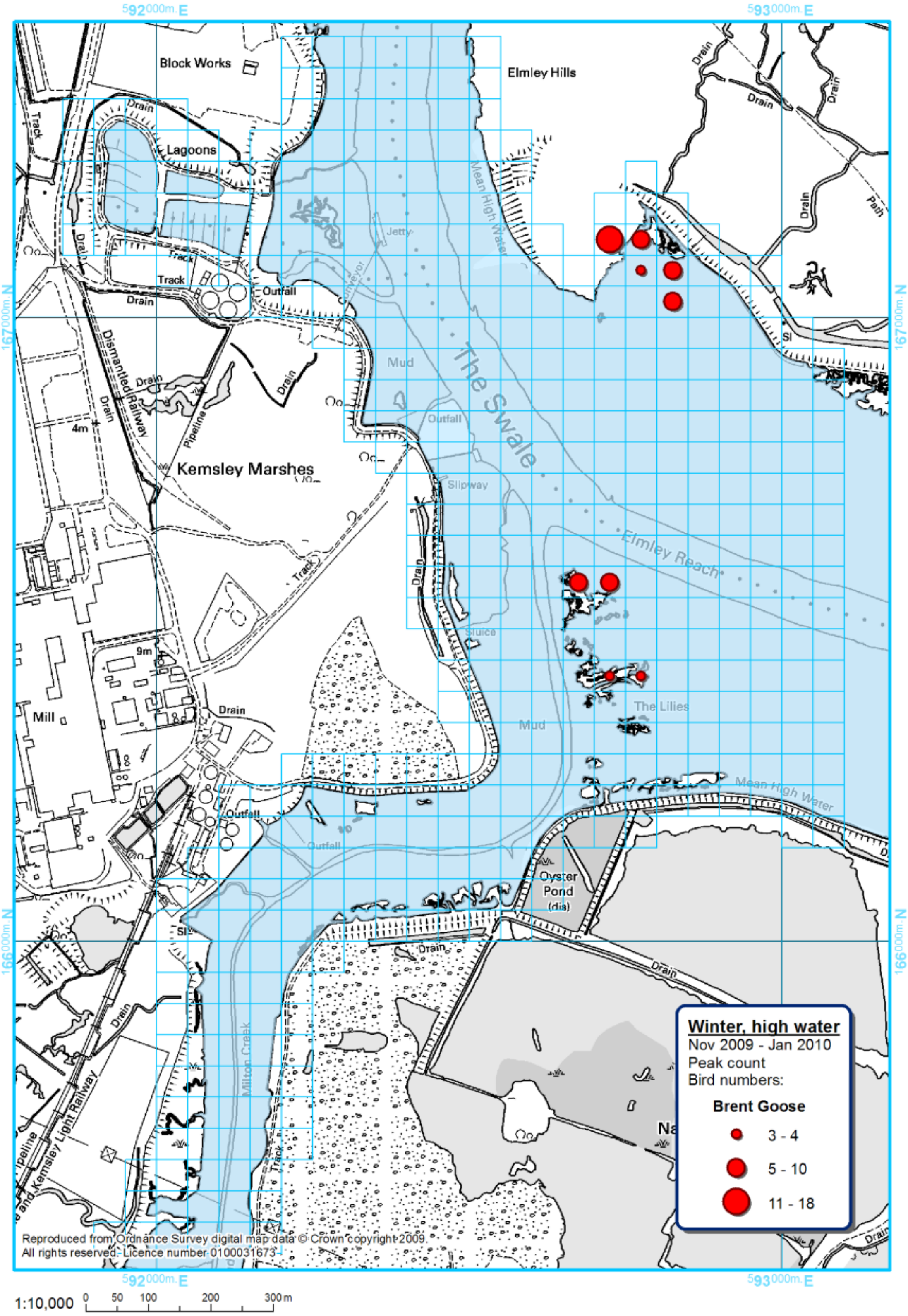


Figure C.10: Spatial distribution of Brent Goose over low water, Nov 2009 - Jan 2010

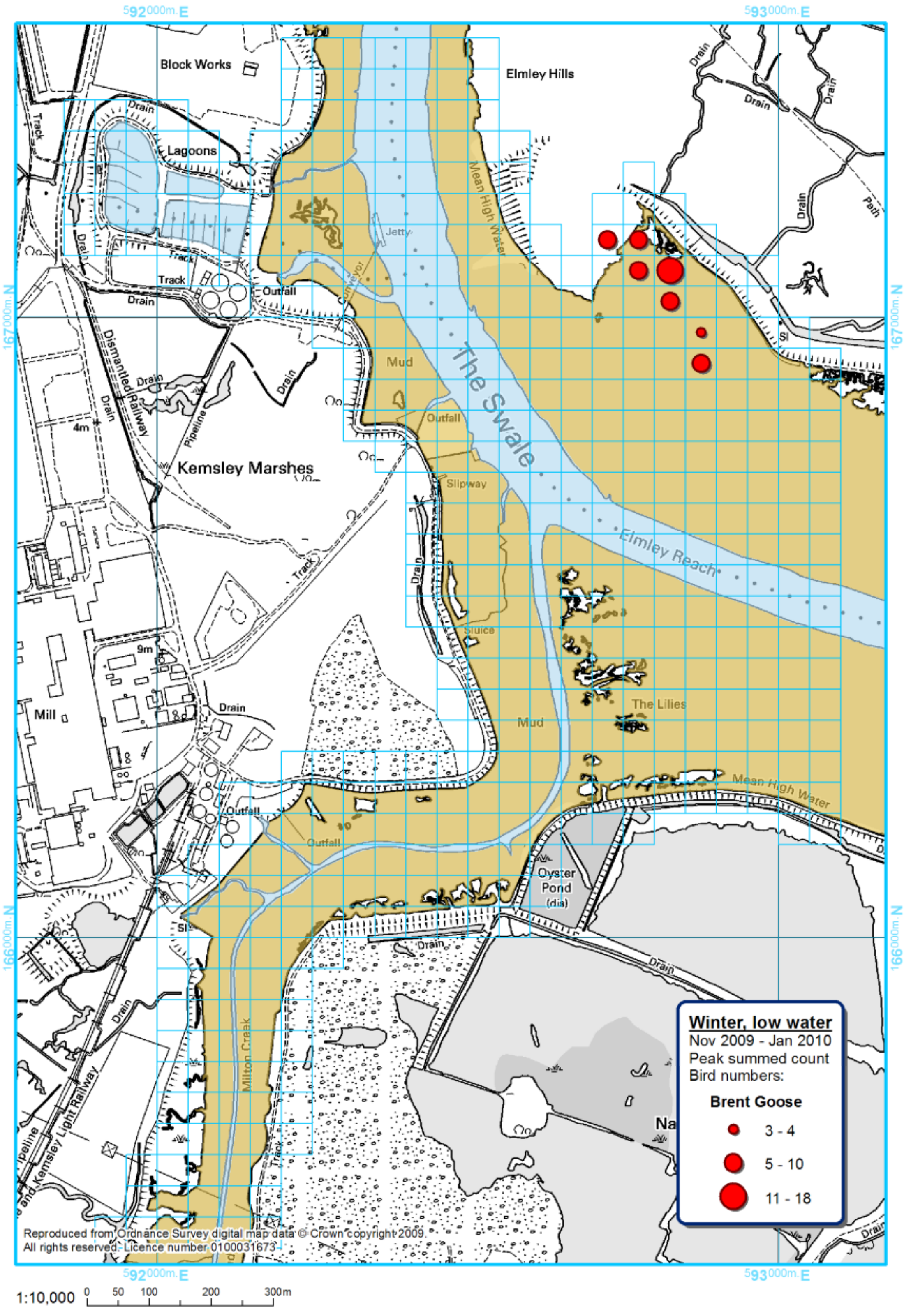


Figure C.11: Spatial distribution of Shelduck over high water , Oct 2009

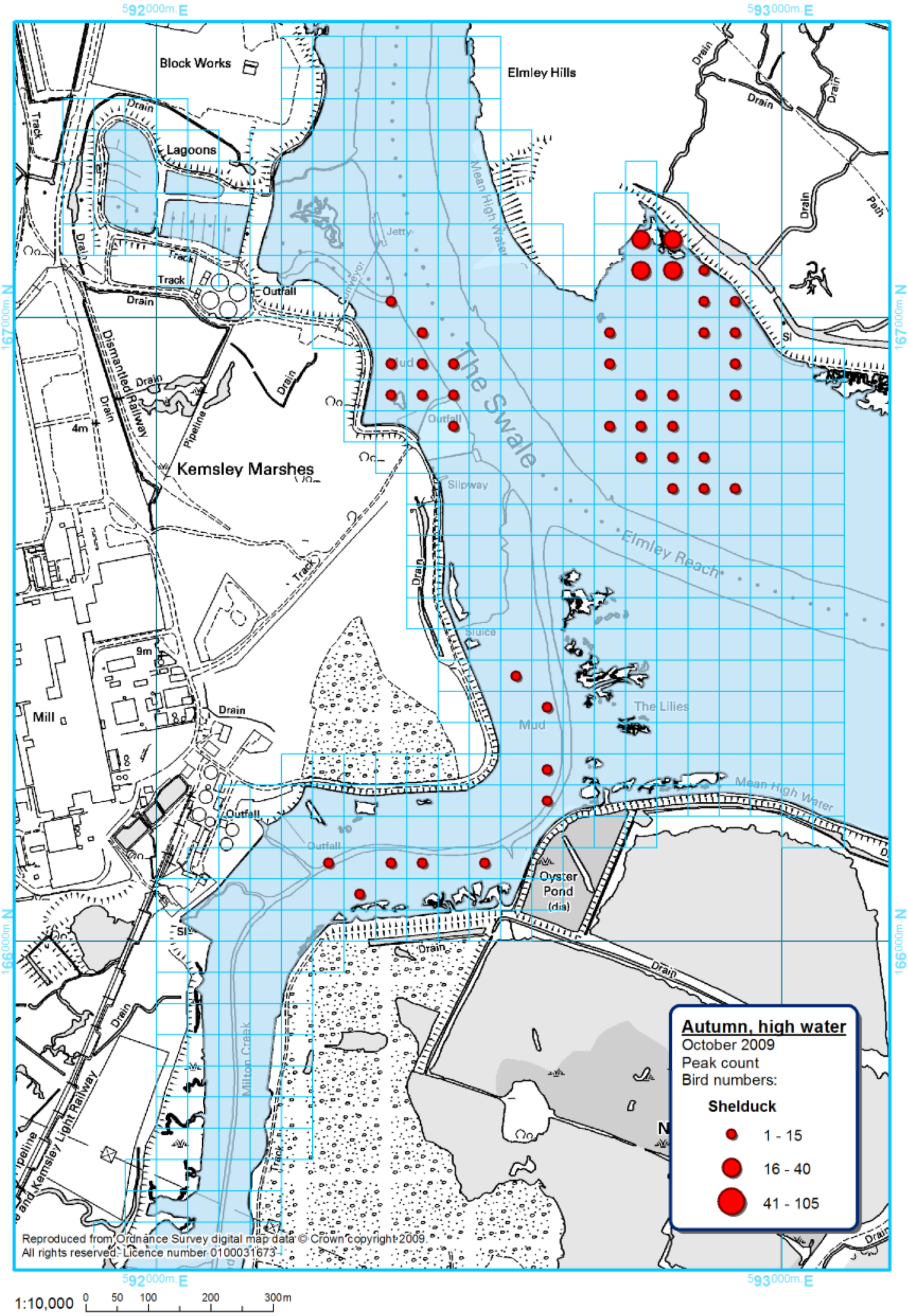


Figure C.12: Spatial distribution of Shelduck over low water , Oct 2009

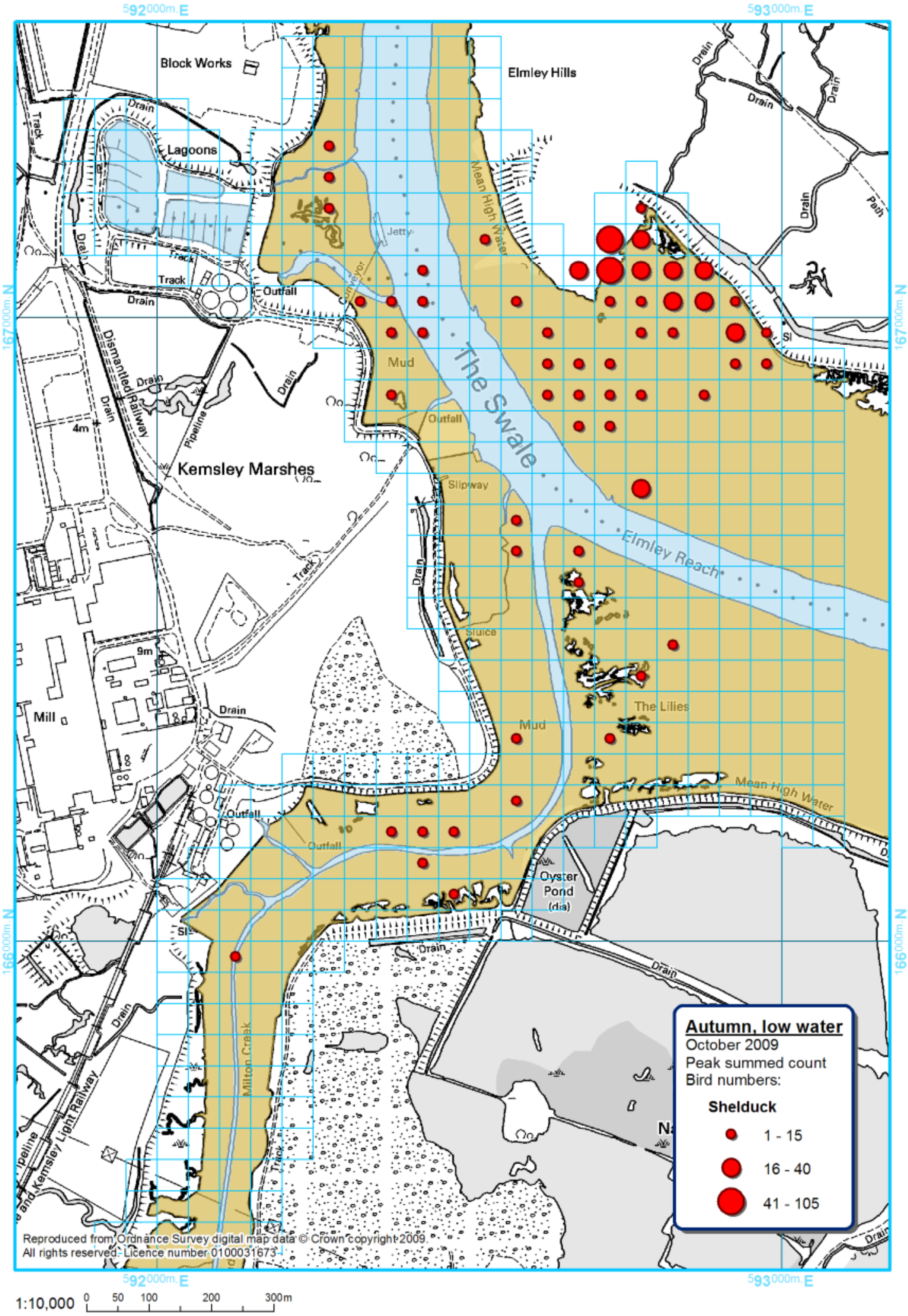


Figure C.13: Spatial distribution of Shelduck over high water, Nov 2009 - Jan 2010

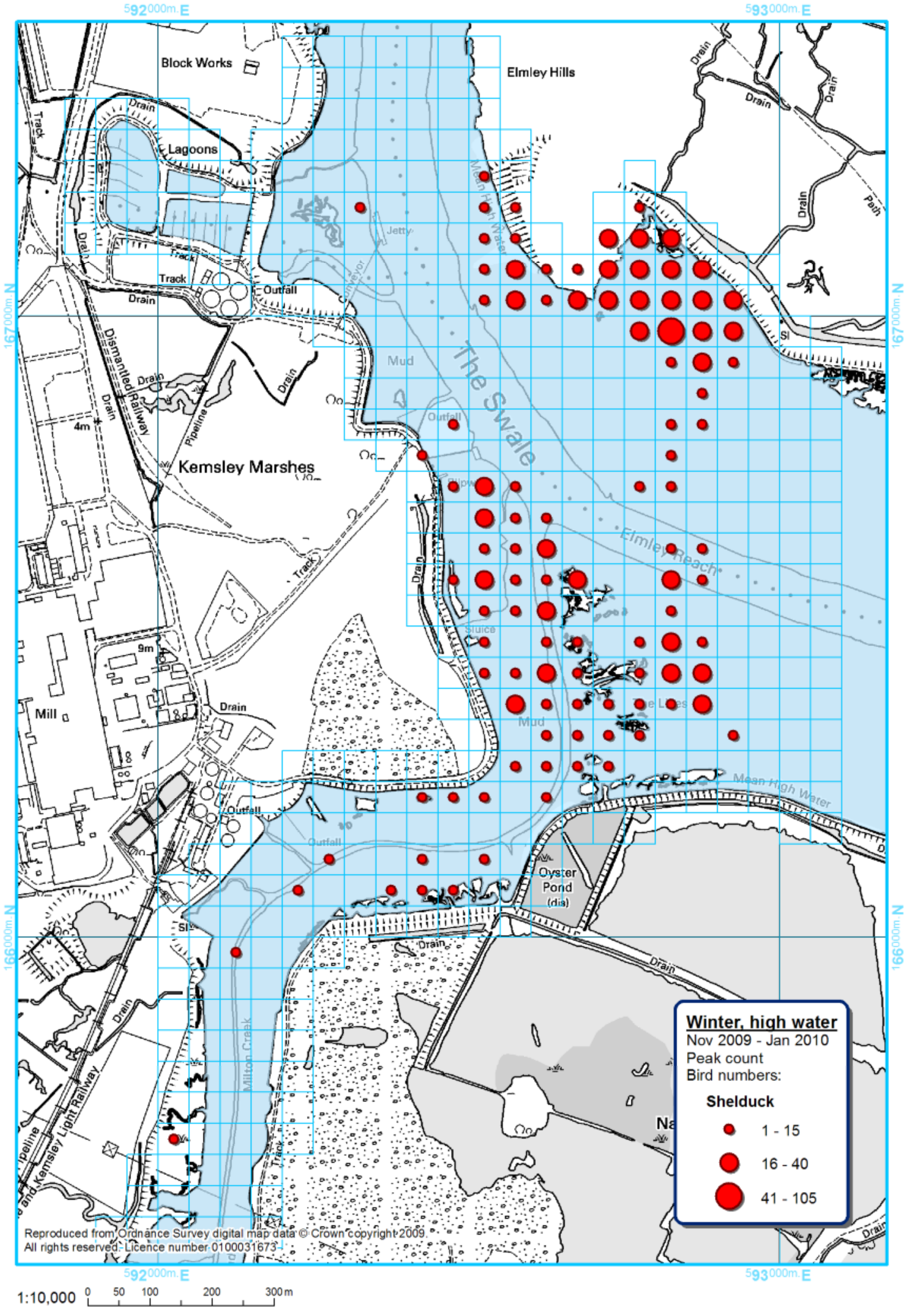


Figure C.14: Spatial distribution of Shelduck over low water, Nov 2009 - Jan 2010

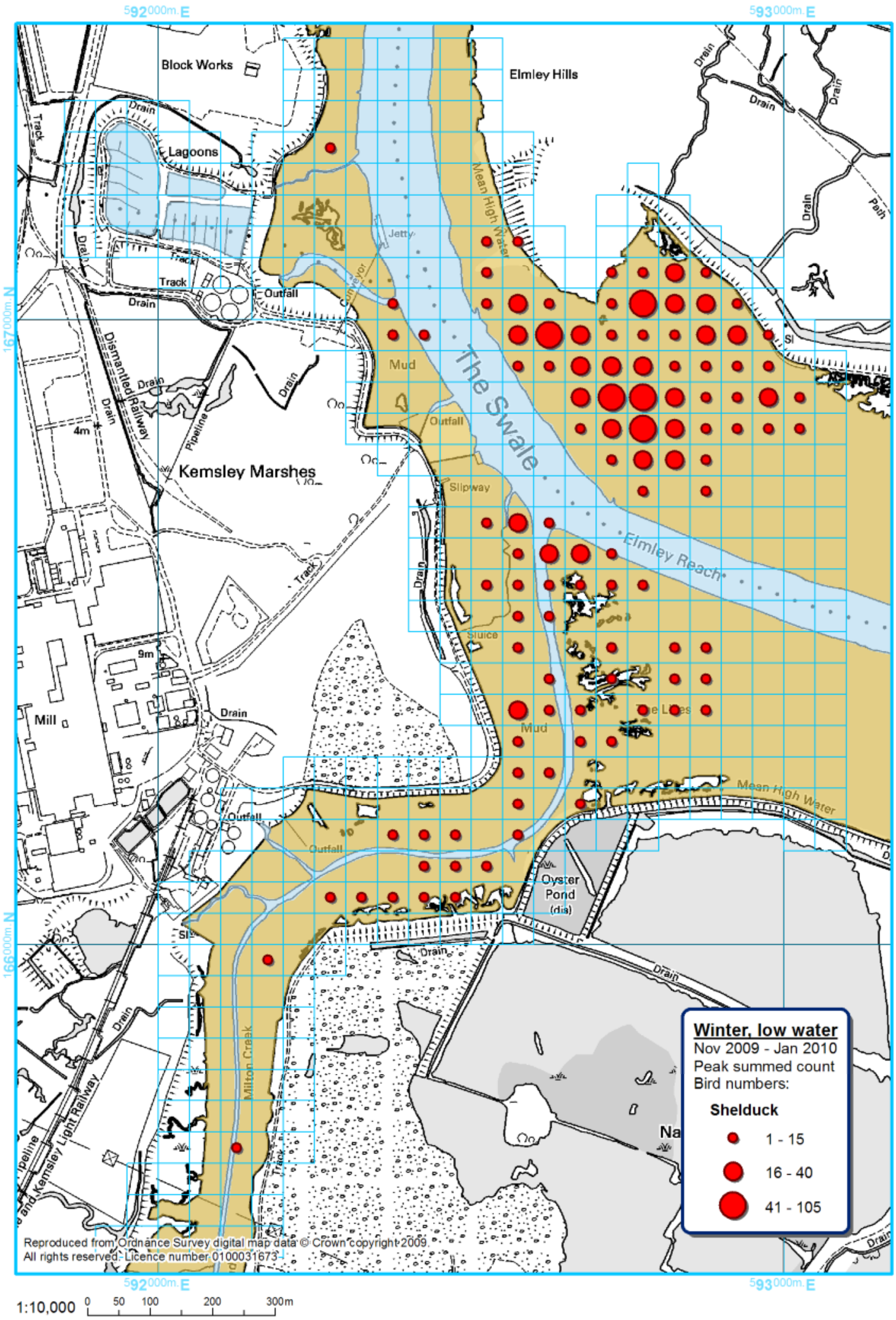


Figure C.15: Spatial distribution of Wigeon over high water , Oct 2009

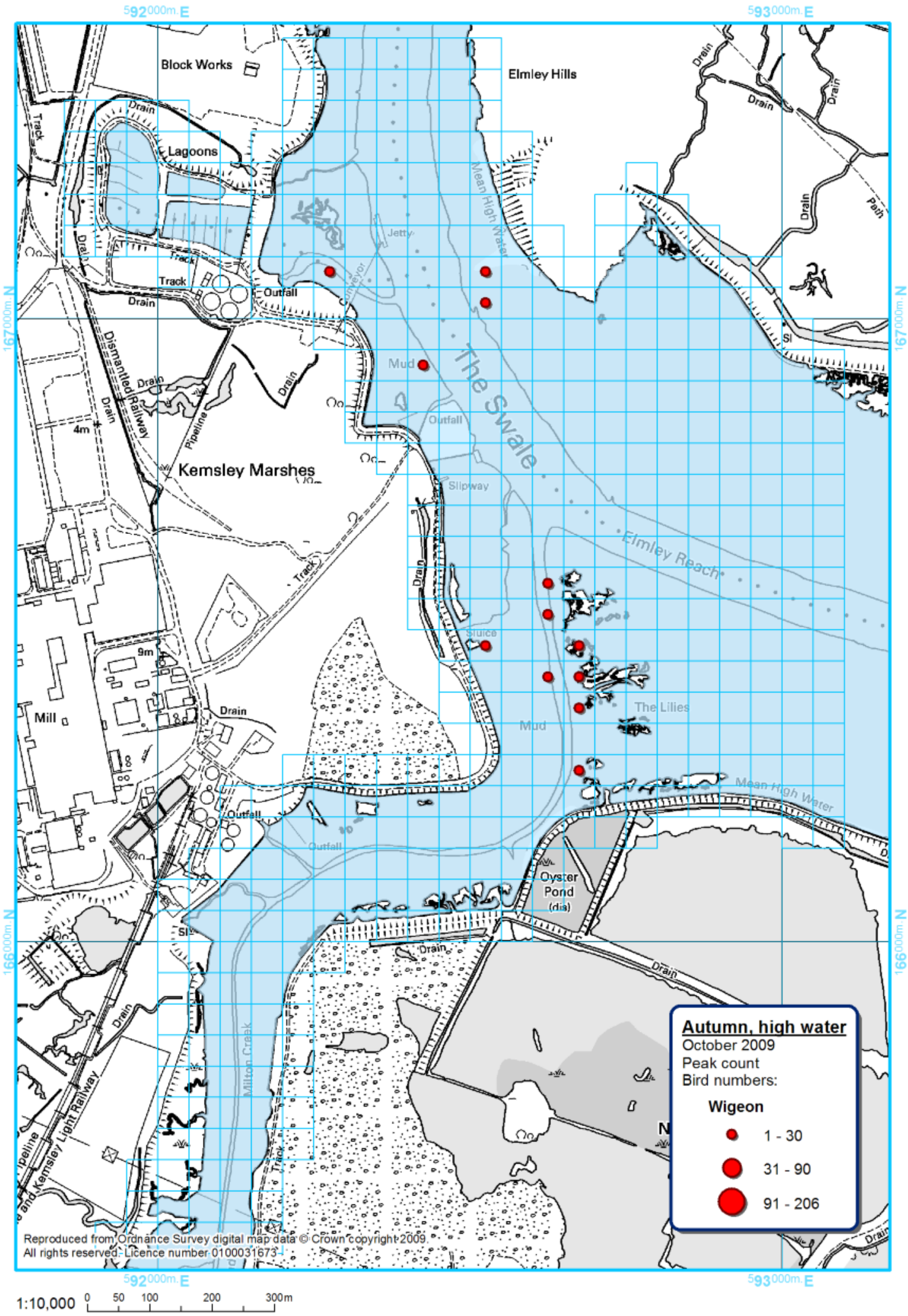


Figure C.16: Spatial distribution of Wigeon over low water , Oct 2009

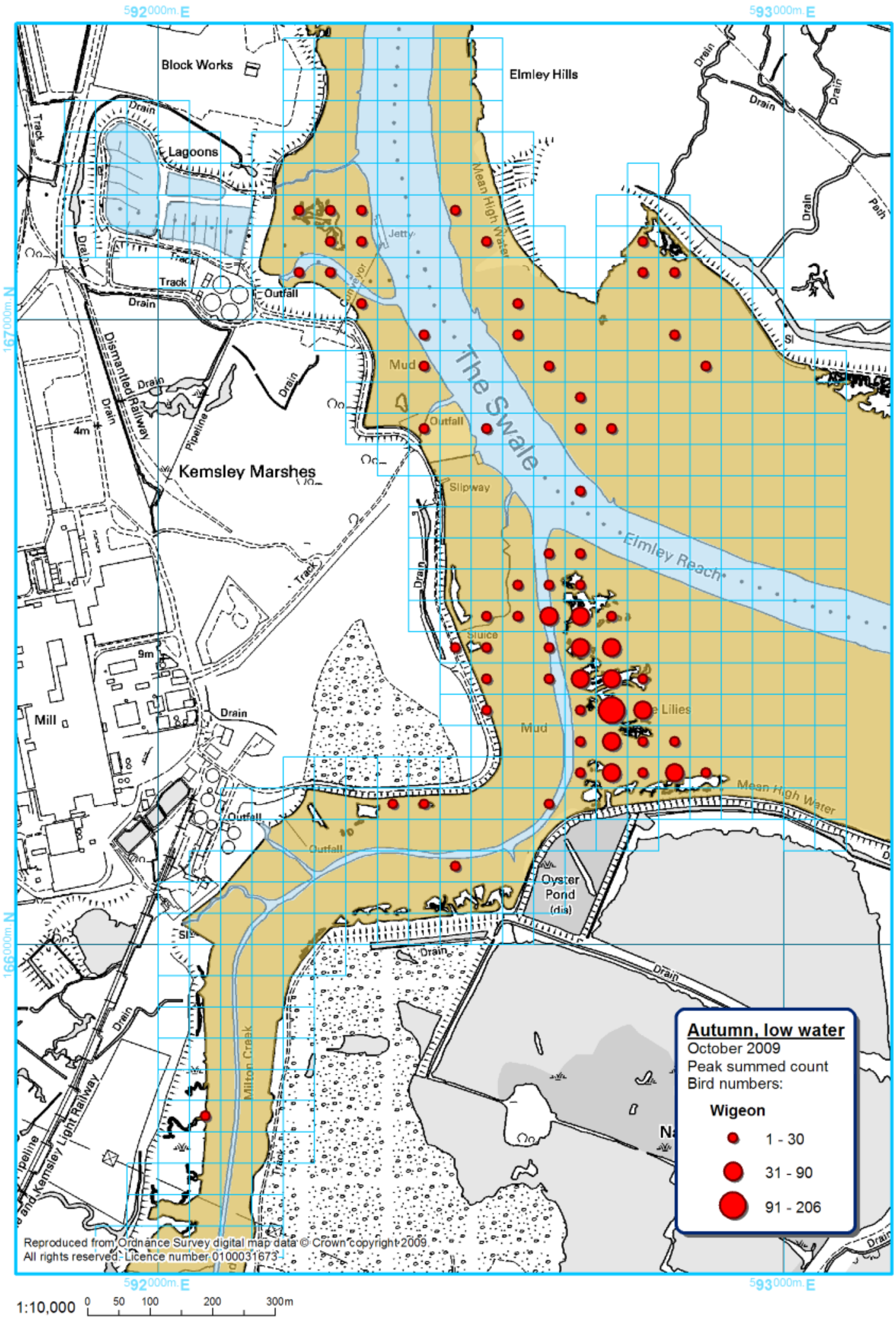


Figure C.17: Spatial distribution of Wigeon over high water, Nov 2009 - Jan 2010

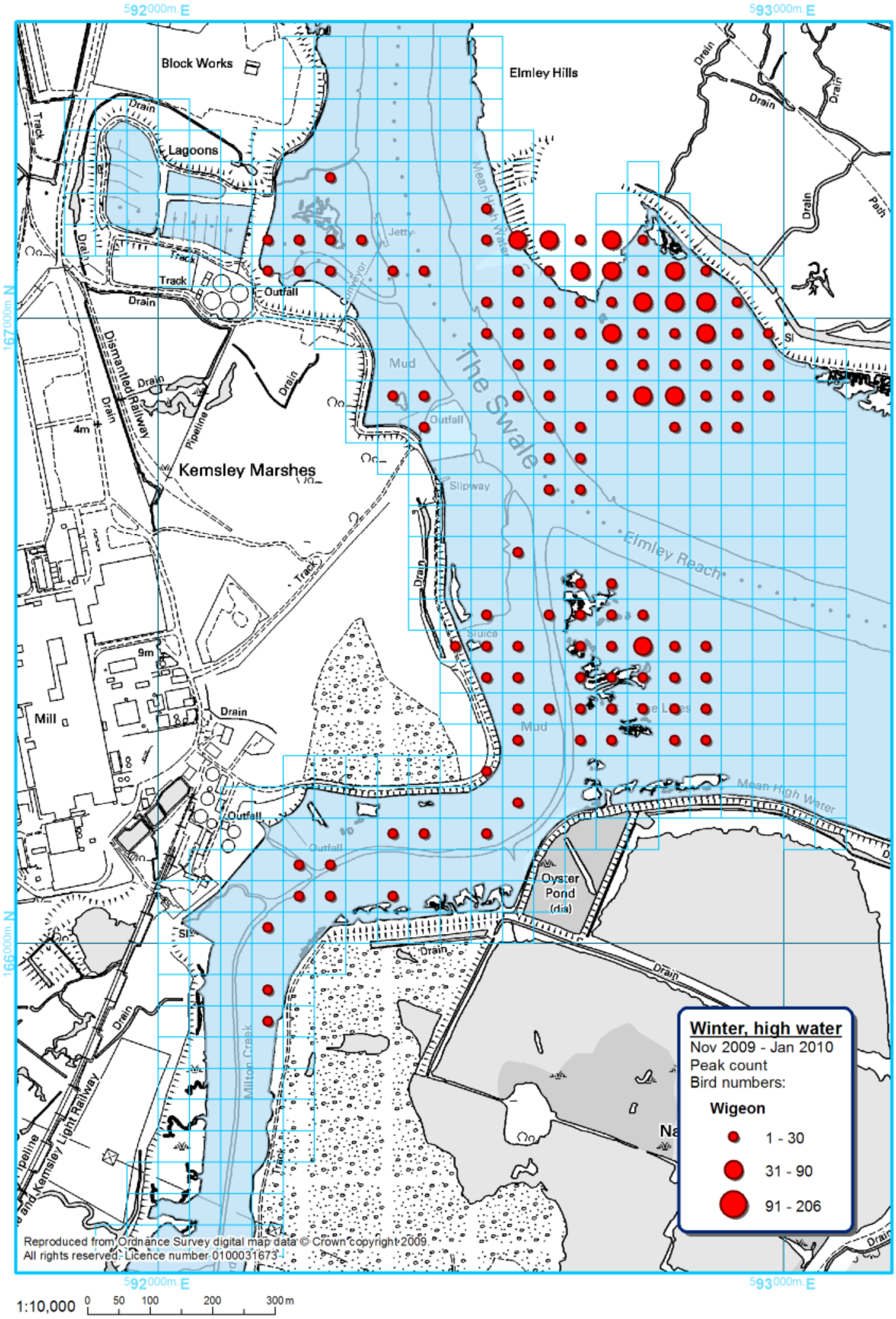


Figure C.18: Spatial distribution of Wigeon over low water, Nov 2009 - Jan 2010

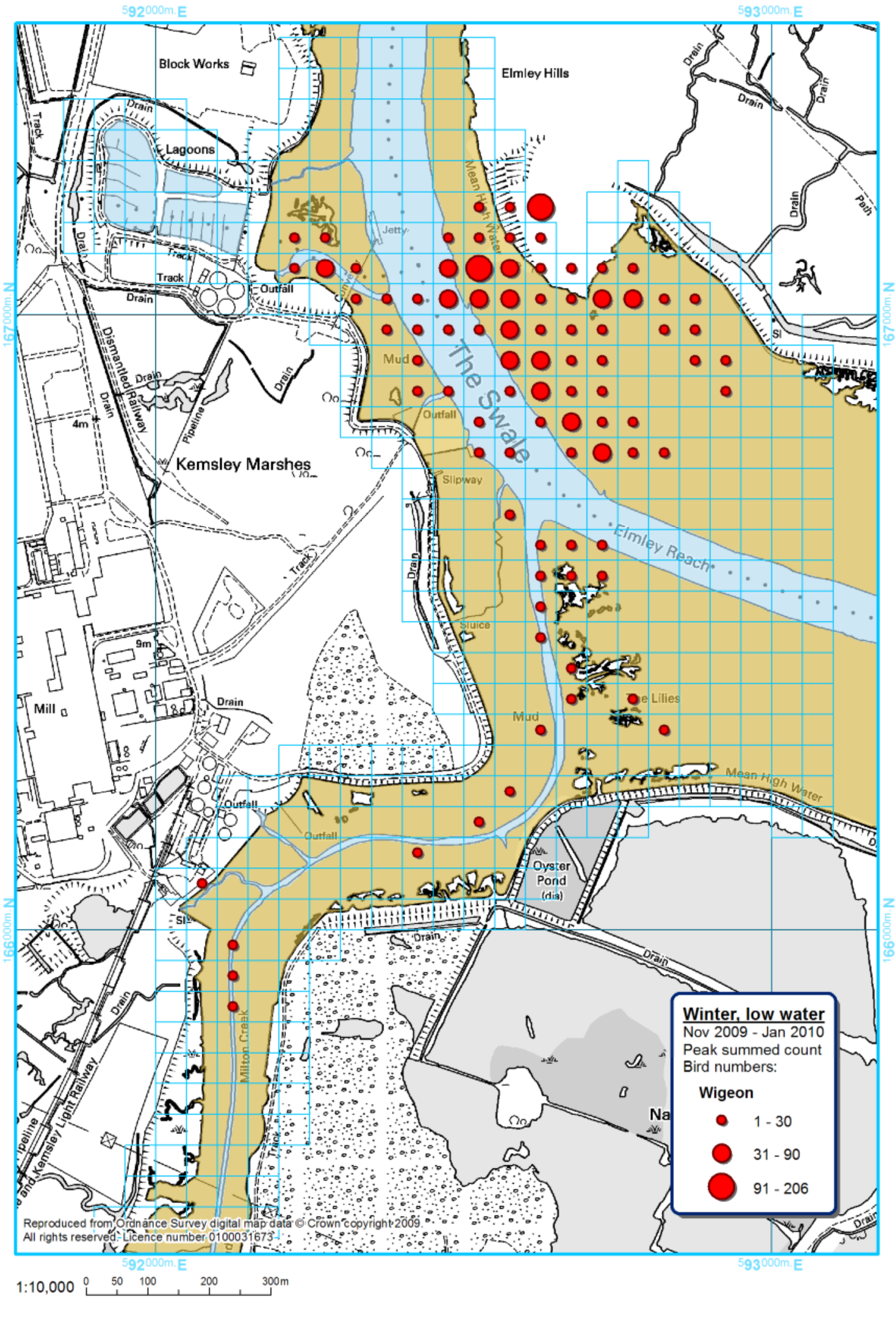


Figure C.19: Spatial distribution of Teal over high water , Oct 2009

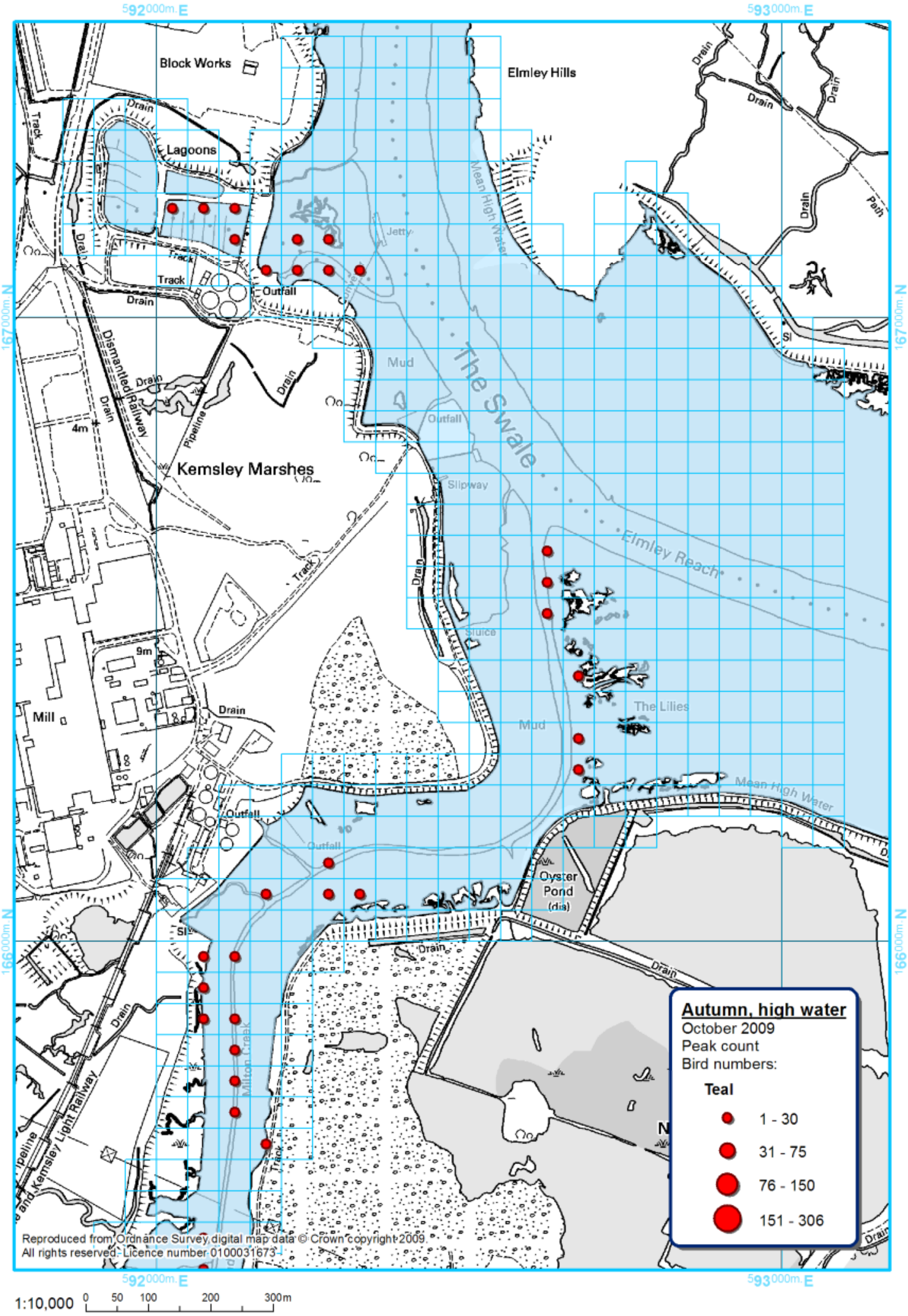


Figure C.20: Spatial distribution of Teal over low water , Oct 2009

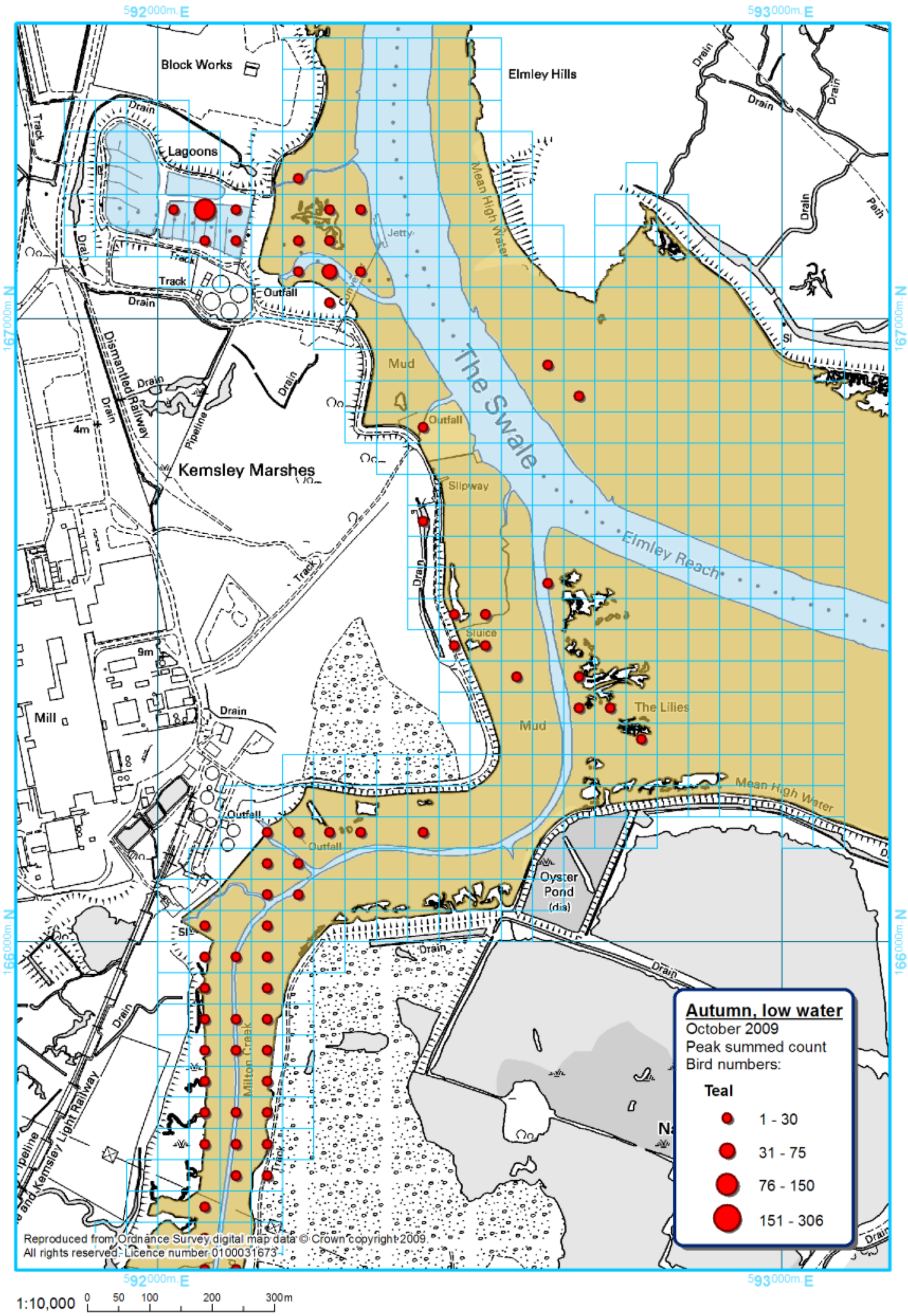


Figure C.21: Spatial distribution of Teal over high water, Nov 2009 - Jan 2010

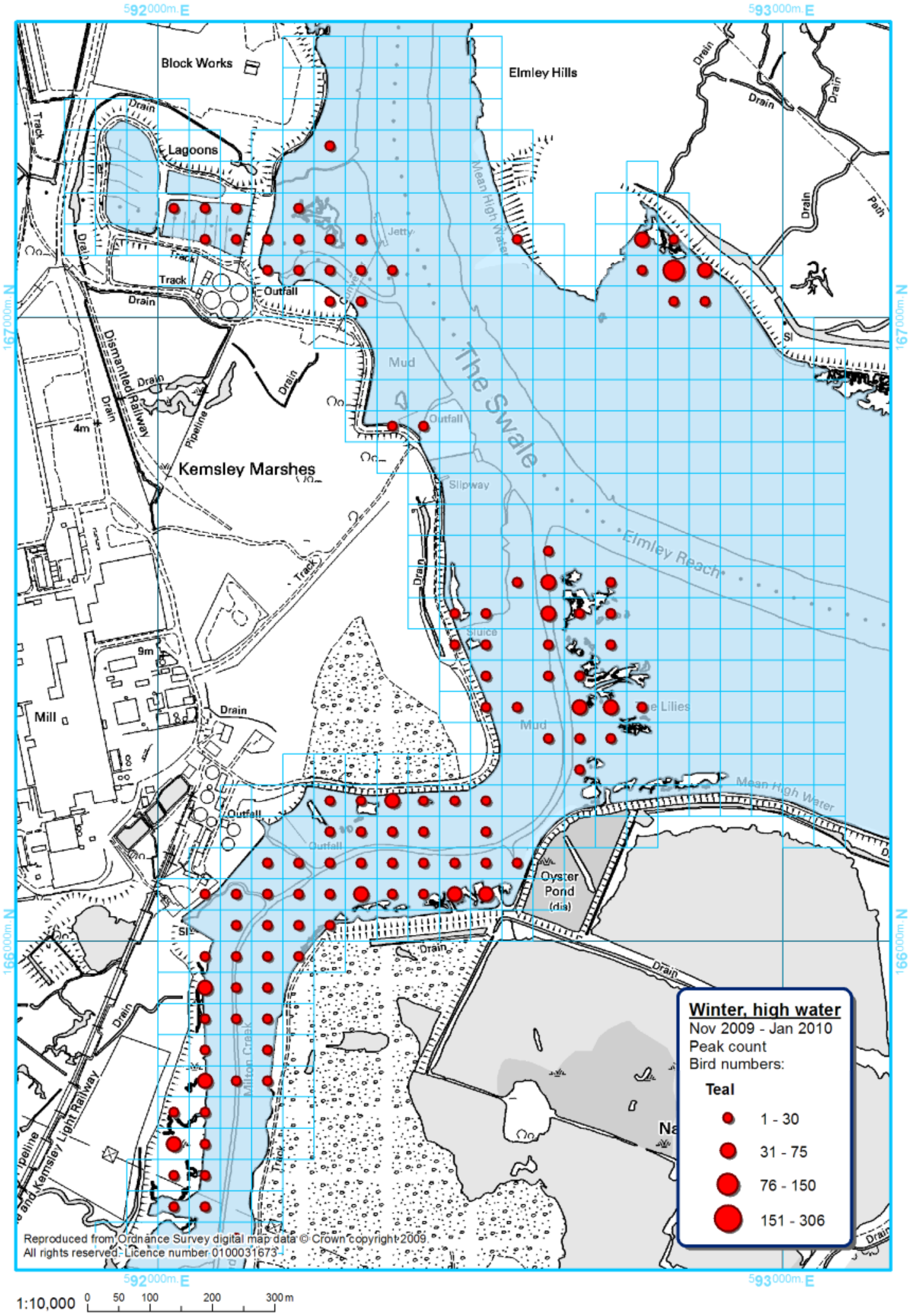


Figure C.22: Spatial distribution of Teal over low water, Nov 2009 - Jan 2010

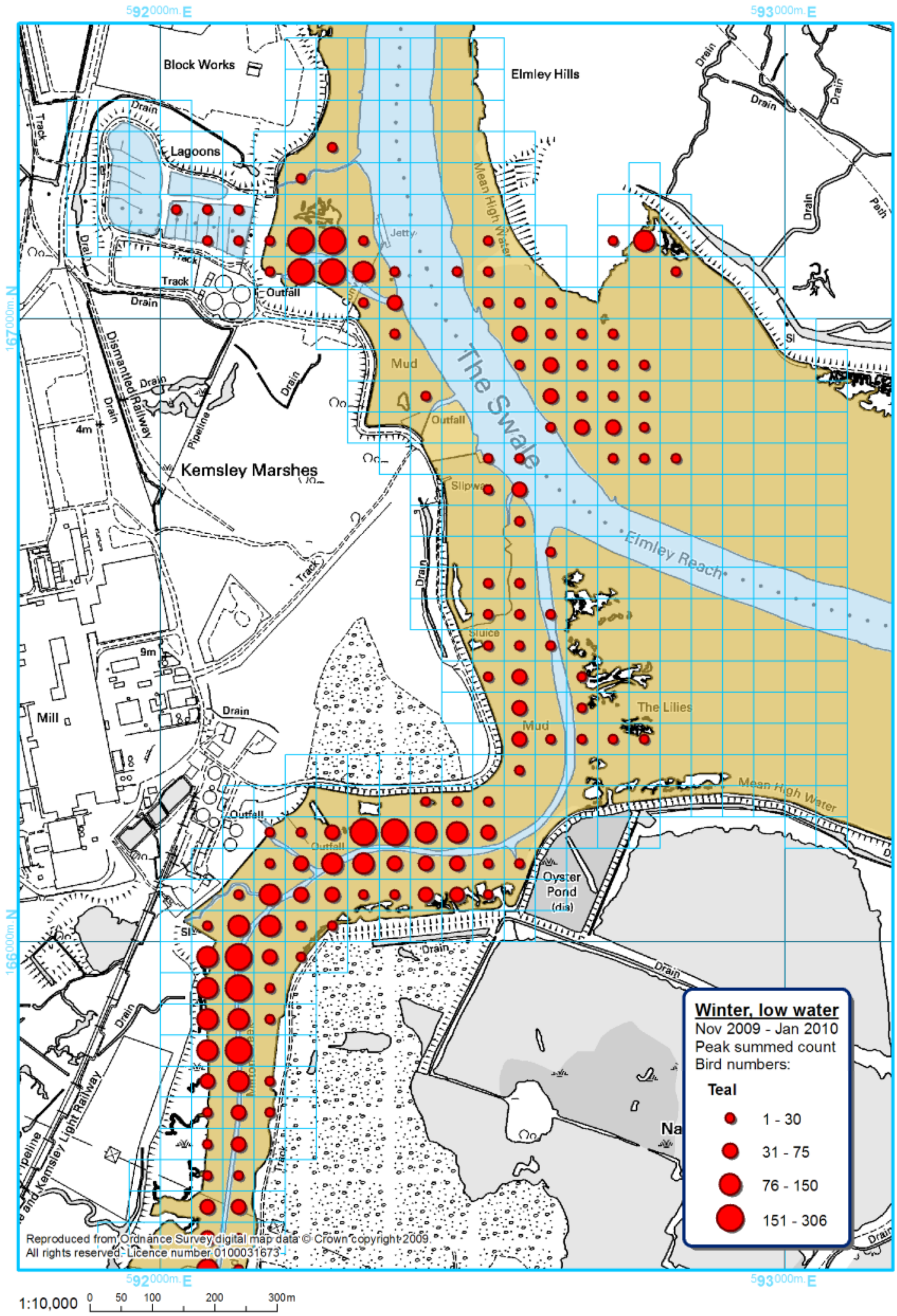


Figure C.23: Spatial distribution of Pintail over low water , Oct 2009

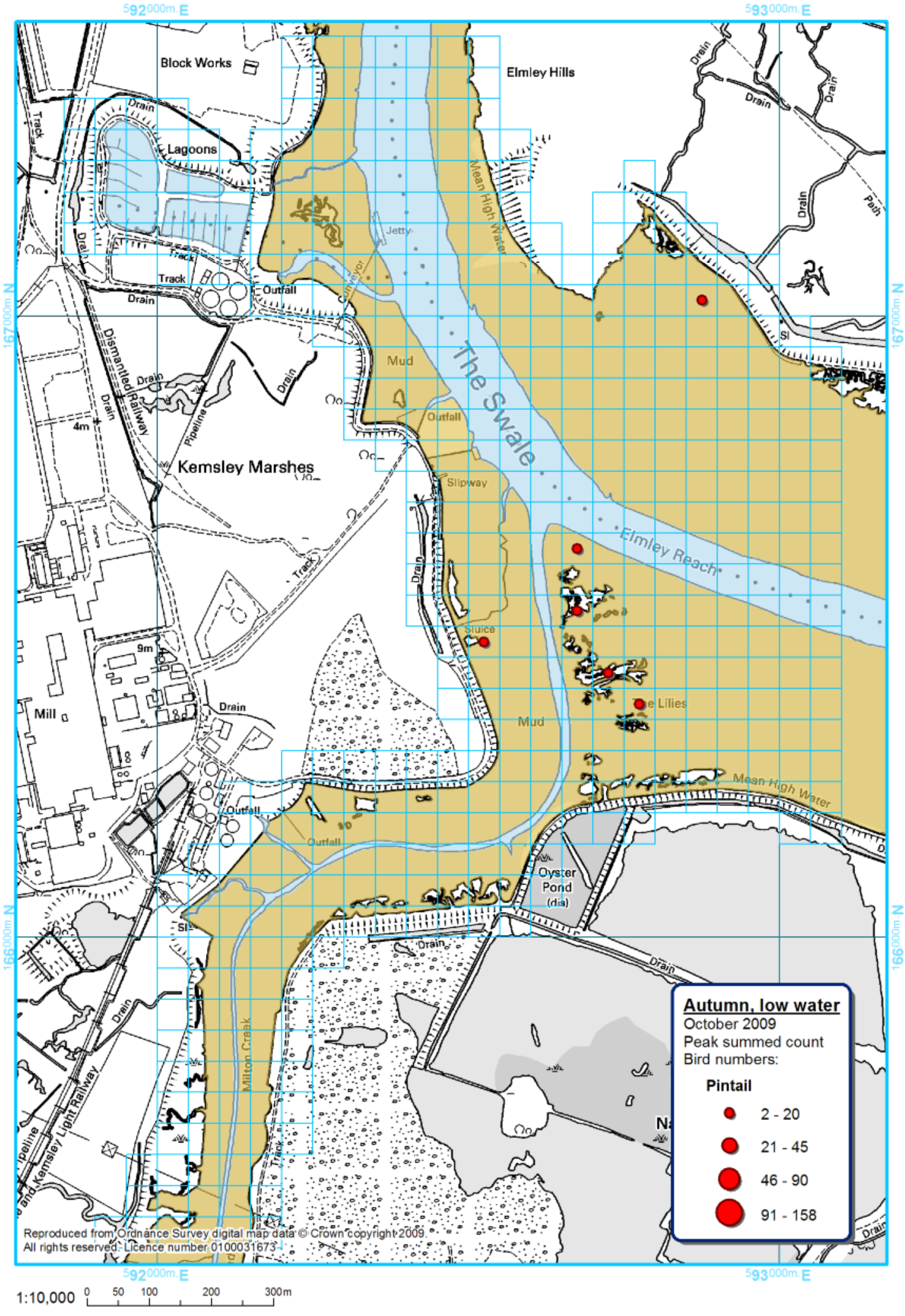


Figure C.24: Spatial distribution of Pintail over high water, Nov 2009 - Jan 2010

