WHEELABRATOR KEMSLEY GENERATING STATION (K3) AND WHEELABRATOR KEMSLEY NORTH (WKN) WASTE TO ENERGY FACILITY DCO:

HABITATS REGULATIONS ASSESSMENT REPORT

WHEELABRATOR TECHNOLOGIES INC

WHEELABRATOR KEMSLEY (K3 GENERATING STATION) AND WHEELABRATOR KEMSLEY NORTH (WKN) WASTE TO ENERGY FACILITY DEVELOPMENT CONSENT ORDER:

HABITATS REGULATIONS ASSESSMENT REPORT

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1 INTRODUCTION

1.1 The need for an Appropriate Assessment is set out in Article 6(3) of the Habitats Directive and interpreted into British law by Regulation 63 of the Conservation of Species and Habitats Regulations (2017) (Table 1.1).

Table 1.1: 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 63	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

1.2 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 Impact Assessment requirements where the findings (as documented in an Environmental Statement) should be 'taken into account' during preparation of the plan or project.

1.3 Under Government advice, Proposed SPAs (pSPA) should also be treated as having protection under the Habitats Regulations.

1.4 It is Government policy (as outlined in Section 176 of the National Planning Policy Framework) 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 an Appropriate Assessment needs to cover features of any relevant Ramsar site.

1.5 In undertaking an assessment, competent authorities (in this case the appropriate Secretary of State) 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. The Planning Inspectorate 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 (Planning Inspectorate (PINS), 2016).

1.6 Plans and projects for which it is not possible to conclude that there would be no adverse effect on the integrity of Natura 2000 sites may still be permitted if there are no alternatives 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.

2 SCOPE AND OBJECTIVES

2.1 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.

2.2 The purpose of this report is therefore to collate and provide sufficient information to enable the Secretary of State to undertake a Habitat Regulations Assessment (HRA) of the potential effects of the DCO application for the WKN Proposed Development and the K3 Proposed Development on land at Kemsley, Sittingbourne, Kent on the Natura 2000 network. It draws upon information within the Environmental Statement, notably Chapter 11 Ecology, but purposely does not repeat the detail contained within the Environmental Statement. Instead, it provides sufficient standalone information, with references to other more detailed sections where necessary, for the Secretary of State to be able to make an informed decision on the potential effects of the proposed development on Natura 2000 sites.

2.3 The following sites should be included in the scope of a Habitats Regulations Assessment:

- All Natura 2000 sites shown to be linked to the proposed development through a known 'pathway'.

2.4 As set out in Chapter 3 of the ES, at the time of scoping, the intention was to apply for an extension to K3 as consented to comprise a power upgrade from 49.9MW to 75MW and an increase in annual permissible waste throughput of 107,000tpa. Whilst this remains the practical effect of the DCO application, in order to accord with the Planning Act 2008 the DCO application seeks permission for the construction and operation of a 75MW generating station with a total annual throughput of 657,000 tpa (i.e. K3 as consented by the planning permission dated 6 March 2012 granted by Kent County Council, together with subsequent material and non-material variations thereto).

2.5 Given this, the baseline conditions are taken to be that prior to the construction of K3, and so are as assessed in the 2010 Ecology and Nature Conservation Chapter of the Environmental Statement and associated Habitats Regulations Assessment (RPS, 2010; Document 3.3 submitted with the application).

2.6 For the purposes of this Habitats Regulations Assessment, therefore, the assessment of effects of K3 uses the conclusions of the original HRA from 2010 in relation to the K3 Proposed Development with any differences due its practical effect described in turn.

2.7 The key activities in relation to the K3 and WKN Proposed Developments are therefore:

- Site preparation and enabling works;
- Piling (method TBC, assume at this stage percussive impact) to establish appropriate foundations;
- Main construction;

- Commissioning of the facility; and
- Decommissioning.

2.8 The key activities in relation to the practical effect of the K3 Proposed Developments are:

- Operation of the facility; and
- Decommissioning.

2.9 As set out in Chapter 2 of the ES, decommissioning will comprise the rendering inoperable of K3 and the WKN Proposed Developments and removal/demolition of key plant and equipment. An appropriately-worded requirement for the written approval of a method statement for the decommissioning and demolition of both K3 and the WKN Proposed Development will be included within the DCO.

2.10 At this stage, the prediction of the nature of such effects is not possible. However, they could include a range of activities that would be similar to those undertaken during construction and would therefore be subject to any necessary mitigation/avoidance measures which may be similar to those identified in Section 6 below. On this basis, the activities of decommissioning and demolition of both K3 and the WKN Proposed Development and effects that may arise from such activities are considered to be analogous to those arising in construction.

2.11 No Natura 2000 sites or Ramsar sites lie wholly or partly within the boundary of the area covered by the DCO application. The locations of the Nature 2000 sites in relation to the application boundary can be seen in Figure 11.1 of the ES.

2.12 Based on the nature of the proposed development and the findings of the technical chapters of the Environmental Statement, it has been decided that the following eight 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;
- Queendown Warren SAC; and
- Outer Thames Estuary SPA.

3 METHODOLOGY

Process

3.1 The stages of HRA are described below, adapted from 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.

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, in the absence of mitigation/avoidance measures, 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 determine whether no adverse effect can be concluded both alone and in-combination with other plans or projects.

Stage 4 – In-combination

- Undertake a similar assessment of the proposal to that described above but in combination with other plans and projects that could act, collectively, to result in an adverse effect on a Natura 2000 or Ramsar site.

Stage 1 – Qualifying Interest Features

3.2 Natural England has provided copies of the relevant citations and confirmed both the conservation objectives and Regulation 33 (English Nature 2001) 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.

3.3 Natural England has confirmed that the assessment should focus on the qualifying features listed within the official Natura 2000 citations as these are the features for which the site is legally designated.

3.4 In addition to qualifying interest features, it is necessary to explore the environmental features and conditions required to maintain the integrity of the eight Natura 2000 and Ramsar sites, as well as both current condition and trends in environmental processes.

Stage 2 - Likely Significant Effect

3.5 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 DCO application could affect the interest features of relevant Natura 2000 and Ramsar site, and then assessing 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.

3.6 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. At this stage, they are made without consideration of mitigation/avoidance measures. 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.

3.7 The WKN Site comprises hard standing and industrial buildings. Therefore, no surveys have been undertaken on the WKN Site. However, a suite of ecological surveys of the surroundings have also been completed to inform other developments within the wider Kemsley Paper Mill site, including targeted breeding bird surveys, assessment of roosting Marsh Harriers, and intertidal waterbird surveys of the Swale in the vicinity of the Proposed Development.

3.8 The methodology for the breeding bird surveys involved standard territory (registration) mapping techniques as outlined in Gilbert *et al.*. (1998) and Bibby *et al.*. (2000). Full survey methods and details of visits are available in the respective technical survey reports (RPS, 2009a, 2016).

3.9 The survey methodology for the intertidal surveys involved monthly counts of the waterbirds using the Kemsley foreshore. Full survey methods and details of visits are available in the respective technical survey reports (RPS, 2009a, 2016). 2018 surveys are currently ongoing although data from February, March, April and May have been used in the current assessment. These surveys followed the same methodology as previous surveys and will be reported when completed in February 2019 with the final ES submission.

Stage 3 - Appropriate Assessment

3.10 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, including whether any suitable avoidance or mitigation measures can be incorporated to avoid or reduce those adverse effects. . 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. This is in line with Department for Communities and Local Government / PINS 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 4 – In-combination Assessment

3.11 The Habitats Regulations require that a decision to grant permission can only be made once the Competent Authority is satisfied that no adverse effects on the integrity of the Natura 2000 sites in question are likely both alone and in-combination with other plans and projects. Therefore, Stage 4 of the HRA process requires the identification of other plans and projects that might affect the interest features of the relevant Natura 2000 sites in combination with the outline planning application and decide whether there any adverse effects that might occur in-combination that did not occur when considered alone.

4 STAGE 1 – QUALIFYING INTEREST FEATURES

4.1 Appendix 3 of the HRAR provides the citations for all sites considered.

The Swale

4.2 The boundary of The Swale SPA / Ramsar site lies 0.16 km to the east of the area covered by the proposal.

4.3 The Swale Estuary 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, 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.

4.4 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 4.1).

Table 4.1: 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

Ramsar Criteria	Scientific Name	Species Name
	Campsicnemus magius	A small dolichopodid fly
	Elachiptera rufifrons	A small chloropid fly
	Myopites eximia	A picture-winged fly

4.5 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.

4.6 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 Ramsar citation and SPA citation (as provided by Natural England in their Section 42 response) are provided in Table 4.2.

4.7 The Conservation Objectives for the SPA (as set out in http://publications.naturalengland.org.uk/publication/5745862701481984?category=6528471664689152) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and,
- The distribution of the qualifying features within the site.

4.8 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.

Table 4.2: Qualifying Bird Species of The Swale

	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
Regularly used by 1% or more of the GB population of an Annex 1 species during passage				
Redshank	*Tringa totoanus*	-	1,712 individuals, representing an average of 1.4% of the British population	269
Migratory Wintering species regularly occurring in internationally-important numbers over winter				
Dark-bellied Brent Goose	*Branta bernicla bernicla*	2,850 representing 1.6% of the world population and 3.1% of the British winter population	2,850 representing 1.6% of the world population and 3.1% of the British wintering population	1,961
Grey Plover	*Pluvialis squatarola*	-	1,550 representing 1% of the East Atlantic Flyway population and 7.3% of the British population	2,021
Dunlin	*Calidris alpina*	13,000 representing 3% of British wintering population	-	13,000
Assemblage				
Regularly supporting over 20,000 waterfowl over winter	-	57,600	57,600	65,588
Diverse assemblage of breeding birds	-	-	-	-

4.9 The 1993 Citation for The Swale describes 17 species occurring within the over-wintering assemblage in nationally- or internationally-important numbers but does not name them. Therefore, Natural England's advice for the K3 application, (Section 42 Response dated 19/04/17), based on the BTO's Wetland Bird Survey (WeBS) data, is that the following species should be considered as important components of the assemblage:

- European white-fronted goose;
- Shelduck;
- Teal;
- Shoveler;
- Oystercatcher;
- Golden Plover;
- Lapwing;
- Dunlin;
- Black-tailed Godwit;
- Green Sandpiper;
- Dark-bellied Brent Goose;
- Wigeon;
- Pintail;
- Little Egret;
- Avocet;
- Grey Plover;
- Sanderling;
- Ruff;
- Bar-tailed Godwit;
- Greenshank;
- Knot; and
- Curlew.

4.10 With respect to the breeding assemblage, The Swale Citation lists a number of species in the 'typical assemblage of breeding species' for grazing marsh:

- Shelduck;
- Coot;
- Mallard;
- Moorhen;
- Lapwing;

- Redshank;
- Reed Warbler; and
- Reed Bunting.

4.11 Natural England's Section 42 advice for that project was that this should be expanded to include breeding ducks, waders, Yellow Wagtail and Marsh Harrier. Given the proximity of the developments, the S42 advice with respect to the K3/K4 developments has been taken as also applying to the WKN Proposed Development.

Medway Estuary and Marshes

4.12 The boundary of the Medway Estuary and Marshes SPA and Ramsar site lies just over 2 km from the area covered by the Proposal site.

4.13 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.

4.14 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 4.3).

4.15 The Medway Estuary and Marshes SPA was classified in 1993 and the citation prepared for that classification has been used to inform this assessment. The qualifying bird interest features listed in the SPA Citation 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 4.4.

4.16 The Conservation Objectives for the SPA (as set out in http://publications.naturalengland.org.uk/publication/6672791487119360) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;

- The population of each of the qualifying features; and,
- The distribution of the qualifying features within the site.

Table 4.3 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 4.4: Qualifying Bird Species of Medway Estuary and Marshes

	Scientific Name	SPA Citation	Ramsar	Assessment 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
Little Tern	*Sterna albifrons*	24 pairs representing 1% of the breeding population in Britain	-	28 pairs
Annex 1 Species Regularly Wintering in Numbers of European Importance				
Avocet	*Recurvirosta avosetta*	70 representing 7% of the population in Britain	-	314
Annex 1 Species Regularly On Passage in Numbers of European Importance				
Grey Plover	*Pluvialis squatarola*	-	3103 individuals, representing an average of 1.2% of the population	1,337
Redshank	*Tringa totanus*	3709 individuals, representing an average of 1.4% of the population	3709 individuals, representing an average of 1.4% of the population	
Migratory Species Regularly Wintering in Numbers of European Importance				
Dark-bellied Brent Goose	*Branta bernicla bernicla*	4,130 representing 2.4% of the world population and 4.6% of British winter population	4,130 representing 2.4% of the world population and 4.6% of British winter population	4,130
Shelduck	*Tadorna tadorna*	5,900 representing 2.3% of the North West European population and 7.9% of the British winter population	5,900 representing 2.3% of the North West European population and 7.9% of the British winter population	5,900
Pintail	*Anas acuta*	980 representing 1.4% of the North West European wintering and 3.9% of the British winter	980 representing 1.4% of the North West European wintering and 3.9% of the British winter	980

	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
		population	population	
Ringed Plover	*Charadrius hiaticula*	740 representing 1.4% of the East Atlantic Flyway population and 3.2% of the British wintering population	740 representing 1.4% of the East Atlantic Flyway population and 3.2% of the British wintering population	768
Knot	*Calidris canutus*	3,690 representing 1.0% of the East Atlantic Flyway and 1.6% of the British wintering population	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	22,900 representing 1.6% of the East Atlantic Flyway and 5.3% of the British wintering population	25,936
Regularly supports in winter a diverse assemblage of wintering species	-	53,900	47,637	65,496
Diverse assemblage of breeding migratory waterfowl	-	-	-	-

4.17 The 1993 citation for the Medway Estuary and Marshes SPA lists 18 species of waterfowl within the over-wintering assemblage occurring in internationally- or nationally-important numbers:

- Dark-bellied brent geese;
- Shelduck;
- Pintail;
- Ringed plover;
- Grey plover;
- Knot;
- Dunlin;
- Redshank;

- Great crested grebe;
- Wigeon;
- Teal;
- Shoveler;
- Oystercatcher;
- Black-tailed godwit;
- Curlew;
- Spotted redshank;
- Greenshank; and
- Turnstone

4.18 The Citation also lists 18 species comprising the diverse assemblage of wintering species including:

- Red-throated Diver;
- Great Crested Grebe;
- Cormorant;
- Shelduck;
- Mallard;
- Teal;
- Shoveler;
- Pochard;
- Oystercatcher;
- Ringed Plover;
- Dunlin;
- Redshank;
- Bewick's Swan;
- Hen Harrier;
- Merlin;
- Golden Plover;
- Short-eared Owl; and

- Kingfisher.

4.19 With respect to the breeding assemblage, the Citation lists the following species:

- Oystercatcher;
- Lapwing;
- Ringed Plover;
- Redshank;
- Shelduck;
- Mallard;
- Teal;
- Shoveler; and
- Common Tern.

Thames Estuary and Marshes

4.20 The boundary of the Thames Estuary and Marshes SPA and Ramsar site lies 8.7 km from the area covered by the Proposal site.

4.21 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.

4.22 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 4.5).

4.23 The Thames Estuary and Marshes SPA was classified in 2000. The qualifying bird interest features listed in the SPA Citation 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 4.6.

4.24 The Conservation Objectives for the SPA (as set out in http://publications.naturalengland.org.uk/publication/4698344811134976) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- The extent and distribution of the habitats of the qualifying features;

- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and,
- The distribution of the qualifying features within the site.

Table 4.5 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* *Trifolium glomeratum* *Trifolium squamosum* *Zostera angustifolia* *Zostera noltii*	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 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*	A water beetle A water beetle A water beetle A water beetle A water beetle A beetle

Ramsar Criteria	Scientific Name	Species Name
	Philonthus punctus	A rove beetle
	Telmatophilus brevicollis	A fungus beetle
	Campsicnemus magius	A fly
	Haematopota bigoti	A horsefly
	Stratiomys longicornis	A soldier fly
	Baryphyma duffeyi.	A spider

Table 4.6 Qualifying Bird Species of the Thames Estuary and Marshes

	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
Annex 1 Species Regularly Wintering in Numbers of European Importance				
Avocet	*Recurvirosta avosetta*	283 representing 28.3% of British wintering population	-	283
Hen Harrier	*Circus cyaneus*	7 representing 1.0% of the British wintering population	-	7
Migratory species regularly occurring on passage				
Black-tailed Godwit	*Limosa limosa islandica*		1,640 individuals - passage 4.5% Europe/ Northern Africa (win)	1,640
Ringed Plover	*Charadrius hiaticula*		595 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)	595
Migratory species regularly occurring over winter				
Grey Plover	*Pluvialis squatarola*	2,593 representing 1.7% of the East Atlantic wintering population		2,593
Knot	*Calidris canutus*	7,279 representing 1.6% of 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*	15,171 representing 1.1% of North Siberia/Europe/ West Africa population	29,646 representing 2.1% of North	15,171

	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
			Siberia/Europe/ West Africa population	
Black-tailed Godwit	*Limosa limosa*	-		
Redshank	*Tringa totanus*	-		
Assemblage of International Importance		45,118	75,019	45,118

Queendown Warren SAC

4.25 Queendown Warren is approximately 9.3 km south west of the DCO Boundary. The qualifying interest feature at Queendown Warren is *Bromus erectus* grassland of the Annex I priority habitat Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (important orchid sites). 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.

4.26 The conservation objectives for the site are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats;
- The structure and function (including typical species) of qualifying natural habitats; and
- The supporting processes on which qualifying natural habitats rely.

4.27 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.

Outer Thames Estuary SPA

4.28 The Outer Thames Estuary SPA is located where the North Sea and the Thames Estuary meet (8 km north east of the DCO Boundary), extending north to the sea off Great Yarmouth on the East Norfolk Coast. It supports the largest assemblage of wintering red-throated diver (*Gavia stellata*) in the UK, an estimated population of 6,466 individuals, which is 38% of the wintering population of Great Britain.

4.29 the recently-confirmed extension to the SPA also includes:

- Little Tern: 746 individuals (2011-2015) or 19.64% of GB population; and
- Common Tern: 532 individuals (2011-2015) or 2.66% of GB population.

4.30 The conservation objectives for both SPA (http://publications.naturalengland.org.uk/publication/4927106139029504) are to Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.

Supporting Habitats

4.31 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 are presented in Table 4.7.

4.32 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 (e.g. Avocet), feeding (e.g. Curlew and Redshank), or roosting when displaced from mudflats at high tide.

Table 4.7 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, etc.)	6.0	-	-
Total	100%	100%	100%

4.33 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, 2010, 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

Internationally Important Assemblage of Waterfowl including Internationally Important Population of Regularly Occurring Migratory Bird Species

4.34 The two key supporting sub-features (habitats) are:

- Mudflats; and
- Saltmarsh.

4.35 Mudflats are a rich source of invertebrates and provide the main feeding ground for wintering species such as Grey Plover and Redshank, which occur on the SPA 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 that occur on the SPA, especially when inland feeding sites are frozen.

4.36 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.

4.37 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

4.38 The four key supporting sub-features (habitats) are:

- Mudflats;
- Saltmarsh;
- Shallow inshore waters; and
- Shingle beaches.

4.39 In summer, the mudflats 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. The mudflats are also a rich source of invertebrates for wintering Avocet which occur on the SPA in internationally important numbers.

4.40 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.

4.41 Shallow in-shore waters are listed as a sub-feature for the Medway (but not the Swale) because they are used by Little Tern, an Annex 1 species which occurs in nationally important numbers.

4.42 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.

4.43 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

4.44 The three key supporting sub-features (habitats) are:

- Mudflats;
- Saltmarsh; and
- Shallow coastal waters.

4.45 The mudflats in the Medway Estuary and Marshes SPA provide the main feeding ground for wintering species which occur on the SPA 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.

4.46 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.

4.47 Great Crested Grebe feed in the shallow waters of the Medway, and at the time of classification, occurred in nationally important numbers.

4.48 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

4.49 The two key supporting sub-features (habitats) are:

- Mudflats; and
- Saltmarsh.

4.50 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.

4.51 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.

4.52 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

4.53 The three key supporting sub-features (habitats) are:

- Mudflats;
- Saltmarsh; and
- Intertidal shingle.

4.54 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 on the SPA 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.

4.55 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.

4.56 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.

4.57 Subject to natural change the conservation objective for these sub-features is to maintain them in favourable condition.

Queendown Warren SAC

4.58 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.

5 STAGE 2 - LIKELY SIGNIFICANT EFFECT

5.1 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 as a result of the construction and operation of the proposed project.

5.2 To aid clarity, the likely significant effects of the K3 Proposed Development, the practical effect of the K3 Proposed Development and the WKN Proposed Development are described in turn.

5.3 The possibility of the development proposed within the DCO application having a likely significant effect on any of the designated sites identified in Section 4 is discussed for each impact pathway in turn below.

5.4 The 2010 HRA was undertaken prior to various case law that would influence the decision with respect to issues to be screened in for appropriate assessment (notably People Over Wind). Further, some of the issues screened in as requiring appropriate assessment are no longer considered as significant (changes in freshwater flows/hydrology, for example) due to updated research. However, the assessment of effects with respect to the 2010 HRAR was considered robust by all consultees at the time, accounting fully for all potential effects. As outlined in the preamble to Appendix 1/2 of the HRAR, the matrices provided address the practical effect of the K3 Proposed Development, along with those of the WKN Proposed Development.

5.5 The environmental pathways that could lead to a significant effect due to the K3 or WKN Proposed Developments (meaning the Site, laydown area and access roads) 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.

K3 Proposed Development

5.6 As described above, for the purposes of assessing the K3 Proposed Development, the baseline scenario is K3 prior to construction. A detailed HRA was submitted with the 2010 application and is provided within the documents that support this application (Document 3.3). This was augmented by additional information submitted during the determination of the existing permission. The 2010 HRA considered the effect of the construction and operation of K3 at 49.9MW. It concluded that the following potential effects could not be screened out without further assessment:

- Urbanisation;
- Air quality;
- Hydrological changes; and
- Disturbance

5.7 All other effects could be screened out as there were considered not likely to have a significant effect.

5.8 K3 as consented is at an advanced stage of construction and due to be fully operational by the end of 2019. All planning conditions of relevance to ecology have been discharged. No further external construction work is required by way of consequence of the practical effect of the K3 Proposed Development. The screening undertaken as part of the 2010 ES therefore remains a robust assessment for the consideration of the construction and operation of K3 as consented.

Practical effect of the K3 Proposed Development

5.9 Given that the practical effect of the K3 Proposed Development comprises only an uplift in power generation and an increase in throughput of waste, the environmental pathways that could lead to a significant effect are operational and may be summarised as:

- Air quality; and
- Disturbance due to increased traffic noise

5.10 Given that there are no construction activities pursuant to the practical effect K3 Proposed Development and no changes to the physical form of the facility proposed, all other potential pathways can be excluded at this stage.

Air quality

5.11 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.

5.12 Appendix 5.4 of the ES (Document 3.1) provides an analysis of the combined impacts of emissions to air of the K3 Proposed Development with the WKN Proposed Development, along with any other committed developments on the features of interest of the surrounding designated sites along with the supporting habitats. Based on current Environment Agency guidelines and the Institute of Air Quality Management Position Statement, for all pollutants (NO_x, NH_3, SO_2, nutrient nitrogen deposition and acid deposition), either the Predicted Environmental Concentration (PEC) did not exceed the Environmental Quality Standard (EQS) or the Process Contribution (PC) was <1% of the EQS for the majority of interest features and supporting habitats of the designated sites. Therefore, all impacts as a result of the operation of both the K3 Proposed Development with the WKN Proposed Development are negligible and, as such, are not significant. On this basis, the impacts of both developments in isolation is also not significant.

5.13 The only interest features where this was not the case was Eurasian reed warbler and reed bunting species within the breeding assemblage for The Swale SPA with respect to nutrient nitrogen deposition where the PC>1% of the minimum critical load and the relevant minimum critical load is already exceeded. Both species are associated with reedbed habitats within which they breed across The Swale. Neither species has been recorded breeding within the DCO boundary nor within the reedbed to the north of the WKN Site. However, they may be present in the wider area, Coldharbour Fleet to the north west, for example.

5.14 Notwithstanding this, reedbed habitats in north Kent are unlikely to be very sensitive to nutrient nitrogen deposition. The APIS website from which the information with respect to critical loads is derived incorporates reedbed with other wetland habitats such as marsh and fens. It notes that the minimum critical load for these habitats listed on APIS and used in Appendix 5.4 (15 $kgN.ha^{-1}.yr^{-1}$) represents more upland habitats that will be naturally more nutrient poor and therefore more susceptible to species composition change due to atmospheric nitrogen input. Reedbeds are, by their nature, monospecific, dominated by common reed. As such, their susceptibility to competitive exclusion by other graminoid species is considered very low. The upper end of the critical load range is therefore considered more appropriate for these habitats, set within grazing marsh which are higher nutrient systems due to the underlying nutrient status of the soils within the flood plain on which they form. Using the upper critical load for this habitat of 30 $kgN.ha^{-1}.yr^{-1}$ is therefore more appropriate meaning that the PC becomes ≤1% of this critical load and, as such, is not significant.

Disturbance

5.15 Although the operational noise of K3 will not change as a result of the K3 Proposed Development, the additional HGV movements to facilitate the increased throughput may generate noise levels sufficient to cause disturbance to birds using the nearby designated sites. The potential for such disturbance is considered very limited, however. Research with respect to the effects of road noise on foraging intertidal birds is limited (Cutts, Phelps & Burdon 2009), although there is some evidence that breeding birds (including waders) may

be negatively affected by road noise (Reijnen, Roppen & Veenbaas. 1997). Distances within which such effects may be observed vary with species, but may be up to 190 m in grassland habitats adjacent to roads with 10,000 average annual daily traffic (AADT) movements (Cutts, Phelps & Burdon 2009). The closest point of the highway network used by the HGVs to the designated sites is at the roundabout at the junction of Barge Way with the North Gate of the Kemsley Paper Mill. This is some 400 m from intertidal habitats of The Swale SPA/Ramsar/SSSI and circa 100 m from the grazing marsh habitats of that site.

5.16 Traffic modelling for the K3 Proposed Development show traffic numbers on Barge Way adjacent to the North Gate would be 3,664 AADT (see Traffic Assessment), uplifted from 3,569 at baseline (i.e. a change of 68 AADT or 1.2%).

5.17 Although the exact relationship between AADT, distance from road and degree of disturbance is not fully elucidated, the potential for disturbance due to traffic noise is considered highly limited due to:

- the distance between the traffic and the designated site. Although a distance of 190 m within which habitat degradation may occur is suggested for roads with 10,000 AADT, given that the predicted future AADT is circa 1/3 of this, it is likely that any buffer around Barge Way would be substantially smaller; and
- the absolute increase in AADT is extremely small (<2%) with a correspondingly small increase in absolute noise.

5.18 Consequently, it is concluded that the effects of disturbance due to traffic noise on qualifying features of any nearby Ramsar sites as well as breeding, passage and wintering birds of any nearby SPAs can be screened out, as no likely significant effects are anticipated.

WKN Proposed Development

5.19 The WKN Site is currently used as a laydown area for the construction of K3 as consented. Therefore, it was historically expected to be returned to its original state (scrub / grassland / rubble mosaic). The WKN Proposed Development baseline will therefore be the WKN Site, as existed prior to the use of the WKN Site as laydown, as informed by the surveys completed at the time, as described in Appendix 11.3. This is considered a worst-case scenario as it allows the WKN Proposed Development to account for the loss of habitat that occurred during the original site clearance.

5.20 Given the above, the environmental pathways that could lead to a significant effect due to the construction and operation of the WKN Proposed Development (meaning the WKN Site, laydown area and access roads) 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

Direct loss or damage of habitats used by interest species

5.21 As the development is a minimum of 160 m from the SPA, SAC or Ramsar sites, the proposal will not result in any direct loss of any designated habitat within any designated site.

5.22 The WKN Site does not support any of the plant species listed on the Swale Ramsar citation, nor does it have any habitat suitable of supporting such species. Therefore, impacts occurring from direct loss can be screened out, as no likely significant effects are anticipated.

5.23 Prior to clearance, the WKN Site comprised bare ground, rubble piles and ephemeral habitats. The laydown area comprises scrub and bare ground. Both areas are unlikely to support populations of any qualifying invertebrate species of the Swale Ramsar site or Medway Estuary and Marshes Ramsar site. These species are mostly reliant on saline/brackish ditch habitats typical of these sites, which are not present with the WKN Site.

5.24 Following bird surveys of the WKN Site in 2009/2010, 2016 and 2018 (see appendices in Ecology Chapter) 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 WKN Site for roosting or breeding.

5.25 The WKN Site also provides no suitable habitat for any of the cited SPA / Ramsar wintering species for foraging. The WKN Site does not contain any habitat suitable for wintering Ramsar/SPA Citation species or associated assemblage.

5.26 There is no evidence that the WKN Site regularly supports 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.

5.27 There is no evidence that the WKN 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.

5.28 Consequently, it is concluded that the effects of direct habitat loss on qualifying features of any nearby Ramsar sites as well as breeding, passage and wintering birds of any nearby SPAs can be screened out, as no likely significant effects are anticipated.

Change in habitat management regimes

5.29 The majority of the existing land use immediately surrounding, and in the vicinity of the WKN Site is in industrial use, pertaining to the Kemsley Paper Mill. A capped tip lies to the south of the site.

5.30 The current management regimes for the SPA / Ramsar sites focus on maintaining the habitats for the qualifying breeding and waterbird assemblages (Natural England, 2014).

5.31 Given the distance from the SPA / Ramsar sites, the WKN Proposed Development will therefore result in no change to current management regimes of any sub-feature of an SPA or Ramsar during either the construction, operation or demolition of the facility.

5.32 Therefore, impacts occurring from a change in habitat management regimes can be screened out, as no likely significant effects are anticipated at any designated site.

Loss of future space to allow for managed realignment

5.33 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 sea walls 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.

5.34 The WKN Site is located to the west of The Swale and is currently used as the laydown area for K3; prior to this, it comprised bare ground and ephemeral habitats.

5.35 Given that much of the site is already made land, it can be concluded that impacts occurring from a loss of future space can be screened out, as no likely significant effects are anticipated at any designated site.

Urbanisation

5.36 Industrial development has the potential to overshadow 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, reducing the appeal of the habitat or increasing the risk of fatalities through collisions.

5.37 The proposed buildings will be visible from part of the intertidal area within the Swale SPA which supports wintering populations of waterbirds. The buildings nearest the Swale SPA / Ramsar boundary will be in keeping with other buildings in the area and the tallest building will be set around 240 metres away from the boundary of the Swale SPA / Ramsar site.

5.38 The WKN Proposed Development is located directly northwards of the K3 Proposed Development coupled with the presence of the existing Kemsley Paper Mill to the west, the WKN 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. Therefore, no further assessment is required in terms of the movement of birds between the Medway Estuary and Marshes and the Swale.

5.39 Consequently, although the intertidal area surrounding the site is considered to be of importance for the birds of the Swale SPA/Ramsar, given the highly urban setting of the site and backdrop of existing industrial buildings, there is little potential for increased urbanisation to impact the interest features for which the SPA/Ramsar are designated.

5.40 Therefore, any impacts occurring from increased urbanisation can be screened out, as no likely significant effects are anticipated at any designated site.

Air quality

5.41 The two air quality issues during construction are dust and increased traffic emissions.

Construction/demolition dust

5.42 The potential for dust release exists during the construction & demolition phases, with potential sources including site clearance, earthworks, building demolition and vehicle movements.

