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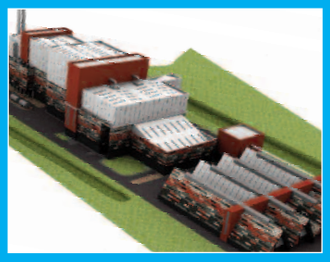

Sustainable Energy Plant, Kemsley Paper Mill, Sittingbourne, Kent.

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

MARCH 2010

E.ON Energy from Waste

ST REGIS

DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL, KEMSLEY

ST. REGIS PAPER COMPANY LTD & EON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

CHAPTER 9:

ECOLOGY AND NATURE CONSERVATION

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9.1 Introduction

9.1.1 This chapter describes and evaluates the current nature conservation interest of the Proposal Site and its environs (Figure 9.1), and provides an assessment of the likely significant effects of the proposed redevelopment and associated access routes, taking into account proposed mitigation and enhancement measures. It assesses:

- the potential of the Site and its environs to support important habitats, protected species or otherwise notable species of wildlife;
- the conservation value of habitats and species both on the Site and its immediate environs;
- the likely significant ecological effects of the proposed redevelopment;
- mitigation measures to be taken to avoid or minimise these effects;
- enhancement measures to be taken that will ensure that the proposed redevelopment has an overall beneficial impact on the ecology of the Site and its environs; and
- predicted residual and cumulative effects of the proposed redevelopment.

9.1.2 In accordance with best practice guidelines, this assessment considers both the habitats and species within the boundary of the Site, as well as those within a 2km radius of the Site. This is because the proposed redevelopment and its associated infrastructure and access routes have the potential to affect both directly and indirectly the ecology of land beyond the Site boundaries.

9.1.3 Between 2007 and 2009 various ecological surveys have been undertaken across the Site and its immediate environs. The results of these surveys form the basis of our assessment and are summarised in the Baseline section of this chapter.

9.2 Legislation and Planning Context

Biodiversity Legislation

9.2.1 Current key legislation relating to ecology that is relevant to the SEP proposal includes:

- the Wildlife and Countryside Act, 1981 (as amended);
- the Conservation (Natural Habitats, etc.) Regulations, 1994 (as amended) which transpose the EU Habitats Directive into UK law;
- the Countryside and Rights of Way Act, 2000; and
- the Natural Environment and Rural Communities Act, 2006.

9.2.2 Detailed descriptions of the legislation, as relevant to the SEP proposal can be found in Appendix 9.4.

National Planning Policy

9.2.3 The following National Planning Policies are relevant to the SEP proposal (full details are provided in Appendix 9.4):

- Planning Policy Statement 9: Biodiversity and Geological Conservation, 2005; and
- UK Biodiversity Action Plan, 1994

Regional Planning Policy

Regional Spatial Strategy

9.2.4 The Medway Towns form part of the Thames Gateway priority area for regeneration established in the Regional Planning Guidance (RPG9) for the South East (Government Office for the South East, 1994). The Thames Gateway Planning Framework published as a supplement to RPG9 (Department of the Environment, 1995), identified the main development opportunities. The Site falls within the Swale development area, where economic redevelopment is considered to be the main planning issue.

9.2.5 The Regional Spatial Strategy (RSS - called the "South East Plan") for South East England was published on 6 May 2009, and sets out the preferred way forward for development until 2026 (South East England Regional Assembly, 2006).

9.2.6 The South East Plan incorporates a number of policies that apply to all aspects of the RSS within the framework of the overall vision and core strategy. These polices are described as 'cross-cutting' and are divided into Part A – Cross-cutting Issue Policies, and Part B – Cross-cutting Spatial Policies.

Part A – Cross-cutting Issue Policies

9.2.7 There is one cross-cutting Issue Policy relevant to the Proposal Site Ecology – Policy CC1: Sustainable Development.

Part B - Cross-cutting Spatial Policies

9.2.8 One cross-cutting Spatial Policy is relevant to the Proposal Site ecology – Policy CC12: Character of the environment and quality of life.

9.2.9 One policy within the South East Plan is specifically relevant to the Kent Thames gateway and ecology – Policy KTG10: Green initiatives.

Ecology Policies

9.2.10 Two polices within the draft South East Plan also have a direct bearing on the ecology and landscape of the Kemsley Mill site:

- Policy NRM4: Conservation and Improvement of Biodiversity; and
- Policy C3: Landscape and Countryside Management.

Kent Biodiversity Action Plan

9.2.11 The Kent Biodiversity Action Plan (Kent Biodiversity Action Plan Steering Group, 1997) identifies habitats and species of conservation importance with the aim of enabling the conservation and enhancement of biodiversity in Kent and so contributes to the maintenance of national and global biodiversity.

9.2.12 Full details of all of the above policies are provided in Appendix 9.4.

Local Planning Policy

Swale Borough Local Plan, 2008

9.2.13 The local development plan with relevance to the ecology of the Proposal Site is the Swale Borough Local Plan, 2008, which includes the following policies that are relevant to the ecology of the Site and these are detailed below:

- SP1: Sustainable development;
- SP2: Environment;
- E2: Pollution; and
- E21: Sustainable design and build.

Local Development Framework

9.2.14 Swale Borough Council are currently preparing a revised Local Development Scheme which will set out the Council's proposals for preparing a number of Local Development Documents (LDDs) over the next five years.

9.2.15 Whilst it is not yet clear what polices the revised LDF will have of relevance to the Proposal Site, some topic papers to inform the LDF are available. Topic Paper 3: The Natural Environment (Swale Borough Council 2009) identifies the need to carefully assess impacts to biodiversity, in particular their impact to European habitats, from new developments projects around the Medway/Swale estuary.

9.2.16 It is anticipated that the revised LDF will have policies in line with those in the RSS.

Swale Biodiversity Action Plan

9.2.17 The Swale Biodiversity Action Plan (Kent Wildlife Trust, 2008) identifies habitats and species of conservation importance with the aim of enabling the conservation and enhancement of biodiversity within the Swale Borough and so contributes to the maintenance of national and global biodiversity. The Swale BAP priority habitats found at Kemsley include Built-up areas and Gardens, with Priority species including birds and bats.

9.2.18 Full details of the above local policies are provided in Appendix 9.4.

9.3 Assessment Methodology and Significance Criteria

Introduction

9.3.1 This section provides a description of the methodology used to assess the potential effects of the redevelopment on the baseline conditions of the study area, which includes both the Proposal Site and its wider ecological context. The boundary of the Site is shown in Figure 11.1 and the baseline is considered to be the conditions on the Site and its environs between 2007 and 2009. Unless otherwise stated, the surveys were undertaken by RPS.

9.3.2 Where the survey methodology followed a standard procedure and there were no deviations from best practice, no further details are provided. If there was deviation from the standard methodology in any way, this is described.

9.3.3 The assessment method for this ecological assessment was based on guidance issued by the Institute of Ecology and Environmental Management (IEEM, 2006). The method involved four key stages:

- baseline studies;
- identification of Valued Ecological Receptors;
- identification and characterisation of potential impacts; and,
- assessment of impact significance.

Survey Methodology for Baseline Studies

Data Search

9.3.4 A desk-based study was conducted in both 2007 and 2009 that involved contacting statutory and non-statutory groups for information on species and sites of nature conservation interest. The organisations contacted were:

- Kent and Medway Biological Records Centre (KMBRC);
- The Kent Field Club;
- Kent Ornithological Society (KOS); and
- The Kent Wildlife Trust.

9.3.5 A review of existing statutory sites of nature conservation interest, such as Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs), Special Area of Conservation (SACs) and National Nature Reserves (NNRs), and non-statutory sites, such as Sites of Nature Conservation Interest (SNCIs) was carried out to help indicate any existing nature conservation interest within 2 km of the Proposal Site.

9.3.6 All information received on species in the search area was reviewed and is summarised in this report.

9.3.7 Relevant publications on the flora and fauna of Kent and other such literature were consulted to inform the scoping study and the ecological assessment.

Phase 1 Habitat survey

2007

9.3.8 A Phase 1 Habitat survey was carried out on 6th September 2007 in accordance with standard methodology (JNCC, 2003) and RPS Standard Operating Procedure 001. This comprised walking over the Site and recording the habitat types present and features associated with boundaries.

9.3.9 Dominant plant species observed within each habitat type were recorded. The naming of the plant species (nomenclature) follows that of Stace (1997).

2009.

9.3.10 The Phase 1 Habitat survey of 2007 was updated in April 2009 in accordance with the standard methodology (JNCC, 2003).

9.3.11 Vascular plant nomenclature follows that of the BSBI checklist of the British and Irish Flora (BSBI, 2007) for vascular plants.

Invertebrates

9.3.12 The Site was visited by Adonis Ecology Ltd on the 21st May 2009 and the value of invertebrate habitats estimated considering the following:

- for wetland habitats, the diversity of plant structures, water depths, bank margin angles, presence of areas of exposed mud and water;
- for grassland habitats, the diversity of vegetation height and structure, flowering species and seasonality of flower resource, bare ground patches, shelter and presence of adjacent scrub and other habitats;
- for scrub habitats, the diversity of vegetation height and shrub species, presence of ground flora and other habitats;
- for ephemeral habitats, the diversity of plant structures, flowering species and seasonality of flowering resource, soil structure and variation in moisture levels and shelter.

9.3.13 The presence of larger invertebrates and signs of invertebrate, e.g. bee burrows in the ground, were also used to assess the likely value of habitats.

9.3.14 The Site was slowly walked around in weather suitable for bee, dragonfly/damselfly and butterfly activity (high temperatures, little wind, sunny). Areas within 5m of the observer were checked for butterflies and dragonflies, and species recorded. Areas within 2m of the observer were checked for bumblebee species and the species recorded.

9.3.15 It should be noted that although the survey was carried out in suitable conditions, since different invertebrate species are apparent as adults at different times of year (most dragonfly species in particular appear as adults in late June/July) the survey was likely to have recorded only a few of the bee, dragonfly and butterfly species that use the Site during the summer.

9.3.16 Whilst this limitation on the survey data is noted, given the small size of the quality habitats within the Site it is considered unlikely that significant numbers of rare or protected invertebrate species were missed.

Reptiles

9.3.17 A reptile survey of a small area of the Site was undertaken in 2007 (the area surveyed is shown in Figure 9.7). The methodology for the survey followed Froglife (1999). On the 6th September 2007 artificial refugia, sheets of roofing felt, were placed in likely basking spots, e.g. un-shaded patches next to cover, in areas of long grass and next to potential hibernation sites, e.g. piles of rubble or logs or disused rabbit burrows.

9.3.18 A total of 20 refugia were laid around the suitable habitat within the eastern section of the Site. The sheets were then checked on seven separate occasions (each on a different day) for reptiles, which may use them for basking and sheltering underneath. Other natural refugia, e.g. fallen logs and large stones, were also checked for reptile presence.

9.3.19 Reptile activity is greatly influenced by weather conditions, with reptiles most likely to use refugia in temperatures of between 9ºC and 18ºC, in hazy or intermittent sunshine with light winds (Froglife, 1999). Visits were therefore timed to coincide with suitable weather conditions whenever possible. Any reptile seen basking on or sheltering underneath the refugia were noted, and their locations recorded.

9.3.20 In April-June 2009 the reptile survey was extended to other suitable habitat within the Site boundary. A total of c. 50 felts were laid around the suitable habitat on Site. The methodology was as above.

Birds

Breeding Birds

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

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

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

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

- 1st April 2009
- 9th April 2009

- 24th April 2009
- 8th May 2009
- 19th May 2009
- 3rd June 2009

9.3.25 The locations of birds were recorded directly into ESRI Arcpad GIS Software on handheld PDA devices, with a 1:10,000 scale Ordnance Survey base map of the study area (and adjacent land).

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

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

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

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

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

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

- Annex 1 of the EU Birds Directive (EU 1979);
- Schedule 1 of the Wildlife and Countryside Act (1981, amended 1985);
- Species listed in Section 41 of the Natural Environment and Rural Communities Act 2006 as being of principal importance for the conservation of biodiversity in England (HM Government 2006).
- Birds of Conservation Concern (BoCC) Red List (Eaton et al., 2009); and
- Birds of Conservation Concern (BoCC) Amber List (Eaton *et al*., 2009).

Intertidal survey

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

9.3.32 A total of 16 survey visits were undertaken during February to May (Table 9.1).

Table 9.1: Intertidal Waterbird Survey dates, tide times & heights and observers.

Date	Time of low tide	Tide height (m)	Time of high tide	Tide height (m)	Observers
5th February 2009	13.39	1.5			Rob Martin
11th February 2009			13.10	6.0	Neal Gates
18th February 2009	12.14	1.6			Neal Gates
23rd February 2009			11.55	5.3	Alan Bull
6th March 2009	13.33	1.6			Rob Martin
10th March 2009			12.08	5.8	Rob Martin
19th March 2009	11.25	1.7			Alan Bull
26th March 2009			12.33	5.6	Neal Gates
7th April 2009			11.58	5.6	Rob Martin
17th April 2008	11.50	1.6			Rob Martin
23rd April 2009			12.19	5.5	Alan Bull

Date	Time of low tide	Tide height (m)	Time of high tide	Tide height (m)	Observers
30th April 2009	10.51	1.1			Rob Martin
1st May 2009	11.43	1.3			Rob Martin
8th May 2009			12.59	5.6	Rob Martin
18th May 2009	13.27	1.7			Rob Martin
21st May 2009			10.47	5.2	Alan Bull

9.3.33 Surveys have also been undertaken between October-January 2010 to fill the gap in the dataset for wintering waterbird distribution. The additional information from November through to January is presented in Appendix 9.5.

9.3.34 The full extent of the intertidal survey area is shown in Appendix 9.3, Figure 9.2.

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

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

inland terrestrial and wetland sites. This is considered to be a robust and reliable method for recording birds and plotting their distribution.

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

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

Water Voles

2007

9.3.39 A Water Vole survey was carried out on the 6th and 17th September 2007 along the ditch that forms the western boundary of the Site, and along the edge of the reedbed to the north of the Site. This survey was carried out in accordance with the recommendations as detailed in the Water Vole Conservation Handbook (Strachan & Moorhouse, 2006).

9.3.40 Water Vole surveys require both banks of the ditch to be walked with the surveyor recording any signs of Water Vole activity. Such signs include:

- visual sightings / sounds of voles entering the water;
- latrines, showing discrete piles of droppings;
- tunnel entrances;
- 'lawns' around tunnel entrances;
- feeding remains of chopped vegetation;
- paths and runs at waters edge or in vegetation; and
- footprints in mud.

9.3.41 At the time of survey, the ditch was heavily over-grown with Common Reed *Phragmites australis* making some stretches impossible to survey. However, 75% of the ditch was examined according to recommended techniques.

2009

9.3.42 The Water Vole survey was updated on the 7th April 2009 The methodology was as stated above.

9.3.43 As with the 2007 survey, the ditch was heavily over-grown with Common Reed, making some stretches impossible to survey. However, 75% of the ditch was examined according to recommended techniques.

Other species

9.3.44 Habitat likely to support other species of conservation importance did not occur within the Site boundary and therefore surveys were not undertaken for any other species.

Assessment of Noise impacts

9.3.45 Noise created by the operation of machines and vehicles during the construction phase has the potential to disturb birds, causing them to cease feeding or fly away from the area of influence. The occurrence of disturbance though will depend upon the nature or type of noise, the strength of the noise at its source and the loss in strength of the noise as it propagates toward and reaches the receptor, in this case birds using habitat around the Site. It is recognised that very loud and short, sharp 'percussive' noises that can mimic gunshot have the greatest potential to cause disturbance to birds. Some birds have been shown to habituate to similar noises occurring at repeated intervals.

9.3.46 A disturbance event may cause birds to take flight (either returning to the same area or departing), to cease feeding or roosting and to temporarily abandon eggs or chicks, leaving them susceptible to chilling and predation. Taking flight or ceasing to feed does not have immediate effects on the survival or productivity of that bird. The increased energy expenditure or reduction in energy intake (feeding interrupted) if repeated, or occurring over an extended period, can place individual birds at risk of starvation/exposure during adverse weather or being in a weakened state preventing successful fattening before migration or preventing that bird coming in to breeding condition. The result can be an effect on survival or productivity.

9.3.47 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 60dBA caused no noticeable disruption to typical activity budgets of waterbirds (Fleming *et al.* 2000);
- Flight responses of flocks of geese in Alaska were recorded for high noise events of >80dBA (Ward *et al.* 2000);
- Harlequin Duck reacted with alert behaviour to noise generated by military jets, especially when the noise exceeded 80dBA (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 85dBA (Conomy et al. 1998a);
- In areas where military aircraft noise regularly exceeded 80dBA, the California Gnatcatcher tended to build fewer nests and lay fewer eggs than individuals breeding in quieter locations, however, once a nest was established, with eggs laid, there appeared

to be no detectable influence on reproductive performance (Awbrey & Hansaker 1997);

- Breeding Crested Terns showed the maximum responses (preparing to fly or flying off) to noise events that were greater than 85dBA (Brown 1990);
- Nesting Ospreys were exposed to controlled low-level jet aircraft overflights. Their behaviour did not differ significantly between the pre and post overflight periods. Despite maximum noise levels occasionally exceeding 100dBA, adult Osprey did not appear agitated or startled when overflown (Trimper *et al*. 1998); and
- Noise events at 100dBA 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).

9.3.48 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 Duck did not under the same circumstances (Conomy et al. 1998b). Burton et al. (2002) found that the densities of five species - Teal, Oystercatcher, Dunlin, Curlew, and Redshank - were significantly reduced adjacent to areas where there was a protracted period of construction work (between 1991 and 1999). The study did not identify the levels of noise or the detail of machinery and methods used in the construction of the barrage, road, land claim, hotel and housing.

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

- 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).

9.3.50 These studies provide a strong evidence base for a threshold to be set for disturbing effects on waterbirds to occur at 80dBA and suggest that such a figure would also apply to breeding passerines and birds of prey. This threshold figure is used in the assessment section of this ES. When maximum noise levels are predicted to occur above 80dBA where a valued ecological receptor occurs then this is identified as an effect. It should be noted that although an effect is identified, this does not automatically mean that an adverse impact should be concluded (Hill *et al*.1997). In the absence of scientific evidence to determine if the identified

effect results in an adverse impact, a precautionary approach is taken and such effects are treated as if there were adverse effect resulting in an impact.

Air Quality Assessment

9.3.51 The methodology for this assessment is detailed in Appendix 9.2, and summarised here.

9.3.52 The operation of the facility will result in emissions to air, the most significant of which, in the context of ecological effects, are oxides of nitrogen (NO_x), sulphur dioxide (SO_2), hydrogen chloride (HCl) and ammonia (NH_3). An assessment of the impact of the proposed development on the statutory nature conservation sites within 10 km has been undertaken (Appendix 9.2). It has been assumed that emissions to air would meet stringent standards included in the European Union Waste Incineration Directive (WID). Contributions of air pollutant concentrations and deposition from the plant to designated ecological sites have been calculated based on dispersion modelling results and compared against relevant Environmental Quality Standards (EQSs).

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

- ambient atmospheric pollutant concentrations; and
- deposition of certain compounds.

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

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

- critical levels; and
- critical loads (or critical load functions).

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

Assessment of ambient atmospheric pollutant concentrations

9.3.57 Critical levels for the protection of vegetation and ecosystems are specified within relevant European Air Quality Directives and corresponding UK air quality regulations as outlined in

the National Air Quality Strategy (NAQS). For this study Process Contributions (PC) and Predicted Environmental Concentrations (PEC) of NO_x, SO_2 and NH_3 at each site have been calculated and compared with the relevant critical level: 30µg.m^{-3} in the case of NO_x, 20µg.m^{-3} in the case of SO_2 and 3µg m^{-3} in the case of NH_3. In addition the Air Pollution Information System (APIS) website (www.apis.ac.uk) recommends an additional critical level for SO_2 of 10µg.m^{-3} for the protection of lichens, and of 1µg m^{-3} in the case of NH_3 for sites where lichens and bryophytes are an important component of the site. HCl contributes to acidifying deposition in the UK, but there is little information on the direct effects of HCl on plants and no critical level is available for the evaluation of direct HCl impacts on vegetation.

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

Assessment of pollution deposition

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

- the deposition to land of nitrogen (N deposition), which contributes to the eutrophication of habitats; and
- the deposition of NOx, SO2, NH3 and to a lesser extent HCl, which contribute to the acidification of habitats.

9.3.60 Predicted contributions to acid and N deposition have been calculated and compared with the relevant critical load range for the habitat types associated with each designated site as derived from the APIS website. For SACs and SPAs, they have been used to evaluate potential impacts using the Site Relevant Critical Loads tool in APIS (see Appendix 9.2 for further details).

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

Ecological Evaluation Criteria

9.3.62 The significance of the predicted emissions of oxides of nitrogen (NO_x), sulphur dioxide (SO_2) and ammonia (NH_3) is assessed in two ways. If the background emissions combined with the predicted emissions from the plant (i.e. the PEC) do not exceed the critical load for a given habitat at a particular site, the impact is not considered to be significant.

9.3.63 If the background concentrations are already above the relevant critical level/load, the impact arising from predicted emissions due to the plant is not considered significant if the maximum process contribution (PC) is less than 1% of the relevant critical level/load for that site. The Environment Agency's guidance (EU Habitats and Birds Direction Handbook) states that: "Where the concentration within the emission footprint in any part of the European site(s) is less than 1% of the relevant long-term benchmark (EAL, Critical Level or Critical Load), the emission is not likely to have a significant effect alone or in combination, irrespective of the background levels".

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

9.3.65 Cumulative ('in combination') impacts with adjacent industrial sources already operational (including the existing stacks on the Paper Mill site) have been accounted for through the use of the background levels in APIS that contain the cumulative of figures from point sources in the area at a 5 km^2 level.

Identification of Valued Ecological Receptors

9.3.66 It is impractical and inappropriate for an assessment of the likely ecological effects of a development to consider every species and habitat that may be affected. Instead, it should focus on 'valued ecological receptors' (VERs). Valued ecological receptors are species and habitats present within the zone of influence of the proposed development that are of sufficiently high value that an effect upon them as a result of the proposed development could be considered to be significant.

9.3.67 The value of sites, populations of species, species assemblages and habitats was evaluated with reference to their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations) and their legal status.

9.3.68 For the purposes of this assessment, sites, species populations, species assemblages and habitats have been valued using the following scale:

- International;
- National (i.e. England);
- County;
- District;
- Local/Parish; and
- Neighbourhood.

9.3.69 Institute of Ecology and Environmental Management (IEEM) guidelines on ecological impact assessment (IEEM, 2006) notes the difficulty of devising valuation criteria that can be consistently applied to designated sites, habitats and species in the same way in all parts of the country, and recommends an approach to valuation that involves defining the different values that could be attached to the ecological receptors under consideration. However, it is beneficial to give examples of the sorts of criteria used in the valuation process, summarised in **Table 9.2**, which have been adapted from a similar table included in earlier drafts of the IEEM guidelines.

Table 9.2 Examples of Criteria used to Evaluate Ecology Receptors

Level of Value	Examples of definitions
International	An internationally important site, e.g. Special Protection Area (SPA), Special Area of Conservation (SAC) or Ramsar site (or a site considered worthy of such designation); a regularly occurring population of an internationally important species (listed on Annex IV of the Habitats Directive)
National (UK)	A nationally designated site, e.g. SSSI, or a site considered worthy of such designation; a viable area of a habitat type listed in Annex 1 of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole; any regularly occurring population of a nationally important species, e.g. listed on Schedules 5 and 8 of the Wildlife and Countryside Act (1981); a feature identified as of priority in the UK BAP
County	Areas of internationally or nationally important habitats which are degraded but are considered readily restored; viable areas of key habitat identified in Local BAPs, or smaller areas of such habitat which are essential to maintain the viability of a larger whole; a site designated as a Wildlife Site or Site of Nature Conservation Interest (SNCI); a regularly occurring, locally significant number of a nationally important species; a regularly occurring locally significant population of a species listed on the Local BAP.
District	Areas of habitat identified in a sub-county (district/borough) or in the relevant Natural Area profile; district sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves; sites or features that are scarce within the district or borough or which appreciably enrich the district or borough habitat resource; a diverse or ecologically valuable hedgerow network
Local/ Parish	A good example of a common or widespread habitat in the local area; Areas of habitat considered to enrich the resource within the Parish e.g. species rich hedgerows; Local Nature Reserves selected on Parish criteria
Neighbourhood (site and its vicinity, including areas of habitats contiguous with or linked to	Areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest; common and widespread species

Level of Value	Examples of definitions
those on site)	

9.3.70 The description and valuation of ecological features took account of any likely changes, including, for example, trends in the population size or distribution of species; likely changes to the extent of habitats; and the effects of other proposed developments or land-use changes.

Identification and Characterisation of Potential Impacts

9.3.71 The likely effects of the proposed development during construction and operation, and the potential ecological impacts that arose from them were identified and characterised and took into consideration the following parameters:

- positive or negative – whether the effect will result in net loss or degradation of a Valued Ecological Receptor (VER) or whether it would enhance or improve it;
- magnitude – the size or intensity of the effect measured in relevant terms, e.g. number of individuals lost or gained, area of habitat lost of created or the degree of change to existing conditions (e.g. noise or lighting levels);
- extent – the spatial scope of the effect, for example the physical area affected or the geographical pattern of the effect;
- duration – the length of time over which the effect occurred;
- reversibility – the extent to which effects were reversible either spontaneously or through active mitigation; and
- timing and frequency – consideration of the timing of events in relation to ecological change, some effects might be of greater significance if they took place at certain times of year (e.g. breeding season). The extent to which an effect was repeated might also be of importance.

9.3.72 Ecological receptors are usually sites, habitats, species assemblages or communities, or populations or groups of a species. Effects could be permanent or temporary, direct or indirect, and could be cumulative. These factors are brought together to assess the magnitude of the impact on particular valued ecological receptors and, wherever possible, the magnitude of the impact is quantified. Professional judgment has then been used to assign the effects on the receptors to one of four classes of magnitude, defined in **Table 9.3** below.

Table 9.3 Definition of Impact Magnitude

Magnitude	Definition
High	A permanent or long-term effect on the extent or size or integrity of a site, habitat, species assemblage or community, population or group. If adverse, this is likely to threaten its sustainability; if beneficial, this is likely to enhance its conservation status
Medium	A permanent or long-term effect on the extent or size or integrity of a site, habitat, species assemblage or community, population or group. If adverse, this is unlikely to threaten its sustainability; if beneficial, this is likely to be sustainable but is unlikely to enhance its conservation status
Low	A permanent or long-term reversible effect on a site, habitat, species assemblage or community, population or group whose magnitude is detectable but will not threaten its integrity
Minimal	A short-term but reversible effect on the extent or size or integrity of a site, habitat, species assemblage or community, population or group that is within the normal range

Assessment of Impact Significance

9.3.73 The significance of the predicted impacts on VERs arising from the identified likely effects of the proposed development was assessed in the absence of any mitigation measures. Significance was assessed as Negative, Positive or Not Significant.

Negative impacts

9.3.74 For habitat areas and species, an impact was considered to be significant if the favourable conservation status of a VER was likely to be affected by the design of the proposed development. Conservation status was defined by the Institute of Ecology and Environmental Management (2006) as being:

- Habitats – "conservation status was determined by the sum of the influences acting on the habitat and its typical species that might affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area".
- Species – "conservation status was determined by the sum of the influences acting on the species concerned that might affect the long-term distribution and abundance of its populations within a given geographical area".

9.3.75 The decision as to whether the favourable conservation status of a VER was likely to be compromised was made using professional judgement based on an analysis of the predicted effects of the proposed development (including consideration of the specific parameters outlined above).

9.3.76 A similar procedure was used for sites that were considered likely to be affected by the proposed development, except that the focus was on the effects on the integrity of each site, defined as "the coherence of ecological structure and function, across a site's whole area, that enable it to sustain the habitat, complex of habitats and/or levels of populations of species for which it was classified." This assessment was made with reference to the features for which a site had been classified/notified.

Positive Impacts

9.3.77 An impact was considered to be significant if development activities caused:

- a non-valued ecological receptor to become valued;
- restoration of favourable conservation status for a habitat/species population; and/or
- restoration of a site's integrity (where this had been undermined).

9.3.78 The significance of an impact was largely a product of the policy, importance or sensitivity of the ecological receptor and the magnitude of the effect on it, moderated by the likelihood of the effect occurring and professional judgement. **Table 9.4** below illustrates a matrix that used for guidance of assessment of significance. Effects were considered to be of significance ranging from 'critical' to 'minor' and 'not significant' where the magnitude of impact is negligible.

Table 9.4 Impact Significance

	Magnitude of impact			
Value of receptor	*Minimal*	*Low*	*Medium*	*High*
International	Minor	Moderate	Major	Critical
National	Minor	Moderate	Major	Major
County	Minor	Minor	Moderate	Major
District	Minor	Minor	Minor	Moderate
Less than District	Minor	Minor	Minor	Minor

9.4 Baseline Conditions

Introduction

9.4.1 This section provides a description of the baseline ecological conditions of the Site and its surroundings against which the likely significant environmental effects of the development will be assessed. The baseline is considered to be the conditions on the Site and its environs between 2007 and 2009.

9.4.2 The Site is situated on the eastern edge of Kemsley, Sittingbourne close to the banks of the Swale Estuary and approximately 350m north of Milton Creek (Figure 9.1).

9.4.3 The Site currently consists of a mosaic of grassland, ruderal and scrub, and an area used for stockpile by the adjacent paper mill and covers approximately 7.08ha.

9.4.4 Land immediately north of the Site has been used previously to store coal, whilst land to the south of the Site forms the Kemsley Waste Disposal Site, which has been recently capped.

9.4.5 Figure 9.1, shows the Proposal Site boundary.

9.4.6 No part of the Site has been designated for its nature conservation value (either as statutorily or non-statutorily designated site). No part of the Proposal Site is directly bordered by a designated site of nature conservation interest (Figure 9.3).

Previous Ecological Surveys

9.4.7 A Phase 1 Habitat survey and a protected species scoping survey were undertaken by RPS in 2007 of an area 18ha in size, and included the habitats immediately adjacent to the levelled site as the exact development footprint had not been decided. The protected species scoping survey identified potential habitat for Water Voles *Arvicola terrestris* and reptiles and specific surveys for these species were also undertaken.

9.4.8 The Site was resurveyed in 2009 to keep the ecology data up to date. In addition to updating the Phase 1 Habitat and protected species scoping surveys, surveys were also undertaken of reptile, intertidal and breeding bird and invertebrates.

Data Search

Designated Sites

9.4.9 Designated sites within 2 km are shown in Table 9.5 and Figure 9.3. Citations for the Ramsar, SPA, and SSSIs are given in Appendix 9.1.

Table 9.5. Designated sites within 2km of the Site

Site name	Type	Approximate area (ha)	Interest Features	Distance from site (km)
The Swale	Ramsar	6,514	Supports a number of nationally scarce plants and seven Red Data Book invertebrates.	0.3
	SPA	6,514	Supports an internationally important assemblage of wintering birds.	0.3
	SSSI	6,514	Largest remaining area of freshwater grazing marsh in Kent and good example of estuarine habitat.	0.3
Medway Estuary & Marshes	Ramsar	4,696	Supports a number of rare plants and twelve Red Data Book invertebrate species.	2.0
	SPA	4,684	Internationally important assemblage of r wintering and breeding birds	2.0
	SSSI,	4,748	Largest area of intertidal habitats in Kent.	2.0
Elmley Island	NNR	1,212	Grazing marsh and estuarine salt marsh. Wintering wildfowl and waders.	0.6
Milton Creek	LWS	67	Saltmarsh, wet pasture and freshwater dykes.	0.2

9.4.10 The Swale Estuary is designated as a Special Protection Area (SPA), Ramsar site and Site of Special Scientific Interest (SSSI) under both international and national legislation.

Swale Ramsar

9.4.11 The Swale Ramsar was designated in 1993. In addition to qualifying under criterion 3a by virtue of regularly supporting over 20,000 waterfowl, with an average peak count of 57,600

birds for the five winter period 1986/1987 to 1990/1991, and under criterion 3c by supporting, in winter, internationally important populations of four species of migratory waterfowl, the Swale also qualifies under Criterion 2a of the Ramsar Convention by supporting a number of species of rare plants and invertebrates (Table 9.6).

Table 9.6 : Qualifying plant and invertebrate species for the Swale Ramsar

Ramsar Criteria	Scientific Name	Species Name
Nationally rare and scarce plant species	*Lactuca saligna* *Peucedanum officinale* *Bupleurum tenuissimum* *Spartina maritima* *Inula crithmoides* *Ranunculus baudotii* *Ceratophyllum submersum* *Carex divisa* *Trifolium squamosum* *Hordeum marinum*	Least Lettuce Hogs Fennel Slender Hare's-ear Small Cord-grass Golden Samphire Brackish Water Crowfoot Soft Hornwort Divided Sedge Sea Clover Sea Barley
Red Data Book invertebrates	*Bagous cylindrus* *Erioptera bivittata* *Lejops vittata* *Poecilobothrus ducalis* *Micronecta minutissima* *Malachius vulneratus* *Philonthus punctus* *Campsicnemus magius* *Elachiptera rufifrons* *Myopites eximia*	An aquatic weevil A cranefly A hoverfly A small dancefly A water bug A beetle A predatory rove beetle A small dolichopodid fly A small chloropid fly A picture-winged fly

9.4.12 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* species, 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.

Swale SPA

9.4.13 The diverse mix of habitats within the Swale support internationally important populations of wintering birds, with some species of waterfowl regularly occurring in nationally or internationally important numbers. The Swale SPA was classified in 1985 and extended in 1993. The qualifying bird interest features listed in the SPA Citation (1993), current SPA data form (review species 2005) and Ramsar citation are presented in Table 9.7.

Table 9.7 Swale Ramsar and SPA citation and review features

	Scientific Name	SPA Citation	SPA Data Form	Ramsar
Regularly supporting more than 1% of the GB breeding population of an Annex 1 species in summer				
Avocet	*Recurvirostra avosetta*	24 pairs, representing 6.2% of British population	-	-
Regularly used by 1% of more of the GB population of an Annex 1 species in the winter				
Hen Harrier	*Circus cyaneus*	11 representing 1.4% of British winter population	-	11 representing 1.4% of British winter population
Migratory species regularly occurring over winter				
Great Crested Grebe	*Podiceps cristatus*	-	-	300 representing 3% of the British winter population
White-fronted Goose	*Anser albifrons*	-	-	1,875 representing 31.2% of British population
Dark-bellied Brent Goose	*Branta bernicla bernicla*	2,850 representing 1.6% of the world population and 3.1% of the British winter population	1,961 representing 0.7% of the Western Siberia/ West Europe population	2,850 representing 1.6% of the world population and 3.1% of the British wintering population
Shelduck	*Tadorna tadorna*	-	-	1,650 representing 2.2% of the British population
Wigeon	*Anas penelope*	9,500 representing 1.2% of the North West Europe population and 3.8% of the British population	-	9,500 representing 1.2% of the North West Europe population and 3.8% of the British population
Gadwall	*Anas strepera*	-	-	74 representing 1.2% of the British population
Teal	*Anas crecca*	-	-	2,100 representing 2.1% of the British population
Pintail	*Anas acuta*	-	-	435 representing 1.7% of the British population
Shoveler	*Anas clypeata*	-	-	340 representing 3.7% of the British population
Oystercatcher	*Haematopus ostralegus*	-	-	3,700 representing 1.3% of British winter population
Avocet	*Recurvirostra avosetta*	37 representing 3.7% of the British population	-	37 representing 3.7% of the British population
Ringed Plover	*Charadrius hiaticula*	-	-	260 representing 1.1% of the British population
Grey Plover	*Pluvialis squatarola*	1,550 representing 1% of the East Atlantic Flyway population and 7.3% of the British population	-	1,550 representing 1% of the East Atlantic Flyway population and 7.3% of the British population
Knot	*Calidris canutus*	-	-	2,650 representing

				1.2% of the British population
Little Stint	*Calidris minuta*	-	-	4 representing 20% of the British population
Dunlin	*Calidris alpina*	13,000 representing 3% of British wintering population	12,394 representing 2.3% of the British population	13,000 representing 3% of British population
Ruff	*Philomachus pugnax*	28 representing 1.8% of British population	-	28 representing 1.8% of British population
Black-tailed Godwit	*Limosa limosa*	-	-	220 representing 4.4% of British population
Curlew	*Numenius arquata*	-	-	1,950 representing 2.1% of British population
Spotted Redshank	*Tringa erythropus*	-	-	5 representing 2.5% of British population
Redshank	*Tringa totanus*	3,100 representing 2% of the East Atlantic Flyway population and 4.1% of the British population	1,640 representing 0.9% of Eastern Atlantic population	3,100 representing 2% of the East Atlantic Flyway population and 4.1% of the British population
Assemblage				
Regularly supporting over 20,000 waterfowl		57,600	65,588	57,600
Diverse assemblage of breeding waterfowl (not otherwise listed)	*Tadorna tadorna* *Anas strepera* *Anas crecca* *Anas platyrhynchos* *Gallinula chloropus* *Fulica atra* *Haematopus ostralegus* *Charadrius hiaticula* *Pluvialis squatarola* *Vanellus vanellus* *Numenius arquata* *Tringa tetanus* *Recurvirostra avosetta* *Anas clypeata* *Podiceps cristatus* *Aythya farina* *Aythya fuligula*	Shelduck Gadwall Teal Mallard Moorhen Coot Oystercatcher Ringed Plover - Lapwing - Redshank Avocet Shoveler Great Crested Grebe Pochard Tufted Duck	Shelduck Gadwall Teal Mallard Moorhen Coot Oystercatcher Ringed Plover Grey Plover Lapwing Curlew Redshank - - - - -	
Diverse assemblage of winter waterfowl (not otherwise listed)	*Acrocephalus scirpaceus* *Emberiza schoeniclus*	- -	Reed Warbler Reed Bunting	

Swale SSSI

9.4.14 The Swale was designated as a SSSI as it includes the largest remaining areas of freshwater grazing marsh in Kent, as well as being representative of the estuarine habitats found on the north Kent coast. In addition, it supports a rich invertebrate and plant population. The habitats

within the SSSI are important for large population of wintering and breeding birds. The citation is located in Appendix 9.1.

Medway Estuary and Marshes Ramsar

9.4.15 The Medway Estuary and Marshes qualify as a SPA, Ramsar site and SSSI under both international and national legislation.

9.4.16 The Medway Estuary and Marshes Ramsar site was designated in 1993. In addition to qualifying under Criterion 3a by virtue of regularly supporting over 20,000 waterfowl with an average peak count of 53,900 birds recorded in the five-year winter period 1986/1987 to 1990/1991 and under Criterion 3c by regularly supporting internationally or nationally important wintering populations of migratory species of waterfowl, the Medway Estuary and Marshes Ramsar also qualifies under Criterion 2a of the Ramsar Convention by supporting a number of species of rare plants and animals (Table 9.8).

Table 9.8 Medway Estuary and Marshes Ramsar qualifying plant and invertebrate species

Ramsar Criteria	Scientific Name	Species Name
Nationally-scarce plant species	*Hordeum marinum* *Parapholis incurva* *Polypogon monspeliensis* *Puccinellia fasciculate* *Bupleurum tenuissimum* *Trifolium squamosum* *Chenopodium botryodes* *Rumex maritimus* *Ranunculus baudotii* *Inula crithmoides* *Salicornia perennis* *Salicornia pusilla*	Sea Barley Curved Hard-grass Annual Beard-grass Borrer's Saltmarsh-grass Slender Hare`s-ear Sea Clover Small Goose-foot Golden Dock Brackish Water-crowfoot Golden Samphire Perennial Glasswort One-flowered Glasswort
British Red Data Book invertebrates	*Polistichus connexus* *Cephalops perspicuus* *Poecilobothrus ducalis* *Anagnota collini* *Baris scolopacea* *Berosus spinosus* *Malachius vulneratus* *Philonthus punctus* *Malacosoma castrensis* *Atylotus latistriatus* *Campsicnemus magius* *Cantharis fusca* *Limonia danica*	A ground beetle A fly A dancefly A fly A weevil A water beetle A beetle A rove beetle Ground Lackey Moth A horsefly A fly A soldier beetle A cranefly

Medway Estuary and Marshes SPA

9.4.17 The Medway Estuary and Marshes SPA was classified in 1993 and the citation prepared for that classification, together with the most recent SPA Data have been used to inform this

assessment. The qualifying bird interest features listed in the SPA Citation, current SPA data form (review species 2005) and Ramsar citation are presented in Table 9.9.

Table 9.9 Qualifying Bird Species of the Medway Estuary and Marshes

	Scientific Name	SPA Citation	SPA Data Form	Ramsar
Annex 1 Species Regularly Breeding in Numbers of European Importance				
Avocet	*Recurvirosta avosetta*	28 pairs representing 7% of the breeding population in Britain	28 pairs representing at least 6.2% of the British breeding population	28 pairs representing 7% of the breeding population in Britain
Common Tern	*Sterna hirundo*	-	77 pairs representing at least 0.6% of the British breeding population	-
Little Tern	*Sterna albifrons*	24 pairs representing 1% of the breeding population in Britain	28 pairs representing at least 1.2% of the British breeding population	24 pairs representing 1% of the breeding population in Britain
Annex 1 Species Regularly Wintering in Numbers of European Importance				
Bewick's Swan	*Cygnus columbianus bewickii*	-	161 representing at least 0.2% of the wintering population in Britain	-
Avocet	*Recurvirosta avosetta*	70 representing 7% of the population in Britain	314 representing at least 24.7% of the wintering population in Britain	-
Migratory Species Regularly Wintering in Numbers of European Importance				
Great Crested Grebe	*Podiceps cristatus*	250 representing 2.5% of British wintering population	-	250 representing 2.5% of British wintering population
Dark-bellied Brent Goose	*Branta bernicla bernicla*	4,130 representing 2.4% of the world population and 4.6% of British winter population	3,205 representing 1.1% of the winter population in Britain	4,130 representing 2.4% of the world population and 4.6% of British winter population
Shelduck	*Tadorna tadorna*	5,900 representing 2.3% of the North West European population and 7.9% of the British winter population	4,465 representing 1.5% of the winter population in Britain	5,900 representing 2.3% of the North West European population and 7.9% of the British winter population
Wigeon	*Anas penelope*	5,200 representing 2.0% of British winter population	4,346 representing 1.6% of British winter population	5,200 representing 2.0% of British winter population
Teal	*Anas crecca*	2,400 representing 2.4% of British winter population	1,824 representing 1.3% of British winter population	2,400 representing 2.4% of British winter population
Pintail	*Anas acuta*	980 representing 1.4% of the North West European wintering and 3.9% of the British winter population	697 representing 1.2% of British winter population	980 representing 1.4% of the North West European wintering and 3.9% of the British winter population
Shoveler	*Anas clypeata*	150 representing 1.7% of British winter population	76 representing 0.8% of British winter population	150 representing 1.7% of British winter population

Oystercatcher	*Haematopus ostralegus*	3,300 representing 1.1% of British winter population	3,672 representing 1% of British population	3,300 representing 1.1% of British winter population
Ringed Plover	*Charadrius hiaticula*	740 representing 1.4% of the East Atlantic Flyway population and 3.2% of the British wintering population	768 representing 1.6% of British wintering population	740 representing 1.4% of the East Atlantic Flyway population and 3.2% of the British wintering population
Grey Plover	*Pluvialis squatarola*	4,810 representing 3.2% of East Atlantic Flyway population and 22.9% of British wintering population	3,406 representing 2% of the wintering population in Britain	4,810 representing 3.2% of East Atlantic Flyway population and 22.9% of British wintering population
Knot	*Calidris canutus*	3,690 representing 1.0% of the East Atlantic Flyway and 1.6% of the British wintering population	541 representing 0.2% of the wintering population in Britain	3,690 representing 1.0% of the East Atlantic Flyway and 1.6% of the British wintering population
Dunlin	*Calidris alpina*	22,900 representing 1.6% of the East Atlantic Flyway and 5.3% of the British wintering population	25,936 representing 1.9% of the wintering population in Britain	22,900 representing 1.6% of the East Atlantic Flyway and 5.3% of the British wintering population
Black-tailed Godwit	*Limosa limosa*	390 representing 7.9% of British winter population	957 representing 12.9% of population in Britain	390 representing 7.9% of British winter population
Curlew	*Numenius arquata*	1,900 representing 2.1% of British winter population	1,900 representing 1.7% of population in Britain	1,900 representing 2.1% of British winter population
Spotted Redshank	*Tringa erythropus*	17 representing 8.5% of British winter population	-	17 representing 8.5% of British winter population
Redshank	*Tringa totanus*	4,180 representing 2.7% of the East Atlantic Flyway and 5.5% of the British wintering population	3,690 representing 2.1% of the wintering population in Britain	4,180 representing 2.7% of the East Atlantic Flyway and 5.5% of the British winter population
Greenshank	*Tringa nebularia*	12 representing 3.0% of British winter population	10 representing 2.6% of population in Britain	12 representing 3.0% of British winter population
Turnstone	*Arenaria interpres*	630 representing 1.4% of British winter population	561 representing 0.9% of population in Britain	630 representing 1.4% of British winter population
Assemblage				
Regularly supports over 20,000 birds		53,900	65,496	47,637

Diverse assemblage of breeding waterfowl (not otherwise listed)l	*Gavia stellata* *Phalacrocorax carbo* *Tadorna tadorna* *Anas crecca* *Anas platyrhynchos* *Anas clypeata* *Aythya ferina* *Circus cyaneus* *Falco columbarius* *Haematopus ostralegus* *Charadrius hiaticula* *Vanellus vanellus* *Tringa tetanus* *Asio flammeus* *Alcedo atthis,*	- - Shelduck Teal Mallard Shoveler Pochard - - Oystercatcher Ringed Plover Lapwing Redshank - -	Red-throated Diver Cormorant - - Mallard - Pochard Hen Harrier Merlin - - Lapwing - Short-eared Owl Common Kingfisher	
Diverse assemblage of wintering species (not otherwise listed)	*Gavia stellata* *Phalacrocorax carbo* *Anas platyrhynchos* *Aythya ferina* *Circus cyaneus* *Falco columbarius* *Recurvirostra avosetta* *Pluvialis apricaria* *Vanellus vanellus* *Asio flammeus* *Alcedo atthis*	Red-throated Diver Cormorant Mallard Pochard Hen Harrier Merlin - Golden Plover - Short-eared Owl Common Kingfisher	Red-throated Diver Cormorant Mallard Pochard - - Avocet - Lapwing - -	

Medway Estuary and Marshes SSSI

9.4.18 The Medway Estuary and Marshes was designated as a SSSI as it forms the largest area of intertidal habitats in Kent. The area holds internationally important populations of wintering and passage birds and is also of importance for its breeding birds. An outstanding assemblage of plant species also occurs within the SSSI, see Appendix 9.1 for the citation.

Elmley Island NNR

9.4.19 Elmley Island NNR is important for large numbers of wintering waterfowl and for birds of prey. Many different bird species also breed at Elmley Island. The watercourses, seasonally wet ground and saltmarsh are also important for invertebrates and plants.

Milton Creek Local Wildlife Site (LWS)

9.4.20 Milton Creek LWS contains a mosaic of habitats including saltmarsh, larger areas of rougher, unmanaged grassland, some winter wet, with a variety of coarse grasses. The northern area comprises much less disturbed unimproved pasture, the freshwater dykes in this section have a good aquatic and marginal flora.

Species

9.4.21 The species records from the results of the data search are shown in Figure 9.4.

Invertebrates

9.4.22 The full list of notable and protected invertebrates recorded within 2 km of the Site within the last 10 years is shown in Table 9.10. Specific grid references and therefore distances from the Site are not given owing to the lack of accurate grid references.

Table 9.10 Notable and protected invertebrate species within 2 km of the Site

Scientific name	Common name	Status
Bombus sylvarum	Shrill Carder Bee	NERC 41, UKBAP, KRDB2
Coenagrion pulchellum	Variable Blue Damselfly	Nb, KRDB3
Lestes dryas	Scarce Emerald Damselfly	NERC 41, UKBAP, RDB2, KRDB3
Brachytron pratense	Hairy Hawker	Nb
Orthetrum coerulescens	Keeled Skimmer	KRDB1
Urophora quadrifasciata	Knapweed Seedhead fly	UKBAP
Conocephalus discolor	Long-winged Conehead	UKBAP
Stictopleurus abutilon	[a Ground Bug]	UKBAP
Myopites inulaedyssentericae	[a Gallfly]	UKBAP

The following codes are used for conservation designations: **NERC 41** Listed on section 41 of the Natural Environment and Rural Communities Act 2006, **Nb** Notable B species (occurring in fewer than 100 10 km squares nationally), **RDB2** Red Data Book 2 (Nationally vulnerable), **KRDB1** Kent Red Data Book 1 (Endangered in Kent, occurs in 1-2 tetrads in the county), **KRDB2** Kent Red Data Book 2 (Vulnerable in Kent, occurs in 3-5 tetrads in the county), **KRDB3** Kent Red Data Book 3 (Rare in Kent, occurs in 6-10 tetrads in the county), **UKBAP** Priority species listed on UK Biodiversity Action Plan.

9.4.23 Two records were found of the Shrill Carder Bee *Bombus sylvarum*, a nationally notable species(occurs in less than 100 10km grid squares nationally), the most recent of which was from 2006. These were from the 10 km grid square containing the proposed development (TQ92 66). A further eight records for this species were supplied from within the last 10 years, covering most of the 2 km search radius.

Amphibians

9.4.24 The nearest record for Great Crested Newt *Triturus cristatus* was approximately 0.75 km to the south-west of the Site. The nearest record for Common Frog *Rana temporaria* and Common Toad *Bufo bufo* are over 1 km to the south-west

Reptiles

9.4.25 No records for Grass Snake *Natrix natrix*, Slow-worm *Anguis fragilis*, Common Lizard *Lacerta vivipara* or Adder *Vipera berus* were provided that related to the Site itself. The nearest records for Common Lizard and Grass Snake were approximately 1.5 km to the south-west and for Slow-worm were approximately 1.5 km to the south. No records of Adder were supplied.

Birds

9.4.26 Kent Ornithological Society, via Kent & Medway Biological Records Centre, supplied over 3,500 bird-sighting records for the 2 km search radius, covering some 197 different bird species. While highlighting the importance of the area for birds, the majority of records do not assist in evaluating the value of the Site or they relate to records of habitats off-site.

9.4.27 The records were filtered by searching for sightings that corresponded to the Site, where a six-figure grid reference was supplied or by name of the Site (Kemsley Mill). Where only a four-figure reference was supplied, records were filtered by searching for sightings that occurred in the 1 km grid square of the Site (TQ92 66). Records within the last 10 years were considered relevant.

9.4.28 This process found that 13 different species of bird had been recorded in that grid square, as listed in Table 9.11.

Table 9.11. Notable and protected bird species in grid square TQ92 66

Scientific name	Common name	Status
Egretta garzetta	Little Egret	Annex 1, BoCC Amber
Circus aeruginosus	Marsh Harrier	Annex 1, WCA1, UKBAP_C, KRDB1, BoCC Amber
Falco peregrinus	Peregrine	Annex 1, WCA1, UKBAP_C, KRDB1, BoCC Amber
Recurvirostra avosetta	Avocet	Annex 1, WCA1, UKBAP_C, KRDB3, BoCC Amber

Gallinago gallinago	Snipe	UKBAP_C, KRDB1, BoCC Amber
Anthus petrosus	Rock Pipit	UKBAP_C, KRDB1
Tadorna tadorna	Shelduck	BoCC Amber
Motacilla cinerea	Grey Wagtail	BoCC Amber
Limosa limosa	Black-tailed Godwit	WCA1, UKBAP, KRDB1, BoCC Red
Tringa ochropus	Green Sandpiper	WCA1, BoCC Amber
Cuculus canorus	Cuckoo	BoCC Red, UKBAP
Alcedo atthis	Kingfisher	Annex 1, WCA1, BoCC Amber
Picus viridis	Green Woodpecker	BoCC Amber

The following codes are used for conservation designations: **Annex 1** listed on Annex 1 of the European Communities Council Directive of the Conservation of Wild Birds 1979 (the Birds Directive) **WCA1** listed on Schedule 1 of the Wildlife and Countryside Act, 1981, as amended; **KRDB1** Kent Red Data Book 1 (≤25 breeding pairs in county), **KRDB2** Kent Red Data Book 2 (>25 breeding pairs in Kent, but listed due to breeding decline), **KRDB3** Kent Red Data Book 3 (all other species on KRDB list), **BoCC Amber** listed on Birds of Conservation Concern Amber list of species of medium conservation concern (Gregory *et al.*, 2002); **BoCC Red** listed on Birds of Conservation Concern Red list of species of high conservation concern (Gregory *et al.*, 2002); **UKBAP** UK Biodiversity Action Plan Priority Species.

9.4.29 Five species listed on Annex 1 of the Birds Directive were found including Little Egret *Egretta garzetta*, Marsh Harrier *Circus aeruginosus*, Peregrine *Falco peregrinus*, Avocet Recurvirostra avosetta and Kingfisher *Alcedo atthis*, along with six species listed on Schedule 1 of the Wildlife and Countryside Act, 1981 (as amended), including Marsh Harrier, Peregrine, Avocet, Kingfisher, Black-tailed Godwit *Limosa limosa* and Green Sandpiper *Tringa ochropus*. Cuckoo *Cuculus canorus* a UKBAP Priority Species was also recorded.

Mammals

9.4.30 No records for Water Vole were supplied for the Site. The nearest records shown in the table below were to the east and north-east and located on the opposite side of the Swale to the Site.

Table 9.12 Water Vole records within 2 km of the Site

Date	Scientific name	Common name	Distance to Site (km)
2002	*Arvicola terrestris*	Water Vole	1.9
2003	*Arvicola terrestris*	Water Vole	0.9
2004	*Arvicola terrestris*	Water Vole	1.5

9.4.31 No records of Badgers *Meles meles* within 2 km of the Site were received in the data search results.

9.4.32 No records of bats were supplied for the Site itself or for the surrounding 1 km. Several recent bat records occur within 2 km of the Site for Pipistrelle bats *Pipistrellus species* And Brown Long-eared bats *Plecotus auritus* see Table 9.13.

Table 9.13 Bat records within 2 km of the Site

Date	Scientific name	Common name	Distance to Site (km)
1999	*Plecotus spp.*	Long-eared bat species	2.3
1999	*Pipistrellus spp.*	Pipistrelle species	2.3
2001	*Chiroptera*	Bat species	1.75
2001	*Pipistrellus spp.*	Pipistrelle species	1.75
2003	*Pipistrellus spp.*	Pipistrelle species	1.75
2003	*Plecotus spp.*	Long-eared bat species	1.75
2004	***Pipistrellus spp.***	**Pipistrelle species**	**2.0**
1999*	***Pipistrellus spp.***	**Pipistrelle species**	**2.1**
1999*	***Pipistrellus pipistrellis***	**Common Pipistrelle**	**2.1**
2005	*Pipistrellus spp.*	Pipistrelle species	1.48

Roosts are shown in bold. * - maternity roost,

9.4.33 The nearest bat records of note were two Pipistrelle maternity roosts consisting of 40-45 bats each from 1999, north east of the Site on Elmsley Island.

9.4.34 There are no recent records for any roosts within 1km of the Site.

9.4.35 Two records (2001, 2002) for Hedgehog occur 1.9km from the Site; both are for Elmley Island on the other side of the Swale to the Site.

9.4.36 There are three records from 2005 for Harvest Mice *Micromys minutus*. Two records are for the south west of the Site (2.7km from the Site). The other record is for Elmsley Island on the opposite side of the Swale, and is 1.9km from the Site.

9.4.37 No records for Dormouse *Muscardinus avellanarius* or Otter *Lutra lutra* were supplied in the data records.

9.4.38 There were several records of Brown Hare *Lepus euroapeus*, with the most recent record from 2007. All the records were from Elmsley Island across the Swale.

Phase 1 Habitat survey

9.4.39 The Phase 1 Habitat survey covered the Site boundary and a large area of less disturbed habitat to the north.

9.4.40 The survey results are presented in the form of a map (Figure 9.5) with the habitat types and target notes marked. Descriptions of the habitat types found are provided below. Habitat descriptions are by broad habitat type, as listed in the Phase 1 Habitat Survey Manual (JNCC, 2003). Specific habitat types are underlined in the text below.

Scrub

9.4.41 Areas of dense scrub containing frequent Bramble *Rubus fruticosus* agg, Hawthorn *Crataegus monogyna* and Dog Rose *Rosa canina* agg. were present across the Site (see Figure 9.5).

9.4.42 On the western edge of the Site was a small area of dense scrub (S1) with occasional Hawthorn, and single specimens of Hazel *Corylus avellana*, Sycamore *Acer pseudoplatanus* and a large Leylandii *Cupressus* x *leylandii*. A small stand of Poplar *Populus* species was also present to the south of this area.

9.4.43 In the south of the Site was an area which contained a mosaic of dense scrub and unimproved neutral grassland (S2). Abundant species included Hawthorn, Oxeye Daisy

Leucanthemum vulgare, False Oat-grass *Arrhenatherum elatius*, Cocksfoot *Dactylis glomerata,* Creeping Bent *Agrostis stolonifera* and Common Couch *Elytrigia repens*. Frequent species included Common Bird's-foot-trefoil *Lotus corniculatus* and Creeping Cinquefoil *Potentilla reptans.*

9.4.44 Areas of scattered scrub were present within the northern half of the Site consisting of frequent Bramble, Hawthorn and Silver Birch *Betulus pendula*. The scattered scrub to the north of the Site also had occasional Gorse *Ulex europaeus*.

Grassland

9.4.45 Areas of unimproved neutral grassland were present across the Site (G1-G3). G1 was relatively species-rich. Abundant species included Kidney Vetch *Anthyllis vulneraria,* Common Restharrow *Ononis repens,* False Oat-grass, Cocksfoot, Creeping Bent and Common Couch. Frequent species included Common Bird's-foot-trefoil and Creeping Cinquefoil. Occasional species included the following: Oxeye Daisy and Ribwort Plantain *Plantago lanceolata.*

9.4.46 G2 was relatively short and more species-rich than G1 and G3. Abundant species included Common Bird's-foot-trefoil, Creeping Bent, frequent Cock's-foot and occasional Common Ragwort *Senecio jacobaea*, Grass Vetchling *Lathyrus nissolia,* Wild Carrot *Daucus carota carota*, Dove's-foot Crane's-bill *Geranium molle*, Common Toadflax *Linaria vulgaris* and Yarrow *Achillea millefolium*.

9.4.47 Areas G3 contained abundant False Oat-grass, Cocksfoot, Creeping Bent, Common Couch. Frequent species included Common Bird's-foot-trefoil and Creeping Cinquefoil Occasional species included the following: Oxeye Daisy, and Ribwort Plantain.

Tall herb

9.4.48 Areas of tall ruderal vegetation were present across the Site with a large area present to the east of the Site. These areas contained abundant Greek Dock *Rumex cristatus*, White Mignonette *Reseda alba*, Bristly Oxtongue *Picris echioides*, Hawkweed Oxtongue *Picris hieracioides* and Hedge Mustard *Sisymbrium officinale.* Frequent species included Yorkshire-fog, Creeping Bent, Oxeye Daisy and Canadian Fleabane *Conyza canadensis.*

Swamp

9.4.49 To the north of the Site was a large expanse (>3 ha) of swamp habitat, dominated by Common Reed with scattered scrub including Elder *Sambucus nigra* and Hawthorn.

9.4.50 A drainage ditch which runs approximately north-south on the western boundary of the Site was heavily overgrown with Common Reed and contained very shallow water (<50mm).

9.4.51 The area south of the reedbed was dominated by bare ground that has recently been manually built up to level parts of the Site. This bare ground consists of a soil and stone aggregate.

Waste tips

9.4.52 Spoil piles of soil and building material dominated the centre of the Site. These areas contained frequent Long-headed Poppy *Papaver dubium,* Oxford Ragwort *Senico squalidus,* Common Field Speedwell *Veronica persica* and Opium Poppy *Papaver somniferum*.

Cultivated/disturbed land

9.4.53 Areas of ephemeral/ short perennial vegetation were present around the area of spoil heaps. These areas were dominated by bare ground with frequent Hawkweed Oxtongue, Bristly Oxtongue, Perennial Ryegrass *Lolium perenne*, Annual Meadow-grass *Poa annua*, Colt's-foot *Tussilago farfara*, Spear Thistle *Cirsium vulgare.* Long-headed Poppy and Oxford Ragwort. Cornflower *Centaurea cyanus* (Target note 1, Figure 9.5) and Annual Beard-grass *Polypogon monspeliensis*. (Target note 2, Figure 9.5) were also recorded. The latter two species are a UKBAP and nationally scarce species respectively.

Invertebrate Survey

Invertebrate Habitats

9.4.54 A map of the invertebrate habitats on site and their likely value at a local scale is given in Figure 9.6.

9.4.55 Habitat 1 consisted of concrete hardstanding with occasional small patches of ruderal and grass. The very limited structural diversity and vegetation present meant that the likely value of this area to important invertebrate species was negligible.

9.4.56 Habitat 2 consisted of patches of grass, ruderal and scrub growing around the fringes of the hardstanding. The combination of vegetation gave more structural and botanical variety, but this habitat combination is common and widespread and unlikely to be significant for rarer invertebrates.

9.4.57 Habitat 3 consisted of a small patch of grassland largely surrounded by scrub. The grassland varied in structure and had a number of patches of flowering species present, as well as invading scrub. The combination of shelter, habitat and structural diversity and flowering species meant that this area would be suitable as a breeding ground for some species of

Lepidoptera and Coleoptera, Diptera including Tephritidae, and other species. The area would also form part of the local foraging resource for adult Odonata, Aculeate Hymenoptera and Lepidoptera.

9.4.58 Habitat 4 consisted of flower rich grassland with a diversity of flowering plants (dominated at the time of survey by Common Vetch *Vicia sativa* and Ox-eye Daisy, a diversity of vegetation heights within the sward, patches of bare ground and tarmac, with scattered wetland species such as Common Reed and Sedge *Carex* species within the southern part of the grassland. The adjacent areas of scrub also provided shelter. These combinations of features would be suitable as breeding ground for a wide variety of butterflies and moths (Lepidoptera) and beetles (Coleoptera), true flies (Diptera) including fruit flies (Tephritidae), and other species. The area would also form a potentially significant part of the local foraging resource for adult dragonflies and damselflies (Odonata), bees, wasps and ants (Aculeate Hymenoptera) and butterflies and moths (Lepidoptera).

9.4.59 Habitat 5 consisted of native scrub of varying heights and species with adjacent reed-filled ditch and the flower-rich grassland. This would make this habitat suitable as a breeding ground for certain Lepidoptera in particular and provide shelter for invertebrates associated with the adjacent flower-rich grassland.

9.4.60 Habitat 6 consisted of an extensive area of tall scrub with limited variation in height and an extensive area of tall grassland with relatively few flowers. The value of this area for significant invertebrates was therefore considered fairly limited as the habitats and habitat combination is fairly widespread and common.

9.4.61 Habitat 7 consisted of an area of recently deposited piles of soil and bare ground being colonised by ruderal species. The quality of the invertebrate habitat was considered similar to an arable field and was therefore of likely very low value for invertebrate conservation.

9.4.62 Habitat 8 consisted of an area of Common Reed with almost no clear water or mud apparent with adjacent ruderal and some tall grass. The structural diversity of the habitats was limited and the value of the area was therefore considered to be low.

9.4.63 Habitat 9 consisted of a combination of ephemeral/short perennial, patches of bare ground, extensive patches of Bird's-foot Trefoil and grass of varying heights. This combination was considered suitable as a potential breeding and foraging habitat for particularly ground nesting bees, wasps and ants (Aculeate Hymenopera) and beetles (Coleoptera) such as ground beetles (Carabidae) and weevils (Curculionidae). The value of this area was considered medium.

9.4.64 Habitat 10 consisted of extensive areas of scrub, ephemeral/short perennial and grassland. The scrub consisted largely of Bramble all of a similar height (1.5m) with occasional Elder. The grassland was relatively species poor and consisted of tall grass and ruderal with few flowering species. The ephemeral/short perennial had bare ground, but very little structure to give shelter and relatively few flowering species. This area was therefore considered of very low value for invertebrate conservation.

Invertebrate Species

9.4.65 The larger invertebrate species recorded during the Site visit of the 21st of May 2009 are given in Table 9.14 The weather conditions were 20 degrees centigrade, wind 1-2 on Beaufort Scale, 25% cloud cover.

9.4.66 The majority of the butterflies and bees, including the UK BAP priority species Brown-banded Carder Bee, were recorded from the flower-rich grassland (area 4 on Figure 9.6) with some numbers also present around area 9 on Figure 9.6. The Nationally Scarce Hairy Hawker *Brachytron pretense* was seen passing north to south over the hardstanding area (area 1 in Figure 9.6).

Table 9.14 Larger Invertebrate Species recorded on the Kemsley Paper Mill Site 21st May 2009

Scientific name	Common name	Status
Lasiommata megera	Wall Brown	Declining UK BAP listed
Polyommatus icarus	Common Blue	Common & widespread
Pieris napi	Green-veined White	Common & widespread
Tyria jacobaeae	Cinnabar Moth	UK BAP listed
Coenonympha pamphilus	Small Heath	UK BAP listed
Lycaena phlaeas	Small Copper	Common & widespread
Pieris rapae	Small White	Common & widespread
Inachis io	Peacock Butterfly	Common & widespread
Bombus pascuorum	Common Carder Bee	Common & widespread
Bombus humilis	Brown Banded Carder Bee	UK BAP listed

Bombus pratorum	Early Bumblebee	Common & widespread
Bombus lapidarius	Red-tailed Bumblebee	Common & widespread
Bombus hortorum	Garden Bumblebee	Common & widespread
Brachytron pretense	Hairy Hawker	Notable
Coenagrion puella	Azure Blue Damselfly	Common & widespread

Reptiles

9.4.67 Reptile surveys were undertaken in 2007 and 2009. The location of refugia for these surveys is provided in Figure 9.7.

2007

9.4.68 Common Lizards were recorded during surveys undertaken in 2007. Table 9.15 shows the dates on which reptile refugia were surveyed, the weather conditions at the time of survey and any reptile findings on those days.

Table 9.15 Results from reptile survey, 2007.

Date	**Weather conditions**	**Reptile Findings**
17/09/07	15^{o}C, overcast (80% cloud cover) with occasional sun	Nothing found
19/09/07	15^{o}C, slight breeze, 100% high cloud	Nothing found
21/09/07	17.5^{o}C, light breeze, overcast (100% cloud cover)	1 adult Common Lizard under log
24/09/07	17^{o}C, strong south-west breeze, sunny, (25% cloud)	Nothing found
26/09/07	11.5^{o}C, slight breeze, cloudy (50% cloud cover)	Nothing found
27/09/07	11^{o}C, slight north-east breeze, cloudy (30% cloud cover)	1 juvenile Common Lizard seen basking on log
28/09/07	12^{o}C, light rain, slight breeze, overcast (100% cloud cover)	4 juvenile Common Lizards basking under roof felts.

9.4.69 A small number of Common Lizards were found within the survey area, including several juveniles, with sightings mainly concentrated around the southern portion of the suitable habitat, bordering the dense scrub (Figure 9.7).

2009

9.4.70 Slow-worm, Common Lizard and Grass Snake were all recorded within the Site boundary during surveys in 2009. Tables 9.16 to 9.18 detail the results of these surveys.

9.4.71 Locations of arrays are shown on Figure 9.7.

Table 9.16 Reptile survey results 2009: Array 1

Date	Weather conditions	Slow-worm	Common Lizard	Grass Snake
07/04/09	15^{0}C.Overcast becoming very sunny during survey	8	1	0
09/04/09	13^{0}C.Cloudy, dry	10	2	0
15/04/09	12^{0}C. Slight breeze, hazy sunshine	10	2	1 (Juvenile)
24/04/09	15 ^{0}C. Dry slight breeze, sunny	13	0	1 (Juvenile)
10/06/09	13^{0}C.Heavy rain previously. Over cast and breezy during survey.	3	1	0
11/06/09	17^{0}C.Fine, dry	7	2	2 (Juvenile)
12/06/09	15^{0}C.High cloud, hazy sunshine	9	1	0
Peak Count		13	2	2 (Juvenile)

Table 9.17 Reptile survey results 2009: Array 2

Date	Weather conditions	Slow-worm	Common Lizard	Grass Snake
07/04/09	15^{o}C.Overcast becoming very sunny during survey.	3	0	0
09/04/09	13^{0}C.Cloudy, dry	3	0	0
24/04/09	15 ^{o}C. Dry slight breeze, sunny	2	0	0
10/06/09	13^{0}C.Heavy rain previously. Over cast and breezy during survey.	3	0	0
11/06/09	17^{0}C.Fine, dry	1	1	0
12/06/09	15^{0}C.High cloud, hazy sunshine	1	0	0
Peak Count		3	1	0

Table 9.18 Reptile survey results 2009: Array 3

Date	Weather conditions	Slow-worm	Common Lizard	Grass Snake

07/04/09	15°C. Overcast becoming very sunny during survey	1	3	0
09/04/09	13°C. Cloudy, dry	9	0	0
24/04/09	15 °C. Dry slight breeze, sunny	18	4	0
11/06/09	17°C.Fine, dry	3	0	0
12/06/09	15°C.High cloud, hazy sunshine	15	1	0
Peak Count		18	4	0

Birds

Breeding Bird Survey (territory mapping)

Extended survey boundary

9.4.72 A total of 55 species were recorded within the survey boundary during the breeding bird survey. Of the 55 species recorded, 30 species were confirmed to be breeding and 5 species were considered to be possibly breeding. Resulting in a breeding bird assemblage of 35 species with the remaining 20 species considered to be non-breeding records. A summary of the breeding and conservation status of these 55 species, with the numbers of territories identified (or thought likely in the case of probable and possible) is provided in Table 9.19.

9.4.73 The territories for the three Wildlife and Countryside Act 1981 Schedule 1 species (Marsh Harrier, Bearded Tit *Panurus biarmicus* and Cetti's Warbler *Cettia cetti*) which were recorded within the wider survey area are show on Figure 9.8.

Proposal Site boundary

9.4.74 Of the breeding bird assemblage of 35 recorded within the survey area 17 were confirmed as breeding within the Proposal Site boundary and a further six were recorded as possibly breeding. Resulting in a breeding bird assemblage for the Proposal Site of 23. Birds occurring within the Site are denoted within Table 9.19 with an asterisk and the number of territories in brackets.

9.4.75 No Schedule One species were recorded holding territory within the Proposal Site boundary.

9.4.76 Four red listed species were recorded holding territories within the Proposal Site boundary. These were:

- Skylark – one territory;
- Song Thrush – five territories;
- Starling – one territory; and
- Linnet – four territories.

Table 9.19 The breeding and conservation status of birds recorded at the Kemsley Mill Site in 2009

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

Species	Breeding Status	Number of Confirmed Territories	Annex 1 EU Birds Directive[1]	Schedule 1 Wildlife & Countryside Act 1981[2]	NERC Act Section 41 species[3]	Birds of Conservation Concern[4]
Swift	Non-breeding					Amber
Green Woodpecker	Non-breeding					Amber
Skylark*	Probable	1 (1)			•	Red
Sand Martin	Non-breeding					Amber
Swallow	Non-breeding					Amber
Meadow Pipit*	Confirmed	1 (1)				Amber
Yellow Wagtail	Non-breeding				•	Red
Grey Wagtail	Non-breeding					Amber
Pied Wagtail	Non-breeding					
Wren*	Confirmed	17 (5)				
Dunnock*	Confirmed	14 (7)			•	Amber
Robin*	Confirmed	2 (2)				
Nightingale*	Confirmed	1				Amber
Ring Ouzel	Non-breeding				•	Red
Blackbird*	Confirmed	7 (5)				
Song Thrush*	Confirmed	7 (5)			•	Red
Cetti's Warbler	Confirmed	6		•		
Sedge Warbler*	Confirmed	7 (2)				
Reed Warbler*	Confirmed	22 (1)				
Lesser Whitethroat*	Confirmed	1 (1)				
Whitethroat*	Confirmed	15 (9)				Amber

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

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

Intertidal survey

Abundance of Waterbirds

9.4.77 A total of 31 and 27 species of waterbirds (excluding gulls) were recorded using the intertidal study site in February–March 2009 and April-May 2009 respectively. A full list of peak counts for all waterbird species recorded between February and May 2009 can be found in the report 'Intertidal and breeding bird surveys 2009' (RPS 2009) located in Appendix 9.3.

