RSP

RiverOak Strategic Partners

Manston Airport Development Consent Order

Preliminary Environmental Information Report Volume 2: Biodiversity, Freshwater Environment, Historic Environment, Land Quality and LVIA

June 2017

For consultation

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Promoter's Name	RiverOak Strategic Partners
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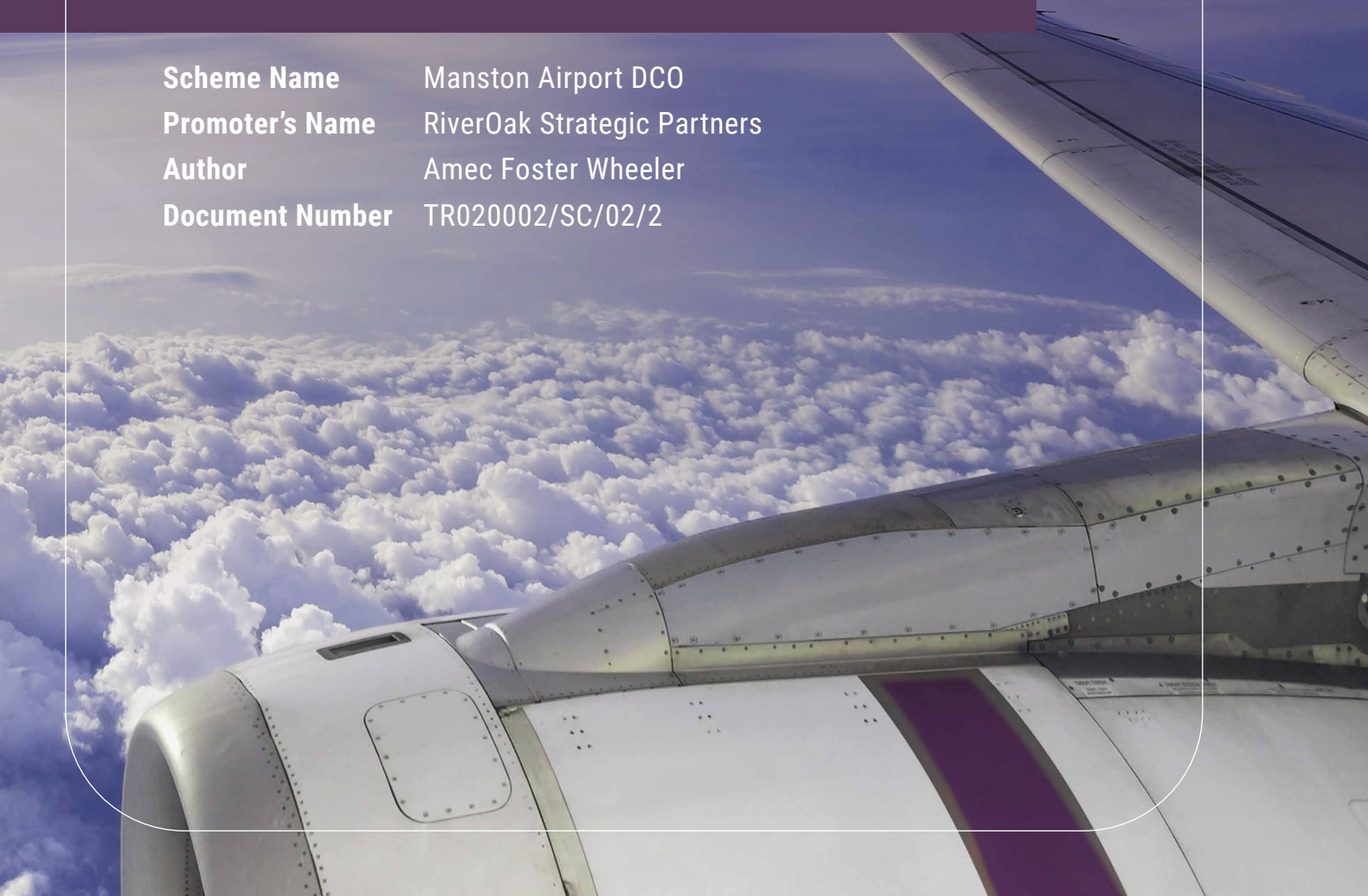

2017 Consultation

Suite of Consultation Documents

1.1 As part of the statutory consultation under section 47 of the Planning Act 2008 a suite of consultation documents relating to the proposal to reopen Manston Airport is available to the public. Together these documents give an overview of the development proposals including information on the potential benefits and impacts of the Project, environmental considerations and the business case. The documents also provide further information on the consultation process and enable the public to submit their feedback.

1.2 This consultation also forms part of RiverOak's initial engagement on the design of airspace and procedures associated with the airport. As such it is an opportunity for members of the community to highlight any factors which they believe RiverOak should take into account during that design phase. Having taken all such factors into account, the subsequent proposals for flightpaths and airspace will be subject to a separate round of consultation once the DCO application has been made.

1.3 The suite of consultation documents includes:

1. a Consultation Leaflet giving an overview of the proposals and details of where more information about the Project can be found;
2. a Feedback Form in order to collect responses to the consultation;
3. an Overview Report giving a summary of the proposals including the potential benefits and impacts of the Project, how we propose to mitigate against potential impacts, and a non-technical summary of the Preliminary Environmental Information Report (PEIR);
4. **a Preliminary Environmental Information Report (PEIR); containing preliminary information on the likely environmental effects of our proposals as we have ascertained them so far, including noise, transport and air quality, and how we propose to minimise these effects, as well as how we propose to maximise the benefits of the Project;**
5. a draft Masterplan for Manston Airport;
6. Manston Airport - a Regional and National Asset, Volumes I-IV; an analysis of air freight capacity limitations and constraints in the South East and Manston's ability to address these and provide for future growth;
7. an Outline Business Case;
8. a Statement of Community Consultation;
9. a Location Plan; and
10. an Interim Consultation Report, setting out the details of the first stage of consultation and how feedback received has been used to help develop the proposals.

1.4 This Preliminary Environmental Information Report has been prepared pursuant to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, as amended.

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7. Biodiversity

7.1 Introduction

7.1.1 This chapter sets out the results of a preliminary assessment of the effects of the Proposed Development on biodiversity.

7.1.2 This chapter should be read in conjunction with the Description of the Proposed Development (**Chapter 3**). Following a summary of the limitations of the PEIR, the chapter outlines the relevant policy, legislation and guidance that has informed the preliminary assessment, and the data gathering methodology that was adopted as part of the biodiversity preliminary assessment. This leads on to a description of the overall baseline conditions, the scope of the assessment, and the assessment methodology. The chapter concludes with a summary of the results of the assessment at this point in time.

7.1.3 The Ecological Impact Assessment (EcIA) will focus on the likely significant effects of the construction and operation of the proposed development on conservation notable and legally protected habitats and species. Potential impacts on nature conservation interests both within and outside of the bounds of the Manston Airport site will be investigated and will broadly include:

- Temporary and permanent habitat loss;
- Habitat degradation / change (e.g. through changes in air quality); and
- Disturbance / displacement of fauna.

7.1.4 Potential impacts may be associated with the:

- Construction of cargo facilities, hangers, aircraft stands, taxiways and associated infrastructure (e.g. a fuel farm);
- Operation of aircraft and associated activities (e.g. aircraft loading) whilst within the bounds of the airport;
- Operation of aircraft approaching and leaving the airport (i.e. outside of the bounds of the airport); and
- Road traffic associated with the construction and operational phases of the Proposed Development.

7.1.5 The EcIA will include an assessment of the potential effects on internationally, nationally and locally designated sites of nature conservation interest. This assessment (with regards to internationally designated sites) will be supported by the production of information necessary for the competent authority (in this case the Secretary of State for Transport) to undertake a Habitat Regulations Assessment (HRA).

Limitation of the PEIR

7.1.6 As outlined in **Section 1.5** the PEIR provides preliminary information based on the Proposed Development to date and data gathered up to this point, that will

subsequently be provided in full and final form within the ES. In addition to the assessment of potential effects on European wildlife sites that will need to be addressed in the ES, there is a requirement under *The Conservation of Habitats and Species Regulations 2010 (SI 2010 No. 490)* (the 'Habitats Regulations') to determine whether any of these sites is likely to be significantly affected by the proposed development, either alone or in combination with other plans and projects. This will be achieved through the production of an Evidence Plan (in ongoing consultation with Natural England), supported by evidence gathered from desk studies, field surveys, and air quality and noise modelling.

7.1.7 This assessment is based on surveys and data gathered to the point of writing, and as such, it cannot be taken as a complete picture of the potential presence and significance of important biodiversity receptors that could be affected by the proposed development. As indicated here and in the baseline section (**Section 7.4)**, it is intended to complete surveys for valued receptors so that a full dataset is available for the ES in 2017/18. The results of these surveys, where indicating the presence of a receptor, will allow for further design development. This will allow for refinement of the existing data and assessments, and consequently provide an informed assessment of the potential effects of the proposed development.

7.1.8 The decision as to whether to carry out further survey is influenced by two factors: the potential presence of valued receptors considered likely to be present in the zone of influence, and the potential for likely significant effects to arise as a result of development. Further surveys may need to be carried out:

- Where data are incomplete to date due to Site access constraints; and,
- To inform the design and planning of site specific design and development of mitigation in advance of the DCO determination being made.

7.1.9 After consultation with Natural England (NE), it was agreed that the biodiversity chapter of the Environmental Statement was to be based upon the results of information available in the public domain from other planning applications for the Manston Airport site, to be supplemented, if required, with targeted ecological surveys off-site and on-site to cover any identified gaps. Ground-truthing[88] of an existing extended Phase 1 habitat survey[89] was undertaken in February 2017, and concluded that the work provided an appropriate basis upon which to proceed. An application to grant access, under Section 53 of the Planning Act, to the site to undertake further (Phase 2) ecological surveys has been submitted to the Secretary of State, these surveys will be undertaken to support the Environmental Statement.

7.1.10 At the time of the PEI assessment, sufficient data on receptors is not yet available, and consequently, any evaluation of effects on receptors is considered following a generic approach to the delivery of construction works and operation for this proposed development. Thus, at this point, environmental measures are limited to those described in **Section 7.5**. A full assessment will be provided within the ES.

[88] This is a process where the facts/information of a desk study are confirmed through a site visit.
[89] This was associated with the Stone Hill Park proposal, which occupies the Manston Airport site and therefore has a site extent very similar to the current proposal.

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7.1.11 Assuming successful implementation of those environmental measures, no residual significant effects to the integrity or conservation status of either habitat or species, nor breaches of legislation are likely to occur. The evaluation of effects and significance for all receptors will be examined and reassessed in full in the ES, once precise effects and mitigation measures specific to receptor are available.

7.1.12 Based on the Phase 1 ecology survey work submitted with the Stone Hill Park application, Amec Foster Wheeler are planning surveys in 2017 and 2018 for the following species[90]/groups:

- Great crested newt
- Bats
- Badgers
- Breeding and non-breeding (wintering) birds
- Reptiles
- Terrestrial invertebrates
- Botanical Interest.

7.1.13 The results of these surveys will help determine any effects on legally protected/ notable species and any features of conservation value, which might result from the proposals. The ecological impact assessment process will help identify magnitude of impacts and any appropriate mitigation.

7.2 Policy and legislative context

7.2.1 A study of biodiversity related planning policy, legislation and guidance at the national, regional and local level has been undertaken for the site and its locality in order to highlight any requirements which the Proposed Development needs to consider. It is always important that policies, legislation and guidance are taken into consideration as they help to define the scope of assessment and can inform the identification of particular local issues. Full details of all national and local planning policies relevant to the proposed development can be found in **Appendix 4.1**. A summary of the relevant national and local policies with regard to biodiversity is provided in Table 7.1.

[90] The scientific and English names of all species mentioned in this chapter are provided in Appendix A of the Ecological Desk Study report (Appendix 7.1).

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Table 7.1 National and Local Planning Policies relevant to Biodiversity

Policy reference	Policy Information relevant to Biodiversity
National Planning Policy Framework (NPPF)[91]	Paragraph 109 - "*The planning system should* contribute to and enhance the natural and local environment by: *minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*".
	Paragraph 112 - "*Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites, so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks*".
	Paragraph 118 - "*When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:* ▶ *if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;* ▶ *proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;* ▶ *opportunities to incorporate biodiversity in and around developments should be encouraged;* ▶ *planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and* ▶ *the following wildlife sites should be given the same protection as European sites: – potential Special Protection Areas and possible Special Areas of Conservation; – listed or proposed Ramsar sites; and – sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.*"

[91] Communities and Local Government (CLG) (2012) *National Planning Policy Framework*, CLG, London.

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Policy reference	Policy Information relevant to Biodiversity
Thanet District Council Local Plan[92]	Saved Policy NC3. "*Development which would be damaging to…sites of Nature Conservation Interest…either in the long term or short term, will not be permitted.*"
Thanet District Council Draft Local Plan to 2031 (not yet adopted)	Proposed policy SP05 (bullet point 8). "*Proposals at the airport, that would support the development, expansion and diversification of Manston Airport, will be permitted subject to all of the following requirements…There will be no significant harm to Thanet's SSSI/SAC/SPA/Ramsar sites. A Habitats regulations assessment will be required.*"
	Proposed policy SP23. "*Thanet's Green Infrastructure network is an integral part of the design of all major development. Opportunities to improve Thanet's green infrastructure network by protecting and enhancing existing green infrastructure assets and the connections between them, should be included early in the design process for major developments*. *Development should make a positive contribution to Thanet's Green Infrastructure network by:* ▶ *Creating new wildlife and biodiversity habitats* ▶ *Providing and managing new accessible open space* ▶ *Mitigating against the loss of any farmland bird habitats* ▶ *Providing private gardens and play space; and/or* ▶ *Contributing towards the enhancement of Thanet's Biodiversity Opportunity Areas or the enhancement of the Green Wedges.* *Investment and developer contributions should be directed to improve and expand green infrastructure and provide connecting links where opportunities exist.*"
	Proposed policy SP25. Protection of the European Sites, Sites of Special Scientific Interest and National Nature Reserve. "*Development that would have a detrimental impact on the European Sites, Sites of Special Scientific Interest or National Nature Reserve will not be permitted.* *Planning permission may only be granted when it can be demonstrated that any harm to internationally and nationally designated sites resulting from that development will be suitably mitigated.*"

Legislative requirements

7.2.2 In preparing the biodiversity assessment, account will be taken of relevant legislation, namely:

[92] Thanet District Council (TDC) *The Thanet Local Plan 2006: Saved Policies*, TDC, Thanet [Accessed here: https://www.thanet.gov.uk/your-services/planning-policy/thanets-current-planning-policy/thanet-local-plan-2006/ Last accessed 14/04/2016]

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- Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations);
- Natural Environment and Rural Communities Act 2006 (the NERC Act);
- Countryside and Rights of Way Act 2000 (the CRoW Act);
- Hedgerow Regulations 1997;
- Protection of Badgers Act 1992;
- Wildlife and Countryside Act 198193 (as amended);
- National Parks and Access to the Countryside Act 1949 (as amended).

Relevant guidance

7.2.3 Other guidance relevant to the biodiversity assessment includes:

- Planning Inspectorate Advice Note Ten: Habitat Regulations Assessment relevant to nationally significant infrastructure projects (Version 7; 2016);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (Second Edition). Chartered Institute of Ecology and Environmental Management (2016).
- Wildlife Hazard Management at Aerodromes. CAP 772. Civil Aviation Authority 2014.

7.3 Data gathering methodology

7.3.1 This section describes the desk study and surveys undertaken to inform the biodiversity assessment.

Desk Study

7.3.2 A data-gathering exercise was undertaken to obtain any available information relating to statutory and non-statutory biodiversity sites, priority habitats and species, and legally protected and controlled species (**Appendix 7.1**). These are the sites, habitats and species that are of sufficient importance that effects upon them could be significant (**Boxes 7.1** and **7.2**).

[93] Hereafter abbreviated in this document as WCA.

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Box 7.1 Designated biodiversity sites, and priority habitats and species

Statutory biodiversity sites

Internationally important sites (collectively referred to in this report as European sites – whilst recognising that Ramsar sites are designated at a global level):

- Special Area of Conservation (SACs)
- candidate SACs
- Sites of Community Importance (SCIs)
- Special Protection Areas (SPAs)
- Listed or proposed Ramsar sites, potential SPAs, possible/proposed SACs; and
- Sites identified or required as compensatory measures for adverse effects on other European sites.

Nationally important sites:

- Sites of Special Scientific Interest (SSSIs) that are not European sites; also
- National Nature Reserves (NNRs)

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as biodiversity. Their level of importance is defined by their other statutory or any non-statutory designations (e.g. if an LNR is also an SSSI but is not a European site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of borough/district-level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory nature conservation sites

Sites of county importance: Non-statutory nature conservation sites in Kent are notified as Local Wildlife Sites.

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Priority habitats and species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, habitats and species of principal importance for the conservation of biological diversity in England are identified as of national species/habitat importance reflecting the fact that the importance of these species/habitats has been defined at a national level. The level of importance pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued (other than for waterfowl, for which thresholds have been defined for national/international 'population importance).

- International importance: populations of species or areas of habitat for which European sites are designated;
- International importance: populations of birds meeting the threshold for European importance (1% of the relevant international population).
- National importance: Priority habitats and species of principal importance for the conservation of biological diversity in England. These are listed on**:**

  http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/prioritylist.aspx
- National importance: Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern (BoCC) Red List[94].
- National importance: Nationally Rare and Nationally Scarce species, which are species recorded from, respectively, 1-15 and 16-100 hectads (10x10km squares of the national grid).
- National importance: Populations of birds comprising at least 1% of the relevant British breeding/wintering population (where data are available).
- Borough/district importance: Habitats and species listed in the Borough/District Biodiversity Action Plan (BAP).

[94]Eaton, M.A., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud D., and Gregory, R. (2015). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds, 108:708-746.

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Box 7.2 Legally protected and controlled species

Legal protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this PEI, legal protection refers to:

- species included in Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding:
- species that are only protected in relation to their sale (see Section 9(5) and 13(2) of that Act), given that the proposed development does not include any proposals relating to the sale of species, and
- species that are listed in Schedule 1 but that are not likely to breed on or near the site, given that this schedule is only applicable whilst birds are breeding;
- species included in Schedules 2 and 5 of the *Habitats Regulations 2010*;
- badgers, which are protected under the *Protection of Badgers Act 1992*; and
- hedgerows, some of which are protected under *The Hedgerow Regulations 1997*.

Legal control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it is an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild

7.3.3 Given the potential for the proposed development to affect biodiversity resources located off- as well as on-site, data were obtained for:

- statutory sites of biodiversity interest located on or within 15 km of the Site;
- bat roosts within 5 km of the Site;
- non-statutory sites of biodiversity interest located on or within 2 km of the Site;
- records of priority habitats and priority, legally protected and controlled species to a distance of 1 km from the Site; and
- water bodies (potential great crested newt breeding habitat) located on or within 0.5 km[95] of the Site.

7.3.4 Data will be updated as appropriate through the remainder of the assessment period to ensure that the most up to date information is used in the ES.

7.3.5 In order to establish the baseline situation, biodiversity data was obtained from the sources listed in **Table 7.2** to identify existing data about the site and the surrounding area.

[95] 500 m is the distance within which, in the absence of barriers to movement, GCN will move from their breeding waterbodies to utilise suitable areas of surrounding terrestrial habitat. Therefore, where a waterbody occurs within 500 m of a site, Natural England requires further consideration of the potential for GCN originating from these off-site waterbodies to occur within the development area.

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Table 7.2 Information used in the preparation of the PEIR

Source	Data
The Government's Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.defra.gov.uk)	Statutory biodiversity sites; granted European protected species mitigation licence applications (to 15.09.2015); Sites of Special Scientific Interest (SSSI) Impact Risk Zones (IRZs)[96]
The Kent and Medway Biological Records Centre (KMBRC)	Non-statutory (local) wildlife sites; ancient woodland and priority habitats, records of legally protected and priority species
Kent Ornithological Society (KOS)/Kent County Bird Recorder	Bird data; Pegwell Bay bird reports
British Trust for Ornithology (BTO)	Wetland Bird Survey (WeBS) survey data
Sandwich Bay Bird Observatory	Bird data
Google Earth	Review of satellite imagery for identification of biodiversity interest features e.g. water bodies, connectivity features
National Biodiversity Network (NBN) (www.nbn.org.uk)	Records of legally protected and priority species
UK Biodiversity Action Plan (UKBAP) http://ukbars.defra.gov.uk/plans/priority.asp	UK Priority BAP species/habitats
Kent Biodiversity Action Plan (KBAP) (http://www.kentbap.org.uk/habitats-and-species/)	KBAP species and habitats
Natural England[97]	Section 41 NERC Act species and habitats (updated 14/05/2014)
Ecological Appraisals provided for development projects at or in close proximity to the Manston Airport site – namely Stone Hill Park (OL/TH/0550); Land East of Haine Road (OL/TH/14/0050); Land south of Great West Autos (F/TH/12/0722); Land east of Worlds Wonder (F/TH/14/0645) and Land North of Thorne Farm (F/TH/13/0596).	Ecology survey data e.g. phase 1 habitat surveys, protected species surveys. No evidence of protected or notable species were revealed by any of these developments other than nesting birds and potential foraging and roost habitat for bats, and habitat for the four widespread reptiles.

[96] The Impact Risk Zones (IRZs) are a GIS tool developed by NE to make a rapid initial assessment of the potential risks posed by development proposals to: Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites. They define zones around each site which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

[97] http://publications.naturalengland.org.uk/publication/4958719460769792

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Survey Work

7.3.6 Subsequent to agreement with NE[98] it had been agreed that, following satisfactory ground-truthing of the existing extended Phase 1 habitat survey, reliance would be placed upon that and the results of Phase 2 ecological surveys that are in the public domain from other planning applications for the Manston Airport site. However the results of the Phase 2 ecological surveys are either incomplete or not considered sufficient to provide the required baseline for the assessment. Therefore a survey programme in support of the Proposed Development is now planned.

7.3.7 Off-Site non-breeding (over-wintering) bird surveys for 2016/17 have been completed (see below). There is a programme of Phase 2 survey work planned. Surveys are to include:

- Great crested newt: waterbodies on site and within 500m of the Site boundary have been assessed using the Habitat Suitability Index[99] (HSI) with water bodies then subsequently surveyed where considered suitable for breeding great crested newt. From Ordnance Survey maps and satellite imagery only four waterbodies are considered present within 500 m of the Site. If necessary, initial survey would include presence/likely absence survey leading to population size class survey if great crested newt is present. Great crested newt surveys will follow the good practice guidance set out by English Nature[100]. This methodology entails all surveys to be completed between mid-March and mid-June with half of the survey effort between mid-April and mid-May.
- Bats: activity and roost surveys. Activity surveys, to help identify any foraging and commuting areas, will involve manual transects and the deployment of static recorders. Four bat activity transects will be surveyed once per month (at dusk), between April and October, inclusive (i.e. 7 visits in total). During one of the visits, the activity survey will comprise a dusk and pre-dawn activity survey. Survey methodology will follow current good practice guidance from the Bat Conservation Trust's guidelines (2016)[101] for sites with moderate habitat quality for bats. Static monitoring devices will be deployed for five nights at two locations per transect (eight locations in total) on seven occasions (i.e. monthly between April and October inclusive). Bat survey methodology will follow current good practice guidance from the Bat Conservation Trust (2016).
- Breeding birds: territory mapping surveys, following the British Trust for Ornithology's (BTO) Common Bird Census (CBC) methodology of the Site plus, where public access permits, a 100 m buffer. Surveys will be conducted once

[98] Baseline Data Collection Methodology and PEIR Meeting between Amec Foster Wheeler and Natural England on 03/11/2016.
[99] http://www.narrs.org.uk/documents/HSI%20guidance.pdf
[100] English Nature (2001). *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough: 500 m is generally accepted to be the dispersal distance of great crested newts over land, between breeding ponds. Note: English Nature is now Natural England.
[101] Collins, J (ed.) (2016). Bat Surveys for professional Ecologists: Good Practice Guidelines (3rd Edition). The Bat Conservation Trust, London.

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per month from March to June inclusive. Survey for barn owl will follow Shawyer (2011)[102].

- Wintering bird surveys: undertaken due to the proximity of the Thanet Coast and Sandwich Bay SPA and Ramsar site, and the Sandwich Bay to Hacklinge Marshes SSSI, all of which are important or designated for their wader and waterfowl interest. Two stand-alone survey methodologies were employed: 'Functional habitat surveys', involving land up to some 2 km from the Site boundary, and 'Pegwell Bay distribution counts'. The functional habitat surveys targeted golden plover (as well as other farmland/notable bird species) and were carried out once per month from September 2016 to March 2017. The Pegwell Bay distribution surveys were undertaken one day per month, from October 2016 to March 2017, over a six hour diurnal period capturing a partial tidal cycle within each visit. When possible survey dates coincided with daytime high tides.
- Reptiles: presence / likely absence surveys will be undertaken in suitable potential reptile habitat within the Site. Surveys will involve a combination of visual search of potential basking areas and the placement of artificial refugia. If initial surveys reveal the presence of reptiles, survey will be extended to identify a population size class. Survey methodology will follow current good practice including that of Froglife (1999)[103].
- Terrestrial invertebrates: following a Site assessment for invertebrates, surveys will be undertaken designed to identify those species/assemblages for which the Site is most likely to support.
- Botanical Interest: National Vegetation Classification[104] [NVC] survey methodology will be employed to identify grassland communities and any areas of botanical interest.

A summary of the biological surveys to be carried out to inform the preparation of this chapter is provided in **Table 7.3**. A survey programme[105] is also included. The detailed methodologies for, and results of, these surveys will be described in the respective Baseline Technical Reports[106] which will accompany the ES and be used for the EcIA. Agreement will be sought with Natural England where the survey programme exceeds the DCO application programme to ensure that assessment based upon a full baseline data set will be available for the examination.

[102] Shawyer, C. R. 2011. Barn Owl *Tyto alba* Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting. IEEM, Winchester.
[103] Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth; and, Gent, A.H. and Gibson, S.D., Eds. (1998). *Herpetofauna Workers' Manual*. Joint Nature Conservation Committee, Peterborough. Revised and reprinted 2003.
[104] Rodwell, J.S. (2006). *National Vegetation Classification: Users' Handbook*. Joint Nature Conservation Committee, Peterborough; and; Rodwell, J.S., (ed.) 1992. *British Plant Communities. Volume 3. Grassland and Montane Communities*. Cambridge University Press.
[105] Provisional on obtaining access to the Site.
[106] At this stage in the assessment process, these are not supplied with the PEIR as data gathering is ongoing, therefore full data sets are not yet available. Methods and preliminary data can be made available on request where pertinent to specific consultations. Complete baselines will be submitted with the ES.

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Table 7.3 Baseline surveys

Survey requirement	Survey specification	Survey area	Survey programme
Habitats	Ground-truthing of desk study data collected including Stone Hill Park Extended Phase 1 habitat survey (June 2015)	Site and surrounding land (to 50m).	February 2017
Legally controlled species	Presence/absence survey	Site and surrounding land (to 50m)	July- October 2017
Great crested newt (GCN)	Assessment of water bodies' suitability for GCN	All water bodies on surrounding land (to 500m)	April 2017
	Presence/absence survey	All water bodies assessed as suitable on the site and surrounding land (to 500m)	April – June 2018
Reptiles	Presence/absence survey Population size class estimate	Areas of suitable habitat within the site Areas of suitable habitat within the site	July - early October 2017 April – early October 2018
Bats (roost)	External/internal building inspections Survey of buildings for bat summer roost potential Survey of buildings for bat hibernation (winter) roost potential	All buildings within the site All buildings within the site Any appropriate building within the Site	July 2017 July – August 2017 December 2017 - February 2018[107]
Bats (activity)	Static automated bat activity survey	Site only	July – October 2017 April – June 2018[108]
	Bat activity transect survey	Representative habitats within the site	July – October 2017 April – June 2018
Badger	Presence/absence survey	Site and surrounding land (to 30m)	July – October 2017
Birds (breeding)	Breeding bird walkover (CBC) Surveys	Site and surrounding land to 100m	March – June 2018
Birds (wintering)	Functional habitat surveys: golden plover and other key species Pegwell Bay distribution counts	Land up to 2 km from the site boundary Pegwell Bay south to the River Stour	September 2016 – March 2017 October 2016 - March 2017
Invertebrates	Site assessment Presence/absence survey	Site	July 2017 July - September 2017

[107] If necessary, surveys likely mid-January and mid-February 2018, and may require use of static recorders.
[108] This split in surveys over the two years is a result of Site access restrictions in 2017, and the programme has not yet been agreed with Natural England. Alternatively surveys may be conducted May – October 2018.

		Areas of suitable terrestrial habitat within the site	May – June 2018
Botanical interest	NVC survey	Areas of suitable land within the Site	July 2017

Consultation

7.3.8 Since 2015 and throughout the undertaking of the survey and assessment work, RiverOak has engaged with consultees with an interest in potential biodiversity effects. A scoping report (**Appendix 1.1**), including a chapter covering biodiversity, was produced and submitted to PINS who provided a scoping opinion (**Appendix 1.2**).

7.3.9 Organisations that were consulted include:

- PINS
- Natural England
- Environment Agency
- Kent County Council
- Thanet District Council
- The Royal Society for the Protection of Birds (RSPB)
- The Kent Wildlife Trust (KWT)

7.3.10 Meetings have been held with NE and the Kent Wildlife Trust[109] (KWT). RSPB confirmed (by email[110]) that they do not wish to meet or participate in the Evidence Plan process for this Proposed Development other than responding (or not) to the public consultation materials and/or application documents as these are released. KWT indicated that, although they would still like to be consulted, might not participate in meetings due to resource constraints. Information and an opportunity to engage in the Evidence Plan process has been provided to Kent County Council (KCC) and Thanet District Council (TDC). Consultation is planned with the Kent Downs Area of Outstanding Natural Beauty Unit[111]. Consultation with NE continues in regard to ongoing assessment and the Evidence Plan (HRA) process.

7.3.11 A summary of the consultee comments and responses received on the Scoping Report with regard to biodiversity is provided in **Table 7.4** below:

[109] The contact at KWT was Vanessa Evans.
[110] Dated 09/11/2016, from Dora Querido, Conservation Officer, South-east Regional Office.
[111] The Kent Downs AONB Unit is based in Ashford, Kent. http://www.kentdowns.org.uk/

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Table 7.4 Consultee comments

Consultee	Comments and considerations	How addressed in this PEIR
PINS	There are eight internationally designated nature conservation sites within 10km of the proposed development site, the four closest of which are 925m away to the south east. These comprise two Special Protection Areas (SPAs), three Special Areas of Conservation (SACs), one Site of Community Importance (SCI), and one Ramsar site. There are six nationally designated conservation sites within 10km of the proposed development site, comprised of four SSSIs, the closest of which, Sandwich Bay to Hacklinge Marshes, is 925m away to the south east; and two National Nature Reserves: Sandwich and Pegwell Bay, 925m to the south west; and Stodmarsh, 7700m to the south west.	The desk-based study presented in this PEI will provide summary detail of all the designated sites with distances and directions taken from the magic website.
PINS	Limited information has been provided in Section 6.6 of this chapter about the methodology for determining what would constitute a significant effect. The definition of a significant effect and the criteria that will be used to determine it must be clearly explained in the ES. The Secretary of State notes that it is stated that the biodiversity assessments will be undertaken 'with reference to' the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment, and recommends that the assessments are carried out in accordance with those Guidelines.	Additional detail has been added within this PEI as to what constitutes a significant effect, including criteria used in determination.
PINS	Table 6.1 (pages 59 – 61) identifies eight European sites, and Figure 6.1 (Designated Sites of Nature Conservation Importance) shows the location of European sites (not identified by name), within 10km of the proposed development. It is indicated in Section 3.5 that only one Natura 2000 site is located within that radius, which is incorrectly identified as the 'Thanet Coast & Sandwich Bay Special Protection Area and Ramsar Site', which comprises two separate international sites, identified in Table 6.1 as the Thanet Coast & Sandwich Bay Special Protection Area (SPA) and the Thanet Coast & Sandwich Bay Ramsar site. Figure 6.1 does not include Sites of Community Importance (SCIs) in the legend, although the Margate and Long Sands SCI is identified in Table 6.1. The Secretary of State expects the ES to include relevant figures which accurately identify the location and name of all of the designated sites considered in the assessment.	A figure accurately identifying the location and name of the relevant designated sites has been included in this PEIR.
PINS	The Secretary of State notes that it is indicated in Section 3.5 that the Applicant intends to prepare an Evidence Plan in relation to HRA. It is recommended that preparation of this plan begins, and that NE is contacted, at the earliest opportunity during pre-application. Information on Evidence Plans is provided in Section 4 of this Opinion.	Consultation with NE is ongoing and additional consultations are to occur following publication of the PEI. Consultations to date have included discussions regarding physical scope, methods of survey and assessment, and principles of mitigation. Further consultation will include detailed mitigation measures as the results from planned survey work and modelling become apparent. This will include any potential contamination effects on the designated sites at Pegwell Bay, potential effects from noise and air quality on surrounding European sites, and potential impacts on bats and great crested newts (European protected species).

Consultee	Comments and considerations	How addressed in this PEIR
PINS	Section 6.4 indicates that consultation with relevant consultees has begun. It does not appear that the scope of and methodology for the ecological assessments has yet been agreed, however the Secretary of State notes that consultation is ongoing and that formal agreement is being sought and recommends that this is progressed as soon as possible. The Secretary of State recommends that surveys should be thorough, up to date, and take account of other development proposed in the vicinity.	Progress on the scope of and methodology for the ecological assessments ongoing with the aim to reach formal agreement with NE soon after PEI production. Survey programme to extend from September 2016 to at least October 2017. Account of other proposed development to be included within cumulative assessment with appropriate information gathered from nearby applications including Stone Hill Park (OL/TH/0550); Land East of Haine Road (OL/TH/14/0050); Land south of Great West Autos (F/TH/12/0722); Land east of Worlds Wonder (F/TH/14/0645) and Land North of Thorne Farm (F/TH/13/0596).
PINS	It is noted that the Sandwich and Pegwell Bay National Nature Reserve (NNR) is identified in Table 6.2 as scoped in to the assessment, in relation to potential for indirect effects resulting from deterioration in the air quality and increased levels of deposition. The Secretary of State considers that the potential effects on the NNR of contamination of the existing outfall that discharges into Pegwell Bay should also be considered.	The potential effects of contamination of the existing outfall on the Sandwich and Pegwell Bay National Nature Reserve (NNR) is to be considered in the ES.
PINS	It is indicated in Section 6.5 that a 10km search area has been used to identify statutory sites which may be affected by the proposed development, a 1km search area from the airport boundary to identify non-statutory sites, and a 30m search area to identify any features of biodiversity conservation importance. Very limited information is provided to explain the basis for selecting these study areas. The extent of and rationale for selecting each of the ecological study areas should be clearly and fully set out in the ES Biodiversity chapter, and agreed with consultees where possible.	Information to be provided on the rational for selecting ecological study areas.
PINS	It is suggested in paragraph 6.6.7, and also reflected in paragraph 6.6.12, that direct effects are those that affect receptors on a development site while indirect effects are those that affect offsite receptors. The Secretary of State considers that this approach does not properly reflect how effects should be assessed, e.g. construction works on the boundary of a site or construction and operational traffic movements to and from the site could disturb flora and fauna beyond and at some distance from the boundary, depending on the nature of the activity and the sensitivity of the receptor; and aircraft movements beyond the boundary could increase collision risk with birds. Consideration should be given by the Applicant to how direct and indirect effects are defined and assessed in the EIA.	Agreed and those effects beyond the site boundary which would occur as a direct result of proposal activities are considered as direct effects.
PINS	It is suggested in Box 6.3 (page 66) that a small population of a priority species important at a national level that could be affected by a development would often be assessed as being of insufficient value for an effect to be significant and that therefore it could be 'scoped out' of an assessment. This approach is not completely consistent with the 2016 CIEEM Guidelines for Ecological Impact Assessment. The Secretary of State refers the Applicant in particular to Section 4 of that guidance, which provides advice on determining the importance of habitats and species. Any departure from that advice should be fully explained in the ES.	Any departure from the 2016 CIEEM guidelines would be documented and justified.

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Consultee	Comments and considerations	How addressed in this PEIR
PINS	It is noted that the list of potential receptors scoped in for further assessment in Table 6.2 does not include over-wintering birds or great-crested newts, although Section 6.6 identifies potential for both of these to be found on the proposed development site and a potential need for more detailed survey work. The Secretary of State recommends that potential effects on these species are considered in the EIA.	Potential effects on over-wintering birds and great crested newt to be considered.
PINS	Paragraph 6.6.16 notes that the design of the proposed development will incorporate measures to avoid or reduce adverse effects or deliver enhancements. Very limited reference is made in this chapter to potential mitigation measures for effects which may not be avoided or reduced as a result of the design, and no reference is made to how potential residual effects will be considered and assessed in the EIA. The Secretary of State expects such matters to be covered in the ES.	Explanation and details to be provided of any mitigation measures for effects which may not be avoided or reduced as a result of the design.
PINS	The Secretary of State draws attention to the need to consider combined effects in addition to cumulative effects. The ecological assessment should take account of noise, vibration, and air quality (including dust) impacts, and include consideration of the interrelationship between effects on ground and surface water and on biodiversity features. The Applicant's attention is drawn to the comments of TDC, contained in Appendix 3 of this Opinion, in this regard. The Secretary of State notes and welcomes that the outcomes of the air quality assessment will be evaluated in the ES biodiversity chapter. Cross-reference should be made in the ES between the relevant topic chapters.	Noise, vibration and air quality outcomes are to be included in the assessment in the ES biodiversity chapter also with cross-reference to be made in the ES between relevant topic chapters.
PINS	The Applicant's attention is drawn to the comments of KCC, contained in Appendix 3 of this Opinion, particularly in relation to the extent of the ecological study areas, and potential effects on nearby internationally designated sites.	Noted.
Environment Agency	Section 14 summarises the scoped-out effects. While the recommendation to scope-out "potential effects on relevant habitats and species in watercourses/water bodies" in this section is accepted, the development of the construction management plan and the environmental management plan for the airport will be of interest to us and, if possible, we request that we are consulted during their preparation.	CMP and EMP is a requirement in order to allow potential effects on relevant habitats and species in watercourse/water bodies to be scoped out. The EA will be consulted during their preparation.
Kent County Council	The proposed approach to ecological impact assessment outlined is broadly acceptable although as the information is currently based only on a desk-top assessment, there is potential for additional ecological receptors to be identified during the course of the detailed survey work. KCC expects that the Environmental Statement will provide all the details of the ecological surveys carried out, and adequate justification for scoping out any ecological receptors.	The ES will provide all details of the ecological surveys carried out and adequate justification for scoping out any ecological receptors.
Kent County Council	The County Council does not agree with the conclusion that non-statutory sites beyond 1km from the site can be scoped out (paragraph 6.5.4, page 61). The operation of the proposed development could have much wider implications as a result of impacts from noise, reduced air quality and aircraft deposition and KCC advises that the assessment must include adequate consideration of the effects at all scales.	Adequate justification to be provided for scoping out any ecological receptors, however, we will reconsider impacts incorporating information from air quality and noise and vibration modelling and scope in as necessary.

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Consultee	Comments and considerations	How addressed in this PEIR
Kent County Council	The County Council also advises that the definition of Local Wildlife Sites in Box 6.2 (page 64) is incorrect. Whilst some Local Wildlife Sites are publicly owned and accessible, the majority are in private ownership and so are not accessible. Local Wildlife Sites have no requirement to provide recreational value.	Amended as the reference in the Scoping report with regard to recreation should have been applied to Local Nature Reserves (LNRs) as opposed to Local Wildlife Sites.
Kent County Council	Table 6.2 (pages 68-69) provides an overview of the potential receptors currently scoped in. As stated above, KCC advises that there may be additional ecological receptors identified during the initial ecological survey work. There appears to be some typographical errors with regards to the Thanet Coast and Sandwich Bay Ramsar site and the Stodmarsh Ramsar site (pages 68-69) as the identified "Potentially significant effects" for both of these simply replicates the text relating to the respective SPA designations. KCC queries why there appears to be no intention to consider the potential effects of air quality and aircraft deposition on the SPA or Ramsar sites; the presence of the features is dependent on the quality of habitats and as such KCC considers there to be a need to consider habitat impacts.	The potential effects of changes to air quality and deposition as a result of the proposals are to be considered.
Kent County Council	Depending on the expected levels of use of the proposed development, KCC also queries whether there is a need to consider the impacts of traffic and freight travelling to and from the airport on designated sites further afield.	The potential effects of changes to air quality from aircraft and any additional traffic as a result of the proposals are to be considered.
Kent County Council	The County Council would anticipate that the submission will include consideration of all necessary mitigation measures, including where protected species impacts are expected even where it is concluded that effects will not be significant in the context of the Environmental Statement.	Assessment of impacts and any subsequent mitigation/compensation will follow the latest CIEEM EcIA guidance (2016) to ensure legislative and policy compliance.
Thanet District Council	Proposed scope is sufficient to assess the likely significant effects, but should also draw on and cross reference other topics, including air quality and ground and surface water, when looking at indirect effects. NE are key consultee.	Noted, all impacts upon valued ecological receptors will be evaluated in the ES Biodiversity chapter, also with cross-reference to be made in the ES between relevant topic chapters.
Minster Parish Council	Topics to be covered assume a zone of influence of 5km or, in the case of the road network, the local impact. The potential for the impact of operational development to exceed this distance seems clear, particularly with regard to noise impact upon the resident population beneath and adjacent to flight paths and the impact upon the nearby SPA and Ramsar site in terms of ecology.	Potential noise impacts on the Thanet Coast and Sandwich Bay SPA will be considered pending outcome of noise modelling.

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Consultee	Comments and considerations	How addressed in this PEIR
Natural England	NE welcomes the recognition in this chapter [Air Quality] that there is the potential for air quality impacts on vegetation and ecosystems as well as human health. We are generally satisfied with the methodology proposed where it relates to the assessment of impacts on the natural environment and we would be happy to work with the applicant to identify and agree appropriate, sensitive non-human receptors as recommended in paragraph 3.46 of your Scoping Opinion. We are pleased to see that air quality impacts will be assessed not only from the aircraft themselves but also from the additional traffic that will be associated with the airport during both the construction and operational phases of the development. Paragraph 5.6.2 of the Scoping Report provides criteria from the Design Manual for Roads and Bridges (DMRB) guidance on when a formal air quality assessment of vehicular emissions is likely to be required. Such an assessment will need to be carried out for designated nature conservation sites sensitive to air quality impacts where they fall within 200m of a road meeting one or more of the criteria listed here.	Designated nature conservation sites sensitive to air quality effects that they fall within 200m of a road meeting one or more of the criteria listed in the chapter to be identified and air quality impacts subsequently assessed and included within the ES. .
Natural England	As this is the chapter most closely aligned to NE's remit it is worth making a more general point here about the early stage this project appears to be at, certainly in terms of the level of detail reflected in the Scoping Report, with most of the information in this chapter being extremely generic. We share your concerns around the 'limited detail and evidence' provided on key areas such as the gathering of baseline data, the approach to be taken to assessing environmental impacts and proposed mitigation measures (Scoping Opinion, paragraph 3.8). However, we can advise you that Amec Foster Wheeler have recently contacted us to seek more detailed advice on biodiversity issues and in particular in putting together an HRA Evidence Plan.	The level of baseline knowledge of the site is growing as access has become available. A detailed knowledge will therefore be available to support the assessment as documented within the ES. Consultation with NE in regard to preparation of the Evidence Plan to continue.
Natural England	We note from Section 6.5 of the Scoping Report that a 10km search radius has been used to identify statutory sites which may be affected by the proposed development and we support your request (Scoping Opinion, paragraph 3.59) that the Environmental Statement (ES) provide justification for a zone of influence of this size. We consider that the designated sites listed below are those which are most likely to be affected by the development, all of which fall within the current 10km zone, but we will work with the applicant as more detailed information becomes available to assess whether or not there are any other relevant sites outside this. • Sandwich Bay to Hacklinge Marshes Site of Special Scientific Interest (SSSI) (0.9km) • Sandwich Bay Special Area of Conservation (SAC) (0.9km) • Thanet Coast SAC (0.9km) • Thanet Coast & Sandwich Bay Special Protection Area (SPA) (0.9km) • Thanet Coast & Sandwich Bay Ramsar site (0.9km) • Sandwich & Pegwell Bay National Nature Reserve (NNR) (0.9km) • Thanet Coast SSSI (4.3km) • Outer Thames Estuary SPA (4.7km) • Margate & Long Sands SAC (6km) • Stodmarsh SSSI / SAC / SPA / Ramsar site / NNR (7.6km) • Preston Marshes SSSI (8.9km)	The designated sites listed are to be considered in the assessment particularly with regard to changes in air quality/deposition and noise effects.