5.43 Based on studies elsewhere, it is anticipated that the majority of dust would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site.

5.44 The boundary of the Swale SPA and Ramsar site is over 160 metres to the east of the WKN Site and therefore outside the area potentially most affected.

5.45 The closest part of the Medway Estuary and Marshes SPA and Ramsar to the Proposal site where construction works is 2.1 km to the north and therefore outside the area potentially affected by dust. This, and more distant designated sites can be screened out as no likely significant effects are anticipated.

Traffic – construction/demolition

5.46 For sensitive ecological receptors, the IAQM Guidance on the assessment of dust from demolition and construction sets out 50 m as the distance from the site boundary and from the site traffic route(s) within which there could potentially be nuisance dust and PM10 effects. There is scrub habitat along the access road that is within 50 m of construction/demolition traffic, but the nearest designated site boundary is located over 160 metres to the east of the WKN Site and therefore outside the area potentially most affected.

5.47 It can therefore be concluded that in relation to dust relating to construction/demolition traffic, impacts can be screened out for all designated sites, as no likely significant effects are anticipated.

Traffic - Operational

5.48 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, the contribution of vehicle emissions from the roadside to local pollution levels is not significant beyond 200 metres from a road (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 traffic emissions associated with the proposed development.

5.49 The Highways Agency (now Highways England) DMRB (Design Manual for Roads and Bridges) methodology sets out a range of criteria for when assessment of effects due to increases in traffic are necessary. The key criterion with respect to the WKN Proposed Development is the AADT of Heavy Duty Vehicles (HDV) where a change of at least 200 movements is required. As shown in Chapter 4 of the ES, the AADT of HDVs would go from 1,243 to 1,481, an increase of 241 associated with the WKN Proposed Development. As this is greater than the 200 AADT threshold set out in the DMRB, further analysis has been undertaken.

5.50 The operational effects of air quality arising from traffic have been modelled in Appendix 5.4 of Chapter 5 (Table 5.4.13 & 5.4.14). Modelling was undertaken at a selection of discrete receptor points at the closest point of the habitat site to a road adjacent to roads affected by the WKN Proposed Development.

5.51 The cumulative traffic data for the WKN Proposed Development and K3 Proposed Development together in the opening year of the WKN Proposed Development, 2024 was also modelled. The PC from the WKN and K3 stack emissions at each of the sensitive receptors was added to the road contribution to give a 'WKN + K3' PC that considers both stack and traffic emissions.

5.52 Only the Swale SPA/SSSI/Ramsar and the Medway Estuary and Marshes SPA/Ramsar are within 200 m of a road affected by the WKN Proposed Development and K3 Proposed Development. The A249 passes through the Medway Estuary and Marshes SPA/Ramsar so receptors were selected at the roadside.

5.53 For NO_x, the cumulative PC as % of the CL is less than 1% for the Medway Estuary and Marshes SPA/Ramsar. At both the Swale SPA/SSSI/Ramsar and the Medway Estuary and Marshes SPA/Ramsar, the PEC is less than the CL. On that basis, the cumulative effects are considered insignificant.

5.54 For N deposition the cumulative PC as % of the CL is >1% for both the Medway Estuary and Marshes SPA/Ramsar and the Swale SPA/SSSI/Ramsar. However, the critical loads presented in Table 5.4.14 are the lowest on APIS for these sites. The minimum critical load used for The Swale SPA/Ramsar is 15 $kgN.ha^{-1}.yr^{-1}$ listed on APIS as representing Eurasian reed warbler and reed bunting. As described above, this critical load though is for upland habitats that will be naturally more nutrient poor and therefore more susceptible to species composition change due to atmospheric nitrogen input. Using the more appropriate upper critical load for this lowland reedbed habitat of 30 $kgN.ha^{-1}.yr^{-1}$ means that the PC becomes $\leq$1% of this critical load and, as such, is not significant.

5.55 The minimum critical load used for the Medway Estuary & Marshes SPA/Ramsar is 8 kgN.ha^{-1}.yr^{-1} listed on APIS as representing acid stable dune grasslands for both interest feature species of breeding tern. As for hen harrier and merlin, while the tern species will both use such habitats elsewhere in the country, within the Medway Estuary system, both species breed mainly on the many salt marsh islands (Burntwick Island, for example) that occur in the river channel. As such, a more appropriate critical load would be that for early-pioneer salt marsh of 30 kgN.ha-1.yr^{-1}. Using this figure, the cumulative PEC is only 45% of the critical load meaning that the cumulative PEC does not exceed the critical load and, as such, cumulative effects in combination with the K3 and WKN Proposed Developments are not significant.

5.56 The cumulative PECs presented in Appendix 5.4 can be considered highly conservative as the PCs from the other developments are the maximum impacts across a grid and are unlikely to occur at the same location as the maximum road contribution. On this basis, all impacts as a results of traffic emissions are negligible, and as such, are not significant..

Operational emissions

5.57 The principal source of operational emissions will be gases exhausted from the stack after treatment in the flue gas treatment system. The combustion of waste during the operation of the WKN Proposed Development will give rise to atmospheric emissions of a number of substances in low concentrations which will be regulated under the Waste Incineration Directive (WID) 2000/76/EC.

5.58 The methods for screening of potential likely significant effects with respect to operational emissions is described in Chapter 5 Air Quality while the data relating to designated sites is presented in Appendix 5.4.

5.59 For all pollutants (NO_x, NH_3, SO_2, nutrient nitrogen deposition and acid deposition), either the PEC did not exceed the EQS or the PC was ≤1% of the EQS for all interest features of all designated sites in the study area.

5.60 The only interest features where this was not the case was Eurasian reed warbler and reed bunting for The Swale SPA with respect to nutrient nitrogen deposition where the PC>1% of the minimum critical load and the relevant minimum critical load is already exceeded. Both species are associated with reedbed habitats within which they breed across The Swale. Neither species has been recorded breeding within the DCO boundary nor within the reedbed to the north of the WKN Site. However, they may be present in the wider area, Coldharbour Fleet to the north west, for example.

5.61 Notwithstanding this, reedbed habitats in north Kent are unlikely to be very sensitive to nutrient nitrogen deposition. The APIS website from which the information with respect to critical loads is derived incorporates reedbed with other wetland habitats such as marsh and fens. It notes that the minimum critical load for these habitats listed on APIS and used in Appendix 5.4 (15 kgN.ha^{-1}.yr^{-1}) represents more closely upland habitats that will be naturally more nutrient poor and therefore more susceptible to species composition change due to atmospheric nitrogen input. Reedbeds are, by their nature, monospecific, dominated by common reed. As such, their susceptibility to competitive exclusion by other graminoid species is considered very low. The upper end of the critical load range is therefore

considered more appropriate for these habitats, set within grazing marsh which are higher nutrient systems due to the underlying nutrient status of the soils within the flood plain on which they form. Using the upper critical load for this habitat of 30 $kgN.ha^{-1}.yr^{-1}$ is therefore more appropriate meaning that the PC becomes ≤1% of this critical load and, as such, is not significant.

5.62 Impacts occurring from operational air quality issues on all designated sites can therefore be screened out, as no likely significant effects are anticipated.

Water quality

5.63 The quality of the water entering Natura 2000 and Ramsar sites is an important determinant of habitat condition and hence the species they support. Poor water quality can have a range of ecological impacts.

5.64 Likely significant effects on The Swale SPA/Ramsar site cannot be excluded due to the relatively close proximity of the nearest boundary to the proposed site.

5.65 There is a substantially greater separation distance between the proposed site and other designated sites. This means that direct effects on water quality by the proposed project are either not possible as there is no direct mechanism by which they could occur, or dilution effects mean they would not be significant. This means that they can be screened out, as no likely significant effects are anticipated.

Hydrological changes

5.66 WKN Proposed Development will use two drainage systems. The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching).

5.67 The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into The Swale. It is currently intended that discharge would be via a separate pipe to that used by K3, albeit with pipe sitting adjacent to that of K3 in the sea wall.

5.68 The Marine Licence for the construction of the outfall associated with the Kemsley Generating Station Outfall (MMO Ref: L/2017/00482/1) included the option to construct two discharge pipes – one for K3 and a second for the Incinerator Bottom Ash (IBA) facility, planning permission for which was previously granted for development on the WKN Site. The IBA permission will not now be implemented but a second Marine Licence (MMO Ref L-2017-00482-2) has been granted covering the WKN outfall included provision for discharge. Thesupporting technical work supporting the licence application identified that the operation of the second outfall would not result in any significant effects on The Swale SPA/Ramsar. Discharge from the WKN Proposed Development would be clean, uncontaminated surface water. On this basis, therefore, no likely significant effects of the operation of the outfall on any designated site due to changes in hydrology are predicted.

5.69 No hydrological changes to other designated sites as a result of the operation of the WKN Proposed Development are predicted.

Disturbance

5.70 Disturbance can be caused by visible activity (construction, operation or recreation) noise and lighting. Because of the relative complexity of these issues, and their ability to have impacts on waterbirds within several hundred metres depending on the nature of the activity and the receptors, likely significant effects due to this impact pathway cannot be excluded at the Swale SPA/Ramsar without further assessment and/or application of mitigation as necessary.

5.71 For other designated sites, the separation distances between their boundaries and the proposed site means that disturbance impacts can be screened out, as no likely significant effects are anticipated.

Introduction or spread of non-native invasive species

5.72 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. The only non-native invasive species currently known to be in the area, though not on the WKN Site, is Japanese Knotweed. No importation of soil s required to build the WKN Proposed Development and no final planting is proposed that could inadvertently import non-native invasive species to site.

5.73 The issue of introducing and spread of non-native species is therefore screened out from further consideration in this assessment on the grounds of not likely to have a significant effect.

6 STAGE 3 – APPROPRIATE ASSESSMENT

K3 Proposed Development

6.1 A summary of the outcomes of Stage 2 is presented in Table 6.1, as described in the HRA that accompanied the 2010 ES and subsequent information.

Table 6.1 Summary of Stage 2 Conclusions – K3 Proposed Development

	Screening Outcome	Designated Site	Feature
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	Breeding Marsh Harrier Wintering birds
		Medway Estuary and Marshes SPA / Ramsar site	Wintering birds (Knot and Redshank only)
Air quality	Through to Stage 3 (Operational emissions only)	Swale SPA / Ramsar	Grazing marsh sub-feature / Ramsar plant and invertebrate species / wintering birds / breeding Marsh Harrier
		Medway Estuary and Marshes SPA / Ramsar site	Grazing marsh sub-feature / Ramsar plant and invertebrate species / wintering birds / breeding birds
		Thames Estuary and Marshes SPA / Ramsar site	Grazing marsh sub-feature / Ramsar plant and invertebrate species / wintering birds / breeding 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 /
		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	Breeding Marsh Harrier / 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		

6.2 The conclusion of the subsequent Appropriate Assessment in the original HRA document from the 2010 ES in relation to each of the above impacts where likely significant effects could not be excluded was that no adverse effect on integrity was predicted. This conclusion is still considered robust.

Practical Effect of K3 Proposed Development

6.3 No likely significant effects were predicted as occurring as a result of the Practical Effect of the K3 Proposed Development. Therefore, no further assessment is necessary.

WKN Proposed Development

6.4 A summary of the outcomes of Stage 2 is presented in Table 6.2, and Appropriate Assessment for the relevant impact pathways provided below this. Mitigation is also included where appropriate. Integrity matrices are provided in Appendix 2.

Table 6.2 Summary of Stage 2 Conclusions – WKN Proposed Development

Impact Pathway	Screening Outcome	Designated Site	Feature
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	No Likely Significant Effect		
Air quality (construction dust)	Likely Significant Effect cannot be excluded	The Swale SPA / Ramsar	All
Air quality all other issues	No Likely Significant Effect		
Water quality	Likely Significant Effect cannot be excluded	The Swale SPA / Ramsar	All
Hydrological changes	No Likely Significant Effect		
Disturbance	Likely Significant Effect cannot be excluded	The Swale SPA / Ramsar	All
Introduction or spread of non-native invasives	No Likely Significant Effect		

Air quality (construction/demolition dust)

6.5 Whilst studies suggest most dust from construction/demolition of the WKN Proposed Development would be deposited in the area immediately surrounding the source (up to 50 m, which is outside the boundary of the Swale SPA/Ramsar site), and that no change in level of exposure is expected beyond 300 m from the site, this does mean that some impacts are possible within The Swale SPA/Ramsar boundary, which is located 160 m to the east of the WKN Site.

6.6 To ensure compliance with relevant standards and guidelines relating to dust and airborne particulate matter, various techniques not relating to the avoidance or reduction in effect on a European site will be implemented during the construction/demolition phases. Such measures will be included within a Construction Environmental Management Plan and are expected to include:

- commitment to the considerate contractor's 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;

6.7 Following the implementation of such mitigation measures, no adverse effect on site integrity of the Swale SPA/Ramsar site is anticipated as a result of the WKN Proposed Development due to dust, either during construction or demolition.

Water quality

6.8 Poor water quality can result in a range of 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.

6.9 Because The Swale SPA/Ramsar site is within 160 m of the proposed development, measures are required to prevent the release of contaminated water into the SPA, directly or otherwise.

6.10 Table 10:14 of Chapter 10 Water Environment in the ES provides details of general industry guideline and best practice measures to be incorporated into the decommissioning and constructional phases of the WKN Proposed Development. Such measures will be secured within the CEMP. Table 10:15 provides the mitigation measures that will be incorporated into the operational phase.

6.11 Process water from the WKN Proposed Development will be reused within the process to ensure no discharge of such water occurs.

6.12 The construction of the proposed second outfall for the WKN Proposed Development into The Swale (Work No.7) will follow the same methodology/timing restrictions set out in the approved Marine Licence for the first outfall constructed to serve K3 (ref MLA/2017/00316). This approach is codified in the amended Marine Licence submitted to the MMO. The

application for the amended Marine Licence includes an ecological appraisal of the potential effects on the marine component of the SPA/Ramsar (Appendix 11.7).

6.13 This concluded that, assuming all the methodological/timing restrictions set out in the Marine Licence were adhered to, there would be no impacts on The Swale from the construction of the outfall. As such, all impacts due to the outfall are considered to be not significant and are not discussed further in this assessment.

6.14 Implementation of these measures during both construction and operational phases of the proposed development limits the risk of a significant pollution incident. Following implementation of mitigation measures, no adverse effect on site integrity of the Swale SPA/Ramsar site is anticipated as a result of the proposed project.

Disturbance

Visible Disturbance - Recreation

6.15 The movement of people and plant during both the construction phase and operation of the WKN Proposed Development may be visible to waterbirds using the intertidal areas of the Swale SPA / Ramsar site. Such activity can disturb birds through causing increased anxiety and flight. The alert distance and flight initiation distance responses to disturbance are in general species specific and affected by the relevant habituation of the birds present to human contact and thus may vary between migration to overwintering periods. The greatest effect is associated with human presence on the intertidal zone of estuaries (Cutts *et al.*. 2013, Davidson and Rothwell 1993).

6.16 People from a wide-ranging catchment area 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. Ultimately, this can result in increased mortality rates for designated species. That being said, the ornithological component of this SPA can be assumed to be highly habituated to anthropogenic activity.

6.17 The potential for disturbance to SPA / Ramsar Citation species from recreational activities by either construction or subsequent operational staff is considered low. Whilst there is access to the Saxon Shore Way from the wider Kemsley Paper Mill, 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 of the site, as Sittingbourne is 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. It is anticipated that few if any construction and operational staff will access the Swale SPA.

6.18 Consequently, it is concluded that activity disturbance in the form increased recreation as a result of the WKN Proposed Development will not compromise the conservation objectives

of The Swale SPA and no adverse effect on site integrity of the Swale SPA/Ramsar site is anticipated as a result of the WKN Proposed Development.

Lighting

6.19 Lighting during the construction, operational and demolition phases of the proposed development has the potential to disturb the qualifying species of the Swale SPA / Ramsar site. 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,

6.20 Although there is limited data on the extent to which the area covered be the application is used by birds at night, given that, prior to development, the site was bare ground with ephemeral habitats, it is considered highly unlikely that any SPA / Ramsar citation species would be using the WKN Site.

6.21 Further to this, given the distance of the proposed development to the SPA / Ramsar light from the proposed development does not have the potential to illuminate either the terrestrial or inter-tidal habitats above that which it is currently. As per the relevant requirement within the DCO, all lighting will be designed as per best practice standards to ensure that no additional light spill above the current situation would occur. Therefore, this issue does not compromise the conservation objectives of The Swale SPA/Ramsar and no adverse effect is predicted. The lighting strategy is provided in Appendix 11.8.

Visual disturbance – Activity (Construction, Operation and demolition)

6.22 Studies of construction phase disturbance do suggest that disturbance is less significant when human presence is restricted to the edge of inter-tidal areas and even less significant when set back from intertidal areas. Cutts *et al..* (2013) determined that with respect to visual disturbance, high impact activities occur exclusively within or directly adjacent to the intertidal area. Observable effects have however been recorded within 300m of activities (Cutts *et al.*. 2009), thus as the Proposal site is approximately 160 metres from the boundary of the Swale SPA / Ramsar, at its closest, site works could potentially result in disturbance to foraging or roosting birds dependent on the species present, their activity and habituation.

6.23 Further consideration of visual disturbance is provided below on a species-by-species basis for the SPA feature species.

Noise - Operation

6.24 Under normal operating conditions, the WKN Proposed Development will produce a low hum, rather than any loud, sudden noises that might elicit a disturbance response from nearby interest-feature birds using the intertidal areas of The Swale. It will furthermore not result in noise levels of greater than 55dB L_{Amax} within the SPA (Figures 7.3 & 7.5 from Chapter 7 of the ES). On this basis, therefore, it can be stated that the issue of operational noise-related disturbance will not compromise the objectives of the Swale SPA.

Noise – Construction/demolition

6.25 The Proposal site has the potential to generate noise during both site preparation and construction stages, notably as a result of ground clearance, vehicle movements, construction of the outfall and piling. Similar activities associated with demolition may have similar effects. Very loud noise (which can be defined as greater than 80 dBL_{Amax}) and percussive noises have the potential to disturb birds, increasing time spent alert and in flight, reducing the available time to feed and increasing mortality.

6.26 Waterbirds often respond to disturbance in their environment by deviations from their current and predominant behaviour (Platteeuw & Henkens 1997). Birds disturbed while foraging thus generally experience a loss of foraging time whilst birds at roost must locate an alternative safe roost site with the necessary associated flight/movement, these actions both have potential accompanying implications for energy budgets. Regular disturbance thus has the potential to reduce the carrying capacity of sites for water birds (Platteeuw & Henkens 1997).

6.27 The effects of disturbance during construction work on the Humber estuary have been studied by the Institute of Estuarine and Coastal Studies (i.e. Cutts *et al.* 2009, Cutts *et al.* 2013). These studies have noted that disturbance to feeding waders varies according to the level and type of construction activity. Birds are liable to habituation to regular noise and ongoing background or regular noise is likely to be more readily assimilated by waterfowl than sudden irregular noise events at a similar decibel level (Cutts *et al.* 2013). For instance irregular piling noise above 70 dB levels was noted to cause high to moderate disturbance whereas regular piling noise, or irregular noise at lower levels, was accepted by the birds (Cutts *et al.*. 2009).

6.28 The effects of disturbance are dependent on the spatial and temporal extents of the disturbance, with temporary and spatially limited disturbance less likely to impact on the survival of a species. This will depend on how much foraging time is lost and how much additional energy expenditure occurs because of the disturbance, and whether individual birds can compensate (Davidson & Rothwell 1993). Where alternative habitat is available, or birds can quickly return after a disturbance, most birds will be able to overcome the effect of disturbance by increasing food intake rates (Swennen *et al.*. 1989 in Davidson & Rothwell 1993), and/or extending the length of time that they feed (Davidson & Rothwell 1993). However, as estuarine birds can only feed during low tide when mudflats are uncovered this can limit their ability to compensate. This limiting factor becomes more important in cold weather when birds need to feed for longer to meet their energy requirements (Woodward *et al.* 2015).

6.29 Loud but discontinuous noises, as can be produced by machinery during construction processes, have been shown to cause disturbance when that noise is above certain recorded levels. The following effects have been noted:

- noise events from aircraft at a level of 60 dBA caused no noticeable disruption to typical activity budgets of waterbirds (Flemming *et al.*. 2000);
- harlequin duck reacted with alert behaviour to noise generated by military jets, especially when the noise exceeded 80 dBA (Goudie & Jones 2004);
- black duck, American wigeon, gadwall and green-winged teal were not adversely affected by aircraft disturbance (using a time activity budget approach) at below 85 dBA (Conomy *et al.*. 1998); and
- noise events at 100 dBA could cause temporary or permanent hearing impairment if the subject is within 15 m and chronic, intense noise may induce physiological stress in some birds if they cannot avoid exposure (West *et al.*., 2007).

6.30 Birds have been shown to habituate to regular, loud noise events, although this may vary between species, for example black ducks became habituated to loud aircraft noises whilst wood ducks did not under the same circumstances (Conomy *et al.*., 1998).

6.31 Short, sharp percussive noise, most familiar as gunshot but also produced during construction processes by for instance the hammering in of metal piles, has been shown to cause disturbance. The following effects have been noted:

- Cutts *et al.*. (2013) suggests that for a sharp, sudden noise to qualify as a high level effect, it must be over 60 dB, and over 55 dB for a medium level effect;
- shooting can cause temporary disruption of normal activities of waterbirds, altering their diurnal rhythms and increasing recorded escape flight distances, as well as displacing waterbirds from their preferred feeding and roosting habitats (Madsen & Fox, 1995 & Mahaulpatha *et al.*., 2000); and
- on heavily disturbed days, including those when shooting was occurring, brent geese fed at night during mid-winter in order to balance their daily energy budget (Riddington *et al.*., 1996).

6.32 Different species of bird however have different tolerance thresholds and susceptibility to disturbance impacts (i.e. Redshank is notably sensitive to disturbance in severe weather as it feeds on very small prey relative to its size (Burton *et al*. 2006) and therefore construction works and other operations impact upon different species in differing ways dependent on the weather conditions at the time of works. As such species-specific consideration of impact is warranted where suitable information is available. Such an approach is possible at the WKN Proposed Development due to the wealth of historic coastal bird survey information collected to inform the K3 development. Noise disturbance impacts on the species listed individually and that make up the assemblages on the citations for The Swale SPA/ Ramsar sites are considered on a species by species basis along with visual

disturbance below. This assessment has drawn on the available historic bird survey information to determine spatial and temporal distributions.

Dark-Bellied Brent Goose (*Branta bernicula bernicula*)

6.33 Dark-Bellied Brent Goose have been irregularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in the months of January, February, March, April, October, November and December. Over the course of 93 survey visits completed, Dark-Bellied Brent Goose were recorded on nine occasions with a peak count of 250 individuals recorded in February 2018. Dark-Bellied Brent Goose were primarily recorded during high tide surveys with records largely consisted of foraging and roosting individuals/ flocks.

6.34 The recorded spatial distribution of Dark-Bellied Brent Goose over the course the high tide cycle is presented in Figure 6.1. This figure shows the median density of birds per 50m grid square over all years survey and as such provides a summary of the relative importance of habitats within the survey area. It is clear from this figure that the majority of Dark Bellied Brent Goose records are associated with the mouth of Milton Creek (~570m from the WKN Site boundary) and the opposite eastern bank of the Swale (~400m from the WKN Site boundary).

6.35 Brent Geese are a species highly sensitive to noise disturbance and they react in a variable manner to visual disturbance (Smit & Visser, 1993). Smit & Visser, 1993 found that geese react to up to 92% of aircraft passes although this declined to 64% with habituation. Cutts *et al.*. (2013) suggest that the sensitivity of Brent Geese to visual disturbance varies depending on their activity. When foraging they tolerate disturbance relatively nearby with an average proximity to disturbance threshold of 105m for first reaction. When roosting or loafing the birds are far more sensitive, with the range for first reaction increasing to 205m. Cutts (2013) conclude that if geese are within 400m of works then consideration should be given to mitigation for visual disturbance.

6.36 Cutts *et al.* (2013) also suggest that Brent Geese are very sensitive to noise stimuli and a minimum approach distance of at least 100m is expected. At this distance Cutts (2013) estimated a noise required to create high level disturbance would be 110-115dB at source.

6.37 The favoured areas for Dark-Belied Brent Goose on the eastern bank of The Swale (circa 370m to 400m from the WKN Site boundary) will be subject to a low noise disturbance stimuli (Cutts *et al.* 2013) with an LAmax of between 50-55 dB and a low/ moderate visual disturbance stimuli. Whilst utilised habitat at the mouth of Milton Creek would also be subject to a low noise disturbance stimuli (Cutts *et al.* 2013) with an LA_{max} of between 50-55dB and limited/ no visual disturbance stimuli through the screening of the WKN Site by the K3 development and coastal scrub.

6.38 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA with regards to Dark-Bellied Brent Goose.

Dunlin *(Calidris Alpina)*

6.39 Dunlin have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in the months of January, February, March, April, May, August, September, October, November and December. Over the course of 93 survey visits completed, Dunlin were recorded on 56 occasions with a peak count of 1,600 individuals recorded in January 2010. Dunlin were recorded during both high tide and low tide surveys although peak counts were associated with high tide and roosting activity.

6.40 The recorded spatial distribution of Dunlin over the course the high tide and low tide cycle is presented in Figures 6.2 and 6.3. These figures show the median density of birds per 50m grid square over all the years of survey and provide an indication of the relative importance of habitats within the survey area at both high tide and low tide. It is clear from Figure 6.2 that the highest density of Dunlin records at high tide are associated with the opposite eastern bank of the Swale (~400m from the WKN Site boundary). It is also clear from Figure 6.3 that as the tide recedes Dunlin spread out across the intertidal zone and are present across a wider area at a low density but with the highest density of Dunlin records also associated with the opposite eastern bank of the Swale (~250-300m from the Proposal site boundary).

6.41 Dunlin are very tolerant of moderate and high level visual disturbance and tend to habituate to various works fairly quickly (Cutts *et al.* 2009, 2013). They are tolerant of people and plant, allowing approach as close as 50-90m before flushing when confronted with a lone walker on the mudflat and foraging <50m from plant.

6.42 Dunlin are also considered not particularly sensitive to noise stimuli, and Cutts *et al.*. (2013) suggest a noise level of >60dB at the bird as unlikely to disturb and up to 72dB at the bird as acceptable with some caution.

6.43 The favoured roost site for Dunlin on the eastern bank of the Swale at high tide, located ~400m from the WKN Site boundary, will be subject to a low noise disturbance stimuli (Cutts *et al.*. 2013) with an L_{Amax} of between 50-55dB and low/moderate level visual disturbance stimuli (Cutts *et al.*. 2013). However, based on the distance of works from the roost site (~400m) coupled with the general tolerance of Dunlin to visual disturbance no significant effect is likely.

6.44 The favoured foraging areas for Dunlin are also on the eastern bank of the Swale at low tide, located ~250-300m from the WKN Site boundary, will be subject to a low noise disturbance stimuli (Cutts *et al.*. 2013) with an L_{Amax} of between 50-55dB and low/ moderate level visual disturbance stimuli (Cutts *et al.et al.*. 2013). However, based on the distance of works from the foraging habitat (>250m) coupled with the general tolerance of Dunlin to visual disturbance no significant effect is likely.

6.45 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of The Swale SPA with regards to Dunlin.

Redshank (*Tringa Totanus*)

6.46 Redshank have been regularly recorded within The Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in the months of January, February, March, April, May, July, August, September, October, November and December. Over the course of 93 survey visits completed, Redshank were recorded on 84 occasions with a peak count of 425 individuals recorded in October 2009. Redshank were recorded during both high tide and low tide surveys although peak counts were associated with high tide and roosting activity.

6.47 The recorded spatial distribution of Redshank over the course the high tide and low tide cycle is presented in Figures 6.4 and 6.5. These figures show the median density of birds per 50m grid square over all the years of survey and provide an indication of the relative importance of habitats within the survey area at both high tide and low tide. It is clear from Figure 6.4 that the highest density of Redshank records at high tide are associated with the area of saltmarsh present at the mouth of Milton Creek (~570m from the WKN Site boundary) and the area of saltmarsh to the north of the site boundary adjacent to the water treatment works(~40-90m from the WKN Site boundary).

6.48 It is also clear from Figure 6.5 that as the tide recedes Redshank disperse across the intertidal zone and are present across a wider area at a low density within the study area. The highest density of Redshank records during low tide surveys is associated with the area of saltmarsh present at the mouth of Milton Creek (~570m from the WKN Site boundary) with a lower density of birds also using the area of saltmarsh to the north of the site boundary adjacent to the water treatment works (~40-90m from the WKN Site boundary).

6.49 Cutts *et al.* (2013) identify Redshank as very tolerant of visual disturbance stimuli but conversely as particularly sensitive to noise stimuli, especially in conjunction with visual stimuli. As such they suggest a 100m zone of consideration for visual stimuli when starting works and recommend efforts be incorporated to avoid high level disturbance when birds are present within this zone. Cutts *et al.* (2013) also recommend noise limits of up to 70dB as acceptable at the bird but advise caution at noise levels in excess of 55dB (60dB in a highly-disturbed area).

6.50 The highest density foraging and roosting areas for Redshank at the mouth of Milton Creek (~570m from the WKN Site boundary), will be subject to a low noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between 50-55dB and low/ moderate level visual disturbance stimuli (Cutts *et al.* 2013). However, based on the distance of works from the foraging habitat (>400m) coupled with the general tolerance of Redshank to visual disturbance no significant effect is likely to birds using this habitat resource.

6.51 The lower density aggregation area located around the saltmarsh to the north of the site boundary adjacent to the water treatment works (~40-170m from the WKN Site boundary) will be subject to a moderate/ high noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between 55-65dB and low/ moderate level visual disturbance stimuli (Cutts *et al.* 2013). This combination of noise and potential visual disturbance is likely to result in a reduced suitability of this intertidal habitat and disturbance to the Redshank (~median 200-250 Redshank at low and high tide) using this area in the absence of mitigation.

Grey Plover (*Pluvialis squatarola*)

6.52 Grey Plover have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in the months of January, February, March, April, May, August, September, October, November and December. Over the course of 93 survey visits completed, Redshank were recorded on 59 occasions with a peak count of 75 individuals recorded in October 2016. Grey Plover were recorded during both high tide and low tide surveys although peak counts were associated with high tide and a mixture of foraging and roosting activity.

6.53 The recorded spatial distribution of Grey Plover over the course the high tide and low tide cycle is presented in Figures 6.6 and 6.7. These figures show the median density of birds per 50m grid square over all the years of survey and provide an indication of the relative importance of habitats within the survey area at both high tide and low tide. It is clear from Figure 6.6 that the highest density of Grey Plover records at high tide are associated with the opposite eastern bank of The Swale (~400m from the WKN Site boundary) with secondary aggregation associated with the area of saltmarsh present at the mouth of Milton Creek (~570m from the WKN Site boundary.

6.54 As with previous species it can be seen from Figure 6.7 that as the tide recedes Grey Plover disperse across the intertidal zone and are present across a wider area at a low density (1-2 per $50m^2$) within the study area. The highest density of Grey Plover recorded during low tide surveys is associated with the opposite eastern bank of the Swale (~300-350m from the WKN Site boundary).

6.55 There is limited data on Grey Plover's tolerance to disturbance although what is available suggests that Grey Plover are a relatively tolerant species, the ability of Grey Plover to habituate to works is however an unknown.