9.4.78 A full list of those found between October 2009 and January 2010 can be found in Appendix 9.5, including a discussion of the background bird numbers.

9.4.79 Black-tailed Godwit was recorded in internationally important numbers, with a peak count of 1,500 individuals (International threshold is 350 individuals). Avocet was recorded in Nationally important numbers, with a peak count of 80 (National threshold being 50). Both species are interest features for the Swale SPA/Ramsar.

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

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

Spatial and temporal distribution of intertidal waterbirds

9.4.82 The species recorded during the course of the intertidal surveys, for which detailed accounts are presented, were chosen on the following criteria:

- A waterbird species part of the interest feature of the Swale SPA (Cited 1993 or review 2005). These are Hen Harrier *Circus cyaneus,* Dark-bellied Brent Goose *Branta bernicla bernicla*, Wigeon *Anas penelope*, Avocet *Recurvirostra avosetta*, Grey Plover *Pluvialis squatarola*, Dunlin *Calidris alpina*, Ruff *Philomachus pugnax* and Redshank *Tringa totanus*.
- A waterbird species cited as part of the interest feature of the Swale Ramsar site (JNCC 2008) under (i) Ramsar criterion 6 (species/populations occurring at levels of international importance) and (ii) 'noteworthy fauna' as species outside the breeding season currently occurring at national levels. These species are in addition to those already mentioned; Little Grebe *Tachybaptus ruficollis*, Little Egret, White-fronted Goose *Anser albifrons*, Shelduck *Tadorna tadorna*, Wigeon *Anas penelope*, Pintail *Anas acuta*, Golden Plover *Pluvialis apricaria*, Lapwing *Vanellus vanellus*, Knot *Calidris canuta*, Ruff *Philomachus pugnax*, Black-tailed Godwit, Whimbrel *Numenius phaeopus*, Spotted Redshank *Tringa erythropus* and Greenshank *Tringa nebularia*.
- Those waterbird species that were considered part or wholly ecologically dependant upon the intertidal flats where their numbers exceeded a peak of 25 birds.

9.4.83 Individual species accounts and distributions for the above species are presented in the detailed RPS report reproduced as Appendix 9.3. The detailed descriptions include the nine

species which are the Swale SPA 2005 review interest features – Hen Harrier, Dark-bellied Brent Goose, Wigeon, Avocet, Grey Plover, Dunlin, Ruff and Redshank.

9.4.84 The through the tide distribution that has been observed can be summarised, for the SPA interest feature birds and the assemblage, as:

Hen Harrier

- The RPS surveys in 2009, both intertidal and breeding birds produced no records of this species.

Dark-bellied Brent Goose

- The only records of this species were of 12 birds during the ebb tide of the 17th April.

Wigeon

- Wigeon were only recorded using the study area in late winter with a peak count in 158 in February, with numbers declining from early February. Within this period the study area was not consistently used with no birds present during two of the eight late winter surveys.
- Wigeon used the study area throughout the tidal period, with a clear differentiation in its use between the high and low water periods when most birds fed and roosted respectively.
- Wigeon during the low water period were predominately distributed centrally in the survey area on the eastern lower intertidal flats of Elmley Reach and east side of the saltmarsh islands, the Lilies. At high water, birds were concentrated within the bay on the Elmley side opposite to the proposed development with some use also made of the saltmarsh islands, the Lilies.

Avocet

- Avocet were recorded in the study area by all surveys throughout the late winter and into spring until the last survey over the high water period. Numbers declined through the period form a tidal maximum of 80 to less than 20 in spring.
- A marked difference was found between late winter and spring in the use made of the study area by Avocet.
- In late winter, birds were using the study area throughout the tidal cycle with a tendency for more birds to occur at and around high tide.
- By the spring, the study area was little frequented at high tide, the vast majority of birds present over the low water period. At low tide birds were widely distributed along the western side of Elmley Reach and along Milton Creek, with a marked concentration of bird activity in late winter in the central part of the eastern lower intertidal flats of Elmley Reach.

- With tidal inundation of the flats at high tide, birds in late winter congregated to both feed and roost within the bay on Elmley, opposite the proposed development, and at the mouth of Milton Creek.

Grey Plover

- In late winter Grey Plover were recorded by all surveys, numbers fluctuating between counts with no discernable temporal pattern despite that suggested from the graphs.
- The vast majority of birds occurred during the low water period, a notable exception being a roost of 62 birds at high water, the overall peak count of the study. Only one or two birds were recorded in the study area during spring, these on two dates in and around high tide.
- Grey Plover use of the study area was found during the low water period to be widely distributed. Within the area however, the species usage was notably concentrated upon the intertidal flats along the east side of The Lilies and the lower level flats of Elmley Reach, opposite the Site.
- At high tide, birds were to be found predominantly within the bay on Elmley, opposite the Site and around the saltmarsh islands, The Lilies.

Dunlin.

- Dunlin were recorded on five surveys in late winter with a peak count of 223 on the 23rd February. The majority of records were from the low water period, with the exception being the count on the 23rd February which was made just before the tidal mudflats were inundated with water.
- The birds were feeding on the last remaining sections of intertidal mud within the Site boundary before they were forced off their roost sites elsewhere. Dunlin usage of the intertidal mudflats over the low water period was predominantly from the area around the peninsula at Elmley. Over high water the vast majority of usage was of the areas around The Lilies.

Ruff

- RPS 2009 intertidal surveys found no records of Ruff.

Redshank

- Redshank were recorded throughout the survey period and tidal cycle, with birds using the intertidal flats for feeding right up until inundation by water. Redshank were widely distributed across the intertidal mudflats over low water, with roosting and birds being recorded on The Lilies over high water.

9.4.85 The through the tide distribution that has been observed for the species that were recorded in internationally numbers, Black-tailed Godwit can be summarised as:

Black-tailed Godwit

- Black-tailed Godwit were recorded throughout the winter period with small numbers occurring in April. The peak count of 1,500 was made over high water on 11th February.
- The Site was used throughout the tidal cycle, although the largest numbers were recorded over the high water period. Over the low water period the species was widely spread over the intertidal mudflats throughout the survey period. Roosts of birds were recorded from the peninsula at Elmley and The Lilies.

Other bird surveys

9.4.86 A continuation of the previous wintering birds intertidal surveys has been undertaken in order to cover the winter period October-January. These surveys followed the methodology used for the surveys in February-May. Initial findings indicate that comparable numbers and species of waterbird are being recorded to those observed in February-March. The full findings are discussed in Appendix 9.5.

Mammals

Water Voles

9.4.87 Evidence of feeding signs were recorded in the section of ditch to the north of the main entrance these were considered to be Bank Vole *Clethrionomys glareolus* and no evidence of Water Vole presence such as latrines or burrows was recorded.

Bats

9.4.88 No potential bat roosts were identified on Site and within the landscape context, the large expanse of reedbed to the north would provide more substantial foraging habitat and be more likely to have bat foraging activity than the Site itself. Bats roosting in the surrounding area may commute over the Site, however given that many bat species are known to mainly use linear landscape features as flight paths, rarely flying in the open (Altringham, 2003) it is considered unlikely large numbers are flying over the Site.

Otter

9.4.89 No records of Otter are available for the Site or surrounding area. No signs were recorded during the Water Vole survey and limited foraging habitat it present on Site. Therefore this species is not considered further in this assessment.

Badgers

9.4.90 No evidence of Badgers has been found on Site and this species is not considered further.

Brown Hare

9.4.91 There are records of Brown Hare within 2km of the Site, however there is only minimal sub-optimal habitat on Site, and it is considered that Brown Hare do not occur on Site, therefore they are not considered further.

Harvest Mice

9.4.92 There are records of Harvest Mice occurring within 2km of the Proposal Site and whilst there have been no sightings of this species on Site during the surveys, there is suitable habitat to the north of the Site in the form of long grass, reedbed and scrub (Macdonald & Tattersall 2001). There is potential for a limited population of Harvest Mice to occur on Site.

9.4.93 No other species of conservation value are considered likely to occur within the Site boundary.

9.5 Valued Ecological Receptors

Designated Sites

9.5.1 No designated sites of International, national or county importance occur within the Site boundary.

9.5.2 Designated sites of **International** importance within 5km of the Site boundary include the Swale Ramsar/SPA, and the Medway Estuary and Marshes Ramsar/SPA. Those of **National** importance include the Swale SSSI, Medway Estuary and Marshes SSSI and Elmley Island NNR. Milton Creek LWS is of **County** importance.

Habitats

Brownfield habitat

9.5.3 The majority of the Proposal Site, qualifies as the UKBAP Priority Habitat 'Open Mosaic Habitats on Previously Developed Land' and Kent BAP 'Built-up areas and gardens'.

9.5.4 Qualifying features for UKBAP Priority Habitat 'Open Mosaic Habitats on Previously Developed Land' include the presence of UKBAP Priority Species, areas which comprise of bare ground which is retained over extended periods, and the presence of areas which are rich and/or large examples of habitats typical of the substrate conditions concerned, which demonstrate the characteristic mosaic of bare ground, pioneer communities, flower rich grassland and other habitat patches with associated structural and topographical features. (UKBAP, undated (a)).

9.5.5 High quality examples of UK BAP brownfield habitat are characterised as "unmanaged flower-rich grasslands with sparsely-vegetated areas developed over many years on [edaphically-] poor substrates" (Harvey 2000, referring to the East Thames Corridor, but it applies to all types).

9.5.6 In Kent, brownfield sites support some of the country's most important populations of reptiles and invertebrates. (http://www.kentbap.org.uk/)

9.5.7 Whilst the brownfield habitat within the Proposal Site does contain species-rich grassland, and supports both reptiles and invertebrates, the overall area of this habitat is small, and fragmented.

9.5.8 Therefore the Brownfield habitat on Site is considered to be of **Local** importance.

Other habitats

9.5.9 Of the remaining habitats on Site the only other of note is the ditch which is located on the western boundary of the Proposal Site. This ditch in itself is not considered to fall within the UKBAP definition of Reedbed given its small size and poor condition and is not considered further here. However, it may support species of conservation concern and would be retained within the overall development.

Plants

9.5.10 Two plant species of conservation importance were recorded on Site. These were Cornflower and Annual Beard-grass.

9.5.11 A single Cornflower plant was recorded. Cornflower is a UKBAP Priority Species which occurs as an arable weed. However, the UKBAP states that only populations occurring on natural sites are covered by the action plan. Natural sites are defined as populations thought to have arisen naturally (i.e. not from intentional sowing) as part of an arable community or newly recorded, viable populations which have arisen from a long-established seed bank, opposed to intentional sowing.(UKBAP http://www.ukbap.org.uk/BAPGroupPage.aspx?id=98)

9.5.12 None of these criteria is met by the single plant found and it is considered that the single specimen recorded on the Site is not a viable population. Also, given the presence of a large number of non-native plant species present on Site, it is considered likely that the Cornflower is likely to be the result of garden escape or a remnant of previous deliberate sowing.

Therefore the Cornflower on Site is not considered to fall under the UKBAP plan and as such is not considered further.

9.5.13 Annual Beard-grass is a Nationally Scarce species as it has only been recorded as a native in thirty 10km x 10km grid squares in the UK. Annual Beard-grass, is included in the Kent Red Data List (Waite (ed.), 2000) and has been recorded as rare in Kent (Philp, 1982). It occurs on bare soil and along ditches by the coast. The infilling of ditches and conversion of coastal grazing marsh to arable has resulted in the species decline (Preston et al (eds), 2002). This grass has been recorded in one location on Site, and there is a total of 0.3 hectares of ephemeral habitat within the Proposal Site which could support Annual Beard-grass. As Annual Beard-grass in North Kent grows in scattered clumps, the area available is deemed to support at best would support a small population. Whilst Philip (1982) describes the Annual Beard-grass as rare in Kent, and shows no populations within the Kemsley area, this distribution map is considered out-of-date. The description indicates the populations are widely scattered in the Hoo-Grain area and given extensive populations are known to occur in several coastal areas on the Hoo peninsula, it is considered that the Annual Beard-grass population on Site is of **Local** importance only.

Invertebrates

9.5.14 Although the Site overall contained a variety of habitats, most of the habitats on Site were of poor quality for a diversity of invertebrates of conservation significance, having poor structural diversity.

9.5.15 The flower-rich grassland area, considered to be of high value for invertebrates and the other areas of medium value would likely provide a small part of the foraging resource for some of the locally occurring significant species, the most important of which would be the Brown Banded Carder Bee and possibly the Shrill Carder Bee, both of which are priority UK BAP species with particularly significant metapopulations around the Thames Estuary. The grassland would also provide a potential maturing site for other groups such as Diptera (true flies) and various Coleoptera (beetles).

9.5.16 Overall, therefore, parts of the Site (amounting to 0.9ha, around 15% of the proposed development area) were considered like to be of medium to high **Local** importance.

Reptiles

9.5.17 All British reptile species are listed on Schedule 5 of the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000.

9.5.18 Adder, Grass Snake, Slow-worm and Common Lizard receive partial protection under part of Section 9(1) and all of Section 9(5). As such it is an offence to:

- intentionally or recklessly kill or injure any individual; and
- sell, offer for sale, possess or transport for the purpose of sale or publish advertisements to buy or sell individual reptiles.

9.5.19 All three reptiles are UKBAP Priority species.

Grass Snake

9.5.20 The Grass Snake is patchily distributed throughout England and Wales and occurs in a wide variety of damp habitats, usually associated with ponds and lakes, marshes, streams and ditches. Grass snakes are thought to be dropping in numbers throughout the UK because of habitat loss and persecution. Whilst the 2007 reptile survey found no evidence of Grass Snakes using the Site, two juveniles were recorded in 2009 in Array 1, immediately adjacent to the north-western boundary of the Proposal Site. This indicates breeding in the vicinity of the Site, but at best a 'Small' population (Froglife 1999).

9.5.21 The Site is relatively isolated from any good quality habitat in the surrounding area (grazing marsh with a network of ditches) by a series of industrial developments to the south, west and north; with Milton Creek to the southeast. Kent has many sites with good populations of reptiles, and given the isolated nature of the Site, the Grass Snake population is considered to be of **Neighbourhood** importance.

9.5.22 Whilst the Grass Snakes on Site were found to the north of the Proposal Site outside the Site boundary, this species is considered further given the presence of suitable habitat within the Proposal Site and the species large territory range, there is potential for the development to have significant impacts on this species.

Common Lizard

9.5.23 Common Lizards are considered to have a widespread but patchy distribution throughout the UK. The Proposal Site provides 2 hectares of suitable habitat for this species, with survey results indicating a peak count of four in 2009, therefore the population on Site is considered to be 'Small' (Froglife 1999). Kent has many sites with good populations of reptiles, and given the isolated nature of the Site, the Common Lizard population is considered to be of **Neighbourhood** importance.

Slow-worm

9.5.24 The Slow-worm is widespread throughout the British Isles. The most abundant reptile species recorded on Site was the Slow-worm, with a peak count of 33 individuals on 24/04/09, indicating a good population within the survey area. However given that the peak count within the Proposal Site was three individuals and that Slow-worms are known to occur at densities

of 600-2000/ha (Arnold & Ovenden, 2002), the population within the Proposal Site is relatively small and isolated, and it is considered to be of **Neighbourhood** importance only.

Birds

Breeding Birds

9.5.25 The survey of breeding birds recorded a breeding assemblage of 35 species over the six visits within the wider survey area at the Kemsley Mill Site. 23 species were recorded within the Proposal Site. For the purposes of this assessment only the assemblage and species within the Proposal Site are considered further, with the exception of those species covered by the Wildlife and Countryside Act 1981 Schedule 1 recorded within the wider survey area.

Breeding bird assemblage

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

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

9.5.27 Based on Fuller's criteria, the breeding bird assemblage of the survey area is of Local importance. However, it should be noted that Fuller's analysis was developed in the 1970's. Since then species diversity has declined significantly (Eaton *et al*., 2009). As a result, Fuller's thresholds are too high for today's breeding bird populations. However. despite these changes in bird populations, and whilst also giving consideration to the number of species of conservation interest, it is still considered most likely that the breeding bird assemblage at the Site is of no more than of **Neighbourhood** importance (being 23 species, less than bottom boundary for Local importance).

9.5.28 Further to Fuller's criteria, the Nature Conversancy Council (NCC, now JNCC, 1989) identifies localities as being eligible for SSSI selection and therefore of National importance through Proposal of an index that takes account of the breeding assemblage in respect to habitat and geographical location. With a breeding bird assemblage of 23 species, the Proposal Site falls some way short of this status.

9.5.29 The threshold score for SSSI selection is 31 for lowland open water and its margins and 15 for scrub. The breeding bird assemblage present within the Proposal Site at the Kemsley scores 9 for scrub. This further confirms the assessment of the breeding bird community within the Proposal Site is of **Neighbourhood** importance.

Bird species of conservation concern

Proposal Site

9.5.30 Within the Proposal Site boundary six of the species recorded as breeding or probably breeding (Linnet, Skylark, Song Thrush *Turdus philomelos*, Dunnock *Prunella modularis*, Starling and Reed Bunting) are listed in Section 41 of the NERC Act 2006 as being of principal importance for the conservation of biodiversity in England.

9.5.31 Four of the species recorded as breeding or probably/possibly breeding (Skylark, Song Thrush, Starling and Linnet) are included on the BoCC Red List. Seven of the species recorded as breeding or probably/possibly breeding (Shelduck, Stock Dove *Columba oenas*, Meadow Pipit *Anthus pratensis*, Dunnock, Nightingale *Luscinia megarhynchos*, Whitethroat and Reed Bunting) are included on the BoCC Amber List.

9.5.32 None of the species mentioned above were considered to have populations within the study area of greater than **Neighbourhood** importance.

Wider Survey Area

9.5.33 There were three species were recorded breeding within the wider survey area (see Figure 9.8) which are specially protected through Schedule 1 of the Wildlife and Countryside Act: Marsh Harrier, Cetti's Warbler and Bearded Tit. Marsh Harrier is also afforded extra protection through Annex One of the Birds Directive. These three species are considered further below.

9.5.34 National population estimates are published in Baker et al. (2006). For the nationally rarer breeding species population estimates are presented in the latest Rare Breeding Bird report (Holling and RBBP 2008) and for Nightingale the national survey undertaken in 1999 (Wilson *et al.* 2002). Any breeding population identified on Site would be identified of national importance if it exceeded 1% of the national population. No breeding population either within the Proposal Site or the wider survey area approaches the 1% level of the national population.

9.5.35 At county level, breeding population estimates are dated with the last full Kent Atlas being undertaken in 1988-1994 (Henderson and Hodge 1998). A Local Wildlife Site in Kent can be designated on the basis of regularly holding at least 2.5% of the Kent breeding population for any particular species (Kent Wildlife Trust 2006). The population of two species within the survey area can be considered to be of **county** importance based on this criterion: **Cetti's Warbler** and **Bearded Tit**, with 4.5% and 3% of the county population respectively. The

Marsh Harrier population within the study area is also approaching that of **county** importance.

Marsh Harrier

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

9.5.37 The Marsh Harrier population within the study site is **approaching** that of **county** importance. For the purpose of this assessment however it must considered of **Local** importance.

9.5.38 The core of the Marsh Harrier territory lies ~175 m to the north of the Proposal Site. This species is considered further, due to the likelihood of the development having significant off-site impacts on this species, such as noise and disturbance from people and plant movements.

Cetti's Warbler

9.5.39 Cetti's Warblers were recorded throughout the duration of the survey, with singing birds recorded during every visit. Cetti's Warbler is a secretive species to observe, inhabiting damp scrub and reedbed. The six Cetti's Warbler territories were located in the northern section of the breeding bird survey area, in scrub bordering the reedbed area. The population within the study area is considered to be of **County** importance, with 4.5% of the county population present.

9.5.40 However none of the recorded territories fall within the Proposal Site, with the nearest territory boundary being ~ 20m north of the Proposal Site. This species is considered further, due to the likelihood of the development having significant off-site impacts on this species, such as noise and disturbance from people and plant movements.

Bearded Tit

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

9.5.42 The population within the study area is considered to be of **County** importance, with 3% of the county population present.

9.5.43 However none of the recorded territories fall within the Proposal Site, with the nearest territories boundary being ~ 100m north-west of the Proposal Site This species is considered further, due to the likelihood of the development having significant off-site impacts on this species, such as noise and disturbance from people and plant movements.

Non-breeding intertidal waterbirds

9.5.44 The findings identify the intertidal area adjacent to Kemsley to be used by non-breeding waterbird populations of significant conservation value.

9.5.45 A total of 36 species of waterbird (excluding gulls and terns) were recorded using the survey area within the vicinity of Kemsley in February-May 2009, with overall usage peaking in February (See Figures 9.9 a-d).

9.5.46 Additional intertidal surveys to cover October through to January have been undertaken. Data for this period is provided in Appendix 9.5.The conclusion as a result of those surveys is that the assessment of conservation significance of the various VERs below is also valid for the period October through January. Full analysis is provided in Appendix 9.5.

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

9.5.48 National water bird population estimates are published in Banks et al. (2006) with international and national threshold criteria presented for the more numerous species. Any non-breeding waterbird population using the Site, or the adjacent intertidal area that was subject to survey, would be identified of international or national importance if these thresholds were exceeded.

9.5.49 A number of the waterbird species and the waterbird assemblage are interest features of the adjacent Swale SPA and the numbers upon which the SPA designation is based is presented in JNCC (2006). Any waterbird population identified using the Site, or the adjacent intertidal area that was subject to survey, would be identified of international importance if it exceeded 1% of the population for which the SPA is classified.

Waterbird assemblage

9.5.50 The total waterbird assemblage for the study area represents 5.1% of the SPA wintering assemblage and 16% of the SPA spring assemblage based on the most recent WeBS data available for the Swale Estuary SPA (5 year peak mean 2002/3-2006/7). This assemblage is considered to be of **International** importance and whilst no part of the assemblage falls within the Proposal Site it is considered further, due to the likelihood of the development having significant off-site impacts.

Hen Harrier

9.5.51 There were no records of Hen Harrier and this species is not considered further.

Dark-bellied Brent Goose

9.5.52 There was only one record of Dark-bellied Brent Goose from the study area in the survey period of February-May, that of 12 birds on the 17th April. Due to the small number of birds recorded using the study area, well below thresholds for national importance and/or an important component of the Swale SPA population, this species is not considered further.

Wigeon

9.5.53 Wigeon were recorded only during the late winter period (February-March) with a peak count of 158. This represents 1.6% of the SPA citation population based on the 1993 citation, peak mean of 9,500 (5 year peak mean 1986/87 to 1990/91) and 0.9% of most recent WeBS data available for the Swale Estuary SPA, peak mean of 18,521 (5 year peak mean 2002/3-2006/7).

9.5.54 This assemblage is considered to be of **International** importance and whilst no part of the assemblage falls within the Proposal Site it is considered further, due to the likelihood of the development having significant off-site impacts.

Avocet

9.5.55 Avocet were recorded throughout the study period utilising the study area for both feeding and roosting. The peak winter count was of 80 birds roosting in February and the peak spring count 18 birds feeding on the intertidal flats in April. This represents 217% of the SPA citation population based on the 1993 citation, peak mean of 37 (5 year peak mean 1986/87 to 1990/91)and based on the threshold of 50 for national importance (Banks et al 2006) this species is considered to be of **National** importance in its own right. This assemblage is considered to be of **International** importance and whilst no part of the assemblage falls within the Proposal Site it is considered further, due to the likelihood of the development having significant off-site impacts.

Grey Plover

9.5.56 The peak number of Grey Plover recorded from the study area in the survey period of February-May was 62. This represents 4 % of the SPA citation population based on the 1993 citation, peak mean of 1,550 (5 year peak mean 1986/87 to 1990/91) and 3.9% of the SPA citation population based on the most recent WeBS data available for the Swale Estuary SPA, peak mean 1,576 (5 year peak mean 2002/3-2006/7). This assemblage is considered to be of **International** importance and whilst no part of the assemblage falls within the Proposal Site it is considered further, due to the likelihood of the development having significant off-site impacts.

Dunlin

9.5.57 Dunlin were recorded only during the late winter period (February-March) with a peak count of 223 feeding on the intertidal flats. This represents 1.7% of the SPA citation population based on the 1993 citation, peak mean of 13,000(5 year peak mean 1986/87 to 1990/91) and 2.4% of the SPA citation population based on the most recent WeBS data available for the Swale Estuary SPA, peak mean 9,202 (5 year peak mean 2002/3-2006/7). This species is considered to be of **International** importance and whilst no part of the assemblage falls within the Proposal Site it is considered further, due to the likelihood of the development having significant off-site impacts.

Ruff

9.5.58 There were no records of Ruff and this species is not considered further.

Redshank

9.5.59 Redshank were recorded throughout the study period utilising the study area for both feeding and roosting, with a peak count of 210. This represents 6.7% of the SPA citation population based on the 1993 citation, peak mean of 3,100(5 year peak mean 1986/87 to 1990/91) and 18.7% o of the SPA citation population based on the most recent WeBS data available for the Swale Estuary SPA, peak mean 1,127 (5 year peak mean 2002/3-2006/7). This species is considered to be of **International** importance and whilst no part of the assemblage falls within the Proposal Site it is considered further, due to the likelihood of the development having significant off-site impacts.

Black-tailed Godwit

9.5.60 Black-tailed Godwit were recorded throughout the study period utilising the study area for both feeding and roosting. The peak winter count was of 1,500 birds roosting in February and the peak spring count 919 birds roosting in April. Based on the threshold of 350 for international importance (Banks et al 2006) this species is considered to be of **International**

importance and whilst no part of the assemblage falls within the Proposal Site it is considered further, due to the likelihood of the development having significant off-site impacts.

Mammals

Bats

9.5.61 No suitable roost sites or obvious linear features which maybe used as feeding or flight corridors were recorded on the Site.

9.5.62 The Site does have some limited potential to be used as a foraging area by bats within the local area. However the considerable lighting in the area from surrounding buildings would deter most bat species. This combined with the isolated nature of the Site (devoid of linking habitat) means the use of the Site by foraging bats is not considered further.

Water Vole

9.5.63 No evidence of latrines, burrows or runs through the vegetation which are typical of Water Voles were recorded, the feeding signs recorded during the survey were that of a Bank Vole.

9.5.64 Water Voles are not considered further, as there was no evidence of them being present in 2009.

Harvest Mice

9.5.65 Harvest Mice has recently been included as a UKBAP priority species due to significant decline in the UK population. Whilst there have been no sightings of this species on Site during the surveys, there is suitable habitat on Site. There is potential for a limited population of Harvest Mice to occur on Site.

9.5.66 Should Harvest Mice occur on Site population is considered of **Neighbourhood** importance.

Summary of Valued Ecological Receptors

9.5.67 Table 9.20 summarises the valued ecological receptors within the zone of influence of the construction boundary.

Table 9.20 Summary of Valued Ecological Receptors

Valued Ecological Receptor (VER)	Reason for consideration	Level of biodiversity value if applicable
Swale Ramsar/SPA	Statutory designated site	International

Medway Estuary and Marshes RAMSAR, SPA	Statutory designated site	International
Swale SSSI	Statutory designated site	National
Medway Estuary and Marshes SSSI	Statutory designated site	National
Elmley Island NNR	Statutory designated site	National
Milton Creek LWS	Non-statutory designated site	County
Brownfield habitat	UK & Kent BAP Priority Habitat	Local
Annual Beard-Grass	Nationally Scarce, Kent Red Data List	Local
Invertebrate habitat	Species-rich grassland	Local
Grass Snake	Wildlife and Countryside Act Sch 5, UK BAP	Neighbourhood
Common Lizard	Wildlife and Countryside Act Sch 5, UK BAP	Neighbourhood
Slow-worm	Wildlife and Countryside Act Sch 5, UK BAP	Neighbourhood
Breeding bird assemblage	23 species	Neighbourhood
Marsh Harrier	Wildlife and Countryside Act Sch 1, Amber list	Local (off-site)
Cetti's Warbler	Wildlife and Countryside Act Sch 1	County(off-site)
Bearded Tit	Wildlife and Countryside Act Sch 1	County(off-site)
Skylark	UK & Kent BAP, Red list	Neighbourhood
Dunnock	UK BAP, Amber list	Neighbourhood

Song Thrush	UK BAP, Red list	Neighbourhood
Starling	UK BAP, Red list	Neighbourhood
Common Linnet	UK & Kent BAP, Red list	Neighbourhood
Reed Bunting	UK & Kent BAP, Amber list	Neighbourhood
Shelduck, Stock Dove, Meadow Pipit, Nightingale, Whitethroat	Amber list	Neighbourhood
Waterbird bird assemblage	Swale SPA interest feature Peak count 6.8% (1993), 5.1%(recent) SPA population	International (off-site)
Wigeon	Swale SPA interest feature Peak count 1.6% (1993), 0.9% (recent) SPA population	International (off-site)
Avocet	Swale SPA interest feature Peak count 217% (1993) SPA population, National in own right	International (off-site)
Grey Plover	Swale SPA interest feature Peak count 4% (1993), 3.9% (recent) SPA population	International (off-site)
Dunlin	Swale SPA interest feature Peak count 1.7% (1993), 2.4% (recent) SPA population	International (off-site)
Redshank	Swale SPA interest feature Peak count 6.7%(1993), 18.7% (recent) SPA population	International (off-site)
Black-tailed Godwit	Peak count 1,500 (International threshold 350 individuals)	International(off-site)
Harvest Mice	UK BAP	Neighbourhood

Predicted Changes in Baseline

9.5.68 The EIA baseline is based upon the condition of the Site between 2007 and 2009 including all known changes to the existing situation within that time period. However, it is important to recognise that the habitats comprising the Site are dynamic and that without management they will change. Such change is relevant between the submission of the planning application and the commencement of the development.

9.5.69 Continued dumping of soil, rubble etc. within the Proposal Site is likely to have two effects. The extension of bare ground habitat relied upon by Annual Beard-grass suggests potential for an increase in this species distribution which is at present restricted. The Proposal Site currently provides good quality habitat for assemblages such as reptiles, breeding birds and invertebrates. The continued encroachment of this spoil onto the grassland and scrub habitats would decrease available habitat and therefore both the assemblages and number of individuals of each species present.

9.5.70 It is anticipated that the development of the Site will occur within two years of the application. However should a greater time period elapse and measures not taken to slow down successional processes such as scrub encroachment and vegetation of the ditch at the northern boundary, the suitable habitat for invertebrates, birds etc. on the Site will slowly degrade.

9.6 Identification and Evaluation of Likely Significant Effects

9.6.1 The impacts are assessed on the basis of the details of construction, operation of the development outlined in Chapter 4. Potential construction impacts are considered first and then operational impacts. The following terms are used throughout this Environmental Statement:

- Baseline conditions – these are the conditions which will prevail in the year that construction of the development commences, currently envisaged to be 2010; and
- Principal Assessment Year is the year at which the development will be operational, this has been assumed to be 2012.

9.6.2 The redevelopment will involve consecutive stages of Site clearance and construction and post-redevelopment. A summary of each stage is presented in Chapter 4. Based on a review of available information, and in the absence of invasive species on Site, the following potential effects on the ecology of the Site and its environs have been identified:

- Loss and fragmentation of habitat;
- Traffic/pedestrian movement;
- Water supply and drainage;

- Air quality;
- Noise and vibration, and
- Artificial lighting.

9.6.3 The permanent loss of habitat as result of infrastructure works, including roads and building bases is considered in the construction effects section.

9.6.4 The assessment focuses on likely impacts to identified Valued Ecological Receptors (VER), as summarised above.

Construction Phase

9.6.5 Construction activities are detailed in Chapter 4 Construction and in terms of ecological impacts the development may potentially cause:

- Permanent loss of natural or semi-natural habitats;
- Temporary loss of natural or semi-natural habitats;
- Permanent loss of habitat that supports species of conservation importance;
- Temporary loss of habitat that supports species of conservation importance;
- Temporary disturbance to wildlife, e.g. from noise, vibration or light pollution, human activity and vehicular movements, and overshadowing of bird habitats;
- Soil compaction, resulting in changes to flora and fauna; and/or,
- Accidental release of pollution from the Proposal Site.

Designated Sites

The Swale Ramsar and SPA

Habitat loss

9.6.6 The development will cause no direct impact to the Swale Ramsar and SPA via habitat loss, given no part of either designated site falls within the Proposal Site boundary. The nearest boundary of the Swale Ramsar & SPA is 91m from the Proposal Site boundary.

9.6.7 The Proposal Site does not contain any habitat suitable for wintering Ramsar/SPA cited/review species, such as Dark-Bellied Brent Goose, Teal, Oystercatcher and Ringed Plover, therefore any habitat loss within the Proposal Site will cause no impact on the SPA/Ramsar assemblage.

Drainage

9.6.8 The Proposal Site drains eastwards into the Swale and therefore there has the potential to impact on the Ramsar and SPA site. Works on Site will follow the best practice guidelines.

Temporary foul drainage to serve the contractors welfare facilities will be provided at the start of works on Site. The following activities/items will be located more than 20m from the Site perimeter: refuelling and maintenance of machines, oil storage tanks, chemical or fuel storage and on Site concrete batching plants (if utilised). A strict waste management system will be incorporated to prevent the disposal of construction or domestic rubbish entering the adjacent marshland areas.

9.6.9 It is anticipated that the storage pond required for the permanent works will be constructed in advance of the earthwork operations such that construction phase storage and settling pond capabilities are available from the start of the works, and to provide tidal inundation protection to the construction Site.

9.6.10 This affords protection to the Swale from any spills or other pollutants. Whilst changes to the drainage network are proposed, mechanisms will be implemented to avoid any pollution incidents in accordance with legislative requirements and Environment Agency guidance.

9.6.11 Full implementation of the above would ensure no adverse impacts on the SPA in relation to drainage and surface hydrology.

Light spill

9.6.12 There is potential for light spill from the construction Site to impact the birds using the SPA/ Ramsar. The light scheme (see Appendix 8.2) for the construction phase will follow best practice to minimise light impacts. The construction lighting design will include 32x 400W floodlights with the luminaires mounted at a height of 10m on temporary columns around the Site. Task specific lighting may also be required, however through careful positioning and planning this should have minimal effect on the areas outside the Site.

9.6.13 The assessment of off-site lighting spill in Appendix 8.2 indicates that for the construction period at the north end of the Site the lighting levels drop to 1lux (bright moonlight) at a maximum distance of 30m from the Site boundary. Given the SPA is over 90m from the Site, there will be no significant impact from the construction lighting.

Disturbance from people and plant movements

9.6.14 The movement of people and plant during the construction phase of the development may be visible to a small proportion of the SPA cited/review bird species using the intertidal areas of the SPA/Ramsar. It is considered there is a limited potential for disturbance to be caused by people when account is taken of the fact that:

- The SPA cited/review bird species feeding on the intertidal area adjacent to the proposed development Site are already habituated to people using the Knauf Jetty (to the north

east of the Proposal Site), industrial areas behind the seawall and public footpath along the seawall itself.

- The bird distribution studies have shown the limited presence of SPA/Ramsar cited/review bird species on the intertidal area adjacent to the proposed development Site. The majority of SPA/Ramsar cited/review bird species on the intertidal area during all phases of the tide will be screened from people movement by the sea wall, buildings and topographical features and the concentrations occurring on the opposite bank of the River Swale are over 200 m from the proposed area of construction and separated by the river channel and seawall.

9.6.15 Therefore it is not anticipated that SPA cited/review birds will be disturbed by plant or people movement during the construction phase of the development.

Recreational disturbance

9.6.16 The potential for disturbance to SPA/Ramsar cited/review bird species from recreational use of the construction staff is considered low. Whilst there is an access route via the path at the southern end of the Site, there is no current use of this access route by Kemsley Mill staff. The operational nature and characteristics of the wider Kemsley Mill Site mean access is restricted and measures are already in place to prevent incursion outside of defined areas. Therefore, it is not anticipated that any of the construction staff will access the Swale SPA.

9.6.17 There will be no impact from recreational disturbance from members of the public, as there is no public access via the Site.

Noise

9.6.18 Noise created during the construction phase from piling works, HGV movements and other plant activities has the potential to disturb birds wintering within the SPA/Ramsar, causing them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}. The main intertidal areas of the Swale Ramsar/SPA used by wintering citation birds recorded by the foreshore monitoring are over 200 m from the areas of the Proposal Site where significant noise events may occur.

9.6.19 The maximum noise has been modelled at the main intertidal area of the SP/Ramsar to be no more than 65dB L_{Amax} (see Figure 9.10). As a result no effect is predicted due to construction noise.

Overshadowing/line of sight

9.6.20 During the construction phase of the development there will be Piling rigs and cranes on Site. There is potential for both the plant on Site and the SEP as it is constructed to overshadow the SPA/Ramsar and block clear lines of sight for the bird species utilising the intertidal area, thereby causing them to abandon current feeding and roosting areas.

9.6.21 The first of SEP buildings (the UEU) visible from the Swale will be 17.5m high, and is located 210 m from the low water line, the second major building (the UEB) is 50m high at a distance of 385 m, whilst the stacks will be ~ 90m high and is located 520 m from the low water mark. Therefore the nearest part of the proposed development associated with the Proposal Site will be 210 m from the low water mark and separated from it by the sea wall (see Figure 9.12).

9.6.22 In order to determine the intrusion effect of the development on waterbirds using the intertidal area adjacent to the Proposal Site calculations were made to see whether the development would become a visual disturbance to the bird's line of sight. Calculations were undertaken for a bird 0.5m in height (an average for wildfowl) standing on the low mean water line of the foreshore with the intervening sea wall of 5.5m AOD.

9.6.23 The calculation indicates birds will be impacted to a small extent by a 17.5 m high building on the very edge of the proposed development, given that approximately 9m of the building would be visible to an average height bird (0.5m).

9.6.24 As the height of the buildings and distance between the development and the Swale increases (520m to the stacks at 90 m high) the birds will be able to see approximately 11m of the top section for the UEB above the UEU, and then approximately 20m of the top of the stacks (Figure 9.12).

9.6.25 Whilst the buildings will be in view from the low water line, the buildings are static and therefore less likely to cause disturbance than a moving object, the distance is considerable and the buildings will blend visually into the Kemsley Paper Mill behind it.

9.6.26 The percentage of 360^{o} view of a bird sat on the low water line that would be impaired by the 85 m wide proposed development is 6.4% (see Figure 9.12).

9.6.27 This, together with the relatively low number of birds utilising the foreshore adjacent to the Proposal Site (in comparison to the rest of the intertidal survey area), indicates that there will be negligible obstruction of sight-lines or overshadowing on the intertidal area. It is therefore

concluded that the development would not affect the suitability of the adjacent intertidal areas or result in areas being abandoned.

Flight lines

9.6.28 Observations as part of the intertidal bird surveys and general observations on Site during the breeding bird survey have shown that the main flight lines for SPA/Ramsar species in the vicinity of the Proposal Site are offshore, with no waterbirds being noted to fly over the Proposal Site. The surrounding area is already heavily industrialised and areas of conurbation exist to the west, thus making it unlikely that waterbirds would pass through the Proposal Site on route to other wetland areas such as the Medway Estuary. As the Proposal Site lies entirely on the landward side of the sea wall and birds do not fly over the sea wall and onto/over the site in any significant numbers, it will not affect the flight lines of SPA/Ramsar birds using the Swale.

9.6.29 It is considered likely that the impacts of this development on a receptor of **International** value, would be of **negligible** and therefore **Not significant**.

Medway Estuary and Marshes Ramsar and SPA

9.6.30 The Proposal Site does not contain any habitat suitable for wintering Ramsar/SPA cited/review species, such as Avocet and Little Tern, therefore any habitat loss within the Proposal Site will cause no impact on the SPA/Ramsar assemblage.

9.6.31 The Proposal Site drains eastwards into the Swale and therefore there is no potential for impacts on the Ramsar and SPA site.

9.6.32 The present baseline noise, lighting and disturbance from human activity are such that further disturbance due to construction at a minimum distance of 2.4km is unlikely to have significant impact.

9.6.33 There are no predicted impacts from the development from recreational usage of the SPA/Ramsar, given the intervening distance and lack of access routes.

9.6.34 Noise created during the construction phase from piling works, HGV movements and other plant activities has the potential to disturb birds wintering in the area, causing them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}. The Medway Estuary and Marshes

Ramsar and SPA occur at 2.4km from the construction Site and the maximum noise has been modelled here to be no more than 55dB L_{Amax}. As a result no effect is predicted due to construction noise.

9.6.35 Given the distance involved there is no potential for the buildings or plant used during the construction phase to overshadow the SPA/Ramsar or block clear lines of slight for birds utilising the intertidal areas causing them to be disturbed.

9.6.36 Observations as part of the intertidal bird surveys and general observations on Site during the breeding bird survey have shown that the main flight lines in the vicinity of the Proposal Site are offshore, with no waterbirds being noted to fly over the Proposal Site. The surrounding area is already heavily industrialised and areas of conurbation exist to the west, thus making it unlikely that waterbirds would pass through the Proposal Site on route to the Medway Estuary. As the Proposal Site lies entirely on the landward side of the sea wall and birds do not fly over the sea wall and onto/over the Site in any significant numbers, it will not affect the flight lines of SPA/Ramsar birds using the Medway Estuary and Marshes.

9.6.37 It is considered that the predicted impacts of the construction phase of the development on this receptor of **International** value, would be negligible and therefore **not significant**.

Swale SSSI

9.6.38 The development will cause no direct impact to the Swale SSSI via habitat loss, given no part of the SSSI falls within the Proposal Site boundary. The Swale SSSI is 91 m from the Proposal Site boundary.

9.6.39 The Proposal Site drains eastwards into the Swale Estuary and therefore there is potential for impact on the SSSI. Measures to prevent spills/ accidental pollution are detailed in the SPA impact assessment section above. Whilst changes to the drainage network are proposed, mechanisms will be implemented to avoid any and pollutions/incidents in accordance with legislative requirements and Environment Agency guidance

9.6.40 There is potential for light spill from the construction Site to impact the birds using the SSSI, however the assessment of off-site lighting spill (see Appendix 8.2) shows the lighting levels drop to acceptable levels within 30 m of the Proposal Site boundary. Noise created during the construction phase (particularly the piling works) has the potential to disturb birds causing them to cease feeding or fly away from the area of influence. The assessment of construction noise on the SSSI is detailed in the SPA impact assessment section above.

9.6.41 The issues dealing with impacts to wintering waterbirds have been discussed previously with relation to the Swale Ramsar/SPA.

9.6.42 It is considered likely that the impacts of the development on this receptor of **National** value, would be **negligible** and therefore of **Not Significant**.

Medway Estuary and Marshes SSSI

9.6.43 The Medway Estuary and Marshes SSSI was notified for its large area of intertidal habitats, holding internationally important populations of wintering and passage birds and is also of importance for its breeding birds. An outstanding assemblage of plant species also occurs on the SSSI.

9.6.44 The development will cause no direct impact to the Medway Estuary and Marshes SSSI via habitat loss, given no part of the SSSI falls within the Proposal Site boundary. The Medway Estuary and Marshes SSSI is 2.4km from the Proposal Site boundary.

9.6.45 The Proposal Site drains eastwards into the Swale and as such there is no potential for impact on the Medway Estuary and Marshes SSSI.

9.6.46 The present baseline noise, lighting and disturbance from human activity are such that further disturbance due to construction at a minimum distance of 2.4km would not have significant impact.

9.6.47 The issues dealing with impacts to breeding and wintering waterbirds have been discussed previously with relation to the Medway Estuary and Marshes Ramsar/SPA.

9.6.48 Therefore it is considered likely that the impacts from the construction phase of the development on this receptor of **National** value, would be negligible and therefore **Not significant**.

Elmley Island NNR

9.6.49 Elmley Island NNR is located 334 m to the east of the Proposal Site on the other side of the Swale.

9.6.50 Elmley Island NNR is important for large numbers of wintering waterfowl and for birds of prey. Many different bird species also breed at Elmley Island. The watercourses, seasonally wet grassland and saltmarsh are also important for invertebrates and plants.

9.6.51 The only potential impacts to Elmley Island NNR from the construction phase would be dust and noise. However the distances involved (~330 m) and the intervening Swale make this impact negligible.

9.6.52 It is considered likely that the impacts of the development on this receptor of **National** value, would be **not significant**.

Milton Creek Local Wildlife Site

9.6.53 Milton Creek Local Wildlife Site (LWS) contains a mosaic of habitats including saltmarsh, larger areas of rougher, unmanaged grassland, some unimproved pasture, and freshwater dykes with good aquatic and marginal flora. Although not designated as such due to the high levels of pollution present in the sediment from previous industrial activities, Milton Creek forms an extension to the Swale SPA.

Habitat loss

9.6.54 No part of the LWS falls within the Proposal Site boundary, therefore there will be no direct impact on Milton Creek via habitat loss.

Drainage

9.6.55 The Proposal Site drains eastwards into the Swale and therefore there is potential for impact on the LWS, which is located 125m from the outfall. Protection measures being implemented to protect the Swale from any spills or other pollutants will also protect Milton Creek LWS. Whilst changes to the drainage network are proposed, mechanisms will be implemented to avoid any and pollutions incidents in accordance with legislative requirements and Environment Agency guidance.

Lighting

9.6.56 There is potential for light spill from the construction Site to impact the Swale SPA citation birds using Milton Creek. The light scheme for the construction phase will follow best practice to minimise light impacts. The construction lighting design will include 32x 400W floodlights with the luminaires mounted at a height of 10m on temporary columns around the Site. Task specific lighting may also be required, however through careful positioning and planning this will have minimal effect on the areas outside the Site.

9.6.57 The assessment of off-site lighting spill within Appendix 8.2 indicates that for the construction period at the north end of the Site the lighting levels drop to 1lux (bright moonlight) at a maximum distance of 30m from the Site boundary. Given Milton Creek is over 60 m from the Site, there will be no significant impact from the construction lighting.

Disturbance from people and plant movements

9.6.58 The movement of people and plant during the construction phase of the development which may be visible to a small proportion of the SPA cited/review bird species using the intertidal areas of Milton Creek. It is considered there is a limited potential for disturbance to be caused by people when account is taken of the fact that:

- The bird distribution studies have shown the limited presence of SPA/Ramsar cited/review bird species on the intertidal area adjacent to the proposed development Site.
- The bird species feeding on the intertidal area adjacent to the proposed development Site are already habituated to people.

9.6.59 Therefore, it is not anticipated that SPA cited/review birds will be disturbed by plant or people movement during the construction phase of the development.

Noise

9.6.60 Noise created during the construction phase from piling works, HGV movements and other plant activities has the potential to disturb birds wintering within Milton Creek, causing them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}. The main intertidal areas of Milton Creek used by wintering citation birds from the Swale SPA recorded by the foreshore monitoring are at their closest point over 300m from the areas of the Proposal Site where significant noise events will occur.

9.6.61 The maximum noise has been modelled at the main intertidal area of Milton Creek to be no more than 60dB L_{Amax} (see Figure 9.10). As a result no effect is predicted due to construction noise.

9.6.62 It is considered likely that the impacts of the development on this receptor of **County** value, would be of negligible magnitude and therefore of **Not Significant**.

Habitats

Brownfield

9.6.63 The UKBAP brownfield habitat covers the majority of the Site (5.69ha), comprising a mosaic of neutral unimproved grassland, bare ground, ephemeral, swamp and ruderal. The majority of this habitat will be lost (5.2 ha), except the area of ruderal/scrub on the eastern end of the Site which will form the main mitigation area and will be retained and enhanced for reptiles. The ditch on the eastern boundary of the Proposal Site will be realigned and enhanced for wildlife.

9.6.64 There will also be a small temporary loss of habitat during the installation of the drain into the Swale.

9.6.65 Other potential significant impacts of the construction phase include dust deposition, to retained and adjacent habitat.

9.6.66 It is considered likely that the impacts of habitat loss on this population of **Local** value, would be of High magnitude (large extent, permanent, negative) and therefore of **Minor adverse significance**.

Annual Beard-grass

9.6.67 The ephemeral habitat within the Proposal Site supports Annual Beard-grass. A 0.42ha section of this habitat will be lost to the development. However, since Annual Beard-grass is an annual and its distribution will change yearly, the loss of this section of ephemeral habitat is of less importance than the loss of open/bare ground habitat.

9.6.68 It is considered likely that the impacts of habitat loss on this population of **Local** value, would be of Low magnitude (small extent, permanent, negative) and therefore of **Minor adverse significance**.

Invertebrate habitat

9.6.69 0.9 ha of high quality invertebrate habitat will be lost to the development. Other potential significant impacts of the construction phase include dust deposition to retained and adjacent habitat.

9.6.70 It is considered likely that the impacts of habitat loss on this population of **Local** value, would be of High magnitude (large extent, permanent, negative) and therefore of **Minor adverse significance**.

Reptiles

9.6.71 Grass Snake, Common Lizard and Slow-worm all have relatively small isolated populations within the Proposal Site.

9.6.72 The main potential impacts of the construction phase on reptiles are permanent and temporary loss of habitat, habitat fragmentation, disturbance and possible injury. 1.89ha of the reptile habitat within the Proposal Site will be lost to development, however there is at least an equivalent area of habitat suitable for reptiles directly adjoining the Site.

9.6.73 There is potential for the development to cause a loss of connectivity in reptile habitat therefore fragmenting the local population. However the retained habitat on the eastern side of the Site (adjacent to the Swale) will provide a corridor for reptile movement. Therefore this impact is considered Not Significant.

9.6.74 Several areas of reptile habitat are to be retained within the landscaping (0.47ha) areas (including areas of habitat creation). However reptiles within these areas could be disturbed, and possibly killed or injured by plant movement within the Site during construction.

9.6.75 It is considered likely that the impacts resulting from habitat loss on reptile populations of **Neighbourhood** value, of habitat loss would be of Medium magnitude (medium extent, permanent, negative) and therefore of **Minor adverse significance**.

9.6.76 It is considered likely that the impacts on these populations of **Neighbourhood** value, of disturbance and temporary habitat loss would be of minimal magnitude (small extent, temporary, negative) and therefore of **Minor adverse significance**.

Breeding birds

Habitat loss

9.6.77 Clearance of vegetation for the construction phase would cause habitat loss and associated disturbance to a number of breeding bird species. Habitat clearance will take place outside of the breeding season, if some work during the breeding season is unavoidable then an experienced ornithologist would make a thorough search of the identified area to ensure that there are no breeding birds present.

9.6.78 An area of approximately 4.44ha of suitable habitat supporting breeding birds will be lost from within the Proposal Site, in the form of scrub, grassland, tall ruderal, ephemeral and ditch habitats.

Drainage

9.6.79 There is potential for the construction phase of the development to accidentally release pollution into the Reedbed habitat to the north of the Proposal Site which supports the majority of the birds of conservation concern.

9.6.80 The Proposal Site drains eastwards into the Swale Estuary. Works on Site will follow the best practice guidelines. Temporary foul drainage to serve the contractors welfare facilities will be provided at the start of works on Site. The following activities/items to be located more than 20m from the Site perimeter: refuelling and maintenance of machines, oil storage tanks, chemical or fuel storage and on Site concrete batching plants (if utilised). A strict

waste management system will be incorporated to prevent the disposal of construction or domestic rubbish entering the adjacent marshland areas.

9.6.81 It is anticipated that the storage pond required for the permanent works will be constructed in advance of the earthworks operations such that construction phase storage and settling pond capabilities are available from the start of the works, and to provide tidal inundation protection to the construction Site.

9.6.82 This affords protection to the reedbed area from any spills or other pollutants. Whilst changes to the drainage network are proposed, mechanisms will be implemented to avoid any pollution incidents in accordance with legislative requirements and Environment Agency guidance.

Light spill

9.6.83 There is potential for light spill from the construction Site to impact the breeding birds using the adjacent reedbed habitat. The light scheme for the construction phase will follow best practice to minimise light impacts. The construction lighting design will include 32x 400W floodlights with the luminaires mounted at a height of 10m on temporary columns around the Site. Task specific lighting may also be required, however through careful positioning and planning this should have minimal effect on the areas outside the Site.

9.6.84 The assessment of off-site lighting spill (see Appendix 8.2) shows that for the construction period at the north end of the Site the lighting levels drop to 1lux (bright moonlight) at a maximum distance of 30m from the Site boundary. Given the key reedbed area is at its closest point 45m from the Proposal Site boundary, there will be no significant impact from the construction lighting.

Disturbance from people and plant movements

9.6.85 The movement of people and plant during the construction phase has potential to cause visual disturbance to nesting birds. Identifying the impact on different species and individuals is difficult as their tolerance to visual disturbance and their ability to habituate will vary. Again these impacts are only likely to be significant at the very edge of the reedbed, facing the Proposal Site, not within the reedbed where the Schedule 1 species nest.

Noise

9.6.86 Noise created during the construction phase has the potential to disturb breeding birds causing them to cease feeding or fly away from the area of influence. It is recognised that short, sharp ‘percussive’ noises have the greatest potential to cause disturbance.

9.6.87 Noise created during the construction phase from piling works, HGV movements and other plant activities has the potential to disturb birds breeding in the area to cause them to fail to establish a breeding territory or abandon their attendance at a nest. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}.

9.6.88 The nearest significant area of habitat for nesting birds retained on Site occurs 45 m from the main construction Site at it's nearest point and the maximum noise has been modelled here will be between 75 and 80dB L_{Amax}. As a result a potential significant impact on the bird assemblage is predicted due to construction noise. It is considered likely that the impacts of noise on the off-site assemblage of **Neighbourhood** value, would be of Medium magnitude (medium extent, temporary, negative) and therefore of **Minor adverse significance**.

9.6.89 The nearest Wildlife and Countryside Act 1981 Schedule 1 bird species is Cetti's Warbler territory occurs ~30m from the construction Site and the maximum noise has been modelled here will be between 75 and 80dB L_{Amax}. As a result a potential significant impact on this species is predicted due to construction noise. It is considered likely that the impacts of noise on the off-site Cetti's Warbler territories of **County** value, would be of Medium magnitude (medium extent, temporary, negative) and therefore of **Moderate adverse significance**.

9.6.90 The nearest Bearded Tit territory occurs ~110m from the construction site and the maximum noise has been modelled here will be between 70 and 75dB L_{Amax}. As a result there is unlikely to be a potential significant impact due to construction noise. It is considered likely that the impacts of noise on the off-site Bearded Tit of **County** value, would be of Low magnitude (small extent, temporary, negative) and therefore of **Minor adverse significance**.

9.6.91 The Marsh harrier territory occurs ~160m from the construction Site and the maximum noise has been modelled here will be between 65 and 60dB L_{Amax}. As a result there is unlikely to be a potential significant impact due to construction noise. It is considered likely that the impacts of noise on the off-site Marsh Harrier of **Local** value, would be of Low magnitude (small extent, temporary, negative) and therefore of **Minor adverse significance**.

Dust

9.6.92 There is potential for impacts on breeding birds within the adjacent reedbed habitat from dust deposition during the construction phase. Quantities of dust blowing from the Proposal Site into the reedbed could potentially cause behavioural disturbance to adult birds (avoidance behaviour), ingestion by chicks and impact the availability and quality of invertebrate and

reedbed food sources. However these impacts are only likely to be significant at the very edge of the reedbed, facing the Proposal Site.

9.6.93 It is considered likely that the impacts of habitat loss on the breeding bird assemblage of **Neighbourhood** value, would be of High magnitude (large extent, permanent, negative) and therefore of **Minor adverse significance**.

9.6.94 It is considered likely that the impacts of disturbance on the off-site assemblage of **Neighbourhood** value from sudden noise, would be of Medium magnitude (medium extent, temporary, negative) and therefore of **Minor adverse significance**.

Wintering birds

Habitat loss

9.6.95 There is no habitat on Site which supports wintering bird species, therefore there will be no habitat loss caused by the development to areas used by over-wintering bird species.

Waterbird Assemblage

Disturbance from people and plant movements

9.6.96 During the construction both people and plant working on the development Site may be visible to a small proportion of the population using the adjacent Swale and Milton Creek. It is considered there is a limited potential for disturbance to be caused by people when account is taken of the fact that:

- Waterbirds feeding on the intertidal area adjacent to the proposed development Site are already habituated to people using the jetty, industrial areas behind the seawall and public footpath along the seawall itself.
- Bird distribution studies carried out for the proposed development have shown limited presence of waterbirds on the intertidal area adjacent to the proposed development Site. The majority of wintering birds on the intertidal area during all phases of the tide will be screened from people movement by the sea wall, buildings and topographical features. The concentrations of waterbodies occurring on the opposite bank of the River Swale are over 200 m from the proposed area of construction and separated by the river channel and seawall.

9.6.97 Disturbance from construction activities on the waterbird assemblage using the area is not a significant effect and is temporary and reversed once construction activity ceases in any one day, in any one week and at the end of the construction of the structures. This is a negligible magnitude effect to an **Internationally** important receptor and is concluded to be of **no significant impact** on the waterbird assemblage.

Noise

9.6.98 Noise created during the construction phase from piling works, HGV movements and other plant activities has the potential to disturb birds wintering in the area and cause them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}. Waterbirds occurring on the intertidal area are at their closest, 200m from the construction Site boundary and the maximum noise has been modelled here using the indicative positioning of rigs to be no more than 65dB L_{Amax}. The majority of waterbirds however occur in areas where the maximum noise has been modelled as 60dB L_{Amax} or less. As a result no effect is predicted due to construction noise. This is a negligible magnitude effect to an **Internationally** important receptor and is concluded to be of **no significant impact** on the waterbird assemblage.

Artificial Lighting

9.6.99 Artificial light used to enable activities in periods of poor light or darkness during the construction phase has the potential to disturb birds and cause them to cease feeding or fly away from the area of influence.

9.6.100 Off-site lighting plans (see Appendix 8.2) show that for the construction period the lighting levels will decrease fairly rapidly on moving away from the Site boundary. The construction period drawing indicates that at the north end of the Site the lighting levels drop to 1 lux (as a guide bright moonlight is measured in the region of 1lux, RPS 2009) at a maximum distance of 30m from the Site boundary. Given the Swale SPA/Ramsar at its closest, is 90m from the Site boundary, the lighting level influencing the intertidal area is considered to be well below that which occurs in natural circumstances i.e. moonlit nights. As a result no effect is predicted due to construction lighting. This is a negligible magnitude effect to an **Internationally** important receptor and is concluded to be of **no significant impact** on the waterbird assemblage.

Ramsar/ SPA Cited/review species (International importance)

9.6.101 The following impact assessment covers all the SPA cited/review bird species VERS. This includes both citation and SPA review species as per Natural England advice. The assessment is therefore against the following internationally important species Wigeon, Avocet, Grey Plover, Dunlin and Redshank.

Disturbance from people and plant movements

9.6.102 The construction operations will involve processes where there will be people working on the development Site both from within and outside of machinery which may be visible to a small proportion of the SPA cited/review bird species populations using the survey area. It is considered there is a limited potential for disturbance to be caused by people when account is taken of the fact that:

- The SPA cited/review bird species feeding on the intertidal area adjacent to the proposed development Site are already habituated to people using the jetty, industrial areas behind the seawall and public footpath along the seawall itself.
- The bird distribution studies have shown the limited presence of SPA/Ramsar cited/review bird species on the intertidal area adjacent to the proposed development Site. The majority of SPA/Ramsar cited/review bird species on the intertidal area during all phases of the tide will be screened from people movement by the sea wall, buildings and topographical features and the concentrations occurring on the opposite bank of the River Swale are over 200 m from the proposed area of construction and separated by the river channel and seawall.

9.6.103 Disturbance from construction activities is predicted to result in an adverse effect to a proportion of the SPA/Ramsar cited/review bird species populations using the area. This impact is not predicted to significant because it will be temporary and reversed once construction activity ceases in any one day, in any one week and at the end of the construction of the structures. This has been classified as an impact of negligible magnitude to an **Internationally** important receptor and is concluded to be **Not significant.**

Noise

9.6.104 Noise created during the construction phase from piling works, HGV movements and other plant activities has the potential to disturb birds wintering in the area and cause them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80 dB L_{Amax}.

9.6.105 Wigeon, Avocet, Grey Plover and Redshank occurring on the intertidal area are at their closest, 100 m from the construction Site boundary. The maximum noise has been modelled here using the indicative positioning of rigs to be no more than 65dB L_{Amax}. The majority of SPA cited/review bird species however occur in areas where the maximum noise has been modelled as 60 dB L_{Amax} or less.

9.6.106 Dunlin occur on the intertidal area are at their closest, 300m from the construction Site boundary and the maximum noise has been modelled here using the indicative positioning of rigs to be no more than 60dB L_{Amax}. The majority however occur in areas where the maximum noise has been modelled as 55dB L_{Amax} or less.

9.6.107 As a result no significant adverse impact is predicted due to construction noise. This is a negligible magnitude effect to an **Internationally** important receptor and is concluded to be of **no significant impact**.

Artificial lighting

9.6.108 Artificial lighting used to enable activities in periods of poor light or darkness during the construction phase has the potential to disturb birds and cause them to cease feeding or fly away from the area of influence.

9.6.109 The assessment of off-site lighting spill (see Appendix 8.2) shows that for the construction period at the north end of the Site the lighting levels drop to 1 lux (bright moonlight) at a maximum distance of 30 m from the Site boundary. Given the SPA is over 90m from the Site, the lighting level influencing the intertidal area is considered to be well below that which occurs in natural circumstances i.e. moonlit nights. As a result no effect is predicted due to construction lighting. This is a negligible magnitude effect to an **Internationally** important receptor and is concluded to be of **no significant impact** on the SPA cited/review bird species.

Locally occurring species

9.6.110 The following impact assessment covers Black-tailed Godwit which was identified as occurring in International numbers locally.

Disturbance from people and plant movements

9.6.111 The construction operations will involve processes where there will be people working on the development Site both from within and outside of machinery. It is considered there is a limited potential for disturbance to be caused by people when account is taken of the fact that:

- Black-tailed Godwit feeding on the intertidal area adjacent to the proposed development Site are already habituated to people using the Knauf Jetty, industrial areas behind the seawall and public footpath along the seawall itself.
- The bird distribution studies have shown the limited presence of Black-tailed Godwit on the intertidal area adjacent to the proposed development Site. The majority of Black-tailed Godwit on the intertidal area during all phases of the tide will be screened from people movement by buildings and topographical features and the concentrations occurring on

the opposite bank of the River Swale are over 300m from the proposed area of construction and separated by the river channel and seawall.

9.6.112 Disturbance from construction activities is an adverse effect to a proportion of the Black-tailed Godwit population using the area that is not significant and is temporary and reversed once construction activity ceases in any one day, in any one week and at the end of the construction of the structures. This is a negligible magnitude effect to an **Internationally** important receptor and is concluded to be of **no significant impact** on Black-tailed Godwit.

Noise

9.6.113 Noise created during the construction phase from piling works, HGV movements and other plant activities has the potential to disturb birds wintering in the area and cause them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}. Black-tailed Godwit occurring on the intertidal area are at their closest, 100m from the construction Site boundary and the maximum noise has been modelled here using the indicative positioning of rigs to be no more than 65dB L_{Amax}. The majority of Black-tailed Godwit however occur in areas where the maximum noise has been modelled as 60dB L_{Amax} or less.

9.6.114 As a result no effect is predicted due to construction noise. This is a negligible magnitude effect to an **Internationally** important receptor and is concluded to be of **no significant impact** on Black-tailed Godwit.

Artificial lighting

9.6.115 Artificial light used to enable activities in periods of poor light or darkness during the construction phase has the potential to disturb birds and cause them to cease feeding or fly away from the area of influence.

9.6.116 Off-site lighting plans (see Appendix 8.2) shows that for the construction period the lighting levels will decrease fairly rapidly on moving away from the Site boundary. The construction period drawing indicates that at the north end of the Site the lighting levels drop to 1 lux (as a guide bright moonlight is measured in the region of 1 lux, RPS 2009) at a maximum distance of 30m from the Site boundary. Given the SPA at its closest, is 90 m from the Site boundary, the lighting level influencing the intertidal area is considered to be well below that which occurs in natural circumstances i.e. moonlit nights. As a result no effect is predicted due to construction lighting. This is a negligible magnitude effect to an **Internationally** important receptor and is concluded to be of **no significant impact** on Black-tailed Godwit.

Harvest mice

9.6.117 Main impacts to Harvest mouse from the construction phase of the development will be loss of habitat and potential disturbance to off-site retained habitat. There will be a loss of 2.08ha rough grassland, swamp and scrub. There is potential for dust deposition to cause a decline in the availability and quality of the invertebrate and vegetation food resources, within retained habitats on-site and the off-site habitat to the north of the Proposal Site.

9.6.118 It is considered likely that the impacts on these populations of **Neighbourhood** value, of habitat loss would be of High magnitude (large extent, permanent, negative) and of disturbance to off-site habitat would be medium magnitude (medium extent, temporary, negative) and therefore of **Minor adverse significance**.

Operational Impacts

9.6.119 Operational activities may potentially cause:

- changes in air quality;
- degradation and loss of habitats e.g. from pollution and lack of or inappropriate management;
- degradation to and loss of habitats that support species of conservation importance e.g. from pollution and lack of or inappropriate management; and
- disturbance to wildlife e.g. from noise or light pollution, human activity and vehicular movement.

Designated Sites

The Swale Ramsar and SPA

9.6.120 The Proposal Site does not contain any habitat suitable for wintering Ramsar/SPA cited/review species, such as Dark-Bellied Brent Goose, Dunlin and Redshank therefore any habitat loss within the Proposal Site will cause no impact on the SPA/Ramsar assemblage.

Drainage

9.6.121 As the development drains eastwards into the Swale therefore there could be an impact on Ramsar or SPA supporting features such as invertebrates, and plants. The new development will significantly increase the impermeable area of the Site and hence the volume of the surface water run-off and potentially the nature of the run- would increase and there would be potential for pollution events. The overall philosophy for the design of the surface water drainage system for the Site development is therefore to manage surface water discharge sustainably and at source and to ensure that discharged waters do not constitute a pollution risk.

9.6.122 It is proposed that all clean surface water from the Site is discharged to receiving storage ponds constructed on the northern, eastern and southern perimeters of the Site. These

ponds will also provide protection against flooding of the Site during rainfall and tidal events, and prevent uncontrolled discharge water entering areas of land adjacent the Site, such as the SPA.

9.6.123 Minor fuel/oil spillages from plant within Site will enter surface water drainage systems and be treated through class 1 full retention interceptors. Incidents that could result in volumes of fuel/oil which exceed the capacity of the interceptors, would involve contaminated water being discharged directly to the storage ponds, with closure valve retaining the water within the ponds for a tanker to remove off Site. Therefore there will be no significant impact from operational drainage on the SPA.

Light spill

9.6.124 The light scheme for the operational phase will follow best practice to minimise light impacts. The operational lighting design incorporates street lighting and flood lighting located on the Site buildings to provide illumination to roads, car parks and hard standing areas.

9.6.125 The street lighting is fitted with a flat glass profile to minimize light spill. The lighting levels for the final operational plant can be seen to drop to a level of 1lux (bright moonlight) within an average distance of 12m from the Site boundary (see Appendix 8.2). Given the boundary of the Ramsar/SPA is over 140m from the Site, combined with the current significant lighting surrounding the Kemsley Paper Mill and associated roads there will be no significant impact from the operational lighting.

Disturbance from people and plant movements

9.6.126 The movement of people and plant during the operational phase of the development may be visible to a small proportion of the SPA cited/review bird species using the intertidal areas of the SPA/Ramsar. It is considered there is a limited potential for disturbance to be caused by people when account is taken of the fact that:

- The SPA cited/review bird species feeding on the intertidal area adjacent to the proposed development Site are already habituated to people using the Knauf Jetty, industrial areas behind the seawall and public footpath along the seawall itself.
- The bird distribution studies have shown the limited presence of SPA/Ramsar cited/review bird species on the intertidal area adjacent to the proposed development Site. The majority of SPA/Ramsar cited/review bird species on the intertidal area during all phases of the tide will be screened from people movement by the sea wall, buildings and topographical features and the concentrations occurring on the opposite bank of the River Swale are over 200m from the proposed area of construction and separated by the river channel and seawall.

- The main operational areas do not face directly towards the SPA/Ramsar site, being located mainly to the north and south of the buildings.

9.6.127 Therefore, it is not anticipated that SPA cited/review birds will be disturbed by plant or people movement during the construction phase of the development.

Recreational Disturbance

9.6.128 The potential for disturbance to SPA/Ramsar cited/review bird species from recreational use of the operational staff is considered low. Whilst there is an access route via the path at the southern end of the Site, there is no current use of this access route by Kemsley Mill staff. The operational nature and characteristics of the wider Kemsley Mill Site mean that access is restricted and measures are already in place to prevent incursion outside of defined areas. It is estimated that no more than 12 staff will be present on Site at any one time during the operational phase. Therefore, it is not anticipated that large numbers, if any, of the staff will access the sea wall overlooking the Swale SPA, causing disturbance to birds.

Operational Noise

9.6.129 It is considered that there is a low potential for sudden noises during the operational phase of the development to cause disturbance impacts on SPA cited/review birds.

9.6.130 Sudden noise created during the operational phase from valve releases associated with the slag and combustion residues processing plant (UEW and UEU), HGV movements and other plant activities has the potential to disturb birds wintering in the area to cause them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}.

9.6.131 Waterbirds occurring on the intertidal area are at their closest, 100 m from the construction Site boundary and the maximum noise has been modelled here using the indicative source point of noise for valve release at the northern end of the Site to be no more than 35dB L_{Amax} (see Figure 9.11). The majority of waterbirds however occur in areas where the maximum noise has been modelled as 30dB L_{Amax} or less. As a result there is no predicted effect due to sudden noises during the operational phase.

Air quality

9.6.132 There is potential for impacts on wintering birds within the SPA from dust deposition during the operational phase. Quantities of dust could potentially cause behavioural disturbance to adult birds (avoidance behaviour), impact the availability and quality of invertebrate food sources. However these impacts are only likely to be significant immediately adjacent to the

works areas within the Proposal Site and will be subject to standard, best-practice dust-suppression methods.

9.6.133 Appendix 9.2 provides an analysis of the impacts of emissions to air of the proposed SEP on the features of interest of the SPA. For all pollutants (NO_x, SO_2, NH_3, N 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 the SPA. Therefore, no impacts on the SPA interest features as a result of the operation of the SEP are predicted.

9.6.134 There is the potential for the emissions to air to have an impact on the supporting habitats of the SPA. These are covered under The Swale SSSI below.

Overshadowing/line of sight

9.6.135 During the operational phase of the development there is potential for the SEP buildings to overshadow the SPA/Ramsar and block clear lines of sight for the bird species utilising the intertidal area, thereby causing them to abandon current feeding and roosting areas.

9.6.136 The first of SEP buildings (the UEU) visible from the Swale will be 17.5m high, and is located 210m from the low water line, the second major building (the UEB) is 50m high at a distance of 385m, whilst the stacks will be ~ 90m high and is located 520m from the low water mark. Therefore the nearest part of the proposed development associated with the Proposal Site will be 210m from the low water mark and separated from it by the sea wall (see Figure 9.12).

9.6.137 In order to determine the intrusion affect of the development on waterbirds using the intertidal area adjacent to the Proposal Site calculations were made to see whether the development would become a visual disturbance to the bird's line of sight. Calculations undertaken for a bird 0.5m in height (an average for wildfowl) standing on the low mean water line of the foreshore with the intervening sea wall of 5.5m AOD.