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Consultee	Comments and considerations	How addressed in this PEIR
Natural England	We are generally happy with the broad summary of impacts scoped in for further assessment as outlined in paragraph 6.6.12 of the Scoping Report. We would add that when assessing the potential impact of management measures to reduce bird collision risk the ES also covers any implications stemming from the resumption of the 13km bird strike safeguarding zone defined by the International Civil Aviation Organisation (ICAO) which would require all future planning applications within this zone to be assessed for their potential impacts on bird numbers and movements. When assessing all impacts on designated sites a comparison should be made between what is proposed in the DCO and the previous airport operations.	Mitigation measures to reduce bird collision and the implications stemming from the resumption of the 13 km bird strike safeguarding zone to be considered.
Natural England	We agree with your request that the potential for effects on relevant habitats and species resulting from pollution incidents during both the construction and operational phases of the airport should remain scoped in at this stage (Scoping Opinion, paragraph 3.34), particularly given the confirmed presence of contamination on site (Scoping Report, Chapter 9). We support Thanet District Council's request that a Construction Environmental Management Plan (CEMP) should form part of the ES.	Effects from pollution incidents during construction and operation of the airport to be considered, and a CEMP provided as part of the ES.
Natural England	We do not believe that Table 6.2 of the Scoping Report currently provides a comprehensive cross-reference of each designated site with the likely pathways of impact by which the proposed development could affect it. We would query why the potential for deterioration in water quality is not picked up for those sites with a hydrological link to the airport. We also support Kent County Council's query as to why it is not proposed to consider the potential effects of air quality and aircraft deposition on SPA and Ramsar sites.	More detail on likely pathways to designated sites to be provided. Potential effects of air quality changes/nutrient nitrogen deposition on any sensitive habitats within European sites to be considered.
Natural England	At this early stage NE would refer the applicant to our Standing Advice on protected species which gives up to date guidance on best practice survey methodology: https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications As the project progresses our focus will be around European Protected Species (EPS) and we would encourage the applicant to seek guidance from us if they are planning to diverge from the best practice methods for surveys and mitigation measures set out in the Standing Advice. We note that paragraphs 4.17 to 4.22 of your Scoping Opinion advise the applicant on the best approach to take should they conclude that an EPS licence is required. We support your recommendation in paragraph 3.62 that great crested newts should be scoped in for assessment in the ES.	Noted.

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Consultee	Comments and considerations	How addressed in this PEIR
Natural England	NE notes [Ground and Surface Water] the main site discharge point from the runway and apron areas is via a pipe running out to the designated sites at Pegwell Bay and that if the applicant wishes this discharge to continue under their operation of the site then they will need to apply to the Environment Agency (EA) for a new discharge permit. In our initial meeting with the applicant on 26 April 2016 we advised that we would not wish to see any reduction in the quality of this discharge from what was previously permitted. We are pleased to see that the ES will give further consideration to the effects on water quality targets at Pegwell Bay and associated designated sites (Scoping Report, paragraph 7.6.4) and we also support your Scoping Opinion request (paragraph 3.35) that the potential for accidental spillages to Pegwell Bay via the site drainage network during construction remains scoped in at this early stage.	Noted. The potential effects to water quality targets at Pegwell Bay and associated designated nature conservation sites to be considered.

7.4 Overall Biodiversity baseline

Current baseline

7.4.1 The desk study and Amec Foster Wheeler's ground-truthing survey of the Site indicates that the former Manston Airport site comprises a combination of hardstanding and buildings, large expanses of grassland and some limited areas of scrub and/or domestic landscaping. The initial desk study has revealed that there is the potential for, or records of species which are legally protected or a priority for nature conservation to be present on or adjacent to the Site, namely: reptiles within suitable terrestrial habitats and badgers within the wider landscape. Bats are potentially likely to roost in suitable buildings and trees (potentially on site), and forage within the vicinity.

7.4.2 The site is likely to support breeding bird assemblages associated with farmland and urban habitats including some species listed on section 41 of NERC 2006, red-listed BoCC species and Schedule 1 of the WCA, such as skylark, house sparrow, grey partridge and barn owl; over-wintering species may include wading birds and wildfowl. Due to the historic management of the site as an airfield the usage of the area by birds is likely to be lower than may be expected for similar expanses of habitat elsewhere (i.e. management to reduce bird strike has been practiced for decades).

7.4.3 The desk study revealed six water bodies on and within 500m of the Site (see Appendix 7.1, Figure 4.2). One of these is within the site and five are outside of the Site. Permission to access these ponds was sought and only obtained for three (numbered 1, 3 and 4 on Figure 4.2). These three water bodies were scoped out as they were considered unsuitable for breeding great crested newt. Water body 5 has been scoped out as it is separated from the Site by the A299, which is considered a major barrier to any newt movement onto the Site.

7.4.4 The desk study has indicated the presence of the following statutory sites within a potential Zone of Influence (ZoI) (see **Box 7.4** for definition): The designated sites are shown on **Figure 7.1** with summary detail in **Table 7.5**. It should be noted that at this stage, a 15 km radius has been used as the search area and potential ZoI

for the Proposed Development (to ensure incorporation of potential flight paths). As more Proposed Development information and baseline data becomes available, this ZoI may be extended or reduced. For example, the air quality assessment will inform the ZoI with regards to the potential distance over which deposition of nitrogen and other emissions may typically be detected. Over 15 km, the emissions due to aircraft moving to or from the airport are likely to be deposited in a dispersed manner due to their ejection at altitude. This will be determined as the assessment progresses. Current justification for defining ZoI is provided in **Appendix 7.2**, Table 7C.1.

Table 7.5 Desk Study: Statutory Sites (in order of distance from Manston Airport)

Site	Status	Description	Approximate Distance from Site
Thanet Coast and Sandwich Bay	Ramsar	The site is of value to breeding and wintering birds, as well as supporting outstanding communities of terrestrial and marine plant species and a significant number of rare invertebrate species. The site supports a total of at least 15 Red Data Book invertebrate species associated with wetlands.	~925m South-east
Thanet Coast and Sandwich Bay	SPA	The site supports populations of European importance for turnstone (*Arenaria interpres)* (Non-breeding);European golden plover (*Pluvialis apricaria*) (non-breeding) and Little tern (*Sternula albifrons*) (breeding)	~925m South-east
Sandwich Bay	SAC	Selected as an SAC due to the presence of several Annex I habitats. These being; embryonic shifting dunes, shifting dunes along the shoreline with European marram grass (*Ammophila arenaria)* - 'white dunes', fixed coastal dunes with herbaceous vegetation and dunes with *Salix repens* ssp. *Argentea*.	~925m South-east
Thanet Coast	SAC (including Inshore Marine)	The longest continuous stretch of coastal chalk in the UK that supports Annex 1 Habitats: Reefs and submerged or partially submerged sea caves.	~925m South-east
Sandwich and Pegwell Bay	NNR	The Reserve has a complex mosaic of habitats including inter-tidal mudflats, saltmarsh, shingle beach, sand dunes, ancient dune pastures, chalk cliffs, wave cut platform and coastal scrubland. It supports the only ancient dune pasture in Kent. The reserve is of international importance for its wader and wildfowl populations. 615ha of the NNR is managed as a Kent Wildlife Trust Reserve.	~925m South-west
Sandwich Bay to Hacklinge Marshes	SSSI	The most important sand dune system and sandy coastal grassland in South East England. There are also a wide range of other habitats such as mudflats, saltmarsh, chalk cliffs, freshwater grazing marsh, scrub and woodland are found here. This site comprises grazing marsh habitats within Minster Marshes and often supports large wintering populations of waders, some of which regularly reach levels of National importance. Associated with the site are outstanding assemblages of both terrestrial and marine plants and invertebrates.	~925m South-east
Outer Thames Estuary	SPA (Marine)	The site is classified for the protection of the largest aggregation of wintering red-throated diver *(Gavia stellata)* in the UK, an estimated population of 6,466 individuals, which is 38% of the wintering population of Great Britain. The sites extends to 379, 823.81 ha	~3,400m North and north-west

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Site	Status	Description	Approximate Distance from Site
Prince's Beachlands	LNR	A narrow coastal site located between two sections of Sandwich and Pegwell Bay NNR and within the Sandwich Bay to Hacklinge Marshes SSSI. A complex mosaic of habitats of international importance for its bird populations.	~3,680m South-east
Thanet Coast	SSSI	The Thanet Coast is particularly noted for its bird populations, supporting both internationally and nationally important numbers of wintering birds, Associated with the various constituent habitats of the site are outstanding assemblages of both terrestrial and marine plant species, including communities of marine algae that are of limited occurrence elsewhere in the British Isles. Invertebrates are also of interest and there are recent records of three nationally rare and one nationally scarce species.	~4,500m East
Margate and Long Sands	SCI[112] (Inshore Marine)	Margate and Long Sands starts to the north of the Thanet coast of Kent and proceeds in a north-easterly direction to the outer reaches of the Thames Estuary. It contains a number of Annex I Sandbanks slightly covered by seawater at all times, the largest of which is Long Sands itself.	~4,840m North
Stodmarsh	SPA	The site qualifies as an SPA as it holds internationally important numbers of several species with over winter: bittern and hen harrier, and during the breeding season gadwall. It also supports internationally important numbers over winter of shoveler, and gadwall and also qualifies due an internationally important diverse assemblage of over wintering birds, including white-fronted goose, wigeon, mallard, pochard, tufted duck, water rail, lapwing and snipe.	~7,700 South-west
Stodmarsh	SAC	A sizeable population of the rare Desmoulin's whorl snail (*Vertigo moulinsiana*) lives beside ditches within pastures on the floodplain of the River Stour where reed sweet-grass (*Glyceria maxima*), large sedges and common reed (*Phragmites australis*) dominate the vegetation.	~7,700 South-west
Stodmarsh	NNR	Supports internationally important habitats including reedbeds, fens, ditches, wet grassland and open water which provide an ideal habitat for breeding and wintering birds, invertebrates and rare plants. Water voles are found on the reserve.	~7,700m South-west
Stodmarsh	SSSI	This wetland site contains a wide range of habitats including open water, extensive reedbeds, scrub and alder (*Alnus glutinosa*) carr which together support a rich flora and fauna diversity. The vegetation is a good example of southern eutrophic flood plain and a number of rare plants are found here. The site is also of interest due to its diverse breeding bird community and several scarce moths.	~7,700m South-west

[112] Margate and Long Sands was formally submitted by the government to the European Commission as a candidate Special Area of Conservation on 20 August 2010. Margate and Long Sands cSAC was adopted by the European Commission as a Site of Community Importance (SCI) in 2011. The UK Government then has 6 years from adoption to designate it as a SAC.

Site	Status	Description	Approximate Distance from Site
Stodmarsh	Ramsar	The site supports six British Red Data Book wetland invertebrates, 2 nationally rare and 5 nationally scarce plant species. The flora of the site includes the rare sharp leaved pondweed, as well as vulnerable whorled water-milfoil (*Myriophyllum verticillatum*), rootless duckweed (*Wolffia arrhiza*) and *Carex divisa*. Otter is also recorded here.	~8,450m South-west
Preston Marshes	SSSI	The last remaining area of fen vegetation within the Little Stour Valley, supporting a number of notable plant species and breeding and wintering bird assemblages including lapwing, redshank, reed buntings and reed and sedge warblers. Wintering species include lapwing, snipe and various wildfowl such as teal and wigeon.	~8,900m South-west
Bishopstone Cliffs	LNR	A clifftop grassland important for insects, with some rare varieties, and birds, such as sand martin (nesting in the cliffs), skylark, meadow pipit and corn bunting. The LNR is part of Reculver Country Park.	~9,220m North-west
Blean Complex	SAC	A complex of broad leaved deciduous woodland designated for the Annex I habitat "Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*".	~11,500m West
Blean Woods	NNR	Largest ancient woodland in southern Britain. Hornbeam, hazel, beech, oak, birch and sweet chestnut grow on the reserve, whilst brambles, bracken and bluebells dominate the woodland floor.	~11,500m West
East Blean Woods	SSSI	East Blean Woods is one of the best remaining examples of primary deciduous woodland in the Blean Woods complex. The wood comprises mixed coppice with oak standards.	~11,500m West

7.4.5 There is one non-statutory site located within 2 km of the Site boundary: Woods and Grassland, Minster Marshes Local Wildlife Site (LWS ref. TH12). The LWS is located approximately 1.6 km to the south of the Site.

Future baseline

7.4.6 The future baseline of the Site itself is unlikely to be materially different in the absence of the proposed development. It is therefore appropriate to use the current baseline for the purpose of the PEIR and this will be reviewed again prior to the ES.

7.4.7 In respect of ornithology, future baseline may alter due to the effects of climatic change on bird productivity, survival rates, breeding and wintering ranges. Recent collaborative work by Durham University, the BTO and RSPB predict substantial changes in species ranges during the coming decades with an average shift north of 4 km per year and contraction of range and species richness (Huntley *et al*., 2007[113]). The bird survey work to be undertaken for this proposal will represent a snapshot of the bird community at the time of the survey and cannot be extrapolated to predict future population trends in the wake

[113] Huntley, B., Green, R. E., Collingham, Y. and Willis, S. G. (2007). A climatic atlas of European breeding birds. Durham, Sandy and Barcelona: Durham University, RSPB and Lynx Editions.

of agricultural change or climate disruption. There are likely to be similar climate change impacts on all other biodiversity.

7.5 Environmental measures incorporated into the Proposed Development

7.5.1 How these environmental measures influence the assessment of significance is discussed in **Section 7.6**. However the broad approach adopted is that where achievable and agreed environmental measures have been incorporated into the Proposed Development, the effect that those environmental measures have on the significance of potential effects is taken into account during the assessment. In some cases a potential effect may require no further consideration following incorporation of appropriate environmental measures.

7.5.2 Given ongoing survey and data collection, these measures will be reconsidered and effects reassessed for the ES, once final effects and appropriate environmental measures are known.

7.5.3 There is on-going consultation with NE and the Kent Wildlife Trust regarding the HRA and EcIA, and following completion and compilation of baseline surveys and assessment of impacts, further discussion will be had on all the environmental measures that would be incorporated into the proposed development. Due to the nature of the proposals, with limited opportunity for on-Site measures, these might include, as appropriate, off-Site restoration and enhancement works proportional and in response to the predicted effects. NE have identified the north and east Kent coast as a key focus area for their work and, as information on the predicted ecological effects increases, may be able to provide more detailed guidance on the most appropriate and beneficial compensation and/or enhancement measures that, via a tariff, Manston Airport could contribute to implementation/operation.

7.5.4 A summary of the environmental measures that have been incorporated into the development proposals to date in order to avoid, reduce or compensate for potential adverse biodiversity effects is provided below in **Table 7.6**.

Table 7.6 Rationale for incorporation of environmental measure

Potential receptor	Predicated changes and potential effects	Incorporated measure
Designated sites	Pollution/eutrophication from site discharges	Discharge of treated and clean water to Pegwell Bay rather than to ground with appropriate monitoring of water quality to ensure quality standard is maintained. The discharge will be regulated under a Water Discharge Activity Permit from the Environment Agency.
Habitats		
Potential effects on birds due to damage or destruction of active nests	Legal non-compliance	Any removal of vegetation or buildings with the potential to support nesting birds will, wherever possible, be undertaken outside the bird nesting season (March to August inclusive) to ensure compliance with the Wildlife and Countryside Act 1981 (as amended). If any clearance work has to be undertaken during the main breeding season, it will only be undertaken after a qualified ecologist has confirmed that the feature does not support any nesting birds. In view of this, no potential adverse effects are anticipated.

Potential receptor	Predicated changes and potential effects	Incorporated measure
Badgers	Legal non-compliance: damage/disturbance to habitats and individuals	To ensure compliance with legislation a method statement and tool-box talk[114] would be prepared that would include details of pre-construction surveys to check on the presence of badgers and the approach that would be followed to avoid contravening the *Protection of Badgers Act 1992*. Where required, this would involve obtaining a Natural England licence with respect to development. Best practice guidelines would be followed during the works. This includes making all contractors aware of the potential presence of badgers, and not leaving trenches uncovered overnight (or leaving an escape plank if excavations cannot be covered). Any obvious mammal trails will be kept clear of obstruction.
Bats	Disturbance to/loss of foraging, commuting bats Potential disturbance to roosts, mortality/injury to individuals; habitat loss	A method statement and tool-box talk would be prepared that would include details of pre-construction verification surveys for bats, and would describe the approach that would be followed to avoid contravening the *Wildlife and Countryside Act 1981* (as amended) (WCA) and *The Conservation of Habitats and Species Regulations 2010*. Where required, this would involve obtaining a NE licence with respect to development. The method statement would also describe habitat enhancements to be implemented as part of the proposed development. Due to the nature of the development it is unlikely that much of the site will be suitable for bats once operational with extensive site and building lighting. Consequently compensation for foraging/habitat loss and any enhancements (including the installation of bat boxes, if required) would be off-Site.
Great Crested Newt	Disturbance, kill/injure/ /destroy habitat, affect distribution.	Method statement and tool box talks are required to avoid contravening the WCA (as amended) and *The Conservation of Habitats and Species Regulations 2010*. Updated surveys may be required. A GCN development licence may be required from NE prior to the start of the works. Mitigation required as part of the licence may require fencing, trapping and translocating GCN from the Site to on off-Site receptor site, as well as creation of new habitats.
Reptiles	Kill/injure reptiles	Method statement and tool box talks are required to avoid contravening the WCA (as amended). Removal of suitable habitat would be designed to avoid the risk of injury to reptiles, through measures such as timing ground works to avoid the reptile hibernation period and the gradual removal of habitat. Where good reptile populations occur, capture and translocation to good (potentially off-site) habitats (e.g. with hibernacula, compost heaps, log/brash piles and basking areas) may be required.
Barn owl	Disturbance to nesting birds	Wherever possible, construction within 200m of barn owl nest sites would be timed to avoid breeding season (that is March – December inclusive). If this is not possible, nest boxes would be capped outside the breeding season prior to construction and new alternative nest sites would be installed off-Site at sufficient distance to prevent birds using the operational site.
All	Damage to habitats and/or species through excessive dust/disturbance from noise	Dust control measures have been assessed in **Chapter 6: Air Quality** and would be implemented during the construction phase of work. Noise control measures have been assessed in **Chapter 12: Noise**. During the construction phase these would include maintaining buffer distances to sensitive receptors, use of best technology, dampers on vibrating or noise emitting equipment, timing of works.

[114] A 'toolbox talk' is a short presentation to the workforce on an aspect of a particular topic.

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Potential receptor	Predicated changes and potential effects	Incorporated measure
All	Damage to habitats and/or species through pollution (terrestrial and aquatic)	Pollution prevention control measures (including the management of noise, dust and water quality issues) would be detailed in a method statement (as part of the CEMP) and implemented during the construction phase to avoid damage to habitats/species. Construction practices would comply with the Environment Agency's Pollution Prevention Guidelines with a view to preventing the pollution of ground and surface water. **Chapter 9: Freshwater Environment** details further measures.

7.6 Scope of the assessment

7.6.1 This section sets out information on: the process whereby receptors are identified; the potential receptors that could be affected by the development; and the potential effects on receptors that could be caused by the development.

7.6.2 The scope of assessment has been informed by: the scoping study; consultee responses to the Scoping Report; the results the work detailed in **Section 7.4**; and the preliminary Proposed Development design.

Approach to identifying receptors

7.6.3 The identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study for the site location.

7.6.4 In some cases, even without quantified information, it is reasonable to assume that some potential receptors will not experience significant effects. This is sometimes the result of tried and trusted mitigation measures that have been incorporated into the Proposed Development, which might reasonably be expected to be effective (see **Section 7.5**).

7.6.5 The following considerations have been taken into account in identifying potential receptors:

- the extent to which the receptor will be affected by changes that are expected to result from the development;
- the sensitivity of the receptors to the changes that are likely to occur;
- the likely magnitude, duration and other characteristics of the effects;
- the importance or value of the receptor at a local, regional and national level; and
- relevant best practice and guidance where specialist methodologies have been developed as detailed below.

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Potential receptors

7.6.6 The identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study for the site location.

7.6.7 This section identifies the potential receptors that have been identified based on the above factors and on the consultation response received from PINS. The receptors listed in **Table 7.6** are considered capable of being significantly affected and will therefore be taken forward for further assessment.

7.6.8 A key consideration in assessing the effects of any development/proposed works on flora and fauna is to define the habitats and species that need to be included in the assessment. In identifying these receptors, it is important to recognise that a development can affect flora and fauna both within the Site (e.g. through the land-take required) as well as beyond the Site (e.g. through noise generation, changes in air quality). The approach that has been taken in preparing this scoping report (and that will be used in the ongoing scoping and subsequent detailed assessment) is to identify important biodiversity resources (the sites, habitats and species of sufficient importance that effects upon them could be significant), as well as considering legally protected species.

7.6.9 Assessment of the effects of the proposed development on biodiversity will be undertaken with reference to CIEEM's Guidelines for Ecological Impact Assessment in the United Kingdom[115]. The assessment will focus on legally protected and otherwise important biodiversity resources (see **Boxes 7.1** and **7.2**).

7.6.10 The starting point for the scoping assessment was to undertake an exercise, using the baseline data that were collected through the desk study and knowledge of the local area, to subdivide the recorded biodiversity receptors (i.e. designated sites, together with species populations and habitats) into:

- those that could be significantly affected by the proposed development or for which the development could result in the contravention of relevant legislation, and that therefore required more detailed assessment; and
- those that were assessed as not being likely either to be significantly affected or for relevant legislation to be contravened, and that did not therefore require further assessment (i.e. that were 'scoped out' of the assessment).

7.6.11 For sites/habitats/species that meet the criteria in **Box 7.1** and or **7.2**, and are therefore important for biodiversity conservation, the next stage of the scoping assessment is to determine whether the identified receptors are likely to be of sufficient 'biodiversity conservation value' that an effect upon them could be significant in EIA terms. In this context:

- biodiversity conservation value relates to the quality and/or size of sites or habitats, or the size of species populations (see **Box 7.3**); and

[115] CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Accessed at http://www.cieem.net/data/files/Publications/EcIA_Guidelines_Terrestrial_Freshwater_and_Coastal_Jan_2016.pdf

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- potential significance means that the effect could be of sufficient concern, or for positive effects, of such substantial benefit, that it could influence the decision about whether or not development consent or a specified other consent should be granted.

Box 7.3 Value and importance for biodiversity conservation

> The distinction between importance and value can be illustrated by common species such as the house sparrow. This species is important at a national level because it is a priority species (Section 41, NERC Act 2006). However, a small population that could be affected by a development would often be assessed as being of insufficient value for an effect (whether adverse or beneficial) to be of potential significance. On this basis it would not need to be assessed further within the ES (i.e. it would be 'scoped out' of the assessment).

7.6.12 Receptors that are of sufficient value that an effect upon them would have the potential to be significant, together with all relevant legally protected species, are taken through to the assessment. This involves identifying, for each receptor:

- any environmental changes that are likely to be caused by the proposed development which have the potential to lead to a significant effect and/or to contravene relevant legislation;
- for these environmental changes, determining the area within which each change could cause a likely significant effect or could contravene relevant legislation (i.e. an 'ecological zone of influence' - see **Box 7.4**);
- comparing the area where the receptor occurs with the ecological zone of influence; and
- if the receptor occurs or is likely to occur within the zone of influence, concluding that either the receptor could be subject to a significant effect and/or the relevant legislation could be contravened, in which case the effects upon the receptor are scoped in, or no significant effect is likely to occur and it is scoped out.

Box 7.4 Defining ecological zones of influence

> The ecological zone of influence that is the most straightforward to define is the area affected by land-take and direct land-cover changes associated with the development. This zone is the same for all affected receptors. By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (e.g. changes in noise associated with development activities within the land-take area), the zone of influence may vary between receptors, dependent upon the receptors' sensitivity to the change and the precise nature of the change.
>
> For example, dormouse might be unaffected by noise associated with a development unless the noise is generated very close to where the dormouse nests, while another mammalian

species might be disturbed at much greater distances; other species (e.g. of invertebrate) may be unaffected by changes in noise. A further complication is that the response of a receptor to a change associated with one development may differ to the response of the same receptor to a similar change on another development. This can occur as a result of the wide range of variables that influences the precise nature of any change (e.g. for noise this can include: differing baseline noise conditions; specific magnitude, timing or other characteristics of the noise; and the effects of screening and topography).

In view of these complexities, the definition of the zones of influence that extend beyond the land-take area will be based upon professional judgement, informed by discussions with the technical specialists who are working on other chapters of the ES. These specialists will provide information about the environmental changes that they assess within their ES chapters. This information will be combined with available ecological information about receptors' sensitivities to different environmental changes in order to define the extent of each ecological zone of influence.

The key issues relating to biodiversity receptors and the development proposals are as follows:

- the effects of temporary and permanent habitat loss from land take by access and construction areas;
- the effects by way of pollution (air quality effects associated with changes in air quality and nitrogen deposition leading to enrichment/acidification of habitats, pollution from surface water run-off etc.);
- disturbance (noise, visual and light) to surrounding habitats and associated species; and
- the effects of collision with aeroplanes, which is of particular relevance in areas known to support raptors or large concentrations of waterfowl.

7.6.13 **Table 7.7** summarises information about the receptors that have been identified through the scoping process at this stage as having the potential to be significantly affected by the proposed development and/or for which legislation could be contravened (see Table 7A.1 and &B1, Appendix 7.2). The table also identifies the potential effects that need to be assessed. The Evidence Plan will detail the assessment of those receptors covered by the Habitats Regulations.

Cumulative assessment

7.6.14 The biodiversity assessment will consider the potential effects of the proposed development in combination with other developments. Other major developments need to be considered in assessing cumulative effects and include those under construction; permitted but not yet implemented; submitted but not yet determined; projects on the planning inspectorates programme of projects; and those identified in development plans and other plans which are reasonably likely to come forward.

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Table 7.7 Potential receptors

Potential Biodiversity Receptor	Valued and / or legally protected?	Relevant criteria (from Box 7.1) and legislation (from Box 7.2)	Potentially significant effects/legal contravention and causal changes
Thanet Coast and Sandwich Bay Ramsar	Biodiversity conservation value Legal status	Habitat Regulations	There is a potential for direct effects to the foraging habitat of over-wintering birds from the discharge of treated water and clean water to Pegwell Bay. There is potential for effects to foraging habitat and potential disturbance / displacement effects to over-wintering birds as a result of aircraft movements. During the operational period, there is potential risk of collision.
Thanet Coast and Sandwich Bay SPA	Biodiversity conservation value Legal status	Habitat Regulations	There is a potential for direct effects to the foraging habitat of over-wintering birds from the discharge of treated water and clean water to Pegwell Bay. There is potential for effects to foraging habitat and potential disturbance / displacement effects to over-wintering birds as a result of aircraft movements. During the operational period, there is potential risk of collision.
Thanet Coast SAC	Biodiversity conservation value Legal status	Habitat Regulations	There is potential for direct effects resulting from a deterioration in air quality, increased deposition and from the discharge of treated and clean water.
Sandwich and Pegwell Bay NNR	Biodiversity conservation value Legal status	*National Parks and Access to the Countryside Act 1949* and *the Wildlife and Countryside Act 1981*(as amended)	There is potential for direct effects resulting from a deterioration in air quality, increased deposition and from the discharge of treated and clean water.
Sandwich Bay to Hacklinge Marshes SSSI	Biodiversity conservation value Legal status	*Wildlife and Countryside Act 1981* (as amended)	There is a potential for direct effects to the foraging habitat of over-wintering birds from the discharge of treated water and clean water to Pegwell Bay. There is potential for effects to foraging habitat and potential disturbance / displacement effects to over-wintering birds as a result of aircraft movements. During the operational period, there is potential risk of collision.
Thanet Coast SSSI	Biodiversity conservation value Legal status	*Wildlife and Countryside Act 1981* (as amended)	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.
Margate and Long Sands SCI (Inshore marine)	Biodiversity conservation value Legal status	Habitat Regulations	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.

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Potential Biodiversity Receptor	Valued and / or legally protected?	Relevant criteria (from Box 7.1) and legislation (from Box 7.2)	Potentially significant effects/legal contravention and causal changes
Stodmarsh SAC	Biodiversity conservation value Legal status	Habitats Regulations	There is potential for direct effects resulting from a deterioration in air quality and increased deposition
Stodmarsh NNR	Biodiversity conservation value Legal status	*National Parks and Access to the Countryside Act 1949* and *the Wildlife and Countryside Act 1981*(as amended)	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.
Stodmarsh SSSI	Biodiversity conservation value Legal status	*Wildlife and Countryside Act 1981* (as amended)	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.
Stodmarsh Ramsar	Biodiversity conservation value Legal status	Habitat Regulations	There is potential for effects to foraging habitat and potential disturbance/displacement effects to over-wintering birds as a result of aircraft movements. During the operational period, there is potential risk of collision.
Stodmarsh SPA	Biodiversity conservation value Legal status	Habitats Regulations	There is potential for effects to foraging habitat and potential disturbance/displacement effects to over-wintering birds as a result of aircraft movements. During the operational period, there is potential risk of collision.
Preston Marshes SSSI	Biodiversity conservation value Legal status	*Wildlife and Countryside Act 1981* (as amended)	There is potential for direct effects resulting from a deterioration in air quality and increased deposition
Blean Complex SAC	Biodiversity conservation value Legal status	Habitats Regulations	There is potential for direct effects resulting from a deterioration in air quality and increased deposition
Blean Woods NNR	Biodiversity conservation value Legal status	*National Parks and Access to the Countryside Act 1949* and *the Wildlife and Countryside Act 1981*(as amended)	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.
East Blean Woods SSSI	Biodiversity conservation value Legal status	*Wildlife and Countryside Act 1981* (as amended)	There is potential for direct effects resulting from a deterioration in air quality and increased deposition

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Potential Biodiversity Receptor	Valued and / or legally protected?	Relevant criteria (from Box 7.1) and legislation (from Box 7.2)	Potentially significant effects/legal contravention and causal changes
Breeding birds	Biodiversity conservation value Legal status	*Wildlife and Countryside Act 1981* (as amended)	Potential effects on birds due to damage or destruction of nests. Any removal of vegetation or buildings with the potential to support nesting birds will, wherever possible, be undertaken outside the bird nesting season (March to August inclusive) to ensure compliance with the Wildlife and Countryside Act 1981 (as amended). However, for all breeding birds, should damage, or in the case of Schedule 1 species only, disturbance, be unavoidable, it may be necessary to obtain a derogation licence to proceed.
Bats	Biodiversity conservation value Legal status	Habitat Regulations NERC Act 2006 section 41 Species of Principal Importance (7 species) Kent BAP Priority species (Noctule, Soprano Pipistrelle and Brown Long-Eared Bat species)) *Wildlife and Countryside Act 1981* (as amended)	Removal of /damage to and/ or disturbance of roosts. Disturbance of commuting and foraging bats from light spill. Disturbance of /barrier effects to commuting routes from new development.
Great crested newt	Biodiversity conservation value Legal status	Habitat Regulations NERC Act 2006 section 41 Species of Principal Importance Kent BAP Priority species *Wildlife and Countryside Act 1981* (as amended)	Removal of /damage to and/ or disturbance of terrestrial habitat. Land take/land cover change (habitat removal) resulting in death or injury.
Reptiles	Legal status	NERC Act 2006 section 41 species of principal importance *Wildlife and Countryside Act 1981* (as amended) Kent BAP Priority species	Land take/land cover change (habitat removal) resulting in death or injury of reptiles.
Invertebrate assemblage	Biodiversity conservation value	NERC Act 2006 section 41 Species of Principal Importance	Land take/land cover change (habitat removal); management changes resulting in reduction in habitat.
Lowland grassland	Biodiversity conservation value	NERC Act 2006 section 41 Habitats of Principal Importance	Land take/land cover change, management changes resulting in loss /reduction in extent of receptor. There is potential for direct effects resulting from a deterioration in air quality and increased deposition
Woodland, including lowland, mixed deciduous and wet woodland, and traditional orchards	Biodiversity conservation value	NERC Act 2006 section 41 Species of Principal Importance	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.

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Potential Biodiversity Receptor	Valued and / or legally protected?	Relevant criteria (from Box 7.1) and legislation (from Box 7.2)	Potentially significant effects/legal contravention and causal changes
Coastal and floodplain grazing marsh	Biodiversity conservation value	NERC Act 2006 section 41 Species of Principal Importance	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.
Reedbeds	Biodiversity conservation value	NERC Act 2006 section 41 Species of Principal Importance	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.

Spatial and temporal scope

7.6.15 The spatial extent of the assessment of each potential likely significant effect reflects the area occupied by the receptor that is being assessed and the zone of influence associated with the environmental changes that are likely to affect the receptor (see **Box 7.4**). Thus, if part of a designated biodiversity site is located within the ecological zone of influence relating to a particular environmental change, an assessment will be made of the effects on the site as a whole. A similar approach will be taken for areas of notable habitat. For species that occur within an ecological zone of influence that relates to a change that could significantly affect the species, an assessment will be carried out on the total area that is used by the affected individuals or population of the species (e.g. for foraging or as breeding territories).

7.6.16 Effects on biodiversity (designated sites sensitive to air quality impacts) associated with emissions (see Section 6) from road traffic as a result of the construction and operation of the development (e.g. HGV movements during construction, cargo deliveries to and from the airport) will be assessed. Assessments will occur where such sites fall within 200m of a road meeting one or more of the criteria included in the Highways Agency's Advice Note HA 207/07 contained within Volume 11, Section 3 of the Design Manual for Roads and Bridges (DMRB) guidance and the Environmental Protection UK/Institute of Air Quality Management (EPUK/IAQM)[116].

7.6.17 Study areas associated with the impacts associated with changes in noise (**Chapter 12**) and air quality (**Chapter 6**) during the operational phase will be informed by the outcome of ongoing modelling based upon the location of the flight paths, and will be based upon worst-case (Year 20) assessments.

Potentially significant effects

7.6.18 Based on the methodology that is set out below, Table 7.7 summarises information about the receptors that have been identified (through the scoping process) as having the potential to be significantly affected by the proposed development (due to their value) and/or for which legislation could be contravened. The table also identifies the potential effects that need to be assessed. The identified receptors are taken forward (in Section 7.8) for further, post-scoping assessment.

[116] IAQM, 2015. 'Land-Use Planning & Development Control: Planning for Air Quality'.

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7.6.19 The environmental changes that are likely to be caused by the proposed development where the receptor is considered sensitive to the environmental change or scale of environmental change, during construction, operation, maintenance and decommissioning), which have the potential to cause significant effects and/or contravention of wildlife legislation have been identified as:

- land-take/land cover change//construction/dismantling;
- increased light, noise and vibration;
- dust deposition;
- increased vehicle movement;
- pollution (contamination/eutrophication), and
- air quality changes/emissions.

7.6.20 The potential ornithological environmental changes have been identified as:

- the direct effects of temporary and permanent habitat loss from land take by new airport infrastructure, access and construction areas;
- the direct effects of habitat loss/barrier effects, i.e. the displacement of species from an area due to disturbance during construction and operational phases of the airport. Such disturbance may occur as a consequence of access and construction work, increased vehicle movements, wildlife hazard management measures and the noise/presence of aircraft landing/taking off;
- the direct effects of contamination/eutrophication of off-Site habitats from the discharge of on-Site water;
- the direct effects by way of air quality changes/emissions of surrounding sensitive habitats.

7.6.21 Each receptor has not been assessed against every potential environmental change where they may not be applicable. In these cases the receptor is not considered sensitive to the environmental change or sensitive to the scale of environmental change and is scoped out. Whether a receptor is sensitive or not to an environmental change is based on professional judgement, Proposed Development design, statutory guidance and appropriate relevant literature.

7.6.22 This process of scoping in (or out) biodiversity receptors which could be subject to potentially significant effects will continue up to the point of completing the ES, to ensure that all likely significant effects are encapsulated.

7.7 Assessment methodology

7.7.1 The assessment will be based upon the results of the desk study, survey data, air quality and noise modelling and also relevant published information (on potential biodiversity receptors' status, distribution, sensitivity to environmental changes and ecology), and professional knowledge of ecological processes and functions.

7.7.2 For each scoped-in receptor, effects will be assessed against the predicted future baseline conditions for that receptor during construction and operation. Air quality and noise modelling will be based upon a worst-case scenario. This future baseline will be defined using information about the likely future use and

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management of the site in the absence of development, known population trends (for species) and any other proposed developments (consented or otherwise) that may act cumulatively with the Proposed Development to affect biodiversity receptors. If it is not possible to conclude that any predicted future baseline scenario is more likely to occur than the current baseline, the current baseline will be used in the ES.

7.7.3 Throughout the assessment process, findings about potential likely significant effects will be used to inform the definition of requirements for additional baseline data collection and the identification of environmental measures to incorporate into the Proposed Development design (in order to avoid or reduce adverse effects or to deliver enhancements). Measures to comply with relevant policies and legislation will also be included. The results of the assessment, will, reflect the final Proposed Development design (i.e. incorporating the environmental measures).

7.7.4 The spatial extent of the assessment of each potential likely significant effect reflects the area occupied by the receptor that is being assessed and the zone of influence associated with the environmental changes that are likely to affect the receptor (see **Box 7.4**). Thus, if part of a designated biodiversity site is located within the ecological zone of influence relating to a particular environmental change, an assessment will be made of the effects on the site as a whole. A similar approach will be taken for areas of notable habitat. For species that occur within an ecological zone of influence that relates to a change that could significantly affect the species, an assessment will be carried out on the total area that is used by the affected individuals or population of the species (e.g. for foraging or as breeding territories).

7.7.5 For each receptor, the assessment will deal with the effects of construction, together with the effects of the operational airport. As progressively more information is available about the development proposals and about the populations of important and legally protected species, the scope of the assessment will be refined to focus on those receptors that have the potential to be significantly affected by the proposed development. Each scoped-in receptor will then be subject to further assessment work that addresses how the receptor is likely to be affected by the proposed development, allowing for environmental changes that could affect the receptor during construction and operation, as well as dismantling where that is occurring.

7.7.6 In respect of biodiversity for this PEIR, as further baseline data is yet to be collected exact effects are currently unknown, significance cannot be fully assessed at this stage for all receptors. However environmental mitigation measures would seek to ensure that potential effects upon valued receptors are not significant.

Negative effects

7.7.7 An effect is considered to be significant if the favourable conservation status of a receptor is compromised by the proposed development. Conservation status is

defined by the Chartered Institute of Ecology and Environmental Management[117] as being:

- for habitats - the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area;
- for species - the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.

7.7.8 A similar procedure has been used for designated sites that are affected by the development, except that the focus is on the effects on the integrity of each site, defined by the CIEEM guidelines as "*… the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*." The assessment of effects on integrity draws upon the assessment of effects on the conservation status of the features for which the site has been designated.

7.7.9 The decision as to whether the favourable conservation status has been compromised will be made using informed judgement based on the findings of the assessment of how the resource would be affected.

Positive effects

7.7.10 A positive effect is assessed as being significant if development activities are predicted to cause:

- an improvement in the condition of a habitat/species population from unfavourable to unfavourable recovering or favourable (noting that condition data are only available for SSSIs but that professional judgement has been used to apply the same principle to habitats/species elsewhere); or
- partial or total restoration of a site's favourable condition.

7.7.11 If a species population, habitat or site is already in favourable condition, it is still possible for there to be a significant positive effect. There is, however, no simple formula for determining when such effects are significant and decisions about significance therefore have to be made on a case by case basis using professional judgement.

7.8 Assessment of effects on on Thanet Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay to Hacklinge Marshes SSSI

Baseline conditions

Current baseline

7.8.1 Thanet Coast and Sandwich Bay SPA (and Ramsar) is located at the north eastern tip of Kent in southern England approximately 925 m south-east of the Site

[117] CIEEM (2016) Guidelines for Ecological Impact Assessment in the United Kingdom. CIEEM

boundary. It is a coastal site consisting of a long stretch of rocky shore, adjoining areas of estuary, sand dune, maritime grassland, saltmarsh and grazing marsh. The site holds important numbers of the following species:

- European golden plover (non-breeding);
- Ruddy turnstone (non-breeding); and
- Little tern (breeding).

7.8.2 The wetland habitats support 15 British Red Data Book invertebrates, as well as a large number of nationally scarce species (Ramsar criterion 2 - supports 15 British Red Data Book wetland invertebrates and Ramsar Criterion 6 - species/populations occurring at levels of international importance).

7.8.3 Golden plover is also a species included as a notification feature of aggregations of non-breeding birds for Sandwich Bay to Hacklinge Marshes SSSI.

Golden plover (Non-breeding)

7.8.4 Golden plover is a qualifying species for the Thanet Coast & Sandwich Bay SPA under Article 4.2 (individual species - overwinter).

7.8.5 Golden plover winter on coastal and inland habitats around Sandwich Bay and Pegwell Bay. Their main feeding habitat is on arable fields and grazing marsh located inland of the dunes of Sandwich Bay. Historically, golden plover have roosted in large numbers (+10,000 birds) at low tide on the intertidal mudflats of Pegwell Bay, with Musgrove *et al.* (2003) indicating that golden plover were largely confined to the area by the outflow of the river Stour.

7.8.6 Analysis of Kent Ornithological Society (KOS) desktop records for golden plover exceeding 300 birds in the last ten years has revealed several important locations for golden plover in the wider locality besides Pegwell Bay.

- The fields around Nicholas St Wade approximately 4.4 km to west-north-west of the Site boundary have several records for golden plover including an exceptional count of 3,950 feeding on winter wheat in 2003.
- An occasional roost has been recorded at the north end of Stodmarsh (600 birds were recorded in 2006), some 6.6 km west-south-west of the Site.

7.8.7 Griffiths 2004[118] showed that that golden plover winter on both intertidal and inland areas around Pegwell Bay with their main feeding habitats arable fields and grazing marsh located inland of the dunes at Sandwich Bay.

7.8.8 Winter bird surveys (September 2016 – March 2017) are currently ongoing and will be reported in the ES.

Turnstone (non-breeding)

7.8.9 Turnstone is a qualification feature of the Thanet Coast & Sandwich Bay SPA under Article 4.2, as it regularly supports an internationally important wintering population, with 1.4% of the Western Palearctic population between 1991/2 and

[118] Griffiths, M., 2004. '*Numbers and distribution of the wintering golden plover population in and around the Thanet Coast and Sandwich Bay SPA 2002/2003'* in English Nature Research Reports; Number 569. English Nature: Peterborough.

1995/6. The Thanet Coast Turnstone monitoring report (2016[119]) concluded from six surveys undertaken between 2001 -2010 that the population of turnstone within the SPA varied from 1,087 – 1,335, with a mean of 1,227. A coordinated count in 2013 showed a marked decline, with 620 turnstone counted. Further coordinated counts in winter 2013/14 (two counts) and latterly 2016 (single count) confirmed this decline with 583; 664 and 537 respectively. It was suggested within the monitoring report that turnstone regularly undertook westerly movement, prior to high-tide and may be joining a roost 2.5 km west of Whitstable Harbour on the north Kent coast and within the Swale SPA and some 18 km directly north-west of Manston Airport. This suggestion was based on results from coastal survey plots, and it would therefore appear the birds, as would be expected for this species, are following the coastline around Thanet and not undertaking overland movement. Tabulated survey results from the report indicate that turnstone concentrations within the SPA occur mainly across the northern extremities of the SPA, heading west toward Whitstable, with Pegwell Bay supporting only a small proportion of the numbers mentioned here.

Little tern (breeding)

7.8.10 Little tern is a qualification feature of the Thanet Coast & Sandwich Bay SPA. It qualifies under Article 4.1 as during the breeding season the area regularly supports 0.3% (5 year mean, 1992-1996) of the breeding population of Great Britain. Following the third JNCC review (2016)[120] of the SPA designated species, it was suggested little tern be removed, due to recent extirpation from the site, although this change is as yet unratified.

Future baseline

7.8.11 In the absence of development it is assumed that the Site will habitats will remain principally as grassland and hard standing and immediate vicinity will remain primarily as arable farmland. As a result, the management of this area would be unlikely to change in the foreseeable future and therefore the baseline with respect to Thanet Coast & Sandwich Bay SPA would not be altered significantly.

Predicted effects and their significance

7.8.12 Distribution data from the locality of the Site indicate that birds utilising farmland to the south, north and west are likely to be connected with the Pegwell Bay (Thanet Coast & Sandwich Bay SPA) wintering population i.e. they disperse from Pegwell Bay at high tide. As a result of the likely movements of birds between high-tide foraging areas around the Site and Pegwell Bay at low tide, there is potential for disturbance / displacement effects as a result of aircraft movements during operation of the Site. Also, during the operational phase, there is potential risk of collision. Disturbance and displacement could result from aircraft noise and visual disturbance, and also from noise associated with any onsite pyrotechnical bird

[119] Hodgson, I., 2016. '*Thanet Coast Turnstone (Arenaria interpres) monitoring, January – February 2016'* in A Report to Natural England. Sandwich Bay Bird Observatory Trust: Sandwich.
[120] Stroud, D.A., Bainbridge, I.P., Maddock, A., Anthony, S., Baker, H., Buxton, N., Chambers, D., Enlander, I., Hearn, R.D., Jennings, K.R, Mavor, R., Whitehead, S. & Wilson, J.D. - on behalf of the UK SPA & Ramsar Scientific Working Group (eds.) 2016. The status of UK SPAs in the 2000s: the Third Network Review. [c.1,108] pp. JNCC, Peterborough. http://jncc.defra.gov.uk/page-7309

scaring methods. The potential of collision risk results from flight lines (birds moving between coastal and inland foraging sites) intercepting the flight paths of incoming/outgoing planes.

7.8.13 Golden Plover is a qualifying feature of the SPA as the SPA regularly supports 0.2% of the population of Great Britain, over the five year peak mean 1991/92-1995/96 (Article 4.2 qualification)[121]. For the purposes of understanding European and National context and in order to determine significance, with respect to effects on the SPA population, Table 7.8 presents a breakdown of population sizes and selection/significance thresholds[122].

Table 3.8 Golden plover populations and selection thresholds

Golden Plover		Population sizes (individuals)	1% Selection/ Significance thresholds
Bio-geographic population		1,800,000	18,000
GB population		250,000	2,500
Thanet Coast & Sandwich Bay SPA/Ramsar	1985/86-1989/90, an average peak count	1,980	N/A
	1998/99 to 2002/03 five-year mean peak Pegwell Bay 'roost' count	6,332	N/A
	An average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)	4,190	42

Construction phase effects

Construction displacement - habitat loss

7.8.14 Noise, vibration and physical activity within the site from earthworks, fixed and mobile plant during the construction phase provides potential for foraging golden plover to be displaced from any suitable farmland adjacent to the site. Increased noise and vibration may also occur due to an increase in construction road traffic. As construction noise, vibration and activity within the site is currently lacking and also likely to be unpredictable it has a greater potential to cause disturbance than an increase in road traffic noise and vibration. This is because birds in the vicinity of the airport are likely to be habituated to current road traffic noise and vibration and its more predictable pattern.