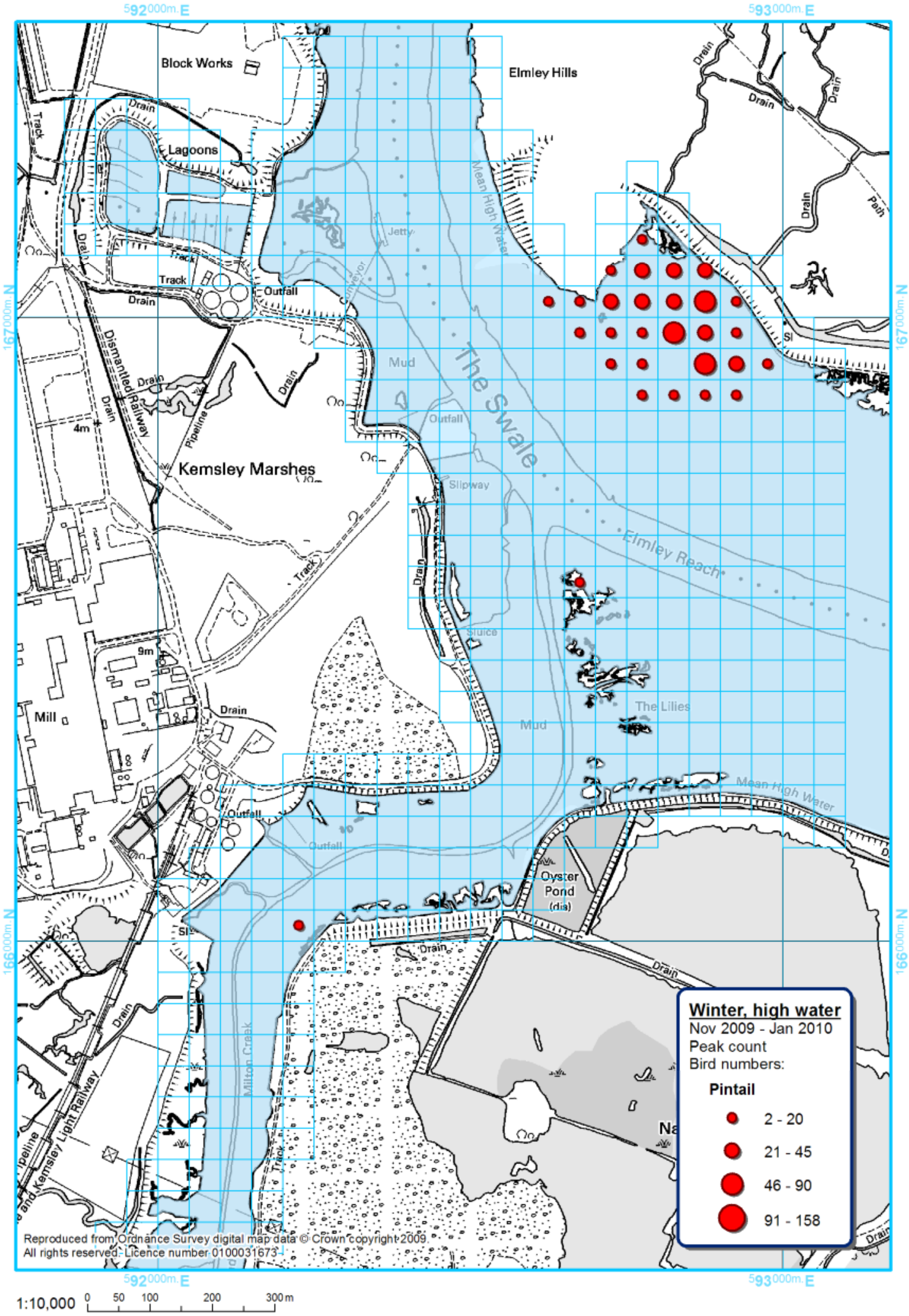


Figure C.25: Spatial distribution of Pintail over low water, Nov 2009 - Jan 2010

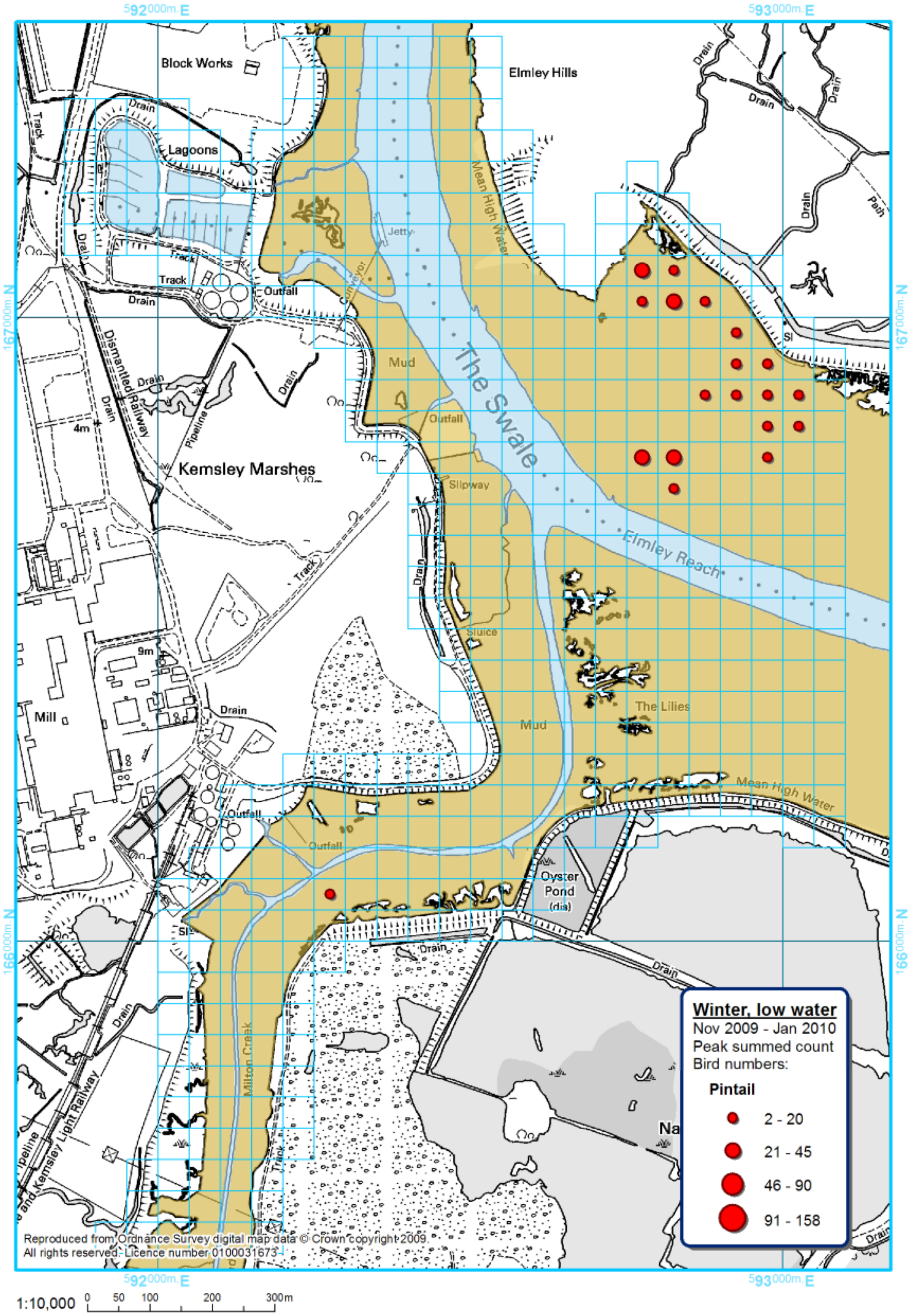


Figure C.26: Spatial distribution of Oystercatcher over high water , Oct 2009

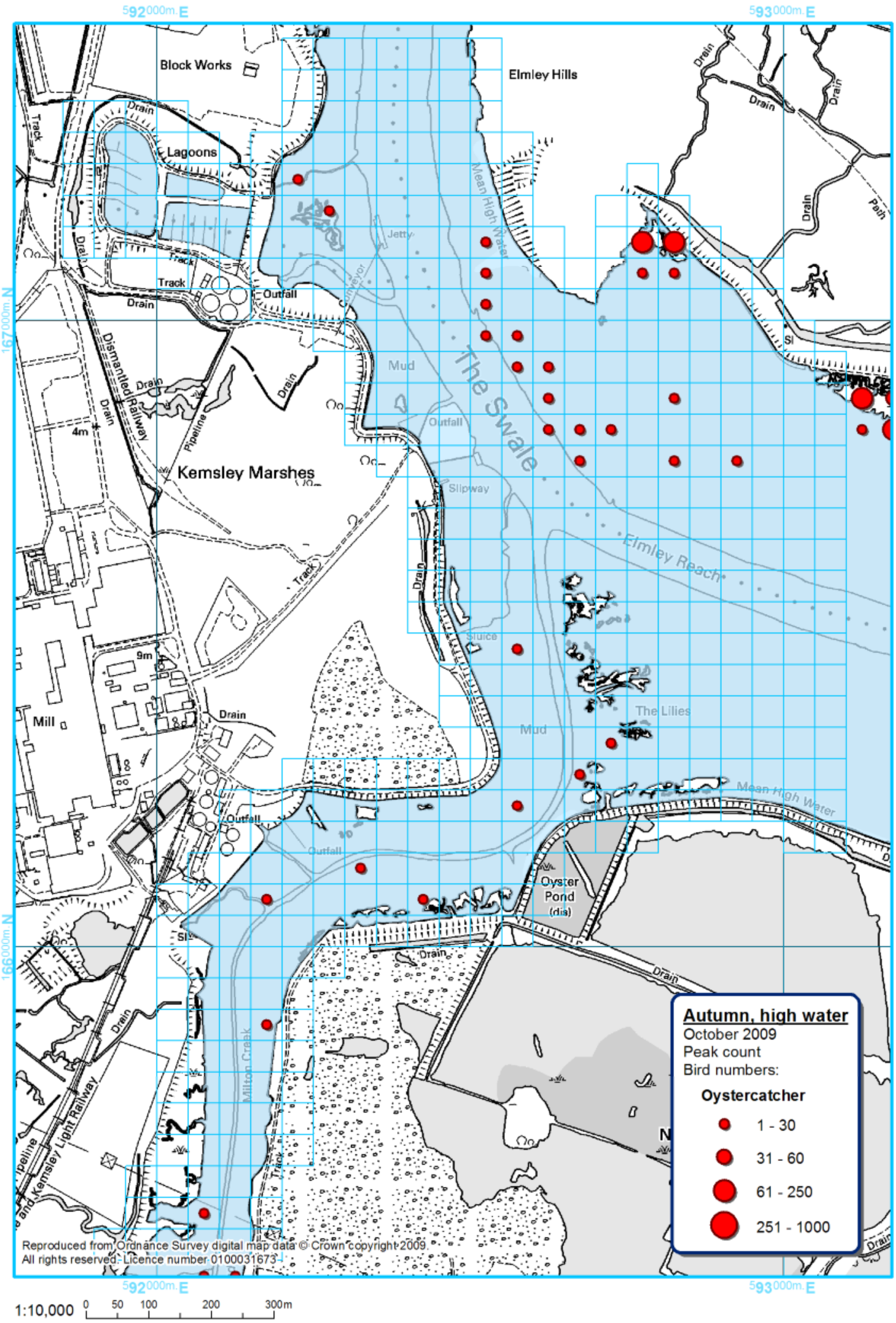


Figure C.27: Spatial distribution of Oystercatcher over low water , Oct 2009

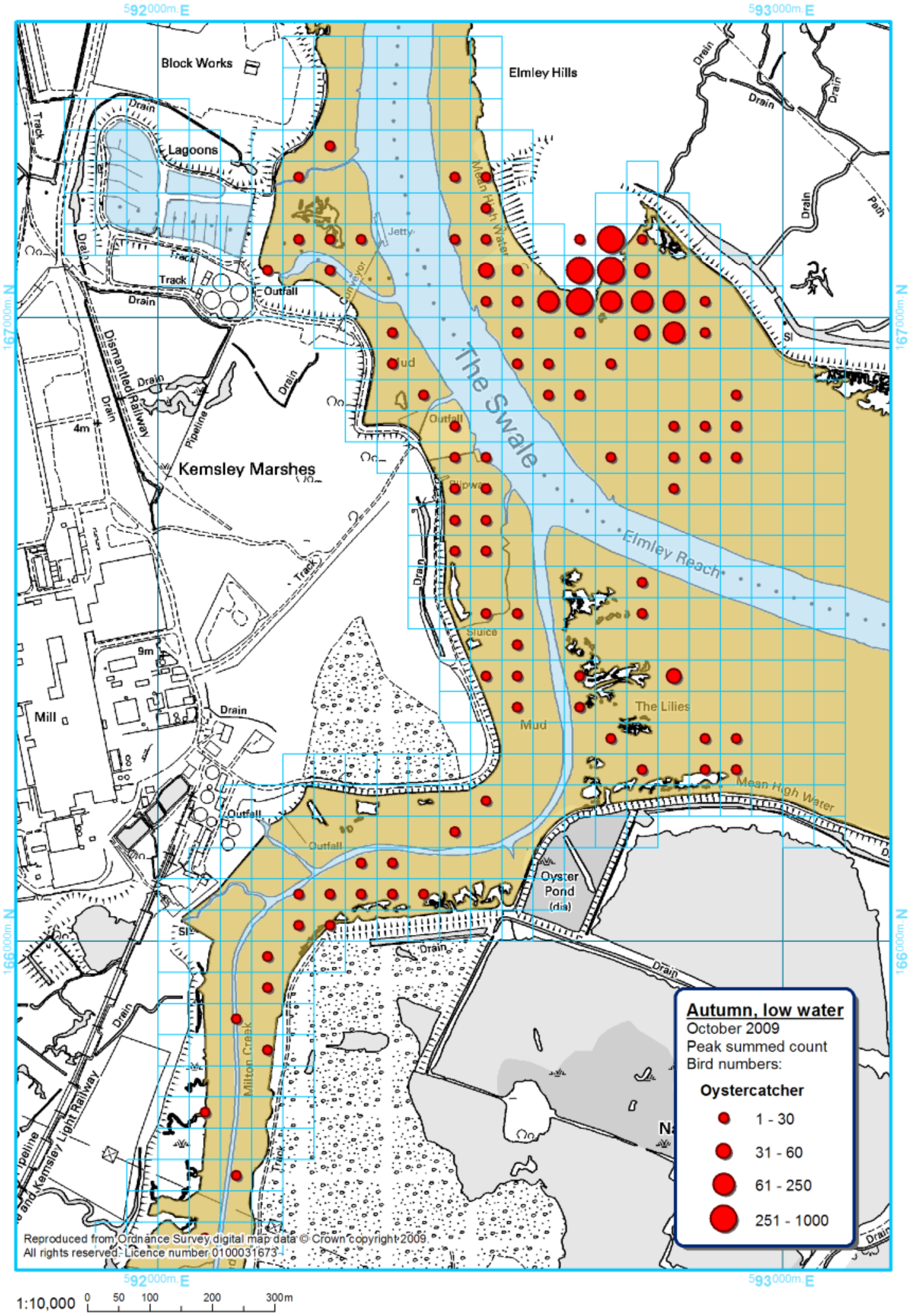


Figure C.28: Spatial distribution of Oystercatcher over high water, Nov 2009 - Jan 2010

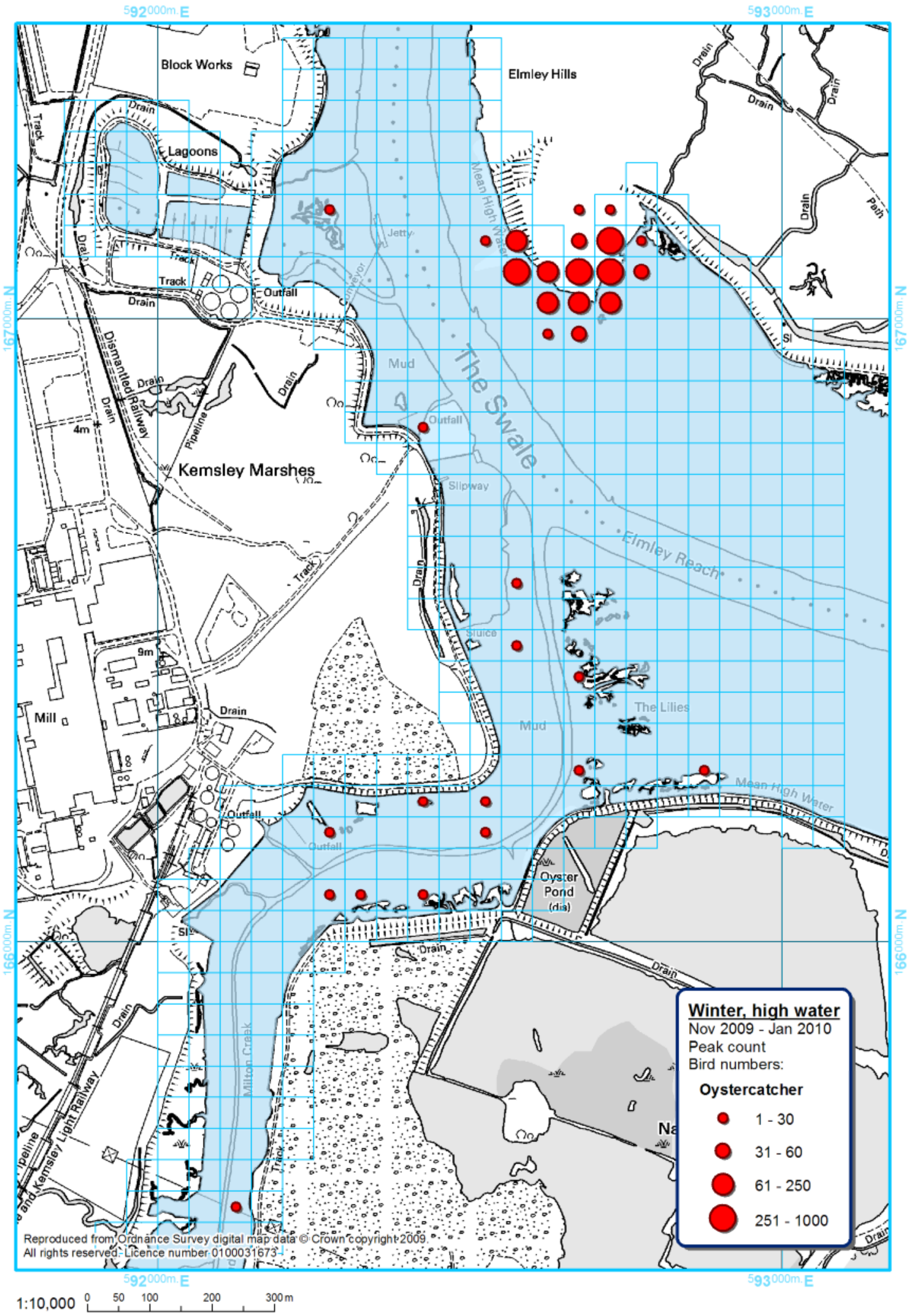


Figure C.29: Spatial distribution of Oystercatcher over low water, Nov 2009 - Jan 2010

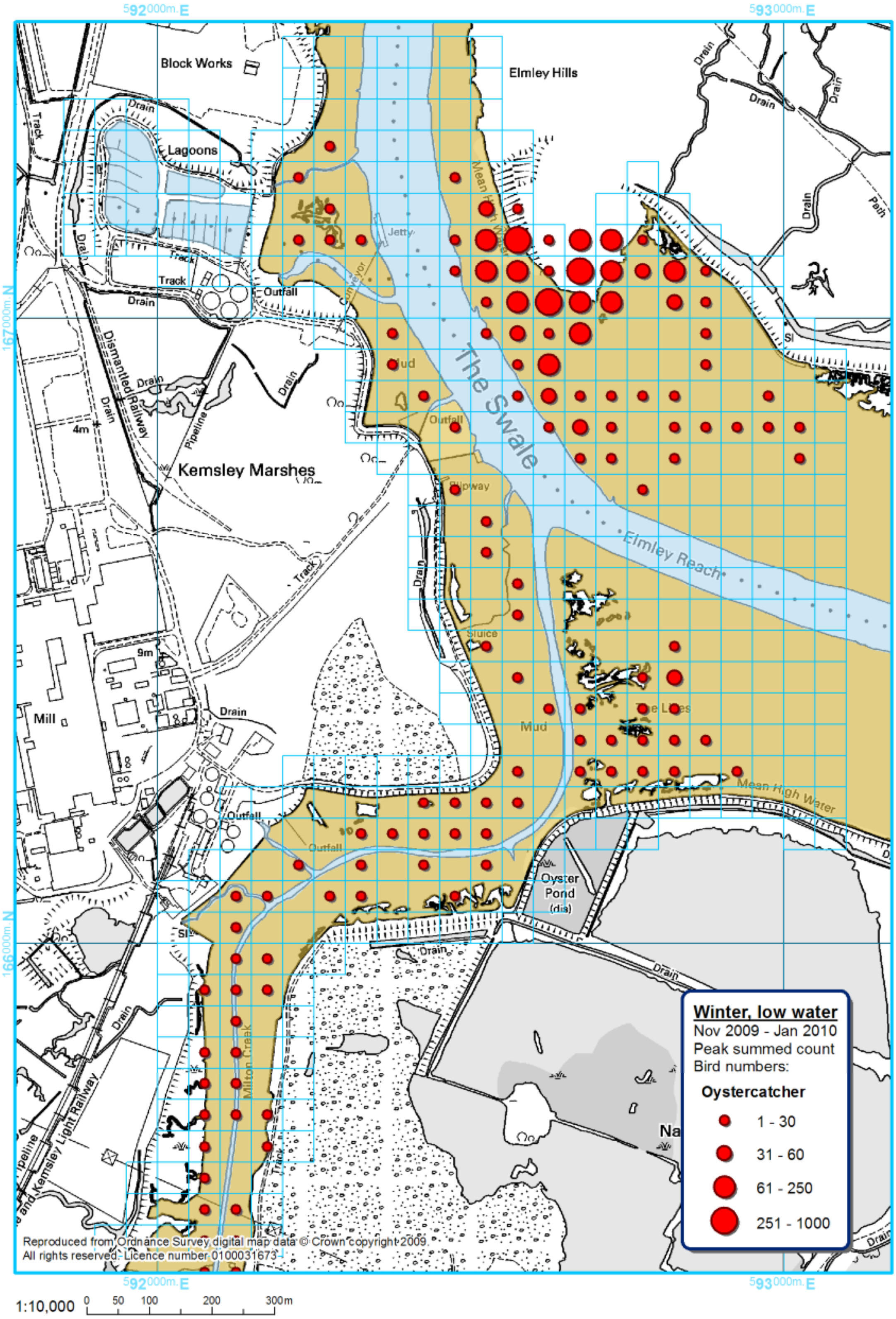


Figure C.30: Spatial distribution of Avocet over high water , Oct 2009

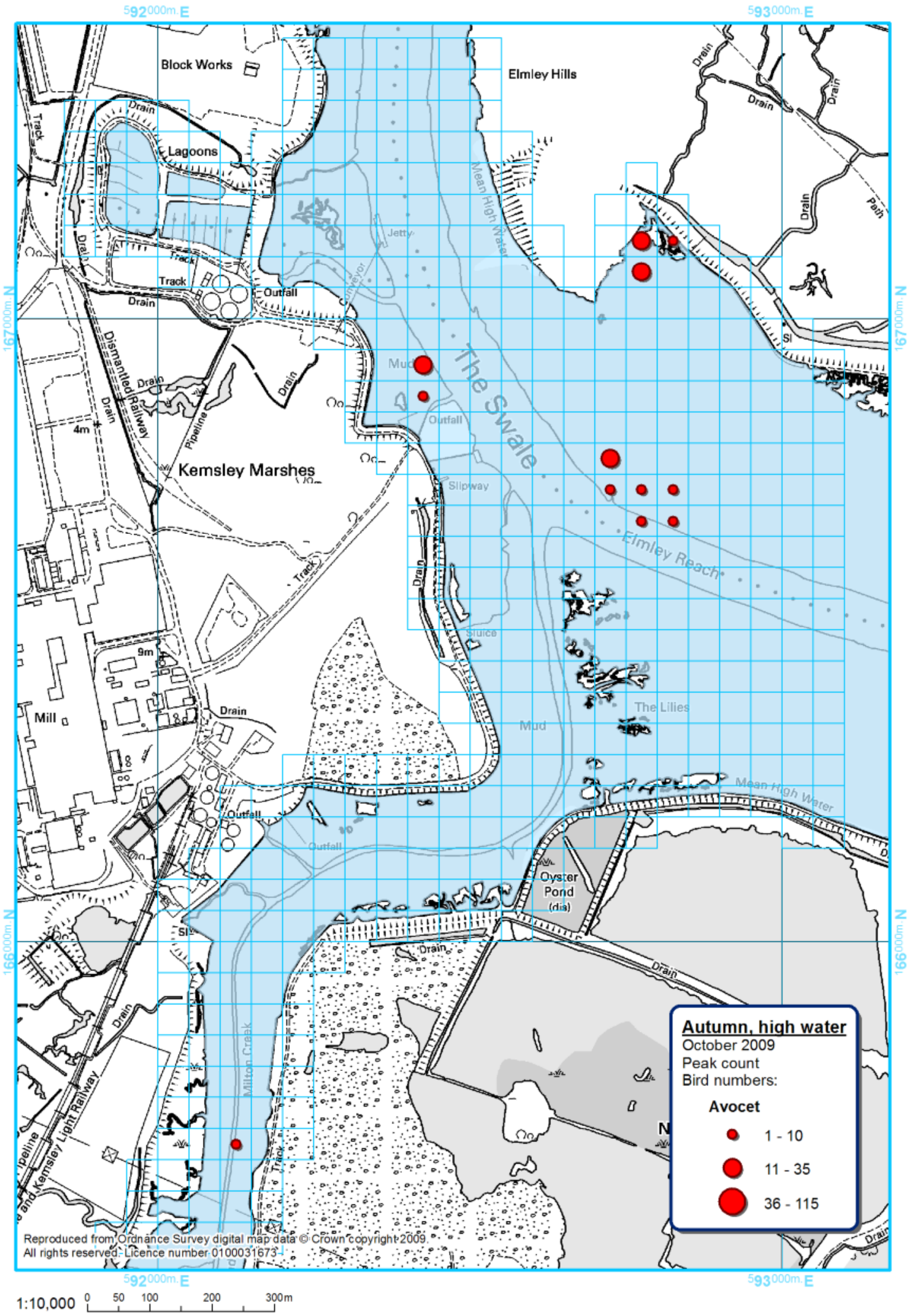


Figure C.31: Spatial distribution of Avocet over low water , Oct 2009

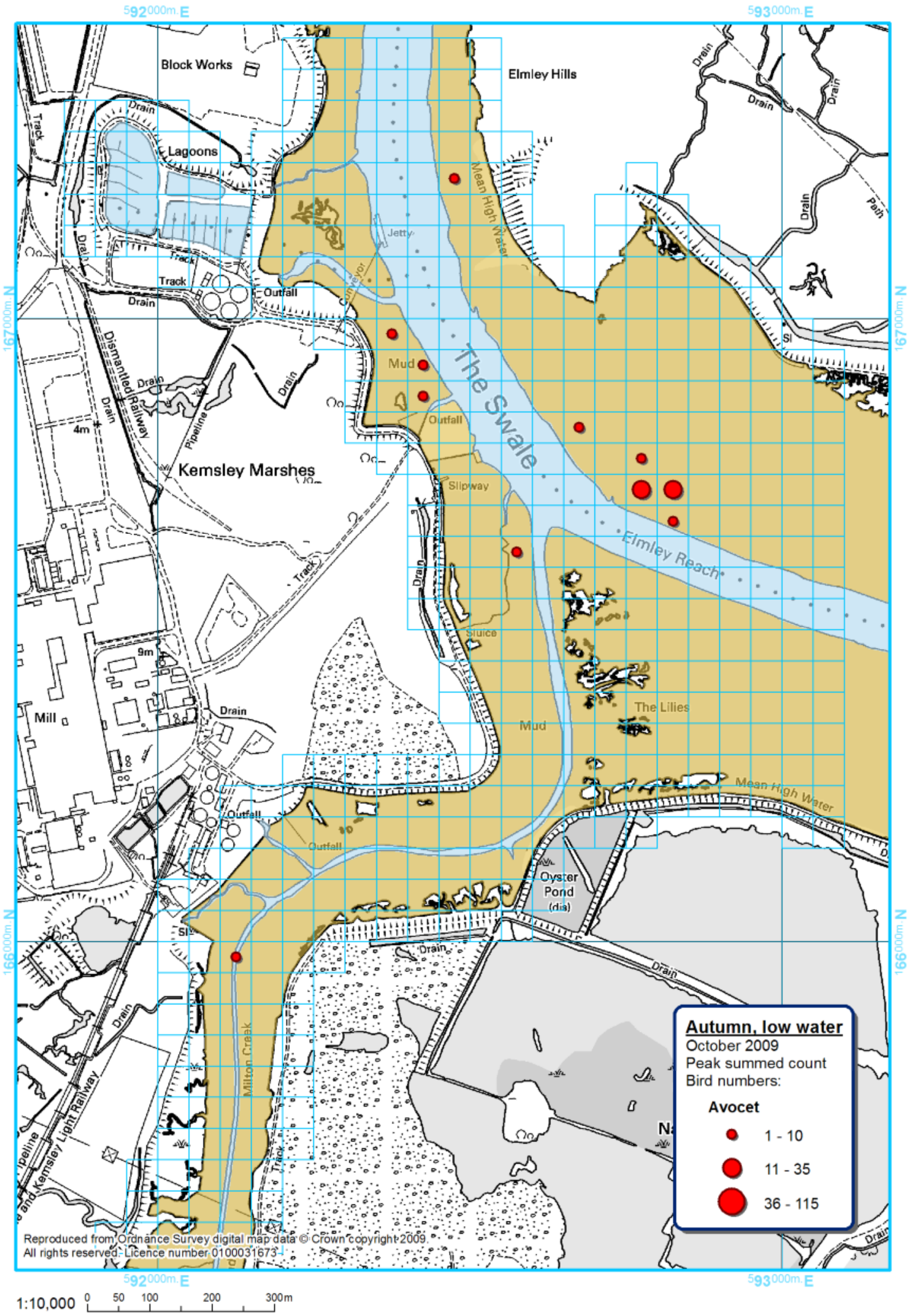


Figure C.32: Spatial distribution of Avocet over high water, Nov 2009 - Jan 2010

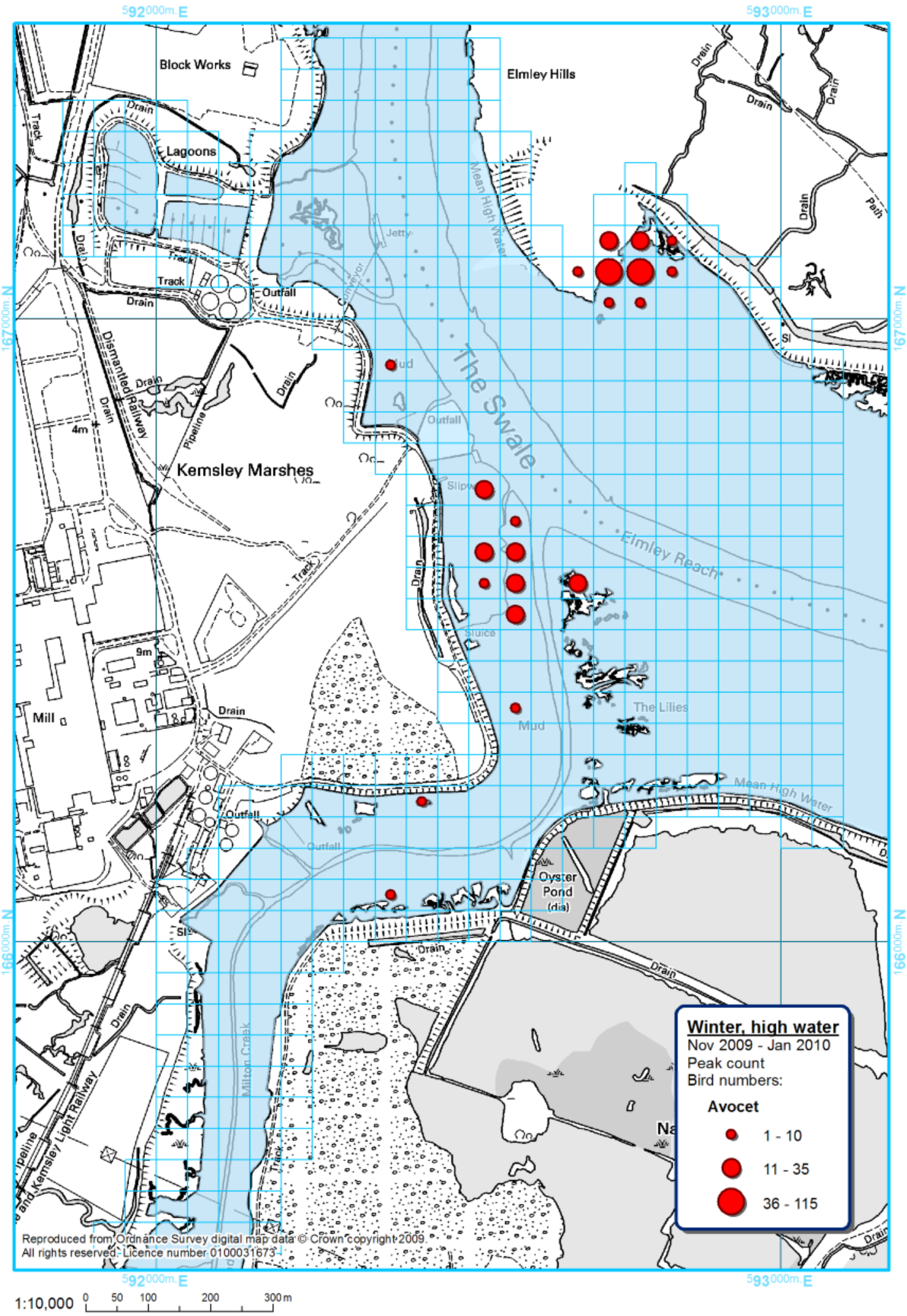


Figure C.33: Spatial distribution of Avocet over low water, Nov 2009 - Jan 2010

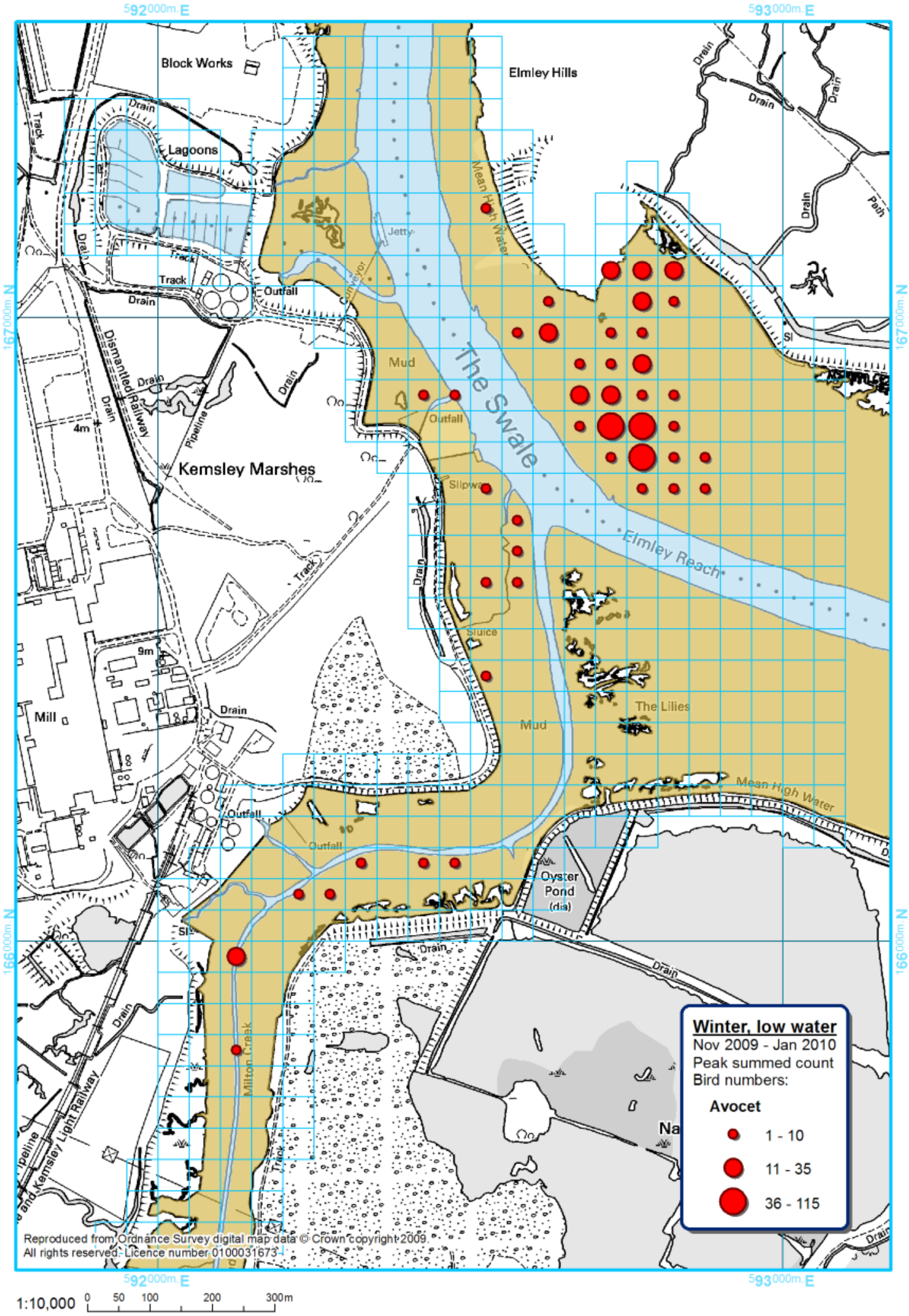


Figure C.34: Spatial distribution of Ring Plover over low water , Oct 2009

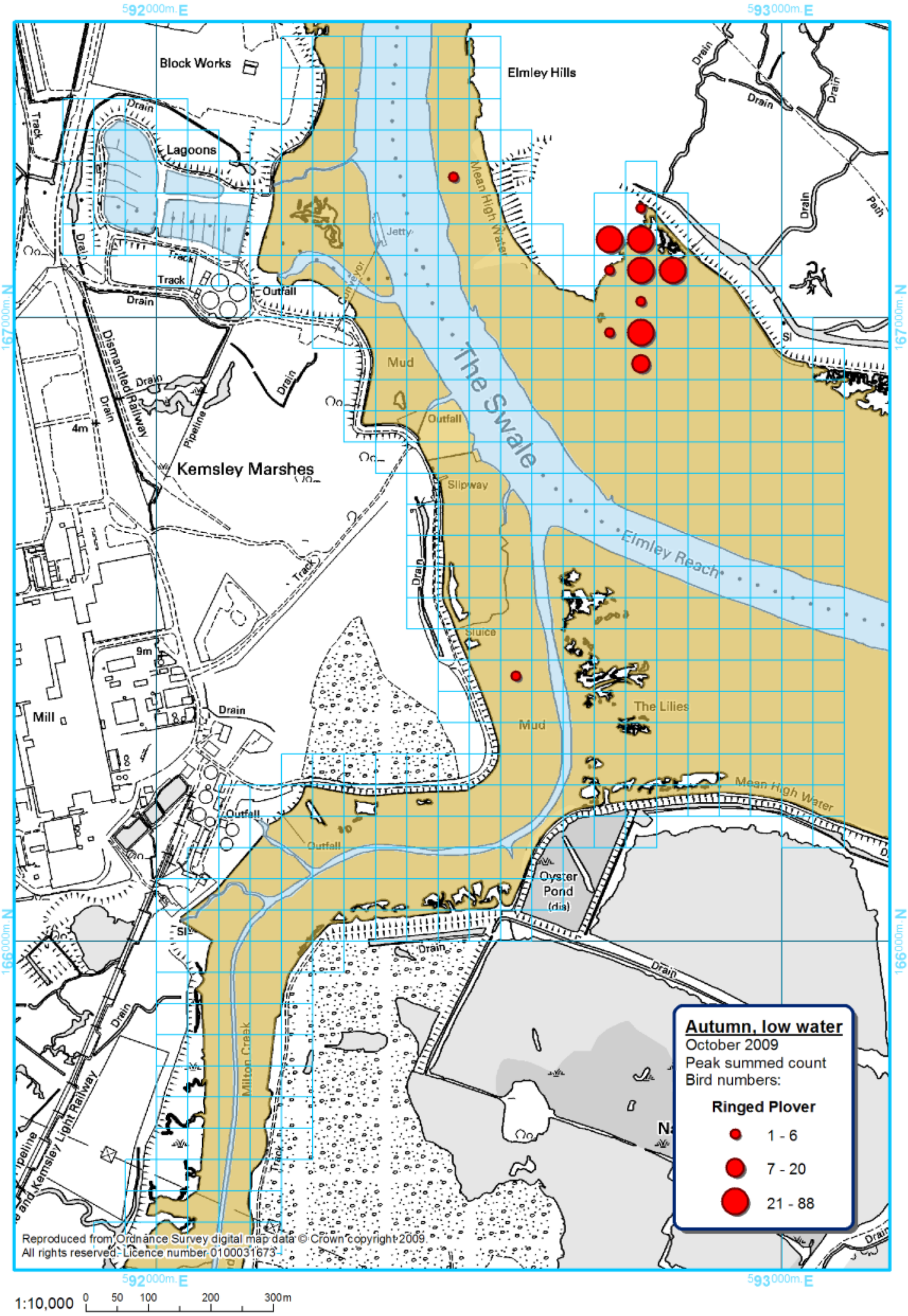


Figure C.35: Spatial distribution of Ring Plover over high water, Nov 2009 - Jan 2010

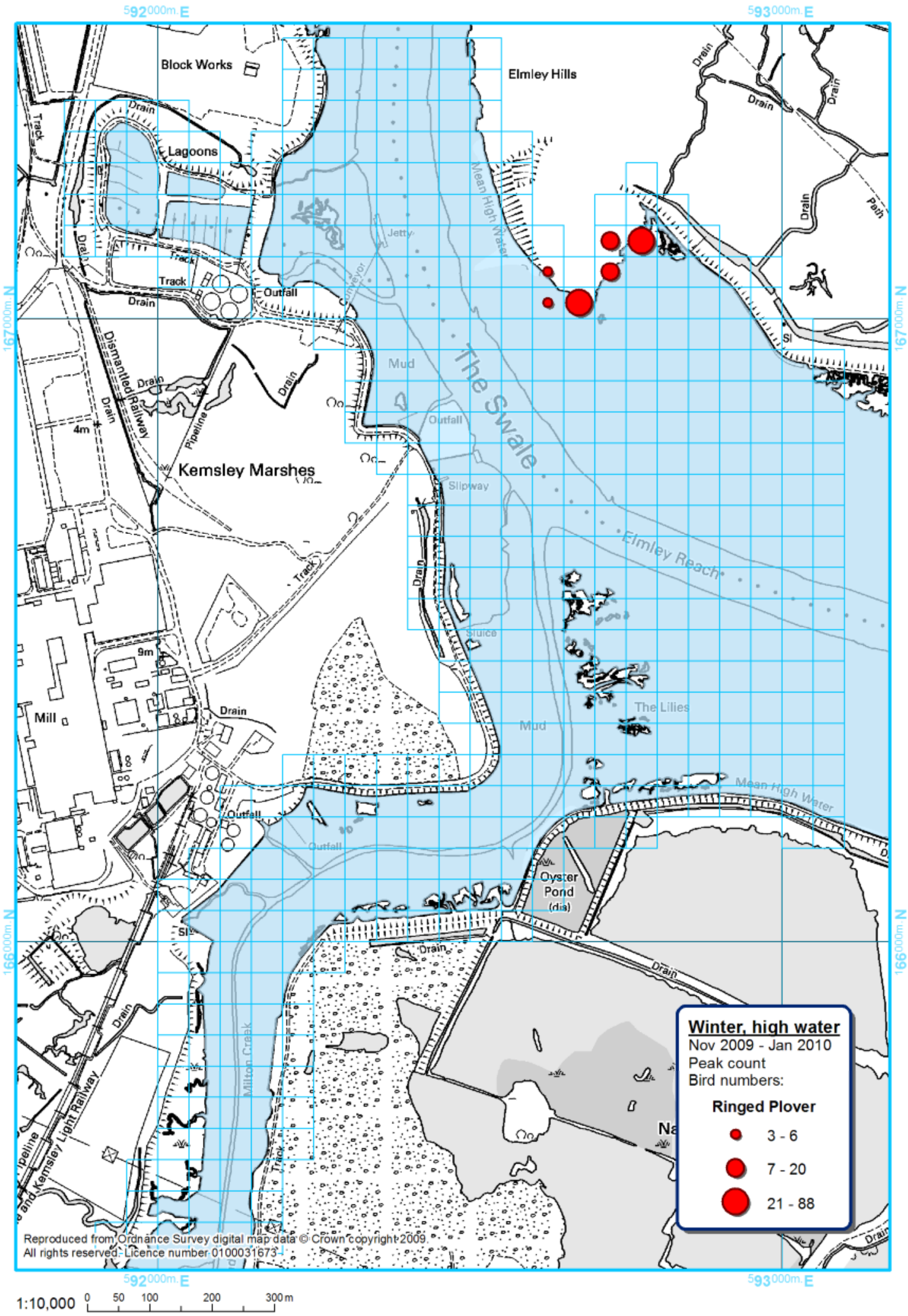


Figure C.36: Spatial distribution of Ring Plover over low water, Nov 2009 - Jan 2010