9.6.138 The calculation indicates birds will be impacted to a small extent by a 17.5m high building on the very edge of the proposed development, given that approximately 9m of the building would be visible to an average height bird (0.5m).

9.6.139 As the height of the buildings and distance between the development and the Swale increases (520 m to the stacks at 90m high) the birds will be able to see approximately 11m of the top section for the UEB above the UEU, and then approximately 20m of the top of the stacks (Figure 9.12).

9.6.140 Whilst the buildings will be in view from the low water line, the buildings are static and therefore less likely to cause disturbance than a moving object, the distance is considerable and the buildings will blend visually into the Kemsley Paper Mill behind it.

9.6.141 The percentage of 360º view of a bird sat on the low water line, that would be impaired by the 85m wide proposed development is 6.4 % (see Figure 9.12).

9.6.142 This, together with the relatively low number of birds utilising the foreshore adjacent to the Proposal Site (in comparison to the rest of the intertidal survey area), indicates that there will be negligible obstruction of sight-lines or overshadowing on the intertidal area. It is therefore concluded that the development would not affect the suitability of the adjacent intertidal areas or result in areas being abandoned.

Flight lines

9.6.143 Observations as part of the intertidal bird surveys and general observations on Site during the breeding bird survey have shown that the main flight lines for SPA/Ramsar species in the vicinity of the Proposal Site are offshore, with no waterbirds being noted to fly over the Proposal Site. The surrounding area is already heavily industrialised and areas of conurbation exist to the west, thus making it unlikely that waterbirds would pass through the Proposal Site on route to other wetland areas such as the Medway Estuary. As the Proposal Site lies entirely on the landward side of the sea wall and birds do not fly over the sea wall and onto/over the Site in any significant numbers, it will not affect the flight lines of SPA/Ramsar birds using the Swale.

9.6.144 Therefore it is considered likely that the impacts of this development on a receptor of **International** value, would be **Not Significant**.

Medway Estuary and Marshes Ramsar and SPA

9.6.145 The Proposal Site does not contain any habitat suitable for wintering Ramsar/SPA cited/review species, such as Avocet and Bewick's Swan, therefore any habitat loss within the Proposal Site will cause no impact on the SPA/Ramsar assemblage.

9.6.146 The main intertidal areas of the Medway Estuary and Marshes Ramsar/SPA are over 2.6km from the Proposal Site. The development drains eastwards into the Swale Estuary therefore there will be no impact on the Ramsar and SPA.

9.6.147 At a minimum distance of 2.6km, with considerable developed and farmland between the Proposal Site and the Medway, any overshadowing, operational noise, lighting and

disturbance from human activity from the operational phase of the development is unlikely to have significant impact.

9.6.148 Appendix 9.2 provides an analysis of the impacts of emissions to air of the proposed SEP on the features of interest of the SPA. For all pollutants (NO_x, SO_2, NH_3, N 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 the SPA. Therefore, no impacts on the SPA interest features as a result of the operation of the SEP are predicted.

9.6.149 There is the potential for the emissions to air to have an impact on the supporting habitats of the SPA. These are covered under The Medway Estuary and Marshes SSSI below.

9.6.150 Observations as part of the intertidal bird surveys and general observations on Site during the breeding bird survey have shown that the main flight lines for SPA/Ramsar species in the vicinity of the Proposal Site are offshore, with no waterbirds being noted to fly over the Proposal Site. The surrounding area is already heavily industrialised and areas of conurbation exist to the west, thus making it unlikely that waterbirds would pass through the Proposal Site on route to the Medway Estuary. As the Proposal Site lies entirely on the landward side of the sea wall and birds do not fly over the sea wall and onto/over the Site in any significant numbers, it will not affect the flight lines of SPA/Ramsar birds using the Medway.

9.6.151 Therefore it is considered likely that the impacts of this development on a receptor of **International** value, would be **Not Significant**.

Swale SSSI

9.6.152 Details of the analysis of impacts of emissions to air from the SEP on habitats within the SSSI are provided in Appendix 9.2. There is potential for impacts on wintering birds within the SSSI from dust deposition during the operational phase. Potential impacts include behavioural disturbance to adult birds (avoidance behaviour), impacts on the availability and quality of invertebrate food sources. However these impacts are only likely to be significant immediately adjacent to the works areas within the Proposal Site and will be subject to standard, best-practice dust-suppression methods.

9.6.153 The PC for NO_x, SO_2, NH_3 and N deposition is <1% of the EQS for all the habitats within the SSSI. Therefore, no impacts are predicted on the SSSI as a result of these pollutants.

9.6.154 Although the PC acid deposition is predicted to be >1% of the EQS at the Swale SSSI, the habitats present within this site are not considered to be sensitive to acid deposition

(www.apis.ac.uk). An indicator of this insensitivity is that, as a result of the implementation of European Directives relating to air quality, the Site will have experienced much higher levels of acid deposition in the recent past than is predicted to occur with the operation of the SEP but are still defined by Natural England as being in favourable condition. Therefore, no impacts are predicted on the SSSI as a result of acid deposition.

9.6.155 Observations as part of the intertidal bird surveys and general observations on Site during the breeding bird survey have shown that the main flight lines for SPA/Ramsar species in the vicinity of the Proposal Site are offshore, with no waterbirds being noted to fly over the Proposal Site. The surrounding area is already heavily industrialised and areas of conurbation exist to the west, thus making it unlikely that waterbirds would pass through the Proposal Site on route to other wetland areas such as the Medway Estuary. As the Proposal Site lies entirely on the landward side of the sea wall and birds do not fly over the sea wall and onto/over the Site in any significant numbers, it will not affect the flight lines of SPA/Ramsar birds using the Swale.

9.6.156 The impacts of this development on a receptor of **National** value, would be **Not Significant**.

Medway Estuary and Marshes SSSI

9.6.157 Details of the analysis of impacts of emissions to air from the SEP on habitats within the SSSI are provided in Appendix 9.2.

9.6.158 The PC for NO_x, SO_2, NH_3 and N deposition is <1% of the EQS for all the habitats within the SSSI. Therefore, no impacts are predicted on the SSSI as a result of these pollutants.

9.6.159 Although the PC acid deposition is predicted to be >1% of the EQS at the Medway Estuary and Marshes SSSI, the habitats present within this Site are not considered to be sensitive to acid deposition. An indicator of this insensitivity is that as a result of the implementation of European Directives relating to air quality, the Site will have experienced much higher levels of acid deposition in the recent past than is predicted to occur with the operation of the SEP but are still defined by Natural England as being in favourable condition. Therefore, no impacts are predicted on the SSSI as a result of acid deposition.

9.6.160 The impacts of this development on a receptor of **National** value, would be **Not Significant**.

Elmley Island NNR

9.6.161 Elmley Island NNR is located 334 m to the east of the Proposal Site on the other side of the Swale. Given the distance, the only potential impacts to Elmley Island NNR from the operational phase would be noise and air quality.

Noise

9.6.162 It is considered that there is a low potential for sudden noises during the operational phase of the development to cause disturbance impacts on SPA cited/review birds.

9.6.163 Sudden noise created during the operational phase from valve releases associated with the slag and combustion residues processing plant (UEW and UEU), HGV movements and other plant activities has the potential to disturb birds wintering in the area to cause them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}. Waterbirds occurring on the intertidal area are at their closest, 100m from the construction Site boundary and the maximum noise has been modelled here using the indicative source point of noise for valve release at the northern end of the Site to be no more than 35dB L_{Amax} (see Figure 9.11). The majority of waterbirds however occur in areas where the maximum noise has been modelled as 30dB L_{Amax} or less. As a result there is no effect predicted due to sudden noises during the operational phase.

9.6.164 The distance between the Proposal Site and Elmley NNR make disturbance by operational noise highly unlikely and this impact is considered to be not significant.

Air Quality

9.6.165 Elmley NNR is wholly within the Swale SPA. Therefore, although no specific modelling has been undertaken with respect to the habitats etc present in the NNR, these will be the same as for the SPA and therefore no significant impact from operational emissions to air are predicted.

9.6.166 Therefore, it is considered likely that the impacts of the development on this receptor of **National** value, would be **Not Significant**.

Milton Creek LWS

Drainage

9.6.167 The Proposal Site drains eastwards into the Swale and therefore there is potential for impact on the LWS, which is located 125m from the outfall. All drainage from the Proposal Site passes through the attenuation ponds and interceptor plant. This affords protection to the Swale and Milton Creek from any spills or other pollutants.

Light spill

9.6.168 The light scheme for the operational phase will follow best practice to minimise light impacts. The operational lighting design incorporates street lighting and flood lighting located on the Site buildings to provide illumination to roads, car parks and hard standing areas.

9.6.169 The street lighting is fitted with a flat glass profile to minimize light spill. The lighting levels for the final operational plant can be seen to drop to a level of 1lux (bright moonlight) within an average distance of 12m from the Site boundary (see Appendix 8.2). Given the boundary of Milton Creek is over 60m from the Site, combined with the current significant lighting surrounding the Kemsley Paper Mill and associated roads there will be no significant impact from the operational lighting.

Disturbance from people and plant movements

9.6.170 The movement of people and plant during the operational phase of the development may be visible to a small proportion of the SPA cited/review bird species using the intertidal areas of Milton Creek. It is considered there is a limited potential for disturbance to be caused by people when account is taken of the fact that:

- The SPA cited/review bird species feeding on the intertidal area adjacent to the proposed development Site are already habituated to people using the Knauf Jetty, industrial areas behind the seawall and public footpath along the seawall itself.
- The bird distribution studies have shown the limited presence of SPA/Ramsar cited/review bird species on the intertidal area adjacent to the proposed development Site. The majority of SPA/Ramsar cited/review bird species on the intertidal area during all phases of the tide will be screened from people movement by the sea wall, buildings and topographical features and the concentrations occurring on the opposite bank of the River Swale are over 200m from the proposed area of construction and separated by the river channel and seawall.
- The main operational areas do not face directly towards the LWS site, being located mainly to the north and south of the buildings.

9.6.171 Therefore it is not anticipated that SPA cited/review birds will be disturbed by plant or people movement during the construction phase of the development.

Operational noise

9.6.172 It is considered that there is a low potential for sudden noises during the operational phase of the development to cause disturbance impacts on SPA cited/review birds.

9.6.173 Sudden noise created during the operational phase from valve releases associated with the slag and combustion residues processing plant, HGV movements and other plant activities has the potential to disturb birds wintering in the area to cause them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}.

9.6.174 Waterbirds occurring on the intertidal area are at their closest, 100m from the construction Site boundary and the maximum noise has been modelled here using the indicative source point of noise for valve release at the northern end of the Site to be no more than 35dB L_{Amax} (see Figure 9.11). The majority of waterbirds however occur in areas where the maximum noise has been modelled as 30dB L_{Amax} or less. As a result there is no effect predicted due to sudden noises during the operational phase.

Air Quality

9.6.175 Details of the analysis of impacts of emissions to air from the SEP on habitats within the LWS are provided in Appendix 9.2.

9.6.176 The PC for SO_2, NH_3 and N deposition is <1% of the EQS for all the habitats within the LWS. Therefore, no impacts are predicted on the LWS as a result of these pollutants.

9.6.177 Although the PC acid deposition is predicted to be >1% of the EQS at the Milton Creek LWS, the habitats present within this Site are not considered to be sensitive to acid deposition. An indicator of this insensitivity is that as a result of the implementation of European Directives relating to air quality, the Site will have experienced much higher levels of acid deposition in the recent past than is predicted to occur with the operation of the SEP but no adverse impacts as a result have been noted. Therefore, no impacts are predicted on the LWS as a result of acid deposition.

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

9.6.179 It is considered likely that the impacts of the development on this receptor of **County** value, would be **negligible** and therefore **Not Significant**.

Habitats

Brownfield and reedbed

9.6.180 The habitat retained and created within the Site could be a risk of degradation through a lack of management. This would allow scrub encroachment into species rich grassland and reedbed, and the vegetating over of open bare ground, reducing the habitats ability to support a range of species such as Grass-Snake and Annual Beard-Grass.

9.6.181 There is potential for pollution from runoff from the development to impact the surrounding brownfield and reedbed habitat, However, the attenuation ponds and interceptors through which surface water runoff from the Site will be discharged will decrease the risk of a pollution incident.

9.6.182 There is also potential for dust from operational vehicles to impact the habitat both on and off-Site, however standard best-practice measures will be in place to prevent spread of dust (damping down during dry weather, for example).

9.6.183 It is considered likely that the impacts of habitat loss on this population of **Local** value, has the potential to be of medium magnitude (medium extent, permanent, negative) and therefore of

Minor adverse significance.

9.6.184 There will be no significant impacts on the brownfield and reedbed habitat during the operational phase of the development from dust or drainage, therefore this impact is considered **Not significant**.

Annual Beard-grass

9.6.185 The main impacts to Annual Beard-grass from the operational phase of the development will be the gradual loss of open bare habitat from a lack of appropriate management. This has the potential, if unmitigated, to cause the loss of Annual Beard-grass from the Proposal Site when taken in combination with the habitat loss which would have occurred in the construction phase.

9.6.186 It is considered likely that the impacts of habitat loss on this population of **Local** value, has the potential to be of High magnitude (large extent, permanent, negative) and therefore of **Minor adverse significance**.

Invertebrates

9.6.187 The main impacts to on-site invertebrate habitat during the operational phase of the development are habitat loss from a lack of management maintaining suitable flower-rich grassland, open water and other suitable habitats, and dust deposition on key habitats.

9.6.188 It is considered likely that the impacts of this habitat loss on this population of **Local** value, would be of High magnitude (large extent, permanent, negative) and therefore of **Minor adverse significance**.

Reptiles

9.6.189 As the development will be in operation 24hrs a day, there is potential for traffic to cause fatalities to reptiles whilst they are moving across the Proposal Site foraging and basking. However the likelihood of this occurring is small, given the Proposal Site speed limit is likely to be restricted to a low speed and that reptiles readily feel vibrations and oncoming traffic would be detected by individuals which would move out of roadways.

9.6.190 Within the Proposal Site there is potential for a lack of management allowing scrub encroachment within open habitats such as the grassland. However, dense structured vegetation provides cover and foraging habitat for reptile species and there is no predicted adverse impact in the medium term.

9.6.191 Therefore it is considered likely that the impacts on the reptile populations of **Neighbourhood** value would be **Not Significant**.

Birds

Breeding birds

9.6.192 The main impacts to breeding birds from the operational phase of the development are likely to be increased disturbance from operational noise, pedestrians and traffic, potential for 24 hour lighting to spill onto the habitats used for breeding and habitat loss.

Light spill

9.6.193 Given the SEP will be active 24hrs a day, there is potential for light spill from the operational phase to impact the birds nesting both within the Proposal Site and within the reedbed to the north. The light scheme for the operational phase will follow best practice to minimise light

impacts. The operational lighting design incorporates street lighting and flood lighting located on the Site buildings to provide illumination to roads, car parks and hard standing areas.

9.6.194 The street lighting is fitted with a flat glass profile to minimize light spill. The lighting levels for the final operational plant can be seen to drop to a level of 1lux (bright moonlight) within an average distance of 12m from the Site boundary (see Appendix 8.2). This is likely to have some impact on birds nesting within the reedbed, and landscape planting on Site, however given the Reedbed habitat off-site is over 45m from the Site, combined with the current significant lighting surrounding the Kemsley Paper Mill and associated roads there will be no significant impact from the operational lighting to off-site breeding birds of conservation concern.

Disturbance from people and plant movements

9.6.195 The movement of people and plant during the operational phase has potential to cause visual disturbance to nesting birds. Identifying the impact on different species and individuals is difficult as their tolerance to visual disturbance and their ability to habituate will vary. However this is likely to be a significant impact only immediately adjacent to the main works areas, for example birds within the centre of the reedbed habitat to the north of the Site are unlikely to be disturbed.

Operational noise

9.6.196 There are two potential impacts on breeding birds from the operational noise:

- Masking noise
- Sudden noises causing disturbance

9.6.197 A possible effect of the operational background humming noise caused by the SEP is the 'masking' of bird songs or calls by similar noise frequencies, thereby reducing the distance over which the song or call can be heard. Two of the most important functions of avian acoustic signals are territory defence and mate attraction (Slabbekoorn & Ripmeester 2008). Interference with acoustic communication and especially territorial song, presents a major problem to breeding birds. For a song, alarm call or another sound to give rise to a response from a bird, the sound must be detectable against the background noise. The detectability of a sound is determined by the signal-to-noise ratio (SNR) and the detection ability of the bird. Within a given frequency band, signals with an SNR below the detection threshold of the listening bird are 'masked'. As a result, background noise is important in determining which birds can hear a sound and the quality of the message contained within that sound (Patricelli and Blickley 2006). Continuous noise may also mask the arrival of predators or the associated alarm calls given by neighbouring birds.

9.6.198 Of the Wildlife and Countryside Act Schedule 1 bird species breeding in close proximity to the Proposal Site, only Cetti's Warbler has a defined territorial song which could be used for modeling of masking noise.

9.6.199 An audio sample of Cetti's Warbler song (recorded by Andrew Carter, Salisbury, Wilts) was processed using Matlab software (specifically the 'Signal Processing Toolbox') to calculate the power spectral density (psd) of the file. The psd describes how the power of a signal or time series is distributed with frequency. The psd of the song sample indicated that the dominant frequencies of the song were within the range of the 4,000Hz octave band, which extends from approximately 2,840Hz to 5,680Hz.

9.6.200 Noise emission levels from the facility at various receptors have been predicted in terms of octave-band L_{Aeq} spectra using a detailed computer noise model. Baseline background noise levels (in terms of octave-band L_{A90}, which is the level that is occurring for 90% of the time and therefore an appropriate parameter for the assessment of masking effects to communication of the continuous operational noise from the facility) for the reedbed area were determined by a survey over five days. Details of the acoustic prediction and survey are provided in Chapter 12 'Noise and Vibration'.

9.6.2 The results of the noise assessment are provided in Appendix 12.5. The results of the noise prediction indicate that the majority of acoustic energy emitted from the facility is at low-frequencies (< 500 Hz) and that the emissions in the 4,000 Hz octave band, representing the frequency range within which the Cetti's Warbler song transmission is expected to be most significant, are relatively low. The measured baseline background noise levels in the 4,000Hz band for a nominal three-hour period between 03.00 and 07.00 hours that is representative of the dawn chorus were between 19 and 28dB $L_{A90,\ 15\text{-}min}$ (the mean level was 24dB). The greatest predicted operational noise emission level from the facility was 10dB L_{Aeq} in the 4,00 Hz band at the reedbed; 100m from the facility. Noise emission levels decrease with increasing distance from the facility.

9.6.201 The intelligibility of an acoustic signal, in this case the song of the warbler, will be affected by the difference between this signal and the prevailing noise level. The predicted noise emission level at the reedbed (100m) would not be expected to increase the mean background noise level between 03.00 and 07.00 hours in the 4,000 Hz octave-band (for example, 19dB + 10dB = 19.5dB and 24dB + 10dB = 24dB). On this basis, no effect is predicted on Cetti's Warbler due to masking by operational noise.

9.6.202 Sudden noise created during the operational phase from valve releases associated with the slag and combustion residues processing plant (UEW and UEU), HGV movements and other

plant activities has the potential to disturb birds breeding in the area to cause them to fail to establish a breeding territory or abandon their attendance at a nest. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}. The nearest Wildlife and Countryside Act 1981 Schedule 1 bird species is Cetti's Warbler territory occurs ~30m from the Proposal Site and the maximum noise has been modelled here will be between 45 and 40dB L_{Amax} . As a result there is no potential significant impact predicted from sudden operational noise.

Lack of management

9.6.203 Within the Proposal Site there is potential for habitat loss caused by a lack of management allowing scrub encroachment within open habitats such as the grassland and within the reedbed within the attenuation ponds.

Dust

9.6.204 There is potential for impacts on breeding birds nesting both within the Proposal Site and the adjacent reedbed habitat from dust deposition during the operational phase. Quantities of dust could potentially cause behavioural disturbance to adult birds (avoidance behaviour), ingestion by chicks and impact the availability and quality of invertebrate and reedbed food sources. However these impacts are only likely to be significant immediately adjacent to the works areas the Proposal Site.

9.6.205 Therefore it is considered likely that the impacts on this bird assemblage of **Neighbourhood** value, would be **negligible** and therefore **Not Significant**.

Wintering birds

9.6.206 The main impacts to wintering birds utilising the Swale SPA/Ramsar from the operational phase of the development are likely to be increased disturbance from operational noise, pedestrians and traffic. There is a potential for 24 hour lighting to spill on to the adjacent intertidal area used for roosting.

9.6.207 The following impact assessment covers Black-tailed Godwit which was identified as occurring in International numbers locally.

Light spill

9.6.208 Given the SEP will be active 24hrs a day, there is potential for light spill from the operational phase to impact the wintering birds roosting within the SPA. The light scheme for the operational phase will follow best practice to minimise light impacts. The operational lighting design incorporates street lighting and flood lighting located on the Site buildings to provide illumination to roads, car parks and hard standing areas.

9.6.209 The street lighting is fitted with a flat glass profile to minimize light spill. The lighting levels for the final operational plant can be seen to drop to a level of 1 lux (bright moonlight) within an average distance of 12m from the Site boundary (see Appendix 8.2). Waterbirds occurring on the intertidal area are at their closest, 100 m from the Proposal Site boundary, combined with the current significant lighting surrounding the Kemsley Paper Mill and associated roads there will be no significant impact from the operational lighting to wintering birds.

Disturbance from people and plant movements

9.6.210 The movement of people and plant during the operational phase has potential to cause visual disturbance to wintering birds. Identifying the impact on different species and individuals is difficult as their tolerance to visual disturbance and their ability to habituate will vary. However this is likely to be a significant impact only immediately adjacent to the main works areas, given that all main works areas are shielded from the view of birds within the SPA by the proposed buildings and the sea wall, it is considered highly unlikely that a significant impact will occur.

Operational noise

9.6.211 Sudden noise created during the operational phase from valve releases associated with the slag and combustion residues processing plant (UEW and UEU), HGV movements and other plant activities has the potential to disturb birds wintering in the area to cause them to cease feeding or fly away from the area of influence. It is recognised that loud and 'percussive' noises have the greatest potential to cause disturbance and a threshold has been identified from the published scientific literature of 80dB L_{Amax}. Waterbirds occurring on the intertidal area are at their closest, 100m from the Proposal Site boundary and the maximum noise has been modelled here using the indicative positioning of rigs to be no more than 35dB L_{Amax}. The majority of waterbirds however occur in areas where the maximum noise has been modelled as 30dB L_{Amax} or less. As a result there is no effect predicted due to sudden noises during the operational phase.

Dust

9.6.212 There is potential for impacts on wintering birds within the SPA from dust deposition during the operational phase. Quantities of dust could potentially cause behavioural disturbance to adult birds (avoidance behaviour), impact the availability and quality of invertebrate food sources. However these impacts are only likely to be significant immediately adjacent to the works areas the Proposal Site.

9.6.213 Therefore it is considered likely that the impacts on this off-site assemblage of **International** value, would be **negligible** and therefore **Not Significant**.

Harvest Mice

9.6.214 The main impacts to Harvest Mouse from the operational phase of the development could be disturbed in both created and retained on-site habitat, and off-site habitat through dust deposition and noise.

9.6.215 However, Harvest Mice in the vicinity are already habituated to operational noise. Standard dust suppression methods will be used to ensure this is not an issue. Therefore, it is considered likely that if this species is present, it is concluded there would be a negligible impact on a predicted population of **Neighbourhood** value and therefore **Not Significant**.

9.7 Mitigation

General mitigation - Noise disturbance

9.7.1 Given the potential for disturbance to breeding birds, especially Schedule 1 species (particularly Cetti's Warbler) using the reedbed to the north of the Proposal Site, the following piling restrictions/methods will be adhered to:

- Piling will start at the end of August. There will be no restrictions on timing, duration or method whilst the risk of disturbance to sensitive receptors is minimal between the end of August and mid-October. The Cetti's Warbler breeding season runs from late April to mid-July, with the majority of birds fledging by mid-August. There is a lower risk of the birds having the feeding of their chicks disturbed in August. In September and October the wintering SPA birds will be under less stress from factors such as bad weather, which is likely to occur later on in the winter period.
- Piling between April and mid-August (Cetti's Warbler main breeding season) will be avoided. If considered absolutely necessary, it will only be undertaken using "soft" piling techniques such as vibro piling;
- Outside of these measures, piling will be via impact driven piling and will be scheduled to occur in the most western sections of the Site to help ensure the highest noise levels on the SPA occur during the least sensitive period. Also, "soft-start" techniques (where the power levels in piling rigs are slowly ramped up to allow habituation and avoid the initial loud "bang") will be used for at least 30 minutes before piling to allow birds to habituate to noise levels.

9.7.2 Also, a programme of monitoring of construction noise levels and appropriate bird movements will be implemented throughout construction phase. Appropriate noise abatement strategies would be put in place if any disturbances are recorded during monitoring visits.

General mitigation - Dust

9.7.3 Standard, best practice dust-suppression methods (see Chapter 6 Traffic and Transport) will be used throughout both construction and operation of the SEP, thereby avoiding any impacts as a result of dust settlement on habitats and species.

Habitats

Brownfield

9.7.4 Although no aims or objectives have been set for this new UKBAP Priority Habitat, areas of this type of habitat mosaic will be retained in the Proposal Site owing to the presence of reptiles and Annual Beard-grass. It is therefore considered that the mitigation suggested for these these species will also compensate for the loss of this habitat type.

Reedbed

9.7.5 While not specifically impacted by the development, a considerable area of new reedbed habitat will be created within the attenuation ponds.

Annual Beard-grass

9.7.6 Annual Beard-grass is an annual species which grows on bare muddy patches. Areas along the banks of the attenuation pond would be suitable to establish and maintain these conditions.

9.7.7 Selected areas of the pond margins / banks will not be seeded with a conventional seed mix (~1 x 2m), but will be maintained as bare ground on an annual basis, by regular scraping of the bank surface to remove regenerating vegetation particularly any competitive species.

9.7.8 In the first year of the creation of the attenuation ponds seeds will be collected from Annual Beard-grass plants growing on the wider site. Annual Beard-grass flowers from June to August and it is anticipated that seed could be collected from July to September. Seed which has been collected can be directly sown in the newly-created bare areas along the banks of the attenuation ponds.

9.7.9 Monitoring of the success of the habitat creation will be undertaken for the following year after construction works.

Invertebrates

9.7.10 The attenuation ponds would provide foraging habitat for a variety of invertebrates, including the Nationally Scarce Hairy Hawker. Whilst there will be a loss of species-rich grassland during the construction of the development (0.9ha of high grade habitat), the attenuation ponds banks will be planted with flower-rich seed mixes to encourage species such as the UK BAP priority species Brown-banded Carder Bee and Shrill Carder Bee, as well as providing

increased habitat for general invertebrate species. The managed margins of the attenuation ponds will provide 1.2ha of high grade invertebrate habitat. Whilst the 0.4ha of reptile receptor habitat of grassland/ scrub mosaic and the 520m of ditch/ pond reedbed will provide additional invertebrate habitat.

Reptiles

9.7.11 As areas of suitable reptile habitat are to be lost (1.89ha), it will be necessary to remove/deter reptiles from using these areas to prevent accidental injury or death during construction works. The most common methodology for excluding reptiles is directional strimming of vegetation to ground level to 'push' the reptiles into suitable habitat. This is then followed by maintenance of the vegetation at ground level throughout the construction period. This method is only suitable if a significant proportion of the habitat (approximately 75% or above) on Site remains intact.

9.7.12 Given this criteria will not be met within the Proposal Site, Reptiles are caught by installing an exclusion barrier fence around the reptile habitats that will be lost, followed by placing artificial refugia within the area. Selective strimming of vegetation removes the extent of potential cover encouraging reptiles to use the artificial refugia. Animals using the refugia are caught and moved to a prepared receptor area.

9.7.13 The receptor site will approximately match the area of habitat from which the reptiles are being translocated, and habitats of high value for reptile species will be established. Suitable reptile habitat to be lost is approximately 2ha (grassland and scrub).

9.7.14 The proposed receptor site falls within the eastern end of the Proposal Site. This area is currently sub-optimal habitat (ruderal) which will be seeded and managed for reptiles as a grassland/ scrub mosaic, with two hibernacula (constructed from pieces of wood and rubble will be part buried and capped with top soil) created and brash piles into which reptiles can be placed when first released on to the Site. The receptor site is 0.44ha in size, however habitat created which can be used by reptiles such as the grassland, scrub and reedbed planting in and around the attenuation ponds will provide 1.69 ha of suitable habitat. There will be a total of 1.88ha high quality habitat available.

9.7.15 These brash piles and hibernacula will provide cover and foraging areas when the reptile released on Site have not yet established territories, this particularly relates to Slow-worms. The receptor site will be fenced with reptile fencing so as to prevent any translocated reptiles leaving in search of their previous territories for at least a month.

9.7.16 The attenuation ponds will also provide suitable reptile habitat. However, it is not considered that these areas would provide suitable receptor sites for translocation prior to construction works commencing.

9.7.17 The shading of the banks of the attenuation ponds by planted trees will be limited, especially on the south sides of any banks thereby creating an increase in basking areas available to reptiles.

9.7.18 Tussock-forming grassland such as Cock's-foot *Dactylis glomerata* and Tufted Hair-grass *Descampsia cespitosa* will be planted on the banks of the attenuation ponds, to provide ideal basking, foraging and hibernation sites for reptiles.

9.7.19 Piles of dead vegetation, grass clippings etc will be heaped up in discrete piles along the bank of the attenuation pond to provide nesting sites for Grass Snakes. These will be positioned where they are unlikely to be disturbed during the summer months.

Birds

Breeding Birds

9.7.20 The development will cause a loss of several areas of suitable breeding habitat (4.44 ha).

9.7.21 Habitat clearance will take place outside of the breeding season. If some work during the breeding season is unavoidable then an experienced ornithologist will make a thorough search of the identified area to make sure that there are no breeding birds present. If nesting birds are found then a suitable area surrounding the nest will be cordoned off and work will not commence on this area until the ornithologist is satisfied that breeding is over.

9.7.22 The creation and retention of the attenuation ponds with associated marginal vegetation for other protected species will directly benefit a wide variety of breeding birds and the grassland/scrub habitat creation will provide a mosaic of vegetated areas to encourage breeding birds. Whilst tree and scrub screening landscaping once mature will provide enhanced nesting habitat. In total 2.47ha of habitat will be created/ retained on Site for breeding birds. Therefore the net outcome should be no overall loss of breeding bird habitat.

Harvest Mice

9.7.23 The creation of scrub, grassland and reedbed habitats for other species will provide new Harvest Mice habitat and mitigate the loss of habitat that will occur during Site development.

Monitoring

9.7.24 Post-development monitoring surveys to assess the success of the mitigation outlined above will be carried out over the first five years after completion and any issues, such as the loss or reduction in any of the populations of species of conservation concern rectified through the implementation of appropriate strategies to be drawn up as necessary.

Summary of Residual Impact Significance

9.7.25 The residual effects of the proposed scheme once the above mitigation measures have been applied are summarised in Table 9.21 below. No significant residual impacts have been identified for the majority of the VERs. Residual impacts (either negative or beneficial) have been identified for the following VERs:

Table 9.21 Significance of Residual Impacts

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
Construction				
Swale Ramsar/SPA/SSSI	Habitat loss	Not significant	-	-
	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Recreational disturbance	Not significant	-	-
	Noise	Not significant	Piling restrictions	-
	Overshadowing/line of site	Not significant	-	-
	Flight lines	Not significant	-	-
Medway Ramsar/SPA/SSSI	Habitat loss	Not significant	-	-
	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant	Not significant	-	-

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
	movements			
	Recreational disturbance	Not significant	-	-
	Noise	Not significant	-	-
	Overshadowing/line of site	Not significant	-	-
	Flight lines	Not significant	-	-
Elmley Island NNR	Dust and noise	Not significant	-	-
Milton creek LWS	Habitat loss	Not significant	-	-
	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
Brownfield habitat	Permanent and Temporary habitat loss (4.4 ha)	Minor adverse	Provision of high quality grassland/scrub mosaic habitat, plus open bare ground, reedbed (2.3ha)	Minor adverse
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Annual Beard-grass	Permanent Habitat loss (0.42 ha)	Minor adverse	Provision of suitable habitat (1x 2m bare ground patches) to be managed	Not Significant

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
			appropriately.	
Invertebrate habitat	Permanent Habitat loss (0.9 ha)	Minor adverse	Provision of suitable habitat (1.6ha, and 520m of ditch/pond), including attenuation ponds, species-rich grassland, to be managed appropriately.	Not Significant
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Reptiles	Permanent habitat loss (1.89ha)	Minor adverse	Receptor site with mosaic of grassland and scrub (0.44ha), plus additional habitat provided by the attenuation ponds (1.69ha), a total of 1.88ha	Not Significant
	Habitat fragmentation	Not significant	Retained connecting habitat on the eastern boundary linking to the north and south of the site.	Not Significant
	Disturbance to retained habitat	Minor adverse	Retained habitat fenced and maintained	Not Significant

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
Breeding birds	Habitat loss (4.44ha)	Minor adverse	Provision of suitable habitat (2.47ha), including attenuation ponds, species-rich grassland, and scrub to be managed appropriately.	Minor adverse
	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Minor adverse	Birds breeding on site are already habituated to significant HGV and people movements in the adjacent paper mill.	Not Significant
	Noise	Minor adverse	Restrictions on piling during the breeding season	Not Significant
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Cetti's Warbler	Noise	Moderate adverse	Restrictions on piling during the breeding season	Not Significant
Marsh Harrier	Noise	Minor adverse	Restrictions on piling during the breeding season	Not Significant

Description of feature	**Proposed activity**	**Significance of unmitigated impact**	**Mitigation**	**Significance of residual impact**
Bearded Tit	Noise	Minor adverse	Restrictions on piling during the breeding season	Not Significant
Wintering birds (off-site)- Waterbird assemblage and SPA citation/review species	Habitat Loss	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
Wintering birds(off-site) – non SPA citation/review species	Habitat Loss	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
Harvest Mice	Habitat loss	Minor adverse	Provision of suitable habitat to be managed appropriately.	Not Significant
Operational				
Swale Ramsar/SPA/SSSI	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Recreational disturbance	Not significant	-	-

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
	Noise	Not significant	-	-
	Air quality	Not significant	-	-
	Overshadowing/line of site	Not significant	-	-
	Flight lines	Not significant	-	-
Medway Ramsar/SPA/SSSI	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Recreational disturbance	Not significant	-	-
	Noise	Not significant	-	-
	Air quality	Not significant	-	-
	Overshadowing/line of site	Not significant	-	-
Elmley Island NNR	Dust and noise	Not significant	-	-
Milton Creek LWS	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
	Air quality	Not significant	-	-
Brownfield habitat and reedbed	Habitat loss through lack of suitable management	Minor adverse	Suitable management regime implemented to ensure population	Not Significant

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
			sustained on-site.	
	Drainage	Not significant	-	-
	Dust	Not significant	-	-
Annual Beard-grass	Habitat loss through lack of suitable management	Minor adverse	Suitable management regime implemented to ensure population sustained on-site.	Not Significant
Invertebrate habitat	Habitat loss through lack of suitable management	Minor adverse	Suitable management regime implemented to ensure population sustained on-site.	Not Significant
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Reptiles	Killing/injuring by site traffic	Not significant	Site speed limits slow enough to allow reptiles to move out of the way	Not Significant
	Habitat loss through lack of suitable management	Not significant	Suitable management regime implemented to ensure population sustained on-site.	Not Significant
Breeding birds	Lighting	Not significant	-	-

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
	Disturbance from human movement/activity	Not significant	-	-
	Operational noise	Not significant	-	-
	Habitat loss through lack of suitable management	Minor adverse	Suitable management regime implemented to ensure population sustained on-site.	Not Significant
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Wintering birds(off-site) – non SPA citation/review species	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
	Dust	Not significant	-	-
Harvest Mice	Disturbance	Not significant	-	-

9.8 Conclusions

9.10.1 Following a search for existing ecological information and extensive surveys of the Proposal site and its immediate environs, the following Valued Ecological Resources were identified:

- The Swale SPA/Ramsar/SSSI
- Medway Estuary & Marshes SPA/Ramsar/SSSI
- Elmley NNR

- Milton Creek LWS
- Brownfield
- Annual Beard-grass
- Invertebrate habitat
- Grass Snake
- Common Lizard
- Slow-worm
- Breeding bird assemblage
- Marsh Harrier
- Cetti's Warbler
- Bearded Tit
- Waterbird assemblage (SPA interest features)
- Black-tailed Godwit
- Harvest Mouse

9.10.2 Whilst there were minor adverse residuals for Brownfield habitat and breeding bird habitat, the receptors are of Local and neighbourhood importance only and the quality of the available habitat will be higher than that which is lost to the development. Therefore it is considered that once the proposed mitigation measures are taken into account, the development of the Proposal Site residual impact would be neutral.

9.9 Cumulative impacts

9.9.1 The purpose of this section is to assess the cumulative effects of the scheme, with proposed developments near the site that are currently in the planning process or have been approved but are not yet constructed. The relevant proposals considered are:

- Biomass Combined Heat and Power Plant at Countryside Ltd, Ridham Dock,
- Biomass Combined Heat and Power Plant at sites 4 and 7, Ridham Dock,
- Anaerobic Digestion plant at Kemsley Paper Mill
- Queenborough and Rushenden Regeneration Project
- Sittingbourne Town Centre regeneration
- East Hall Farm
- Iwade Expansion
- Kent Science Park
- Sittingbourne Northern Relief Road
- Thistle Hill
- Port of Sheerness Wind Farm

9.9.2 The potential for cumulative effects between the proposed development and the other proposals is dependent on those developments resulting in residual effects for the same habitats, species and populations as those using the Proposal Site.

9.9.3 Given the distance of the majority of these developments from the Proposal Site, potential cumulative impacts with the SEP proposals could occur to the following:

- The Swale Ramsar, SPA and SSSI;
- The Medway Estuary and Marshes Ramsar, SPA and SSSI; and
- Birds including Marsh Harrier, Bearded Tit and Cetti's Warbler.

Ridham Dock CHP (Countryside Recycling Ltd)

9.9.4 The proposed biomass combined heat and power plant at Countryside Recycling Ltd is located 1 km north of the Proposal Site. The site is currently used as a waste management centre and as such there is little potential for habitats of concern to be present, though part of the site is not currently being utilised and has developed vegetation cover.

9.9.5 An environmental statement for the application was submitted to Kent County Council in November 2009 (WYG 2009). This identified a range of potential impacts to various local receptors including a nearby reedbed habitat as well as noise. However, suitable mitigation is provided to ensure that this does not occur, including through the timing of works (the loudest of which will be within the existing building) and the creation of bunding around the development to prevent run-off/encroachment from the construction site into the reedbed. No cumulative impacts are therefore anticipated with these elements.

9.9.6 Potential impacts were also identified to as a result of emissions to air from the CHP plant, including localised acidification of nearby grazing marsh. There is the potential, therefore, for cumulative impacts to the Swale SSSI, SPA, Ramsar site via changes to air quality. The principal habitat of concern is grazing marsh, particularly the area directly opposite the site on the Sheppey side of the Swale. However, given that APIS does not list this habitat type as sensitive to acidification (www.apis.ac.uk), no cumulative impacts with the Kemsley SEP are predicted.

Ridham Dock CHP (Evonik New Energies UK Ltd)

9.9.7 The proposed biomass and combined heat and power plant at sites 4 and 7, Ridham Dock, Kent is located 1.5km North of the Proposal Site. There is habitat on the site of the proposed biomass combined heat and power plant for reptiles and Water Voles, whilst the habitat adjacent to the site supports Great Crested Newts, Water voles, waders and waterfowl. Birds of Conservation Concern were also recorded on site.

9.9.8 A scoping opinion was requested from Kent County Council, under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999. Significant issues raised by the consultees included:

- impact to the Swale SSSI, SPA and Ramsar sites;
- impact to Medway Estuary and Marshes SSSI, SPA, and Ramsar sites;
- Impact to Elmley NNR;
- impact to the Swale SSSI from extra traffic on the access road through the SSSI;
- impact of lighting on nocturnal bird species such as night foraging Lapwing;
- predation by rodent species on ground nesting birds;
- air quality;
- disturbance to SPA/Ramsar sites during construction and operation;
- disturbance to SPA/Ramsar sites due to increased boat traffic to the dock;
- deterioration of SPA habitat due to airborne and waterborne emissions;
- Deterioration of SPA habitat due to changes in hydrological regimes;
- impact to wintering birds;
- changes to habitat due to smothering of vegetation and/or habitat from particulates; and
- changes to habitat due to acidification and/or nutrient enrichment from airborne emissions.

9.9.9 A subsequent planning application was submitted in November 2009. The associated EIA (WYG 2009) identified potential impacts

9.9.10

9.9.11 submitted for this proposal and as such it is difficult to assess cumulative impacts with the proposed SEP. However, potential cumulative impacts would be to the Swale and Medway Estuary and Marshes SSSI, SPA, Ramsar sites and Elmsley NNR via changes to air quality and noise and would need to be assessed during the production of the CHP EIA.

Anaerobic Digestion Plant, Kemsley Paper Mill (St Regis)

9.9.12 The proposed Anaerobic Digestion Plant (AD Plant) is 0.5km to the north of the Proposal Site, on the far side of the reedbed, adjacent to the Swale sea wall. The site is currently in use as an aerobic digestion facility and will be upgraded as part of the on-going requirements for waste water treatment that forms part of the EU Water Framework Directive. This project is currently not at the same level of development as the SEP project, however subject to satisfactory economic evaluation it is likely to be implemented within similar timeframe.

9.9.13 A scoping opinion has been requested from Kent County Council who raised the following concerns:

- impact to the Swale SSSI, SPA and Ramsar sites;
- impact to Medway Estuary and Marshes SSSI, SPA, and Ramsar sites;

- impacts on reptiles, flora, invertebrates and bats;
- impacts on breeding birds, in particular Marsh Harrier;
- impacts on SPA birds; and
- impacts on Milton Creek LWS.

9.9.14 There is not currently a planning Proposal submitted for this proposal and as such it is difficult to assess cumulative impacts with the proposed SEP. However, potential cumulative impacts would be to the Swale and Medway Estuary and Marshes SSSI, SPA, Ramsar sites and Elmsley NNR via changes to air quality and noise and would need to be assessed during the production of the AD Plant EIA.

9.9.15 It was noted by the Council that there may be the potential for the reedbed where Marsh Harrier currently breed to become unsuitable if both the AD Plant and SEP went ahead, due to the "enclosed" feel this would give the reedbed. However, communication with a number of ornithologists around Kent has indicated that due to the increasing population of Marsh Harrier in Kent, breeding pairs have been recorded in many sites previously thought unsuitable. It is unlikely, therefore, that, assuming the reedbed is maintained/protected during both developments, Marsh Harrier would stop breeding on site, as they are already breeding successfully on a site subject to significant existing disturbance from the Paper Mill. It is considered unlikely that there would be a significant cumulative impact on Marsh Harriers from the two developments, and therefore **Not Significant**.

Queenborough and Rushenden Regeneration Project

9.9.16 The Queenborough and Rushenden Regeneration Project is located 4.5km to the north of the Proposal Site and is to regenerate and develop the area for residential and commercial development, employment space, community facilities and services, open spaces, a CHP plant and a marina. It is one of the largest developments in the Swale Borough and biodiversity impacts were identified through the Appropriate Assessment (Campbell Reith 2009a)/Environmental Impact Assessment accompanying the planning Proposal for the proposal (Campbell Reith 2009b). Significant impacts from the Queenborough and Rushenden Regeneration Project proposals could occur to:

- Swale SSSI, Ramsar & SPA;
- Medway Estuary & Marshes SSSI, Ramsar & SPA.

9.9.17 The development is a long-term project in a series of phases. The phase 1 residential development at Neats Court started in 2008 and is nearing completion. This is an on-going regeneration scheme and the completion date is unknown, although the indicative Masterplan was adopted by Swale Borough Council on the 18th November 2009.

9.9.18 Given that the majority of the development has yet to achieve full planning permission, detailed in-combination impacts are difficult to assess. However, it is assumed that all impacts to protected species/sites (including the Swale/Medway Estuary SSSI, Ramsar and SPA) will be mitigated according to any Environmental Statement/Appropriate Assessment submitted with detailed planning Proposals for the individual components of the Masterplan as they come forward for development and therefore any cumulative impacts will be negligible, and therefore **Not significant**.

Sittingbourne Town Centre Regeneration

9.9.19 The proposed Sittingbourne Town Centre Regeneration Masterplan area is located 2 km to the south of the Proposal Site and is to redevelop the town centre to include new retail space, civic buildings, residential housing and infrastructure links.

9.9.20 Given the broad nature of the Masterplan, exact impacts have not been identified. The potential effects of the development on European designated sites are described in the Appropriate Assessment accompanying the Masterplan proposal (Scot Wilson 2009).

9.9.21 The principal impact identified was that of increased recreational pressure. This has been screened out as a potential impact as a result of the SEP and therefore any cumulative impacts will be negligible, and therefore **Not significant**.

East Hall Farm

9.9.22 East Hall Farm is a residential development being undertaken as a number of phases, with some already having been completed. The East Hall Farm site is located 2km to the south of the Proposal Site.

9.9.23 The development is currently under construction as a phased development with the majority of the site already built-out and due for completion in 2010. Development of the SEP plant is not expected to start until 2011.

9.9.24 It is assumed that all impacts to protected species/site have already been mitigated according to the Environmental Statement and therefore any cumulative impacts will be negligible, and therefore **Not significant**.

Iwade Expansion Project

9.9.25 The proposed Iwade Expansion Project is located 1.5km to the north west of the Proposal Site and is to further expand the village of Iwade. The development will not be granted planning permission until the developments within the Ridham and Kemsley Employment

Area or the village centre have commenced and so there will be no overlap of build times. Therefore, no cumulative construction impacts would occur.

9.9.26 It is assumed that all impacts to protected species will be mitigated according to any Environmental Statement submitted with the development and therefore any cumulative impacts will be negligible.

9.9.27 Potential impacts on the Medway Estuary and Marshes SPA and Swale SPA have been identified as a result of increases in housing development, population and recreational pressure within the local area. However, recreational disturbance has been screened out of the current Proposal impact assessment and therefore cumulative impacts with the SEP would be negligible and therefore **Not Significant**.

Kent Science Park

9.9.28 The proposed development at Kent Science Park is located 6km to the south of the Proposal Site and is to expand the park by 4ha. The distance of the proposed expansion site from the Proposal Site and the lack of any ecological connectivity make cumulative impacts highly unlikely and are therefore considered negligible.

Sittingbourne Northern Relief Road

9.9.29 The Sittingbourne Northern Relief Road is located to 0.75km south west of the Proposal Site and is to construct a road bypassing Sittingbourne town centre and crossing Milton Creek, linking to the Ridham Avenue on the opposite side of the existing Paper Mill to the Proposal Site.

9.9.30 Significant impacts from the Sittingbourne Northern Relief Road proposals could occur to:

- Great Crested Newts
- Reptiles
- The Swale SPA/Ramsar/SSSI
- Milton Creek LWS

9.9.31 Construction on the creek crossing was due to start in September 2009. However, the subsequent phase of construction is currently delayed due to a lack of consensus on the proposed route of the road.

9.9.32 However, assuming it were to go ahead, there is the potential for impacts as a result of increased traffic movements and associated pollution. Traffic pollution is unlikely to have a significant impact more than 100m from a site (Bignal *et al*. 2007) and the Swale is over 500m

from the proposed route. Therefore, cumulative air pollution impacts on the Swale SPA are considered unlikely.

9.9.33 There is the possibility that cumulative impacts as a result of air pollution could occur to Milton Creek LWS. However, the direct impacts of the relief road have been assessed as minimal during the consultation process and therefore it is unlikely that further cumulative impacts would occur with the SEP, given that the site has been subject to higher levels of air pollution in the recent past with no evidence of significant impacts.

9.9.34 Therefore, assuming that all mitigation etc within the Environmental Statement will be undertaken in the development of the new relief road, any cumulative impacts with the SEP would be negligible, and therefore **Not significant**.

Thistle Hill

9.9.35 The Thistle Hill development is located approximately 7km to the north east of the Proposal Site and is a substantial residential development. The development is phased with some phases already having been completed.

9.9.36 The site is a considerable distance from the Proposal Site and not linked ecologically. Therefore, there will be no signicant cumulative impacts with the SEP.

Port of Sheerness Wind Farm (Peel Energy)

9.9.37 The Port of Sheerness Wind Farm is being developed along the Lappel Bank dock wall in the Port of Sheerness and is around 7.5km north of the site. It will comprise four 125m high 2.5–3MW turbines and was granted planning permission in March 2009.

9.9.38 The distance from the Proposal Site and the fact that Sheerness is not adjacent to any designated site (making disturbance of birds using these sites unlikely) indicated there will be no signifcant cumulative impacts with the SEP.

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Legend

- Proposal site
- Survey boundary

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

RPS
Willow Mere House Compass Point Business Park Stocks Bridge Way
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Client: G.E.L

Project: Kemsley Mill ES

Title: Proposal site and survey boundary

Scale: 1:8,000 @A3

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Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: SS

Job Ref: **JPP1804** Figure No: **9.1** Revision: **B**

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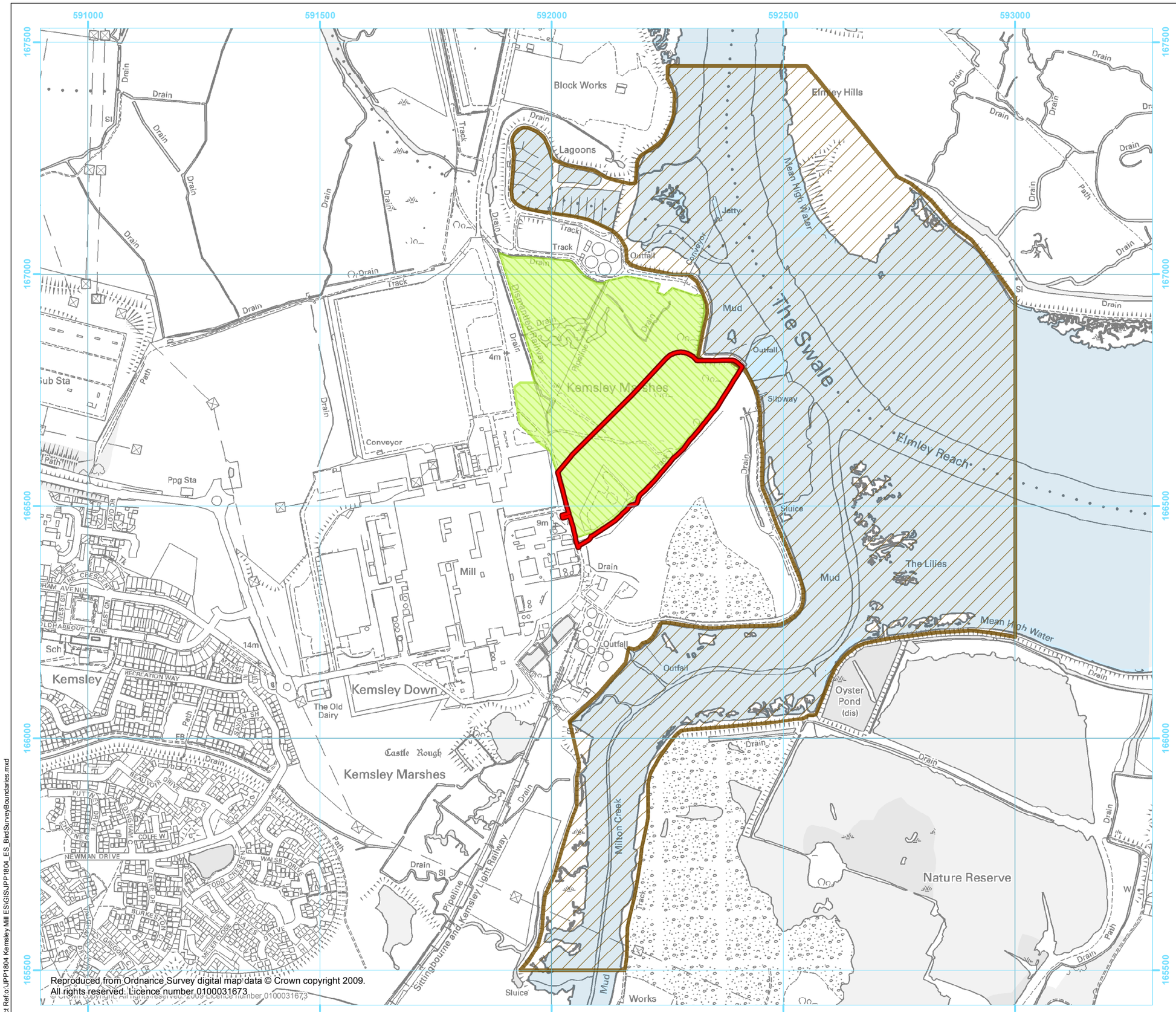

Legend

- Proposal site
- Breeding bird survey area
- RPS Intertidal study area

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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Client: G.E.L

Project: Kemsley Mill ES

Title: Bird survey boundaries (breeding birds and intertidal)

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Projection: British National Grid Datum: OSGB36

Date: 24/11/2009 Drawn: BF Checked: SAS

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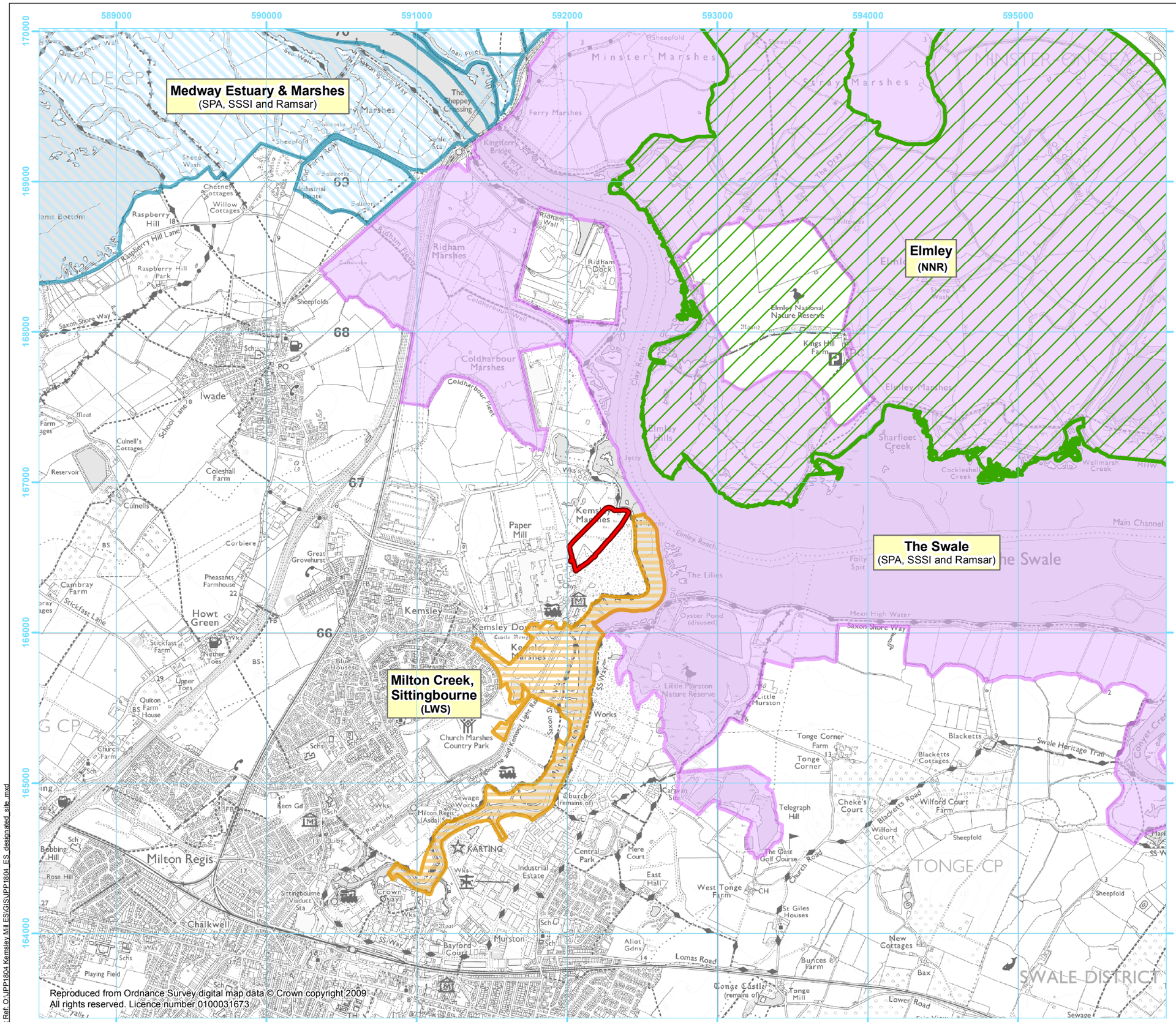

Legend

- Proposal site
- The Swale (SPA, SSSI and Ramsar sites)
- Medway Estuary & Marshes (SPA, SSSI and Ramsar)
- Emley (National nature reserve)
- Milton Creek, Sittingbourne (Local Wildlife Site)

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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Client: G.E.L.

Project: Kemsley Mill ES

Title: Location of designated sites

Scale: 1:25,000 @A3

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Projection: British National Grid Datum: OSGB36

Date: 04/12/2009 Drawn: BF Checked: JG

Job Ref: **JPP1804** Figure No: **9.3** Revision: **B**

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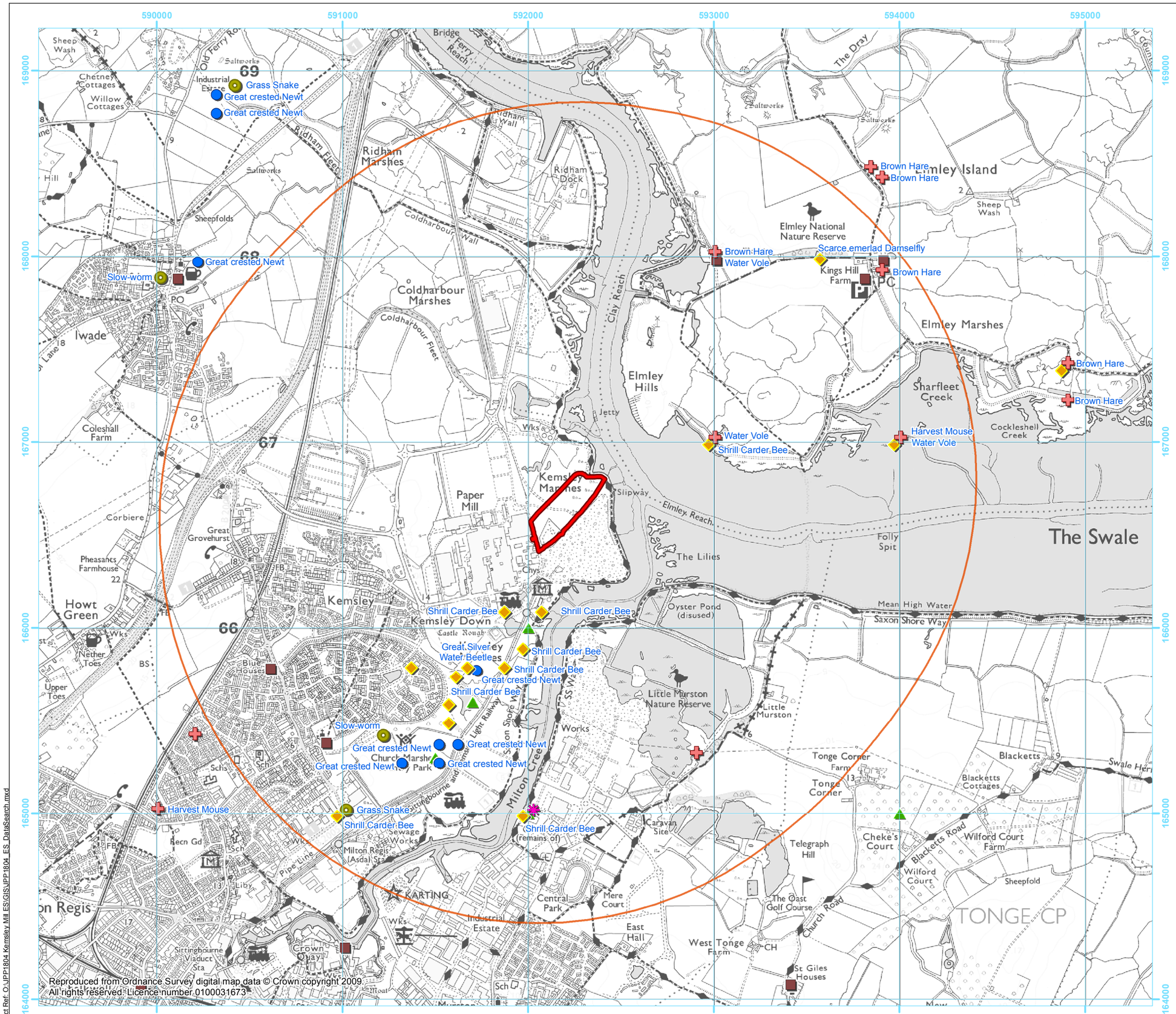

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Project Ref: O:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_DataSearch.mxd

Legend

- Proposal site
- Proposal site, 2km buffer

Data search record for:

- Amphibian
- Bat roost
- Bird
- Invertebrate
- Mammal
- Plant
- Reptile

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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Client: G.E.L.