6.56 Cutts *et a*l. (2013) classify Grey Plover as tolerant of moderate and high level visual disturbance, and suggest a visual disturbance consideration buffer of 200m to works. They also suggest that Grey Plover are moderately sensitive to noise stimuli and due to their wary nature the minimum approach distance can be expected at least 150m.

6.57 The high density aggregation areas for Grey Plover associated with the opposite eastern bank of the Swale (~300-400m from the WKN Site boundary) and the saltmarsh at the mouth of Milton Creek (~400m from the WKN Site boundary) will be subject to a low noise disturbance stimuli (Cutts *et al*. 2013) with an L_{Amax} of between 50-55dB and low/ moderate level visual disturbance stimuli (Cutts *et al*. 2013). This combination of low noise stimuli and potential visual disturbance in light of Grey Plover's relative tolerance of visual disturbance makes any reduced suitability of this intertidal habitat and disturbance to Grey Plover unlikely.

6.58 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA with regards to Grey Plover.

European White-fronted Goose

6.59 European White-fronted Goose have only been recorded on a single occasion during survey work undertaken in 2009, 2016 and 2018. This species was recorded during high tide surveys in November 2009 with a peak count of 15. In light of the low numbers and lack of regular use of the survey area no viable pathway of interaction between the scheme and European White-fronted Goose associated with The Swale is considered probable.

6.60 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA with regards to European White-fronted Goose.

Shelduck

6.61 Shelduck have been recorded on a regular basis during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all except June with a peak count of 155 individuals recorded in December 2009. Over the course of 93 survey visits completed, Shelduck were recorded on 88 occasions. Shelduck were recorded during both high tide and low tide surveys although peak counts were associated with high tide and a mixture of foraging and roosting activity.

6.62 The recorded spatial distribution of Shelduck over the course of the high tide and low tide cycle is presented in Figures 6.8 and 6.9. These figures show the median density of birds per 50m grid square over all the years of survey and provide an indication of the relative importance of habitats within the survey area at both high tide and low tide. It is clear from Figure 6.8 that the highest density of Shelduck records at high tide are associated with the opposite eastern bank of the Swale (~400m from the WKN Site boundary) with secondary lower density aggregation associated with the area of saltmarsh present at the mouth of Milton Creek (~570m from the WKN Site boundary).

6.63 At low tide this species, as with other species, disperse across the intertidal zone and are present across a wider area at a low density (see Figure 6.9) as the tide recedes. The highest density of Shelduck recorded during low tide surveys is associated with the opposite eastern bank of the Swale (~200-350m from the WKN Site boundary).

6.64 Cutts *et al*. (2013) identify Shelduck as extremely sensitive to moderate and high level visual disturbance and identify 500m as distance over which the potential for visual disturbance should be considered. They also note Shelduck as quite sensitive to noise stimuli and define a sudden aural disturbance threshold of 60dB and any noise above 72dB.

6.65 The high density aggregation areas for Shelduck associated with the opposite eastern bank of the Swale (~200-400m from the WKN Site boundary) and the saltmarsh at the mouth of Milton Creek (~570m from the WKN Site boundary) will be subject to a low noise disturbance stimuli (Cutts *et al*. 2013) with an L_{Amax} of between 50-55dB and low/ moderate level visual disturbance stimuli (Cutts *et al.* 2013). As such given this species sensitivity to visual disturbance at distances up to 500m it is likely that works at the WKN Site will reduce the suitability of this intertidal habitat at both the high tide roost site and low tide foraging areas in the absence of mitigation.

Shoveler

6.66 Shoveler have only been recorded on a five occasions during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all except June with a peak count of 5 individuals recorded in January 2010. In light of the low numbers and lack of regular use of the survey area no viable pathway of interaction between the scheme and Shoveler associated with the Swale is considered probable.

6.67 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA with regards to Shoveler.

Teal

6.68 Teal have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in the months of January, February, March, April, May, August, September, October, November and December. Over the course of 111 survey visits completed, Teal were recorded on 86 occasions with a peak count of 400 individuals recorded in December 2016. Teal were recorded during both high tide and low tide surveys although peak counts were associated with low tide and roosting activity.

6.69 The recorded spatial distribution of Teal over the course of the high tide and low tide cycle is presented in Figures 6.10 and 6.11. These figures show the median density of birds per 50m grid square over all the years of survey and provide an indication of the relative importance of habitats within the survey area at both high tide and low tide. It is clear from Figure 6.10 that the highest density of Teal records at high tide are associated with the opposite eastern bank of The Swale (~400m from the WKN Site boundary) and the area of saltmarsh present to the north of site adjacent to the water treatment works (~100m from the WKN Site boundary).

6.70 At low tide this species, as with other species, disperse across the intertidal zone and are present across a wider area at a lower density (see Figure 6.11) as the tide recedes. The highest density of Teal recorded during low tide surveys is associated with Milton Creek (~570m from the WKN Site boundary).

6.71 Cutts *et al*. (2013) do not specifically consider Teal and there is limited available research on the interaction between construction noise and visual stimulus and this species. Burton *et al*. (2002) reviewed bird densities during construction works at Cardiff Bay and recorded a reduction in Teal density in adjacent count sectors to construction works. This paper does not however provide any indication of a clear effect distance but does clearly demonstrate Teal are sensitive to construction disturbance. Klein *et al*. 1995 investigated the distance of migrant ducks (American Wigeon Anas americana, Eurasian Teal, Northern Pintail A. acuta and Northern Shoveler A. clypeata) along an access road in Florida and noted these dusk species remained more than 80 m from the road even at low visitation levels suggesting a minimum combined noise and visual disturbance threshold distance of ~80m.

6.72 The high density aggregation areas for Teal at high tide (opposite eastern bank of the Swale (~400m) and saltmarsh present to the north of site (~100m)) will be subject to a low

to moderate noise disturbance stimuli (Cutts *et al*. 2013) with an L_{Amax} of between 50-65dB and low/ moderate level visual disturbance stimuli (Cutts *et al*. 2013). As such given this species has been shown to react to construction disturbance stimuli it is likely that works at the WKN Site will reduce the habitat suitability at the high tide aggregation sites in the absence of mitigation. No impact on the highest density low tide aggregation sites are considered likely given the distance separating these from works (~700m).

Oystercatcher

6.73 Oystercatcher have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all months except June. Over the course of 111 survey visits completed, Oystercatcher were recorded on 111 occasions with a peak count of 845 individuals recorded in December 2009. Oystercatcher were recorded during both high tide and low tide surveys although peak counts were associated with high tide and roosting activity.

6.74 The recorded spatial distribution of Oystercatcher over the course of the high tide and low tide cycle is presented in Figures 6.12 and 6.13. These figures show the median density of birds per 50m grid square over all the years of survey and provide an indication of the relative importance of habitats within the survey area at both high tide and low tide. It is clear from Figures 6.12 and 6.13 that the highest density of Oystercatcher records at high tide and low tide are associated with the opposite eastern bank of the Swale (~275-400m from the WKN Site boundary).

6.75 Oystercatchers are relatively tolerant of visual and aural disturbance stimuli and will habituate rapidly to ongoing activity, they have also been shown to tolerate regular noise of up to 60dB with no observable disturbance effect (Cutts *et al*. 2013). Cutts *et al*. (2013) also suggest a 200m threshold distance from a potential disturbance source.

6.76 The high density aggregation areas for Oystercatcher at high and low tide on the opposite eastern bank of The Swale (~270-400m) will be subject to a low noise disturbance stimuli (Cutts *et al*. 2013) with an L_{Amax} of between 50-55dB during piling and low/ moderate level visual disturbance stimuli (Cutts *et al*. 2013). As such given this species has been shown to not react to construction disturbance stimuli of 60dB and is tolerant of visual stimuli works at the WKN Site are considered unlikely to affect Osytercatcher.

6.77 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of The Swale SPA/Ramsar with regards to Oystercatcher.

Golden Plover

6.78 Golden Plover have only been recorded on two occasions during survey work undertaken in 2009, 2016 and 2018. This species was recorded during high tide surveys in October and December 2009 with a peak count of 190. In light of lack of regular use of the survey area no viable pathway of interaction between the scheme and Golden Plover associated with the Swale is considered probable.

6.79 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of The Swale SPA/Ramsar with regards to Golden Plover.

Lapwing

6.80 Lapwing have been regularly recorded within The Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all months except June and July. Over the course of 111 survey visits completed, Lapwing were recorded on 54 occasions with a peak count of 409 individuals recorded in December 2016. Lapwing were only recorded during both high tide surveys and were largely roosting.

6.81 The recorded spatial distribution of Lapwing over the course of the high tide cycle is presented in Figure 6.14. This figure shows the median density of birds per 50m grid square over all the years of survey and provides an indication of the relative importance of habitats within the survey area at high tide. It is clear from Figure 6.14 that the highest density of Lapwing records at high tide are associated with the opposite eastern bank of the Swale (~275-400m from the WKN Site boundary), the area of saltmarsh at the mouth of Milton Creek (~570m from the WKN Site) and the saltmarsh present to the north adjacent to the water treatment works (~100-150m from the WKN Site boundary).

6.82 Cutts *et al*. (2013) describe Lapwing as reasonably tolerant of moderate level visual disturbance stimuli and describe no response to visual disturbance at c. 300-400m. However, they do recommend further consideration of birds where closer than 300m with regards visual disturbance stimuli. Cutts *et al*. (2013) also describe Lapwings as moderately sensitive to noise stimuli and suggest caution where noise levels in excess of 55dB are likely.

6.83 The high density aggregation areas for Lapwing at high tide on the opposite eastern bank of the Swale (~275-400m) and at the mouth of Milton Creek will be subject to a low noise disturbance stimuli (Cutts *et al*. 2013) with an L_{Amax} of between 50-55dB during piling and low/moderate level visual disturbance stimuli (Cutts *et al.* 2013). As such given this species has been shown to not react to be tolerant of disturbance at these distances construction disturbance works at the WKN Site are considered unlikely to affect Lapwing at these locations.

6.84 However roosting birds located at the saltmarsh present to the north of site (adjacent to the water treatment works (~100-150m) will also be subject to a low/moderate visual disturbance stimuli (visible movement of plant) and moderate noise disturbance stimuli of 60-65dB during piling. As such works at the WKN Site are considered likely to affect disturb/ displace Lapwing at this location in the absence of mitigation.

Black-tailed Godwit

6.85 Black-tailed Godwit have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all months except June. Over the course of 111 survey visits completed, were recorded on 93 occasions with a peak count of 1,500 individuals recorded in February 2009. Black-tailed

Godwit were recorded during high and low tide surveys although the largest densities of birds were associated with high tide and roosting.

6.86 The recorded spatial distribution of Black-tailed Godwit over the course of the high tide cycle is presented in Figure 6.15. This figure shows the median density of birds per 50m grid square over all the years of survey and provides an indication of the relative importance of habitats within the survey area at high tide. It is clear from Figure 6.15 that the highest density of Black-tailed Godwit records at high tide are associated with the opposite eastern bank of the Swale (~400m from the WKN Site boundary) and the area of saltmarsh at the mouth of Milton Creek (~450m from the WKN Site).

6.87 At low tide this species again appears to disperse across the intertidal zone and are present across a wider area at a lower density (see Figure 6.16) as the tide recedes. The highest density and aggregations of Black-tailed Godwit recorded during low tide surveys were associated with the mouth of Milton Creek (~450m from the WKN Site boundary), the eastern bank of The Swale (~350m from the WKN boundary) and the western bank of The Swale to the north of the WKN Site (~350m).

6.88 Cutts *et al*. (2013) describe Black-tailed Godwit as an under-studied species with regard disturbance impacts, but are considered tolerant of moderate visual disturbance and noise disturbance. Gill *et al*. (2001) also suggest that the species is tolerant of disturbance. Cutts et al. (2013) suggest a 250m threshold for visual disturbance and again suggest caution above 55dB due to a lack of relevant research.

6.89 The high density aggregation areas for Black-tailed Godwit will be subject to a low noise disturbance stimuli (Cutts *et al*. 2013) with an LAmax of between 50-55dB during piling and low/moderate level visual disturbance stimuli (Cutts *et al*. 2013). As such given this species relevant tolerance of visual and noise disturbance coupled with the distance from no disturbance effect is considered likely.

6.90 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA with regards to Black-tailed Godwit.

Green Sandpiper

6.91 Green Sandpiper have been irregularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded January, February, March, April, October, November and December. Over the course of 111 survey visits completed, were recorded on 16 occasions with a peak count of 3 individuals recorded in February and October 2009. Green Sandpiper were recorded during both high tide surveys and low tide surveys. However, in light of the lack of regular use of the survey area no viable pathway of interaction between the scheme and Green Sandpiper associated with the Swale is considered probable.

6.92 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA with regards to Green Sandpiper.

Wigeon

6.93 Wigeon have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all months except June, July, August and September. Over the course of 111 survey visits completed, this species were recorded on 60 occasions with a peak count of 595 individuals recorded in January 2010. Wigeon were recorded during high and low tide surveys although the largest densities of birds were associated with high tide and roosting.

6.94 The recorded spatial distribution of Wigeon over the course of the high tide cycle is presented in Figure 6.17. This figure shows the median density of birds per 50m grid square over all the years of survey and provides an indication of the relative importance of habitats within the survey area at high tide. It is clear from Figure 6.17 that the highest density of Wigeon records at high tide are associated with the opposite eastern bank of the Swale (~400m from the WKN Site boundary), the area of saltmarsh at the mouth of Milton Creek (~450m from the WKN Site), the area of saltmarsh adjacent to the water treatment works and in the channel of the Swale (~100-200m from the WKN Site boundary).

6.95 At low tide this species appears to converge in higher densities along the eastern bank of the Swale (see Figure 6.18) as the tide recedes with lower density aggregation areas present at the mouth of Milton Creek (~400m) and the saltmarsh adjacent to the water treatment works (~150m).

6.96 Cutts *et al.* (2013) do not specifically consider Wigeon and there is limited available research on the interaction between construction noise and visual stimulus and this species. Burton *et al.* (2002) reviewed bird densities during construction works at Cardiff Bay and recorded a reduction in Wigeon density in adjacent count sectors to construction works. This paper does not however provide any indication of a clear effect distance but does clearly demonstrate Wigeon are sensitive to construction disturbance.

6.97 The high density aggregation areas for Wigeon at high tide and low tide will be subject to a low to moderate noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between 50-65dB and low/ moderate level visual disturbance stimuli (Cutts *et al.* 2013). As such given this species has been shown to react to construction disturbance stimuli it is likely that works at the WKN Site will reduce the habitat suitability of both the high and low tide aggregation sites in the absence of mitigation.

Pintail

6.98 Pintail have been irregularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in January, February, March, October and December only. Over the course of 111 survey visits completed, this species were recorded on 13 occasions with a peak count of 218 individuals recorded in January 2010. Pintail were recorded during high and low tide surveys although the largest densities of birds were associated with high tide and roosting.

6.99 The recorded spatial distribution of Pintail over the course of the high and low tide cycle is presented in Figures 6.19 and 6.20. These figures show the median density of birds per 50m grid square over all the years of survey and provides an indication of the relative

importance of habitats within the survey area. It is clear from these figures that the highest density of Pintail records at both high tide and low tide are associated with the opposite eastern bank of The Swale (~400m from the WKN Site boundary).

6.100 Cutts *et al.* (2013) do not specifically consider Pintail and there is limited available research on the interaction between construction noise and visual stimulus and this species. Klein *et al.* 1995 investigated the distance of migrant ducks (American Wigeon *Anas americana*, Eurasian Teal, Northern Pintail *A. acuta* and Northern Shoveler *A. clypeata*) along an access road in Florida and noted these duck species remained more than 80 m from the road even at low visitation levels suggesting a minimum combined noise and visual disturbance threshold distance of ~80m.

6.101 The high-density aggregation areas for Pintail at high tide and low tide will be subject to a low noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between 50-55dB and low/ moderate level visual disturbance stimuli (Cutts *et al.* 2013). As such given the distances between the aggregation areas of this species and the WKN Site no disturbance is considered likely.

6.102 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA with regards to Pintail.

Little Egret

6.103 Little Egret have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all months except June. Over the course of 111 survey visits completed, this species were recorded on 79 occasions with a peak count of 50 individuals recorded in September 2016. Pintail were recorded during high and low tide surveys although the largest densities of birds were associated with high tide and roosting.

6.104 The recorded spatial distribution of Little Egret over the course of the high tide and low tide cycle is presented in Figures 6.21 and 6.22. These figures show the median density of birds per 50m grid square over all the years of survey and provides an indication of the relative importance of habitats within the survey area. It is clear from these figures that the highest density of Little Egret records at both high tide and low tide are associated with the saltmarsh at the mouth of Moulton Creek (~400m from the WKN Site boundary). The low tide spatial distribution does however differ from high tide in supporting a wider low bird density distribution across wider extents of the study area.

6.105 Cutts *et al.* (2013) do not specifically consider Little Egret and there is little publically available information or research on the interaction between construction noise and visual stimulus and this species.

6.106 The high-density aggregation areas for Litte Egret at high tide and low tide will be subject to a low noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between 50-55dB and low visual disturbance stimuli – works are unlikely to be visible (Cutts *et al.* 2013). As such given the distances between the aggregation areas of this species and the WKN Site no disturbance is considered likely.

6.107 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of The Swale SPA with regards to Little Egret.

Avocet

6.108 Avocet have been regularly recorded within The Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all months except June and August. Over the course of 111 survey visits completed, this species were recorded on 94 occasions with a peak count of 125 individuals recorded in December 2016. Avocet were recorded during both high and low tide surveys.

6.109 The recorded spatial distribution of Avocet over the course of the high and low tide cycles are presented in Figures 6.23 and Figure 6.24. These figure shows the median density of birds per 50m grid square over all the years of survey and provide an indication of the relative importance of habitats within the survey area at high tide. It is clear from Figures 6.23 that the highest density of Avocet records at high tide are associated with the opposite eastern bank of the Swale (~400m from the WKN Site boundary) with a lower density/ aggregation area on the western bank of the Swale adjacent to the K3 site (~220m from the WKN Site boundary).

6.110 At low tide this species appears to disperse across the study area as the tide recedes, and is found at lower densities mostly along the eastern bank of the Swale (see Figure 1.37) - ~300-400m from the WKN Site.

6.111 Cutts *et al.* (2013) do not specifically consider Avocet and there is limited available research on the interaction between construction noise and visual stimulus and this species. Recent research on the Mersey by Bonnington and Smith (2018) identified no significant effect on bird density of the wading bird group of species (including Avocet) during construction works. This does suggest some tolerance of these species to construction disturbance.

6.112 The high density aggregation areas for Avocet at high tide and low tide will be subject to a low to moderate noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between 50-65dB and a moderate visual disturbance stimuli – works are likely to be visible (Cutts *et al.* 2013). As such given the distances between the aggregation areas of this species and the WKN Site disturbance is considered possible in the absence of mitigation, especially at the aggregation area on the western bank of the Swale adjacent to the K3 site (~220m from the WKN Site boundary).

Sanderling

6.113 Sanderling have not been recorded within the Swale survey area during any survey work undertaken in 2009, 2016 and 2018. In light of lack of regular use of the survey area no viable pathway of interaction between the scheme and Sanderling associated with the Swale SPA/Ramsar is considered probable.

6.114 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA/Ramsar with regards to Sanderling.

Ruff

6.115 Ruff have not been recorded within The Swale survey area during any survey work undertaken in 2009, 2016 and 2018. In light of lack of regular use of the survey area no viable pathway of interaction between the scheme and Ruff associated with the Swale SPA/Ramsar is considered probable.

6.116 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of The Swale SPA/Ramsar with regards to Ruff.

Bar-tailed Godwit

6.117 Bar-tailed Godwit have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all months except May, June or July. Over the course of 111 survey visits completed, they were recorded on 67 occasions with a peak count of 30 individuals recorded in January 2019. Bar-tailed Godwit were recorded during both high and low tide.

6.118 The recorded spatial distribution of Bar-tailed Godwit over the course of the high tide cycle is presented in Figure 6.25. This figure shows the median density of birds per 50m grid square over all the years of survey and provides an indication of the relative importance of habitats within the survey area at high tide. It is clear from Figure 6.25 that the highest density of Bar-tailed Godwit records at high tide are associated with the opposite eastern bank of the Swale (~400m from the WKN Site boundary).

6.119 At low tide this species again appears to disperse across the intertidal zone and are present across a wider area at a lower density (see Figure 6.26) as the tide recedes. The highest density and aggregations of Bar-tailed Godwit recorded during low tide surveys were associated the eastern bank of the Swale (~350m from the WKN boundary).

6.120 Cutts *et al.* (2013) describe Bar-tailed Godwit as an under-studied species with regard disturbance impacts, but are considered tolerant of moderate visual disturbance and noise disturbance. Gill *et al.*. (2001) also suggest that the species is tolerant of disturbance. Cutts *et al.* (2013) suggest a 200m threshold for visual disturbance and again suggest caution above 55dB due to a lack of relevant research.

6.121 The high-density aggregation areas for Bar-tailed Godwit at will be subject to a low to moderate noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between 50-65dB during piling and low/ moderate level visual disturbance stimuli (Cutts *et al.* 2013). As such given this species relative tolerance to visual and aural disturbance coupled with the distance from the WKN Site no disturbance effect is considered likely.

6.122 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of the Swale SPA with regards to Bar-tailed Godwit.

Greenshank

6.123 Greenshank have been regularly recorded within the Swale survey area during survey work undertaken in 2009, 2016 and 2018. The species has been recorded in all months except June. Over the course of 111 survey visits completed, they were recorded on 64 occasions with a peak count of 13 individuals recorded in October 2018. Greenshank were recorded during both high and low tide surveys.

6.124 The recorded spatial distribution of Bar-tailed Godwit over the course of the high and low tide cycle are presented in Figures 6.27 and 6.28. These figures show the median density of birds per 50m grid square over all the years of survey and provide an indication of the relative importance of habitats within the survey area. It is clear from both of these figures that the highest density of Greenshank records are associated with Milton Creek (~600m south pf the WKN Site boundary).

6.125 The high density aggregation areas for Greenshank will be subject to a low noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between <50dB during piling and no visual disturbance stimuli – no line of site to the WKN Site (Cutts *et al.* 2013). As such no disturbance effect is considered likely.

6.126 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of The Swale SPA/Ramsar with regards to Greenshank.

Knot

6.127 Knot have been irregularly recorded within the Swale survey area during survey work, undertaken in 2009, 2016 and 2018. The species has been recorded in January, February, March, October, November and December. Over the course of 111 survey visits completed, they were recorded on 32 occasions with a peak count of 940 individuals recorded in January 2010. Knot have been recorded during both high and low tide, although peak counts were associated with high tide and roosting activity.

6.128 The recorded spatial distribution of Knot over the course of the high and low tide cycle are presented in Figures 6.29 and Figure 6.30. These figures show the median density of birds per 50m grid square over all the years of survey and provides an indication of the relative importance of habitats within the survey area. It is clear from these figures that the highest density of Knot records are associated with the opposite eastern bank of the Swale (~400m from the WKN Site boundary) and the mouth of Milton Creek (~400m from the WKN Site boundary).

6.129 Cutts *et al.* (2013) consider Knot a relatively tolerant species that habituates to works rapidly although highly sensitive to noise disturbance, moving away from stimuli readily. Cutts *et al.* suggest a visual disturbance threshold of 100m and caution at noise levels above 55 dB.

6.130 The high density aggregation areas for Knot will be subject to a low noise disturbance stimuli (Cutts *et al.* 2013) with an L_{Amax} of between 50-55dB during piling and low/moderate level visual disturbance stimuli – visible plant movements likely (Cutts *et al.* 2013). As such

given this species relative tolerance to visual disturbance coupled with the low predicted noise levels no disturbance effect is considered likely.

6.131 On this basis, therefore, it can be stated that the issue of construction phase noise or visual related disturbance will not compromise the objectives of The Swale SPA/Ramsar with regards to Knot.

Curlew

6.132 Curlew have been regularly recorded within the Swale survey area during survey work, undertaken in 2009, 2016 and 2018. The species has been recorded in all months except June. Over the course of 111 survey visits completed, they were recorded on 106 occasions with a peak count of 152 individuals recorded in March 2009. Curlew have been recorded during both high and low tide, although peak counts were associated with high tide and roosting activity.

6.133 The recorded spatial distribution of Curlew over the course of the high and low tide cycle are presented in Figures 6.31 and Figure 6.32. These figures show the median density of birds per 50m grid square over all the years of survey and provides an indication of the relative importance of habitats within the survey area. It is clear from these figures that Curlew are present across the survey area at low densities (<50m from the Proposal Site Boundary) through both the high and low tide cycles with a notable high density aggregation associated with the opposite eastern bank of the Swale (~400m from the WKN Site boundary).

6.134 Cutts *et al*. (2013) consider Curlew an extremely wary species that does not habituate to works rapidly and are also particularly intolerant of people. Cutts *et al*. suggest a visual disturbance threshold of 300m and caution at noise levels above 55 dB.

6.135 The high density aggregation areas for Curlew will be subject to a low noise disturbance stimuli (Cutts *et al*. 2013) with an L_{Amax} of between 50-55dB during piling and low/ moderate level visual disturbance stimuli – visible plant movements likely (Cutts *et al*. 2013). However, given the distance from the WKN Site to the high density aggregation area (>300m) coupled with the low predicted noise levels no disturbance effect is considered likely at this location. A possible disturbance effect/ displacement is however likely across the wider low density areas in the absence of mitigation.

Marsh Harrier

6.136 The reedbed to the north of the WKN Site has supported breeding and roosting Marsh Harrier every year that surveys have been undertaken between 2009 and 2018. Additional observations of breeding Marsh Harrier have been made most years in between the surveys during clearance of reptiles from the K3 site, for example.

6.137 The reedbed is within 50 m from the main WKN Site and surrounded by the access road, construction access road and laydown area.

6.138 While anecdotal evidence suggests that the effect of disturbing activity on breeding Marsh Harrier during the construction phase of WKN is unlikely to be significant (supported by the continued presence of breeding Marsh Harrier during the construction of K3 and the DS

Smith AD Plant), some doubt remained during the original 2009 assessment of K3. The S106 Agreement for K3 therefore included the requirement to create a new reedbed at Hartey Fen on the Isle of Sheppey as part of the RSPB's habitat creation scheme to return farmland to grazing marsh and associated habitats (including reedbed). This was intended to provide alternative breeding habitat, should the Marsh Harrier choose to abandon the Kemsley reedbed, particularly during construction of K3.

6.139 Such a reedbed has been created and signed off as complete by the RSPB.

6.140 The provision of the reedbed ensures that alternative breeding habitat is also available during the construction of WKN, should the birds choose to abandon the Kemsley reedbed due to increased disturbance.

6.141 To further avoid any activity disturbance related to human activity during construction, a 2.4 m closed-board wooden fence has been erected along the northern site boundary of the WKN Site prior to the construction of K3. This will be maintained for the construction of WKN and extended around the laydown area and along the construction access road.

6.142 There will be no direct entry of the reedbed to the north of the assessment boundary by people or machinery as a result the proposed development. The need to mitigate any indirect affects arising from disturbance from activities during construction of the proposed development will be dependent upon whether Marsh Harrier nest in the reedbed, the stage of breeding that the Marsh Harrier has reached (nest building, sitting on eggs or feeding chicks) and the nature of the activity. Based on research regarding the flight response of Marsh Harrier (RPS 2009b and references therein), the following activities will not occur within the distances listed of the nest site in the event that Marsh Harrier is found breeding in the Kemsley reedbed during construction:

6.143 Activities that only involve the movement of vehicles:

- Nest building 100 m
- Eggs 100 m
- Chicks 50 m

6.144 Activities that involve people outside of vehicles and construction activities such as excavation, concrete pouring and assembly:

- Nest building 200 m
- Eggs 200 m
- Chicks 100 m

6.145 Given that the hoarding erected is screening such activities within the main development site, this is aimed at preventing any development activities occurring within the buffer zone between the edge of the DCO boundary and the edge of the reedbed.

6.146 Further, within the final stages of the construction, a palisade fence at least 2 m high, will be installed around much of the perimeter including along the northern boundary near to

the reedbed. As well as securing the site, this will ensure human activity within the development is not visible to Marsh Harrier using the reedbed once operational.

6.147 If any of these activities are required outwith the hoarding then the project ecologist should be consulted to ensure that the breeding status of Marsh Harrier can be determined in advance of such works and planned taking this constraint into account.

6.148 The extent that activities would cause disturbance of the Marsh Harrier is considered further limited when account is taken of:

- The haul road is already heavily trafficked by HGVs associated with the activities of the Kemsley Paper Mill;
- The regular disturbance from activity on the track way immediately to the north of the reedbed running to the Knauf gypsum jetty. This can involve up to 30 20-tonne tipper lorry movements an hour with vehicles travelling at speed up the private road. No impact (in the form of flight from nest) of such lorry movement on the breeding pair of Marsh Harrier was observed during any of the surveys undertaken; and
- The fact that marsh harriers are frequently tolerant of human disturbance (Ruddock and Whitfield 2007).

6.149 Consequently, it is concluded that activity disturbance on the breeding Marsh Harrier using the site in the form of plant (machinery) or people movement during the construction of the proposed development does not compromise the conservation objectives of the Swale SPA.

Adopted mitigation with respect to piling/visual disturbance

6.150 In the absence of mitigation, a number of species listed on the citations of The Swale SPA/Ramsar are considered likely to be negatively impacted by construction activities through the pathway of noise/visual disturbance based on their sensitivity and/or spatial distribution. These are:

- Redshank;
- Shelduck;
- Teal;
- Lapwing;
- Wigeon;
- Avocet;
- Curlew; and
- Marsh Harrier

6.151 Therefore, in order to ensure these species are not disturbed during construction of WKN that could compromise their ability to survive, the following mitigation strategy will be implemented (to be included in the final CEMP, secured by Requirement 11 of the DCO):

- Erection of a visual screen along the periphery of the WKN Site to remove any visual disturbance stimuli;
- No impact piling between the months January and February inclusive;
- Limited impact piling is permissible between the months of November and December provided that any impact piling activity does not accrue to more than a total of 10 days consecutively or otherwise;
- No impact piling during the period when Marsh Harrier are breeding (April to August inclusive);
- Impact piling is permissible unrestricted outside of these time periods.

6.152 Construction of the new outfall will follow the same avoidance methods as for the first outfall, i.e. will only take place between 1st April and 31st September. This avoidance measure will be secured via the Marine Licence.

6.153 On this basis, therefore, it can be stated that the issue of construction/demolition phase noise or visual related disturbance will not compromise the objectives of The Swale SPA/Ramsar with regards to the above species.

Conclusion

6.154 Following the Appropriate Assessment provided above, and provision of mitigation measures as appropriate, it is concluded that the DCO application for the WKN Proposed Development will not compromise the conservation objectives of Natura 2000 sites, and there will be no adverse effect on site integrity.

7 STAGE 4 – IN-COMBINATION ASSESSMENT

7.1 The purpose of this section is to assess the cumulative effects of the WKN Proposed Development and K3 Proposed Development with other developments near the site that are currently in the planning process or have been approved but are not yet constructed, as set out in Chapter 3. In order to ensure that all of the cumulative impacts from the K3 Proposed Development, WKN Proposed Development and the two combined are assessed both individually and cumulatively, the following methodology has been proposed:

- Baseline + K3 Proposed Development + other relevant cumulative developments within the zone of influence of the K3 Proposed Development
- K3 as consented + the practical effect of the K3 Proposed Development + WKN Proposed Development + other relevant cumulative developments within the zone of influence of the K3 Proposed Development
- Baseline + K3 Proposed Development + WKN Proposed Development + other relevant cumulative developments within the zone of influence of the K3 and WKN Proposed Developments
- K3 as consented + the practical effect of the K3 Proposed Development + WKN Proposed Development + other relevant cumulative developments within the zone of influence of the K3 and WKN Proposed Developments
- K3 as consented + WKN Proposed Development + other relevant cumulative developments within the zone of influence of the WKN Proposed Developments

7.2 All of the developments set out in the DCO Scoping Opinion have been reviewed for relevance to ecology. A number are not considered any further as there are either no overlapping pathways by which cumulative effects on ecological receptors could occur (for example, residential developments), or distance (i.e. are too far away). Those that have been included are generally those that result in emissions to air.