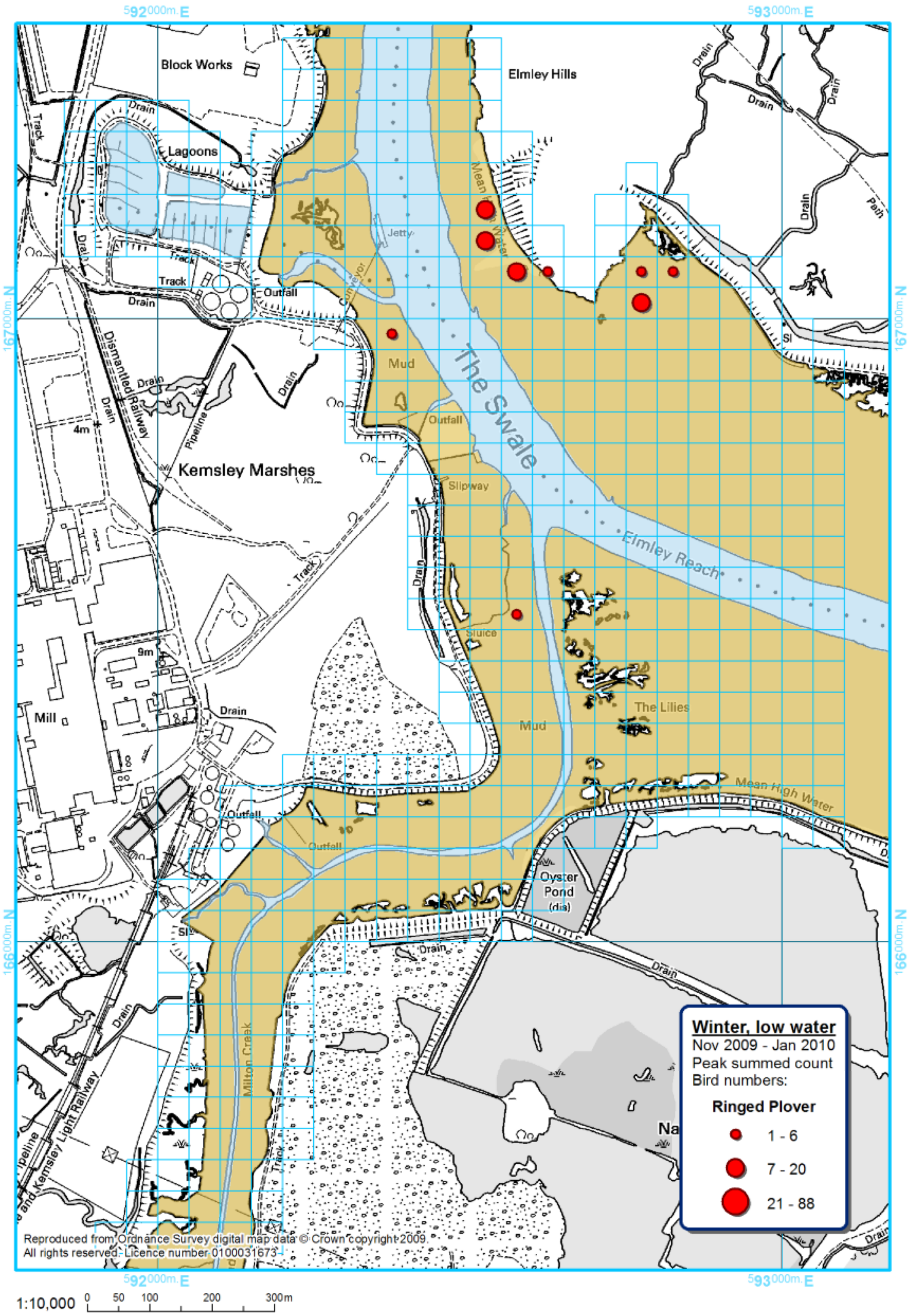


Figure C.37: Spatial distribution of Grey Plover over high water , Oct 2009

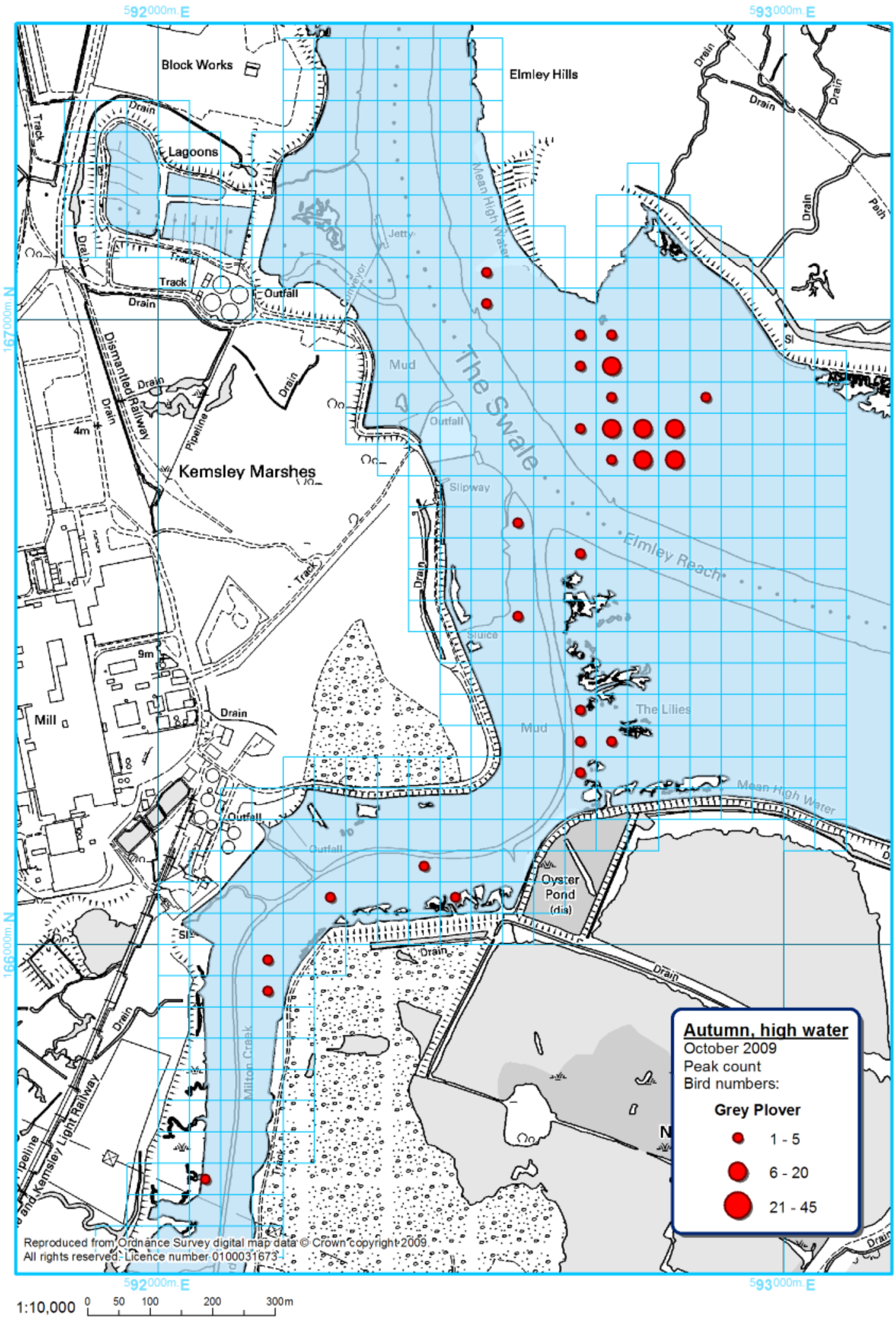


Figure C.38: Spatial distribution of Grey Plover over low water , Oct 2009

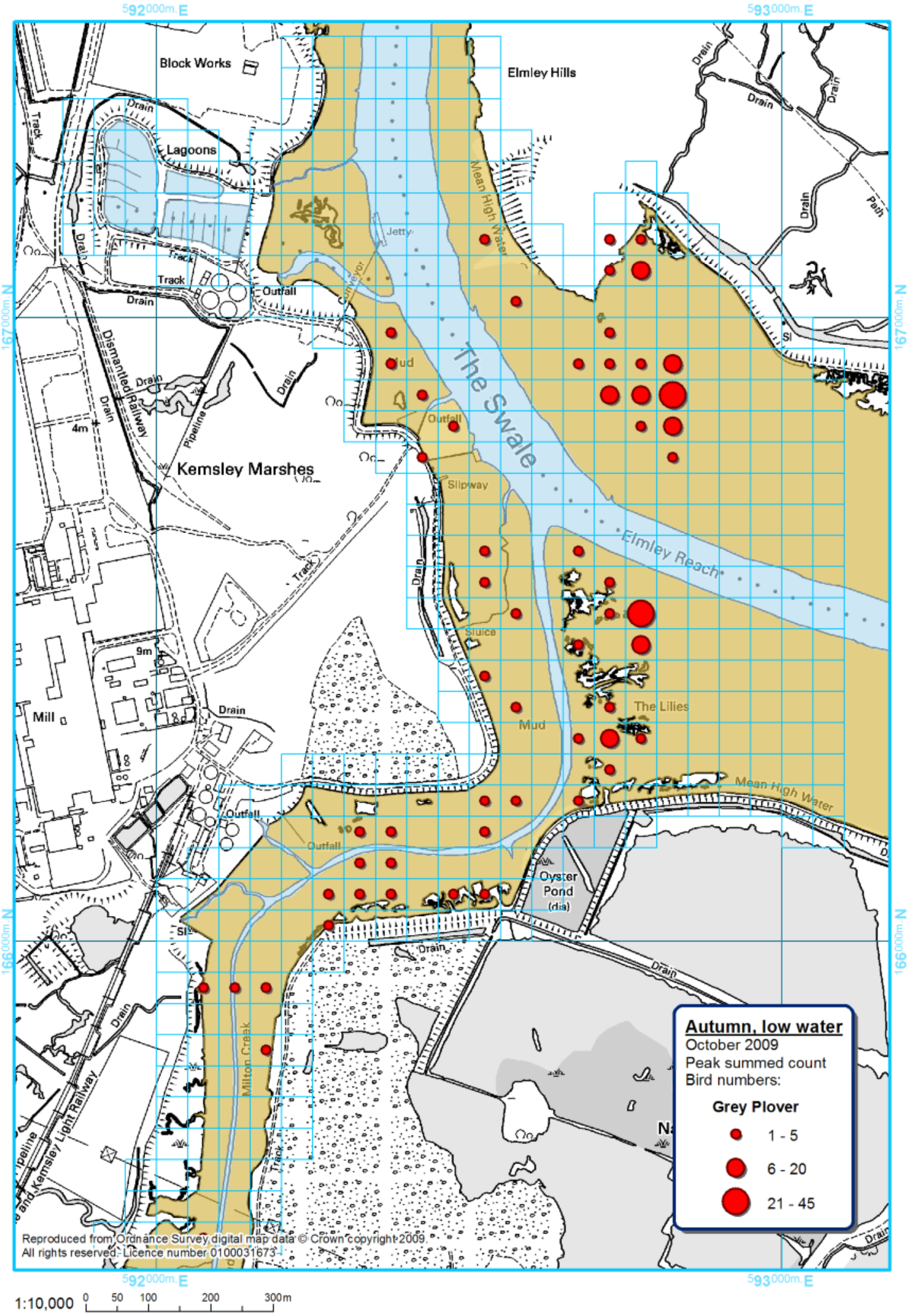


Figure C.39: Spatial distribution of Grey Plover over high water, Nov 2009 - Jan 2010

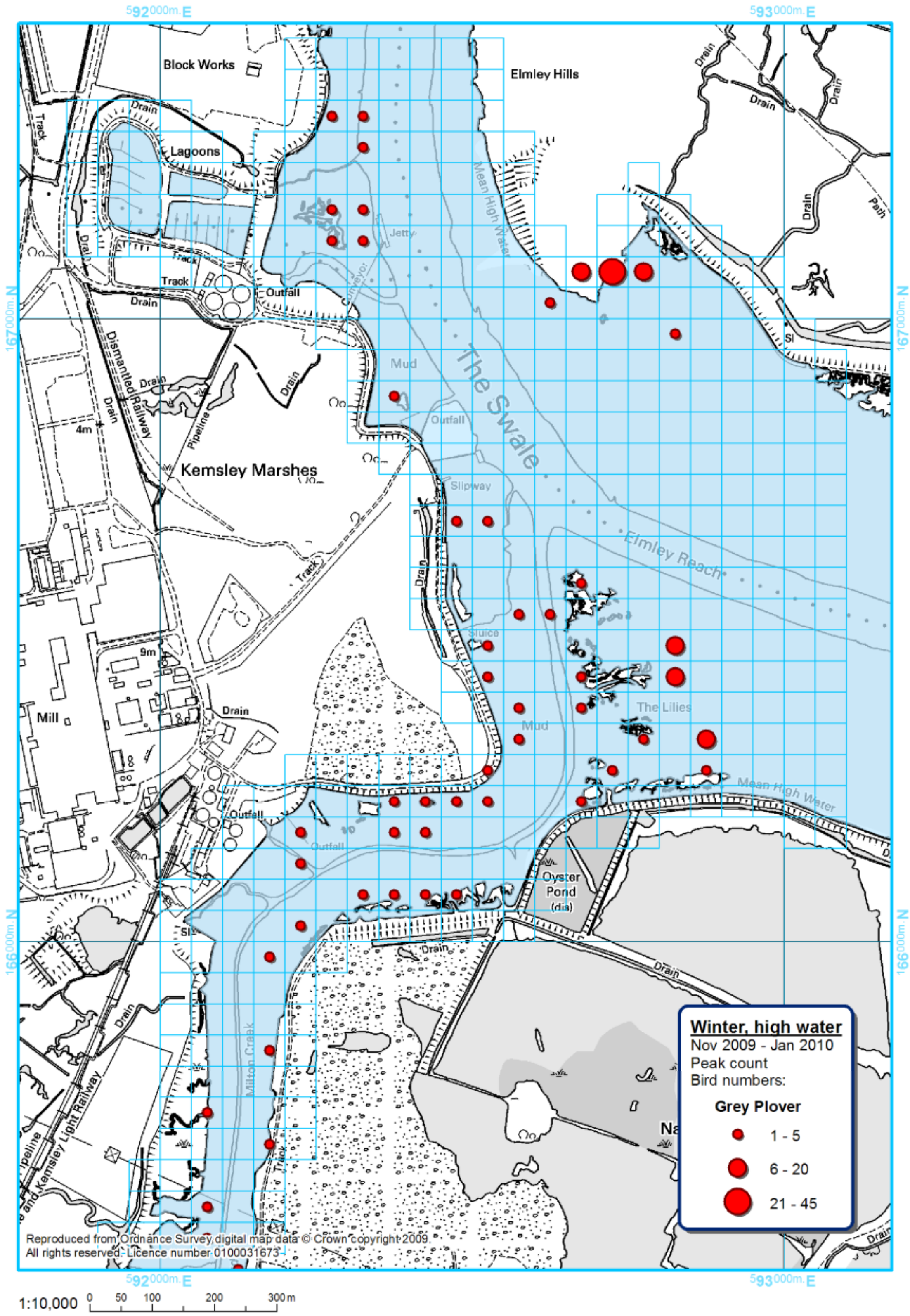


Figure C.40: Spatial distribution of Grey Plover over low water, Nov 2009 - Jan 2010

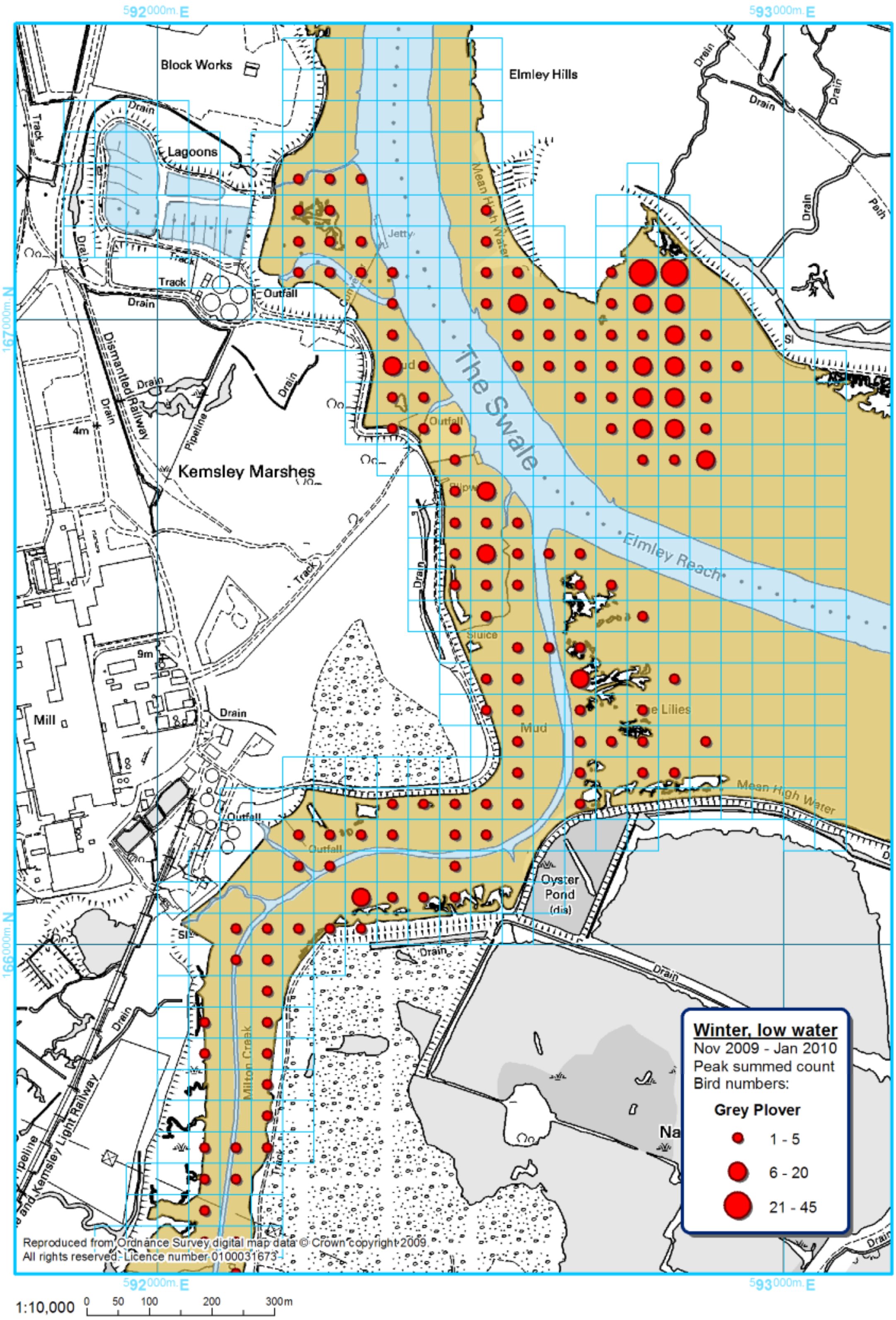


Figure C.41: Spatial distribution of Lapwing over high water , Oct 2009

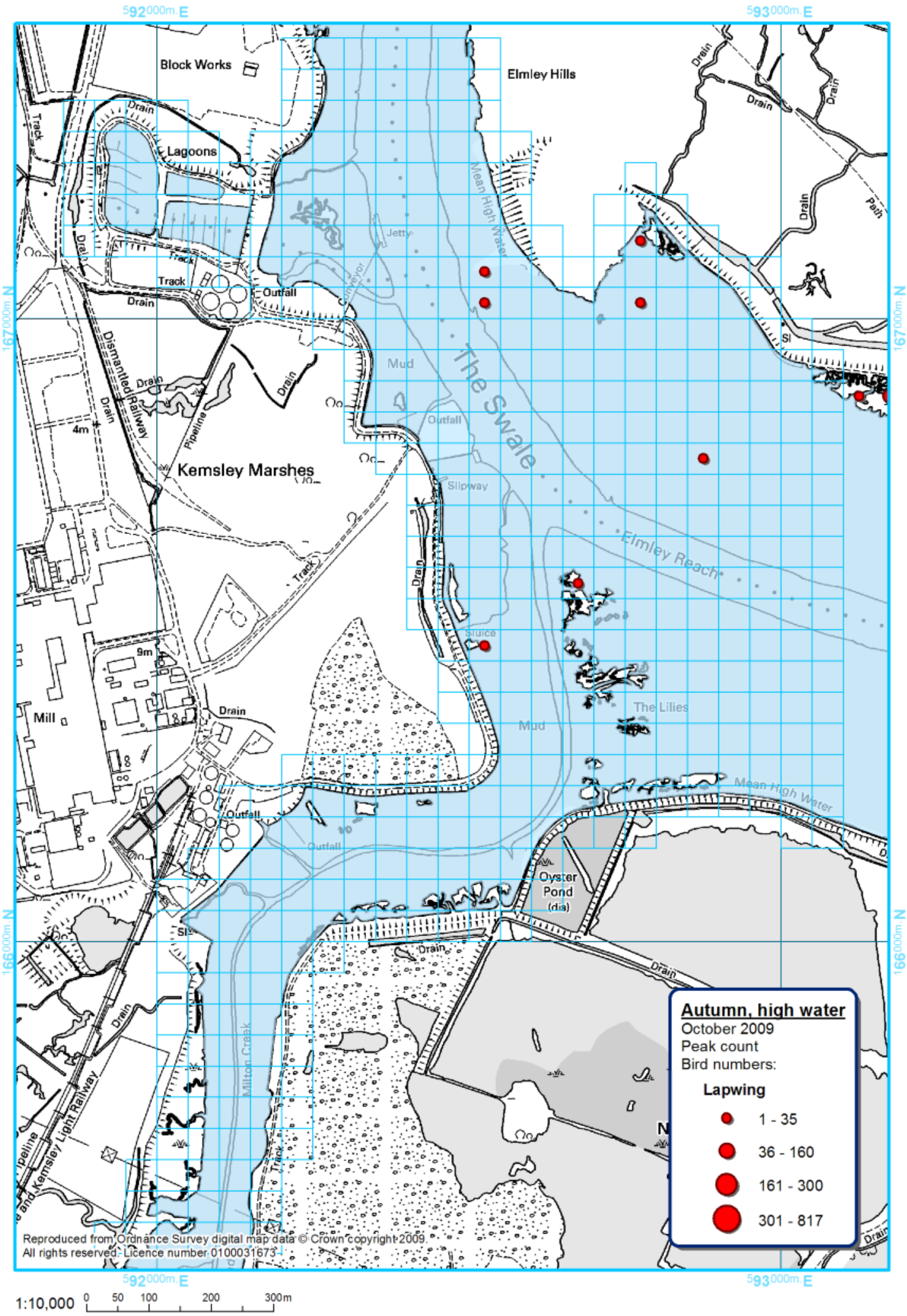


Figure C.42: Spatial distribution of Lapwing over low water , Oct 2009

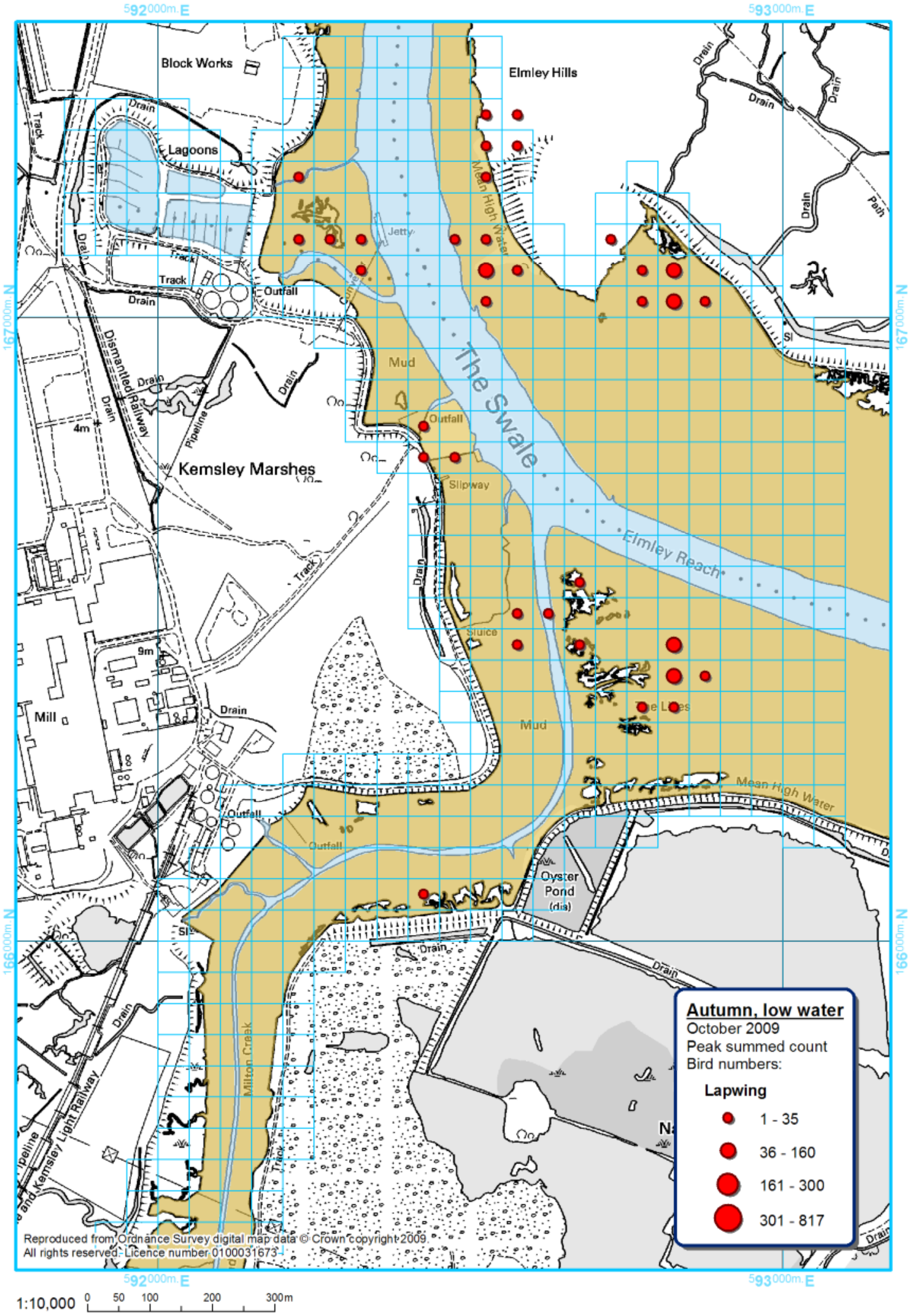


Figure C.43: Spatial distribution of Lapwing over high water, Nov 2009 - Jan 2010

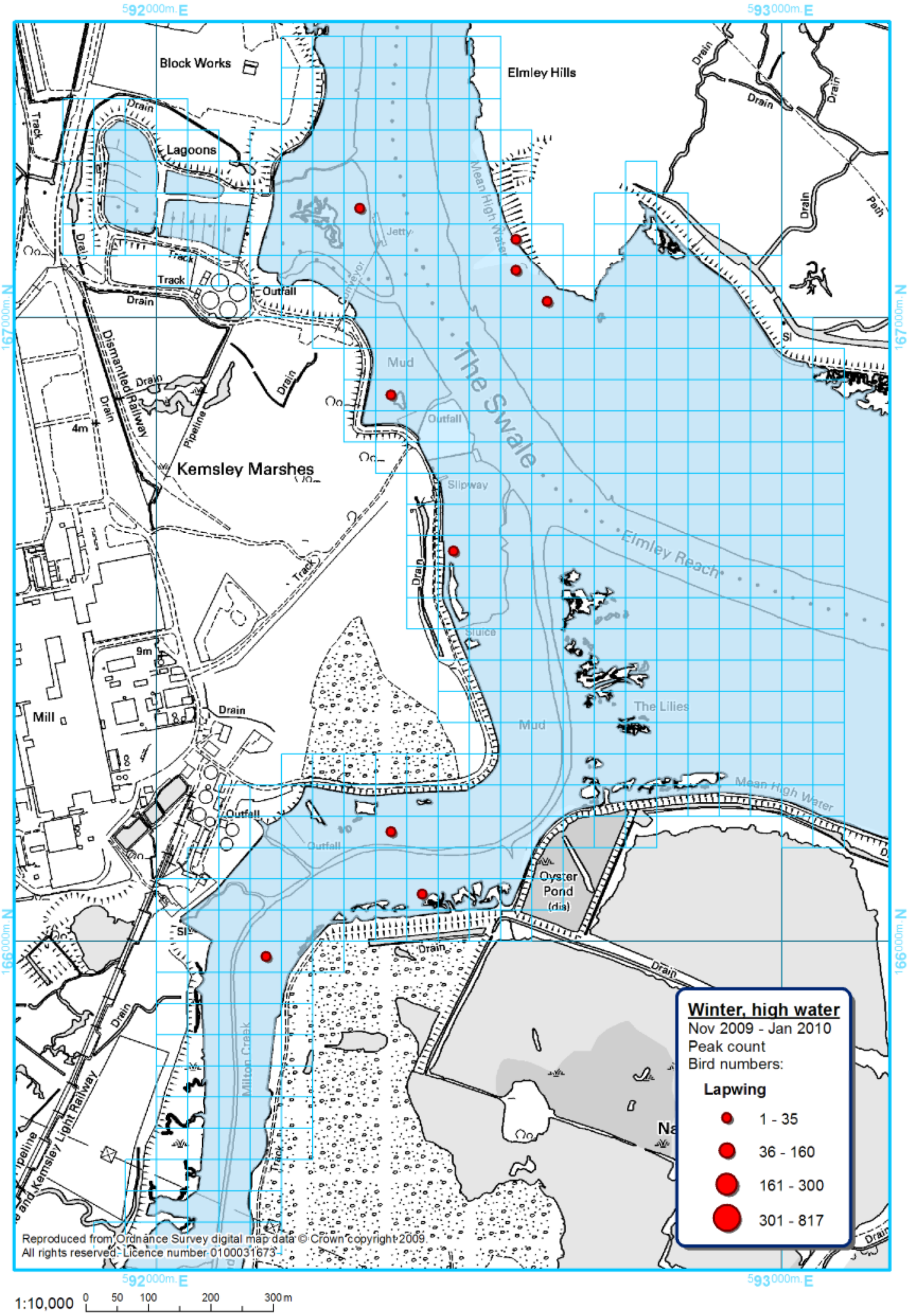


Figure C.44: Spatial distribution of Lapwing over low water, Nov 2009 - Jan 2010

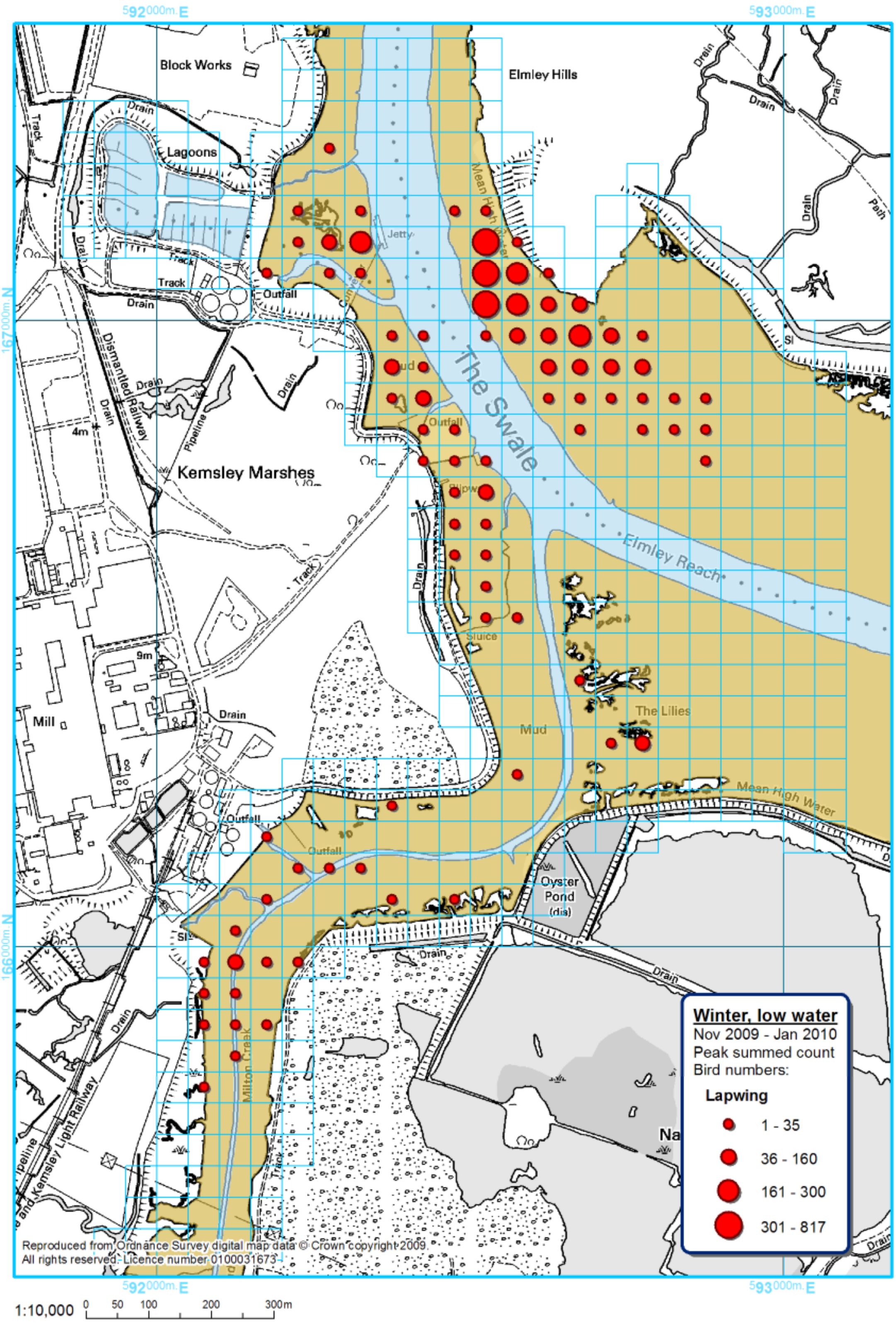


Figure C.45: Spatial distribution of Knot over low water , Oct 2009

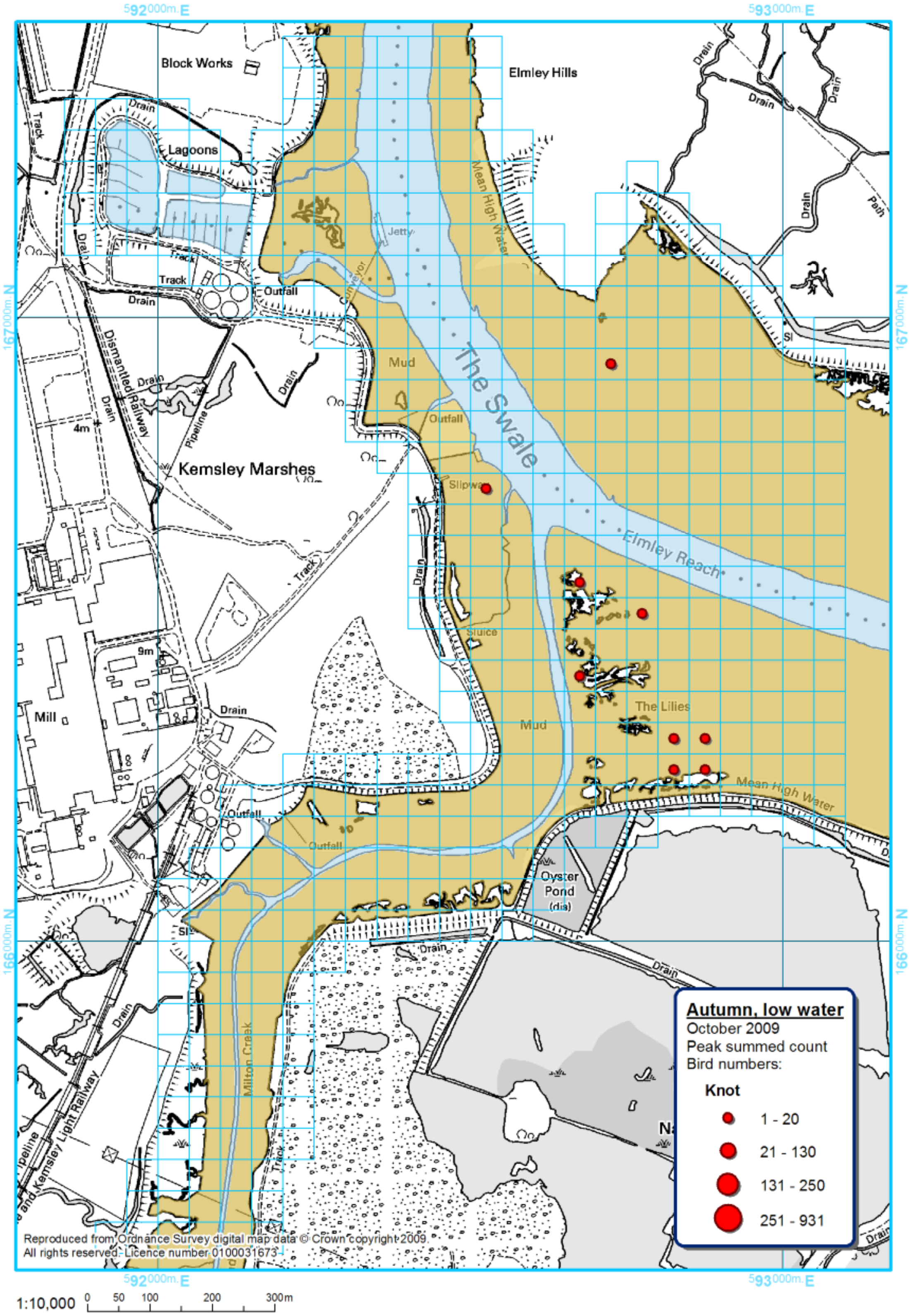


Figure C.46: Spatial distribution of Knot over high water, Nov 2009 - Jan 2010

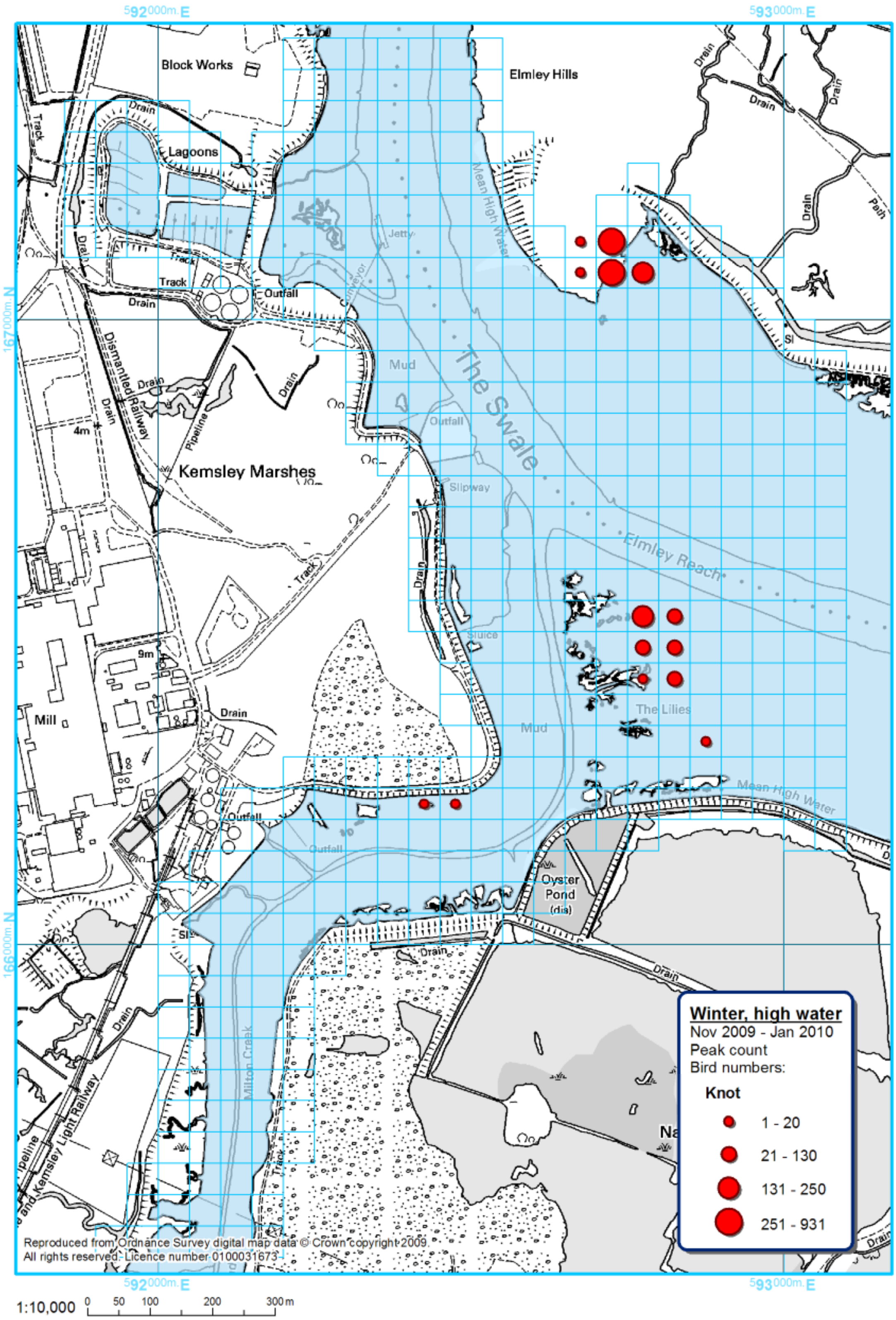


Figure C.47: Spatial distribution of Knot over low water, Nov 2009 - Jan 2010

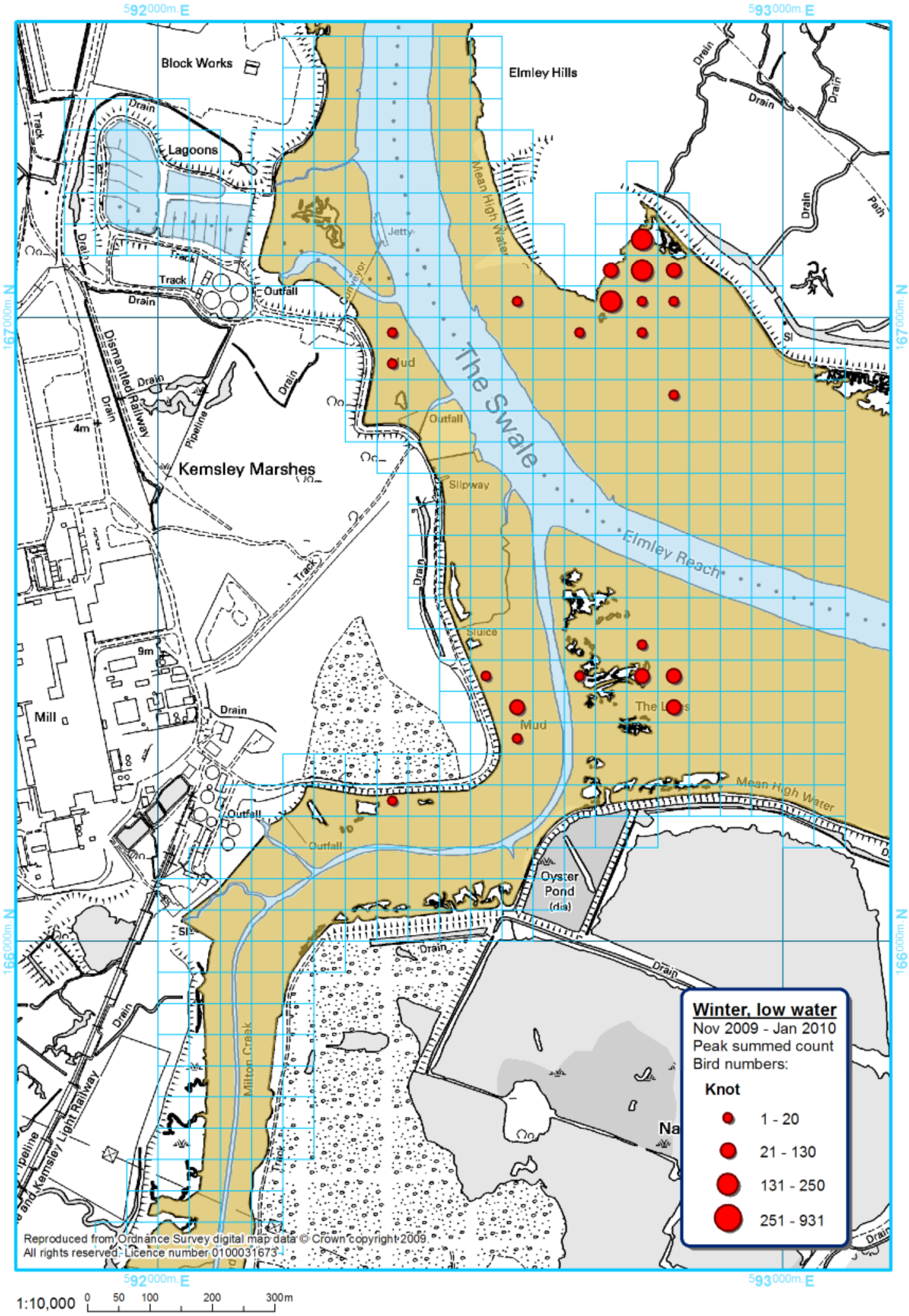


Figure C.48: Spatial distribution of Dunlin over high water , Oct 2009

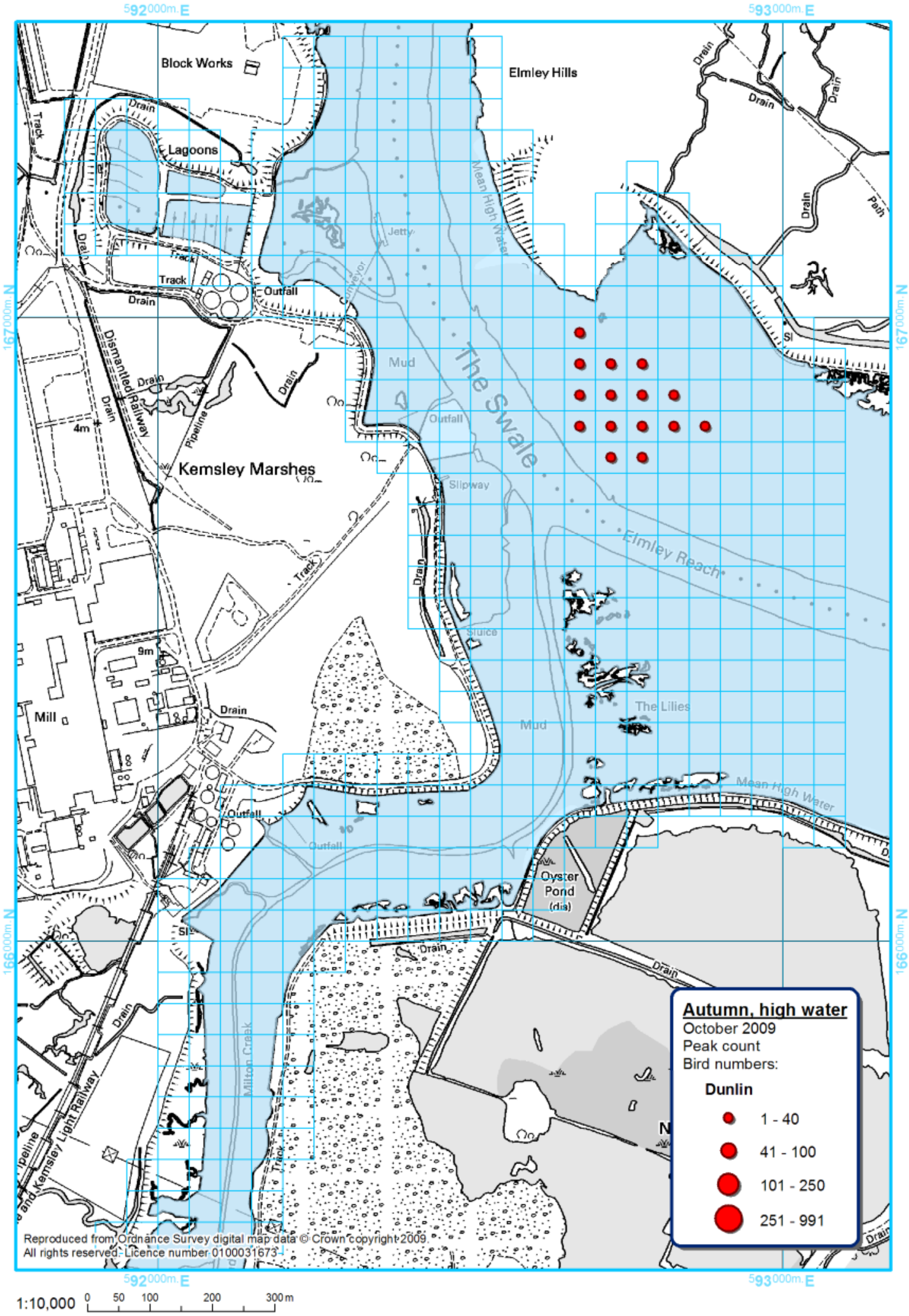


Figure C.49: Spatial distribution of Dunlin over low water , Oct 2009

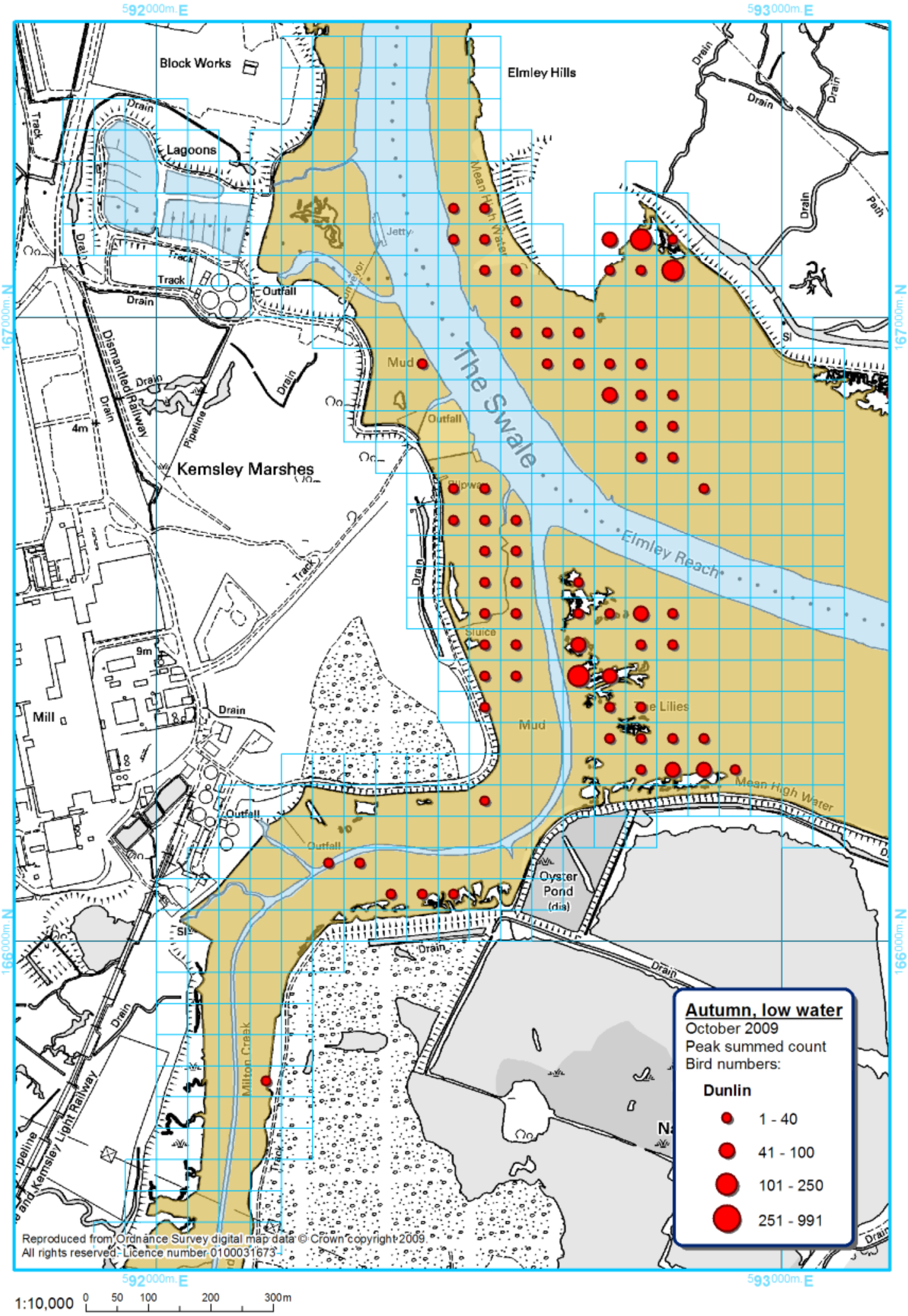


Figure C.50: Spatial distribution of Dunlin over high water, Nov 2009 - Jan 2010

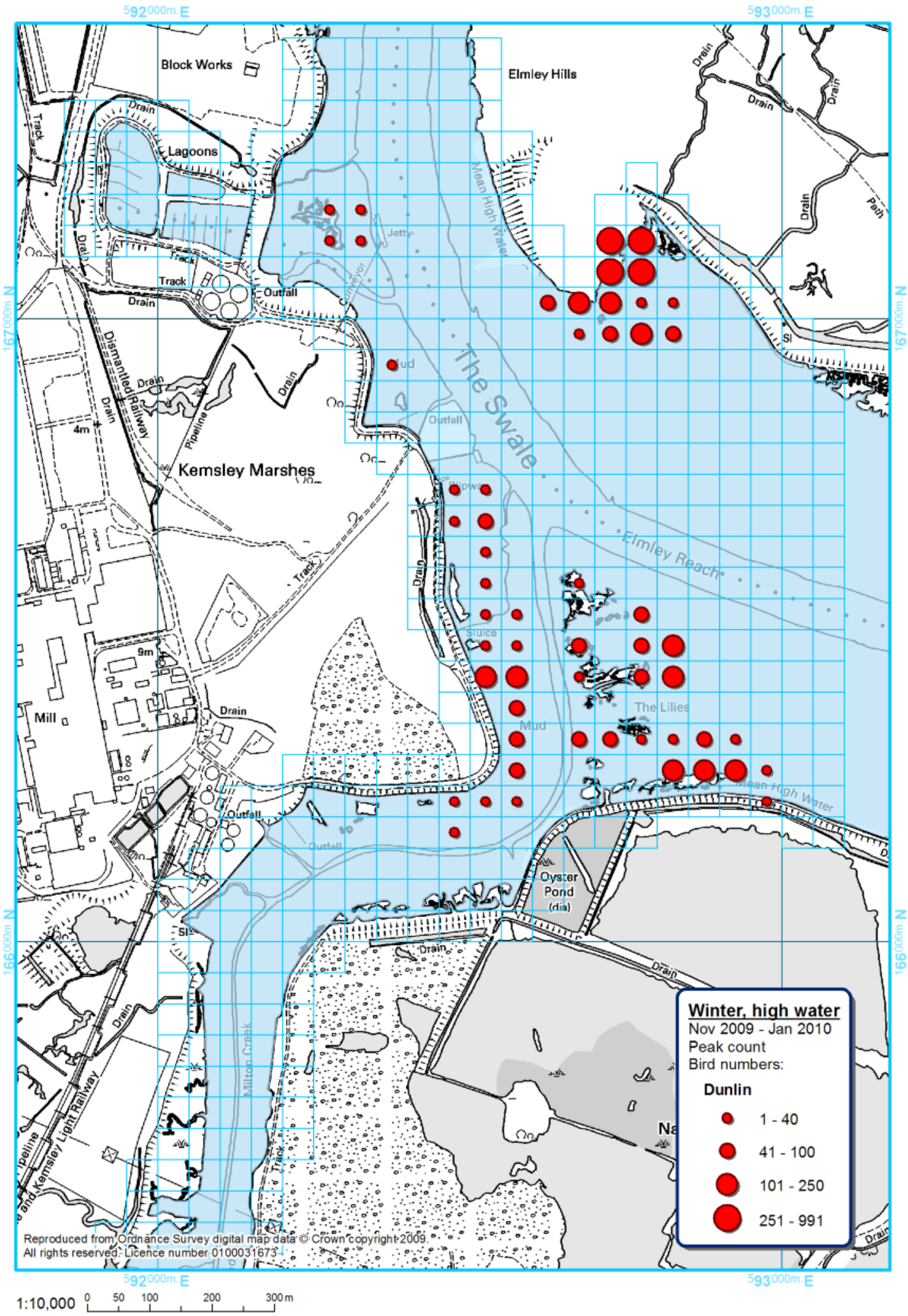


Figure C.51: Spatial distribution of Dunlin over low water, Nov 2009 - Jan 2010

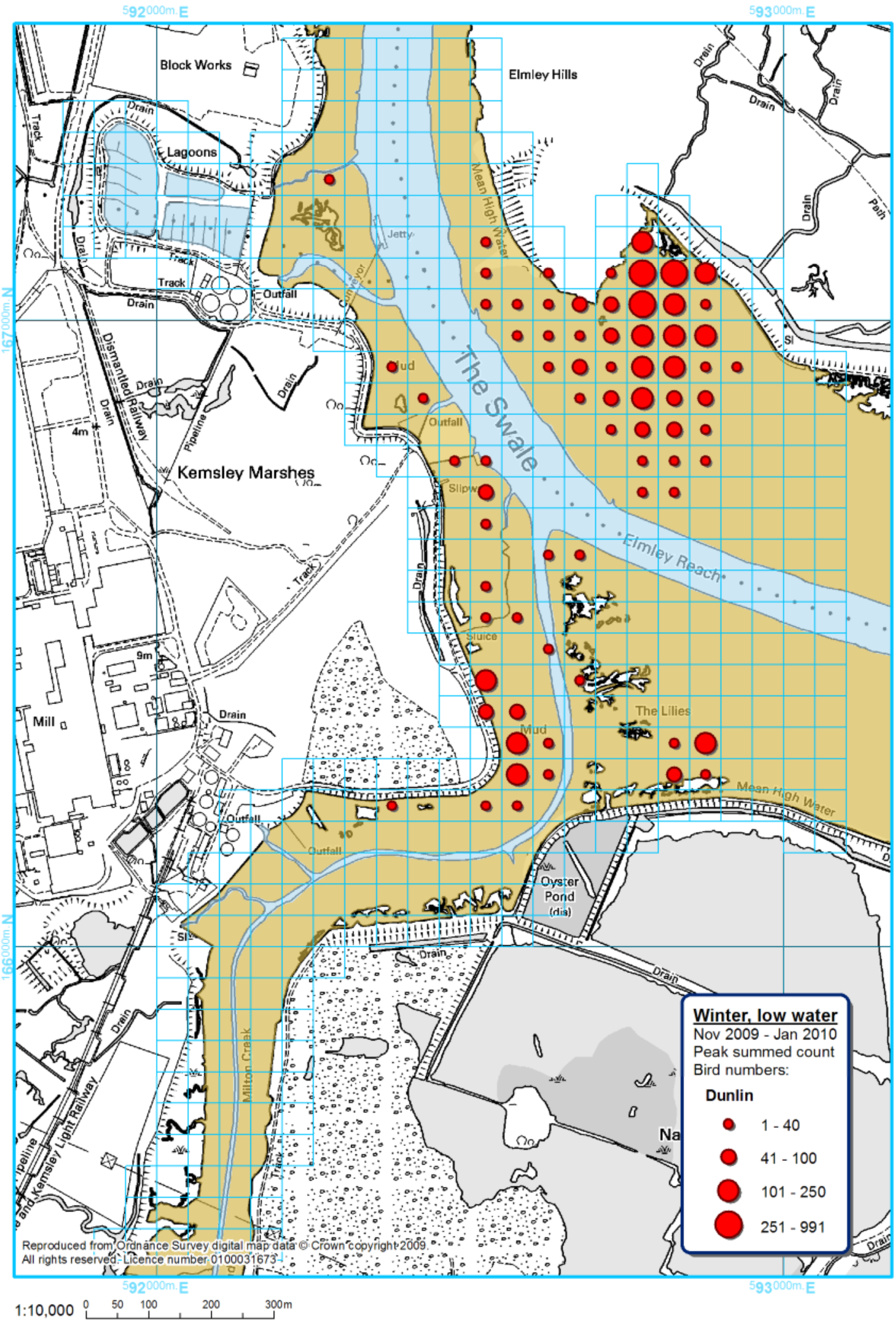


Figure C.52: Spatial distribution of Black-tailed Godwit over high water , Oct 2009