Project: Kemsley Mill ES

Title: Data search results

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Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: SS

Job Ref: **JPP1804** Figure No: **9.4** Revision: **B**

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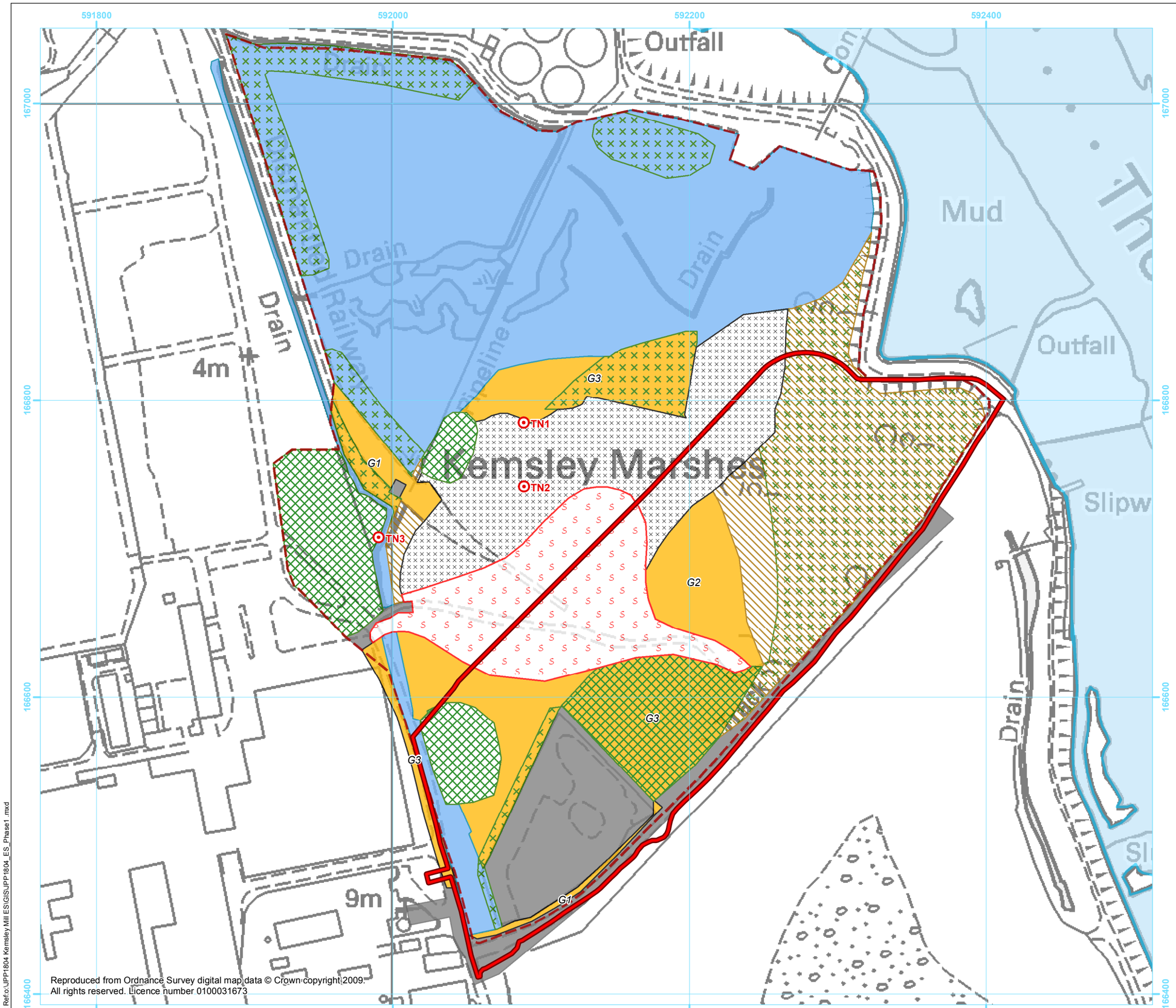


Legend

- Proposal site
- Survey boundary

Phase1 habitat

- Dense scrub
- Scattered scrub
- Unimproved Neutral grassland (*with grass type code, Gx*)
- Tall ruderal
- Swamp
- Spoil
- Ephemeral/short perennial
- Hard standing
- Target Note (*with reference*)

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Phase 1 habitat survey 2009

Scale: 1:2,500 @A3

0 10 20 30 40 50 100 m

Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: JG

Job Ref: **JPP1804** Figure No: **9.5** Revision: **B**

www.rpsgroup.com

Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_Phase1.mxd

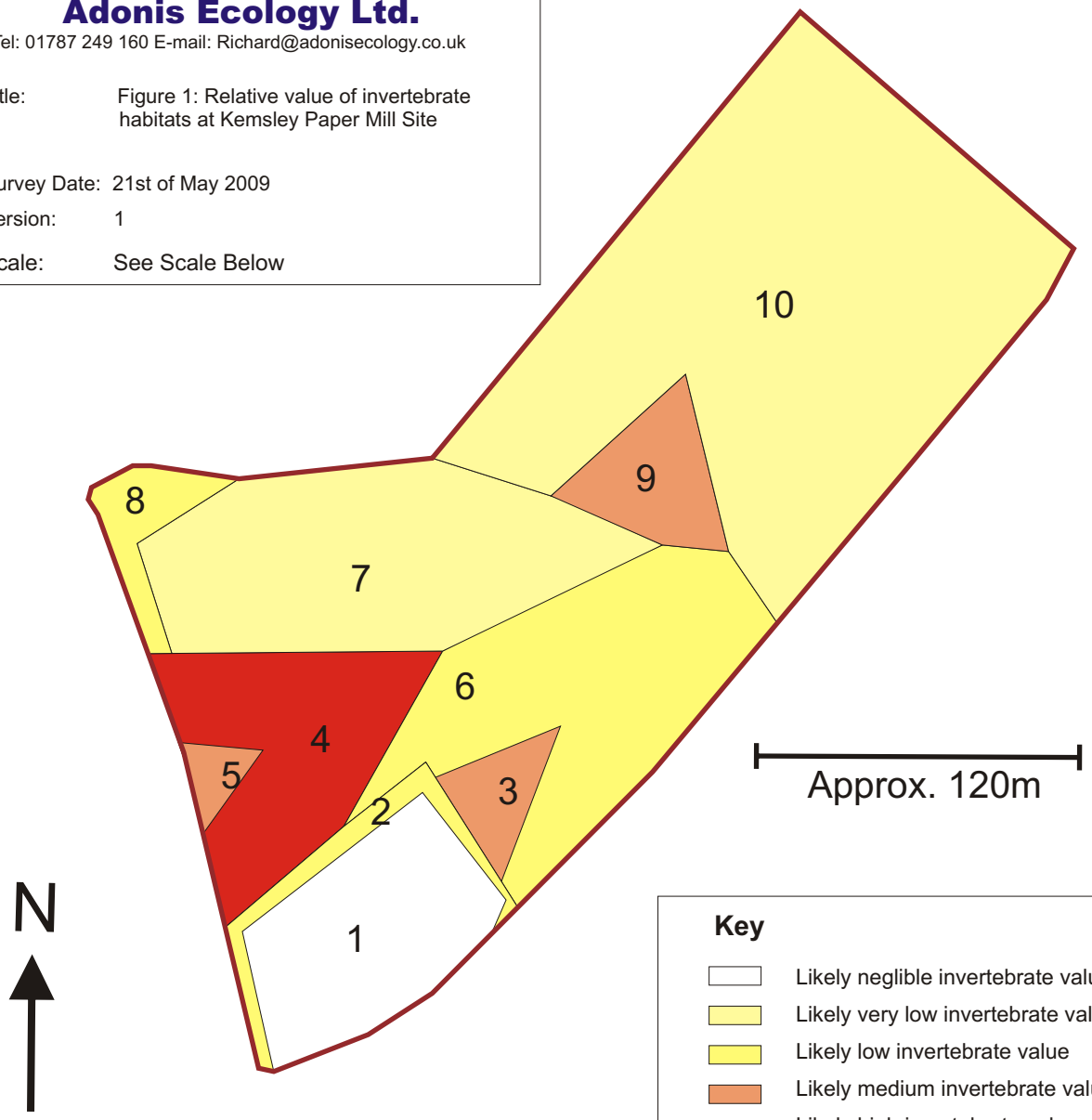
Adonis Ecology Ltd.
Tel: 01787 249 160 E-mail: Richard@adonisecology.co.uk

Title: Figure 1: Relative value of invertebrate habitats at Kemsley Paper Mill Site

Survey Date: 21st of May 2009

Version: 1

Scale: See Scale Below



Descriptions of invertebrate habitats

1 Concrete hardstanding.

2 Ruderal and scattered scrub.

3 Sheltered grassland of varying structure with scrub.

4 Flower-rich grassland of varying structure, scattered scrub and reed.

5 Scrub of varying height and composition adjacent to flower-rich grassland.

6 Dense scrub and tall grassland.

7 Bare earth and scattered ruderal.

8 Reed swamp and ruderal.

9 Combination of short ephemeral, grassland of varying structure and bare ground.

10 Large areas of tall grassland, scrub and short ephemeral each of limited structural variation.

RPS

Figure 9.6: Key invertebrate habitat

Drawn by: AE	**Project no.:** JPP1804
Version: 1	**Date:** 21/05/2009

Willow Mere House, Compass Point Business Park, Stocks Bridge Way, St Ives, Cambridgeshire PE27 5JL. Tel: 01480 466335 Fax: 01480 466911

591800
592000
592200
592400
167000
166800
166600
166400
Outfall
Drain
Dismantled Railway
Drain
Drain
Drain
Pipeline
4m
Kemsley Marshes
A1
A2
A3
A3
A3
Track
Mud
Outfall
Slipw
Drain
9m

Legend

- Proposal site
- Survey boundary
- Reptile refugia sheets, **survey 2009** *(with refugia reference)*
- Reptile refugia sheets, **survey 2007**

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Location of reptile refugia 2007 & 2009

Scale: 1:2,500 @A3

0 10 20 30 40 50 100 m

Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: JG

Job Ref: **JPP1804** Figure No: **9.7** Revision: **B**

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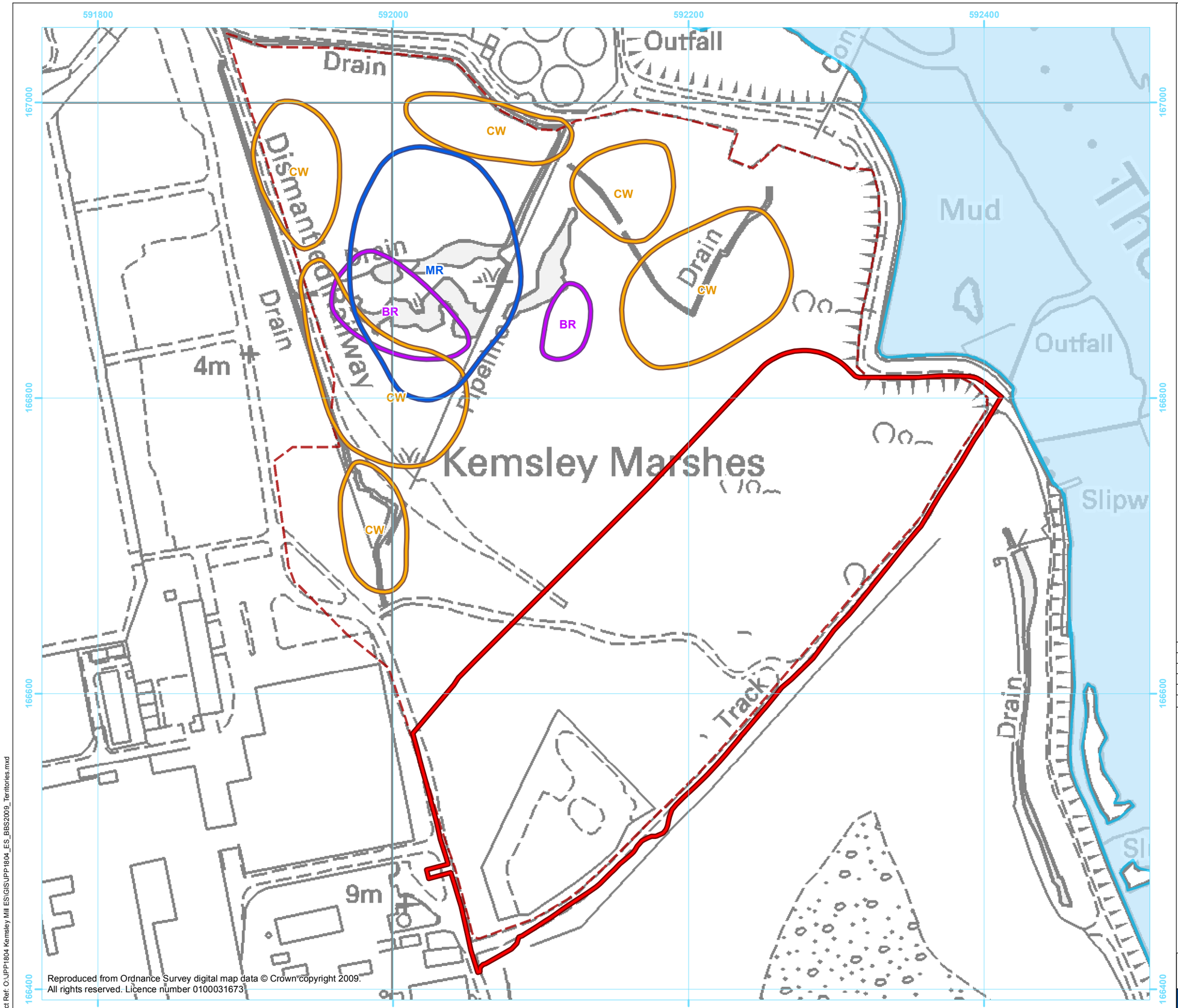
Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_Reptiles.mxd



Legend

- Proposal site
- Survey boundary

Breeding bird territory

- Marsh Harrier (MR)
- Cetti's Warbler (CW)
- Bearded Tit (BR)

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Schedule 1 breeding bird territories 2009

Scale: 1:2,500 @A3

0 10 20 30 40 50 100 m

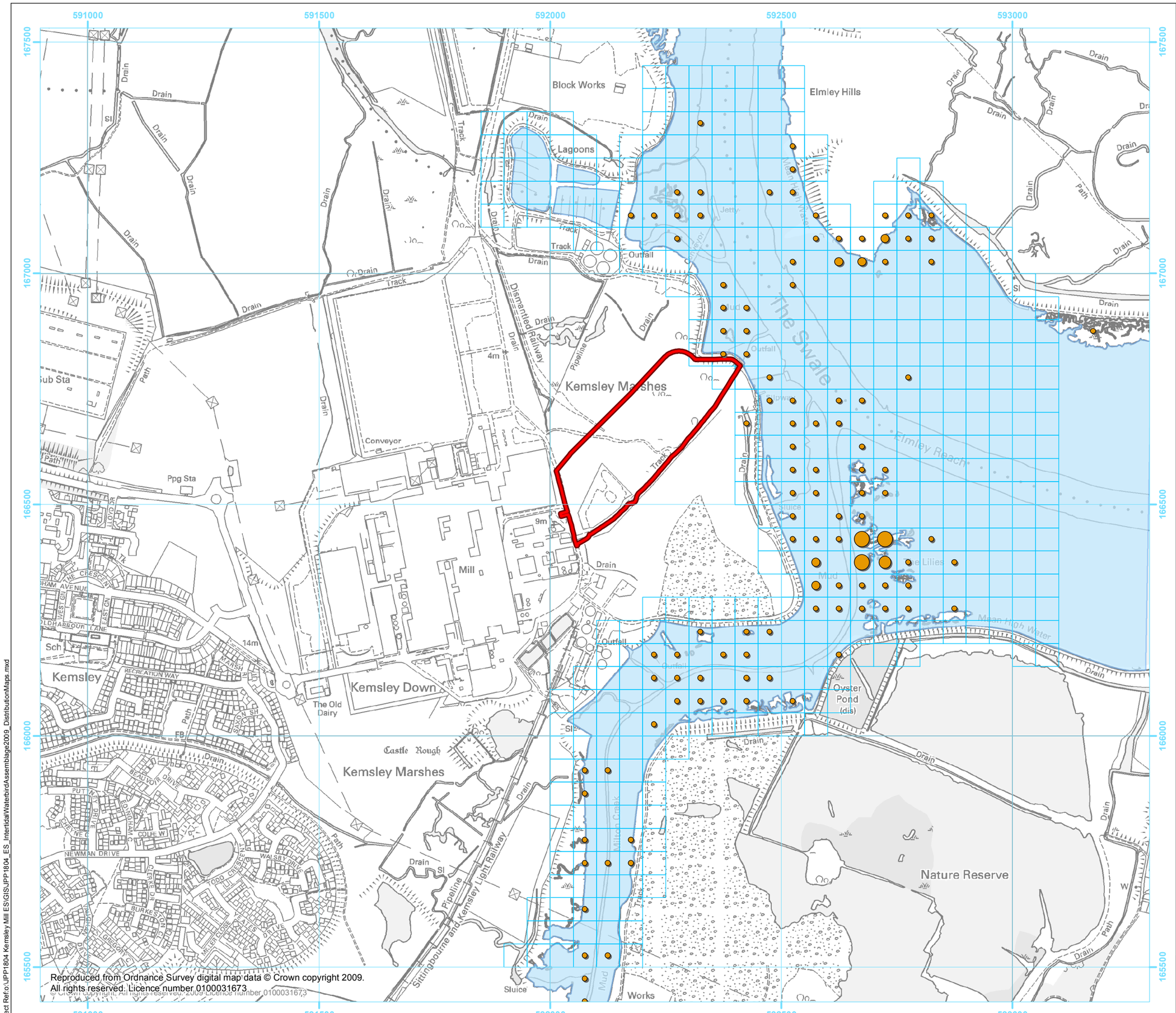
Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: NG

Job Ref: **JPP1804** Figure No: **9.8** Revision: **B**

www.rpsgroup.com

Project Ref: O:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_BBS2009_Territories.mxd



Legend

Proposal site

Peak count
Bird numbers:

- 1 - 30
- 31 - 100
- 101 - 250
- 251 - 1100

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Waterbird Assemblage,
Spring High Tide (April to May)

Scale: 1:8,000 @A3

0 40 80 120 160 200 400 m

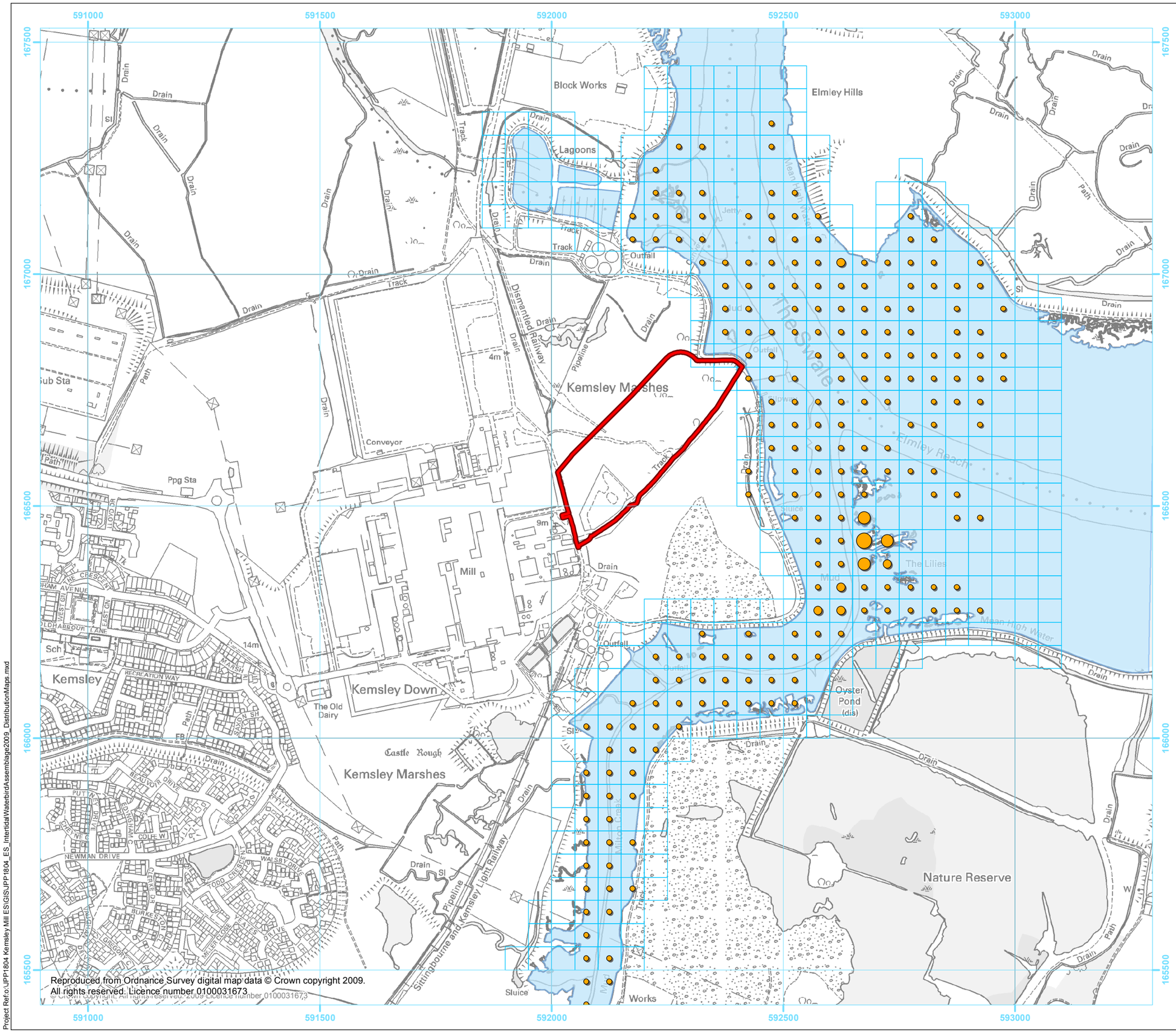
Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: NG

Job Ref: **JPP1804** Figure No: **9.9a** Revision: **B**

www.rpsgroup.com

Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_IntertidalWaterbirdAssemblage2009_DistributionMaps.mxd



Legend

Proposal site

Peak summed count
Bird numbers:

- 1 - 30
- 31 - 100
- 101 - 250
- 251 - 1100

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Waterbird Assemblage, **Spring Low Tide** (April to May)

Scale: 1:8,000 @A3

0 40 80 120 160 200 400 m

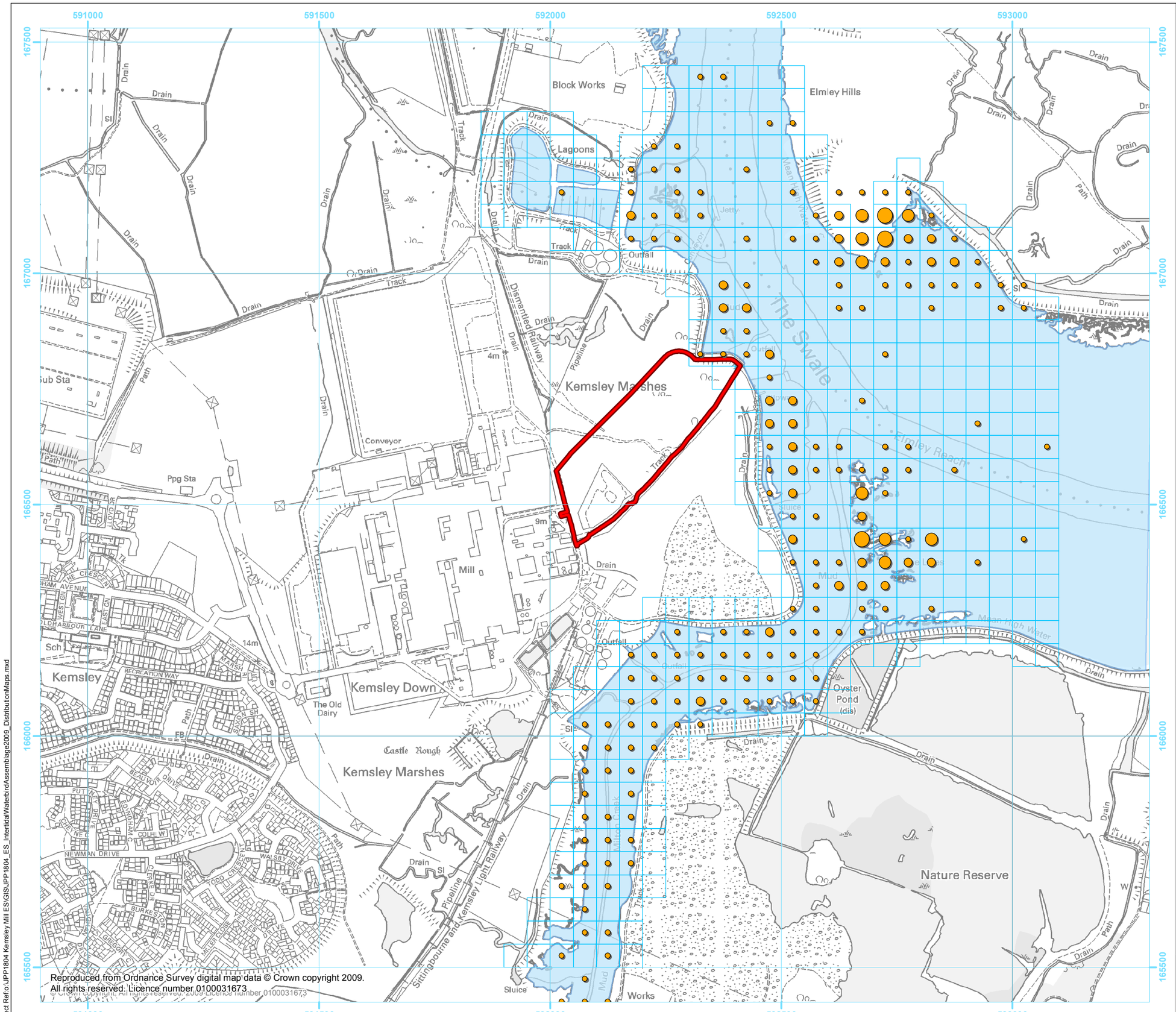
Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: NG

Job Ref: **JPP1804** Figure No: **9.9b** Revision: **B**

www.rpsgroup.com

Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_InterIdalWaterbirdAssemblage2009_DistributionMaps.mxd



Legend

Proposal site

Peak count

Bird numbers:

- 1 - 30
- 31 - 100
- 101 - 250
- 251 - 1100

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Waterbird Assemblage, **Winter High Tide** (February to March)

Scale: 1:8,000 @A3

0 40 80 120 160 200 400 m

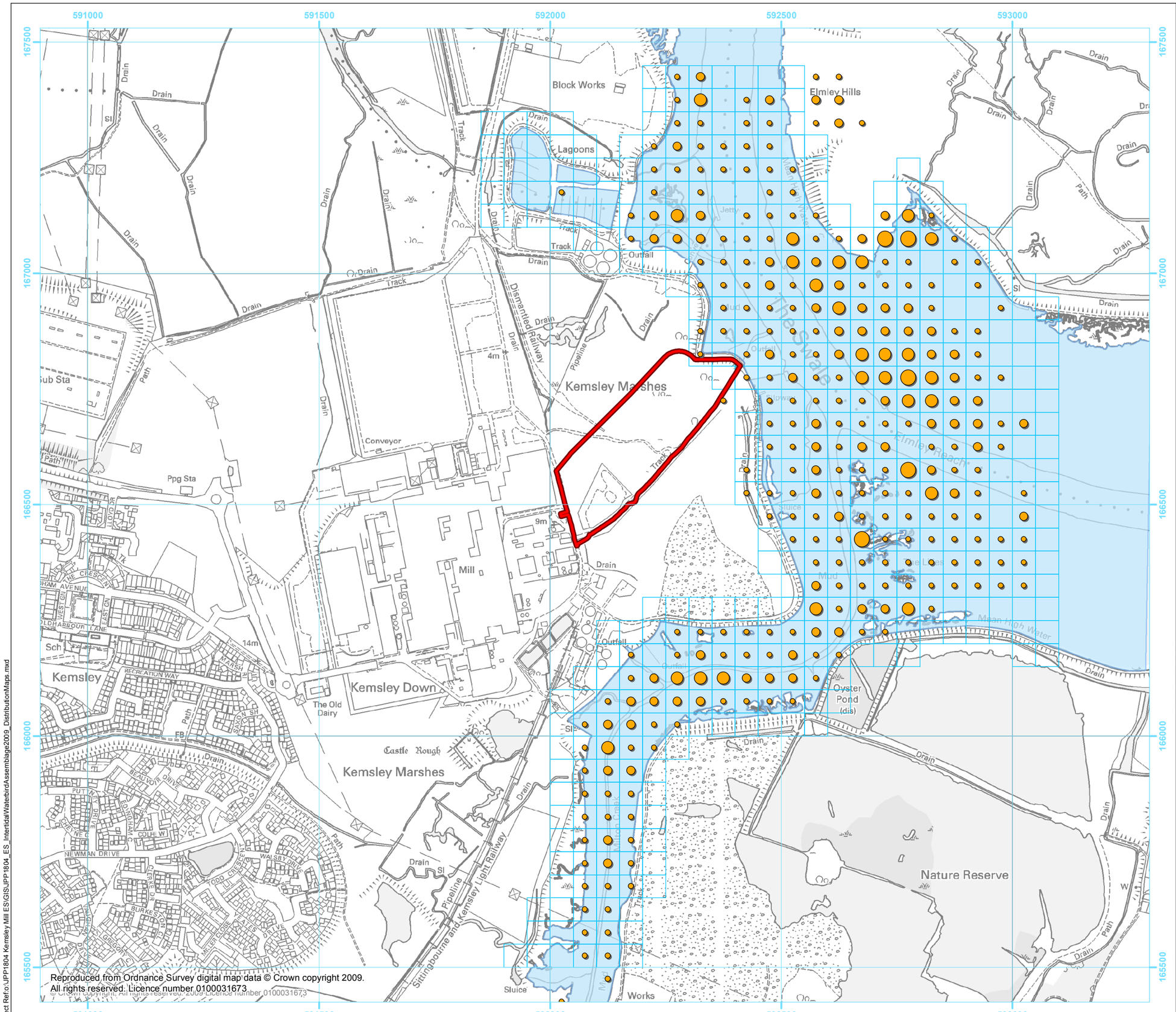
Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: NG

Job Ref: **JPP1804** Figure No: **9.9C** Revision: **B**

www.rpsgroup.com

Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_InterTidalWaterbirdAssemblage2009_DistributionMaps.mxd



Legend

Proposal site

Peak summed count
Bird numbers:

- 1 - 30
- 31 - 100
- 101 - 250
- 251 - 1100

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Waterbird Assemblage,
Winter Low Tide (February to March)

Scale: 1:8,000 @A3

0 40 80 120 160 200 400 m

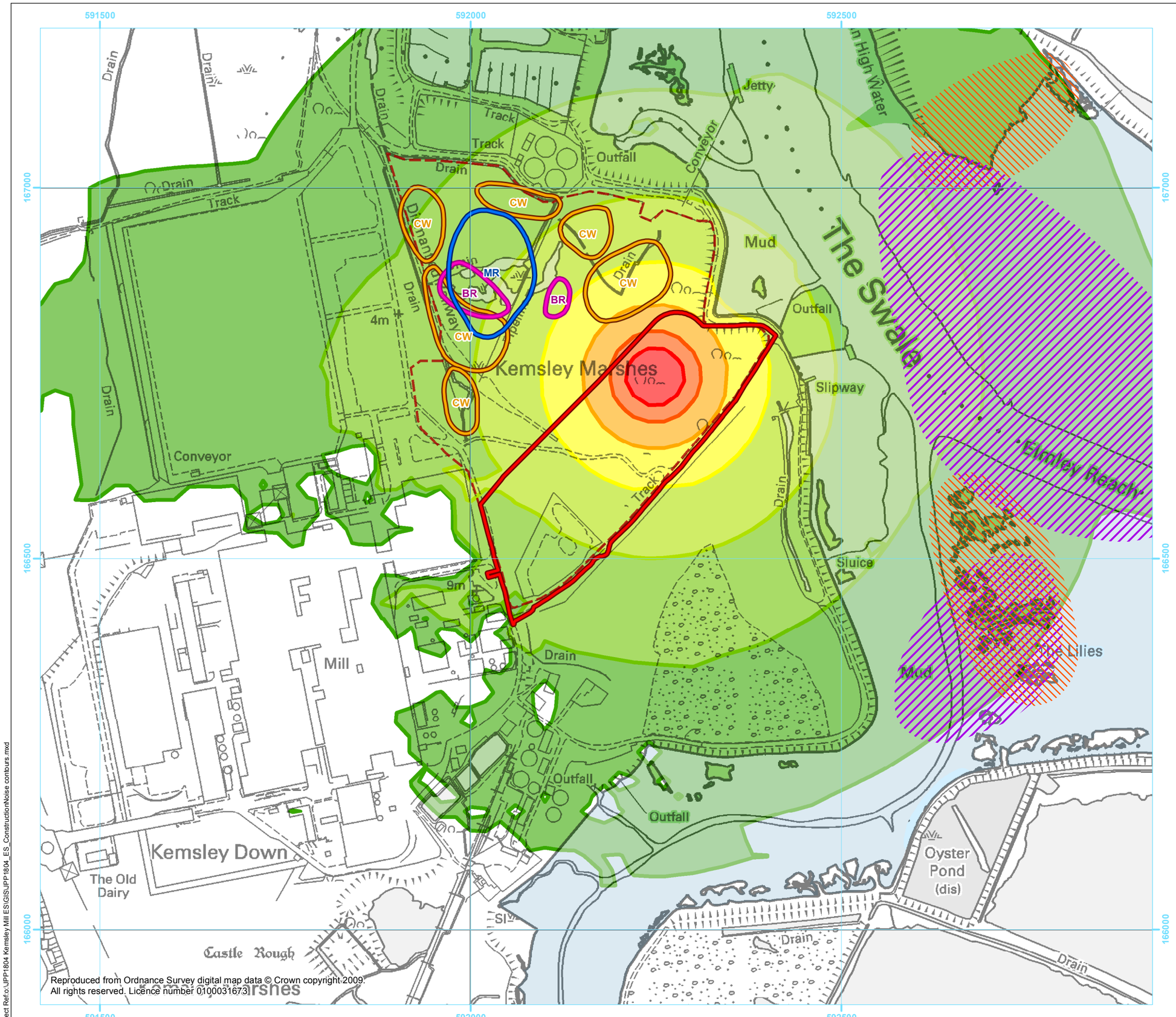
Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: NG

Job Ref: **JPP1804** Figure No: **9.9d** Revision: **B**

www.rpsgroup.com

Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_InterTidalWaterbirdAssemblage2009_DistributionMaps.mxd



Legend

- Proposal site
- Survey boundary

Breeding bird territory

- Marsh Harrier (MR)
- Cetti's Warbler (CW)
- Bearded Tit (BR)

Approx. area of actvity (Avocet and Black-tailed Godwit)

- Feeding
- Roosting

Noise contours (LAmax)

- 55dBL_{AMAX}
- 60dBL_{AMAX}
- 65dBL_{AMAX}
- 70dBL_{AMAX}
- 75dBL_{AMAX}
- 80dBL_{AMAX}
- 85dBL_{AMAX}

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Construction noise contours and birds

Scale: 1:5,000 @A3

0 20 40 60 80 100 200 m

Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: SAS

Job Ref: **JPP1804** Figure No: **9.10** Revision: **B**

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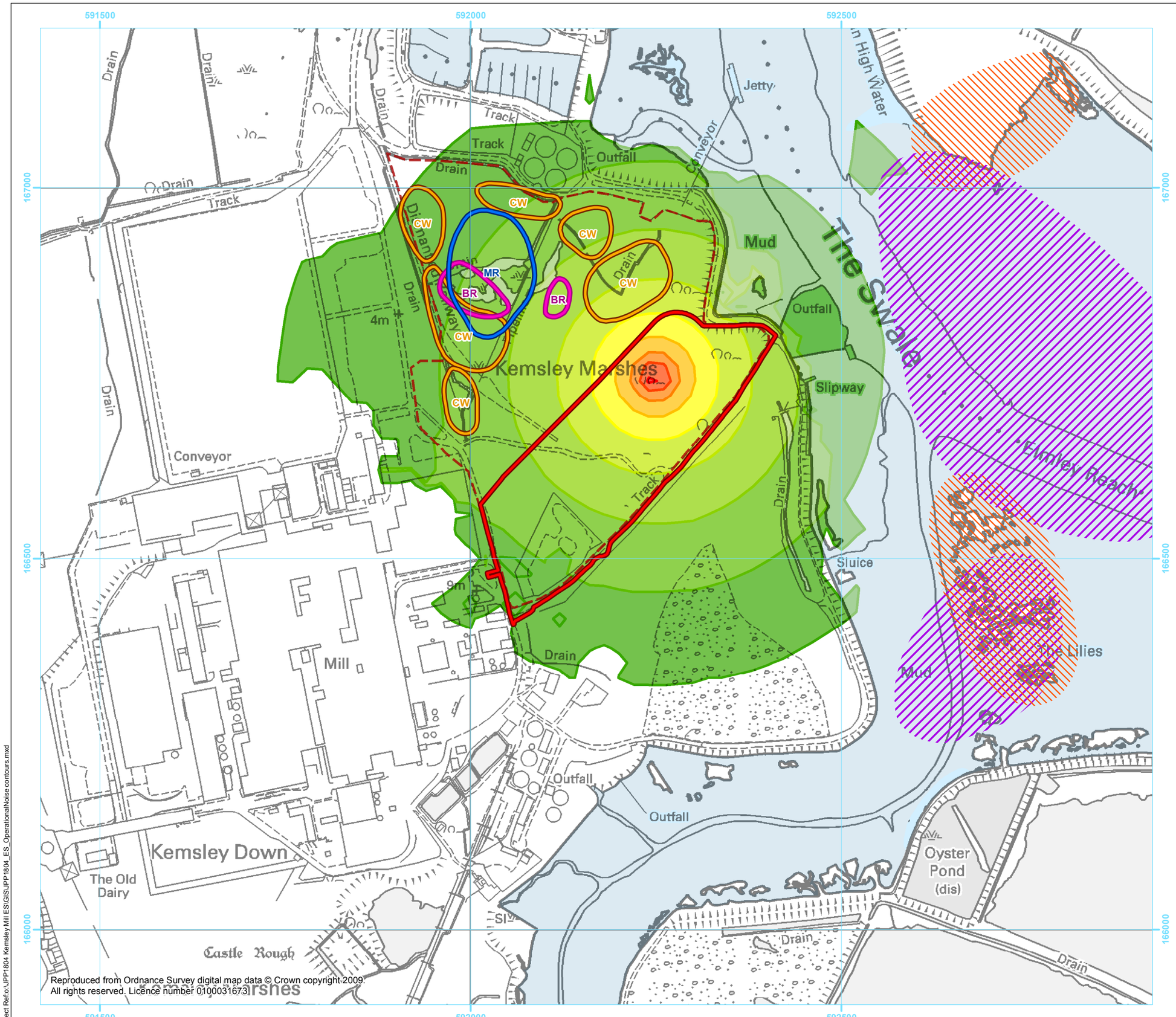
Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_ConstructionNoise contours.mxd



Legend

- Proposal site
- Survey boundary

Breeding bird territory

- Marsh Harrier (MR)
- Cetti's Warbler (CW)
- Bearded Tit (BR)

Approx. area of actvity (Avocet and Black-tailed Godwit)

- Feeding
- Roosting

Noise contours (LAmax)

- 30dBLAMAX
- 35dBLAMAX
- 40dBLAMAX
- 45dBLAMAX
- 50dBLAMAX
- 55dBLAMAX
- 60dBLAMAX
- 65dBLAMAX
- 70dBLAMAX

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Operational noise contours and birds

Scale: 1:5,000 @A3

0 20 40 60 80 100 200m

Projection: British National Grid Datum: OSGB36

Date: 01/12/2009 Drawn: BF Checked: SAS

Job Ref: **JPP1804** Figure No: **9.11** Revision: **B**

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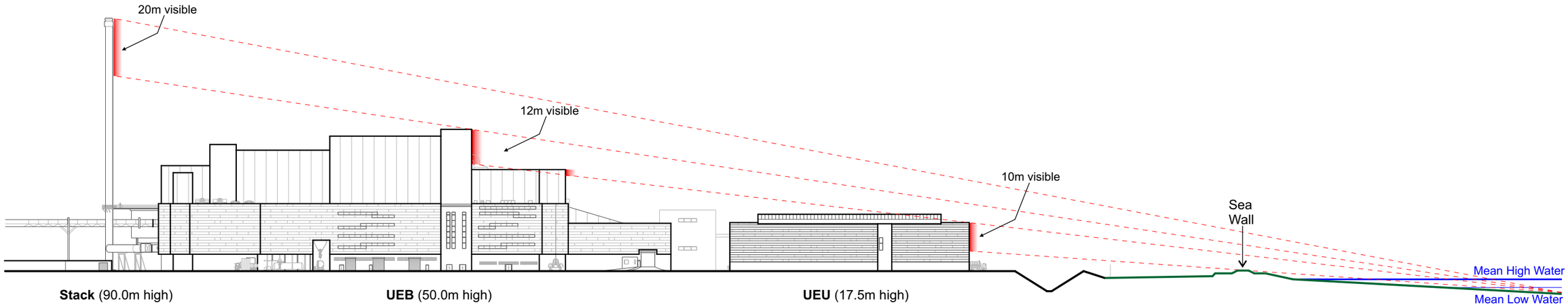
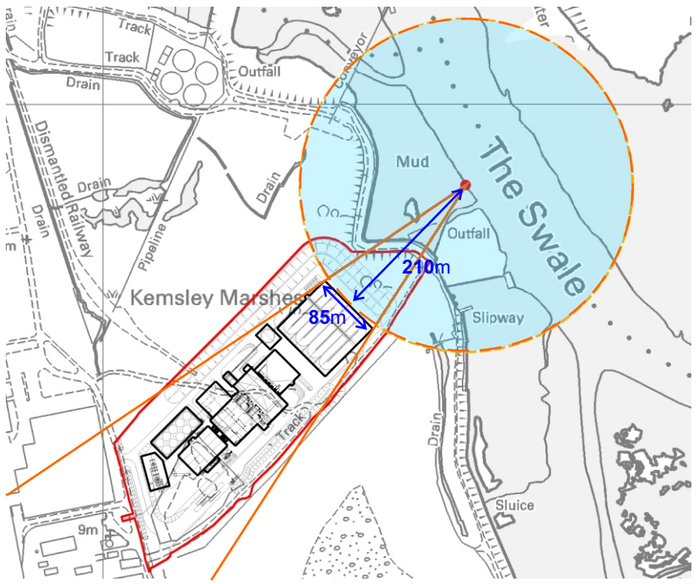
Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_OperationalNoise contours.mxd





Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L.

Project: Kemsley Mill ES

Title: Line of sight from Swale SPA to development

Scale: Not to scale

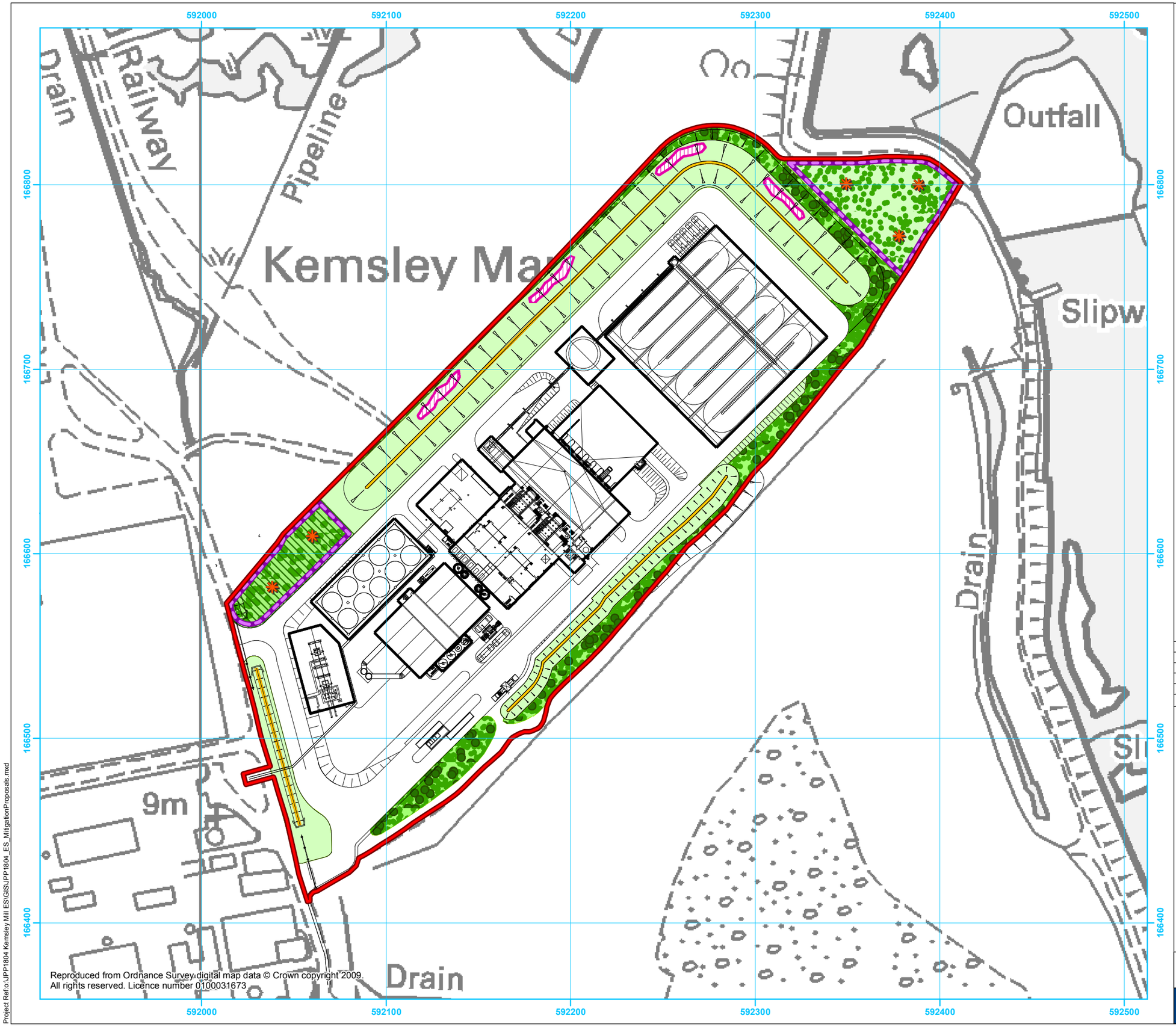
Projection: Datum:

Date: 02/12/2009 Drawn: BF Checked: SS

Job Ref: **JPP1804** Figure No: **9.12** Revision: **A**

www.rpsgroup.com

Project Ref: O:\JPP1804 Kemsley Mill ES\GIS\Data\Profile\JPP1804_ES_LineOfSight.cdr



Legend

- Proposal site
- Receptor site (reptiles)
- Hibernacula

Created Habitat

- Grassland
- Grassland/Scrub
- Tree/Scrub
- Reedbed
- Annual Beard Grass

Retained Habitat

- Grassland/Scrub

Based upon:
Landscape Proposals, drawing reference
5958D_091126AVG_LandscapeProposals_RevA.dwg

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2009

Status: **FINAL**

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

Client: G.E.L

Project: Kemsley Mill ES

Title: Mitigation Proposals

Scale: 1:2,010 @A3

0 10 20 40 60 80m

Projection: British National Grid Datum: OSGB36

Date: 02/12/2009 Drawn: BF Checked: SS

Job Ref: **JPP1804** Figure No: **9.13** Revision: **B**

Project Ref:o:\JPP1804 Kemsley Mill ES\GIS\JPP1804_ES_MitigationProposals.mxd

DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL, SITTINGBOURNE, KENT

ST REGIS PAPER COMPANY LIMITED & E.ON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

CHAPTER 10:

HYDROLOGY AND FLOOD RISK

Prepared by:
Jonathan Morley
Environmental Consultant

Checked by:
Paul Hardwick
Associate Director

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Leeds
LS1 4LX

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RPS Planning & Development

Contents

Tables, Drawings & Appendices

Tables

Drawings

Appendices

10 Hydrology and Flood Risk

10.1 Introduction

10.1.1 This chapter assesses the likely significant effects on hydrology and flood risk of the proposed Kemsley Sustainable Energy Plant (SEP) within the St. Regis Paper Mill Complex, Kemsley, Kent.

10.1.2 The proposed site layout is set out within Figure 4.2.

10.1.3 This assessment covers the site preparation, construction and operation of the development, full details of which are presented in Chapter 4.

10.1.4 The aim of this chapter is to identify and evaluate those aspects of the proposal that have the potential to affect the existing baseline situation with respect to hydrology:

- Surface water drainage;
- Flooding;
- Water Quality

10.1.5 This chapter contains the following:

- Methodology – describes the process used to produce this assessment and outlines the legislation and guidance referred to;
- Baseline Assessment – a description of the existing hydrological conditions of the assessment area based on site visits, provided information and consultation;
- Impact Assessment – identifying the ways in which the hydrology of the assessment area could be affected by the proposed development; or whether these factors may affect the development and surrounds.
- Mitigation – a description of measures that will be implemented to mitigate the identified likely significant effects of the development.

10.2 Legislation and Planning Context

10.2.1 A detailed review of the development plan documents and planning context in relation to the development proposals is provided in Chapter 3.

10.2.2 This section summarises those policies that are directly relevant to hydrology and flood risk issues.

National Policy & Legislation

10.2.3 At a national level, the central government strategy document 'A Better Quality of Life – A Strategy for Sustainable Development for the United Kingdom' recognises the fundamental importance of good water quality to health and the environment and identifies the major challenges to water quality which it states are; growing demand for water supplies, pollution pressures from the new development, diffuse pollution inputs, changed weather patterns and loss of habitats. Relevant planning policy documents include PPS25 (Development and Flood Risk), and PPS23 (Planning and Pollution Control). These have been taken into consideration in assessing the hydrological effects of the proposed development.

Planning Policy Statement 23 (PPS23) –Planning and Pollution Control

10.2.4 PPS23 complements the new pollution control framework.

Planning Policy Statement 25 (PPS25) –Development and Flood Risk

10.2.5 PPS25 Development and Flood Risk, 2006 explains how flood risk should be considered at all stages of the planning and development process in order to reduce future damage to property and loss of life. It states the importance the Government attaches to the management and reduction of flood risk in the land-use planning process, acting on a precautionary basis and taking account of climate change. The aim of PPS25 is to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk.

Land Drainage Act and Water Resources Act

10.2.6 The application will need to be considered by the Environment Agency (EA) under the Land Drainage Act (1991) and the Water Resources Act (1991). Consent from the EA is required for any proposed discharges to controlled waters. Consent would also be required for any

development within 8m of a designated main river under the Environment Agency's Land Drainage Byelaws.

CIRIA Environmental Good Practice on Site (C502) (1999), CIRIA Control of Water Pollution from Construction Sites (C532) (2001)

10.2.7 These provide guidance on hydrology, flood risk and water quality for consultants and contractors.

Environment Agency Pollution Prevention Guidelines

10.2.8 Produced by the Environment Agency Pollution Prevention Guidelines (PPG's) give advice on the statutory responsibilities and good environmental practice. Each PPG addresses a specific industrial sector or activity.

Regional Policy

- The South East Plan - Regional Spatial Strategy for the South East to 2021 (May 2009)

10.2.9 The South East Plan (RSS) was adopted in May 2009 and covers the period until 2026.

10.2.10 Policy NRM1: Sustainable Water Resources and Ground water Quality states:

- *Water supply and ground water will be maintained and enhanced through avoiding adverse effects of development on the water environment. A twin-track approach of demand management and water resource development will be pursued. In preparing local development documents, and determining planning applications, local authorities will:*

i) *assist the UK in achieving the objectives of the Water Framework Directive by delivering appropriate actions set out in River Basin Management plans.*

ii) *identify any circumstances under which new development will need to be supported by water efficiency standards exceeding extant Building Regulations standards*

iii) *set out the circumstances under which sustainable drainage solutions should be incorporated into new development*

iv) *encourage winter water storage reservoirs and other sustainable land management practices which reduce summer abstraction, diffuse pollution and runoff, increase flood storage capacity and benefit wildlife and recreation*

v) *direct new development to areas where adequate water supply can be provided from existing and potential water supply infrastructure. In addition ensure, where appropriate, that development is phased to allow time for the relevant water infrastructure to be put in place in areas where it is currently lacking but is essential for the development to happen.*

10.2.11 Policy NMR2: Water Quality states:

Water quality will be maintained and enhanced through avoiding adverse effects of development on the water environment. In preparing local development documents, and determining planning applications, local authorities will:

i) take account of water cycle studies, groundwater vulnerability maps, groundwater source protection zone maps and asset management plans as prepared by the Environment Agency, water and sewerage companies, and local authorities

ii) ensure that the environmental water quality standards and objectives as required by European Directives are met

iii) ensure that the rate and location of development does not breach either relevant 'no deterioration' objectives or environmental quality standards

iv) not permit development that presents a risk of pollution or where satisfactory pollution prevention measures are not provided in areas of high groundwater vulnerability (in consultation with the Environment Agency and Natural England).

Local authorities will work with water and sewerage companies and the Environment Agency to:

i) identify infrastructure needs, allocate areas and safeguard these for infrastructure development

ii) ensure that adequate wastewater and sewerage capacity is provided to meet planned demand

iii) ensure that impacts of treated sewage discharges on groundwater, inland and marine receiving waters do not breach environmental quality standards or 'no deterioration' objectives

iv) ensure that plans and policies are consistent with River Basin Management Plans

v) ensure that water cycle studies are carried out, prior to development sites being given planning permission, where investigations by the Environment Agency indicate that water quality constraints exist

vi) ensure that Sustainable Drainage Systems are incorporated in a manner to reduce diffuse pollution.

Local authorities should promote land management initiatives to reduce diffuse agricultural pollution

10.2.12 Policy NRM4: Sustainable Flood Risk Management states:

The sequential approach to development in flood risk areas set out in PPS25 will be followed. Inappropriate development should not be allocated or permitted in flood zones 2 and 3 (Diagram NRM1), areas at risk of surface water flooding (critical drainage areas) or areas with a history of groundwater flooding, or where it would increase flood risk elsewhere, unless there is over-riding need and absence of suitable alternatives. Local authorities, with advice from the Environment Agency, should undertake a Strategic Flood Risk Assessment (SFRA)

to provide a comprehensive understanding of the flood risk and put in place a framework for applying the PPS25 sequential approach. This will facilitate allocating sites in a decreasing probability of flood risk. The SFRA would assess future climate change and identify appropriate types of development in accordance with the PPS25 sequential test and flood vulnerability of different land uses. Existing flood defences will be protected from development. Where development is permitted in appropriately defended floodplains it must be designed to be resilient to flooding (to minimise potential damage) and to allow for the future maintenance, realignment or management of the defences to be undertaken. In the preparation of local development documents and considering planning applications, local authorities in conjunction with the Environment Agency, should also:

i) take account of River Basin Management Plans, Catchment Flood Management Plans, Shoreline Management Plans and Surface Water Management Plans in developing local development documents and other strategies. Where locationally specific flood risk and land management options such as flood storage, managed realignment and set back from coastal defences are identified, land should be safeguarded for these purposes and appropriate land use and land management practices should be encouraged

ii) consider the associated social and environmental costs and benefits to fisheries, biodiversity and the built and historic environment in assessment of new flood management schemes

iii) require incorporation and management of Sustainable Drainage Systems (SuDS), other water retention and flood storage measures to minimise direct surface run–off, unless there are practical or environmental reasons for not doing so iv. take account of increased surface water drainage on sewage effluent flows on fluvial flood risk.

Local Policy

10.2.13 The proposed development site falls within the administrative area of Swale Borough. The relevant Local Plan Policy for the area has therefore been reviewed.

The Swale Borough Local Plan, adopted February 2008

- Policy E2 Pollution

All development proposals will minimise and mitigate pollution impacts. Development proposals will not be permitted that would, individually or cumulatively, give rise to pollution significantly adversely affecting the following: human health; residential amenity; flora and fauna; areas or buildings of architectural or historic interest; rural areas; and water supply sources, groundwater aquifers, or local hydrology.

- Policy E4 Water

The Borough Council will not grant planning permission where acceptable sites at lesser risk of flooding are available to accommodate the development. Where there is considered to be a

risk of flooding, the Borough Council will not grant planning permission where the degree of risk of flooding, either to, or arising from, the development, would give rise to adverse impacts upon, or increased risk to, human life, ecosystems, habitats and development, including those resulting from: the impedance of, or increase in, flood flows; the loss of storage volume in the floodplain; the loss of integrity of the flood defences; and increased surface water run-off from the creation of large impermeable areas.

Where there is considered to be a risk of flooding, development proposals will be accompanied by a flood risk assessment and should a) incorporate, where necessary, sustainable drainage systems within development proposals and b) include, when necessary, new flood defence and alleviation measures installed and maintained by the developer(s).

10.3 Assessment Methodology

Relevant Guidance

10.3.1 Following best practice, this assessment has been undertaken by following relevant national policies, legislation and guidance on hydrology and flood risk assessment including:

- Planning Policy Statement 25 (PPS25): Development and Flood Risk.
- Land Drainage Act 1991.
- Water Resources Act 1991.
- PPS23: Planning and Pollution Control

10.3.2 Planning Policy Statement 23 emphasises the role of the planning system in contributing to improving water quality. PPS23 recommends the integration of land use planning with other plans and strategies to achieve control, mitigation and removal of pollution. Annex I Pollution Control, Air and Water Quality provides guidance specific to water quality.

CIRIA Environmental Good Practice on Site (C502)1999

10.3.3 C502 provides guidance on how to avoid causing environmental damage when on a construction site:

Pollution Prevention Guidelines

10.3.4 Produced by the Environment Agency, Pollution Prevention Guidelines (PPGs) give advice on statutory responsibilities and good environmental practice. Each PPG addresses a specific industrial sector or activity. Those of relevance to this assessment are listed below:

- PPG01 General guide to the prevention of water pollution.
- PPG02 Above ground oil storage tanks.
- PPG05 Works in, near or liable to affect watercourses.

- PPG06 Working at construction and demolition sites.
- PPG07 Pollution prevention guidelines refuelling facilities.
- PPG08 Storage and disposal of used oils.
- PPG13 High pressure water and steam cleaners.
- PPG18 Control of spillages and fire fighting run-off.
- PPG21 Pollution incident response planning.
- PPG26 Storage and handling of drums and intermediate bulk containers.

Methodology

10.3.5 This assessment has involved the following:

Consultation

10.3.6 As detailed in Chapter 1, a formal scoping exercise was undertaken to inform the scope of the Environmental Assessment. The formal Scoping response is included in Appendix 10.3.

- A response from Joseph Williamson, Development and Flood Risk Officer at the Environment Agency was received on 13th July 2009. He confirmed that the proposed development lies partially within Flood Zone 2 and 3a with the eastern edge of the site influenced by extreme tidal flood events.
- The EA highlighted that consideration should be given to the potential for the site to become 'tide-locked' from a predicted extreme tidal level of 5.2mAOD occurring at the same time as a 1 in 100 year extreme storm event.

10.3.7 In addition to the formal Scoping exercise, the following informal consultations and discussions have informed this chapter (see Flood Risk Assessment, Appendix 10.2 for more information):

- The Environment Agency, July 2009.
- Swale Borough Council

10.3.8 The site is located partially within a Flood Zone 2 and 3a. Following the re-profiling of the site to a finished floor level of 5.8mAOD, the site will be elevated above the area subjected to flooding.

10.3.9 As the proposed development is in excess of 1 hectare a Flood Risk Assessment will be required – this was confirmed in the formal scoping response from the Environment Agency.

10.3.10 The EA have confirmed that on-site attenuation is to be provided for a 1 in 100 year storm event, with clean run-off to be discharged directly into the Swale.

10.3.11 No run-off limits to the Swale have been recommended by the EA.

Desk Study

10.3.12 Evaluation of the hydrological site conditions was undertaken by consulting maps and published information regarding the topography, geology, and hydrogeology of the area. Much of the information was obtained from an Envirocheck Report (Appendix 10.1). In addition, the Environment Agency was consulted regarding existing licensed surface and groundwater abstractions, on the existing water quality of watercourses around the site and on an agreed methodology for the Flood Risk Assessment (FRA). A site walkover and site investigation works were also undertaken to ascertain the current site conditions and the state of nearby drainage ditches.

10.3.13 The information used to compile this section includes:

- Landmark Envirocheck Report, Reference 27464042-1-1, dated 13th March 2009;
- Ordnance Survey Explorer Map 178: Thames Estuary;
- Site Survey;
- Environment Agency Flood Maps;
- Data provided by the Environment Agency;
- Site walkover surveys undertaken by RPS on 26th June 2009;

10.3.14 Full details of these sources of information are provided within the Technical Appendices.

Water Quality Assessment

10.3.15 A qualitative assessment of potential effects on local surface water quality has been undertaken and relates primarily to the proposed changes to the surface water drainage regime. The potential effect of contaminants on local watercourses, including a review of the Envirocheck Report and Environment Agency water quality data for The Swale, is considered in Chapter 11 Ground Conditions and Hydrogeology.

Flood Risk Assessment

10.3.16 A detailed Flood Risk Assessment has been undertaken for the application site and is located in the Technical Appendix. Figure 10.2 shows the Environment Agency flood map for the proposed site. The FRA scope was agreed with the EA and meets the intent of PPS25. The key components of the FRA were as follows:

- A hydrological assessment of the surface water flows for the developed site; and

- Development of a conceptual outline of a drainage strategy for the development, which incorporates appropriate mitigation measures.

Flood Defence Assessment

10.3.17 There are flood defences noted to the south of the site. Any work within 15 m of these flood defences would require agreement from the Environment Agency.

Assessment of Significance

10.3.18 The methodology used in this assessment follows the DETR guidance *'The Environmental Impact Assessment: A Guide to Procedures* (DETR 2000). This provides general guidance on the assessment of the significance of the potential effect of a project. The significance of the potential effects of the proposed development on site hydrology and water quality is classified by three factors:

- Sensitivity;
- Magnitude; and
- Likelihood

10.3.19 The sensitivity of the receiving environment can be defined as its ability to absorb an effect without perceptible change, and can be classified as shown in Table10.1.

10.3.20 The magnitude including the timing, scale, size and duration of the potential affects from the proposal can be classified as follows (Table10.2):

Table 10.1 – Site Sensitivity Criteria

Sensitivity	Comments
Negligible	No significant effects
Minor	The environmental equilibrium is stable and resilient to changes that are considerably greater than natural fluctuations, without detrimental effect on its existing character.
Moderate	The environmental equilibrium copes well with all natural fluctuations but would struggle to absorb some changes greater than this without affecting its present characteristics.
Major	The environmental equilibrium is precarious, struggles to adapt to natural fluctuations and cannot absorb further change without fundamentally altering its present character or sensitive use (e.g. drinking water supply, EC designated conservation site, Salmonid fishery)
Substantial	Environmental likely significant effects will be of a consistently high magnitude and frequency with Standards exceeded by a significant margin. Secondary likely significant effects also likely to have a high magnitude and frequency. Significant residual effects.

Table 10.2 – Magnitude Criteria

Magnitude	Definition
Negligible	No perceptible changes to the site hydrology
Minor	Measurable but non-material changes to hydrology
Moderate	Material but non-fundamental changes to hydrology
Major	Fundamental changes to the hydrology

10.3.21 Assesments of the sensitivity of the receiving environment together with the magnitude of the effect define the significance of the unmitigated effect (Table 10.3).

Table 10.3 – Unmitigated Significance Criteria

Magnitude Category	Sensitivity				
	Negligible	**Minor**	**Moderate**	**Major**	**Substantial**
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Minor	Negligible	Negligible	Minor	Moderate	Moderate
Moderate	Negligible	Minor	Moderate	Moderate/Major	Major
Major	Minor	Minor	Moderate	Major	Major

10.3.22 The likelihood of an event occurring is then assessed and classified as unlikely, possible or likely. Finally, the residual (or overall) significance after implementation of mitigation measures is a function of the unmitigated significance combined with the likelihood of an event occurring (with mitigation taking place) as shown in Table 10.4.

Table 10.4 – Residual Significance Criteria after Mitigation

Unmitigated Significance	Likelihood		
	Unlikely	**Possible**	**Likely**
Negligible	Negligible	Negligible	Negligible
Minor	Negligible	Negligible	Minor
Moderate	Negligible	Minor	Moderate
Major	Minor	Moderate	Major

10.3.23 This assessment concludes whether the residual significance of the likely significant effects of the proposed development will be major, moderate, minor or negligible, once appropriate

mitigation measures have been implemented. This assessment relies on professional judgement to ensure that the likely significant effects are appropriately assessed. Likely significant effects of *moderate significance or greater* are considered significant in terms of the EIA Regulations and should be taken into account in the decision-making process.

Cumulative Likely Significant Effects

10.3.24 A review of proposed or possible future third party projects that may have a cumulative impact with the development proposals has been undertaken and used to inform this Environmental Statement. Projects identified are summarised in Chapter 1.

10.3.25 In relation to hydrology and flood risk, no developments have been identified as having the potential to impact cumulatively with the proposal with respect to hydrology.

10.4 Baseline Conditions

Site Setting

10.4.1 A site walkover was carried out by RPS on the 26th June 2009. Details of this site visit are noted below.

10.4.2 The site is located at OS NGR: 592070, 166551, c.1.4km to the east of Kemsley Village Centre and c.3.2km northeast of Sittingbourne Town Centre.

10.4.3 The development area is a roughly rectangular shaped parcel of land occupying approximately 7 ha and comprises the former St. Regis Paper Mill coal store and inert waste tip.

10.4.4 Much of the former coal store area has been cleared. However, the application area incorporates numerous relatively new heaps of inert and construction waste underlain by made ground.

10.4.5 The site is accessed along the western boundary via an internal site road, which runs south to north along the eastern edge of St. Regis Paper Mill.

10.4.6 Topographical data indicates that the site slopes from the west at an elevation of approximately 7.0m Above Ordnance Datum (AOD) to approximately 4.0mAOD in the east. The lowest elevations are located within the southeast corner of the application area, 3.18 to 4.09 mAOD.

10.4.7 The majority of site is covered with a veneer of cohesive made ground comprising colliery spoil (black to grey angular gravel with occasional fragments of coal, brick, ash and clinker) and reworked natural clay deposits.

10.4.8 The site drainage is generally north and eastward with the topographical slope, but the natural drainage is affected by past surface water management at site, notably internal bunds and associated ditches in the west of the site and a perimeter ditch along the western boundary.

Surface Water

10.4.9 The location of surface water features within the site and surrounding area are illustrated in Figure 10.1 and are described below.

10.4.10 The site lies partially within Flood Zone 2 and 3a and therefore has a 1 in 200 annual probability, of flooding from tidal sources in any one year. The Swale Estuary is located to the east of the site, flowing in an easterly direction until its confluence with the North Sea approximately 16km to the east of the site.

10.4.11 Following the re-profiling of the site to 5.8mAOD, the development will have been uplifted outside the flood plain with a 'low probability' of flooding for the Swale Estuary.

10.4.12 A Flood Risk Assessment (FRA) is included at Technical Appendix 10.2.

10.4.13 A surface water ditch is located along the western boundary of the site, which flow northwards towards a number of informal attenuation and settlement ponds to the north of the proposed SEP.

10.4.14 Land to the north of the proposed site slopes to the north-eastwards, and a number of natural drainage channels confirm this. These drain into Kemsley Marsh and then flow eastwards to discharge into The Swale.

Surface Water Quality

10.4.15 The Environment Agency has not provided RPS with any information relating to the river quality monitoring of the Swale

Surface Water Abstractions and Discharges

10.4.16 There are no recorded surface water abstractions within a 1km radius of the site.

10.4.17 Records indicate that there are seventeen discharge consents within a 1km radius of the application site. Nine of licences belong to Grovehurst Energy Limited for discharge of process water, cooling water and Trade Effluent to saline estuary at locations c.0m west, c.65m south west and c.273m south, c.275m north, c.380m north, c.387m south, c.414m south, c.423m and west c.495m southwest of the site.

10.4.18 Two licences belong to Southern Water Services Ltd c.315m south for sewerage discharge to saline estuary.

10.4.19 Single licences are held by; St Regis Paper Co. c.288m north for trade effluent to freshwater stream, Niall Cormac-Walsh c.611m north for sewerage discharges to freshwater stream, Knauf Drywall c.762m north for sewage discharge to freshwater and Trevor Ellis c. 762m north for trade effluent.

10.4.20 A further two licences are held by National Grid Electricity c.857m west and c.902m west for trade effluent to freshwater sources.

Pollution Incidents to Controlled Waters

10.4.21 There have been 25 incidents to controlled waters within 1km of the site between 1992 and 1999. Eight of the incidents have been classified as a category 2 with 'significant' severity. The majority of the incidents relate to the discharge of untreated sewage to the swale from various sources.

10.4.22 The remaining pollution incidents have been categorised as a level 3 of minor severity, with no long lasting environmental impact. In all cases the pollutants were unidentified.

Groundwater

10.4.23 The site is underlain by London Clay, a non aquifer with more permeable Woolwich and Thanet beds- Major Aquifer units at depth.

10.4.24 This site is not located within a Source Protection Zone.

Flood Defences

10.4.25 The site is not within an area benefiting from the flood defences along The Swale.

Flooding

10.4.26 Correspondence with the Environment Agency indicates that the site is located within the 1 in 200 year tidal flood zone. The EA flood map shows the eastern edge of the site to be located within flood extent with an annual chance of flooding of 1 in 200 (0.5%) from the sea.

10.4.27 Following the re-profiling of the site to 5.8mAODN, 600mm above the 5.2mAODN critical flood level, the site will be located entirely within Flood Zone 1, with less than 0.1% probability of flooding from tidal sources.

10.5 Incorporated Enhancement and Mitigation

10.5.1 The following section highlights those elements which have been incorporated within the design of the site to reduce the potential effects on flood risk and water quality both at the site and to the surrounding environment. These measures include the following key elements, which are discussed in greater detail below:

- Drainage strategy including surface water outfalls;
- SUDS measures including petrol interceptors and attenuation basins;
- Design of layout.

Drainage Strategy – Surface Water Considerations

10.5.2 The surface drainage strategy for the site incorporates measures designed to minimise the effects on flood levels, water quality, river/stream morphology and habitat. Full details of the strategy are provided in the Flood Risk Assessment in Appendix 10.2.

10.5.3 Precise details of the current drainage system, with regards to the drainage network and discharge locations are not available. Information supplied from the EA indicates that areas to the north and south were subjected to flooding from The Swale in 1953.

Drainage Measures - Surface Water Quality Considerations

10.5.4 A water quality monitoring strategy will be in place to monitor outflows from the site discharge point into The Swale. This will highlight potential contaminants and suspended sediment originating from the site, which may affect the receiving watercourse. Monitoring will be carried out during the construction phase and continue throughout the lifetime of the development.

Design of Proposed Layout

10.5.5 The proposed development is for 4.6ha of the 7ha site to comprise an SEP within the former St. Regis Paper Mill coal store and inert tip.

10.6 Identification and Evaluation of Likely Significant Effects

10.6.1 The potential effects of the proposed development on surface water, flood risk, existing flood defences and water quality have been assessed for the construction and operation phases of the development. These effects are accounted for in mitigation measures incorporated within the design of the development in consideration of the environmental risks highlighted by the baseline assessment

Construction Phase

Surface Water Runoff

10.6.2 There is a potential risk of accumulations of standing water on site and also accidental discharges of run-off to surface watercourses while the development and the operational surface water drainage system is being constructed. Where unmitigated, accidental discharges of runoff may result in **minor** adverse to **moderate** adverse effects on volumes and levels in receptor watercourses. However, the sensitivity of the receptor (River Swale, wider sea environment) to these effects is negligible to minor.

Surface Water Quality

10.6.3 There are a number of potential pollutants which could arise during construction, and hence which may affect the water quality of receiving watercourses. These are outlined below:

- Fine particulate materials (e.g. silts and clays);
- Cement;
- Oil and chemicals (from plant machinery and processes); and
- Other wastes such as wood, plastics, sewage and rubble.

10.6.4 These pollutants may be present as a result of normal site activities, incorrect storage of oils and chemicals and/or accidental spillage. The significance of the incident would be dependent on the nature of the pollutant, on the mitigation measures adopted and their timing and effectiveness, and on the sensitivity of the receiving watercourse.

10.6.5 Potential effects on water quality during the construction phase could include:

- direct discharges to ground and surface water from run-off during the construction phase containing increased loads of suspended solids and/or contaminants;
- accidental spillages or leakages from storage of potentially polluting substances, affecting groundwater and surface waters;
- disposal of drainage and effluent from construction sites, and from concrete batching plants;
- direct loss, disturbance or other effects on aquatic habitats and species of nature conservation value; and

Tidal/Fluvial Flooding

10.6.6 Presently the proposed eastern site area lies partially within Flood Zone 2 and 3a and is hence at risk of tidal flood events with a return period of less than 1 in 200 years. The EA predicts extreme tidal event(s) with a water level of 5.2mAODN up to the year 2070.

10.6.7 Finished ground level plans indicate that the site is to be uplifted to 5.8mAOD thereby reducing the risk of tidal flooding at the site to **negligible**. The risk of site uplift affecting tidal levels locally or elsewhere is considered to be negligible.

10.6.8 Unmitigated effects of construction works for the proposed site would have a **minor** adverse effect on flood risk to the site should a flooding event occur during this time. Potential effects during the construction phase could include:

- affecting land drainage by stopping up of existing drains
- by compaction of soils ; and by
- increases in impermeable surfaces.

Operation Phase

Surface Water

10.6.9 Redevelopment of the site will increase the area of low permeability surfaces. Where unmitigated, this may lead to an increase in the volume and speed of surface water runoff discharged to the adjacent watercourses for a given storm event. Without attenuation, this could increase the risk of localised flooding outside the site, resulting in a **minor** to **moderate** adverse effect on water levels in watercourses and adjacent properties not benefiting from sufficient flood protection. However, the effects on tidal levels in the locality and elsewhere is considered to be negligible. In addition the associated discharge may result in **minor adverse to moderate adverse** effects on the morphology and ecology of the receiving watercourses, through increased erosion/sedimentation as a result of scour However, the effects on tidal levels in the locality and elsewhere is considered to be negligible..

10.6.10 Following the re-profiling of the site to 5.8mAOD the development will be located within Flood Zone 1. The site area does not form part of the functional floodplain and raising site levels would not cause any significant loss of floodplain storage area. The effect on flood storage is therefore considered to be **negligible**.

10.6.11 Following site reprofiling and provision of a surface water drainage system and mitigation measures as outlined in Appendix 10.2 FRA, the potential effects will be reduced to **negligible** to **minor**. It is therefore considered that the proposed site is protected by a surface water drainage strategy to a minimum 100-year standard from on-site flooding. Consequent to this, there will be no increase in flood risk to site from tidal waters.

Surface Water Quality

10.6.12 During the operation of the development, there are a number of potential pollutants, which may give rise to water quality effects on the surrounding surface watercourses. These include:

- Fine particulate materials (e.g. silts and clays);
- Hydrocarbons;
- Oils and chemicals (from plant machinery and processes); and
- Process waste/trade waste.

10.6.13 These pollutants may be present as a result of normal operations, traffic, and emergency or accidental spillage. Although often at low levels, cumulatively these can result in poor water quality in rivers and streams which affects biodiversity and amenity. After rainfall, the first flush can often be highly polluting. The significance of the incident would be dependent on the nature of the pollutant, on the mitigation measures adopted and their timing and effectiveness, and on the sensitivity of the receiving watercourse.

10.6.14 No water quality data for The Swale has been provided by the Environment Agency.

10.6.15 Pollution arising from accidental spillages on site such as road traffic accidents could result in a range of effects on watercourses from **negligible** to **major**. The provision of permanent mitigation measures as outlined in Section 10.7 would reduce the range of potential effects to **negligible** to **minor**.

Fluvial Flooding

10.6.16 The proposed uplifted site will be raised above the tidal flood plain, With attenuation of site runoff, operation of the site would have a **minor** to **negligible** effect on the flood risk to the surrounding area should a flooding event occur during this time.

10.7 Mitigation

10.7.1 This section discusses the mitigation requirements proposed for the protection of the site from effects relating to flood risk, hydrology and water quality, over and above those already incorporated within the development design as described in section 10.5.

Surface Water volumes

10.7.2 Temporary drainage facilities are to be provided during the construction phase to ensure the controlled discharge of surface water run-off into nearby watercourses, until such time as the permanent drainage strategy is implemented. These temporary drainage facilities will prevent ponding of surface water within the development site and ensure that the risk of localised flooding is not increased.

10.7.3 The provision of temporary drainage facilities and/or early phasing of the operational water management system would result in a reduction of the likely effect on water runoff and local water levels to a **minor** to **negligible** effect.

Surface Water Quality

10.7.4 The potential effects identified in relation to surface water quality are applicable to most construction sites. It is common practise for the local planning authority to impose planning conditions requiring a detailed Construction Environmental Management Plan (CEMP) to be submitted for approval prior to any development occurring on the site.

10.7.5 The CEMP will draw on the CIRIA document “Control of Water Pollution from Construction Sites” and the Environment Agency document on “Sustainable Drainage Systems”. All construction work should be undertaken in accordance with guidelines including; Environment Agency, Planning Policy Guidance Note 6 (PPG6): Pollution Prevention Guidelines – Working at Construction and Demolition Sites; Environment Agency, Planning Policy Guidance Note 5 (PPG5): Pollution Prevention Guidelines – Working, in, near or liable to affect watercourses;

CIRIA (C532) Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors; CIRIA – SUDS Manual.

10.7.6 The following specific mitigation measures for the protection of surface water during construction activities should be included within the CEMP prepared for the site:

- Management of construction works to comply with the necessary standards and consent conditions as identified by the Environment Agency;
- A briefing highlighting the importance of water quality, the location of watercourses, and pollution prevention included within the site induction;
- Any significant water run-off from the site during the construction phase to be filtered to remove suspended solids prior to discharge to the River Swale. All surface water discharges from construction activities to pass through sediment traps (e.g. settlement lagoons or tanks);
- Areas with prevalent run-off to be identified and drainage actively managed, e.g. through bunding and/or temporary drainage;
- Any water features, such as the potential sediment/attenuation basins to allow for the storage of water on site and for filtration and sedimentation prior to the discharge to controlled waters. The drainage network to include an interceptor system to remove potential contaminants. In this way pollution incidents such as oil releases, will be contained within the water features as required by the Environment Agency;
- Consultation with the Environment Agency to be undertaken regarding any specific consents required to discharge into The Swale;
- Areas at risk of spillage, such as vehicle maintenance areas, and hazardous substance stores (including fuel oils and chemicals) to be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or the local watercourses. Additionally the bunded areas to have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage;
- Movement of vehicles and earthworks to not take place near to water features, with disturbance to areas close to watercourses reduced to the minimum necessary for the work;
- Works using concrete to be carefully controlled and concrete wagons will be washed out in a safe area;
- Dust build up and mud deposits to be avoided and stockpiled material covered or stored within a contained area to enable run-off to be treated. This is discussed in the air quality chapter (see chapter 7);

- Excavated material and the surcharging layer to be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses;
- Construction materials to be managed in such a way as to effectively minimise the risk posed to the aquatic environment;
- All plant machinery and vehicles to be maintained in a good condition to reduce the risk of hydrocarbon contamination and should only be active when required;
- Drainage works to be constructed to prevent surface water being affected during earthwork operations. No discharge to surface watercourses will occur without permission from the Environment Agency;
- Wheel washers and dust suppression measures to be used to prevent the migration of pollutants;
- Regular cleaning of roads of any construction waste and dirt to be carried out;
- A construction method statement to be submitted for approval by the relevant statutory authorities prior to the commencement of construction; and
- Consultation with the EA to be ongoing throughout the construction period to promote "best practise" and to improve proposed mitigation measures.

10.7.7 An emergency response plan to be followed in the event of a pollution incident would be developed in consultation with the EA. The plan would include the provision of appropriate emergency response equipment on-site and staff training in emergency procedures. The provision of temporary water quality facilities and/or early phasing of the operational water quality works and the provision of an early response plan would result in a reduction of the likely effect on water quality to a minor adverse to moderate adverse effect.

Tidal Flooding/Fluvial Flooding

10.7.8 Following the proposed uplift of the site to 5.8mAOD will raise the development from within a Flood Zone 2 and 3a to entirely within Flood Zone 1. Therefore, the proposed development will be outside the zone of influence from tidal or fluvial flooding, meaning there will be a **minor** to **negligible** risk of a flooding from tidal or fluvial sources.

Monitoring/Management Strategies

10.7.9 This section includes details of the management plans that will be required to ensure implementation and delivery of the incorporated and recommended mitigation measures and to monitor the environmental effect of the project. A brief description of each is supplied below

for both construction and operational phases and includes details of the timescales of each management plan and their geographical extent.

Construction Phase

10.7.10 Water quality monitoring. This should be carried out throughout the construction phase to ensure no discharge of pollutants or increase in suspended sediments occurs. The site drainage systems should be monitored downstream of any petrol interceptors to ensure they are removing all potential contaminants and suspended sediments; and

10.7.11 Flood management plan – This plan is applicable throughout the construction phase, and should include flood-warning measures.

Operational Phase

- Drainage maintenance plan – This plan is applicable throughout the lifetime of the development for the drainage within the site, and any connections to the surface water, or foul sewer and trade waste networks;
- Flood management plan – This plan is applicable throughout the lifetime of the development, and should include flood-warning measures. This plan applies to the site on a regional basis;
- Emergency spillage management plan. This plan is applicable throughout the lifetime of the development, and should include emergency measures. This plan applies to the site on a regional basis; and
- Water quality monitoring strategy – Ongoing water quality monitoring should be undertaken throughout the lifetime of the development. This will apply to the drainage ditches within and surrounding the site.
- Use of fire fighting water -

Table 10.6: Summary of Recommended Key Mitigation Measures

Phase	Recommended Mitigation
Construction	Temporary drainage and water quality measures, including petrol and sediment interceptors, surface water storage areas and outfalls / pumps to the nearby drainage ditches.
Construction	Flood management plan for safe site evacuation
Construction	The Code of Construction Practice adopted for the site will be applied to mitigate against potential adverse effects
Operation	Flood management plan for safe site evacuation
Operation	Emergency spillage management plan
Operation	Continued maintenance and repair of surface water drainage network
Operation	Ongoing water quality monitoring

10.8 Residual Impact

10.8.1 The residual effects associated with Hydrology, Flooding and Water Quality represent those effects that have not been assessed and mitigated against as part of the development form. The measures that are considered and assessed as part of the development form are detailed in Section 10.5 Incorporated Enhancement and Mitigation.