7.3 The following planning applications have been considered further (planning references have been given for each project):

- 28. 16/507687/COUNTY County matters application for the construction and operation of an Incinerator Bottom Ash (IBA) Recycling Facility on land adjacent to the Kemsley Sustainable Energy Plant. Kemsley Paper Mill Ridham Avenue Sittingbourne Kent ME10 2TD. Permitted February 2017.

- 8. 16/501484/COUNTY County matter - The construction and operation of a gypsum recycling building with plant and machinery to recycle plasterboard and the re-configuration of the existing lorry park to include office/welfare facilities and ancillary supporting activities, including rain water harvesting tanks, container storage, new weighbridges, fuel tanks, hardstanding, safe lorry sheeting access platform and automated lorry wash. Countrystyle Recycling Storage Land Ridham Dock Road Sittingbourne Kent ME9 8SR. Permitted April 2016.

- 1. SW/11/1291 Anaerobic digester and associated ground profiling and landscaping. Land To The North Of The DS Smith Paper Mill, Kemsley, Sittingbourne, Kent, ME9 8SR. Permitted July 2012.

- 18. 16/506935/COUNTY County Matters application for steam pipeline connecting the Ridham Dock Biomass Facility to the Kemsley Paper Mill14/501181/COUNTY KCC Regulation 13 - Scoping opinion as to the scope of an environmental impact assessment for a proposed combined heat and power plant at Ridham B. Ridham Dock, Sittingbourne, Kent. July 2014. Ridham Docks, Sittingbourne. Permitted October 2016.

- 5. SW/15/500348 – Construction of advanced thermal conversion and energy facility (4Evergreen Technologies Ltd.)

- 17. 17/505073/FULL Erection of a tile factory including service yard, storage yard and car parking area.

- 2. SW/14/0224 – Application for a solar farm - Solar farm, comprising the erection of solar arrays of photovoltaic panels, inverter and transformer sheds, fencing, site storage cabin, combined DNO and EPC switchgear housing, internal gravel access road, and associated equipment.

- 14. SW/13/1495 Variation of condition 9 of planning permission SW/11/548 (use of building 15B to install and operate materials recycling facility (MRF) and a refuse derived fuel (RDF) facility and to use existing weighbridge, weighbridge office, site office and washroom/toilets to the south of building 15a) to allow an increase of HGV movements from 58 to 98 (49 in and 49 out) for a temporary period of 12 months;

- 16. EN010090 (18/501923/ADJ) Application for an Order Granting Development Consent to decommission the existing K1 CHP on the site and build, commission and operate a new CHP plant;

7.4 The potential for cumulative effects between the proposed DCO 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 development site.

7.5 Given the distance of the majority of these developments from the site (see Figure 3.2, Chapter 3), potential cumulative impacts with the proposals are limited to:

- The Swale Ramsar, SPA and SSSI; and

- The Medway Estuary and Marshes Ramsar, SPA and SSSI.

7.6 Cumulative impacts from emissions to air are addressed separately below, followed by an assessment of other potential impacts not related to such emissions.

Cumulative emissions to air

7.7 Appendix 5.4 sets out an assessment of the cumulative impacts of emissions to air from all of the developments above for which data are available. here are four developments where

there was sufficient detail to allow a PC to be added to give a cumulative PEC for ecological receptors:

- Kemsley K4 CHP PC (EN010090 (18/501923/ADJ))
- Kemsley AD (SW/11/1291)
- Reserve Power Plant PC (18/500393/FULL)
- Garden of England Energy Facility (15/500348/COUNTY)

7.8 The PCs for each of these four developments were added to the maximum PEC from the WKN and K3 Proposed developments to give a Cumulative PEC.

7.9 This shows that for the majority of receptors, there is no effect (i.e. either the cumulative PC<1% of the EQS and/or the cumulative PEC<EQS) of the other developments operating with the K3 Proposed Development and WKN Proposed Development.

7.10 As set out in Appendix 5.4, those features where an effect cannot immediately be excluded are shown in Table 5.4.11. This included Eurasian reed warbler and reed bunting for The Swale SPA and hen harrier/Merlin for the Medway Estuary & Marshes SPA with respect to nutrient nitrogen deposition where the cumulative PC>1% of the minimum critical load and the relevant minimum critical load is already exceeded. All species are associated with reedbed and grazing marsh habitats within which they breed or hunt across the two SPAs.

7.11 Both habitats in north Kent are unlikely to be very sensitive to nutrient nitrogen deposition. The APIS website from which the information with respect to critical loads is derived incorporates reedbed with other wetland habitats such as marsh and fens. It notes that the minimum critical load for these habitats listed on APIS and used in Appendix 5.4 (15 $kgN.ha^{-1}.yr^{-1}$ for reed warbler and reed bunting and 10 $kgN.ha^{-1}.yr^{-1}$ for hen harrier and merlin) represents more closely upland habitats (including, heathland) that these species are also associated with elsewhere in the country and that will be naturally more nutrient poor and therefore more susceptible to species composition change due to atmospheric nitrogen input than those in Kent. Reedbeds are, by their nature, monospecific, dominated by common reed. As such, their susceptibility to competitive exclusion by other graminoid species is considered very low. The upper end of the critical load range is therefore considered more appropriate for these habitats, set within grazing marsh which are higher nutrient systems due to the underlying nutrient status of the soils within the flood plain on which they form. Using the upper critical load for this habitat of 30 $kgN.ha^{-1}.yr^{-1}$ is therefore more appropriate meaning that the cumulative PEC does not exceed the critical load and, as such, cumulative effects in combination with the K3 and WKN Proposed Developments are not significant.

7.12 With respect to hen harrier and merlin, the 10 $kgN.ha^{-1}.yr^{-1}$ critical load used represents upland habitats (including, heathland) that these species are also associated with elsewhere in the country and that will be naturally more nutrient poor and therefore more susceptible to species composition change due to atmospheric nitrogen input than the grazing marsh habitats over which they forage during winter in Kent. The majority of such habitats within the Medway system are agriculturally-improved to a greater or lesser extent

and therefore the upper end of the critical load range is considered more appropriate for these habitats of 30 kgN.ha^{-1}.yr^{-1}. On this basis, any cumulative PEC will not exceed the critical load and, as such, cumulative effects in combination with the WKN and K3 Proposed Developments would not be significant

7.13 Table 5.4.11 also shows an exceedance from the cumulative PEC of the minimum critical load for nutrient nitrogen for both species of breeding tern at the Medway Estuary & Marshes SPA. The minimum critical load used is 8 kgN.ha^{-1}.yr^{-1} listed on APIS as representing acid stable dune grasslands. As for hen harrier and merlin, while the tern species will both use such habitats elsewhere in the country, within the Medway Estuary system, both species breed mainly on the many salt marsh islands (Burntwick Island, for example) that occur in the river channel. As such, a more appropriate critical load would be that for early-pioneer salt marsh of 30 kgN.ha^{-1}.yr^{-1}. Using this figure, the cumulative PEC is only 45% of the critical load meaning that the cumulative PEC does not exceed the critical load and, as such, cumulative effects in combination with the K3 and WKN Proposed Developments are not significant.

7.14 Table 5.4.11 also shows two supporting habitats as having exceedances for nutrient nitrogen (shingle & sea cliff on The Swale Ramsar/SSSI and Medway Estuary & Marshes Ramsar/SSSI). However, the closest area of this habitat type within The Swale is on the eastern end of the Isle of Sheppey some 12 km from any of the developments considered. While modelling has not been undertaken in this location, given the distance, cumulative effects are considered very unlikely. The modelling presented in Appendix 5.4 combines the maximum PCs from each development to give a summed PC. This is highly conservative as there would be very little overlap between where these maximum rates of deposition occurred; none of them will occur 12 km from the K3 and WKN Proposed Developments. The nearest shingle habitats to the K3 and WKN Proposed Developments within the Medway Estuary & Marshes Ramsar/SSSI are to the north west, on the north of Deadman's Island and the southern edge of the Isle of Grain where the Medway meets the Thames Estuary & Marshes Ramsar/SSSI. While some shingle beaches may be potentially very susceptible to atmospheric nitrogen inputs, in particular where the shingle is stable and becoming vegetated, the shingle that occurs in these locations within the Medway is mostly tidal, being inundated by sea water on a twice-daily basis. This means that, in this location, they are considered to be insensitive to atmospheric nutrient nitrogen deposition with their nutrient status controlled by that of the inundating tide. On this basis, no in-combination effects are predicted.

7.15 In addition to the above, at Natural England's request, an assessment of the potential cumulative effect of increased traffic associated with the Swale Local Plan with the K3/WKN Proposed Developments has been undertaken. Given its location, the only road that lies within 200m of The Swale SPA/Ramsar and Medway Estuary and Marshes SPA/Ramsar which could also carry traffic associated with the Swale Local Plan would be the A249 at the Swale Crossing (which marks the boundary between the two sites). However, in this location, the habitats present within 200 m of the road comprise intertidal mudflats and cattle-grazed grazing marsh, neither of which are sensitive to changes in air quality (the former by virtue of being inundated by the tide, the latter because of the high-nutrient status systems, especially when grazed). Therefore, no in-combination effect is predicted.

16/507687/COUNTY IBA Recycling Facility

7.16 A detailed consideration of these impacts is provided in the Ecology Statement that accompanied this planning application.

7.17 The IBA development is not going to be constructed and WKN will be located on the land previously allocated for the IBA. Therefore, given this, there will be no in-combination effects between this application and either the WKN Proposed Development or K3 Proposed Development.

16/501484/COUNTY Gypsum Recycling Building

7.18 Various developments have been proposed or are being constructed at the Countrystyle Recycling Ltd. site 350 m to the north of the proposed development. The largest of these includes 16/501484/COUNTY - Gypsum Recycling Building for which the Habitats Regulations Assessment submitted identified potential impacts from the development with respect to changes in water quality and disturbance of wintering birds during impact piling. The proposed mitigation to avoid such impacts included a detailed surface water management plan and the timing of piling works to occur between May and September.

7.19 Given this, the lack of impacts associated with either of these pathways identified above from the K3 Proposed Development, no in-combination effects are considered likely.

7.20 WKN is not anticipated to have any impact upon water quality, and the embedded mitigation measures to be included are eliminating the impacts upon wintering birds. Therefore, no in-combination effects are likely with the WKN Proposed Development.

SW/11/1291 - Kemsley AD Plant (DS Smith Paper)

7.21 The proposed Kemsley AD Plant is located on the far side of the reedbed immediately to the north of the DCO boundary. It is currently being commissioned, having been constructed during 2017/2018. In-combination impacts to the Swale SPA/Ramsar could occur via cumulative changes to air quality. Such effects are considered above. No other in-combination effects are considered likely.

14/500327/OUT New Offices

7.22 The proposed creation of up to 8,000 m2 of new Class B1 and B2 floor space along with the extension of the Milton Creek Country Park 495 m to the south of the Proposed Development is in close proximity to The Swale SPA/SSSI/Ramsar. However, potential impacts associated with the development on these sites derive from an increased recreational use of the foreshore area by visitors to the Country Park. Since there are no such increases in recreational use associated with the proposed development, there are no overlapping pathways for effects to occur either individually with K3 / WKN, or cumulatively, with both WKN and K3; therefore, there are no in-combination effects.

14/502737/EIASCO and 16/506935/COUNTY – Works at Ridham Docks

7.23 Ridham Docks is 1.6 km to the north of the proposed development and comprises a range of industrial uses including a biomass incinerator (constructed), Materials Recycling Facility (MRF) and various storage facilities (including wood for the biomass incinerator). All of the

current applications (submitted and not determined) relate to variations to existing permissions, none of which are considered likely to have an in-combination effect with the Proposed Developments, either K3 or WKN individually, or when considering both in-combination.

SW/15/500348 – Construction of advanced thermal conversion and energy facility (4Evergreen Technologies Ltd.)

7.24 The proposed energy facility will pyroloyse refuse-derived fuel to generate syngas that can then be burnt to generate heat and, subsequently, electricity. The process of burning the syngas leads to the emission to air of a range of chemicals, similar to those emitted by the Proposed Development. As part of the planning application, an assessment of the potential ecological effects of these emissions was completed. There are therefore potential impacts through cumulative changes to air quality. Such effects are considered above. No other in-combination effects are considered likely..

17/505073/FULL Erection of a tile factory including service yard, storage yard and car parking area.

7.25 The application is for a new tile factory, along with a storage yard, car park and associated landscaping features. As part of the planning application, a suite of ecological surveys were undertaken, including reptile, GCN, bird, otter and water vole. The assessment also looked at impacts on the nearby designated sites, however, it was concluded that, given the site was already highly disturbed, that the slight increase in noise would not negatively impact the birds using the SPA/Ramsar, especially given the mitigation measures, such as the creation of a bund.

7.26 Therefore, no residual impacts remain that could result in in-combination impacts with either K3 / WKN developments individually, or when assessed in-combination.

15/500348/COUNTY | Install advance thermal conversion and energy facility at Kemsley Fields Business Park

7.27 To produce energy and heat, including construction of new buildings to house thermal conversion and energy generation plant and equipment; construction of associated offices; erection of external plant including storage tanks; and erection of discharge stack (KCC planning application KCC/SW/0010/2015 refers).

7.28 As part of the planning application, an assessment of the potential ecological effects of these emissions was completed (Environmental Compliance 2014). There are therefore potential impacts through cumulative changes to air quality. Such effects are considered above. No other in-combination effects are considered likely..

18/500393/FULL Erection of a natural gas fuelled reserve power plant with a maximum export capacity of up to 12MW.

7.29 There are potential impacts through cumulative changes to air quality from this application. Such effects are considered above. No other in-combination effects are considered likely.

SW/14/0224 – Application for a solar farm;

7.30 An application for a solar farm, on 38 hectares of arable farmland on the Tonge Corner Farm, near Sittingbourne, Kent.

7.31 Wintering bird surveys found that the arable fields provided occasional opportunities for curlew and golden plover. Redshank and Lapwing were also recorded within the arable land but in very low numbers and on only a small number of occasions. Other species associated with the nearby SPA and Ramsar site were recorded in adjacent habitats, in particular over the sheep grazed pasture to the north of the application area.

7.32 In order to ensure that no negative impacts occur on the SPA / Ramsar, all good-practise dust suppression measures were used during the construction phase of the development. Noise was not considered to be an issue, during either the construction or the operational phase. The increased ecological landscaping, aimed at providing habitat for wintering birds, will also increase the carrying capacity of the site.

7.33 Given this, the lack of impacts associated with any of these pathways identified above from the proposed K3 and WKN developments (individually and in-combination) and that all other developments on the site are minor and not considered to have any effect on The Swale.

SW/12/1211 – Construction of materials recycling facilities and waste transfer station.

7.34 Prior to development, the land comprised hardstanding with a thin strip of ruderal vegetation present. The application site was located nearby to The Swale SPA and Ramsar, and so a HRA was undertaken.

7.35 Given the distance of the site from the SPA / Ramsar, no impacts from air quality/noise are anticipated (as no dust etc. would settle within the SPA / Ramsar). Therefore, no in-combination impacts are anticipated with either the K3 development, or WKN development individually, or when they are assessed in-combination.

7.36 Overall, there would be no significant effect between the proposed DCO application and any of the developments described above.

SW/13/1495

7.37 Variation of condition 9 of planning permission SW/11/548, to increase the number of HGV movements from 58 to 98 (49 in and 49 out) for a period of 12 months. The application does not provide any additional details on whether this increase in vehicular movement will impact any of the nearby designated sites. However, the 12 months sought will not overlap with the construction period of WKN. Therefore, no cumulative impacts are anticipated, either with K3 or WKN individually, or when they are assessed together.

EN010090 (18/501923/ADJ)

7.38 It is possible that the general construction activity within the proposed development of WKN (in combination with K4) could further make the reedbed unattractive to Marsh Harrier. However, the existing proposed mitigation for this (1 ha of new reedbed habitat in an

appropriate location on the Isle of Sheppey to provide alternative breeding habitat during the development) would also provide sufficient mitigation for any further disturbance/urbanisation associated with the Proposed Developments (either K3 or WKN) in combination with K4.

7.39 There are therefore potential impacts through cumulative changes to air quality. Such effects are considered above. No other in-combination effects are considered likely.

7.40 In order to ensure that all of the cumulative impacts from the K3 Proposed Development, WKN Proposed Development and the two combined are assessed both individually and cumulatively, the following methodology has been used:

Baseline + K3 Proposed Development + other relevant cumulative developments within the zone of influence of the K3 Proposed Development

K3 as consented + the practical effect of the K3 Proposed Development + WKN Proposed Development + other relevant cumulative developments within the zone of influence of the K3 Proposed Development

Baseline + K3 Proposed Development + WKN Proposed Development + other relevant cumulative developments within the zone of influence of the K3 and WKN Proposed Developments

K3 as consented + the practical effect of the K3 Proposed Development + WKN Proposed Development + other relevant cumulative developments within the zone of influence of the K3 and WKN Proposed Developments

K3 as consented + WKN Proposed Development + other relevant cumulative developments within the zone of influence of the WKN Proposed Developments

7.41 Under all five scenarios, no significant cumulative effects on any Natura 2000 site have been identified.

7.42 Additionally, existing operational projects near to the DCO Boundary that could act in-combination with the WKN/K3 Proposed Developments have been reviewed for relevance. The following have therefore been considered:

- Existing operations at Kemsley Paper Mill;
- Existing operations from other industry in the area, in particular the Knauf factory, those at Ridham Docks, Sittingbourne GPark (including the Morrison's distribution depot) and Countrystyle Recycling; and
- Activities that discharge water into the designated sites.

7.43 All existing industrial operations, listed above, where any potential dust generation could occur will be implementing standard dust control measures, the control of which would have been a consideration at consenting stage for the activity. Therefore, given that these

operations will be avoiding the generation of dust, there is no potential for any in-combination effect.

7.44 All existing discharges to The Swale or Medway are regulated by the Environment Agency, including through the Environmental Permitting process, with the consents for such discharge subject to their own Habitats Regulations Assessment. The consents granted are periodically reviewed through the Review of Consents process to ensure they are all still appropriate with any necessary amendments made, depending on the findings. Moreover, discharge from the WKN/K3 Proposed Developments has also been the subject of a Water Framework Directive assessment and Marine Conservation Zone Assessment (Appendix 11.7 of the ES). Therefore, given this tight control of discharges (including that from Kemsley Paper Mill), there is no potential for in-combination effects.

7.45 The only pathway by which disturbance impacts could occur in combination with WKN/K3 Proposed Developments from operational activities would be through loud, sudden noise generation that could illicit startle responses. By their nature, industrial activities can result in occasional, sudden noise generation. However, any activities that would result in frequent occurrences of such noise would have been subject to their own controls at consenting stage, through the Habitats Regulations Assessment process; they may be subject to timing restrictions etc. to avoid the periods of the year when birds using the SPA are most vulnerable, for example. Therefore, when such avoidance mechanisms are combined with those described in the here, there is no potential for in-combination effects.

7.46 All avoidance measures for both K3 and WKN Proposed Developments are to secured by Requirements within the DCO and represent industry standard practices meaning there is high confidence they are effective.

Summary

7.47 No likely significant effect, beyond those identified alone in Sections 5 and 6 above, are considered likely in combination with any of the other projects described above.

8 REFERENCES

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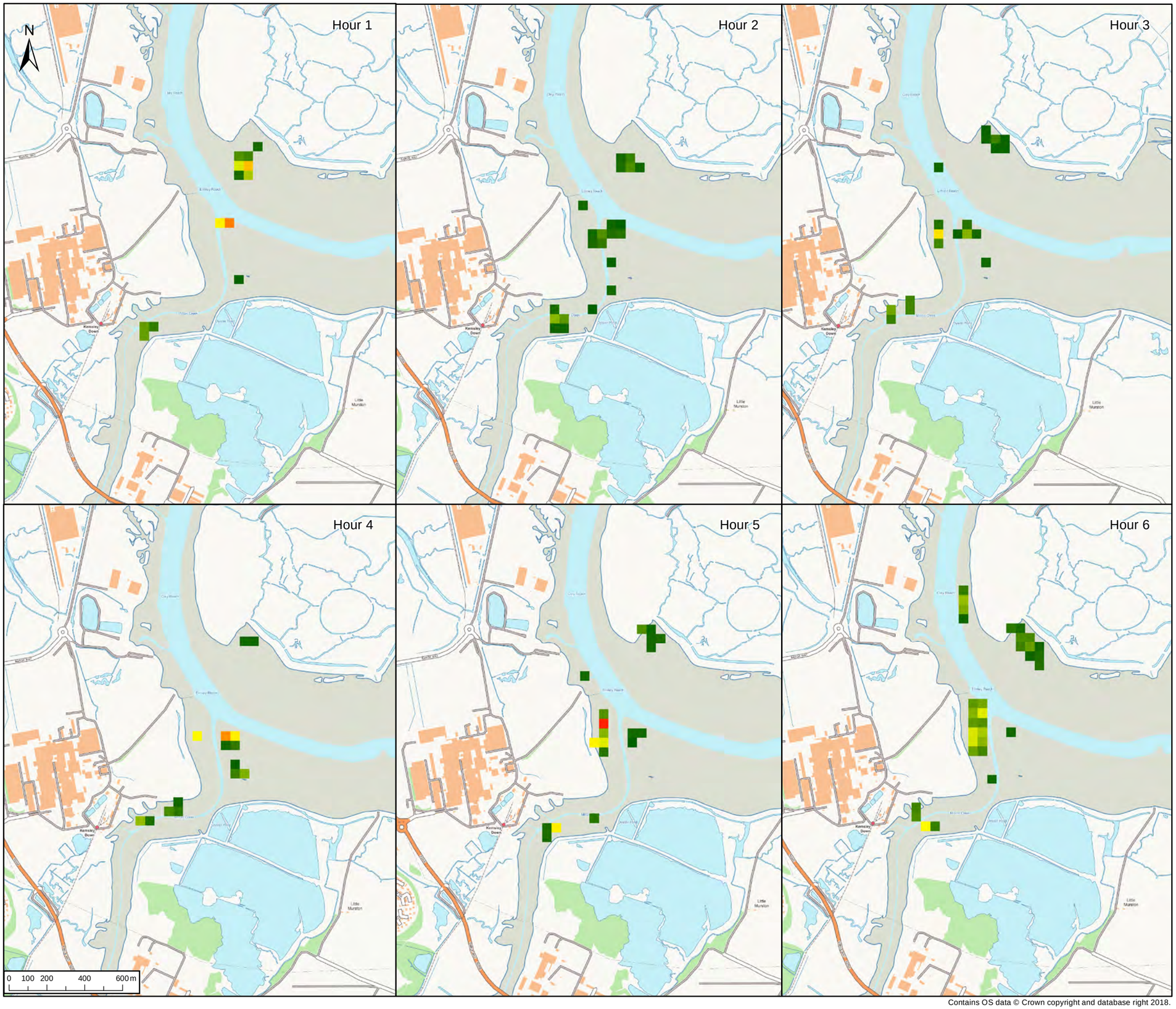
Figures



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Legend

Bird density

High : 110.87

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Brent Goose recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.1		01

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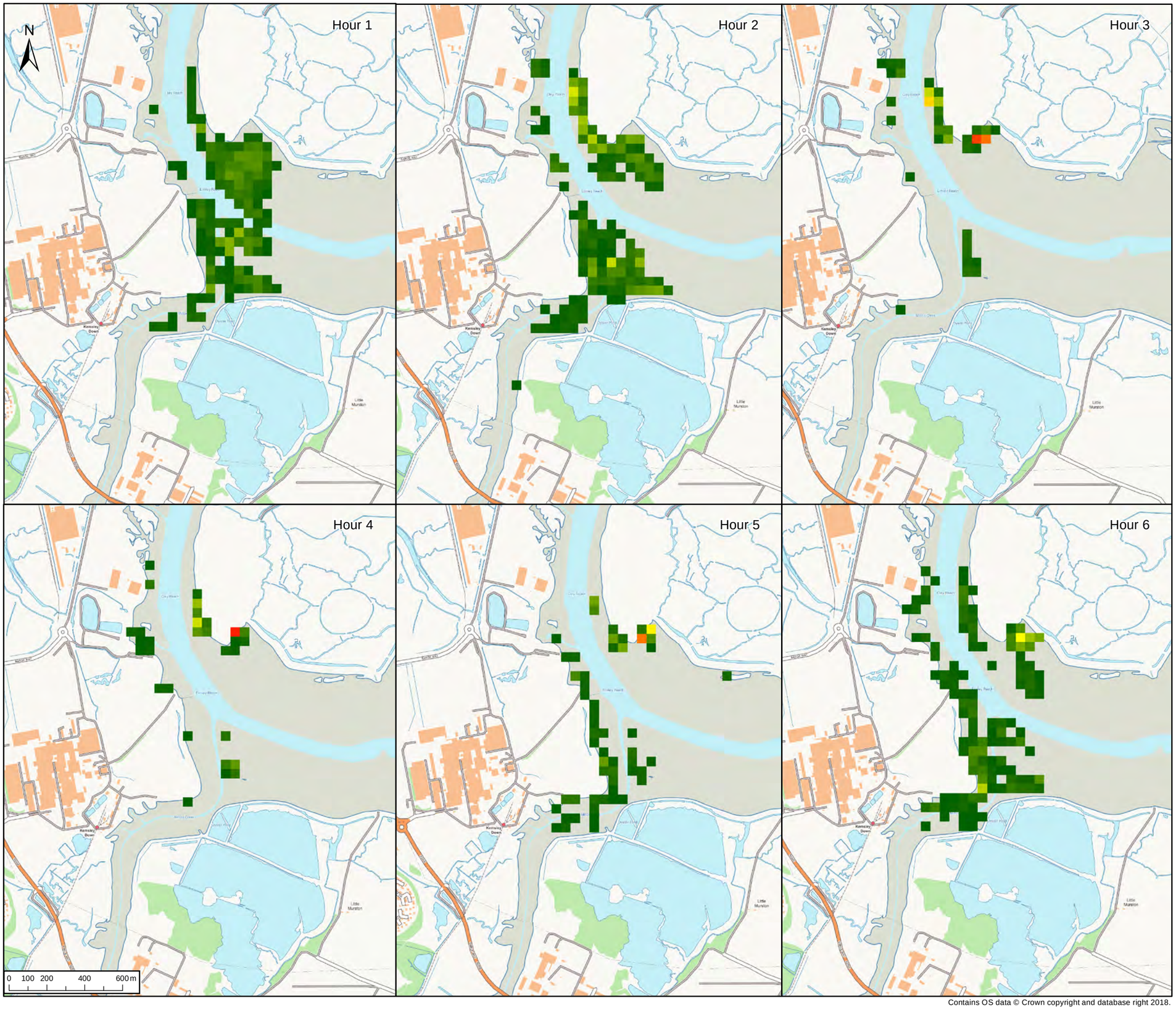

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Legend

Bird denisty

High : 949.07

Low : 1

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RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Dunlin recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.2		01

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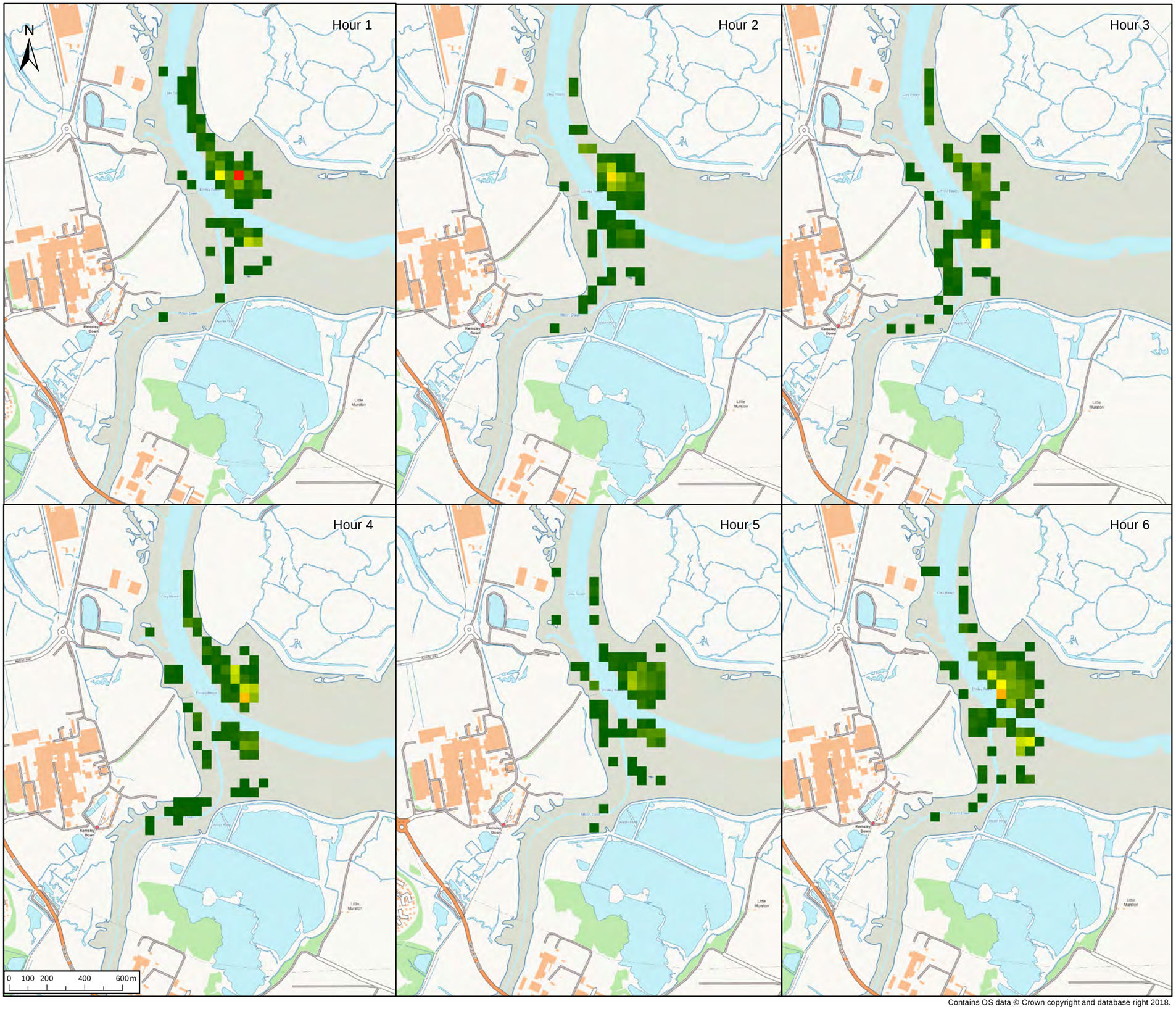