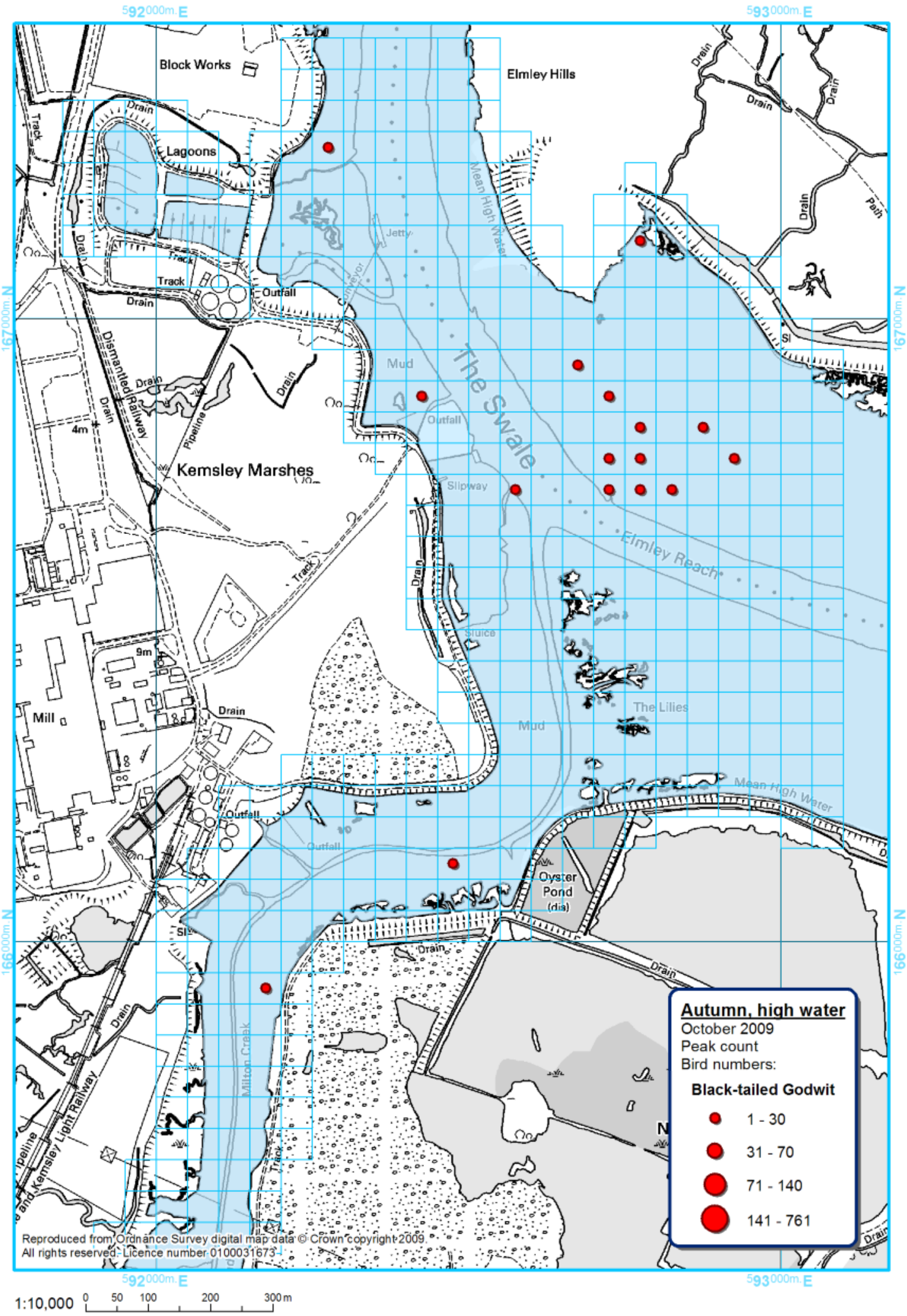


Figure C.53: Spatial distribution of Black-tailed Godwit over low water , Oct 2009

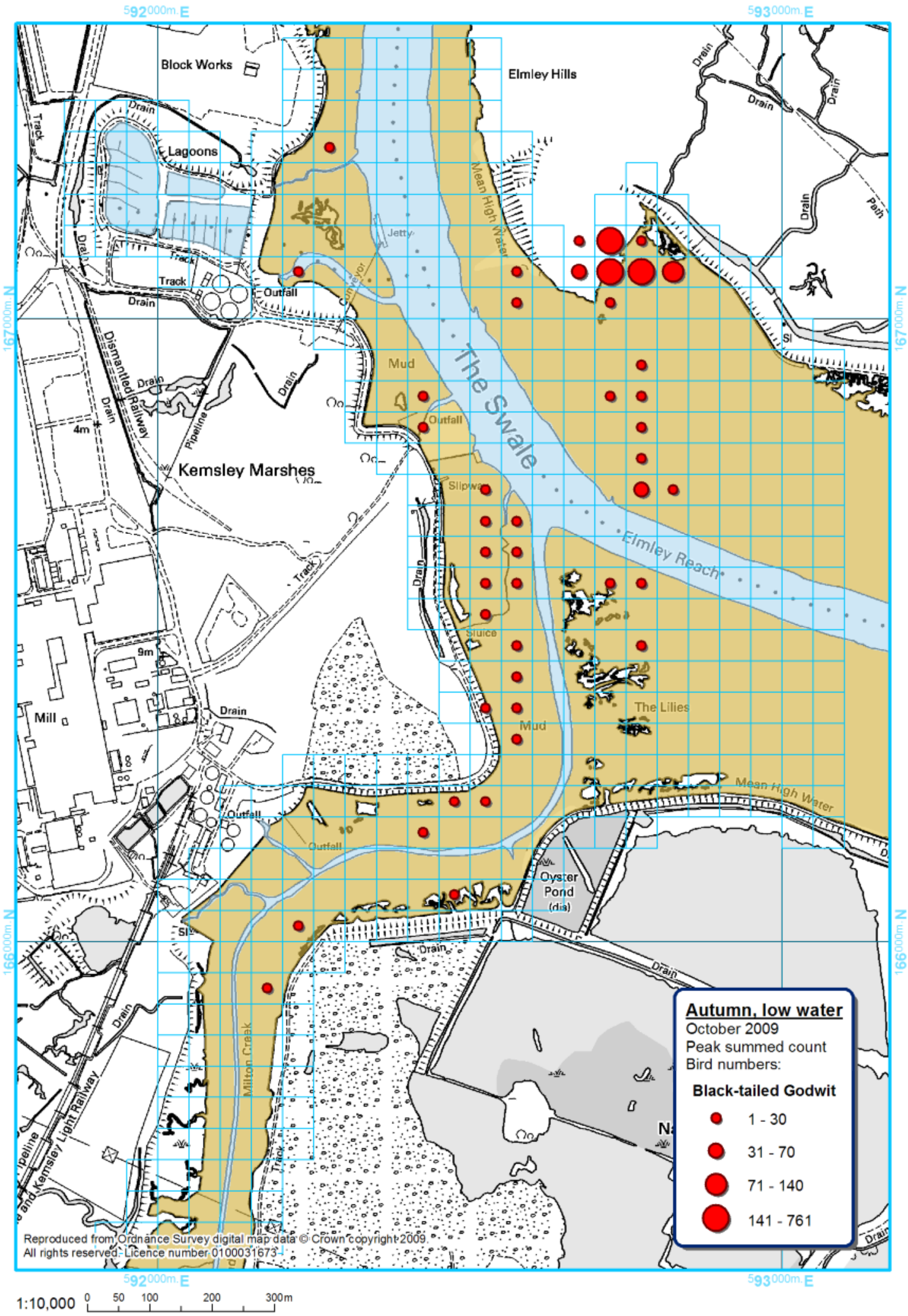


Figure C.54: Spatial distribution of Black-tailed Godwit over high water, Nov 2009 - Jan 2010

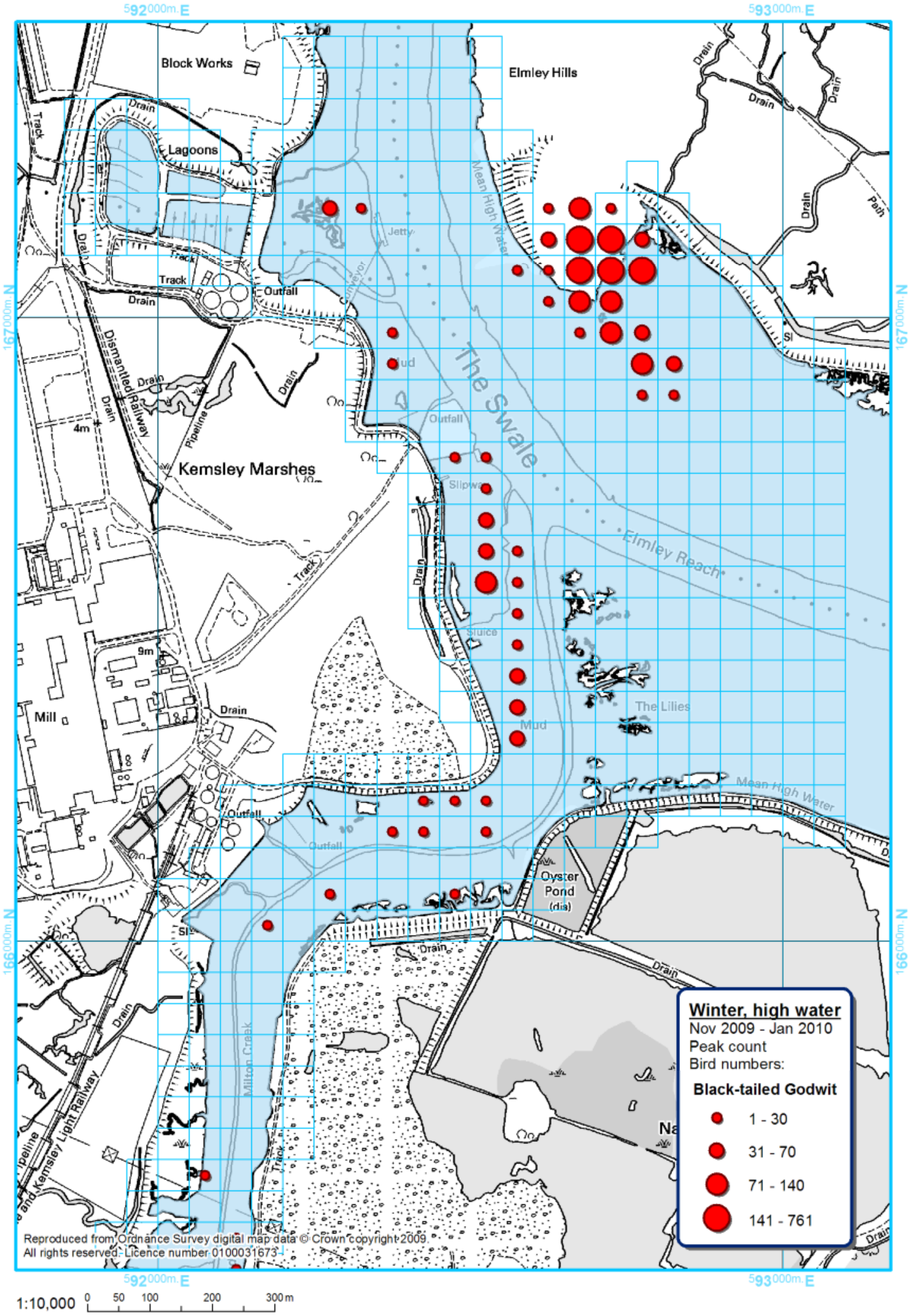


Figure C.55: Spatial distribution of Black-tailed Godwit over low water, Nov 2009 - Jan 2010

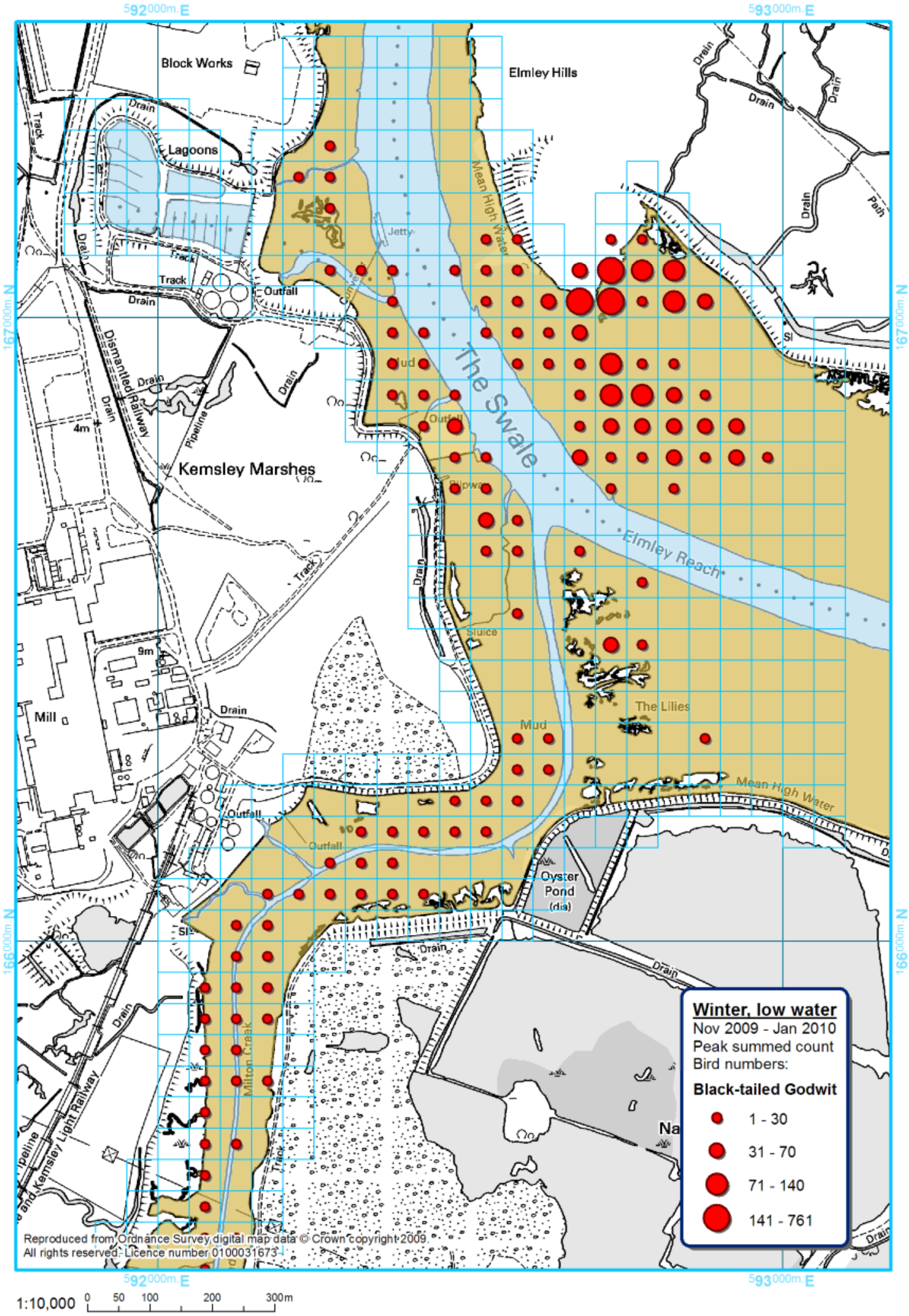


Figure C.56: Spatial distribution of Curlew over high water , Oct 2009

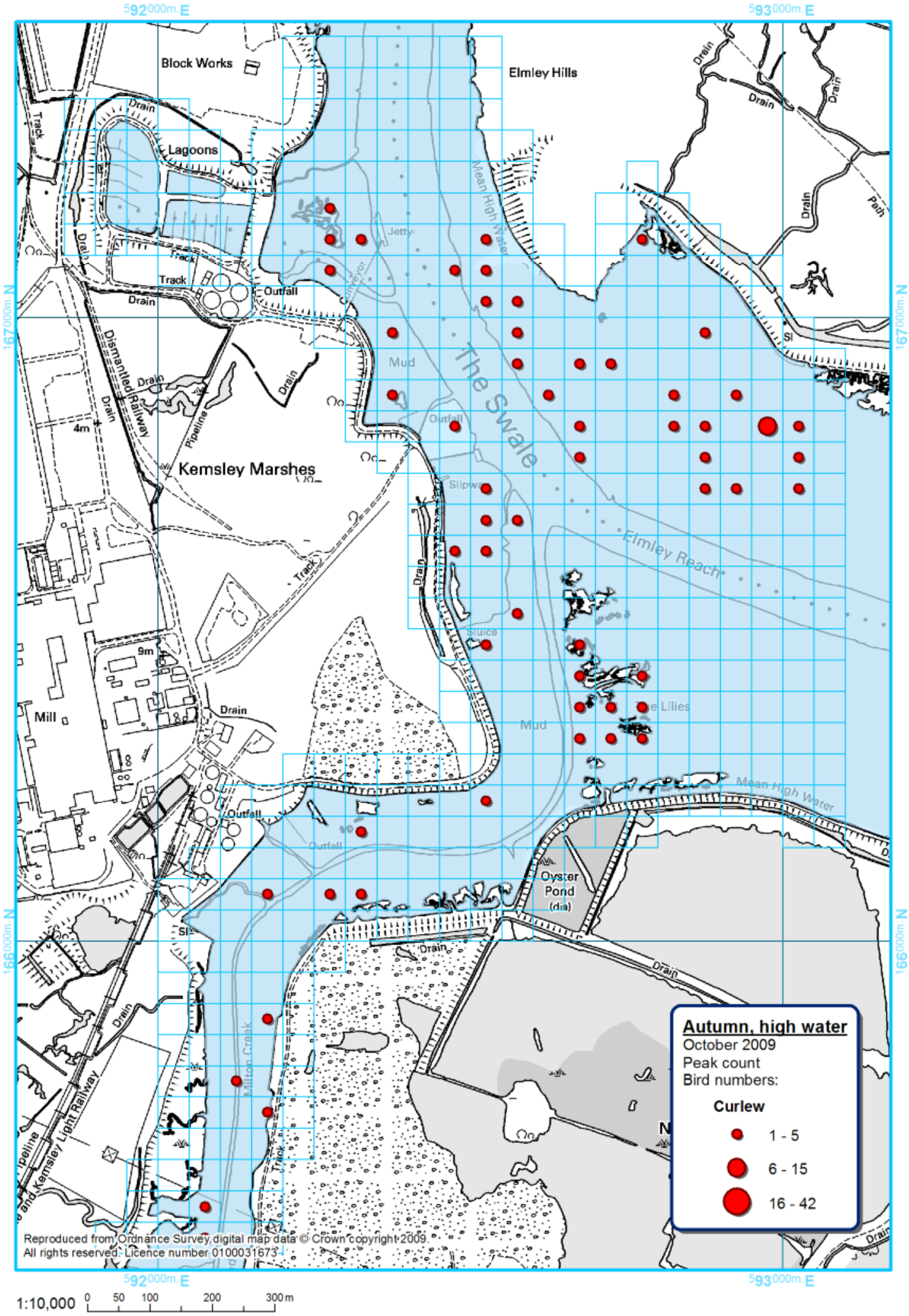


Figure C.57: Spatial distribution of Curlew over low water , Oct 2009

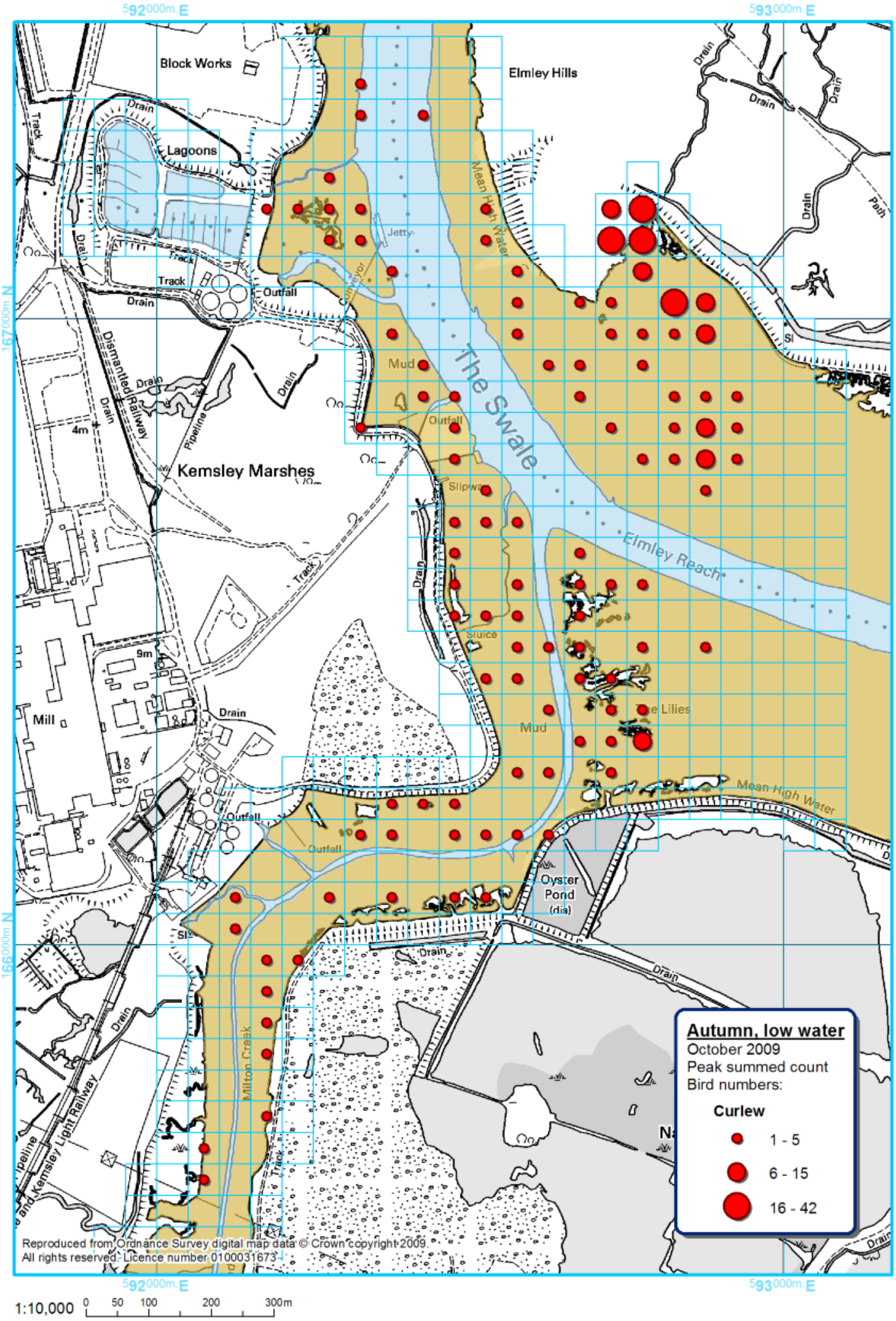


Figure C.58: Spatial distribution of Curlew over high water, Nov 2009 - Jan 2010

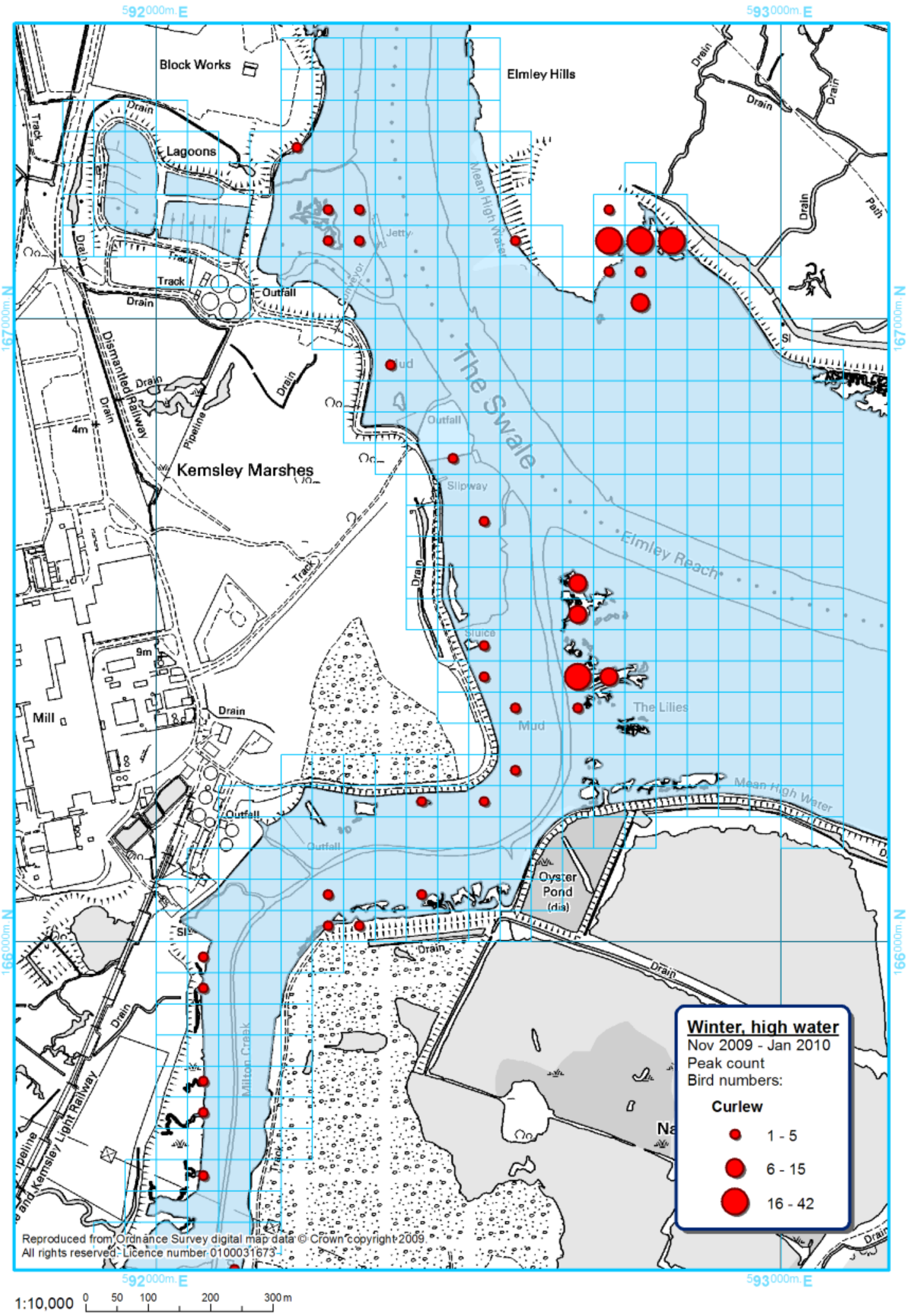


Figure C.59: Spatial distribution of Curlew over low water, Nov 2009 - Jan 2010

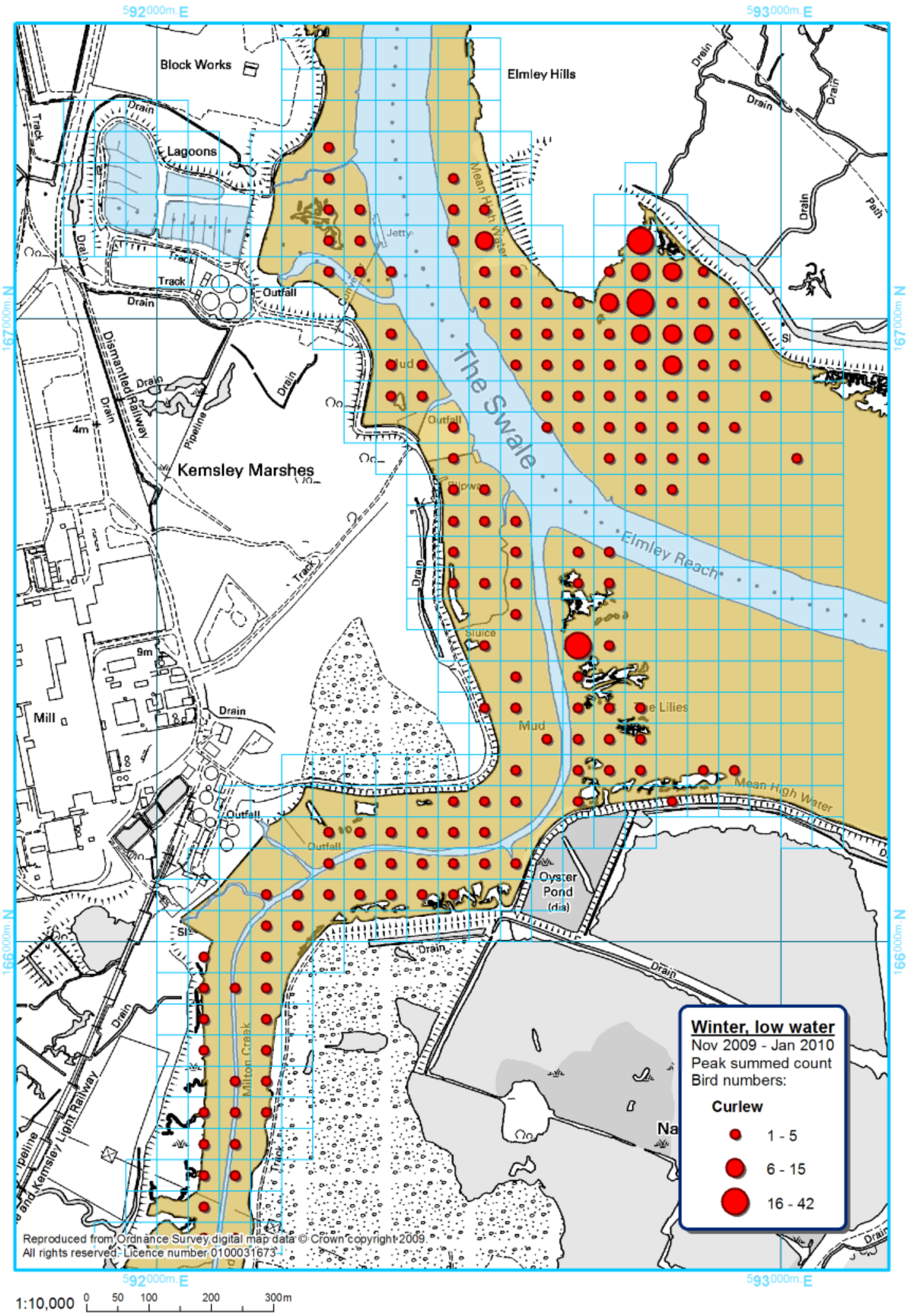


Figure C.60: Spatial distribution of Redshank over high water , Oct 2009

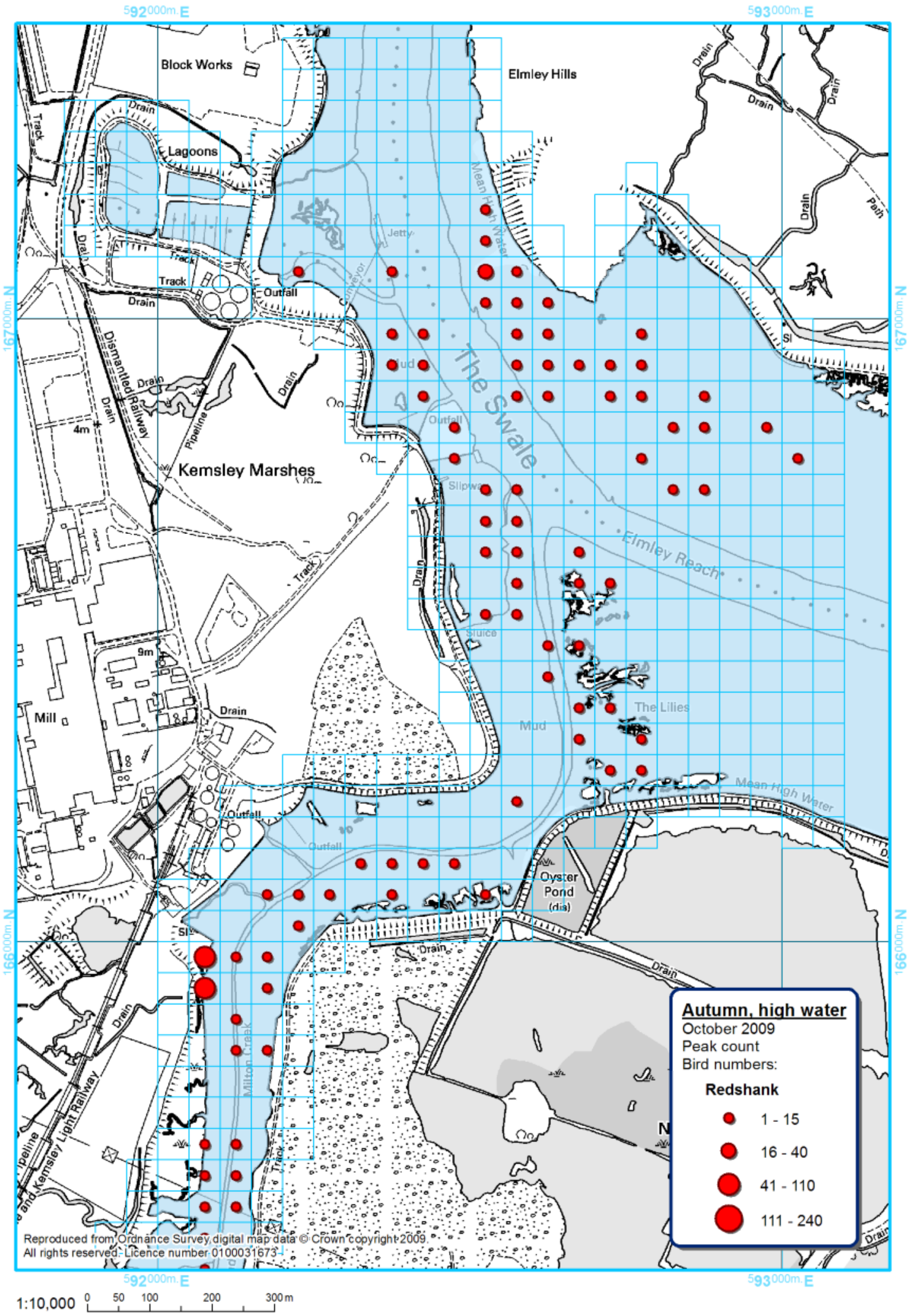


Figure C.61: Spatial distribution of Redshank over low water , Oct 2009

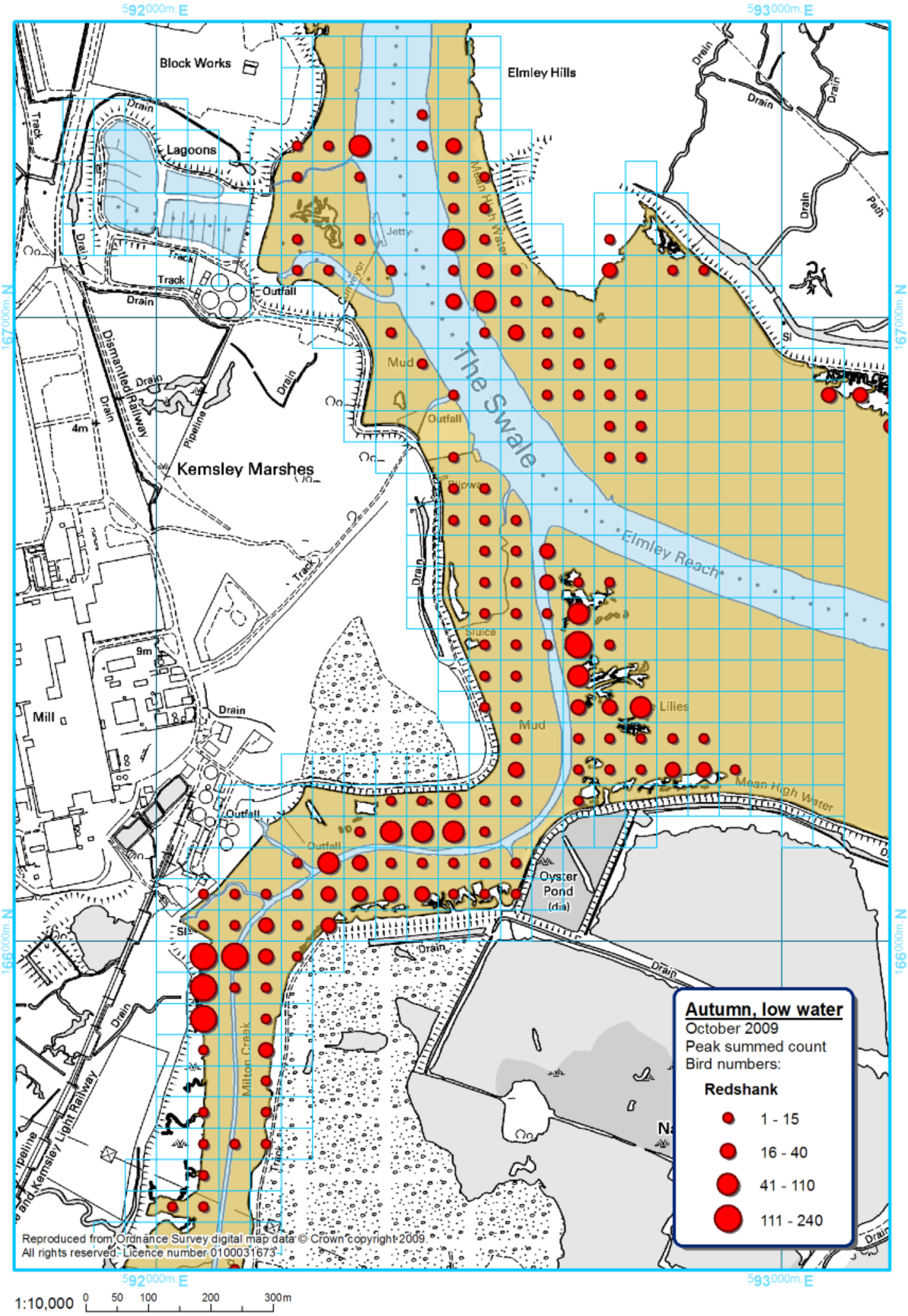


Figure C.62: Spatial distribution of Redshank over high water, Nov 2009 - Jan 2010

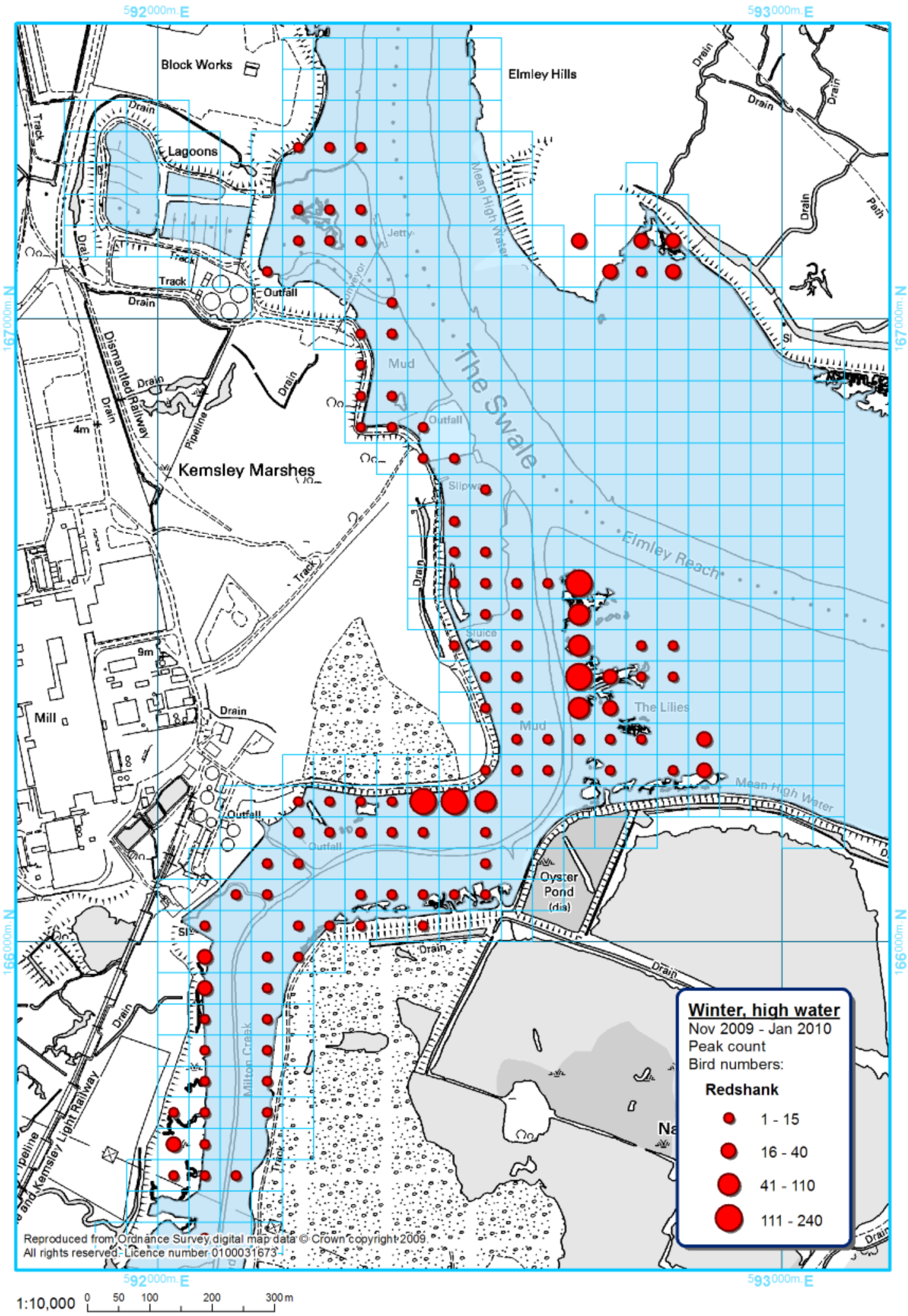


Figure C.63: Spatial distribution of Redshank over low water, Nov 2009 - Jan 2010

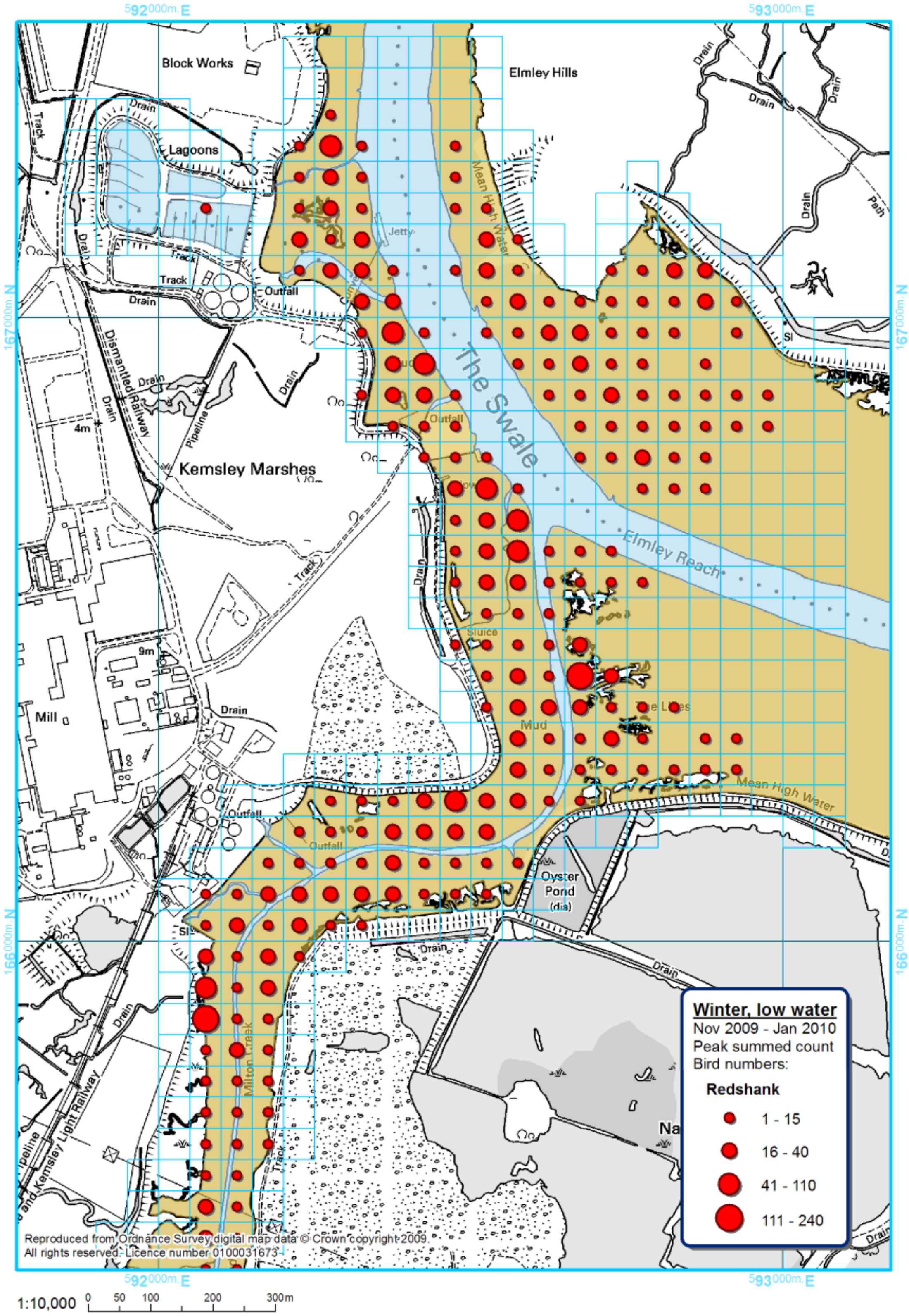


Figure C.64: Spatial distribution of Greenshank over high water , Oct 2009

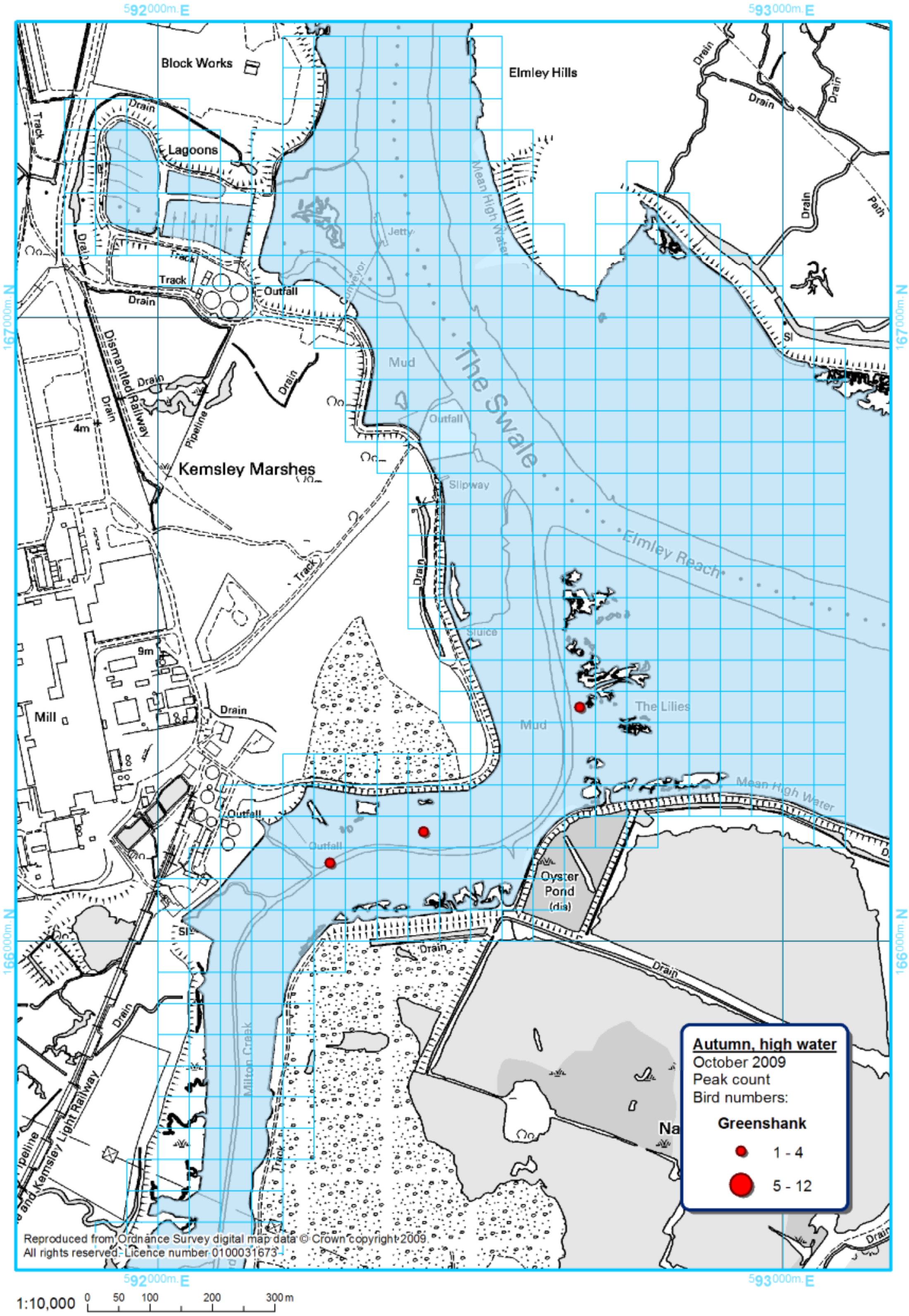


Figure C.65: Spatial distribution of Greenshank over low water , Oct 2009

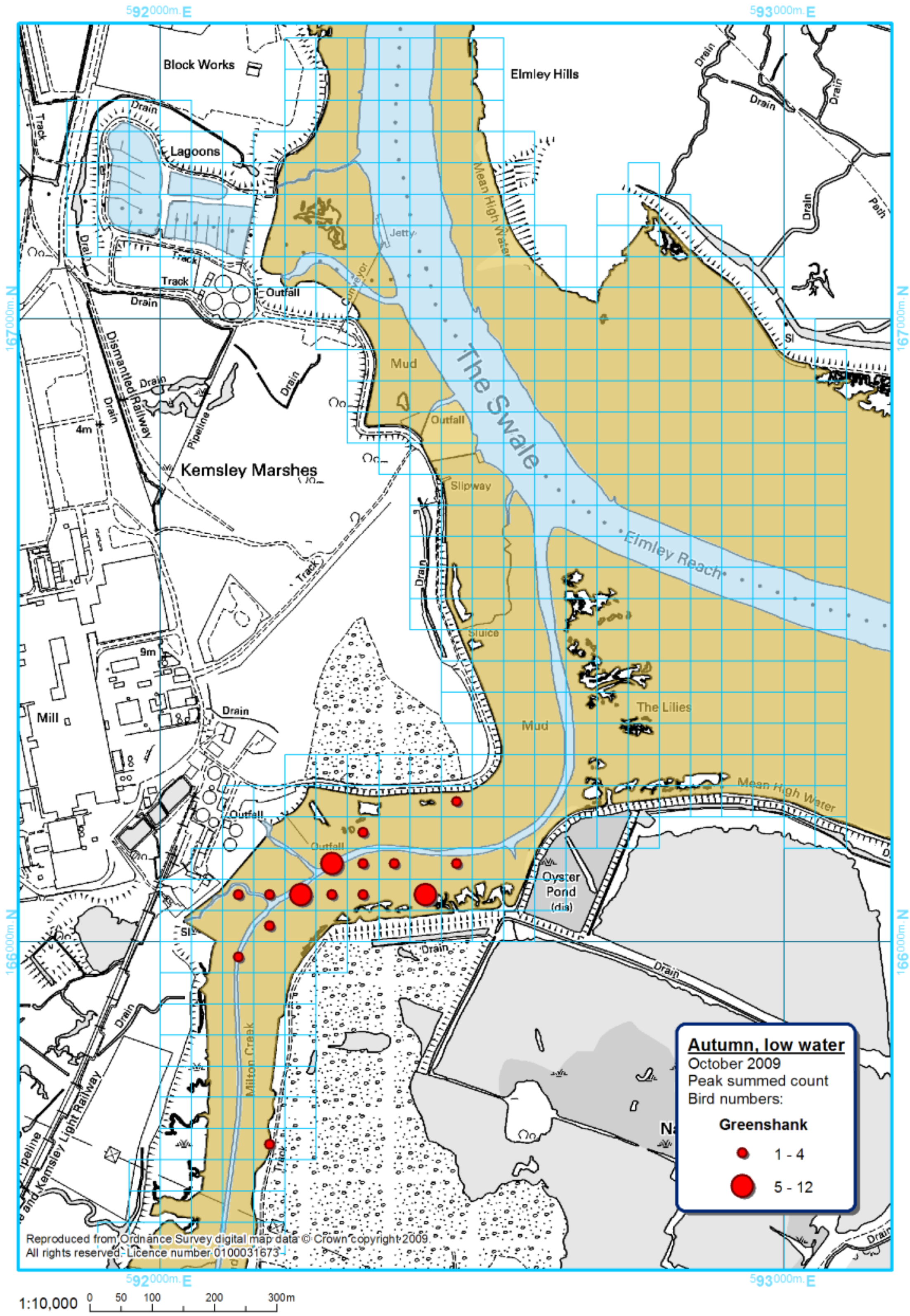


Figure C.66: Spatial distribution of Greenshank over high water, Nov 2009 - Jan 2010