7.8.15 The work by Griffiths (2003) identified a concentration of golden plover (over 80%) at high tide in fields inland of the SPA at Sandwich Bay with most of the others

[121] Natura 200 Standard Data Form: Thanet Coast and Sandwich Bay SPA. http://jncc.defra.gov.uk/

[122] There is no fundamental biological reason to take 1% of a population as the threshold level for establishing the level of importance of a site. Nevertheless, this percentage is widely considered to be of value in developing measures that give an appropriate level of protection to populations, and has gained acceptance on this basis throughout the world. The criterion was, for example, adopted by parties involved in the Ramsar Convention 1971. Thereafter, the 1% level of national species totals has been taken as the basis of assessment in various countries, including Britain (Stroud, Mudge & Pienkowski, 1990).

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near the north Kent coast, and others immediately inland of Pegwell Bay. The data of this work having been collected whilst Manston Airport was still operational.

7.8.16 Ongoing survey of farmland habitat around the proposal Site by Amec Foster Wheeler has shown limited use by golden plover of functional habitat adjacent to the Site. Between September 2016 and February 2017 inclusive few golden plover were recorded with generally five or less birds recorded within 2km of the Site. An exception was the November survey when a flock of 530 birds was recorded in an arable field immediately to the south of the Site at the eastern end. Soon after this record, the field was cultivated and no further records were obtained from that location.

7.8.17 Winter bird surveys are ongoing although indicate that plovers do not make regular use of nearby farmland although may use it opportunistically, depending upon suitability of crop type, with birds favouring winter cereals (Mason and MacDonald, 1999). As a result the use of arable land surrounding the airport may vary year to year depending upon crop type and the extent of winter cereal to oil seed rape, which is less favoured.

7.8.18 At present the full details of construction activities, construction plant and on-times, and of the potential noise and vibration effects, have not been assessed (see **Chapter 12: Noise & Vibration**). All calculations and assessments will be undertaken based on the methodology advocated in BS5228-1:2009+A1:2014 *'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'*. Furthermore, road traffic noise from construction vehicles will also be assessed. The construction noise will be assessed following the same assessment methodology as the on-site construction activities.

7.8.19 Given that the functional habitat surveys have not currently revealed use of the land around the proposal Site to regularly support significant numbers of golden plover (with a count of 530 birds on a single occasion) and with the availability of extensive alternative inland feeding habitat within the vicinity, the effects of displacement on the SPA golden plover population are considered not significant.

7.8.20 Other qualification/notification species are confined to the coastal habitats of the designated sites. These are too distant from the airport and the road network to be affected by noise and physical activity during the construction phase, and it is considered that there will be no significant impacts upon these species.

7.8.21 These conclusions will be reviewed following more detailed information on construction phase noise/vibration data and assessment with collation of winter 2016/17 survey data and in light of any more recent desk study data.

Operational phase effects

Operational displacement - habitat loss

7.8.22 Once the airport is operational there is potential for foraging golden plover to be displaced from arable land and grazing marshes below or near to the flight paths of planes. The altitude, lateral distance and noise of the aircraft are all factors involved in potential disturbance, although separating the effect of aircraft noise from that of visual disturbance is difficult.

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7.8.23 In addition to any disturbance caused directly by aircraft, methods employed at the airport to reduce/prevent collision risk by deterring hazardous birds from using the aerodrome and adjacent land may also prevent golden plovers from using otherwise suitable habitat.

7.8.24 Unlike the other qualifying/notification wader species of the coastal designated sites, golden plover can move to inland farmland areas to forage. Movements to and from inland areas and the coast result in a potential for collision risk with aircraft taking off and landing at Manston Airport.

7.8.25 Even if golden plover do not use Manston Airport, collision risk might also result from birds moving through aircraft flights paths during movements between designated coastal sites and inland foraging areas. Therefore, it is important to know the distribution of golden plover surrounding the airport and in relation to the flight paths of aircraft using the airport.

7.8.26 The work by Griffiths (2004) identified a concentration of golden plover (over 80%) at high tide in fields inland of the SPA at Sandwich Bay with most of the others near the north Kent coast, and others immediately inland of Pegwell Bay. The data of this work having been collected whilst Manston Airport was still operational.

7.8.27 Ongoing survey of farmland habitat around the proposal Site by Amec Foster Wheeler has shown limited use by golden plover (and lapwing) of functional habitat adjacent to the Site. Between September 2016 and February 2017 inclusive few golden plover were recorded with generally five or less birds recorded. An exception was the November survey when a flock of 530 birds was recorded in an arable field immediately to the south of the Site at the eastern end. Soon after this the field was cultivated and no subsequent records were obtained from that location.

7.8.28 There is little documented evidence on the disturbance effects of aircraft on birds and much of this is comes from studies that have looked mainly at geese, ducks, swans and seabirds Those studies involving waders have looked at the effects of microlights and jets. Also, these studies have mainly been based upon effects associated with aircraft altitude rather than lateral distance.

7.8.29 A literature review being undertaken by Amec Foster Wheeler on a bird disturbance by aircraft has found that estimated minimum disturbance altitudes for wading birds are on average 300 m or more above ground level. Lateral distances have not been as widely reported, though disturbance distances in excess of 1 km have been reported for some species such as brent goose and whooper swan. Noise levels in excess of 80 dB(A) have been recorded as causing the more severe disturbance incidents in a number of studies. This included species such as harlequin duck, American wigeon, gadwall and crested tern. However, some degree of habituation is likely to occur, should aircraft departures and arrivals become regular and predictable.

7.8.30 Current information on aircraft flight paths indicate that:

- All over-flights of the SPA will be at or in excess of altitudes of 500 m.
- Aircraft flight routes ensure that aircraft are in excess of 1 km from the SPA boundary

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- The SPA boundary and functional habitat regularly used by SPA/SSSI species is outside the 80 dB(A) noise contour for aircraft operations at the airfield (where noise levels would be at their greatest)

7.8.31 Wildlife hazard management at airports adopts the requirements set out in CAP 772 (Civil Aviation Authority, 2014). One such measure is a long grass policy (LGP), where grass is maintained at a height of 150 to 200 mm with minimal levels of weed infestation. This LGP has been proven to reduce the presence of hazardous birds at aerodromes, such wading birds (e.g. golden plover and lapwings) as well as passerines (e.g. corvids and starlings), gulls, and pigeons. This likely sufficient in itself to deter use of the airport by golden plover although if required it may be combined with additional bird scaring techniques e.g. use of birds of prey (falconry), pyrotechnic bird scaring cartridge (BSC), *etc.*, to further deter presence within the aerodrome and on adjacent land.

7.8.32 Given that the functional habitat surveys have not revealed use of the land around the proposal Site to regularly support significant numbers of golden plover (with a count of 530 birds on a single occasion) and with the availability of extensive alternative inland feeding habitat within the vicinity, the effects of displacement on the SPA population are considered not significant.

7.8.33 These conclusions will be reviewed following more detailed information on aircraft flight paths and noise levels along with collation of survey data from the winter period 2016/2017, and in light of any more recent desk study data.

7.8.34 For those qualification/notification species restricted to the coastal habitats of the designated sites no significant effects are anticipated due to the distance (lateral and/or vertical) of the flight paths from the designated sites.

Decommissioning phase effects

7.8.35 The same approach would be undertaken for the decommissioning phase as for the construction phase, therefore no significant effects are anticipated.

Combined Effects

7.8.36 No combined effects are anticipated.

7.9 Assessment of effects to Thanet Coast and Sandwich Bay SPA/Ramsar; Thanet Coast SAC; Sandwich Bay to Hacklinge Marshes SSSI; Sandwich and Pegwell Bay NNR through water discharge

Construction phase effects

Treated water discharge into Pegwell Bay and associated designated nature conservation sites – change in habitat quality

7.9.1 There is a potential for direct effects to the foraging habitat of over-wintering birds from the discharge of treated water and clean water to Pegwell Bay. There is also potential for the discharge to adversely affect the qualifying/notification habitats of the Thanet Coast SAC and Sandwich Bay to Hacklinge Marshes SSSI. Effects of

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the discharge on habitats could be through contamination (via pollutants, for example, from fuel spills) or through eutrophication (through increased nitrate or phosphate levels).

7.9.2 In addition to the ornithological features of the SPA/Ramsar, the SSSI is notified for its aggregations of non-breeding birds for grey plover, ringed plover and sanderling, all of which occur in winter at nationally important numbers. Additional notification features include, as well several dune community types, a number of strandline/intertidal vegetation communities, including:

- *Honkenya peploides* - *Cakile maritima* strandline community;
- *Suaeda maritima* saltmarsh;
- *Elytrigia atherica* saltmarsh;
- *Suaeda vera* - *Limonium binervosum* saltmarsh;
- *Juncus maritimus* saltmarsh;
- *Festuca rubra* saltmarsh;
- *Puccinellia maritima* sub-community; and
- *Atriplex portulacoides* saltmarsh.

7.9.3 The Pegwell Bay section of the SAC/NNR is largely intertidal although with four Annex 1 dune habitats comprising the primary reason for selection of the site (**Table 7.9**):

Table 7.9 Annex 1 habitats of Thanet Coast SAC

Annex 1 habitat	Description/comment
Embryonic shifting dunes	The Embryonic shifting dunes at Sandwich Bay are representative of this habitat type in south-east England. The seaward edge of the north of this site displays a good sequence of embryonic shifting dune communities and there is a clear zonation within the dune habitat, with strandline species on the seaward edge and sand-binding grasses inland. Lyme-grass *Leymus arenarius* is extremely sparse and sand couch *Elytrigia juncea* is the dominant sand-binding species.
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	Shifting dunes along the shoreline with *Ammophila arenaria* occurs along the seaward edge of the northern half of this extensive dune system. It is representative of shifting dune vegetation in south-east England, a region where the habitat type is very restricted in its distribution. Although the area of this habitat type is small by comparison with other listed sites, the shifting dune vegetation contains a good range of characteristic foredune species including sea bindweed *Calystegia soldanella*, sea spurge *Euphorbia paralias* and sea-holly *Eryngium maritimum*.
Fixed coastal dunes with herbaceous vegetation (grey dunes)	Priority feature. Sandwich Bay is a largely inactive dune system with a particularly extensive representation of fixed dune grassland, the only large area of this habitat in the extreme south-east of England. The vegetation is extremely species-rich and the site has been selected because it includes a number of rare and scarce species, such as fragrant evening-primrose *Oenothera stricta*, bedstraw broomrape *Orobanche caryophyllacea* and sand catchfly *Silene conica*, as well as the UK's largest population of lizard orchid *Himantoglossum hircinum*.
Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)	The small area of dunes with *Salix repens* ssp. *argentea* found at Sandwich Bay is of interest as it is the only example found in the dry south-east of England and is representative of this habitat type in a near-continental climate.

7.9.4 In addition, the Annex 1 habitat (see **Table 7.9**), humid dune slacks are present as a qualifying feature, but not a primary reason for selection of the site as a SAC.

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7.9.5 Discharge into Pegwell Bay is not likely to impact these dune and other terrestrial habitats, with any pollutant or nutrients impacting intertidal habitats.

7.9.6 Construction phase site discharge in Construction Phase 1 will be contained on site and discharged to the site sewer network, following treatment by siltbusters or similar, or taken off-site. Additional measures, which will be detailed in the Construction Environmental Management Plan (CEMP) and put in place to protect the groundwater environment during the construction phase should also ensure that no potential pollutants reach Pegwell Bay.

7.9.7 In construction phases 2-4 it is envisaged that the site drainage network will be in place and discharges will be to Pegwell Bay, all discharge will only take place once silt and any other potential pollutants (e.g. hydrocarbons) have been removed from site discharge.

7.9.8 Following the incorporation of the environmental measures it is conclude that all effects on Pegwell Bay will be Negligible. Therefore it is not concluded that there will be no significant effects on Pegwell Bay or any associated designated sites during the construction phase of the site.

Operational phase effects

7.9.9 It is proposed that the site discharge is through the current discharge pipe into Pegwell Bay. It is anticipated that the discharge will be regulated by a Water Discharge Activities Permit from the Environment Agency. Water quality treatment will take place on site in attenuation ponds and water will only be pumped to the discharge pipe from these ponds once appropriate quality standards are reached. It is proposed that there are two ponds on site, one of which will receive “dirty” run-off (for example that containing de-icer) and one receiving “clean” run-off. Water will only be discharge from the “dirty” run-off pond once treatment is complete and pumped discharge will only take place from the “clean” pond. These ponds will be sized to take account of the capacity of the pipe and pump and will appropriately consider the February 2016 update to the NPPF climate change allowances. Further details will be submitted with the site drainage plan and Flood Risk Assessment, which will accompany the DCO application. Both documents will have been discussed with the Environment Agency prior to submission.

7.9.10 The appropriate design of the site drainage system of the regulation of the site discharge through an environmental permit mean that all effects on Pegwell Bay from the site discharge are concluded to be negligible in the operation phase. Therefore it is not envisaged that there will be any potentially significant effects on Pegwell Bay and any associated designated sites during the operation phase of the site.

Decommissioning phase effects

7.9.11 The same approach would be undertaken for the decommissioning phase as for the construction phase, therefore no potentially significant effects are anticipated.

Combined Effects

7.9.12 The requirements of site discharge during construction phases 2-4 will need to be balanced against the requirements of the discharge from the operational area of

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the site. Management plans, to be agreed with the Environment Agency, will need to be in place for the control of site discharge to ensure that attenuation and treatment areas have sufficient capacity. Therefore it is not envisaged that there will be any potentially significant effects on Pegwell Bay and any associated designated sites during the operation phase of the site.

7.10 Assessment of effects to designated sites/priority habitats through air quality effects

7.10.1 There is potential for direct effects resulting from a deterioration in air quality. The principal pollutant of concern associated with traffic emissions that might affect sensitive habitats is nitrogen oxide[123] (NOx[124]). Road traffic emissions may increase the ambient NOx concentrations to which vegetation is exposed. NOx emissions may also, following chemical conversion in the air, form nitrogen dioxide, which is then deposited. This (nutrient) nitrogen deposition may affect plant communities by causing nutrient enrichment and also by acidifying the soils.

7.10.2 Plant and equipment used during construction as well as road traffic generated during the construction phase will produce emissions. During operation emissions will result from aircraft and airside plant and equipment; and road traffic generated during the operation phase.

Construction phase effects

7.10.3 Effects might arise on designated nature conservation sites/priority habitats sensitive to changes in air quality up to 200 m from roads used by traffic accessing and departing from the airport. Air quality modelling will inform the assessment of any such effects.

Operational phase effects

Nitrogen oxides (NO_x) concentrations in air

7.10.4 Road traffic generated during the operational phase might also impact designated sites/priority habitats sensitive to changes in air quality, and modelling will inform the assessment of any such effects with the assessment fully reported in the ES.

7.10.5 Effects on receptors might also result from aircraft and airside plant and equipment during the operation phase. Effects might arise from Nitrogen oxides (NO_x) concentrations in air. Air quality modelling (Chapter 6) results for Year 20 (worst case) are currently available for the SPA, SAC, Ramsar site and SSSI with the five highest PCs and PECs, and the local sites with the five highest PCs and PECs.

7.10.6 Exceedance is considered when the Predicted Environmental Concentrations (PEC) is less than 70% of the Air Quality Assessment Level (AQAL). In Year 20, the worst air quality receptors[125] are five located around Pegwell Bay included

[123] Assessment of sulphur oxides (SO_2) has been scoped out as such emissions are expected to be negligible (see Air Quality chapter, section 6.4).
[124] Nitrogen oxides were taken to be nitrogen dioxide (NO_2) + nitrogen/nitric oxide (NO).
[125] Receptors E20-24, see section 6.4.9, Chapter 6

within the SPA, SAC, Ramsar site, SSSI and NNR. For these the % PEC of AQAL for annual mean NOx range from 88.8% to 92%.

7.10.7 The maximum annual mean NO_x PEC at any relevant local nature receptor (i.e. excluding Ramsar, SPA, SAC and SSSI sites) is predicted as 31 µg m^{-3} or 104% of the AQAL at the E78 receptor, representing deciduous woodland in the Priority Habitat Inventory at Alland Grange. The modelled contribution from the airport here is 5.3 µg m^{-3}, which is the greatest PC at any of the modelled local nature receptors. The woodland at Alland Grange is less than 200m from the Site boundary (see Figure 6.5, Chapter 6). The other receptor with a PEC over 100% of the AQAL is an adjacent part of the Alland Grange site. The woodland here is less than 50 m from the Site boundary (see Figure 6.5). At all other sites, the modelled PEC is less than 100% of the AQAL. Under Environment Agency guidance[126], the PC at all local nature sites is less than 100% of the AQAL so can be screened out from further assessment. Therefore as a result of the air quality modelling, it is concluded that, except at Alland Grange, no existing or new exceedances are predicted.

Nutrient nitrogen deposition

7.10.8 For the statutory designated sites it was found that nutrient nitrogen background deposition rates at most of the modelled receptors are modelled to be at exceedance already, without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

7.10.9 At the European sites (including SSSIs) that include Pegwell Bay (and the E22 receptor), the additional process contribution is at most 2.2% of the critical load. The PEC here is 137% of the critical load.

7.10.10 At the local nature sites, the additional PC is at most 10.8% of the critical load at the E78 receptor, which represents priority habitat deciduous woodland at Alland Grange. This is less than 100% of the assessment level, so under Environment Agency guidance, it can be considered insignificant and does not need to be assessed further.

7.10.11

Decommissioning phase effects

7.10.12 To be confirmed with further air quality modelling data.

Combined Effects

7.10.13 To be confirmed with further air quality modelling data.

[126] 'Air emissions risk assessment for your environmental permit'. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit, dated 2 August 2016.

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7.11 Assessment of effects to bat assemblage

Current baseline

7.11.1 The desk study did not provide any records of bats from within the Site. Within 5 km of the Site there were 125 records of bats since 2000, of at least six species: common pipistrelle; Nathusius' pipistrelle; soprano pipistrelle; brown long-eared; Natterer's and serotine; some records are only allocated to species level (*pipistrellus Sp*.) with six records of *Chiroptera sp.*

7.11.2 The Stone Hill Park extended Phase 1 habitat survey (June 2015), supported by the Amec Foster Wheeler ground truth visit (February 2017), found that the Site provides a mixture of semi-natural habitats suitable for foraging and commuting, although much of the site is exposed and dominated by managed grassland. As a result bat activity is likely to be concentrated around the margins of the Site where cover is present e.g. around the northern part of the Site.

7.11.3 External building assessments included within the Stone Hill Park extended Phase 1 habitat survey found a total of 52 buildings/structures within the site with the majority considered to have negligible or low potential for roosting bats. Roost potential (in accordance with the Hundt, 2012) of buildings/ structures from the external inspections only was found to be as follows:

- 34 with negligible potential
- 20 with low potential
- 2 with medium potential
- 1 with high potential, and
- None with confirmed roosts.

7.11.4 In general the buildings are dominated by large aircraft hangars with sheet metal construction or ancillary buildings of modern construction, with many of these very small (e.g. various electrical sub-station buildings).

7.11.5 Further survey work by Amec Foster Wheeler is planned for 2017 within the Site with regard bats. This work is planned to involve external and internal (where safe/possible to do so) inspections of all buildings with a view to assessing the roost potential (after Collins, 2016) of each building. Subsequently, appropriate levels of dusk/re-entry surveys will be undertaken to determine bat roosts. In addition, bat activity over the Site will be determined through manual walked transects and the deployment and use of static recorders.

Future baseline

7.11.6 In the absence of any specific bat survey information, the current baseline is yet to be fully determined, however, it is not possible to conclude that a different future baseline (in the absence of the proposed development) is more likely to occur than that currently present.

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Construction phase effects

7.11.7 The principal predicted effects on bats occur during the construction phase which could lead via the demolition and refurbishment of buildings, and the construction of new infrastructure, to the removal, damage and/or disturbance of any roosts present, and loss of foraging habitat. Barrier effects and disturbance to commuting routes could also occur during the construction phase.

7.11.8 Should roosts require removal or disturbance as part of development proposals, updated emergence surveys and a derogation licence from Natural England would be required. By default, derogation licences do not allow for a significant impact on the favourable conservation status of those species affected. Therefore, assuming the incorporation of appropriate mitigation which would be developed following further survey, in combination with the environmental measures incorporated into the proposed development and habitat replacement, residual effects would be expected to be not significant.

7.11.9 Environmental measures incorporated into the proposed development would negate any potential direct effects of lighting upon foraging/commuting/migrating individuals to a level that would be not significant.

Operational phase effects

7.11.10 No significant effects are expected at the operational phase as the measures in place to mitigate or avoid disturbance of and barrier effects to commuting routes from the new development will have been put in place during the construction phase.

Decommissioning phase effects

7.11.11 The same approach would be undertaken for the decommissioning phase as for the construction phase, therefore no significant effects are anticipated.

Combined Effects

7.11.12 No combined effects are anticipated.

7.12 Assessment of effects to great crested newt (GCN)

Current baseline

7.12.1 The Stone Hill Park extended Phase 1 habitat survey (2015) identified two water bodies within the site: a balancing pond and emergency water supply tank. The balancing pond is a concrete structure with vertical walls covered with a wire frame; fish are visible and there is limited vegetation overhanging the concrete banks. The water supply tank is an above ground metal tank. It was considered that neither feature provides suitable breeding habitat for great crested newts. The accompanying desk study revealed no records for the Site or within 2 km and identified three ponds with a radius of 500m from the site, which might be suitable for great crested newt.

7.12.2 The Amec Foster Wheeler desktop study provided one record of great crested newt since 2000, which was from Monkton Chalk Pit Nature Reserve in 2011, 2.9

km to the west of the Site. Great crested newt presence was found not to feature in the ecology studies of any other nearby recent developments. In addition, no mitigation licences for this species appear on the Magic database within at least 2 km of Manston Airport. Study of aerial imagery and Ordnance survey maps identified five waterbodies (including the three identified by for the Stone Hill Park work) within 500 m of the Manston Airport boundary. The ground-truthing work of the Site also found that the two water bodies within the Site were unsuitable for breeding GCN.

7.12.3 Survey work is planned to include assessments, access permitting, of the off-Site waterbodies within 500 m of the red line to determine their suitability for great crested newt. Assessments will use current good practice methods[127] (adapted from Oldham *et al*., 2000). Any of these ponds assessed as suitable for GCN will be surveyed according to the good practice methodology provided by English Nature (2001) for presence /likely absence, and, where present, for population size class.

Future baseline

7.12.4 The current baseline is yet to be fully determined, however, it is not possible to conclude that a different future baseline (in the absence of the proposed development) is more likely to occur than that currently present.

Construction phase effects

7.12.5 Should any off-site ponds contain breeding GCN there is potential for animals to be present in suitable habitat within the Site boundary. As the Site lacks suitable waterbodies for breeding GCN, predicted effects would be limited to disturbance, removal and loss of potential terrestrial habit, and land take/land cover change (habitat removal) resulting in death or injury, all mitigated by environmental measures via method statements. Should it be considered that GCN are present on Site, a derogation licence from NE would be sought. This would include appropriate mitigation and/or compensation, such as fencing and trapping (and translocating) animals to prevent mortality/injury from any land take/cover change, and provision/enhancement of suitable good quality terrestrial GCN habitat (e.g. grassland, hibernacula, compost heaps, log/brash piles and scrub).

7.12.6 Implementation of the appropriate measures under licence would ensure legal compliance and conserve favourable conservation status and no significant effects on the GCN population within the local area would be expected during construction.

Operational phase effects

7.12.7 No significant effects are expected at the operational phase as the measures in place to mitigate or avoid disturbance of and barrier effects to commuting routes from the new development will have been put in place during the construction phase.

127 http://www.narrs.org.uk/documents/HSI%20guidance.pdf

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Decommissioning phase effects

7.12.8 The same approach would be undertaken for the decommissioning phase, therefore no significant effects are anticipated.

Combined Effects

7.12.9 No combined effects are anticipated.

7.13 Assessment of effects to reptiles

Current baseline

7.13.1 The desk study returned 91 records of three species of reptile - common lizard, grass snake and slow-worm – within 5 km of the Site, since 2000. The nearest of these were records of common lizard 1.85 km south-east of the Site with all other records over 2 km.

7.13.2 Areas of longer grassland, bunds, brownfield areas, and field margins provide suitable habitat for common reptile species (adder, grass snake, slow worm and common lizard). The suitable habitat parcels are relatively isolated at the landscape level, separated from other suitable habitat by roads, residential development, arable fields and closely managed grassland decreasing the likelihood that large numbers of reptiles will be present. However their presence at cannot be discounted, especially as the Site is sufficiently large and undisturbed to have maintained self–sustaining populations.

7.13.3 Survey work is planned in order to determine presence/likely absence of the four widespread species of reptile following good practice methodology (Froglife, 1999), with surveys extended to identify population size class(es) if any species of reptile be present.

Future baseline

7.13.4 The current baseline is yet to be fully determined, however, it is not possible to conclude that a different future baseline (in the absence of the proposed development) is more likely to occur than that currently present.

Construction phase effects

7.13.5 The predicted effects would be limited to disturbance, removal and loss of potential terrestrial habit, and land take/land cover change (habitat removal) resulting in death or injury, all mitigated by environmental measures via method statements. Appropriate mitigation and/or compensation, such as fencing and trapping (and translocating) animals to prevent mortality/injury from any land take/cover change, and provision/enhancement of suitable good quality terrestrial reptile habitat (e.g. grassland, hibernacula, compost heaps, log/brash piles and scrub).

7.13.6 Implementation of the appropriate measures would ensure legal compliance and the conservation status of any reptile populations would not be affected and thus effects are expected to be not significant.

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Operational phase effects

7.13.7 No significant effects are expected at the operational phase as the measures in place to mitigate or avoid disturbance of and barrier effects to commuting routes from the new development will have been put in place during the construction phase.

Decommissioning phase effects

7.13.8 The same approach would be undertaken for the decommissioning phase as for the construction phase, therefore no significant effects are anticipated.

Combined Effects

7.13.9 No combined effects are anticipated.

7.14 Assessment of effects to breeding barn owl

Current baseline

7.14.1 Work (in 2015) undertaken for the Stone Hill Park application recorded roosting barn owl in one of the buildings on Site, and pellet evidence of this species was also seen at the entrance of the same building during the ground-truthing work (February 2017).

7.14.2 The on-Site buildings provide potential nest sites as well roosting opportunities for barn owl and the grassland provides foraging habitat.

7.14.3 Survey work is planned in 2017 to identify any breeding barn owl on Site.

Future baseline

7.14.4 It is not possible to conclude that a different future baseline (in the absence of the proposed development) is more likely to occur than that currently present. It is therefore appropriate to use the current baseline for the purpose of the PEIR and the ES.

Construction phase effects

7.14.5 The physical activity associated with the construction phase is likely to result in disturbance of nesting barn owls. Demolition of buildings could result in nest destruction and/or removal of nest sites, and new areas of hard standing will result in loss of grassland and reduction in foraging habitat. Provided construction works are timed to avoid (or maintain a 200m buffer) from any nest sites during the breeding season until young fledge (March – December inclusive), there would be no contravention of WCA Schedule 1. However, if this is not possible, nest sites would need to be removed outside the breeding season prior to construction and new alternative nest sites would be installed at a sufficient distance away to prevent use of the Site. Such a locality would need to be near to a sufficient area of grassland for foraging and at least 1 km distant from busy roads. In so doing, there would be no significant effects to the local barn owl population.

Operational phase effects

7.14.6 No significant effects are expected at the operational phase as the measures in place to mitigate or avoid effects from the new development will have been put in place during the construction phase.

Decommissioning phase effects

7.14.7 Wildlife hazard management requirements will require that barn owls do not nest at the site whilst it is operational and therefore no significant effects are anticipated.

Combined Effects

7.14.8 No combined effects are anticipated.

7.15 Assessment of effects to terrestrial invertebrates/invertebrate assemblage

Current baseline

7.15.1 The desk study provided records of over 150 species of invertebrates within 5 km of the Site, since 2000. Of these, 13 species are classified as Notable A[128], 69 species as Notable B[129] with 53 species classified as IUCN Red-listed[130]. The red-listed species recorded here are saltmarsh and sand dune specialists, therefore confined to habitats outside and at some distance from the Site. However, several species, all butterflies, have dispersal capabilities and could occur on Site. These include: small heath, small blue and wall. Swallowtail butterfly have also been recorded near Site although there is no suitable habitat on Site for this species.

7.15.2 The non-amenity grassland on Site, particularly any areas which are not managed (cut/mown) frequently and have not received modification through pesticide/fertiliser applications, provide potential habitat for a range of invertebrates. In addition to the less intensively managed grassland areas, field margins and brownfield habitat / bunds also provide suitable habitat for a variety of invertebrate species. Although these areas represent a small proportion of the Site area, it is possible that individual species or an assemblage of increased conservation value could be present.

[128] Notable A - Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10 km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties. Superseded by Nationally Scarce, and therefore no longer in use.

[129] Notable B -Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10 km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties. Superseded by Nationally Scarce, and therefore no longer in use.

[130] IUCN Red-listing - The IUCN Red List Index (RLI) measures overall trends in extinction risk for groups of species based on genuine changes in their Red List status over time. Habitat availability, population and subpopulation size, number of mature individuals and extent of occurrence are all quantified during the designation of red-list species.

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7.15.3 Survey work is planned in 2017 to survey the Site's terrestrial invertebrate fauna, with targeted surveys of the most appropriate areas following expert assessment. Surveys will identify presence/absence of individual species as well as determining any presence of particular assemblages.

Future baseline

7.15.4 It is not possible to conclude that a different future baseline (in the absence of the proposed development) is more likely to occur than that currently present. It is therefore appropriate to use the current baseline for the purpose of the PEIR and the ES.

Construction phase effects

7.15.5 The predicted effects would be limited to land take/land cover change resulting in habitat removal/reduction. Invertebrates likely to occur on Site are those associated with grassland habitats, and if any assemblages or notable species are revealed through survey, measures can be incorporated to maintain conservation status. Appropriate measures will include suitable grassland management that is compliant with the wildlife hazard management of CAP 772. Any brownfield species would require appropriate habitat enhancement/creation, again compliant with wildlife hazard management requirements. Such measures, where not provided onsite, to be provided off-Site. Implementation of the appropriate measures would ensure the conservation status of any invertebrate species/assemblages would not be affected and thus effects are expected to be not significant.

Operational phase effects

7.15.6 No significant effects are expected at the operational phase as the measures in place to mitigate or avoid disturbance of and barrier effects to commuting routes from the new development will have been put in place during the construction phase. The long grass policy to reduce hazardous bird species on Site is likely to benefit grassland invertebrates.

Decommissioning phase effects

7.15.7 The same approach would be undertaken for the decommissioning phase as for the construction phase, therefore no significant effects are anticipated.

Combined Effects

7.15.8 No combined effects are anticipated.

7.16 Conclusions of preliminary significance evaluation

7.16.1 The Conclusions on the significance of all those effects that have been subject to assessment in **Sections 7.8** to **7.14** are summarised in **Table 7.10**.

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Table 7.10 Summary of significance of effects

Receptor and effects	Significance Level	Rationale
SPA/SSSI qualification/notification species: golden plover **Displacement – habitat loss**	Not significant	Noise, physical activity, aircraft flightpaths and wildlife hazard management at the site during construction and operation could prevent this species, which uses farmland, from using otherwise suitable habitat on/adjacent the site. Survey and desk study data show no regular use of land surrounding Site. Noise control measures during construction and location of aircraft flightpaths too distant from designated sites and key areas of farmland to result in disturbance. Conclusions to be reassessed for ES with additional survey/desk study data, information on flight paths and results from noise/vibration modelling. Environmental Measures and habitat specific mitigation would render residual effects to a level which would not affect the receptor's Favourable Conservation Status
SPA/SSSI qualification/notification species: turnstone; grey plover, ringed plover, sanderling (all non-breeding); little tern (breeding) **Displacement – habitat loss**	Not significant	Noise from, physical activity at the site, and aircraft flightpaths during construction and operation could disturb these species preventing use of otherwise suitable habitat within the designated sites approximately 925m from the airport. Conclusions to be reassessed for ES with additional survey/desk study data, information on flight paths and results from noise/vibration modelling. Environmental Measures and habitat specific mitigation would render residual effects to a level which would not affect the receptor's Favourable Conservation Status
Designated sites that include Pegwell Bay: contamination/eutrophication of habitats through discharge into the bay from site drainage.	Not significant	Water quality regulated via a Water Discharge Activity Permit from the Environment Agency that will ensure pollutants/nutrients cannot be discharged into designated sites. Environmental Measures and habitat specific mitigation would render residual effects to a level which would not affect the receptor's Favourable Conservation Status
Designated sites/priority habitats: air quality changes, increased deposition	Not significant	The principal pollutant of concern associated with traffic/aircraft emissions that might affect sensitive habitats is nitrogen oxide (NO_X). Road traffic emissions may increase the ambient NOx concentrations to which vegetation is exposed. NO_x emissions may also, following chemical conversion in the air, form nitrogen dioxide, which is then deposited. This nitrogen deposition may affect plant communities by causing nutrient enrichment and also by acidifying the soils. Effects to be confirmed and conclusions reassessed through additional air quality modelling and traffic assessment.
Great crested newt: **Removal of /damage to and/ or disturbance of terrestrial habitat. Land take/land cover change (habitat removal) resulting in death or injury.**	Not significant	Environmental Measures and habitat specific mitigation would render residual effects to a level which would not affect the receptor's Favourable Conservation Status
Bats **Removal of /damage to and/ or disturbance of roosts. Disturbance of commuting and foraging bats from light spill. Disturbance of /barrier effects to commuting routes from new development.**	Not significant	Environmental Measures and habitat specific mitigation would render residual effects to a level which would not affect the receptor's Favourable Conservation Status Effects to be confirmed and conclusions reassessed with Site survey data, and any need/ability for off Site mitigation.

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Receptor and effects	Significance Level	Rationale
Reptiles: Land take/land cover change (habitat removal) resulting in death or injury of reptiles.	Not significant	Environmental Measures and habitat specific mitigation would render residual effects to a level which would not affect the receptor's Favourable Conservation Status
Terrestrial Inverts: Land take/land cover change (habitat removal); management changes resulting in reduction in habitat.	Not significant	Environmental Measures and habitat specific mitigation would render residual effects to a level which would not affect the receptor's Favourable Conservation Status

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8. Freshwater environment

8.1 Introduction

8.1.1 This chapter sets out the results of a preliminary assessment of the effects of the proposed scheme on the freshwater environment (including potential effects on water quality, resources and flood risk).

8.1.2 This chapter should be read in conjunction with the scheme description (**Chapter 3**). Following a summary of the limitations of the PEIR, the chapter outlines the relevant policy, legislation and guidance that has informed the preliminary assessment, and the data gathering methodology that was adopted as part of the freshwater environment preliminary assessment. This leads on to a description of the overall baseline conditions, the scope of the assessment, and the assessment methodology. The chapter concludes with a summary of the results of the assessment at this point in time.

Limitation of the PEIR

8.1.3 This chapter is informed by the following ongoing assessments, **Table 8.1** details the work that has been done to support the PEIR, and the additional work that will be undertaken to inform the ES.

Table 8.1 Technical reports supporting this assessment

Technical assessment	Work undertaken to inform the PEIR	Additional work to be undertaken to inform the ES
Hydrogeological Risk Assessment	A draft HRA has been produced as an appendix to this document (see **Appendix 8.1**).	Finalised HRA which will take into account PEIR responses and further consultation with the Environment Agency (EA) and Southern Water with regards to the details of mitigation measures and the design/location of the fuel farm.
Flood Risk Assessment (FRA)	Conversations with the EA to inform the scope of the assessment.	Finalised FRA.
Drainage Strategy	Conversations with the EA to inform the scope of the assessment and proposals for site drainage design included in masterplan.	Finalised Drainage Strategy.
Water Framework Directive Assessment	Establishing the baseline and potential effects on WFD receptors.	Finalised WFD assessment

8.1.4 No intrusive investigations have been undertaken to date. Discussions have been held with the Environment Agency and Southern Water as to whether or not intrusive investigations will be needed to inform the assessment in the Environmental Statement. If required the scope of any works will be agreed with the EA, TDC and Southern Water prior to commissioning.

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8.2 Policy, legislation and guidance

8.2.1 A study of freshwater environment related planning policy, legislation and guidance at the national, regional and local level has been undertaken for the site and its locality in order to highlight any requirements which the development scheme needs to consider. It is always important that policies, legislation and guidance are taken into consideration as they help to define the scope of assessment and can inform the identification of particular local issues. Full details of all national and local planning policies relevant to the proposed development can be found in **Appendix 4.1**.

Table 8.2 National and Local Planning Policies relevant to the freshwater environment

Policy Reference	Policy Information
National Policies	
Soil Strategy for England 'Safeguarding Our Soils' (DEFRA, 2009 (2))	The policy guidance describes adverse impacts on soils, such as soil pollution and compaction. The soil strategy also deals with the management of contaminated land.
National Planning Policy Framework: (NPPF)	The National Planning Policy Framework sets out the Government's planning policies for England and how these are expected to be applied. It identifies requirements for addressing flood risk for new developments, steering more vulnerable development into areas of lower flood risk.
Local Policies	
Policy EC2 - Manston Airport	Identifies the requirement for proposals to demonstrate that new development cannot contaminate groundwater sources and/or that appropriate mitigation measures will be incorporated into the development to prevent contamination.
Policy EP13 - groundwater protection zones	Development located within groundwater Source Protection Zones, if identified to have the potential to result in a risk of contamination of groundwater sources, will not be permitted without adequate mitigation measures to prevent such contamination taking place.
Flood and coastal erosion risk management policy statement	Provides a public statement of the Council's approach to flood and coastal erosion risk management within the district.
Emerging Local Policies	
Policy SE04 (Ground Water Protection Zones)	Proposals for development within the Groundwater Source Protection Zones identified on Map 19 will only be permitted if there is no risk of contamination to groundwater sources. If a risk is identified, development will only be permitted if adequate mitigation measures can be implemented. Proposals for Sustainable Drainage systems involving infiltration must be assessed and discussed with the Environment Agency to determine their suitability in terms of the impact of any drainage into the groundwater aquifer.

Legislative requirements

8.2.2 Legislation relevant to the assessment of potential effects on water quality, resources and flood risk includes, but is not necessarily limited to, the following:

- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.
- Floods and Water Management Act 2010;

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- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009;
- The European Union (EU) Floods Directive (2007/60/EC), as enacted into domestic law by the Flood Risk Regulations 2009;
- Priority Substances Directive (2008/105/EC), as enacted into domestic law by the 2010 Directions listed above;
- The EU Water Framework Directive (2000/60/EC) (WFD), as enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003;
- Water Act 2003;
- Environment Act 1995;
- Land Drainage Act 1991;
- Water Resources Act, 1991;
- Environmental Protection Act 1990; and
- Control of Pollution Act 1974.

Guidance and strategies

8.2.3 A range of general good practice advice and technical guidance is of relevance to this assessment, including the following:

- Pollution Prevention Guidance notes (PPG) (http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx)[131];
- CIRIA Report C753: The SuDS manual;
- CIRIA Report C698: Site handbook for the construction of SuDS;
- CIRIA Report C532: Control of water pollution from construction sites;
- CIRIA Report C648: Control of water pollution from linear construction projects – technical guidance;
- CIRIA Report C649: Control of water pollution from linear construction projects – site guide ;
- CIRIA Report C692: Environmental good practice on site (third edition);
- Groundwater protection: Principles and Practice (GP3). Environment Agency, August 2013 version 1.1;

[131] The PPG notes were withdrawn by the Environment Agency in December 2015. This was because the Environment Agency no longer provide good practice guidance. They have been referenced in this report because they provide a good summary of environmental good practice measures which will demonstrate compliance with legislation for protection of the water environment.

- Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: Guidance on pollution prevention, Environment Agency, May 2001;
- Piling into contaminated sites, Environment Agency; and
- The Environment Agency's approach to groundwater protection, March 2017 Version 1.0

8.2.4 A number of bodies with responsibility for management and regulation of the water environment have also produced plans and strategies that are of relevance to this assessment. Regional management plans and strategies for the water environment of relevance to this assessment include:

- Thanet Surface Water Management Plan (2013);
- River Stour Catchment Flood Management Plan (2009);
- Stour Abstraction Licensing Strategy (February 2013); and
- South East River Basin District River Basin Management Plan (February 2016).

8.3 Data gathering methodology

8.3.1 This section describes the desk study and surveys undertaken to inform the freshwater assessment. In order to establish the baseline situation, freshwater data were obtained from the sources listed in **Table 8.3** to identify existing data about the site and the surrounding area.

8.3.2 The study area has been defined as follows:

- The Water Framework Directive surface waterbodies[132] which receive drainage from the site
- The Water Framework Directive groundwater bodies which underlie the site
  - This includes any dependent groundwater abstractions within 1km of the site. If effects can be shown to be mitigated within this radius of the development then it can be inferred that more distance dependent abstractions will also be protected.

Table 8.3 Information used in the preparation of the PEIR

Topic	Source of Information
Topography, Elevation, Relief	OS 1:10K and 1: 25K Mapping Met Office http://www.metoffice.gov.uk/public/weather/climate

[132] Under the Water Framework Directive (WFD), the Environment Agency has produced nine River Basin Management Plans (RBMP) for England to manage water quality targets and the overall ecological health of the water environment. The River Basin planning process has defined specific surface water bodies (river catchments), lake water bodies, groundwater bodies, transitional waterbodies (estuaries) and coastal waterbodies and assessed the ecological and chemical status of each water body and identified where status improvements were required to meet WFD targets.

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Topic	Source of Information
Climate	
Water Quality	Environment Agency http://www.environment-agency.gov.uk/maps/ Environment Agency http://environment.data.gov.uk/catchment-planning/
Flood Risk	Environment Agency Flood Risk for Planning Map http://www.environment-agency.gov.uk/maps/ GOV.UK Long term flood risk information https://flood-warning-information.service.gov.uk/long-term-flood-risk Thanet District Strategic Flood Risk Assessment, Entec, 2009.
Hydrogeology	Environment Agency http://www.environment-agency.gov.uk/maps/ Envirocheck Report, March 2016 British Geological Survey (BGS) website: http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html Aquaterra, 2007. Lord of the Manor Constraints Investigation (Desk Study). Prepared for Southern Water pp. 42. Atkins, 2014. Thanet sewers programme - Geotechnical and environmental investigation Phase A: desk study. Prepared for Southern Water. pp110 Atkins, 2015. Thanet sewers programme: Geotechnical and environmental investigation Groundwater monitoring, February to June 2015. Prepared for Southern Water. pp208 Mouchel 2007. Outline for the final report on Thanet Sewers Survey Phase II. Prepared for Southern Water. pp 98. Mouchel, 2008. Groundwater Risk Assessment Interpretive Report – Isle of Thanet Groundwater Quality Assessment. Prepared for Southern Water. pp 39
Soils and Soil Type	Cranfield University website http://www.landis.org.uk/soilscapes/ Envirocheck Report, March 2016
Water Abstractions and Discharges	Envirocheck Report, March 2016 Thanet District Council Stour Abstraction Licensing Strategy, February 2013 (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289867/LIT_2048_61c7f0.pdf)
Designated Sites	www.magic.gov.uk North East Kent (Thanet) SIP, Natural England, 2014.
Site drainage	RPS, 2017, Masterplan Drawings (**Chapter 3**, **Figures 3.X**)

Desk Study

8.3.3 A desk study has been undertaken to establish the baseline environment within the study area, using the sources outlined in Table 6.2. This has been supported by the production of a draft Hydrogeological Impact Assessment (**Appendix 8.1**) which provides a comprehensive picture of the hydrogeological baseline environment.

Survey Work

8.3.4 Site walkover surveys were undertaken on the 7th, 8th and 9th March 2017 to support the assessment. These surveys comprised a visual inspection of the site infrastructure and land uses.

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8.3.5 No intrusive investigations have been undertaken to date. Discussions have been held with the Environment Agency and Southern Water as to whether or not intrusive investigations will be needed to inform the assessment in the Environmental Statement. If required the scope of any works will be agreed with the EA, TDC and Southern Water prior to commissioning.

Consultation

8.3.6 Since 2015 and throughout the undertaking of the walkover surveys and preliminary assessment work, RiverOak has engaged with consultees with an interest in potential freshwater environment effects. A scoping report (**Appendix 1.1**), including a chapter covering the freshwater environment, was produced and submitted to PINS who provided a scoping opinion (**Appendix 1.2**).

8.3.7 A summary of the relevant consultee comments is provided in **Table 8.4** below along with a response to identify how the matter is dealt with in this report.