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Legend

Bird density

High : 287.31

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Dunlin recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
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Drawing Number		**Rev**
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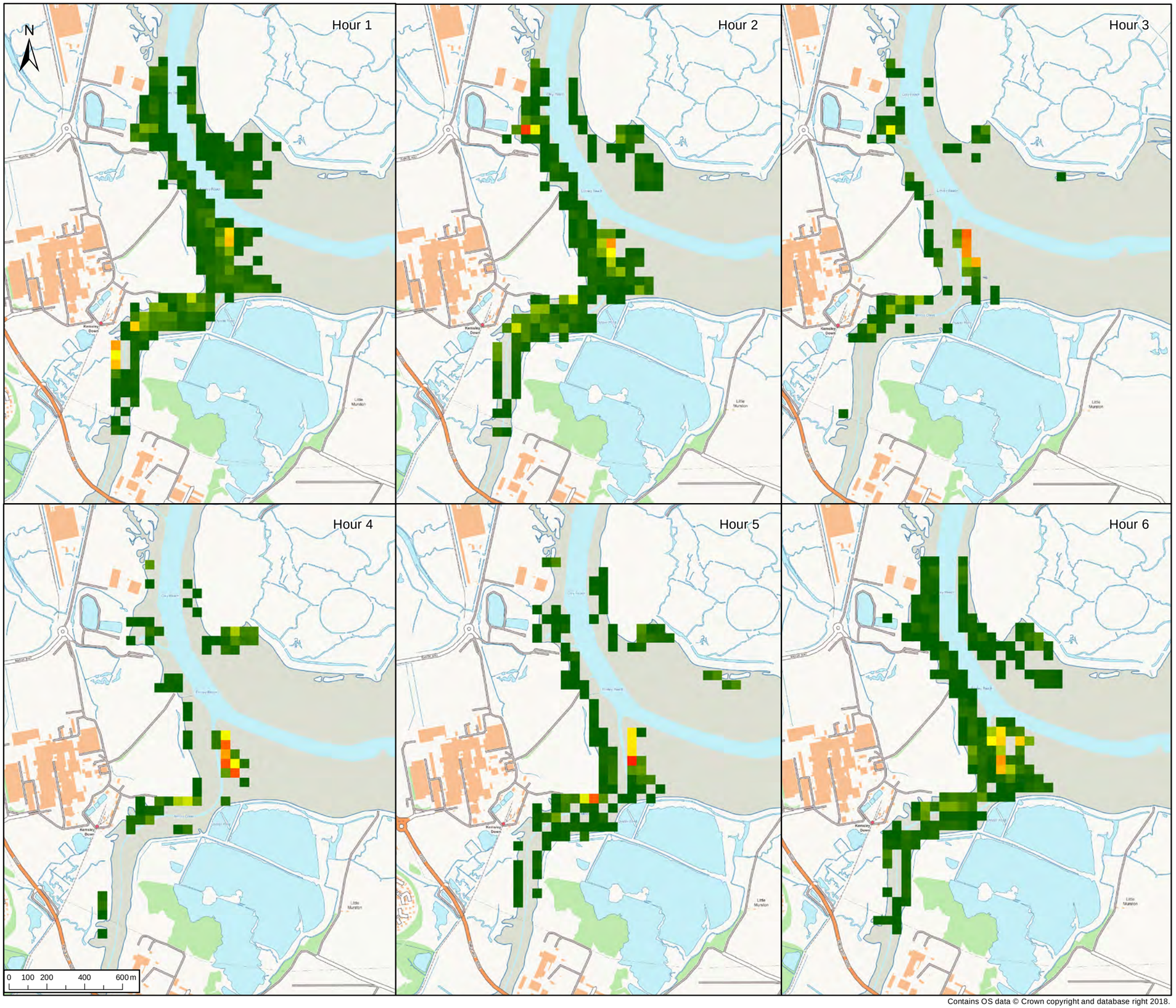

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Legend

Bird density

High : 231.95

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Redshank recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
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Drawing Number		**Rev**
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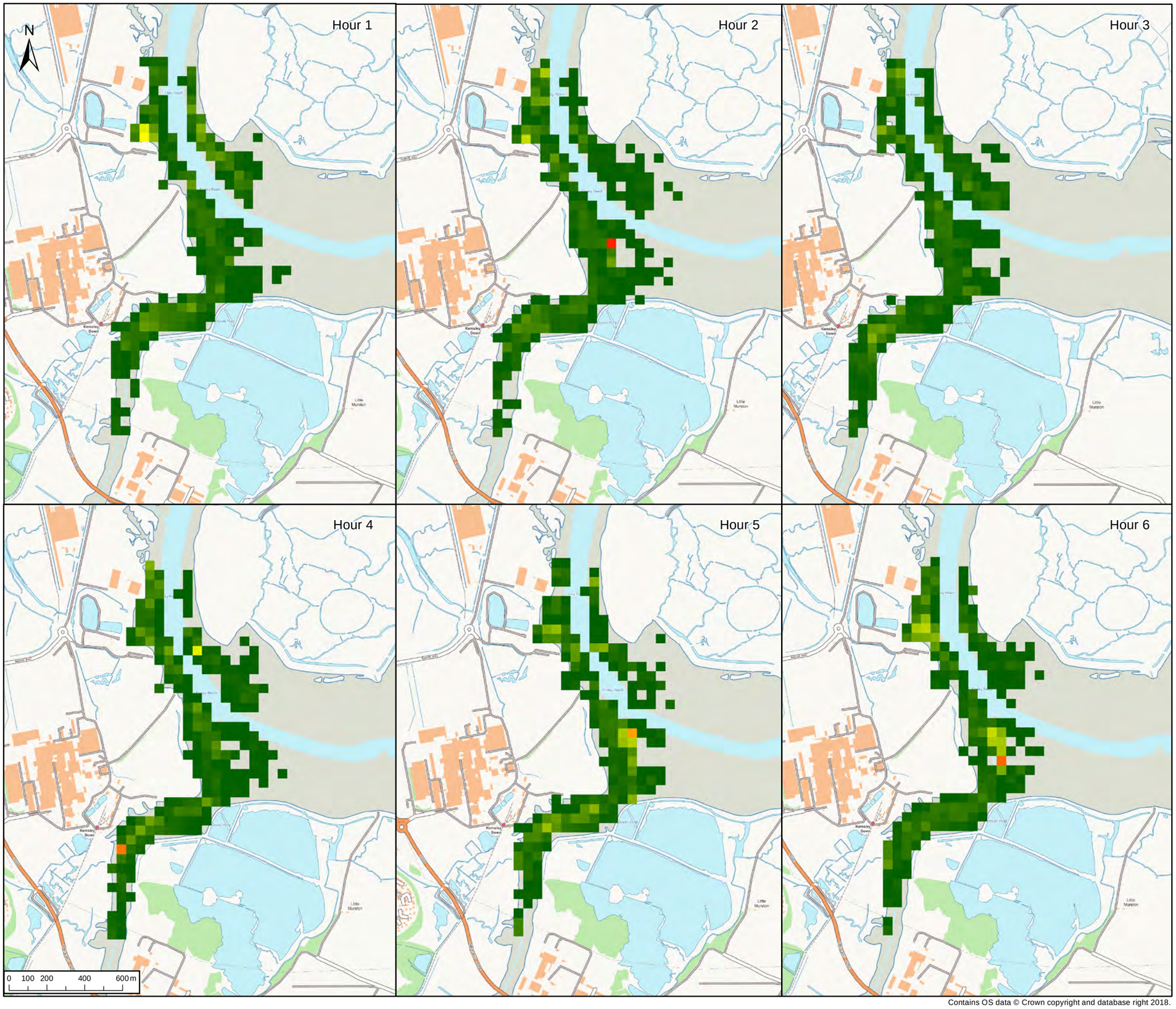

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Legend

Bird density

High : 137

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Redshank recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
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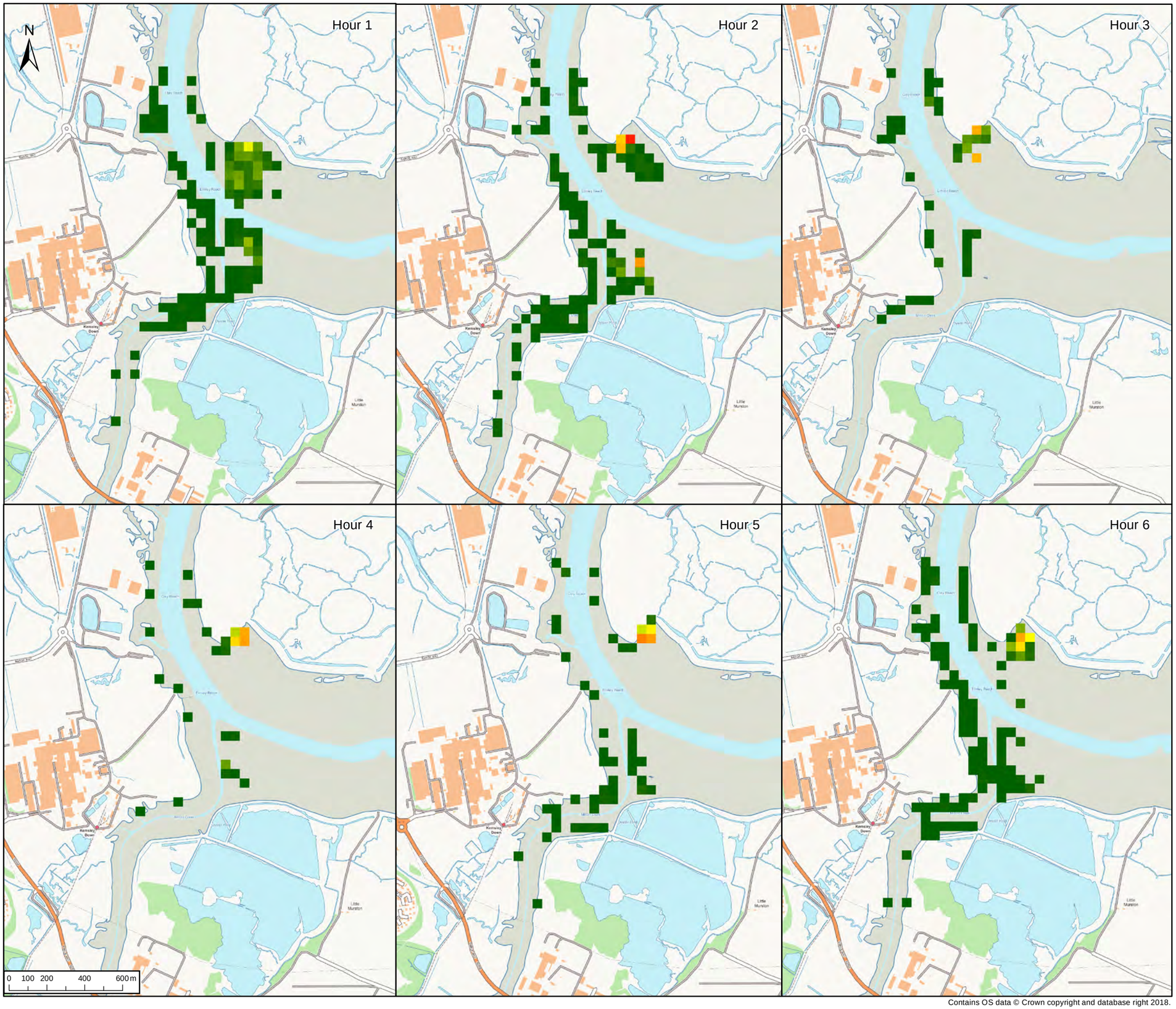

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Legend

Bird density

High : 74.57

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Grey Plover recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.6		01

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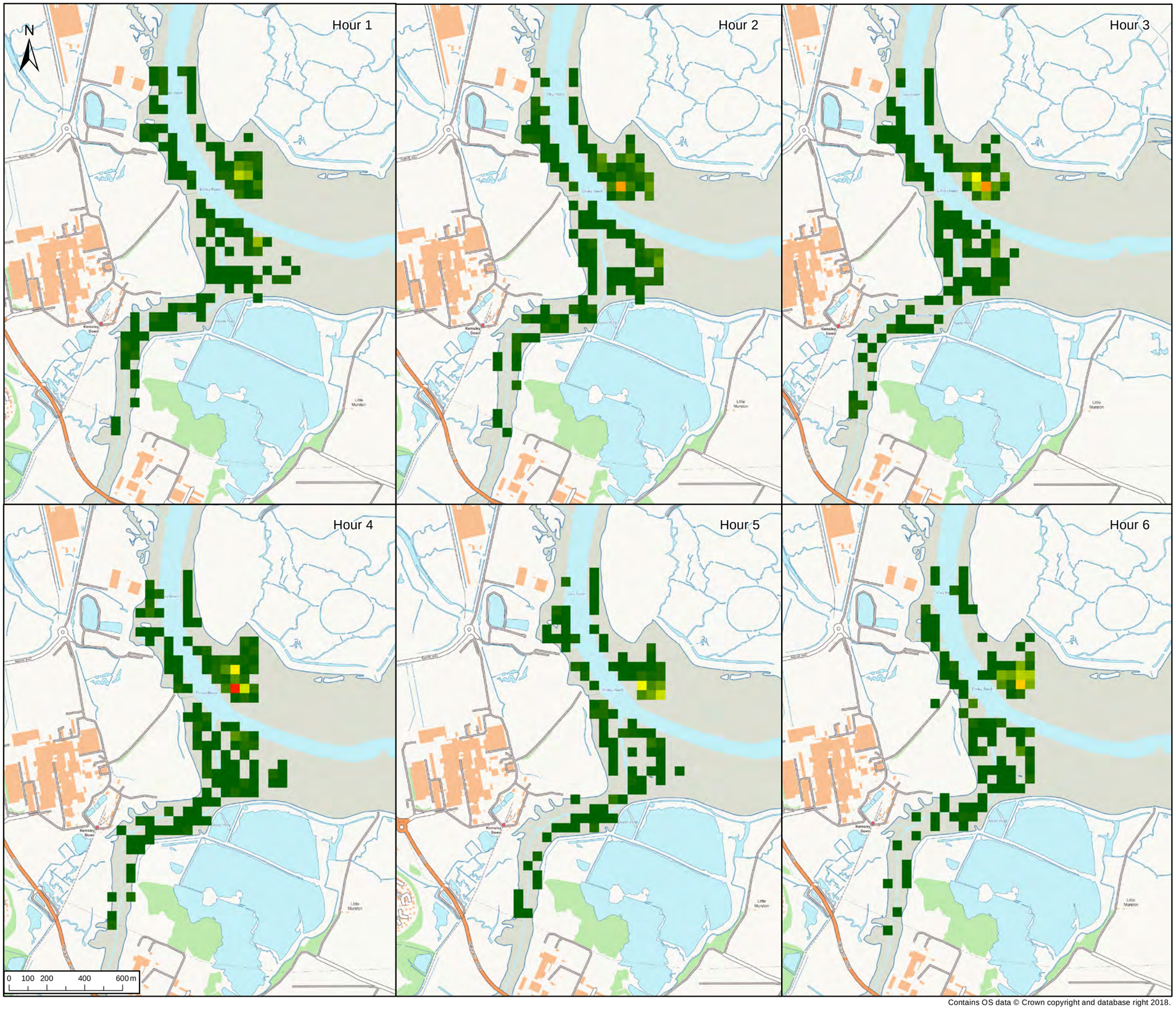

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Legend

Bird density

High : 25.84

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Grey Plover recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
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Drawing Number		**Rev**
Figure 6.7		01

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Legend

Bird density

High : 84.67

Low : 1

Rev	Description	Date	Initial	Checked

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Shelduck recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
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Drawing Number		**Rev**
Figure 6.8		01

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Legend

Bird density

High : 29.8519

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Shelduck recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
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Drawing Number		**Rev**
Figure 6.9		01

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Legend

Bird density

High : 5

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Shoveler recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.10		01

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Legend

Bird density

High : 2

Low : 1

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Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Shoveler recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
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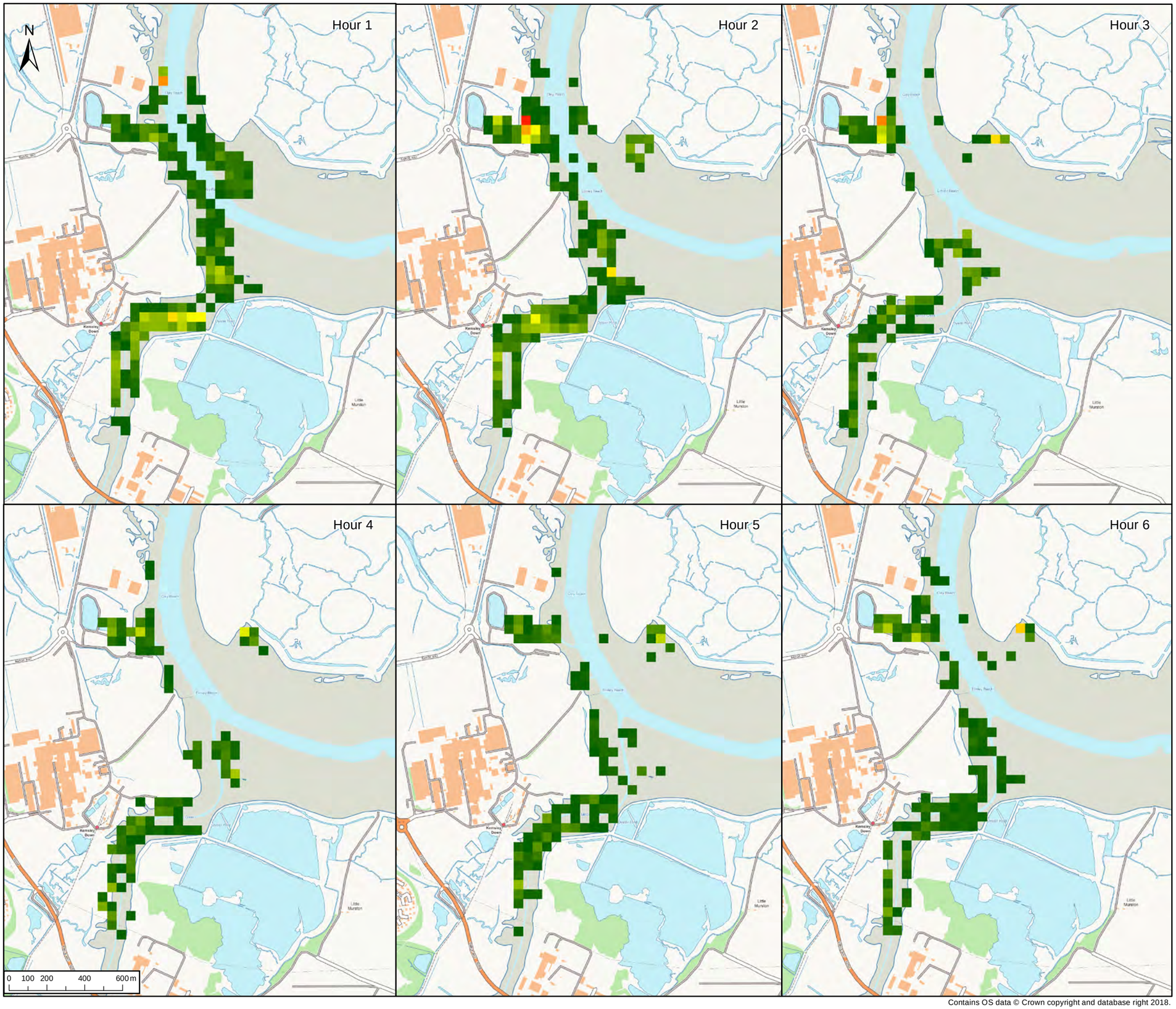

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Legend

Bird density

High : 149.17

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Teal recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
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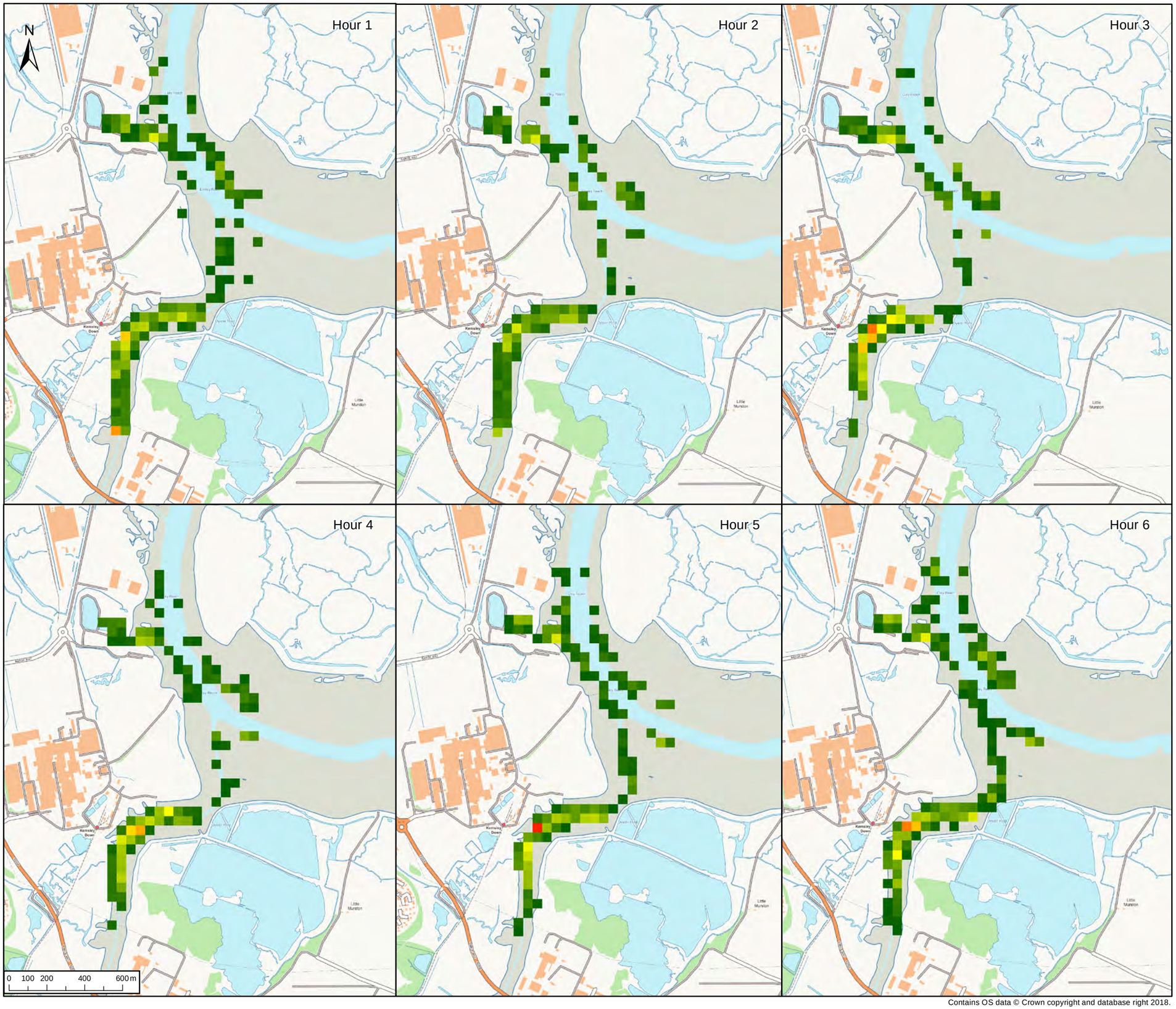

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Legend

Bird density

High : 151.01

Low : 1

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Teal recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.13		01

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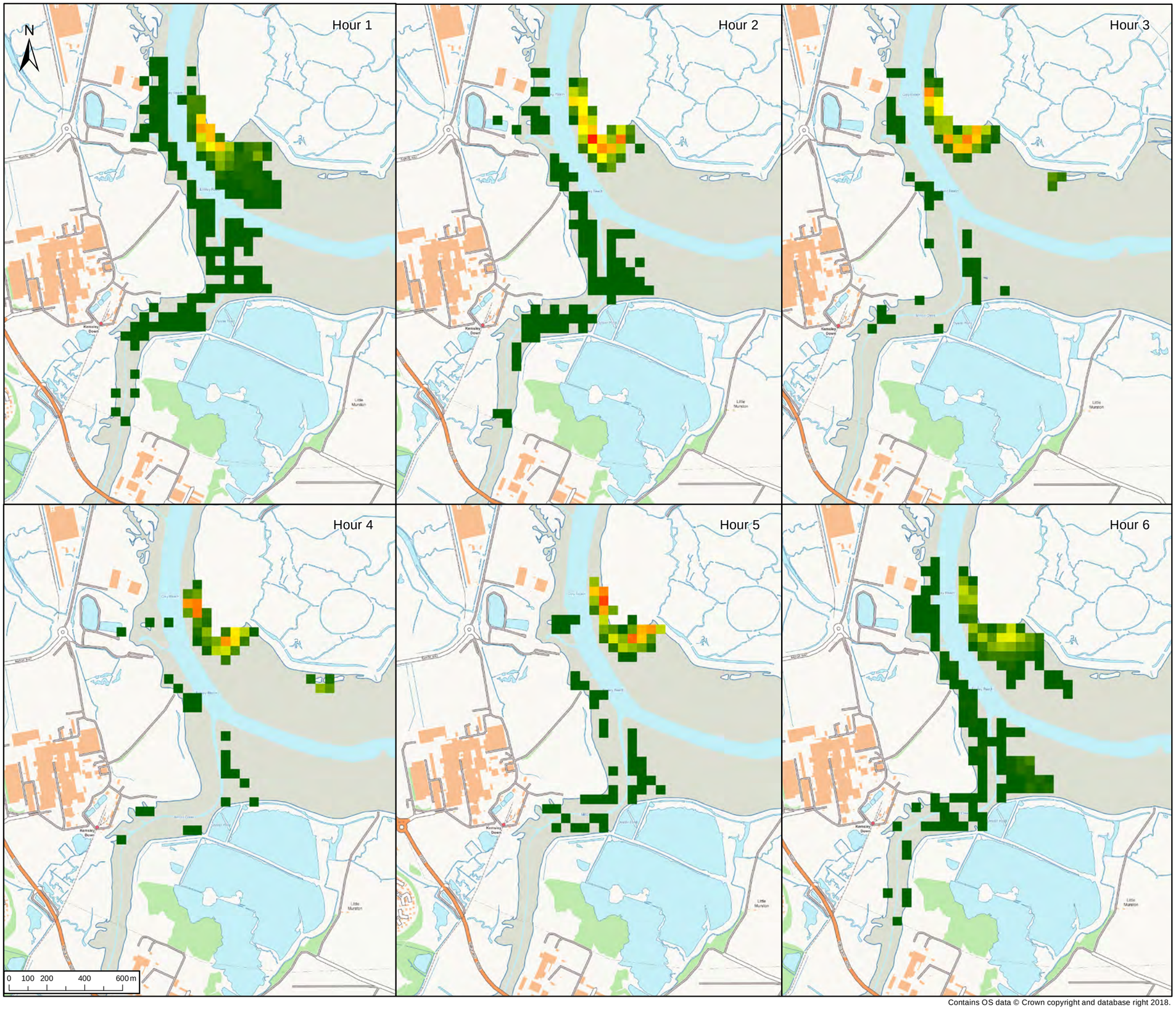

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Legend

Bird density

High : 490.94

Low : 0

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Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Oystercatcher recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
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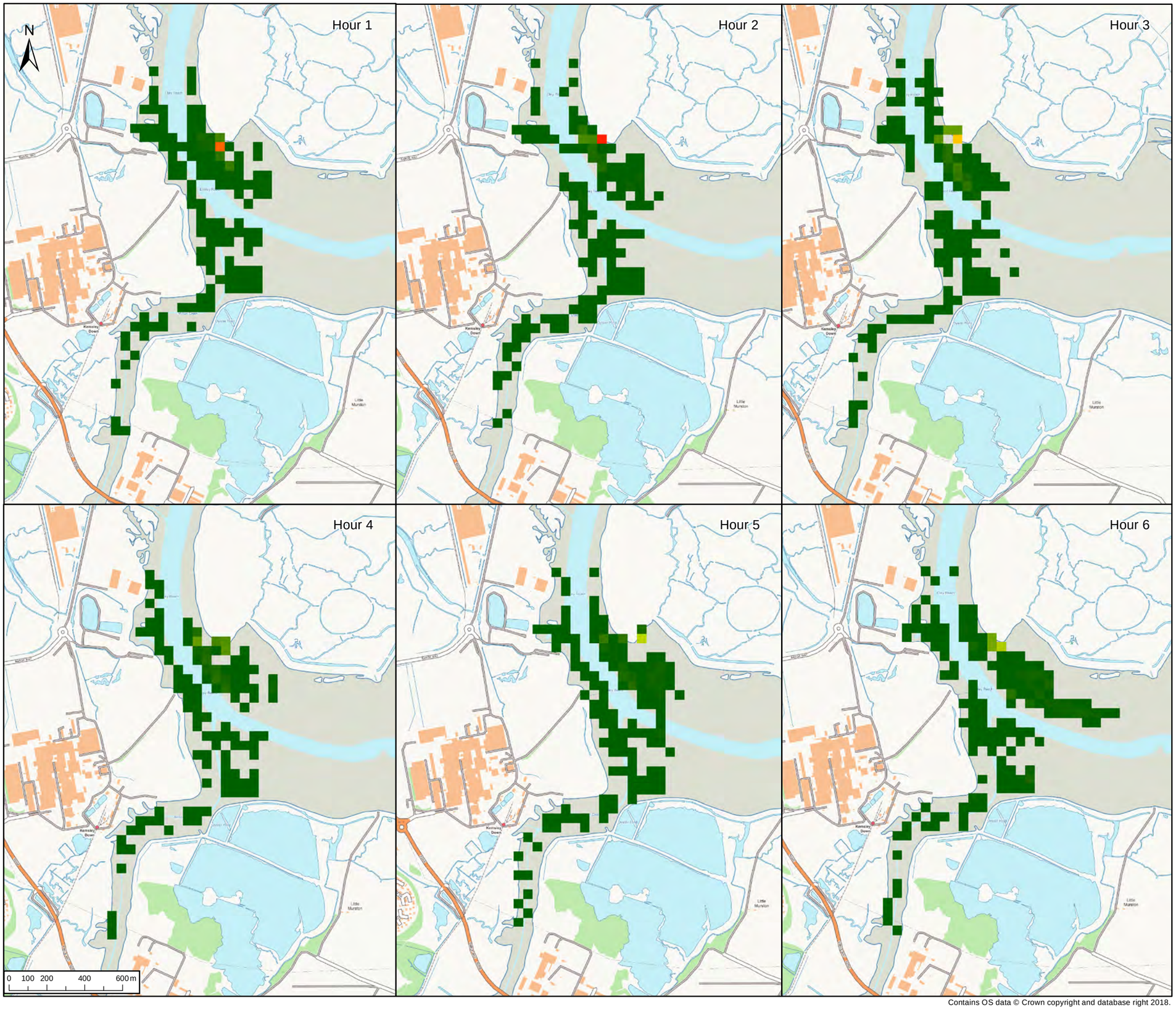

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Legend

Bird density

High : 315.56

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Oystercatcher recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.15		01

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Legend

Bird density

High : 281.62

Low : 1

Rev	Description	Date	Initial	Checked

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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Lapwing recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.16		01