Surface Water Run-off Control

10.8.2 Surface water storage areas are proposed for surface water attenuation, Drawing 0301 within the Drainage Philosophy. The maintenance and management of the surface water drainage system and outfall structure(s) will be essential in preventing surface water flooding of the site. Assuming appropriate maintenance and management of the system, the residual effect from surface water flooding would be considered as **minor**.

Surface Water Quality

10.8.3 The maintenance and management of the surface water drainage and adopted emergency spill containment system will be essential in preventing pollution incidences in the receiving watercourse. The surface water drainage systems would be located on private property and its maintenance and management would need to be included in the overall Emergency Spillage Management Plan and the Water Quality Monitoring Strategies for the development. Assuming appropriate maintenance and management of the systems is undertaken, the residual effect to local water quality upon implementing a surface water quality and emergency spill containment system would be considered as **minor** to **negligible**.

Tidal/Fluvial Flooding

10.8.4 Following the re-profiling of the site the proposed development will not be at risk from either tidal flooding. The residual effect from tidal flooding is therefore considered to be **negligible**.

Summary

10.8.5 Residual effects, their magnitude and significance are summarised in the table below;

Table 10.7 - Summary of Residual Effects

Phase	Effect	Effect Type	Magnitude	Significance
Operation	Surface Water Runoff	Minor	Negligible	Negligible / Minor
Operation	Surface Water Quality	Minor / Negligible	Negligible	Negligible / Minor
Operation	Surface Water	Minor Adverse/	Negligible	Minor adverse

	Quality Emergency Spill	Negligible		/Negligible

10.9 Conclusions

10.9.1 The site is located approximately 3km north of Sittingbourne centre and 1.3km north of Kemsley town centre. It is bounded to the southwest and west by the St Regis Paper Mill complex, and to the north and east by marsh scrubland with the Swale Estuary

10.9.2 A Flood Risk Assessment (FRA) for the site has been completed to meet the requirements of PPS25 and considers the hydrology, surface water, flood defence and flooding issues for the existing site and proposed development.

10.9.3 The site is designed to be protected against a 1 in 100 year storm runoff event coinciding with an extreme predicted tidal level (to the year 2070 and including climate change allowance with freeboard). Mitigation measures should be incorporated within the design of the development to ensure its potential effects on flood risk and water quality of the receiving environment are negligible.

10.9.4 A number of surface water drains are present on and near to the site, as well as informal drains located off site. Outfalls are present which discharge surface water to the Swale Estuary in times of high surface water events. The proposed development would increase the potential runoff to this watercourse. Therefore a surface drainage strategy has been prepared for the development to mitigate this potential effect. Attenuation of surface waters at the site has been calculated to total approximately 3,200m^3. The incorporation of the surface drainage strategy element would result in a negligible effect on surface water flooding.

10.9.5 The existing site and proposed development were assessed for tidal flood risk from the Swale Estuary. Following the uplifting of the site to 5.8mAOD the proposed site is will not be at risk from tidal flooding. The effect of tidal flooding on the proposed development has been assessed as negligible.

10.9.6 The inclusion of water quality monitoring and flood risk mitigation at the site means that the overall hydrological effect of the proposed development will be negligible and therefore there is no likely significant effect.

10.10 References

A Better Quality of Life: a Strategy for Sustainable Development in the UK. HMSO. 1999

Planning Policy Statement 25: Development and Flood Risk. Department of Transport, Environment and the Regions. December 2006

Land Drainage Act 1991. HMSO

Water Resources Act 1991. HMSO

Control of Water Pollution from Construction Sites. CIRIA 2001.

Sustainable Drainage Systems – A Guide for Developers. Environment Agency

Landmark Envirocheck Report, Reference 27464042-1-1, dated 13th March 2009;

Key

Application Boundary

RPS
3RD FLOOR
34 LISBON ST.
LEEDS
LS1 4LX
TEL: 0113 220 6190
FAX: 0113 243 9161

PROJECT

Kemsley Sustainable Energy Plant

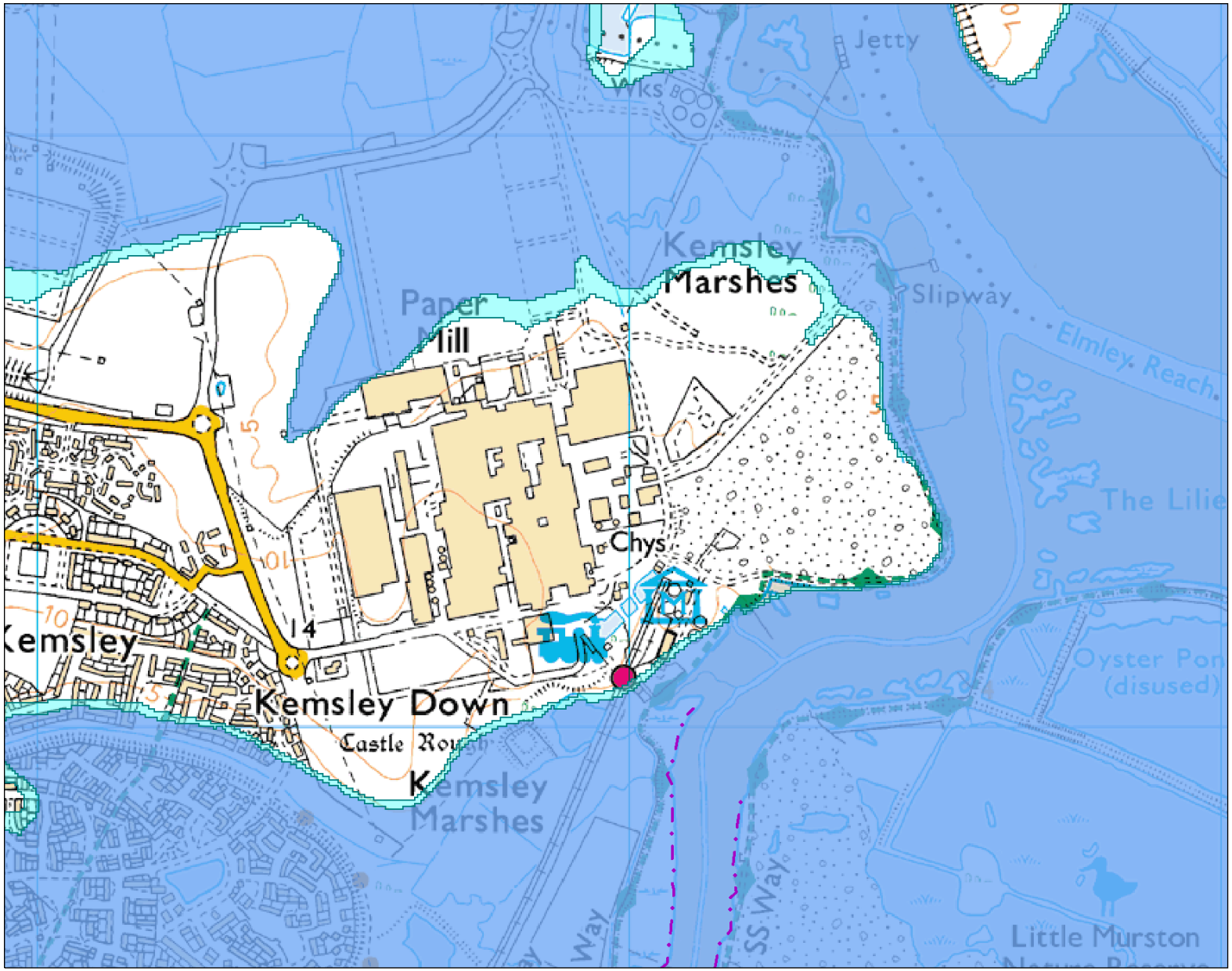
TITLE

Site Location Plan and Surface Water Features

SCALE	DRAWN BY
1:20,000 @ A3	JM
DATE	CHECKED
November 2009	PH
CAD FILE	
CAD FILE	
PROJECT NUMBER	DRAWING NUMBER / REV
DLE1726	Figure 10.1

RPS

Flood Map centred on St Regis Paper Mill, Kemsley, Sittingbourne, Kent - Created 19 August 2009



Environment Agency

Scale 1:10,001

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Legend

- Flood Map - Defences
- Areas Benefiting from Flood Defences
- Flood Map - Flood Storage Areas
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL, SITTINGBOURNE, KENT

ST REGIS PAPER COMPANY LIMITED & E.ON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

CHAPTER 11:

HYDROGEOLOGY AND GROUND CONDITIONS

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RPS Planning & Development

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11 Hydrogeology and Ground Conditions

11.1 Introduction

11.1.1 This chapter provides a description of ground conditions in terms of geology, hydrogeology and land contamination for the proposed Sustainable Energy Plant at Kemsley Mill, Sittingbourne, Kent. An assessment of the likely significant effects the Sustainable Energy Plant (SEP) will have on hydrogeology has been undertaken for the construction and operation phase of the development. An assessment is also undertaken to ascertain whether, and to what extent, human health (i.e. construction workers and future site users), controlled waters, the general environment and the Sustainable Energy Plant (SEP) itself will be impacted by the ground conditions identified on the site.

11.1.2 The likely significant effects are assessed against pre-determined baseline conditions for the site using a Conceptual Site Model (CSM) that enables risks to site users and environmental receptors to be determined. The proposed design for the development is described in detail in Chapter 4, with the proposed layout shown in Figure 4.2

11.2 Legislation and Planning Context

11.2.1 A detailed review of the development plan documents and planning context in relation to the development proposals is provided in Chapter 3. The current environmental legislation that relates to contaminated land is described in Appendix 11.1 and includes:

- Environmental Protection Act 1990 (Part IIA);
- Contaminated Land (England) Regulations, 2006;
- Groundwater Regulations, 1998;
- Water Resources Act 1991 (Section 85);
- The Environment Act (1995);
- The Water Act, 2003;
- Town and Country Planning Act 1990;
- The Building Act 1984 ; and
- The Building Regulations 2000 (Statutory Instrument No. 2531).

11.2.2 The national, regional and local planning policy relevant to the consideration of hydrogeology and ground conditions is also described in Appendix 11.1 and includes:

- Planning Policy Statement (PPS23): 'Planning and Pollution Control'
- South East Plan, Policy NRM1 and NRM2;
- Waste Local Plan, Policy NRM1 (Sustainable Water Resources and Ground water Quality) and Policy NMR2 (Water Quality);
- Swale Borough Local Plan, Policy E3 (Development Control Policy for Land Contamination).

11.3 Assessment Methodology

Relevant Guidance

11.3.1 Contaminated land occurs where historical land-management practices have led to the deliberate or accidental release or disposal of substances onto the land. These substances can pose a risk to humans, controlled waters, ecological systems, produce, livestock and buildings. "Contaminated Land" is defined by section 78A(2) of Part IIA of the Environmental Protection Act 1990 as: "*any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that*:

- Significant Harm is being caused or there is a significant possibility of such harm being caused; or
- Pollution of Controlled Waters is being, or is likely to be caused.'

11.3.2 Within the current regulatory framework the determination of contaminated land uses a risk-based approach. Under the risk assessment procedure, for harm to the non-aquatic environment, or pollution of controlled waters to occur, there must be a 'pollutant linkage'. A pollutant linkage is based on the characterisation of the following:

- Source of contamination (Hazard);
- Pathway for the contaminant to move from source to receptor; and
- Receptor which is affected by the contaminant, including human beings, ecology, controlled waters, physical systems and built structures, which could be affected by the hazard.'

General Approach

11.3.3 The objective of this assessment is to identify and where possible quantify potential impacts on pre-determined baseline conditions during the construction and operation phase of the development. Direct impacts on hydrogeology, geology and human health are considered, in addition to indirect impacts on the environment, controlled waters and other groundwater receptors.

11.3.4 Baseline conditions have been defined by a desk based review of published data sources; consultation; the reported results of intrusive works on the site; and the results of 'baseline assessments' of pre-existing contamination (both soil and groundwater) and ground gases present on the site. Using this information a CSM is developed for both the current and future developed site, from which the likely significance of impacts can be determined.

11.3.5 The assessment and any proposal for remedial measures aims to ensure that the Sustainable Energy Plant (SEP) process will not result in any risk to human health or increased detrimental impact on the environment; and that the developed site would not present any liabilities, with regard to ground conditions, under the Part IIA regulatory regime.

Sources of Information

Previous Investigations

11.3.6 This assessment is largely based on the results from two recent studies undertaken with respect to ground conditions on the site:

- Phase 1 Environmental Site Assessment – Kemsley Paper Mill, Sittingbourne, Kent (RPS, 2009a); and
- Phase 2 Intrusive Investigation – Kemsley Paper Mill, Sittingbourne, Kent (RPS, 2009b).

11.3.7 The report associated with each study is provided in Appendix 11.2 and Appendix 11.3 respectively. These two studies build on previous works undertaken on the site in 2001 and a number of subsequent quarterly monitoring rounds undertaken, as described in the Phase 2 Report provided in Appendix 11.2. The Phase 2 intrusive works included:

- Three cable percussive boreholes to a depth of 20 m and completed as combined gas and groundwater monitoring installations;
- Eight window samples to a maximum depth of 4.0 mBGL;
- Fifteen trial pits excavated to a maximum depth of 3.5 mBGL;
- Soil sampling and analysis;
- A groundwater monitoring round and analysis; and
- Two rounds of ground gas monitoring.

11.3.8 The Phase 2 intrusive investigation undertaken in 2009 was designed to provide baseline data for site assessment, with further investigation envisaged at a later date to inform the final detailed design of the Sustainable Energy Plant (SEP).

11.3.9 The position of each exploratory location on the site is shown in Figure 11.3. Representative soil samples were collected from all exploratory locations and subject to laboratory analysis for a range of targeted parameters and a variety of geotechnical tests. Groundwater levels

have been monitored on the site and groundwater samples analysed for a range of targeted substances. The concentration of ground gases (principally carbon dioxide and methane) have also been monitored on the site.

Consultation & Scoping Exercise

11.3.10 A formal request for scoping opinion was issued in July 2009. The scoping report was issued to all statutory consultees including the Environment Agency (EA) and Swale Borough Council (SBC)

11.3.11 In their response, the EA state that they 'agree that further surveys are required to determine the level of contamination present on site. The impact of this contamination will be assessed in accordance with Planning Policy Statement 25'. It is presumed the EA are referring to PPS23 (Planning and Pollution Control) described in Chapter 3 and Section 11.3 of this chapter.

Desk Study

11.3.12 The following sources of data have also been reviewed for the purpose of baseline characterisation:

- Envirocheck Report (Landmark, 2009);
- British Geological Survey. 1977. Chatham. England and Wales Sheet 272. Solid and Drift Geology. 1:50000, Keyworth, Nottingham: British Geological Survey.
- Environment Agency. 1997. Policy and Practice for the Protection of Groundwater, Groundwater Vulnerability of East Kent, Sheet 47, 1:100000 Scale;
- Environment Agency Website (http://maps.environment-agency.gov.uk/wiyby); and
- British Geological Survey Website (http://www.bgs.ac.uk/Lexicon and http://www.bgs.ac.uk/geoindex).

Baseline Assessment Methodology

11.3.13 The preliminary baseline assessment of data gathered through intrusive works on the site involves a qualitative screening of soil, groundwater and gas data against appropriate assessment criteria (AC). This screening exercise will determine whether further quantified assessment or data gathering is required. All baseline assessments undertaken as part of these works are described in detail in the Phase 2 Report provided in Appendix 11.3 and summarised below.

Human Health Assessment of Pre-existing Soil Contamination

11.3.14 A range of AC have been used to assess site available soil data and include:

- New UK CLEA Soil Guideline Values (SGVs); and
- RPS General Assessment Criteria (GACs) derived using the CLEA UK model and former SGVs.

11.3.15 To assess whether observed soil contamination poses a theoretical risk to human health the chemical analytical results for soil have first been screened against the new CLEA soil guideline values for a commercial / industrial end land use. Where SGVs are not available, contaminant concentrations are compared against RPS GACs and former SGVs. On the basis of the results of this screening assessment further works may be required that include further site characterisation and/or addition Quantitative Risk Assessment (QRA), prior to the commencement of construction.

Controlled Water Risk Assessment

11.3.16 To determine the significance of contaminant concentrations in groundwater sample data have been screened against the following water quality AC:

- UK Environmental Quality Standards (EQS) for saline water - applied to surface water, or groundwater that could enter a surface;
- UK Environmental Quality Standards (EQS) for freshwater - applied to surface water, or groundwater that could enter a surface water;
- UK / EU Drinking Water Standards (DWS), taken from UK Water Supply (Water Quality) Regulations (1989 and 2000); and
- World Health Organisation (WHO) Health Standards and Appearance Taste and Odour (ATO) Standards for Drinking Water.

11.3.17 In general the UK EQS values for saline water is considered most applicable to groundwater beneath the site due to the close proximity of The Swale and the fact that The Swale is likely to be the principal receptor of groundwater underlying the site. Where the EQS is given as an alkalinity dependent range, the most conservative value is used for the water screening. The results were screened against the applicable EQS as a guideline, using the DWS and subsequently the WHO standard for screening only when no EQS is available for a given determinant. The greatest potential risk associated with groundwater contamination corresponds with discharge to surface waters, rather than to abstractions used for drinking water supply.

Ground Gas Assessment

11.3.18 Waste Management Paper 27 (Department of the Environment, 1991) and Building Regulations 2000 (Statutory Instrument No. 2531, 2001) require certain measures to be implemented to mitigate risks posed by potentially hazardous, explosive or asphyxiant gases at above guideline concentrations, that is:

- Methane exceeding 1% by volume; and/or
- Carbon dioxide exceeding 5% by volume.

11.3.19 The guidance suggests that a quantitative gas assessment or gas protection measures may be required if methane concentrations in the ground exceed 1% or carbon dioxide concentrations exceed 1.5%. Where significant concentrations of ground or landfill gases are identified further investigation and assessment will be required in line with CIRIA C665 (CIRIA, 2007) to further characterise risk and/or determined appropriate mitigation measures for a site.

Assessment of Significance

11.3.20 The significance of impacts on hydrogeology and the health of construction workers and/or future site users likely to occur during the construction, operation and decommissioning phase of the development shall be determined using the largely qualitatively process described below. In order to assess the significance of the impacts the following definitions of potential significance have been assumed as follow:

- ***Neutral*** - No significant effects;
- ***Minor*** - Impacts are of low magnitude and frequency;
- ***Moderate*** - Impacts are of moderate magnitude and frequency;
- ***Major*** - Impacts are likely to be of high magnitude and frequency with quality standards being exceeded at times; and
- ***Substantial*** - Impacts will be of a consistently high magnitude and frequency).

11.3.21 The effects that result from the Sustainable Energy Plant (SEP) can either be beneficial or adverse.

11.4 Baseline Conditions

Site Setting

11.4.1 The site setting is shown in Figure 11.1. The proposal site is located immediately north-east of the existing Kemsley Paper Mill that is situated on the eastern periphery of Kemsley and approximately 3km to the north of the centre of Sittingbourne. The site is situated on low lying land immediately west of The Swale estuary. Existing ground elevations across the site are low, generally between 5mAOD and 6mAOD, but rising to in excess of 7.5mAOD in the south-west corner of the site. An earth track follows the southern site boundary and declines to a minimum elevation of approximately 3mAOD in the north-east corner of the site adjacent to The Swale.

11.4.2 Current land use on the site comprises an area of marsh land, an area of stockpiled material and a contractor's area and equipment lay down area. A significant volume of stockpiled material is present on the western parts of the site, towards the existing Kemsley Mill. This

material has not been included in the baseline assessment as it shall be removed from the proposal site during pre-construction enabling works. The eastern area of the SEP proposal site is largely derelict, with a sparse vegetative cover.

11.4.3 Outside of the proposal site boundary, Kemsley Marshes are located to the north and a capped former landfill is situated to the south of the access track that delimits the southern proposal site boundary. This landfill is currently in phase of ongoing post-closure monitoring.

Historical Land Use

11.4.4 The historical land use on the proposal site and in the vicinity thereof is described in detail in the Phase 1 Report provided in Appendix 11.2. Principal land uses on the proposal site include a former refuse tip in the north and east of the sit between 1978 and 1983 (See Figure 11.1), before which the site formed part of Kemsley marshes. The site was historically the location of coal stockpiling for the main industrial site to the west. A number of tramways associated with the adjacent paper mill also crossed the site in 1939.

Hydrology

11.4.5 The local hydrology of the site is shown in Figure 11.1. The proposal site is situated on low lying land immediately west of the tidal estuary of The Swale and north of Milton Creek. The eastern boundary of the site is approximately 180m from The Swale, a 13 mile estuary separating the Isle of Sheppey from the mainland of north Kent and to the north of Milton Creek.

11.4.6 A drainage ditch was observed within the Sustainable Energy Plant (SEP) area during a site walkover undertaken by RPS in 2009. The ditch runs along the western boundary of the site in a north to south direction towards Milton Creek. The ditch is poorly maintained and heavily silted.

Geology

11.4.7 The local geological sequence is summarised in Table 11.1, with supporting geological logs appended to the Phase 2 Investigation Report provided in Appendix 11.3. The typical unit thicknesses presented in Table 11.1 are based on the results from exploratory works undertaken on the proposal site in 2009.

Table 11.1. Geological Sequence

Age	Unit / Formation	Description[1]	Typical Thickness on Site (m) (Depth, mBGL)
Recent	Made Ground	Brown grey gravelly sands and clays with	0.45 – 4.6

		frequent infill materials including bricks, plastics, and wood. Peat and gravels of coal dust, ash and clinker present in places.	(0.9 – 4.6)
	Alluvium	Grey brown orange mottled firm to stiff clay.	3.2 – 3.55 (7.0 -7.4)
Eocene	London Clay Formation (part of Thames Group)	Stiff grey clay with sand bands at depth.	Maximum of 4.9 (7.0 – 14.0)
Palaeocene	Woolwich & Reading Beds (Lambeth Group)	Glauconitic sands at base overlain by grey clays and sands with brackish fauna and interleaved red and variegated clays and sands	Not Proven (> 14.0)
	Thanet Sand Formation	Pale yellow-brown, fine-grained sand that can be clayey and glauconitic.	Not Proven
Cretaceous	Chalk	Pure, white microporous limestone.	Not Encountered

1 Where site-specific data is not available lithological descriptions are taken from BGS Lexicon of Named Rock Units (http://www.bgs.ac.uk/Lexicon)

11.4.8 Made Ground was encountered across the whole site to depths of 0.9mBGL to 4.6mBGL. The Made Ground comprises brown and grey gravelly sands and clays with frequent infill materials including bricks, concrete, plastics, and wood. These infill materials were more commonly found in locations within the northern and western site areas (e.g. Trial Pits TP10, TP11 and TP13). Ash and clinker were also identified. In the far south of the site underneath the hard standing area, gravels cobbles and coal residues were encountered. This comprised a thick layer of 1.9m beneath hardstanding in trial pit TP6, and a thinner layer between 0.75 mBGL and 1.2 mBGL in borehole WS4. Coal residues in Made Ground relate to historical stockpiling on the site and subsequent conveyance to the main industrial site to the east.

11.4.9 The Made Ground was generally underlain by a typically grey brown orange mottled firm to stiff clays, presumed to be estuarine alluvium. These deposits were sandy, gravelly and friable in places, and were generally encountered to a depth of 7.0 mBGL to 7.4 mBGL.

11.4.10 London Clay was identified in all deep boreholes and was generally stiff and grey in nature with occasional sands, and sand bands present at depth. This low permeability clay unit is present to a depth of 14.0mbGL and is underlain by a dense grey slightly silty sand presumed to be the Woolwich & Reading Beds and possibly the Thanet Sands. The base of this granular unit was not intercepted. Between 4.0m and 9.4m of low permeability clays were identified between the base of the Made Ground and underlying Woolwich & Reading Beds.

Hydrogeology

11.4.11 The London Clay and alluvial clay that underlie the site are classified as 'unproductive' units (EA, 2003) that can be considered non-aquifers. Shallow groundwater was identified in three trial pits and one borehole constructed on the site and appeared to be clean with no evidence of an oily sheen or colouring. Groundwater was also identified in five of the eight window samples completed at shallow depth (principally within the Made Ground), with a groundwater elevation of between 2.39mAOD (WS5) and 5.79mAOD (WS4). Shallow deposits on the site are therefore characterised by a localised and laterally discontinuous water body perched on the underlying low permeability clay deposits, with levels that generally decline to the east towards The Swale.

11.4.12 Groundwater is present in the granular deposits (Woolwich and Reading Beds) that underlie the London Clay Formation, with an elevation of between 1.46mAOD (BH3) and 1.74mAOD (BH2). This suggests that groundwater contained in these granular deposits is confined by the overlying clays, with a shallow gradient orientated towards The Swale in the east. Groundwater levels in the Woolwich and Reading Beds are thought to be subject to tidal fluctuations, complicating the interpretation of spot level measurements. Groundwater levels within the shallow, near-surface deposits (where present) are greater than the groundwater levels observed in the underlying Woolwich & Reading Beds. This suggests a downward potential for groundwater flow from the Made Ground to the underlying granular deposits. However, vertical flow the intervening London Clay and alluvium is unlikely to be a significant transport pathway owing to their low permeability. Lateral groundwater flow will therefore dominate in the Made Ground, where saturated higher permeability pathways are present.

11.4.13 The principal receptor of laterally flowing groundwater in the shallow Made Ground or deeper aquifer unit is The Swale. This tidal estuary is of high ecological value being designated as a Special Protection Area (SPA) under the EC Birds Directive (74/409/EEC) and Site of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981 (as amended). Groundwater will be discharged to The Swale directly by bank-side seepage or indirectly by seepage into surface drainage channels at low elevations.

11.4.14 The site does not lie within a groundwater Source Protection Zone (SPZ) and no groundwater abstractions are identified in the vicinity of the proposed site. No designated or ecologically sensitive groundwater dependent receptors have been identified down-gradient of the site.

11.4.15 Chloride concentrations measured in groundwater range from 130mg/l (Borehole WS1) to 800mg/l (Borehole WS7) suggesting fresh to brackish groundwater in both shallow and deep boreholes, which is consistent with the estuarine location of the site. Sulphate concentrations also range from 480mg/l (BH3) and 1,700mg/l (BH1), with the exception of WS7 where a sulphate concentration 80 mg/l was measured. Again this attests to largely non-potable

nature of shallow perched groundwater and deeper confined groundwater encountered on the site.

Baseline Assessments

Human Health Assessment of Pre-existing Contamination in Soils

11.4.16 The Made Ground was encountered as ashy sand in Trial Pits TP9, TP11, TP12 and boreholes BH1 and WS1. Clinker was encountered at a number of locations including Trial Pits TP4 and TP9, boreholes WS1, WS5 and WS7 within the top 4m in the central and southern site areas. These layers occasionally exhibited a slight hydrocarbon odour. Sand, silt and gravel sized fragments of coal were encountered in the south of the site. There was little olfactory evidence of soil contamination by volatile compounds, with all measurements by a Photo-Ionisation Detector (PID) of below 5 parts per million (ppm).

11.4.17 Between twenty-four and forty soil samples were subject to laboratory analysis for a targeted suite of parameters in 2009. The analytical results and detailed soil assessment is presented in the Phase 2 Report provided in Appendix 11.3 and summarised below.

11.4.18 The highest concentrations of inorganic and organic determinands were typically within shallow Made Ground in the north and east of the site. Hotspots of organic determinants, most notably Polycyclic Aromatic Hydrocarbons (PAH) (Max. concentration of 400mg/kg in WS7) and Total Petroleum Hydrocarbons (TPH) (Max. concentration of 2300mg/kg in TP9) have been identified. Elevated concentrations of metals, most notably copper, lead and zinc, have also been identified. Although elevated, the soil concentrations observed do not exceed respective Soil Guideline Values (SGV) or human health Generic Assessment Criteria (GAC) for an industrial / commercial end land use. This suggests that shallow soils on the site represent little risk to future site users for an industrial / commercial end land use.

11.4.19 Six soil samples were analysed for presence of asbestos, with asbestos being identified in one (WS8, 0.8 mBGL – 1.2 mBGL). The asbestos was identified as amosite (brown) asbestos. The source of the asbestos could not be confirmed by the laboratories although a gauze type material was identified within soils at this location which could have potentially been the source. Additional investigation works to further characterise the nature and distribution of asbestos contamination within soils shall be undertaken before development of the site to determine the potential risk to the health of construction works.

Controlled Water (Groundwater) Assessment

11.4.20 Nine groundwater samples were subject to laboratory analysis for a targeted suite of parameters in 2009. The analytical results and detailed groundwater assessment is

presented in the Phase 2 Report provided in Appendix 11.3 and summarised in Table 11.2 below.

Table 11.2. Baseline Assessment of Groundwater Quality

Parameter[1]	Detection Limit (µg/l)	No. Samples	Maximum Concentration (µg/l)		Saline EQS	No. Samples Above EQS	UK DWS	No. Samples above UK DWS
Copper	1.6	9	30	WS3	15	4	2000	0
Chromium	1	9	11	WS7	5	3	50	0
Nickel	1.5	9	63	WS5	30	3	50	4
Selenium	1	9	14	WS7	-	-	10	1
Sulphate	3	9	1700	BH1	400	8	250	8
TPH (C6 – C40)	10	9	3300	WS3	-	-	10	1
B(a)P	0.009	9	1.5	WS3	0.7[2]	1	0.01	3
PAHs	0.1	9	12	WS3	-	-	0.1	5

1 TPH denotes Total Petroleum hydrocarbons; B(a)P denotes Benzo(a)pyrene; and PAH denotes polycyclic Aromatic Hydrocarbons.

2 WHO Standard for Drinking Water.

11.4.21 Elevated concentrations of nickel, selenium, sulphate, TPH and PAHs have been identified on the proposal site. The majority of concentrations that exceed either the EQS for saline waters or the UK DWS were identified in shallow perched groundwater within Made Ground and alluvium. Concentrations above any AC occur infrequently in groundwater from the underlying granular aquifer and is principally restricted to nickel and sulphate. It is considered that these elevated concentrations may represent natural baseline variability as opposed to the impact of near surface contamination.

11.4.22 Groundwater quality data currently available for the site provides no evidence for the active migration of leachate from the adjacent closed landfill on to the proposal site.

Ground Gas Assessment

11.4.23 From the initial two rounds of ground gas monitoring, concentrations of ground gas are generally low with methane concentrations rarely above 0%. However one concentration of carbon dioxide was measured above current guidance levels for the assessment of soil gases (Waste Management Paper 27 (Department of the Environment, 1991) and Building Regulations 2000 (Statutory Instrument No. 2531, 2001)) at Borehole WS3 (5.5%). There was little olfactory evidence of soil contamination by volatile compounds, with measurements by a PID that range from 0ppm to 5ppm across the site.

11.4.24 Baseline monitoring data available to date indicates a low risk from ground gas on the site. However, further gas monitoring and gas assessment will be undertaken in accordance with CIRIA C665 (CIRIA, 2007) to confirm this assessment prior to construction. This will confirm

any risks to human health and buildings, and inform the detailed design on the requirement or otherwise for ground gas protection measures to be incorporated, which can include:

- Reinforced concrete cast in situ floor slab (suspended, non suspended or raft) with at least 1200 gDPM2;
- Beam and block or pre cast concrete slab and minimum 2000 gDPM/reinforced gas membranes;
- Possible under-floor venting or pressurisation in combination with the above depending on use; and
- All joints and penetrations sealed, with minimum 2000 g/reinforced gas proof membrane and passively vented under floor subspace with monitoring facility.

11.4.25 Gas data currently available for the site provides no evidence for the active migration of landfill gases from he adjacent closed landfill on to the proposal site.

Conceptual Site Model (CSM)

11.4.26 In accordance with current UK guidance (Environment Agency 2005 and 2006a) the CSM for a contaminated site is best described in terms of Source-Pathway-Receptor (Pollutant Linkages). Potential sources of pre-existing contamination identified on site include the localised occurrence of inorganic and organic contaminants within Made Ground which include hotspots of inorganic determinants, PAH and TPH and brown asbestos (amosite) within Made Ground at a single location (WS8). Currently unknown areas of pre-exiting contamination may also reside in Made Ground on site. The closed landfill site to the south of the proposal site also represents a potential source of leachate and/or gas contamination that could potentially affect the proposal site.

11.4.27 The principal receptors identified on site include:

- Ground workers / construction staff;
- Site end users (e.g. staff and visitors to site);
- Shallow perched groundwater in the Made Ground and alluvium;
- Deep groundwater in granular deposits (Woolwich & Reading Beds and Thanet Sands) confined by the overlying London Clay; and
- The Swale Estuary.

11.4.28 The principal pathways identified on site include:

- Contact, inhalation and/or digestion of shallow soil contamination during construction works;
- Contact, inhalation and/or digestion with contaminated groundwater during construction works;

- Lateral flow of shallow groundwater, principally through the Made Ground and direct seepage to The Swale, east of the site;
- Lateral flow of shallow groundwater, principally through the Made Ground and direct seepage to drainage ditches (pre-existing or new) that discharge to The Swale;
- Vertical transfer of contaminated perched groundwater to the underlying confined groundwater through the London Clay and/or new pathways created during construction; and
- Lateral flow of confined deep groundwater in Woolwich and Reading Beds and seepage to the Swale.
- Lateral transfer of landfill gas and/or leachate from the closed landfill site to the south on to the proposal site by migration through shallow deposits and /or deeper groundwater.

11.5 Incorporated Enhancement and Mitigation

Construction Phase

11.5.1 All construction works shall be undertaken under the control of a Construction Environmental Management Plan (CEMP) produced by, or on behalf of, EON and to include all mitigations stated below. The CEMP shall ensure that all relevant national guidance and current UK best practice is adhered to. This shall include, but not be restricted to the following:

- BS5930: 1999 Code of practice for site investigations;
- BS10175: Investigation of potentially contaminated land. Code of practice;
- Pollution Prevention Guideline 6: Working at demolition and construction sites;
- Pollution Prevention Guideline 8: Safe Storage and Disposal of Fuel Oils;
- Groundwater Protection: Policy and Practice (GP3) (Environment Agency);
- CIRIA 132: A guide for safe working on contaminated sites; and
- CIRIA 73: Role and responsibility in site investigation.

11.5.2 During construction dust generation will be minimised by covering or damping down of dusty surfaces during dry weather and wheel washing of vehicles exiting the site. To alleviate the potential impact from accidental fuel and chemical spills, potentially hazardous substances will be stored within bunded and/or drip trays situated away from any surface water drainage present on the site. The CEMP will include appropriate site-specific method statements for the works which would cover storage and use of chemicals and fuels during construction. Emergency procedures will include the use of spill kits and booms to deal with fuel and chemical spillages in accordance with regulatory guidance (e.g. Environment Agency pollution prevention guidelines).

11.5.3 Precautionary measures will be put in place to protect construction workers involved in earthworks, by way of an earthworks methodology / construction management plan part of the CEMP. This plan will be designed to mitigate risks relating to the disturbance of residual soil or groundwater contamination, identification removal and validation of contamination hotspots and all statutory requirements associated with the earthworks such as discharge consents spoil generation handling and where appropriate off site disposal where required. This plan will also include the groundwater management plan referred to earlier. Appropriate PPE will be worn at all times during excavation and/or handling excavated soils.

11.5.4 The CEMP will include the Remedial Strategy and Materials Management Plan, the results/recommendations from the piling Risk Assessment and the findings of the full ground gas assessment.

Operation Phase

11.5.5 Regular inspection of tanks, bunds, hardstanding and subsurface structures (e.g. pipe-work, drains etc) will be undertaken in order to assess ongoing integrity of all pollution prevention features included in the facility design. Inspections will be undertaken by qualified personnel on a regular basis and compiled into a monitoring report and submitted to the EA on an agreed basis as part of the Environmental Permitting (EP) regime. The storage and use of potentially polluting substances stored on site will be audited. Any refuelling activities will be undertaken on areas of hard-standing with spill kits available to enable a quick and effective response to any spillages.

11.6 Identification and Evaluation of Likely Significant Effects

Construction Phase

11.6.1 Significant excavations are proposed on parts of the site, most notably in the vicinity of the fuel storage bunkers where a Finished Floor Level (FFL) of -1.2mAOD is proposed. This implies a maximum excavation depth of approximately 7.2m in central parts of the site. Elsewhere, the proposed FFL is approximately 5.8mAOD, which will require minor excavations in the west and south-west of the site, with additional fill to raise ground levels in the east and south-east towards The Swale.

11.6.2 Only limited evidence of soil contamination has been identified across the proposal site. The short-term exposure of construction workers to soils excavated and transported during construction represents a risk to human health of ***minor adverse*** significance. These adverse effects can be mitigated by adopting standard PPE and personal hygiene protocols (implemented through the CEMP) and the derivation of remedial target concentrations for key contaminants through a site-specific Quantified Risk Assessment (QRA) for Human Health.

Remedial targets shall be presented in a Site Remedial Strategy and Materials Management Plan to be included in the CEMP. This plan will also provide contingency plans for dealing with any currently unknown source of soil contamination that may be encountered on the site during construction.

11.6.3 Some asbestos contamination has been identified in soils on the site and the significance of the risk to human health posed by asbestos on the site is currently considered to be ***minor adverse***. The risk to construction workers shall be re-evaluated following further characterisation of the extent of asbestos contamination in the vicinity of WS8 undertaken prior to the development of the proposal site. Appropriate handling and disposal methods will be determined following these works and included in the CEMP if required.

11.6.4 Little groundwater is expected to be encountered in the shallow excavations required over the site. Although groundwater in the shallow aquifer is generally non-potable, exposure to this water does not represent a significant risk to the health of construction workers assuming appropriate personal hygiene protocols and PPE are used during construction, as specified in the CEMP. The risk to human health from exposure to groundwater is considered to be of **minor adverse** significance.

11.6.5 Groundwater quality in the shallow aquifer exceeds saltwater EQS for a number of parameters. However, the discharge of shallow groundwater to The Swale (either directly or via seepage into surface drains) is considered to represent a low risk to water quality in The Swale considering: the discontinuous occurrence of shallow groundwater on the Site; the complexity of the existing pathways to The Swale; and diffuse discharge mechanisms that would be involved. The significance of such an impact is therefore considered to be ***minor adverse***. Furthermore, the proposed land raise along the eastern part of the proposal site and the construction of the new drainage systems in this area is likely to minimise the potential impact from pre-existing pathways between shallow perched water and The Swale.

11.6.6 The granular deposits underlying the London Clay (i.e. Woolwich and Reading Beds) may be intercepted in the areas of deepest excavation proposed on the site. In the absence of appropriate control measures, the ingress of groundwater into deep excavations represents a risk to construction workers of ***moderate adverse*** significance. Although groundwater levels in the deep aquifer are low (c. 1.2 mAOD) appropriate groundwater management precautions may be required and these will include, where appropriate, aquifer dewatering to lower confined water pressures, use of sheet piling to support the excavation and/or sump pumping to control groundwater ingress. A groundwater control and management plan will therefore be produced by a suitably qualified specialist following further investigation works undertaken on

the site to inform the SEP design. The groundwater control and management plan shall be included within the CEMP.

11.6.7 The uncontrolled discharge of potentially contaminated groundwater to the surface water drainage system may result in an adverse impact on surface water features and ultimately The Swale. This risk shall be mitigated by the analysis of extracted groundwater and adoption of the appropriate discharge arrangements which will be specified in the CEMP prior to construction. On the basis of the groundwater quality identified on the site, any discharge of groundwater shall be controlled by a discharge consent issued by the Environment Agency or the appropriate authorisation from the local Water Company if discharge is to be to the foul sewer system. Alternatively arrangements for off-site disposal may be required, although this is considered unlikely.

11.6.8 Temporary groundwater control and/or dewatering would locally reduce groundwater levels in the deep confined aquifer on the site. This will result in a temporary reduction in the flux of groundwater flow towards The Swale. In the absence of any groundwater dependent receptors down gradient of the site (e.g. abstractions, wetlands, rivers and springs) the significance of this temporary impact on controlled waters is ***neutral***.

11.6.9 The concentration of potentially hazardous ground gases (i.e. carbon dioxide, methane and VOCs) identified on site is generally low. The significance of the risk from ground gas across the site currently therefore appears to be ***neutral***. However the monitoring dataset is limited and additional gas monitoring and assessment will be completed prior to the construction phase. The gas risk assessment will confirm the level of risk to future site users and will inform whether gas protection measures are required as part of detailed design.

11.6.10 Data currently available for the site provides no evidence of the active migration of landfill gases or leachate from the adjacent closed landfill on to the Proposal Site. The risk posed to construction works during construction as a result of such lateral migration is therefore considered to be of ***minor adverse*** significance. This risk will be mitigated through the procedures and PPE specified in the CEMP.

11.6.11 Deep excavations in the vicinity of fuel storage bunkers and potential use of pile foundations may open new preferential pathways for contamination transport from the surface and/or near surface. This may result in a deterioration of water quality in deep groundwater by accidental spillages during construction and or leakage of shallow perched groundwater. The significance of this impact on groundwater is considered to be ***minor adverse*** but is unlikely to affect any other controlled waters or groundwater dependent environmental receptors.

These effects will be mitigated through the production of the piling risk assessment that will inform design and the CEMP.

11.6.12 Dust and silt may be disturbed by the excavation and movement of soils by machinery during construction. If left uncontrolled this could result in the silting-up of the local drainage systems and possible emission to The Swale. Such an impact is considered to be of ***minor adverse*** significance and will be controlled by the management of surface run-off during construction and damping down during dry weather. Both measures will be specified in the CEMP.

11.6.13 During construction there is potential for the accidental spillage of hazardous substance from vehicles, plant and the storage of materials on the site. The magnitude of the impact due to accidental spillage of fuels from construction vehicles is dependent on the frequency and size of the spillage. Depending on the size of such an event, it is considered that the impact of a fuel or chemical spillage would be of ***neutral*** to ***minor adverse*** significance considering the presence of low permeability deposits overlying the deeper aquifer unit. The potential for an accidental release of hazardous substances will be minimised through the CEMP, by specific protocols regarding the designation of bunded storage areas on the site, restriction of refuelling to specified areas on the site, the control / handling / use of hazardous substances on the site and the availability of spill kits.

Operation Phase

11.6.14 Based on soil assessments undertaken to date the potential impact from current soil conditions identified on site on human health of future site users is considered to be of ***neutral*** significance. This appraisal will be confirmed by the screening of excavated soils against site specific AC determined from a QRA for human health to determine appropriate end-use.

11.6.15 The floor slabs and raft or pad foundations proposed for many structures included in the design (See Chapter 4), most notably in the area of where ground levels must be raised above the surrounding flood plain in the east of the site, is likely to involve the use of an imported, clean and largely granular sub-base. This could promote lateral transfer of shallow perched groundwater towards The Swale. However, significant flow is not anticipated owing to the construction of largely impermeable surface cover over the majority of the site and the use of clean materials is likely to attenuate contamination concentrations along an easterly flow path beneath the site and towards The Swale. Thus the potential significance of the impact of shallow groundwater on the quality in The Swale and/or new sustainable urban drainage (SUDs) features on the site is therefore considered ***neutral***.

11.6.16 Piled foundation, where used, and deep structures associated with the development may intercept deeper groundwater in the Woolwich and Reading Beds underlying the site. Although this may result in a small alteration to natural groundwater levels and flow, it is unlikely to adversely affect any groundwater dependant receptors and the significance of this impact therefore considered to be ***neutral***. These structures may create new pathways between the shallow perched groundwater and deeper groundwater, although these will be mitigated through a piling risk assessment. The significance of this impact on deep groundwater quality is therefore considered to be ***minor adverse***.

11.6.17 The geological site setting suggests that the lateral migration landfill gases from the closed landfill site to the south on to the Proposal Site is unlikely to pose a significant risk to future users on the site. Furthermore, the continued post-closure peripheral gas monitoring on this closed facility (see Section 11.4.3) should identify any risk from gas emissions should they arise in the future. The significance of the impact of landfill gas ingress from the adjacent site is therefore considered to be ***minor adverse***.

11.6.18 The storage, handling, transport and disposal of these materials may potentially contaminate soils and shallow groundwater on the site. Waste materials and ash will be dry, contained in closed facilities and removed from site by HGV. The potential impact of these sources of contamination on soil and groundwater is therefore considered ***minor adverse***. This impact will be mitigated through requirements of the EP regime for the site.

11.7 Mitigation

Construction Phase

11.7.1 A groundwater management plan will be developed for site to minimise risks associated with intercepting the confined deep aquifer and resulting groundwater ingress. This plan will identify all groundwater control measures required (i.e. aquifer dewatering and/or sheet piling and sump pumping) and will include a plan regarding the handling, storage and disposal of groundwater encountered on site following UK best practice.

11.7.2 A piling risk assessment will be produced prior to construction.

11.8 Residual Impact

11.8.1 Residual impacts, following the implementation of all mitigation measures are summarised in Table 11.3.

Resource	Phase	Residual Effect (Additional Mitigation Measure)	Sensitivity of Receptor	Magnitude of Impact	Duration	Significance	Geographical Level of Importance of Issue				
							I	N	R	D	L
Hydrogeology, Controlled Waters and Human Health	Construction	Inhalation, dermal contact or ingestion of contaminated soils during excavation and / or movement	High	Minor	Short Term	Minor Adverse					✓
		Inhalation, dermal contact or ingestion of contaminated groundwater during shallow excavation and / or movement	High	Minor	Short Term	Minor Adverse					✓
		Inhalation, dermal contact or ingestion of asbestos (further SI to characterise extent)	High	Minor	Short Term	Minor Adverse					✓
		Ingress of groundwater into deep foundation excavations (Groundwater Management Plan)	High	Minor	Short Term	Minor Adverse					✓
		Lateral transport of contaminated shallow perched groundwater to The Swale.	Medium	Minor	Medium Term	Minor Adverse					✓
		Vertical transport of contaminated shallow perched groundwater to deep groundwater.	Low	Minor	Medium Term	Neutral					✓
		Groundwater level and flow reduction resulting from dewatering and/or control	Low	Minor	Short Term	Neutral					✓
		Explosion and/or asphyxia by ground gas during excavation	High	Negligible	Short Term	Neutral					✓
		Accidental Spillage of potentially contaminating substances	Low	Minor	Short Term	Neutral					✓
	Operation	Inhalation, dermal contact or ingestion of contaminated soils as a result of exposure and/or re-use on the site. (Site-specific QRA?)	High	Negligible	Medium Term	Neutral					✓
		Explosion and/or asphyxia by ground gas.	High	Negligible	Medium Term	Neutral					✓
		Impacts form accidental spillage and or leakages from vehicles and/or stored substances	Medium	Minor	Medium Term	Minor Adverse					✓
		Reduced groundwater quality in deep aquifer resulting from construction pile foundations	Low	Minor	Medium Term	Minor Adverse					✓
		Lateral transport of contaminated shallow perched groundwater to The Swale through preferential pathway created by granular sub-base.	Medium	Minor	Medium Term	Minor Adverse					✓
		Impact on levels and flow directions in deep aquifer by construction of deep foundations and/or piled foundations	Low	Minor	Long Term	Neutral					✓

Key: I: International N: National R: Regional D: District L: Local

11.9 Conclusions

11.9.1 An assessment of the likely impact of current ground conditions and the Sustainable Energy Plant (SEP) may have on hydrogeology, controlled waters and human health has been undertaken for the proposed Sustainable Energy Plant at Kemsley Mill, Sittingbourne, Kent. The site is situated on low lying land immediately adjacent to The Swale estuary and a closed landfill site to the south. The site was the location of former coal storage and a refuse tip. The site is now largely derelict with some stockpiled material in the west. It is assumed that all stockpiled material will be removed before construction and is not therefore included in this assessment.

11.9.2 This assessment has been based on a review of historical documents available at the time of writing and the results of Phase 2 intrusive works undertaken by RPS in 2009. The largely qualitative risk assessments referred to in this chapter are contained in the interpretive report presented in Appendix 11.3.

11.9.3 The site is characterised by a veneer of Made Ground and alluvial clays that overlie the London Clay, with silty sands of the Woolwich and Reading Beds beneath. A laterally discontinuous perched water body has been identified at shallow depth, with continuous saturated conditions identified in the underlying granular deposits. The London Clay is thought to effectively separate shallow perched groundwater form water in the granular deposits at depth. Groundwater flow in both water bodies is therefore orientated to the east towards The Swale. Groundwater will ultimately be discharged to The Swale either directly (through intervening estuarine muds) or indirectly (through existing drainage features on the site) although this flux will be quantitatively trivial. The Swale is an ecologically important site, with SPA and SSSI designation.

11.9.4 Pre-existing soil contamination, principally dominated by TPH and PAH, has been identified in shallow deposits on the site. However baseline assessments suggest the concentrations are acceptable for industrial / commercial end land use and do not represent an unacceptable risk to construction workers. Brown asbestos has been identified at one locality on the site and additional characterisation investigations will be undertaken before construction.

11.9.5 Shallow groundwater demonstrates elevated concentrations of nickel, selenium, sulphate, TPH and PAHs relative to saltwater EQS at a number of localities.

11.9.6 Shallow waters are more heavily contaminated than deep groundwater, the latter exhibiting elevated concentrations of only nickel and sulphate. It is considered that these elevated concentrations may represent natural baseline variability as opposed to the impact of near surface contamination.

11.9.7 The principal concerns relating to the development include the risk to human health caused by groundwater ingress to deep excavations, the lateral migration of contaminated shallow groundwater towards The Swale and asbestos containing materials identified in shallow soils. By undertaking some additional targeted works and associated assessment, in addition to the production of a robust Construction Environmental Management Plan (CEMP) for the development, all potential impacts that may result from the development have been reduced to ***neutral*** or ***minor adverse*** significance. Additional works will include intrusive investigation to inform design and asbestos presence on the site; additional gas monitoring in line with CIRIA C665 (CIRIA, 2007); the production of groundwater management plan and piling risk assessment; and the production of QRA for human health and controlled waters.

11.10 References

Construction Industry Research and Information Association (CIRIA). 2007. Assessing risks posed by hazardous ground gases to buildings. Report C665.

Department of the Environment. 1991. Waste Management Paper 27: Landfill Gas – A technical memorandum providing guidance on the monitoring and control of landfill gas, 2nd Edition, 1991.

Environment Agency. 2006b. Pollution Prevention Guideline 8: Safe Storage and Disposal of Fuel Oils. Bristol: Environment Agency

Environment Agency. 2005. Model Procedures for the Management of Land Contamination. Contaminated Land Report 11 (CLR11). Bristol: Environment Agency, September 2005

Environment Agency. 2006a. Remedial Targets Methodology - Hydrogeological Risk Assessments for Land Contamination. Report Reference: GEHO0706BLEQ-E-E, Bristol: Environment Agency, October 2006

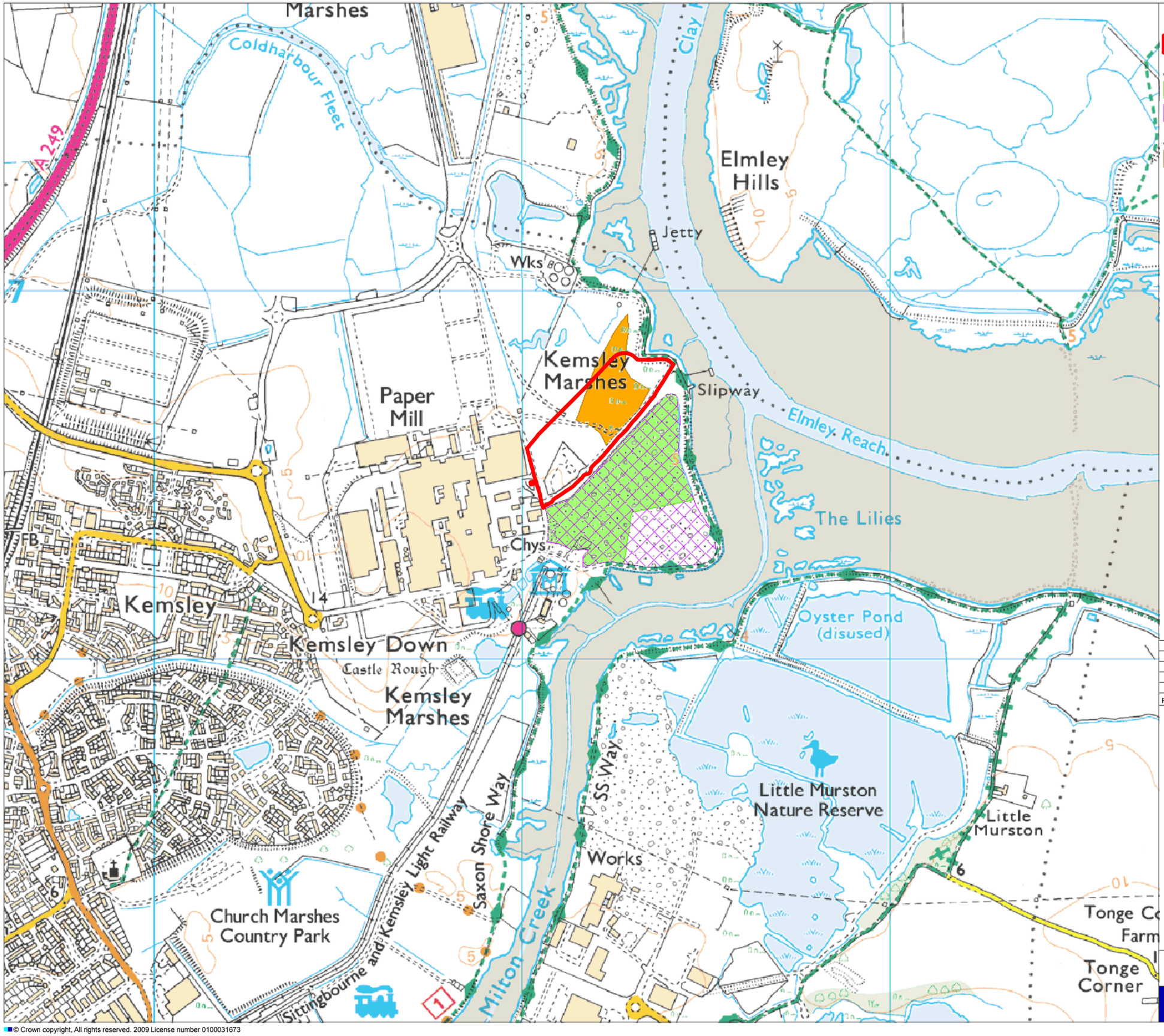
RPS Planning and Development 2009b. Phase 2 Intrusive Site Investigation, Kemsley Paper Mill, Sittingbourne, Kent. Report Ref. JER4418 R 090909 AP, September 2009.

PRS Planning and Development/ 2009a. Phase 1 Environmental Site Assessment, Kemsley Mill, Sittingbourne, Kent. Report Ref. JER3773 R 090318 LW, March 2009.

Statutory Instrument No. 2531. 2000. Building and Buildings England and Wales, The Building Regulations 2000, Crown Copyright 2000.

11.11 Glossary

AC	Assessment Criteria
B(a)P	Benzo(a)pyrene
BGS	British Geological Survey
CEMP	Construction Environmental Management Plan
CHP	Combined Heat Power Station
CSM	Conceptual Site Model
DWS	Drinking Water Standard
EA	Environment Agency
EP	Environmental Permitting
EQS	Environmental Quality Standard
GAC	Generic Assessment Criteria
mAOD	Metres Above Ordnance Datum
mbGL	Metres Below Ground Level
PAH	Polycyclic Aromatic Hydrocarbons
PID	Photo-Ionisation Detector
PPE	Personal Protective Equipment
ppm	Parts Per Million
QRA	Quantified Risk Assessment
SBC	Swale Borough Council
SGV	Soil Guideline Value
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SUD	Sustainable Urban Drainage
TPH	Total Petroleum hydrocarbons
VOC	Volatile Organic Compounds



Legend

Site Boundary

Grovehurst Energy Limited

Licensed Waste Management Facility

Registered Landfill Site (P/05/63)

Kemsley Mill

Historic Landfill

E.ON STREGIS

Rev:	Date:	Amendment:	Name:	Checked:
-	07/12/09	Revised Redline Boundary	RJ	MW

Data Source: RPS 2009

Status: FINAL

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Client: E.ON

Project: Kemsley Mill

Title: Baseline Environmental Setting

Scale: A3 @ 1:10,000

0 250 500m

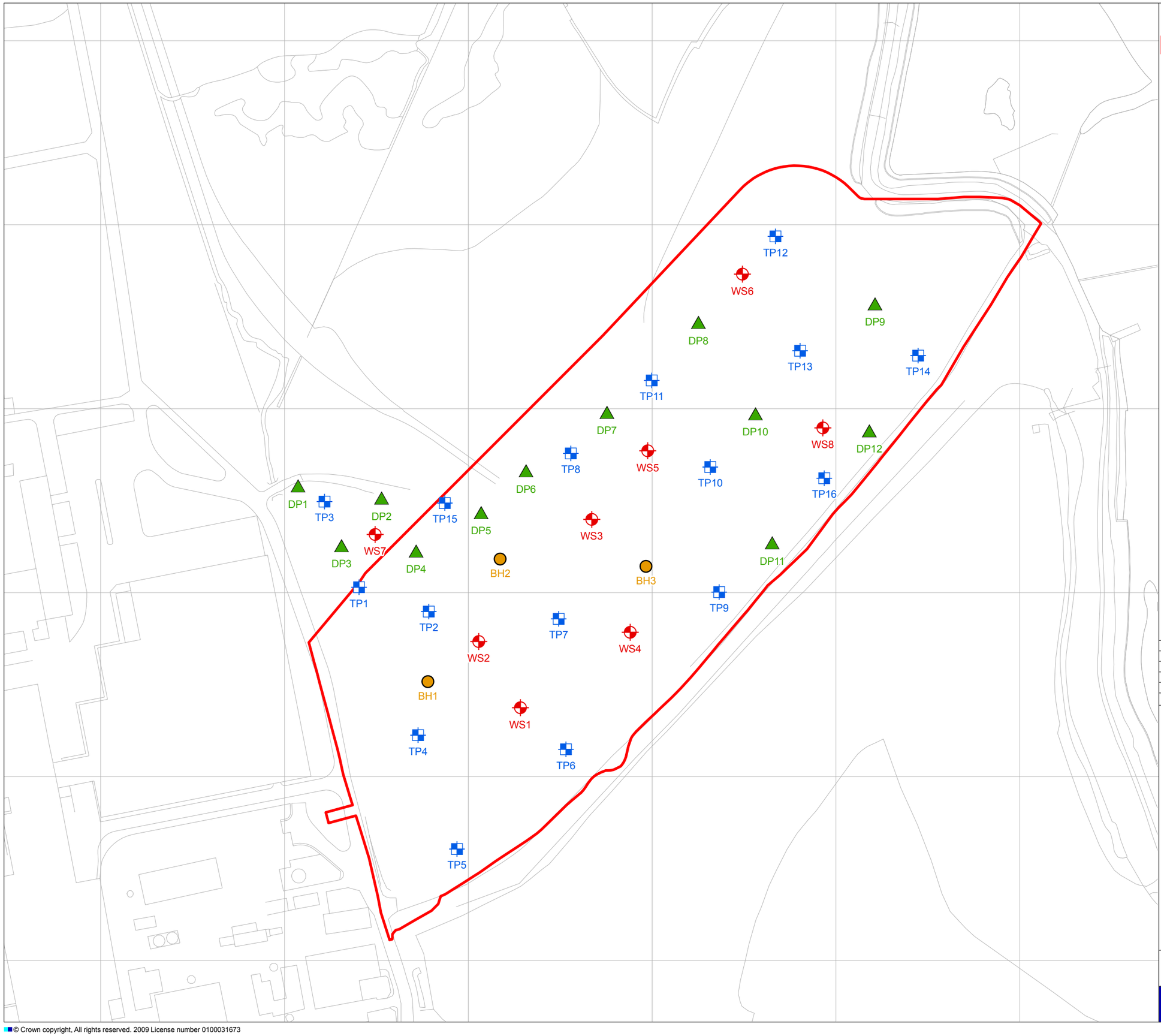
N

Date: 18/11/2009 Datum: OSGB36 Projection: BNG

Drawn: RJ Checked: AG Job Ref: JER4418

Figure No: **11.1** Revision: -

Project Ref: J:\Drawings\JER4418



Legend

- Site Boundary

Investigation Locations

- Shell & Auger (3)
- Trial Pit (16)
- Window Sample (8)
- Dynamic Cone Penetrometer (12)

Rev:	Date:	Amendment:	Name:	Checked:
-	07/12/09	Revised Redline Boundary	RJ	MW

Data Source: RPS 2009

Status: FINAL

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Client: E.ON

Project: Kemsley Mill

Title: Intrusive Investigation Location Plan

Scale: A3 @ 1:2,000

0 50 100m

N

Date: 18/11/2009 Datum: OSGB36 Projection: BNG

Drawn: RJ Checked: AG Job Ref: JER4418

Figure No: **11.2** Revision: -

Project Ref: J:\Drawings\JER4418

DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL,

ST REGIS PAPER COMPANY LIMITED & E.ON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

Chapter 12:

NOISE AND VIBRATION

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Appendix 12.5: Operational Noise Model Assessment

12 Noise and Vibration

12.1 Introduction

12.1.1 This chapter of the ES assesses the likely significant noise and vibration effects associated with the construction and operation of the Proposed Development and is supported by Appendices 12.1 to 12.5.

12.1.2 The chapter describes the assessment methodology; the baseline conditions currently existing at the potentially affected noise and vibration sensitive receptors; the likely significance of noise and vibration effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects and the likely residual effects after these mitigation measures have been employed.

12.2 Legislation and Policy Context

12.2.1 A detailed review of the Development Plan documents and planning context in relation to the development proposals is provided in Chapter 3. This section summarises those policies that are directly relevant to noise and vibration issues. A summary of relevant British Standards (BS) and guidance that have been used to inform the assessment is provided in Appendix 12.1.

National Policy and Legislation

Planning Policy Guidance 24 (PPG 24) – Planning and Noise

12.2.2 Sections 19 and 20 of Annex 3 of Planning Policy Guidance Note 24: Planning and Noise (PPG 24) [1] cite the use of British Standard 4142 'Method for Rating industrial noise affecting mixed residential and industrial areas' (BS 4142) [2] to assess noise from industrial and commercial developments. The Standard provides a method for rating industrial noise affecting mixed residential and industrial areas and has been extensively used by local authorities and consultants to rate noise from fixed installations, such as plant noise. Paragraph 19 of PPG 24 states the following:

'The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are taken into account by the 'rating level' defined in BS 4142. This 'rating level' should be used when stipulating the level of noise than can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new

development (expressed in terms of the rating level) and the existing background noise. The Standard states that: 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance.' Since background noise levels vary throughout the a 24 hour period it has been necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the project. Similar considerations apply to developments that would emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987, and guidance on the control of noise from surface mineral workings can be found in MPG 11.'

(Note that BS4142:1009 has been superseded by BS4142:1997, BS 8233: 1987 has been superseded by BS 8233: 1999 [3] and MPG 11 has been superseded by MPS 2 [4] in England)

British Standard 4142 'Method for Rating industrial noise affecting mixed residential and industrial areas' (BS 4142)

12.2.3 BS 4142 advocates the use of L_{Aeq}. The L_{Aeq} is either measured or calculated at a receptor location and this is termed the 'specific noise level'. The specific noise level may then be corrected for the character of the noise, if appropriate, and it is then termed the 'rating level'. A correction of +5 dB is made if the noise contains any discrete tones e.g. hums or whistles, any impulsive characteristics such as crashes, bangs or thumps or if the noise is irregular enough in character to attract attention.

12.2.4 When used to rate the likelihood of complaints, the rating level is determined and the L_{A90} background noise level is subtracted from it. Where positive differences occur, the greater the difference between the two levels, the greater the likelihood of complaints. Where negative differences occur, the greater the difference between the two levels, the lesser the likelihood of complaints. A difference of around +10 dB or higher indicates that complaints are likely; a difference of around +5 dB is of marginal significance; and a difference of -10 dB is a positive indication that complaints are unlikely.

12.2.5 BS 4142 requires a 'representative background noise level' to be adopted for the assessment. There is no Government or BS guidance that states what is considered to constitute 'representative' and the night-time period is particularly difficult as it can be subject to a wide variation in noise level between the shoulder night periods.

IPPC Sector Guidance Note – Combustion Activities

12.2.6 As of 6th April 2008, the Waste Management Licensing Regulations and the Pollution Prevention and Control (PPC) Regulations were replaced by the Environmental Permitting

Regulations 2007. However, the Integrated Pollution Prevention and Control (IPPC) Sector Guidance Notes remain current. The IPPC Technical Guidance Note for the Combustion Sector, S5.01 [5] contains the following advice with regard to noise and vibration:

'Indicative BAT requirements for noise and vibration

Describe the main sources of noise and vibration (including infrequent sources), the nearest noise-sensitive locations and relevant environmental surveys which have been undertaken, and the techniques and measures used for the control of noise.

The Operator should employ basic good practice measures for the control of noise, including adequate maintenance of any parts of plant or equipment whose deterioration may give rise to increases in noise (for example, bearings, air handling plant, the building fabric, and specific noise attenuation kit associated with plant, equipment or machinery).

The Operator should also employ such other noise control techniques to ensure that the noise from the installation does not give rise to reasonable cause for annoyance, in the view of the Regulator and, in particular, should justify where Rating Levels ($L_{Aeq,T}$) from the installation exceed the numerical value of the Background Sound Level ($L_{A90,T}$).

Further justification will be required should the resulting field rating level ($L_{Ar,Tr}$) exceed 50 dB by day and a facade rating level exceed 45 dB by night, with day being defined as 07:00 to 23:00 and night 23:00 to 07:00.

In some circumstances 'creeping background' (i.e. creeping ambient) may be an issue. Where this has been identified in pre application discussions or in previous discussions with the local authority, the Operator should employ such noise control techniques as are considered appropriate to minimise problems to an acceptable level within the BAT criteria.

Noise surveys, measurement, investigation e.g. on sound power levels of individual items of plant) or modelling may be necessary for either new or existing installations, depending upon the potential for noise problems. Where appropriate, the Operator should have a noise management plan as part of its management system.'

British Standard 5228 'Code of practice for noise and vibration control on construction and open sites' – Part 1: Noise and Part 2: Vibration (BS 5228-1 and BS 5228-2)

12.2.7 BS 5228-1 [6] gives recommendations for basic methods of noise control relating to construction and open sites where work activities/operations generate significant noise levels, including industry-specific guidance. The legislative background to noise control is described and recommendations are given regarding procedures for the establishment of effective liaison between developers, site operators and local authorities. BS 5228-1 provides guidance concerning methods of predicting and measuring noise and assessing its impact on those exposed to it.

12.2.8 BS 5228-2 [7] gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration levels, including industry specific guidance. The legislative background to vibration control is described and recommendations are given regarding procedures for the establishment of effective liaison between developers, site operators and local authorities. Guidance is provided concerning methods of measuring vibration and assessing its effects on the environment.

Other Relevant Guidance on Noise

Guidelines for Community Noise and Sleep Disturbance Criteria

12.2.9 'Guidelines for Community Noise' (GCN) [8] was published by the World Health Organisation (WHO) in 2000 and provides guidance on desirable levels of environmental noise. GCN refers to observation threshold levels at which the lowest observable effects occurred and are not suggestions of noise limits.

12.2.10 For daytime levels, it is considered that:

'To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces, and outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq}. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.'

12.2.11 The time base for the L_{Aeq} values provided above is 16-hours for the daytime effects. This implies that $L_{Aeq, 16h}$ is the appropriate parameter to assess reaction of people in residential areas to changes in ambient daytime noise level.

12.3 Regional Policy and Legislation

Regional Strategic Strategy: South East Plan, 2009

12.3.1 Government published the final South East Plan on 6 May 2009. The plan brings together policies and provides a framework for the region, to balance economic growth with environmental and social issues. With regards to noise, the document sets out proposals to implement noise reduction within the region.

12.3.2 The plan's sustainability appraisal highlighted a growing concern regarding the impact of the transport system on the environment. It is acknowledged that growth in road, rail and air traffic has increased noise pollution in both urban and rural areas.

12.3.3 Policy NRM8: Noise, states that:

'Measures to address and reduce noise pollution will be developed at regional and local level through means such as:

i Locating new residential and other sensitive development away from existing sources of significant noise or away from planned new sources of noise.

ii Traffic management and requiring sound attenuation measures in major transport schemes.

iii Encouraging high levels of sound-proofing and screening as part of sustainable housing design and construction.'

Local Policy and Legislation

Swale Borough Council

12.3.4 On 29 August 2007, SBC agreed a new Local Development Scheme (LDS), which was approved by the Secretary of State on the 6 September 2007. The revised LDS sets out SBC's proposals for preparing a number of Local Development Documents (LDDs) over the next five years. The SBC website states that it is SBC's intention to produce a Local Development Framework (LDF) containing Development Plan Documents (DPDs) that will provide the Council's planning policies and proposals for the period to 2026.

12.3.5 A series of Topic Papers intended to set out the baseline information that will inform the Local Development Framework. Topic Paper 3, The Natural Environment, states:

14.2 Noise: Pollution from noise has become a matter for concern to people, the background noise levels are perceived to have increased with road sources from increased traffic as being a particular issue. To date, no measurements have been specifically taken to confirm this but there is an intention to carry out noise mapping in the borough which would establish a benchmark for future monitoring. Reducing traffic overall, will reduce noise and further benefits will be an improvement in air quality and road safety. Localised noise can come from individual commercial or residential premises and there is legislation to control this where it impinges on the amenity of residential property. Industry can be a big influence on noise levels too. When considering new development proposals, the Council seeks to minimise the impact of noise between new and existing uses.

Discussion

12.3.6 Regional policy and legislation suggests that the impact of noise from industrial facilities on existing noise sensitive uses should be minimised and that spatial separation between noise sources and receptors is desirable. This is commensurate with national policy and no alternative criteria are proposed. Therefore, national policy is the appropriate guidance upon which to base the assessment of the proposed SEP.

12.4 Assessment Methodology

Relevant Guidance

12.4.1 As a matter of best practice, this assessment has been undertaken based on the relevant guidance on noise and vibration effects from the construction and operation of industrial facilities upon residential receptors. This includes:

- BS 4142;
- IPPC Technical Guidance Note for the Combustion Sector, S5.01;
- BS 5228; and
- 'Guidelines for Community Noise' (GCN).

Consultations

12.4.2 A formal scoping exercise has been undertaken to inform the scope of the Environmental Assessment. The formal Scoping response is included in Appendix 1.2 and included the following references to noise and vibration:

Kent County Council

- KCC request that the noise and vibration assessment include the effects of noise on designated sites of nature conservation.
- Noise during the construction and operation of the proposed development has been predicted, the results of which are reported in this chapter and the effects of which upon birds has been assessed and reported in Chapter 9, Ecology.
- Although not an explicit reference to noise and vibration, the Public Rights of Way Officer suggests that some form of screening may be appropriate for public footpaths that are close to the site and may be affected by the proposed development.

This chapter has considered the effects of noise from the construction and operation of the proposed development on the Saxon Shore Way.

Natural England

- The scoping response from Natural England included a request that the EIA consider the effects of noise from the construction and operation of the proposed development on birds within the designated sites of nature conservation.