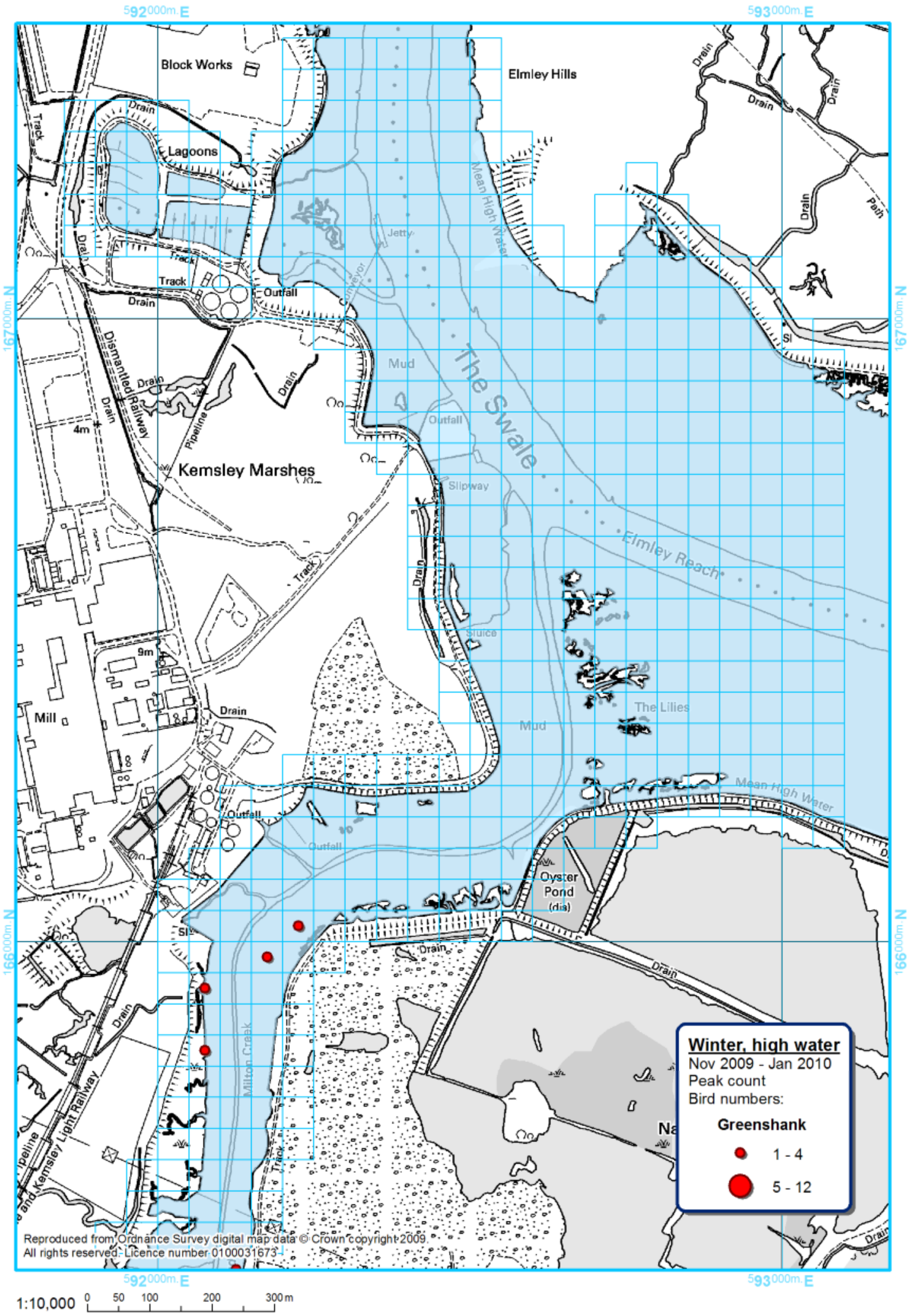


Figure C.67: Spatial distribution of Greenshank over low water, Nov 2009 - Jan 2010

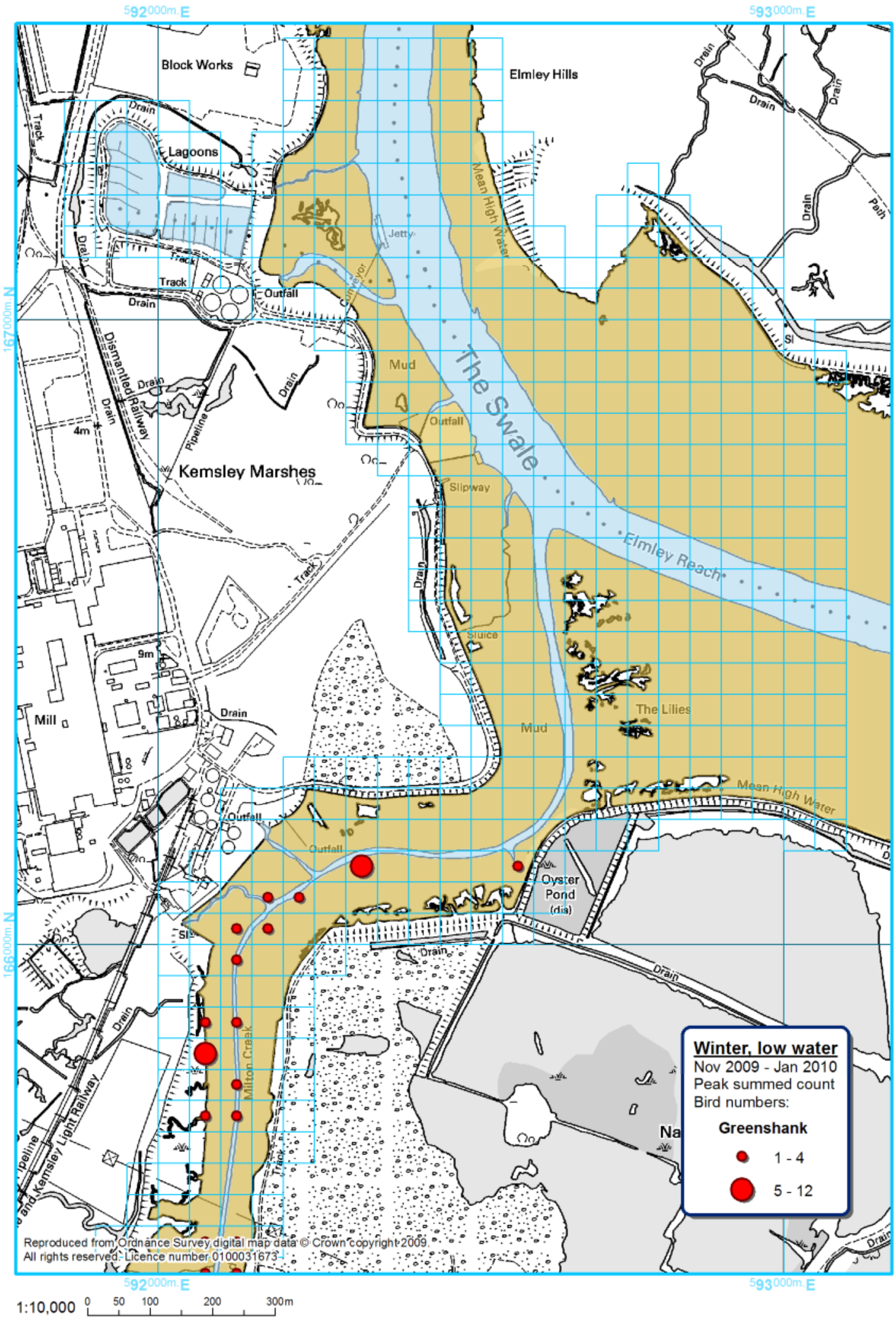


Figure C.68: Spatial distribution of Turnstone over high water , Oct 2009

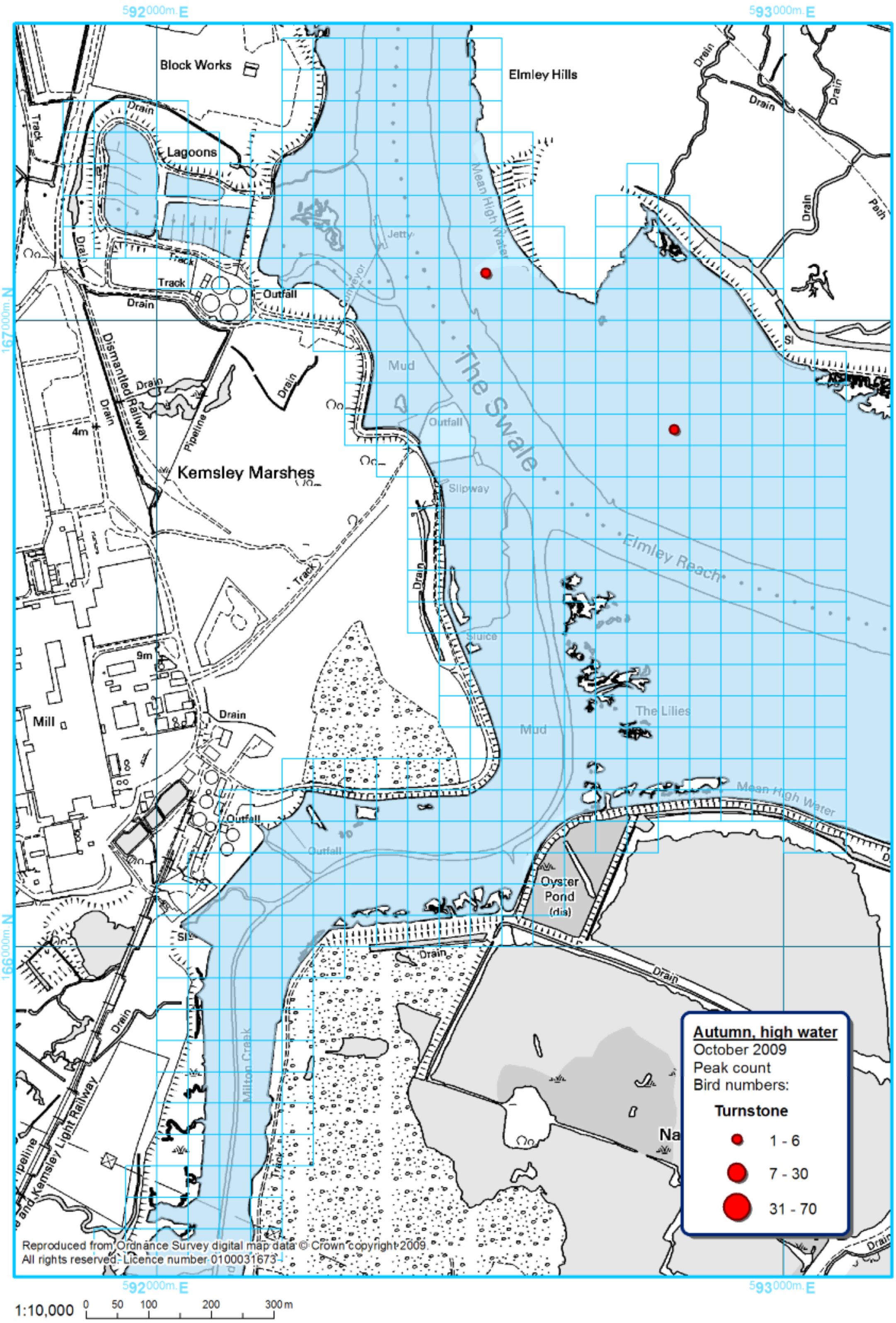


Figure C.69: Spatial distribution of Turnstone over low water , Oct 2009

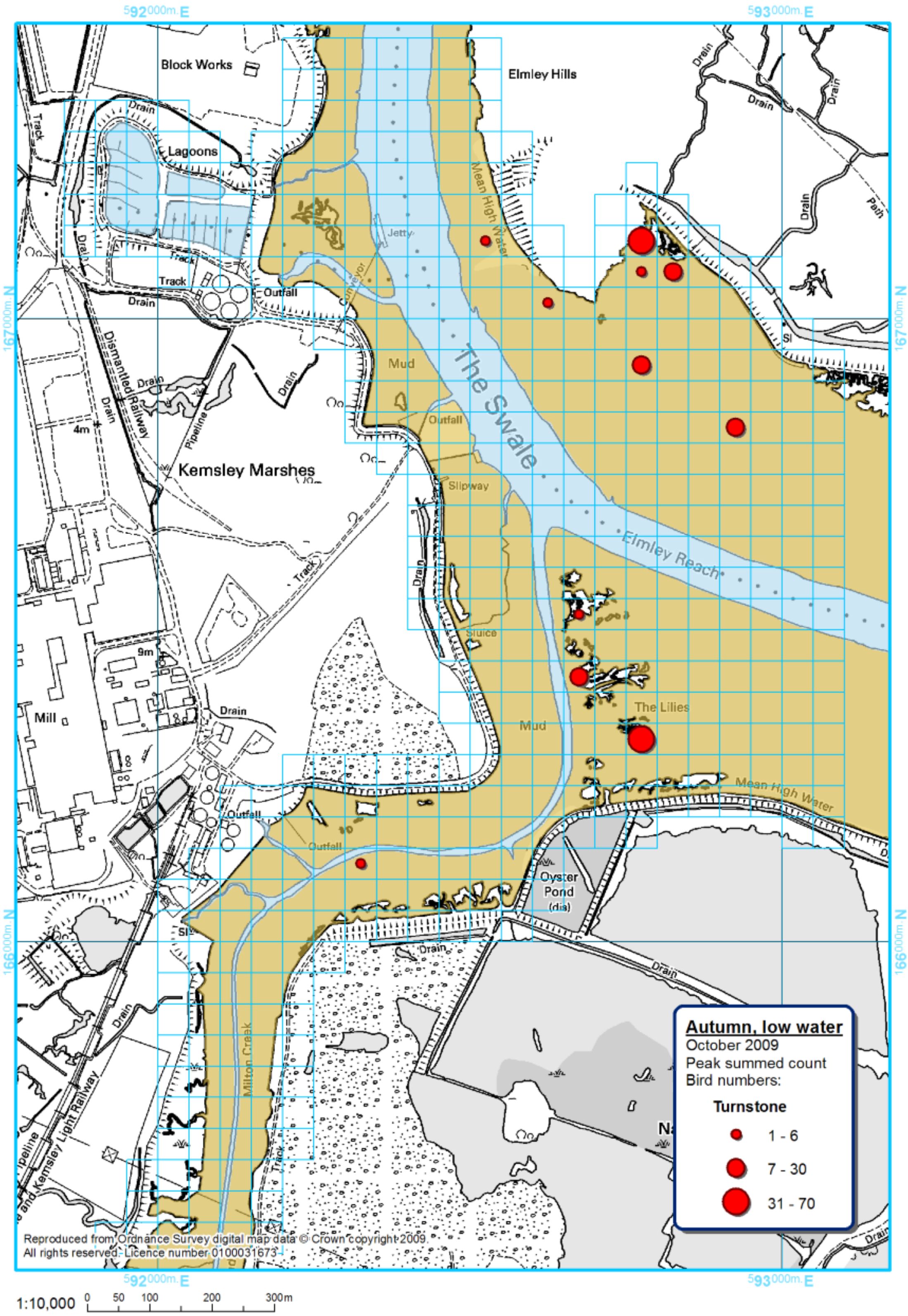


Figure C.70: Spatial distribution of Turnstone over high water, Nov 2009 - Jan 2010

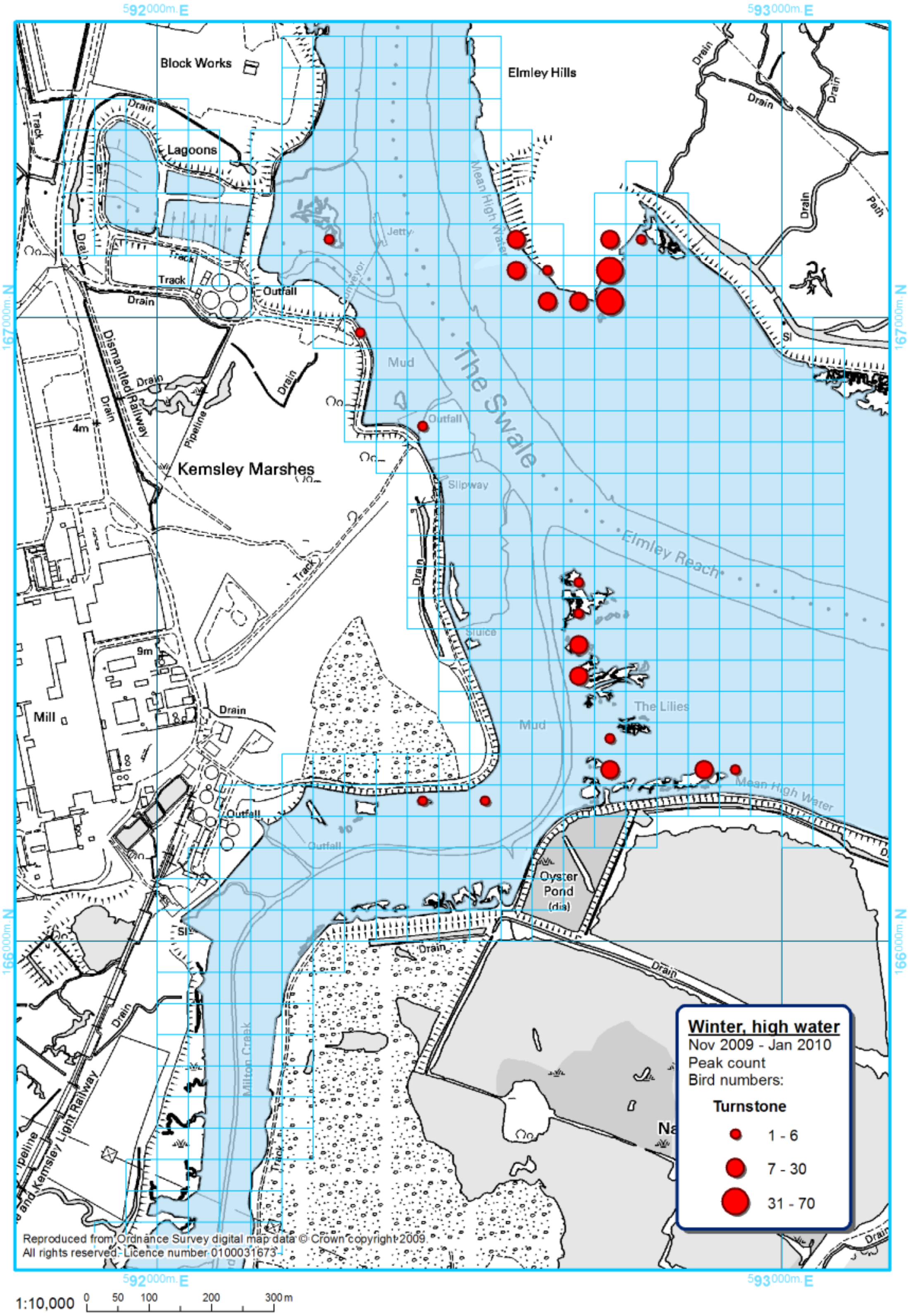
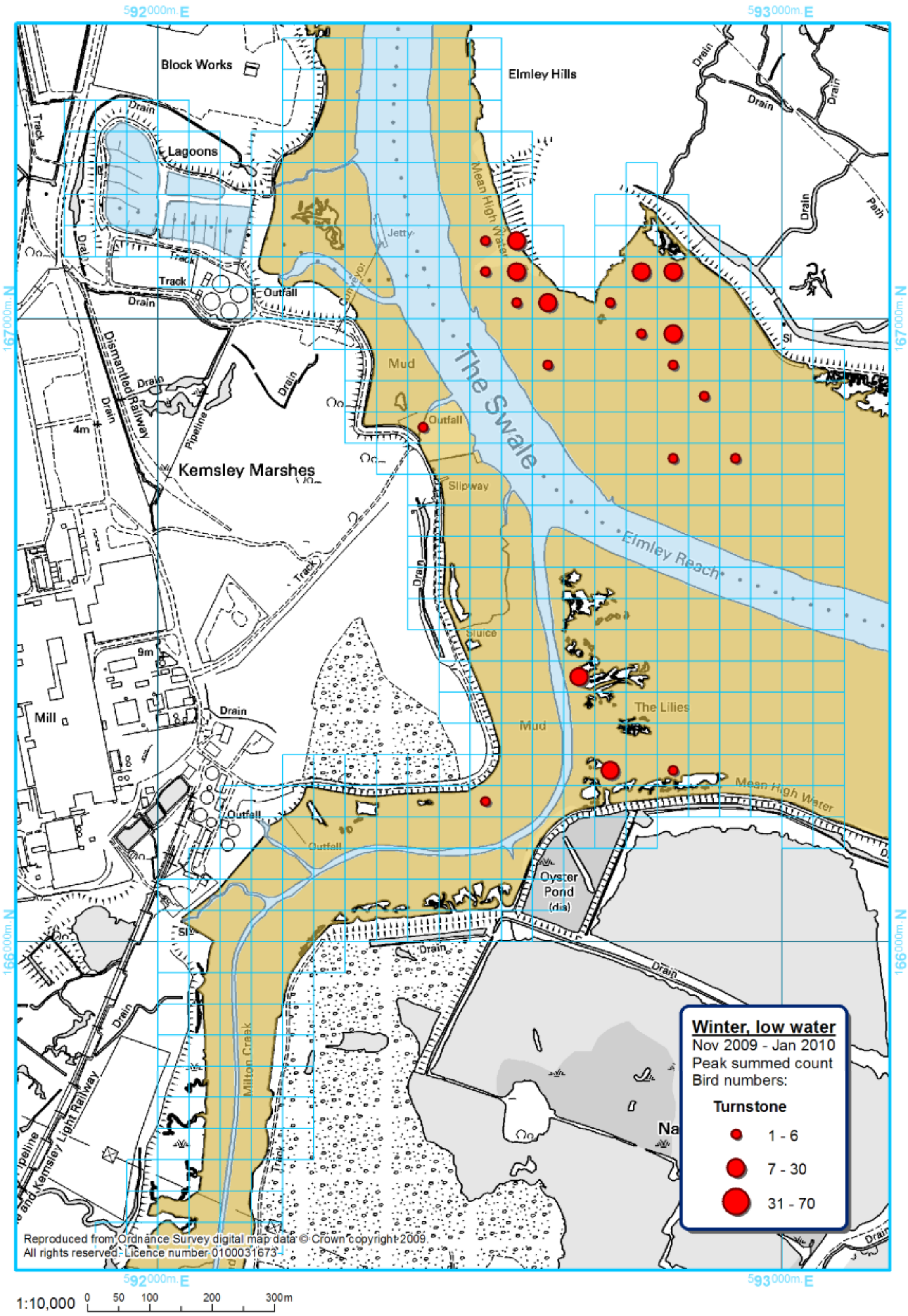


Figure C.71: Spatial distribution of Turnstone over low water, Nov 2009 - Jan 2010



RPS

Development of a Sustainable Energy Plant.

St Regis Paper Mill, Kemsley

On behalf of St. Regis Paper Mill Co.

Environmental Statement

Appendix 9.6:

Information for an Appropriate Assessment

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RPS Planning & Development

9 KEMSLEY SUSTAINABLE ENERGY PLANT (SEP)

INFORMATION FOR AN APPROPRIATE ASSESSMENT

INTRODUCTION

9.1 The need for an Appropriate Assessment is set out in Article 6(3) of the Habitats Directive and interpreted into British law by Regulation 48 of the Habitats Regulations (Table 9.1).

Table 9.1 Legislative basis for a Habitats Regulations Assessment

The legislative basis for Habitat Regulations Assessment		
Habitats Directive	Article 6(3)	Any plan or project not directly connected with or necessary to the management of a Special Protection Area (SPA) or Special Area of Conservation (SAC) but likely to have a significant effect thereon, either individually or in-combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.
Habitats Regulations	Regulation 48	A competent authority, before deciding to give any consent for a plan or project which is likely to have a significant effect on a European site shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives

9.2 The Habitats Directive applies the precautionary principle to relevant designated areas, in so much as plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of a SPA or SAC, collectively termed Natura 2000 sites. This is in contrast to Environmental Assessment requirements where the findings (as documented in an Environmental Statement) should be ‘taken into account’ during preparation of the plan or project.

9.3 It is Government policy (as outlined in Planning Policy Statement 9: Biodiversity and Geological Conservation) for sites designated under the Convention on Wetlands of International Importance (Ramsar sites) to be treated as having equivalent status to Natura 2000 sites. As such, information to inform a local authority Appropriate Assessments needs to cover features of any relevant Ramsar site.

9.4 In undertaking an assessment, competent authorities must have regard to both direct and indirect effects on an interest feature of the Natura 2000 site, as well as cumulative effects. This may include consideration of features and issues outside the boundary of a Natura 2000 site. Department for Communities and Local Government guidance states that an assessment should be proportionate to the geographical scope of the plan or project and that it need not be done in any more detail, or using more resources, than is useful for its purpose (CLG, 2006).

9.5 Plans and projects for which it is not possible to conclude no adverse effect on the integrity of Natura 2000 sites, may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

SCOPE AND OBJECTIVES

9.6 Whilst it is the responsibility of the competent authority to determine whether it can be concluded there is no adverse effect, it is the responsibility of applicants to submit sufficient information to enable such a determination to be made.

9.7 The purpose of this Appendix is therefore to collate and provide sufficient information to enable Kent County Council to undertake a Habitat Regulations Assessment of the potential effects of the planning application for land at Kemsley on the Natura 2000 network. It draws upon information within the Environmental Statement, notably Chapter 9; Ecology, but purposely does not repeat the detail contained within these chapters. Instead, it provides sufficient stand alone information, with references to other more detailed sections where necessary, for Kent County Council to be able to make an informed decision.

9.8 Current guidance suggests the following sites should be included in the scope of a Habitats Regulations Assessment:

- All Natura 2000 sites within the authority’s boundary; and
- Other sites shown to be linked to the proposed development through a known ‘pathway’

9.9 The planning application is for a new Sustainable Energy Plant on land to the north of Milton Creek, on the west side of the Swale.

9.10 The development programme is set out in Chapter 4 of the Environmental Statement. The key activities are:

- Site preparation and enabling works;
- Piling to establish appropriate foundations;
- Main construction; and
- Commissioning of the SEP

9.11 No Natura 2000 sites or Ramsar sites lie wholly or partly within the boundary of the area covered by the planning application. However, based on the nature of the proposed development, the findings of the technical chapters of the Environmental Statement and discussions with Natural England, it has been decided that the following seven Natura 2000 and Ramsar sites require consideration as to whether they could be affected:

- Swale SPA;
- Swale Ramsar;
- Medway Estuary and Marshes SPA;
- Medway Estuary and Marshes Ramsar;
- Thames Estuary and Marshes SPA;
- Thames Estuary and Marshes Ramsar, and
- Queendown Warren SAC.

METHODOLOGY

Key Principles

9.12 The key principles adopted during the collation and analysis of information are set out in Table 9.2.

Table 9.2 Key principles underpinning the assessment methodology

Key principles underpinning the assessment methodology	
Principle	Rationale
Use of best available existing information	We will use best available existing information to inform the assessment. This will include ecological information gathered on behalf of St Regis, information made available through production of the Environmental Statement and information from other sources, including Natural England, British Trust for Ornithology, the Environment Agency and others.
Proportionality	We will ensure that the level of detail provided in the assessment reflects the level of detail in the planning application (i.e. that the assessment is

	proportionate).
Consultation	We will ensure continued consultation with both Natural England and the Environment Agency and other stakeholders during production of the assessment and ensure that we take on board their comments.
Transparency in the assessment process	We will endeavour to keep the process as open, transparent and simple as possible while ensuring an objective and rigorous assessment in compliance with the Habitats Directive, Habitats Regulations and emerging best practice.
Audit trail	We will ensure that the process followed and the conclusions reached are clearly documented to ensure there is a clear audit trail.

Process

9.13 Figure 1 below outlines the stages of HRA according to Department for Communities and Local Government guidance. The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations and any relevant changes to the plan until no significant adverse effects remain.

Figure 1: Four-stage approach to Habitat Regulation Assessment (Source: CLG, 2006)

Stage 1 – Qualifying Interest Features
Collect information on identified Natura 2000 and Ramsar sites and their conservation objectives.

↓

Stage 2 – Likely Significant Effect
Determine whether the planning application is likely to have a significant effect on relevant Natura 2000 and Ramsar sites.

↓

Stage 3 – Appropriate Assessment
Assess the likely significant effects of the outline planning application on the conservation objectives of relevant Natura 2000 and Ramsar sites and

↓

Stage 4 – Avoidance and Mitigation
Identify measures such that no adverse effect can be concluded.

Stage 1 – Qualifying Interest Features

9.14 Natural England has provided copies of the relevant citations and confirmed both the conservation objectives and Regulation 33 advice to be taken into account. The conservation objectives provide the basis for determining what is currently, or may cause, a significant effect, and for informing the scope of appropriate assessments.

9.15 Natural England has confirmed that whilst the assessment should focus on the citations, due regard should be given to subsequent reviews of qualifying features available from the UK Joint Nature Conservation Committee (JNCC). Whilst a revised SPA Review network has been formally accepted by government, this has not yet been adopted by the European Commission. In accordance with advice from Natural England, in addition to the citation, analysis is therefore also carried out against the latest UK SPA data forms available from the JNCC. In terms of assessment, whichever gives the greater protection is used under the precautionary principle. Under Government advice, Proposed SPAs (pSPA) should also be treated as having protection under the Habitats Regulations.

9.16 In addition to qualifying interest features, it is necessary to explore the environmental features and conditions required to maintain the integrity of the seven Natura 2000 and Ramsar sites, as well as both current condition and trends in environmental processes.

Stage 2 - Likely Significant Effect

9.17 The second stage is to determine whether there is a likely to be a significant effect. This is essentially a risk assessment to decide whether a more detailed assessment is required, and if so, the scope of the issues and features to be addressed. This involves identifying the potential pathways through which the planning application could affect the interest features of relevant Natura 2000 and Ramsar site, and then accessing in broad terms the magnitude of each effect to determine whether it is likely to have a significant effect. In making this determination, we have taken into account the risk of an effect not just on those sites within the administrative boundary of Swale Borough Council, but in line with best practice, considered potential ways in which the application could impact upon other relevant Natura 2000 or Ramsar sites.

9.18 The main purpose of this stage is to screen out those aspects of the proposal that can be considered not likely to have a significant effect, as well as those features of each relevant Natura 2000 and Ramsar site that are not likely to be significantly affected. Judgements have been based on sound reasoning and within the context of best available knowledge on the various ways in which development of the nature proposed could impact on the interest features of the relevant Natura 2000 and Ramsar sites. If it cannot be concluded with confidence that adverse effects are unlikely, then under the precautionary principle, it is assumed that the issue requires more detailed consideration.

9.19 In determining likely significant effect, as well as any subsequent analysis, historical data from a variety of different sources has been used. The principal source has been data collected over the last ten years through the Wetland Bird Survey (WeBS). This is a joint scheme between the British Trust for Ornithology (BTO), the Wildfowl and Wetlands Trust (WWT), the Royal Society for the Protection of Birds (RSPB) and the JNCC, and comprises Core Counts and Low Tide counts.

9.20 For both types of count, sites are divided into a number of pre-determined sub-divisions, each of which is usually allocated to an experienced volunteer recorder. Core Counts are undertaken annually to monitor population sizes, determine trends in numbers and to identify important sites for waterbirds. Coastal wetlands like the Swale are primarily monitored at high tide when birds are congregated at roosts, though not all sub-divisions may be counted each year.

9.21 Low Tide Counts are undertaken on selected estuaries each year in the period two hours either side of low tide, to determine the distribution of waterbirds during low tide and to identify important feeding areas (Austin *et al*, 2008). Low tide data over the last ten years was available for the Swale for 2001/2002 (good coverage), the Medway Estuary and Marshes for 1996/1997 (good coverage), 2004/2005 (partial) and 2005/2006 (partial), for the Thames Estuary and Marshes for 1998/1998 (partial), January 2000 (partial) and November 2002 (partial).

9.22 Further information was obtained from a variety of other reputable data sources, both published and unpublished, notably the Kent Bird Reports of the Kent Ornithological Society.

9.23 A suite of ecological surveys of the site and its surroundings have also been completed, including the habitats surveyed and scoped for their importance for invertebrates, targeted breeding bird surveys and intertidal waterbird surveys of the swale in the vicinity of the proposal site.

9.24 The methodology for the breeding bird surveys involved standard territory (registration) mapping techniques as detailed in Bibby *et al*. (2000). This method is based on the observation that many species during the breeding season are territorial. This is found particularly amongst passerines, where territories are often marked by conspicuous song, display, and periodic disputes with neighbouring individuals. Registrations of birds were recorded using standard BTO two letter species codes. Specific codes were also used for singing, calling, movements between areas, flying, carrying food, nest building, aggressive encounters and other behaviour.

9.25 The expected outcome of this technique is that mapped registrations fall into clusters, approximately coinciding with territories. Where a species has closely packed territories (e.g. Reed Warbler), the mapping of simultaneously singing birds becomes essential. Territory boundaries are taken to be between such birds.

9.26 The study area was walked at a slow pace in appropriately fine weather in order to locate and identify all individual birds. All field boundaries and suitable breeding habitats were walked. Visits were undertaken early in the morning, generally between 05:30–10:00. The whole survey area was covered in each visit, using suitable optical equipment to observe bird behaviour. Survey routes were mapped and routes were alternated on each visit, to ensure that all areas were covered at various times of day across the duration of the survey. Surveys were undertaken between April and June 2009 with a total of six survey visits taking place.

9.27 The survey methodology for the intertidal surveys involved monthly counts of the waterbirds using the Kemsley foreshore. A total of sixteen survey visits were undertaken during February to May 2009 and a further sixteen between October 2009 and January 2010.

Stage 3 - Appropriate Assessment

9.28 When a plan or project cannot be ‘screened out’ as being unlikely to have a significant effect on a Natura 2000 or Ramsar site, it is necessary to progress to explore whether there are any adverse effects, and if so, devise suitable avoidance and mitigation measures to be able to conclude no adverse effect. Experience suggests that the best approach to addressing this is on a site by site basis, with avoidance / mitigation measures focused on the environmental conditions needed to maintain site integrity. The steps involved in are outlined in Figure 2:

Figure 2: Steps involved in the Appropriate Assessment

Step 1 – Determine the sensitivity of interest features

By using published literature, national guidance and expert judgment, including that of bodies such as Natural England, the Environment Agency and RSPB, ascribe a **Sensitivity** to the designated features of each relevant Natura 2000 and Ramsar site (species and habitats) to each pathway where reasonable to do so. For this assessment, the sensitivity of species or habitats is ranked from *negligible* to *high*.

↓

Step 2 – Determine the exposure to the hazard

The **Exposure** to the 'hazard' (in this case the pathway by which the outline application may have an impact) relates to what degree the interest feature falls within the zone of influence of each pathway. Methods employed to determine site specific exposure (*negligible* to *high*) included use of habitat and species distribution maps, WeBS counts and consultation with local experts. Using this information an exposure rank was assignment to each sub-catchment for each feature.

↓

Step 3 – Determine the vulnerability of the interest features

The **Vulnerability** of each interest feature is determined from the interaction between its sensitivity and level of exposure using the matrix in Table 9.3.

↓

Step 4 – Decide if the identified impact is likely to lead to an adverse effect

The risk of an adverse effect occurring to a feature and thus the risk to site integrity is assessed by assessing the interaction between the degree of Vulnerability and the magnitude of impact using the matrix in Table 9.4.

↓

Step 5 – Complete an in-combination assessment

Identify other plans and projects that might affect the interest features of the relevant Natura 2000 and Ramsar sites in combination with the outline planning application and decide whether there any adverse effects that might occur in-combination that did not result from the outline planning application alone.

Table 9.3 Determining the Vulnerability of interest features Exposure

	Exposure to hazard				
Sensitivity of feature		High	Medium	Low	Negligible
	High	High	High	Medium	Low
	Medium	High	Medium	Low	Negligible
	Low	Medium	Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Table 9.4 Determination of Adverse Effect

	Magnitude of impact				
Vulnerability of feature		High	Medium	Low	Negligible
	High	Yes	Yes	Yes	No
	Medium	Yes	Yes	No	No
	Low	Yes	No	No	No
	Negligible	No	No	No	No

Stage 4 – Avoidance and Mitigation Measures

9.29 This involves developing measures to avoid the effect entirely, or as a minimum to mitigate the impact sufficiently that its effect on the integrity of a Natura 2000 or Ramsar site is rendered insignificant. In evaluating whether an identified impact is likely to have an adverse effect, we have relied upon both recognised standards and professional judgement. In the absence of quantifiable data, under the precautionary principle the approach we have adopted is that if an adverse effect cannot be confidently ruled out, avoidance or mitigation measures must be provided.

9.30 This is in line with Department for Communities and Local Government guidance that the level of detail of the assessment, whilst meeting the relevant requirements of the Habitats Regulations, should be 'appropriate' to the level of plan or project that it addresses.

STAGE 1 - QUALIFYING INTEREST FEATURES

The Swale

9.31 The Swale separates the Isle of Sheppey from the Kent mainland. To the west it adjoins the Medway Estuary, to the east the outer Thames Estuary. It consists of a complex of grazing marsh with ditches, and intertidal saltmarshes and mud-flats. The grazing marsh is the most extensive in Kent and there is much diversity both in the salinity of the dykes (which range from fresh to strongly brackish) and in the topography of the fields.

9.32 The Swale Ramsar was designated in 1993. In addition to qualifying under criterion 3a by virtue of regularly supporting over 20,000 waterfowl, with an average peak count of 57,600 birds for the five winter period 1986/1987 to 1990/1991, and under criterion 3c by supporting, in winter, internationally important populations of four species of migratory waterfowl, the Swale also qualifies under Criterion 2a of the Ramsar Convention by supporting a number of species of rare plants and invertebrates (Table 9.5).

Table 9.5 Qualifying plant and invertebrate species for the Swale Ramsar

Ramsar Criteria	Scientific Name	Species Name
Nationally rare and scarce plant species	*Lactuca saligna*	Least Lettuce
	Peucedanum officinale	Hogs Fennel
	Bupleurum tenuissimum	Slender Hare's-ear
	Spartina maritima	Small Cord-grass
	Inula crithmoides	Golden Samphire
	Ranunculus baudotii	Brackish Water Crowfoot
	Ceratophyllum submersum	Soft Hornwort
	Carex divisa	Divided Sedge
	Trifolium squamosum	Sea Clover
	Hordeum marinum	Sea Barley
Red Data Book invertebrates	Bagous cylindrus	An aquatic weevil
	Erioptera bivittata	A cranefly
	Lejops vittata	A hoverfly
	Poecilobothrus ducalis	A small dancefly
	Micronecta minutissima	A water bug
	Malachius vulneratus	A beetle
	Philonthus punctus	A predatory rove beetle
	Campsicnemus magius	A small dolichopodid fly
	Elachiptera rufifrons	A small chloropid fly
	Myopites eximia	A picture-winged fly

9.33 The intertidal flats are extensive, especially in the east of the site, and support a dense invertebrate fauna. These invertebrates, together with beds of algae and Eelgrass *Zostera* spp., are important food sources for waterbirds. Locally there are large Mussel

Mytilus edulis beds formed on harder areas of substrate. The wide diversity of coastal habitats combine to support important numbers of waterbirds throughout the year.

9.34 The diverse mix of habitats within the Swale support internationally important populations of wintering birds. It supports outstanding numbers of waterfowl with some species regularly occurring in nationally or internationally important numbers. The Swale SPA was classified in 1985 and extended in 1993. The qualifying bird interest features listed in the SPA Citation, current SPA data form and Ramsar citation, together with the criteria used for this assessment (in line with Natural England advice this is whichever provides the strongest protection) are presented in Table 9.6.

9.35 During severe winter weather elsewhere, the Swale can assume even greater national and international importance as a cold weather refuge. Wildfowl and waders from many other areas arrive, attracted by the relatively mild climate, compared with continental European areas, and the abundant food resources available.

9.36 The boundary of the Swale SPA / Ramsar site lies some 150 metres to the east of the area covered by the proposal.

Table 9.6 Qualifying Birds Species of the Swale

	Scientific Name	SPA Citation	SPA Data Form	Ramsar	Criteria
Regularly supporting more than 1% of the GB breeding population of an Annex 1 species in summer					
Avocet	**Recurvirostra avosetta**	**24 pairs, representing 6.2% of British population**	-	-	24
Regularly used by 1% or more of the GB population of an Annex 1 species in the winter					
Hen Harrier	Circus cyaneus	11 representing 1.4% of British winter population	-	11 representing 1.4% of British winter population	11
Migratory species regularly occurring over winter					
Great Crested Grebe	Podiceps cristatus	-	-	300 representing 3% of the British winter population	300
White-fronted Goose	Anser albifrons	-	-	1,875 representing 31.2% of British population	1,875
Dark-bellied Brent Goose	Branta bernicla bernicla	2,850 representing 1.6% of the world population and 3.1% of the British winter population	1,961 representing 0.7% of the Western Siberia/ West Europe population	2,850 representing 1.6% of the world population and 3.1% of the British wintering population	2,850
Shelduck	Tadorna tadorna	-	-	1,650 representing 2.2% of the British population	1,650
Wigeon	Anas Penelope	9,500 representing 1.2% of the North West Europe	-	9,500 representing 1.2% of the North West Europe	9,500

		population and 3.8% of the British population		population and 3.8% of the British population	
Gadwall	Anas strepera	-	-	74 representing 1.2% of the British population	74
Teal	Anas crecca	-	-	2,100 representing 2.1% of the British population	2,100
Pintail	Anas acuta	-	-	435 representing 1.7% of the British population	435
Shoveler	Anas clypeata	-	-	340 representing 3.7% of the British population	340
Oystercatcher	Haematopus ostralegus	-	-	3,700 representing 1.3% of British winter population	3,700
Avocet	Recurvirostra avosetta	37 representing 3.7% of the British population	-	37 representing 3.7% of the British population	37
Ringed Plover	Charadrius hiaticula	-	-	260 representing 1.1% of the British population	260
Grey Plover	Pluvialis squatarola	1,550 representing 1% of the East Atlantic Flyway population and 7.3% of the British population	-	1,550 representing 1% of the East Atlantic Flyway population and 7.3% of the British population	1,550
Knot	Calidris canutus	-	-	2,650 representing 1.2% of the British population	2,650
Little Stint	Calidris minuta	-	-	4 representing 20% of	4

				the British population	
Dunlin	Calidris alpina	13,000 representing 3% of British wintering population	12,394 representing 2.3% of the British population	13,000 representing 3% of British population	13,000
Ruff	Philomachus pugnax	28 representing 1.8% of British population	-	28 representing 1.8% of British population	28
Black-tailed Godwit	Limosa limosa	-	-	220 representing 4.4% of British population	220
Curlew	Numenius arquata	-	-	1,950 representing 2.1% of British population	1,950
Spotted Redshank	Tringa erythropus	-	-	5 representing 2.5% of British population	5
Redshank	Tringa totanus	3,100 representing 2% of the East Atlantic Flyway population and 4.1% of the British population	1,640 representing 0.9% of Eastern Atlantic population	3,100 representing 2% of the East Atlantic Flyway population and 4.1% of the British population	3,100
Assemblage					
Regularly supporting over 20,000 waterfowl		57,600	65,588	57,600	65,588
Diverse assemblage of breeding waterfowl (not otherwise	Tadorna tadorna Anas strepera Anas crecca	Shelduck Gadwall Teal	Shelduck Gadwall Teal		Present Present Present Present

listed)	Anas platyrhynchos Gallinula chloropus Fulica atra Haematopus ostralegus Charadrius hiaticula Pluvialis squatarola Vanellus vanellus Numenius arquata Tringa tetanus Recurvirostra avosetta Anas clypeata Podiceps cristatus Aythya farina Aythya fuligula	Mallard Moorhen Coot Oystercatcher Ringed Plover - Lapwing - Redshank Avocet Shoveler Great Crested Grebe Pochard Tufted Duck	Mallard Moorhen Coot Oystercatcher Ringed Plover Grey Plover Lapwing Curlew Redshank - - - - -		Present Present Present Present Present Present Present Present
Diverse assemblage of winter waterfowl (not otherwise listed)	Acrocephalus scirpaceus Emberiza schoeniclus	- -	Reed Warbler Reed Bunting		Present Present Present

Medway Estuary and Marshes

9.37 The Medway Estuary forms a single tidal system with the Swale to the east and joins the outer Thames Estuary between the Isle of Grain and Sheerness. It has a complex arrangement of tidal channels, which drain around islands of saltmarsh. The mud-flats are rich in invertebrates and also support beds of Enteromorpha and some Eelgrass Zostera spp. Small shell beaches occur, particularly in the outer part of the estuary. Together these form the largest area of intertidal habitats of value for nature conservation in Kent and are representative of the estuarine habitats found on the North Kent coast. Grazing marshes intersected by dykes and fleets are present in places inside the sea walls around the estuary.

9.38 The Medway Estuary and Marshes Ramsar site was designated in 1993. In addition to qualifying under Criterion 3a by virtue of regularly supporting over 20,000 waterfowl with an average peak count of 53,900 birds recorded in the five-year winter period 1986/1987 to 1990/1991, and under Criterion 3c by regularly supporting internationally or nationally important wintering populations of migratory species of waterfowl, the Medway Estuary and Marshes Ramsar also qualifies under Criterion 2a of the Ramsar Convention by supporting a number of species of rare plants and animals (Table 9.7).

9.39 The Medway Estuary and Marshes SPA was classified in 1993 and the citation prepared for that classification, together with the most recent SPA Data have been used to inform this assessment. The qualifying bird interest features listed in the SPA Citation, current SPA data form and Ramsar citation, together with the criteria used for this assessment (in line with Natural England advice this is whichever provides the strongest protection) are presented in Table 9.8.

9.40 The boundary of the Medway Estuary and Marshes SPA and Ramsar site lies just over 2km from the area covered by the Proposal site.

Table 9.7 Medway Estuary and Marshes Ramsar qualifying plant and invertebrate species

Ramsar Criteria	Scientific Name	Species Name
Nationally-scarce plant species	Hordeum marinum	Sea Barley
	Parapholis incurva	Curved Hard-grass
	Polypogon monspeliensis	Annual Beard-grass
	Puccinellia fasciculate	Borrer's Saltmarsh-grass
	Bupleurum tenuissimum	Slender Hare`s-ear
	Trifolium squamosum	Sea Clover
	Chenopodium botryodes	Small Goose-foot
	Rumex maritimus	Golden Dock
	Ranunculus baudotii	Brackish Water-crowfoot
	Inula crithmoides	Golden Samphire
	Salicornia perennis	Perennial Glasswort
	Salicornia pusilla	One-flowered Glasswort
British Red Data Book invertebrates	Polistichus connexus	A ground beetle
	Cephalops perspicuus	A fly
	Poecilobothrus ducalis	A dancefly
	Anagnota collini	A fly
	Baris scolopacea	A weevil
	Berosus spinosus	A water beetle
	Malachius vulneratus	A beetle
	Philonthus punctus	A rove beetle
	Malacosoma castrensis	Ground Lackey Moth
	Atylotus latistriatus	A horsefly
	Campsicnemus magius	A fly
	Cantharis fusca	A soldier beetle
	Limonia danica	A cranefly

Table 9.8 Qualifying Birds Species of the Medway Estuary and Marshes

	Scientific Name	SPA Citation	SPA Data Form	Ramsar	Criteria
Annex 1 Species Regularly Breeding in Numbers of European Importance					
Avocet	Recurvirosta avosetta	28 pairs representing 7% of the breeding population in Britain	28 pairs representing at least 6.2% of the British breeding population	28 pairs representing 7% of the breeding population in Britain	28 pairs
Common Tern	Sterna hirundo	-	77 pairs representing at least 0.6% of the British breeding population	-	77 pairs
Little Tern	Sterna albifrons	24 pairs representing 1% of the breeding population in Britain	28 pairs representing at least 1.2% of the British breeding population	24 pairs representing 1% of the breeding population in Britain	28 pairs
Annex 1 Species Regularly Wintering in Numbers of European Importance					
Bewick's Swan	Cygnus columbianus bewickii	-	161 representing at least 0.2% of the wintering population in Britain	-	161
Avocet	Recurvirosta avosetta	70 representing 7% of the population in Britain	314 representing at least 24.7% of the wintering population in Britain	-	314
Migratory Species Regularly Wintering in Numbers of European Importance					
Great Crested Grebe	Podiceps cristatus	250 representing 2.5% of British wintering population	-	250 representing 2.5% of British wintering population	250
Dark-bellied Brent	Branta bernicla bernicla	4,130 representing 2.4%	3,205 representing 1.1%	4,130 representing 2.4%	4,130

Goose		of the world population and 4.6% of British winter population	of the winter population in Britain	of the world population and 4.6% of British winter population	
Shelduck	Tadorna tadorna	5,900 representing 2.3% of the North West European population and 7.9% of the British winter population	4,465 representing 1.5% of the winter population in Britain	5,900 representing 2.3% of the North West European population and 7.9% of the British winter population	5,900
Wigeon	Anas penelope	5,200 representing 2.0% of British winter population	4,346 representing 1.6% of British winter population	5,200 representing 2.0% of British winter population	5,200
Teal	Anas crecca	2,400 representing 2.4% of British winter population	1,824 representing 1.3% of British winter population	2,400 representing 2.4% of British winter population	2,400
Pintail	Anas acuta	980 representing 1.4% of the North West European wintering and 3.9% of the British winter population	697 representing 1.2% of British winter population	980 representing 1.4% of the North West European wintering and 3.9% of the British winter population	980
Shoveler	Anas clypeata	150 representing 1.7% of British winter population	76 representing 0.8% of British winter population	150 representing 1.7% of British winter population	150
Oystercatcher	Haematopus ostralegus	3,300 representing 1.1% of British winter population	3,672 representing 1% of British population	3,300 representing 1.1% of British winter population	3,672
Ringed Plover	Charadrius hiaticula	740 representing 1.4% of	768 representing 1.6% of	740 representing 1.4% of	768

		the East Atlantic Flyway population and 3.2% of the British wintering population	British wintering population	the East Atlantic Flyway population and 3.2% of the British wintering population	
Grey Plover	Pluvialis squatarola	4,810 representing 3.2% of East Atlantic Flyway population and 22.9% of British wintering population	3,406 representing 2% of the wintering population in Britain	4,810 representing 3.2% of East Atlantic Flyway population and 22.9% of British wintering population	4,810
Knot	Calidris canutus	3,690 representing 1.0% of the East Atlantic Flyway and 1.6% of the British wintering population	541 representing 0.2% of the wintering population in Britain	3,690 representing 1.0% of the East Atlantic Flyway and 1.6% of the British wintering population	3,690
Dunlin	Calidris alpina	22,900 representing 1.6% of the East Atlantic Flyway and 5.3% of the British wintering population	25,936 representing 1.9% of the wintering population in Britain	22,900 representing 1.6% of the East Atlantic Flyway and 5.3% of the British wintering population	25,936
Black-tailed Godwit	Limosa limosa	390 representing 7.9% of British winter population	957 representing 12.9% of population in Britain	390 representing 7.9% of British winter population	957
Curlew	Numenius arquata	1,900 representing 2.1% of British winter population	1,900 representing 1.7% of population in Britain	1,900 representing 2.1% of British winter population	1,900

Spotted Redshank	Tringa erythropus	17 representing 8.5% of British winter population	-	17 representing 8.5% of British winter population	17
Redshank	Tringa totanus	4,180 representing 2.7% of the East Atlantic Flyway and 5.5% of the British wintering population	3,690 representing 2.1% of the wintering population in Britain	4,180 representing 2.7% of the East Atlantic Flyway and 5.5% of the British winter population	4,180
Greenshank	Tringa nebularia	12 representing 3.0% of British winter population	10 representing 2.6% of population in Britain	12 representing 3.0% of British winter population	12
Turnstone	Arenaria interpres	630 representing 1.4% of British winter population	561 representing 0.9% of population in Britain	630 representing 1.4% of British winter population	630
Assemblage					
Regularly supports over 20,000 birds		53,900	65,496	47,637	65,496
Diverse assemblage of breeding waterfowl (not otherwise listed)l	Gavia stellata Phalacrocorax carbo Tadorna tadorna Anas crecca Anas platyrhynchos Anas clypeata Aythya ferina Circus cyaneus Falco columbarius Haematopus ostralegus	- - Shelduck Teal Mallard Shoveler Pochard - - Oystercatcher	Red-throated Diver Cormorant - - Mallard - Pochard Hen Harrier Merlin -		Present Present Present Present Present Present Present Present Present Present

	Charadrius hiaticula	Ringed Plover	-		Present
	Vanellus vanellus	Lapwing	Lapwing		Present
	Tringa tetanus	Redshank	-		Present
	Asio flammeus	-	Short-eared Owl		Present
	Alcedo atthis,	-	Common Kingfisher		Present
Diverse assemblage of wintering species (not otherwise listed)	Gavia stellata	Red-throated Diver	Red-throated Diver		Present
	Phalacrocorax carbo	Cormorant	Cormorant		Present
	Anas platyrhynchos	Mallard	Mallard		Present
	Aythya ferina	Pochard	Pochard		Present
	Circus cyaneus	Hen Harrier	-		Present
	Falco columbarius	Merlin	-		Present
	Recurvirostra avosetta	-	Avocet		Present
	Pluvialis apricaria	Golden Plover	-		Present
	Vanellus vanellus	-	Lapwing		Present
	Asio flammeus	Short-eared Owl	-		Present
	Alcedo atthis,	Common Kingfisher	-		Present

Thames Estuary and Marshes

9.41 The Thames Estuary and Marshes consists of an extensive mosaic of grazing marsh, saltmarsh, mudflats and shingle characteristic of the estuarine habitats of north Kent. Freshwater pools and some areas of woodland provide additional variety and complement the estuarine habitats. Whilst the majority is situated in Kent along the south shore of the Thames estuary, additional areas are located along the north shore of the Thames Estuary.