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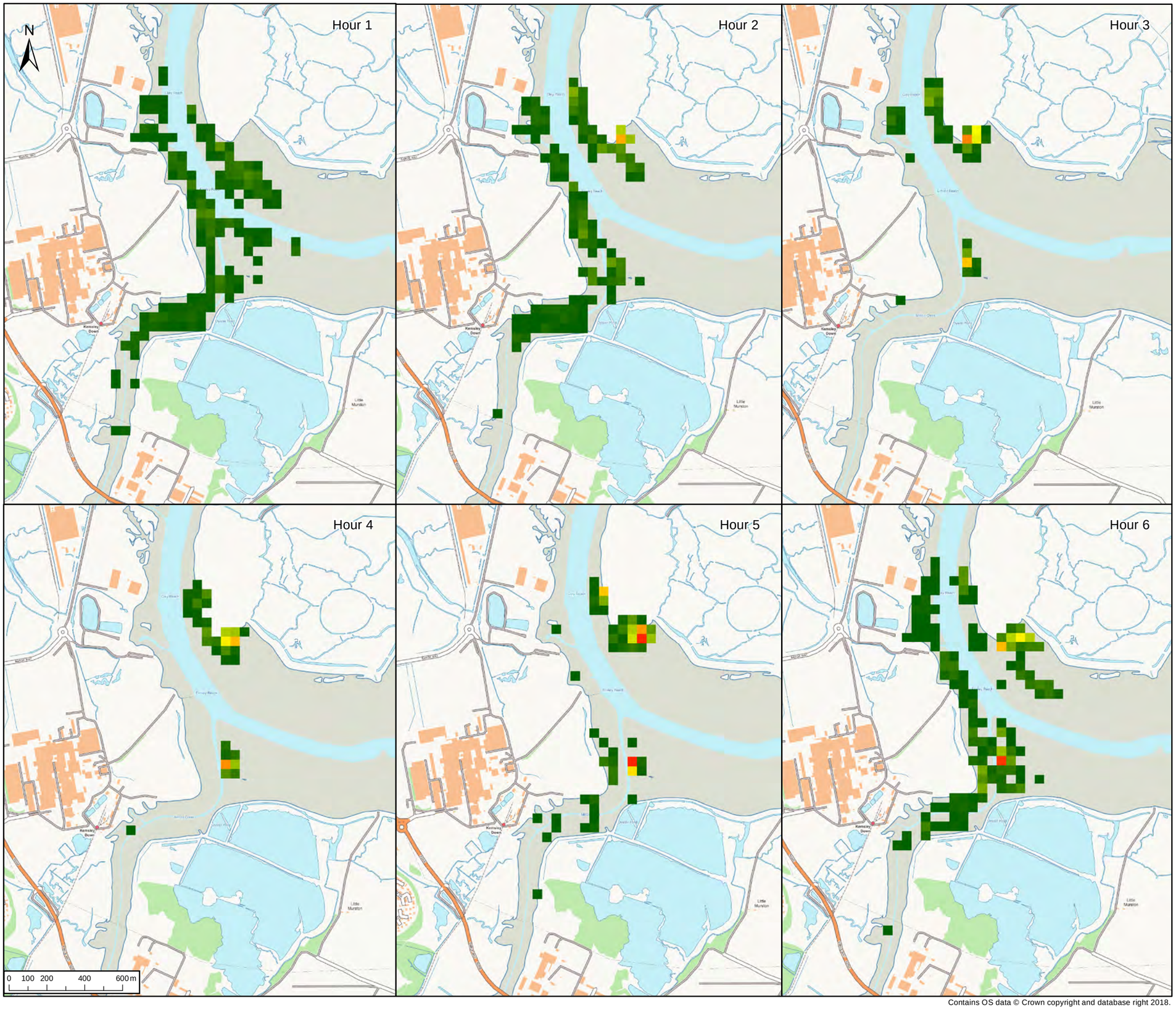

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Legend

Bird denisty

High : 691.17

Low : 0

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Black-tailed Godwit recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.17		01

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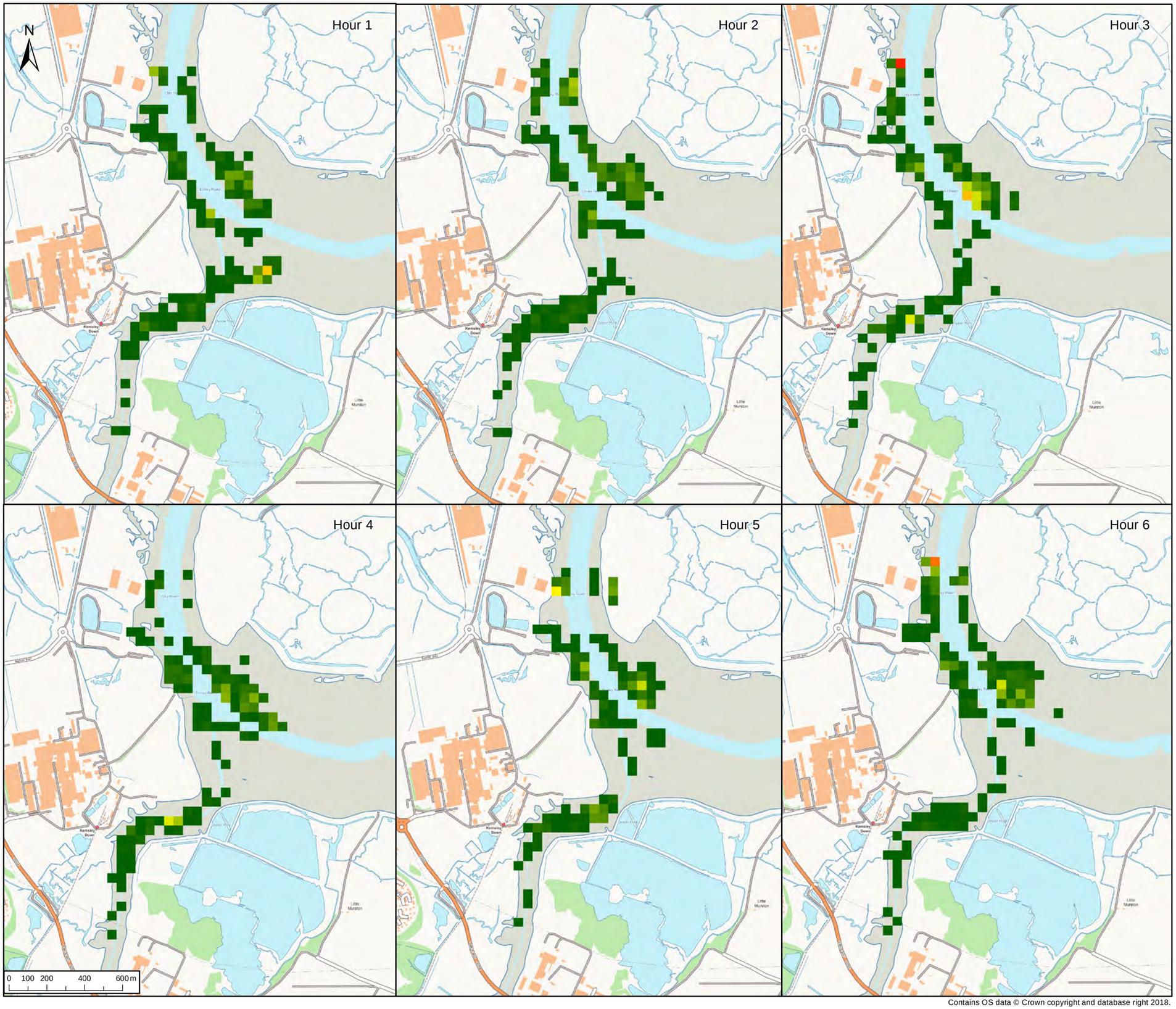

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Legend

Bird density

High : 276.92

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Black-tailed Godwit recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.18		01

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Legend

Bird density

High : 2

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Green Sandpiper recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.19		01

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Legend

Bird density

High : 3

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Green Sandpiper recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.20		01

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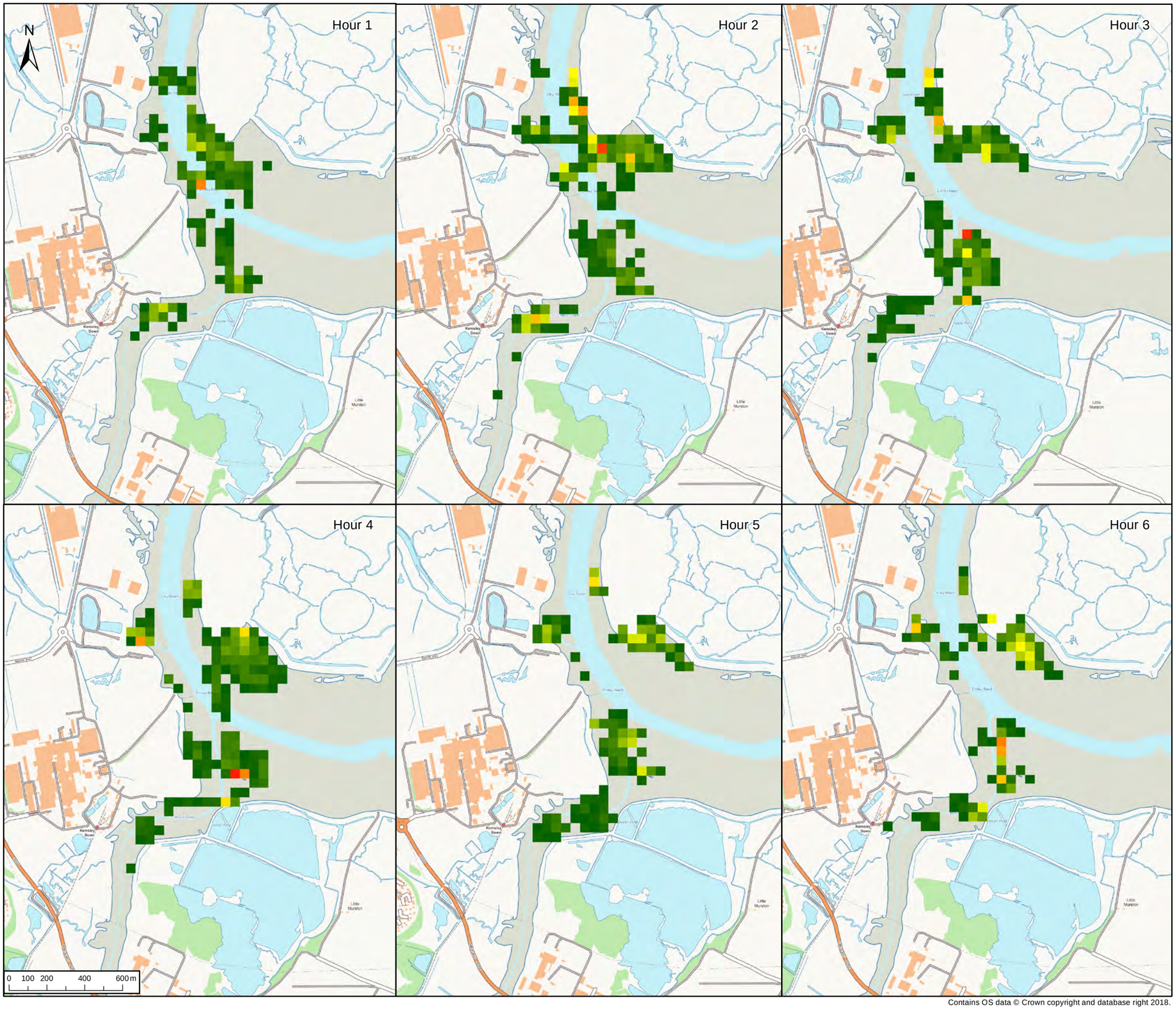
Document: V:\GIS temp (other offices work)\Kemsley K5\Drawings\47-0015-001 Green Sandpiper LW.mxd



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Legend

Bird density

High : 190.74

Low : 1

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Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Wigeon recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.21		01

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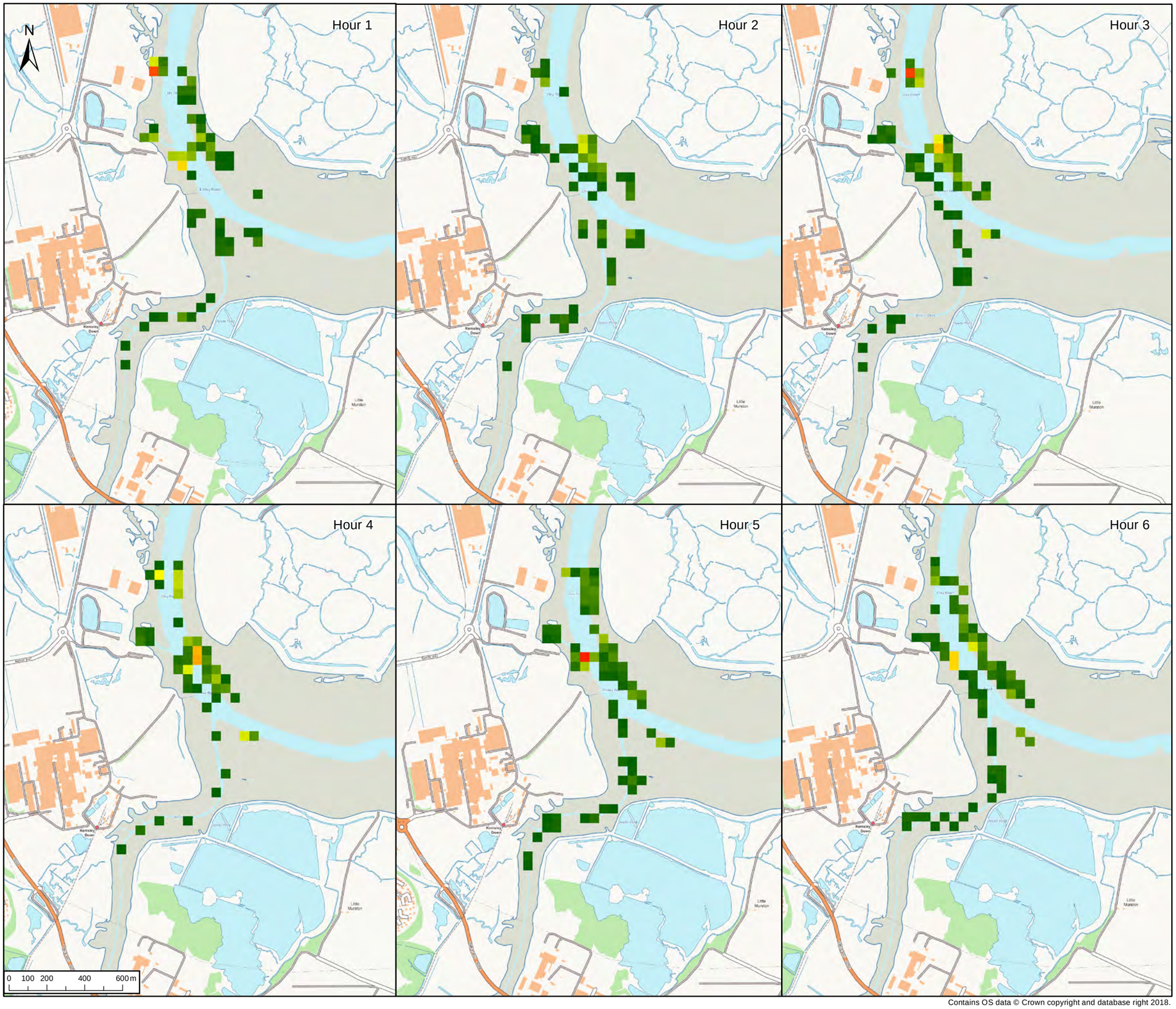
Document: V:\GIS temp (other offices work)\Kemsley K5\Drawings\47-0036-001 Wigeon HW.mxd



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Legend

Bird density

High : 149.24

Low : 1

Rev	Description	Date	Initial	Checked

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Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Wigeon recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.22		01

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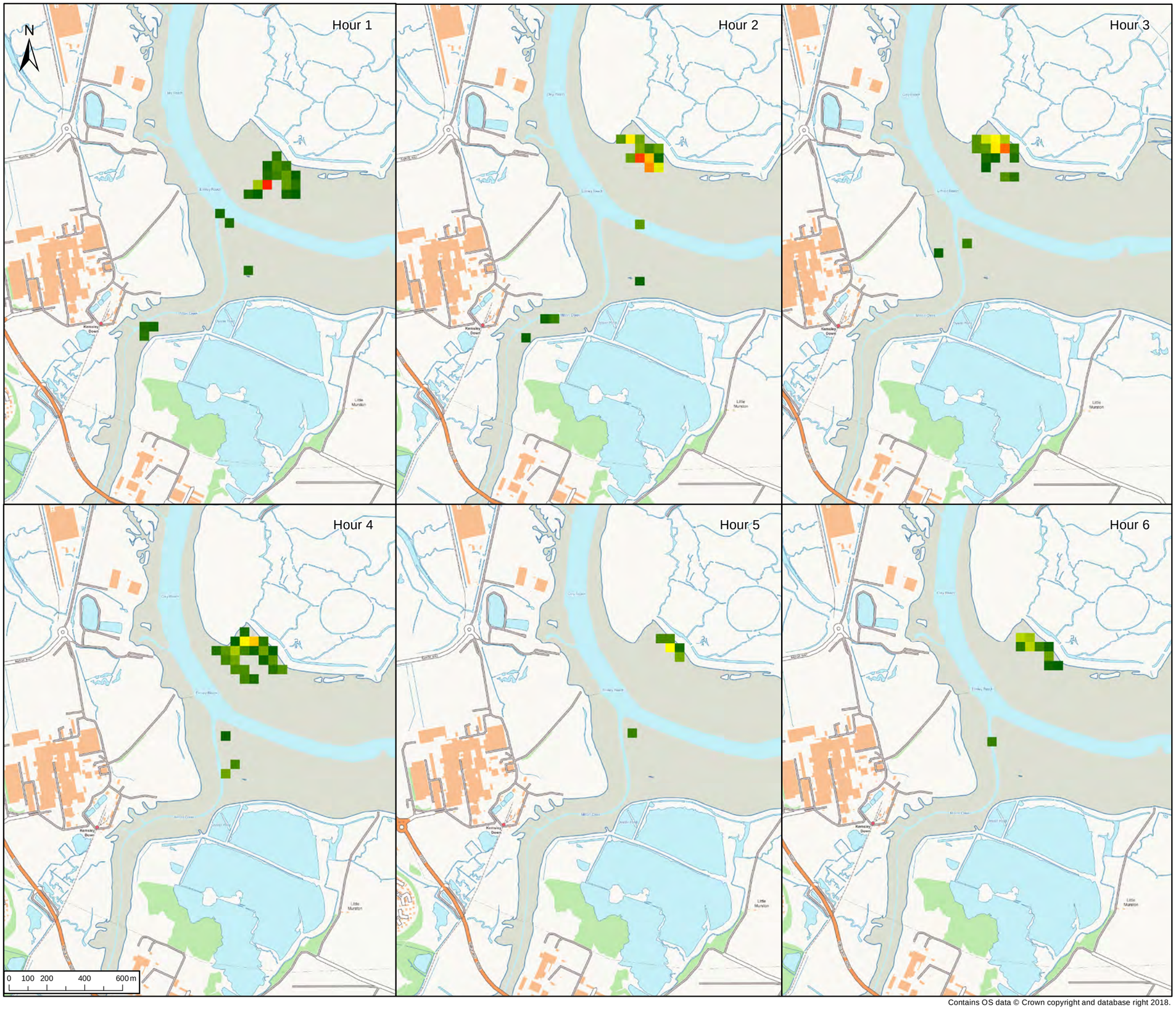
Document: V:\GIS temp (other offices work)\Kemsley K5\Drawings\47-0037-001 Wigeon LW.mxd



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Legend

Bird density

High : 66.75

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Pintail recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.23		01

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Legend

Bird density

High : 63

Low : 1

Rev	Description	Date	Initial	Checked

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Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

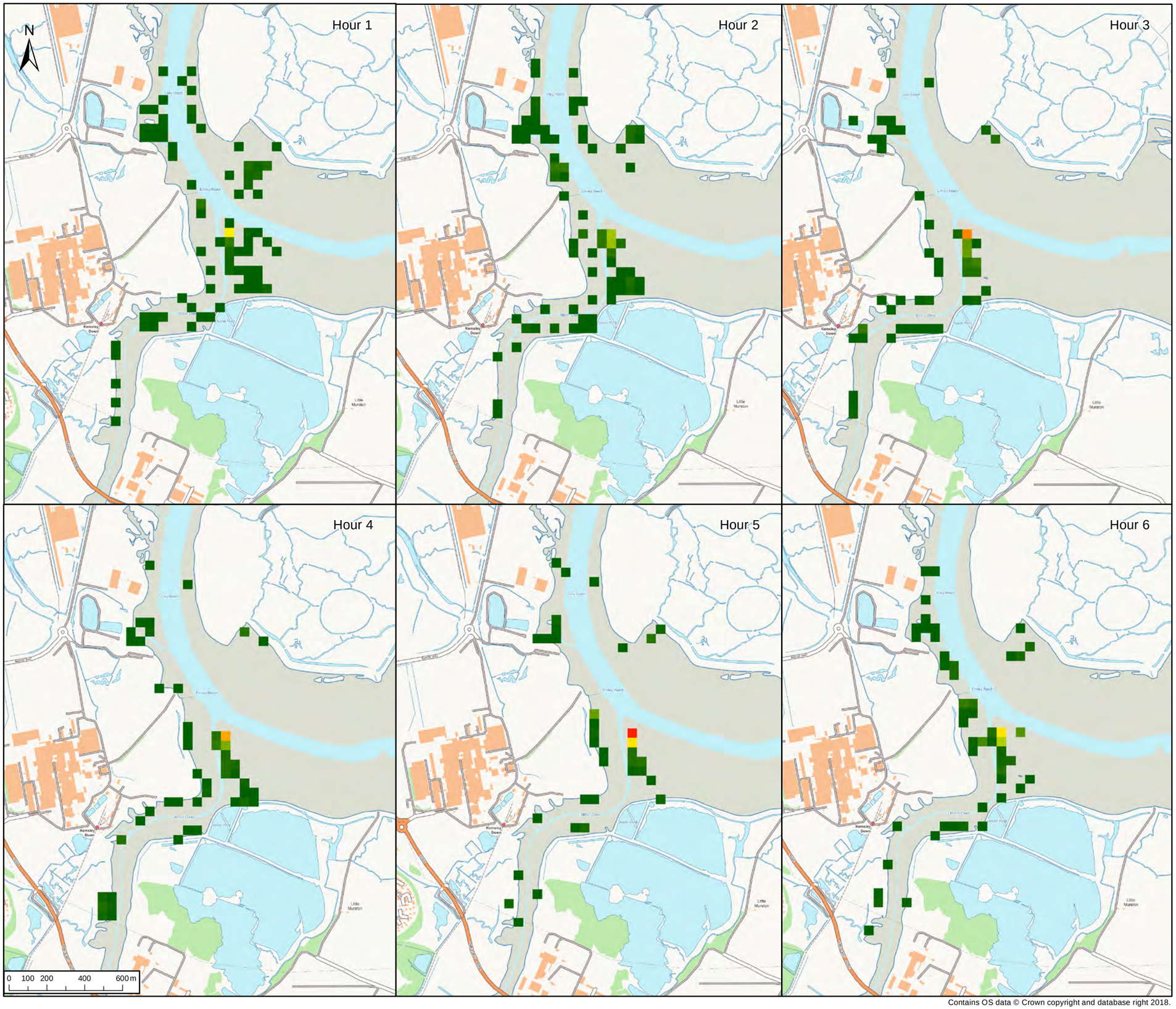
Project: Kemsley K3/WKN

Title: Density of Pintail recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.24		01

rpsgroup.com/uk

Document: V:\GIS temp (other offices work)\Kemsley K5\Drawings\47-0027-001 Pintail LW.mxd



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Legend

Bird density

High : 57.41

Low : 1

Rev	Description	Date	Initial	Checked

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Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Little Egret recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.25		01

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Legend

Bird density

High : 46

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Little Egret recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.26		01

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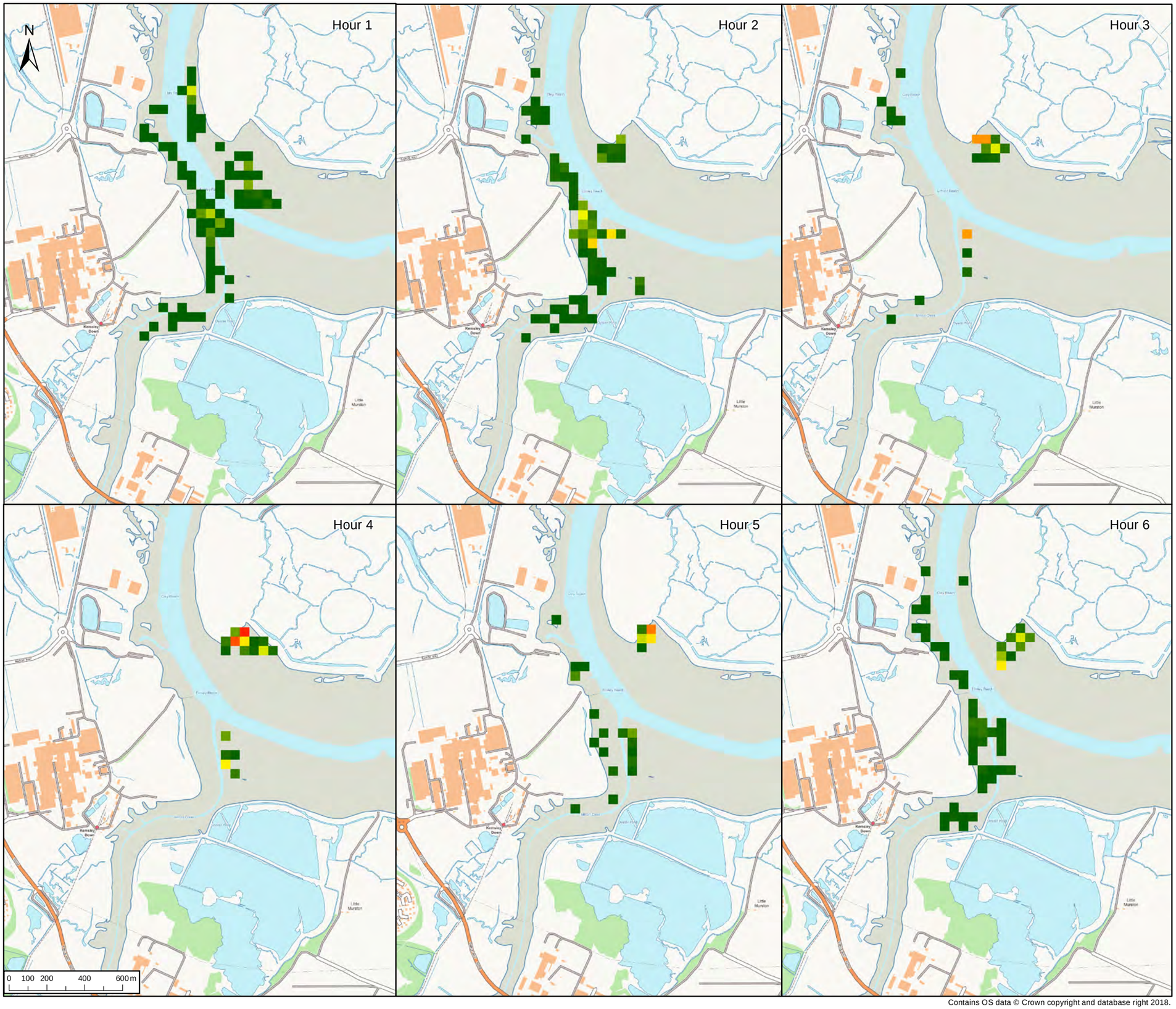

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Legend

Bird denisty

High : 110.93

Low : 11

Rev	Description	Date	Initial	Checked

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Willow Mere House, Compass Point Business Park
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T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Avocet recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.27		01

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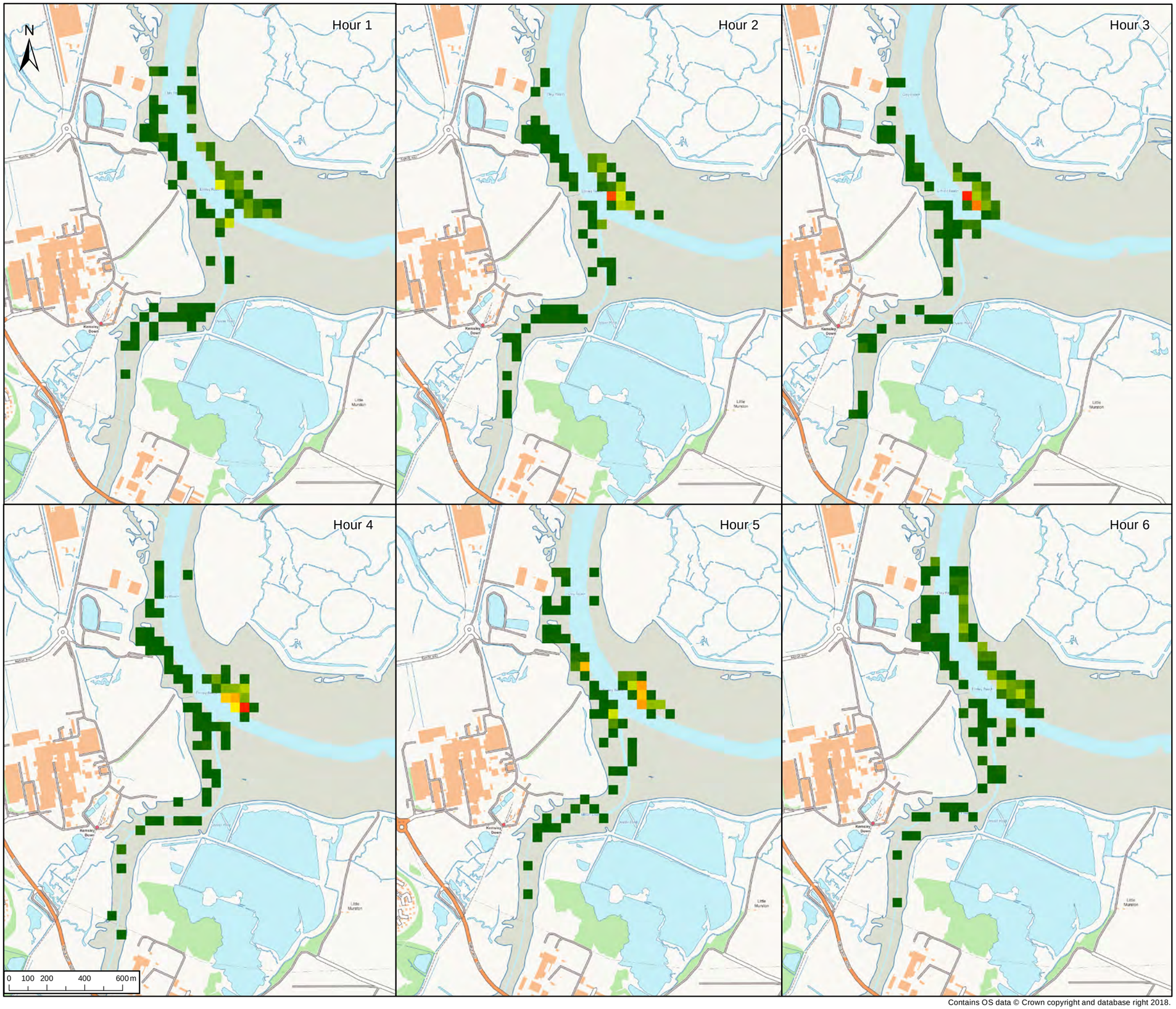
Document: V:\GIS temp (other offices work)\Kemsley K5\Drawings\47-0001-001 Avocet HW.mxd