Table 8.4 Consultee comments

Consultee	Comments and considerations	How addressed in this PEIR
SoS	Impacts on surface water receptors should not be scoped out as Pegwell Bay is an important receptor. The DCO should consider the potential for effects on Pegwell Bay in the construction and operation stages.	Impacts on the surface water environment have been considered in this chapter.
SoS	A groundwater risk assessment (in line with GP3) should be produced. The scope of any intrusive works and associated mitigation measures should be agreed with the EA, TDC and Southern Water.	A draft risk assessment has been produced to accompany the PEIR, this has been produced in discussion with the EA and Southern Water. No intrusive works have been undertaken as yet, the scope of any works will be agreed with the EA, TDC and Southern Water prior to commissioning.
SoS	The effect of the proposals on the objectives of the Water Framework Directive, as set out in the South East River Basin Management Plan, should be assessed.	The baseline WFD environment has been established and likely effects on WFD receptors have been identified, as well as appropriate draft mitigation measures.
SoS	The Flood Risk Assessment should be developed in consultation with the EA and the Lead Local Flood Authority (KCC).	The flood risk baseline has been established in the PEIR, the scope of the flood risk assessment will be agreed with KCC and EA.
SoS	The site drainage network must demonstrate that measures to avoid existing drainage runs or to block existing drains have informed the proposed construction methodology and operation design development. Agreement should be sought from Southern Water for proposed drainage attenuation ponds.	An outline site drainage plan has been submitted with the PEIR, the premise of which has been discussed with the Environment Agency and Southern Water. A more detailed site drainage design will be submitted with the DCO application and the details of attenuation pond design will be agreed with Southern Water before this submission.
SoS	Mitigation measures should be addressed and the Secretary of State advises that measures relating to other regimes, e.g. environmental permitting, are included, for example in relation to clean and foul water drainage discharges. Measures to attenuate runoff and to minimise water demand on site, e.g. via rainwater harvesting, should also be discussed. On-going monitoring should also be addressed and agreed with the	Draft mitigation and monitoring measures of this type have been detailed in this document.

Consultee	Comments and considerations	How addressed in this PEIR
	relevant authorities to ensure that any mitigation measures are effective.	
SoS	Scoping Report Chapter 7 states that significance will be based on receptor sensitivity and magnitude of change criteria. No details regarding the significance thresholds are set out in the Scoping Report. The Secretary of State requires that specific significance criteria are set out in the ES.	Draft significance criteria have been provided in this document which will form the basis of the assessment reported in the ES.

8.3.8 In addition to this formal scoping consultation, informal consultations have been held with the EA and SW to establish the scope of the assessment. These have comprised the meetings listed in **Table's 8.5** and **8.6**.

Table 8.5 Summary of meetings with the Environment Agency

Date of meeting	Key points of discussion
11 April 2016	**Site Drainage:** The site discharge point from the runway area is believed to be in the south east corner of the site and may run under the A299. It is not thought to run below the fuel station, located to the south of the site boundary. It is unknown if there are other pipes linked to this discharge or if it is from the airport only. This pipe discharges to the beach (Pegwell Bay) and the Environment Agency receive complaints and enquiries from the public as the pipe is visible on the beach. If this was going to continue to be the discharge route then discharge would need to be permitted and water quality considered in the drainage strategy. They would hope that there would not be an increase in the volume of the discharge. Drainage within the red line boundary is currently partially to ground and partially captured. This discharge to ground would not be permitted in future in areas where potentially polluting substances are in use (e.g. de-icer in runway or apron areas) or there is fuel. SUDS would need careful consideration and are best outside Source Protection Zone 1 (SPZ 1).[133] **Water Quality**: The fuel station to the south east of the site is known to be an issue and in the EA's view there are probably groundwater and land contamination issues with that site associated with historical activities and spills.[134] The Environment Agency and Southern Water hold water quality monitoring data from boreholes around the site which should be requested. The closest Southern Water source treated for Nitrate pollution, and there have been issues in the past with hydrocarbons and solvents. There are currently no water quality monitoring data inside the site boundary, this is seen as a key data gap. **Delineation of Source Protection Zone:** The Adit[135] associated with the area of SPZ1 under the runway is thought to be at about 0m AOD so approx. 40 to 50m below ground level. It is unknown if there are additional shafts associated with it. The SPZ delineation is very basic (50m circle) so they consider that the SPZ1 could potentially be larger. Further consultation with Southern Water is necessary.
9th November 2016	**Groundwater Quality**: RiverOak would need to ensure that the proposed development did not make the quality issues worse. It was acknowledged that there was another large adit to the east

[133] SPZ1 is defined as the zone around a groundwater abstraction in which contaminants have a50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.
[134] Further information on ground contamination can be found in Section 10 of this PEIR
[135] An Adit is a horizontal passage leading into the Lord of the Manor groundwater abstraction to increase flow to the source.

Date of meeting	Key points of discussion
	feeding the Lord of the Manor[136] source from the area below Ramsgate which may also contribute to poor water quality. **Hydrogeological Conceptual model:** It was agreed that the conceptual understanding of the site is well known and therefore there was no need for any further work to establish this. Although the conceptual understanding will still need to be presented and discussed in any site report to ensure an accurate conceptual model (source, pathway, receptors) is established. However the Environment Agency would need to understand the distribution of contaminants across the site so that future work didn't result in their mobilisation. The Environment Agency would not want to see intrusive works near the adit or within SPZ1, and acknowledge the desire of Southern Water for the minimum level of intrusive work so as to avoid mobilising contaminants and creating pathways through the unsaturated zone. However some boreholes (in target areas) would be needed to see if any pollution/contamination is reaching the water table. The desk study and other site investigations will be used to inform the need for any boreholes; it was agreed to undertake further discussions in the future to establish what is suitable for intrusive investigations in different areas of the site. **Jentex Fuel Farm**: RiverOak is looking at different options for the location of a new fuel farm for the airport. These include the Jentex Fuels site located to the southeast of the airport; although RiverOak will need to look into costs and implications of remediation and/or construction at this site. EA stated that this site has long been a concern, especially given the location close to the SPZ; the EA would be unlikely to approve this as a site for bulk fuel storage due to its location within SPZ1. **Fuel Storage:** The Environment Agency stated that they would request that any fuel tanks located anywhere on site are to be positioned above ground, there are precedents in Kent at a Tesco site where above ground fuel tanks have been required. **Site Discharge**: The Environment Agency is happy with the construction of ponds for water attenuation and treatment, prior to discharge to Pegwell Bay, however, they stated the following caveats: - Ponds would need to be properly constructed with sufficient operational control measures; - Ensure 'dirty' water lagoon was not a potential source for odour; - A condition check should be undertaken of the drainage pipeline to Pegwell Bay; - New discharge consent would be needed, this may require a WFD assessment; - Also need details of the operational procedure and controls to show the system will be properly managed; and - The EA would like to see water saving measures implemented, for example grey water use, re-use of run off from roofs. **CEMP**: The Environment Agency is happy that a draft CEMP will be submitted with the DCO application and will seek to secure conditions for the production of a final CEMP prior to construction. **Technical information for inclusion in the DCO application**: The DCO application should include sufficient information on the operational procedures for the airport, for example the use of pesticides to control insects, locations for de-icing and washing of aircraft, emergency procedure and spill response.
6th March 2017	**Site drainage:** The proposed surface water capture and treatment system was discussed. All surface water will be captured, positive drainage would be used to send the water to the treatment facility to be located on the north side of Manston Road. There would be silt traps, oil separators and other infrastructure in the system. It is proposed that there are two ponds which will be sized according to assessed need. From the ponds the water will be pumped to the existing discharge pipe located in the south-eastern part of the airport site. There are two options, either to re-use an existing drainage network around the western end of the runway, or to install a new network around the eastern end. From the discharge pipe all drainage is positive. The drainage and surface water treatment system would be installed during the first phase on construction, before the reopening of the airport. The Environment Agency welcomed this approach. **Local sewer network:** The Environment Agency requested that the project confirm the capacity, condition and ownership of the foul sewer network on site. **Clean water requirements:** An assessment of clean water requirements will form a part of the sustainability/resources strategy which will be submitted as a part of the DCO.

[136] The Lord of the Manor source is the Southern Water borehole in close proximity to the site. Further details are given the baseline description.

Date of meeting	Key points of discussion
	Discharge Permit: The Environment Agency confirmed that an application for a Discharge Permit from the Pegwell Bay outfall was made by the previous site owner but was not granted due to changes in ownership. The Environment Agency indicated that it was likely that a discharge permit would be required to regulate the Pegwell Bay Discharge. The Environment Agency agreed to confirm whether this would be necessary and confirm if it would regulate quantity as well and quality. **SuDS:** It was agreed that SuDS were not preferred on site given the groundwater risks. The Environment Agency indicated that this would need to be discussed with Thanet District Council and Kent County Council and a formal justification provided. **Land raising:** As part of the construction, material will need to be imported to create a new raised building platform for the cargo aircraft stands and taxiway. It is proposed to reuse as much excavated material as possible from elsewhere on the site, but where imported material is needed this would be clean and suitable for use. **Hydrogeological Conceptual Model: Southern** Water and Amec Foster Wheeler (working for Southern Water) have done a lot of work on a conceptual model for the site. Southern Water have confirmed that they are happy for the project to use this information, therefore it is proposed that no additional work is needed to develop a conceptual model for the site. The Environment Agency accepted that the Southern Water information represented the best information available and that they would not expect additional information to be collected. **Hydrogeological Risk Assessment (HRA):** The HRA is being finalised and has not yet been provided for review, but will be submitted as part of the water chapter in the PEIR. It is proposed that mitigation will be put in place following the assessment to reduce the risk. The HRA will not be quantitative but more qualitative following an EIA type approach to assessment. It will be based primarily on information from Southern Water. The Environment Agency requested that the Land Quality Phase 1 and the HRA are linked and cross-referenced where appropriate. **Nitrate in groundwater:** The Environment Agency stated that Thanet is a priority area for groundwater, with the main issue being nitrates. Therefore the Environment Agency have put a lot of effort in to engaging with farmers, industrial sites, the local authority and others to make them aware of risks and to follow up with information and actions to be taken. The Environment Agency would therefore seek to similarly engage with the operators of Manston Airport. **Embedded mitigation measures:** The project will use in-built (embedded design) mitigation to reduce risks. This will include developing airport management procedures, including spill response and wildlife management (including spraying for weeds/insects). The Environment Agency would be involved in their design. The Environment Agency requested that is be a condition that all documents and reviewed and signed off by all relevant consultees. **Flood Risk Assessment:** The entire site is in Flood Zone 1, and all surface water drainage is going to be discharged into the sea. Therefore it is considered that the flood risk for the site is low. It is proposed that a Flood Risk Assessment and Drainage Strategy will not be prepared for the PEIR, but will be submitted as part of the ES. Furthermore, as the drainage is to sea, the drainage system does not need to include flood attenuation measures. **Fuel Farm:** Riveroak are looking to acquire the Jentex site and develop this as the fuel farm for the project. Previously other options were being looked at, but this site has a number of operational and environmental advantages. The Environment Agency have concerns about the use of the site as it is located in/adjacent to SPZ1 and would need to understand what the approximate bulk fuel storage needs are for the site as part of the proposals. Furthermore the new Environment Agency groundwater protection policies (published 14 March 2017) state that the Environment Agency will not support any 'new' bulk fuel storage in SPZ1. It was noted that the site is only partly within SPZ1. The Environment Agency stated that the biggest risk was the sitting and location of the bulk fuel storage, and that the current proposed location was considered as the most sensitive on the site. Amec Foster Wheeler provided an example of another similar bulk fuel storage facility that was built recently at Bristol Airport. This was similarly close to SPZ1, and was designed in a way that was able to satisfy the EA and local authority.
16th May 2017	**Thanet Chalk:** The Chalk on Thanet is highly sensitive due to the lack of alternative water resources. The Environment Agency indicated that the Thanet Chalk was a candidate water protection zone – to highlight the sensitivity of the water resources situation, however it's been a candidate zone for ~10 years and is unlikely to be designated as such. If it were designated as a water protection zone that would give the EA additional powers to enforce pollution prevention measures. **Fuel Farm:** The Environment Agency would like to see within the Environmental Statement a consideration of alternative locations for the fuel farm, with their preference being for a fuel farm that was away from the abstraction point and SPZ1. Furthermore they require that the location of the fuel farm is justified and it is demonstrated that all alternatives have been explored. They will

Date of meeting	Key points of discussion
	require a very high level of mitigation, Best Available Technique (BAT), for the fuel farm and the site will need a new permit. It was noted by the Environment Agency that the existing facilities are not BAT and will need to be replaced. Given the sensitivity of the site the approach outlined in GP3 may not be sufficient. **Pollution prevention on site:** The Environment Agency reiterated a point from previous meetings - that they expect a high level of pollution prevention measures to be taken across the site with respect to drainage from runways / aprons, vegetation management, crashes etc **Site Drainage:** As stated in previous meeting the Environment Agency are not happy with any drainage to ground or use of soakaways on the site. The Environment Agency are happy with discharge to sea but are not sure of the exact permitting position because some of the discharge will be treated. There are unlikely to be volume constraints.

Table 8.6 Summary of meetings with Southern Water

Date of Meeting	Key points of discussion
29th April 2016	**Lord of the Manor Public Water Supply (PWS)**: The adit running under the runway measures approximately 2x2m in cross section and is located at sea level (therefore approximately 40-50mbgl), and possibly dates from the 1930s. The exact spatial orientation of the adit is unconfirmed; delineation of SPZ1 is therefore regarded as approximate. The shaft is located to the east of the site. The source is currently not in use but is one of four that supply drinking water to Thanet. Sources are currently blended with imported water. There are recorded incidents of turbidity (generally caused by large changes in groundwater table elevation after heavy rainfall), plus there have been historical issues with high levels of nitrate and Trichloroethylene (TCE). There are currently no facilities in place to remove TCE and the increases in use at the airport may result in increases in the levels of TCE, therefore Southern Water would require mitigation measures which minimise the use of, or target the interception of TCE's. Southern Water is not concerned about changes to aquifer recharge rate due to new airport concrete infrastructure. **Site Drainage**: The site is private so Southern Water has limited information on the existing drainage. There were previous applications to install new drainage pipes and an interceptor but it is not known whether it was installed. If the existing pipe network was to be reused a condition survey should be undertaken first to ensure that is fit for purpose/use. If there were any pumps needed the design and location of these would need to be considered to reduce risks. Southern Water's initial position is that they would not want to see any sort of ponds or water storage tanks on the site due to risks to groundwater quality. Any water storage on site should be minimised. The fuel farm should be designed to include sufficient safeguards, e.g. above ground bunded tanks, and it should be located outside of groundwater source protection zones (SPZ) 1 and 2 and as far as practically possible away from the adit. **Water Use:** Southern Water requested that an estimate of the water usage for the airport be provided, there are currently issues with capacity in Thanet and the proposed increase in flights would likely require more water. Southern Water requested that the DCO application should include details of how waste water and surface water will be managed. It was stated that existing foul water connections could be used provided flow rates for sewerage are no greater than existing, capacity checks for the existing infrastructure should also be undertaken. Nothing should be discharged to ground on the site. **Construction**: The main concern for Southern Water is around the construction activities, for example deep piling. Any foundations should be designed to avoid deep piling where possible, Southern Water should be notified of any works ahead of time, there should be no use of anti-freeze within piling operations. If the PWS borehole was knocked out and had to be pumped to clear waste, Southern Water would charge a developer. If RiverOak wants to install any new monitoring wells to monitor groundwater quality they would need to be away from the adit and designed to minimise risk, the particular concern is turbidity. Southern Water would need to be notified in advance of any drilling. There are two rising mains crossing the southwest of the site, the exact locations are not known as the records are old. They will need to be protected, i.e. no excavation within 6m either side, with hand digging to identify services if required.

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Date of Meeting	Key points of discussion
22nd February 2017	**Site Drainage**: Southern Water would prefer a design which captured all rainfall and run-off and took it off site, though they are happy for there to be water re-use within the site. **Construction**: Southern Water would prefer that the current runway area was left undisturbed due to turbidity concerns at their source, though if some removal of hardstanding is required then this needs to be properly designed to avoid groundshaking etc.. Works in the area designated as SPZ1 should be avoided. If any piling is to be used methods must be used to minimise ground disturbance. **Site Investigations**: Southern Water requested that any site investigation works are co-ordinated with the other potential applications for the site to result in the minimum of ground disturbance. **Hydrogeological Conceptual Model** – it was agreed that given the level of previous studies that the overall conceptual model was well understood and that there was no requirement for any additional field investigations to improve the confidence in the conceptual understanding. **Fuel Storage**: Fuel storage tanks should be placed above ground to protect the aquifer from pollution. **Mains supply & sewage**: There will need to be an application from Riveroak for a capacity check of the local foul sewage and mains supply systems to ensure that the requirements of the site can be supplied/serviced.

8.4 Overall freshwater environment baseline

Current baseline

Topography and climate

8.4.1 The Manston Airport site is mainly situated at an elevation between 45-50mAOD. The southern portion is located at an elevation of approximately 50mAOD, along the length of the existing runway, but rises to approximately 55mAOD in the western most corner of the site. North of the runway the site level falls to approximately 40mAOD, in the west, at the Spitfire Way Junction (crossroads of the Manston Road (B2050) and the Spitfire Way (B2190)), forming the start of the headwater valley for the Brooksend Stream, while remaining at 45-50mAOD in the northern most part of the site.

8.4.2 The average annual rainfall recorded at Manston between 1981 and 2010 is 592.5mm (Source: Met Office).

Surface Watercourses and other water features

8.4.3 There are no river watercourses on or adjacent to the site. A series of water channels and streams that form part of the Minster Marshes are located more than 1km to the south of the site. This marsh drains south into the River Stour, 3km south of the site, which flows east and into Sandwich and Pegwell Bays. Currently runoff from the site infiltrates locally and, due to the highly permeable nature of the underlying geology, is unlikely to reach these surface water systems via overland flow routes.

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8.4.4 OS mapping indicates a drainage channel on the opposite side of the road at the northern most point of the site. This is possibly associated with an operational garden nursery (Rosemary Nurseries) adjacent to the site.

8.4.5 OS mapping also indicates a number of reservoirs within 3km of the site. A number of small uncovered reservoirs are located approximately 1.5km or more from the western most boundary of the site. A covered reservoir is located approximately 0.5km north of the site, and on further uncovered reservoir located 0.3km from the southern boundary of the site.

8.4.6 There are a number of other small water features (e.g. ponds) located within 3km of the site.

Abstractions

8.4.7 There are no public water supply abstractions located within the site boundary, but a number of people and organisations abstract water from groundwater or ponds/lakes up to 1000m outside the site boundary (6 located within 500m, and a further 3 up to 1000m from the site boundary). The abstractions are for private water undertaking, public water supply and agriculture (**Table 8.7**). It is assumed that where no permit end date is provided in the Envirocheck Report that the abstraction is currently operational.

Table 8.7 Licensed abstractions within 1000m of the Manston Airport site

Licence Holder	Purpose	Source	NGR	Operational	Direction from Development Site	Approx. Distance from Development site (m)
Wilson & Wilson Ltd	Private Water Undertaking: General Use (Medium Loss)	Groundwater	631690 165470	Yes	E	176
Southern Water Services Ltd	Public Water Supply: Potable Water Supply - Direct	Groundwater	635350 165100	Yes	E	384
Southern Water Services Plc	Public Water Supply	Pond or Lake	635350 165095	Yes	E	386
Mrs L R Saunders	Spray Irrigation	Pond or Lake	632855 166805	Yes	W	474
Mrs E Green	General farming and Domestic/ spray irrigation	Groundwater	632850 166810	Yes	W	481
Mrs L R Saunders	General farming and Domestic/ spray irrigation	Groundwater	632850 166810	Yes	W	481
Southern Water Services Ltd	Public Water Supply: Potable Water Supply – Direct	Groundwater	630650 165140	Yes	W	805
Southern Water Services Ltd	Public Water Supply: Potable Water Supply – Direct	Groundwater	630860 164860	Yes	SW	949

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Licence Holder	Purpose	Source	NGR	Operational	Direction from Development Site	Approx. Distance from Development site (m)
Southern Water Services Plc	Agriculture (General)	Pond or Lake	630860 164855	Yes	SW	954

8.4.8 Thanet District Council has confirmed that there are no known private water supplies within a 2km radius of the centre of the Manston Airport Site.

8.4.9 The 2013 River Stour Abstraction Licensing Strategy (ALS) indicates that there is "a presumption against" the licensing of new abstractions in the Chalk aquifer due to the high volume of abstraction already licensed.

Discharges

8.4.10 Two historic permitted discharges have been identified within the Manston Airport site. These are:

- A discharge consent held by the Modern Jet Support Centre Ltd, which discharged site drainage to land, and was revoked in 2004.
- A discharge consent held by Kent International Airport Ltd (consent number P02258). This discharge allowed drainage from the runway and apron areas to discharge to Pegwell Bay via a pipe located on the southern edge of the airport. Discharge was pumped (against topographic gradient) from the site to this pipe. Conversations with the Environment Agency (see Table 8.5) have indicated that understood that this discharge consent was never live due to the change in site owner.

8.4.11 There are a further ten permitted discharges identified up to 500m outside the site boundary, and a further nine located up to 1000m from the site boundary. All those identified discharge to land, groundwater or saline estuary, being used for single domestic properties, surface waters, site drainage and process waters from trade effluents or storm sewage overflows for public supplies. It is assumed that where no revocation date is provided in the Envirocheck Report that the discharge is currently operational, consequently ten of the permitted discharges (identified in **Table 8.8**) are assumed to be currently operational.

Table 8.8 Discharges within 1000m of the Manston Airport site

Operator	Discharge type	Grid Reference (NGR)	Estimated distance from site in metres (indicated direction from site)	Receiving Water	Status
Kent International Airport Ltd	Discharge of other matter – surface water	634030 166280	On site (south)	Saline Estuary	Non-operational
The Modern Jet Support Centre Ltd	Trade Effluent Discharge-Site Drainage	633960 166000	On site (north)	Into Land	Revoked in 2004

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Operator	Discharge type	Grid Reference (NGR)	Estimated distance from site in metres (indicated direction from site)	Receiving Water	Status
Cohnen Partnership	Discharge Of Other Matter-Surface Water	631650 166220	119 (south)	Into Land	Revoked in 1999
Summit Engineering Limited	Sewage Discharges - Final/Treated Effluent	631719 166241	148 (south)	Ground Waters Via Soakaway	Currently operational
Thanet Waste Management	Trade effluent Discharge – site drainage	633980 167410	165 (north)	Into Land	Revoked in 2012
Dds (Demolition) Limited	Trade effluent Discharge – site drainage	633980 167410	195 (north)	Into Land	Currently operational
Cohnen Partnership	Trade Effluent Discharge-Site Drainage	631670 166380	280 (south)	Into Land	Revoked in 2014
	Trade Effluent Discharge-Site Drainage	631670 166380	280 (south)	Into Land	Revoked in 2012
	Discharge Of Other Matter-Surface Water	631670 166380	280 (South)	Into Land	Revoked in 1999
Mr. Struan Robertson	Sewage Discharges - Final/Treated Effluent	632068 166387	335 (south)	Ground Waters Via A Soakaway	Currently operational
Channel Freight Storage Limited	Sewage Discharges	631530 165326	337 (south)	Groundwater Via Borehole	Currently operational
Mr Stuart Robertson	Sewage Discharges - Final/Treated Effluent	632166 166421	342 (east)	Groundwater Via A Soakaway	Currently operational
Southern Water Services Ltd	Public Sewage: Storm Sewage Overflow	634600 164700	506 (south east)	Controlled Sea	Revoked in 1997
Mpo Homes Ltd	Sewage Discharge	634183 167736	526 (north)	Underground Water	Currently Operational
	Sewage Discharge	634183 167736	526 (north)	Underground Water	Revoked in 2012
Edward Stanton Farms	Trade Discharge - Process Water	631850 165050	575 (south east)	Into Land	Revoked in 2004
Mr John Randall	Sewage Discharges	632180 164970	620 (south east)	Underground Strata	Currently operational
Cohline Uk Ltd	Trade Effluent Discharge-Site Drainage	631800 166760	673 (north east)	Into Land	Revoked in 2014
	Trade Effluent Discharge-Site Drainage	631800 166760	673 (north east)	Into Land	Revoked in 2012
Cosgrove Leisure (Wayside) Limited	Sewage Discharges	632110 164890	707 (south east)	Underground Strata	Currently operational
Ms Lydia Scott	Sewage Discharges	632110 164890	707 (south east)	Underground Strata	Revoked 2012
Reclamet Ltd	Trade Effluent Discharge-Site Drainage	632650 167210	914 (north east)	Into Land	Revoked in 2008

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Operator	Discharge type	Grid Reference (NGR)	Estimated distance from site in metres (indicated direction from site)	Receiving Water	Status
Southern Water Services Ltd	Public Sewage: Storm Sewage Overflow	635160 164270	976 (south east)	Saline Estuary	Currently operational

Flood Risk

8.4.12 Environment Agency flood mapping indicates that the whole of the Manston Airport site is located within an area where flooding from rivers and the sea is very unlikely (Flood zone 1 where there is a less than a 0.1 per cent (1 in 1000) chance of flooding occurring each year). The nearest flood risk is coastal flooding associated with Pegwell Bay located approximately 2km southeast of the site. There is no risk of flooding to the site from reservoirs.

8.4.13 Flooding from land (rainfall run-off and surface water flooding) is considered to be a potential source of flood risk to the proposed development, in particular in the lower elevation ground across the middle of the site. The flood risk would occur through rainfall falling directly onto the development site, particularly when the ground is saturated. The majority of this flood risk has been identified to be of low risk (each year, the chance of flooding is between 1 in 1000 (0.1%) and 1 in 100 (1%)). There are areas of higher risk (with a greater than 1 in 30 (3.3%) chance of flooding) which are likely to be associated with localised depressions.

8.4.14 Groundwater within the Thanet District is not identified to be of strategic concern but a Strategic Flood Risk Assessment (SFRA) completed for Thanet District Council (Entec, 2009) recommended that flooding from groundwater, surface water and foul water drainage networks are considered at site specific level. As the development site is covered with relatively permeable soils and geology, groundwater flooding is not considered to be a significant risk to the development site.

8.4.15 It is anticipated that there will be sewers and associated infrastructure across the site, based on its previous use as an operational airport. Therefore there is a potential risk of sewer flooding.

Site Drainage

8.4.16 The site has a significant North / South fall with the runway at the sites highpoint. The main site outfall is at the south eastern site boundary and is a large diameter (up to 1200mm) pipe which travels on a south easterly trajectory discharging into Pegwell Bay. The ownership of this pipe is currently subject to discussion although it is considered at this stage that it is a private airport sewer.

8.4.17 An existing pumping station is located adjacent to the passenger apron, **Figure 3.21**. This supplies a 300mm diameter pipe which runs along the site's western boundary entering into a gravity system around the 10 runway threshold. This then runs along the sites southern edge before discharging into the outfall to Pegwell Bay.

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Soils and Land Use

8.4.18 The LANDIS soils database indicates that the site is underlain by slightly acid and lime rich, loamy soils that are freely draining. The leaching potential of the soils indicates that they have the potential to transmit a wide range of pollutants.

8.4.19 Although Manston Airport ceased operation in 2014, the remnant land use across the site remains. The southern part of the site is dominated by the tarmac runway, with a network of roads and taxiways linking this to the northern parts of the site. Carparks and buildings across the site remain and all the infrastructure is surrounded by cleared, maintained grass areas.

8.4.20 The site is bordered by roads that run along the length of the southern and western boundaries, with the B2050 cutting across the site in the north. Beyond these roads are farmland and industrial/retail areas (including Manston Fire Museum). To the north and east of the site are areas of farmland and residential dwellings.

Geology

8.4.21 The BGS mapping indicates that the bedrock geology underlying the entire of the site is the upper Newhaven Chalk, this is overlain by the sands and silts of the Thanet formation along the site's northern boundary. The overlying superficial (drift) geology is variable with areas having no superficial geology (predominantly in the south of the site) interspersed with areas of Head formation, comprising clay and silt.

8.4.22 Further detail on the site's underlying geology can be found in **Appendix 8.1** (Hydrogeological Impact Assessment).

Hydrogeology and Groundwater Vulnerability

8.4.23 Online Environment Agency mapping indicates that the Manston Airport site is underlain by a Principal Bedrock Aquifer, associated with the underlying Chalk, which can provide high levels of water storage. This aquifer supports local public water supply. The Thanet Formation, along the site's northern boundary, has been classed as a Secondary A aquifer by the Environment Agency. A secondary A aquifer is defined as a permeable layer capable of supporting water supplies at a local rather than strategic scale.

8.4.24 The Manston Airport site is located entirely within a groundwater Source Protection Zone (SPZ) catchment[137]. The inner zone (SPZ1), where risk of contamination from pollution causing activities is greatest, is identified in a strip beneath the runway. This is surrounded by a wider area of outer zone (SPZ2) that also dominates the area beneath the runway, in the south of the site. The remainder of the site falls within the wider SPZ catchment area (SPZ3).

[137] The Environment Agency have defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. There are three main zones (Zone 1 - inner, Zone 2- outer and Zone 3 - total catchment). Source: http://apps.environment-agency.gov.uk/wiyby/37833.aspx

8.4.25 The entire of the Manston Airport site is also located within a groundwater Nitrate Vulnerable Zone (NVZ)[138].

8.4.26 Further detail on the site's underlying hydrogeology can be found in **Appendix 8.1** (Hydrogeological Impact Assessment).

Water Framework Directive Classifications

8.4.27 Under the Water Framework Directive (WFD), the Environment Agency has produced nine River Basin Management Plans (RBMP) for England to manage water quality targets and river basin planning. These were updated during 2015. One of the aims of the WFD is for all waterbodies to achieve Good Ecological Status[139] and to ensure no deterioration from current status. The Manston Airport site is located with the South East River Basin District.

Surface *Waterbodies*

8.4.28 The 2009 RBMP waterbodies were revised for the updated plans and small streams (less than 1km in length or with a catchment area of less than 10km^2) are now identified to be non-reportable and are not formally a WFD waterbody. This means that their overall Status is not reported in the RBMP. The northern part of the Manston Airport site is located within the Thanet Operational Catchment, which is coastal (extending between Birchington and Ramsgate) and comprises a network of small channels, within the area of Wade Marsh, that drain straight to Minnis Bay. No waterbodies are formally identified and therefore no 2015 water quality conditions are reported, and no objectives are set under the Environment Agency Catchment Data Explorer. However these stretches of water are still protected by law (see section 8.2.2) and can be improved where local actions and assessments deem it to be a priority.

8.4.29 The southern part of the Proposed Development is located within the Monkton and Minster Marshes surface waterbody (within the Stour Marshes Operational Catchment), which forms the catchment of the Minster Stream before it joins the River Stour and flows into Sandwich and Pegwell Bays. **Table 8.9** provides the current water quality, objectives and mitigation measures identified for this waterbody and the downstream River Stour waterbody (East Kent Coast Operational Catchment). Neither of the two waterbodies are currently of good status, however mitigation measures have been identified that will provide improvement from the current status by 2027 for both waterbodies.

[138] Nitrate Vulnerable Zones (NVZs) are areas designated as being at risk from agricultural nitrate pollution. They include about 58% of land in England. The Department for Environment, Food and Rural Affairs (Defra) reviews NVZs every 4 years to account for changes in water pollution. https://www.gov.uk/guidance/nutrient-management-nitrate-vulnerable-zones

[139] Ecological Status is classified in all WFD Water Bodies, expressed in terms of five classes (high, good, moderate, poor or bad). These classes are established on the basis of specific criteria and boundaries defined against biological, physico-chemical and hydromorphological elements. The overall Ecological Status of a water body is determined by whichever of these assessments is the poorer. For example, a water body might pass 'Good Status' for chemical and physico-chemical assessments, but be classed as 'Moderate Status' for the biological assessment: In this case it would be classed overall as 'Moderate Ecological Status'. http://evidence.environment-agency.gov.uk/FCERM/en/SC060065/About.aspx

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Table 8.9 Surface Waterbody status, objectives and mitigation (South East RBMP, 2015)

WFD Waterbody (Waterbody type)	2015 Overall Waterbody status (ecological status)	Reasons for failure to meet Good	Overall Objective	Types of mitigation measures anticipated
Monkton and Minster Marshes (River)	Moderate (Moderate)	Phosphate- Probable source: Sewage discharge (diffuse) from towns, cities and transport	Good status by 2027	Reduce diffuse pollution at source. Reduce diffuse pollution pathways (i.e. control entry to water environment. Mitigate/remediate diffuse pollution effects on receptor.
		Dissolved Oxygen – Probable source: physical modification and flow (Land drainage - water level management)		Improvement to the condition of channel/bad and/or banks Removal or modification of engineering structure Change to operations and maintenance Vegetation management Water demand management Control pattern/timing of abstraction Use alternative source/relocate abstraction or discharge.
River Stour (Kent) (Transitional)	Poor (Poor)	Phytoplankton – Probable source: Diffuse phosphate pollution from rural areas Confirmed Source: Point source pollution from waste water	Moderate by 2027	Reduce diffuse pollution at source Mitigate/remediate diffuse pollution effects on receptor Mitigate/remediate point source effects on receptor Reduce point source pollution at source Reduce point source pathways (i.e. control entry to water environment)
		Dissolved inorganic Nitrogen – confirmed source: Point source pollution from waste water		Mitigate/remediate point source effects on receptor Reduce point source pollution at source Reduce point source pathways (i.e. control entry to water environment)

Groundwater Body

8.4.30 The Manston Airport site is located within the Kent Isle of Thanet Chalk groundwater body (within the East Kent Chalk and Tertiaries Operational catchment). The overall 2015 waterbody is of poor status (as a result of poor status for both quantitative and chemical components), with an overall waterbody objective to remain at poor status by 2015. Attaining the default (good status) is not justified under WFD because the costs of the measures exceed the benefits for the quantitative component. However the Chemical component has an objective to reach Good status by 2027. To achieve this the WFD highlights improvements in relation to the Chemical Drinking Water Protected Area and General Chemical Test. These measures would be unaffordable to implement within a particular timetable (in advance of 2027) without creating disproportionate burdens for particular sectors or parts of society or any identified solution would be at odds with the polluter pays principle.

8.4.31 This waterbody is identified under the WFD as a Drinking Water Protected Area (DWPA), and has a number of associated 'safeguard zones'[140]. The Manston Airport Site extends into the safeguard zones for three abstractions.

8.4.32 Water quality, and in particular nitrate concentrations, have been a concern in Thanet for many years with levels being close to, or exceeding, the prescribed levels. Other water quality issues also include pesticides and organic compounds. Further detail on the groundwater quality within this water body can be found in **Appendix 8.1** (Hydrogeological Impact Assessment).

Conservation sites

8.4.33 The north coast of the Isle of Thanet, located approximately 3.5km north of the site, is designated as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protected Area (SPA) and RAMSAR site. In closer proximity to the Manston Airport site are Sandwich and Pegwell Bays, located 1.5km south east. Together these bays are part of designated National Nature Reserve (NNR), RAMSAR, SSSI, SPA and SAC sites, these sites are described more fully in **Chapter 7: Biodiversity** of this report. The proposed Manston Airport development site, due to the proximity to Sandwich and Pegwell Bay SSSI, has been identified as falling within associated SSSI risk zones[141].

8.4.34 Implementing the WFD contributes to outcomes for nature conservation and biodiversity by improving the water environment. The RBMPs include a summary of the measures needed for water dependent Natura 2000 sites to meet their conservation objectives. Supporting Site Improvement Plans (SIPs[142]) provide an overview of the issues (both current and predicted) affecting the current condition and outlines the priority measures required to improve the condition of the features. Sandwich Bay SAC, Thanet coast and Sandwich Bay SPA and Thanet Coast SAC are water dependent and fall under the North East Kent (Thanet) SIP.

8.4.35 Measures for the Thanet Coast SAC and Thanet coast and Sandwich Bay SPA were completed in 2015 to enable conservation objectives to be met according to the SIP. For Sandwich Bay SAC the measures will be complete by 2027, which requires implementation of management actions to address and adapt to changes in water levels affecting sand dune vegetation.

Factors influencing the baseline

8.4.36 Baseline conditions for hydrology and flood risk could change over the anticipated lifetime of the Proposed Development as a consequence of changes in climate, land use, and as a result of measures taken to improve the water environment in the context of the WFD.

8.4.37 As a result of climate change, it is predicted that winters will become generally wetter and summers generally drier, as indicated by results from the UK Climate

[140] Safeguard zones are non statutory areas established for 'at risk' abstractions where land use, management practices and other activities can affect the quality of the raw water. Measures to prevent and reduce pollution are targeted within these zones.
[141] Zones around each SSSI site (the extent of which reflects the sensitivities of the features for which the site is notified) that indicate the extent beyond the SSSI where development proposals may still have adverse impacts on the SSSI.
[142] Site Improvement Plans (SIPs): provides an overview of the issues (both current and predicted) affecting the current condition and outlines the priority measures required to improve the condition of the features

Projections 2009 (UKCP09)[143]. It is also likely that peak rainfall intensities could increase, with a consequent effect on the frequency and magnitude of high river flows. Furthermore, mean sea levels are predicted to rise, which could be accompanied by changes in storm surge and wave climate. There could be an increase in the frequency and magnitude of flood events as a consequence.

8.4.38 Changing land use, in the form of changing agricultural land management practices, urban development, and major developments, on site or in the surrounding area could cause changes to the surface water environment and flood risk within the Study Area. These changes could relate to changes in patterns and rates of rainfall infiltration, changes in flow pathways, sources and magnitude of sediment inputs, direct morphological alterations to water bodies, or the introduction, alteration or removal of sources of pollution.

8.4.39 It is anticipated that the future status of all lower quality WFD river water bodies will improve, ultimately to one of good status/potential by 2027, where possible, as required by the WFD.

Future baseline

8.4.40 During the lifetime of the development it is considered that the baseline will evolve in the following manner:

- Construction Phase 1 and start of operation (2019-2021): The baseline will remain unchanged
- Construction phases 2,3&4 and ongoing operation (2022-2036): During this period the WFD targets for surface and groundwater bodies will be attained and there may be some measurable change in climate
- Full operation phase (2036 onwards): climate change will cause further variation from baseline climatic patterns.

8.5 Environmental measures incorporated into the proposed development

8.5.1 A summary of the environmental measures that have been incorporated into the development proposals to date in order to avoid, reduce or compensate for potential adverse freshwater environment effects is provided below in **Table 8.10** (construction phase) and **Table 8.11** (operation phase).

8.5.2 How these environmental measures influence the assessment of significance is discussed in **Section 8.7**. However the broad approach adopted is that where achievable environmental measures have been incorporated into the scheme. The effect that those environmental measures have on the significance of potential effects is taken into account during the assessment. In some cases a potential effect may require no further consideration following incorporation of appropriate environmental measures.

[143] CONSTRUCTION INDUSTRY RESEARCH & INFORMATION ASSOCIATION. (2010). Environmental good practice on site (third edition). Report C692. London: Construction Industry Research & Information Association

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Table 8.10 Rationale for incorporation of environmental measures in the construction phase

Potential receptor	Predicated changes and potential effects	Incorporated measure
Surface and ground water	Uncontrolled sediment from the construction process entering the freshwater environment as a potential pollutant.	• Site access points will be regularly cleaned to prevent build-up of dust and mud. • Earth movement will be controlled to reduce the risk of silt combining with the site run-off. • Properly contained wheel wash facilities will be used (where required) to isolate sediment rich run-off. • Cut-off ditches and/or geotextile silt-fences will be installed around excavations, exposed ground, stockpiles to prevent the uncontrolled release of sediments from the site. • Sediment traps will be required on all surface water drains in the surrounding region. • Silty water abstracted during excavations will be discharged to settlement tanks or siltbusters as appropriate. Cleaned run-off will be discharged through the existing foul sewer drains. If sewer capacity is limited then silty water will need to be stored and removed from the site by tanker and disposed of at a suitably licensed location. A discharge consent for discharge to foul sewer, detailing volumes and rates of discharge will be agreed with Southern Water prior to the commencement of works, if necessary. • Stockpiles and material handling areas will be kept as clean as practicable to avoid nuisance from dust. Dusty materials will be dampened down using water sprays in dry weather or covered.
Surface and ground water	Spillages of oils and other chemicals associated with the construction process entering the freshwater environment as a potential pollutant.	• Wherever possible, plant and machinery will have drip trays beneath oil tanks / engines / gearboxes / hydraulics which will be checked and emptied regularly and correctly disposed of via a licensed waste disposal operator. • Oils and hydrocarbons will be stored in designated locations with specific measures to prevent leakage and release of their contents, including the sitting of the storage area away from the drainage system on an impermeable base, with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked when not in use. • A spillage Environmental Response Plan will be produced, which site staff will have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material.
Surface and ground water	Pollution incidents resulting from concrete batching and cement products on site during the construction process.	• Any mixing and handling of wet concrete that is required on-site will be undertaken in designated areas outside of SPZ1. • A designated area will be used for any washing down or equipment cleaning associated with concrete or cementing processes and facilities provided to remove sediment prior to disposal to foul sewer. • Any contaminated soil will be identified by ground investigation prior to construction and either treated onsite and reused, or removed and disposed of off-site by a suitably licensed waste disposal operator. • Measures such as cut-off trenches will be put in place to prevent any potentially polluted run-off from within the site entering any excavations.
Groundwater	Piling increasing turbidity of groundwater at the Lord of the Manor Source	• The approach to any on-site piling will be agreed with Southern Water and the Environment Agency prior to the commencement of works. Piling methods will be designed to have a minimum of ground disturbance and will be in accordance with “Piling and Preventative Ground Improvement Methods on Land Affected by

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Potential receptor	Predicated changes and potential effects	Incorporated measure
		Contamination: Guidance on pollution prevention" and "Piling into contaminated sites".
Water supply/ sewage infrastructure	Effects on the functionality of the water supply and sewer infrastructure around the site during the construction phase.	• The exact locations of nearby sewers and water supply infrastructure needs to be established by on-site survey prior to demolition works. An appropriate protection system (i.e. temporary support structure, sheet piles, installation of secant piles etc.) has to be implemented to minimise any impact to the public sewer network. The piling methodology will be developed considering the neighbouring utility services. • The water demand for the construction phase will be agreed with Southern Water. • Discharge rates from the site will not exceed current sewer capacity and these rates will be agreed with Southern Water to ensure appropriate storage is provided on site during the construction phase.

8.5.3 A CEMP will be produced, following the structure of the draft CEMP to be submitted with the ES, by each of the appointed contractors for each phase of the development. The CEMP will detail the methodology, objectives, operations, resource management responsibilities, key points of contact, auditing processes to monitor performance, provision of reporting performance and progress updates. The final CEMP measures will be agreed with Southern Water, the Environment Agency and Thanet District Council, as appropriate.

Table 8.11 Rationale for incorporation of environmental measures in the operation phase

Potential receptor	Predicated changes and potential effects	Incorporated measure
Surface and groundwaters	Poorly managed site drainage from site leads to pollution of water environent	• An outline site drainage strategy has been developed (see **Chapter 3: Description of the Proposed Development**). The drainage system will be designed to capture, treat and discharge water in a controlled manner. No water will be allowed to infiltrate to ground from any site hardstanding and water will either be re-used or set to the site treatment facilities (attenuation ponds). Discharge from these ponds will be via a permitted discharge to Pegwell Bay.
Groundwater	Leakage from the on-site waste-water lagoon (s) enters the groundwater environment as a potential pollutant.	• The lagoons will be constructed to high standards and monitored. Discharge of treated water and clean water will be to Pegwell Bay rather than to ground.
Groundwater	Leakage from fuel storage tanks enters the groundwater environment as a potential pollutant.	• All storage tanks will be appropriately designed to current standards (e.g. double skinned, bunded etc.). Bunds will provide for 110% of tank capacity with allowance for the 1:100 rainfall event.
Groundwater	Spillage during re-fuelling enters the groundwater	• Re-fuelling will be in designated areas with active drainage areas and fuel interceptors. Control levels and alarms will be used to identify leaks or overflows.

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Potential receptor	Predicated changes and potential effects	Incorporated measure
	environment as a potential pollutant.	
Groundwater	Contaminated run-off generated by de-icer storage and use enters the groundwater environment as a potential pollutant.	• Application of de-icer will only be in designated areas which have active drainage where the run-off is directed to water treatment lagoons. • The lagoons will be appropriately sized to account for NPPF climate change allowances, to ensure that treatment facilities continue to function
Groundwater	Leakage from the drainage network enters the groundwater environment as a potential pollutant	• The drainage network will be upgraded to modern standards and all discharge will be collected in appropriately sized attenuation ponds and treated prior to off-site discharge. The drainage facilities will allow for the interception and segregation of contaminated water and un-contaminated water (e.g. roof run-off). Ponds will be monitored for possible leakage.
Groundwater	Leakage from foul sewer connections enters the groundwater environment as a potential pollutant	• All foul drainage pipework will be surveyed to allow the identification of leaks/failures and these will be repaired to meet modern standards.
Groundwater	Poorly managed fire water disposal enters the groundwater environment as a potential pollutant	• The application will be in designated areas with active drainage where run-off is lead to water treatment lagoons. • Fire-fighting training ground will be appropriately sized, using a lined (impermeable base) hardstanding and with a perimeter bund.
Groundwater	Spilled pesticides enter the groundwater environment as a potential pollutant.	• Pesticides will only be applied to hardstanding areas with active drainage to water treatment works. • The airport will develop a Wildlife Hazard Management Plan, Habitat Management Plan, and Long Grass Policy to control and manage the use of chemicals to prevent them being discharged to ground/groundwater.
Pegwell Bay and associated designated sites	Pollution from site discharges	• The discharge from the site will be regulated under a Water Discharge Activity Permit from the Environment Agency.
Water supply infrastructure	Impacts on local water availability in the public water supply network in the operation phase	• A Resources/Sustainability strategy will be submitted with the DCO application to identify how water efficiency measures will be incorporated into the development to maximise water re-use and minimise the demand on supply. • The water demand for the operation phase will be agreed with Southern Water and presented in the ES.
Surface and groundwater	General impacts on surface and groundwater quality in the operation phase, not specified above	• Oil separators will be used on drains from roads and car parks to remove hydrocarbons from site run-off. • Foul sewerage will be discharged to the local public sewer network, managed by Southern Water. • Operational phase Plans for the management of on-site spillages will be developed prior to the DCO application or will be expected as Requirements on the DCO. These include an Environmental Management Plan, Emergency Response and

Potential receptor	Predicated changes and potential effects	Incorporated measure
		Post-Crash Management Plan and an Environmental Spillage Plan. • The integrity of the Pegwell Bay pipe will be tested prior to its use as an operational discharge route and any appropriate repairs will be undertaken.
Mitigation of flood risk	Impacts on flood risk receptors during the operation phase.	• All site-drainage from areas of hardstanding will either be captured for water re-use (in the case of roof-run-off) or captured by the site drainage systems and transferred to the attenuation ponds for treatment and discharge to Pegwell Bay. • The attenuation ponds will be designed to an appropriate capacity, taken into account NPPF climate change allowances and the capacity of the pipe into Pegwell Bay. This will be agreed with the Environment Agency prior to submission. • Foul sewer capacity will be appropriately sized in consultation with Southern Water and the Environment Agency.