9.42 The Thames Estuary and Marshes Ramsar was designated in 2000. In addition to qualifying under criterion 5 as it is used regularly by over 20,000 waterfowl in any season and under criterion 6 as it is used regularly by 1% or more of the biogeographic populations of migratory species of waterfowl, it also qualifies under criterion 2a of the Ramsar Convention by supporting a number of species of rare plants and animals (Table 9.9).

9.43 The Thames Estuary and Marshes SPA was classified in 2000. The qualifying bird interest features listed in the SPA Citation, current SPA data form and Ramsar citation, together with the criteria used for this assessment (in line with Natural England advice this is whichever provides the strongest protection) are presented in Table 9.10.

9.44 The boundary of the Thames Estuary and Marshes SPA and Ramsar site lies just under 10 km from the area covered by the Proposal site.

Table 9.9 Qualifying plant and invertebrate species for the Thames Estuary and Marshes Ramsar

Ramsar Criteria	Scientific Name	Species Name
Nationally rare plant species	Chenopodium chenopodioides	Saltmarsh Goosefoot
Nationally scarce plant species	Alopecurus bulbosus Bupleurum tenuissimum Carex divisa Hordeum marinum Inula crithmoiodes Polypogon monspeliensis Puccinellia fasciculate Puccinellia rupestris Salicornia pusilla Stratiotes aloides	Bulbous Foxtail Slender Hare's-ear Divided Sedge Sea Barley Golden Samphire Annual Beard Grass Borrer's Saltmarsh-grass Stiff Saltmarsh-grass Glasswort Water Soldier

	Trifolium glomeratum Trifolium squamosum Zostera angustifolia Zostera noltii	Clustered Clover Sea Clover Narrow-leaved Eelgrass Dwarf Eelgrass
Endangered invertebrate species	Bagous longitarsis	A weevil
Vulnerable invertebrate species	Henestaris halophilus Bagous cylindrus Polystichus connexus Erioptera bivittata Hybomitra expollicata Lejops vittata Poecilobothrus ducalis Pteromicra leucopeza Philanthus triangulum Lestes dryas	A groundbug A weevil A ground beetle A cranefly A horse fly A hoverfly A dancefly A snail killing fly A solitary wasp A damselfly
Rare invertebrate species	Cercyon bifenestratus Hydrochus elongates H.ignicollis Ochthebius exaratus Hydrophilus piceus Malachius vulneratus Philonthus punctus Telmatophilus brevicollis Campsicnemus magius Haematopota bigoti Stratiomys longicornis Baryphyma duffeyi.	A water beetle A water beetle A water beetle A water beetle A water beetle A beetle A rove beetle A fungus beetle A fly A horsefly A soldier fly A spider

Table 9.10 Qualifying Birds Species of the Thames Estuary and Marshes

	Scientific Name	SPA Citation	SPA Data Form	Ramsar	Criteria
Regularly used by 1% of more of the GB population of an Annex 1 species in the winter					
Avocet	Recurvirosta avosetta	283 representing 28.3% of British wintering population	283 representing 28.3% of British wintering population	-	283
Hen Harrier	Circus cyaneus	7 representing 1.0% of the British wintering population	7 representing 1.0% of the British wintering population	-	7
Migratory species regularly occurring over winter					
Grey Plover	Pluvialis squatarola	2,593 representing 1.7% of the East Atlantic wintering population	2,593 representing 1.7% of the East Atlantic wintering population	2,593 representing 1.7% of the East Atlantic wintering population	2,593
Knot	Calidris canutus	4,848 representing 1.4% of Northeast Canada/ Greenland/Iceland/ North West Europe population	4,848 representing 1.4% of the Northeast Canada/ Greenland/ Iceland/North West Europe population	4,848 representing 1.4% of Northeast Canada/ Greenland/Iceland/ North West Europe population	4,848
Dunlin	Calidris alpina	29,646 representing 2.1% of North Siberia/Europe/ West Africa population	29,646 representing 2.1% of North Siberia/Europe/ West Africa population	29,646 representing 2.1% of North Siberia/Europe/ West Africa population	29,646

Black-tailed Godwit	Limosa limosa	1,699 representing 2.4% of the Iceland breeding population	1,699 representing 2.4% of the Iceland breeding population	1,699 representing 2.4% of the Iceland breeding population	1,699
Redshank	Tringa totanus	3,251 representing 28.3% of the Eastern Atlantic wintering population	3,251 representing 28.3% of the Eastern Atlantic wintering population	3,251 representing 28.3% of the Eastern Atlantic wintering population	3,251
Migratory species regularly occurring on passage					
Ringed Plover	Charadrius hiaticula	1,324 representing 2.6% of the Europe/Northern Africa wintering population	1,324 representing 2.6% of the Europe/Northern Africa wintering population	1,324 representing 2.6% of the Europe/Northern Africa wintering population	1,324
Assemblage					
Regularly supporting over 20,000 waterfowl		75,019	75,019	75,019	75,019
Nationally important populations	Tadorna tadorna Anas strepera Anas crecca Anas acuta Anas clypeata Aythya ferina Aythya fuligula	Shelduck Gadwall Teal Pintail Shoveler Pochard Tufted Duck	- - - - - - -	Shelduck Gadwall Teal Pintail Shoveler Pochard Tufted Duck	Present Present Present Present Present Present Present

Queendown Warren SAC

9.45 Queendown Warren consists of *Bromus erectus* grassland. This priority habitat type comprises calcareous grasslands containing an important assemblage of rare and scarce species, including Early Spider-orchid *Ophrys sphegodes*, Burnt Orchid *Orchis ustulata* and Man Orchid *Aceras anthropophorum*. Important orchid assemblage sites are defined in the *Interpretation Manual of European Union Habitats* (European Commission DG Environment 2007) as localities which meet one or more of the following criteria:

- hosts a rich suite of orchid species;
- hosts an important population of at least one orchid species considered not very common on the national territory, or
- hosts one or several orchid species considered to be rare, very rare or exceptional on the national territory

9.46 During the most recent condition assessment process, 100% of Queendown Warren SSSI was adjudged to be in favourable condition. The key environmental conditions that support the features of European interest are:

- maintenance of grazing;
- minimal recreational trampling;
- minimal air pollution – nitrogen deposition may cause reduction in diversity, and sulphur deposition can cause acidification;
- absence of direct fertilisation, and
- well-drained soils.

SUPPORTING HABITATS

9.47 Whilst the qualifying species listed for SPA and Ramsar sites are referred to as interest features, the ecologically important habitats supporting each feature have also been identified as sub-features. The supporting habitats of the Swale SPA, Medway Estuary and Marshes SPA and Thames Estuary and Marshes SPA and are presented in Table 9.11.

9.48 The Medway Estuary and Marshes SPA and Ramsar site, the Thames Estuary and Marshes SPA and Ramsar site and the Swale SPA and Ramsar site include terrestrial, intertidal and subtidal areas. Some species, such as the internationally important wintering population of Hen Harrier on the Thames Estuary and Marshes SPA, are dependent on the terrestrial supporting habitats, notably areas of grazing marsh. Other qualifying species also use areas of the Natura 2000 sites above the highest astronomical tide for breeding, such as Avocet, feeding, such as Curlew and Redshank, or roosting when displaced from mudflats at high tide.

Table 9.11 Percentage of supporting habitat sub-features

	Swale SPA	Medway SPA	Thames SPA
Estuaries, mudflats, sandflats and lagoons	39.0	67.0	57.3
Saltmarsh	5.0	15.0	1.5
Shingle and sea cliff	1.0	-	0.9
Standing water	2.0	1.0	5.6
Bogs, marshes and fens	-	1.0	3.7
Dry grassland	-	1.0	1.9
Wet grassland	-	15.0	29.1
Other arable land	47.0	-	-
Other land (waste land, industrial sites)	6.0	-	-
Total	100%	100%	100%

9.49 The intertidal and subtidal components of the Medway Estuary and Marshes SPA and Ramsar site, the Thames Estuary and Marshes SPA and Ramsar site and the Swale SPA and Ramsar site are termed European marine sites. Under Regulation 33(2a) of the Habitats Regulations, 1994, Natural England has a duty to advise other relevant authorities as to the conservation objectives of each European marine site. Conservation objectives focus on the habitat conditions necessary to support the interest features in recognition that bird populations may change as a reflection of national or international trends. Sub-features are identified which describe the key habitats within the marine site component of the SPA.

Marine Component of the Swale SPA

9.50 Internationally important assemblage of waterfowl including internationally important populations of regularly occurring migratory bird species

9.51 The two key supporting sub-features (habitats) are:

- Mudflats

- Saltmarsh

9.52 Mudflats are a rich source of invertebrates and provide the main feeding ground for wintering species such as Grey Plover and Redshank, which occur in internationally important numbers, and the other nationally important waterfowl species which contribute to the waterfowl assemblage. In addition mudflats do support plant life, including eel-grass and algae. These are valuable as food for the internationally important populations of Dark-bellied Brent Goose and Wigeon, especially when inland feeding sites are frozen.

9.53 Saltmarsh is the predominantly vegetated part of the intertidal zone and its importance for birds is again for high tide roosting and feeding. Whilst the characteristics of the vegetation varies because the plants are adapted to a particular degree of tidal exposure, areas of Saltmarsh within the Swale SPA also varies because of grazing by domestic livestock. Where the vegetation is kept short by grazing livestock, wildfowl which are themselves grazers, including Wigeon and Dark-bellied Brent Goose, can feed. Around high tide, the creeks within the saltmarsh are the only exposed areas of mud, as mudflats in the lower parts of the estuary are still covered by the tide. Wading birds will feed within these creeks. Where there is shallow water within the saltings it is especially suitable for dabbling duck.

9.54 Subject to natural change the conservation objective for these sub-features is to maintain them in favourable condition.

Marine Component of the Medway SPA

Internationally important populations of regularly occurring Annex 1 species

9.55 The four key supporting sub-features (habitats) are:

- Mudflats
- Saltmarsh
- Shallow inshore waters
- Shingle beaches

9.56 Mudflats are a rich source of invertebrates and provide the main feeding ground for wintering species such as Avocet which occur in internationally important numbers. In summer, they also provide a feeding area for Avocet, which are known to move their young into the intertidal area when feeding grounds on the landward side of the sea walls become unsuitable.

9.57 Saltmarsh is the predominantly vegetated part of the intertidal and varies because the plants at each level within its vertical profile are adapted to their particular degree of tidal exposure. The importance of the saltmarshes for birds is for high tide roosting by Avocet.

9.58 Shallow in-shore waters are listed as a sub-feature for the Medway (but not the Swale) because they are used by Little Tern and Great Crested Grebe, both of which are Annex 1 species which occur in nationally important numbers.

9.59 Shingle beaches, such as those that occur in Stoke Saltings, are used for nesting by Little Tern. They prefer a shallow sloping shoreline that provides protection against flooding.

9.60 Subject to natural change the conservation objective for these sub-features is to maintain them in favourable condition.

Internationally important assemblage of waterfowl including internationally important populations of regularly occurring migratory bird species

9.61 The three key supporting sub-features (habitats) are:

- Mudflats
- Saltmarsh
- Shallow coastal waters

9.62 The mudflats in the Medway Estuary and Marshes SPA provide the main feeding ground for wintering species which occur in internationally important numbers, such as Knot, Grey Plover Dunlin and Redshank, as well as other nationally important waterfowl species which contribute to the waterfowl assemblage.

9.63 The saltmarsh in the Medway Estuary and Marshes SPA provide roosting and feeding grounds for wintering species which occur in internationally important numbers, as well as other nationally important waterfowl species which contribute to the waterfowl assemblage.

9.64 Great Crested Grebe feed in the shallow waters of the Medway, and at the time of classification, occurred in nationally important numbers.

9.65 Subject to natural change the conservation objective for these sub-features is to maintain them in favourable condition.

Marine Component of the Thames Estuary and Marshes SPA

Internationally important populations of regularly occurring Annex 1 species

9.66 The two key supporting sub-features (habitats) are:

- Mudflats
- saltmarsh

9.67 Mudflats are extensive within the Thames Estuary and Marshes SPA, with over 2,250 ha on the south bank of the Thames. The mudflats are a rich source of invertebrates (shell fish and worms) and provide feeding grounds for wintering avocet. The mudflats at Higham and Mucking in the west of the site are particularly important for this species.

9.68 Saltmarshes are not extensive in the Thames Estuary and Marshes SPA, but nevertheless provide important high tide roost sites for birds, particularly at Higham in the west of the site. Shallow water within the saltings also provide suitable habitat for feeding birds.

9.69 Subject to natural change the conservation objective for these sub-features is to maintain them in favourable condition.

Internationally important assemblage of waterfowl including internationally important populations of regularly occurring migratory bird species

9.70 The three key supporting sub-features (habitats) are:

- mudflats
- saltmarsh
- intertidal shingle

9.71 Mudflats are a rich source of invertebrates and provide the main feeding ground for wintering species such as Dunlin, Knot and Black-tailed Godwit, which occur in internationally important numbers, and the other nationally important waterfowl species which contribute to the waterfowl assemblage. In addition, mudflats do support plant life, including algae and some very limited eel-grass and algae. These can be valuable as food for wildfowl, especially when inland feeding sites are frozen. Mudflats also provide important roosting areas for internationally important assemblages of waterfowl and its qualifying species.

9.72 Saltmarsh is not extensive in the Thames Estuary and Marshes SPA, but nevertheless provide important high tide roost sites for the internationally important assemblage of waterfowl and its qualifying species. Upper saltmarsh in particular provide high tide roost sites. The vegetation varies because the plants at each level within its vertical profile are adapted to their particular degree of tidal exposure. Also in parts, the vegetation varies because of grazing by domestic livestock. Where the vegetation is kept short by grazing livestock, wildfowl which are themselves grazers, including Teal, can feed. Where there is shallow water within the saltings, it is especially suitable for dabbling duck.

9.73 Small areas of intertidal shingle and cobble beaches on the south bank of the Thames provide important roost sites for wading birds displaced from the mudflats at high tide.

9.74 Subject to natural change the conservation objective for these sub-features is to maintain them in favourable condition.

Queendown Warren SAC

9.75 The Queendown Warren SAC, on the south-facing slope of a dry chalk valley, comprises grassland and woodland. The former has a diverse flora and there are a good variety of invertebrates present, including the Adonis blue butterfly. Potter's Wood is mainly sweet chestnut coppice with oak standards, but with beech, hazel and other species along the southern edge. Uncommon plant species occur, such as lady orchid and yellow bird's nest.

STAGE 2 - LIKELY SIGNIFICANT EFFECT

9.76 This section deals with the screening of likely significant negative effects on the qualifying feature and sub-features of the relevant Natura 2000 and Ramsar sites. Based on the conservation objectives of the relevant sites, discussions with Natural England and information supplied by them, including site citations, the environmental pathways that could result in a significant effect may be summarised as:

- Direct loss or damage of habitats within a designated site or of nearby areas used by interest species;
- Change in management regimes (e.g. grazing / mowing of marshland) of habitats within a designated site or of nearby areas used by interest species;
- Loss of future space to allow for managed realignment to avoid coastal squeeze;
- Urbanisation that results in over shadowing, reduction of sight lines or which hinders flight paths;

- Air quality;
- Water quality;
- Hydrological changes, including in the balance of saline and non-saline conditions;
- Disturbance (activity, recreation, noise and lighting); and
- Introduction or spread of non-native invasive species

9.77 The likelihood of the development proposed within the planning application having a significant effect is discussed for each of these environmental pathways in turn below.

Direct loss or damage of habitats used by interest species

9.78 The proposal will result in no direct loss of any area of habitat designated as SPA, pSPA SAC or Ramsar site during either its construction or operation.

9.79 The propsoal Site does not support any of the plant species listed on the Swale Ramsar citation, but does currently supports one qualifying plant species of the Medway Estuary and Marshes Ramsar site (Annual Beard-grass). As the Proposal site is outside the boundary of this Ramsar site, it can only be seen as providing a refuge area and additional source of seed material. Consequently, with appropriate mitigation to ensure these species continue to be present, it can be concluded that the effects of the loss of habitat outside the Ramsar boundary but which supports qualifying plant species, can be screened out on the grounds of not likely to have a significant effect.

9.80 The scoping of the potential for the habitats currently within the Proposal site to support qualifying invertebrates leads to the conclusion that the majority of the qualifying species of the Swale Ramsar site or Medway Estuary and Marshes Ramsar site are likely to be present, being mostly reliant on saline/brackish ditch habitats typical of these sites, but not present on the Proposal site.

9.81 Further, none of the supporting habitats listed as being important for the invertebrate species (saltmarsh and grazing marsh) are present within the Proposal site.

9.82 Following surveys of the Proposal site in 2009/2010, no qualifying bird species of either the Swale SPA and Ramsar site or Medway Estuary and Marshes SPA and Ramsar site were recorded utilising the Proposal site for breeding and/or foraging. The Proposal site provides little in the way of suitable habitat for any of the SPA cited breeding species. This is based upon:

- the Proposal site does not contain any habitat suitable for wintering

Ramsar/SPA Citation/Data Form species, such as Dark-Bellied Brent Goose, Teal, Oystercatcher and Ringed Plover,

- the poor quality of much of the available habitat within the Proposal site boundary for roosting;
- past construction activity in parts of the site;
- breeding bird surveys undertaken in 2009; and
- no SPA / Ramsar species were noted during any of the other surveys during 2007/2009/2010 roosting on the Proposal site.

9.83 It is therefore concluded that the terrestrial areas of the Proposal site do not regularly support significant numbers of roosting birds either of qualifying individual species or assemblages of the Swale SPA / Ramsar site or the Medway Estuary and Marshes SPA / Ramsar site.

9.84 There is no evidence that the Proposal site is regularly used as a significant feeding or roosting site during passage or winter by any qualifying species of either the Swale SPA / Ramsar site or the Medway Estuary and Marshes SPA / Ramsar site.

9.85 Consequently, it is concluded that the effects of direct habitat loss on qualifying invertebrates as well as breeding, passage and wintering birds can be screened out on the grounds of not likely to have a significant effect.

Change in habitat management regimes

9.86 The majority of the existing land use in the vicinity of the Proposal site is in industrial use, notably the paper mill immediately to the west or brownfield land, including a capped tip to the southeast. The planning application will therefore result in no change to current management regimes of any sub-feature of a SPA or Ramsar during either the construction or operation of the SEP. It will also not result in any direct detrimental change in habitat management of any land adjacent to either the Swale SPA / Ramsar site or the Medway Estuary and Marshes SPA and Ramsar site. Consequently, the effects of change in habitat management regimes can be screened out on the grounds of not likely to have a significant effect.

Loss of future space to allow for managed realignment

9.87 There is evidence that rising sea levels are causing intertidal habitats, notably saltmarsh and mudflats, to migrate landwards across all the designated sites under consideration. However, such landward migration can be rendered impossible due the presence of the sea wall and other flood defences, resulting in a reduction in both the extent and quality of some sub-features through coastal squeeze. The removal or landward relocation of defences is seldom possible in existing built up areas and new development which takes place immediately behind sea walls and flood defences can result in it no longer being possible to move the defences landwards to accommodate replacement of eroded or drowned out intertidal habitats.

9.88 The Proposal site is located in the north of Milton Creek and currently lies vacant. Much of the land in the area is predominantly low-lying and the majority is within Flood Zone 3 on the Environment Agency Flood Map. As detailed in the Flood Risk Assessment, the entire Proposal site is considered to be an area benefiting from defences.

9.89 The planning application will result in no loss of undeveloped land immediately behind the primary sea and flood defences, it can be concluded that in relation to loss of future space to allow for managed realignment there is no likely significant effect.

Urbanisation

9.90 Industrial development in close proximity of Natura 2000 and Ramsar sites has the potential to over shadow areas of habitat within designated sites, or areas used by the interest features of such sites, as well as obstruct flight paths and lines of sight of qualifying species reducing the appeal of the habitat or increasing the risk of fatalities through collisions.

9.91 There is evidence that the Swale foreshore to the east of the Proposal site (within the SPA / Ramsar site) as well as the lower reaches of Milton Creek to the south of the Proposal site (outside the Swale SPA / Ramsar) support important numbers of wintering waterbirds. A summary of the available data for qualifying species is presented in Table 9.12 but see also Appendix 9.5:

Table 9.12 : Waterbird data for the Kemsley Foreshore (February-March 2009)

Species	Peak count during February - March 2009 at Kemsley study area		5yr Peak mean for Swale SPA (2002/03-2006/07)	Great Britain 1% Threshold	International 1% Threshold
	Number of birds	% of SPA population			
SPA Citation / Data Form Species					
Dark-bellied Brent Goose	0	0	1,754	981	2,000
Dunlin	223	2.4	9,202	5,600	13,300
Redshank	210	18.7	1,127	1,200	2,800
Ramsar Species / SPA Assemblage					
Shelduck	102	4.8	2,114	782	3,000
Wigeon	158	0.9	18,521	4,060	15,000
Teal	403	8.3	4,812	1,920	5,000
Pintail	174	22.0	790	279	600
Oystercatcher	600	12.2	4,910	3,200	10,200
Avocet	80	13.4	595	50	730
Ringed Plover	28	8.5	(328)	330	730
Grey Plover	62	3.9	1,576	530	2,500
Black-tailed Godwit	1,500	105.3	1,425	150	470
Curlew	156	13.0	1,201	1,500	8,500
Additional Assemblage Species					
Little Grebe	21	31.3	67	78	4,000
Turnstone	68	15.7	434	500	1,500
Total waterbird assemblage	3,929	5.1		-	-
Total SPA waterbird assemblage			76,323	-	-

9.92

9.93 The data in Table 9.12 indicates that the Kemsley foreshore holds significant numbers of two Citation / Data Form species of the Swale SPA / Ramsar assemblage, namely Oystercatcher and Ringed Plover and Avocet. No direct loss of the habitat used by these species would occur as a result of the proposed SEP. This conclusion is further substantiated by the wintering birds surveys started in October and run through to January 2010 to cover full passage and winter periods (Appendix 9.5).

9.94 Examination of the proposed SEP reveals that there will be no likely significant effects on any Natura 2000 or Ramsar sites as a result of over shadowing. This is because the Proposal site is set around 150 metres away from the boundary of the Swale SPA / Ramsar site. The layout of the buildings also means they are aligned away from the Swale SPA / Ramsar (as opposed to parallel to it).

9.95 Natural England has indicated that the Habitats Regulations cover interest features utilising adjacent habitats. The Proposal site contains no habitats regularly utilised by qualifying species from the Swale SPA and Ramsar site.

9.96 Due to the presence of the existing paper mill to the west, and ridge of higher land beyond, the Proposal site is not seen as being strategically located between the Swale SPA /Ramsar site and the Medway Estuary and Marshes SPA / Ramsar site in terms of flight paths.

9.97 Natural England has confirmed that it would appear that the movement of birds between the Medway Estuary and Marshes and the Swale is limited for most species, with the exception of Knot and to a lesser extent Redshank.

9.98 Whilst it would appear that the effects of urbanisation on the qualifying species of the Swale SPA / Ramsar and Medway Estuary and Marshes SPA and Ramsar site could be screened out on the grounds of not likely to have a significant effect, in line with advice from Natural England, this issue is taken through to Stage 3 in relation the interest features of the Swale SPA / Ramsar site due to the waterbird interest recorded on adjoining intertidal areas.

Air quality

9.99 The two main air quality issues during construction are dust and increased traffic emissions. Levels of understanding of air quality effects on semi-natural habitats and qualifying interest species of Natura 2000 sites are relatively in their infancy. The Air Pollution Information System (APIS) is a publicly available support tool for UK conservation and regulatory agencies, industry and local authorities to help assess the potential effects of air pollutants on habitats and species. It aims to enable a consistent approach to air pollution assessment across the UK. This specifically includes informing assessments required under the Habitats Regulations. Consequently, reference has been made to the information contained within the APIS website.

Construction Dust

9.100 The potential for dust release exists during the construction phase, with potential sources including site clearance, earthworks and construction. Possible impacts on ecology from dust deposition include:

- altering water chemistry of ponds, lakes and possibly watercourses;
- chemical reactions or reduced photosynthesis in leaves;
- deposition of alkaline dust may change species composition, especially in more acid communities; and
- trees may drop their leaves early following exposure to high levels of dust

9.101 The precise behaviour of dust, its residence time in the atmosphere and distance travelled before being deposited depend on a number of factors. These include the characteristics of the dust, local topography, the presence of structures that may intercept dust and wind direction and strength. The prevailing wind direction in the UK is from the south and south-west. The land to the north and east of the site is therefore at most risk of increased deposition of dust as a result of construction activities. Nevertheless, based on studies elsewhere, it is anticipated that the majority of dust would be deposited in the area immediately surrounding the source (up to 100 metres away) and that no change in level of exposure is expected beyond 300 metres from the site.

9.102 The boundary of the Swale SPA and Ramsar site is over 140 metres to the north east of the Proposal site and therefore outside the area potentially most affected. The site boundary runs parallel to the shore at this location. The intertidal zone is subject to daily coverage by the tide and the nearest area of grazing marsh on the far shore of the Swale is over 600 metres away. The closest part of the Medway Estuary and Marshes SPA and Ramsar to the Proposal site where construction works is 2 km to the north and therefore outside the area potentially affected by dust.

9.103 This, together with implementation of techniques to control dust and airborne particulate matter, to ensure compliance with relevant standards and guidelines, it can be concluded that in relation to construction dust, there is no likely significant effect. This issue is therefore screened out from further analysis.

Traffic

9.104 The major impacts of air pollutants on coastal habitats and grasslands in the UK as a result of traffic are ozone, nitrogen deposition and acidification. According to the Department for Transport's Transport Analysis Guidance, beyond 200 metres the contribution of vehicle emissions from the roadside to local pollution levels is not significant (Department for Transport, 2009). This is therefore the distance that has been used to determine whether Natura 2000 and Ramsar sites are likely to be significantly affected by the proposed development.

9.105 Chapter 6 of the Environmental Statement indicates an expected increase in traffic on the A429 as a result of the proposed development. The majority of the increase in traffic will be at least 2 km from the boundary of the Swale SPA / Ramsar site and Medway Estuary and Marshes SPA / Ramsar site. The issue of pollution from increased traffic is therefore screened out from further assessment as it can be concluded it is not likely to have a significant effect on any of the qualifying species and sub-features of the Swale SPA / Ramsar site or Medway Estuary and Marshes SPA and Ramsar site.

Operational Emissions

9.106 The principal source of operational emissions to atmosphere will be gases exhausted from the stack after treatment in the flue gas treatment system. The combustion of waste during the operation of the SEP will give rise to atmospheric emissions of a number of pollutants in low concentrations which will be regulated under the Waste Incineration Directive (WID) 2000/76/EC. The key emissions are nitrogen oxides (NO_x), sulphur dioxide (SO_2), hydrogen chloride (HCl) and ammonia (NH_3).

9.107 The most significant harmful effects of emissions on ecosystems are those known to result from:

- deposition to land of nitrogen (N deposition), which contributes to the eutrophication of habitats; and
- deposition of NO_X, SO_2, NH_3 and to a lesser extent HCl, which contribute to the acidification of habitats.

9.108 As such, the issue of emissions from the operation of the SEP plant is taken through to the next stage for further consideration. In line with Natural England advice, whether it can be concluded emissions do not have an adverse effect will be assessed against the qualifying species or sub-features of the Swale SPA / Ramsar site, Medway Estuary and Marshes SPA and Ramsar site, Thames Estuary and Marshes SPA / Ramsar site and

Queendown Warren SAC.

Water quality

9.109 The quality of the water entering Natura 2000 and Ramsar sites is an important determinant of habitat condition and hence the species they support. Water pollution refers to the introduction of substances or energy that has a deleterious effect on the ability of an area to support its qualifying features. Poor water quality can have a range of ecological impacts. These include:

- at high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour;
- some industrial chemicals and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life; and
- eutrophication, the enrichment of plant nutrients in water, increases plant growth with high levels of macroalgal growth potentially smothering the mudflats used as feeding areas by qualifying bird species. The decomposition of organic matter that often accompanies eutrophication can deoxygenate water. In the marine environment, nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.

9.110 Whilst coastal grazing marsh is sensitive to deteriorations in water quality, no such areas will receive surface water drainage from the Proposal site. It is it is therefore concluded that there will be no likely significant effect on the grazing marsh sub-feature of any of the SPA and Ramsar sites under consideration.

9.111 The proposed development will significantly increase the impermeable area of the site and hence could potentially increase both the volume and nature of surface water run-off and hence its capacity to pollute receiving waterbodies. The Proposal site currently includes a surface water drainage system which serves to drain the Proposal site through an outfall to the Swale. Estuaries can be subject to many types of water pollution and being at the top of their food chains wintering birds often provide a sensitive indicator. Oil is one of the most visible forms of water pollution and around estuaries sources can include small, but chronic losses from shore-based activities such as construction sites and industrial premises. Qualifying species on the Swale Ramsar site such as Great Crested Grebe are generally most at risk since these swim on the water. Wading birds are generally less affected unless oil settles on the mudflats or toxic dispersants are used

(Campbell *et al*, 1978).

9.112 A site-wide surface water pollution prevention system will be developed to prevent the discharge of contaminated surface water to the Swale. The key measures to prevent water pollution are as follows:

- the surface water drainage, including the primary gravity drainage channels and associated systems will remain the responsibility of St Regis;
- surface water drainage will continue to be discharged to the Swale or the foul water system where appropriate;
- As the mobilisation of contaminants during construction works can lead to increased pollution loadings, appropriate treatment (e.g. settlement) and pollution prevention measures (e.g. interceptors) will be provided to prevent polluted flows from being discharged into the Swale

9.113 The overall philosophy for the design of the surface water pollution prevention system for the site is to manage surface water sustainably and to ensure that discharged waters do not constitute a pollution risk.

9.114 It is proposed that all clean surface water from the site is discharged to receiving storage ponds. Minor fuel/oil spillages from plant within Site will enter surface water drainage systems and be treated through class 1 full retention interceptors. Incidents that could result in volumes of fuel/oil which exceed the capacity of the interceptors, would involve contaminated water being discharged directly to the storage ponds, with closure valve retaining the water within the ponds for a tanker to remove off site. Therefore there should be no significant impact from operational drainage on the SPA.

9.115 These ponds will also provide protection against flooding of the site during rainfall and tidal events, and prevent uncontrolled discharge water entering areas of land adjacent the site, such as the SPA. The system is designed to cater for 1 in 100 year storms

9.116 Implementation of these measures during both construction and operational phases of the proposed development limits the risk of a significant pollution incident. Consequently, it can be concluded that the issue of water pollution can be screened out on the grounds of not likely to have a significant effect.

Hydrological changes

9.117 No hydrological changes to terrestrial areas of the Swale SPA and Ramsar site (or any other SPA or Ramsar site) will occur as a result of the proposed development.

9.118 A series of ditches drain eastwards via an outfall to the Swale. The ditch system provides storm water storage when the outfall is tide locked and a flap valve prevents tidal waters entering the system. A site-wide Drainage Strategy has been developed with the aim of ensuring that surface water runoff is suitably managed. The key features are as follows:

- the site will be expected, wherever possible, to utilise practical systems for the collection and re-use of water, particularly from roof areas, to help reduce both potable water demand and surface water runoff all surface water drainage will continue to be discharged to the Swale;
- a new primary drainage system will replace the existing surface water drainage system in a phased manner as the development is brought forward, and
- attenuation of surface water runoff will be dealt with in individual detailed planning applications for each individual development plot and is expected to make use of techniques such as SUDS

9.119 The proposed development will therefore result in changes to the existing freshwater flows across the Kemsley foreshore into the Swale.

9.120 Significant changes to the hydrology of estuaries have the potential to affect the balance between saline, brackish and freshwater conditions, as well as change erosion, sediment transport and depositional processes of estuarine systems. The only potential hydrological impact on the Swale from the proposed changes in the volumes discharged from the outfalls. In view of the small size of these relative to the Swale, which is principally comprised of sea water, the issue of changes to estuary scale hydrology or hydromorphology can be screened out on the grounds of not likely to have a significant effect.

9.121 Several species of birds have been recorded using freshwater flows and flow channels across intertidal areas for feeding, roosting, drinking and preening/bathing (Environment Agency, 2007). Ravenscroft and Beardall (2003) further examined the importance of freshwater flows over mudflats of East Anglian estuaries for wintering wading birds and wildfowl. They found that some species were present around most flows and that certain species, including qualifying species of the Swale SPA and Ramsar site such as Dark-bellied Brent Goose, were consistently recorded in greater numbers around flows than would be expected from average densities. However, the small numbers precluded statistical analysis. There was though evidence of a large turnover of some species of birds using flows, with flocks of Knot for example alighting briefly in flows before dispersing. Overall, the findings indicated potentially significant proportions of the populations of some species were making use of flows.

9.122 The proposed alterations to the drainage network associated with the Proposal site could lead to changes in discharge rates and volumes of water draining into the Swale. This in turn could lead to an impact on intertidal or marine qualifying and supporting features of the Swale SPA / Ramsar site, such as changes in sedimentation patterns along the creek generated by the outfall. This in turn could influence usage of the flows by species for which the site is designated for activities such as preening, drinking and bathing. Consequently, the effects of changes in freshwater volumes cannot be screened out from this assessment on the grounds of not likely to have a significant effect. This issue is therefore taken through to the next stage to determine whether it can be concluded it does not have an adverse effect on the Swale SPA and Ramsar site.

Disturbance

9.123 Disturbance can be caused by activity, recreation, noise and lighting.

Activity

9.124 The movement of people and plant during both the construction phase and operation of the proposed development may be visible to a proportion of the Citation / Data Form species of waterbirds using the intertidal areas of the Swale SPA / Ramsar site. Such activity can disturb birds through causing increased anxiety and flight. The distance at which a bird will take flight due to perceived danger is variable between species, activity type and habituation to human contact. The greatest effect is associated with human presence on the intertidal zone of estuaries. A study on disturbance to waterfowl on estuaries produced by the Wader Study Group (Davidson and Rothwell, 1993), suggested an average flight distance of 148 metres for Shelduck.

9.125 Studies also suggest disturbance is less significant when human presence is restricted to the edge of inter-tidal areas and even less significant when some distance from intertidal areas. Numbers of species such as Shelduck, Black-tailed Godwit, Curlew and Redshank, have though been shown to be lower on the upper shore where a footpath, is used close to where they would otherwise occur (Burton *et al*, 2002a).

9.126 It is considered there is a limited potential for disturbance to be caused by activity when account is taken of the fact that:

- the closest part of the Proposal site which could potentially result in activity disturbance is some 150 metres from boundary of the Swale SPA / Ramsar site;

- the nearest intertidal zones of the Swale to the Proposal site already receive a high degree of visual protection from the Proposal site due to the presence of the seawall;
- bird distribution studies have shown limited numbers of SPA / Ramsar Citation or Data Form bird species on the intertidal area adjacent to the proposed development site;
- waterbirds feeding or loafing on the Swale or Milton Creek in the vicinity of the Proposal site have a high degree of habituation to people due to the presence of the Saxon Shore Way public footpath along the seawall, sailing on the Swale and use of personalised watercraft (jet skis) along Long Reach of the Swale;
- concentrations of waterbirds occurring on the opposite shore of the Swale are over 400 metres from the Proposal site and separated from it by the Swale channel and seawall;

9.127 Consequently, it is concluded that activity disturbance in the form of plant or people movement during both the construction and operation of the proposed development can be screened out as not likely to have a significant effect.

Recreation

9.128 People from a wide-ranging catchment that includes the whole of Kent extensively use the shoreline of the Swale for recreational activity. This includes waterborne activities e.g. personal watercraft on Long Reach of the Swale by Kingsferry Bridge, sailing on the Swale and land-based activities e.g. dog walking. Activities of walkers (particularly dog walkers) and water-borne recreation can, particularly if carried out in winter, have a significant disturbing effect upon large numbers of waterfowl thus increasing energetic expenditure (as birds have to take flight more frequently) and competition on the less disturbed mudflats.

9.129 The potential for disturbance to SPA / Ramsar Citation / Data Form species from recreation activities by either construction or subsequent operational staff is considered low. Whilst the site is less than 150 metres from the Saxon Shore Way that runs along the Swale seawall, this will be fenced off during construction of the proposed Kemsley SEP. The operational nature and characteristics of the Kemsley Mill site means that access will continue to be restricted and measures put in place to prevent incursion outside of defined areas.

9.130 Whilst there is access to the Saxon Shore Way at the southern end of the site, currently very little or no use is made of this by Kemsley Mill staff. It is possible that there will be increased recreational usage made of the Saxon Shore Way during both construction and operation of the site, as Sittingbourne is well within potential travel distance over lunch break. However, it should be bourne in mind that Milton Creek is outside the SPA and that dogs will not be permitted on site. Therefore it is anticipated that few if any construction and operational staff will access the Swale SPA. Consequently, it is concluded that activity disturbance in the form of plant (machinery) or people movement during both the construction and operation of the proposed development can be screened out as not likely to have a significant effect.

Noise

9.131 The Proposal site has the potential to generate significant noise during both site preparation and construction stages, notably as a result of ground clearance, vehicle movements and piling. Very loud noise (which can be defined as greater than 70 dB) and percussive noises have the potential to disturb birds, increasing time spent alert and in flight, reducing the available time to feed. Due to the nearness of the Swale SPA / Ramsar site, the effects of noise cannot be screened out from this assessment on the grounds of not likely to have a significant effect. This issue is therefore taken through to the next stage for further consideration of whether it can be concluded it does not have an adverse effect on the integrity of the Swale SPA / Ramsar site.

9.132 Natural England has confirmed that it would appear that the movement of birds between the Swale and Medway Estuary and Marshes is limited for most species, with the exception of Knot and to a lesser extent Redshank. Consequently, only these two species need to be considered in relation to the effects of noise on the qualifying species of the Medway Estuary and Marshes SPA / Ramsar site.

Lighting

9.133 Lighting during both construction and operational phases of the proposed development has the potential to disturb the qualifying species of the Swale SPA / Ramsar site, as well as potentially Redshank on the Medway Estuary and Marshes SPA / Ramsar site due to the apparent movement of this species between the two sites. Available research indicates that ecological impacts following introduction of lighting could potentially include:

- Disruption of the daily rhythms of some species of plant resulting in changes in growth and flowering times;

- Prolonged settling of nocturnal insects resulting in reduced feeding, breeding and egg laying;
- Reduced ability of female moths such as the Ground Lackey Moth to attract males and increased mortality of larvae due to delayed or failure to produce wintering pupae; and
- Disruption of nocturnal bird behaviour such as roosting and feeding,

9.134 Although there is limited data on the extent to which the area covered by the planning application is used by birds at night, it is increasingly being recognised that the use birds make of both intertidal and terrestrial areas is potentially underestimated by studies that rely on daytime surveys alone. Light from the proposed development has the potential to illuminate both terrestrial and intertidal areas that support qualifying species.

9.135 Due to the nearness of the Swale SPA / Ramsar site and because the Kemsley foreshore is used by qualifying species, the effects of lighting cannot be screened out on the grounds of not likely to have a significant effect. This issue is therefore taken through to the next stage for further consideration of whether it can be concluded it does not have an adverse effect on the integrity of the Swale SPA / Ramsar site and Medway Estuary and Marshes SPA / Ramsar site in relation to Redshank.

Introduction or spread of non-native invasive species

9.136 The movement of people and traffic, as well as importation of material and plants to a site, can result in the introduction of non-native species to a site. However, with appropriate good practice measure the risk of this can be managed.

9.137 Ground works can also result in the spread of non-native species present on a site. The only non-native invasive species currently known to be in the area, though not on the Proposal site is Japanese Knotweed. Again, appropriate measure can reduce the risk of this species spreading.

9.138 The issue of introducing and spread of non-native species is therefore screened out from this assessment on the grounds of not likely to have a significant effect.

STAGE 3 – APPROPRIATE ASSESSMENT

9.139 A summary of the outcomes of Stage 2 is presented in Table 9.13.

Table 9.13 Summary of Stage 2 Conclusions

	Screening	Designated Site	Feature

	Outcome		
Direct loss of habitats	No Likely Significant Effect		
Change in management regimes	No Likely Significant Effect		
Loss of future space for managed realignment	No Likely Significant Effect		
Urbanisation	Through to Stage 3	Swale SPA / Ramsar site	Wintering birds
		Medway Estuary and Marshes SPA / Ramsar site	Wintering birds (Redshank only)
Air quality	Through to Stage 3 (Operational emissions only)	Swale SPA / Ramsar	Grazing marsh sub-feature / Ramsar plant species / wintering birds
		Medway Estuary and Marshes SPA / Ramsar site	Grazing marsh sub-feature / Ramsar plant species / wintering birds
		Thames Estuary and Marshes SPA / Ramsar site	Grazing marsh sub-feature / Ramsar plant species / wintering birds
		Queensdown Warren SAC	Chalk grassland
Water quality	No Likely Significant Effect		
Hydrological changes	Through to Stage 3	Swale SPA / Ramsar site	Mudflat sub-feature / wintering birds / invertebrates
		Medway Estuary and Marshes SPA / Ramsar site	Wintering birds (Knot and Redshank only)
Disturbance	Through to Stage 3 (noise and lighting only)	Swale SPA / Ramsar site	Wintering Birds
		Medway Estuary and Marshes SPA / Ramsar site	Wintering birds (Knot and Redshank only)

Introduction or spread of non-native invasives	No Likely Significant Effect

9.140 It is concluded that the planning application for the Kemsley SEP cannot be screened out as being unlikely to result in significant effects on Natura 2000 and Ramsar sites, because of the potential following pathways: urbanisation, air quality, hydrological changes and disturbance. A more detailed assessment to identify if it can be concluded that these do not have an adverse effect is presented below.

Urbanisation

9.141 The Proposal site is located on the west side of the Swale. The open character of the site means that an assessment needs to be made on whether the proposed development could affect sight lines or reduce the functioning of the Swale to act as a corridor for qualifying species to move along the Swale and in the case of Redshank and Knot between the Swale and Medway Estuary. Few studies of the impact of urbanisation have been found and as a result this assessment is based on field observations, best available information and the precautionary principle.

9.142 Natural England has advised that it is only possible to judge the significance of any impact associated with urbanisation through an understanding of the key feeding and roosting locations on the Swale and how close these are to the Proposal site

Waterbird Distribution

9.143 The Kemsley foreshore and mouth of Milton Creek attract a range of estuary bird species for both feeding and loafing, though no specific wading bird roost was identified in the surveys undertaken. Data from the Kemsley foreshore counts, low tide WeBS and other reputable sources indicates these areas support >1% of the Swale SPA / Ramsar site flock for two SPA / Review species, namely Dunlin and Redshank and nine Ramsar /SPA assemblage species.

Dunlin

9.144 Three races of Dunlin regularly occur in Britain. The main wintering population is of the nominate race, whose breeding range extends from Scandinavia northwards and eastwards. During passage, birds from the *arctica* and *schinzii* races, which breed in Greenland and Iceland, the latter also in Britain, supplement numbers on British estuaries (Collier *et al*, 2005).

9.145 At 293,882, the British maximum for Dunlin in 2006/2007 was the lowest since 1970, a time when far fewer sites were counted for WeBS (Austin *et al*, 2008). The steady decline in national peak numbers over the last decade has been reflected on The Swale where the peak winter Core (high tide) count over the winter of 2006/2007 of 4,612 was the lowest for many years and almost half the peak of 9,000 recorded during the low tide counts over the winter of 2001/2002.

9.146 The five year peak winter mean on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 9,202. This is below the threshold for international importance. Although the Swale historically supported internationally important numbers of Dunlin, the decline means it now only supports nationally important numbers for this species.

9.147 Numbers of Dunlin on the Swale tend to increase rapidly from September to a peak between December and February. Following this peak numbers rapidly decline with very few birds recorded on/after March. This is generally consistent with the national picture where numbers of wintering dunlin remain relatively stable from December to February and decline sharply in March and April as birds depart for breeding grounds (Austin *et al*, 2008).

9.148 Distribution maps for the low tide count carried out in 1992/1993 showed Dunlin to be widespread throughout the Swale, though with the highest concentrations in the inner reaches (Cranswick *et al*, 2003). In the 2001/2002 low-tide count, Dunlin were again recorded in their highest concentrations in the inner reaches and off Seasalter at the mouth of the Swale some 15 km to the east of the Proposal Site.

9.149 The ornithological fieldwork for the SEP proposal shows that relatively low numbers of Dunlin were recorded feeding on the mudflats adjacent to the Proposal Site. Approximately 2% of the estimated size of the SPA flock on the Swale were recorded within the survey area. This is below the percentage expected if Dunlin were preferentially attracted to the area of evenly distributed.

9.150 Dunlin tend to be highly mobile as they move between feeding areas and roost sites, which on the Swale notably include Elmley Marshes on Sheppey and Oare Marshes some 10 km to the east of the Proposal Site. Most movements appear to being over areas of intertidal habitat or the Swale Channel.

Redshank

9.151 At 74,883, the British maximum for Redshank in 2006/2007 (the most recent winter for which data is available) had fallen for the third year running and was the lowest since the winter of 1986/1987(Austin *et al*, 2008). Peak counts on most key sites for this species, including the Swale, were below average. The five year peak winter mean on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 1,127. This is almost a third of the peak mean stated on the Ramsar citation.

9.152 Ringing recoveries at a number of estuaries in Britain have found Redshank are highly site-faithful during the winter (Wernham *et al*, 2002). The available low tide data from 1992/1993 and 2001/2002 indicates Redshank make use of the intertidal mudflats throughout of the Swale in relatively low densities, though with the highest concentrations occurring in the creeks. This is consistent with the ornithological data from the fieldwork undertaken for the SEP planning application which suggests approximately 19% of the estimated size of the SPA flock on the Swale were recorded on the mudflats adjacent to the Proposal Site.

9.153 Natural England has advised that there is evidence of interchange between the populations of Redshank on the Swale and Medway Estuary. Large high tide roosts occur in the west of the Medway Estuary at Burntswick/Greenborough Island Motney and to a lesser extent on Chetney Marshes which separates the Swale channel from the Medway Estuary, as well as on the grasslands and pools at Oare Marshes.

Shelduck

9.154 The five year peak winter mean for Shelduck on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 2,114. At 48,667, the British maximum for Shelduck in 2006/2007 was the lowest for about 30 years, albeit only slightly lower than that of 2005/2006 (Austin *et al*, 2008). Numbers on most key sites, including the Swale were the lowest for many years. Shelduck predominantly forage on intertidal mudflats and the available low tide data indicate this species is widely distributed throughout the Swale.

9.155 The ornithological fieldwork for the SEP proposal shows that relatively low numbers of Shelduck were recorded feeding on the mudflats adjacent to the Proposal Site. Approximately 4.8% of the estimated size of the SPA flock on the Swale were recorded within the survey area.

Teal

9.156 The five year peak winter mean of Teal on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 4,812. Over the winter of 2006/2007 the peak monthly totals of Teal in Britain were the lowest for several years, falling by a quarter compared to the previous year (Austin *et al*, 2008). Although numbers of Teal have generally been increasing over the past decades, peak numbers on the Swale have generally been falling. The available low tide data from 1992/1993 and 2001/2002 indicates Teal are fairly widespread throughout of the Swale, with the highest concentrations occurring in the inner reaches and creeks, including in the vicinity of the Proposal Site. This is consistent with the data from the fieldwork undertaken for this planning application which showed approximately 8% of the estimated size of the SPA flock on the Swale were recorded within the survey area.

Pintail

9.157 The five year peak winter mean of Pintail on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 790. Pintail numbers in Britain have shown some fluctuation over the past few decades but on the whole have been fairly stable (Austin *et al*, 2008). Distribution maps for the low tide counts carried out in 1992/1993 and 2001/2002 showed the inner Swale was the key area for Pintail, notably the area off Elmley Island opposite Milton Creek.

9.158 The ornithological fieldwork for the SEP proposal shows that a significant percentage (approximately 22%) of the estimated size of the Pintail flock on the Swale was recorded on the mudflats adjacent to the Proposal Site.

Oystercatcher

9.159 The five year peak winter mean of Oystercatcher on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 4,910. At 216,308, the British maximum for this widespread and numerous species over the winter of 2006/2007 was slightly higher than that of the previous year and around 10% lower than the average of the past ten years (Austin *et al*, 2008). During this time there has been a slight but steady decline in the number of Oystercatchers in Britain. Lower than average counts were noted on several sites, in 2006/2007 including the Swale where peak counts had previously remained fairly constant between 5,000 and 6,000.

9.160 Oystercatcher predominantly forage on intertidal mudflats and the available low tide data indicates that this was one of the more widespread species on the Swale. Although the ornithological fieldwork for the SEP proposal shows that a significant percentage (approximately 12%) of the estimated size of the Oystercatcher flock on the Swale was recorded on the mudflats adjacent to the Proposal Site, the highest densities were on the outer, more coastal reaches, notably on the north shore of the Swale between Harty

Ferry and Shellness, approximately 10 km to east of the Proposal site.

9.161 Where wintering Oystercatcher occur on intertidal areas at low tide has traditionally been related to the distribution of their prey. In Britain, they are found exclusively on the coast, notably where there are good stocks of shellfish (Goss-Custard, 1996).). Although Oysters (*Ostrea edulis*) were historically probably a major food source, the Peppery Furrow Shell (*Scrobicularia plana*) and similarly sized Common Cockle (*Cerastoderma edule*) are now more usual prey (Goss-Custard *et al*, 2004). They will also consume Baltic Tellin (*Macoma balthica*), Common Limpet (*Patella vulgata*), and Mussel (*Mytilus edulis*), as well as crabs and worms (Zwarts *et al*, 1996).

9.162 This is recognised as the principal sector on the Swale for this species both for feeding and for roosting. Oystercatcher are known to fly to communal roosts at high tide and a significant increase on numbers has been reported on the Sheppey side of the Swale near Harty Ferry since 1998/99 (Banks *et al*, 2005).

Avocet

9.163 At 6,615, the British maximum for Avocet over the winter of 2006/2007 (the most recent for which data are available) was the highest ever recorded and reflected a prolonged increase in numbers (Austin *et al*, 2008). The five year peak winter mean of Avocet on the Swale based on WeBS Core Counts 2002/2003 – 2006/2007 provide by the BTO is 595. The peak number of Avocet recorded on the Swale has varied considerably over this five year period surpassing the international threshold in both 2003/2004 and 2004/2005 (Banks *et al*, 2006). The current wintering population of Avocet on the Swale is far in excess of the mean peak stated on the Ramsar citation and is now above the threshold for a site of national importance in Britain.

9.164 Distribution maps for the low tide count carried out in 1992/1993 showed the inner estuary was the key area on the Swale for this species. The low tide count in 2001/2002 showed that on the Swale this species occurred mainly off Spitend, Elmley Island. The ornithological fieldwork for the SEP proposal shows that a significant percentage (approximately 13%) of the estimated size of the Avocet flock on the Swale was recorded on the mudflats adjacent to the Proposal Site.

9.165 Avocet tend to be highly mobile as they move between feeding areas and roost sites, which on the Swale includes Oare Marshes some 10 km to the east of the Proposal Site. Most movements appear to being over areas of intertidal habitat or the Swale Channel.

Ringed Plover

9.166 The five year peak winter mean of Ringed Plover on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 328. Given that passage numbers of Ringed Plover moving through Britain each spring and autumn are substantially higher than those remaining to overwinter, the peak British maximum of 11,377 over 2006/2007 occurred in August, at which time the Swale held nationally important numbers of this species (Austin *et al*, 2008). Following a decade and a half of steady decline, the most recent data suggests winter numbers in Britain may have started to stabilise.

9.167 The ornithological fieldwork for the SEP proposal shows that approximately 8% of the estimated size of the Ringed Plover flock on the Swale was recorded on the mudflats adjacent to the Proposal Site. Ringed Plover predominantly forage on intertidal mudflats and the available low tide data over the winter indicate that whilst it is one of the relatively more widespread species on the Swale, the highest densities occur on either the inner reaches or most outer flats. Significant numbers therefore occur well away from the Proposal Site.

Grey Plover

9.168 The five year peak winter mean of Grey Plover on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 1,576, which is very close to the mean figure stated on the Ramsar citation.

9.169 At 33,808, the counted British maximum over the winter of 2006/2007 for this species was around 20% lower than in the previous year and was the lowest since 1987/1988 (Austin *et al*, 2008). The underlying trend in Grey Plover numbers has remained downwards since the mid-1990s. Much of this decline has been attributed to an eastward shift in the population (Maclean and Austin, 2008), which may help explain the continuing performance in peak mean Grey Plover numbers on the Swale.

9.170 In winter, Grey Plover predominantly forage on intertidal mudflats and the available low tide data indicates that whilst this is one of the more widespread species on the intertidal zone of the Swale, the highest densities were on the inner reaches, notably off Harty Ferry and Shellness on the north side of the Swale where a localised and sustained increase in numbers was recorded between 1993/94 and 1996/97 and on the intertidal flats off Nagden Marshes on the southern side of the main channel. As Grey Plover also use the more coastal flats of the outer reaches of the Swale, this species occurs well away from the Proposal Site.

9.171 The ornithological fieldwork for the SEP proposal shows that approximately 4% of the estimated size of the Grey Plover flock on the Swale was recorded on the mudflats adjacent to the Proposal Site. Studies have shown that grey plover will use the same feeding areas from tide to tide and also from year to year (Wernham *et al*, 2002).