Noise during the construction and operation of the proposed development has been predicted, the results of which are reported in this chapter and the effects of which upon birds has been assessed and reported in Chapter 9, Ecology.

Jacobs

Mr Woolley of Jacobs (advisors to Kent County Council) indicates that he considers the proposed approach of the noise and vibration assessment to be acceptable. He states that DMRB (Design Manual for Roads and Bridges) provides a methodology for the assessment of effects of changes in road traffic and requests that noise effects of HGVs during the night-time be considered if deliveries are proposed during the night-time.

The methodology of the assessment of noise effects of delivery HGVs is commensurate with the guidance contained within DMRB and the proposal does not include deliveries during the night-time.

12.4.3 In addition to the formal Scoping exercise, the following informal consultations and discussions have informed this chapter:

- The scope of baseline surveys and the methodology and criteria for the assessment of operational effects has been developed following liaison with Environmental Health Officers (EHOs) from Swale Borough Council (SBC).

Methodology

Baseline Survey Methodology

12.4.4 The noise assessment methodology requires a comparison to be made between the existing daytime and night-time noise environments at the noise sensitive receptors (NSRs) and the future noise levels that would be expected to occur, at those locations, with the SEP being constructed and then operated. Existing noise levels were determined by a field study.

12.4.5 The field study comprised three long term unattended noise surveys (locations A, B and D) and one short-term attended survey (location C) at separate locations in the area. The survey locations are shown in Figure 12.1.

12.4.6 The noise surevys were undertaken at:

Location A: 79 Reams Way.

12.4.7 Noise levels at this location will be representative of the nearest residential properties to the west of the paper mill. The sound level meter used trigger sampling to make audio recordings of noise events over 80 dB(A). These data can be used to temporally correlate $L_{Amax,F}$ values at the receptor with impulsive noise sources at the paper mill, for example, air valve releases.

Location B: Reedbed:

12.4.8 Noise levels at this location will be representative of the potentially noise sensitive ecological habitats adjacent to the proposed SEP.

Location C: Saxon Shore Way public footpath.

12.4.9 A 15-minute measurement was undertaken at this location to evaluate the difference in daytime noise level between the middle of the site (location B) and the Saxon Shore Way public footpath adjacent to the eastern boundary of the site.

Location D: 97 Walsby Drive.

12.4.10 Noise levels at this location will be representative of the nearest residential properties to the site for which there will be a 'line of sight' to the proposed SEP (i.e. not screened by the paper mill, as is location A).

12.4.11 The long-term surveys at locations A and D were undertaken from 29th July to 11th August 2009 using Rion NL32 sound level meters in environmental protection cases. Both surveys measured broadband A-weighted noise levels in 15-minute periods and were undertaken at freefield locations. The long term survey at location B was undertaken from 29th July to 3rd August 2009 using a Brüel & Kjaer 2250 sound level meter in an environmental protection case. The survey measured 1/3rd-octave noise levels in 15-minute periods at a freefield location.

12.4.12 The instrumentation was calibrated both prior to and immediately following the surveys to ensure that no significant drift had occurred over the survey period. All instrumentation was within the manufacturers' periods of calibration.

12.4.13 BS 4142 requires a 'representative background noise level' to be adopted for the assessment of noise effects at residential receptors during the operation of the SEP. One approach that is commonly adopted, and has been adopted for this project, is to use the average L_{A90} for the daytime period between 07:00 and 23:00 hours and the night-time period between 23:00 and

07:00 hours, i.e. the arithmetic mean of the 15-minute data from the long term surveys within the appropriate time period.

12.4.14 The assessment also considers the changes in ambient ($L_{Aeq,T}$) noise levels during the construction and operation of the SEP. These assessments have used the logarithmic average of the 15-minute L_{Aeq} between 07.00 and 19.00 hours, 07.00 and 23.00 hours and 23.00 and 07.00 hours for the assessments of noise during daytime construction, daytime operation and night-time construction, respectively.

12.4.15 Only data that were measured when the wind speeds were at or less than 5 m/s were included in the datasets used to derive the baseline noise levels. BS 4142 implies that measurements can be taken in wind speeds up to 5 m/s, i.e. it states 'For the purposes of this standard, windshields are generally effective up to wind speeds of 5 m/s'. It is considered that, by only using data obtained when wind speeds are at or less than 5 m/s, data will be obtained that is robust and valid in accordance with BS 4142. A silent meteorological station was installed at location B and measured wind speed and direction concurrently with all of the noise surveys. Location B is considerably more exposed to wind than locations A and D, which are in built up areas. Consequently, it is considered that if the wind speed measured at location B does not exceed 5 m/s then it is likely that the wind speeds at locations A and D will not exceed 5 m/s.

Noise from On-site Construction Activities

12.4.16 Noise emissions from the site during the construction phase have been predicted using SoundPLAN noise modelling software, which implements the methodology contained within BS 5228-1. Source terms have been obtained from BS 5228-1 based on typical construction plant and activities.

12.4.17 The assessment has considered four situations which have the greatest potential to give rise to significant noise effects. At the current stage of the project, the specific items of plant and methods that will be required to construct the SEP have not been finalised. The noise assessment has considered the possibility of impact driven pre-cast concrete piling during the construction of the building foundations and 24-hour concrete pouring operations (i.e. concrete pouring during the night-time) on a 'worse-case' basis.

Noise from Off-site Construction Activities (Delivery HGVs)

12.4.18 Delivery HGVs will be required to transport construction materials and equipment to the site. The noise assessment has predicted the change in noise emissions from roads around the

site due to an increase in the flow of HGVs using the methodology contained within the Calculation of Road Traffic Noise (CRTN) [12].

Vibration from Construction Activities

12.4.19 It is considered that the only construction sources that would have the potential to give rise to significant vibration effects would be driven or vibratory piling (bored or augured piles would be unlikely to give rise to significant levels of vibration). Significant vibration effects due to HGVs to residential receptors are unlikely provided that the access roads do not contain significant discontinuities.

12.4.20 The effects of vibration emissions associated with the construction of the Proposed Development have been predicted using methods contained within BS 5228-2 on the basis of impact driven pre-cast concrete piling being required during the construction of the foundations.

Noise and Vibration during the Operation of the Proposed Development

12.4.21 Noise levels arising from the operation of the Proposed Development have been predicted using SoundPLAN noise modelling software, implementing the methodology contained within ISO 9613-2 [13]. Broadband internal noise levels for the areas containing the most significant noise generating plant and Sound Reduction Indices (SRIs) of the facades of the building have been provided by Umwelttechnik & Ingenieure GmbH on behalf of St Regis Paper Company. A generic spectral shape that is representative of internal diffuse reverberant noise levels within an SEP has been applied to the calculated source terms. A spectral shape has been applied to the SRIs that is representative of the type of cladding from which the SEP is expected to be built.

12.4.22 The significance of the operational effects of noise to residential receptors has been assessed using the methodology contained within BS 4142. In addition, consideration has also been given to the ambient daytime noise change that would be expected occur at residential and recreational receptors (Saxon Shore Way) as a result of the introduction of the SEP. Spectral noise emissions within potentially noise sensitive ecological habitats have been predicted and are assessed in Chapter 9, Ecology.

12.4.23 The noise effects associated with an increase in the flow of HGVs on local roads, due to the operation of the Proposed Development, have been predicted using the methodology contained within CRTN.

12.4.24 Significant operational vibration effects are unlikely and, therefore, a quantitative assessment is not required.

Assessment of Significance

12.4.25 In order to assess the significance of the effects the following definitions of potential significance have been assumed as follows:

- **Neutral** – No significant effects
- **Minor**- effects are of low magnitude and frequently occurring
- **Moderate** –effects are of moderate magnitude and frequently occurring
- **Major-** Effects are likely to be of high magnitude and frequently occurring with quality standards being exceeded at times
- **Substantial** – effects will be of a consistently high magnitude and frequently occurring.

These definitions have been used with reference to the different noise sources and receptors considered in this chapter as described in the following sections.

Noise from On-site Construction Activities

12.4.26 The following significance criteria are based upon one of three methodologies contained within Annex E of BS 5228-1, a discussion of which is provided in Appendix 12.1, and has been used as the basis for the threshold of significance for this assessment. The relative semantic ratings for adverse effects have been arbitrarily adopted based changes in progressive increases in 5 dB.

Table 12.1: Thresholds of Significance for Construction Noise at Residential Receptors

Noise Change, $L_{Aeq,T}$ (dB)	**Significance**
<= 5	Not Significant
> 5 and <= 10	Minor Adverse
> 10 and <= 15	Moderate Adverse
> 15 and <= 20	Major Adverse
> 20	Substantial Adverse

Note 1: T is daily working hours of the site

Note 2: Applies to residential receptors

12.4.27 The limits provided in Table 12.1 are subject to lower cut-off values of 65 dB and 45 dB $L_{Aeq,T}$, from construction noise alone, for the daytime and night-time periods, respectively. There are no suggested criteria for non-residential receptors, such as business premises or recreational areas. In the absence of any guidance these locations and uses have not been considered further.

Noise from Off-site Construction Activities (Delivery HGVs)

12.4.28 The following semantic scale has been adopted to assess the significance of the effects of noise change associated with construction HGVs on local roads. Further discussion of the assessment of the significance of traffic noise is provided in Appendix 12.1.

Table 12.2: Semantic Scale for Describing Noise Change at Residential Receptors – Thresholds of Significance (Non-permanent Construction Traffic)

Predicted Noise Change		**Scale Rating**
Decrease of more than 6 dB	Significant decrease	Significant Positive Effect
Increase or Decrease of Less than 6 dB	No Significant change	No Effect
Increase of 6 – 10 dB	Minor Increase	Significant Negative Effect
Increase of 11 – 20 dB	Moderate Increase	
Increase of more than 20 dB	Major Increase	

Vibration from Construction Activities

12.4.29 Table 12.3 provides the vibration limits contained within BS 5228-2 above which cosmetic damage could occur and have been adopted as the threshold of significant effects for construction vibration to buildings (minor adverse effect). The Standard states that the vibration limits above which minor and major damage could occur are twice and four times respectively those given in Table 12.3, and correspond to moderate and major adverse effects, respectively.

Table 12.3: Threshold Vibration Values for the Evaluation of Cosmetic Building Damage (BS 5228-2)			
Building Classification	**Frequency Range of Vibration (Hz)**	**Vibration Level, PPV mm/s**	
		Transient Vibration	*Continuous Vibration*
Unreinforced or light framed structures	4 Hz to 15 Hz	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	7.5 mm/s at 4 Hz increasing to 10 mm/s at 15 Hz
Residential or light commercial type buildings	15 Hz and above	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above	10 mm/s at 15 Hz increasing to 25 mm/s at 40 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	4 Hz and above	50	25

Note: the limits refer to vibration measured in the foundations of a building.

Noise and Vibration during the Operation of the Proposed Development

12.4.30 The thresholds of significance for the assessment of noise effects upon residential receptors have been based upon guidance contained within BS 4142 and S5.01. The semantic scale for assessing the significance of adverse effects has been adopted based upon the semantic scale for noise change. The overall significance of the development has been determined as the maximum effect determined by any one of the criteria.

Table 12.4: Thresholds of Significance for Noise during the Operation of the Proposed Development at Residential Receptors					
Criterion	**<= 0 dB**	**>0 and <=3 dB**	**>3 and <=5 dB**	**>5 and <=10 dB**	**>10 dB**
Rating level ($L_{Ar,Tr}$) / background noise level (L_{A90}) difference	Not Significant	Minor Adverse	Moderate Adverse	Major Adverse	Substantial Adverse
Freefield rating level ($L_{Ar,Tr}$)	Not	Minor	Moderate	Major	Substantial

Table 12.4: Thresholds of Significance for Noise during the Operation of the Proposed Development at Residential Receptors					
Criterion	**<= 0 dB**	**>0 and <=3 dB**	**>3 and <=5 dB**	**>5 and <=10 dB**	**>10 dB**
(07.00 to 23.00 hours) / 50 dB difference; and the baseline daytime ambient level is 50 dB, $L_{Aeq,16h}$ (07.00 to 23.00 hours), or less	Significant	Adverse	Adverse	Adverse	Adverse
Façade rating level ($L_{Ar,Tr}$) (23.00 to 07.00 hours) / 45 dB difference; and the baseline night-time ambient is level 45 dB, $L_{Aeq,8h}$ (23.00 to 07.00 hours), or less	Not Significant	Minor Adverse	Moderate Adverse	Major Adverse	Substantial Adverse
Ambient noise change $L_{Aeq,16h}$ (07.00 to 23.00 hours)	Not Significant	Minor Adverse	Moderate Adverse	Major Adverse	Substantial Adverse
Noise change from operational traffic	Not Significant	Not Significant	Minor Adverse	Moderate Adverse	Major Adverse

12.4.31 There are no nationally adopted standards or guidance for the assessment of noise effects to public footpaths. GCN provides guidance on the reaction of people in outdoor living areas. However, the time base for these criteria is 16-hours, which implies residential areas and gardens. People on public footpaths are transitory and temporary receptors and it is not appropriate to adopt these criteria at the Saxon Shore Way.

12.4.32 In the absence of appropriate guidance, it is not considered robust to adopt an arbitrary threshold of significance. Consequently, noise emission levels from the SEP and the associated change in daytime ambient noise level have been reported and discussed but it is not robust to interpret a level of significance from these results.

Cumulative Effects

12.4.33 The potential cumulative noise and vibration effects arising from the concurrent construction or operation of the proposed development with the construction or operation of consented developments in the area have been assessed qualitatively considering the proximity of consented developments to NSRs that are predicted to be affected by the proposed development and the expected noise and vibration emissions from consented developments.

Limitations of the Assessment

12.4.34 ISO 9613-2 states that accuracy of the prediction method is +/- 3 dB for distances between 100 and 1,000 m. SoundPLAN claims an accuracy of within 0.2 dB. It is considered that there are no significant limitations to the assessment, beyond the published accuracies of the ISO 9613-2 prediction method and the implementation by SoundPLAN.

12.4.35 It has been necessary to undertake predictions of maximum noise levels from impulsive noise sources (e.g. L_{Amax} levels from impact driven piling). There are no nationally or internationally adopted methodologies for prediction of L_{Amax} levels. Therefore, it has been necessary to undertake the prediction using the methodology contained within ISO 9613-2. However, it is considered that this will not affect robust determination of significance of effects (for example, startle responses of birds) because the thresholds of significant effect cannot be determined with precision.

12.5 Baseline Conditions

Site Description

12.5.1 The proposed site is at St Regis Paper Mill at Kemsley, Sittingbourne, Kent. A plan of the area around the site is provided in Figure 12.1.

12.5.2 The site is bounded to the west by the paper mill; to the east by mudflats and a waterway called Elmley Reach; to the north by Kemsley Marshes, beyond which are industrial uses; and to the south by Kemsley Marshes, beyond which is mudflats and a waterway called Milton Creek. The nearest residential receptors are in the north-east of Kemsley and are approximately 1 km to the west, beyond the paper mill, and south-west.

12.5.3 Potentially noise sensitive ecological habitats border the site to the north, east and south. Details of the locations, contents and designations of these habitats are provided in Chapter 9, Ecology. Although not normally considered noise sensitive, the assessment will consider the noise effects at the Saxon Shore Way public footpath, which follows the bank of the waterways and passes to the east of the site.

Baseline Noise Surveys

Location A (Long term) – Rear Garden of 79 Reams Way, Kemsley.

12.5.4 The dominant noise sources during the installation and collection of the survey, included hum and crackle from overhead power lines; vehicle pass-bys on Ridham Avenue; and a low-frequency hum from the paper mill. The sound recordings, which automatically trigger when the sound pressure level exceeds 80 dB(A), were almost exclusively of vehicle pass-bys, particularly motorbikes and scooters. None of the recorded events exceeding 80dB(A) were identified as impulsive noises from the paper mill, such as an air-valve release.

12.5.5 The survey was undertaken during a period of dry and calm weather. The results of the long term noise survey, excluding data obtained during wind speeds greater than 5 m/s, are provided in Table 12.5 and, graphically, in Figure 12.2.

Table 12.5: Long-term Noise Survey Results - LT A: 79 Reams Way

Date at Start of Period	**Day**	**Daytime (07.00 to 19.00 hours)**		**Daytime (07.00 to 23.00 hours)**			**Night-time (23.00 to 07.00 hours)**		
		$L_{Aeq,12h}$ (dB)	*Hours in Dataset*	$L_{Aeq,16h}$ (dB)	L_{A90} (dB)	*Hours in Dataset*	$L_{Aeq,8h}$ (dB)	L_{A90} (dB)	*Hours in Dataset*
29/07/2009	Wednesday	58	*6.75*	57	45	*10.75*	55	42	*8*
30/07/2009	Thursday	58	*12*	57	44	*16*	55	43	*8*
31/07/2009	Friday	57	*12*	57	46	*16*	55	50	*8*
01/08/2009	Saturday	54	*12*	53	45	*16*	50	42	*8*
02/08/2009	Sunday	51	*12*	51	41	*16*	52	42	*8*
03/08/2009	Monday	57	*12*	56	44	*16*	56	50	*8*
04/08/2009	Tuesday	58	*12*	57	46	*16*	55	48	*8*
05/08/2009	Wednesday	57	*12*	57	46	*16*	55	47	*8*
06/08/2009	Thursday	58	*12*	58	48	*16*	56	47	*8*
07/08/2009	Friday	58	*12*	57	45	*16*	53	44	*8*
08/08/2009	Saturday	55	*12*	55	49	*16*	54	51	*8*
09/08/2009	Sunday	55	*12*	54	50	*16*	54	46	*8*
10/08/2009	Monday	58	*12*	57	44	*16*	54	43	*8*
11/08/2009	Tuesday	61	*5.25*	61	47	*5.25*			*0*
Mean	**Mon - Fri**	**58**		**57**	**46**		**55**	**46**	
	Mon - Sat	**57**		**57**	**46**		**54**	**46**	

	Sun	**53**		**53**	**46**		**53**	**44**	
Minimum	**All Days**	**51**		**51**	**41**		**50**	**42**	

Location B (Long-term) – Reed bed

12.5.6 The dominant noise sources during the installation and collection of the survey were noise from the paper mill to the west and from the industrial uses to the north. The noise from the paper mill was a mid-high frequency broadband 'swooshing' noise; similar to the noise from sliding a piece of paper across the surface of a desk. The noise from the industrial units to the north was a low frequency hum.

12.5.7 The survey was undertaken during a period of dry and calm weather. The land around the site is generally flat and exposed to wind. Baseline noise levels will be higher during periods of high wind and/or rainfall than those measured during the survey. The results of the long term noise survey, excluding data obtained during wind speeds greater than 5 m/s, are provided in Table 12.6 and, graphically, in Figures 12.3 to 12.5.

12.5.8 Figures 12.4 and 12.5 provide the results of the noise survey between 03.00 and 07.00 hours as 1/3rd-octave spectra. This period is considered to be representative of the period of the dawn chorus and pertinent to the assessment of noise effects to avian receptors, the results of which are provided in Chapter 9, Ecology. The ambient and background noise levels are relatively similar during this period, which indicates that the noise environment is dominated by continuous sources, such as meteorological effects over a relatively wide area (noise from local wind gusts or rain are more likely to result in an elevated ambient noise level over the background); industrial units to the north; and, to a certain extent, the paper mill.

12.5.9 Noise from the industrial units to the north has a varied influence on the baseline noise environment. For example, the ridge in the background noise level at 80 Hz is likely to be noise from these sources. This is clearly present on Thursday and Saturday; less significant on Friday and Sunday; and only present in the latter section of the period on Monday. Noise from the paper mill is temporally and spectrally indistinguishable from meteorological sources. On this basis, it is considered that the influence of industrial activities in the area on the baseline noise environment within the reed bed is minimal and limited to the low-frequencies.

Table 12.6: Long-term Noise Survey Results - LT B : Reedbed

Date at Start of Period	Day	Daytime (07.00 to 19.00 hours)		Daytime (07.00 to 23.00 hours)			Night-time (23.00 to 07.00 hours)		
		$L_{Aeq,12h}$ (dB)	*Hours in Dataset*	$L_{Aeq,16h}$ (dB)	L_{A90} (dB)	*Hours in Dataset*	$L_{Aeq,8h}$ (dB)	L_{A90} (dB)	*Hours in Dataset*
29/07/2009	Wednesday	58	*4.5*	55	47	*8.5*	52	48	*8*
30/07/2009	Thursday	53	*12*	52	48	*16*	50	47	*8*
31/07/2009	Friday	50	*12*	49	43	*16*	48	44	*8*
01/08/2009	Saturday	50	*12*	50	45	*16*	49	46	*8*
02/08/2009	Sunday	50	*12*	50	44	*16*	49	46	*8*
03/08/2009	Monday	49	*9.5*	49	44	*9.5*			*0*
Mean	**Mon - Fri**	**53**		**51**	**46**		**50**	**46**	
	Mon - Sat	**52**		**51**	**45**		**50**	**46**	
	Sun	**50**		**50**	**44**		**49**	**46**	
Minimum	**All Days**	**49**		**49**	**43**		**48**	**44**	

Location C (Short-term) – Saxon Shore Way

12.5.10 The dominant noise during survey was low frequency hum from the industrial uses to the north. The paper mill was not audible at the survey location. The results of the measurement at the Saxon Shore Way and current measurements at the long-term survey location at the reed bed (location B) are provided in Table 12.7. The results of the survey indicate that there is unlikely to be a significant spatial variation in noise level within the site.

Table 12.7: Short-term Noise Survey Results - LT C : Saxon Shore Way

Location	Time	$L_{Aeq,\ 15\text{-}min}$ (dB)	$L_{Amax,F}$ (dB)	L_{A90} (dB)
C	29/07/2009 14:45	52	68	49
B	29/07/2009 14:15	69	90	49
B	29/07/2009 14:30	54	62	49
B	29/07/2009 14:45	54	69	49
B	29/07/2009 15:00	54	62	48

Location D (Long term) – Rear Garden of 97 Walsby Drive, Kemsley

12.5.11 The dominant noise sources during the installation and collection of the survey, included hum and crackle from overhead power lines; and a distant low-frequency hum from the paper mill.

12.5.12 The survey was undertaken during a period of dry and calm weather. The results of the long term noise survey, excluding data obtained during wind speeds greater than 5 m/s, are provided in Table 12.8 and, graphically, in Figure 12.6.

Table 12.8: Long-term Noise Survey Results - LT D: 97 Walsby Drive

Date at Start of Period	Day	Daytime (07.00 to 19.00 hours)		Daytime (07.00 to 23.00 hours)			Night-time (23.00 to 07.00 hours)		
		$L_{Aeq,12h}$ (dB)	*Hours in Dataset*	$L_{Aeq,16h}$ (dB)	L_{A90} (dB)	*Hours in Dataset*	$L_{Aeq,8h}$ (dB)	L_{A90} (dB)	*Hours in Dataset*
29/07/2009	Wednesday	49	*8.5*	48	40	*12.5*	44	37	*8*
30/07/2009	Thursday	46	*12*	46	40	*16*	41	37	*8*
31/07/2009	Friday	47	*12*	46	38	*16*	41	39	*8*
01/08/2009	Saturday	45	*12*	45	39	*16*	42	40	*8*
02/08/2009	Sunday	55	*12*	53	38	*16*	38	36	*8*
03/08/2009	Monday	50	*12*	49	37	*16*	41	39	*8*
04/08/2009	Tuesday	45	*12*	44	39	*16*	40	38	*8*
05/08/2009	Wednesday	44	*12*	44	38	*16*	44	41	*8*
06/08/2009	Thursday	51	*12*	50	44	*16*	48	45	*8*
07/08/2009	Friday	46	*12*	46	43	*16*	44	42	*8*
08/08/2009	Saturday	45	*10.75*	45	42	*16*	42	40	*8*
09/08/2009	Sunday	50	*12*	49	42	*16*	42	40	*8*
10/08/2009	Monday	44	*12*	44	39	*16*	43	40	*8*
11/08/2009	Tuesday	48	*7.5*	48	43	*7.5*			*0*
Mean	**Mon - Fri**	**47**		**47**	**40**		**43**	**40**	
	Mon - Sat	**47**		**46**	**40**		**43**	**40**	
	Sun	**53**		**51**	**40**		**40**	**38**	

Baseline Analysis

12.5.13 The mean wind speed at the site did not exceed 5 m/s throughout the survey period, which is the wind speed below which BS 4142 considers wind shields to be effective. On this basis, it is considered that wind noise did not affect the measured noise levels. Noise levels are significantly affected by the noise from wind and rain and will consequently be higher than those obtained during the surveys at times when such conditions prevail.

12.5.14 BS 4142 does not contain explicit guidance of how survey data should be evaluated to obtain a single value for the daytime and a single value for the night-time. BS 4142 refers to a '*representative'* and '*typical'* background noise level.

12.5.15 Notwithstanding the above, it is considered that the assessment will be robust based upon the typical noise levels that are likely to occur during calm and dry weather, which will be the worst case. On this basis, the assessment has adopted the lowest values determined for each period for the assessment of effects. The baseline daytime ambient noise adopted for the Saxon Shore Way is 49 dB $L_{Aeq,\ 16\text{-hours}}$. The baseline noise levels adopted for the assessment of residential receptors are provided in Table 12.9.

Table 12.9 : Baseline Noise Levels Adopted for the Assessment of Residential Receptors

	Daytime (07.00 to 19.00 hours)	Daytime (07.00 to 23.00 hours)		Night-time (23.00 to 07.00 hours)	
	$L_{Aeq,\ 12h}$ (dB)	$L_{Aeq,\ 16h}$ (dB)	L_{A90} (dB)	$L_{Aeq,\ 8h}$ (dB)	L_{A90} (dB)
Reams Way	51	51	41	50	42
Walsby Drive	53	51	40	40	38

12.6 Identification and Evaluation of Key Effects

Noise from On-site Construction Activities

12.6.1 The majority of activities associated with the construction of the development will occur during the daytime. The construction of the development may require a concrete pour associated with the construction of the foundations that may require 24-hour working. Four periods during the construction phase that are representative of the periods for which there is the greatest potential for significant noise effects to occur have been assessed quantitatively:

- site preparation and ground excavations;
- pre-cast concrete driven piling;
- night-time concrete pour of foundations; and
- general building construction.

12.6.2 The noise sources and source terms included in the construction models are provided in Appendix 12.2. The results of the construction assessments are provided in Appendix 12.3.

12.6.3 The results of the assessment indicate that the noise emission levels from daytime construction activities are not expected to exceed 65 dB $L_{Aeq, 12h}$ at NSRs during the construction of the proposed SEP. The results of the assessment indicate that the noise emission levels from night-time concrete pouring activities are not expected to exceed 45 dB $L_{Aeq, 8h}$ at NSRs and, on this basis, significant adverse noise effects are not predicted to occur at NSRs. On this basis, noise effects during the construction or the SEP are considered to be **not significant**.

12.6.4 Although not normally considered to be noise sensitive, the assessment has considered receptors at the areas of public amenity closest to the site, which is the Saxon Shore Way public footpath. Daytime ambient noise levels, during dry and calm weather, have been predicted to increase by approximately 1 and 5 dB to approximately 50 to 54 dB $L_{Aeq, 12h}$. GCN suggests that:

'To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces, and outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq}. '

12.6.5 On the basis of the above, and considering that receptors at these locations will be temporary and transitory, as will the sources of noise, it is unlikely that users of the Saxon Shore Way will be '*seriously'* annoyed by noise associated with the construction of the SEP.

12.6.6 Noise levels at avian receptors have been predicted in terms of 1/3rd-octave L_{Aeq} levels and are presented numerically and graphically with baseline spectral ambient noise levels in Appendix 12.3. The maximum impulsive noise level to occur during piling has been predicted using source terms in BS 5228 Part 1, which are provided in terms of L_{Aeq}. BS 5228 Part 1 suggests that the L_{A01} is typically 9 dB higher than the L_{Aeq} for hydraulic hammer pile drivers with a striking rate of approximately 40 – 50 blows per minute. There are no general empirical relationships between L_{Amax} and L_{Aeq}, but, in the absence of measured data from a similar piling rig to that expected for this project, the L_{A01} is an appropriate estimate of the spatial extent of effects. Noise emissions have been predicted using a SoundPLAN model, the results of which are provided graphically in Appendix 12.3. Maximum impulsive noise levels, predicted as L_{A01}, are less than 80 and 85 dB L_{Amax} approximately 60 and 40 m from the piling rig.

12.6.7 Reversing signals on HGVs may be considered as impulsive noise sources, albeit with significantly less potential to give rise to startle effects at avian receptors than impact piling.

Maximum noise levels from a reversing signal have been predicted on the basis of manufacturer's data and hemispherical geometric spreading. The results of this prediction, which does not include attenuation due to ground absorption, indicate that maximum noise levels from a reversing signal will be less than 80 and 85 dB L_{Amax} approximately 16 and 50 m from the vehicle.

12.6.8 No data are available of representative maximum impulsive noise levels associated with other plant and activities on construction sites, such as miscellaneous bangs and/or crashes during materials handling. However, these effects will be significantly less than those associated with impact driven piling which has been assessed.

Noise from Off-site Construction Activities (Delivery HGVs)

12.6.9 Appendix 12.3 contains the results of an assessment of the noise change on local roads associated with construction traffic. The number of vehicles would vary during the construction period between approximately 15 cars and 30 HGVs per day to approximately 60 cars and 240 HGVs per day. The assessment has been undertaken on an extreme worst-case basis that predicts the noise effects of the maximum number of vehicles all using one road (i.e. 60 cars and 240 HGVs per day assessed on every link).

12.6.10 The results of the assessment indicate that the noise change would be less than 1 dB and, on this basis, noise effects associated with delivery HGVs attending the site during the construction of the SEP are considered to be **not significant**.

Vibration from Construction Activities

12.6.11 The assessment has considered the effects of vibration from vibratory piling upon the closest buildings to the site, which is the paper mill. At the closest point, the paper mill is approximately 60 m from the nearest structure within the proposed development, which is the air-cooled condenser.

12.6.12 The results of a prediction of freefield vibration levels from vibratory piling based upon the methodology contained within BS 5228-2 are provided in Appendix 12.3. Vibration levels within the foundations of a building are expected to be less than the freefield levels at the same location due to the mass loading of the building. The level of vibration attenuation varies, but levels in the foundations of a large industrial building, such as the paper mill, may be 50 – 70% of the freefield levels [14].

12.6.13 With regards to the assessment of effects to structures, impact driven piling is a 'transient' vibration source. With reference to Appendix 12.3, the results of the assessment indicate that the vibration levels in the foundations of a building 60 m from the piling rig would be expected to be 5 mm/s, or less, which is a tenth of the level at which BS 5228-2 suggests is commensurate with the level above which cosmetic damage may occur in industrial buildings. On this basis, vibration effects are considered to be **not significant**.

Noise and Vibration during the Operation of the Proposed Development

12.6.14 The plant noise source terms and SRIs of building facades upon which the assessment has been based are provided in Appendix 12.4. The model includes the terrain of the area. The results of the operational assessment are provided in Appendix 12.5. Noise contours of the predicted rating level at 4.1 m above ground level (the approximate height of first floor windows) are provided in Figure 12.5. Noise contours of the predicted noise emission level at 1.5 m above ground level are provided in Figure 12.6.

12.6.15 It is considered that there is a potential for the noise emissions from the SEP to contain '*a distinguishable, discrete, continuous note (whine, hiss, screech, hum, etc.)*' and, therefore, a +5 dB correction has been applied to the predicted specific noise level at NSRs, in accordance with BS 4142.

12.6.16 The results of the assessment indicate that, at all residential NSRs, the rating levels do not exceed the background noise level; 50 dB $L_{Ar,\ 1h}$ during the daytime; or 45 dB $L_{Ar,\ 5min}$ during the night-time; and no daytime ambient noise change is predicted to occur. With reference to Table 12.5, noise effects due to the operation of the SEP are considered to be **not significant**.

12.6.17 Although not normally considered to be noise sensitive, the assessment has considered receptors at the areas of public amenity closest to the site, which is the Saxon Shore Way public footpath. Daytime ambient noise levels, during dry and calm weather, have been predicted to increase by approximately 6 to 11 dB to approximately 52 and 60 dB $L_{Aeq,16h}$. GCN suggests that:

'To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces, and outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq}. '

12.6.18 The noise from the SEP will be noticeable to walkers as they pass the site. However, these receptors are temporary and transitory and it is not appropriate to apply the same criteria as one would for long term outdoor amenity receptors, such as residential gardens. Although no guidance is provided in GCN with regards to the expected level of annoyance due to industrial noise affecting footpaths, it would be expected that the onset of measurable effects would occur at higher noise levels than those for gardens. 60 dB $L_{Aeq, 16h}$ is not a particularly high noise level compared with levels that the majority of people experience in every day life. BS 8233 suggests that noise levels on a residential road parallel to a busy main road with free flowing traffic and screened by the houses from the main road traffic are approximately 58 dB $L_{Aeq, 16h}$. Noise levels may be expected to be higher within typical town centres and shopping areas.

12.6.19 Whilst it is accepted that the noise environment of the Saxon Shore Way would be expected to be quieter than a town centre or shopping area, it is considered that that it would not be unreasonable to expect walkers to tolerate noise levels around 60 dB $L_{Aeq, 16h}$ for a limited period whilst passing the site. On the basis of the above it is unlikely that walkers will be significantly adversely affected by noise associated with the operation of the SEP.

12.6.20 Noise levels at avian receptors have been predicted in terms of 1/3rd-octave L_{Aeq} levels and are presented numerically and graphically with baseline spectral background noise levels in Appendix 12.4. The predicted noise emissions from the SEP have significantly more energy in the lower frequency octave bands than in higher bands. Noise emissions in the 2,000 Hz octave band and above are typically around 10 dB lower than the baseline background noise levels in these bands during dry and calm weather (the baseline background noise levels may be expected to be higher during wind and/or rain).

12.6.21 The significance of this is that although the overall 'A'-weighted noise levels may increase due to the introduction of the SEP, this does not necessarily indicate a significant impairment to acoustic communication. For example, human hearing is generally strongest around 1,000 to 6,000 Hz. This is why signals that are intended to be noticed, such as HGV reversing signals and the Greenwich Mean Time signal (the 'pips' on Radio 4) are generally around 1,000 Hz. Furthermore, the sibilant sounds that are fundamental to human speech (e.g. the 'tt' and 'ss' sounds) are in the 4,000 Hz band. Therefore, the effect that the noise emissions from the SEP may have upon the ability for avian receptors around the site to effectively communicate depends upon the frequencies that are important to the communication of the particular species in question. An assessment of the noise effects of the operation of the SEP to avian receptors is provided in Chapter 9, Ecology.

12.6.22 It is considered that impulsive noise emissions from the operation of the SEP could occur from blower valves, for example within the combustion residue handling equipment. Measurements of fly ash blower valves at other similar facilities indicate that noise levels of around 95 dB L_{Amax} at 1 m are typical of these sources. On this basis, maximum noise levels from a reversing signal will be less than 80 and 85 dB L_{Amax} approximately 10 and 32 m from the SEP.

12.6.23 Reversing signals on HGVs may be considered as impulsive noise sources, albeit with significantly less potential to give rise to startle effects at avian receptors than a loud bang, such as occurs from impact driven piling. Maximum noise levels from a reversing signal have been predicted on the basis of manufacturer's data and hemispherical geometric spreading. The results of this prediction, which does not include attenuation due to ground absorption, indicate that maximum noise levels from a reversing signal will be less than 80 and 85 dB L_{Amax} approximately 16 and 50 m from the vehicle.

Noise from Off-site Operational Activities (Delivery HGVs)

12.6.24 Appendix 12.5 contains the results of an assessment of the noise change on local roads associated with operational traffic. The assessment has been undertaken on a worst-case basis that predicts the noise effects of all vehicles using one.

12.6.25 The results of the assessment indicate that the noise change would be less than 1 dB and, on this basis, noise effects associated with delivery HGVs attending the site during the construction of the SEP are considered to be **not significant**.

Cumulative Effects

12.6.26 The assessment has considered the cumulative effects of the concurrent construction or operation of the following consented developments with the construction or operation of the Proposed Development:

- Sittingbourne Town Centre regeneration - (major regeneration scheme south and north of the railway line. South of the railway line will include new retail floor space, office, community and learning, open space and residential and will be delivered first. North of the railway line will be the second phase of development to include mainly 1000 residential units with open space, school and other community facilities);
- East Hall Farm – (residential development of circa 800 houses, about half is built out);
- Kent Science Park (4 ha expansion and new units);
- Iwade Expansion (Residential development of 450 houses);

- Thistle Hill (Residential development - 1000 already approved; further 750 to come);
- Queenborough and Rushenden Regeneration Project (New residential and mixed use development and employment land development);
- Port of Sheerness (Wind farm, Port expansion);
- Northern Relief Road (New access road to relieve the traffic through Sittingbourne. The first section to Eurolink has been approved and will commence construction in the autumn. The final link to Bapchild will go out to consultation on a preferred route later this year).

12.6.27 None of the consented residential development is closer than the receptors included in the assessment. The results of the noise assessment indicate that adverse noise effects are unlikely to occur at the closest receptors due to the construction and operation of the SEP and, therefore, adverse noise effects are also unlikely to occur at the areas of consented residential development.

12.6.28 The wind farm and port expansion at Port of Sheerness is over 5 miles north of the proposed development site, between which is the Isle of Sheppey. The developments are sufficiently distant such that noise emissions from one development will not affect the receptors that are affected by the other. On this basis, cumulative effects from both developments will not occur.

12.6.29 The assessment of the noise effects on development traffic using local roads has been based upon data from the Transport Assessment, which considers the Northern Relief Road. Baseline noise levels used in the assessment of operational noise from the SEP have been determined from surveys undertaken in the summer of 2009. The Northern Relief Road will introduce an additional source of road traffic noise to the area, which may raise, to a certain extent, background noise levels and, consequently, reduce the significance of the effects of noise from the industrial sources in the area.

12.6.30 It is not appropriate to combine the noise emissions from the road and existing and/or proposed industrial development as reaction in residential areas is different for the different sources. This is why there are different assessment methodologies for road and industrial development. On the basis of the above, adverse cumulative effects would not occur due to the development of the Northern Relief Road and there is a possibility that positive cumulative effects may occur.

12.7 Design Response and Mitigation

12.7.1 The results of the assessment indicate that significant adverse noise and vibration effects are not predicted to occur during the construction or operation of the SEP, assessed individually

or cumulatively with committed development in the area, and therefore no mitigation will be required.

12.8 Residual Effects

12.8.1 The results of the assessment indicate that significant adverse noise and vibration effects are not predicted occur during the construction or operation of the Proposed Development, assessed individually or cumulatively with committed development in the area, and therefore residual noise and vibration effects are considered to be **not significant**.

12.9 Conclusion

12.9.1 The potential noise effects due to the construction and operation of the proposed development of a sustainable energy plant at Kemsley, Sittingbourne, have been predicted and assessed in accordance with international, national and local standards and guidance. Surveys have been undertaken to determine the baseline noise levels at locations representative of the potentially most affected noise sensitive receptors.

12.9.2 The results of the noise and vibration assessment indicate that significant adverse noise or vibration effects would not be expected to occur at sensitive receptors during either the construction or operational phases of the SEP. **Table 12.6** contains a summary of the likely effects of the proposed development.

Table 12.6 Summary of Residual Impacts

Resource	Phase	Nature of Effect	Significance	Magnitude of Impact	Duration	Mitigation/ Enhancement	Residual Effect	Geographical Level of Importance of Issue				
								I	N	R	D	L
	Construction	Noise from On-site Construction Activities	Not Significant	Negligible	Temporary	Not Required	None					x
		Noise from Off-site Construction Activities (Delivery HGVs)	Not Significant	Negligible	Temporary	Not Required	None					x

		Vibration from Construction Activities	Not Significant	Negligible	Temporary	Not Required	None					x
	Operation	Noise and Vibration during the Operation of the Proposed Development	Not Significant	Negligible	Permanent	Not Required	None					x

Key: I: International N: National R: Regional D: District L: Local

References

1 Department of the Environment. Planning Policy Guidance (PPG) 24, Planning and Noise, September 1994.

2 British Standards Institution. British Standard 4142: Method for Rating industrial noise affecting mixed residential and industrial areas, 1997.

3 British Standards Institution. British Standard 8233: Sound insulation and noise reduction for buildings - Code of practice. 1999.

4 Office of the Deputy Prime Minister. Minerals Policy Statement 2: Controlling and Mitigating the Environmental Effects of Mineral Extraction in England. 2005.

5 Environment Agency. IPPC S5.01 Guidance for the Incineration of Waste and Fuel Manufactured from or Including Waste. 29 July 2004.

6 British Standards Institution. British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Part 1: Noise. 2009.

13. British Standards Institution. British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration. 2009.

14. World Health Organisation (WHO). Guidelines for Community Noise, 2000.

15. South East England Regional Assembly. The South East Plan. 6 May 2009.

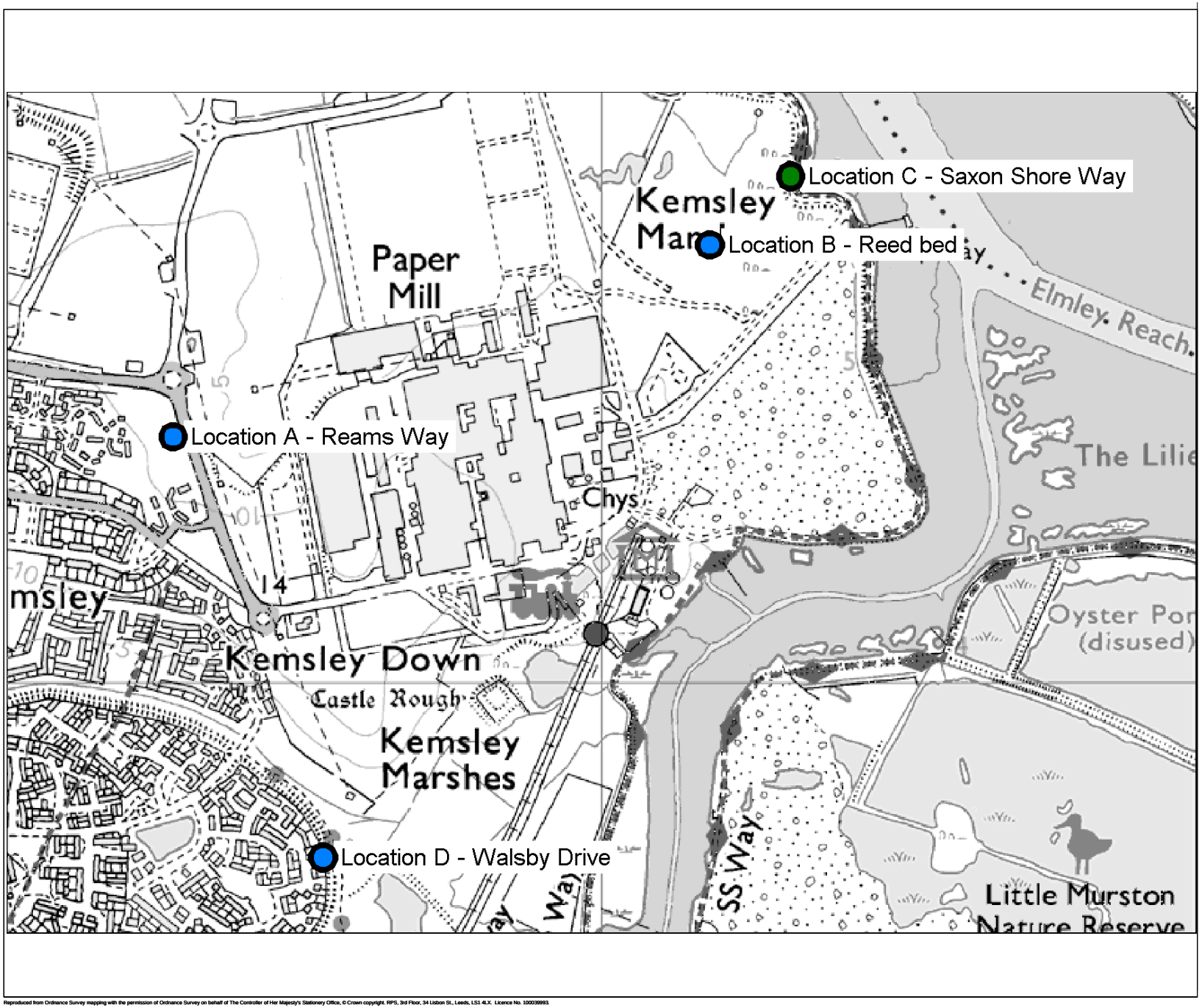
16. Kent County Council. Kent & Medway Structure Plan. July 2006.

17. Swale Borough Council. LDF Topic Paper 3 - The Natural Environment, V1.0.

18. Department of Transport. Calculation of Road Traffic Noise. HMSO. 1988.

19. International Organization for Standardization. ISO 9613-2:1993: Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation

20. Nelson, P. M. Transportation Noise Reference Book. Butterworths 1987



Key:

- Long-term Survey Location
- Short-term Survey Location
- Site Boundary

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TITLE
Site Plan and Baseline Noise Survey Locations

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PROJECT NUMBER	DRAWING NUMBER	REV
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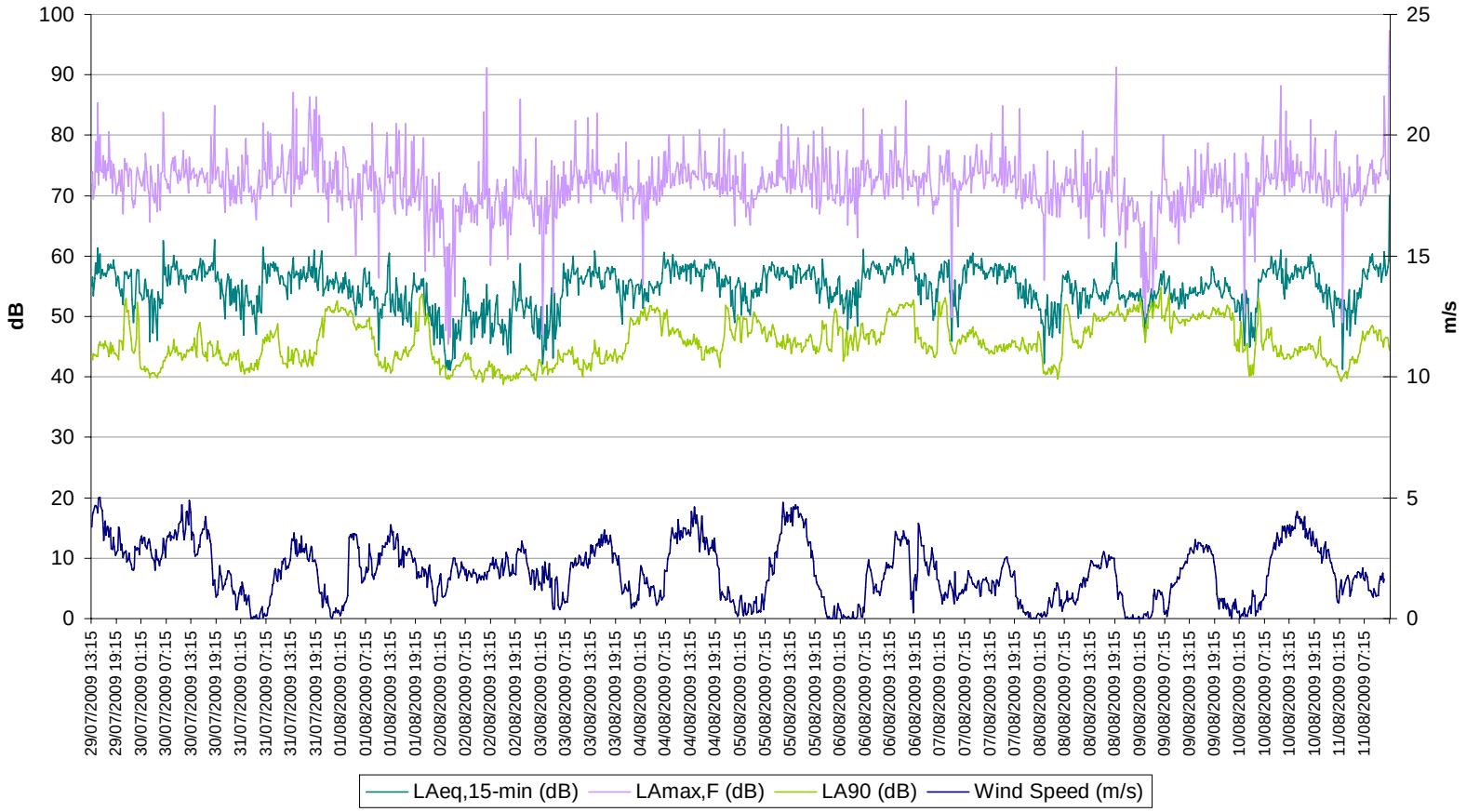

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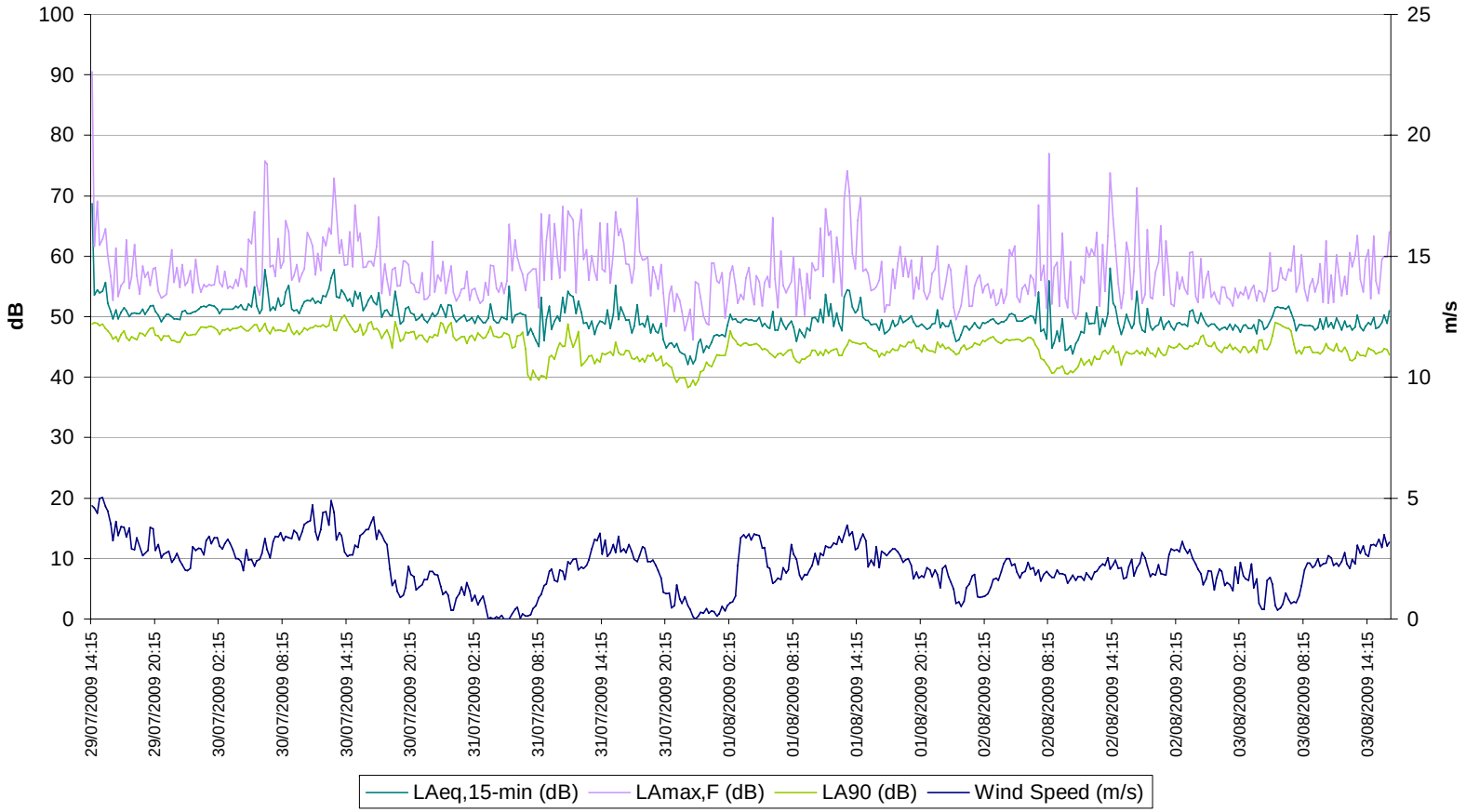
Location B: Reedbed



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Long-term Baseline Noise Survey Results – Reed bed

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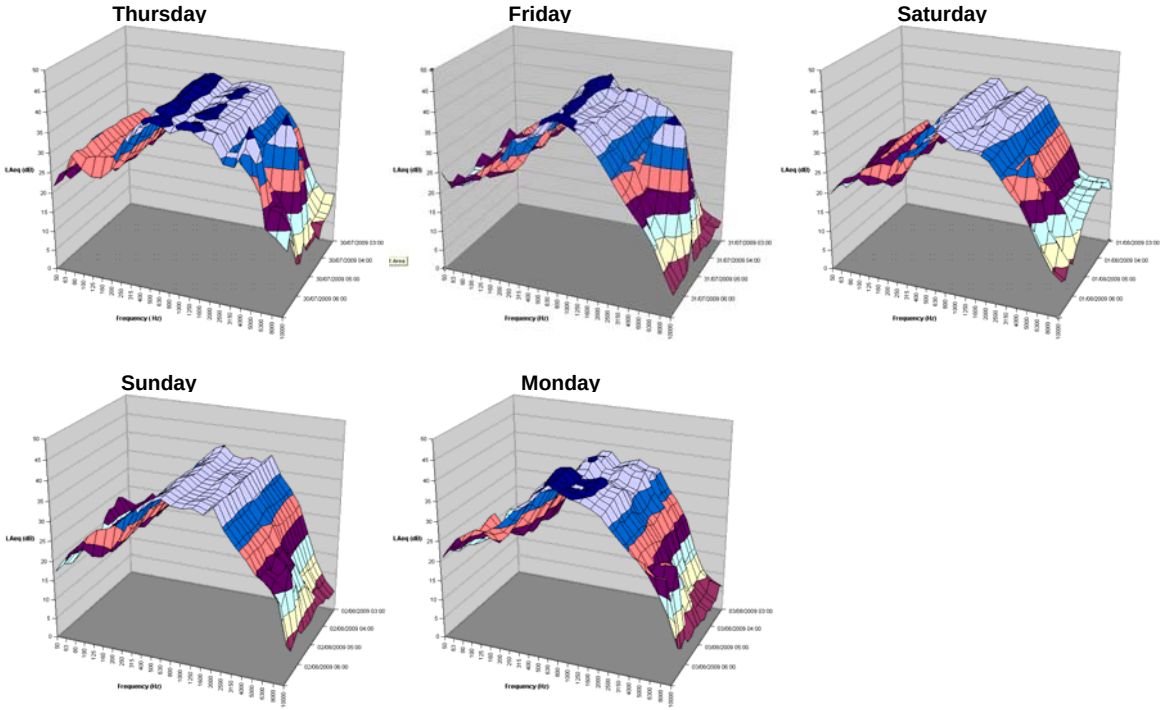
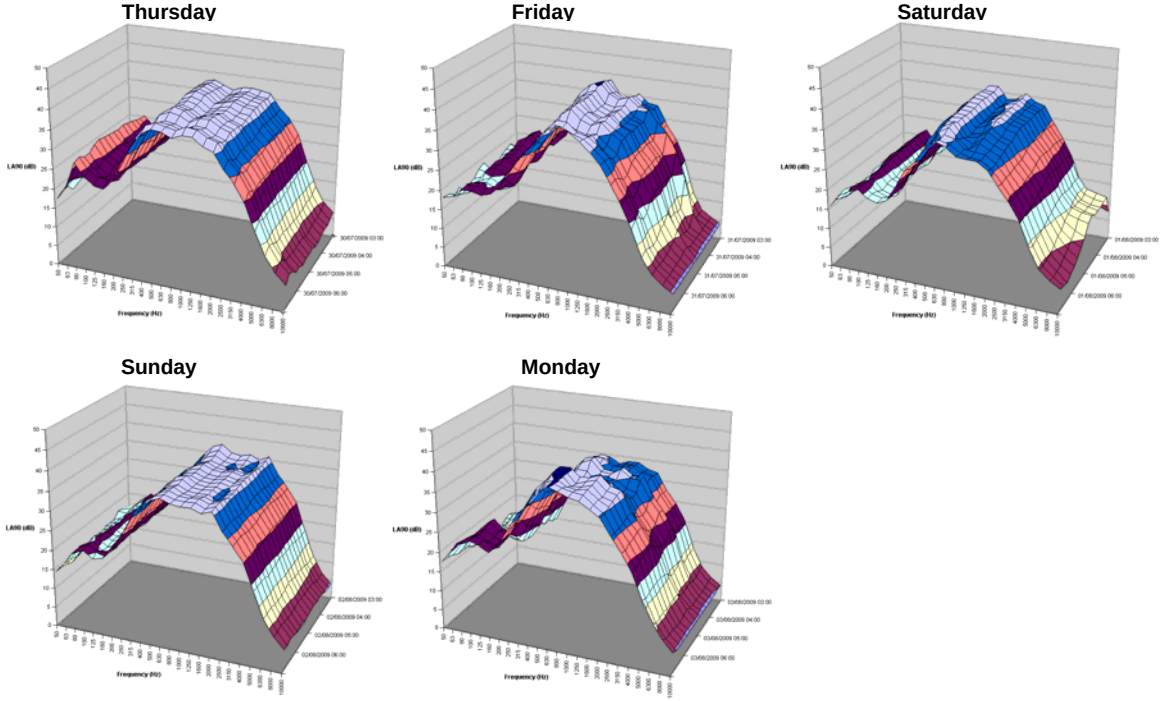
Ambient Noise Level (L_{Aeq})



Background Noise Level (L_{A90})



Key:

Noise Level dB(A)

- 45-50
- 40-45
- 35-40
- 30-35
- 25-30
- 20-25
- 15-20
- 10-15
- 5-10
- 0-5

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Long-term Baseline Noise Survey Results – Reed bed

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Figure 12.4

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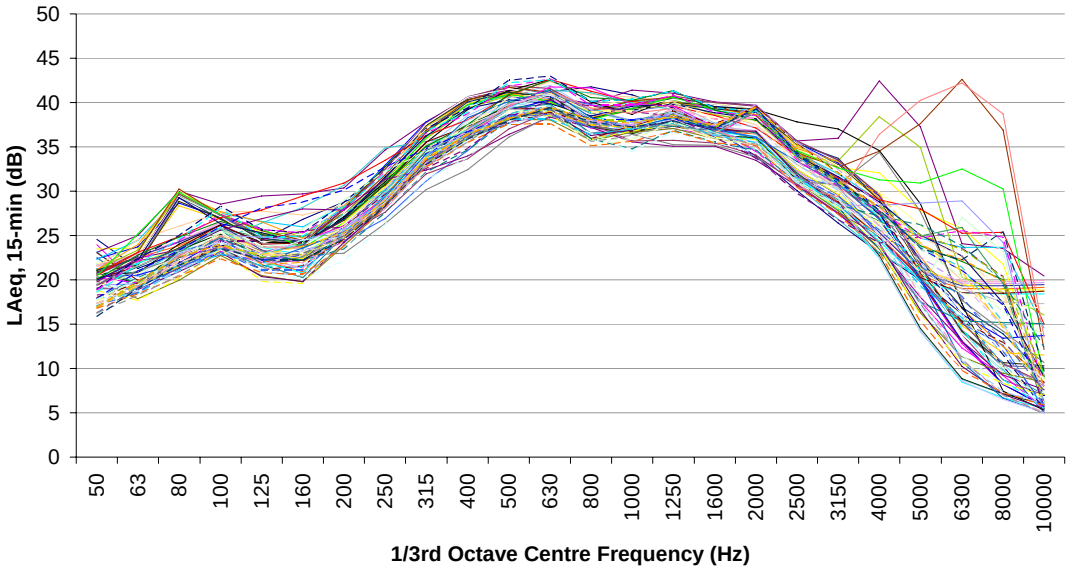
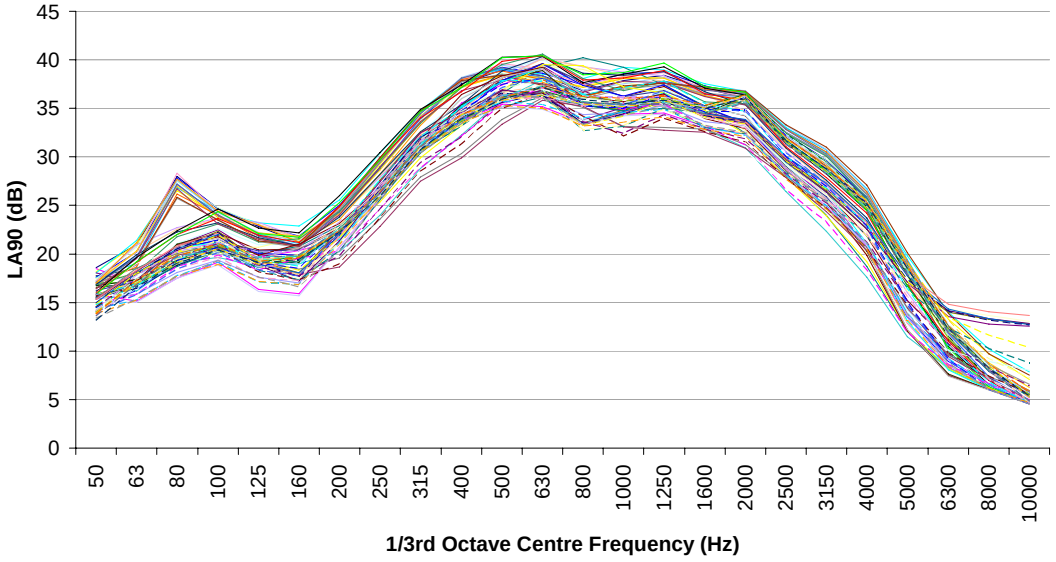
Ambient Noise Levels - Reed bed (03.00 to 07.00 hours)



Background Noise Levels - Reed bed (03.00 to 07.00 hours)



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Long-term Baseline Noise Survey Results – Reed bed

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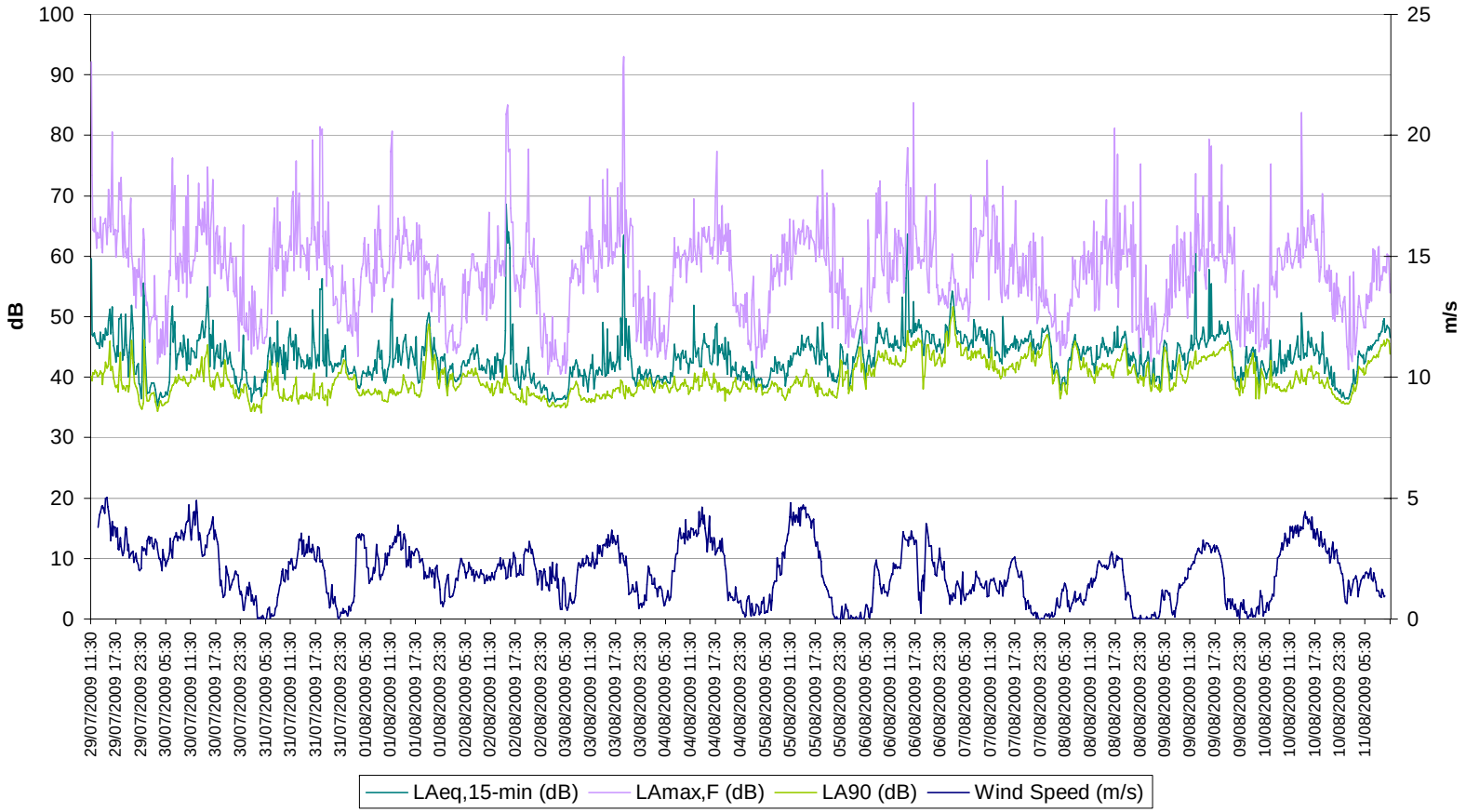
Location D: 97 Walsby Drive



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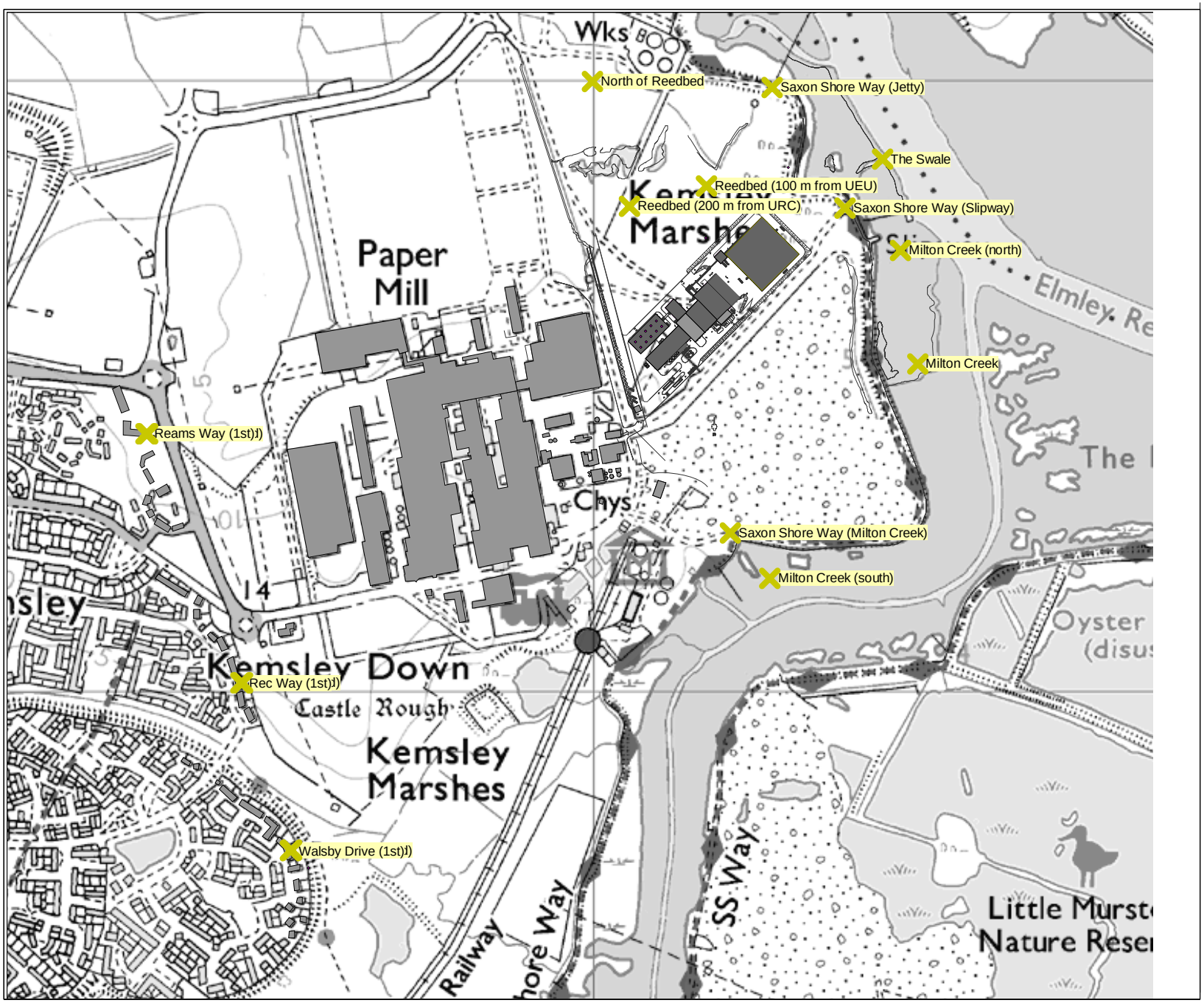

Key:

Rating Level, $L_{Ar,Tr}$ (dB)

4.1 m AGL

	< 35
35 <=	< 40
40 <=	< 45
45 <=	< 50
50 <=	< 55
55 <=	< 60
60 <=	< 65
65 <=	< 70
70 <=	< 75
75 <=	< 80
80 <=	

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TITLE

Rating Level, $L_{Ar,Tr}$ (dB) at 4.1 m

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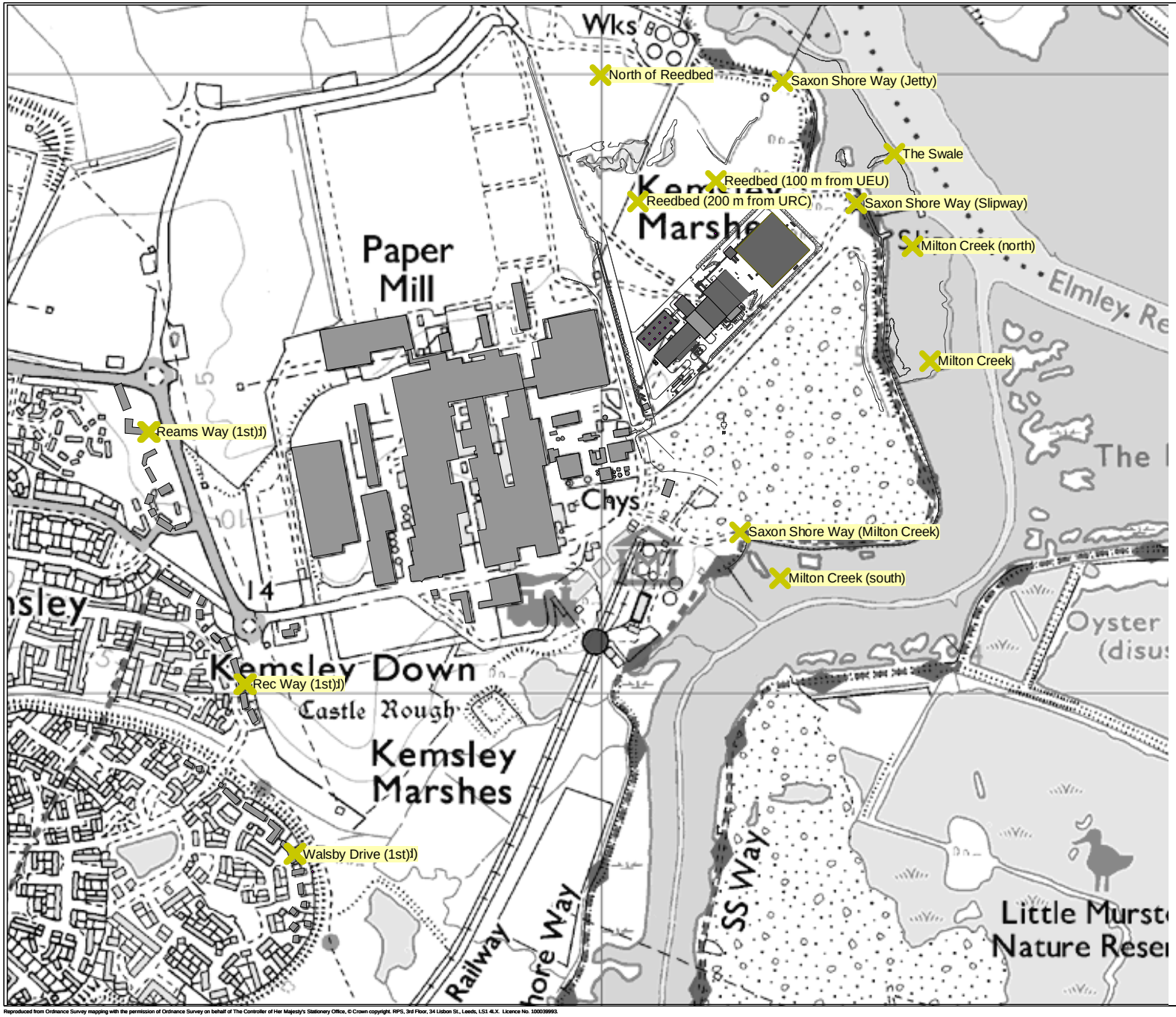

Key:

Noise Level, $L_{Aeq,T}$ (dB)

1.5 m AGL

	< 35
35 <=	< 40
40 <=	< 45
45 <=	< 50
50 <=	< 55
55 <=	< 60
60 <=	< 65
65 <=	< 70
70 <=	< 75
75 <=	< 80
80 <=	

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TITLE
Noise Level, $L_{Aeq,T}$ (dB) at 1.5 m

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DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL,

ST REGIS PAPER COMPANY LIMITED & E.ON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

CHAPTER 13:

ARCHAEOLOGY AND CULTURAL HERITAGE

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13. Introduction

13.1 Introduction

13.1.1 This chapter assesses the likely significant effects on archaeology and cultural heritage of the proposed development of a Sustainable Energy Plant at Kemsley Paper Mill, Sittingbourne, Kent. Full details of the development proposed are presented in Chapter 4, which sets the basis against which this assessment has been conducted.