8.6 Scope of the assessment

8.6.1 This section sets out information on: the process whereby receptors are identified; the potential receptors that could be affected by the development; and the potential effects on receptors that could be caused by the development.

8.6.2 The scope of assessment has been informed by: the scoping study; consultee responses to the Scoping Report; the results of the work detailed in **Section 8.4**; and the preliminary scheme design.

Approach to identifying receptors

8.6.3 The identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study for the site location.

8.6.4 In some cases, even without quantified information, it is reasonable to assume that some potential receptors will not experience significant effects. This is sometimes the result of tried and trusted mitigation measures that have been incorporated into the scheme, which might reasonably be expected to be effective (see **Section 8.5**).

8.6.5 The following considerations have been taken into account in identifying potential receptors:

- The extent to which the receptor will be affected by changes that are expected to result from the development;
- The sensitivity of the receptors to the changes that are likely to occur;
- The likely magnitude, duration and other characteristics of the effects;
- The importance or value of the receptor at a local, regional and national level; and

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- Relevant best practice and guidance where specialist methodologies have been developed as detailed below.

Potential receptors

8.6.6 The identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study and site visit for the site location.

8.6.7 This section identifies the potential receptors that have been identified based on the above factors and on the consultation response received from PINS. The receptors listed in **Table 8.12** are considered capable of being significantly affected and will therefore be taken forward for further assessment.

Table 8.12 Potential receptors

Receptor	Distance from site boundary	Reason for selection
Pegwell Bay (and associated designated sites)	c. 1.5Km	The current surface water drainage pipe which discharges into Pegwell Bay provides a potential pathway between the site and receptor during the construction phase. In addition this pipe is being considered for use in the operation site drainage network.
Southern Water Public Water supply sources	<0.5km	The adit which supplies the Southern Water Lord of the Manor Source lies under the site boundary.
Other licensed groundwater abstractions	0.1m-1km	The site is being developed on the exposed Chalk, which supports these supplies. There is therefore a potential pathway between the site and these supplies.
Kent Isle of Thanet Chalk WFD groundwater body	Underlies the site	The groundwater body underlies the site and supports nationally important abstractions.
Thanet Formation Secondary A aquifer	Adjacent to the site's northern boundary	The designated aquifer lies adjacent to the site boundary and could support locally important abstractions.
Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD Transitional water body.	Underlies the southern portion of the site, around the runway.	The site lies within the boundary of this surface water body.
Site users	On site	Site users can be effected by changes to flood risk on the sites, specifically the sites surface water drainage regime and response to surface water flooding.
Off-site users	Adjacent to the site boundary	Changes to land use within the site boundaries has the potential to change surface water run-off and discharges to the local drainage network.

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Receptor	Distance from site boundary	Reason for selection
On and off site public sewer network	Within the site boundaries	Changes to the site run-off regime and ground disturbance during construction has the potential to effect the public sewer network.
Public water supply infrastructure	On and off site	Changes in water demand at the site has the potential to effect water availability in the public water supply network.

Spatial and temporal scope

Spatial Scope

8.6.8 The spatial scope of the assessment has been considered for three sets of receptor categories:

- Surface water: Surface water receptors have been defined as those which are downstream of the site. Since there is no surface water flowing over the site surface water receptors are defined as those which receive site drainage and the WFD surface water body which the site lies partially within.
- Groundwater: Groundwater receptors have been defined as the Chalk WFD groundwater body which underlies the site and dependant abstractions and the Thanet Formation Secondary A Aquifer which lies adjacent to the site, and any dependant abstractions.
- Flood risk: Flood risk receptors will be defined in detail by the FRA for the purposes of the PEIR they are considered to be on-site users and adjacent site users.

Temporal scope

8.6.9 The temporal scope of assessment will be considered in the following way:

- The flood risk assessment to be submitted with the DCO application will appropriately consider the February 2016 update to the NPPF climate change allowances[144] in designing the volume of on-site storage.
- The assessment of the construction phase effects will consider the effects from all four of the construction phases as outlined in **Chapter 3: Description of the Proposed Development**. Where there are different potential effects from each construction phase these will be outlined and each assessed separately;
- The assessment of the operation phase effects will consider the maximum potential effects, which, for most potential effects, are likely to be those from Year 20 of the airport forecast as detailed in **Chapter 3: Description of the Proposed Development**.

[144] National Planning Policy Framework section 10

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Potentially significant effects

8.6.10 The potentially significant effects from the proposed development, which are subject to further discussion in this chapter, are summarised below.

- Potential effects on the groundwater quality in the Chalk, Thanet Formation, dependant abstractions and WFD groundwater body during the construction and operational phases of the proposed development. Effects could arise from these activities including increase of turbidity of the underlying ground water, or pollution from the leakages and spillages of oils, fuels or other chemicals.
- Potential effects on Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD Transitional water body during the construction and operational phases of the proposed development. Effects could arise as a result of site run-off during the construction phase, or from surface water discharges during the operation.
- Potential effects on Pegwell Bay (and associated designated sites) during the construction and operational phases of the proposed development. The effects could arise through the proposed use of the existing surface water discharge system, which discharges into Pegwell Bay.
- Potential effects on the capacity of the Public Water Supply Network and Public Sewer network during the construction and operational phases of the proposed development. The effects could arise from the increase in demand for potable water supply and for foul water connections during both phases of the development.
- Potential effects on flood risk receptors (on and adjacent to the Proposed Development) during the construction and operational phases of the Proposed Development. Effects could arise as a result of changes to site drainage and discharge during both phases of the proposed development.

8.7 Assessment methodology

Methodology for predicted effects

8.7.1 The baseline assessment has been used to identify receptors associated with the freshwater environment. Effects of the proposed development on receptors have been identified taking into account best practice and guidance for construction and operation of the site. The approach used is consistent with that developed by the Institute of Environmental Management and Assessment[145].

Significance evaluation methodology

8.7.2 The assessment of likely significant effects as a result of the proposed development has taken into account both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development and the sensitivity or value of the affected receptor / resource to resulting changes. Magnitude of change is

[145] Institute of Environmental Management and Assessment, 2011: The State of Environmental Impact Assessments in the UK.

assessed on a scale of high, medium, low and negligible whilst the sensitivity of the affected receptor / resource is assessed on a scale of very high, high, medium, and low.

8.7.3 The assessment of significance in this chapter draws on the sensitivity and magnitude definitions in **Tables 8.13** and **8.14**. The final conclusions as to the significance of any effects also includes a consideration, based on professional judgement, of the efficacy of Environmental Measures in reducing the magnitude of the effects.

Sensitivity of Receptor

8.7.4 Guidance on the categories and definitions of value and/or sensitivity of receptors, used in the assessment, are given in **Table 8.13**. Where a receptor could reasonably be placed within more than one value/sensitivity rating, conservative professional judgment has been used to determine which rating would be applicable.

Table 8.13 Definitions of Receptor Sensitivity

Value/Sensitivity	Criteria	Example
Very High	Aquatic Environment feature with a very high yield, quality or rarity with little potential for substitution. Water resources supporting human health and economic activity at a regional scale. Features with a very high vulnerability to flooding.	Conditions supporting sites with international conservation designations (Special Areas of Conservation (SAC), Special Protection Area (SPA), Ramsar sites), where the designation is based specifically on aquatic features. Strategically important public water supplies. Land use types defined as 'Essential Infrastructure' (i.e. critical national infrastructure, such as essential transport and utility infrastructure) and 'Highly Vulnerable' (e.g. police/ambulance stations that are required to operate during flooding, mobile homes intended for permanent residential use) in the NPPF flood risk vulnerability classification.
High	Feature with a high yield, quality or rarity with a limited potential for substitution. Water resources supporting human health and economic activity at a local scale. Features with a high vulnerability to flooding	Conditions supporting sites with national conservation designations (e.g. Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR)) where the designation is based specifically on aquatic features. Receptor WFD water body: all relevant WFD elements are currently attaining at least good status/potential. Local public surface water supplies. Licensed non-public surface water supply abstractions which are large relative to available resource, or where raw water quality is a critical issue, e.g. industrial process water. Land use types defined as 'More Vulnerable' in the NPPF flood risk vulnerability classification (e.g. hospitals and health centres, educational institutions, most types of residential development).
Medium	Feature with a moderate yield, quality or rarity with some potential for substitution. Water resources supporting human health and economic activity at household/individual business scale. Features with a moderate to low vulnerability to flooding	Sites with local conservation designations (e.g. Local Nature Reserves (LNRs), County Wildlife Sites (CWS)) where the designation is based specifically on aquatic features. Receptor WFD water body: all relevant WFD elements are currently attaining a status/potential of moderate or lower. Licensed non public surface water supply abstractions which are small relative to available resource, or where raw water quality is not important, e.g. cooling water, spray irrigation. Unlicensed potable surface water abstractions, e.g. private domestic water supplies.

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Value/Sensitivity	Criteria	Example
		Land use types defined as 'Less Vulnerable' in the NPPF flood risk vulnerability classification (e.g. most types of business premises).
Low	Commonplace feature with low yield or quality with good potential for substitution. Water resources do not support human health, and of only limited economic benefit. Features that are resilient to flooding	Non-reportable WFD river water bodies (usually coastal catchments with an area of <10km^2 that the Environment Agency is not required to monitor, classify or report on). Unlicensed non-potable surface water abstractions, (e.g. livestock supplies). Land use types defined as 'Water-compatible development' in the NPPF flood risk vulnerability classification, and undeveloped land (e.g. flood control infrastructure; water transmission infrastructure).

Magnitude of change

8.7.5 The magnitude of potential change to baseline conditions is based on an assessment of the scale or degree of change from the baseline condition as a result of the proposed development, the duration and reversibility of the change. The scale of change that the proposed development would have upon sensitive or valued receptor/ resource is also considered taking into account relevant legislation and/or policy standards and guidance as well as the environmental measures which have been incorporated into the scheme. **Table 8.14** provides examples of how various magnitudes of change will be determined with respect to water features.

Table 8.14 Examples of water environment magnitude of change

Magnitude	Criteria	Examples of change
High	Results in major change to feature, of sufficient magnitude to affect its use/integrity	Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant SSSI conservation objectives (COs), or downgrading of WFD status (deterioration in current thresholds as defined by current WFD status, including supporting WFD elements). Complete loss of resource or severely reduced resource availability and/or quality, compromising the ability of water users to exercise licensed rights. Change in flood risk resulting in potential loss of life or major damage property and infrastructure. Measureable decrease in surface water discharge or increase in flood storage from baseline to provide significant catchment-wide betterment.
Medium	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances	Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant SSSI COs, or downgrading of WFD status (deterioration in current thresholds as defined by current WFD status, including supporting WFD elements). Water quality status may impact upon potential future thresholds in relation to objective WFD status – potential for prevention of waterbody reaching its future WFD objectives. Moderate reduction in resource availability and/or quality, which may compromise the ability of water users to exercise licensed rights. Change in flood risk resulting in potential for minor damage to property and infrastructure.

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		Measureable decrease in surface water discharge or increase in flood storage from baseline to provide significant local betterment.
Low	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances	Measureable deterioration in river flow regime, morphology or water quality, but remaining generally within SSSI COs, and with no change of WFD status (of overall status or supporting element status) or compromise of Environmental Quality Standards (EQSs). Minor reduction in resource availability and/or quality, but unlikely to affect the ability of water users to exercise licensed rights. Change in flood risk resulting in potential for minor damage to property and infrastructure. Measureable decrease in surface water discharge or increase in flood storage from baseline to provide minor local betterment.
Negligible	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity	No measureable deterioration in river flow regime, morphology or water quality, and no consequences in terms of SSSI COs or WFD designations. No measurable change in resource availability or quality, and no change in ability of water users to exercise licensed rights. Change in flood risk causes more frequent inconvenience and triggering of emergency response measures, but does not result in increased risk of damage to property and infrastructure.

Determination of significance

8.7.6 The approach to determining the significance of effects that will be taken for the hydrological assessment is set out in **Table 8.15**. Significance is determined by consideration of both the sensitivity of a receptor and the magnitude of change. Significance can be Positive, Adverse or Neutral.

Table 8.15 Significance criteria

	Magnitude of Change			
Sensitivity/Value	**High**	**Medium**	**Low**	**Negligible**
Very High	Significant	Significant	Significant	Not Significant
High	Significant	Significant	Not Significant	Not Significant
Medium	Significant	Not Significant	Not Significant	Not Significant
Low	Not Significant	Not Significant	Not Significant	Not Significant

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8.8 Assessment of effects on the Chalk Aquifer unit, Thanet Formation, dependant abstractions and WFD groundwater body

8.8.1 This assessments of effects incorporates the environmental measures referenced in **Section 8.5**.

Construction phase effects

8.8.2 The construction phase has the potential to have an adverse effect on the water quality of the underlying aquifer and dependent abstractions. This would be through the following mechanisms:

- The increase of turbidity of the underlying ground waters as a result of sediment mobilisation and ground disturbances; and
- Pollution from the spillages of oils, fuels or other chemicals.

8.8.3 Phase 1 will have the biggest volume of construction activity, as it will involve earthworks for the levelling of the new apron areas and the installation of the drainage system. Phases 2-4 will still have the potential for effects, but of a potentially lower magnitude as there will be less ground disturbance, though still the potential for piling.

8.8.4 The detailed design of the new infrastructure and foundations, including the taxiways, aprons, stand and cargo facilities, will be completed following the geotechnical site investigations which will be conducted in construction phase 1. These investigations, and the final design of the foundations will be agreed in advance with the Environment Agency and Southern Water. If pilling, and other foundation techniques with the potential to affect these receptors are required, then appropriate construction techniques and controls to mitigate any significant effects will be agreed and a Piling Risk Assessment produced.

8.8.5 Environmental measures listed in this section will be included in the site's CEMP as well as a number of site specific approaches, paramount of which is the avoidance of ground disturbance within SPZ 1 and the agreement of any approaches to piling prior to the commencement of construction. All measures will be confirmed with the Environment Agency and Southern Water prior to the submission of the DCO.

8.8.6 It is concluded that the combination of construction good practice and site specific measures for the protection of the Chalk aquifer, in combination with further consultation with the Environment Agency and Southern Water, will result in no potentially significant effects during the construction phase.

8.8.7 The summary presentation of these potential effects assumes the presence of the most sensitive receptor (sensitivity of very high) previously identified i.e. the Kent Isle of Thanet Chalk WFD groundwater body. The magnitude of potential change to groundwater receptors has been identified in all instances to be negligible and therefore the significance is assessed to be not significant.

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Operational phase effects

8.8.8 The operational phase effects comprise the potential for pollution of the Chalk aquifer by the spillage or leakage of potential pollutants from site infrastructure or as a result of site activities. The Hydrogeological Impact Assessment (**Appendix 8.1**, **Section 4**) includes an assessment of the risk to the groundwater environment from operational activities and suggests appropriate environmental measures to be incorporated into the site's design and Environmental Management Plan (EMP). The summary of recommended environmental measures from this document have been included in **Table 8.11** in this Chapter.

8.8.9 The Hydrogeological Impact Assessment concludes that the environmental measures, to be incorporated into site operation and design, will only result in effects of low or negligible magnitude. This will ensure effects are fully mitigated for the Thanet Formation (Medium Sensitivity receptor), but could result in potentially significant effects on the Very High sensitivity receptors associated with the Thanet Chalk and dependent public water supply abstractions. This is with the exception of the risk from the Fuel Storage Areas, currently proposed to be at the former Jentex site. **Section 2.4** of the PEIR provides further information on the consideration of on-site alternatives in relation to the fuel farm and **Section 3.2** contains further information on the Jentex site and Fuel Farm Design. Further mitigation measures to manage this risk are suggested as follows:

- further discussion with the Environment Agency and Southern Water to finalise the location and design of the fuel farm. Design will be undertaken to Best Available Techniques (BAT);
- regular inspection of tanks, bunds, impermeable surfaces and operating facilities;
- a tank integrity monitoring programme;
- tanks with overflow outlets directed to the emergency spillage containment tank and then a tertiary containment gallery;
- implementation of strict fuel delivery and control systems; and
- detailed emergency response procedure in the event of a failure.

The Environmental Statement will develop further mitigation measures, in consultation with the Environment Agency and Southern Water to appropriately mitigate potential effects on this receptor.

8.8.10 In addition a WFD assessment will be undertaken to support the ES to demonstrate how the development of the site will not impede the achievement of WFD objectives.

Decommissioning phase effects

8.8.11 It is envisaged that decommissioning phase effects would be similar to construction phase effects, albeit with less ground disturbance due to piling. Good practice methods and the discussion of site specific approaches with the relevant statutory consultees should ensure that there are no potentially significant effects in the construction phase.

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8.9 Assessment of effects on Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD Transitional water body

Construction phase effects

8.9.1 Site run-off in the construction phase will be controlled and not allowed to freely discharge into the environment. These measures have been put in place to protect the underlying Chalk aquifer and will also serve to protect the surface water environment (Medium sensitivity receptor). Furthermore the highly permeable nature of the underlying geology means that there is no direct overland flow route to these receptors as water will always preferentially infiltrate rather than flow overland. Therefore it is not envisaged that there will be any potentially significant effects on surface water receptors during the construction phase of the site.

Operational phase effects

8.9.2 In a similar manner all operational phase surface water discharges will be captured on site, treated and discharged through the pipe to Pegwell Bay. In addition the airport will develop a Wildlife Hazard Management Plan, Habitat Management Plan, and Long Grass Policy to control and manage the use of chemicals, including pesticides, herbicides and insecticides, to prevent them being discharged to ground or surface waters. Therefore it is not envisaged that there will be any potentially significant effects on surface water receptors during the operation phase of the site.

8.9.3 In addition a WFD assessment will be undertaken to support the ES to demonstrate how the development of the site will not impede the achievement of WFD objectives.

Decommissioning phase effects

8.9.4 The same approach would be undertaken for the decommissioning phase, therefore no potentially significant effects are anticipated.

Combined Effects

8.9.5 Due to the lack of a pathway between the site and these receptors it is not anticipated that there will be any combined effects on surface water receptors.

8.10 Assessment of effects on Pegwell Bay (and associated designated sites)

Construction phase effects

8.10.1 Construction phase site discharge in Construction Phase 1 will be contained on site and discharged to the site sewer network, following treatment by siltbusters or similar, or taken off-site. Additional measures, which will be detailed in the Construction Environmental Management Plan (CEMP) and put in place to protect

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the groundwater environment during the construction phase should also ensure that no potential pollutants reach Pegwell Bay.

8.10.2 In construction phases 2-4 it is envisaged that the site drainage network will be in place and discharges will be to Pegwell Bay. Discharge will only take place once silt and any other potential pollutants (e.g. hydrocarbons) have been removed from site discharge.

8.10.3 Following the incorporation of the environmental measures it is concluded that all effects on Pegwell Bay will be Negligible. Therefore it is not considered likely that there will be any potentially significant effects on Pegwell Bay or any associated designated sites during the construction phase of the site.

Operational phase effects

8.10.4 It is proposed that the site discharge is through the current discharge pipe into Pegwell Bay. It is anticipated that the discharge will be regulated by a Water Discharge Activities Permit from the Environment Agency. Water quality treatment will take place on site in attenuation ponds and water will only be pumped to the discharge pipe from these ponds once appropriate quality standards are reached. It is proposed that there are two ponds on site, one of which will receive “dirty” run-off (for example that containing de-icer) and one receiving “clean” run-off. Water will only be discharged from the “dirty” run-off pond once treatment is complete and pumped discharge will only take place from the “clean” pond. These ponds will be sized to take account of the capacity of the pipe and pump and will appropriately consider the February 2016 update to the NPPF climate change allowances. Further details will be submitted with the site drainage plan and Flood Risk Assessment, which will accompany the DCO application. Both documents will have been discussed with the Environment Agency prior to submission.

8.10.5 The appropriate design of the site drainage system and the regulation of the site discharge through an environmental permit mean that all effects on Pegwell Bay from the site discharge are concluded to be negligible in the operation phase. Therefore it is not envisaged that there will be any potentially significant effects on Pegwell Bay and any associated designated sites during the operation phase of the site.

Decommissioning phase effects

8.10.6 The same approach would be undertaken for the decommissioning phase, therefore no potentially significant effects are anticipated.

Combined Effects

8.10.7 The requirements of site discharge during construction phases 2-4 will need to be balanced against the requirements of the discharge from the operational area of the site. Management plans, to be agreed with the Environment Agency, will need to be in place for the control of site discharge to ensure that attenuation and treatment areas have sufficient capacity. Therefore it is not envisaged that there will be any potentially significant effects on Pegwell Bay and any associated designated sites during the operation phase of the site.

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8.11 Assessment of effects on the capacity of the Public Water Supply Network and Public Sewer network

Construction phase effects

8.11.1 RiverOak will agree construction phase water and foul water demands with Southern Water prior to the commencement of works and this will be included in the final ES. Following this it is concluded that all effects will be negligible and therefore no significant construction phase effects are anticipated.

Operational phase effects

8.11.2 RiverOak will formally request a capacity check of the local water supply and sewage systems from Southern Water and agree sustainable levels of supply and discharge. In addition a Sustainability Strategy will be submitted with the DCO application to demonstrate how water efficiency measures will be incorporated into the site's design. Following this work to support the ES it is concluded that any effects will be negligible and no operational phase significant effects are anticipated.

Decommissioning phase effects

8.11.3 The same approach would be undertaken for the decommissioning phase, therefore no potentially significant effects are anticipated.

Combined Effects

8.11.4 Effects on the capacity of the water supply and foul drainage network will be negligible due to the incorporation of appropriate site demand and discharge rates into the final design and the agreement of these rates with Southern Water, therefore it no combined effects are anticipated.

8.12 Assessment of effects on Flood Risk Receptors: On and adjacent development

Construction phase effects

8.12.1 Site discharge in the construction phase will be collected on site and either discharged, following treatment, through the pipe to Pegwell Bay or removed from the site via tankers. There will be no increase in surface water run-off from the site and therefore no anticipated increase in surface water flood risk on or off the site. Therefore it is concluded that all effects will be negligible and it is not envisaged that there will be any potentially significant effects during the construction phase of the site.

Operational phase effects

8.12.2 During the operational phase all site drainage will be similarly contained and discharged through the Pegwell Bay pipe, therefore there will be no increase in uncontrolled site run-off as a result of the increase in hardstanding. A Flood Risk Assessment and Drainage Strategy will be produced to accompany the DCO

application to demonstrate how site infrastructure has been sized to an appropriate capacity to manage site drainage. The assessments will appropriately consider the February 2016 update to the NPPF climate change allowance and the capacity of the Pegwell Bay pipe. Following the production of a compliant Flood Risk Assessment it is concluded that all effects during the operation phase will be negligible and there will not be any potentially significant effects to on or off-site during the operation phase of the site.

Decommissioning phase effects

8.12.3 During the decommissioning phase similar measures will be taken to control site run-off as the requirement to protect the underlying Chalk aquifer will still be in place. Therefore it is not envisaged that there will be any potentially significant effects either on or off-site during the decommissioning phase of the site.

Combined Effects

8.12.4 No combined effects from surface water discharge will be experienced by either on or off-site users. The Flood Risk Assessment and Drainage Strategy will demonstrate how current site-runoff rates will be maintained.

8.13 Conclusions of preliminary significance evaluation

8.13.1 The conclusions on the significance of all those effects that have been subject to assessment in **Sections 8.8** to **8.12** are summarised in **Table 8.16**.

Table 8.16 Summary of significance of adverse effects

Receptor and effects	Significance Level	Rationale	Further work to be undertaken to support the ES
Pegwell Bay (and associated designated sites)	Not Significant	The pathway between the site and Pegwell Bay is the site discharge pipe, discharges through this pipe will be regulated via a Water Discharge Activity Permit from the Environment Agency, and this will ensure no adverse effect on Pegwell Bay and associated designated sites.	Discussion with the Environment Agency as to the likely conditions to be placed on a discharge to Pegwell Bay and the appropriate sizing of on-site water treatment and attenuation areas. Documentation of these discussion in the SOCG.
Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD Transitional water body.	Not Significant	Site drainage from hardstanding will be captured on site by the site drainage system and all discharge will be to foul sewer or Pegwell Bay. Site drainage on grassed areas will infiltrate before it reaches any surface water receptor due to the high permeable nature of the underlying geology therefore	Finalisation of site drainage design and appropriate sizing of attenuation ponds. A WFD Assessment will be produced to demonstrate how the site will not comprise the achievement of WFD objectives in these waterbodies.
Southern Water Public Water supply sources	Potentially significant	Construction phase effects can be avoided by good practice construction measures and an approach to piling agreed with Southern Water and the	Further discussions need to be undertaken with Southern Water and the Environment Agency to confirm the location of the fuel farm, the final design (using BAT) and the

Receptor and effects	Significance Level	Rationale	Further work to be undertaken to support the ES
		Environment Agency. Operational phase effects associated with potential spills from the fuel farm have been identified as potentially significant and will require the development of further mitigation measures to be agreed with Southern Water and the Environment Agency. This rationale has been expanding in the draft Hydrogeological Impact Assessment accompanying this PEIR submission (see **Appendix 8.1**)	measures which will be included in the CEMP, these will be incorporated into the SOCG and the draft CEMP to be submitted with the ES. Further mitigation measures will need to be designed as a part of the Emergency Spill Response Plan to ensure the protection of the aquifer and associated sources during the construction phase. A final Hydrogeological Risk Assessment (HRA) will be produced and signed off by Southern Water and the Environment Agency.
Other licensed groundwater abstractions	Not Significant	Mitigation measures designed to protect the most sensitive proximate receptors – the Southern Water Public Water Supply sources will also serve to protect these receptors.	No additional work will be undertaken.
Kent Isle of Thanet Chalk WFD groundwater body	Potentially significant	Mitigation measures designed to protect the most sensitive proximate receptors – the Southern Water Public Water Supply sources will also serve to protect these receptors.	A WFD Assessment will be produced to demonstrate how the site will not comprise the achievement of WFD objectives in these waterbodies.
Thanet Formation Secondary A aquifer	Not Significant	Mitigation measures designed to protect the most sensitive proximate receptors – the Southern Water Public Water Supply sources will also serve to protect these receptors.	No additional work will be undertaken.
Site Infrastructure	Not Significant	The site drainage network will be sized to take account of NPPF climate change allowances and the capacity of the pump/Pegwell Bay pipe.	An FRA and drainage strategy will be produced in consultation with the Environment Agency and Kent County Council and Thanet District Council.
Off-site Infrastructure	Not Significant	The site drainage network will be sized to take account of NPPF climate change allowances and the capacity of the pump/Pegwell Bay pipe.	An FRA and drainage strategy will be produced in consultation with the Environment Agency and Kent County Council and Thanet District Council.
On and off site public sewer network	Not Significant	Site discharge foul sewer will be capable of discharge rate appropriate for the capacity of the local sewer network.	A capacity check of the local sewer network will be undertaken to determine site discharge rates. These will be agreed with Southern Water and documented in the SOCG.
Public water supply infrastructure	Not Significant	Water use will be at a rate appropriate to the capacity of the current network. To minimise demand water efficiency measures, such as grey water re-use, will happen wherever possible on-site.	A sustainability strategy will be submitted with the ES to document water efficiency measures. Site water demand will be agreed with Southern Water through the SOCG process.

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9. Historic Environment

9.1 Introduction

9.1.1 This chapter sets out the results of a preliminary assessment of the effects of the Proposed Development on the historic environment.

9.1.2 This chapter should be read in conjunction with the scheme description (**Chapter 3**). Following a summary of the limitations of the PEIR, the chapter outlines the relevant policy, legislation and guidance that has informed the preliminary assessment, and the data gathering methodology that was adopted as part of the historic environment preliminary assessment. This leads on to a description of the overall baseline conditions, the scope of the assessment, and the assessment methodology. The chapter concludes with a summary of the results of the assessment at this point in time.

9.1.3 The historic environment is defined, following the Draft Airports NPS, as:

9.1.4 *"All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora."*[146]

Limitation of the PEIR

9.1.5 As outlined in **Section 1.4** the PEIR provides preliminary information based on the development of the project to date and data gathered at this point, that will subsequently be provided in full and final form within the ES.

9.1.6 This assessment is based solely on desk-based research and the results of any known previous archaeological investigations within the site and study area; therefore, it cannot necessarily be taken as a definitive statement of the potential presence and significance of archaeological remains within the site boundary. In some cases, it may be necessary to undertake further survey in order to refine the assessments made on the basis of existing knowledge and to allow an informed assessment of the potential effects of the Proposed Development.

9.1.7 No intrusive survey has been undertaken to date. Discussion has been held with Historic England and Kent County Council as to whether or not intrusive investigations will be needed to inform the assessment in the Environmental Statement. If required, the scope of any works will be agreed with Historic England and Kent County Council.

9.1.8 The methods used to carry out any further survey will be influenced by the nature of the archaeological remains which may be present and the prevailing ground conditions.

[146] Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England, February 2017, Paragraph 5.177

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9.2 Policy and legislative context

9.2.1 A study of Historic Environment related planning policy, legislation and guidance at the national, regional and local level has been undertaken for the site and its locality in order to highlight any requirements which the Proposed Development needs to consider. It is always important that policies, legislation and guidance are taken into consideration as they help to define the scope of assessment and can inform the identification of particular local issues. Full details of all national and local planning policies relevant to the Proposed Development can be found in **Appendix 4.1**.

Legislative requirements

9.2.2 The importance of cultural heritage and archaeology is recognised in legislation and heritage assets that are deemed to be of particular importance are given legal protection.

9.2.3 Under the *Ancient Monuments and Archaeological Areas Act 1979*, as subsequently amended by the *National Heritage Acts 1983 and 2002*, sites assessed to be of national importance are required to be compiled in a Schedule of Monuments. These sites are accorded statutory protection and Scheduled Monument Consent is required before any works are carried out which would have the effect of demolishing, destroying, damaging, removing, repairing, altering, adding to, flooding or covering up a scheduled monument, although the act does not consider the settings of scheduled monuments. The *Infrastructure Planning (Decisions) Regulations 2010* require decision-makers to have regard to the desirability of preserving the scheduled monument or its setting.

9.2.4 The Secretary of State is required to compile a list of buildings of special architectural or historical interest under the *Planning (Listed Buildings and Conservation Areas) Act 1990*. The buildings included in this list are classified as Grades I, II* and II, and are accorded statutory protection. The *Infrastructure Planning (Decisions) Regulations 2010* require decision-makers to have regard for the desirability of preserving listed buildings, any features which contribute to their special interest and their settings.

9.2.5 Under the 1990 Act, areas of special architectural or historic interest can be designated as conservation areas, the character or appearance of which it is desirable to preserve or enhance. The *Infrastructure Planning (Decisions) Regulations 2010* require decision-makers to have regard for the desirability of preserving the character and appearance of conservation areas.

9.2.6 *The Hedgerow Regulations 1997* set out criteria for identifying important hedgerows and for a process of gaining consent for their removal. These criteria include a number of heritage-based considerations. Removal of an important hedgerow is deemed as permitted where a planning permission or DCO which would require removal of a hedgerow has been granted as detailed in The Infrastructure Planning (Miscellaneous Prescribed Provisions) Regulations 2015.

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Table 9.1 Legislation, National and Local Planning Policies relevant to Historic Environment

Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
Legislation:	
Ancient Monuments and Archaeological Areas Act (1979)	Changes to the fabric of scheduled monuments require consent from the Secretary of State, as advised by Historic England.
Planning (Listed Buildings and Conservation Areas) Act (1990)	Covers the registration of Listed Buildings (buildings that are seen to be of special architectural or historic interest) and designation of Conservation Areas (areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance).
National Planning Policy:	
Draft Airports National Policy Statement	The government issued the Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England in February 2017. Whilst this document focuses on the potential for an expanded Heathrow Airport it provides policy guidance as to how the impacts of airport development upon the historic environment should be considered. The Draft NPS is consistent with the NPPF, but emphasises the specific impacts that come from airport development. Paragraph 5.184 of the Draft NPS makes reference to noise impacts and how these affect the understanding and appreciation of heritage assets affected by the scheme. This paragraph refers to a methodology produced for Historic England detailed in Aviation Noise Metric – Research on the Potential Noise Impacts on the Historic Environment by Proposals for Airport Expansion in England (September 2014). This document provides a methodology for assessing noise impacts based upon plotting the area around an airport that would be exposed to a 60db noise, this is a level that interrupts normal speech. The assessment is based upon the sensitivity of heritage assets to noise. There are four suggested classes of asset where silence or reduced noise contributes to their significance are: Where solitude is intrinsic to the understanding of the form, for example a Cistercian Monastery or hermitage; Where specific, existing soundscapes contribute to the asset, for example working windmills, open air theatres, or cascades; Where abandonment of the asset creates a romantic atmosphere that silence contributes to, for example deserted medieval villages or ruinous houses; and Where the absence of modern sound contributes to the experience of an asset at a particular point in time, for example the abandonment of a monastic house. Effectively these four classes of asset are two classes, one where specific noises need to be heard to appreciate significance, and one where silence contributes to significance. Other types of asset, for example, an urban conservation area, silence or specific sounds, contribute less to their significance and could be scoped out. Once assets of the four types have been identified noise assessments would need to be made concerning the impact from the changing level of noise. A quantitative assessment would be made considering: How disturbing the noise is; How much new noise interferes with existing noise; and How often the disturbance occurs. This then enables a level of harm to be assessed against the significance of the heritage asset and assessed against the policy tests of the NPPF. As this methodology is detailed in a national policy document it would be applied to heritage assets within the 60db contour around Manston.
National Planning Policy Framework (2012) **Paragraph 128**	The NPPF does not set out the policy for the testing of Nationally Significant Infrastructure Projects (NSIPs). However, Section 12 relates to the Historic Environment and is consistent with the draft policies of the Draft Airports NPS. A positive strategy should be implemented for the conservation and enjoyment of the historic environment, including heritage assets most at risk through neglect, decay or other threats. Heritage assets should be conserved in a manner appropriate to their significance. Local authorities will require applicants to describe the significance of heritage assets including the contribution made by their setting affected by the application.
Paragraph 132	When considering the impact of a proposal on a designated heritage asset great weight should be given to the asset's conservation. The more significant the asset the greater the weight should be. Significance can be harmed or lost through alteration to the asset or development in its setting.
Paragraph 134	Where development will lead to less than substantial harm to the significance of the designated asset the harm should be weighed against the public benefit of the proposal.

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Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
Paragraph 135	The effect of a proposal on the significance of a non-designated heritage asset should be taken into account in determining the application.
Paragraph 139	Non designated archaeological heritage assets of demonstrably equivalent in significance to scheduled monuments should be managed as designated heritage assets.
Local Policies:	
Thanet District Adopted Local Plan (2008) saved policies **Policy HE11**	To determine planning applications the District may require the provision of an archaeological assessment which, in certain cases, may involve fieldwork.
Policy HE12	Archaeological sites will be preserved and protected. Where sites do not merit preservation planning permission will be granted subject to a suitable programme of archaeological recording.
Emerging Local Policies:	
Draft Thanet Local Plan to 2031 Preferred Options Consultation January 2015 **Policy HE01**	The Council will promote the identification, recording, protection and enhancement of archaeology and historic sites and encourage their potential though management and interpretation. Developers should submit suitable information to enable the impact of proposals to be assessed in the form of a desk-based assessment or field evaluation. Development adversely affecting the setting of a scheduled monument or equivalent archaeology of comparable significance will be refused. Where the Council is not seeking to preserve a site a suitable programme of recording will be required according to a written scheme of investigation detailing site works, post-excavation works and publication.
Policy HE03	The Council supports the retention of local heritage assets that will be identified in the local list as part of the heritage strategy.
Policy HE04	Permission will not be granted for any development that adversely affects the visual, historical or horticultural character of an historic park or garden whether or not it is on the statutory register.
Policy HE05	Works to address climate change by adapting heritage assets will be supported where the significance of the asset is not compromised.

Guidance

9.2.7 Historic England have produced guidance on how to assess the impacts upon the setting of heritage assets and the implementation of heritage policies from the NPPF. The Chartered Institute for Archaeologists (CIfA) has produced standards and guidance documents for the production of desk-based assessments and providing consultancy advice in the historic environment.

Table 9.2 Historic England and CIfA Guidance

Source	Summary description
Historic England **Managing significance in decision-taking in the historic environment (2015)**	Guidance from Historic England on how to implement the historic environment policies included in the NPPF.
Historic England **The Setting of Heritage Assets (2015)**	Guidance from Historic England demonstrating how to assess the impacts upon the setting of a heritage asset.

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Source	Summary description
CIfA **Standard and guidance for historic environment desk-based assessment (December 2014)**	Assessment will determine, as far as is reasonable, from existing records the nature, significance potential and importance of the historic environment with a defined area. The assessment will also assess the impact of the Proposed Development on identified assets, both designated and undesignated.
CIfA **Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment (December 2014)**	Advice provided should be clear, impartial, informed robust and compliant with policy and guidance. It should be proportionate, research and provide a reasoned argument assessing the known and potential significance of heritage assets impacted by the proposal.

9.3 Data gathering methodology

9.3.1 This section describes the desk study and surveys undertaken to inform the historic environment assessment.

9.3.2 The study area has been defined as follows:

- a 1km radius around the site of the Proposed Development; and
- additional data collected on significant sites beyond the 1km study area as identified in consultation with Kent County Council.

9.3.3 The following sources and data sets were consulted for the purposes of establishing the baseline:

- Kent County Council Historic Environment Record (HER);
- Kent County Council Historic Landscape Characterisation data (HLC);
- Historic England Archive (formerly National Monuments Record);
- Historic England National Heritage List for England spatial datasets;
- Historic England National Record of the Historic Environment (NRHE);
- Kent Archives and Local History Service;
- Kent County Council heritage maps;
- Thanet District Council conservation area mapping;
- documents submitted as part of the Stone Hill Park planning application (OL/TH/16/0550) including Appendix 10.1 Historic Environment;
- the zone of theoretical visibility produced for **Chapter 11: Landscape and Visual Impact**;
- historic Ordnance Survey mapping provided by Envirocheck;
- Natural England historic environment mapping provided at Magic.gov.uk;
- The library of the Society of Antiquaries of London; and
- Other published and online sources as necessary.

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9.3.4 Particular reference has been made to the working papers issued by Kent County Council as part of the development of the South-East Research Framework (SERF).

Desk Study

9.3.5 A baseline study has been undertaken in accordance with the principles laid down in the CIfA Standards and Guidance for Archaeological Desk-Based Assessments (CIfA 2014). This has been supported by the production of gazetteers of designated heritage assets, from the Historic England Archive, within the 1km study area (**Appendix 9.1**, **Figure 9.1**), and of other heritage assets and events, from the Historic England Archive and the Kent Historic Environment Record, from within the 1km study area with additional data collected on significant sites beyond the 1km study area as identified in consultation with Kent County Council (**Appendix 9.2**, **Figures 9.2** and **9.3**).

Survey Work

9.3.6 Site walkover surveys were conducted on 7th and 8th of March 2017 to support the assessment. These surveys comprised a visual inspection of the current site infrastructure and land uses.

9.3.7 Archaeological trial trenching in support of planning application OL/TH/16/0550 was in progress during the site walkover survey, which exposed some sequences of below ground deposits. Visible archaeology, including (not yet officially dated) pottery, pits, ditches and other occupation features, was observed in many of the exposed trenches indicating that there is archaeology extant on the site.

9.3.8 Access has not been granted for further intrusive investigations or assessment of historic structures within the site. Discussion has been held with Historic England and Kent County Council as to whether or not intrusive investigations and historic building study will be needed to inform the assessment in the Environmental Statement. If required, the scope of any works will be agreed with Historic England and Kent County Council.

Consultation

9.3.9 Since 2015 and throughout the undertaking of the survey and assessment work, RiverOak has engaged with consultees with an interest in potential historic environment resource effects. A scoping report (**Appendix 1.1**), including a chapter covering historic environment resources, was produced and submitted to PINS who provided a scoping opinion (**Appendix 1.2**).

9.3.10 Organisations that were consulted include:

- Kent County Council Heritage Conservation Group;
- The Trust for Thanet Archaeology;
- Planning Inspectorate (PINS);
- Historic England; and
- Thanet District Council.

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9.3.11 A summary of the consultee comments and responses provided is provided in **Table 9.3** below:

Table 9.3 Consultee comments

Consultee	Comments and considerations	How addressed in this PEIR
PINS	A study to scope potential direct effects on heritage assets outside the proposed site boundary, on the basis that direct effects can only arise from physical disturbance of assets. The Secretary of State considers that, the potential for direct effects arising from offsite works, if required, would require evaluation and therefore must be scoped in.	Assets outside the proposed site boundary are considered within the study area.
PINS	While PINS proposes to not include potential indirect effects to designated heritage assets outside of the 1km study area, the Secretary of State would like heritage assets within the Zone of Theoretical Visibility (ZTV) to be assessed as appropriate.	Significant assets which may experience an effect as a result of the Proposed Development beyond the 1km study area which were identified through consultation are included in the assessment.
PINS	The Scoping Report did not outline the extent of consultation and level of agreement with relevant consultees in regards to the historic environment assessment clearly. The Scoping Report noted that KCC and HE have agreed with an archaeological study of area of 500m radius around the site boundary. However it is not apparent if additional requests by KCC (that consideration be given to other archaeological sites [listed] beyond this radius, effects on above-ground aviation-related archaeology, and effects of flights on heritage assets) and HE (the inclusion of other additional baseline views, including from Richborough Castle and the Abbey in Minster) will be included in the assessment. The Secretary of State considers that they should be assessed.	The archaeological sites requested to be assessed by KCC and HE have been agreed and considered. These sites have been included in this report. The study area has been expanded from 500m to 1km radius around the site.
PINS	The Secretary of State recommends that the study areas be extended with the input of relevant consultees. The extension should be primarily informed by the ZTV prepared as part of the landscape and visual impact assessment (LVIA), rather than by an arbitrary buffer.	The study area has been expanded to a 1km radius around the site. Additionally, further study areas have been identified through consultation using assets beyond the 1km radius which may experience an effect as a result of the Proposed Development; these further study areas will be informed by the ZTV and assessed in conjunction with LVIA.
PINS	The rationale for selecting the heritage study areas and for deciding which features outside the selected study area will be assessed must be clearly explained in the ES.	The rationale for selecting the further study areas have been described here and will be fully detailed in the ES. Discussion of any additional study areas to support the ES will continue to be discussed in future consultation in advance of the ES.
PINS	The inter-relationships between the historic environment and landscape and visual impact assessment should be considered in both chapters.	LVIA and Historic Environment will continue to liaise during the ES process.
PINS	The Applicant's attention is drawn to the comments, contained in Appendix 3 of this Opinion, of KCC in relation to baseline environment surveys and potential impacts; and National Grid's comments about potential cumulative effects of the Proposed Development together with the Richborough Connection Project (RCP) on the historic environment.	Cumulative effects as a result of other developments will be considered during the ES process.

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Consultee	Comments and considerations	How addressed in this PEIR
KCC	Requests that the Kent Historic Environment Record, aerial photographs, and maps of the study area, along with other records, be used to produce the baseline study.	Data held by the Kent HER, including historic maps and aerial photographs, has formed the basis of the baseline study along with additional sources and archives as documented in Section 9.3.
KCC	Certain sites that lie outside the immediate study area need to be understood as they illustrate the character and richness of the archaeology that can be expected. The list set out at paragraph 8.4.1 is appropriate.	This list of sites has been included in this assessment.
KCC	So that the archaeological landscapes are properly articulated and extrapolated into the development site, historic assets should be clearly illustrated by phase and feature.	A phased site map will be produced to support the ES.
KCC	Archaeological evaluation in the field of the Proposed Development areas, in the forms of a site walkover, geophysical survey and targeted trial trenching, need to be undertaken to inform the study and planning of this proposal.	A site walkover was conducted and is described in Section 9.3.6. A geophysical survey has been carried out by another company and the results are part of the public domain and will be used to inform this study. Targeted trial trenching has recently been conducted by another company; when their results enter the public domain they will also be used to inform future studies.
KCC	The study should include a walkover to identify heritage assets related to the airfield (structural remains and earthworks) and their significance and the effect of the development on them should be explained. “The study should also consider how the airfield heritage and the airfield landscape can be used positively to create a historic sense of place and be integrated into the heritage tourism that the two on-site museums already offer.”	A site walkover was conducted and is described in Section 9.3.6. This walkover identified heritage assets related to the airfield and their significance and they form part of the assessment and consideration of the site.
KCC	Historic England and the Thanet District Council Conservation Officer will lead on the issues relating to the setting of designated heritage assets.	HE and TDC CO will be consulted on issues relating to the setting of designated heritage assets.
KCC	KCC requests that impacts on the former Wantsum Sea Channel be considered.	Impacts on the former Wantsum Sea Channel will be considered.
KCC	It is not clear how the potential impact of flight noise over heritage assets will be included in the assessment.	Methodology for assessing impact of flights on heritage assets will be provided.
KCC	KCC recommends that the Trust for Thanet Archaeology be contacted for resources for this study. As well the archives at the two museums at Manston be used.	The Trust for Thanet Archaeology has been consulted and will continue to be liaised with during the production of the ES. The archives of the two museums at Manston have also been consulted, in addition to the RAF museum based at Hendon and other sources.
HE	A comprehensive understanding of the baseline conditions is necessary in order to design proposals that will minimise harm to the historic environment and maximise and opportunities for enhancement that may exist. Once that work has been carried out, we recommend that the applicant should reassess their Master Plan in order to identify ways in which careful design could improve the outcome for the historic environment.	Liaison with the Masterplanning team will continue throughout the ES process.