Black-tailed Godwit

9.172 The ornithological fieldwork for the SEP proposal shows that over 100% of the estimated size of the Black-tailed Godwit flock on the Swale was recorded on the mudflats adjacent to the Proposal site. The five year peak winter mean of Black-tailed Godwit on the Swale based on WeBS Core Counts 2002/2003 – 2006/2007 provided by the BTO is 1,425 and has remained relatively stable over the last five years. This winter peak mean is more than a six-fold increase over the peak mean stated on the Ramsar citation. This is consistent with the national trend which shows overall numbers of Black-tailed godwit wintering in Britain have continued to rise since the early 1980s. At 29,406, the British maximum over 2006/2007 (the most recent for which data are available) was slightly lower than the previous year's figure and below 30,000 for the first time in five years (Austin *et al*, 2008).

9.173 Black-tailed Godwit predominantly forage on intertidal mudflats and the available low tide data indicates that most Black-tailed Godwit occur on the inner reaches of the Swale particularly on the north side of the Swale off Elmley. The main concentration is therefore close to the Proposal Site. Black-tailed Godwit tend to be highly mobile as they move between feeding areas and roost sites, which on the Swale includes a notable roost sites at Elmley on Sheppey some 4 km to the east and Oare Marshes some 10 km to the east of the Proposal Site, where over 700 have been recorded. Most movements appear to being over areas of intertidal habitat or the Swale Channel.

Curlew

9.174 There has been a decline in the numbers of curlew wintering in Britain since 2000/2001, though more recent peak counts indicate that this decline may have stabilised. At 83,259, the British maximum over the winter of 2006/2007 for this species was around 10% higher than in the previous year, although was in line with the average for the past five years (Austin *et al*, 2008).

9.175 Peak wintering numbers of Curlew on the Swale underwent a sizable and prolonged decline over the period 1993/94 – 2003/04 (Banks *et al*, 2005). The five year peak winter mean of Curlew on the Swale over the most recent five winters for which WeBS Core Counts (2002/2003 – 2006/2007) is available from the BTO is 1,201. Whilst well below the five year peak mean stated on the Ramsar citation, it does show that numbers appear to have stabilised more recently.

9.176 Distribution maps for the low tide count carried out in 1992/1993 and 2001/2002 showed that whilst Curlew were one of the more widespread species on the Swale, the highest densities occurred on the inner estuary. This is consistent with the ornithological fieldwork for the SEP proposal shows that over 13% of the estimated size of the Curlew flock on the Swale was recorded on the mudflats adjacent to the Proposal Site.

9.177 Curlew are known to be fairly mobile and will also commonly use areas of grazing pasture and marshland for both feeding and roosting, including at Elmley on the Isle of Sheppey.

Assessment

9.178 The effects that the proposed development could have on the qualifying features of the Swale SPA / Ramsar site and Redshank in relation to the Medway Estuary and Marshes SPA / Ramsar site through impairing lines of sight or flight lines has been assessed for the Proposal Site based on the following design criteria:

- the main alignment of the proposed SEP is east to west and therefore away from (as opposed to parallel to) the Swale SPA / Ramsar site;
- the first of SEP building (the UEU) visible from the Swale will be 17.5 metres high and located 210 metres from the low water mark;
- the second major building (the UEB) will be 50 metres high and located 385 metres from the low water mark;
- the chimney stack of the SEP will be c90 metres high and located 520 metres from the low water mark.

9.179 The nearest part of the proposed development associated with the Proposal Site will be 210 metres from the low water mark and separated from it by the sea wall. In order to determine the intrusion affect of the development on waterbirds using the intertidal areas adjacent to the Proposal site, calculations were made to see whether the development could visually intrude into the line of sight of waterbirds. Calculations were undertaken for a bird 0.5 m in height (an average for wildfowl) standing on the mean low water mark taking into account the presence of the intervening sea wall with an average height of 5.5 m AOD.

9.180 The calculations indicate that a 0.5 metre high waterbird located at the low water mark would be able to see some approximately the top 9 metres of the proposed UEA building located on the very edge of the proposed development, approximately the top 11 metres of the proposed UEB building and approximately the top 20 metres of the chimney stacks located 520 metres away.

9.181 Few studies have been found to inform the assessment of whether it can be concluded such visual intrusion will not have an adverse effect. It is safe to assume that waterbirds would not be disturbed more than they are at present on those parts of the Swale foreshore from which there would be no additional visual intrusion. This includes approximately the upper half of the foreshore due to the presence of the existing seawall. It is also safe to assume that there will be no visual impact on those areas which lie further away from the Proposal Site than the maximum distance at which waterbirds are disturbed by the presence of new structures.

9.182 The available literature suggests that to ensure no adverse effect, there should be no significant increase in obstruction of lines of sight within 200 metres of foraging wading birds. This is less for some species such as Redshank and Teal which are commonly found on the narrower and more enclosed creeks and upper reaches of estuaries. The general tameness of wading birds on the Swale to human activity and structures is recognised on RSPB local group and birdwatching society websites. Whilst such habituation is often cited, there appear to be relatively few studies on this issue.

9.183 The potential impact of landscape features on wintering waterbirds using intertidal mudflats was considered by Burton *et al* (2002b) on six estuaries by relating numbers of waterbirds to the presence of nearby footpaths, roads, railroads, and towns. They found that there was not always a negative relationship with Ringed Plover numbers being higher close to towns. Waterbirds may also compensate for reduced feeding due to the presence of a structure by feeding for longer, sometimes at an increased rate, either during the daytime or when this is insufficient switch to, or increase, feeding during the night when the physical presence of a structure like the proposed Kemsley SEP several hundred metres away would have no relevance.

9.184 Given that:

- the location of the proposed buildings and distance from the Swale means there will be no over-shadowing apart from a minor effect at sunset;
- there will be no change in sightlines across much of the adjacent intertidal areas of the Swale due to the proposed heights of the buildings, distances involved and presence of the existing seawall;
- whilst the buildings will be in view from the low water line, they will be static and therefore less likely to cause disturbance than a moving object), over 200 metres away and blend visually into the Kemsley Paper Mill behind;

- the percentage of the 360º view of a bird on the mean low water mark line through which the proposed 85 metre wide proposed development would be visible is approximately 6.4 %;
- where currently inadequate, additional screening measures will be incorporated into the design to further reduce visual intrusion.

9.185 It can be concluded that there will be negligible obstruction of sight-lines or overshadowing on the Swale intertidal area. It is therefore concluded that the proposed development would not affect the suitability of the adjacent intertidal areas for feeding or result in areas being abandoned by waterbirds.

9.186 In relation to flight lines, the majority of waterbird movements in the vicinity of the Proposal site appear to be along Swale between feeding and roosts sites. For most species the major roost sites appear to be to the east of the Proposal Site, notably on the south side of Sheppey between Harty Ferry and Shellness and the pools at Oare Marshes. With the Proposal Site being located towards the western end of the Swale SPA/ Ramsar site, this observation is substantiated by the advice from Natural England that there appears to be relatively little interchange between the waterbird populations of the Swale and Medway Estuary apart from Knot and Redshank.

9.187 Whilst there is evidence that birds move between feeding and roosting sites there is no evidence that they make use of the Proposal site as a flyway. The literature on flight lines indicates that the risk of disturbance would be more significant where new facilities are located immediately adjacent to foraging and roosting sites or in areas currently comprising open countryside. The risk appears lower if facilities are situated in areas where there is already some form of industrial or commercial activity.

9.188 The proposed buildings of the Kemsley SEP will be in keeping with the existing Kemsley Mill. This, together with the retention of significant open areas of the Proposal Site between the proposed development and the Swale, means that it can be concluded there will be no substantial interference with flight-lines of qualifying birds species as a result of the proposed Kemsley SEP and that the it would not impair the movement of waterbirds over the adjacent intertidal areas or Swale channel.

9.189 It is concluded that in relation to urbanisation there is no adverse effect on the integrity of the wintering birds of the Swale SPA / Ramsar site or the Medway Estuary and Marshes SPA / Ramsar in relation to wintering Redshank.

Air Pollution

9.190 An assessment of the effects of emissions to air from the proposed facility on European designated sites has been established as being required. Following good practice, and discussions with Natural England, all European and nationally designated sites within 10 km have been considered within this assessment. Due to the large area of some of these designations, a series of discrete receptors were included within the modelling to account for the geographic variation of predicted concentrations.

9.191 The assessment of impacts on ecological receptors has been undertaken assuming emissions from the stack at the Waste Incineration Directive (WID) long-term emission limits. This is a precautionary approach to the assessment of the potential effect of emissions from the plant on ecological receptors and represents the worst-case scenario for contributions from the proposed WTP.

9.192 Habitats within each site may be affected through changes in:

- ambient atmospheric pollutant concentrations; and
- deposition of certain compounds.

9.193 The potential effects on habitats within protected sites are quantified by comparing the maximum Process Contributions (PC) and Predicted Environmental Concentrations (PEC) (incorporating a maximum background concentration) to empirically derived thresholds above which damage to vegetation is known to occur (Environmental Quality Standards: EQS). Two EQSs are used to assess the potential effect of emissions on sensitive ecological receptors. These are:

- Critical levels; and
- Critical loads.

9.194 Critical levels and critical loads are quantitative estimates of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge. The critical load relates to the quantity of pollutant deposited from air to the ground, whereas the critical level is the gaseous concentration of a pollutant in the air.

9.195 Critical levels for the protection of vegetation and ecosystems are specified within relevant European Air Quality Directives and corresponding UK air quality regulations as outlined in the National Air Quality Strategy (NAQS). Process Contributions (PC) and Predicted Environmental Concentrations (PEC) of NO_x, SO_2 and NH_3 at each site have been calculated and compared with the relevant critical level: 30 $\mu g.m^{-3}$ in the case of NO_x, 20 $\mu g.m^{-3}$ in the case of SO_2 and 3 $\mu g\ m^{-3}$ in the case of NH_3.

9.196 Although the mudflat components of the Swale SPA / Ramsar site, Medway Estuary and Marshes SPA and Ramsar site and Thames Estuary and Marshes SPA and Ramsar site are not known to be sensitive to atmospheric nitrogen deposition (www.apis.ac.uk), the grazing marsh components (on which the wintering and breeding birds rely for feeding and roosting) are known to be sensitive.

9.197 Background levels of acid deposition and nitrogen deposition based on NO_x, SO_2 and NH_3 concentrations at each of the designated sites have been derived from the APIS website (www.apis.ac.uk). As they can vary across a site, particularly when sites are large; the highest background level was used in the assessment. Although the SEP is based on a two line design, with each served by its own flue and stack, these are only 5 metres apart and have therefore been modelled as a single effective stack, in line with good practice guidance published by the Environment Agency.

9.198 The approach to the assessment of emissions from the SEP stack after treatment in the flue gas treatment system has involved a quantitative assessment of NO_x, SO_2 HCl and NH_3 deposition on designated ecological sites within 10 km of the proposed facility utilising “new generation” Gaussian dispersion models ADMS 4.1 and AERMOD. No dispersion model is wholly accurate and all models will produce variations in results under certain conditions. Model uncertainty has been considered in this assessment by using both ADMS and AERMOD PRIME. Such an approach is again in line with good practice advocated by the Environment Agency.

9.199 The plume dispersion model has taken into account:

- National Weather Prediction (NWP) data generated by the meteorological office., including wind direction, wind speed, cloud cover, temperature and atmospheric stability, particularly vertical motion, based on observations from the nearest meteorological station;
- terrain, including areas of higher ground which can significantly affect (usually increase) ground level deposition concentrations;
- roughness of the terrain over which the plume passes (principally agricultural in this case) as this can have a significant effect on dispersion the ;
- building wake effects as movement of air over and around buildings generates areas of flow circulation, which can lead to increased ground level concentrations.

9.200 Full methods used to calculate the PC for all pollutant species can be found in Chapter 7 (Air Quality Assessment) of the EIA.

9.201 The critical load for acid and nitrogen deposition depends on the habitat type potentially affected. APIS includes a number of broad habitat types for use in the searchable database of critical loads. The habitats within each site to be assessed therefore need to be assigned to one of these APIS habitat types.

9.202 The critical loads for acid deposition and N deposition can vary across a site. The lowest critical load for each ecological site has been used in the assessment.

9.203 Additionally, the citation for each designated site was investigated to determine what habitats occurred within the site. Subsequent to this, a corresponding APIS website habitat category was assigned.

9.204 APIS was further consulted to obtain the data for critical levels and background atmospheric concentrations of NO_x and SO_2 and the critical load and deposition of nitrogen and acid for each corresponding habitat type at the OS grid reference of the designated site. The background levels all pollutants in the tables below are the maximum figures for that conservation site derived from APIS.

Site Relevant Critical Loads Assessment of SACs and SPAs

9.205 SACs and SPAs have been evaluated using the information in the Site Relevant Critical Loads tool in APIS (www.apis.ac.uk). An overview of each interest feature for each site is provided and critical loads (or critical load functions) are assigned to each feature if it is sensitive to either nutrient nitrogen or acidity. Furthermore, deposition data for nitrogen and sulphur at each site is provided.

9.206 To assess the significance of the predicted acid deposition against the relevant critical load function (CLF), the radial distance from the origin of the graph through the modelled deposition point to the critical function line is calculated. The distance from the origin to the modelled deposition point is divided by the radial distance to give a percentage.

9.207 The Site Relevant Critical Loads tool in APIS may also provide information on species sensitivity to acid and N deposition, and this information is referred to in the relevant evaluation sections where applicable.

Ecological Evaluation Criteria

9.208 Maximum PC and PEC of NO_x, SO_2, NH_3, acid deposition and N deposition are compared against the relevant EQS for the relevant habitat type. Potentially significant impacts are predicted if the maximum PC exceeds 1% of the relevant EQS and the PEC exceeds the relevant EQS.

9.209 Also, in cases where the EQS was already exceeded by background deposition rates, the Environment Agency’s guidance (Environment Agency 2007a) states that: “Where the concentration within the emission footprint in any part of the European site(s) is less than

1% of the relevant long-term benchmark (EAL, Critical Level or Critical Load), the emission is not likely to have a significant effect alone or in combination, irrespective of the background levels".

9.210 When comparing the maximum PC within a site against the EQS, it has been assumed that the maximum PC level affects the whole site. This is a conservative approach to the assessment and ensures that the predicted effects represent a worst-case scenario.

Air Quality impacts of the proposed Waste Treatment plant on nature conservation sites

9.211 Full results from the air quality modelling can be found in Appendix 9.2 and Chapter 9 Ecology and Nature Conservation of the EIA. Details relevant to the current assessment of impacts on European protected sites are summarised here.

Ambient concentrations of NO_x, SO_2 and NH_3

9.212 The PC NO_x comprises <1% of the EQS and/or the PEC NO_x is not predicted to exceed the relevant EQS (critical level for NO_x) for all designated sites within the assessment area. Therefore, no significant impacts are predicted on these sites from increased concentrations of NO_x resulting from the operation of the SEP facility.

9.213 The PC SO_2 comprises <1% of the EQS and/or the PEC SO_2 is not predicted to exceed the relevant EQS at any designated site within the assessment area. Therefore, no significant impacts are predicted on these sites from increased concentrations of SO_2 resulting from the operation of the SEP facility.

9.214 The PEC NH_3 comprises <1% of the EQS and/or the PEC NH_3 is not predicted to exceed the relevant EQS at any designated site within the assessment area. Therefore, no significant impacts are predicted on these sites from increased concentrations of NH_3 resulting from the operation of the SEP facility.

Acid deposition - Ramsar and SAC

9.215 Pollutants including NO_x, SO_2 and ammonia all contribute to acid deposition. The National Expert Group on Trans boundary Air Pollution (2001) concluded that:

- By 2010, deposited nitrogen was expected to be the major contributor to acidification, replacing the reductions in SO_2;
- Whilst critical loads for acidification were exceeded in 71% of UK ecosystems in 1997, this was expected to decline to 47% by 2010; and

- Reduced inputs of acidity and nitrogen from the atmosphere may allow chemical and biological recovery from previous air pollution impacts to begin, but the timescales of these processes will be long compared to the timescales of reductions in emissions.

9.216 More recently, Grice *et al* (2006) and Grice *et al* (2007) suggested that air quality in the UK will improve significantly over the next 15 years due primarily to reduced emissions from amongst other things road transport.

9.217 The effects of acid deposition usually result from the leaching of base cations from exchange sites in the soil. Habitats and species can be affected through both wet (acid rain) and dry deposition. Some sites will be more at risk than others depending on soil type, bed rock geology, weathering rate and buffering capacity. Grasslands which are already moderately acidic are more at risk than those which are base rich. The clay soils and input of spring water from the Chalk to the marshes of the north Kent probably helps maintain them as relatively base rich and therefore at less risk of acidification.

9.218 The PC acid deposition is predicted to comprise <1% of the EQS/CLF at the Thames Estuary and Marshes Ramsar site and Queensdown Warren SAC. At the other two Ramsar sites assessed (The Swale Ramsar and Medway Estuary and Marshes Ramsar) the PC acid deposition was >1% of the EQS. However, at all these sites, the habitats present are considered not sensitive to acid deposition (www.apis.ac.uk), despite the apparent high deposition rates etc. The SSSIs that underpin these sites are currently considered to be in favourable condition by Natural England (http://www.natureonthemap.org.uk/), with no evidence suggesting that the previously experienced levels of acid deposition had any adverse impacts. Therefore significant impacts on these sites as a result of increased levels of acid deposition resulting from the operation of the facility are considered very unlikely.

9.219 The PC acid deposition is predicted to comprise <1% of the minimum critical load function (CLF) for all of those features of interest that are sensitive to acid deposition at all SPAs within the assessment area. Therefore, no significant impacts are predicted on interest features of SPAs as a result of acid deposition from the proposed SEP facility.

9.220 Further, following European-wide industrial compliance with the requirements of the Large Combustion Plant Directive and Limitation of Sulphur in Liquid Fuels Directive, background levels of acid deposition have declined in recent years - at the Swale and Medway Estuary and Marshes SPAs they are predicted to decline from 1.74 and 1.96 keq.ha^{-1}.year^{-1}, respectively, in 2003 to 1.5 and 1.71 keq.ha^{-1}.year^{-1} in 2010 (www.apis.ac.uk), a decline of 14% and 13%, respectively. Consequently, even when the SEP is in operation, predicted levels of acid deposition at the above sites (PEC of

1.63 and 1.717 keq.ha^{-1}.year^{-1}, respectively) will still be less than experienced at the sites in recent years.

Nitrogen deposition

9.221 Nitrogen deposition is of particular concern for semi-natural grasslands that are not fertilised. In these situations, plant species composition is adapted to nutrient poor conditions, with low productivity. This may therefore apply to some qualifying plant species of the Swale Ramsar and Medway Estuary and Marshes Ramsar sites. Enhanced nitrogen supply from atmospheric deposition tends to favour the growth of some grasses at the expense of some other species, which may be of more conservation interest (e.g. Bobbink and Roelofs 1995, UBA 1996). Plant communities most at risk are those rich in bryophytes and where species richness is comprised of slow growing species. Grazing marshes appear therefore to be less sensitive to atmospheric nitrogen deposition, although there appears limited specific information available regarding the impacts on this habitat type, especially as management regimes may obscure or modify some of the relationships between atmospheric deposition and habitat change.

9.222 According to the World Health Organisation (WHO), the critical NO_x concentration (threshold) for the protection of vegetation is an annual loading of 30 µgm^{-3} (WHO, 2000). This is based on ecological studies that have determined the rate of deposition beyond which research indicates that adverse effects can reasonably be expected to occur as a result of atmospheric nitrogen deposition.

9.223 The grazing marshes of the Swale SPA/ Ramsar site, Medway Estuary and Marshes SPA / Ramsar site and Thames Estuary and Marshes SPA / Ramsar site within 10 km of the Proposal site do not currently exceed the critical threshold for nitrogen deposition, NO_x or acid deposition. Improvements in air quality since data used by the Air Pollution Information System means that the total average deposition rates should be further reduced by 2% per year to estimate background deposition rates. As the majority of the background data in APIS is from 2003, this means that the baseline will be around 16% lower than the data presented in Appendix 9.2 of the Environmental Statement by the time the construction activities for the Kemsley SEP are scheduled to commence (2011), further decreasing the likelihood of any significant impact.

9.224 The pollutants that contribute to nitrogen deposition derive mainly from ammonia (NH_3) and nitrogen oxides (NO_x) emissions. While these pollutants may lead to acidification, nitrogen deposition refers to the pollutant dose that may lead to nitrogen eutrophication. NH_3 emissions result primarily from the decomposition and volatilisation of animal wastes and are therefore not considered further. Nitrogen oxides are produced naturally by lightning and also to a small extent by microbial processes in soils. Of man-made sources, around half are derived from motor vehicles, about one-quarter from power stations and the rest from other industrial and domestic combustion processes. NO_x emissions are therefore widely dispersed, but unlike emissions of sulphur dioxide, emissions of nitrogen oxides are only falling slowly in the UK, as emission control strategies for stationary and mobile sources are offset by increasing numbers of road vehicles.

Conclusion

9.225 In conclusion, in relation to the Ramsar sites within the study area, the PC nitrogen deposition comprises <1% of the EQS within the assessment area. Therefore, it can be concluded there will be no adverse effects on these sites from increased Nitrogen deposition resulting from the operation of the SEP facility. In relation to SPAs within the study area and Queendown Warren SAC, The majority of interest features are either insensitive to N deposition or sensitive indirectly via potential impacts on their habitats. As PC N deposition comprises <1% of the minimum EQS at all SAC/SPAs within the assessment area, no adverse effects are predicted on these sites from increased Nitrogen deposition resulting from the operation of the SEP facility.

Disturbance

9.226 A number of studies have suggested that disturbance from construction and operational activities may affect both the behaviour and distribution of water birds including their biological fitness (i.e. survival rate and fecundity). Studies indicate that waterbirds are likely to be more sensitive to infrequent disturbance such as different, sudden or surprising stimuli rather than prolonged disturbance.

9.227 One of the key factors in the level of disturbance has been attributed to the actual presence of people with the results of the various studies suggesting waterbirds are often less abundant along parts of the shore where there is heavy human activity. In a study by Fitzpatrick and Bouchez, (1998), the most important factor determining the amount of scanning done by Redshank, Oystercatcher and Curlew on a beach in County Antrim was shown to be the presence of people. Burger (1988) found that demolition work reduced the feeding efficiency of waterbirds throughout the day and for an average of one hour afterwards. Burton *et al* (2002a) provided evidence to suggest that onshore construction work may have longer term effects. This was based on the observation that the use of adjacent mudflats in Cardiff Bay by Oystercatcher, Curlew, Dunlin, Redshank and perhaps Shelduck was reduced during the 11-year period of construction works associated with the construction of the barrage.

9.228 Studies that have tested the possibility that birds are less abundant in places where disturbance from human activity is frequent have often not fully considered all potential variables. Some studies have failed to find that onshore construction works have an effect on adjacent bird populations. Pearson *et al* (1990), for example, found little evidence to suggest disturbance from onshore construction activities in Poole Harbour affected most species of wading birds feeding on adjacent mudflats. Comparing the numbers of birds over two winters during which construction took place with the numbers that occurred there in the previous winter revealed little change in numbers of Oystercatcher, Grey Plover and Dunlin, though Curlew numbers were lower.

9.229 A study by Gill *et al* (2001a) into the differences in bivalve densities along the shore found that shore based activities which caused Black-tailed Godwit to frequently fly away, had no effect on the densities of bivalves (a food source Black-tailed Godwit) on the estuaries of the east of England. This study took place at a range of spatial scales, from small patches of mudflat up to whole estuaries and using a range of measures of human activity. Differences in bivalve densities would have been expected if Black-tailed Godwit, the main predator of this resource, had been permanently prevented from feeding in disturbed areas. This suggests birds were exploiting the available food resource once the disturbance has subsided, including potentially at night suggesting that even if a change in bird distribution is recorded owing to disturbance from human activity, the effects may only be temporary and not necessarily reflect a negative effect. .

9.230 Most studies of disturbance on wintering wading birds and wildfowl have focused on the effects of disturbance on their behaviour such as the distance at which birds fly away and whether their distribution is changed as a consequence of this disturbance. However, It is recognised that the real measure of the impact of disturbance on birds is how it affects their biological fitness including survival rate and fecundity of birds (Brown and Langston 2000, Gill and Sutherland 2000, Gill *et al*, 2001a, Gill *et al* 2001b, Goss-Custard 2003a, Hill *et al*, 1997, Madsen 1994, Robinson and Pollitt 2002).

9.231 The responses of birds to disturbance often involve activities that are energetically costly (e.g. flying) or affect the behaviour in a way that might reduce food intake or moving to less preferred and potentially less profitable feeding sites. Studies have attempted to measure these costs, which have been shown to be sometimes considerable. However, because estimating the impact of disturbance on fitness has seldom been truly possible, most studies make the precautionary assumption that if bird behaviour is affected, there is a risk that their fitness might also be affected.

9.232 This is clearly not always the case and because birds react to disturbance this should not be taken to mean their fitness is necessarily reduced. A review of relevant studies carried out by Goss-Custard (2007) showed that whilst a reduction in fitness as a result of disturbance is suggested by some studies, others indicate that this is not always the case. Most studies remain undecided on when the frequency of disturbance reaches the point at which fitness would be reduced because the increased demand for energy could not be met in the reduced time available for feeding.

9.233 Studies have also been undertaken as regards whether waterbirds can compensate for the losses of time and energy resulting from disturbance by altering their behaviour or by habituating to human activities (Davidson and Rothwell, 1993). Short flight distances in response to disturbance of Curlew, Redshank and Oystercatcher on a beach in County Antrim were attributed to habituation by Fitzpatrick and Bouchez (1998). Waterbirds may also feed for longer, sometimes at an increased rate, either during the daytime or when this is insufficient switch to, or increase, feeding during the night. Many papers claim that birds habituate to frequent disturbance arising from a variety of causes, though few studies appear to have been carried out. Most evidence tends to be anecdotal and use habituation as an explanation of the relative tameness of the birds.

9.234 The sensitivity of waterbirds to disturbance may also decrease through the winter. The distance to which Oystercatcher on a mussel bed on the Exe would forage from a stationary person for example decreased over the winter (Stillman and Goss-Custard, 2002). This was interpreted as a result of the birds progressively finding it harder to find food as the winter progressed and therefore prepared to take greater risk than to their becoming habituated to disturbance.

9.235 Flight distances of waterbirds were measured on the Exe Estuary during the winters of 2002 and 2003 (Goss-Custard 2003b). In 2002 this included measuring the flight distances of birds feeding alongside an elevated walkway. Very few birds of the five common species studied (Avocet, Dunlin, Black-tailed Godwit, Curlew and Redshank) flew away at distances above 100 metres. It was considered likely that in the circumstances birds had become habituated to the presence of people moving at a steady pace and not outlined against the sky. In 2003, flight distances were measured against activities on top of seawalls 4-6 metres above the level of the mudflats at various locations around the estuary. Very few of the nine species studied (including seven relevant to this assessment: Oystercatcher, Avocet, Grey Plover, Dunlin, Black-tailed Godwit, Curlew and Redshank) flew away at distances above 200 metres.

9.236 It is well reported that flight distances vary between species, as well during different activities, times of day, stages of the tide and between different sites. Goss-Custard (2007) reports that flight distance varied tenfold (27 metres to 250 metres) between studies of roosting birds and by an even greater difference (7 metres to 350 metres) in foraging birds. Flight distance can be influenced by many parameters including species, flock size, habitat, direction of activity, time of day and time of year. In the absence of site specific flight measurements for the Swale, on the basis of flight distance measured on the Exe Estuary, it is considered that a distance of 200 metres or more from the Proposal Site can be used to define the buffer zone between human activity in the form of people or plant (machinery) moving at a steady pace and not outlined against the sky and waterbirds if the frequency of disturbance is not to be increased above present day levels.

9.237 As has been shown birds may habituate to disturbance and therefore it is not considered that the short term higher levels of general disturbance associated with construction, nor the longer term but lower level disturbance associated with operational works are likely to have a significant effect. Whether it can be concluded the effects of noise and vibration, and lighting during construction and operational works do not have an adverse effect is determined below.

Noise and vibration

Construction

9.238 It is recognised that Infrequent, short, sharp ‘percussive’ noises have the potential to cause the greatest disturbance (Burton *et al*, 2002a). Such noises are considered most likely to be generated during the construction phase, and be a comparatively uncommon event during the operation of the proposed works.

9.239 Noise created during the construction phase has the potential to effect wading birds and waterfowl using the Swale SPA / Ramsar site and the Medway Estuary and Marshes / Ramsar site. Peak levels of sound in relation to the planning application are most likely to occur from the impact of concrete breaking and pneumatic drilling during site preparation and piling during construction. These activities can have an impact on bird species at a distance of up to 250 metres and is based on published research and studies by the Environment Agency for the Humber Estuary Tidal Defences scheme (Environment Agency, 2000). The Environmental Statement for the Humber Defences states that: ‘sudden noise in the region of 80dB appears to elicit a flight response in waders up to 250 metres from the source, with levels below this to approximately 70dB causing flight or anxiety behaviour in some species.’

9.240 Evans and Ward (2001) aimed to quantify the background levels of noise on the Tees Estuary, a heavily industrialised site. The background noise levels as measured at the mid-tide shoreline were found to be on average 47.5dB. The zone of impact in which waterbirds were considered potentially at risk from noise was considered to be a radius of 500 metres. This figure has been used as a worst-case scenario. Site preparation and construction work producing levels of noise in excess of 80dB within 500 metres of the Swale SPA / Ramsar site therefore have the potential for an adverse effect.

9.241 Noise created during the construction phase from piling works, HGV movements and other plant activities has the potential to disturb birds wintering within the SPA/Ramsar, causing them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80 dB L_{Amax}. The main intertidal areas of the Swale Ramsar/SPA used by wintering citation birds recorded by the foreshore monitoring are over 200 m from the areas of the Proposal Site where significant noise events may occur.

9.242 The maximum noise has been modelled at the main intertidal area of the SP/Ramsar to be no more than 65 dB L_{Amax} (see Figure 9.10). As a result no effect is predicted due to construction noise.

9.243 In terms of exposure, very little of the Swale falls within the worst case area that could be affected (see Figure 9.10 of the Environmental Statement). However, bird data for this area indicates that it does support significant numbers of qualifying bird species of the Swale SPA / Ramsar site. The vulnerability rating is therefore considered to be high.

9.244 Disturbance by noise, including large amplitude 'startling' components such as piling will also be avoided and mitigated by a work programme and method statement including where the use of a 'soft start' to the piling operation during winter months and the scheduling of works to ensure that piling during the most sensitive periods (i.e. during the worst weather conditions over winter when the birds are potentially highly stressed) is undertaken at the points furthest away from the more sensitive receptors.

9.245 There is a limited potential for disturbance to be caused by noise during construction when account is taken of the facts that:

- The waterbird assemblages feeding around the Swale, Medway and Thames estuaries are already habituated to an extent to construction noise;
- Bird distribution studies have shown small but not significant populations of birds feeding in the area contained within 500 metres of the proposal site; and
- Construction noise is temporary and reversed once construction activity ceases in any one day, in any one week and at the end of the construction of the structures.

9.246 The outcome is that it can be concluded that noise will have no adverse effect on any qualifying species or the waterbird assemblage of the Swale SPA / Ramsar site or the Medway Estuary and Marshes SPA / Ramsar site.

Operational

9.247 People getting in and out of vehicles, including shutting doors is thought to cause more disturbance than continuous low-intensity disturbances such as low-level continuous noise (Hill *et al*, 1997). It is generally thought that birds may habituate to continual noise so long as there is no large-amplitude 'startling' component (Hockin *et al*, 1992). In a review of studiers on waterbird disturbance, Goss-Custard (2007) concluded that there was nothing in his literature review to challenge this view.

9.248 The area to the west of the Proposal Site is already relatively noisy due to the presence of Kemsley Mill. In terms of sensitivity, waterbirds appear to habituate to continual noise provided there is no large amplitude 'startling' component. It is considered that there is a low potential for sudden noises during the operational phase of the development to cause disturbance impacts on SPA cited/review birds.

9.249 Sudden noise created during the operational phase from valve releases associated with the slag and combustion residues processing plant (UEW and UEU), HGV movements and other plant activities has the potential to disturb birds wintering in the area to cause them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80 dB L_{Amax}.

9.250 Waterbirds occurring on the intertidal area are at their closest, 100 m from the construction Site boundary and the maximum noise has been modelled here using the indicative source point of noise for valve release at the northern end of the Site to be no more than 35 dB L_{Amax} (see Figure 9.11). The majority of waterbirds however occur in areas where the maximum noise has been modelled as 30 dB L_{Amax} or less. As a result there is no predicted effect due to sudden noises during the operational phase.

9.251 The general increase in ambient noise post-construction is not expected to constitute a significant effect on the waders and waterfowl using the Medway Estuary and Marshes SPA / Rmasar site or the Thames Estuary and Marshes / Ramsar site.

Night Lighting

Construction

9.252 The key attributes that determine the effect that night lighting has on qualifying features appears to be its proximity, type, direction and intensity.

9.253 It has been assumed that there will be little night working during construction of the proposed Kemsley SEP. Night lighting during construction is therefore expected to be limited to compounds for security and safety reasons and temporary work areas where engineering works are required outside normal working hours or security and safety reasons.

9.254 Outside of initial site wide works, night lighting during construction will be limited to that part of the Proposal site required to develop each phase. The characteristics of the night lighting during construction will be downward facing and shielded to reduce spillage, involve lighting on relatively short columns or temporary structures and use luminaries of only the necessary wattage. The lighting will therefore be equal to or less intense than that of the existing security night lighting on Kemsley Mill to the west

9.255 The effect of night lighting during construction will therefore have no adverse effect on the qualifying species of the Swale SPA / Ramsar site or Medway Estuary and Marshes SPA / Ramsar site in relation to Redshank for the following reasons:

- It will be over 150 metres away from the boundary of any designated site;
- It will be limited to specific areas, temporary in nature and not add significantly to the existing night light loading of the area.

Operational

9.256 Night lighting during operation of the proposed Kemsley SEP could also be a potential source of disturbance to the qualifying features (both flora and fauna) of the Swale SPA / Ramsar site and Medway Estuary and Marshes SPA / Ramsar site in relation to Redshank. The design of this lighting will be directional to reduce spillage into other areas. Existing developments to the west of the Proposal site will also act as a shield to reduce the impact of the additional lighting on surrounding areas. The secondary flood defence in the southeast of the site will also shield the Swale foreshore from direct lighting

9.257 Whilst this will limit the impact on static qualifying species, it is more difficult to quantify whether this will be sufficient for more mobile species, such as wildfowl and wading birds, without a detailed knowledge of the night time use of an area. The distribution of wildfowl and wading birds in daylight hours cannot always be taken to indicate that this is where they occur at night. Grey Plover for example, a qualifying species of the Swale Ramsar site have been shown to meet the majority of their energy requirements at night due to the nocturnal emergence of preferred polychaete prey (Dugan, 1981).

9.258 The study on the risk of bird strike in response to the suggestion of an airport at Cliffe (Department for Transport, 2006) included two weeks attempting to assess night time behaviour and movements to ascertain if this differed greatly (or unpredictably) from daytime movements and behaviour. The results included night time movements of both Oystercatcher and Curlew.

9.259 In areas of high disturbance wildfowl and wading birds may need to switch to, or increase, feeding at night to meet their daily energy requirements. Nocturnal feeding by Teal for example has been reported particularly when disturbed during daylight hours (Guillemain *et al*, 2000). Work by Burton and Armitage, (2005) on the Severn Estuary has also shown that Redshank use a greater number of sites at night, including areas not used during the day due to disturbance. Sitters (2000) proposed five hypotheses for the role of night foraging:

- Preference for day with supplementary feeding at night;
- Preference for night with supplementary feeding during the day;
- Indifferent to time or day;
- Even spread to avoid peaks of body weight; and
- Feed whenever possible.

9.260 For probing species like Dunlin, feeding in darkness probably makes little or no difference since they principally feed by tactile cues. Species that use visual signs will either feed less efficiently at night or switch to using tactile cues, whilst those species with superior vision in poor light conditions may continue to use visual cues. During the hours of darkness Oystercatcher which feed principally by sight are known to feed at under half the daytime rate. It is possible that a moderate increase in light levels could therefore benefit sight-feeding waders such as Oystercatcher and Redshank, both of which have been recorded feeding on the Kemsley foreshore.

9.261 The use of areas at night for roosting and foraging by wildfowl and wading birds is though complex, appearing to vary between species (Zwarts *et al*, 1990, Dodd and Colwell, 1998) as well as seasonally (Dodd and Colwell, 1996). Wildfowl and wading birds may become habituated to increased lighting and the additional lighting from the proposed development is not considered to have a cumulative effect on existing light levels close to the development area.

9.262 The light scheme for the operational phase will follow best practice to minimise light impacts. The operational lighting design incorporates street lighting and flood lighting located on the Site buildings to provide illumination to roads, car parks and hard standing areas.

9.263 The street lighting is fitted with a flat glass profile to minimize light spill. The lighting levels for the final operational plant can be seen to drop to a level of 1 lux (bright moonlight) within an average distance of 12 m from the Site boundary (see Appendix 8.2). Given the boundary of the Ramsar/SPA is over 140 m from the Site, combined with the current significant lighting surrounding the Kemsley Paper Mill and associated roads there will be no significant impact from the operational lighting.

9.264 The effect of night lighting during operation of the Kemsley SEP will therefore have no adverse effect on the qualifying species of the Swale SPA / Ramsar or Medway Estuary and Marshes SPA / Ramsar site in relation to Redshank for the following reasons:

- It will be over 150 metres away from the boundary of any designated site;
- It will be limited to specific areas, notably access routes and car parks;
- The type of lighting will be carefully selected and directional to ensure no unnecessary illumination into surrounding areas, and
- It will not add significantly to the existing night light loading of the area to which flora and fauna are likely to have become accustomed.

Hydrological Change

9.265 The Proposal site and surrounding areas are currently served by a man-made drainage system that discharges into the Swale. The proposed development will result in the construction of a significant number of new impermeable surfaces such as building roofs and paved areas. As part of the planning application, a site-wide drainage system has been developed that will ensure that the rate of surface water runoff is controlled.

9.266 As the site is developed, the owners will undertake to revitalise the existing primary drainage systems, providing additional attenuation storage where appropriate. It is also proposed that a new primary gravity drainage system will replace the existing surface water drainage system in a phased manner as the development is brought forward. If necessary, subject to approval by the appropriate regulatory body or bodies, the outfall will be modified to facilitate improved discharge.

9.267 The planning application therefore identifies changes to the existing freshwater flows across the Kemsley foreshore, which may in turn lead to changes in the hydromorphology of the discharge channel. Several species of birds have been recorded using freshwater flows and flow channels across intertidal areas of estuaries for feeding, roosting, drinking and preening/bathing (Environment Agency, 2007). Ravenscroft and

Beardall (2003) found that some species were present around most flows and that certain species were consistently recorded in greater numbers around flows than would be expected from average densities. Although the small numbers precluded statistical analysis, there was evidence of a large turnover of some species of birds using flows. Overall, the findings indicated potentially significant proportions of the populations of some species were making use of flows.

9.268 The exposure to the potential hazard relates to what degree each interest feature and the supporting habitat it uses falls within the zone of influence of the proposed change in freshwater flow regimes. Feature specific levels of exposure have been assigned to each of the qualifying species primarily on the basis of the monthly winter bird counts of the intertidal areas adjacent to the Proposal site collected on behalf of St. Regis. This has been supplemented by analysis of other available data, including WeBS low tide counts, and a review of relevant literature concerning habitat requirements.

9.269 Suggested sensitivities of those qualifying waterbirds of the Swale SPA / Ramsar site to freshwater flows have been ascribed based on previous studies (Enviros Consulting Ltd., 2005). As all bird species require freshwater in one way or another to support suitable habitats, feeding, and hunting areas for example, a rank of negligible was not ascribed to any bird species.

9.270 Data on the exposure and sensitivity of qualifying species recorded on the intertidal areas adjacent to the Proposal site of the Swale SPA / Ramsar to freshwater flows are presented in Table 9.2.

Table 9.14 Kemsley foreshore waterbird exposure and sensitivity to freshwater flows

Species	> 1% SPA Total Population	High Sensitivity to Freshwater Flow	Taken Forward for Further Assessment
SPA Citation / Review Species			
Dunlin	Yes	No	No
Redshank	Yes	Yes	Yes
Ramsar Species / SPA Assemblage			
Shelduck	Yes	Yes	Yes
Wigeon	No	Yes	No
Teal	Yes	No	No
Pintail	Yes	Yes	Yes
Oystercatcher	Yes	No	No

Avocet	Yes	Yes	Yes
Ringed Plover	Yes	No	No
Grey Plover	Yes	No	No
Black-tailed Godwit	Yes	No	No
Curlew	Yes	No	No

9.271 An assessment of the vulnerability of four species to the effects of the proposed changes to freshwater flows across the intertidal foreshore at Kemsley is presented below.

Shelduck

9.272 The number of Shelduck recorded wintering in Britain increased from when wildfowl counts began in 1948 to a peak of around 70,000 in the mid-1970s (Lack, 1986) after which peak counts remained relatively stable until the mid 1990s with the exception of occasional high numbers associated with prolonged frozen conditions on the Waddenzee (Ridgill and Fox, 1990). Since then, there has been a gradual decline in the peak national count with 48,667 in 2006/2007 the lowest maximum for around 30 years, albeit only slightly lower than the that of 2005/2006 (Austin *et al*, 2008). This decline is in line with research showing UK breeding numbers declined by 38% between 1994 and 2004 (Raven *et al*, 2005). The spate of mild winters may also have had a bearing as when there is severe weather on the continent more Shelduck move from the Wadden Sea to estuaries southern Britain (Baillie *et al*, 1986).

9.273 Shelduck numbers on the Swale have fluctuated greatly since the beginning of the WeBS reporting period, though generally increased to a peak of over 3,000 in the late 1990s. Since then the peak number of Shelduck over-wintering on the Swale has declined sufficiently over the medium-term and short-term to trigger Medium-Alerts. Despite the inherent variability in numbers exhibited by this species, as both national and regional numbers have undergone declines of a lesser magnitude this would suggest that adverse local conditions could be partially responsible for the downturn in numbers on this site (Maclean and Austin, 2008).

9.274 Although found on the sandy estuaries of northwest England and reported to make use of coastal grasslands, the majority of wintering Shelduck in Britain occur on the muddier estuaries of eastern and southern England such as the Swale (Banks *et al*, 2006). Although they tend to disperse as the winter progresses, on estuaries like the Swale numbers usually remain high due to the arrival of Shelduck from the main moulting site of the Waddenzee well into the New Year. Peak numbers normally therefore occur on estuaries in January or February (Musgrove *et al,* 2001).

9.275 On intertidal mudflats, Shelduck tend to be highly gregarious and feed chiefly by sieving wet sediment through their bill. Such a feeding strategy demands considerable quantities of food and for this reason they tend to capture abundant but small invertebrates and plant material on or near the surface of intertidal mudflats rather than larger but more deeply buried prey items (Atkinson-Willes, 1963).

9.276 The principal food item is the small gastropod snail *Hydrobia ulvae*. Whilst this occurs in a wide range of salinities (Jackson, 2000), highest numbers are reported occur in areas of generally lowered salinity (15-30‰). Shelduck has been shown to exhibit five distinct feeding methods relating to the state of the tide and behaviour of *Hydrobia* (Bryant and Leng, 1975). These include dabbling at the waters edge and up-ending in shallow water. Shelduck have been shown to feed on a wide range of other invertebrates living in the surface sediment and where *Hydrobia* are scare have been noted to feed notably on oligochaete and ploychaete worms (Anders *et al*, 2008), some species of which can occur in higher densities near creeks and channels.

9.277 Shelduck therefore predominantly forage on intertidal mudflats and the available low tide data indicate this species is widely distributed throughout the Swale, with particular concentrations noted in the major creeks and side channels.

9.278 In view of:

- Shelduck are distributed throughout the Swale;
- Shelduck principally feed on *Hydrobia* which whilst able to tolerate a wide range of salinities occurs in higher densities in reduced salinities but is generally absent from low salinity areas and is therefore not generally present in freshwater flows; and
- Although Shelduck feed on a variety of other prey, including worms that have been shown to occur in higher densities near freshwater flow channels, they tend to occur in higher densities on sheltered areas of wet mud, notably the larger side creeks.

9.279 It can be concluded that the proposed hydrological changes will have no adverse effect on site integrity for Shelduck on the Swale SPA / Ramsar site.

Pintail

9.280 Pintail is a rare breeding bird in Britain, as in the rest of Europe. Declines in numbers of breeding Pintails have been recorded from Russia, Finland, Estonia, Denmark, Poland

and Ukraine (Berndt and Kauppinen 1997). Of the three European wintering populations of this species, the north-west European is the smallest, and has shown a long pattern of slow decline (BirdLife International, 2004). This has been attributed primarily to habitat loss and degradation in both breeding and wintering areas.

9.281 Most of the Pintail occurring in winter migrate from more northern and eastern breeding areas in Iceland, Fennoscandia and Russia (Stroud *et al*, 2001). The European distribution in winter has traditionally been concentrated on a small number of coastal sites where Pintail form large flocks on brackish coastal lagoons and estuaries, as well as flooded grassland and large lakes and reservoirs.

9.282 Flocks of Pintail became a regular visitor on British estuaries, particularly those of north-west England and north Wales, during the mid 1950s (Piotrowski, 2003). In the UK, numbers of non-breeding Pintail increased by 3.5% between 1966 and 1995. During this time there were periods when numbers remained relatively consistent or even declined slightly (Kershaw, 1998) as well as years when numbers where significantly higher due to influxes from mainland Europe during harsh weather conditions (Ridgill and Fox 1990; Berndt and Kaupinnen 1997; Scott and Rose 1996).

9.283 Numbers recorded in Britain since then have fluctuated considerably, with the peak counts in 2001/2002 and 2002/2003 being amongst the highest ever recorded (Cranswick *et al*, 2005). Since then Pintail numbers have been more stable (Austin *et al*, 2008). Peak numbers in Britain can show a double peak over the winter. One hypothesis for this is differences in the timing of movements of different sub-populations away from their breeding grounds. Icelandic Pintail for example may arrive in early winter and disperse before the later arrival of continental birds when weather systems push them further west (Cranswick *et al*, 1999).

9.284 Trends in winter numbers in Britain have varied both between regions and between habitats with numbers increasing at some sites, notably lakes, reservoirs and flooded mineral workings. At the same time, numbers on some estuaries and coastal sites have generally stabilised, suggesting the birds are undergoing some re-distribution to less traditional habitats. The picture is though complicated by Pintail being extremely mobile during the winter (Stroud *et al*, 2001). This mobility causes local changes in distribution and changes to the relative importance of individual sites through the winter (Owen *et al.* 1986). Numbers of birds at individual sites also fluctuate markedly between years indicating a low degree of site fidelity (Pollitt *et al*. 2000) and a high degree of opportunism for temporarily suitable sites such as flooded fields (Brown and Smart, 2002).

9.285 Peak winter counts on the Swale have fluctuated markedly between years. The peak count over the winter of 1997/1998 was around 40% below average for the time (Cranswick *et al*, 1999). Following a run of relatively low peak counts in the late 1990s, the five year average dropped below the international threshold in 1999/2000 (Musgrove *et al*, 2001). Following a run of peak counts of just below 1,000 in the early 2000's, the five year average for the Swale again rose above the international threshold. In the most recent five years for which data are available, peak counts have fallen to around 600-700 (Austin *et al*, 2008).

9.286 Analysis of WeBS low tide count data for the Swale indicates that the north side of the inner Swale opposite Milton Creek was the principal feeding area for Pintail. The main flock there occurs in an area unaffected by freshwater flows. The peak count of 218 from the fieldwork on the mudflats adjacent to the Proposal site carried out for the proposed development represented some 22% of the population on the Swale based upon the five-year mean peak (2002/2002 – 2006/2007).

9.287 Pintail are known to eat a wide variety of plant material, including seeds, tubers and vegetative parts of aquatic plants and sedges, and, in summer, also consume aquatic invertebrates, amphibians and small fish (Hoyo *et al*. 1992). On British estuaries they have been found to depend largely on small snails of the genus *Hydrobia*. Whilst this occurs in a wide range of salinities (Jackson 2000), highest numbers are reported occur in areas of generally lowered salinity (15-30‰). On grazing marshes, seeds have been shown to be by far the most important food (Owen *et al*. 1986).

9.288 Being omnivorous, their distribution on estuaries is not related to a particular prey. Studies by Ravenscroft (1998) on the Stour Estuary suggest an association between some species of waterfowl and freshwater flows. Pintail showed statistically greater densities closer to flows when compared with the remaining areas of mudflat. A study on the distribution of birds associated with some freshwater flows on the Medway Estuary (Marcus Kohler Associates, 2002) concluded that Pintail were one of six species which occurred at significantly higher densities within freshwater creeks than in adjacent mudflats. The study also noted that Pintail may preferentially use creeks for loafing. Other studies have shown that on estuaries Pintail will preferentially sift the soft mud at the waters edge (Piotrowski 2003).

9.289 In view of:

- Pintail on the Swale are mainly located on the opposite shore to the Proposal site where they will be unaffected by any hydrological changes as a result of the proposed development;
- Pintail feed on Hydrobia, which is able to tolerate a wide range of salinities, as

well as a wide a wide range of other prey, including seeds;

- Pintail are opportunistic feeders and will utilise areas of grassland which are not related to freshwater flows;
- Pintail tend to occur in higher densities on sheltered areas of wet mud, including the mid-lower shore and in larger side creeks, which will be unaffected by any hydrological changes associated with the Proposal site;
- Flows will continue to be discharged across the Kemsley foreshore as a result of the proposed development.

9.290 It can be concluded that the proposed hydrological changes will have no adverse effect on site integrity for Pintail on the Swale SPA / Ramsar site.

Avocet

9.291 Having been absent from the UK as a breeding species for 100 years, Avocets became re-established in Suffolk in 1947 (Cadbury and Olney 1978; Cadbury *et al*. 1989). Considerable expansion in breeding numbers and range (including into Kent) has occurred since the mid 1970s, principally as a result of habitat management at key breeding sites (Gibbons *et al*. 1993). Wintering numbers have similarly risen in Britain with the counted British maximum of 6,615 over the winter of 2006/2007 (the latest for which data are available) the highest ever recorded (Austin *et al*, 2008).

9.292 In addition to reflecting growth in the British breeding population, it is likely that the considerable increase in wintering numbers has been supplemented by immigration from the Netherlands and Denmark, where the breeding population doubled in 15 years, probably as a result of eutrophication in the Wadden Sea increasing food supply and the creation of artificial breeding sites Delta area (Hagemeijer and Blair, 1997, Hotker and West, 2005).

9.293 Peak winter numbers on the Swale over the last ten years have generally been in the range of 300-500 hundred. A particularly low peak winter count of 145 was recorded in 2000/2001 (Pollitt *et al*, 2003) whereas the peak count of 1,290 over the winter of 2004/2005 meant the Swale held the second highest site total for the year in Britain (Banks *et al*, 2006). The low tide distribution maps for this species on the Swale show that in both 1992/1993 and 2001/2002 Avocet were principally located between Spitend Point at Elmley and Conyer Creek, some 5 km to the east of the Proposal site.

9.294 The behaviour of wintering Avocet feeding on intertidal areas has been studied on estuaries both in the UK and Europe. By far the most common feeding strategy has bene shown to be a sweeping action in shallow water (Moreira, 1995a). This was non-prey specific, with species ingested mainly comprising small crustaceans like *Corophium volutator* oligochaetes, spionid worms and *Capitella capitata* (a polychaete worm). *C. volutator* is a euryhaline species capable of living in environments of variable salinity (Neal and Avant, 2006). Although it can potentially occur over much of the shore, growth seems to be fastest at 15-20‰ (McLusky, 1967) and a salinity of over 7.5‰ is required for reproduction (McLusky, 1968). As such they tend not to occur in the bottom of creeks with a freshwater flow.

9.295 Studies, including work on Suffolk and Essex estuaries, show the distribution and abundance of the invertebrate prey of Avocet to be more related to large-scale zonation patterns. The salinity of the upper shore for example is higher than on the lower shore due to the greater influence of seawater at high tide (Little, 2000). In a detailed study of the use of the mudflats of the Tagus estuary in Portugal, Moreira (1995b) found that the density of Avocet on the upper shore was much higher than on the lower shore, possibly as a consequence of the effect of salinity on invertebrate populations.

9.296 There are few reported studies dealing with the distribution of birds like the Avocet along the salinity gradient of an estuary. The zonation of the non-breeding waterbird community has though been described in detail for the Schelde Estuary, which has a complete salinity gradient (Ysebaert *et al*, 2000). Non-prey specific species of birds like the Avocet that feed in soft and silty sediments were generally found to be concentrated in the mesohaline reaches of an estuary (5-18 parts per thousand). This could suggest that they are at least partially salinity dependent.

9.297 Other research has shown Avocet to be one of the species of wading birds least associated with the salinity gradient, or if there is an association, it is with higher salinities rather than lower salinites. Lourenco *et al* (2005) for example found that the density of Avocet was highest near channels draining from saltmarsh that contained no freshwater flow. The association of this species of wading bird with drainage channels may therefore be more related to the physical characteristics of the sediment, perhaps increasing the ability to capture prey. The use made of channels with a freshwater flow is though likely to be different from the use made of channels with no freshwater flow, including for example drinking.

9.298 Two other less commonly observed feeding strategies used by Avocet wintering on estuaries include worm specific and *Scrobicularia plana* (peppery furrow shell snail) specific (Moreira, 1995b). In the worm-specific strategy, Avocet preyed mainly on ragworm (*Nereis diversicolor*). There is evidence that this species prefers areas of low salinity (Oglesby, 1969), though it remains unclear whether such brackish conditions are the favoured habitat or if the conditions serve to limit competition from other species (Little, 2000). The Peppery Furrow Shell is able to tolerate low salinities only in thick mud (Pizzolla, 2002) which are less attractive to feeding Avocet.

9.299 The presence of freshwater flows appeared to have little bearing on the wintering distribution of Avocet in studies on Suffolk and Essex estuaries which found no statistical association between the presence of Avocet and freshwater flows (Ravenscroft, 2005). Whilst the Enviros Consulting Ltd. (2005) considered Avocet to be highly sensitive to changes in freshwater flows, this is principally based on their breeding requirements. Based on the above analysis, this is considered overly precautionary. In view of :

- Avocet on the Swale are mainly located 5 km away from the Proposal site where they will be unaffected by any hydrological changes as a result of the proposed development;
- Avocet are opportunistic feeders and will predate a range of invertebrate prey across a range salinities;
- Specific studies on Suffolk and Essex estuaries found no statistical association between the presence of Avocet and freshwater flows;
- High densities of Avocet have been shown to occur near drainage channels with no freshwater flow,
- Flows will continue to be discharged across the Kemsley foreshore as a result of the proposed development.