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Legend

Bird density

High : 97.49

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Avocet recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.28		01

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Legend

Bird density

High : 16

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Bar-tailed Godwit recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.29		01

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Document: V:\GIS temp (other offices work)\Kemsley K5\Drawings\47-0003-001 Bar-tailed Godwit HW.mxd

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Legend

Bird density

High : 25

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Bar-tailed Godwit recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.30		01

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Legend

Bird density

High : 12

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Greenshank recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.31		01

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Legend

Bird density

High : 4.5

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Greenshank recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.32		01

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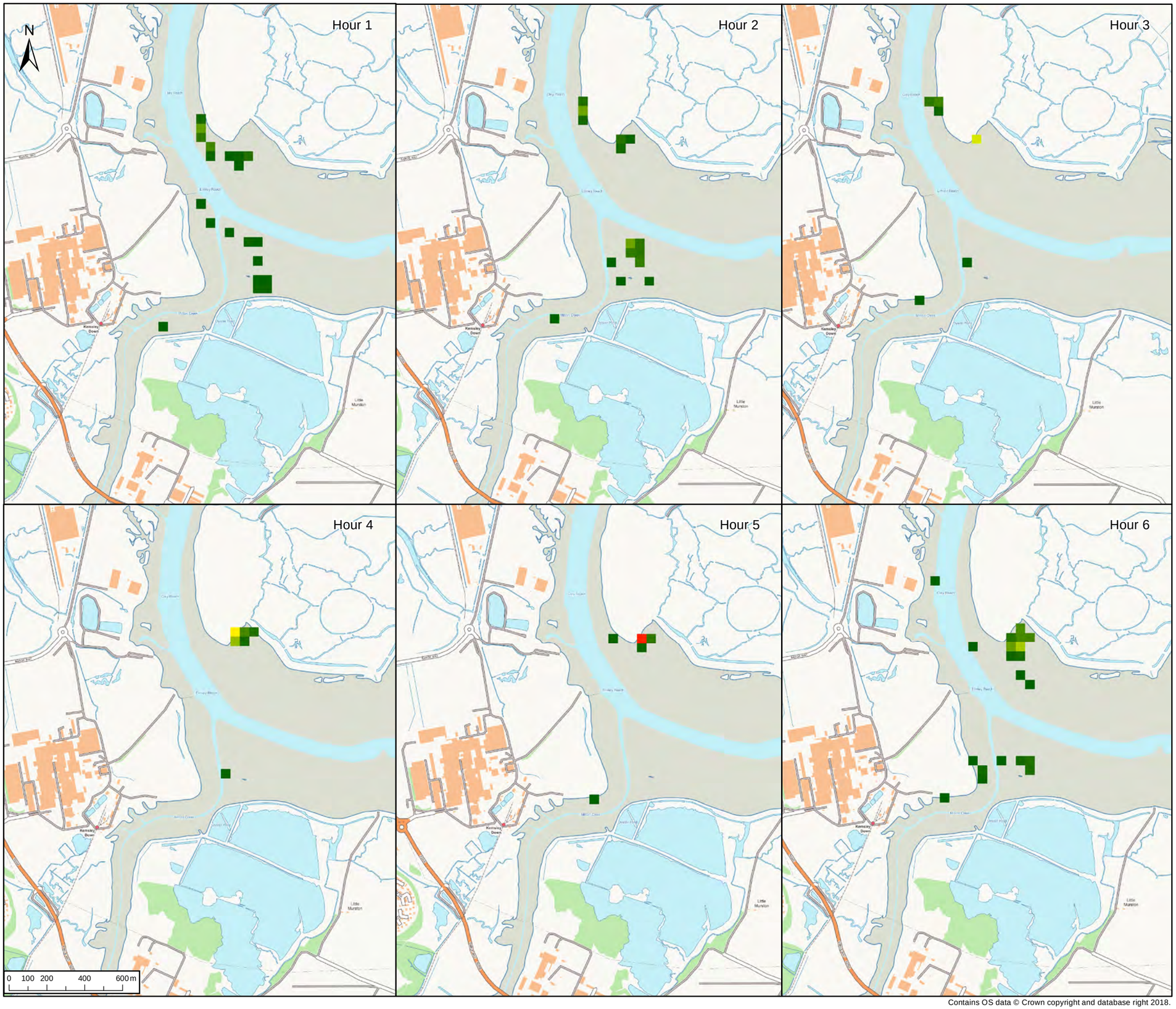

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Legend

Bird density

High : 1102.03

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Knot recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.33		01

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Legend

Bird density

High : 130.89

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Knot recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.34		01

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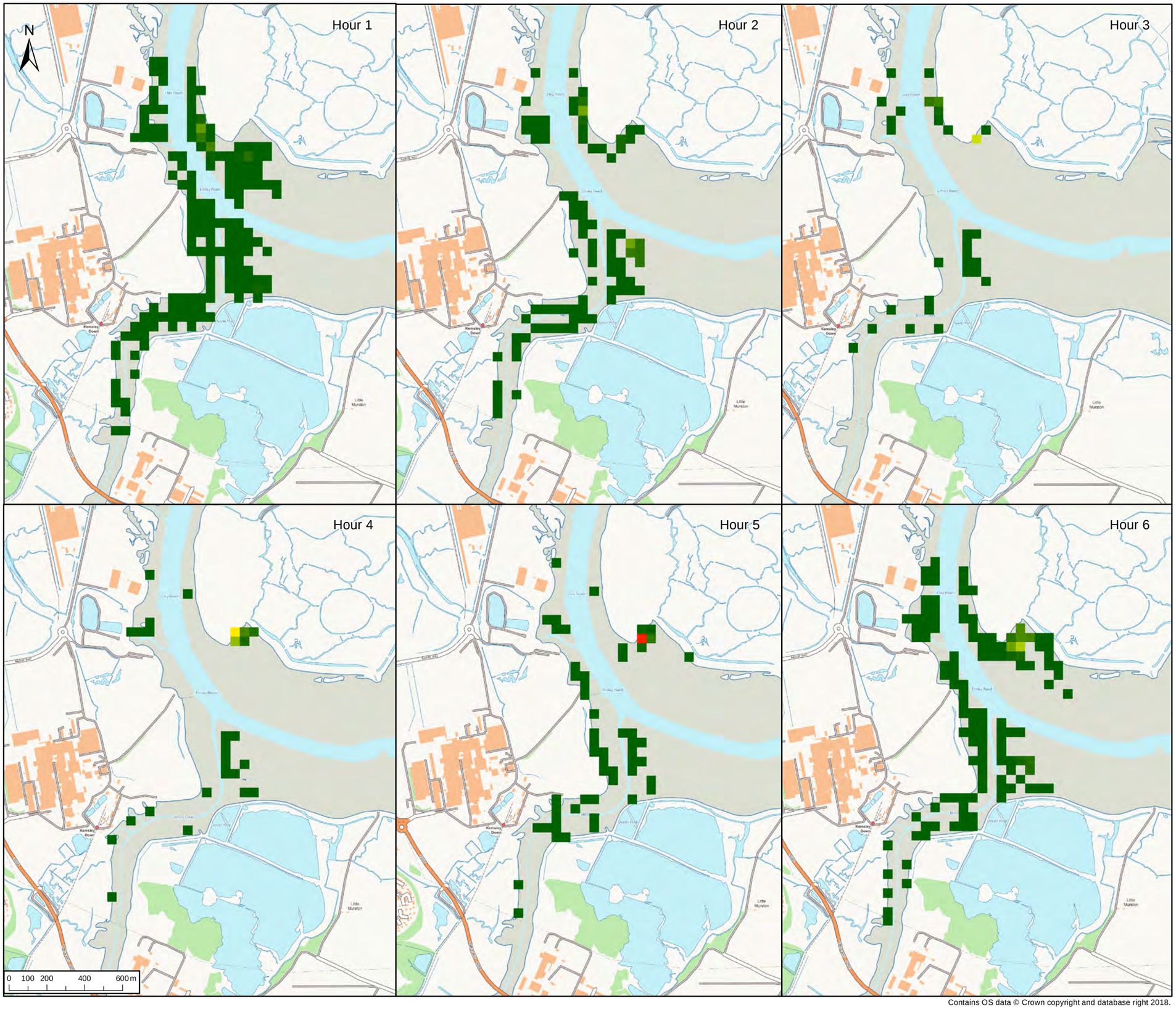

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Legend

Bird denisty

High : 1092.03

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Curlew recorded in high water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.35		01

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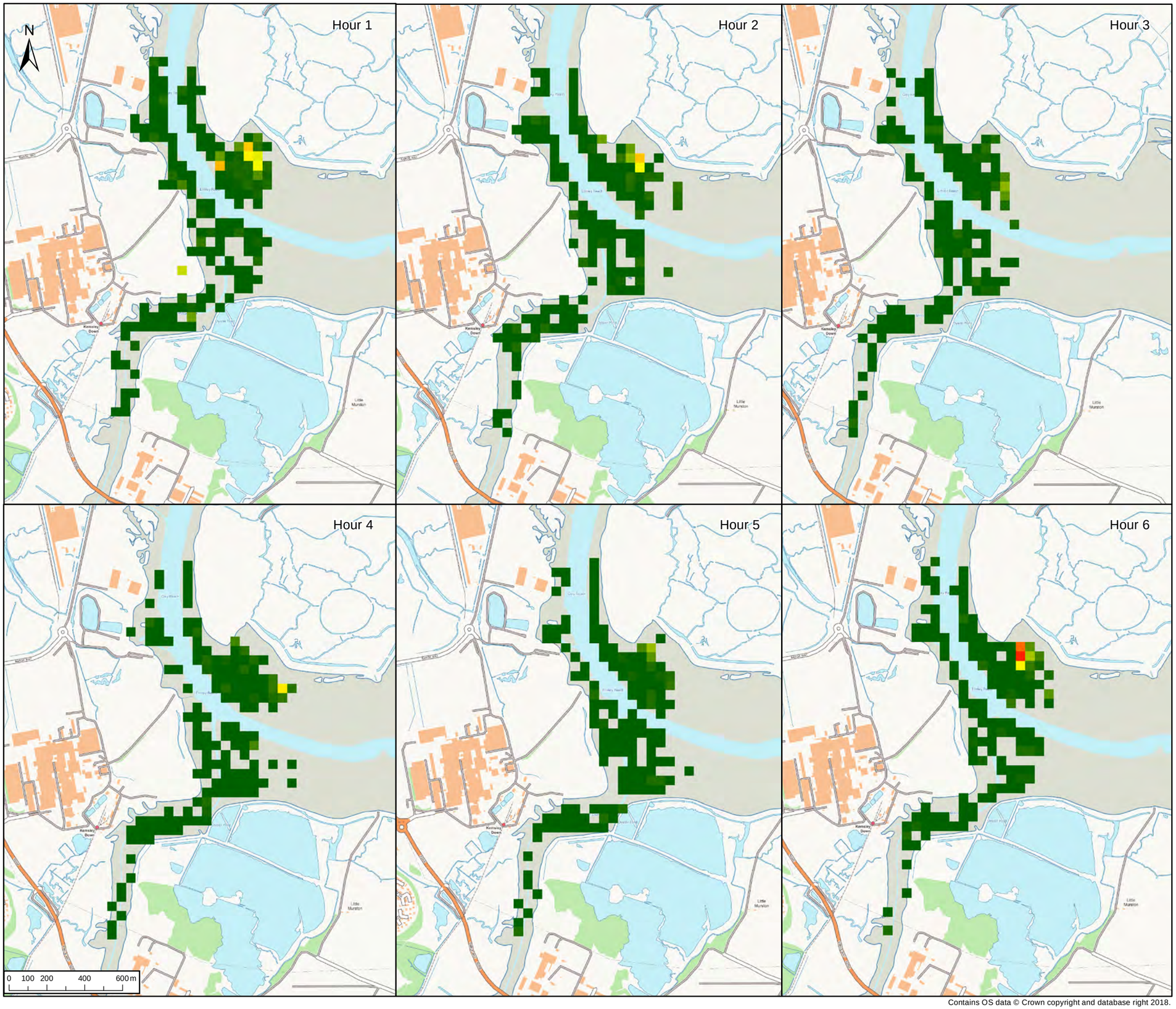

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Legend

Bird density

High : 23.79

Low : 1

Rev	Description	Date	Initial	Checked

RPS

Willow Mere House, Compass Point Business Park
Stocks bridge Way, St. Ives, Cambs, PE27 5JL
T: 01480 466 335 **E**: rpscm@rpsgroup.com **F**: 01480 466 911

Client: Wheelabrator Technologies

Project: Kemsley K3/WKN

Title: Density of Curlew recorded in low water survey

Status	Drawn By	PM/Checked By
Final	KM	MS
Job Ref	**Scale @ A3**	**Date**
ECO00047	1:20,000	OCT 18
Drawing Number		**Rev**
Figure 6.36		01

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Appendices

Appendix 1

WKN/K3 DCO – Habitats Regulations Assessment Screening Matrices

Note that Construction below refers to WKN only. Construction effects of the K3 Proposed Development were addressed in the 2010 ES with a conclusion of no significant effect/no adverse effect on integrity.

Operation and Decommissioning are for both WKN Proposed Development and the practical effect of the K3 with any separation noted in the supporting evidence.

Matrix 1 – Screening of Likely Significant Effects: The Swale SPA

Name of European Site	**The Swale Special Protection Area**																													
EU Code	UK9012011																													
Distance to Proposal site	160 m																													
European site features	Direct loss or damage of habitats used by interest species			Change in Habitat Management Regime			Loss of future space to allow for managed realignment			Urbanisation			Air quality - dust			Air quality - emissions			Hydrological Changes			Water quality			Disturbance			Introduction or spread of non-native invasive species		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Migratory Wintering species regularly occurring in internationally-important numbers over winter – **Dark**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l

bellied brent geese																													
Migratory Wintering species regularly occurring in internationally-important numbers over winter – **Dunlin**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l
Regularly supporting over 20,000 waterfowl over winter	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l
Diverse assemblage of breeding birds	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l

Evidence supporting conclusions

a.	No likely significant effect from direct loss of habitat on any interest feature. None of the surveys undertaken on site as being used by interest feature species. Therefore, it does not support habitat suitable for any citation species (ref HRAR para 5.21 – 5.28).
b.	Given the distance from the SPA, the DCO application will result in no change to current management regimes of any supporting habitat of The Swale SPA during either the construction of WKN or the operation/demolition of either WKN or K3 (ref HRAR para 5.29 – 5.32).
c.	The site comprises mostly hard standing and bare ground, with ruderal vegetation and dense scrub, it is circa 160 m from The Swale SPA. No loss of land for managed realignment is therefore expected (ref HRAR para 5.33 – 5.35).
d.	The Proposal Site is 160 m from The Swale SPA and set against a backdrop of existing industrial buildings. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (ref HRAR para 5.36 – 5.40).
e.	Based on studies elsewhere, it is anticipated that the majority of dust generated during construction/demolition would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site. The boundary of the Swale SPA site is 160 metres east of the proposal site and therefore outside the area potentially most affected. However, likely significant effects cannot be excluded without further assessment and/or application of mitigation as necessary (ref HRAR para 5.43-5.45)..
f.	No dust-generating activities are associated with the operational phase of K3 / WKN. Therefore, no likely significant effect is predicted on any interest feature.
g.	All emissions arising from construction traffic are either below the necessary EQS, the Process Contribution is <1% of the EQS or the habitats are not considered sensitive to changes in air quality. Therefore, no likely significant effect is predicted from traffic emissions during construction (ref HRAR para 5.43-5.56).
h.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard and/or the features are not considered sensitive (ref HRAR para 5.57 – 5.62).
i.	The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching). The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into the Swale. Therefore, no hydrological changes to terrestrial areas of The Swale SPA will occur as a result of the proposed development (ref HRAR para 5.66-5.69).
j.	In the absence of mitigation, likely significant effects on The Swale SPA due to changes in water quality cannot be excluded due to the relatively close proximity of the nearest boundary to the proposed site (ref HRAR para 5.63-5.65)..
k.	Because of the relative complexity of these issues, and their ability to have impacts on waterbirds/breeding marsh harrier within several hundred metres depending on the nature of the activity and the receptors, likely significant effects due to disturbance cannot be excluded at The Swale SPA without further assessment and/or application of mitigation as necessary (ref HRAR para 5.70-5.71)..

I.	The only non-native invasive species currently known to be in the area, though not on the proposal site, is Japanese Knotweed. No importation of material is required to build WKN and no final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (ref HRAR para 5.72 – 5.73).

Matrix 2 – Screening of Likely Significant Effects: The Swale Ramsar

Name of European Site	**The Swale Ramsar**																													
EU Code	N/A																													
Distance to Proposal site	160 m																													
	Direct loss or damage of habitats used by interest species			Change in Habitat Management Regime			Loss of future space to allow for managed realignment			Urbanisation			Air quality - dust			Air quality - emissions			Hydrological Changes			Water quality			Disturbance			Introduction or spread of non-native invasive species		
European site features	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Ramsar Criterion 2 - **Nationally rare and scarce plant species**	× a	× a	× a	× b	× b	×b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l
Ramsar Criterion 2 - **Red Data Book invertebrates**	× a	× a	× a	× b	× b	×b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l
Ramsar Criterion 5 – **Overwinter assemblage of international importance**	× a	× a	× a	× b	× b	×b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l

Ramsar Criterion 6 - Numbers of International Importance during spring/autumn passage **Redshank**	× a	× a	× a	× b	× b	×b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Dark bellied brent geese**	× a	× a	× a	× b	× b	×b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Grey Plover**	× a	× a	× a	× b	× b	×b	× c	× c	× c	× d	× d	× d	✓ e	× f	✓ e	× g	× h	× g	× i	× i	× i	✓ j	✓ j	× j	✓ k	✓ k	× k	× l	× l	× l

Evidence supporting conclusions

a.	No likely significant effect from direct loss of habitat on any interest feature. None of the surveys undertaken on site have identified the site as being used by interest feature species. Therefore, it does not support habitat suitable for any citation species (ref HRAR para 5.21 – 5.28).
b.	Given the distance from the Ramsar, the DCO application will result in no change to current management regimes of any supporting habitat of The Swale Ramsar during either the construction of WKN or the operation/demolition of either WKN or K3 (ref HRAR para 5.29 – 5.32).
c.	The site comprises mostly hard standing and bare ground, with ruderal vegetation and dense scrub, it is circa 160 m from The Swale Ramsar. No loss of land for managed realignment is therefore expected (ref HRAR para 5.33 – 5.35).
d.	The Proposal Site is 160 m from The Swale Ramsar and set against a backdrop of existing industrial buildings. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (ref HRAR para 5.36 – 5.40).
e.	Based on studies elsewhere, it is anticipated that the majority of dust generated during construction/demolition would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site. The boundary of the Swale Ramsar site is 160 metres east of the proposal site and therefore outside the area potentially most affected. However, likely significant effects cannot be excluded without further assessment and/or application of mitigation as necessary (ref HRAR para 5.44). .
f.	No dust-generating activities are associated with the operational phase of K3 / WKN. Therefore, no likely significant effect is predicted on any interest feature.
g.	All emissions arising from construction traffic are either below the necessary EQS, the Process Contribution is <1% of the EQS or the habitats are not considered sensitive to changes in air quality. Therefore, no likely significant effect is predicted from traffic emissions during construction (ref HRAR para 5.46-5.47)).
h.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard and/or the features are not considered sensitive (ref HRAR para 5.57 – 5.62).
i.	The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching). The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into the Swale. Therefore, no hydrological changes to terrestrial areas of The Swale Ramsar will occur as a result of the proposed development (ref HRAR para 5.66-5.69).
j.	In the absence of mitigation, likely significant effects on The Swale Ramsar due to changes in water quality cannot be excluded due to the relatively close proximity of the nearest boundary to the proposed site (ref HRAR para 5.63-6.65)..
k.	Because of the relative complexity of these issues, and their ability to have impacts on waterbirds/breeding marsh harrier within several hundred metres depending on the nature of the activity and the receptors, likely significant effects due to disturbance cannot be excluded at The Swale Ramsar without further assessment and/or application of mitigation as necessary (ref HRAR para 5.70-5.71)..

I.	The only non-native invasive species currently known to be in the area, though not on the proposal site, is Japanese Knotweed. No importation of material is required to build WKN and no final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (ref HRAR para 5.72 – 5.73).

Matrix 3 – Screening of Likely Significant Effects: Medway Estuary and Marshes SPA

Name of European Site	**Medway Estuary and Marshes SPA**																													
EU Code	UK9012031																													
Distance to Proposal site	2.1 km																													
European site features	Direct loss or damage of habitats used by interest species			Change in Habitat Management Regime			Loss of future space to allow for managed realignment			Urbanisation			Air quality - dust			Air quality – emissions			Hydrological Changes			Water quality			Disturbance			Introduction or spread of non-native invasive species		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Regularly supporting more than 1% of the GB breeding population of an Annex 1 species in summer – **Avocet**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Regularly supporting more than 1% of the GB breeding population of an Annex 1 species in summer – **Little tern**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Annex 1 Species Regularly Wintering in Numbers of European Importance - **Avocet**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Annex 1 Species Regularly on Passage in Numbers of European Importance – **Grey Plover**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Annex 1 Species Regularly on Passage	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

in Numbers of European Importance – **Common Redshank**																													
Migratory Species Regularly Wintering in Numbers of European Importance - **Dark-bellied Brent Goose**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Migratory Species Regularly Wintering in Numbers of European Importance - **Shelduck**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Migratory Species Regularly Wintering in Numbers of European Importance - **Pintail**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Migratory Species Regularly Wintering in Numbers of European Importance - **Ringed plover**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Migratory Species Regularly Wintering in Numbers of European Importance - **Knot**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Migratory Species Regularly Wintering in Numbers of European Importance - **Dunlin**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Regularly supports in winter a diverse assembla	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

ge of wintering species																													
Regularly supports over 20,000 waterfowl	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Diverse assemblage of breeding migratory waterfowl	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Evidence supporting conclusions

a.	No likely significant effect from direct loss of habitat on any interest feature. None of the surveys undertaken on site have identified the site as being used by interest feature species. Therefore, it does not support habitat suitable for any citation species (ref HRAR para 5.21 – 5.28).
b.	Given the distance from the SPA, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during either the construction of WKN or the operation/demolition of either WKN or K3 (ref HRAR para 5.29 – 5.32)).
c.	The site is already developed land and >2 km from the Medway Estuary & Marshes SPA. No loss of land for managed realignment is therefore expected (ref HRAR para 5.33 – 5.35).
d.	The Proposal Site is 2.1 km from the Medway Estuary and Marshes SPA and set against a backdrop of existing industrial buildings. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (ref HRAR para 5.36 – 5.40).
e.	Based on studies elsewhere, it is anticipated that the majority of dust generated would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site. The boundary of the SPA site is over 2 km to the north of the proposal site and therefore outside the area potentially affected by any dust. Therefore, no likely significant effect is predicted on any interest feature (ref HRAR para 5.43 – 5.45)..

f.	All emissions arising from construction traffic are either below the necessary EQS, the Process Contribution is <1% of the EQS or the habitats are not considered sensitive to changes in air quality. Therefore, no likely significant effect is predicted from traffic emissions during construction (ref HRAR para 5.46-5.57).
g.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (ref HRAR para 5.57 – 5.62).
h.	The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching). The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into the Swale. Therefore, no hydrological changes to terrestrial areas of the Medway Estuary & Marshes SPA or area which supports a SPA species will occur as a result of the proposed development (ref HRAR para 5.66- 5.69).
i.	Given the distance between the proposal site and the SPA, no changes to water quality are anticipated (ref HRAR para 5.63-5.65).
j.	Given the distance between the proposal site and the SPA, no likely significant effect on any interest feature is predicted from disturbance (ref HRAR para 5.70-5.71)..).
k.	The only non-native invasive species currently known to be in the area, though not on the Proposal site, is Japanese Knotweed. No importation of material is required to build WKN and no final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (ref HRAR para 5.72 – 5.73).

Matrix 4 – Screening of Likely Significant Effects: Medway Estuary and Marshes Ramsar

Name of European Site	**Medway Estuary and Marshes Ramsar**									
EU Code	N/A									
Distance to Proposal site	2.1 km									
European site features	Direct loss or damage of habitats used by interest species	Change in Habitat Management Regime	Loss of future space to allow for managed realignment	Urbanisation	Air quality - dust	Air quality – emissions	Hydrological Changes	Water quality	Disturbance	Introduction or spread of non-native invasive species

	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Ramsar Criterion 2 - **Nationally rare and scarce plant species**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 2 - **Red Data Book invertebrates**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 5 – **Overwintering assemblage of international importance**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 6 - Regularly on Passage in Numbers of International Importance – **Grey Plover**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Ramsar Criterion 6 - Species Regularly on Passage in Numbers of International Importance – **Common Redshank**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Dark-bellied Brent Goose**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Shelduck**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance – **Pintail**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Ringed plover**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Knot**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Dunlin**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Evidence supporting conclusions

a.	No likely significant effect from direct loss of habitat on any interest feature. None of the surveys undertaken on site have identified the site as being used by interest feature species. Therefore, it does not support habitat suitable for any citation species (ref HRAR para 5.21 – 5.28).
b.	Given the distance from the Ramsar, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during either the construction of WKN or the operation/demolition of either WKN or K3 (ref HRAR para 5.29 – 5.32).
c.	The site is already developed land and >2 km from the Medway Estuary & Marshes Ramsar. No loss of land for managed realignment is therefore expected (ref HRAR para 5.33 – 5.35).
d.	The Proposal Site is 2.1 km from the Medway Estuary and Marshes Ramsar and set against a backdrop of existing industrial buildings. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (ref HRAR para 5.36 – 5.40).
e.	Based on studies elsewhere, it is anticipated that the majority of dust generated would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site. The boundary of the Ramsar site is over 2 km to the north of the proposal site and therefore outside the area potentially affected by any dust. Therefore, no likely significant effect is predicted on any interest feature (ref HRAR para 5.43 – 5.45)..
f.	All emissions arising from construction traffic are either below the necessary EQS, the Process Contribution is <1% of the EQS or the habitats are not considered sensitive to changes in air quality. Therefore, no likely significant effect is predicted from traffic emissions during construction (ref HRAR para 5.46-5.47).
g.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (ref HRAR para 5.57 – 5.62).
h.	The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching). The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into the Swale. Therefore, no hydrological changes to terrestrial areas of the Medway Estuary & Marshes Ramsar or area which supports a Ramsar species will occur as a result of the proposed development (ref HRAR para 5.66- 5.69).
i.	Given the distance between the proposal site and the Ramsar, no changes to water quality are anticipated (ref HRAR para 5.63-5.65).
j.	Given the distance between the proposal site and the Ramsar, no likely significant effect on any interest feature is predicted from disturbance (ref HRAR para 5.70-5.71).
k.	The only non-native invasive species currently known to be in the area, though not on the Proposal site, is Japanese Knotweed. No importation of material is required to build WKN and no final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (ref HRAR para 5.72 – 5.73).

Matrix 5 – Screening of Likely Significant Effects: Thames Estuary and Marshes SPA

Name of European Site	**Thames Estuary and Marshes SPA**																													
EU Code	UK9012021																													
Distance to Proposal site	8.7 km																													
European site features	Direct loss or damage of habitats used by interest species			Change in Habitat Management Regime			Loss of future space to allow for managed realignment			Urbanisation			Air quality – dust			Air quality - emissions			Hydrological Changes			Water quality			Disturbance			Introduction or spread of non-native invasive species		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Annex 1 Species Regularly Wintering in Numbers of European Importance – **Avocet**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Annex 1 Species Regularly Wintering in Numbers of European Importance – **Hen harrier**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Migratory species regularly occurring on passage – **Ringed plover**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Migratory Species Regularly Wintering in Numbers of European Importance - **Dunlin**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Migratory Species Regularly Wintering in Numbers of European Importance - **Knot**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Migratory Species Regularly Wintering in Numbers of European Importance – **Black-tailed godwit**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Migratory Species Regularly Wintering	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

in Numbers of European Importance - **Redshank**																													
Migratory Species Regularly Wintering in Numbers of European Importance - **Grey plover**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Assemblage regularly supporting over 20,000 waterfowl	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Evidence supporting conclusions

a.	No likely significant effect from direct loss of habitat on any interest feature. None of the surveys undertaken on site have identified the site as being used by interest feature species. Therefore, it does not support habitat suitable for any citation species (ref HRAR para ref HRAR para 5.21 – 5.28).
b.	Given the distance from the SPA, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during either the construction or operation of the plant (ref HRAR para 5.29 – 5.32).
c.	The site is already surrounded by developed land and 8.7 km from the Thames Estuary & Marshes SPA. No loss of land for managed realignment is therefore expected (ref HRAR para 5.33 – 5.35).
d.	The proposal site is 8.7 km from the Thames Estuary and Marshes SPA and set against a backdrop of existing industrial buildings. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (ref HRAR para 5.36 – 5.40).

e.	Based on studies elsewhere, it is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site. The boundary of the SPA site is 8.7 km to the north east of the proposal site and therefore outside the area potentially affected by any dust. Therefore, no likely significant effect is predicted on any interest feature (ref HRAR para 5.43 – 5.45)..
f.	Given the distance to the designated site (8.7 km), no effect from construction traffic emissions are predicted (ref HRAR para 5.46 - 5.47).
g.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (ref HRAR para 5.57 – 5.62).
h.	The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching). The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into the Swale. Therefore, no hydrological changes to terrestrial areas of the SPA or area which supports a SPA species will occur as a result of the proposed development (ref HRAR para 5.66- 5.69).
i.	Given the distance between the proposal site and the SPA, no changes to water quality are anticipated (ref HRAR para 5.63-5.65).
j.	Given the distance between the proposal site and the SPA, no likely significant effect on any interest feature is predicted from disturbance (ref HRAR para 5.70-5.71).
k.	The only non-native invasive species currently known to be in the area, though not on the Proposal site, is Japanese Knotweed. No importation of material is required to build WKN and no final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (ref HRAR para 5.72 – 5.73).

Matrix 6 – Screening of Likely Significant Effects: Thames Estuary and Marshes Ramsar

Name of European Site	**Thames Estuary and Marshes Ramsar**									
EU Code	N/A									
Distance to Proposal site	8.7 km									
European site features	Direct loss or damage of habitats used	Change in Habitat Management Regime	Loss of future space to allow for	Urbanisation	Air quality – dust	Air quality - emissions	Hydrological Changes	Water quality	Disturbance	Introduction or spread of non-native

	by interest species						managed realignment																					invasive species		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Ramsar Criterion 2 - **Nationally rare and scarce plant species**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 2 - **Red Data Book invertebrates**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 5 – **Assemblage of international importance**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 6 - Species Regularly occurring on passage in Numbers of International Importance - **Black-tailed godwit**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - **Knot**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - **Dunlin**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Evidence supporting conclusions

a.	No likely significant effect from direct loss of habitat on any interest feature. None of the surveys undertaken on site have identified the site as being used by interest feature species. Therefore, it does not support habitat suitable for any citation species (ref HRAR para ref HRAR para 5.21 – 5.28).
b.	Given the distance from the Ramsar, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during construction of WKN, or the operation/demolition of K3 or WKN (ref HRAR para 5.29 – 5.32).
c.	The site is already surrounded by developed land and 8.7 km from the Thames Estuary & Marshes Ramsar. No loss of land for managed realignment is therefore expected (ref HRAR para 5.33-5.35).
d.	The proposal site is 8.7 km from the Thames Estuary and Marshes Ramar and set against a backdrop of existing industrial buildings. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (ref HRAR para 5.36 – 5.40).

e.	Based on studies elsewhere, it is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site. The boundary of the Ramsar site is 8.7 km to the north east of the proposal site and therefore outside the area potentially affected by any dust. Therefore, no likely significant effect is predicted on any interest feature (ref HRAR para 5.43 – 5.45)..
f.	Given the distance to the designated site (8.7 km), no effect from construction traffic emissions are predicted (ref HRAR para 5.46-5.47).
g.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (ref HRAR para 5.57 – 5.62).
h.	The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching). The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into the Swale. Therefore, no hydrological changes to terrestrial areas of the Ramsar or area which supports a Ramsar species will occur as a result of the proposed development (ref HRAR para 5.66- 5.69).
i.	Given the distance between the proposal site and the Ramsar, no changes to water quality are anticipated (ref HRAR para 5.63-5.65).
j.	Given the distance between the proposal site and the Ramsar, no likely significant effect on any interest feature is predicted from disturbance (ref HRAR para 5.70-5.71).
k.	The only non-native invasive species currently known to be in the area, though not on the Proposal site, is Japanese Knotweed. No importation of material is required to build WKN and no final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (ref HRAR para 5.72 – 5.73).