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Consultee	Comments and considerations	How addressed in this PEIR
HE	No details were given in the Scoping Report as to the type of site investigation works that will be conducted in order to inform the assessment of effect.	Details of proposed fieldwork will be provided in the Environmental Statement.
HE	Effects on the settings of designated and non-designated heritage assets, within and outside the site boundary, should be assessed. Expect published guidance on the setting of heritage assets. Suggest that confirmation of approach to use photomontages with regard to the historic environment.	Effect on settings of designated assets within and outside site boundary to be considered. Accurate visual representations of the levels of possible harm should be presented. Approach to use of photomontages to be agreed with HE in advance.
HE	Other airfields developed in recent years have had varying degrees of success in achieving sustainable development that appropriately conserves their historic origins. HE suggests that other consideration of the success of previous developments be made to inform this application.	Other relevant recent airfield developments will be considered to inform this application.

9.3.12 In addition to this formal scoping consultation, informal consultations have been held with Historic England, Kent County Council and the Trust for Thanet Archaeology to establish the scope of the assessment. These have comprised meetings listed in **Table 9.4**.

Table 9.4 Summary of meetings with statutory consultees

Date of Meeting	Consultees	Key point of discussion.
5 May 2016	Simon Mason, Kent County Council (SM) Peter Kendal, Historic England (PK)	It was confirmed that, whilst the development is to be phased, the assessment will look at the total Proposed Development, based upon a completed masterplan. A draft Zone of Theoretical Visibility was presented, PK requested additional baseline views be considered including Richborough Castle and the Abbey in Minster Designated assets around the site should also be considered including Lord of the Manor, Ozengell Grange, Laundry Road and listed houses and farm buildings around the site. For the archaeology baseline a radius of 500m was agreed and significant sites outside this area would also be examined, including the East Kent Access Road, Southern Water Weatherless Pipeline, Ramsgate Causewayed Enclosure, Cliffsend Farm, Thanet Way duelling and Thanet Earth. SM stated the archaeology in Thanet is very close to the surface, especially on the central chalk plateau. Due to the 'gateway' nature of Thanet there is significant and unique archaeological heritage in the area. Manston Airport should be considered as a heritage asset in its own right, due to its foundation in WWI, and its continued use in WWII. The adoption of Manston by the United States Airforce during the Cold War and subsequent role as an RAF base provide later heritage significances for the site. PK requested that views of the runway from the museums should be maintained during redevelopment. It was confirmed the assessment would look at the operational aspects of the airport and how this impacts upon heritage assets. PK stated Historic England would look to agree a statement of common ground before DCO submission and would hope this could be signed by KCC.

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9.4 Overall Historic Environment baseline

Current baseline

Topography and geology

9.4.1 The Proposed Development site is mainly situated at an elevation between 45-50mAOD. The southern portion is located at an elevation of approximately 50mAOD, along the length of the existing runway, but rises to approximately 55mAOD in the western most corner of the site. North of the runway the site level falls to approximately 40mAOD, in the west, at the Spitfire Way Junction (crossroads of the Manston Road (B2050) and the Spitfire Way (B2190)), while remaining at 45-50mAOD in the northern most part of the site.

9.4.2 Telegraph Hill, at the west end of the site, is a high point in the surrounding landscape, while the existing runway is roughly sited along the length of a ridge running east from Telegraph Hill.

9.4.3 The site is underlain by bedrock Margate Chalk Member of the upper Newhaven Chalk Formation, overlain by the sands and silts of the Thanet Formation along the site's northern boundary. The superficial drift deposits overlying the site are variable, with some areas having no superficial geology (predominately in the south of the site) interspersed with areas of Head Formation, comprising Clay and Silt.

Designated Heritage Assets

9.4.4 A gazetteer of designated heritage assets is provided as **Appendix 9.1**, these are shown on **Figure 9.1**.

9.4.5 There are no World Heritage Sites (WHS) within the study area. The nearest WHS, Canterbury Cathedral, St Augustine's Abbey and St Martin's Church in Canterbury, is located 16km southeast of the 1km study area.

9.4.6 There are two Scheduled Monuments (SM) within the 1km study area which are both within close proximity to the site:

- An Anglo-Saxon Cemetery south of Ozengell Grange (List Entry 1004228) located 100m to the east of the site. Partial excavation since the mid-19th century has recorded over 100 Anglo-Saxon burials, many with grave goods, on or in the vicinity of the site. Further archaeological remains survive in the vicinity of this site but are not included because they have not been formally assessed (i.e. partial excavation near Ozengell Grange, to the north of the monument, has recorded several hundred Anglo-Saxon burials, which are likely to be part of the same inhumation cemetery); and
- Enclosure and ring ditches sited 180m east-northeast of Minster Laundry (List Entry 1004203) and located directly south of the A299 which forms the southern boundary of the site. The features recorded as crop marks on aerial photographs represent the surviving ditches of a Romano-British and Iron Age settlement.

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9.4.7 There are no listed buildings within the site, however there are 24 listed buildings surrounding the site within the 1km study area.

Table 9.5 Listed buildings within the study area

List Entry	Name	Grade	Direction and Distance from Site Boundary
1224593	Wayborough Manor	II*	570m to south
1224683	Cleve Court and Cleave Lodge	II*	220m to north west
1336669	Barn about 50m east of Ozengell Grange	II*	430m to north east
1085377	Ozengell Grange	II	400m to north east
1085409	53 and 55 Foad's Lane	II	820m to south
1085442	Grove Farmhouse and Walled Front Garden	II	500m to east
1085443	Remains of Monastic Building	II	35m to east
1085444	Barn at Preston Farm	II	680m to east
1085445	Barn at Manston Green	II	450m to east
1204244	Flete Lodge	II	580m to north east
1223803	Cheeseman's Farm	II	760m to north
1224336	Chapel House	II	480m to south
1224337	Psalm Cottage	II	920m to south west
1224339	Rose Cottage and Pansy Cottage	II	675m to south
1224448	Prospect Inn	II	150m to west
1224499	Bay Tree Cottage	II	950m to south west
1224545	Tudor Cottage	II	660m to south
1266885	Rose Cottage	II	920m to south west
1266887	Way House and Wayborough House, and attached Garden Wall	II	350m to south
1336624	Old Forge House	II	480m to east
1336625	Manston Court and adjacent Wall	II	60m to east
1336626	Granary about 25m south of Manston Court Farmhouse	II	50m to east
1429581	Eastern of two Concrete WWII 4-inch gun emplacements	II	950m to south east
1430779	Manston War Memorial	II	445m to east

9.4.8 There are no conservation areas within the 1km study area, however the conservation areas of Acol and Minster in Thanet are within 2km of the site.

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9.4.9 There are no Registered Parks and Gardens (RPG) within a 1km radius around the site. The nearest RPG is grade II* registered Goodnestone Park which is 11km beyond the 1km study area.

9.4.10 There are no Registered Battlefields in Kent.

Non-designated HER data

9.4.11 A gazetteer of non-designated heritage assets is provided in **Appendix 9.2**, these are shown on **Figure 9.2**.

9.4.12 There are over 800 previously identified non-designated archaeological features within the site and the 1km study area, including archaeological remains from the prehistoric through to the medieval period onwards, including various phases of use of the airport, which are evidence of long term human activity within the area.

9.4.13 A summary of the archaeological baseline is presented below. A full desk-based assessment will be produced to inform the Environmental Statement.

Prehistoric period (c. 780,000 BP – AD 43)

9.4.14 The prehistoric period encompasses the evolution from earlier pre-anatomically modern human and close human relatives to modern *Homo sapiens sapiens* as well as the transition from a nomadic itinerant hunter gatherer lifestyle to one of settled agriculture and pastoralism within a landscape enclosed by field boundaries.

9.4.15 Archaeological evidence relating to all of the prehistoric periods (Palaeolithic, Mesolithic, Neolithic, Bronze Age and Iron Age) has been recovered from the study area. This evidence mainly takes the form of unstratified find spots of isolated artefacts such as flint scatters; visible cropmarks indicating the locations of barrows, roundhouses, enclosures and field systems; or features encountered during archaeological investigation on the site and within the study area.

9.4.16 Two Palaeolithic flints have been found on the site (TR 36 NW 546, TR 36 NW 55), while Late Mesolithic flints have been recovered from the study area (TR 36 NW 439, TR 36 NW 504). A possible Neolithic enclosure and round barrow are recorded as cropmarks at the western end of the site (TR 36 NW 210).

9.4.17 Several artefact finds from the Bronze Age have been recovered from the site including a bronze blade and other bronze fragments which may represent a former hoard since dispersed by ploughing (TR 36 NW 193). Unstratified Bronze Age pottery was recovered during evaluation trenching of the passenger and cargo side taxiways and aprons at the airport (TR 36 NW 470). Eleven pieces of worked Bronze Age flint redeposited into later features were identified during evaluation prior to the construction of the EDF Substation on the very northeast corner of site (TR 36 NW 487).

9.4.18 Bronze Age sites located within the site of the Proposed Development include the location of a probable round barrow which was partly excavated in 1985 although no finds or features were revealed (TR 36 NE 54); a barrow located at the east end of the runway which was examined in 1944 after being damaged during the (WWII) and which revealed two burials of probable Bronze Age data although no

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dateable material was recovered during the excavation (TR 36 NW 34); and a curving ditch containing pottery dating to c.1000 BC (TR 36 NW 466).

9.4.19 A variety of evidence from the Iron Age has been found on the site. Iron Age pottery was recovered during evaluation works on the passenger side of the airport (TR 36 NW 469). A pit containing a rim sherd of flint gritted pottery was found during excavations at Laundry Road on the southern edge of the site in 1995 (TR 36 NW 382). A concentration of early Iron Age pits and other features was found under the far eastern end of the Manston Airport runway (TR 36 NW 35). Finally, an extensive late Iron Age and early Roman settlement was revealed during evaluation works in advance of the construction of a new car park at the Airport (TR 36 NW 1176).

9.4.20 Beyond the prehistoric evidence identified on the site itself, the wider study area includes a large amount of prehistoric archaeology, including find spots of flint and metal artefacts as well as the sites of burials, cemeteries and settlements.

Roman

9.4.21 The Roman period is characterised by dense settlement patterns and proliferation of Roman structures throughout the south east including several roads, Roman forts and settlements.

9.4.22 The potential location of a Roman Road follows the modern route of the A299 along the southern boundary of the site, and this route is marked by a large scatter of Roman finds and inhumation and cremation burials along its length within and just to the south of the site (TR 36 NW 187, TR 36 NW 188). An extensive Romano-British industrial and settlement site was found during the construction of a gas pipeline in 1984 along the southern edge of the Airport site (TR 36 NW 182). Further Romano-British settlement evidence was reportedly found during westward expansion of the runway during the WWII (TR 36 NW 209) while Roman ditches, gullies, pits and cremations were found as a result of the East Kent Access Route excavations in 2009-2011 (TR 36 SW 405). A Roman pit with a hearth in the base was found during excavations on the cargo side of the airport in 2000 (TR 36 NW 467).

Early Medieval

9.4.23 Anglo Saxon activity in the area is indicated by the Scheduled Monument of Ozengell Grange Anglo-Saxon inhumation cemetery (1004228).

9.4.24 At the western end of the site, a small barrow and linear features visible as cropmarks have been identified as Anglo-Saxon as a result of Anglo-Saxon finds made in close proximity (TR 36 NW 214). Various early medieval finds from the site include an early-medieval bead and iron knife (TR 36 NW 216), a silver early penny ('sceat') (TR 36 NW 498), a Merovingian gold tremissis (TR 36 NW 499) and fragments of mid-Saxon to medieval pottery (TR 36 NW 471).

Medieval

9.4.25 The first documentary evidence for settlement in the vicinity of the site comes from the medieval period, with the earliest settlement noted at Minster while settlement at Manston likely dates from the 12th century (VCH, Kent, Vol 2). Medieval

trackways are visible on both historic mapping, shown as Dunstrete, and through geophysical survey of the site recently completed in support of the planning application OL/TH/16/0550.

9.4.26 Medieval finds from the site include pottery, a medieval copper alloy buckle and features including ditches and pits indicating medieval occupation of the site (TR 36 NW 471, MKE80179, TR 36 NW 468).

Post Medieval

9.4.27 The post medieval period sees agriculture competing with quarrying activity, mainly for chalk but also targeting flint and clay, including the mid-18th century Manston Caves chalk mine on the eastern part of the site (TR 36 NW 437, TR 36 NW 1125).

9.4.28 A large number of post medieval Farmsteads are known from this period within the study area (i.e. MKE87021, MKE88749, MKE87023), including Foster's Folly on the eastern edge of the site itself, close to the terminal buildings, which was a loose courtyard plan farmstead with buildings to two sides of the yard (MKE87020).

9.4.29 Two windmills used for flour production were located on the site from 1839; they were removed by 1907 (TR 36 NW 1107, MKE91767).

Modern

9.4.30 The airport has its origins just prior to World War I and was later used extensively in WWII, with the remains of the WWII RAF Battle HQ still extant in the north of the site (MKE98027). During the early period of the Cold War until 1960, the site was used by fighter-bombers of the United States Airforce. In the 1960s the airport was returned to RAF use and subsequently became a commercial use airport.

9.4.31 The airport has the potential for remains from all periods of its use, especially for the WWII airfield, the perimeter defences, pillboxes and trenches, which have been identified in the Kent Historic Environment Record.

Archaeological Events

9.4.32 A gazetteer of archaeological events is provided in **Appendix 9.2**, these are shown on **Figure 9.3**.

9.4.33 There has been an extensive and lengthy programme of archaeological investigations undertaken within the study area. Archaeological work within the peninsula has revealed notable archaeological remains from all periods and provided evidence for settlement, burial and agricultural production.

9.4.34 Previous Events – Within Site Boundary

Table 9.6 Previous archaeological investigations within the Site Boundary

Title	When	Who	Details
Manston Aerodrome 639613	1944	Ministry of Works	Bronze Age features were excavated during the 'Excavation on Defence Sites 1939-1945' project. A mostly destroyed ring ditch

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Title	When	Who	Details
			of a barrow and two burials were examined (TR 36 NW 34). No grave goods were recovered. Report: Grimes, W. F., 1960 *Excavations on Defence Sites 1939-1945,* Pages 1-248
Way/Manston Airfield 639598	1944	Ministry of Works	A possible Iron Age to Roman Age industrial settlement (TR 36 NW 182) was excavated after archaeological remains were identified during construction of the Monkton gas pipeline. The site included pits, a ditch, a wall foundation, and smaller finds such as a plumb bob, bronze pins, iron slag, Potin coins, and bones. Pottery dating to the late 14th century and 16th to 17th century was also found. Report: Grimes W. F., 1985, *Kent Archaeological Society, Archaeologia Cantiana: being contributions to the history and archaeology of Kent,* Vol 102, Page 59
Thanet Gas Pipeline, Phase I EKE3995	1971	Canterbury Archaeological Trust	Excavation for North Sea gas pipeline. 30 sites were investigated, of which 28 were previously unrecorded. The sites range in date from the Iron Age to Medieval period and include the Jutish Cemetery (TR 26 NE 13). Report: Operation Gas Pipe: Thanet Section (1973) No. 30 pages 298-301
Lord of the Manor 639618	1976-7 & 1977-82	Isle of Thanet Archaeological Unit	Excavations of a Neolithic enclosure, and Bronze Age barrow and ring ditch (TR 36 NE 132. Reports: 1977, *Kent Archaeological Society, Archaeologia Cantiana: being contributions to the history and archaeology of Kent,* Vol 92, Pages 245-5 Isle of Thanet Archaeological Unit Publication – Interim report
Monkton Gas Pipeline: Phases III- IV EKE4199	1983-4	Isle of Thanet Archaeological Unit	This pipeline follows the southern boundary of the site and archaeological remains from the Prehistoric to Post Medieval Period were exposed during construction. Associated monuments include a Neolithic pit (TR 26 NE 86), Bronze Age blade and fragments (TR 36 NW 193), burials and a cemetery from the Roman to Early Medieval to Anglo-Saxon Periods (TR 36 NW 186, 187 and 189), a Roman Age industrial/settlement site (TR 36 NW 182), and an Iron Age settlement site (TR 36 NW 190). Reports: Perkins, D. R. J., 1984, *The Thanet gas pipeline Phase III 1983,* 78 page 180 (article in serial) and Perkins, D. R. J. 1986, *The Monkton Gas Pipeline: Phases III & IV 1983-84,* CII pages 43-69 (article in serial)
Cliffs End 639614	1984	Isle of Thanet Archaeological Unit	During excavation to lay the Monkton-Ramsgate gas pipeline remains of a late Iron Age (possibly continuing into the early Roman period) settlement were encountered (TR 36 NW 190). The pipeline construction cut through pits and exposed animal bone, shells, and pottery sherds. Report: Perkins, D. R. J., 1985, *Kent Archaeological Society, Archaeologia Cantiana: being contributions to the history and archaeology of Kent,* Vol 102, Pages 63, 64-5
Thorne Farm 639609	1984	Isle of Thanet Archaeological Unit	A Roman cemetery and an Early Medieval cemetery were excavated during construction of the Monkton pipeline. The Roman Age cemetery included five inhumations and four cremation burials and grave goods (TR 36 NW187). The Anglo-Saxon cemetery was dated to the late 6th to mid 7th century and was three burials, with one grave covered by what may have been a small boat (TR 36 NW 186). Report: Perkins, D. R. J., 1985, *Kent Archaeological Society, Archaeologia Cantiana: being contributions to the history and archaeology of Kent,* Vol 102, Pages 52-4, 58-61, 63, 66-9
Watching Brief on the Sparrow Castle – Manston Water Pipeline/ Sparrow Castle to Manston Pipeline, Birchington EKE 8131	1989	Trust for Thanet Archaeology	Iron Age, Roman period, WWII, and undated archaeological features were encountered during monitoring of pipeline construction. Significant finds include Iron Ages pits containing pottery (TR 36 NW 368), Roman enclosures (TR 36 NW 205) and Roman Pits (TR 36 NW 369).

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Title	When	Who	Details
660252			Report: Trust for Thanet Archaeology, 1989, *An Archaeological Watching Brief on the Sparrow Castle – Manston Water Main* (unpublished document)
Geotechnical work at Manston Airport EKE11465	1999	Foundation and Exploration Services	During geotechnical work associated with the cargo hangers and apron taxiways, five boreholes and ten trial pits were dug. Report: Foundation and Exploration Services, 1999, *Kent International Airport Cargo Hangers and Apron Taxiways: Factual report on ground investigation.*
Evaluation of passenger and cargo side taxiways and aprons, Manston EKE11793	2000	Trust for Thanet Archaeology	Open area and trench excavations were conducted in four areas, resulting in the identification of archaeological features dating from the Bronze Age to the Medieval Period (TR 36 NW 466-471). Report: Trust for Thanet Archaeology, 2001, *London Manston Airport, Manston, Thanet, Kent: Archaeological Evaluations and Investigations of Passenger and Cargo side Taxiways and Aprons* (unpublished document)
189 Ramsgate Road, Broadstairs 1434919	2002	Trust for Thanet Archaeology	Prehistoric features and an Iron Age site where identified during excavation of a proposed residential development. Report: Trust for Thanet Archaeology, 2002, *189 Ramsgate Road, Broadstairs, Kent: an archaeological evaluation*
Survey of a Second World War air raid shelter, Manston EKE13134	2004	Kent Underground Research Group	While working near the Manston Airport terminal building, contractors broke though into a deep air raid shelter. A chalk cut shelter, most likely dating to 1940, was recorded (TR 36 NW 518). Report: Kent Underground Research Group, 2005, *Caves and Tunnels in South East England – Part 17* (unpublished document).
Trial trenching evaluation at the site of a new car-park, Manston Airport	2004	Swale and Thames Archaeological Survey Company	A series of multi-phase enclosures and a late Iron Age to early Roman Period settlement were encountered during excavations, which included 52 trial trenches (TR 36 NW 1176). Reports: Swale and Thames Archaeological Survey Company, 2004, *Archaeological evaluation of land east of the Kent International Airport, Manston, Isle of Thanet, Kent*
EDF Substation Site 1410715	2005	Museum of London Archaeology Service	Five trenches were excavated across the proposed substation location and identified Bronze Age flints, an undated post hole, and an undated pit. This work was informed by an earlier desk-based assessment. Report: Museum of London Archaeology Service, 2005, *EDF Substation, Manston, Kent: an archaeological evaluation report*
Excavation of area prior to pipe installation, Margate to Broadstairs EKE13336	2005	Wessex Archaeology	Over 600 archaeological features were recorded during work related to the construction of pipeline. The features date to all periods form the Neolithic to WWII (TR 36 NE 675, 676, and 677). Report: Wessex Archaeology, 2006, *Margate and Broadstairs Urban Wastewater Treatment Scheme*
Excavations along the route of the East Kent Access route (A256) EKE13407	2009-11	Oxford Wessex Archaeology Joint Venture	Field survey, evaluation trenching, and large-scale excavations were undertaken along the East Kent Access route. The excavations identified and recorded archaeological features and finds dating from the Palaeolithic through to WWII. Report: Oxford Wessex Archaeology Joint Venture, 2011, *East Kent Access (Phase II), Thanet Kent: Post-Excavation Assessment Volume 1*
Survey of Buildings and Structures Associated with Manston Airport and the Surrounding Areas	2016	Kent County Council	A survey commissioned by Kent County Council's Heritage Group, which is designed to provide an updated historic and strategic context for Manston airport and highlight extant buildings and structures in and around Manston airfield for inclusion to the Historic Environment Record.

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Table 9.7 Previous archaeological investigations within the 1km Study Area

Title	When	Who	Details
Excavation of a Beaker Burial from Manston EKE8123	1987	Isle of Thanet Archaeological Unit (with Trust for Thanet Archaeology)	Excavation of a Late Neolithic/Early Bronze Age barrow (TR 36 NE 182) and Late Bronze Age/Early Iron Age pits and postholes within the barrow (TR 36 NE 406). Report: Perkins, D. R. J. & Gibson, A. M., 1991, *A Beaker Burial From Manston, Near Ramsgate.* Vol CVIII Pages 11-27
Monkton to Mount Pleasant (A253 Duelling) EKE8121	1994-5	Canterbury Archaeological Trust (with Trust for Thanet Archaeology)	Archaeological investigation in advance of widening of the A253. Post holes and associated beaker burials and a ring ditch (TR 26 NE 239 & 240), all dating to the Late Neolithic to Early Bronze Age, a 12th century farmstead and associated features (TR 26 NE 168), and a defensive World War II slit trench (TR 26 NE 238) were identified during the investigation. Reports: Canterbury Archaeological Trust, 1996, *Canterbury's Archaeology 1994-1995.* English Heritage Scheduling Section, 1999, *Anglo-Saxon Cemetery and Associated Remains at Monkton, 550m North of Walters Hall Farm*
Excavation at Kent International Park, Manston 1997 EKE8388	1994-7	Trust for Thanet Archaeology	Archaeological investigations were undertaken prior to development at Kent International Business Park. Archaeological remains excavated include Neolithic to Early Bronze Age features and finds (TR 36 NW 397), an Iron Age enclosure and associated features and finds (TR 36 NW 359), Medieval farmstead (TR 36 NW 246), a WWII slit trench (TR 36 NW 398) and a RAF bombing range used in the 1930s (TR 36 NW 399). Report: Trust for Thanet Archaeology, 1997, *Kent International Business Park, Manston 1994-97* (unpublished document)
Evaluation at Laundry Road, Minster EKE8122	1995	Isle of Thanet Archaeological Unit (with Trust for Thanet Archaeology)	Evaluation trenching along Laundry Road included the excavation of a Late Neolithic to Middle Bronze Age settlement and ditched enclosure (TR 36 NW 177), an Early Medieval or Anglo-Saxon inhumation burial in an irregular shallow pit (TR 36 NW 383), and an Iron Age pit with mammal remains and pottery sherds (TR 36 NW 382). Report: Trust for Thanet Archaeology, 1995, *Archaeological Evaluation at Laundry Road, Minster, Isle of Thanet* (unpublished document)
Evaluation on Land Adjacent to No.6 Laundry Road, Minster, Thanet EKE8342	1996	Trust for Thanet Archaeology	Evaluation conducted on land adjacent to No. 6 Laundry Road, which resulted in no significant archaeological finds. Report: Trust for Thanet Archaeology, 1996, *Archaeological Evaluation of Land Adjacent to No.6 Laundry Road, Minster, Isle of Thanet*
Excavations of an Iron Age pit and a Roman cave, Spratling Court Farm chalk pit, Manston EKE12956	1996-2007	Colin A. Baker	A Middle Iron Age chalk quarry pit and a Roman cave were observed in the section of a modern chalk pit (TR 36 NE 635 & 637). Worked flints and pottery, dated from the Late Mesolithic to Late Bronze Age, were found in association with the pit and cave (TR 36 NE 636). The original discovery was made in 1996 with additional work undertaken 2003-2008. Report: Colin A. Baker, 2010, *Excavations of an Iron Age pit and Roman cave at Manston in the Isle of Thanet: A report of stratigraphic and archaeological investigations at Spratling Court Farm chalk quarry, Manston, Kent, 1996-2007.*
Watching Brief on Margate & Broadstairs WTW Enhancement Scheme EKE5692	2000	Wessex Archaeology	No archaeological remains were found during a watching brief carried out on geotechnical trail-pitting. Report: Wessex Archaeology, 2000, *Margate & Broadstairs WTW Enhancement Scheme. Archaeological Watching Brief During Site Investigation*
North Kent Coast Rapid Coastal Zone Assessment Survey Phase II: Field Assessment (Pilot) 46565 EWX8094	2002	Wessex Archaeology	First part of the pilot study, which involved non-intrusive field and photographic surveys and identified numerous archaeological features. Report: Wessex Archaeology, 2002, *North Kent Coast Rapid Coastal Zone Assessment Survey Phase II: Field Assessment (Pilot)*

Title	When	Who	Details
Watching brief at Bradgate Caravan Park, Manston Court Road, Margate EKE11851	2002	Trust for Thanet Archaeology	Monitoring of road construction; no significant archaeological features or finds were observed, though a colluvial deposit was recorded which contained worked flints and medieval pottery. Report: Trust for Thanet Archaeology, 2003, *Bradgate Caravan Park, Manston Court Road, Margate, Kent: Evaluation and Watching Brief* (unpublished document)
Building survey of buildings at Manston Court Farm EKE12790	2004	Holt and Wooton Ltd	A survey of farmyard buildings, including Manston Court (Farmstead MKE87018). Report: Holt & Wotton, 2004, *Manston Court Farm Historic Building Report* (unpublished document)
Survey of buildings at Grove Farm, Manston EKE12055	2004	Trust for Thanet Archaeology	A survey of a farm building prior to demolition (TR 36 NW 1017). The barn is dated to 1702 AD and was formally a listed building. Reports: Trust for Thanet Archaeology, 2004, *Grove Farm, Manston Road, Manston, Kent: Archaeological Evaluation Report* Trust for Thanet Archaeology, 2005, *Grove Farm, Manston Road, Manston, Kent: Archaeological Assessment Report* (unpublished documents)
Survey, North Kent Coastal Zone: Phase II, Year Two 56751 EWX8626	2005	Wessex Archaeology	Numerous archaeological remains were identified and recorded during non-intrusive field surveys. Wessex Archaeology, 2002, *North Kent Coast Rapid Coastal Zone Assessment Survey: Phase II: Field Assessment Year 2 Report* (unpublished document)
Building survey of a pillbox on Manston Road allotments, Ramsgate EKE12291	2007	The Historic Environment Consultancy	Prior to demolition, a WWII Type 24 infantry pillbox was recorded (TR 36 NE 566). Report: The Historic Environment Consultancy, 2007, *Building Recording: Pillbox, Manston Road Allotments, Ramsgate*
Watching brief on land adjacent to 19 Mount Green Avenue, Cliffsend EKE12141	2007	Trust for Thanet Archaeology	During a watching brief on groundworks for piling, a ring-beam and a soakaway pit, archaeological features, indicating settlement in the prehistoric period, dating from the Neolithic to Early Bronze Age, were encountered (TR 36 SW 130). Report: Trust for Thanet Archaeology, 2007, *Land Adjacent to 19 Mount Green Avenue, Cliffsend, Ramsgate: Archaeological Watching Brief Report* (unpublished report)
Watching brief on geotechnical test pits on the East Kent Access route EKE12316	2008	Trust for Thanet Archaeology	During monitoring of geotechnical test pits several Prehistoric, Bronze Age, Iron Age and undatable features were identified, including ditches and a shell midden (TR 36 SE 720, TR 36 SW 235, 236 & 237). Report: Trust for Thanet Archaeology, 2008, *East Kent access Phase 2: Archaeological monitoring of Test Pits* (unpublished document)
Archaeological evaluation at Thorne Farm, Kent EKE13367	2013	Wardell Armstrong Consulting Group	Archaeological evaluation undertaken at Throne Farm identified one early Iron Age ditch, three undated ditches and a possible Roman inhumation (TR 36 NW 109). Wardell Armstrong Archaeology, 2013, *Thorne Farm, Kent: Archaeological Evaluation Report*

Future baseline

9.4.35 Change to the baseline is anticipated during the period that the Proposed Development would be built. An understanding of these changes is necessary in order to fully understand the effect of the Proposed Development. The majority of these changes would not give rise to any direct effects within the site, but would present a degree of cumulative change within the setting of heritage assets which needs to be considered. These changes are considered in more detail in the relevant assessments as appropriate, but key consideration in this respect include:

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- Land north of Steven & Carlotti, Ramsgate Road Materials Recycling Unit
- Thanet Road Solar Farm, Ramsgate Road
- Stevens & Carlotti Solar Farm Ramsgate Road
- Sandwich Tidal Flood Defences
- Solar Farm, Ebbsfleet Farm Ebbsfleet Lane
- Anaerobic Digester, Ebbsfleet Farm, Ebbsfleet Lane
- Richborough Energy Par, Peaking Plant,
- Richborough Power Station
- Discovery Park Biomass Plant, Ramsgate Road, Sandwich
- Discovery Park Foodstore, Ramsgate Road, Sandwitch
- Woodlands Farm Solar Farm, Sturry
- South Easter Water Reservoir at Broad Oak
- Strategic Development Site SP3 Site 2: Sturry and Broad Oak
- Strategic Development Site SP3 Site 8: Land North of Hersden
- Sturry Link Road
- Canterbury substation and associated works
- New substation and converter station and converted station

9.5 Environmental measures incorporated into the Proposed Development

9.5.1 This section lists the environmental measures relevant to the historic environment which have been incorporated into the Proposed Development.

9.5.2 How these environmental measures influence the assessment of significance is discussed in **Section 9.6**. However the broad approach adopted is that where achievable and agreed environmental measures have been incorporated into the Proposed Development, the effect that those environmental measures have on the significance of potential effects is taken into account during the assessment. In some cases a potential effect may require no further consideration following incorporation of appropriate environmental measures.

9.5.3 A summary of the environmental measures that have been incorporated into the Proposed Development to date in order to avoid, reduce or compensate for potential adverse effects on historic environment features during the construction phase is provided below in **Table 9.7**.

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Table 9.8 Rationale for incorporation of environmental measure in the construction phase

Potential receptor	Predicated changes and potential effects	Incorporated measure
Non-designated heritage assets of archaeological interest	Disturbance or removal of assets could give rise to loss of archaeological interest	Design of scheme to avoid likely locations of greater archaeological potential on site. Harm or loss of archaeological interest could be mitigated by archaeological investigation. An appropriate Written Scheme of Investigation (WSI) would be agreed with KCC Heritage.
Designated Heritage Assets	Change to setting arising from visibility of new buildings at the airport can harm the contribution made to the significance of heritage assets by that setting.	Harm arising from new buildings, or increased scale of buildings could be mitigated by additional planting or screening and the treatment of the airport boundary in specific places.
Historic Landscape Character, designated assets and current heritage uses within the airport boundary.	Changes to the layout of the airport arising from the visibility of construction works, demolition and access. Potential changes to location of heritage uses within the airport.	Removing temporary construction features to restore plan and character of airport where possible. Where this is not possible historic airport landscape features should be recorded according to an appropriate method agreed with KCC Heritage. Where the museums require relocation provision should be made to ensure new locations retain a view of part of the runway.

9.5.4 A summary of the environmental measures that have been incorporated into the development proposals to date in order to avoid, reduce or compensate for potential adverse effects on heritage assets during the operational phase is provided below in **Table 9.8.**

Table 9.9 Rationale for incorporation of environmental measures in the operational phase

Potential receptor	Predicated changes and potential effects	Incorporated measure
Designated heritage assets including Historic Buildings, scheduled monuments and conservation areas.	Change in setting due to construction of new buildings at the airport and uses such as aircraft stands. Potential impact from airport noise upon the setting of heritage assets and subsequent impact upon the significance of assets.	Landscaping, boundary treatment or screening to reduce views into the airport. Incorporated noise attenuation measures within the airport boundary to reduce noise effects at boundary. Mitigation measures, potentially including timing of flights to reduce impacts upon surrounding heritage assets.

9.6 Scope of the assessment

9.6.1 This section sets out information on:

- the process whereby receptors are identified;
- the potential receptors that could be affected by the development; and
- the potential effects on receptors that could be caused by the development.

9.6.2 The scope of assessment has been informed by:

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- the scoping study;
- consultee responses to the Scoping Report;
- the results the work detailed in Section 6.4; and
- the finalised Proposed Development design.

Approach to identifying receptors

9.6.3 The identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study for the site location.

9.6.4 In some cases, even without quantified information, it is reasonable to assume that some potential receptors will not experience significant effects. This is sometimes the result of tried and trusted mitigation measures that have been incorporated into the Proposed Development, which might reasonably be expected to be effective (**see Section 9.5**).

9.6.5 The following considerations have been taken into account in identifying potential receptors:

- The extent to which the receptor will be affected by changes that are expected to result from the development;
- The sensitivity of the receptors to the changes that are likely to occur;
- The likely magnitude, duration and other characteristics of the effects;
- The importance or value of the receptor at a local, regional and national level; and
- Relevant best practice and guidance where specialist methodologies have been developed as detailed below.

Direct effects

9.6.6 Direct effects on heritage assets are those which result from physical damage or disturbance which gives rise to a loss of heritage significance. Consequently, it is only those assets which might be physically disturbed by (i.e. within the footprint of) the Proposed Development and associated enabling works such as, intrusive surveys, site compounds and access tracks which are potentially subject to direct effects. As archaeological features are not always evident, a desk-based assessment will be produced to examine this potential for, and the potential locations of, archaeological heritage assets compared to the Proposed Development layout in order to ascertain the potential for heritage assets to be affected. As conclusions from desk-based assessment are predictive and probabilistic, there are some cases where the potential presence of heritage assets or their significance remains difficult to state with confidence. It has been noted where further survey work to ascertain this potential would allow a robust assessment of effects to be set out.

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Indirect effects

9.6.7 Indirect effects are defined here as those which result in change to heritage significance but do not give rise to physical damage or disturbance to the asset. In this context, these effects will generally arise through change to the settings of heritage assets. Setting is not explicitly defined in statute. It is defined in the NPPF as:

- "The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve."

9.6.8 Historic England guidance follows this definition, and sets out a methodology for considering any effects on the significance of heritage assets arising from change to setting.

9.6.9 Assessment of settings is primarily associated with designated heritage assets or non-designated heritage assets of equivalent significance (where such assets are identified). The scope of the assessment has been established with reference to a Zone of Theoretical Visibility (ZTV) of the Proposed Development, a desk-based appraisal and subsequent site visits to identify those assets with settings which might be sensitive to change arising from development. This process of identification of assets and their significance at scoping follows Step 1 of the 5-step sequential process set out in Historic England guidance.

Potential receptors

9.6.10 The identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study for the site location.

9.6.11 This section identifies the potential receptors that have been identified based on the above factors and on the consultation response received from PINS. The receptors listed in **Table 9.9** are considered capable of being significantly affected and will therefore be taken forward for further assessment.

Direct Effects

9.6.12 There are a number of previously identified archaeological heritage assets which could be affected by the Proposed Development. Due to the scale of archaeological remains identified within the site and in the immediate area the likely periods of archaeology to be represented within the site have been summarised in **Table 9.9**.

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Table 9.10 Potential receptors

Receptor	Distance from site boundary	Reason for selection
Prehistoric Archaeology	Within site and in the vicinity of the site	Prehistoric archaeological remains dating from the early Neolithic have been identified within the site. Oher prehistoric remains from later periods have also been identified, together with what is apparently much of a bronze-age landscape. In the area outside the site there is evidence for occupation and use of the landscape from all prehistoric periods. In particular flint implements from the Lower to Middle Palaeolithic have also been found
Roman Archaeology	Within the site and in the vicinity of the site	Roman archaeology has been identified within the site and in the area around the site the form of settlement evidence agricultural use of the landscape and burials. Within the wider landscape the presence of the Saxon Shore fort at Richborough and extensive archaeological finds from this period across the Thanet area confirm the presence of material from this period
Anglo-Saxon Archaeology	Within the site and in the immediate area	Finds of Anglo-Saxon artefacts within the site indicate occupation and use of the landscape from this period. Within the vicinity of the site burial grounds demonstrate this. The documented early history of Minster, to the south of the site confirms the presence of settlement in the area from this period.
Medieval	Within the site and in the surroundings	Within the site are the documented remains of medieval buildings and the exploitation of the wider landscape during this period would have included the area of the airport. Settlement in the area around the site includes villages, hamlets and isolated farms that will have origins in the medieval period.
Post medieval	Within the site and in the surroundings	The post-medieval use of the area follows a similar pattern to the settlement structure and hierarchy established during the medieval period, with a landscape of villages, hamlets and discrete farms in the surrounding of the airport and within the site.
The airport	Within the site	The airport has had, broadly, five phases of use. It was established during the First World War and reused in WWII. After the war the United States Airforce converted Manston to a Cold War air base and the site was later used by the RAF before turning to commercial use. Each of these phases of use will have left archaeological remains and upstanding features, such as pillboxes. The layout of the airport and buildings relates to the phases of development of the site.

9.6.13 There is also a potential for previously unrecorded archaeological features to be present across the area within the site boundary. This is considered further in the baseline description and in the assessment of effects.

Indirect Effects

9.6.14 The heritage assets identified within the data search comprise a number of different asset types with differing characteristics. Where the settings of assets share common defining characteristics, either through geographical/spatial location or through thematic links, they are considered as a group, with effects on specific structures considered as appropriate.

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9.6.15 The scoping assessment considered non-designated as well as designated heritage assets as potential receptors of significant indirect effects. Designated heritage assets identified as potentially subject to significant adverse indirect effects comprise the following:

- assets within the 1km study area as detailed in table 9.5;
- two scheduled monuments within the 1km study area, the Anglo-Saxon Cemetery south of Ozengell Grange (List Entry 1004228) and Enclosure and ring ditches sited 180m east-northeast of Minster Laundry (List Entry 1004203);
- Ramsgate, Broadstairs, Minster and Acol Conservation Areas; and
- Richborough Roman Fort.

9.6.16 The desk-based assessment will examine heritage assets present within the 60db noise envelope likely to be produced by the airport. The methodology for this study will be based upon that detailed in Historic England's Aviation Noise Metric Study.

9.6.17 The potential for change to setting to give rise to harm of significance to other designated and non-designated archaeological heritage assets was considered within the scoping opinion and will not be assessed further. Some comprise assets which share common features with assets discussed above but will not be affected either by virtue of intervening screening or increased distance from the Proposed Development.

Spatial and temporal scope

9.6.18 The spatial scope comprises the 1km agreed study area as well as significant sites outside the study area which require inclusion in the baseline as identified through discussion with HE and KCC.

9.6.19 The construction period of the Proposed Development will take place over four construction phases. Operational effects will concentrate on Year 20 after development when operations at the Airport will have reached their peak.

Potentially significant effects

9.6.20 The potentially significant effects from the Proposed Development, which are subject to further discussion in this chapter, are summarised below.

- Potential direct effects on undesignated and previously unrecorded heritage assets within the proposed site boundary. These effects would arise from the construction phase of the Proposed Development and could include the disturbance or removal of archaeological remains by intrusive groundworks or pilling;
- Potential direct and indirect effects on the heritage significance of the airport and surviving assets relating to World War One, interwar, WWII and Cold War uses of the site. These effects could arise from losses or changes to existing heritage assets as a result of the construction of the Proposed Development, or to changes of the site as a result of the operational phase;
- Potential indirect effects on the settings and views of designated and undesignated heritage during the construction phase of the Proposed

Development. These effects may arise from the effects of construction activities and equipment such as cranes and the concrete/asphalt batching plants;

- Potential indirect effects on the settings and views of designated and undesignated heritage during the operational phase of the Proposed Development. These effects may arise as a result of the changes to the landscape and views as a result of visibility of the new buildings and other elements of the project in views of and from heritage assets;
- Potential indirect effects on designated and undesignated heritage assets from the operational phase of the Proposed Development. These potential effects on the settings of these assets would arise from the effects from overflights by aircraft; and
- Potentially the Proposed Development might involve the relocation of museum assets within the airport boundary. The museums will be retained, and potentially enhanced. KCC has expressed concerns that the two museums, or new heritage area, retain a view to the airport runway.

9.7 Assessment methodology

Methodology for predicted effects

9.7.1 To understand the significance of direct effects, the presence of any heritage assets that are known to be, or could potentially be, within the area that will be disturbed by the Proposed Development have been assessed. Comparison of the distribution of known and potential archaeological features within the proposed 1km study area allows the potential extent and nature of any direct disturbance to be characterised.

9.7.2 The methodology adopted for the assessment of effects arising from change in setting follows the approach set out by Historic England in 'The Setting of Heritage Assets' Historic Environment Good Practice Advice in Planning: 3 (July 2015).

Significance evaluation methodology

9.7.3 The assessment of significance of any effect on a heritage asset is largely a product of the heritage significance of an asset and magnitude of the effect that may give rise to harm, qualified by professional judgement of the assessment of effects on an asset involved and understanding of the heritage significance of the asset and in the case of an indirect effect, the contribution of the setting to the significance of the asset.

9.7.4 The conservation of the significance of heritage assets is considered in Historic England guidance, in which change is characterised as an inevitable process, but one that can be managed[147]. In this context, it is important to note that loss of archaeological interest is usually considered to be only partially mitigated through archaeological fieldwork, as archaeological investigation cannot fully capture the informative potential of a heritage asset. This is often set against the knowledge that in many cases, archaeological interest of an asset may decline over time as a

[147] English Heritage, *Conservation Principles.* London: English Heritage 2008

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result of natural processes such as erosion, or cultural processes including cultivation. Heritage significance does not depend on the preservation of a feature in its current condition and can be enhanced through sensitive management. The NPPF directs the decision-maker to take account of viable uses that sustain the significance of the historic environment, consistent with the conservation of heritage assets[148].

9.7.5 Rather than just characterising the potential physical effects of development, any assessment therefore needs to understand the effects on the significance of heritage assets and/or significant places[149]. The heritage significance of the asset is determined by reference to the heritage interests set out in the NPPF. These are:

- Archaeological interest: the potential of a place to yield evidence about the past;
- Historic interest: how the past can be connected to the present through a place through association with or illustration of the past; and
- Architectural/artistic interest: how sensory and intellectual stimulation is drawn from a place either through design or fortuitous development over time.

Sensitivity of receptor

9.7.6 For the purposes of assessing the significance of effects in EIA terms, heritage significance has also been assigned to one of four classes, with reference to the heritage interests described above and relying on professional judgement as informed by policy and guidance. The hierarchy given in **Table 9.10** reflects the NPPF distinction between designated and non-designated heritage assets. The NPPF further distinguishes between designated assets of the highest heritage significance (i.e. scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites) and other designated heritage assets. This further distinction is relevant to planning policy, but has less influence on the establishment of the significance of an effect in EIA terms.

Table 9.11 Definition of heritage significance

Heritage Significance	Summary rationale	Example asset class
High	Asset has significance for an outstanding level of archaeological, architectural, historic and/or artistic interest	Designated Heritage Assets
Medium	Asset has significance for a high level of archaeological, architectural, historic and/or artistic interest	Locally listed buildings and other local/county-based designations. Regionally significant non-designated archaeological sites.
Low	Asset has significance for elements of archaeological architectural, historic or artistic interest	Locally-significant archaeological site

[148] National Planning Policy Framework paragraph 126
[149] English Heritage Historic Environment Good Practice in Planning Guidance Note 2: Managing Significance in Decision-Taking in the Historic Environment. (GPA2) London: English Heritage 2014, and English Heritage Conservation Principles. London: English Heritage 2008

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Heritage Significance	Summary rationale	Example asset class
Negligible	Due to its nature of form/condition/survival, cannot be considered as an asset in its own right	Non-extant HER record

Magnitude of change

9.7.7 Direct effects are qualified by the extent and nature of remains associated with an asset which would be disturbed or lost, and the effect of this loss on the values of the asset. In respect of buried archaeological remains with no visible above ground remains, this would normally result in the loss of archaeological interest, but elements of architectural and historic interest can also be affected.