9.300 It can be concluded that the proposed hydrological changes will have no adverse effect on site integrity for Avocet on the Swale SPA / Ramsar site.

Black-tailed Godwit

9.301 The majority of the non-breeding Black-tailed Godwit recorded in Britain are of Icelandic origin (*islandica*). A small number are of the nominate race, principally passage birds occurring in the east and south of England, where some a few also breed (Collier *et al*, 2005). From less than 100 Black-tailed Godwit wintering in Britain in the early 1930s, apart from the cold winter of 1962/1963, numbers gradually increased until the early 1970s (Prater, 1975). This rise was attributed to increased breeding success in Iceland in response to milder climatic conditions (Cranswick *et al*, 1999). Cold springs and poor summer weather resulted in a decline in numbers in the early 1970s after which they steadily increased again. Between 1981/1982 and 1988/1992 wintering numbers in Britain increased from 4,700 to 7,410 (Cayford and Waters, 1996).

9.302 The increase in the Icelandic race of the Black-tailed Godwit has shown no signs of abating. In line with this growth in the estimated breeding population the numbers recorded wintering in Britain has continued to rise despite some indications in the mid to late 1990s that peak counts were beginning to stabilise. The peak winter count of over 31,000 over the winter of 2002/2003 was the highest to that date by a considerable margin (Cranswick *et al*, 2005). The data suggested that wintering numbers had increased by 42% over the preceding ten years and by 73% over the preceding 25 years.

9.303 The national increase has been driven largely by rises on sites in the south and southeast of England. Despite this, the peak numbers recorded on the Swale over the last ten years for which data are available apart from one high count over 2,000 in 2000/200 have generally remained between 1,000 and 1,500. Following uncharacteristically high numbers in the early to mid-1990s, a medium-term Medium-Alert has been triggered (Maclean and Austin, 2008). Regionally numbers have remained relatively stable, which together with the fact that numbers generally fluctuate markedly, means the significance of the decline is hard to assess.

9.304 Although the numbers of Black-tailed Godwit wintering on the Swale has been compared against the national and international thresholds set out on the SPA/ Ramsar site citations and SPA Review, these are clearly out of date as the peak British peak count has until recently exceeded the stated international population estimate. The international threshold for Black-tailed has now been updated to 470 (Austin *et al*, 2008). This may help explain why the mudflats adjacent to the Proposal site apparently support over 100% of the Swale population. It is also explained by the low tide distribution maps for this species on the Swale showing that in both 1992/1993 and 2001/2002 Black-tailed Godwit were principally located in the inner reaches between Elmley Hills and Conyer Creek.

9.305 The Icelandic breeding population of Black-tailed Godwit spends the winter principally feeding on the estuaries of Ireland, Britain and France (Gill *et al*, 2001a). Those wintering in Britain tend to be highly gregarious and form tight flocks on areas of mudflat where they can feed on larger invertebrates, including Lugworm (*Arenicola marina*) and Ragworm (Hale, 1980). Lugworm has been shown to be absent from intertidal freshwater seepage areas, whereas Ragworm do occur in higher densities in such areas (Tyler-Walters, 2008, Budd, 2008). As euryhalines, this species is able to tolerant a wide range of salinities from full sea water down to about 5‰ (Barnes, 1994), though prolonged periods of low salinity (<8‰) can adversely affect reproduction (Ozoh and Jones, 1990).

9.306 Whilst this could explain why this species has been observed to cluster around freshwater (Enviros Consulting Ltd. 2005), Black-tailed Godwit are known to feed on other prey, notably bivalves. In a study on East Anglian estuaries, Gill *et al* (2001a) found these were actually the most abundant food source throughout the winter. Polychaetes were only included in the diet in significant proportions towards the end of the winter. *Scrobicularia plana, Macoma balthica* and Sand Gaper (*Mya arenaria*) comprised on average 88% of the bivalves consumed. Whilst *Mya arenaria* tolerates a wide range of salinities (Strasser, 1999) and *Scrobicularia plana* is able to tolerate low salinities in thick mud (Pizzolla, 2002), *Macoma balthica* is reported to prefer salinities in the range of 15-35‰ and may die if subjected to lower salinities (Kristensen, 1958).

9.307 With their very long straight bill, Black-tailed Godwit tend to feed in areas of finer sediment where they can wade in water or probe wet mud for prey (Holden and Sharrock, 2002). In a study attempting to determine how the movement of the tide line influences the use of intertidal flats by wading birds, Granadeiro *et al* (2005) revealed some species, including Black-tailed Godwit, actively followed the tide line. Densities near the tide line were up to five times higher than elsewhere. In a study on creeks fed only by drainage from saltmarshes, Lourenco *et al*, (2005) also found the densities of several species including Black-tailed Godwit peaked 1-2 metres from the channel. Whilst the sloping banks of creeks where largely avoided, Black-tailed Godwit were frequently observed foraging on the channel bed. This suggested they were attracted to the soft muddy bottoms covered by water that was generally too deep (>10cm) for smaller waders.

9.308 Numbers of Black-tailed Godwit have been found to be significantly lower where a footpath follows the line of the seawall (Burton *et al*, 2002b). As such, they tend to make little use of channels and flows on the upper shore. Small freshwater flows which peter out on the upper shore are therefore less used by this species even though it is known to move around considerably during the course of a winter. Whilst this means flocks can occur almost anywhere there are suitable feeding conditions, prey intake rates appear to be a major factor in determining habitat choice (Goss-Custard, 1980). A study of seasonal changes in diet on southern and eastern coastal wintering sites revealed that at the start of winter of Black-tailed Godwit forage on estuarine mudflats but apparently responded to prey depletion later in the winter by switching to exploit higher prey densities, notably earthworms on meadows (Gill *et al*, 2001a).

9.309 In view of :

- Black-tailed Godwit occupy reaches of the Swale where they will be unaffected by any hydrological changes as a result of the proposed development;

- Black-tailed Godwit tend to avoid the upper shore where there is a footpath along the seawall, as in the case of mudflats near the Proposal site;
- Black-tailed Godwit feed on a range of invertebrate prey across a range salinities;
- High densities of Black-tailed Godwit have been shown to occur along the tide line and near drainage channels with no freshwater flow and ,
- Flows will continue to be discharged across the Kemsley foreshore as a result of the proposed development.

9.310 It can be concluded that the proposed hydrological changes will have no adverse effect on site integrity for Black-tailed Godwit on the Swale SPA / Ramsar site.

STAGE 4 – AVOIDANCE AND MITIGATION

Avoidance and mitigation measures

Direct loss of habitats

9.311 The proposed development will not result in the direct loss of any areas of habitat within a Natura 2000 or Ramsar site. In terms of areas used by qualifying species, the proposed development will not result in the direct loss of any habitat used by qualifying species of nearby Natura 2000 sites. It will however result in the loss of areas outside of the designated boundary that may support plant species listed on the Medway Estuary and Marshes Ramsar site citation. Mitigation in the form of providing areas within the development site to support these species and mechanisms to ensure they continue to occur are included within the design concept for the site.

Change in management regimes

9.312 The planning application for the Kemsley SEP will not result in a change of management of any areas of habitat within a Natura 2000 or Ramsar site or nearby areas used by qualifying species. Future management of the areas of habitat being retained on site is being addressed within a comprehensive mitigation strategy, as well as, potentially, through a water level management plan, for the site.

Loss of future space to allow for managed realignment

9.313 This issue was screened out on the grounds of no likely significant effect. As such, no avoidance and mitigation measures are proposed.

Urbanisation

9.314 The proposed Kemsley SEP will result in minimal over shadowing of habitats within the Swale SPA / Ramsar site (just before sunset). It will also not result in the reduction of sight lines or hinder flight paths for any qualifying species of the Swale SPA / Ramsar site or Medway Estuary and Marshes SPA / Ramsar site, in relation to Redshank.

9.315 Avoidance measures incorporated into the design include aligning buildings away from the Swale SPA / Ramsar site and setting the buildings 150 metres back from the boundary of the Swale SPA / Ramsar site.

Air quality

9.316 The results of the assessment identified that construction of the proposed development could give rise to emissions of dust. Adopting appropriate mitigation measures will ensure there are no significant effects on qualifying features or their supporting habitats. Measures are expected to include:

- commitment to the considerate contractors scheme;
- minimisation of dust generation wherever appropriate (e.g. cutting rather than breaking);
- damping down when conditions require;
- wheel and body washing of vehicles where appropriate; and
- vehicles carrying material to be sheeted as required;

9.317 The operation of the SEP will result in emissions to air, though these are shown to not exceed critical levels/loads (see Appendix 9.3 of the Environmental Statement) for all qualifying features or that the supporting habitats are insensitive to the pollutant issue (acid deposition, for example). Therefore, it is concluded the proposed development does not have an adverse effect on any of the SPAs, Ramsar sites or SAC considered and no mitigation is proposed.

Water quality

9.318 All surface water drainage will continue to discharge to the Swale. The main avoidance measures incorporated into the design of the Proposal site to prevent water pollution include appropriate treatment and pollution prevention measures during both construction and operation of the SEP.

Hydrological changes

9.319 Changes to the surface water drainage network could potentially result in hydrological and hence geomorphological changes to the freshwater flow through the outfall into the Swale. The main mitigation measures incorporated into the design of the proposed development to ensure it can reasonably be concluded changes in freshwater flows will have no adverse effect on any qualifying species of the Swale SPA / Ramsar or Medway Estuary and Marshes SPA / Ramsar site in relation to redshank include:

- alterations to outfall structures or volumes discharged will be discussed and approved by the appropriate regulatory body or bodies and it is envisaged that discharge rates (taking the attenuation ponds into account) will be similar to that currently experienced;

- studies in relation to changing the outfall, including hydromorphological and ecological, including continued surveys of the use of foreshore by wading birds and wildfowl through all months of the year and through all states of the tide;
- the surface water drainage incorporating Sustainable Urban Drainage Systems features to provide attenuation and storage, providing a range of additional environmental benefits; and
- opportunity will be taken to investigate and implement a site-wide water level management plan.

Disturbance

9.320 The three main potential pathways taken through to Stage 3 in relation to disturbance are activity, noise and lighting.

9.321 The main avoidance and mitigation measures incorporated into the design of the proposed Kemsley SEP to ensure it can reasonably be concluded that activity resulting in visual intrusion will have no adverse effect on any qualifying species of the Swale SPA / Ramsar and Medway Estuary and Marshes SPA / Ramsar site in relation to Redshank include:

- commitment to the considerate contractors scheme in relation to timing, noise and lighting;
- no access to the foreshore or designated sites, and
- retention of a ‘buffer’ strip of habitat between the Swale SPA / Ramsar and the nearest element of development.

9.322 Recognising that there is a risk of disturbance to a proportion of the waterbird assemblage from the most ‘startling’ of noises that could be generated from the proposed development, notably during construction activities, a method statement will be prepared to avoid and mitigate such effects. The main avoidance and mitigation measures incorporated into the design to ensure it can reasonably be concluded that noise will have no adverse effect on any qualifying species of the Swale SPA / Ramsar site and Redshank in relation to the Medway Estuary and Marshes SPA / Ramsar site include:

- a ‘soft start’ to the piling operation;

- sensitive location of equipment, compounds and plant maintenance areas as required in the British Standard for ‘Noise control on construction and open sites’ (BS 5528), (British Standards Institution, 2009) and
- limited night time construction or operational activity that could produce ‘startling’ noise.

9.323 Although neighbouring development already extensively uses night lighting, the main avoidance and mitigation measures incorporated into the design of the proposed Kemsley SEP to ensure it can reasonably be concluded that lighting during both construction and operation will have no adverse effect on any qualifying species of the Swale SPA / Ramsar site and Medway Estuary and Marshes SPA / Ramsar site in relation to Redshank include:

- no direct lighting of any designated areas which at its closest will be 300 metres from the Swale SPA / Ramsar site;
- careful siting of construction compounds;
- relatively low level directional lighting that limits spillage, glare or additional sky flow, and
- lighting will be screened from designated areas by the existing flood defences.

Introduction or spread of non-native invasive species

9.324 This issue was screened out on the grounds of no likely significant effect.

Summary of conclusions in relation to no ‘alone’ adverse effects

9.325 The residual effects of the proposed scheme in relation to each of the potential construction and operation pathways acting alone once the avoidance and mitigation measures have been applied are summarised in Table 9.17. No residual adverse effects have been identified.

Table 9.17 Summary of conclusions in relation to no alone adverse effects

Feature	Activity	Likely Significant Effect	No Adverse Effect
Swale SPA / Ramsar site (breeding birds)	All activities	No likely significant effect	No adverse effect
Swale SPA / Ramsar site	Habitat loss	No likely significant	No adverse effect

Feature	Activity	Likely Significant Effect	No Adverse Effect
(wintering birds)		effect	
	Change in management regime	No likely significant effect	No adverse effect
	Loss of space for managed realignment	No likely significant effect	No adverse effect
	Urbanisation	Likely significant effect	No adverse effect
	Air quality	Likely significant effect	No adverse effect
	Water quality	No likely significant effect	No adverse effect
	Hydrological changes	Likely significant effect	No adverse effect
	Disturbance from people and plant activity	Likely significant effect	No adverse effect
	Recreational disturbance	No likely significant effect	No adverse effect
	Noise	Likely significant effect	No adverse effect
	Lighting	Likely significant effect	No adverse effect
	Introduction or spread of invasive species	No likely significant effect	No adverse effect
Swale Ramsar site (Invertebrate habitat)	Habitat loss	No likely significant effect	No adverse effect
	Change in management regime	No likely significant effect	No adverse effect
	Loss of space for managed realignment	No likely significant effect	No adverse effect
	Urbanisation	No likely significant effect	No adverse effect
	Air quality	Likely significant effect	No adverse effect

Feature	Activity	Likely Significant Effect	No Adverse Effect
	Water quality	No likely significant effect	No adverse effect
	Hydrological Changes	Likely significant effect	No adverse effect
	Disturbance from people and plant movements	No likely significant effect	No adverse effect
	Recreational disturbance	No likely significant effect	No adverse effect
	Noise	Likely significant effect	No adverse effect
	Lighting	Likely significant effect	No adverse effect
	Introduction or spread of invasive species	No likely significant effect	No adverse effect
Medway SPA / Ramsar site (Redshank only)	Habitat loss	No likely significant effect	No adverse effect
	Change in management regime	No likely significant effect	No adverse effect
	Loss of space for managed realignment	No likely significant effect	No adverse effect
	Urbanisation	Likely significant effect	No adverse effect
	Air quality	Likely significant effect	No adverse effect
	Water quality	No likely significant effect	No adverse effect
	Hydrological changes	Likely significant effect	No adverse effect
	Disturbance from people and plant movements	Likely significant effect	No adverse effect
	Recreational disturbance	No likely significant effect	No adverse effect
	Noise	Likely significant effect	No adverse effect

Feature	Activity	Likely Significant Effect	No Adverse Effect
	Lighting	Likely significant effect	No adverse effect
	Introduction or spread of invasive species	No likely significant effect	No adverse effect
Medway Estuary and Marshes Ramsar (Plants – Annual Beard Grass)	Habitat loss	No likely significant effect	No adverse effect
	Change in management regime	No likely significant effect	No adverse effect
	Loss of space for managed realignment	No likely significant effect	No adverse effect
	Urbanisation	Likely significant effect	No adverse effect
	Air quality	Likely significant effect	No adverse effect
	Water quality	No likely significant effect	No adverse effect
	Hydrological changes	Likely significant effect	No adverse effect
	Disturbance from people and plant movements	No likely significant effect	No adverse effect
	Recreational disturbance	No likely significant effect	No adverse effect
	Noise	No likely significant effect	No adverse effect
	Lighting	Likely significant effect	No adverse effect
	Introduction or spread of invasive species	No likely significant effect	No adverse effect
Thames Estuary and Marshes SPA / Ramsar site	Air quality	Likely significant effect	No adverse effect
Queendown Warren SAC	Air quality	Likely significant effect	No adverse effect

9.326

Conclusions

9.327 It is considered that when the proposed mitigation measures are taken into account during both construction and operation of the proposed development, it can be concluded that the Proposal site alone will have no adverse effects on any qualifying feature of supporting feature of any of the Natura 2000 or Ramsar sites considered.

STAGE 5 – IN-COMBINATION ASSESSMENT

9.328 In-combination effects are those that result from incremental changes caused with other current or reasonably foreseeable plans and projects. There are two main types of in-combination effect:

- Combined effects on a particular receptor of individual effects from the proposed Kemsley SEP, and
- Effects from other developments (both construction and operation) which individually may be considered not significant, but when considered together could have a significant cumulative effect.

9.329 Through discussion with Swale Borough and Natural England, plans and projects relevant to the pathways for potential effects on the qualifying features or supporting features of the Swale SPA / Ramsar site, Medway Estuary and Marshes SPA / Ramsar site, Thames Estuary and Marshes SPA / Ramsar site and Queendown Warren SAC associated with the Proposal site have been identified. These have been assessed to determine whether it can be concluded that the planning application for the Kemsley SEP would not cause a significant effect upon the features of the European sites in-combination with the effects of these other plans or projects. In view of the potential pathways for in-combination effects, the key in-combination plans and projects that could have combined or cumulative effects on

Plans

9.330 For the purposes of this assessment, we have reviewed the following plans, other more technical reports and papers are referenced in the text as appropriate:

Plans reviewed for in-combination effects

Plan	Author	Description
South East Plan	Government Office for the South East (2009)	Sets out a vision for the future of the south-east region of England to 2026, outlining how

		to respond to challenges facing the region such as housing, the economy, transport and protecting the environment. Also calls for infrastructure delivery programmes to be agreed before major new developments begin
Local Development Framework – Topic Paper 10 Water	Swale Borough Council (2009)	Provides access to the baseline information that Swale Borough Council intends to use in the preparation of its Development Plan Documents and Supplementary Planning Documents.
Swale Strategic Flood Risk Assessment	Halcrow (2009)	Developed in conjunction with the Environment Agency to: - inform the Local Development Framework and guide development to the safest areas;; - update the Environment Agency's online flood risk maps for Swale;; - assist Development Control decisions - assist Developers in the preparation of Flood Risk Assessments - help prioritise and target improvements to flood defences and prepare for flood emergencies
Business Plan 2010 - 2015	Southern Water (2009)	Water supply and wastewater treatment to the Proposal site
Business Plan 2010-2015	South East Water (2009)	Drinking water supply to land to the east and south of the Proposal site.
Water for Life and Livelihoods - Consultation Response Document to the draft Thames River Basin Management Plan	Environment Agency (2009a)	Details on the key points raised and how the Environment Agency intends to deal with the comments
Draft River Basin Management Plan, Thames River Basin	Environment Agency (2009b)	Describes the pressures that the water environment faces, the current state of the water environment in the river basin district,

District December 2008 (Corrected 2009)		and sets out the actions are needed to address the pressures to meet the objectives for the river basin district. It sets out what improvements are possible by 2015 and what difference these will make to catchments, estuaries, the coast and groundwater
TE2100 Plan - Consultation Document	Environment Agency (2009c)	Sustainable flood risk and coastal habitat management
North Kent Rivers Catchment Flood Management Plan – Main Stage Report	Environment Agency (2008)	High-level strategic planning tool through which the Environment Agency seeks to work with other key decision-makers to identify and agree policies for sustainable flood risk management for the area which includes the Kemsley Proposal site.
Swale Borough Local Plan 2008	Swale Borough Council (2008)	Provides policies and proposals relating to development and other use of land in the Borough, with the exception of the extraction of minerals and the management of waste. In so doing it seeks to: - apply Government land use planning policy at a local level, including its objective of securing sustainable development - provide a detailed basis for planning decisions by identifying sites for particular purposes, and criteria based policies against which development proposals will be assessed - present local and detailed planning issues to the public, and to foster the community's engagement in the plan making process - provide a basis for decisions on the investment of private and public resources and the management of land.

Draft Water Resource Management Plan	South East Water (2008a)	Reassessment of water resource needs for the next 25 years to maintain the long-term balance between increasing demand and available supply of drinking water to most of Kent, 70% of which is from over 150 boreholes and wells, with the remainder from six river intakes and surface water reservoirs.
Water Resource Management Plan Strategic Environmental Assessment (SEA) – Environmental Report	South East Water (2008b)	Assesses the potential impact of the draft Water Resources Management Plan on the environment, including the Swale, land to the east of Milton Creek and Chalk aquifers to the south of the Proposal site.
Sustainability Appraisal Scoping Report for the Swale LDF Core Strategy	Scott Wilson (2008a)	Background context on the implications of various issues and options in relation to aggregates, waste, housing and employment to inform the Local Development Framework Core Strategy
Sustainability Appraisal Scoping Report for the Sittingbourne Town Centre and Milton Creek Supplementary Planning Document	Scott Wilson (2008b)	Intended to help provide a comprehensive and long-term Planning Framework for the next 20 years, upon which investment decisions by the public and private sectors can be based.
Swale Green Grid Strategy	Swale Borough Council (2007)	Background to green infrastructure in the Borough
Thames Gateway Delivery Plan	CLG (2007)	Development within the Thames Gateway that could act in-combination, including through direct loss/damage of habitats, urbanisation, changes to freshwater flows, pollution and disturbance.
Medway Estuary and Swale Shoreline Management Plan – Consultation Draft	Halcrow (2007)	Sustainable flood risk management along the Swale and around the Medway Estuary. Defines flooding and erosion risks to people and the developed, historic and natural environment within the plan area over the next

		century. Identifies the preferred policies for managing those risks and the consequences of implementing the preferred policies.
Corporate Plan 2007-2011: Shaping the Future of Swale	Swale Borough Council (2006a)	Background to development within Swale
Sustainable Communities Plan 2016, Priority Swale	Swale Borough Council (2006b)	Community Strategy for Swale
Swale Forward Regeneration Framework	Swale Forward (2006)	Background to SPD
Sustainability Appraisal of the South East Plan	South East England Regional Assembly, (2006)	The Sustainability Appraisal for the Regional Spatial Strategy
Appropriate Assessment of the South East Plan	Scott Wilson / Levett-Therivel (2006)	The Appropriate Assessment for the Regional Spatial Strategy
Medway Regeneration Framework 2006-2016	Medway Council (2006)	Strategic framework for integrated growth through regeneration, including the biggest brown field industrial re-development site in the southeast on the Isle of Grain.
North Kent and Swale Catchment Abstraction Management - Final Strategy	Environment Agency (2004)	Background on hydrology, abstraction and licensing
Local Plan	Medway Council (2003)	Strategic, development and environmental policies within the Unitary Authority

9.331 An in-combination assessment should consider both the geographical location and the likely timings of plans. As each plan is at a different stage within the planning process, it is difficult to fully ascertain the levels of potential combined and cumulative effects based on the information currently available. Nevertheless, the in-combination effects through the potential pathways considered in relation to the Proposal site are presented below.

Direct loss of habitats used by interest species

9.332 Some direct loss of habitat within the Swale SPA / Ramsar site as well as nearby areas used by interest species are predicted as a result of the plans reviewed, notably the Medway Estuary and Swale Shoreline Management Plan and Medway Local Plan. However, the in-combination effect does not change the conclusion that in relation to direct loss of habitats used by qualifying species the Kemsley SEP does not have an adverse effect on the integrity of any of the sites since the SEP proposals do not increase the area of direct habitat loss from any of the sites considered.

Change in management regimes

9.333 The main changes to the management of terrestrial habitats within the Swale SPA / Ramsar site, or nearby land that supports qualifying species, is through agricultural intensification, adoption of different grazing/mowing regimes or neglect. As the proposed Kemsley SEP will not be constructed on grazing marsh, is not located adjacent to grazing marsh and the part of the site nearest the Swale SPA / Ramsar site are to be managed through an comprehensive mitigation strategy there are no in-combination effects.

9.334 Maintenance of ditches and suitable hydrological conditions are also considered critical to the favourable condition of the marshland habitats within the Swale SPA / Ramsar site and nearby land that supports qualifying species. The Environment Agency and Lower Medway Internal Drainage Board (IDB) are responsible for the maintenance of the primary watercourses and structures in the area of the Proposal site. A Water Level Management Plan has been prepared to balance and integrate the requirements of activities including agriculture, land drainage and nature conservation. As ditches within the Proposal site are to be retained, extended, and managed to perform both their drainage function and provide wildlife habitat there are no in-combination effects.

Loss of future space to allow for managed realignment to avoid coastal squeeze

9.335 Only the outermost parts of the Medway and Swale Estuaries were included in the original “open coast” Shoreline Management Plan (SMP) developed for north Kent in 1996. This was in line with the guidance at that time. The absence of a strategic framework for the management of flood and erosion risks in the Swale was recognized as hindering decision making on long-term policies for the area. The Environment Agency who have permissive powers for undertaking flood defence works therefore developed a strategic flood risk management plan for the area in line with the SMP guidance.

9.336 In the Medway Estuary and Swale Shoreline Management Plan (Halcrow, 2007) the long-term policy for the Kemsley stretch of coast within policy unit E4 26: Sayes Court to north Elmley Island, is to hold the line. Under this policy, the recommended long-term plan for the majority of the Swale is to allow the coastline to realign to a more naturally functioning system, whilst continuing to provide flood defence to the large floodplain and isolated properties. It is recognised that this section of shoreline provides an opportunity for environmental enhancement and habitat creation through a managed realignment policy.

9.337 A high proportion of land within Swale Borough falls within the Environment Agency's tidal flood zones. A Strategic Flood Risk Assessment (SFRA) for Swale (Halcrow, 2009) provides greater clarity of flood zones within the borough for present day, for 2070 (for commercial development) and 2115 (for housing), taking into account the effects of climate change. The SFRA assessed 9 potential development areas in detail. In terms of tidal flood risk Sittingbourne Town Centre, Iwade and Faversham Town Centre have significant proportions of their areas in Flood Zone 1 (low risk). Other areas (including Milton Creek) had extensive areas covered by the tidal flood zones.

9.338 The proposed Kemsley SEP is consistent with the policies in the shoreline management plan and the SFRA as such there are no significant in-combination effects.

Urbanisation

9.339 The site at Kemsley is largely vacant. The plans under review, notably those associated with the regeneration of Sittingbourne will result in increased urbanisation in the vicinity of the Proposal site which could have an in-combination effect on qualifying species.

9.340 Sittingbourne has experienced rapid growth in recent years with the population rising to some 55,000. Prospects for opening up new employment and housing sites, notably areas to the north of the town to be further developed as a location for manufacturing activity, largely depend on the Northern Relief Road (NRR) going ahead. This is a combination of two schemes: the Milton and Kemsley Distributor Road (MKDR) and the Northern Distributor Road (NDR).

9.341 The aim of the MKDR is to open up strategic sites for employment and housing development at Ridham and Kemsley, giving them better access from the A249 Trunk Road and providing a by-pass for Milton Regis and Kemsley. The NDR forms the North and Eastern arm of the NRR and by crossing Milton Creek provides direct East-West access for existing and new employment and housing sites joining to the A2. Together the MKDR/NDR projects are integral to the strategic plan for the area as a whole and are required to deliver the majority of housing and development within the Sittingbourne-Sheerness 'Zone of Change'.

9.342 A planned new waterfront district will aim to re-connect Sittingbourne with the Swale and the Saxon Shore Way. A green corridor of water, reeds, open spaces and pathways will link Sittingbourne to the Swale Estuary Marshes (CLG, 2008). The proposed Kemsley SEP is set back from the boundary of the Swale SPA / Ramsar site, which together with the retention of an undeveloped zone adjacent to the Swale means that the final development will be buffered from the designated site boundary and that there are no significant in-combination effects.

Air pollution

9.343 Data from APIS (www.APIS.ac.uk) and air quality modelling undertaken during the preparation of the Environmental Statement associated with the SEP indicates that the only background concentrations (particularly of Nitrogen deposition) only represent c60% of the critical load/level for the Swale SPA / Ramsar site and Medway Estuary and Marshes SPA / Ramsar site. Background rates of acid deposition already exceed critical loads in many areas around the Proposal site, but none of the qualifying features/supporting habitats within the designated sites are listed as being sensitive to this (www.APIS.ac.uk).

9.344 It is highly unlikely therefore that any in-combination increase in pollutant concentration as a result of emissions from the Kemsley SEP will result in sufficiently large additions to deposition rates to exceed the critical level/load even in the context of other development plans or increases in vehicle movements along the A249 as a result of development elsewhere in the area.

9.345 Further, given the well-documented expected reductions in atmospheric concentrations of NO_x and SO_2 as a result of the implementation of legislation relating to air quality, current background levels are expected to drop by approximately 2% a year (Highways Agency, 2005).

9.346 It is concluded that the proposed Kemsley SEP will have no adverse in-combination effects on the qualifying features or supporting features of any of the Natura 2000 or Ramsar sites under consideration.

Water pollution

9.347 There are considered to be no in-combination effects with incidental pollution events due to shipping in the Swale as the proposed SEP plant will not result in increased shipping within the Swale SPA / Ramsar site.

9.348 The Thames River Basin Management Plan for estuarine waters indicates that the water quality of Milton Creek and the Swale in the vicinity of the Proposal site is currently classed as moderate for ecological quality and a fail for chemical quality and that this status is expected to remain unchanged until at least the next reporting period in 2015.

9.349 Historically Milton Creek was polluted by effluent from Sittingbourne Paper Mill at the head of the Creek and Kemsley Paper Mill and creosote plant at the mouth of the Creek, as well as from Sittingbourne Sewage Treatment Works. In 2001, the Environment Agency undertook surveys of discharges into Natura 2000 sites in north Kent as part of the review of consents required by the Habitats Regulations. The results indicated that Milton Creek was the most contaminated area surveyed and contained concentrations of several determinands at significantly higher levels than any other sites elsewhere in the Swale or Medway Estuary. It was concluded that dredging and disturbance of this material would disturb the sediment resulting in a release of toxins into the water environment which could adversely impact the Swale SPA.

9.350 According to South East Water, within the North Kent and Swale catchment the water quality of Frognal Drain which runs into the Swale via Conyer Creek 4 km to the east of the Proposal site, suffers from the influence of the final effluent discharged from Teynham Wastewater Treatment works. Water quality is limited by reduced dilution rates and the physical characteristics of the watercourse. This has been recognised as a problem and action will be taken through the Periodic Review to improve sewage discharge into Frognal Drain (Teynham), as well as Milton Creek and Faversham Creek (Environment Agency, 2009d).

9.351 Any increase in surface water run-off due to development involving large impermeable surfaces could potentially lead to a reduction in water quality. Whilst this would predominately be downstream of the Proposal site, due to the tidal nature of the Swale the risk extends in both directions from the outfall. The main risk would be via an accidental localised pollution event, such as an increase in silt. Changes in loading with nutrient rich matter can impact both the structure and functioning of estuary ecosystems (Day *et al*, 1989). Despite a growing body of scientific research, considerable uncertainty remains over the impact nutrient enrichment has on estuarine wintering birds due to complex interactions and variability in environmental conditions making cause and effect difficult to distinguish. A rise in productivity due to a moderate increase in organic loading may though lead to higher numbers of some species (Burn and Drewitt, 1999).

9.352 Despite the suggestion of a correlation between higher numbers of wintering birds and moderate increases in nutrient loading, the causal link has not yet been shown conclusively and is not consistent across all species (Green *et al*, 1991). It is not, therefore, a foregone conclusion that a decrease in nutrient loading will result in a decrease in bird numbers. Nevertheless, a decline in wintering bird numbers has been linked to improvements in water quality on some estuaries. This includes declines in wading birds on the Clyde against an upward trend in regional numbers (Burn and Drewitt, 1999), declines in Shelduck on the Axe Estuary and a sharp fall in the numbers of Pochard and Tufted Duck on the Severn following the transfer of discharges to a new offshore pipe in 2001 and improved treatment in 2002 (Burton *et al*, 2003).

9.353 In most cases, changes to waste water treatment and subsequent improvements in water quality have been too recent for any long-term impacts on waterbird numbers to be apparent. Whilst the effects of a sustained and significant reduction of nutrient inputs on the wintering waterfowl population on the Swale SPA / Ramsar Site are difficult to predict, there is a concern that numbers may currently be artificially high and that a sustained improvement in water quality could therefore lead to reduced numbers at a more natural equilibrium. The Environment Agency has commented that, while nutrient levels within the Thames Estuary are high, this does not result in the smothering macroalgal growth that is having an adverse effect upon other European marine sites. The interconnected nature of the Thames and Medway estuaries with the Swale implies that similar conclusions are likely to apply.

9.354 Natural freshwaters, estuaries and coastal waters with high levels of nitrates which can cause a high growth of algae and other plants which can affect species living in the water, and the quality of the water overall are considered Sensitive areas (eutrophic). Areas designated to help fulfil the requirements of EC Directives are classed Sensitive (Bathing Waters) or Sensitive (Shellfish waters). Whilst the Eastern Swale and north side of Sheppey are classed as Sensitive Areas, there are also no bathing waters within the vicinity of the proposed Kemsley SEP.

9.355 There is an expectation that developers will incorporate measures within the development footprint to improve the quality of surface water run-off. Within the Local Plan, Swale Borough Council outlines measures such as SUDS which will help to attenuate water run-off. All reasonable measures to control the quality of surface water runoff into the Swale SPA / Ramsar site have been incorporated into the design of the Kemsley SEP. As such, there is not anticipated to be any deterioration in Swale SPA / Ramsar site features or sub-features due to increased wastewater run-off as a result of the proposed development, even considered in-combination with development of 10,800 homes in Swale Borough (notably at Queenborough/Rushenden or Sittingbourne) as set out in the South East Plan.

9.356 Groundwater quality is generally classed as good in the North Kent and Swale catchment, with no detectable evidence of saline intrusion. According to the North Kent and Swale CAMS, there is one relevant groundwater clean-up operation underway. This relates to a former insecticide plant in Sittingbourne and it is possible that the groundwater in the area has been affected by the long history of industrial activity. Marginal quality water can be found in the confined Chalk and Lower Tertiaries aquifers due to ion-exchange. The use of fertilisers and pesticides but the area around the Proposal site is not included in a Nitrate Vulnerable Zone.

9.357 Much of the work needed within Swale to improve groundwater quality will be through addressing diffuse and point source pollution (Environment Agency, 2009d). The Environment Agency indicates the risk to groundwater supplies from potentially polluting activities and accidental releases of pollutants by defining Source Protection Zones (SPZ) around wells, boreholes and springs used for major potable uses, in particular public drinking water supply. The zones are used, in conjunction with Groundwater Protection: Policy and Practice to set up pollution prevention measures in areas at higher risk and to monitor the activities of potential polluters nearby. There are no SPZ within or near the Proposal site.

9.358 Therefore, no in-combination effects of the development of the Kemsley SEP and other development plans are considered likely since the drivers for any change are far from certain and unlikely to be directly attributable to increased development.

Hydrological changes

9.359 Due to the strategic nature of water supply, development to be delivered under the planning application needs to be considered in-combination with other plans affecting not just its environs, but north Kent and further afield. The Appropriate Assessment of the South East Plan notes that the proposed level of development within Kent as a whole is likely to result in increased water abstraction from both surface and groundwater sources.

9.360 Kemsley is supplied with drinking water by Southern Water and is within the Kent Medway Water Resource Zone (WRZ) which extends from Gravesend in the west to Sittingbourne in the east and the North Downs in the south. The geology of the area means that 76% of the water supply to the Kemsley / Sittingbourne area is sourced from the Chalk. The aquifer is considered to be in hydraulic continuity with the Lower London Tertiaries and London clays that overlay it in places, though the situation is complicated due to the presence of gravels and sands.

9.361 The surface water in this low-lying catchment is made up of many spring fed streams which are reliant on ground water levels. Stream flow is affected by abstraction from the North Downs Chalk and the Lower London Tertiaries. One of the key features of the catchment is its extensive grazing marsh habitats, which are dependent on maintained water levels. Levels are managed by the implementation of Water Level Management Plans. A number of studies have been commissioned to clarify the groundwater interaction between the Chalk and the overlying deposits. This has included investigations aimed at resolving whether groundwater and more importantly the spring flow, emitting from the Lower London Tertaries, was originating from the underlying Chalk aquifer. The results showed that the interaction varied considerably.

9.362 The Environment Agency's North Kent Catchment Abstraction Management plan notes that the Sittingbourne Chalk and Lower London Tertiaries Management Unit is currently 'over-abstracted', while the Unit between Sittingbourne and the Medway Estuary and Marshes SPA/Ramsar at Iwade has 'no water available.' As part of their Restoring Sustainable Abstraction programme, the Environment Agency will therefore seek to secure downward variations of existing licences in the Kent Medway WRZ through the renewal of time limited licences.

9.363 The Environment Agency recognises that the expected scale of future development will have a substantial demand-driven pressure on the maintenance (or increase) of licences. Although Catchment Abstraction Management Plans have no in-built means of avoiding this potential conflict, it is expected that the implications of the water resource status of the catchment will be noted by the water companies and the planning authorities and that plans and policies will be adjusted accordingly. It is assumed that efforts will be made to reconcile conflicting demands through the effective management of the demand for water and through other sustainable water management initiatives.

9.364 The Appropriate Assessment of the draft South East Plan notes that development in the context of a further 139,420 new homes within Kent is likely to result in increased water abstraction from sources that supply the Swale with freshwater and potentially therefore a decline in freshwater flows. In developing and implementing the Sittingbourne Town Centre and Milton Creek Supplementary Planning Document it is understood that the Council liaised with Southern Water in order to ensure that the development is able to be supplied by water without requiring damaging levels of abstraction from tributaries of any European sites including the Swale SPA / Ramsar site and the Medway Estuary and Marshes SPA / Ramsar site.

9.365 The Environment Agency has confirmed that abstraction licences have also been assessed in accordance with European legislation and the Habitats Regulations, 1994 through their Review of Consents process. An Appropriate Assessment was submitted to Natural England in March 2006 for review. Natural England has confirmed they are in agreement with the findings. As no abstraction licence was identified as having an adverse effect on any of the designated features all abstraction licences will be reaffirmed. Consequently, there are no significant in-combination effects with the proposed Kemsley SEP.

9.366 In order to protect water supplies, Southern Water has a number of strategies contained within its emerging Water Resource Management Plan. To 2015, they will focus on inter-zonal water transfer, groundwater source improvements, metering and leakage reduction. By 2020, a waste-water recycling scheme, and a licence variation on a ground water supply should ensure adequate capacity for the Kent Medway WRZ. In the light of current and predicted improvements in water supply, most of Kent is predicted to be in water surplus (sufficient water to support expected additional demand) through to 2026.

9.367 To further improve sustainability in relation to water, Swale Borough Council sets out expectations for new development to incorporate water efficiency measures. The planning application sets out an expectation that wherever possible the design will utilise practical systems for the collection and re-use of water, particularly from roof areas, to reduce potable water demand. Within the context of the measures being implemented by Southern Water and the Environment Agency, it is considered that no further measures are required to ensure that the proposed development does not have an adverse effect on r any other Natura 2000 / Ramsar site under consideration.

Disturbance

9.368 The potential for disturbance on the qualifying features of the Medway Estuary and Marshes SPA / Ramsar, Thames Estuary and Marshes and Swale SPA and Ramsar has been raised as an area of concern. An activity atlas (Medway Swale Estuary Partnership, 2004) identified a number of key areas where water borne and shore-based activities were concentrated. These included sailing in the Swale, personalised watercraft in Long Reach and the Saxon Shore way. The area is already subject to heavy disturbance from these activities.

9.369 The strategic planning framework for this area of North Kent is to promote further recreational activity where this is compatible with nature conservation interests, including the qualifying features and supporting habitats of designated sites. This includes promoting further access along the Saxon Shore Way, linking the new Church Marshes Country Park with the western section of Milton Creek.

9.370 The activity atlas showed a clear relationship between season and levels of recreational activity as well as most leisure activities being centred on sailing and other water sports and there are three marinas (including Milton Creek) – i.e. on the river itself. The only activity to show a clear increase during the winter months was bird-watching. The reduction in all other aspects of activity lowers the potential to cause disturbance. This, together with the SEP planning application specifically excluding any activity on or near the shore means there are no significant in-combination effects.

9.371 Disturbance as a result of increased levels of background noise is unlikely to occur. The Swale Estuary area is already subject to high levels of background noise as a result of the many industrial activities present around its shores. Birds using the SPA will already be habituated to this. The development of the SEP will not result in substantial increases above the already noisy background. Therefore, no in-combination impacts are therefore likely.

9.372 The area of the proposed SEP is already subject to extensive night lighting from neighbouring properties, including Kemsley Paper Mill and associated industrial activity. Of the projects reviewed, only the BP Windfarm is likely to result in further lighting in the vicinity of the Proposal site. In view of the mitigation and avoidance measures incorporated into the design of the proposed SEP, it is concluded there will be no significant in-combination effects.

Introduction or spread of non-native invasive species

9.373 No activity envisaged to be part of the Kemsley SEP will introduce non-native species to the area and there are therefore no in-combination impacts that might increase the introduction of non-native species.

9.374 No invasive non-native species are currently present within the Proposal site boundary. Therefore, the development of the proposed development will not result in the increased spread of these species from the site.

9.375 In order to ensure that no non-native invasive species are allowed to establish on site, a suitable management plan will be produced. This will include details to ensure that activities associated with the development do not carry invasive species either to or away from the site. Therefore, no significant in-combination impacts are forseen.

Projects

9.376 For the purposes of this assessment, we have reviewed the following projects (planning application numbers, where available, are included in parenthesis), other more technical reports and papers are referenced in the text as appropriate:

9.377 The purpose of this section is to assess the cumulative effects of the scheme, with proposed developments near the site that are currently in the planning process or have been approved but are not yet constructed. The relevant proposals considered are:

- Sittingbourne Northern Relief Road
- Anaerobic Digestion plant at Kemsley Paper Mill
- Biomass Combined Heat and Power Plant at Countryside Ltd, Ridham Dock
- Biomass Combined Heat and Power Plant at sites 4 and 7, Ridham Dock
- Iwade Expansion
- East Hall Farm
- Sittingbourne Town Centre regeneration
- Queenborough and Rushenden Regeration Project
- Kent Science Park
- Thistle Hill
- Port of Sheerness Wind Farm

Summary of in-combination effects

9.378 The potential for cumulative effects between the proposed development and the other proposals is dependent on those developments resulting in residual effects for the same habitats, species and populations as those using the Proposal site. Given the distance the majority of these developments are from the Proposal site, potential cumulative impacts with the SEP proposals could occur to the following:

- The Swale SPA / Ramsar site
- The Medway Estuary and Marshes SPA / Ramsar site

Sittingbourne Northern Relief Road

9.379 The Sittingbourne Northern Relief Road is located to 0.75 km south west of the Proposal site. This project involves construction of a road bypassing Sittingbourne town centre and crossing Milton Creek, linking to the Ridham Avenue on the opposite side of the existing Paper Mill to the Proposal site.

9.380 Significant impacts from the Sittingbourne Northern Relief Road proposals could occur to:

- The Swale SPA / Ramsar site

9.381 Construction on the creek crossing was due to start in September 2009. However, the subsequent phase of construction is currently delayed due to a lack of consensus on the proposed route and design of the road. Assuming it were to go ahead, there is the potential for impacts as a result of increased traffic movements and associated pollution. Traffic pollution is unlikely to have a significant impact more than 100 metres from the source (Bignal *et al*. 2007). As the boundary of the Swale SPA / Ramsar site is over 500 metes from the proposed route, cumulative air pollution impacts with the Kemsley SEP considered not likely to have a significant effect.

9.382 There is also the potential for impacts due to noise and changes in water quality. The Environment Agency has advised that there should be no disturbance to the sediments of Milton Creek. On the basis that the appropriate mitigation techniques set out in the Environmental Statement will be undertaken in the development of the new relief road, any cumulative impacts on the qualifying features of the Swale SPA / Ramsar site with the proposed SEP would be negligible. Therefore, no cumulative construction or operational impacts in-combination with the Kemsley SEP could occur.

Anaerobic Digestion Plant, Kemsley Paper Mill (St Regis)

9.383 The proposed Anaerobic Digestion Plant (AD Plant) is 0.5 km to the north of the Proposal site, on the far side of the reedbed, adjacent to the Swale sea wall. The site is currently in use as an aerobic digestion facility and will be upgraded as part of the on-going requirements for waste water treatment that forms part of the EU Water Framework Directive.

9.384 A scoping opinion has been requested from Kent County Council who raised the following concerns in relation to Natura 2000 and Ramsar sites:

- impact to the Swale SPA / Ramsar sites;
- impact to Medway Estuary and Marshes SPA / Ramsar sites;
- impacts on flora and invertebrates and
- impacts on SPA birds; and

9.385 There is not currently a planning application submitted for this proposal and as such it is difficult to assess cumulative impacts with the proposed SEP. However, potential cumulative impacts could be to the Swale SPA / Ramsar site and Medway Estuary and Marshes SPA / Ramsar site via changes to air quality and noise. These would need to be assessed during the production of the EIA / Habitats Regulations Assessment for the AD Plant. However, given that the SEP proposal is considered unlikely to result in any impact on the designated sites in the area, cumulative impacts on the qualifying features and supporting habitats are unlikely

Ridham Dock CHP (Countryside Recycling Ltd)

9.9.2 The proposed biomass combined heat and power plant at Countryside Recycling Ltd is located 1 km north of the Proposal site. The site is currently used as a waste management centre. An environmental statement for the application was submitted to Kent County Council in November 2009 (WYG 2009). This identified a range of potential impacts to various local receptors including via construction noise. However, suitable mitigation is provided to ensure that this does not occur, including through the timing of works (the loudest of which will be within the existing building). No cumulative impacts to interest features of European designated sites are therefore anticipated with these elements.

9.9.3 Potential impacts were also identified to as a result of emissions to air from the CHP plant, including localised acidification of nearby grazing marsh. There is the potential, therefore, for cumulative impacts to the Swale SPA, Ramsar site via changes to air quality. The principal habitat of concern is grazing marsh, particularly the area directly opposite the site on the Sheppey side of the Swale. However, given that APIS does not list this habitat type as sensitive to acidification (www.apis.ac.uk), no cumulative impacts with the Kemsley SEP are predicted on this or any other interest feature of a European designated site.

Ridham Dock CHP (Evonik New Energies UK Ltd)

9.386 The proposed biomass and combined heat and power plant at sites 4 and 7, Ridham Dock, Kent is located 1.5 km to the north of the Proposal site. In response to a request for a scoping opinion from Kent County Council, under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999, the following issues in relation to Natura 2000 and Ramsar sites were identified:

- impact to the Swale SPA / Ramsar sites;
- impact to Medway Estuary and Marshes SPA / Ramsar sites;
- disturbance to SPA / Ramsar site during construction and operation, notably by noise,
- deterioration of SPA habitat due to waterborne emissions;
- deterioration of SPA habitat due to changes in hydrological regimes;
- impact of lighting on nocturnal bird species;

- air quality, including potentially changes to habitat due to smothering of vegetation and/or habitat from particulates and due to acidification and/or nutrient enrichment from airborne emissions.

9.387 There is not currently a planning application submitted for this proposal. As such, it is difficult to assess cumulative impacts with the proposed Kemsley SEP. However, there could be potential cumulative impacts to the Swale SPA / Ramsar and Medway Estuary and Marshes SPA / Ramsar site via changes to air quality. This together with disturbance, water quality, and hydrological changes would need to be assessed during the production of the EIA and Habitats Regulations Assessment for the CHP. However, given that the SEP proposal is considered unlikely to result in any impact on the designated sites in the area, cumulative impacts on the qualifying features and supporting habitats are unlikely.

Iwade Expansion Project

9.388 The proposed Iwade Expansion Project is located 1.5 km to the north west of the Proposal site and is to further expand the village of Iwade. The development will not be granted planning permission until the developments within the Ridham and Kemsley Employment Area or the village centre have commenced and so there will be no overlap of build times. Therefore, no cumulative construction impacts could occur.

9.389 It is assumed that all operational impacts to protected species will be mitigated according to any Environmental Statement submitted with the development and therefore any cumulative impacts will be negligible.

9.390 Potential impacts on the Swale SPA / Ramsar site have been identified as a result of increases in housing development, population and recreational pressure within the local area. However, recreational disturbance has been screened out of the current application impact assessment (there being no increase in recreational pressure as a result of the development) and therefore cumulative impacts with the SEP would be negligible.

East Hall Farm

9.391 The East Hall Farm residential development is currently under construction as a phased development located 2 km to the south of the Proposal site. The majority of the site has already been built-out and the remainder is due for completion in 2010. As the development of the SEP plant is not expected to start until 2011 there will be no or very limited overlap in timing of construction operations. Therefore, there are considered to be no in-combination impacts on the designated sites in the area.

Sittingbourne Town Centre Regeneration

9.392 The proposed Sittingbourne Town Centre Regeneration Masterplan area is located 2 km to the south of the Proposal site. This involves redevelopment of the town centre to include new retail space, civic buildings, residential housing and infrastructure links.

9.393 Given the broad nature of the Masterplan, exact impacts have not been identified. The potential effects of the development on European designated sites are described in the Appropriate Assessment accompanying the Masterplan proposal (Scott Wilson 2009).

9.394 The principal impact identified was that of increased recreational pressure. This has been screened out as a potential impact as a result of the SEP and therefore any cumulative impacts will be negligible.

9.395 The Habitats Regulations Assessment prepared for the Sittingbourne Town Centre Regeneration is currently being updated following receipt of comments from public consultation. This includes advice from Natural England that further consideration needs to be given to the effects of urbanisation on the Swale SPA / Ramsar site.

9.396 Urbanisation impacts on the Swale SPA/Ramsar site as a result of the proposed SEP are not considered to be significant. Therefore, it is any cumulative impacts as a result of urbanisation and the Sittingbourne Town Centre Regeneration project are considered to be negligible.

Queenborough and Rushenden Regeneration Project

9.397 The Queenborough and Rushenden Regeneration Project is located 4.5 km to the north of the Proposal site. This project involves development of an area on the west side of the Isle of Sheppey for residential and commercial use, employment space, community facilities and services, open spaces, a CHP plant and a marina. It is one of the largest developments in the Swale Borough and biodiversity impacts were identified through the Habitats Regulations Assessment (Campbell Reith 2009a) / Environmental Assessment accompanying the planning application for the proposal (Campbell Reith 2009b). Likely significant effects from the Queenborough and Rushenden Regeneration Project proposals could occur to:

- Swale SPA / Ramsar site
- Medway Estuary and Marshes SPA / Ramsar site

9.398 The development is a long-term project being taken forward in a series of phases. The phase 1 residential development at Neats Court started in 2008. This is an on-going regeneration scheme with an indicative Masterplan adopted by Swale Borough Council on the 18th November 2009. Given that the majority of the development has yet to achieve full planning permission, detailed in-combination impacts are difficult to assess. It can be assumed that all impacts to qualifying features and sub-features (including of the Swale SPA / Ramsar site and /Medway Estuary and Marshes SPA / Ramsar site) will be mitigated in line with any Environmental Statement/Appropriate Assessment submitted with detailed planning applications for the individual components of the Masterplan as they come forward for development. Any cumulative impacts will therefore be unlikely to have a significant effect.

Kent Science Park

9.399 The proposed development at Kent Science Park is located 6 km to the south of the Proposal site. This involves expanding the park by 4 ha. The potential ecological effects of the development are described in the Environmental Statement accompanying the planning application for the proposal (E.ON 2005).

9.400 The character and distance of the proposed Science Park from the Proposal site, together with the lack of any ecological connectivity make any cumulative impacts on designated sites unlikely to have a significant effect.

Thistle Hill

9.401 The Thistle Hill development is located approximately 7 km to the north east of the Proposal site and is a substantial residential development. The development is being phased, with some phases having already been completed.

9.402 Thistle Hill is a considerable distance from the Proposal site and not linked to it ecologically. Therefore, any cumulative impacts with the Kemsley SEP would be unlikely to have a significant effect on designated sites.

Port of Sheerness Wind Farm (Peel Energy)

9.403 The Port of Sheerness Wind Farm is being developed along the Lappel Bank dock wall adjacent to the Medway Estuary and is around 7.5 km north of the site. It will comprise four 125 metre high 2.5–3-MW turbines and was granted planning permission in March 2009.

9.404 The distance from the Proposal site and the fact that in relation to the Medway Estuary and Marshes SPA / Ramsar site, it is only relevant to Redshank, make cumulative impacts unlikely to have a significant effect.

CONCLUSIONS

9.405 The Natura 2000 and Ramsar sites identified as potentially affected by the planning application are:

- Medway Estuary and Marshes SPA / Ramsar site
- Thames Estuary and Marshes SPA / Ramsar site
- Swale SPA / Ramsar site
- Outer Thames Estuary pSPA

9.406 Of nine potential pathways identified, four were screened out has not likely to have a significant effect. The following potential pathways were taken forward for more detailed consideration:

- urbanisation;
- air pollution;
- change in fresh water flows; and
- disturbance – noise and night lighting.

9.407 Appropriate avoidance and mitigation measures have been incorporated into the design of the proposed SEP to be able to draw a conclusion of no adverse effect on all of the qualifying features of the Natura 2000 and Ramsar sites under consideration.

9.408 The in-combination effects would be the cumulative effect of development on SPA/Ramsar species due either to indirect impacts on the SPA/Ramsar sites (lighting, noise access) or loss of habitat outside the designation but used by SPA/Ramsar species. Mitigation measures in the form of design, retention and enhancement of existing habitats are proposed to offset these impacts for all the developments that have been assessed. For those plans and projects where impacts are unknown at this time, best practice would be followed to reduce and mitigate impacts so that overall the in-combination effects would be negligible.

9.409 However, based on the wide array of where the developments are geographically and within the planning process; and the fact that it is unlikely that they would occur at the same time, impacts on both SPA/Ramsar sites are considered to be negligible.

9.410 The final conclusion is that the planning application will have no adverse effects on the integrity of the following sites:

- The Swale SPA and Ramsar

- Medway Estuary and Marshes SPA and Ramsar
- Thames Estuary and Marshes SPA and Ramsar
- Outer Thames Estuary pSPA

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