13.1.2 The proposed development area covers approximately 7ha and is bounded to the south west by the existing paper mill, to the northwest by open land, to the north east by open land and the Saxon Shore Way along the coast of the Swale and to the south east by a drain and a large spoil heap.

13.1.3 The proposed development site currently comprises an area of open ground with extensive dumping of demolition material and arisings from excavations

13.1.4 The solid geology of the proposed development area consists of London Clay (BGS 1:1,250 1996). The drift geology is alluvium. The north eastern part of the proposed development area and the area to the south of the drain forming the south eastern site boundary are recorded as landfill sites. Site investigation has indicated that the proposed development area is underlain by made ground to a depth of between 0.9 metres and 4.6 metres below current ground level.

13.2 Legislation and Planning Context

Guidance

13.2.1 PPG 16 Planning Policy Guidance: Archaeology and Planning (1990), provides advice to planning authorities regarding the protection of archaeology within the planning process. The guidance makes clear that prospective developers should make provision for the archaeological appraisal of a site when assessing a sites development potential (Section 2B, paragraph 18a, 1990).

13.2.2 PPG15 Planning and the Historic Environment (1994) deals with Conservation Areas, Listed Buildings, World Heritage Sites, Historic Parks and Gardens, Historic Battlefields and the wider historic landscape.

Legislation

13.2.3 Listed buildings are protected under the provisions of the Planning (Listed Buildings and Conservation Areas) Act 1990 which empowers the Secretary of State for the Department of Culture, Media and Sport (DCMS) to maintain a list of built structures of historic or architectural significance.

13.2.4 Scheduled Monuments are protected through the Ancient Monuments and Archaeological Areas Act 1979, which has been updated in the National Heritage Act 1983. Scheduled Monuments are maintained on a list held by the Secretary of State for DCMS. Any alterations or works to a Scheduled Monument (including archaeological investigation) requires Scheduled Monument Consent (SMC).

13.2.5 The Hedgerow Regulations 1997 includes guidelines that aim to protect hedgerows that have been assessed as 'important' in terms of criteria that include historical elements. Developments that would require the removal of any part of an 'important' hedgerow require a consent from the Local Planning Authority for that removal.

13.2.6 The key Regional and Local Planning Policies relevant to archaeology and cultural heritage are as follows:

Regional Planning Guidance

The South East Plan, Regional Spatial Strategy for the South East

- POLICY BE6: Management of the Historic Environment
- POLICY NRM15: Location of Renewable Energy Development

Swale Borough Local Plan, adopted February 2008.

- Policy E14 Development Involving Listed Buildings

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- Policy E15 Development Affecting a Conservation Area
- Policy E16 Scheduled Ancient Monuments and Archaeological Sites
- Policy E17 Historic Parks and Gardens

13.2.7 Details of the above policies are given at Appendix 13.2

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13.3 Assessment Methodology

13.3.1 The study areas in paragraphs 13.3.1 and 13.3.2 are chosen on the basis of the distance from the proposed development outside which a significant adverse effect on the cultural heritage resource is unlikely to occur. The study area given in paragraph 13.3.3 is chosen so that consideration can be given to those remains which may inform the archaeological potential of the proposed development area. For designated cultural heritage resources of international and national significance (World Heritage Sites, Scheduled Monuments, Listed Buildings Grade I and II*, Registered Parks and Gardens of Special Historic Interest Grade I and II*, Registered Battlefields), the study area is a circle of 5 kilometre radius centred on the proposed development.

13.3.2 For designated historic environment resources of regional and local significance (Conservation Areas, Listed Buildings Grade II, Registered Parks and Gardens of Special Historic Interest Grade II, locally designated Parks and Gardens, locally listed buildings, locally identified historic landscape areas), the study area is a circle of 2.5 kilometre radius centred on the proposed development.

13.3.3 For buried archaeological sites that are recorded on the Historic Environment Record but not otherwise designated, the study area is a circle of 1 kilometre radius centred on the proposal site.

Desk Assessment

13.3.4 The desk based assessment (Appendix 13.1) comprised:

- Consultation with and an examination of information obtained from the Kent Historic Environment Record (HER).
- An examination of information on Scheduled Ancient Monuments, Registered Parks and Gardens and Registered Battlefields obtained from English Heritage.
- A review of relevant documentary and archival material held in the Kent Historic Environment Record and the Kent County Record Office.

13.3.5 A site visit was undertaken in June 2009 to:

- establish the presence of above ground archaeology, whether or not previously recorded.
- assess and validate data collected as part of the desk-based assessment;
- assess the topography and geomorphology of the proposed development area;
- inform an assessment of the site's context within the wider historic landscape.

13.3.6 The site visit also provided an indication of the suitability of any further survey technique. Site notes were made and digital photographs taken of the proposed development area and features, listed buildings etc. visited.

13.3.7 For the purposes of the assessment, archaeological periods are defined as follows:

- Prehistoric [comprising Lower Palaeolithic (pre 30,000 BC), Upper Palaeolithic (30,000 - 10,000BC), Mesolithic (10,000 - 3,500BC), Neolithic (3,500 - 2,000BC), Bronze Age (2,000 - 700BC) and Iron Age (700BC - AD43)]
- Roman (AD43 - AD450)
- Medieval (AD450 - AD1540)
- Post Medieval (AD1540 onwards)

Assessment of Resource Importance (Value) – Archaeological Remains

13.3.8 There are no national government guidelines for evaluating the importance or significance (and hence the 'value' of cultural heritage resources). For archaeological remains, English Heritage has proposed a series of recommended (i.e. non-statutory) criteria for use in the determination of *national* importance when scheduling ancient monuments, and these are expressed in Annex 4 of *Planning Policy Guidance 16: Archaeology and Planning* (PPG 16). The criteria include period, rarity, documentation, group value, survival / condition, fragility / vulnerability, diversity and potential, and can be used as a basis for the assessment of the importance of historic remains and archaeological sites. However the annex also states that *'these criteria should not be regarded as definitive …… rather they are indicators which contribute to a wider judgement based on the individual circumstances of a case'*.

13.3.9 The criteria described above could be used as a basis for the assessment of the importance of archaeological remains of less than national significance. However the categories of regional and district / local importance are less clearly established than that of national, and implicitly relate to local, district and regional priorities which themselves will be varied within and between regions. Local, district and regional research agenda may be available, and local or structure plans may also help.

13.3.10 Clearly a high degree of professional judgement is necessary to ensure the correct assessment of resource importance, guided by acknowledged standards, designations and priorities. It is also important to understand that buried archaeological remains may not be well-understood at the time of assessment, and can therefore be of uncertain value.

13.3.11 The most recent guidance from any national agency regarding cultural heritage and Environmental Impact Assessment is from the Highways Agency, and is expressed in Guidance Note 208/07 (August 2007) that now forms part of the Design Manual for

Roads and Bridges (DMRB, Volume II, section 3, part 2). Guidance Note 208/07 provides the following table as a guide for assessing the value of archaeological resources:

Table 13.1: Factors for assessing the value of archaeological assets

Very High	• World Heritage Sites • Assets of acknowledged international importance • Assets that can contribute significantly to acknowledged international research objectives
High	• Scheduled Monuments • Undesignated assets of schedulable quality and importance • Assets that can contribute significantly to acknowledged national research objectives
Medium	• Designated or undesignated assets that contribute to regional research objectives
Low	• Undesignated assets of local importance • Assets compromised by poor preservation and/or poor survival of contextual associations • Assets of limited value, but with potential to contribute to local research objectives
Negligible	• Assets with very little or no surviving archaeological interest
Unknown	• The importance of the resource cannot be ascertained

Assessment of Resource Importance (Value) - Historic Buildings

13.3.12 For historic buildings, assessment of importance is usually based on the designations used in the Listed Building process. However where historic buildings are not listed, or where the listing grade may be in need of updating, professional judgement will be required.

13.3.13 The criteria used in establishing the value of historic buildings within the listing procedure include architectural interest, historic interest, close historic association (with nationally important people or events), and group value. Age and rarity are also taken into account; in general (where surviving in original or near-original condition)

all buildings of pre-1700 date are listed, most of 1700-1840 date are listed, those of 1840-1914 date are more selectively listed, and thereafter still more selectively listed. Specific criteria have been developed for buildings of 20th century date.

13.3.14 At a local level, buildings may be valued for their association with local events and people or for their role in the community.

13.3.15 Guidance Note 208/07 provides the following table as a guide for evaluating the value of historic buildings:

Table 13.2: Guide for establishing the value of historic buildings

Very High	• Standing buildings inscribed as of universal importance as World Heritage Sites • Other buildings of recognised international importance
High	• Scheduled Monuments with standing remains • Grade I and II* Listed buildings • Other listed buildings that can be shown to have exceptional qualities in their fabric or historical association not adequately reflected in the listing grade • Conservation Areas containing very important buildings • Undesignated structures of clear national importance
Medium	• Grade II Listed Buildings • Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical association • Conservation Areas containing important buildings • Historic Townscape or built-up areas with historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Low	• 'Locally listed' buildings • Historic (unlisted) buildings of modest quality in their fabric or historical association • Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Negligible	• Buildings of no architectural or historic note; buildings of an intrusive character
Unknown	• Buildings with some hidden (i.e. inaccessible) potential for historic significance

Assessment of Resource Importance (Value) - Historic Landscape

13.3.16 The sub-topic of Historic Landscape is recognised as having significant overlaps with other topics such as Landscape and Townscape, and a multi-disciplinary approach to assessment is required. This is partially to avoid double-counting, and also to avoid duplication of effort. There are also significant overlaps with the other Cultural Heritage sub-topics; Archaeological Remains and Historic Buildings. The elements that are considered within those two sub-topics can make significant contributions to the historic landscape, and this latter subtopic should concentrate on the overall historic landscape character and its value rather than the individual elements within it.

13.3.17 All landscapes have some level of historic significance, as all of the present appearance of the urban and rural parts of England is the result of human or human-influenced activities overlain on the physical parameters of climate, geography and geology.

13.3.18 There are number of designations that can apply to historic landscapes, including World Heritage Sites (inscribed for their historic landscape value), Registered Parks and Gardens of Special Historic Interest, Registered Historic Battlefields, and Conservation Areas. Some local plans include locally designated Historic Landscape Areas, and Historic Parks and Gardens (or similar).

13.3.19 A model has been produced by the Council for British Archaeology whereby the historic landscape can be divided up into units that are scaled, from smallest to largest, as follows:

- **Elements** - individual features such as earthworks, structures, hedges, woods etc
- **Parcels** - elements combined to produce, for example farmsteads or fields
- **Components** - larger agglomerations of parcels, such as dispersed settlements or straight-sided field systems
- **Types** - distinctive and repeated combinations of components defining generic historic landscapes such as ancient woodlands or parliamentary enclosure
- **Zones** - characteristic combinations of types, such as Anciently Enclosed Land or Moorland and Rough Grazing
- **Sub-regions** - distinguished on the basis of their unique combination of interrelated components, types and zones
- **Regions** - areas sharing an overall consistency over large geographical tracts

The model described above can be used as the principal part of the overall assessment usually known as Historic Landscape Characterisation (HLC). However, although HLC has been undertaken for much of England, there is no significant

guidance or advice regarding the attribution of significance or value to identified historic landscape units.

13.3.20 Guidance Note 208/07 provides the following table as a guide for evaluating the value of historic landscape units:

Table 13.3: Guide for evaluating Historic Landscape Character units

Very High	• World Heritage Sites inscribed for their historic landscape qualities • Historic landscape of international sensitivity, whether designated or not • Extremely well-preserved historic landscapes with exceptional coherence, time-depth, or other critical factor(s)
High	• Designated historic landscapes of outstanding interest • Undesignated landscapes of outstanding interest • Undesignated landscapes of high quality and importance, and of demonstrable national sensitivity • Well-preserved historic landscapes exhibiting exceptional coherence, time-depth, or other critical factor(s)
Medium	• Designated special historic landscapes • Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional sensitivity • Averagely well-preserved historic landscapes with reasonable coherence, time-depth, or other critical factor(s)
Low	• Robust undesignated historic landscapes • Historic landscapes with specific and substantial importance to local interest groups, but with limited sensitivity • Historic landscapes whose sensitivity is limited by poor preservation and/or poor survival of contextual associations • Robust historic landscapes
Negligible	• Landscapes with little or no significant historical interest

Assessment of Impact Magnitude - Archaeological Remains

13.3.21 The magnitude of impact is assessed without regard to the value of the resource. In terms of the judgement of the magnitude of impact, this is based on the principle

(established in PPG16) that preservation of the resource is preferred, and that total physical loss of the resource is the least preferred.

13.3.22 It is not always possible to assess the physical impact in terms of percentage loss, and therefore it can be important in such cases to try to assess the capacity of the resource to retain its character following any impact. Similarly, impacts on the setting of archaeological remains may also be more difficult to assess as they do not involve physical loss of the resource and may actually be reversible.

13.3.23 Additional methodology regarding the assessment of effects on settings is provided below.

13.3.24 Impact scales are defined(as in DMRB Volume 11, Section 3, Annex 7) thus:

Major	Change to most or all key archaeological elements, such that the resource is totally altered. Comprehensive changes to setting.
Moderate	Changes to many key archaeological elements, such that the resource is clearly modified. Considerable changes to setting.
Minor	Changes to key archaeological elements, such that the asset is slightly altered. Slight changes to setting.
Negligible	Very minor changes to elements or setting.
No change	No change.

Assessment of Impact Magnitude - Historic Buildings

13.3.25 The magnitude of impact is assessed without regard to the value of the resource, so the total destruction of an insignificant building has the same degree of impact as the total loss of a high value building. In terms of the judgement of the magnitude of impact, this is based on the principle that preservation of the resource and its setting is preferred, and that total physical loss of the resource is the least preferred.

13.3.26 Impacts on the setting of historic buildings may include vibration, noise and lighting issues as well as visual impacts, and may be reversible. Additional methodology regarding the assessment of effects on settings is provided below.

13.3.27 Impact scales are defined (as in DMRB Volume 11, Section 3, Annex 7) thus:

Major	Change to key historic building elements, such that the resource is totally altered. Total change to the setting.

Moderate	Change to many key historic building elements, such that the resource is significantly modified. Changes to the setting of an historic building, such that it is significantly modified.
Minor	Changes to key historic building elements, such that the asset is slightly different. Change to setting of an historic building, such that it is noticeably changed.
Negligible	Slight changes to historic buildings elements or setting that hardly affect it
No change	No change to fabric or setting

Assessment of Impact Magnitude - Historic Landscape

13.3.28 Historic landscapes cannot be destroyed or damaged but impacts on them can change their character. Impacts should be assessed using evaluated historic landscape character units, not the elements/parcels/components that contribute towards the character (see above). There may be impacts on the setting of identified units, especially with regard to designated historic landscapes. Additional methodology regarding the assessment of effects on settings is provided below.

13.3.29 Impact scales are defined (as in DMRB Volume 11, Section 3, Annex 7) thus:

Major	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit.
Moderate	Changes to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character.
Minor	Changes to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited changes to historic landscape character.
Negligible	Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.

No change No change to elements, parcels or components; no visual or audible changes; no changes arising from amenity or community factors.

Significance of Effects

13.3.30 The significance of effects is a combination of the value of the resource or asset and the magnitude of impact on that resource or asset. Effects can be adverse or beneficial. Beneficial effects are those that mitigate existing impacts and help to restore or enhance heritage assets, therefore allowing for greater understanding and appreciation. In line with Guidance Note 208/07 the following matrix is used for all three sub-topics.

Table 13.4: Cultural Heritage: Significance of Effects Matrix

VALUE / SENSITIVITY					
Very High	Neutral	Slight	Moderate/ Large	Large or Very Large	Very Large
High	Neutral	Slight	Moderate/ Slight	Moderate/ Large	Large/Very Large
Medium	Neutral	Neutral/ Slight	Slight	Moderate	Moderate/ Large
Low	Neutral	Neutral/ Slight	Neutral/ Slight	Slight	Slight/ Moderate
Negligible	Neutral	Neutral	Neutral/ Slight	Neutral/ Slight	Slight
	No Change	**Negligible**	**Minor**	**Moderate**	**Major**
	MAGNITUDE OF IMPACT				

13.3.31 Where the matrix provides a split in the significance of effects, e.g. Moderate/Slight, the assessor will exercise professional judgement in determining which of the levels of significance is more appropriate.

13.3.32 Moderate or greater effects are considered to be significant.

Settings

13.3.33 The issues surrounding the identification of the 'setting' of cultural heritage features, and the nature and magnitude of impacts and consequently effects on such 'settings', have been subject to much recent debate within the historic environment profession. Legislation and guidance makes reference to the desirability of preserving or not adversely affecting 'settings', but the term has never really been clearly defined.

13.3.34 English Heritage note that ‘Setting’ is an established concept that relates to the surroundings in which a place is experienced, its local context, embracing present and past relationships to the adjacent landscape. Definition of the setting of a significant place will normally be guided by the extent to which material change within it could affect (enhance or diminish) the place’s significance. (English Heritage 2008: 39).

13.3.35 The Institute for Archaeologists has recently established a working party to address this issue. In the meantime Colcutt’s (1999) definition of setting, as summarised in Lambrick (2008, below) is used as follows:

- Intrinsic visual interest and listing visual qualities
- Topographic setting, identifying visual relationships to topography and natural features that can be linked with the function of the site or the reason for placement of the site in the landscape
- Landuse setting, identifying whether the landuse is sympathetic to the site’s intellectual understanding
- Group setting including both contemporary and diachronic groupings or patterning, listing other sites, above or below ground, that could assist with creating a network of relationships. This should acknowledge any spatial element.

Limitations

13.3.36 No limitations were encountered during the preparation of the desk based archaeological assessment in connection with this project. However, a degree of uncertainty is attached to the baseline data sources used in any desk based assessed. These include:

- The SMR can be limited because it depends on random opportunities for research, fieldwork and discovery. This is particularly true in this case, where there have been no pieces of documented archaeological fieldwork having taken place within 1km of the centre of the application area.
- Documentary sources are rare before the medieval period, and many historic documents are inherently biased. Older primary sources often fail to accurately locate sites and interpretation can be subjective.

- Geotechnical information regarding made ground does not necessarily preclude the existence of archaeological deposits. Made ground could either be imported/disturbed material of no archaeological value or may actually represent archaeological deposits.

13.4 Baseline Conditions

Prehistoric and Roman.

13.4.1 The proposed development area is located at the junction of the higher ground of the Kemsley Ridge, which lies on London Clay, and the alluvial floodplain, underlying the proposed development site and which in general has the potential to contain deposits of palaeo-environmental significance.

13.4.2 The wider area saw extensive activity from early times, with remains of ritual, settlement and agricultural origin being recorded on the mainland and on Sheppey.

13.4.3 A prehistoric log boat was found in 1924, apparently during river drainage in Milton Creek, while a greenstone celt found in the vicinity was apparently a separate find (HER number TQ96NW12).

13.4.4 Remains dating to the Neolithic and/ or Bronze Age were recorded during an archaeological evaluation to the north of Ridham Avenue, some 700 metres west of the proposed development area. The remains comprised ditches gullies pits and postholes in an area approximately 300 metres in length (HER number TQ96NW96 & 97). On the slightly higher ground to the south, two intercutting features of mid to late Bronze Age date were revealed (HER number TW96NW98). The remains were interpreted as being an extension of the known settlement activity to the south (TQ96NW99).

13.4.5 Salt making was a major activity locally in the later prehistoric and Roman periods and later. The remains of two salterns are located some 700 metres and 800 metres from the proposed development area, and finds including briquetage, pottery, burnt flint and animal bone have been made (HER numbersTQ96NW1108 & TQ961110).

13.4.6 The wider area was heavily Romanised with the line of Roman Watling Street leading from London to the coast running rather less than 3 kilometres to the south of the proposed development area.

13.4.7 Three ditches of Roman date were recorded during an archaeological evaluation to the north of Ridham Avenue, some 700 metres from the proposed development area (HER number TQ96NW98).

13.4.8 In summary at least part of the higher ground of the Kemsley Ridge is known to have been used for occupation activity during the prehistoric and Roman periods, while the alluvial floodplain would have been marshland and would have been exploited for a number of purposes, including salt making and pottery manufacture as well as hunting and fishing.

Medieval

13.4.9 There is relatively little physical evidence for an Anglo-Saxon presence in the area, although several local place names appear in early records. The place name Milton first appears in the Anglo Saxon Chronicle in 893. Its derivation indicates that it was the meeting place for the Hundred of Milton and it would have been located at its centre (Wallenberg: 254). The adjacent parish of Tonge is first mentioned in the Domesday Book of 1086 and probably derives from its topographical location on a projection of land (Wallenberg: 265). The place name Kemsley seems to be post Norman conquest in origin (Wallenberg: 255), while Sittingbourne first appears in 1200 (Wallenberg 264).

13.4.10 A possible Anglo Saxon site of unknown type is recorded as being located some 200 metres south of the proposed development area. The source is antiquarian and the site type and location uncertain, although it may be based on place name evidence (HER number TQ96NW13).

13.4.11 There is documentary evidence for oyster beds in the area being exploited from the end of the 12th century onwards. The oyster grounds probably included Milton Creek and a stretch of the Swale (HER number TQ96NW1007).

13.4.12 The old church at Murston, located some 1.9 kilometres south of the proposed development area, is known to have been in existence by 1291. A new church was constructed in a more convenient location close to the London to Canterbury road in 1873 and much of the medieval church was demolished. The remains of the church is a Scheduled Monument (number 25469).

13.4.13 A moated site, Castle Rough, is located some 500 metres south of the proposed development area. The site is located below the 5 metre contour and comprises a rectangular earthwork island surrounded on four sides by a moat. Excavations during the early 1970s indicated that the site was constructed during the 13th or 14th century. Numerous earlier artefacts were recovered dating from the Mesolithic and Roman periods. These were interpreted by the excavators as having been brought in with material from elsewhere. It is not entirely clear from the available material whether material was imported from some distance or whether the dumped material represents upcast from the moat (HER number TQ96NW10, SAM Kent 115).

13.4.14 The parish church of the Holy Trinity, Milton church is flint-faced with Stone Quoins. The roof is of the 14th century, while the south porch is of the 15th century. The church was subject to restoration during the 1880s. The building is listed at grade I and is located some 1.5 kilometres southwest of the proposed development area.

Post-medieval

13.4.15 There are numerous remains of timber structures and vessels recorded along the foreshore. The vast majority of these are probably post medieval in origin and when recognisable this seems to be the case, although some remains may be earlier. The proposed development area itself appears to have been used for agricultural purposes until the 19th century, although nearby fields were used for brick making and other industries.

13.4.16 Little Murston Farmhouse, located some 1.4 kilometres southwest of the proposed development area is a farmhouse of the 18th century or earlier. It is of two storeys in brown brick, now partly pebble- dashed. The building has a hipped tiled roof with one chimney stack. The building is listed at Grade II.

13.4.17 The earliest detailed map of the area is probably William Barlow's Map of the hundreds of Milton and Teynham of 1800, published in Halstead's Topographical Survey of Kent, shows the wider area as being divided in to three zones, which seem to represent water, marshland and dry land. The settlement of Milton with its parish church is located within the latter, while the proposed development area and Castle Rough are located in the marsh.

13.4.18 William Mudge's Map of 1801 shows Milton as being a rather larger settlement than Sittingbourne. Castle Rough is shown with a drain into Milton Creek. The proposed development area is shown as enclosed fields.

13.4.19 The Milton Next Sittingbourne Tithe Map of 1838 shows the proposed development area and much of the surrounding area as being owned by William Marshall. The area was being used for pasture, with parcels occasionally being recorded as 'pasture and water'. Castle Rough is shown and is recorded as being recorded as 'wood' at that time.

13.4.20 The first edition six inch to the mile Ordnance Survey map of 1869 shows the proposed development area as being in fields with a sheepfold on its north eastern boundary. The proposed development area is indicated as being within Kemsley Down and Kemsley Marshes. The proposed development area is divided into two by a field boundary and is crossed by a north-south running tramway. A further tramway runs roughly east to west approximately 200 metres south of the proposed development area and connects with that running through the proposed development area. A brick field is marked immediately south of New Milton. In the wider area a

large duck decoy is marked 950 metres to the northwest of the proposed development area.

13.4.21 The OS six inch edition of 1898 shows a number of brickworks established in the area, including buildings constructed on the brick field marked on the OS edition of 1869 (paragraph 4.4.4, above). Along the shore line, saltings and a disused oyster pond are marked. By the time of the OS edition of 1909, the brickworks were disused and the Govehurst Dock had been dug.

13.4.22 The post First World War shortage of wood pulp saw an increased value in paper. Frank Lloyd, the owner of the Sittingbourne paper mill therefore expanded the operation and built a new paper mill at Kemsley. Construction began in 1923 and the mill was in operation in 1924. The mill was coal powered and featured an aerial ropeway from Ridham Dock, which brought in logs for grinding. Kemsley village was constructed for the paper mill workers. Of the planned 750 houses, 188 had been completed by the summer of 1927 (Bellingham1996: 67-69). The 1938 edition of the OS shows these buildings.

13.4.23 The mill was supplied from Ridham Dock by a tramway which extended into Sittingbourne to the south, from where it acted as a passenger railway, bringing workers to and from the mill. In 1969 the railway was handed over to the Locomotive Club of Great Britain's Light Railway Section which became the Sittingbourne & Kemsley Light Railway. The southern half of the railway, south of the proposed development area, continues in use as a preserved railway, while the section of the northern part which forms the western boundary of the proposed development area has been replaced by the perimeter road around the paper mill.

13.4.24 An aerial photograph taken in 1945 shows the paper mill with conical mounds of material to its north. Most of the proposed development area, in particular the western half, has material piled upon it. The OS edition of 1950 indicates a similar disposition. The OS edition of 1979 indicates that material has been deposited on the eastern half of the proposed development area.

13.4.25 The site visit indicated that the proposed development area is located within the perimeter fence of the paper mill, but lies outside the perimeter road around the main paper mill buildings and is divided form the main area by a deep ditch. There has been significant tipping of arisings from excavations and building material to a depth of c. 1.8 metres in places. The tipping covers over half of the proposed development area.

Geotechnical Survey

13.4.26 A Phase Two geotechnical site investigation was undertaken by RPS in 2009. Intrusive works comprised 3 cable percussion boreholes, 15 trial pits and 8 window sample boreholes. Interventions were undertaken from the base of any arisings.

13.4.27 The survey revealed made ground across the whole of the site, comprising brown grey gravelly sands and clays with frequent infill materials including bricks, plastics, and wood, with peat and gravels of coal dust, ash and clinker noted as being present in places level. These infill materials were more commonly found in locations within the northern and western site areas such as Trial Pits TP10, TP11 and TP13. The made ground extended to depths of between 0.9metres and 4.6metres below current ground level

13.4.28 Peat was occasionally present within Made Ground in the north and east of the site and was encountered as a peaty silt / clay layer within the made ground at1.6 to 1.8m below current ground level in boreholes WS3 and WS5 or as occasional pockets in the made ground in Trial Pits TP1 and TP14.

13.4.29 Superficial Deposits were encountered directly beneath the Made Ground in the majority of the borehole and trial pit locations. The superficial deposits typically comprised grey brown orange mottled firm to stiff clays and appear to be Alluvium, as mapped in the area by the BGS. These were sandy, gravelly and friable in places. Below the made ground the borehole logs from WS1 and WS3 indicate the possible presence of organic matter.

Historic Landscape

13.4.30 The proposed development area is located within HLC type 12.3: Industrial complexes and factories. The Kent Historic Landscape Characterisation project notes that this type represents *largely recent industrial developments which have become established within industrial parks out of town and in rural locations*. The HLC types is *identified on 1:25,000 and 1:10,000 maps by name and consisting predominantly of large structures.*

13.4.31 The area to the east of the proposed development area is HLC Type: 8.7: Mud flats. The Kent Historic Landscape Characterisation project notes that this type comprises *Natural marine deposits of silt and clay particles* and that they are identified *by reference to annotations on OS maps.* In addition *mudflats are to be found in low energy environments along the north and south Kent coasts*.

13.4.32 The area to the west of the proposed development area is HLC Type 1.14: "Fields predominantly bounded by tracks, roads and other rights of way"

13.4.33 The Kent Historic Landscape Characterisation project notes that this type *generally occurs on chalk uplands - especially the dip slopes and has resulted from post-medieval informal enclosures. The roads and tracks are possibly old drove roads to and from the downlands. Other examples include extensive areas of 20th -century market gardening.* The HLC type can be identified by *typically large enclosures bounded by wavy roads, tracks and other public rights of way.*

13.4.34 The area to the north of the proposed development area is HLC Type 5.1 **:** Reclaimed Marsh - Small irregular enclosures

13.4.35 The Kent Historic Landscape Characterisation project notes that this HLC type comprises *reclaimed marshland enclosures, with often highly irregular shapes and very wavy irregular boundaries. Boundaries typically consist of natural drainage channels with larger straighter built drainage channels also being present. Age is often indeterminate, from medieval to modern. Age of reclaimed marshland enclosures can also vary across Kent.*

13.4.36 This HLC type is *generally found in Romney Marsh, the Hoo peninsular and the Isle of Sheppey.*

13.4.37 The northern part of Sittingbourne, to the south and south west of the proposed development area is HLC Type 9.6 **:** Post 1801 Settlement

13.4.38 The Kent Historic Landscape Characterisation project notes that this HLC type comprises *settlement which has developed since 1801. Includes expansion of hamlets, villages, towns and cities as well as new settlement groups.*

13.5 Incorporated Enhancement and Mitigation

13.5.1 Much of the proposed mitigation for the proposed Development is built into the design as embedded mitigation.

13.6 Identification and Evaluation of Likely Significant Effects

Buried Archaeological Remains

13.6.1 The proposed development area lies within a wider landscape which generally has high potential to contain remains of all dates from the prehistoric onwards.

13.6.2 Recent archaeological work on the Sittingbourne Northern Relief Road has indicated that the higher ground of the Kemsley Ridge has the potential to contain remains from the prehistoric through to the medieval periods, with further activity taking place in the lower lying marshlands now represented by areas of alluvium.

13.6.3 The site visit, however, has indicated that there has been significant tipping of arisings from excavations and building material to a depth of c. 1.8 metres in places. The tipping covers over half of the proposed development area and is located in its north and west.

13.6.4 A phase two geotechnical site investigation was undertaken by RPS in 2009. Interventions were undertaken from the base of any arisings. The survey revealed made ground, comprising brown grey gravelly sands and clays with frequent infill materials including bricks, plastics, and wood, with peat and gravels of coal dust, ash and clinker noted as being present in places extended to depths of between 0.9metres and 4.6metres below current ground level.

13.6.5 The made ground was underlain by the natural alluvium. Borehole logs indicate that this material contains organic matter in places. On this basis there may be some potential for surviving palaeo-environmental remains.

13.6.6 There is no evidence for the proposed development area to contain below ground remains of national importance, or of sufficient importance to warrant preservation in situ of archaeological remains.

13.6.7 Both the nature of the 20th century land-use at the site and the associated ground disturbance suggests that the potential for the survival of previously unidentified sub-surface archaeological remains of national importance, or of sufficient importance to warrant preservation in situ, is unlikely. In addition there is no evidence for a surviving soil horizon beneath the made ground, it is likely that any archaeological deposits have been damaged or removed and that the potential for the survival of archaeological remains immediately below the former land surface is low.

13.6.8 The proposed development area is now of low archaeological potential, with the possible exception of very deeply buried deposits under alluvium. It is noted that the proposed development, with the exception of the fuel storage pit, lies on top of and within the area of made ground and an additional layer of general fill to be imported as part of the proposed development.

13.6.9 The fuel storage pit would have a finished floor level of approximately -1.2mAOD. The fuel storage bunker within the building envelope will have dimensions of 32 m in length and 71.6 m in width .

Scheduled Monuments

13.6.10 The nearest statutorily protected cultural heritage receptor is Castle Rough, a Scheduled Monument (County Number 115). The SAM is of high value. The SAM is located some 500 metres south of the proposed development area.

13.6.11 The SAM itself is low lying and not visible from any distance away. Its position in the landscape is indicated by trees. Perhaps the clearest view of the SAM and the proposed development area is obtained from the southwest. From here, the SAM itself is not visible but the trees growing on it are visible against a background of the existing paper mill buildings.

13.6.12 There would be no physical impact upon the SAM from the proposed development and any impact would be on the setting of the site.

13.6.13 The impact magnitude on the site is assessed as being negligible. The effect of the proposed Development on the site would be slight adverse, and this would be an indirect effect.

13.6.14 Murston Old Church, Sittingbourne is a Scheduled Ancient Monument (number 25469). The SAM is of high value and the scheduled area includes both the above ground and buried remains of the church building and encompasses the churchyard. The SAM is bounded on its north side by modern business/ industrial units which provide an effective northern boundary to the setting of the SAM.

13.6.15 There would be no physical impact upon the SAM from the proposed development and any impact would be on the setting of the site.

13.6.16 The impact magnitude on the site is assessed as being no change. The effect of the proposed Development on the site would be neutral.

13.6.17 A World War II Heavy anti aircraft gunsite (known as Thames South 2), is located some 300m west of Chetney Cottages and is a Scheduled Monument (SAM34302). The SAM is of high value and is located some 3 kilometres northwest of the proposed development area. The scheduling description indicates that the site was chosen to defend the industrial and military targets in the Lower Thames and Medway areas from high flying strategic bombers approaching from the south and east. The site overlooks the River Medway and the Chetney Marshes.

13.6.18 The setting of the SAM is dependant on its defensive purpose and is wide ranging. The paper mill at Kemsley would have been in existence during the period of use of the SAM and would presumably have been an area for the guns to avoid, assuming they could be depressed that far. There has been considerable large scale development on the Kemsley Ridge to the northwest of the proposed development area. This development provides a partial visual barrier and means that the original paper mill is not the landscape feature that it would have been during the period of use of the SAM. The proposed development would fit into this area and would add little visible mass.

13.6.19 There would be no physical impact upon the SAM from the proposed development and any impact would be on the setting of the site.

13.6.20 The impact magnitude on the site is assessed as being no change. The effect of the proposed development on the site would be neutral.

Historic Buildings

13.6.21 The closest listed building to the proposed development is Little Murston Farmhouse, listed at Grade II. The listed building is of medium value.

13.6.22 The listed building is located some 1.4 kilometres southwest of the proposed development area. The setting of the listed building comprises the surrounding fields, those to the west having been subject to gravel extraction. The setting of the listed building is now rather degraded. There is currently no intervisibility with the proposed development area. Much of the proposed development would lie on a line of sight between the listed building and the existing paper mill and would be located adjacent to the latter.

13.6.23 The proposed development is taller than the adjacent buildings and although partly screened by the adjacent restored landfill, part of the body of the proposed development would be visible from the listed building. There would be no physical impact upon the listed building from the proposed development and any impact would be on its setting.

13.6.24 The impact magnitude on the site is assessed as being minor adverse. The effect of the proposed Development on the site would be slight adverse, and this would be an indirect effect.

13.6.25 Tonge Corner Farmhouse is located some 2.1 kilometres south east of the proposed development area and is listed at Grade II. The listed building is of medium value. The setting of the listed building comprises the surrounding fields, There is currently little or no intervisibility with the proposed development area, although the stacks of the existing paper mill are likely to be visible from the listed building. The proposed development is likely to be only partly visible from the listed building, being screened by the high ground of the adjacent land fill site and existing farm buildings.

13.6.26 There would be no physical impact upon the listed building from the proposed development and any impact would be on its setting. The magnitude of impact would be minor adverse and the effect of the proposed development on the listed building would be slight adverse.

13.6.27 The medieval parish church of the Holy Trinity, Milton church is listed at grade I and is of high value. The listed building is located some 1.5 kilometres southwest of the proposed development area. Development, including existing paper mill buildings

and stacks, is located between the listed building and the proposed development area and the housing development on the west, north and east side of the listed building effectively limits its setting. There would be little intervisibility between the proposed development and the listed building. There would be no physical impact upon the listed building from the proposed development. Any effect would be on its setting. The magnitude of impact is assessed as being negligible. The effect of the proposed development on the setting of the listed building would be slight adverse.

13.6.28 Kingshill Farmhouse and the barn adjoining the cattleshed immediately north of Kingshill Farmhouse are located some 1.9 kilometres northeast of the proposed development area on the Island of Sheppey and are listed at Grade II. The listed buildings are of medium value. Each listed building and the space between them forms the primary setting of the other. The setting of the listed buildings also comprises the surrounding fields. The proposed development area is visible from the listed buildings but the proposed development would be seen against a background of the existing paper mill buildings.

13.6.29 There would be no physical impact upon the listed buildings from the proposed development and any impact would be on the setting of the site.

13.6.30 The impact magnitude on the site is assessed as being negligible. The effect of the proposed development on the site would be neutral.

13.6.31 The church of All Saints, Iwade is listed at Grade I, is of high value and is located approximately 2.4 kilometres north west of the proposed development area. The church is located within a surrounding churchyard which forms its primary setting. The eastern side of the churchyard is bordered by agricultural fields which form a secondary setting. .

13.6.32 There has been considerable large scale development on the Kemsley Ridge to the northwest of the proposed development area. This development provides a partial visual barrier. The proposed development would fit into this area and would add little visible mass to the view in this direction from the listed building.

13.6.33 There would be no physical impact upon the listed building from the proposed development and any impact would be on the setting of the site.

13.6.34 The impact magnitude on the site is assessed as being no change. The effect of the proposed development on the site would be neutral.

13.6.35 The church of St Giles is located some 2.9 kilometres southeast of the proposed development area, is listed at Grade I and is of high value. Although nominally within the ZTV, the proposed development would not be visible from the listed building. There would be no physical impact upon the listed building from the proposed

development. The magnitude of impact would be no change and the effect of the proposed development on the listed building would be neutral.

13.6.36 Claxfield Farmhouse is listed at Grade II*, is of high value and is located some 4.5 kilometres southwest of the proposed development area. Although nominally within the ZTV, the proposed development would not be visible from the listed building. There would be no physical impact upon the listed building from the proposed development. The magnitude of impact would be no change and the effect of the proposed development on the listed building would be neutral.

13.6.37 There are further Grade II listed buildings at 66 North Street, Kemsley 2 kilometres south west of the proposed development area and to the west of Kemsley, Pheasants Cottage and Bramblefield Farmhouse, 2.25 kilometres and 1.9 kilometres west of the proposed development area respectively. These buildings are of medium value. In each case their settings have been rather degraded. Any view of the proposed development from the listed buildings would be through Kemsley and the existing paper mill buildings. The magnitude of impact would be no change and the effect of the proposed development on the listed building would be neutral.

13.6.38 Mere Court and East Hall, both listed at Grade II are located some 2 kilometres and 2.35 kilometres south of the proposed development area respectively. Development, including recent industrial development, as well as the existing paper mill buildings and stacks, is located between the listed building and the proposed development area. There would be little intervisibility between the proposed development and the listed buildings. There would be no physical impact upon the listed building from the proposed development. Any effect would be on their setting. The magnitude of impact would be negligible and the effect of the proposed development on the listed buildings would be slight adverse.

Conservation Areas

13.6.39 The nearest Conservation Area is Milton Regis High Street, located some 2.5 kilometres south west of the proposed development area. The Conservation Area is of medium value and contains a number of listed buildings which are assessed as part of the Conservation Area. The conservation area is inward looking and on its eastern side, much of it is bounded by trees in back gardens of houses and its setting to the east is thus limited. Views of the proposed development area could not be obtained from any part of the Conservation Area within the public realm and it is unlikely that the proposed development would be visible from the Conservation Area

13.6.40 At most only the stack of the proposed development would be visible from the Conservation Area. There would be no physical impact upon the Conservation Area from the proposed development. Any impact would be on the setting of the Conservation Area. The impact magnitude on the Conservation Area is assessed as

being negligible. The effect of the proposed Development on the site would be slight adverse, and this would be an indirect effect.

13.6.41 Sittingbourne High Street Conservation Area is located some 2.9 kilometres south of the proposed development area. The Conservation Area is of medium value and contains a number of listed buildings which are assessed as part of the Conservation Area. The conservation area is inward looking and its setting is therefore very limited. Views of the proposed development area, or of the proposed location of the stack were not obtained from any part of the Conservation Area within the public realm.

13.6.42 At most only the stack of the proposed development would be visible from the Conservation Area. There would be no physical impact upon the Conservation Area from the proposed development. Any impact would be on the setting of the Conservation Area. The impact magnitude on the Conservation Area is assessed as being negligible. The effect of the proposed Development on the Conservation Area would be slight adverse, and this would be an indirect effect.

13.6.43 The Tonge Conservation Area is located some 2.9 kilometres south west of the proposed development area. The Conservation Area is of medium value.

13.6.44 The Conservation Area Character Appraisal (paragraph 18) notes that *the railway embankment, aligned east-west along the northern edge of Tonge, is an important feature in the local landscape, especially where the banks are covered with tree growth. This embankment has, in effect, severed Tonge visually from the wide sweep of low lying land to the north including the marshes so that it now forms a well defined northern edge to the settlement. The trees now comprise an important background to Tonge when viewed from the south.*

13.6.45 This defined edge limits the setting of the Conservation Area to the north. It is likely that part of the stack of the proposed development would be visible from the Conservation Area. There would be no physical impact upon the Conservation Area from the proposed development. Any impact would be on the setting of the Conservation Area. The impact magnitude on the Conservation Area is assessed as being negligible. The effect of the proposed Development on the Conservation Area would be slight adverse, and this would be an indirect effect.

Historic Parks and Gardens and Historic Battlefields

13.6.46 The nearest Registered Park and Garden is Doddington Place, some 9 kilometres to the south of the proposed development area. There would be no physical impact upon the Registered Park and Garden from the proposed development and no effect on its setting.

13.6.47 There are no registered battlefields within 15 kilometres of the proposed development area and there would be no effect on any registered battlefield or its setting arising from the proposed development.

Historic Landscapes

13.6.48 The proposed development area is located within HLC type 12.3 Industrial complexes and factories. This HLC type has a high ability to withstand change. The proposed development would introduce further large built development of an industrial nature and would be consistent with the existing historic landscape character.

13.6.49 The nature of the proposed development and its location within an area already containing an industrial complexes means that there would be no effect on any other HLC.

13.6.50 Overall, the effect on the historic landscape is considered to be neutral.

13.7 Cumulative Impacts

13.7.1 A number of potential cumulative impacts have been identified as follows

13.7.2 Kent County Council have recently issued Formal Scoping Opinions for two sites at Ridham Dock for proposed biomass combined heat and power plants. One of these is located at the Countryside Recycling site which already has a MRF and composting facility and the other nearer to the dock itself where Brett Aggregates operates a mortar Plant.

13.7.3 Swale Borough Council have identified the following potential cumulative impacts as follows:

13.7.4 Sittingbourne Town Centre regeneration - (major regeneration scheme south and north of the railway line. South of the railway line will include new retail floor space, office, community and learning, open space and residential and will be delivered first. North of the railway line will be the second phase of development to include mainly 1000 residential units with open space, school and other community facilities.

13.7.5 East Hall Farm – (residential development of circa 800 houses).

13.7.6 Kent Science Park (4ha expansion and new units).

13.7.7 Kemsley Industrial Development.

13.7.8 Iwade Expansion (Residential development of 450 houses).

13.7.9 Thistle Hill (Residential development of 1750 houses).

13.7.10 Queenborough and Rushenden Regeration Project (New residential and mixed use development and employment land development).

13.7.11 Port of Sheerness (Wind farm, Port expansion)

13.7.12 Northern Relief Road (New access road to relieve the traffic through Sittingbourne. The first section to Eurolink has been approved and will commence construction in the autumn. The final link to Bapchild will go out to consultation on a preferred route later this year).

13.7.13 Stones Farm (nr Bapchild to the south of East Hall Farm) has been allocated for housing.

13.7.14 The Meads (near the A249 in Sittingbourne) and Fulston Manor (to the south of Sittingbourne). The Meads is close to completion with retail space being constructed. Fulston Manor is a 615 unit housing scheme.

13.7.15 It is noted that none of the proposals with potential cumulative impacts would lie within the same historic landscape character area as the proposed development. A number of the proposals with potential cumulative impacts may impact upon below ground archaeology including the palaeo-environment. There is also the potential for the proposed development to impact upon below ground archaeology, including the palaeo-environment. It is noted that the proposed development area covers a comparatively small footprint, which has been previously disturbed. It is considered that the cumulative effect of the various other proposed developments on the below ground archaeological resource is considerable but that the additional impact of the proposed development would not be significant.

13.7.16 Of the above potential cumulative impacts, the Sittingbourne Town Centre regeneration, The Meads, located to the west of Sittingbourne, Fulston Manor, Kent Science Park, the Queenborough and Rushenden Regeneration Project, Thistle Hill and the Port of Sheerness projects are located either within existing areas of development and/ or in locations where they would have no effect on cultural heritage features impacted by the proposed development. There would therefore be no cumulative impacts with regard to these sites.

13.7.17 The two power projects at Ridham Dock may have an effect on the setting of the Scheduled Heavy anti aircraft gunsite (SAM34302). Any effect is likely to be insignificant however. The Kemsley Industrial Development in effect provides a visual barrier to the setting of the Scheduled Monument and there would therefore be no cumulative impacts with regard to these sites.

13.7.18 Effects on the surrounding cultural heritage features from the Northern Relief Road are assessed in the Environmental Statement accompanying the planning application. There were no significant effects caused by the Northern Relief Road. It is considered, therefore, that cumulative impacts would not be significant.

13.7.19 Development at East Hall Farm is likely to affect the setting of the Grade II listed East Hall and potentially that of the similarly listed Mere Court. The effect of the proposed

development on the listed buildings is assessed elsewhere in this chapter as being slight adverse. This effect from the proposed development is likely to be reduced as development takes place closer to the listed buildings. It is considered, therefore, that cumulative impacts would not be significant.

13.7.20 The Iwade Expansion would involve development on the south and east sides of the village, with a small area on the north east side also included. This is likely to constrain views to the north and southeast form the Grade I listed church. The effect of the proposed development on the listed building is assessed elsewhere in this chapter as being neutral. It is considered, therefore, that cumulative impacts would not be significant.

13.8 Mitigation

13.8.1 Much of the proposed mitigation for the proposed Development is built into the design as embedded mitigation.

13.8.2 In addition to embedded mitigation, it is intended to carry out an appropriate programme of fieldwork in consultation with the County Archaeologist to mitigate any effect on palaeo-environmental remains and deeply buried archaeological deposits.

13.8.3 In the first instance archaeological mitigation would comprise the monitoring of a further tranche of geotechnical test pits further to assess the survival or otherwise of below ground archaeological remains. Depending on results, it may be appropriate to undertake further work, including a borehole survey of the alluvium and/ or archaeological trial trenching. These works may lead to further mitigation in the form of excavation and/ or a watching brief.

13.9 Residual Impacts

13.9.1 Any direct effect on cultural heritage features would be permanent and non-reversible. No such effects are predicted.

13.10 Conclusions

13.10.1 The study has indicated that the proposed development area is located within a landscape that has seen activity since early times and is of high archaeological potential.

13.10.2 No statutorily designated sites (e.g. Scheduled Monuments, Listed Buildings) are present within the application site. The closest statutorily protected cultural heritage receptor is Castle Rough, a Scheduled Ancient Monument (County Number 115), located some 500 metres south of the proposed development area.

13.10.3 There would be no direct effects on cultural heritage receptors through the proposed development. There would be no indirect effect on the setting of a cultural heritage receptor or a greater significance than slight adverse.

13.10.4 It is concluded that, although the proposed development area is located on what was an area suitable for occupation in antiquity, following the landfilling of the entire area, the potential for such remains is low.

13.10.5 No likely significant effects have been identified requiring mitigation and no mitigation measures against direct impacts other than those indicated in section 13.8, above, are necessary or proposed within the boundaries of the proposed Development

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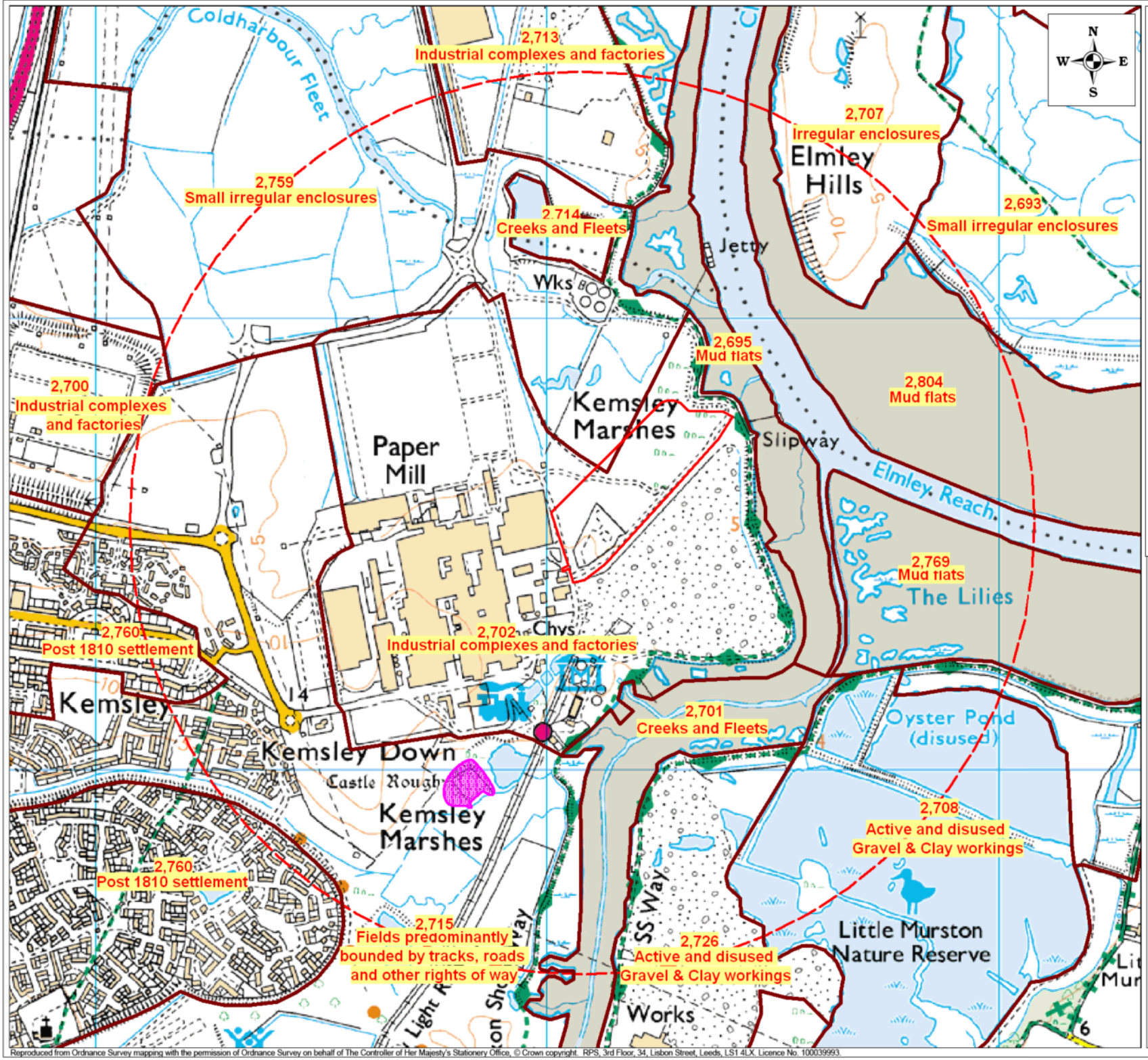

LEGEND

- Site Location
- Historic Landscape Character Areas
- Scheduled Ancient Monument
- 1 kilometre buffer

RPS

3RD FLOOR
34 LISBON STREET
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PROJECT: Kemsley Sustainable Energy Plant

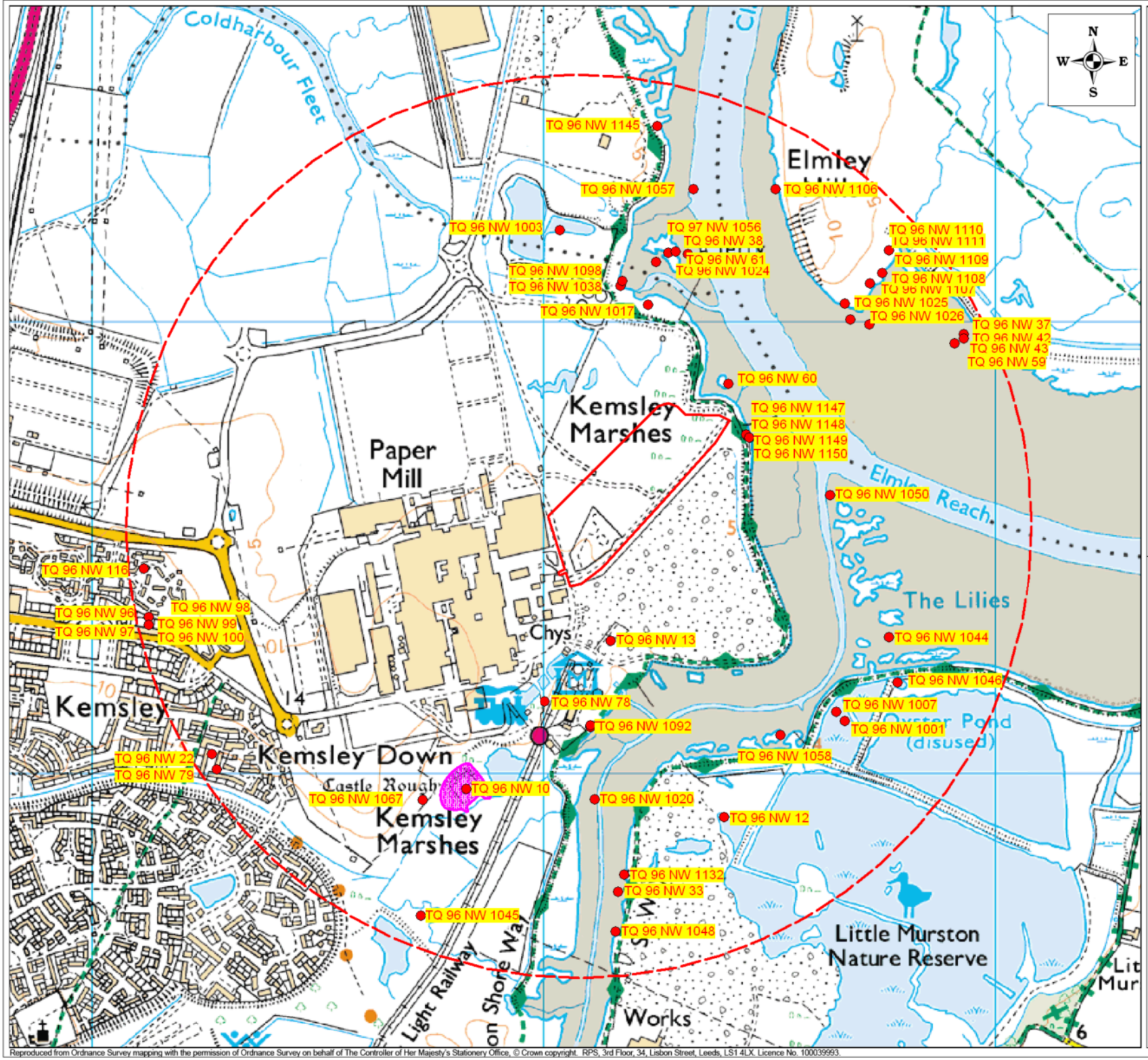
TITLE: Historic Landscape Character Areas within 1km of the Proposed Development Area, supplied by Kent Historic Environment Record

SCALE	DRAWN BY
NTS	AT
DATE	CHECKED
December 2009	DS

MAPINFO FILE:

PROJECT NUMBER	DRAWING NUMBER	REV
DLE1726	Figure 13.2	

CRPS



LEGEND

- Site Location
- HER monument point data
- Scheduled Ancient Monument
- 1 kilometre buffer

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PROJECT
Kemsley Sustainable Energy Plant

TITLE
Recorded sites within 1km of Proposed Development Area supplied by Kent Historic Environment Record

SCALE	DRAWN BY
NTS	AT
DATE	CHECKED
December 2009	DS

MAPINFO FILE

PROJECT NUMBER	DRAWING NUMBER	REV
DLE1726	Figure 13.1	

CRPS

DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL,

ST REGIS PAPER COMPANY LIMITED & E.ON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

CHAPTER 14:

SOCIO ECONOMIC

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14. Socio-Economic

14.1 Introduction

14.1.1 This chapter identifies and assesses the likely significant socio-economic effects of the proposed development of a Sustainable Energy Plant at Kemsley Paper Mill, Sittingbourne.

14.1.2 This chapter considers the socio-economic effects of the development relating to employment generation, the economic multiplier effect, and the diversion of waste from landfill including the generation of renewable energy. Its scope and methodology have been agreed with Kent County Council.

14.2 Legislation and Planning Context

14.2.1 A detailed review of the development plan documents and planning context in relation to the development proposals is provided in Chapter 3.

14.2.2 This section summarises those policies that are directly relevant to socio-economic issues.

National Policy & Legislation

14.2.3 PPS1 sets out that amongst its key principles is to promote outcomes in which environmental, economic and social objectives are achieved over time.[1]

14.2.4 In addition it sets out that the government is committed to promoting a strong, stable, and productive economy that aims to bring jobs and prosperity to all.[2]

14.2.5 PPS10 sets out that in identifying suitable sites for waste management facilities planning authorities should assess suitability against the cumulative effect of previous waste disposal facilities on the well being of the local community, including any significant adverse impacts on environmental quality, social cohesion and inclusion or economic potential.[3]

14.2.6 The Regional Vision of the South East Plan (May 2009) sets out that:

[1] PPS1, para 13

[2] PPS1, para 23

[3] PPS10, para 21

> *"A socially and economically strong, healthy and just South East that respects the limits of the global environment. Achieving this will require the active involvement of all individuals to deliver a society where everyone, including the most deprived, benefits from and contributes to a better quality of life. At the same time the impact of current high levels of resource use will be reduced and the quality of the environment will be maintained and enhanced."*

14.2.7 It goes on to set out that this will be achieved through, amongst other matters, the integration of:

- the physical and mental health of its citizens, their wellbeing and productivity
- the health of the environment around us, including water and air quality, vegetation, habitats, wildlife and landscape
- the health of our neighbourhoods, underpinned by a sharing of the benefits of growth, good quality housing and the provision of community facilities with sustainable transport links between them, green space and a feeling of security
- the health of the region's built environment and historic buildings.

14.2.8 The South East Plan sets out the following Sub Regional Core Strategy for the Kent Thames Gateway through policy KTG1.

14.3 Assessment Methodology

14.3.1 There is currently no definitive guidance or regulation setting out the preferred methodology or content for assessing socio-economic effects as part of Environmental Impact Assessment. This Chapter provides a qualitative assessment of the potential impacts and has been prepared using specialist knowledge and professional experience gained through carrying out studies in respect of other projects. Although there are limitations with this approach, it has been adopted in the absence of definitive or universally accepted guidance, to ensure greater consistency with the methodologies of the other Chapters within the Environmental Statement.

14.3.2 The "Guidelines and Principles For Social Impact Assessment 1994" have not been followed as although they identify a range of social issues that it may be appropriate to consider it does not advocate a methodology for assessment. Regard has been

had to the range of social issues identified, but the focus of the study has been agreed through the scoping process to ensure that it responds to local circumstances.

14.3.3 The significance of effects will, therefore, be determined by the interaction of two factors:

- The value, importance or sensitivity of the receptor; and
- The magnitude, scale or severity of the effect or change.

14.3.4 The sensitivity of a receptor is determined by how sensitive a resource or group is to environmental change, and its ability to absorb an environmental effect.

14.3.5 The sensitivity of receptors will be defined as identified in Table 14.1 below:

Sensitivity	Description
Very High	Very high importance and rarity, international scale and very limited potential for substitution
High	High importance and rarity, national scale, and limited potential for substitution
Medium	High or Medium importance and rarity, regional scale, limited potential for substitution
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale

Table 14.1 Sensitivity Definitions

14.3.6 The sensitivity of receptors in respect of the amenity effects will be determined by the size of the population, and the proximity to the effect. For example, the further away from any change in socio-economic circumstances the receptor is, and the further away from the change, the less sensitive it will be to the environmental effect.

14.3.7 The magnitude of impact is the actual change taking place to the environment, and will be defined as identified in Table 14.2 below:

Magnitude of Impact	Typical criteria descriptors	
	Adverse	Beneficial
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements.	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.	

Table 14.2 Definitions: Magnitude of Impacts

14.3.8 14.3.8 The significance of environmental effects will be defined as identified in Table 14.3 below:

Significance Category	Typical descriptors of effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material

	in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 14.3 Definitions: Significance of Effects

14.3.9 Significance of effect will therefore be determined as identified by Table 14.4 below:

		MAGNITUDE OF IMPACT (DEGREE OF CHANGE)				
		No Change	**Negligible**	**Minor**	**Moderate**	**Major**
ENVIRONMENTAL VALUE (SENSITIVITY)	**Very High**	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or slight	Neutral or Slight	Slight	Slight or moderate

	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Table 13.4 Significance Determination

14.3.10 As it is difficult to quantify the significance of effects in relation to amenity impacts, a qualitative assessment based upon professional judgement will be made. Using this methodology, the greater the sensitivity of the receptor, and the greater the magnitude of impact, the more significant the effect will be.

14.3.11 The identification of socio-economic issues has been made though the application of professional judgement and experience, and has also been informed by engagement with the local community, in addition to that made through community consultation. Accordingly, the following socio-economic issues have been considered by the Assessment:

- Employment
- Landfill Diversion
- Impact on Property Values
- Cumulative Impacts
- Carbon Footprint
- Mill Competitiveness

14.3.12 Although other issues of concern were identified through community consultation, these have been considered in other chapters of the Environmental Statement, and as such are not assessed in this Chapter.

14.3.13 In summary these issues were as follows:

- Traffic and Transportation – Chapter 6
- Air Quality – Chapter 7
- Potential Health Impacts – Chapter 7
- Potential Odour – Chapter 7
- Contaminated Land – Chapter 11
- Potential Noise – Chapter 12
- Proximity to Local Residents – Chapter 15

14.4 Baseline Conditions

Introduction

14.4.1 This section provides the local context for the proposed development and discusses the current condition of the social and economic environment indicators which are likely to be affected by the development.

14.4.2 The sensitive receptors to socio-economic effects are the populations of Kemsley (Ward), Swale, the South East, and England.

14.4.3 The sensitivity of the Sensitive Receptors identified is therefore determined as set out in Table 14.5 below:

Population	Sensitivity to Socio-economic change at the project site
Kemsley	Medium
Swale	Low - Medium
South East	Low
England	Negligible

Table 14.5 Sensitivity of Identified Receptors

14.4.4 The sensitivity of receptors to economic change has been reached through subjective judgement on the basis of population size and proximity to the site. As such the greater the population and the further away from the site, it is considered the less sensitive to socio economic change each population will be.

Population

14.4.5 The population of the borough of Swale at the 2001 Census (UV01) was 122,801 (Males 60,552/ Female 62,249), of which 5,840 (Males 2,904/ Female 2,936) resided in the Kemsley Ward (See Appendix 14.1). Office for National Statistics (ONS) Key Figures for People and Society (Jun 2007) show population figures for Kemsley and Swale at 6,779 and 130,300 respectively.

Migration

14.4.6 Figures for migration are derived from Table KS24 of the 2001 Census. Summary data is presented in Appendix 14.2. The data shows that whilst 5,560 people moved into the district, 3,990 moved out giving net migration of +1,570. This level of population movement is broadly similar to the regional and national data.

General Health and Limiting Long Term Illness

14.4.7 Tables UV20 and UV22 show the 2001 Census data relating to these indicators. The data provided by the respondent is their own opinion and as such is subjective as it is not known whether or what proportion of exaggeration or underestimation factors in the data. Nonetheless, on aggregate these data should provide a reasonably accurate indication of the health of different geographical areas. The data should be read in the context of the data for economic activity and unemployment which are dealt with below.

14.4.8 For comparison purposes Appendix 14.3 presents General Health data for the Kemsley, Swale, South East region and England. At the time of the Census in 2001, 68.76% of the population of England had good health, 22.21% fairly good health, and 9.03% not good health. The data for Kemsley (73.39%, 20.77% and 5.84% respectively), Swale (68.28%, 23.49%, 8.23% respectively) and the South East Region (71.50%, 21.38%, 7.12% respectively) was broadly similar.

14.4.9 Similarly, the data shown in Appendix 14.4 shows that the number of people with a Limiting Long Term Illness in Kemsley (12.09%) and Swale (17.61%) are broadly similar to the regional (15.47%) and national (17.93% data).

Car Ownership

14.4.10 Figures for car ownership are taken from table UV62 of the 2001 Census and presented in Appendix 14.5. The data shows that the percentage of households in Kemsley (13.99%) with no cars is approximately 8% lower than Swale (22.13%), 5.5% lower than the South East Region (19.43%) and 13% lower than England (26.84%).

14.4.11 Similarly, the percentage of households in Kemsley (33.3%) with 2 cars is approximately 7% higher than Swale (26.52%), and also higher than both the South East region (29.56%) and England (23.56%).

14.4.12 The proportion of houses with 3 or 4 cars portrays a different image, with data showing more comparable patterns across all four population levels.

14.4.13 Car ownership is an indicator of affluence and would indicate that both Kemsley and Swale are relatively evenly matched when compared with the remainder of the region and nationally.

Types of Industry

14.4.14 Data on Types of Industry are drawn from table UV34 of the 2001 Census and are presented in Appendix 14.6. The data shows that the proportion of people within Kemsley and Swale working in most sectors of the economy are relatively similar. When compared with the South East region the population percentage working within manufacturing, wholesale/retail and construction drops, however noticeable increases are seen in Real Estate, Education and Health and Social Work.

Industrial Sector for Employment

14.4.15 Table KS11A of 2001 Census presents these figures in more detail (See Appendix 14.7). As suggested, most figures are similar in proportion, with a few exceptions. The most noticeable are the proportion of people working in manufacturing with the percentage in Kemsley (15.47%) and Swale (16.76%) being significantly higher than the South East (12.13%) and England (14.83%) as a whole.

14.4.16 Similarly, the proportion of people working in construction in Kemsley (9.76%) and Swale (9.49%) is noticeably higher than for the South East (7.13%) and England 6.76%). The proportion of people in Kemsley (7.03%) and Swale (6.28%) working in public administration and defence is also slightly higher when compared with the South East (5.93%) and England (5.66%).

14.4.17 However, the proportion of people in Kemsley (2.97%) and Swale (3.83%) working in hotels and catering is lower than the South East (4.30%) and England. The proportion of people within Kemsley (12.33%) and Swale (11.02%) working in real estate is lower than the South East (15.59%) and England (13.21%). There are also less people involved in health and social work within Kemsley (7.30%) and Swale (8.62%) when compared against the South East (9.83%) and England (10.70%).

Occupation

14.4.18 Data on occupations is drawn from Table UV30 of the 2001 Census and is presented in Appendix 14.8. The extrapolated data shows that the proportion of people in Swale employed in the occupations in Groups 1-4 was marginally lower at 47.1% compared to the rest of the South East (58%) and England (53%). The proportion of people working with skilled trade occupations was constant across the geographical areas at between 10.9% and 13.5%.

Economic Activity

14.4.19 Data regarding economic activity has been taken from Table UV28 of the 2001 Census and is shown at Appendix 14.9. The extrapolated data shows that the level of economically active people whilst broadly similar across the geographical areas, is slightly higher in Kemsley (75.9%) and the South East (70.02%), compared to both the Swale (67.15%) and England (66.86%).

14.4.20 The level of retired persons (7.36%) in Kemsley is significantly lower than that of Swale, (13.63%) the South East (13.4%) and England (13.54%), whereas the number

of permanently sick/disabled people in Kemsley (3.5%) and the South East (3.45%) is lower than Swale (5.01%) and England (5.3%).

Unemployment/ Worklessness

14.4.21 The latest available figures for the number of claimants of Job Seekers Allowance are provided by the Office of National Statistics for July 2007 and are presented in Appendix 14.10. These show that the percentage of people claiming Job Seekers Allowance in Kemsley was 2.43% compared with 2.04% in Swale, 1.26% in the South East and 2.05% in England.

Qualifications

14.4.22 Data for Qualifications are taken from the 2001 Census Table UV24 and are set out at Appendix 14.11. Levels 1 and 2 represent GCSE or equivalent, Level 3 represent A-Level, and level 4 and 5 represent Degree level and above. The relatively small level of people with level 3 qualifications is reflective of the fact that many young people have taken A-levels then go on to higher education.

14.4.23 At the time of the Census, the proportion of the Kemsley population (27.84%) possessing no qualifications was generally similar to that of a national level (28.85%), however, within Swale (34.35%) and regionally (23.92%) there were considerable variances.

14.4.24 The proportion of the Kemsley population to possess Degree Level qualifications at 10.37% was considerably less than the national (19.9%), and regional (21.75%) levels as well as when compared with Swale (12.01%).