9.7.8 In this context, the effects of change in the setting of a heritage asset may depend on individual aspects of that setting, and assessments must be, by their nature, specific to the individual assets being considered. Recent Historic England guidance advises that the following aspects of setting should be considered in addition to any identified key attributes:

- the physical surroundings of the asset, including its relationship with other assets;
- the way the asset is appreciated; and
- the asset's associations and patterns of use.

9.7.9 It should also be noted that not all change necessarily detracts from the heritage significance of the asset. In the assessment of effects on the setting of heritage assets, the nature of the effect, i.e. positive, negative or neutral, of development is a subjective matter, usually taken to constitute a negative effect where change will constitute new and different elements to the setting of designated features, either to an imagined contemporary setting or to their existing setting.

9.7.10 Effects on receptors are assigned to one of four classes of magnitude, defined in **Table 9.11.**

Table 9.12 Methodology criteria for magnitude of change

Magnitude of change	Summary rationale
High	Loss of significance of an order of magnitude that would result from total or substantial demolition/disturbance of a heritage asset or from the disassociated of an asset from its setting.
Medium	Loss of significance arising from partial disturbance or inappropriate alteration of asset which will adversely affect its importance. Change to the key characteristics of an asset's setting, which gives rise to harm to the significance of the asset but which still allows its archaeological, architectural or historic interest to be appreciated.
Low	Minor loss to or alteration of an asset which leave its current significance largely intact. Minor and short term changes to setting which do not affect the key characteristics and in which the historical context remains substantially intact.
Negligible	Minor alteration of an asset which does not affect its significance in any discernible way. Minor and short term or reversible change to setting which does not affect the significance of the asset.

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Determination of significance

9.7.11 Effects are considered to be significant or not significant in EIA terms according to the matrix in **Table 9.12.** For this assessment, only a magnitude of change judged to be Medium or High would be considered to be significant in EIA terms, depending on the heritage significance of the asset (above) and the exercise of professional judgement.

Table 9.13 EIA Significance assessment matrix

	Magnitude of Change			
Receptor heritage significance	**High**	**Medium**	**Low**	**Negligible**
High	Significant	Significant	Not Significant	Not Significant
Medium	Significant	Not Significant	Not Significant	Not Significant
Low	Not Significant	Not Significant	Not Significant	Not Significant
Negligible	Not Significant	Not Significant	Not Significant	Not Significant

9.8 Assessment of effects on archaeology within the site area

9.8.1 This assessment of effects incorporates the environmental measures referenced in **Section 9.5**.

Construction phase effects

9.8.2 The construction phase has the potential to have an adverse effect upon the archaeological remains from the prehistoric, Roman, Anglo-Saxon, Medieval, and post-Medieval periods, as well as remains of the five phases of the airport present at the site. This would come from the stripping of soil for construction access, compounds roadways buildings and runway improvement.

9.8.3 Construction works associated with the Taxiways and Aprons, have the greatest potential to impact upon archaeological remains due to the extensive land area under construction, works for aircraft stands, cargo facilities, access, storage and parking. The construction of these elements of the airport will be undertaken over four phases. This work will have effects upon the archaeological resource on site over all four proposed construction phases.

9.8.4 The detailed design of these works will be based upon site investigation works to be undertaken during phase 1 of the development. Detail of such construction impacts will be discussed with KCC's Heritage advisors to determine a programme of archaeological recording to mitigate any significant effects.

9.8.5 It is concluded that the adoption of a scheme of archaeological investigation would provide a measure of mitigation of any loss of archaeological interest that may arise and would confirm the presence or absence of such features. In addition, where non-intrusive access methods were used in areas of specific archaeological

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sensitivity, the magnitude of change would be reduced as a result of the reduced extent of ground disturbance. Until a programme of archaeological evaluation works has been undertaken the level of significance of archaeological remains potentially present on site can only be determined to the extent that desk-based assessment and professional judgement will allow.

Operational phase effects

9.8.6 Further intrusive works are not planned during operation of the Proposed Development. No significant adverse effects would arise as a result of the operation of the airport.

Decommissioning phase effects

9.8.7 The same approach would be undertaken for the decommissioning phase as for the construction phase, therefore no significant effects are anticipated.

9.9 Assessment of effects on built heritage, within the airport boundary

Construction phase effects

9.9.1 Historic buildings and structures on the site may be altered or removed during the construction of the Proposed Development depending upon the final design of the Proposed Development.

9.9.2 Incorporation of historic structures and features into the Proposed Development, and ensuring they have sustainable, viable uses, may prevent significant adverse effects. The potential to reuse structures will be informed by assessment of buildings on site to ascertain their heritage significance, and this will inform the potential to incorporate buildings of heritage significance into the final design of the Proposed Development. Where it is not possible to reuse or retain buildings of heritage significance a programme of building recording will be undertaken to mitigate any loss or reduction in historic structures and features located on the site.

Operational phase effects

9.9.3 Beyond the design of the Proposed Development no further works are proposed for changes to or development of historic buildings and features within the airport boundary.

Decommissioning phase effects

9.9.4 The same approach would be undertaken for the decommissioning phase as for the construction phase, therefore no significant effects are anticipated.

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9.10 Designated Heritage Assets within 1km of the airport boundary and extended study area as requested by KCC and HE

Construction phase effects

9.10.1 Designated heritage assets beyond the boundary of the airport, within the 1km search area, and beyond, as requested, have the potential for their setting to be impacted by the Proposed Development. The siting of construction compounds and other temporary construction equipment and structures may cause a change in visual setting of heritage assets especially those in close proximity to the airport or within ZTV. These effects would be temporary for the duration of the construction on site. Temporary screening and considerate construction codes would ameliorate many of these temporary effects.

Operational phase effects

9.10.2 Designated heritage assets beyond the boundary of the airport, within the 1km search area, and beyond also have the potential for their setting to be effected by the operational effects of this scheme. Masterplan design of the site will be informed by consideration of the setting of heritage assets where there is likely to be a significant effect upon the setting of designated heritage assets. As well as further mitigation, boundary design and treatment will be considered to screen heritage assets from the effects of new buildings, aircraft movements and standing aircraft. Acoustic boundary treatments will also be considered to reduce potential noise impacts from within the site.

Decommissioning phase effects

9.10.3 Designated heritage assets beyond the boundary of the airport, within the 1km search area, and beyond will also experience effects as a result of the decommissioning of the airport. These may be beneficial in improving the setting of heritage assets in close proximity to the site or within ZTV of the Proposed Development.

9.11 Designated Heritage Assets within the 60DB noise contour

Construction phase effects

9.11.1 During the construction phase of the Proposed Development the airport would not be operational, and there would be no aeroplane noise. Therefore there are no construction phase effects.

Operational phase effects

9.11.2 Within the 60dB noise contour heritage assets have the potential for the contribution made to their significance from their setting by changes to the noise experience of the setting of the asset. The 60dB limit is considered to be the level at which normal speech is interrupted by noise. Noise makes a different contribution to the setting of different types of heritage asset, for example within a busy, urban conservation area, noise to the level of 60dB would be less likely to effect the experience of the asset, whilst within a contemplative garden with water

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features, noise to 60dB would be more likely to impact upon the experience of the asset, potentially masking or interrupting the noise of the water feature.

9.11.3 As part of the assessment there will be an identification of assets for which noise (or lack of it) makes a contribution to setting. Following the methodology of Historic England's Aviation Noise Metric, the present noise level at these assets shall be measured and the quantitative difference between the present noise level and 60dB will be assessed. Where this difference is considered to be significant mitigation measures can be considered. Mitigation might include airspace design to reduce noise impacts, or timing of plane movements over particular assets to reduce effects.

Decommissioning phase effects

9.11.4 As the airport would no longer be in operation aeroplane movements would not be creating noise in order to define a 60dB noise contour. Therefore there are no decommissioning phase effects.

9.12 Conclusions of preliminary significance evaluation

9.12.1 The Conclusions on the significance of all those effects that have been subject to assessment in **Sections 9.8** to **9.10** are summarised in **Table 9.13**.

Table 9.14 Summary of significance of effects

Receptor and effects	Significance Assessment	Rationale	Further work to be undertaken to support the ES
Direct construction phase effects on undesignated and previously unrecorded archaeological remains within the site boundary	Not Significant	The detailed design of the Proposed Development, including the locations of any piling, will give consideration to the presence of significant heritage assets and avoid, where possible, those significant assets. Effects would be permanent but can be largely mitigated by an appropriate programme of investigation and recording targeted on areas where site investigation and surface profiling surveys identify deposits of interest.	A full archaeological desk-based assessment and an archaeological disturbance plan will be prepared for the ES which will identify the presence/absence of remains across the site of the Proposed Development site, and an assessment of the potential ground disturbance and effects from construction. An outline programme of further archaeological investigations, including draft WSI will be prepared and submitted as part of the ES.
Historic Buildings within the airport boundary	Significance not yet established	The detailed design of the proposal, including where new buildings will be located has yet to be designed. This will give consideration to the preservation of historic buildings within the airport boundary and investigate their potential for reuse. Effects will be permanent, but can be mitigated due to an agreed programme of archaeological recording. The level of significance of effect will be determined once the building has been assessed and the Proposed Development designed accordingly.	As part of the full desk-based assessment buildings within the airport boundary will be examined and assessed for significance. An outline programme of archaeological building recording, including and draft Written Scheme of Investigation will be prepared and submitted as part of the ES.

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Receptor and effects	Significance Assessment	Rationale	Further work to be undertaken to support the ES
Designated heritage assets within the 1km boundary and extended study area as requested by KCC and HE	Significance not yet established	The detailed design of the proposal has yet to be completed, including building locations and finalised landscape design or boundary treatments. The design will consider the locations of designated assets within the 1km boundary including those identified as significant beyond this radius by KCC and HE. Effects will be permanent, but can be mitigated due to design and arrangement of the Proposed Development, boundary treatments and other designed mitigation measures such as noise attenuation or landscaping.	As part of the full desk-based assessment designated assets within the 1km boundary and others identified by HE and KCC will have their settings considered and the potential impact of the proposal upon the contribution made to significance by setting will be examined. Potential mitigation design will be included and submitted as part of the ES.
Designated Heritage Assets within the 60 DB noise contour	Significance not yet established	The design of the 60bd noise contour has yet to be determined, to enable us to identify what assets are likely to receive effects. Effects are likely to be permanent but can be mitigated due to airspace design and potential interventions at ground level.	As part of the full desk-based assessment heritage assets within the 60db noise contour will be identified and the contribution made to their significance from their current sound environment will be examined. The nature and extent of change caused by potentially increased noise will be considered and, where necessary, mitigation measures recommended.

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10. Land Quality

10.1 Introduction

10.1.1 This chapter sets out the results of a preliminary assessment of the effects of the Proposed Development on land quality.

10.1.2 This chapter should be read in conjunction with the scheme description (**Chapter 3**). Following a summary of the limitations of the PEIR, the chapter outlines the relevant policy, legislation and guidance that has informed the preliminary assessment, and the data gathering methodology that was adopted as part of the land quality preliminary assessment. This leads on to a description of the overall baseline conditions, the scope of the assessment, and the assessment methodology. The chapter concludes with a summary of the results of the assessment.

Limitation of the PEIR

10.1.3 The PEIR is based on a desk study and a site visit only, carried out in accordance with the Environment Agency Contaminated Land Report (CLR) 11, Model Procedures for the Management of Land Contamination, 2004. No intrusive investigations have been undertaken to date, as the approach of the intrusive investigations is under discussion with the Environment Agency and the Thanet District Council. The intrusive works will be carried out post consent.

10.2 Policy, legislation and guidance

10.2.1 A study of Land Quality related planning policy, legislation and guidance at the European, national, regional and local level has been undertaken for the site and its locality in order to highlight any requirements which the Proposed Development needs to consider. It is always important that policies, legislation and guidance are taken into consideration as they help to define the scope of assessment and can inform the identification of particular local issues. Full details of all national and local planning policies relevant to the Proposed Development can be found in **Appendix 4.1**.

Table 10.1 National and Local Planning Policies relevant to Land Quality

Policy Reference	Policy Information
European Policies	
Environmental Liability Directive (2004/35/EC)	Requires an operator to take preventative, as well as remedial, measures. It applies both to damage that has occurred and where there is an imminent risk of it occurring. The Environmental Liability Directive is implemented in England by the Environmental Damage (Prevention and Remediation) Regulations 2009 (SI 2009/153).
Water Framework Directive (WFD) (2000/60/E)	The overall purpose is to establish a framework for the protection of surface fresh water, estuaries, coastal water and groundwater. The primary objectives are to improve surface water groundwater quality and ensure that pollutants are prevented from entering groundwater and surface water. This is implemented into English law through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003

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Policy Reference	Policy Information
Groundwater Directive (80/68/EEC)	Aims to protect groundwater against pollution caused by dangerous substances. The Directive is primarily implemented in England and Wales by the Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675).
Directive on the Protection of Groundwater Against Pollution and Deterioration (2006/118/EC)	Sets out specific measures for preventing and controlling groundwater against pollution and deterioration
National Policies	
The National Planning Policy Framework (NPPF) (March 2012)	States that local planning policies and decisions should ensure that: A site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation; After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and Adequate site investigation information, prepared by a competent person, is presented. In addition, the NPPF states that the planning system should contribute to and enhance the natural and local environment by (a) preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability; and (b) remediating and mitigating …contaminated…land, where appropriate. Since April 2015 the integration of sustainable drainage systems (SuDS) for the management of run-off in major developments have become a planning requirement.
National Legislation	
Town and Country Planning Act 1990	Historical land contamination is a material consideration under this act. It is necessary to ensure that any land which is to be redeveloped is suitable for its proposed end use. Therefore, prior to development, the planning authority may require investigation of the site and, if necessary, remediation.
Environmental Protection Act 1990	The contaminated land regime is set out within Part 2A of the Environmental Protection Act 1990 (EPA, 1990). Part 2A provides a statutory definition of 'contaminated land' and sets out the nature of liabilities that can be incurred as a result of contaminated land and groundwater. Contaminated land is defined 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 significant possibility of such harm being caused; or Significant pollution of controlled water is being caused or there is significant possibility of such pollution being caused". The accompanying Statutory Guidance states that Part 2A takes a risk based approach to defining contaminated land. The guidance follows established principles of risk assessment, including the concept of a 'contaminant linkage' (i.e. a linkage between a 'contaminant' and a 'receptor' by means of a 'pathway') where: A contaminant is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or cause significant pollution of controlled waters; A receptor is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property or controlled waters; and A pathway is a route by which a receptor is or might be affected by a contaminant. Environmental Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance was published in April 2012.
Water Resources Act 1991 and Environmental Permitting (England and Wales) Regulations 2010	For sites where contamination of controlled waters is a potential issue, in addition to the provisions of Part 2A consideration should also be given to the Water Resources Act (WRA) 1991. Parts of the Act have been replaced by the Environmental Permitting (England and Wales) Regulations 2010, SI 2010 No.675 (referred to here as EPR), although some of the core definitions (e.g. controlled waters) still refer to the WRA. The two aspects of the EPR so far as controlled waters are concerned are: Schedule 21: Water discharge activities – these are concerned with discharges to surface waters, that are controlled waters, of any poisonous, noxious or polluting matter; waste matter; trade effluent or sewage effluent; and

Policy Reference	Policy Information
	Schedule 22: Groundwater activities – these are concerned with discharges of pollutants, or other discharges that may lead to input of a pollutant, to groundwater. The "activities" relate both to those that require a permit and activities that are unlawful (e.g. causing pollution to controlled waters), with only a small number of activities being exempt, although even these need to be registered with the Environment Agency (EA). We note that a "passive" release of pollutants, such as may occur to groundwater from land where the original cause of pollution has ceased is not considered to be an activity requiring permitting. Under the WRA, the EA still has the power to remediate pollution of controlled waters by means of Anti-Pollution Works Notices, via Section 161A of the WRA. The provisions of the WRA and EPR (and the consequent powers of the EA) can apply when the land is not Statutory Contaminated Land under the terms of Part 2A. The EA has indicated that in general Part 2A will be applied in preference to WRA powers if it is applicable (i.e. passive discharges are occurring).
Building Regulations 2016	The Approved Document C Site Preparation and Resistance to Contaminants and Moisture, 2013 indicates the need for risk assessment and remediation to be undertaken to ensure safe development.
Local Policy	
Draft Thanet Local Plan to 2031, January 2015. Policy SE01:	Permission for development which is sensitive to pollution will be permitted only if it is sufficiently separated from any existing or potential source of pollution as to reduce pollution impact upon health, the natural environment or general amenity to an acceptable level, and adequate safeguarding and mitigation on residential amenity.
Draft Thanet Local Plan to 2031, January 2015. Policy SE03: Contaminated Land	Development on land known or suspected to be contaminated or likely to be adversely affected by such contamination will only be permitted where: 1) An appropriate site investigation and assessment (agreed by the Council) has been carried out as part of the application […]; 2) The proposed remedial measures would be acceptable in planning terms and would provide effective safeguards against contamination hazards during the development and subsequent occupation of the site.
Draft Thanet Local Plan to 2031, January 2015. Policy SE04: Ground Water Projection Zones	Proposals for development within the Groundwater Source Protection Zones identified on Thanet's Groundwater Protection Zones Map will only be permitted if there is no risk of contamination to groundwater sources. If a risk is identified, development will only be permitted if adequate mitigation measures can be implemented
'Oil and Gas Minerals Local Plan' and 'Brick Earth Subject Local Plan'	Saved policies of Kent County Council's: Oil and Gas saved policies: Policy OG8: Nature conservation: before granting permission for an oil and gas related proposal, the planning authority will require to be satisfied that the Earth Science and Ecological interests of the site and its surroundings, including those set out in paragraphs 5.39 and 5.40, have been established.
Kent Minerals and Waste Local Plan 2013-2030	Policy CSW 14 seeks to ensure that contaminated land is treated in situ or in combination with other contaminated land when those sites are to be redeveloped.
Dover District Council Strategy. Policy DM17	Safeguards against contamination in groundwater protection zones
Guidance	
Environment Agency Contaminated Land Report (CLR) 11, Model Procedures for the Management of Land Contamination, 2004	Provides the technical framework for structured decision-making about land contamination
Environment Agency Groundwater Protection: Principles and Practice (GP3)	Outlines the regulator's framework for the management and protection of groundwater.

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Policy Reference	Policy Information
Guidance for the safe development of housing on land affected by contamination, R&D publication 22: 2008, NHBC, Environment Agency, Chartered Institute of Environmental health	Framework for assessment of contaminated land for development based on CLR11 above.
CL:AIRE (2011)	The Definition of Waste: Development of Industry Code of Practice
CIRIA Report 132	A guide for safe working practices on contaminated Sites (1996)
CIRIA Report C532	Control of Water Pollution from Construction Sites (2001)
CIRIA Report C692	Environmental Good Practice on Site (3rd Edition) (2010)
HSE 1991	Protection of workers and the general public during the development of contaminated land
BS10175:2011+A1 2013	Investigation of Potentially Contaminated Sites - Code of Practice
BS8485:2015	Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings
BS8576:2013	Guidance on Investigations for Ground Gases. Permanent Gases and Volatile Organic Compounds (VOCs)
CIRIA Report C665	Assessing Risks Posed by Hazardous Ground Gases to Buildings (2007)
BS6031:2009	Code of Practice for Earthworks (2009) Best practice guidance on geotechnical aspects of earthworks and on working practices
Department for Environment, Food and Rural Affairs (Defra), 2011	Safeguarding our Soils; a Soil Strategy for England
Government Circular 06/2005 'Biodiversity and Geological conservation	Statutory obligations and their impact within the planning system' (2005)

10.3 Data gathering methodology

10.3.1 This section describes the desk study and site walkover undertaken to inform the Land Quality assessment. In order to establish the baseline situation, Land Quality data were obtained from the sources listed in **Table 10.2** to identify existing data about the site and the surrounding area.

Table 10.2 Information used in the preparation of the PEIR

Topic	Source of Information
BGS mapping website - http://mapapps.bgs.ac.uk/geologyofbritain/home.html	Borehole logs, BGS maps (geological map, sheets no. 274, Ramsgate, 1:50,000, published 1980 and hydrogeological map of the Chalk and Lower Greensand of Kent, sheet no. 3, 1:126,720, published 1970)
Environment Agency website: "What's in your backyard?"	Aquifer designations, groundwater protection zones, catchment and surface water quality, etc.

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Topic	Source of Information
Magic website - http://www.magic.gov.uk/MagicMap.aspx	Land-based designations
Environment Agency catchment data search - http://environment.data.gov.uk/catchment-planning/	Information held by Environment Agency on the water environment which supports and builds upon the data in the river basin management plans.
NHBC/ CIEH / Environment Agency, Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66: 2008	Assessment methodology of receptors sensitivity
Envirocheck report dated 2016 (reference 82787389_1_1)	Historical/OS plans and environmental datasheets
Land Quality Assessment Phase One: Desk Study land Quality Statement. Project No. 10133 – Final report, August 1998, GIBB Environmental	Phase 1 desk study prepared for the Ministry of Defence (MOD) for Manston airfield, comprising the review of publicly available and historical information from books, information provided by the Establishment Works Consultant (EWC), a summary of the site walkover carried out in May 1998, and a qualitative risk assessment.
Geo-environmental Assessment, Jentex petroleum, Cliffsend, Kent, Jentex GEA-18996-15-134, May 2015, Idom Merebrook Ltd	Phase 1 desk study including the findings of an intrusive Phase 2a investigation carried out at the petroleum depot located directly southeast of Manston airfield at Canterbury road. A preliminary risk assessment was prepared to advise on the geo-environmental implications of the re-development of the site from industrial/commercial to residential
Geo-environmental Assessment Report, Jentex – Supplementary Assessment, Cliffsend, Kent, Jentex Group of Companies, GEA-18996B-16-144, May 2016, Idom Merebrook Ltd	Report presents the findings of a supplementary intrusive investigation conducted at the petroleum depot, located directly southeast of Manston airfield at Canterbury road, in order to verify whether or not the hydrocarbon impacted identified during the 2015 investigation had extended to the chalk strata.
Kent International Airport Manston, Radar Mast development, Phase 1 and 2 Contaminated Land Assessment, June 2010, Jacobs located in Planning Applications, F/TH/09/0637 Thanet District Council - https://planning.thanet.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=ZZZZMWQEBJ103	Ground investigation report
Site Investigation Tank 2, Base Validation, Jentex, The Storage Installation, Canterbury Road West, Ramsgate, Kent, CT12 DU, Ref: 07R898, 2007 Randall & Walsh Associates	Ground investigation report
Preliminary Unexploded Ordnance (UXO) Risk Assessment (reference P5188), 2016, Bomb Search, Landmark Information Group Ltd	Kent International Airport Ltd, Kent International Airport, Manston, Ramsgate, Kent, CT12 5BL
Spitfire and Hurricane Memorial Museum, Manston, Kent	Historical website for the site and its surroundings
Thanet District Council, Environmental Protection Manager	The Council provided a map for details of landfill sites near the site (EA Landfill Atlas Data); • Current or historical contaminative land uses e.g. petrol stations, industrial processes etc.; • Any contaminated land identified under your Part 2A (EPA 1990) inspection strategy and the prioritisation status of the site (if appropriate);

Topic	Source of Information
	• Details of nearby regulatory authorisations that may be held by Thanet District Council; • Any other data held by Thanet District Council with regard to contaminated land, such as previous investigations and remediation reports; • Any planning liaison or development control issues; Council databases and external databases, including groundwater or surface water abstractions (for example, wells used for private water supply), disused petrol tanks, protected areas, local coal mining information and the contaminated land register.

Desk Study

10.3.2 A Phase 1 Geoenvironmental Desk Study was undertaken to inform the Land Quality assessment (**Appendix 10.1**) in accordance with the Environment Agency Contaminated Land Report (CLR) 11, Model Procedures for the Management of Land Contamination, 2004. The purpose of this report was to assist in understanding environmental liabilities associated with land quality, and potential geotechnical hazards, for the Proposed Development to support the safe and economic development of the site. The definitions for the qualitative risk assessment have been taken from "Guidance for the Safe Development of Housing on Land Affected by Contamination" Annex 4 R&D Publication 66: 2008 Volume 2[150].

10.3.3 The desk study comprises the following scope of works:

- review of any existing information, including information obtained from sources such as Landmark Information Group's Envirocheck report;
- provision and review of preliminary UXO Assessment Report;
- site walkover;
- Desk Study Reporting including collation of the results of the above tasks into a concise report and the development of a Conceptual Site Model and a preliminary Qualitative Risk Assessment (QRA), according to the source - pathway - receptor model;
- identification of information gaps relating to land contamination and any requirements for further assessment; and
- geotechnical assessment to identify potential hazards and constraints.

Survey Work

10.3.4 A site walkover was undertaken by an Amec Foster Wheeler environmental consultant from 7th to 9th February 2017 to obtain additional information about the site's current setting and any potential land quality issues.

Consultation

10.3.5 Since 2015 and throughout the undertaking of the survey and assessment work, RiverOak has engaged with consultees with an interest in potential Land Quality

150 "The guidance, whilst written to be relevant to housing development on such sites, is also generally applicable to other forms of development, to existing developments and to undeveloped land, where such sites are on land affected by contamination."

effects. A scoping report (**Appendix 1.1**), including a chapter covering Land Quality, was produced and submitted to PINS who provided a scoping opinion (**Appendix 1.2**).

10.3.6 Organisations that were consulted include:

- The Environment Agency (EA);
- Thanet District Council; and
- PINS.

10.3.7 A summary of the consultee comments and responses provided is provided in **Table 10.3** below.

Table 10.3 Consultee comments

Consultee	Comments and considerations	How addressed in this PEIR
PINS	It is proposed to scope out potential contamination effects on human health due to spills and leaks from mechanised plant during the construction phase. Chapter 9 limits this to the installation of the planned tank farms. The Secretary of State is satisfied that these matters can be dealt with through measures such as training and CEMPs. Drafts of such plans should be provided with the DCO application.	Environmental measures expected to be incorporated into the Proposed Development are listed in **Section 10.5** of this PEIR. A Construction Environmental Management Plan (CEMP) will be provided with the DCO application.
PINS	It is proposed to scope out potential effects on human health from any contaminated land during construction. Chapter 9 limits this to effects on construction workers from contaminated soil or buried animals. In light of the potential for contamination from a range of sources, e.g. aviation fuels, trichloroethylene (TCE) and unexploded ordnance (UXO), the Secretary of State considers that an assessment should be carried out, with appropriate mitigation identified and secured in the DCO.	Environmental measures expected to be incorporated into the Proposed Development are listed in **Section 10.5** of this PEIR. A Construction Environmental Management Plan (CEMP) will be provided with the DCO application. An assessment has been undertaken for the site and is detailed in **Sections 10.8** to **10.12**
PINS	Scoping Report Section 9.4 highlights the potential risk of contamination and UXO being present on site and outlines that a Phase 1 Land Quality Assessment (LQA) supported by a site walkover and a 6 Alpha detailed UXO threat & risk assessment will be undertaken. The Secretary of State considers that the Phase 1 LQA should be carried out in accordance with the EA Model Procedures for the Management of Land Contamination (CLR11), and the UXO studies should be carried out in accordance with CIRIA Guide C681 - Unexploded ordnance (UXO): A guide for the construction industry.	A Phase 1 Land Quality Assessment (LQA) (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) has been carried out in accordance with CLR11 and is attached as **Appendix 10.1**. A Preliminary UXO Risk Assessment has been undertaken for the site and included in Appendix B of the Phase 1 LQA. The report identified that there is a medium to high probability of UXO encounter on the site (probability rating of 4, on a scale up to 5). As such a detailed UXO threat & risk assessment will be carried out in accordance with CIRIA C681 Chapter 5 on managing UXO risks, 6 Alpha, prior to any intrusive works.
PINS	Given the confirmed presence of contamination on site, the Secretary of State agrees that the risk assessment should be supported by ground investigation data, where appropriate. The scope of any intrusive investigation should be agreed with the EA and TDC.	Discussions about the findings of the Phase 1 LQA and a proposed intrusive investigation have been initiated with the EA. The intrusive investigation will be undertaken post consent, and will be agreed in advance with EA and TDC.

Consultee	Comments and considerations	How addressed in this PEIR
PINS	The Secretary of State requires that the assessment consider the risk of discharges of contaminated material to European designated sites in Pegwell Bay and the potential for mobilisation of contamination within the aquifer. Given the potential for substantial material imports to level areas of the site, the Secretary of State considers that the assessment should also set out the Applicant's proposed control measures to ensure that fill materials do not introduce new sources of contaminants to the site.	The Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) has assessed the risk to Pegwell Bay. Control measures have been detailed and assessed in **Sections 10.5** and **10.8** to **10.12** of this PEIR. In addition, control measures also set out in the **Chapter 8: Freshwater Environment** will be implemented to control contamination migration.
PINS	The Secretary of State requires that for the purposes of any proposed investigation or construction works aquifer protection measures should be set out and agreed with Southern Water.	Any proposed investigation or construction works aquifer protection measures will be agreed with Southern Water. The intrusive investigation will be undertaken post consent.
PINS	Section 9.6 of the Scoping Report states that the Phase 1 LQA risk assessment will be used to identify potentially significant effects. The detailed significance criteria are not set out in the Scoping Report. The Secretary of State requires that specific significance criteria are described in the ES.	The significance evaluation methodology and the significance criteria are described in **Section 10.7** of this PEIR.
Environment Agency	As discussed in the Scoping Report, the Environmental Impact Assessment should include detailed information on all potential sources of contamination. There are likely to be numerous potential sources of contamination from a former airfield. These potential sources should include (but are not be limited to) drainage infrastructure including interceptors, pesticide storage and use, aprons and taxiways where refuelling occurred, open trenches used in fog clearance and any underground tunnels that may have been used for storage.	A review of the site's history and environmental setting has identified potential contaminant sources on the site and the surrounding area and is included in the Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) (**Appendix 10.1**)
Environment Agency	The Environmental Impact Assessment will need to provide information on potential contamination of the site, but we would also expect a preliminary risk assessment and site investigation to accompany the DCO application for this site. We recommend that the applicant: 1. Follows the risk management framework provide in CLR11, Model procedures for the management of land contamination https://www.gov.uk/government/publications/managing-land-contamination 2. Uses BS 10175 2001, Investigation of potentially contaminated sites – Code of Practice as a guide to undertaking the desk study and site investigation scheme 3. Uses MCERTS accredited methods for testing contaminated soils at the site, 4. Further information may be found on the land contamination technical guidance pages on the direct.gov website	A Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) has been carried out in accordance with CLR11 and is attached as **Appendix 10.1**. It includes recommendations for a staged intrusive investigation. The intrusive investigation will be undertaken post consent. BS 10175 2001, Investigation of potentially contaminated sites – Code of Practice has been used to prepare the Phase 1 LQA and will be used to design the intrusive investigation. MCERTS accredited methods for testing contaminated soils at the site will be used. The land contamination technical guidance pages on the direct.gov website have been consulted.

Consultee	Comments and considerations	How addressed in this PEIR
	https://www.gov.uk/government/collections/land-contamination-technical-guidance	
Environment Agency	Site investigations and any disturbance of the ground before, during and after development, will need to take into account the vulnerability of the groundwater in the underlying aquifer. Any ground disturbance could cause turbidity of the groundwater at the abstraction well, and also pose a risk of causing instability in the adit. We recommend early consultation with Southern Water Services with regard to any planned intrusive investigations, on site demolition and subsequent development of the site.	Discussions about the findings of the Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) and a proposed intrusive investigation have been initiated with the EA and Southern Water.
Thanet District Council	The EIA should consider all potential sources of contamination associated with the former airport/military uses. A Phase 1 contamination survey is reported to have been commissioned but it is not known whether this has been completed. The Phase 1 has not been supplied as part of the Scoping Report. This department understands that the applicant will request access to the site to undertake a site walkover survey. This will be required to inform the Phase 1 Land Quality Assessment.	A Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) has been carried out in accordance with CLR11 and is attached as **Appendix 10.1**. A site walkover was carried out from 7th to 9th February 2017. The findings have been included in the Phase 1 LQA.
Thanet District Council	The scoping opinion states that it is likely that the proposed Phase 1 Assessment will conclude that intrusive work be carried out following the granting of the DCO. Without access to the Phase 1 report it is not possible to conclude whether this is sufficient and a degree of caution must be considered given the sensitivity of the bedrock below. While not stated in this section of the Scoping Report, Table 7.3 in Section 7 states: 'The fuel station to the south east of the site is known to be an issue and there are probably groundwater and land contamination issues with that site associated with historical activity and spills... the closest Southern Water source is mixed to treat for nitrate pollution, and there have been issues in the past with hydrocarbons and solvents.' A degree of caution is therefore advised in allowing soil sampling to be deferred to post consent of the DCO particularly without knowing the construction methods proposed. The EA is key consultee. In general, where necessary approved remediation must be undertaken to ensure the redevelopment will not represent an unacceptable risk to future/adjacent site users or the environment, including vulnerable groundwater receptors.	A Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) has been carried out in accordance with CLR11 and is attached as **Appendix 10.1**. It includes a review of previous site investigation reports and Thanet District Council and the Environment Agency data, recommendations for a staged intrusive investigation. Discussions about the findings of the Phase 1 LQA and a proposed intrusive investigation have been initiated with the EA and Southern Water.
Thanet District Council	Impacts on land quality and underlying groundwater resources from future proposed site uses, including the breaking of aircraft, are a material planning consideration and should be considered as part of the EIA for the operational phase of the development. Appropriate safeguarding measures must be incorporated at the design stage to inform the viability of the development.	Impacts on land quality and underlying groundwater resources from future proposed site uses, including the breaking of aircraft, have been considered for the operational phase of the development in **Sections 10.8** to **10.12** of this PEIR.

Consultee	Comments and considerations	How addressed in this PEIR
Thanet District Council	At page 9.6.10, the report scopes out potential effects from contaminated soil or buried animals on construction workers during construction works due to appropriate use of Personal Protective Equipment. Given the potential presence of Polychlorinated biphenyls (PCBs) from substation buildings and/or contaminants associated with former military uses (e.g. weapons/explosives), potential effects on construction workers should be further assessed. It is agreed that the effects outlined as unlikely to be significant have existing standard and proven mitigation measures to prevent the risk of these effects occurring, but a commitment to such measures should be stipulated through a Construction Environmental Management Plan (CEMP).	Environmental measures expected to be incorporated into the Proposed Development are listed in **Section 10.5** of this PEIR. A Construction Environmental Management Plan (CEMP) will be provided with the DCO application

10.3.8 The Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) has been provided to the EA for review and the comments are pending.

10.4 Overall Land Quality baseline

Current baseline

Geology/Hydrogeology

10.4.1 The Site is underlain by Quaternary deposits (Head 1 and Head 2) comprising Clay and Silt which are underlain by bedrock in the form of Margate Chalk Member and the Seaford Chalk Formation. The British Geological Survey (BGS) 2016 mapping indicates that Sand, Silt and Clay from the Thanet Formation may be present north-east of the site, but this is not supported by the BGS borehole information available for the site. Made Ground is recorded in the centre of site on the BGS logs, however is likely to be present across the site associated with past development.

10.4.2 The entire site and surrounding area is underlain by solid geology in the form of the Chalk Formation that provides approximately 70% of the water to the Southern Water Kent Thanet Water Resource Zone (KT-WRZ). The Chalk bedrock is classified as a Principal Aquifer. A Principal Aquifer is described by the EA (2015[151]) as layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

10.4.3 Borehole and Trial Pit records are available on the BGS website for several areas across and around the site. The information recorded indicates that groundwater was encountered during drilling at 44.3 m AOD in the east of the site and 40.25 m

[151] http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=634500.0&y=166500.0&topic=groundwater&ep=map&scale=9&location=Manston,Kent&lang=_e&layerGroups=default&distance=&textonly=off

AOD in the southeast of the site. Based on the hydrogeological map (BGS website), the groundwater flow direction is assumed to be towards the south-east.

10.4.4 The site lies entirely within a groundwater source protection zone (SPZ) catchment. The inner zone (SPZ1), where risk of contamination from pollution causing activities is greatest, is identified in a strip beneath the runway. This is surrounded by a wider area of outer zone (SPZ2) that also dominates the area beneath the runway, in the south of the site. The remainder of the site falls within the wider SPZ catchment area (SPZ3).

10.4.5 There are no public water supply (PWS) abstractions located within the site boundary, but a number of people and organisations abstract water from groundwater or ponds/lakes up to 1000m outside the site boundary (6 located within 500m, and a further 3 up to 1000m from the site boundary). The abstractions are for private water undertaking, public water supply and agriculture. Thanet District Council has confirmed that there are no known private water supplies within a 2km radius of the centre of the Manston Airport site.

10.4.6 The Lord of the Manor PWS abstraction is closest to Manston Airport, located approximately 385m from the eastern site boundary. The source consists of two wells, Lord of the Manor and Whitehall (the latter is disused and sealed) with three adits[152]. The source was constructed at the southern edge of Thanet to abstract groundwater which would have discharged south towards the sea, and to intercept any high permeability zones. The Whitehall abstraction was drilled in 1850, and suffered from saline intrusion, being close to the coast. Lord of the Manor was constructed to intercept the same adit system to alleviate the saline intrusion issue (Aquaterra, 2007). There are three adits at the Lord of the Manor PWS; the Eastern, Western and South-Western Adit, constructed in the 19th and early 20th century. The most significant abstraction relevant to the Manston Airport development is the Lord of the Manor source. The catchment includes Manston Airport which sits in the southwest of the catchment with its runway over the western adit, the main rail-line to London, and the A299; the groundwater SPZ for this borehole extends below the existing airport runway.

10.4.7 The site lies within a groundwater body with a poor chemical quality under the water framework directive.[153]

10.4.8 The groundwater sensitivity is assessed as very high[154]. The site in underlain by a Principal Aquifer, the nearest abstraction is less than 0.5km from the site and the site is in a SPZ.

Hydrology

10.4.9 There are no surface water features on the site. The nearest major river is the River Stour located approximately 3km south of the site boundary, which flows eastwards to the North Sea. The River Stour is classified as Moderate ecological

[152] An Adit is a horizontal passage leading into the Lord of the Manor groundwater abstraction to increase flow to the source
[153] http://environment.data.gov.uk/catchment-planning/OperationalCatchment/3282/classification?item=106&status=all
[154] NHBC/ CIEH / Environment Agency, Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66: 2008

quality status within the Water Framework Directive assessment (WFD) as issued on the Environment Agency website.

10.4.10 Thanet coast is located approximately 900m southeast of the site boundary. The coastal water sensitivity is assessed as moderate to high[154]. It is anticipated that if the Lord of the Manor abstraction is in use, it would likely capture much of the groundwater. If it is not in use, the adit system would provide a potentially fast pathway to Pegwell Bay.

10.4.11 The surface water sensitivity is assessed as moderate to low[154] due to the potential for pollutant transmission to water located 2.5km from site via baseflow or via an interconnected unclassified drain or stream.

Ecologically Sensitive Land Use

10.4.12 The site is located within a nitrate vulnerable zone. Approximately 900m southeast of the site boundary are Sandwich Bay, Pegwell Bay and the Thanet coast which are classified as:

- National Nature Reserves (Sandwich and Pegwell Bay);
- Ramsar sites (Thanet Coast and Sandwich Bay);
- Sites of Special Scientific Interest (Thanet Coast and Sandwich Bay);
- Special Areas of Conservation and Special Protection Areas (Thanet Coast and Sandwich Bay)[155].

10.4.13 The ecological sensitivity is assessed as moderately high due to close proximity of a Local Nature Reserve.

Current / Historic Land Use

10.4.14 Based on historical mapping the site was grassland and agricultural land from 1873 to 1915. At least two Chalk pits were located within the site boundaries in the central eastern area of the site until 1896 and may have been infilled from this date. A 'Pit' is also recorded in the southwestern part of the site in 1873, presumed to be a former underground Chalk mine.

10.4.15 Information obtained from the Spitfire museum website[156] indicates that aircraft started to use the open farmland of Manston for emergency landings during the winter of 1915-16. An aerodrome was established at the site shortly after including operational flights and a training school. Several training schools were established between 1921 and 1936 and additional facilities – classrooms and barracks – were built[157]. Aerial photographs dated 1947-1949 show the presence of a runway in the southern part of the site. During World War II, Manston was heavily bombed. The site was used as an emergency landing field for returning bombers suffering from low fuel or problems to their hydraulic systems. Three emergency landing strips (concrete) and associated taxiways and dispersals were built and the runway opened in April 1944. The airfield became a storage area for

[155] www.magic.gov.uk
[156] www.spitfiremuseum.org.uk/rafmanston
[157] THE MILITARY AIRFIELDS OF BRITAIN – Southern England, Ken Delve, Crowood (ISBN 1-86126-729-0)

heavy bombers. During the 1950's the US Airforce used the site as a Strategic Air Command base for its fighter and fighter-bomber units. From 1960, the airfield was back under RAF control from the US Airforce, and was designated one of the country's Master Emergency Diversion Airfields for both military and civilian flights due to its runway and its facility for foam-laying[158]**Error! Bookmark not defined.**.

10.4.16 A map from 1968 shows that the site had been developed with taxiways, aprons and buildings in addition to the runway which was already present at the site. A substation is noted in the extreme eastern part of the site from 1977. Two museums had also been developed in the western part of the site by 1995. The RAF operation of the site finished in 1999 and the airport became Kent International Airport operating civilian air traffic (cargo and passenger flights). Kent International Airport ceased operations in 2014. A freight handling facility located in the western part of the site is still in use by a range of haulage companies. There is also a small charter helicopter business operating from the area adjacent to the facility.

10.4.17 Historically, the immediate surrounding area was largely agricultural land but has been subject to increased residential development over time, as well as extensions and additions to the road network. A tank farm located in the direct southeastern vicinity of the site, and which was already visible on an aerial photograph dating from 1949, has reduced in the number of tanks since 1995. The A299 highway, a roundabout and a solar energy farm were constructed to the south of the site during the period 1995-2016.

Agricultural Land Quality

10.4.18 A review of publically available data has been undertaken for the Agricultural Land Classification (ALC) of the site and its surroundings. This classifies the area (of approximately 325m^2) located directly southwest of the site as being Grade 2 (very good quality agricultural land) and Grade 3a (good quality agricultural land) lands. The site itself is not classified as agricultural land[159].

Soils

10.4.19 The soils on and directly surrounding the site are classed as variably permeable urban soils of high leaching potential.[160]

Waste disposal / Landfilling

10.4.20 Based on the available information, there are six historical landfills in the close surroundings of the site (within a 500m distance). At least two Chalk pits were located within the site boundaries in the central eastern and south-eastern areas and may have been backfilled at the beginning of the 20th century.

Previous Reports

10.4.21 Three reports were provided by the client for review by Amec Foster Wheeler.

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[158] Product is understood to contain carbon-tetrachloride - https://www.google.com/patents/US1010870
[159] Ministry of Agriculture Fisheries and Food. Post 1988 Agricultural Land Classification and www.magic.gov.uk
[160] Envirocheck report dated 2016 (reference 82787389_1_1)

Land Quality Assessment Phase One: Desk Study land Quality Statement. Project No. 10133 – Final report, August 1998, GIBB Environmental[161] *, hereafter referred as "GIBB report"*

10.4.22 A Phase 1 desk study was prepared for the Ministry of Defence (MOD) for Manston airfield. It comprised the review of publicly available and historical information from books, information provided by the Establishment Works Consultant (EWC), a summary of the site walkover carried out in May 1998, and a qualitative risk assessment.

10.4.23 The observations from this report have been used to inform Sections 3.4 and 3.7 of the Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) (**Appendix 10.1**).

Geo-environmental Assessment, Jentex petroleum, Cliffsend, Kent, Jentex GEA-18996-15-134, May 2015, Idom Merebrook Ltd[162]

10.4.24 The Phase 1 desk study includes the findings of an intrusive Phase 2a investigation carried out at the petroleum depot located directly southeast of Manston airfield at Canterbury road. A preliminary risk assessment was prepared to advise on the geo-environmental implications of the re-development of the site from industrial/commercial to residential. The intrusive investigation included three cable percussion boreholes advanced down to 10.45m bgl and 15 trial holes dug to 4m bgl. The western part of the site was not included in the investigation.

10.4.25 According to Idom Merebrook, the geology encountered was Made Ground directly overlying Chalk. Neither groundwater nor perched water were encountered. 25 soil samples, including 14 samples from natural ground and 11 samples from Made Ground, were collected and analysed for asbestos, pH, heavy metals, total petroleum hydrocarbon (TPH), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), and Phenols. Shallow soils were found to be impacted with PAHs and asbestos.

10.4.26 The risk to the current and future site users was assessed as being low to moderate, likely requiring mitigation measures. No volatile contamination was identified. The risk to the underlying Chalk aquifer was considered to be low. However a further supplementary investigation was agreed with the EA in order to confirm whether or not the contamination had extended to the Chalk strata.

Geo-environmental Assessment Report, Jentex – Supplementary Assessment, Cliffsend, Kent, Jentex Group of Companies, GEA-18996B-16-144, May 2016, Idom Merebrook Ltd[163]

10.4.27 The report presents the findings of a supplementary intrusive investigation conducted at the petroleum depot, located directly southeast of Manston airfield at Canterbury road, in order to verify whether or not the hydrocarbon impacts identified during the 2015 investigation had extended to the Chalk strata.