Matrix 7 – Screening of Likely Significant Effects: Outer Thames Estuary SPA

Name of European Site	**Outer Thames Estuary SPA**
EU Code	**UK9020309**
Distance to Proposal site	>9 km

European site features	Direct loss or damage of habitats used by interest species			Change in Habitat Management Regime			Loss of future space to allow for managed realignment			Urbanisation			Air quality - dust			Air quality - emissions			Hydrological Changes			Water quality			Disturbance			Introduction or spread of non-native invasive species		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Red throated diver	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Common tern	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k
Little tern	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Evidence supporting conclusions

a.	No likely significant effect from direct loss of habitat on any interest feature. None of the surveys undertaken on site have identified the site as being used by interest feature species. Therefore, it does not support habitat suitable for any citation species (ref HRAR para ref HRAR para 5.21 – 5.28).
b.	Given the distance from the SPA, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during either the construction or operation of the plant (ref HRAR para 5.29 – 5.32).
c.	The site is already surrounded by developed land and 9 km from the Thames Estuary & Marshes SPA. No loss of land for managed realignment is therefore expected (ref HRAR para 5.33 – 5.35).
d.	The proposal site is 9 km from the Thames Estuary and Marshes SPA and set against a backdrop of existing industrial buildings. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (ref HRAR para 5.36 – 5.40).
e.	Based on studies elsewhere, it is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site. The boundary of the SPA site is 9 km to the north east of the proposal site and therefore outside the area potentially affected by any dust. Therefore, no likely significant effect is predicted on any interest feature (ref HRAR para 5.43 – 5.45)..
f.	Given the distance to the designated site (9 km), no effect from construction traffic emissions are predicted (ref HRAR para 5.46-5.47).
g.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (ref HRAR para 5.57 – 5.62).
h.	The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching). The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into the Swale. Therefore, no hydrological changes to terrestrial areas of the SPA or area which supports a SPA species will occur as a result of the proposed development (ref HRAR para 5.66- 5.69).
i.	Given the distance between the proposal site and the SPA, no changes to water quality are anticipated (ref HRAR para 5.63-5.65).
j.	Given the distance between the proposal site and the SPA, no likely significant effect on any interest feature is predicted from disturbance (ref HRAR para 5.70-5.71).
k.	The only non-native invasive species currently known to be in the area, though not on the Proposal site, is Japanese Knotweed. No importation of material is required to build WKN and no final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (ref HRAR para 5.72 – 5.73).

Matrix 8 – Screening of Likely Significant Effects: Queendown Warren SAC

Name of European Site	**Queendown Warren SAC**																													
EU Code	UK0012833																													
Distance to Proposal site	>9 km																													
European site features	Direct loss or damage of habitats used by interest species			Change in Habitat Management Regime			Loss of future space to allow for managed realignment			Urbanisation			Air quality – dust			Air quality - emissions			Hydrological Changes			Water quality			Disturbance			Introduction or spread of non-native invasive species		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× e	× e	× f	× g	× f	× h	× h	× h	× i	× i	× i	× j	× j	× j	× k	× k	× k

Evidence supporting conclusions

a.	No likely significant effect from direct loss of habitat on any interest feature given the distance to the SAC (ref HRAR para ref HRAR para 5.21 – 5.28).
b.	Given the distance from the SAC, the DCO application will result in no change to current management regimes of any supporting habitat of the SAC during either the construction or operation of the plant (ref HRAR para 5.29 – 5.32).
c.	The site is already surrounded by developed land and 9 km from SAC. No loss of land for managed realignment is therefore expected (ref HRAR para 5.33 – 5.35).
d.	The proposal site is 9 km from the SAC and set against a backdrop of existing industrial buildings. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (ref HRAR para 5.36 – 5.40).
e.	Based on studies elsewhere, it is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that no change in level of exposure is expected beyond 300 metres from the site. The boundary of the SAC site is 9 km to the north east of the proposal site and therefore outside the area potentially affected by any dust. Therefore, no likely significant effect is predicted on any interest feature (ref HRAR para 5.43 – 5.45).
f.	Given the distance to the designated site (9 km), no effect from construction traffic emissions are predicted (ref HRAR para 5.46-5.47).
g.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (ref HRAR para 5.57 – 5.62).
h.	The first drainage system will collect clean surface water runoff (for example from building roof areas) and store it in the lagoon. The second drainage system will collect 'dirty' runoff (for example from the FGT area) and store it in the 'dirty' water tank. This 'dirty' water will then be used in the process as required (for example for ash quenching). The clean water will be stored in the lagoon and used to top up the 'dirty' water tank. If the lagoon has reached the maximum acceptable capacity it will be discharged at a controlled rate into the Swale. Therefore, no hydrological changes to terrestrial areas of the SPA or area which supports a SPA species will occur as a result of the proposed development (ref HRAR para 5.66- 5.69).
i.	Given the distance between the proposal site and the SPA, no changes to water quality are anticipated (ref HRAR para 5.63-5.65).
j.	Given the distance between the proposal site and the SPA, no likely significant effect on any interest feature is predicted from disturbance (ref HRAR para 5.70-5.71).
k.	The only non-native invasive species currently known to be in the area, though not on the Proposal site, is Japanese Knotweed. No importation of material is required to build WKN and no final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (ref HRAR para 5.72 – 5.73).

Appendix 2:

WKN/K3 – Habitats Regulations Assessment Integrity Matrices

Matrix 9 – Integrity matrices: The Swale SPA

Name of European Site	The Swale SPA																					
EU Code	UK9012011																					
Distance to Proposal site	160 m																					
	Air Quality - dust			Water quality			Disturbance – Activity			Disturbance – Recreation			Disturbance – Noise			Disturbance - Lighting			In-combination effects		
European site features	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Migratory Wintering species regularly occurring in internationally-important numbers over winter – **Dark bellied brent geese**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h
Migratory Wintering species regularly occurring in internationally-important numbers over winter – **Dunlin**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h

Regularly supporting over 20,000 waterfowl over winter	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h
Diverse assemblage of breeding birds	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h

Evidence supporting conclusions

a.	Whilst studies suggest most dust from construction of the proposed project would be deposited in the area immediately surrounding the source (up to 50 m, which is outside the boundary of the Swale SPA), and that no change in level of exposure is expected beyond 300 m from the site, this does mean that some impacts are possible within the Swale SPA boundary, which is located 160 m to the north east of the Proposal site. To ensure compliance with relevant standards and guidelines relating to dust and airborne particulate matter, various techniques not relating to the avoidance or reduction in effect on a European site will be implemented during the construction phase. This will ensure that dust is managed in line with good practice such that a conclusion of no adverse effect on integrity, once mitigation is incorporated, can be reached (ref HRAR – para 6.5-6.7). It is assumed that similar avoidance measures would be included, as necessary, within any demolition plan to ensure no adverse effect on the SPA.
b.	A site-wide surface water pollution prevention system will be developed to prevent the discharge of any contaminated surface water from the site. 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. Therefore, a conclusion of no adverse effect on integrity can be reached, once this mitigation is included (ref HRAR – 6.8-6.14). It is assumed that similar avoidance measures would be included, as necessary, within any demolition plan to ensure no adverse effect on the SPA.
c.	It is considered there is a limited potential for disturbance to waterbirds to be caused by activity associated with the Proposal when account is taken of the fact that, given the distance to The Swale from the proposal site and existing, intervening buildings. To ensure no visual disturbance On this basis, a conclusion of no adverse effect on integrity can be reached (ref HRAR – 6.22-6.148).
d.	The potential for disturbance to SPA Citation species from recreational activities by either construction or subsequent operational/demolition staff is considered low. Whilst there is access to the Saxon Shore Way from the wider Kemsley Paper Mill, 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/demolition of the site, as Sittingbourne is within potential travel distance over lunch break. However, it should be borne in mind that Milton Creek is outside the SPA and that dogs will not be permitted on site. It is anticipated that few if any construction, operational or demolition staff will access the Swale SPA. On this basis, no adverse effect on integrity is predicted (ref HRAR – 6.17 – 6.18).
e.	An assessment of the potential for each of the interest feature/intertidal assemblage bird species to be susceptible to noise disturbance, based on survey data undertaken across the intertidal area between 2009 and 2018 has been undertaken (ref HRAR - 6.22 – 6.148). This has concluded that, subject to the implementation of suitable avoidance measures (ref HRAR – 6.147-148), no adverse effect on integrity with respect to the interest feature/intertidal assemblage is predicted. It is assumed that similar avoidance measures would be included, as necessary, within any demolition plan to ensure no adverse effect on the SPA.
f.	Under normal operating conditions, the Proposed Development will produce a low hum, rather than any loud, sudden noises that might elicit a disturbance response from nearby interest-feature birds using the intertidal areas of The Swale. It will furthermore not result in noise levels of greater than 55 dBL_{Amax} within the SPA. On this basis, no adverse effect on integrity is predicted (ref HRAR – para 6.24).
g.	Given the distance of the proposed development to the SPA, and that there is further development between the Proposal Site and designated site, light from the proposed development does not have the potential to illuminate either the terrestrial or inter-tidal habitats above that which it is currently. All lighting will be designed as per best practice standards to ensure that no additional light spill above the current situation would occur. On this basis, no adverse effect on integrity is predicted (ref HRAR – 6.19 – 6.21, DCO Requirement 22). It is assumed that similar avoidance measures would be included, as necessary, within any demolition plan to ensure no adverse effect on the SPA.
h.	The in-combination assessment has concluded that there are no adverse effects on the integrity of designated sites, either because there are no ecological pathways via which to do this, or because the in-combination modelling (for noise, air, etc) do not exceed the maximum thresholds. Therefore, no adverse effect on integrity is predicted (ref HRAR Section 7). At this stage, in-combination effects with demolition of WKN/K3 are impossible to predict, given the uncertainty over timing. However, assuming all necessary mitigation/avoidance measures are adopted during demolition, adverse effects on integrity are considered highly unlikely.

Matrix 9 – Integrity matrices: The Swale Ramsar

Name of European Site	The Swale Ramsar
EU Code	N/A
Distance to Proposal site	160 m

European site features	Air Quality - dust			Water quality			Disturbance – Activity			Disturbance – Recreation			Disturbance – Noise			Disturbance - Lighting			In-combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Ramsar Criterion 2 - **Nationally rare and scarce plant species**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h
Ramsar Criterion 2 - **Red Data Book invertebrates**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h
Ramsar Criterion 5 – **Overwinter assemblage of international importance**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance **Redshank**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h
Ramsar Criterion 6 - Regularly Wintering in Numbers of International	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h

Importance - **Dark bellied brent geese**																					
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Grey Plover**	× a	× a	× a	× b	× b	× b	× c	× c	× c	× d	× d	× d	× e	× f	× e	× g	× g	× g	× h	× h	× h

Evidence supporting conclusions

a.	Whilst studies suggest most dust from construction of the proposed project would be deposited in the area immediately surrounding the source (up to 50 m, which is outside the boundary of the Swale Ramsar), and that no change in level of exposure is expected beyond 300 m from the site, this does mean that some impacts are possible within the Swale Ramsar boundary, which is located 160 m to the north east of the Proposal site. To ensure compliance with relevant standards and guidelines relating to dust and airborne particulate matter, various techniques not relating to the avoidance or reduction in effect on a European site will be implemented during the construction phase. This will ensure that dust is managed in line with good practice such that a conclusion of no adverse effect on integrity, once mitigation is incorporated, can be reached (ref HRAR – para 6.5-6.7). It is assumed that similar avoidance measures would be included, as necessary, within any demolition plan to ensure no adverse effect on the Ramsar.
b.	A site-wide surface water pollution prevention system will be developed to prevent the discharge of any contaminated surface water from the site. 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. Therefore, a conclusion of no adverse effect on integrity can be reached, once this mitigation is included (ref HRAR – 6.8-6.14). It is assumed that similar avoidance measures would be included, as necessary, within any demolition plan to ensure no adverse effect on the Ramsar.
c.	It is considered there is a limited potential for disturbance to waterbirds to be caused by activity associated with the Proposal when account is taken of the fact that, given the distance to The Swale from the proposal site and existing, intervening buildings. To ensure no visual disturbance On this basis, a conclusion of no adverse effect on integrity can be reached (ref HRAR – 6.22 - 6.148).
d.	The potential for disturbance to Ramsar Citation species from recreational activities by either construction or subsequent operational/demolition staff is considered low. Whilst there is access to the Saxon Shore Way from the wider Kemsley Paper Mill, 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/demolition of the site, as Sittingbourne is within potential travel distance over lunch break. However, it should be borne in mind that Milton Creek is outside the Ramsar and that dogs will not be permitted on site. It is anticipated that few if any construction, operational or demolition staff will access the Swale Ramsar. On this basis, no adverse effect on integrity is predicted (ref HRAR – 6.17 – 6.18).
e.	An assessment of the potential for each of the interest feature/intertidal assemblage bird species to be susceptible to noise disturbance, based on survey data undertaken across the intertidal area between 2009 and 2018 has been undertaken (ref HRAR - 6.22 – 6.148). This has concluded that, subject to the implementation of suitable avoidance measures (ref HRAR – 6.147-148), no adverse effect on integrity with respect to the interest feature/intertidal assemblage is predicted. It is assumed that similar avoidance measures would be included, as necessary, within any demolition plan to ensure no adverse effect on the Ramsar.

f.	Under normal operating conditions, the Proposed Development will produce a low hum, rather than any loud, sudden noises that might elicit a disturbance response from nearby interest-feature birds using the intertidal areas of The Swale. It will furthermore not result in noise levels of greater than 55 dBL_{Amax} within the Ramsar. On this basis, no adverse effect on integrity is predicted (ref HRAR – para 6.24).
g.	Given the distance of the proposed development to the Ramsar, and that there is further development between the Proposal Site and designated site, light from the proposed development does not have the potential to illuminate either the terrestrial or inter-tidal habitats above that which it is currently. All lighting will be designed as per best practice standards to ensure that no additional light spill above the current situation would occur. On this basis, no adverse effect on integrity is predicted (ref HRAR – 6.19 – 6.21, DCO Requirement 22). It is assumed that similar avoidance measures would be included, as necessary, within any demolition plan to ensure no adverse effect on the Ramsar.
h.	The in-combination assessment has concluded that there are no adverse effects on the integrity of designated sites, either because there are no ecological pathways via which to do this, or because the in-combination modelling (for noise, air, etc) do not exceed the maximum thresholds. Therefore, no adverse effect on integrity is predicted (ref HRAR Section 7). At this stage, in-combination effects with demolition of WKN/K3 are impossible to predict, given the uncertainty over timing. However, assuming all necessary mitigation/avoidance measures are adopted during demolition, adverse effects on integrity are considered highly unlikely.

EC Directive 79/409 on the Conservation of Wild Birds:
Special Protection Area

The Swale extensions (Kent)

The Swale Special Protection Area is a wetland of international importance, comprising intertidal mudflats, shellbeaches, saltmarshes and extensive grazing marshes. It provides habitats for important assemblages of wintering waterfowl, and also supports notable breeding bird populations.

The proposed extensions to the Swale SPA include areas of intertidal mudflats and grazing marshes adjacent to the existing site and within The Swale Site of Special Scientific Interest. These areas are integral components of the complex of estuarine habitats composing the Swale.

The Swale qualifies under Article 4.2 of the EC Birds Directive as a wetland of international importance by virtue of regularly supporting over 20,000 waterfowl, with an average peak count of 57,600 birds recorded in the five winter period 1986/87 to 1990/91. This total includes internationally or nationally important wintering populations of seventeen species of migratory waterfowl. Of these, two occur in significant numbers within the proposed extensions: dark-bellied brent geese *Branta bernicla bernicla* and dunlin *Calidris alpina*. In the five winter period 1986/87 to 1990/91, the average peak counts for the Swale as a whole were 2,850 dark-bellied brent geese (1.6% of the world population, 3.1% of the British wintering population) and 13,000 dunlin (3% of the British wintering population). The mudflats of the proposed extensions have, in recent years, supported over 400 dark-bellied brent geese and 900 dunlin.

The mudflats of the proposed extensions support smaller numbers of several other species of wintering migratory waterfowl, including oystercatcher *Haematopus ostralegus*, ringed plover *Charadrius hiaticula*, grey plover *Pluvialis squatarola*, curlew *Numenius arquata* and redshank *Tringa totanus*. These species are present in internationally or nationally important numbers within the Swale as a whole.

The Swale also qualifies under Article 4.2 by virtue of regularly supporting diverse assemblages of the wintering and breeding migratory waterfowl of lowland wet grassland and other estuarine habitats.

The grazing marshes of the proposed extensions support an assemblage of wintering species typical of the grazing marshes elsewhere within the Swale, including shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca* and curlew *Numenius arquata*. These species are present in internationally or nationally important numbers within the Swale as a whole.

The grazing marshes also support a typical assemblage of breeding species, including shelduck *Tadorna tadorna*, mallard *Anas platyrhynchos*, moorhen *Gallinula chloropus*, coot *Fulica atra*, lapwing *Vanellus vanellus*, redshank *Tringa totanus*, reed warbler

Acrocephalus scirpaceus and reed bunting *Emberiza schoeniclus*. Some of these species have restricted distributions in Britain because of habitat loss and degradation.

The grazing marshes of the proposed extensions also regularly support wintering, and occasionally breeding, short-eared owl *Asio flammeus* (a species listed under Annex 1 of the EC Birds Directive).

During severe winter weather elsewhere, the Swale, including those areas within the proposed extensions, 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.

The Swale SPA, including the proposed extensions, is part of the larger Thames estuary and contributes to its overall regional significance for birds in a European context.

SPA citation
LDS March 1993

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.

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:

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.

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:

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

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

EC Directive 79/409 on the Conservation of Wild Birds:
Special Protection Area.

Medway Estuary and Marshes (Kent)

The Medway Estuary and Marshes proposed Special Protection Area is a wetland of international importance comprising grazing marshes, inter-tidal flats and saltmarshes. The site provides breeding and wintering habitats for important assemblages of wetland bird species, particularly wildfowl and waders.

The boundaries of the proposed Special Protection Area are coincident with those of the Medway Estuary and Marshes Site of Special Scientific Interest (SSSI), apart from the exclusion of a section of inter-tidal mudflats in the west of the SSSI and other small areas of land in the north of the site at Abbey Court, Middle Stoke, and Grain. The proposed designation applies only to land above the Mean Low Water mark. The proposed Special Protection Area is an integral part of the larger Thames estuary and contributes to its overall regional significance for bird species, in a European context.

The Medway Estuary and Marshes qualifies under Article 4.1 of the EC Birds Directive by supporting, in summer, nationally important breeding populations of avocet *Recurvirostra avosetta* (28 pairs, 7% British breeding population) and little tern *Sterna albifrons* (24 pairs, 1% British breeding population) both Annex 1 species.

The site also qualifies under Article 4.1 by regularly supporting a nationally important wintering population of avocet. During the five year period 1986/87 to 1990/91, the average peak count was 70 birds, representing 7% of the British population.

The site also qualifies under Article 4.2 as a wetland of international importance by virtue of regularly supporting over 20,000 waterfowl, with an average peak count of 53,900 birds recorded in the five winter period 1986/87 to 1990/91. This total includes internationally or nationally important wintering populations of the following migratory waterfowl (figures given are average peak counts for the five winter period 1986/87 to 1990/91): 4,130 dark-bellied brent geese *Branta bernicla bernicla* (2.4% of the world population, 4.6% of the British wintering population), 5,900 shelduck *Tadorna tadorna* (2.3% of the North West European population, 7.9% of British), 980 pintail *Anas acuta* (1.4% of the North West European wintering, 3.9% British), 740 ringed plover *Charadrius hiaticula* (1.4% of the East Atlantic Flyway population, 3.2% of British), 4,810 grey plover *Pluvialis squatarola* (3.2% of EAF, 22.9% of British), 3,690 knot *Calidris canutus* (1.0% of EAF, 1.6% of British), 22,900 dunlin *Calidris alpina* (1.6% of the EAF, 5.3% of British), 4,180 redshank *Tringa totanus* (2.7% of the EAF, 5.5% of British), 250 great crested grebe *Podiceps cristatus* (2.5% of British), 5,200 wigeon *Anas penelope* (2.0% of British), 2,400 teal *Anas crecca* (2.4% of British), 150 shoveler *Anas clypeata* (1.7% of British), 3300 oystercatcher *Haematopus ostralegus* (1.1% of British), 390 black-tailed godwit *Limosa limosa* (7.9% of British), 1,900 curlew *Numenius arquata* (2.1% of British), 17 spotted redshank *Tringa*

erythropus (8.5% of British), 12 greenshank *Tringa nebularia* (3.0% of British) and 630 turnstone *Arenaria interpres* (1.4% of British).

The site also qualifies under Article 4.2 by virtue of regularly supporting, in summer, a diverse assemblage of breeding migratory waterfowl including oystercatcher *Haematopus ostralegus*, lapwing *Vanellus vanellus*, ringed plover *Charadrius hiaticula*, redshank *Tringa totanus*, shelduck *Tadorna tadorna*, mallard *Anas platyrhynchos*, teal *Anas penelope*, shoveler *Anas clypeata*, pochard *Aythya ferina* and common tern *Sterna hirundo*, the last an Annex 1 species. The site thus has an important role in maintaining the ranges of several species which have been affected by changes in their habitat elsewhere in Britain.

The site also qualifies under Article 4.2 by virtue of regularly supporting, in winter, a diverse assemblage of wintering species including red-throated diver, *Gavia stellata* great crested grebe *Podiceps cristatus*, cormorant *Phalacrocorax carbo*, shelduck *Tadorna tadorna*, mallard *Anas platyrhynchos*, teal *Anas crecca*, shoveler *Anas clypeata*, pochard *Aythya ferina*, oystercatcher *Haematopus ostralegus*, ringed plover *Charadrius hiaticula*, dunlin *Calidris alpina*, and redshank *Tringa totanus*; and also the following Annex 1 species: Bewick's swan *Cygnus columbianus bewickii*, hen harrier *Circus cyaneus*, merlin *Falco columbarius*, golden plover *Pluvialis apricaria*, short-eared owl *Asio flammeus* and kingfisher *Alcedo atthis*.

During severe winter weather elsewhere, the Medway Estuary and Marshes can assume even greater national and international importance as 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.

SPA Citation
March 1993
SJP

This citation / map relates to a site entered in the Register of European sites for Great Britain
Regist[redacted]
Date o[redacted]

Signed [redacted]
on beha[redacted]

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.

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: 15 December 1993

3. Country:

UK (England)

4. Name of the Ramsar site:

Medway Estuary and Marshes

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:

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

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, 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.

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*.

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.	+	+
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

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Musgrove, AJ, Langston, RHW, Baker, H & Ward, RM (eds.) (2003) *Estuarine waterbirds at low tide. The WeBS Low Tide Counts 1992–93 to 1998–99*. WSG/BTO/WWT/RSPB/JNCC, Thetford (International Wader Studies, No. 16)

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Worsfold, TM, Grist, NC & Hunter, P (2004) *Review of intertidal invertebrate data available for the Medway, Swale and North Kent Marshes estuary systems, with recommendations for future work*. Medway Swale Estuary Partnership, Faversham

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Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

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

		Population				Site assessment			
		Resident	Migratory						
Code	Species name		Breed	Winter	Stage	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)

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: 05 May 2000 / Updated: May 2005

3. Country:

UK (England)

4. Name of the Ramsar site:

Thames Estuary and Marshes

5. Map of site included:

a) hard copy (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no*

b) digital (electronic) format (optional): Yes

6. Geographical coordinates (latitude/longitude)**:**

51º 29’ 08’’ N 00º 35’ 47’’ E

7. General location:

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

8. Elevation (average and/or max. & min.) (metres)**:** **9. Area** (hectares)**:** 5589

Min. -5
Max. 5
Mean No information available

10. Overview:

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.

11. Ramsar Criteria:

2, 5, 6

12. Justification for the application of each Criterion listed in 11. above:

Ramsar criterion 2

The site supports more than 20 British Red Data Book invertebrates and populations of the GB Red Book endangered least lettuce (*Lactuca saligna*), as well as the vulnerable slender hare's-ear (*Bupleurum tenuissimum*), divided sedge (*Carex divisa*), sea barley (*Hordeum marinum*), Borrer's saltmarsh-grass (*Puccinellia fasciculata*), and dwarf eelgrass (*Zostera noltei*).

Ramsar criterion 5
Assemblages of international importance:

Species with peak counts in winter:
45,118 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:

Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	1,640 individuals, representing an average of 4.5% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	15,171 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)
Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	7,279 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3)

More 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 Alerts report, which is updated annually. See http://www.bto.org/survey/webs/webs-alerts-index.htm.

13. Biogeography:

a) biogeographic region:
Atlantic

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

14. Physical features of the site:

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:

No information available

15. Physical features of the catchment area:

No information available

16. Hydrological values:

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

17. Wetland types

Marine/coastal wetland

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

18. General ecological features:

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*.

19. Noteworthy flora:

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*.

20. Noteworthy fauna:

Birds

Species currently occurring at levels of national importance:

Species with peak counts in spring/autumn:

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)
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)
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)
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)

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)
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)
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)

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*.

21. Social and cultural values:

Aesthetic
Archaeological/historical site
Conservation education
Current scientific research
Fisheries production
Livestock grazing
Non-consumptive recreation
Sport fishing
Sport hunting
Tourism
Transportation/navigation

22. Land tenure/ownership:

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

23. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
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	+	

24. Factors 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

25. Conservation measures taken:

Conservation measure	On-site	Off-site
SSSI / ASSI	+	
SPA	+	
Land owned by a NGO for nature conservation	+	+
Management agreement	+	

Site management statement/plan implemented	+	
ESA	+	+

26. Conservation measures proposed but not yet implemented:
No information available

27. Current scientific research and facilities:
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

28. Current conservation education:
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.

29. Current recreation and tourism:
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.

30. Jurisdiction:
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

31. Management authority:
Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

32. Bibliographical references:

Site-relevant references

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EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Queendown Warren
Unitary Authority/County:	Kent
SAC status:	Designated on 1 April 2005
Grid reference:	TQ827629
SAC EU code:	UK0012833
Area (ha):	14.28
Component SSSI:	Queendown Warren SSSI

Site description:
The grassland of this site is on the south-facing slope of a dry chalk valley. It is largely dominated by upright brome *Bromopsis erecta* and sheep's-fescue *Festuca ovina* with numerous plants characteristic of grazed but otherwise undisturbed chalk grassland. Among the more interesting species are chalk milkwort *Polygala calcarea*, squinancywort *Asperula cynanchica*, horseshoe vetch *Hippocrepis comosa* and the nationally rare meadow clary *Salvia pratensis*. The site contains an important assemblage of rare and scarce orchids, including early spider-orchid *Ophrys sphegodes*, burnt orchid *Orchis ustulata* and man orchid *Aceras anthropophorum*. It is rich entomologically and two characteristic species, the adonis blue butterfly *Lysandra bellargus* and the rufous grasshopper *Gomphocerippus rufus* occur here.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (important orchid sites). (Dry grasslands and scrublands on chalk or limestone, including important orchid sites)*

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0012833
Date of registration: 14 June 2005
Signed [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

EC Directive 2009/147/EC on the Conservation of Wild Birds

Special Protection Area (SPA)

Name: *Outer Thames Estuary SPA*

Counties/Unitary Authorities: Norfolk, Suffolk, Essex, Kent

Boundary of the SPA:

The seaward and alongshore extent of the Outer Thames Estuary SPA is defined according to the distribution of non-breeding red-throated divers (O'Brien *et al*. 2012). The site includes coastal areas up to Mean High Water up the coast (to Caister-on-Sea) to provide coverage for little terns from Great Yarmouth North Denes foraging from this SPA, and common terns foraging from Breydon Water SPA. The inclusion of the River Yare channel, to abut the eastern boundary of the existing Breydon Water SPA, and the lower River Bure (to approximately Runham village south of Filby), to provide continuous SPA coverage for common terns foraging from this SPA. The inclusion of coastal areas up to Mean High Water down the coast (to just south of Corton), providing coverage for common terns from Breydon Water foraging from this SPA. The inclusion of the River Blyth to encompass Blythburgh Water, a tidal lagoon directly adjacent to the northern parts of Minsmere-Walberswick SPA in addition to the inclusion of Mean High Water areas up the coast (to Southwold) and down the coast (to Leiston) to provide continuous coverage for little terns foraging from this SPA. The inclusion of the estuarine areas up to Mean High Water within the Crouch and Roach Estuaries, overlapping the existing Crouch and Roach Estuaries SPA in the intertidal area and the inclusion of a small marine area along the south Essex coast and overlapping part of the Foulness SPA for foraging common terns.

Size of SPA: The SPA covers an area of 392,451.66 ha.

Site description:

The Outer Thames Estuary SPA is located on the east coast of England between the counties of Norfolk (on the north side) and Kent (on the south side) and extends into the North Sea. The site comprises areas of shallow and deeper water, high tidal current streams and a range of mobile mud, sand, silt and gravely sediments extending into the marine environment, incorporating areas of sand banks often exposed at low tide. Intertidal mud and sand flats are found further towards the coast and within creeks and inlets inland down the Blyth estuary and the Crouch and Roach estuaries. The diversity of marine habitats and associated species is reflected in existing statutory protected area designations, some of which overlap or abut the SPA.

Qualifying species:

SPA site selection guidelines have been applied to the most up to date information for the site.

The site qualifies under **article 4.1** of the Directive (2009/147/EC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Species	**Season**	**Count (Period)**	**% of population**
Red-throated diver *Gavia stellata*	Non-breeding	6,466 individuals (1989 – 2006/07)[1]	38.0% of GB population
Little tern *Sternula albifrons*	Breeding	746 individuals (2011 – 2015)	19.64% of GB population
Common tern *Sterna hirundo*	Breeding	532 individuals (2011 – 2015)	2.66% of GB population

Assemblage qualification:

The site does not qualify under SPA selection stage 1.3.

Principal bird data sources:

Colony counts from JNCC Seabird Monitoring Programme, Norfolk Bird & Mammal Reports, Foulness Area Bird Survey Group and contributed by colony managers from RSPB.

Data on ringed common terns from national bird ringing scheme.

Red-throated diver data from aerial surveys 1989 - 2006/07: Natural England (2010): Departmental Brief: Outer Thames Estuary Special Protection Area. *Available at*: http://publications.naturalengland.org.uk/publication/3233957

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[1] Value retained from original Outer Thames Estuary SPA standard data form (http://publications.naturalengland.org.uk/publication/3233957)