14.4.25 The proportion of the Kemsley population to have attained GCSE level qualifications compared well with the other geographical areas.

Socio-economic classification

14.4.26 Figures for the socio-economic classifications have been extrapolated from Table UV31 of the 2001 Census, and are set out at Appendix 14.12. The figures show that the proportion of the Kemsley population falling within the Higher Managerial and Professional Occupations at 7.19% was broadly similar when compared to the national (8.61%) and regional levels (10.79%) as well as the level for Swale (6.2%).

14.4.27 However, the proportion of the Kemsley population falling within the Lower Managerial and Professional Occupations at 22.22% was considerably higher than

the national level (18.73%), and the level for Swale (16.73%) but broadly similar to the region (21.18%).

14.4.28 In addition, the proportion of the Kemsley population falling within the Intermediate Occupations at 13.1% was considerably higher than both the national (9.48%) and regional levels (10.31%) and when compared to the level for Swale (9.52%).

14.4.29 Similarly, the proportion of the Kemsley population falling within the Routine Occupations at 11.04% was considerably higher than both the national (9.02%) and regional levels (7.35%), but broadly similar to the level for Swale (11.56%).

Modes of Travel to Work

14.4.30 Data on this topic is taken from 2001 Census Table KS15 and is presented at Appendix 14.13. The data shows that the proportion of Kemsley residents who travel to work by car (either driving or as a passenger) at 71.3% is significantly higher than that for the region (64.8%) and England (61%), and to a lesser extent Swale (65.8%).

14.4.31 Conversely, the proportion of Kemsley residents that travel by non-car modes (underground/metro, train, bus, bicycle or by foot) is relatively low (18.6%) compared to the other geographical areas (Swale 22.9%), rest of the South East (23.2%) and England (27.7%).

Travel to Work

14.4.32 Data for travel to work information has been taken from the 2001 Census table KS15 and extrapolated from table UV35, and are set out at Appendix 14.14.

14.4.33 The data shows that the average distance travelled to work by Kemsley residents is 22.79 kilometres, similar to that for Swale (17.46km) residents, however, this is significantly higher than regional (14.89km) and national levels (13.31km).

Earnings

14.4.34 Data relating to earnings is taken from the ONS Annual Survey of Hours and Earnings Resident Analysis 2009, and is presented in Appendix 14.15. The data set provided is for residents of Swale, the South East and Great Britain.

14.4.35 The figures indicate that Swale performs lower than the South East average, but residents are earning more than the national average in terms of weekly pay. Residents earn less than the regional and national average in relation to hourly rates.

14.4.36 The following are the most significant points:

- Earnings for Swale are lower than the regional average but slightly higher than the national average
- In terms of gender split, Males in Swale earn lower than the regional average but slightly higher than the national average. Females earn less within Swale against both the regional and national average.
- Male workers in Swale earn more than Female Workers. This corresponds with the data for Great Britain.

Job Density

14.4.37 Data relating to Job Densities is taken from the Office of National Statistics, and is presented in Appendix 14.16. The data set provided is for Swale, the South East and Great Britain.

14.4.38 Job density represents the ratio of total jobs compared with the working population. The figures are less than one, as the denominator is the working age population which includes a significant number of people who are not economically active.

14.4.39 The figure for Swale (0.66) shows a significantly lower Job Density than both the regional (0.87) and National (0.88) figures. This shows the lack of jobs available within Swale.

Indices of Multiple Deprivation

14.4.40 The Indices of Multiple Deprivation (IMD) published in 2007 are primarily based on the 2001 Census Data and are intended to provide a concise summary of the extent of deprivation in the 350 or so local authority districts and unitary authorities in England. They are based on seven domains including income, employment, access to housing and other services, and incidence of crime (See Appendix 14.17).

14.4.41 In the overall weighting greater emphasis is given to income and employment. In the ranking 1 is the most deprived and 350 the least deprived. Swale is ranked 116 and as such is not within the 10% most deprived districts in England. Kent is ranked 104 out of 150 County councils and as such is not within the 10% most deprived Counties.

Summary of Baseline Conditions

14.4.42 The baseline conditions show that the socio-economic characteristics of the study area are broadly similar for Kemsley, Swale, the South East and England/Great Britain, but that the socio economic conditions of Kemsley are generally less favourable. In particular Kemsley:

- Has Lower proportion of population (along with Swale and the Region) than the region and England that works in the tertiary sector, but higher proportion within manufacturing.
- Has a Low proportion of population with Degree level qualifications.
- Possesses a higher proportion of population within Routine Occupations.
- Population travels further to work than the regional and national levels.
- Possesses a higher proportion of population that travels to work by car.

Limitations

14.4.43 The main limitations of the baseline surveys are that they are based upon the 2001 Census Data and are therefore out of date. Information on many of the topics which the census covers is not updated between the Censuses. Although there has been major local housing development since 2001, it is not clear whether the social and economic conditions revealed by the analysis above have changed significantly. However, insofar as the availability of more recent data (for example on unemployment) would enable firm conclusions to be drawn, it is concluded that the baseline conditions will not have fundamentally changed in the intervening period.

14.5 Identification and Evaluation of Likely Significant Effects

14.5.1 As is nearly always the case for major developments for which EIA is required, impacts are considered at both the construction and the operational stages. In this particular case, the principal social and economic impacts at both stages consist of the employment likely to be generated. These are considered in turn.

Employment Generation: Construction Phase

14.5.2 One of the key issues raised by the construction phase of infrastructure projects is the extent to which main contractors and sub-contractors attempt to use local labour or that from outside. Normally this is a combination of the two with imported labour more likely to consist of workers with specialist skills, and locally sourced labour consisting of unskilled and semi-skilled labour, however, this may not be the case due to the legacy of the London 2012 Olympics construction programme.

14.5.3 Construction workers, especially those with specialist skills are known to travel significant distances every day to sites for which the construction period may be no more than a few months. A catchment area for labour of ninety minutes travel time is considered to represent the potential labour market. In this case, the catchment area would include the whole of the south east coast, as far south as Bexhill and as far west as Farnborough (using Google Maps Route Finder as guidance).

14.5.4 Given the numbers of skilled people employed in the construction industry in Swale 2,552 and the South East 138,659 it is considered very unlikely that the number of workers required for the proposed development whatever the skill level required would place any pressure upon the construction labour market. It is, therefore, considered that the capacity of the construction labour market would be able to absorb the impact without difficulty.

14.5.5 It is estimated that up to 500 people will be required during the construction phase. An employment change of this scale is assessed as being of minor benefit. The significance of the environmental effects for the socio-economic impacts of employment during the construction phase is therefore assessed as indentified in Table 14.6 below:

		Sensitivity of Receptor		
Magnitude of Impact		Kemsley Medium	Swale Low-Medium	South East Low
	Minor	Slight Beneficial	Neutral/Slight or Slight Beneficial	Slight Beneficial

Table 14.6 Significance of Effect for Employment during Remediation and Construction Phase

14.5.6 In determining the above significance of effects, judgement was used to determine which option was relevant in respect to the effect on the South East. It was determined that the significance of effect was Slight rather than Neutral on the basis that there would be some change to the environment rather than none.

Employment Generation: Operational Phase

14.5.7 It is estimated that the proposed development will create 50 full time jobs in the operational phase. Some of these jobs would need particular management and technical skills to ensure the efficient and safe operation of the plant. In addition an average of 100 contractors will be employed for planned shutdowns.

14.5.8 However, such skills need not be acquired in the waste industry or in a plant of this nature; suitable personnel could be recruited from industries with similar characteristics. Notwithstanding the clear need for people with appropriate skills, it seems likely that the required labour could be identified without difficulty in the immediate area and from within the town itself. This is especially so given the high proportion of manufacturing jobs in the area and Kemsley and the average distance that people already travel to work.

14.5.9 The underlying baseline conditions for Kemsley show that the proportion of people employed in Manufacturing is higher than that for the South East and nationally. Swale also has a higher than average proportion of the population employed in manufacturing. As unemployment rates for both receptors are broadly average, it is anticipated that a large proportion of the operational jobs will be met by people within them.

14.5.10 In terms of magnitude of impact, it is considered that a change of this scale would be minor beneficial.

14.5.11 The significance of the environmental effects for the socio-economic impacts of employment during the operational phase is therefore assessed as indentified in Table 14.7 below:

		Sensitivity of Receptor		
		Kemsley Medium	Swale Low-Medium	South East Low
Magnitude of Impact	Minor	Slight Beneficial	Slight Beneficial	Slight Beneficial

Table 14.7 Significance of Effect for Employment during Operational Phase

14.5.12 In determining the above significance of effects judgement was used to determine which option was relevant in respect to the effect on Swale and the South East. It was determined that the significance of effect was Slight rather than Neutral on the basis that there would be some change to the socio-economic environment rather than none.

Other Socio-Economic Effects

14.5.13 In addition, to employment effects there are a number of other socio-economic impacts that are likely to occur as a consequence of the proposed development.

Multiplier Effect

14.5.14 It is widely recognised that an increase in employment is also likely to lead to an increase in spending in an area which in turn leads to more spending and becomes and upwards spiral. In this respect, the magnitude of effect for both the construction and operational phases is likely to be similar for Kemsley and Swale which is assessed as minor. For the South East, based on the population size and relationship with the site this is assessed as Negligible.

14.5.15 The proposed development will ensure an increase in a number of other economic activities. Bottom Ash Recovery will increase due to the technology of the development, there will be a greater need for the provision of contract maintenance and other services including the continued requirement for the transportation of produce generated from the Paper Mill.

14.5.16 Accordingly, the significance of environmental effects for the socio-economic impacts of economic multiplier effect during the operational phase is assessed as identified in Table 14.8 below:

		Sensitivity of Receptor		
		Kemsley Medium	Swale Low-Medium	South East Low
Magnitude of Impact	Minor	Slight Beneficial	Slight Beneficial	Slight Beneficial

Table 14.8 Significance of Effect for Economic Multiplier

14.5.17 Again, in determining the above significance of effects, judgement was used to determine which option was relevant in respect to the effect on Swale the South East. It was determined that the significance of effect was Slight rather than Neutral on the basis that there would be some change to the socio-economic environment rather than none.

Landfill Diversion

14.5.18 A direct benefit of operations that derive energy from waste is that they divert waste up the Waste Hierarchy and away from Landfill. In the case of the proposed development this will result in the diversion of approximately 500,000 to 550,000 tonnes of residual waste per annum from landfill.

14.5.19 However, this benefit has to be considered taking into account the construction cost of the development.

14.5.20 In addition to this, the costs of landfilling the waste both in financial and environmental terms, which are widely regarded as unacceptable have to be factored into this analysis. This is predicated on the basis that gate fees will be less expensive than diversion to landfill.

14.5.21 Furthermore, the proposed development will also produce heat and power that will not only be used by the Kemsley Mill, but will be exported from the site to the Grid in the form of electricity. As well as exporting electricity, the potential to provide heat to other neighbouring facilities will be investigated. This has to be seen as a particular environmental benefit as it would negate the equivalent amount of energy being produced by non-renewable sources. Although, it is hard to quantify, this will have a net benefit in terms of socio-economic effect.

14.5.22 Overall, the socio-economic benefit associated with landfill diversion at the scale proposed is considered to be moderate for Swale, Kent and the South East as they benefit both from landfill diversion of waste arising from the population and the generation of renewable energy.

14.5.23 Accordingly, the significance of environmental effects is assessed as identified in Table 14.9 below:

		Sensitivity of Receptor		
		Kemsley Medium	Swale Medium	South East Medium
Magnitude of Impact	Minor	Slight Beneficial	Slight Beneficial	Slight Beneficial
	Moderate	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial

Table 14.9 Significance of Effect for Landfill Diversion

14.5.24 In assessing the significance of effect it was determined that the sensitivity of each of the areas (Swale, Kent and the South East) would be Medium as opposed to Low given the importance of managing waste is high rather than low in socio-economic terms.

14.5.25 Further, in determining the significance of effect for the South East it was determined that the significance of effect was Moderate on the basis that waste is likely to be sourced mainly from the South East Region.

Issues Identified through Consultation

14.5.26 In addition to the above socio-economic issues which are identified through professional judgement and experience, additional issues are identified through the consultation process, as set out in the Stakeholder Engagement Report at Appendix 14.18.

14.5.27 In summary these are:

- Air Quality
- Contaminated Land
- Potential health impacts
- Potential Noise

- Potential Odour
- Proximity to Local Resident
- Transport and Access

14.5.28 However, of these additional socio-economic issues identified through consultation all have already been addressed elsewhere within the Environmental Statement.

Cumulative Impacts

14.5.29 PPS10 identifies that the cumulative impacts of other waste management facilities on the community should be taken into account. In the case of the proposed development another waste management proposal has been highlighted as being imminent, situated close to the site. Table 14.11 below shows details of this proposal.

Development	Location	Developer
Bio flame Power Plant at Ridham Dock	Land at Ridham Dock, nr Sittingbourne	Countrystyle

Table 14.11 Cumulative Impacts

14.5.30 For the purposes of this assessment it is considered that the impacts will be similar to that of the proposed development given the sensitivity of receptors and magnitude of effects.

14.5.31 Accordingly, it is considered that together the significance of the effects of the proposed development as identified above will remain unaltered as the combined scale will not alter the magnitude of impact.

Alternative Scenario: No scheme

14.5.32 If the project were not to go ahead, Kemsley Paper Mill would be reliant upon imported gas which in the future is likely to be subject to significant volatility. It is likely that this would present the potential for the paper mill to close, in the event of energy costs making the business unviable. St Regis employs 645 people directly together with a further 205 third party contractors employed full time at the site. The risks to the paper plant have implications for all those who are associated with it. The proposed Sustainable Energy Plant will aid in the securing of jobs that could otherwise be put at risk by virtue of the volatility of gas prices.

Employment Generation

14.5.33 In terms of employment generation, if the project were not to take place, this would effect the need for approximately 500 potential jobs within the construction sector and the further creation of 50 full-time jobs in the operational phase. In addition, there would not be the need for an average of 100 contractors who would have been employed for planned shutdowns.

Multiplier Effect

14.5.34 It is widely recognised that an increase in employment is also likely to lead to an increase in spending in an area which in turn leads to more spending and becomes and upwards spiral. In direct contrast, were the project not to take place this would further place at risk Kemsley Paper Mill, and the potential loss of its existing workforce.

Other Socio Economic Effects

14.5.35 Since Kemsley Paper Mill is a major UK based paper processor, the absence of the Sustainable Energy Plant would have potentially significant implications for local, regional and national wastepaper suppliers. Closure of the Mill would lead to a shift in the balance of trade, with existing exports becoming imports. Kemsley Paper Mill is also the only plasterboard liner producer in the UK.

14.6 Mitigation

14.6.1 It has been concluded, that there are likely to be no likely significant adverse effects on the environment in socio-economic terms that will require mitigation.

14.7 Residual Impacts

14.7.1 The residual socio-economic impacts related to employment generation, economic multiplier effect, and landfill diversion that are associated with the proposal are likely to range between Slight Beneficial and Moderate Beneficial significance effect.

14.7.2 The range of residual impacts and their significance upon environment are summarised in table 14.12 below:

Phase	Nature of Impact	Magnitude of Impact (Range)	Significance of Effect (Range)
Operation	Employment Generation	Minor	Slight Beneficial
Remediation/ Construction	Employment Generation	Minor	Slight Beneficial
Operation	Economic Multiplier	Minor	Slight Beneficial
Operation	Landfill Diversion	Minor to Moderate	Slight to Moderate Beneficial
Operation	Impact on Property Values	No change to Negligible	Neutral

Table 14.12 Summary of Residual Impacts

14.7.3 As well as the above impacts, due to the current reliance on imported gas and predicted volatility in its cost, the Sustainable Energy Plant will be able to provide a viable alternative energy supply to the Paper Mill securing jobs for the long term. Without the proposed development there is the potential that increased energy costs could lead to the business' loss of viability, and the subsequent loss of 800 jobs.

14.8 Conclusions

14.8.1 The socio economic impacts of the proposed development have been assessed in accordance with a methodology that identifies the likely significance of effects on the environment, in a manner that is broadly consistent with the approach of this Environmental Statement. In the absence of an appropriate assessment of socio economic changes the assessment is based on professional judgement and experience.

14.8.2 This assessment has identified the socio-economic baseline through a review of the statistical information available through sources such census data. The identification of socio economic issues relating to the development has been informed through community consultation.

14.8.3 It is concluded that the proposed development will have beneficial effects on the socio economic structures of the Catchment Area and the Region and as such, there is no requirement for any mitigation measures.

14.9 References

- Communities Local Government Indices of Multiple Deprivation 2007
- Office of National Statistics population census 2001
- Office of National Statistics migration census 2001
- Office of National Statistics general health 2001
- Office of National Statistics car ownership census 2001
- Office of National Statistics industry census 2001
- Office of National Statistics economic activity 2001
- Office of National Statistics unemployment/worklessness 2007
- Office of National Statistics qualifications census 2001
- Office of National Statistics socio economic census 2001
- Office of National Statistics mode of travel to work census 2001
- Office of National Statistics Annual Survey of Hours and Earnings Resident Analysis 2006
- Office of National Statistics Job Density Census 2001

DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL,

ST REGIS PAPER COMPANY LIMITED & E.ON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

CHAPTER 15:

AMENITY

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15 Amenity

15.1 Introduction

15.1.1 This Chapter assesses the likely significant effects upon amenity associated with the proposed Sustainable Energy Plant (SEP). In addition to the air quality, odour, dust and noise issues which are addressed in Chapter 7 and 12 respectively, an SEP also has the potential to cause environmental effects through the potential generation of litter, or through the attraction of vermin, birds and other pests on site.

15.1.2 The SEP building footprint takes up a large part of the site and contains: Reception Hall and Bunker; Boiler House; Stacks; Flue Gas Treatment; Air Cooled Condenser; Transformer; Bottom Ash (BA) building; Offices; Disabled car parking; Landscaping; and Access.

15.1.3 For a detailed description of the proposed SEP refer to Chapter 4.

15.1.4 The principle means of control of these operations will be through the Environmental Permit rather than through the planning regime. Nevertheless, the potential impacts and the proposed mitigation are summarised in this chapter.

15.1.5 The scope of this Chapter has been agreed with Kent County Council as set out in the Scoping Request (Appendix 1.1) and through the Council's Scoping Opinion (Appendix 1.2).

15.2 Legisaltion and Planning Context

15.2.1 The effect of development on the amenity of local areas and their residents is a material consideration in the determining of planning applications. Accordingly, such matters are addressed within the development plan through policies in respect of what might be termed general amenity. The Planning Policy Framework is identified in Chapter 3 and analysed further in the Reasoned Justification of the Planning Application Supporting Statement.

15.2.2 The key policies of the statutory development plan are as follows:

- Policy W17 – The South East Plan
- Policy W18 – Kent Waste Local Plan

15.3 Assessment Methodology

15.3.1 This Chapter provides a qualitative assessment of the potential impacts. The significance of effects will be determined by the interaction of two factors:

- The value, importance or sensitivity of the receptor; and
- The magnitude, scale or severity of the effect or change.

15.3.2 The sensitivity of a receptor is determined by how sensitive a resource or group is to, and its ability to absorb an environmental effect or change.

15.3.3 The sensitivity of receptors will be defined as identified in Table 1.1 below:

Sensitivity	Description
High	Amenity is very important to these receptors owing to their sensitivity to changes in amenity, and there legitimate expectations regarding levels of amenity
Medium	Amenity is important to these receptors owing to their sensitivity to changes in amenity, and there legitimate expectations regarding levels of amenity.
Low	Amenity is less important to these receptors owing to their sensitivity to changes in amenity, and there legitimate expectations regarding levels of amenity.
Negligible	The sensitivity of these receptors is limited or they are not sensitive to changes in amenity.

Table 1.1 Sensitivity Definitions

15.3.4 The sensitivity of receptors in respect of the amenity effects will be determined by the nature of the effect i.e. litter or mud, and the proximity to the effect. For example, the further away from any mud deposited on the highway the receptor is, the less sensitive it will be to the environmental effect. Sensitivity will also be determined by how sensitive the receptor is to the nature of the effect. To varying degrees all receptors are sensitive to changes in amenity effects, and determining sensitivity for a particular receptor is highly subjective, therefore, determining sensitivity of receptors is determined by comparing the sensitivity of one receptor

relative to that of another. For example, at the extremes, residential development will be relatively more sensitive to changes in amenity effects than retailers. Essentially this is because residents' legitimate expectations for amenity are generally higher i.e. it is relatively more legitimate to expect your house to be free from vermin, than the shops you visit (even if it is not unreasonable to expect shops to be free from vermin). The reasoning for this is in part due to the nature of the receptor and in part due to the time spent there.

15.3.5 Accordingly, the sensitivity of receptors to amenity in general is as defined in Table 15.2 below:

Sensitivity	Receptor Type
High	Residential receptors tend to be the most sensitive to all amenity issues due to the regular presence of people for long periods and amenity effects impacting on the enjoyment of their own property. Some retail / industrial receptors (e.g. food outlets) may also be particularly sensitive to impacts associated with vermin due to the potential tainting of food.
Moderate	Retail receptors may be moderately sensitive to litter as a dirty frontage may reduce their attractiveness to customers. Industrial / commercial receptors may be moderately sensitive to fly infestation as buzzing flies may disturb work. Recreational areas may also be sensitive to amenity impacts as people may be put off using a certain area or facility and will affect 'enjoyment'. However, they are less sensitive than residential areas as people are only present for short periods.
Low	Industrial receptors tend to be relatively insensitive to litter and mud as they are often relatively dirty in any case and 'enjoyment' of property is not an issue.
Negligible	No people present / no access.

15.3.6 The magnitude of impact is the actual change taking place to the environment, and will be defined as identified in Table 15.3 below:

Magnitude of Impact	Typical criteria descriptors
Major	Severe loss in quality of amenity (Adverse).
	Large scale or major improvement in the quality of amenity; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Moderate	Readily noticeable/appreciable loss in quality of amenity (Adverse).
	Readily noticeable/appreciable improvement in quality of amenity (Beneficial).
Minor	Some measurable change in quality of amenity but less noticeable/appreciable (Adverse).
	Some measurable improvement to amenity (Beneficial).
Negligible	Very minor loss/detriment to amenity (Adverse).
	Very minor improvement to amenity (Beneficial).
No change	No identifiable change in level of amenity

Table 15.3 Definitions: Magnitude of Impacts

15.3.7 The significance of environmental effects will be defined as identified in Table 15.4 below:

Significance Category	Typical descriptors of effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with Residential areas.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect in the quality of amenity.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception.

Table 15.4 Definitions: Significance of Effects

15.3.8 Significance of effect will therefore be determined as identified by Table 15.5 below:

ENVIRONMENTAL VALUE (SENSITIVITY)	MAGNITUDE OF IMPACT (DEGREE OF CHANGE)					
		No Change	Negligible	Minor	Moderate	Major
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or slight	Neutral or Slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Table 15.5 Significance Determination

15.3.9 As it is difficult to quantify the significance of effects it relation to amenity impacts, a qualitative assessment based upon professional judgement will be made. Using this methodology, the greater the sensitivity of the receptor, and the greater the magnitude of impact, the more significant the effect will be.

15.4 Baseline Conditions

15.4.1 The site lies on the industrial northern edge of Sittingbourne, which forms the largest settlement within the district of Swale. Development dates mainly from the 19th and 20th centuries, clustered around the A2 and railway which pass through the centre of the town. The rapidly expanding industrial and commercial district which extends from the edge of Sittingbourne north to Ridham Docks forms the immediate context to the site.

15.4.2 The proposal site extends to some 7.0 hectares of which 4.6 hectares is proposed built development The Kemsley Mill site currently comprises a paper mill and associated infrastructure, including access, car parks and administration buildings.

15.4.3 The site is accessed from the A249 *via* Swale Way (Western Entrance) or from Swale Way onto Barge Way (Northern Entrance). An internal access road which runs to the south and east of the paper mill buildings provides access to Swale Way (Western Entrance) or from Swale Way onto Barge Way (Northern Entrance).

15.4.4 The proposed development site has been developed previously, with the wider area to the north comprising areas of reed bed. Other areas in close proximity to the site comprise mostly bare ground with sections of dense and scattered scrub together with semi-improved grassland, bounded by a sea wall protecting the land from the tidal effects of the Swale estuary. Signs of the historical 1970s paper mill waste tipping activity are evident in the surrounding land although the tips used have since been restored, profiled and capped and are covered by scrub vegetation and grassland. One tip to the south east of the site remains visible.

15.4.5 The Swale River lies to the east, separating the area of land on which the site sits from the Isle of Sheppey to the north. The route of a dismantled railway bisects the western and south western wedge of the site as it runs southwards away from Ridham Dock.

15.4.6 Figure 1.1 identifies sensitive receptors within 1 km of the site. In summary, these are:

- Residential Areas (730m to the south west of the site along the north eastern edge of Kemsley)
- Industrial Development
- Retail Superstore
- Rail Line

15.4.7 The sensitivity of the Sensitive Receptors identified are therefore determined as identified in Table 15.6 below:

Land-use	Sensitivity to Litter	Sensitivity to Mud on Road	Sensitivity to pests and vermin
Residential Amenity	High	High	High
Industrial Amenity	Low	Medium	Medium
Retail Amenity	Low	Low	Medium
Rail line Amenity	Low	Negligible	Negligible

Table 15.6 Sensitivity of Identified Receptors

15.5 Incorporated Enhancement and Mitigation

15.5.1 The following control measures are inherently incorporated into the development proposals to reduce the potential amenity impacts.

Litter

15.5.2 The following control measures will reduce the potential amenity impacts from wind blown litter:

- All container vehicles delivering waste to or removing waste from the site will be required to ensure that all loads or containers are secured to prevent items falling or being blown from the load. No open vehicles will deliver to the site.
- All waste treatment and transfer operations that may be susceptible to problems form windblown litter (i.e. the storage and processing of wastes containing paper, cardboard and plastics) will be conducted inside the enclosed building.
- The facility will be inspected at daily intervals for litter. Any litter that is blown form the site into adjoining parts of site or onto the hard standing area will be collected at least once per week.
- Use of fast closing doors when waste is delivered which will shut prior to unloading in the waste reception area
- Litter fencing

Vermin and Other Pests

15.5.3 The following control measures will reduce the potential amenity impacts from vermin and other pests:

- Undertaking all waste reception and storage operations involving biodegradable waste within the enclosed building
- Minimising the time between initial collection of waste, and treatment or transfer
- Regular inspections and treatment by pest control specialists including the use of pesticides, rodentiscides, and traps, as appropriate
- Inspection and treatment of areas where rats are likely to live such as drains, and culverts.

Mud

15.5.4 The following measures will reduce the potential amenity impacts from Mud during construction:

- Water sprays, wheel washing facilities and road sweeping

15.6 Identification and Evaluation of Likely Significant Effects

Construction Phase (Temporary)

Litter

15.6.1 During this phase there is almost no prospect of any generation of litter other than packaging associated building materials, etc. Should some litter become airborne it will be unlikely to escape from the site due to the effectiveness of the boundary treatment as a barrier. Furthermore, there will be regular litter picking activities within the site.

15.6.2 However, there is less prospect of litter being generated at the site in its present use given that it is unused and is not a source of litter.

15.6.3 The magnitude of the impact on the environment is therefore assessed as being Negligible for sensitive receptors within 250m of the site (as shown on Figure 15.2); Negligible for sensitive receptors within 250m – 500m owing to distance and physical barriers such as roads, paper mill, and buildings; and, No Change for sensitive receptors further way due to distance and barriers it is unlikely that much litter be found.

15.6.4 The significance of the environmental effects for litter is therefore assessed as indentified in Table 15.7 below:

Magnitude of Impact				
Sensitivity of Receptor		0-250m Negligible	250-500m Negligible	500m-1km No change
	Residential - High	Slight Adverse	Slight Adverse	Neutral

	Non-Residential - Low	Slight Adverse	Slight Adverse	Neutral

Table 15.7 Significance of Effect for Litter during Construction Phase

15.6.5 In determining the above significance of effects judgement was used to determine which option was relevant in respect to the effect of industrial at 250-500m. It was determined that the significance of effect was Slight rather than Neutral on the basis that there would be some change to the environment at those distances.

15.6.6 The overall significance of effect on the environment of litter during the Construction Phase is assessed at worst to be Slight Adverse for both the residential and non-residential receptors indentified.

Vermin and Other pests

15.6.7 There is little potential for the attraction of vermin and other pests to the site during this phase of development as there will be no obvious attraction for them. Equally, there is little potential for vermin or other pest in the sites current un-used state.

15.6.8 The magnitude of impact is therefore assessed has been No Change.

15.6.9 The significance of effect for vermin and other pest during this phase is therefore as identified in Table 15.8 below:

Magnitude of Impact				
Sensitivity of Receptor		0-250m No Change	250-500m No Change	500m-1km No change
	Residential - High	Neutral	Neutral	Neutral
	Non-Residential – Medium to Negligible	Neutral	Neutral	Neutral

Table 15.8 Significance of Effect for Vermin and Other Pests during Remediation and Construction Phase

15.6.10 The significance of effect on the environment is therefore Neutral.

Mud Deposits

15.6.11 There is the potential for mud to be deposited on the road in the vicinity of the site from vehicles importing and exporting material to the site during the remediation and construction phases. The amenity issue likely to occur in this respect relates to visual amenity, as potential for traffic accidents is a highway safety issue and does not concern amenity.

15.6.12 However, given the proposed mitigation measures proposed in the form of wheel washing and regular road sweeping reduce the prospects of mud being deposited, and therefore the magnitude of impact is assed as being Negligible within 250m of the site. It is unlikely that of the potential mud deposits none would occur more than 250m from the site and as such, it assessed that there would be No Change in magnitude of impact.

15.6.13 The significance of effect for Mud Deposited on the Highway is therefore assessed as indentified in Table 15.9 below:

Magnitude of Impact				
Sensitivity of Receptor		0-250m Negligible	250-500m No Change	500m-1km No change
	Residential - High	Slight Adverse	Neutral	Neutral
	Industrial and Retail- Low	Slight Adverse	Neutral	Neutral
	Rail- Negligible	Neutral	Neutral	Neutral

Table 15.9 Significance of Effect for Mud deposited on the Highway during Remediation and Construction Phase

15.6.14 In determining the significance of effect for Retail and Industrial within 250m of the site it is assessed that Slight was more appropriate than Neutral on the basis that ere is some potential for Mud deposits.

15.6.15 The overall significance of effect of Mud Deposits is assessed as being no more than Slight Adverse.

Operational Phase

Litter

15.6.16 During this phase there is little prospect of any generation of litter at the site as any wastes will be unlikely to become air borne as litter, due to waste being dealt with within the building behind fast acting fabric doors. Should some litter escape from the building it will be unlikely to escape from the site due to the effectiveness of the boundary treatment as a barrier. Furthermore, there will be regular litter picking activities within the site.

15.6.17 However, there is less prospect of litter being generated at the site in its present use given that it is unused and there is no source of litter.

15.6.18 The magnitude of the impact on the environment is therefore assessed as being Negligible for sensitive receptors within 250m of the site (as shown on Figure 1.2); Negligible for sensitive receptors within 250m – 500m owing to distance and physical barriers such as road, paper mill, and buildings; and, No Change for sensitive receptors further way owing to distance and barriers it is unlikely that much litter be found.

15.6.19 The significance of the environmental effects for litter would therefore be assessed as indentified in Table 15.10:

	Magnitude of Impact			
Sensitivity of Receptor		0-250m Negligible	250-500m Negligible	500m-1km No change
	Residential - High	Slight Adverse	Slight Adverse	Neutral
	Non-Residential - Low	Slight Adverse	Slight Adverse	Neutral

Table 15.10 Significance of Effect for Litter during the Operational Phase

15.6.20 In determining the above significance of effects judgement was used to determine which option was relevant in respect to the effect of non-residential at 250-500m. It was determined that the significance of effect was Slight rather than Neutral on the basis that there would be some change to the environment at those distances.

15.6.21 The overall significance of effect on the environment of litter is assessed at worst to be Slight Adverse for both the residential and non-residential receptors indentified.

Vermin and pests

15.6.22 Due to the biodegradable nature of the waste to be managed at the site especially that associated with Commercial and Industrial and Municipal Solid Waste there is the potential for the site to attract vermin and other pests such as birds and flies.

15.6.23 However, at well managed facilities incorporating the inherent mitigation measures set out above, is unlikely to materialise as an amenity issue especially given that the waste material giving rise to the potential will be within an enclosed building with fast acting doors and therefore less likely to be accessible to vermin and birds. It would also be less likely that any flies would be able to escape to the surrounding environment. Furthermore, the operation will include regular pest control inspections.

15.6.24 The magnitude of the impact on the environment is therefore assessed as being Negligible for sensitive receptors within 250m of the site (as shown on Figure 15.2); Negligible for sensitive receptors within 250m – 500m; and, Negligible for sensitive receptors. These assessments are based on the nature of the pests and particularly flies densities diminishing over distance.

15.6.25 The significance of effect on the environment for Vermin and Other Pests is therefore assessed as identified in Table 15.11 below:

	Magnitude of Impact			
Sensitivity of Receptor		0-250m Negligible	250-500m Negligible	500m-1km Negligible
	Residential - High	Slight Adverse	Slight Adverse	Slight Adverse
	Industrial-Medium	Slight Adverse	Slight Adverse	Slight Adverse
	Retail – Medium	Slight Adverse	Slight Adverse	Slight Adverse
	Rail-Negligible	Neutral	Neutral	Neutral

Table 15.11 Significance of Effect for Vermin and Other Pests during the Operational Phase

15.6.26 In determining the significance of effect on the environment the Slight Adverse rather than the Neutral option was considered more appropriate for Industrial, and Retail on the basis that some effect was possible. However, the opposite was considered appropriate given the less sensitive nature of the receptor.

15.6.27 The overall significance of effect on the environment of vermin and pests is assessed as no worse than Slight Adverse.

Mud Deposits

15.6.28 There is no potential for mud to be deposited on the road during the operational phase of the proposed SEP, as there will be no mud associated with its operation.

15.6.29 As there is no potential for mud to be deposited at present given that the site is un-used, the magnitude of impact is assed as No Change.

15.6.30 The significance of effect on the environment from Mud deposits during this phase is therefore assessed as identified in table 15.12 below:

Magnitude of Impact				
Sensitivity of Receptor		0-250m No Change	250-500m No Change	500m-1km No change
	Residential - High	Neutral	Neutral	Neutral
	Industrial- Low	Neutral	Neutral	Neutral
	Retail – Low	Neutral	Neutral	Neutral
	Rail- Negligible	Neutral	Neutral	Neutral

Table 15.12 Significance of Effect for Mud Deposits during the Operational Phase

15.6.31 The overall significance of effect on the environment during this phase of the proposed SEP is assessed as being Neutral.

15.7 Mitigation

15.7.1 The assessment of Likely Significant Effects, in section 15.6 above, takes account of the mitigation measures incorporated into the design of the proposed development. Taking this assessment into account and in light of the comprehensive incorporation of mitigation

measures already incorporated into the scheme, no further mitigation measures are proposed.

15.7.2 Dust and dirt arising from traffic is mainly associated with HGV traffic. The extent of any impact of dust and dirt arising from the construction and post construction phase would be dependent upon the management practices adopted on site. Specifically procedures such as washing down of wheels and sheeting of HGVs likely to shed debris would prevent the occurrence of dust and dirt spreading from the site to the adjoining road network. It is considered such procedures would remove the possibility of dust and dirt impacting upon the surrounding road network.

15.8 Residual Impact

15.8.1 The residual amenity impacts in relation to Litter, Vermin and other pests, and Mud deposits directly associated with the proposal are likely to be of no more than slight (adverse) significance to the immediate environment.

15.8.2 The range of residual impacts and their significance upon the environment are summarised in table 15.13 below:

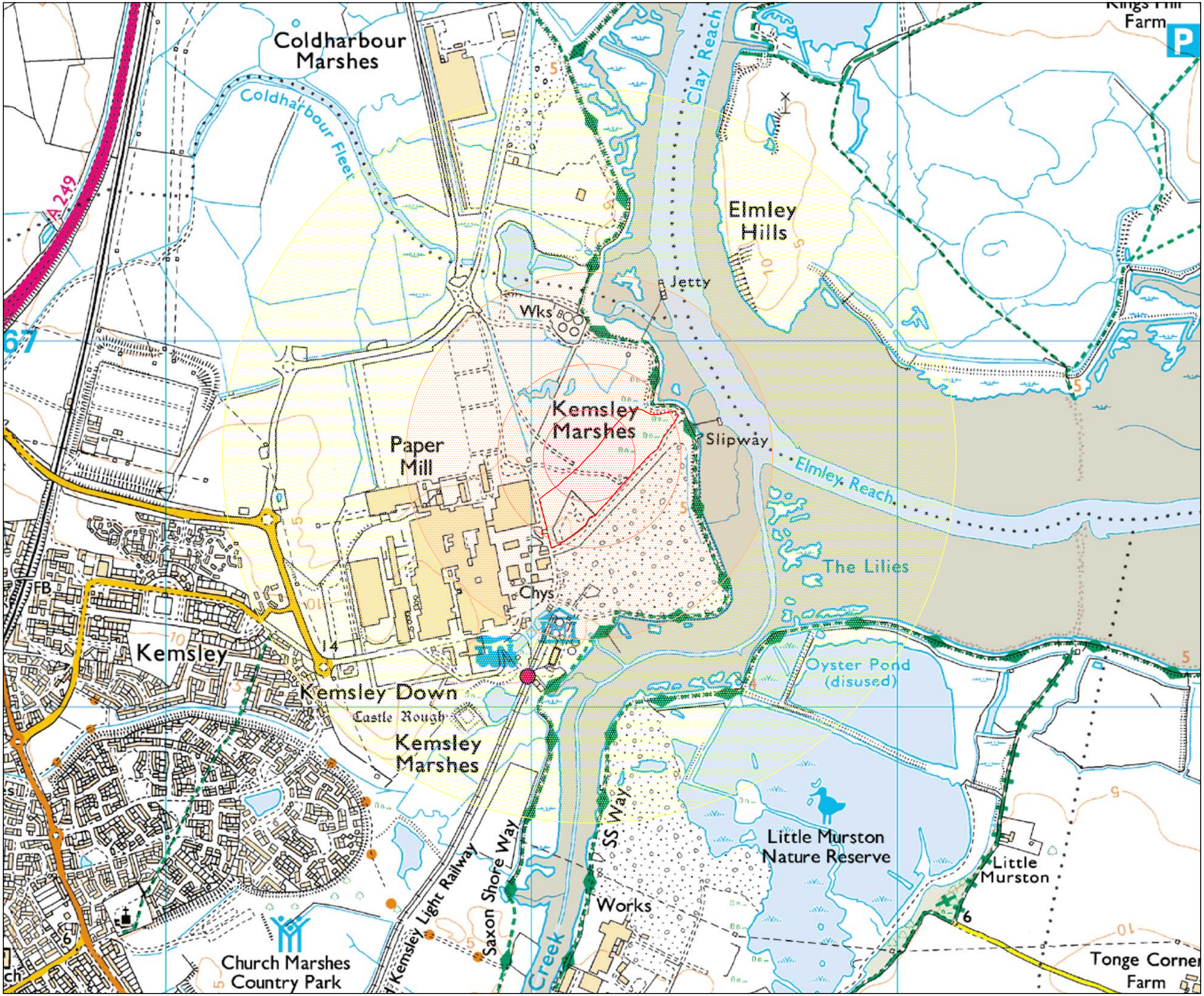
Phase	Nature of Impact	Magnitude of Impact (Range)	Significance of Effect (Range)
Operation	Litter	No Change to Negligible	Neutral to Slight Adverse
Remediation and Construction	Litter	No Change to Negligible	Neutral to Slight Adverse
Operation	Vermin and Other Pests	Negligible	Neutral to Slight Adverse
Remediation and Construction	Vermin and Other Pests	No Change	Neutral
Operation	Mud Deposited on Highway	No Change	Neutral
Remediation and Construction	Mud Deposited on Highway	No Change to Negligible	Neutral to Slight Adverse

15.9 Conclusions

15.9.1 The potential adverse effects on local amenity from Litter, Vermin and Other Pests and Mud Deposited on the Highway can be mitigated to an acceptable level. These standards will be required under the terms of the Environmental Permit.

15.9.2 Taking the mitigation measures into account, it is considered that the proposed SEP will not give rise to any unacceptable effects in terms of local amenity.

15.9.3 In addition, the diversion of the Solid Recovered Fuel waste, Commercial & Industrial waste and Municipal Solid Waste from landfill to the proposed SEP will potentially have a direct beneficial effect upon any sensitive receptors adjacent to those existing sites within the County in relation to effects from Litter, Vermin and Other Pests.



Key:

- Site Location

Zones:

- 125m
- 250m
- 500m
- 1000m

N

RPS
3RD FLOOR
34 LISBON ST.
LEEDS
LS1 4LX
TEL: 0113 220 6190
FAX: 0113 243 9161

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PROJECT
Kemsley SEP

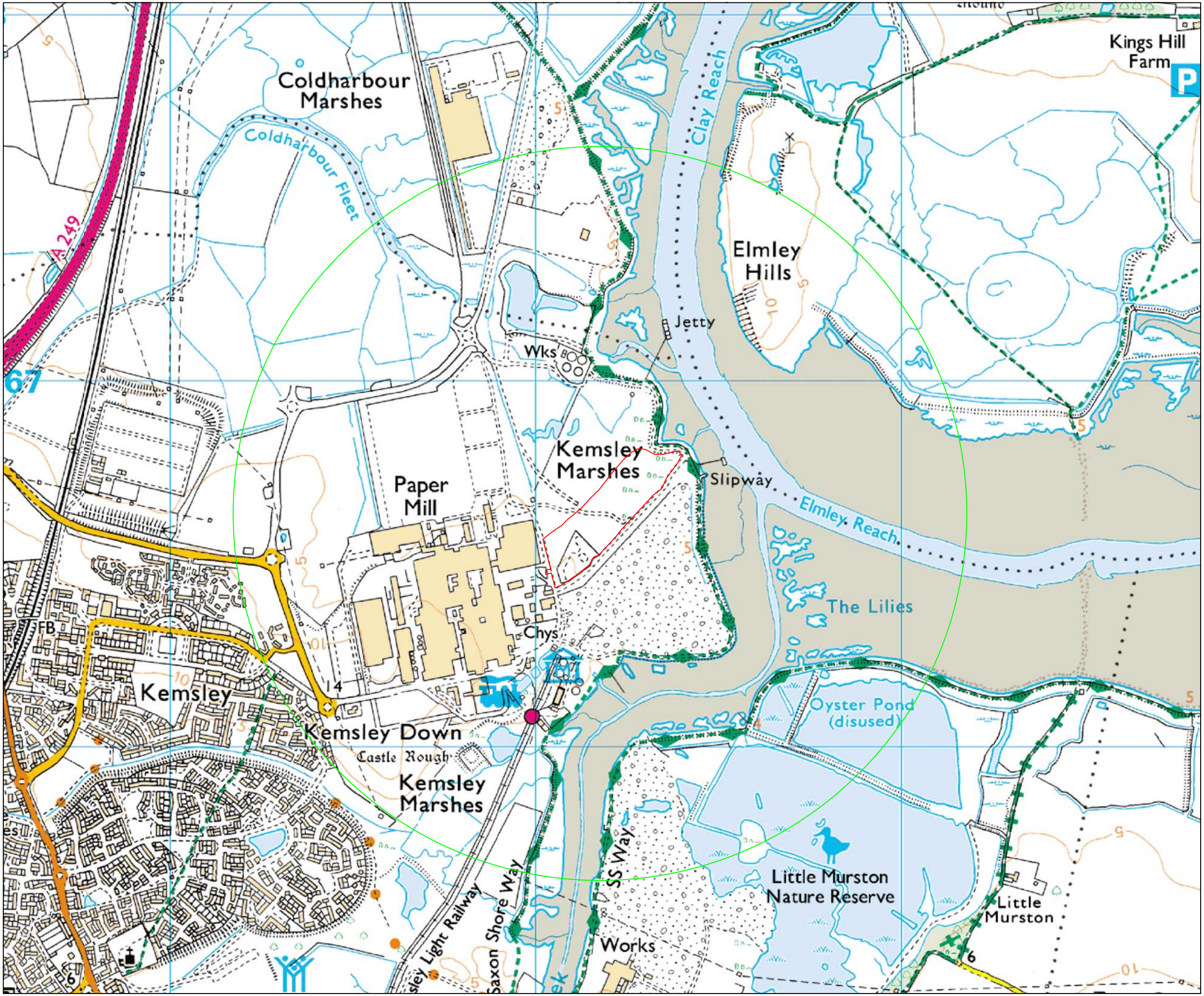
TITLE
Sensitivity Plan

SCALE	DRAWN BY
1:10000 @A3	JM
DATE	CHECKED
December 2009	DC

CAD FILE

PROJECT NUMBER	DRAWING NUMBER	REV
DLE1726	Figure 15.2	

RPS



Key:

Site Location

1km Zone of Influence

N

RPS

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PROJECT

Kemsley SEP

TITLE

Zone of Influence (1km)

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DATE	CHECKED
December 2009	DC
CAD FILE	

PROJECT NUMBER	DRAWING NUMBER	REV
DLE1726	Figure 15.1	

DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL

ST REGIS PAPER COMPANY LIMITED & E.ON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

CHAPTER 16:

SUMMARY

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Figures

No Figures associated with this Chapter

Appendices

No Appendices associated with this Chapter

16 Summary

16.1 Introduction

16.1.1 This concluding Chapter of the Environmental Statement draws together the results of the foregoing assessment. It describes the disciplines addressed, summarises how they have been assessed, summarises further mitigation measures required and recommended, and identifies the likely significant residual effects which conclude with the choice of the proposed Sustainable Energy Plant (SEP).

16.2 Traffic and Transportation

16.2.1 The traffic and transportation chapter contains an assessment of the proposed SEP development upon the highway network and of the overall impact of traffic related to the development during its construction and operation.

16.2.2 The assessment demonstrates that the traffic generated by proposed SEP is not considered to be significant. Indeed, in accordance with the IEMA guidelines, the proposed SEP is likely to have no significant effect on the local road network and highway users. It is concluded that the proposed SEP will cause no residual transport environmental impacts.

16.2.3 Table 16.1 contains a summary of the transport environmental impacts of the proposed SEP development.

Table 16.1 Summary of Residual Impacts (Traffic and Transportation)

Phase	Nature of Effect	Significance	Magnitude of Impact	Duration	Nature	Mitigation/ Enhancement	Residual Impact	Geographical Level of Importance of Issue				
								I	N	R	D	L
Preparation / Construction	**Severance**	Negligible	Minor	Temporary	Adverse	none	Negligible					✓
	Driver Delay	Negligible	Minor	Temporary	Adverse	none	Negligible					✓
	Pedestrian Delay	Negligible	Minor	Temporary	Adverse	none	Negligible					✓
	Pedestrian Amenity	Negligible	Minor	Temporary	Adverse	none	Negligible					✓
	Accidents and Safety	Negligible	Minor	Temporary	Adverse	none	Negligible					✓
	Hazardous Loads	Negligible	Minor	Temporary	Adverse	none	Negligible					✓
	Dust and Dirt	Negligible	Minor	Temporary	Adverse	none	Negligible					✓
Operation	**Severance**	Negligible	Minor	Permanent	Adverse	none	Negligible					✓
	Driver Delay	Negligible	Minor	Permanent	Adverse	none	Negligible					✓
	Pedestrian Delay	Negligible	Minor	Permanent	Adverse	none	Negligible					✓
	Pedestrian Amenity	Negligible	Minor	Permanent	Adverse	none	Negligible					✓
	Accidents and Safety	Negligible	Minor	Permanent	Adverse	none	Negligible					✓
	Hazardous Loads	Negligible	Minor	Permanent	Adverse	none	Negligible					✓
	Dust and Dirt	Negligible	Minor	Permanent	Adverse	none	Negligible					✓

Key: I: International N: National R: Regional D: District L: Local

16.2.4 Measures will be put in place for the control of dirt and dust around the site access during the site preparation and construction phases.

16.2.5 It is concluded from the above table that the residual transport environmental impacts associated with the site preparation, construction and operation are, at worst minor, negligible and permanent.

16.2.6 The effect of road traffic as a result of the construction and operation of the proposed Sustainable Energy Plant development is not predicted to have any significant environmental effect. This is based on the assessment guidelines set out by the IEMA in their 'Guidance Note No. 1: Guidelines for the Assessment of Road Traffic'. The increase in total traffic as a result of development is less than the threshold which would require any more detailed assessments.

16.2.7 It is considered that the traffic generated by the proposed development will not be significant and that there is therefore no need for any specific mitigation measures. Notwithstanding this, this does not obviate the need for the on site management of HGV traffic.

16.3 Air Quality

16.3.1 An assessment of the air quality effects associated with the Scheme has been undertaken. The assessment includes a description of the legislation and policy framework relating to air quality issues associated with power generation installations of this type. It also establishes the current air quality conditions within the study area and describes the methodology used to assess the air quality effects of the proposed SEP.

16.3.2 There is the potential for air quality effects to arise from the construction of the proposed SEP including construction-related traffic movements; and from the operation of the proposed SEP, including traffic movements.

Construction Phase

16.3.3 Relevant mitigation measures to minimise the risk of dust nuisance during the construction phase are described in Chapter 7. Effects on air quality from the construction phase will be relatively short-term. Non-reversible residual effects due to construction are not expected and, therefore residual effects are likely to be negligible.

Operational Phase Stack Effects

16.3.4 The assessment has shown that even assuming worst-case emissions from the stack at 100% of the long-term and short-term EU Directive emissions limits, the resulting ground-level concentrations from will be of 'negligible' to 'slight adverse' significance. As such, residual effects from the operation of the proposed SEP are not likely to be significant.

Operational Phase Traffic Effects

16.3.5 According to the significance criteria adopted for this assessment, overall NO_2 and PM_{10} effects on local air quality are considered to be 'negligible'. Accordingly, no mitigation is proposed. Residual traffic-related effects from the operation of the proposed SEP are not likely to be significant.

Human Health Risk

16.3.6 Section 7.5 of Chapter 7 presented the results of the risk assessment for the proposed SEP. No additional mitigation, other than that incorporated within the proposed plant design, is considered to be necessary for the control of emissions from the proposed SEP. Residual

effects are therefore those predicted in Section 7.5, of Chapter 7 which are not considered significant.

16.3.7 Overall the effects of the SEP are considered to be 'negligible' to 'slight-adverse'.

16.4 Landscape and Visual Impact

16.4.1 An assessment has been completed to

- to describe, classify and evaluate the existing landscape and townscape likely to be affected by the proposal during its construction and operational phases;
- to identify visual receptors with views of the proposed SEP;
- to identify effects on landscape, townscape and views and assess their significance, taking into account measures proposed to reduce or avoid any effects identified.

16.4.2 The significance of a landscape or visual effect is a function of the sensitivity of the affected landscape and visual receptors, the magnitude of change that they will experience and the nature of the effect. Each development is evaluated in accordance to the proposals and the landscape and visual setting.

16.4.3 The overall context of the site is that of an industrial townscape on the northern edge of Sittingbourne, beside The Swale estuary. The townscape is influenced by a variety of land uses including industrial, commercial, open land, disused land, transport corridors and docks. The proposed industrial redevelopment of the site would reflect the adjoining St Regis paper mill complex and reinforce local townscape character.

16.4.4 Landscape mitigation proposals have been included as an integral part of the proposed SEP. The range of treatments including an open mosaic of scrub and rough grassland with clusters of trees, linear reed beds within the base of the flood attenuation ponds, grassland with flora and fruiting trees would be implemented as part of the proposals. The assessment of landscape/townscape and visual effects has been undertaken based on the scheme at year one after completion, when the planting proposals are newly established.

16.4.5 No further secondary mitigation measures are proposed to address the residual effects of the scheme on receptors. However, as the landscape proposals mature they will become a more significant aspect of the scheme, capable of enhancing views of the SEP and the quality of its townscape. There would be a slight reduction in adverse effects on views from the closest visual receptors at the Saxon Shore Way where boundary vegetation would, over time, screen and merge the development into the surrounding landscape and townscape setting. At mid to long distances the improvement in views from receptors would be less significant.

16.4.6 The proposed development has been shown to have low residual townscape and visual impacts (See Table 16.2 below).

Table 16.2: Summary of Residual Effects (Landscape and Visual Impact)

Effect	Significance of Effects	
	Construction	*Operation*
Townscape/Landscape Character – Daytime	Minor/Moderate adverse	Minor adverse
Townscape/Landscape Character – Night time	Negligible	Negligible
Views - Daytime	Minor/Moderate adverse	Moderate/Minor adverse
Views – Night time	Negligible/Neutral	Negligible/Neutral

16.5 Ecology and Nature Conservation

16.5.1 To inform the ecological evaluation of the proposed development and to determine what impacts the proposed SEP may have on the ecological value of the Site and its surroundings, between 2007 and 2009 various ecological surveys have been undertaken across the Site. The results of these surveys form the basis of our assessment and are summarised in the Baseline section of Chapter 9.

16.5.2 A desk-based study was conducted in both 2007 and 2009 that involved contacting statutory and non-statutory groups for information on species and sites of nature conservation interest. The aim of this exercise was to supplement the field survey results by collating and reviewing ecological information relevant to the site and the local area.

16.5.3 A Phase 1 Habitat survey and a protected species scoping survey were undertaken by RPS in 2007 of an area 18ha in size, and included the habitats immediately adjacent to the levelled site as the exact development footprint had not been decided. The protected species scoping survey identified potential habitat for Water Voles *Arvicola terrestris* and reptiles and specific surveys for these species were also undertaken.

16.5.4 The site was resurveyed in 2009 to obtain up to date ecology data. In addition to updating the Phase 1 Habitat and protected species scoping surveys, surveys were also undertaken of reptile, intertidal and breeding bird and invertebrates.

16.5.5 The permanent loss of habitat as a result of infrastructure works, including roads and building bases is considered in the construction effects section of Chapter 9. Ecological impacts the development may potentially cause during construction include:

- Permanent loss of natural or semi-natural habitats;
- Temporary loss of natural or semi-natural habitats;
- Permanent loss of habitat that supports species of conservation importance;
- Temporary loss of habitat that supports species of conservation importance;
- Temporary disturbance to wildlife, e.g. from noise, vibration or light pollution, human activity and vehicular movements, and overshadowing of bird habitats;
- Soil compaction, resulting in changes to flora and fauna; and/or,
- Accidental release of pollution from the site of the proposed SEP.

16.5.6 Operational activities may potentially cause:

- changes in air quality;
- degradation and loss of habitats e.g. from pollution and lack of or inappropriate management;
- degradation to and loss of habitats that support species of conservation importance e.g. from pollution and lack of or inappropriate management; and
- disturbance to wildlife e.g. from noise or light pollution, human activity and vehicular movement.

16.5.7 Mitigation measures include those for noise and dust. In relation to noise, restricting piling, monitoring construction noise levels and bird movements, and providing appropriate noise abatement strategies should ensure potential impacts are mitigated. With regard to habitat protection, a number of mitigation measures are suggested including the provision of new attenuation ponds.

16.5.8 No significant residual impacts have been identified for the majority of the Valued Ecological Receptors. Residual impacts (either negative or beneficial) have been identified for the following VERs Summarised within Table 16.3.,

Table 16.3 - Summary of Environmental Effects (Ecology)

Description of feature	**Proposed activity**	**Significance of unmitigated impact**	**Mitigation**	**Significance of residual impact**
Construction				
Swale Ramsar/SPA/SSSI	Habitat loss	Not significant	-	-
	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Recreational disturbance	Not significant	-	-
	Noise	Not significant	Piling restrictions	-
	Overshadowing/line of site	Not significant	-	-
	Flight lines	Not significant	-	-
Medway Ramsar/SPA/SSSI	Habitat loss	Not significant	-	-
	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Recreational disturbance	Not significant	-	-
	Noise	Not significant	-	-
	Overshadowing/line of site	Not significant	-	-

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
	Flight lines	Not significant	-	-
Elmley Island NNR	Dust and noise	Not significant	-	-
Milton creek LWS	Habitat loss	Not significant	-	-
	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
Brownfield habitat	Permanent and Temporary habitat loss (4.4 ha)	Minor adverse	Provision of high quality grassland/scrub mosaic habitat, plus open bare ground, reedbed (2.3 ha)	Minor adverse
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Annual Beard-grass	Permanent Habitat loss (0.42 ha)	Minor adverse	Provision of suitable habitat (1x 2 m bare ground patches) to be managed appropriately.	Not Significant
Invertebrate habitat	Permanent Habitat loss (0.9 ha)	Minor adverse	Provision of suitable habitat (1.6 ha, and 520 m of ditch/pond), including attenuation ponds,	Not Significant

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
			species-rich grassland, to be managed appropriately.	
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Reptiles	Permanent habitat loss (1.89 ha)	Minor adverse	Receptor site with mosaic of grassland and scrub (0.44ha), plus additional habitat provided by the attenuation ponds (1.69ha), a total of 1.88ha	Not Significant
	Habitat fragmentation	Not significant	Retained connecting habitat on the eastern boundary linking to the north and south of the site.	Not Significant
	Disturbance to retained habitat	Minor adverse	Retained habitat fenced and maintained	Not Significant
Breeding birds	Habitat loss (4.44 ha)	Minor adverse	Provision of suitable habitat (2.47ha), including attenuation ponds, species-rich grassland, and scrub to be	Minor adverse

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
			managed appropriately.	
	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Minor adverse	Birds breeding on site are already habituated to significant HGV and people movements in the adjacent paper mill.	Not Significant
	Noise	Minor adverse	Restrictions on piling during the breeding season	Not Significant
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Cetti's Warbler	Noise	Moderate adverse	Restrictions on piling during the breeding season	Not Significant
Marsh Harrier	Noise	Minor adverse	Restrictions on piling during the breeding season	Not Significant
Bearded Tit	Noise	Minor adverse	Restrictions on piling during the breeding season	Not Significant
Wintering birds (off-site)- Waterbird	Habitat Loss	Not significant	-	-
	Lighting	Not significant	-	-

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
assemblage and SPA citation/review species	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
Wintering birds(off-site) – non SPA citation/review species	Habitat Loss	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
Harvest Mice	Habitat loss	Minor adverse	Provision of suitable habitat to be managed appropriately.	Not Significant
Operational				
Swale Ramsar/SPA/SSSI	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Recreational disturbance	Not significant	-	-
	Noise	Not significant	-	-
	Air quality	Not significant	-	-
	Overshadowing/line of site	Not significant	-	-
	Flight lines	Not significant	-	-

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
Medway Ramsar/SPA/SSSI	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Recreational disturbance	Not significant	-	-
	Noise	Not significant	-	-
	Air quality	Not significant	-	-
	Overshadowing/line of site	Not significant	-	-
Elmley Island NNR	Dust and noise	Not significant	-	-
Milton Creek LWS	Drainage	Not significant	-	-
	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
	Noise	Not significant	-	-
	Air quality	Not significant	-	-
Brownfield habitat and reedbed	Habitat loss through lack of suitable management	Minor adverse	Suitable management regime implemented to ensure population sustained on-site.	Not Significant
	Drainage	Not significant	-	-
	Dust	Not significant	-	-
Annual Beard-grass	Habitat loss through lack of suitable	Minor adverse	Suitable management	Not

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
	management		regime implemented to ensure population sustained on-site.	Significant
Invertebrate habitat	Habitat loss through lack of suitable management	Minor adverse	Suitable management regime implemented to ensure population sustained on-site.	Not Significant
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Reptiles	Killing/injuring by site traffic	Not significant	Site speed limits slow enough to allow reptiles to move out of the way	Not Significant
	Habitat loss through lack of suitable management	Not significant	Suitable management regime implemented to ensure population sustained on-site.	Not Significant
Breeding birds	Lighting	Not significant	-	-
	Disturbance from human movement/activity	Not significant	-	-
	Operational noise	Not significant	-	-
	Habitat loss through lack of suitable	Minor adverse	Suitable management	Not

Description of feature	Proposed activity	Significance of unmitigated impact	Mitigation	Significance of residual impact
	management		regime implemented to ensure population sustained on-site.	Significant
	Dust	Minor adverse	Best-practice dust suppression methods	Not Significant
Wintering birds(off-site) – non SPA citation/review species	Lighting	Not significant	-	-
	Disturbance from people and plant movements	Not significant	-	-
		Not significant	-	-
	Dust	Not significant	-	-
Harvest Mice	Disturbance	Not significant	-	-

16.5.9 In conclusion, it is considered that once the proposed mitigation measures are taken into account, the residual impact of the development would be neutral.

16.6 Hydrology and Flood Risk

16.6.1 An assessment of the baseline conditions on Hydrology and Flood Risk has been undertaken for the proposed development on this site. This assessment has been based on a review of available and collated information, and consultation with regulatory authorities. This includes a review of the Flood Risk Assessment completed for the proposed SEP development site.

16.6.2 Residual effects, their magnitude and significance are summarised in the table below.

Table 16.4 - Summary of Residual Effects (Hydrology and Flood Risk)

Phase	Effect	Effect Type	Magnitude	Significance	Geographical Level of Importance of Issue				
					I	N	R	D	L
Operation	Surface Water Runoff	Minor	Short Term	Negligible / Minor					*
Operation	Surface Water Quality	Minor / Negligible	Short Term	Negligible / Minor			*		
Operation	Surface Water Quality Emergency Spill	Minor Adverse/ Negligible	Short Term	Minor adverse /Negligible			*		
Key: I: International N: National R: Regional D: District L: Local									

16.6.3 Measures have been incorporated within the design of the proposed SEP to ensure a low sensitivity to risk and low effects on the flood risk and water quality of the surrounding areas. The mitigation proposed is essential to meeting the ongoing requirements for safety and the continued protection of the site and surrounding areas. A number of surface water drains are present on and near to the site, as well as informal drains located off site. Outfalls are present which discharge surface water to the Swale Estuary in times of high surface water events. The proposed SEP development would increase the potential runoff to this watercourse. Therefore a surface drainage strategy has been prepared for the development to mitigate this potential effect. Attenuation of surface waters at the site has been calculated to total approximately 3,200m^3. The incorporation of the surface drainage strategy element would result in a negligible effect on surface water flooding. The existing site and proposed SEP development were assessed for tidal flood risk from the Swale Estuary. Following the uplifting of the site to 5.8mAOD the proposed site will not be at risk from tidal flooding. The effect of tidal flooding on the proposed SEP development has been assessed as negligible.

16.6.4 The inclusion of water quality monitoring and flood risk mitigation at the site means that the overall hydrological effect of the proposed development will be negligible and therefore there is no likely significant effect.

16.7 Hydrogeology and Ground Conditions

16.7.1 An assessment has been undertaken to ascertain whether, and to what extent, human health (i.e. construction workers and future site users), controlled waters, the general environment and the proposed SEP development itself will be impacted by the ground conditions identified on the site.

16.7.2 The likely significant effects have been assessed against pre-determined baseline conditions for the site using a Conceptual Site Model (CSM) that enables risks to site users and environmental receptors to be determined.

16.7.3 Residual impacts, following the implementation of all mitigation measures are summarised in Table 16.5.

Table 16.5: Residual Impacts(Hydrogeology and Ground Conditions)

Resource	Phase	Residual Effect (Additional Mitigation Measure)	Sensitivity of Receptor	Magnitude of Impact	Duration	Significance	Geographical Level of Importance of Issue				
							I	N	R	D	L
Hydrogeology, Controlled Waters and Human Health	Construction	Inhalation, dermal contact or ingestion of contaminated soils during excavation and / or movement	High	Minor	Short Term	Minor Adverse					✓
		Inhalation, dermal contact or ingestion of contaminated groundwater during shallow excavation and / or movement	High	Minor	Short Term	Minor Adverse					✓
		Inhalation, dermal contact or ingestion of asbestos (further SI to characterise extent)	High	Minor	Short Term	Minor Adverse					✓
		Ingress of groundwater into deep foundation excavations (Groundwater Management Plan)	High	Minor	Short Term	Minor Adverse					✓
		Lateral transport of contaminated shallow perched groundwater to The Swale.	Medium	Minor	Medium Term	Minor Adverse					✓
		Vertical transport of contaminated shallow perched groundwater to deep groundwater.	Low	Minor	Medium Term	Neutral					✓
		Groundwater level and flow reduction resulting from dewatering and/or control	Low	Minor	Short Term	Neutral					✓
		Explosion and/or asphyxia by ground gas during excavation	High	Negligible	Short Term	Neutral					✓
		Accidental Spillage of potentially contaminating substances	Low	Minor	Short Term	Neutral					✓
	Operation	Inhalation, dermal contact or ingestion of contaminated soils as a result of exposure and/or re-use on the site. (Site-specific QRA?)	High	Negligible	Medium Term	Neutral					✓
		Explosion and/or asphyxia by ground gas.	High	Negligible	Medium Term	Neutral					✓
		Impacts form accidental spillage and or leakages from vehicles and/or stored substances	Medium	Minor	Medium Term	Minor Adverse					✓
		Reduced groundwater quality in deep aquifer resulting from construction pile foundations	Low	Minor	Medium Term	Minor Adverse					✓
		Lateral transport of contaminated shallow perched groundwater to The Swale through preferential pathway created by granular subase.	Medium	Minor	Medium Term	Minor Adverse					✓
		Impact on levels and flow directions in deep aquifer by construction of deep foundations and/or piled foundations	Low	Minor	Long Term	Neutral					✓

16.7.4 The principal concerns relating to the development include the risk to human health caused by groundwater ingress to deep excavations, the lateral migration of contaminated shallow groundwater towards The Swale and asbestos containing materials identified in shallow soils. By undertaking some additional targeted works and associated assessment, in addition to the production of a robust Construction Environmental Management Plan (CEMP) for the development, all potential impacts that may result from the development have been reduced to ***neutral*** or ***minor adverse*** significance.

16.8 Noise and Vibration

16.8.1 There is the potential for noise and vibration effects to arise from the construction of the proposed SEP, together with construction-related traffic movements and noise effects from the operation of the proposed SEP including traffic movements. There are a number of potential noise sensitive receptors (NSRs) in the area.

16.8.2 The results of the assessment indicate that significant adverse noise and vibration effects are not predicted to occur during the construction or operation of the proposed SEP, assessed individually or cumulatively with committed development in the area, and therefore no mitigation will be required.

16.8.3 The results of the assessment indicate that significant adverse noise and vibration effects are not predicted to occur during the construction or operation of the proposed SEP, assessed individually or cumulatively with committed development in the area, and therefore residual noise and vibration effects are considered to be **not significant**.

16.8.4 **Table 16.6** contains a summary of the likely effects of the proposed SEP.

Table 16.6: Summary of Residual Impacts (Noise and Vibration).

Resource	Phase	Nature of Effect	Significance	Magnitude of Impact	Duration	Mitigation/ Enhanc ement	Residual Effect	Geographical Level of Importance of Issue				
								I	N	R	D	L
	Construction	Noise from On-site Construction Activities	Not Significant	Negligible	Temporary	Not Required	None					x
		Noise from Off-site Construction Activities (Delivery HGVs)	Not Significant	Negligible	Temporary	Not Required	None					x
		Vibration from Construction Activities	Not Significant	Negligible	Temporary	Not Required	None					x
	Operation	Noise and Vibration during the Operation of the Proposed Development	Not Significant	Negligible	Permanent	Not Required	None					x

Key: I: International N: National R: Regional D: District L: Local

16.9 Archaeology and Cultural Heritage

16.9.1 The effect, if any, of the proposed SEP on below ground archaeological remains within and immediately surrounding the proposed SEP area have been considered. In addition, consideration was given to information on Scheduled Ancient Monuments, Registered Parks and Gardens and Registered Battlefields, Conservation Areas, Listed Buildings and historic landscapes from a wider area so that the effect, if any, of the proposed SEP development on their setting could be considered.

16.9.2 It is concluded that, although the proposed SEP development area is located on what was an area suitable for occupation in antiquity, following the landfilling of the entire area, the potential for such remains is negligible.

16.9.3 No significant effects have been identified requiring mitigation and no mitigation measures against direct impacts are necessary or proposed within the boundaries of the proposed SEP Development. It is noted that in each case, effects are a function of the sensitivity of the receptor, rather than a great magnitude of impact.

16.10 Socio Economic Impacts

16.10.1 The Environmental Statement has assessed the potential social and economic effects of the proposed SEP. A full description of the site and the proposed SEP development is included in Chapter 4. The assessment was carried out in accordance with the relevant guidance, using data from the 2001 Census and other sources.

16.10.2 It is concluded overall that the proposed SEP development will have beneficial effects on the socioeconomic structure of the Catchment Area and the Region, and as such there is no requirement for any mitigation measures.

16.11 Amenity

16.11.1 The potential adverse impacts on the local amenity from litter, pests and vermin can be adequately mitigated to an acceptable level using standard procedures associated with good waste management practice. These standards will be required under the terms of the Environmental Permit.

16.12 Summary of Recommended Mitigation Measures

16.12.1 The following table summarises the mitigation measures (additional to those incorporated within the development proposals) recommended as a result of the impact assessments.

Table 16.7: Summary of Recommended Key Mitigation Measures

Topic	Phase	Recommended Mitigation
Traffic and Transport	Construction/Operation	It is considered that the traffic generated by the proposed development will not be significant and that there is therefore no need for any specific mitigation measures. Notwithstanding this, this does not obviate the need for the on site management of HGV traffic.
Air and Climate	Construction/Operation	No further air quality mitigation would be proposed other than what is described within Chapter 7 relating to Incorporated Enhancement and Mitigation.
Landscape and Visual Impact	Construction/Operation	No further landscape mitigation would be proposed other than what is described within Chapter 8 relating to Incorporated Enhancement and Mitigation.
Ecology and Nature Conservation	Construction/Operation	No further ecological mitigation would be proposed other than what is described the Residual Impacts Table
Hydrology	Construction	Temporary drainage and water quality measures, including petrol and sediment interceptors, surface

		water storage areas and outfalls / pumps to the nearby drainage ditches.
	Construction	Flood management plan for safe site evacuation
	Construction	The Code of Construction Practice adopted for the site will be applied to mitigate against potential adverse effects
	Operation	Flood management plan for safe site evacuation
	Operation	Emergency spillage management plan
	Operation	Continued maintenance and repair of surface water drainage network
	Operation	Ongoing water quality monitoring
Hydrogeology and Ground Conditions	Construction	A Groundwater Management Plan shall be developed in order to minimise risks associated with intercepting the confined deep aquifer and resulting groundwater ingress. This plan shall identify all groundwater control measures required and shall include a plan regarding the handling, storage and disposal of groundwater encountered on site following UK best practice. A piling risk assessment will also be produced prior to construction.
Noise and Vibration	Construction/Operation	The results of the assessment indicate that significant adverse noise and vibration effects are not predicted to occur during the construction or operation of the SEP, assessed individually or cumulatively with committed development in the area, and therefore no mitigation will be required.
Archaeology and Cultural Heritage	Construction/Operation	Any mitigation measures for the proposed development are built into the design as embedded mitigation.
Socio Economic Impact	Construction/Operation	Following the assessment, it has been concluded that there are likely to be no adverse effects on the environment in socio-economic terms that will require mitigation.
Amenity	Construction/Operation	Taking the amenity assessment into account and in light of the comprehensive incorporation of mitigation measures already incorporated into the scheme, no further mitigation measures are proposed.

16.13 Conclusions

16.13.1 The Environmental Impact Assessment has considered the likelihood of significant environmental effects occurring from the development of the proposed SEP and associated development at Kemsley Paper Mill. The environmental issues addressed as part of the scheme have been identified through consultation with the Council, its consultees and other

stakeholder organisations. With mitigation measures incorporated, the significance of effects is at an acceptable level.

16.13.2 This Environmental Statement has shown that the proposed SEP development will result in beneficial environmental effects by diverting waste from landfill, creating a more secure energy supply whilst reducing the impact on climate change, creating employment and by using waste as a resource through the recovery of energy.