[161] Land Quality Assessment Phase One: Desk Study land Quality Statement. Project No. 10133 – Final report, August 1998, GIBB Environmental
[162] Geo-environmental Assessment, Jentex petroleum, Cliffsend, Kent, Jentex GEA-18996-15-134, May 2015, Idom Merebrook Ltd
[163] Geo-environmental Assessment Report, Jentex – Supplementary Assessment, Cliffsend, Kent, Jentex Group of Companies, GEA-18996B-16-144, May 2016, Idom Merebrook Ltd

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10.4.28 Two boreholes were advanced down to 10m bgl and eight trial pits dug to a maximum depth of 3.5m bgl. The geology encountered was Made Ground overlying Head deposits which were underlain by Chalk. Ground or perched-water was not encountered during the drilling works.

10.4.29 24 soil samples, including 16 from natural ground and eight from Made Ground, were collected and analysed for asbestos, pH, heavy metals, TPH, BTEX, PAHs, Cyanide and Phenols. Localised hydrocarbon (mainly TPH) and lead (at a few locations) impact was detected in shallow soils. No contamination was found to be extending to depth therefore the risk to the Chalk aquifer was estimated as being likely not significant.

10.4.30 In addition to the three reports provided by the client, a Phase 1 & 2 report prepared in connection with the Kent International Airport radar mast application was reviewed by Amec Foster Wheeler as advised by the Thanet District Council.

Kent International Airport Manston, Radar Mast development, Phase 1 and 2 Contaminated Land Assessment, June 2010, Jacobs

10.4.31 A Phase 1 & 2 Contaminated Land Study was undertaken by Jacobs to support the planning application for the installation of radar mast at the airport. The radar mast was proposed to be located in the northwestern part of the site next to the Manston road and north of the Spitfire and Hurricane museums. A site visit was carried out in October 2009. The findings were that the area where the radar mast was intended to be installed consisted of an area of concrete hardstanding which was possibly the foundation for a previous installation. The surroundings areas were open grassed lands.

10.4.32 The Phase 1 study summarizes the findings of the previous investigations that were undertaken at various parts of the site - at the runway, the bulk fuel installation facilities, the fire rescue building and the former MOD domestic site. Elevated concentrations of hydrocarbons were detected above the soil screening guidelines used at the time of those investigations. Concentrations of up to 41,657 mg/kg, i.e. above the Dutch Intervention level of 5,000 mg/kg used at the time, were identified during the fuel compound's investigation in 1999. In addition the study identified the other following potential sources of contamination:

- Made Ground identified as widespread across the airport during the 1999 intrusive investigation – contaminants could include heavy metals, hydrocarbons, asbestos, volatile organic compounds;
- historical Fog Intensity Dispersal Operations (FIDO) – potential presence of hydrocarbons;
- potential leaks from mobile fuel tanks that were not equipped with spill protection;
- several waste management sites, including an historic landfill, two active waste transfer sites and a closed landfill, located within 300m east of the site – contaminants could include heavy metals, hydrocarbons and organic compounds;

- an active petrol station and garage (Drome) and an inactive car body works located within 250m north east of the Site – contaminants could include hydrocarbons, solvents;
- an active road haulage services facility located approximately 450m east of the site – contaminants could include hydrocarbons and solvents;
- potential presence of radioactive material as a hotspot of radioactive material was previously detected at the fire training school which is located close to the potential location of the radar mast;
- potential residual buried UXO from previous site use as an RAF airfield during World War II; and
- use of glyphosate based weed killers at the airport.

10.4.33 An intrusive Phase 2 Site investigation was carried out in March 2010. It included five window sample borings excavated down to 4m bgl in the area of the proposed radar mast location. The geology encountered was Made Ground (between 0 and 0.3m bgl) overlying Clay (between 0.25 and 3.2m bgl) which were underlain by Chalk (between 1.4 and 4m bgl). Groundwater was not encountered during the intrusive works. 10 soil samples were collected within the Made Ground and the Chalk and analysed for heavy metals, pH, total organic carbon (TOC), PAHs, TPH, speciated extractable petroleum hydrocarbons, volatile and semi volatile organic compounds, asbestos screen and glycols. In all the samples the concentrations detected were below the relevant screening criteria (generic assessment criteria (GAC) 2009 for human health for commercial end use and withdrawn soil guideline value 2002 for lead). TPH, for which no GAC were available, were detected with concentrations ranging from 4.11mg/kg to 258mg/kg.

Site Investigation Tank 2, Base Validation, Jentex, The Storage Installation, Canterbury Road West, Ramsgate, Kent, CT12 DU, Ref: 07R898, 2007 Randall & Walsh Associates (RAW)

10.4.34 An intrusive site investigation was carried out at the petroleum depot, located directly southeast of Manston airfield by Randall & Walsh Associates (RAW) to validate the decommissioning and demolition of a fuel oil storage tank (named Tank 2) and assess the site amenity for future land use. The report summarises the findings of the intrusive site investigation Tank 2 was originally built on a brick bund directly over the Chalk Formation. It had a capacity of 2 000 000 litres. The intrusive investigation comprised eleven trial pits excavated down to 0.3m bgl across Tank 2's former location and six soil borings advanced down to 1m bgl in the embankment that surrounded the former location of the tank. Chalk was encountered from ground level to 0.3m bgl in the trial pits.

10.4.35 Topsoil including Chalk fragments was encountered from 0 to 1m bgl in the embankment. Fifteen soil samples were collected from selected trial pits and soil boreholes. A soil sample was also collected from a stockpiled Sand that had previously been scraped back from underneath Tank after it had been decommissioned. Samples were analysed for speciated TPH by gas chromatography with flame ionization detection (GC-FID), volatile organic compounds and BTEX. A maximum TPH concentration of 11mg/kg was detected beneath the former location of Tank 2. A maximum TPH concentration of 390mg/kg was detected in the area surrounding former Tank 2's location. A

maximum TPH concentration of 320mg/kg was detected in the soil embankment. In all the samples the concentrations detected were below the 2002 Soil Guidance Values (SGVs) published by the Department for Environment, Food and Rural Affairs (Defra) and the EA, and the RAW in-house generic soil screening values (SSV) derived using the SNIFFER model for commercial/industrial land use where SGVs were not available.

10.4.36 The risks to human health and building structures, were assessed by RAW as being not significant. The TPH (mainly C21-C35) concentration of 390mg/kg detected in the area surrounding the former tank location was not considered to pose a significant risk to groundwater given the low mobility and solubility properties of the hydrocarbon compounds in this carbon range. No further investigations or remediation works were recommended.

Current and historic site activities

10.4.37 The following current and historic site activities have been identified based on the previous reports available for the site and the site walkover carried out by Amec Foster Wheeler in February 2017. More details are provided in the Phase 1 Contaminated Land Desk Study attached in **Appendix 10.1**.

- Fuel Storage and use:
  - Nine underground storage tanks (USTs) located within the current site boundary and six USTs located outside of the current site boundary had been identified in the previous GIBB report. Their presence could not be verified during the 2017 site walkover and it is not known whether all the USTs are still present and if any remediation works have been carried out. Four above (ground) storage tanks (ASTs) were identified onsite during the 2017 site walkover. Four further ASTs located outside of the current site boundary that had been identified in the previous GIBB report could not be identified during the 2017 site walkover.
  - A fuel station was identified onsite (former aviation training centre) during the 2017 site walkover.
- Historical FIDO was reported by GIBB to have been used from 1943. FIDO consisted of burning petrol along the runway to disperse fog. An AST that is believed to have been associated to the FIDO activities was still present at the southeastern boundary of the site during the 2017 site walkover.
- During the 2017 site walkover the outlets of two fuel pipes that are believed to be connected to a bulk fuel installation (BFI) onsite or/and to the runway were found at the Jentex tank farm located in the direct south-eastern vicinity of the site.
- During the 2017 site walkover, two waste oil tanks in bunds were found at the front (north) of the KIA jet support building and a waste oil container located on a concrete pad was identified at the former aviation training centre in the south-eastern part of the site.
- The Jentex tank farm is located in the direct southeastern vicinity of the site, within the SPZ1 zone. Five ASTs located in bunded areas were observed

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during the Amec Foster Wheeler 2017 site walkover. Staining and a slight hydrocarbon odour were noticed.

- Firefighting activities including:
  - Use and storage of “Pyrene” runway foam: The GIBB report indicates a Pyrene foamer was used to cushion aircraft during emergency landings which operated between 1964 and 1980. The equipment was operated from mobile tankers which were held on standby adjacent to Hangar 3. The composition of this foam is understood to contain carbon tetrachloride[164] .
  - Burning grounds: A burning area previously identified to the east of the fire station (Bldg. 869) in 1998 was still present at the February 2017 site walkover but did not appear to be still in use. It comprises a pile of ashes partly contained in a heavily corroded caged trolley. It is located on an asphalted area but extends towards a grassed area. There is no bund.
- Maintenance activities:
  - At the former and current Motor Transport (MT) workshops. The former MT workshop is now part of the RAF Manston museum that was closed to visitors at the time of the 2017 site walkover. The current MT workshop belongs to and is operated by the MOD. Storage of tyres and wooden pallets outside of the building along the fence was observed during the 2017 site walkover.
  - Storage of potentially hazardous materials at engineering workshops: During the 2017 site walkover an engineering workshop, bldg. 450 and two buildings/shelters that did not appear to be in use were identified, as well as an active lorry haulage company with a truck park all located within the site near the western boundary. They could not be accessed for inspection. The engineering workshop and bldg. 450 are connected.
  - Cleaning of aircraft/ helicopters: The area of Hanger 3 (Bldg. 253) was historically used to clean helicopters and store pyrene runway foam. The KIA Jet Support building area was also used to clean aircraft, and to carry out aircraft and vehicle servicing. The whole area of Hangar 3 and the KIA Jet Support building and the aviation training centre buildings could not be inspected during the 2017 site walkover.
- Significant quantities of de-icing chemicals used to be stored in the MT area. It was not known whether specific containment measures were in place.
- Areas of Infill: Made Ground is potentially present across part of the site and infilled Chalk pits are present on the site, infilled in the early 1900s.
- Waste disposal areas comprising:
  - Two waste storage areas including one on soft ground identified at the KIA jet support building during the 2017 site walkover.

[164] Product is understood to contain carbon-tetrachloride - https://www.google.com/patents/US1010870

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- Potential materials disposed of at an air-raid shelter which used to be located near the Glider School were no longer present during the 2017 site walkover.
- Two historical acid pits mentioned in GIBB report as being potentially infilled with unknown materials. During the 2017 site walkover it was apparent that there is now a road and a pavement at the emplacement of the historical acid pit to the east of the site near the KIA car park. There is a reworked area covered with grass at the location of the historical acid pit at the former MT building.

- Substations: 12 substations and transformers identified by GIBB were inspected during the 2017 site walkover and none of them were noted to have staining indicating potential leakages. Staining/damp was observed around a transformer (that was not listed in the GIBB report) situated along the southwestern border of the site in an area that currently belongs to the MOD and lies inside the current site boundary.
- Radiological sources: A report from the DERA Radiation Protection Services included within the GIBB report suggested that, as with many RAF sites, radioactive materials, and particularly radium luminising material, may have been present in equipment buried at the site and may have been disposed of in waste pits or areas where ash was disposed of.
- Asbestos in buildings: the asbestos register reviewed by GIBB in 1998 identified 12 locations/products either containing or suspected of containing asbestos. The material was listed as being in good to fair condition.
- Site drainage: GIBB indicated that no oil/fuel interceptors were found to be installed along the airfield drainage system, located along the outer lengths of the runway and flowing in an easterly direction, and that the system discharge was into Pegwell Bay although no discharge consent was held for the site. A site drainage investigation was performed during the February 2017 site walkover and is discussed in **Chapter 8: Freshwater Environment**.
- Off-site historical landfills: Alland Grange and Sunny Bank landfills, within 300m of the site, are licensed to take inert wastes mixed with slow degradable and putrescible waste. There is a possibility that landfill gases and leachate may migrate from these sites. In addition the Envirocheck report indicates there is another landfill to the north on Manston Road. This was an inert landfill present from 1976 to 1987.

Conclusions of the Stage 1 Preliminary Risk Assessment and Recommendations

10.4.38 The initial conceptual model has identified a number of potential contaminant linkages for receptors including current and future site users, controlled waters (aquifer and coastal water features) and property. The identified potential contaminant linkages are the bulk fuel installations (BFIs), the onsite petrol station at the aviation training centre, and the gas oil tank located at the KIA jet support building, the burning of petrol along the runway, fuel pipes potentially connected to the BFI to the north east and/or to the runway, the waste oil tanks at the KIA jet support building and the aviation training centre, the Jentex tank farm, the use and storage of Pyrene runway foam, the burning ground area, the Motor Transport

(MT) workshops (former and current), the cleaning of aircrafts / helicopters, the use and storage of de-icing chemicals, the made ground associated with the former development, the infilled chalk pits, the waste storage areas, the acid pits infilled with unknown materials, the onsite substations and the off-site landfills.

10.4.39 The risk rating of the potential linkages range from low to high – refer to the Phase 1 Contaminated Land Desk Study attached in **Appendix 10.1**. The highest risk is associated with risks to groundwater from the Jentex fuel farm which partly overlies the groundwater SPZ1.

Future baseline

10.4.40 The current baseline will be used for the purpose of this assessment, as in the absence of the Proposed Development there are no known trends or factors that are expected to affect the current baseline conditions.

10.5 Environmental measures incorporated into the Proposed Development

10.5.1 A summary of the environmental measures that have been incorporated into the development proposals to date in order to avoid, reduce or compensate for potential adverse Land Quality effects is provided in **Table 10.4** . Effects of turbidity on groundwater are addressed in **Chapter 8: Freshwater Environment**.

10.5.2 The broad approach adopted is that where achievable and agreed, environmental measures have been incorporated into the scheme. The effect that those environmental measures have on the significance of potential effects is taken into account during the assessment. In some cases a potential effect may require no further consideration following incorporation of appropriate environmental measures. The way that these environmental measures influence the assessment of significance is discussed in **Section 10.7**.

Table 10.4 Rationale for incorporation of environmental measures in the construction phase

Potential receptors	Predicated changes and potential effects	Incorporated measure

Humans /Surface (coastal) and ground water	Mobilisation of and exposure to existing potential contamination through soil disturbance, generation of dust during construction activities	• The works will be carried out in accordance with relevant Construction Design Management (CDM) Regulations 2015.
		• The need to complete an intrusive investigation will be secured by a DCO Requirement.
		• The intrusive investigation will inform the package of measures to be included within the detailed design.
		• A construction environmental management plan (CEMP) will be prepared and approved prior to commencement of works, a draft submitted with the DCO application. It will include a pollution response plan and the following measures:
		  • A survey (pre site preparation survey as defined by the HSE) and removal of asbestos containing materials, and other materials and structures contaminated with asbestos fibres, are expected to be performed by a competent/licensed contractor prior to any demolition works.
		  • For site workers and visitors, the potential for exposure to contaminants will be mitigated by the Control of Substances hazardous to Health (COSHH) Regulations 2002 and the

Potential receptors	Predicated changes and potential effects	Incorporated measure
		Management of Health and Safety at Work Regulations 1999 and controlled through good construction practices such as site induction, good hygiene practices, dust suppression (especially in loading / unloading bays and tracks), requirement for PPE suitable to prevent exposure and/or restricted access during higher risk activities. • A watching brief will be in place during demolition, ground and construction works. If unexpected contamination is encountered or suspected, the works will cease in that area and assessment by a suitably qualified land contamination specialist will be made to determine appropriate actions. Soil (soil vapour/ groundwater) samples will be collected and analysed. The risks associated with contamination will be assessed. When required, a remediation strategy will be designed and agreed with the EA and local authority before implementation. • Any construction activity with the potential to produce or release dusts will be assessed and dust avoided where possible through design, or, if unavoidable will be controlled on-site using construction good practice to prevent site users and neighbouring site occupiers being exposed to contaminants. • Site access points will be regularly cleaned to prevent build-up of dust and mud. • Any imported landscaping material will be clean and free of contaminants and of suitable thickness. In addition, measures to control sediment from the construction process also set out in **Chapter 8: Freshwater Environment** will be implemented to control contamination migration including: • Site access points will be regularly cleaned to prevent build-up of dust and mud. • Earth movement will be controlled to reduce the risk of silt combining with the site run-off. • Properly contained wheel wash facilities will be used (where required) to isolate sediment rich run-off. • Cut-off ditches and/or geotextile silt-fences will be installed around excavations, exposed ground, stockpiles to prevent the uncontrolled release of sediments from the site. • Sediment traps will be required on all surface water drains in the surrounding region. • Silty water abstracted during excavations will be discharged to settlement tanks or siltbusters as appropriate. Cleaned run-off will be discharged through the existing foul sewer drains. If sewer capacity is limited then silty water will need to be stored and removed from the site by tanker and disposed of at a suitably licensed location. A discharge consent for discharge to foul sewer, detailing volumes and rates of discharge will be agreed with Southern Water prior to the commencement of works, if necessary. • Stockpiles and material handling areas will be kept as clean as practicable to avoid nuisance from dust. Dusty materials will be dampened down using water sprays in dry weather or covered.
Humans / Soils/ Surface (coastal) and ground water	Exposure to contaminants/ Pollution incidents resulting from spillage due to spillages of oils and other chemicals associated with	• The risks from accidental spillages/leaks during handling and storage of chemicals and fuels will be mitigated by the Control of Substances hazardous to Health (COSHH) Regulations 2002 and the Management of Health and Safety at Work Regulations 1999. • Fuel, oil and chemical storage and handling will be minimised in the design of the works and safe working procedures / method statements for handling fuel and minimising the potential for spillage will be put in place. For instance by emptying and properly decommissioning fuel tanks prior to removal.

Potential receptors	Predicated changes and potential effects	Incorporated measure
	the construction process	• The risks from accidental spillages/leaks during handling and storage of chemicals and fuels will be mitigated by pollution prevention measures and good working practices (CEMP and the pollution response plan) in accordance with current guidelines. In addition measures to control spillages from the construction process also set out in on the **Chapter 8: Freshwater Environment** be implemented to control contamination migration including: • Wherever possible, plant and machinery will have drip trays beneath oil tanks / engines / gearboxes / hydraulics which will be checked and emptied regularly and correctly disposed of via a licensed waste disposal operator. • Oils and hydrocarbons will be stored in designated locations outside of SPZ1 with specific measures to prevent leakage and release of their contents, including the siting of the storage area away from the drainage system on an impermeable base, with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked when not in use. • A spillage Environmental Response Plan will be produced, which site staff will have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material.
Humans / Buildings and services	Discovery and potentially explosion of UXO associated with construction process	• A detailed UXO threat and risk assessment will be carried out in accordance with CIRIA C681 Chapter 5 on managing UXO risks prior to any intrusive works such as a ground investigation and the redevelopment of the site to determine any mitigation required to address this risk.
Soils / Ground water	Pollution incidents resulting from the release of contaminants from building materials or construction activities	• During the site works tendering process the expected level of environmental control will be included in the tender documents, so that all contractors allow for mitigation measures in their work scope. These environmental controls will be included within the finalised CEMP. Suitably qualified and experienced geo-environmental engineers would be used to supervise the ground works. • Designated washdown areas outside of SPZ1 with fully contained drainage will be used for plant/vehicles in contact with contaminated soils to avoid contaminants being moved around the site or taken off-site. • The foundation excavations will be dewatered by pumping if required. The water will be collected in suitable tanks and held on site for collection by a licensed waste contractor. No water from foundation dewatering operations will be discharged directly to ground. If required, any discharge would occur under the appropriate regulator's consent. • The risks will be mitigated through specification of impermeable concrete to the appropriate British Standard to minimise any potential adverse impacts.
Ground and coastal water	Pollution incidents due to creation of pathways for the migration of potential contamination	• Suitable foundation design and piling method will be implemented to prevent migration of any potential/residual contamination and will be agreed with Southern Water and the EA prior to the commencement of works. • Piling methods will be in accordance with "Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: Guidance on pollution prevention" and "Piling into contaminated sites".
Humans / Groundwater/ coastal water	Pollution incidents due to removal of tanks during	• A process will be in place to prevent mobilisation of fuel. • Safety precautions will be implemented and will include preparing an emergency response plan within the site health and safety

Potential receptors	Predicated changes and potential effects	Incorporated measure
	construction phase	documentation. The emergency response plan will identify responsible persons and roles, lines of communication, site evacuation procedures and exclusion zones.
Surface (coastal) and ground water	Pollution incidents resulting from concrete batching and cement products on site during the construction process.	• Any mixing and handling of wet concrete that is required on-site will be undertaken in designated areas outside of SPZ1. • A designated area will be used for any washing down or equipment cleaning associated with concrete or cementing processes and facilities provided to remove sediment prior to disposal to foul sewer. • Any contaminated soil will be identified by ground investigation prior to construction and either treated onsite and reused, or removed and disposed of off-site by a suitably licensed waste disposal operator. • Measures such as cut-off trenches will be put in place to prevent any potentially polluted run-off from within the site entering any excavations.

Table 10.5 Rationale for incorporation of environmental measures in the operation phase

Potential receptor	Predicated changes and potential effects	Incorporated measure
Humans / Buildings and services	Health hazard / Damage to property due to ingress and accumulation of vapour or ground gas resulting in health hazard from vapour or explosion/ asphyxiation for users of site buildings	• Following the site investigation, buildings will be designed to comply with Building Regulations 2016 including, where necessary, ground gas and vapour protection measures such as gas vapour membranes and sub-floor ventilation in buildings and ensuring appropriate ventilation exists in any confined spaces.
Humans	Health hazard due to future maintenance works (particularly any in ground maintenance works) that may disturb any residual contamination	• The site investigation will identify any remediation requirement. This might include the use of defined service corridors or clear service trenches so that maintenance workers are not exposed to potential residual contamination. • The health and safety file for the construction will include information of ground contamination and will kept and used to develop risk assessment and method statement including mitigation measures to address these risks in line with health and safety legislation during operational phase.
Humans / Soils / Ground and coastal water	Health hazard due to, or pollution incidents resulting from, spillages during re-fuelling	• The risks from accidental spillages/leaks during handling and storage of chemicals and fuels will be mitigated by mitigated by the Control of Substances hazardous to Health (COSHH) Regulations 2002 and the Management of Health and Safety at Work Regulations 1999. • Fuel, oil and chemical storage and handling will be minimised in the design of the works and safe working procedures / method statements for handling fuel and minimising the potential for spillage will be put in place. • The risks from accidental spillages/leaks during handling and storage of chemicals and fuels will be mitigated by pollution prevention measures and good working practices (the pollution response plan) in accordance with current guidelines

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Potential receptor	Predicated changes and potential effects	Incorporated measure
		• Re-fuelling will be in designated areas with active drainage areas and fuel interceptors. Control levels and alarms will be used to identify leaks or overflows.
Humans / Buildings and services / Groundwater	Health hazard / Damage to property due to residual contamination being present as a result of the inappropriate re-use / use of contaminated fills and soils during the construction phase	• Soil to be re-used will be controlled under the CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2) to confirm they are suitable both chemically and geotechnically. • Any imported landscaping material will be clean and free of contaminants and of suitable thickness. • The construction development will bring forward a mostly impermeable cover on the site.
Humans/ Soils / coastal and Ground - water	Health Hazard / Pollution incidents due to leakage and / or failure from fuel storage tanks	• Site investigations will be undertaken to inform the detailed design of the fuel farm facility • All storage tanks will be appropriately designed to current standards (e.g. double skinned, bunded etc.). Bunds will provide for 110% of tank capacity with allowance for the 1:100 rainfall event. • The new fuel farm facility will incorporate suitable blast protection and other measures to control and mitigate any risks to nearby commercial, residential and other property from an incident at the fuel farm. The design of these measures will be discussed with the Health and Safety Executive. • A new airside/landside security facility will be installed in the location of the existing 'emergency access gate' adjacent to the Jentex facility to provide direct airside access for the fuel farm. • Re-fuelling will be in designated areas with active drainage areas and fuel interceptors. Control levels and alarms will be used to identify leaks or overflows. Regular tank inspections will be conducted.
Soils / Ground and coastal water	Pollution incidents resulting from spillage from fire-fighting training ground	• Fire-fighting training ground will be appropriately sized, using a lined (impermeable base) hardstanding and with a perimeter bund.
Soils / Ground and coastal water	Pollution incidents resulting from pesticide use	• Pesticides will only be applied to hardstanding areas with active drainage to water treatment works. • The airport will develop a Wildlife Hazard Management Plan, Habitat Management Plan, and Long Grass Policy to control and manage the use of chemicals to prevent them being discharged to ground.
Buildings and services	Permeation of plastic pipes by contaminants	• The intrusive investigation will inform the package of measures to be included within the detailed design, which could include use of appropriate type and material specification of potable water pipes and other buried services (E.g. .use of barrier pipe and/or clean service trenches)
In addition to the environmental measures relevant to Land Quality, the following environmental measures relevant to the freshwater environment detailed in Chapter 8, will be incorporated into the Proposed Development		

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Potential receptor	Predicated changes and potential effects	Incorporated measure
Groundwater	Contaminated run-off generated by de-icer storage and use	• Application will only be in designated areas with active drainage where the run-off is lead to water treatment lagoons.

10.5.3 The above measures are standard industry practice for addressing contamination risks, although exact details would be confirmed by further site investigation and would be agreed with the Environment Agency and Thanet District Council.

10.6 Scope of the assessment

10.6.1 This section sets out information on:

- the process whereby receptors are identified;
- the potential receptors that could be affected by the development; and
- the potential effects on receptors that could be caused by the development.

10.6.2 The scope of assessment has been informed by:

- the scoping study;
- consultee responses to the Scoping Report;
- the results of the work detailed in Section 0; and
- the preliminary scheme design.

Approach to identifying receptors

10.6.3 The identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study for the site location.

10.6.4 In some cases, even without quantified information, it is reasonable to assume that some potential receptors will not experience significant effects. This is sometimes the result of tried and trusted mitigation measures that have been incorporated into the scheme, which might reasonably be expected to be effective (see **Section 10.5**).

10.6.5 The following considerations have been taken into account in identifying potential receptors:

- The extent to which the receptor will be affected by changes that are expected to result from the development;
- The sensitivity of the receptors to the changes that are likely to occur;
- The likely magnitude, duration and other characteristics of the effects;
- The importance or value of the receptor at a local, regional and national level; and

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- Relevant best practice and guidance where specialist methodologies have been developed as detailed below.

Potential receptors

10.6.6 The identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study and site walkover for the site location.

10.6.7 This section identifies the potential receptors that have been identified based on the above factors and on the consultation response received from PINS. The receptors listed in **Table 10.6** are considered capable of being significantly affected and will therefore be taken forward for further assessment.

Table 10.6 Potential receptors

Receptor	Distance from site boundary	Reason for selection
Humans: **Site and adjacent site users (off-site neighbours) – construction phase;** **Future site users (commercial users, personnel on-site, passengers), site adjacent users (off-site neighbours)– operational phase**	Onsite	The Phase 1 LQA preliminary risk assessment has identified risks from current and historic sources
Buildings and Services	Onsite	The Phase 1 LQA preliminary risk assessment has identified risks from current and historic sources
Soils: agricultural land / soil classification	Offsite (adjacent south-west)	Grade 2 (very good quality agricultural land) and Grade 3a (good quality agricultural land) lands
Controlled Waters: Coastal water (Pegwell Bay and Sandwich Bay)	900m south-east of the site	The Phase 1 LQA preliminary risk assessment has identified risks from current and historic sources
Controlled Waters: Principal Aquifer in bedrock	Onsite	The Phase 1 LQA preliminary risk assessment has identified risks from current and historic sources

Spatial and temporal scope

10.6.8 The assessment considers the potential effects of the development in relation to Land Quality on receptors on the site as well as off-site receptors.

- Human receptors: have been defined as those onsite and the off-site neighbours;
- Buildings and Services: have been defined as those onsite;
- Soils: have been defined as those located off-site adjacent southwest and classified as of very good and good agricultural lands;

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- Coastal waters: have been defined as Pegwell Bay and Sandwich Bay located off-site as it is anticipated that if the Lord of the Manor abstraction is not in use the adit system would provide a potentially fast pathway for potentially contaminated groundwater to the coast;
- Groundwater: Groundwater receptors have been defined as the Kent Isle of Thanet Chalk Water Framework Directive (WFD) groundwater body (i.e. identified under the WFD as a Drinking Water Protected Area – refer to **Chapter 8: Freshwater Environment**) which underlies the site and dependant abstractions.

10.6.9 An assessment of the potential effects of the development in relation to Land Quality has been undertaken for the construction, operational and decommissioning phases of the development.

10.6.10 The assessment of the construction phase effects will consider the effects from all four of the construction phases as outlined in **Chapter 3: Description of the Proposed Development**. Where there are different potential effects from each construction phase these will be outlined and each assessed separately.

10.6.11 The assessment of the operation phase effects will consider the worst case scenario potential effects, which, for most potential effects, are likely to be those from Year 20 of the airport forecast as detailed in **Chapter 3: Description of the Proposed Development**.

Potentially significant effects

10.6.12 The potentially significant effects from the Proposed Development, which are subject to further discussion in this chapter, are summarised below.

- Effects on Human Health, including during construction phase;
- Effects on Buildings and Services;
- Effects on Soils;
- Effects on Coastal Waters;
- Effects on Groundwater in the Chalk aquifer

10.7 Assessment methodology

10.7.1 This section sets out the methodologies used to predict effects and to undertake the significance evaluation.

Methodology for predicted effects

10.7.2 The potential effects of contaminated land issues are usually assessed by undertaking a contaminated land risk assessment. The risk assessment process is based on a tiered framework in accordance with Contaminated Land Report (CLR) 11. The preliminary risk assessment approach is summarised in **Table 10.7**.

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Table 10.7 Summary of Preliminary Risk Assessment Approach

Tier 1: Preliminary Risk Assessment
▶ Development of a Conceptual Model; ▶ Preliminary Risk Assessment examining potential contaminants, pathways and receptors to identify the potential 'contaminant linkages'; and ▶ Identification of further risk assessment requirements.

10.7.3 The conceptual model represents the characteristics of the site and indicates the possible relationships between contaminants, pathways and receptors, where:

- a contaminant is a substance which is present in, on, or under the land and has the potential to cause harm;
- a receptor is something which could be adversely affected by the contaminant, for example, human beings, animals, plants, buildings and controlled waters; and
- a pathway is a route or means by which a receptor could be exposed to, or affected by, a contaminant.

10.7.4 For a potential risk to exist at a site all three of the above elements must be present, and linked together so that a contaminant has been identified, a receptor is located on or near the site and there is an exposure pathway that links the contaminant to the receptor. The term 'contaminant linkage', is used to describe a particular combination of contaminant pathway-receptor relationship.

10.7.5 The potential risk associated with each contaminant linkage has been assessed by considering the nature of the contaminant, the degree of potential exposure of a receptor to a contaminant, the likelihood of the exposure and the sensitivity of the receptor.

10.7.6 A detailed explanation of the methodology is provided in Appendix C of the Phase 1 LQA (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) (**Appendix 10.1** of this PEIR).

10.7.7 Where potential sources of contamination have been identified, each of the sensitive receptors has been considered. However, where a plausible pathway cannot be established from the source to receptor, a risk is not deemed to be present and therefore the potential effect is not considered further and is scoped out from further assessment.

Sensitivity of Receptor

10.7.8 The categories and definitions of value and/or sensitivity that will be used in the assessment are displayed in **Table 10.8** Where a receptor could reasonably be placed within more than one value and sensitivity rating, conservative professional judgment has been used to determine which rating would be applicable.

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Table 10.8 Definitions of Receptor Sensitivity

Sensitivity	Definition
High	Receptor of high sensitivity and high intrinsic value (e.g. humans, ecological receptors with international or national designations, strategically important / high value buildings and built environment; Principal Aquifer with significant public water supply abstractions and /or within Inner or Outer Source Protection Zones, high value or sensitive surface water courses). Soil grade 1 (extremely good quality) and / or Grade 2 (very good quality) agricultural land / soil classification.
Medium	Receptor of medium sensitivity and value, i.e. possesses key distinctive characteristics (e.g. important buildings to be constructed on-site with moderate value, habitats or ecology of regional importance; Principal Aquifer with public and or private water supply abstractions and / or within Catchment Source Protection Zone; or Secondary Aquifer with significant water supply abstractions, water quality of receptor supports high biodiversity (not designated); receptor has low capacity to accommodate change to water quality status; water quality of receptor waterbody classified under WFD as good ecological status/potential). Soil grade 3 (good to moderate quality) agricultural land / soil classification.
Low	Receptors of low sensitivity and value,(e.g. low value / sensitivity built environment e.g. hardstanding, drains/ sewers; ecology / ecosystem with only local and / or no designations or protection; Secondary A/B Aquifers without abstractions in the vicinity or Unproductive Aquifers; surface waters where baseline conditions define an environment that has a high capacity to accommodate proposed change to water quality status due, for example, to the large relative size of receiving water feature and effect of dilution; surface waters where specific water quality conditions of receptor water feature likely to be able to tolerate proposed change with very little or no impact upon the baseline conditions; water quality of receptor could be expected to be classified under the WFD as moderate to poor and /or ecological status/potential). Soil grade 4 or 5 (poor and very poor quality) agricultural land /soil classification.

Magnitude of effect

10.7.9 This will be based on the assessment of the scale of change and the consequences the development would have upon sensitive receptors. The scale of change would be considered both spatially and /or temporally when categorising the magnitude of an effect and would be categorised as high, medium, low or negligible. The definitions of the magnitude of an effect are provided in **Table 10.9**.

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Table 10.9 Definitions of Magnitude of Effect

Magnitude	Human Health	Controlled Water	Ecology	Property Structures / Crops and Animals	Examples
High	***Adverse*** **Highly elevated concentrations likely to result in "significant harm" to human health as defined by the Environmental Protection Act (EPA) 1990, Part 2A, if exposure occurs.**	***Adverse*** **Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.**	***Adverse*** **Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population.**	***Adverse*** **Catastrophic damage to crops, buildings or property.**	**Significant harm to humans is defined in Defra circular 01/2006 – contaminated land[165] as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions.** **Major fish kill in surface water from large spillage of contaminants from site.** **Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity).** **Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).**
	Beneficial **Removal of all identified contaminant linkages that pose a risk to receptors.**	***Beneficial*** **Removal of all identified contaminant linkages that pose a risk to receptors.**	***Beneficial*** **Removal of all identified contaminant linkages that pose a risk to receptors.**	***Beneficial*** **Removal of all identified contaminant linkages that pose a risk to receptors.**	
Medium	*Adverse* Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs.	*Adverse* Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	*Adverse* Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.	*Adverse* Significant damage to crops, buildings or property.	Significant harm to humans is defined in Defra circular 01/2006 – contaminated land[165] as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.
	Beneficial Removal of the majority of identified contaminant	*Beneficial*	*Beneficial*	*Beneficial* Removal of the majority of identified contaminant linkages	

[165]Department for Environment, Food and Rural Affairs (Defra) Circular 01/2006 Environmental Protection Act 1990: Part 2A Contaminated Land, September 2006

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	linkages so that risks to receptors are reduced.	Removal of the majority of identified contaminant linkages so that risks to receptors are reduced	Removal of the majority of identified contaminant linkages so that risks to receptors are reduced.	so that risks to receptors are reduced.	
Low	*Adverse* Exposure to human health unlikely to lead to "significant harm".	*Adverse* Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce.	*Adverse* Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population.	*Adverse* Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (e.g. mild skin rash). Surface spalling of concrete.
	Beneficial N/A	*Beneficial* N/A	*Beneficial* N/A	*Beneficial* N/A	
Negligible	*Adverse* No measurable effects on humans.	*Adverse* Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	*Adverse* Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	*Adverse* Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.
	Beneficial N/A	*Beneficial* N/A	*Beneficial* N/A	*Beneficial* N/A	
No change of effect	*No discernible change of effect*	*No discernible change of effect*	*No discernible change of effect*	*No discernible change of effect*	

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Significance evaluation methodology

10.7.10 The significance level attributed to each effect has been assessed based on the magnitude of change due to the development and the sensitivity of the affected receptor as displayed in **Table 10.10**. Magnitude of change is assessed on a scale of high, medium, low and negligible whilst the sensitivity of the affected receptor is assessed on a scale of high, medium, and low.

10.7.11 The effects can be of major, moderate, minor or negligible significance. In addition, effects are judged to be adverse or beneficial and temporary or permanent. The final assessment of the significance of the effect, i.e. the residual effect, is judged on the relationship of the magnitude of effect to the sensitivity and/or importance of the receptor or resource and likelihood of the effect, with any 'incorporated' mitigation.

Table 10.10 Significance criteria

	Magnitude of Change			
Sensitivity/Value	**High**	**Medium**	**Low**	**Negligible**
Very High	Significant	Significant	Not Significant	Not Significant
High	Significant	Not Significant	Not Significant	Not Significant
Medium	Not Significant	Not Significant	Not Significant	Not Significant
Low	Not Significant	Not Significant	Not Significant	Not Significant

10.8 Assessment of effects on Humans

Construction phase effects

10.8.1 The construction phase will involve disturbance of soils which have the potential to contain concentrations of various contaminants including hydrocarbons, heavy metals, asbestos, and solvents. Spillages of oils and other chemicals can also occur during the construction activities. The construction phase therefore has the potential to have an adverse effect on human health through direct contact, ingestion and / or inhalation of impacted soils. The receptor sensitivity has been assessed as high. Environmental measures and construction good practices to control exposure and prevent spreading of contamination have been suggested for incorporation into the site's CEMP as well as a survey and removal of asbestos containing materials – refer to **Table 10.4**. In addition an intrusive investigation will be undertaken before construction to determine if there is any evidence of contamination, the programme and scope of these investigations will be agreed with the Environment Agency, Thanet District Council Environmental Health Officer and other stakeholders as appropriate. This will allow the incorporation of any additional mitigation measures. With all these measures in place, there is a high degree of certainty that the effects on human health would be negligible (i.e.

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combination of a high receptor sensitivity and negligible magnitude of effect) and therefore effects would be not significant during the construction phase.

10.8.2 The discovery and potential for explosion of UXO could also occur during the construction activities. The receptor sensitivity has been assessed as high. A detailed UXO threat and risk assessment will be undertaken prior to any ground works and the findings of the risk assessment implemented. With that measure in place, there is a high degree of certainty that the effects on human health would be negligible (i.e. combination of a high receptor sensitivity and negligible magnitude of effect) and therefore not significant during the construction phase.

10.8.3 At the existing fuel storage areas (Jentex tank farm), new tanks and other infrastructure will be required to meet the needs of the airport, and to ensure that the facility is adequately designed and fit for purpose. Before the construction of the new facility the existing tanks and infrastructure will be decommissioned. The receptor sensitivity has been assessed as high and the magnitude of effect as high; the effects on human health during the construction phase would be expected to be major adverse. Environmental measures have been suggested for incorporation into the Proposed Development during the construction phase including an emergency response plan – refer to **Table 10.4**. Additional measures may need to be identified in the ES and CEMP to mitigate the potential effects on human health so that they are negligible and therefore not significant during the construction phase.

Operational phase effects

10.8.4 The potential effects on human health that could occur during the operational phase comprise:

- health hazard due to ingress and accumulation of ground gas resulting in explosion or asphyxiation for users of site buildings;
- health hazard due to future maintenance works (particularly any in ground maintenance works such as works on buried services) that may disturb any residual contamination;
- health hazard due to spillages during re-fuelling; and
- health hazard due to residual contamination being present as a result of the inappropriate re-use / use of contaminated fills and soils during the construction phase.

10.8.5 With the environmental measures outlined in **Table 10.5** and those detailed in **Chapter 8: Freshwater Environment,** the planned intrusive site investigation and the health and safety file for the construction in place, it is considered that the effects on human health would be negligible and therefore not significant during the operational phase (i.e. combination of a high receptor sensitivity and negligible magnitude of effect).

Decommissioning phase effects

10.8.6 The same approach would be undertaken for the decommissioning phase, therefore no potentially significant effects are anticipated except for decommissioning of existing tanks and infrastructure at the fuel storage areas

(Jentex tank farm). The environmental measures that have been incorporated into the construction phase – refer to **Table 10.4** as well as the additional measures that will be developed in the ES will be implemented to mitigate the potential effects on human health.

Combined Effects

10.8.7 It is anticipated that there will not be any significant combined effects on humans providing that each source is addressed appropriately and that environmental measures to mitigate the effects from air quality, and noise and vibration that could affect the same receptors as land quality will be incorporated in the CEMP.

10.9 Assessment of effects on Groundwater (Chalk aquifer)

Construction phase effects

10.9.1 The construction phase has the potential to have an adverse effect on groundwater through:

- disturbance of soils (earthworks) and mobilisation of existing contamination;
- pollution from spillages of oils and other chemicals;
- pollution incident due to the creation of pathways for the migration of potential contamination.

10.9.2 Construction phase 1 would have the greatest volume of construction activity, as it will involve earthworks for the levelling of the apron areas and the installation of the drainage system. Phases 2-4 would still have the potential for effects, but of a potentially lower magnitude as there would be less ground disturbance, although the potential for piling during the construction of the cargo facilities remains.

10.9.3 The detailed design of the new infrastructure and foundations, including the taxiways, aprons, stand and cargo facilities, would be completed following the geotechnical site investigations which will be conducted in construction phase 1. These investigations, and the final design of the foundations will be agreed in advance with the Environment Agency and Southern Water. If piling, and other foundation techniques with the potential to affect the receptor are required, then appropriate construction techniques and controls to mitigate any significant effects will be agreed.

10.9.4 The groundwater/Chalk aquifer sensitivity has been assessed as high because it is a Principal Aquifer with significant public water supply abstractions and the site lies within the inner and outer Source Protection Zones (SPZ 1 and SPZ 2). Environmental measures have been incorporated into the CEMP and the pollution response plan – refer to **Table 10.4**. They include avoidance of ground disturbance and potentially polluting activities within SPZ1, and agreement of piling approaches with the Environment Agency and Southern Water prior to commencement of construction works. It is concluded that the combination of construction good practice and site specific measures for the protection of the Chalk aquifer, in combination with further consultation with the Environment Agency and Southern Water, will result in negligible magnitude of effect upon a

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high receptor sensitivity, and therefore no potentially significant effects during the construction phase.

10.9.5 In relation to pollution incidents due to removal of tanks at fuel storage areas (Jentex tank farm) during the construction phase, these will be appropriately decommissioned prior to removal. The receptor sensitivity has been assessed as high and the magnitude of effect as high; the effects on groundwater during the construction phase would be expected to be major adverse. Environmental measures have been incorporated into the Proposed Development including an emergency response plan – refer to **Table 10.4**. Due to the sensitivity of the receptor, additional measures will need to be developed in the Environmental Statement to mitigate the potential effects on groundwater. The design of these measures will be discussed with the Environment Agency and Southern Water and will be further developed in the Environmental Statement so that the effects on groundwater would be negligible and therefore not significant (i.e. combination of a high receptor sensitivity and low magnitude of effect).

Operational phase effects

10.9.6 The following operational phase effects have been identified:

- pollution incident due to future maintenance works (particularly any in ground maintenance works) that may disturb and mobilise any residual contamination
- pollution incident due to spillages during re-fuelling
- pollution incident due to residual contamination being present as a result of the inappropriate re-use / use of contaminated fills and soils during the construction phase.

10.9.7 The receptor sensitivity has been assessed as high. The environmental measures outlined in **Table 10.5**, including pollution prevention measures and good working practices (the pollution response plan) in accordance with current guidelines, those detailed in **Chapter 8: Freshwater Environment**, and the intrusive site investigation in place, it is considered that the effects (with exception of the risk from the fuel storage areas at the Jentex tank farm) on groundwater would be negligible and therefore not significant during the operational phase (i.e. combination of a high receptor sensitivity and negligible magnitude of effect).

10.9.8 At the Jentex tank farm, new tanks and other infrastructure will be required to meet the needs of the airport, and to ensure that the facility is adequately designed and fit for purpose. The receptor sensitivity has been assessed as high and the magnitude of effect as high; the effects on groundwater during the operational phase would be expected to be major adverse. In order to mitigate the effects on groundwater, environmental measures have been suggested for incorporation into the Proposed Development – refer to **Table 10.5**.

10.9.9 Further mitigation measures to manage this risk are suggested as follows:

- further discussion with the Environment Agency and Southern Water to finalise the location and design of the fuel farm. Design will be undertaken to Best Available Techniques (BAT);

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- regular inspection of tanks, bunds, impermeable surfaces and operating facilities;
- a tank integrity monitoring programme;
- tanks with overflow outlets directed to the emergency spillage containment tank and then a tertiary containment gallery;
- implementation of strict fuel delivery and control systems; and
- detailed emergency response procedure in the event of a failure.

10.9.10 The Environmental Statement will develop further mitigation measures, in consultation with the Environment Agency and Southern Water to appropriately mitigate potential effects on this receptor.

Decommissioning phase effects

10.9.11 It is envisaged that decommissioning phase effects would be similar to construction phase effects, albeit without ground disturbance due to piling. Good practice methods and the discussion of site specific approaches with the relevant statutory consultees should ensure that there are no potentially significant effects in the decommissioning phase.

Combined Effects

10.9.12 The combined Land Quality and Freshwater effects coincide in relation to groundwater. The Hydrogeological Risk Assessment of the **Chapter 8: Freshwater Environment** (**Appendix 8.1**, **Section 4**) includes an assessment of the risk to the groundwater environment from activities and suggests appropriate measures to be incorporated into the site's design and CEMP and should be read alongside this chapter. In particular effects from uncontaminated sediment and turbidity effects are addressed in the Hydrogeological Impact Assessment of the Freshwater chapter.

10.10 Assessment of Effects on Coastal Waters (Pegwell Bay (and associated designated sites))

Construction phase effects

10.10.1 The construction phase has the potential to have an adverse effect on coastal waters through:

- soils disturbance and mobilisation of existing contamination.
- pollution from spillages of oils and other chemicals.
- pollution incident due to the creation of pathways for the migration of potential contamination

10.10.2 The sensitivity of coastal waters has been assessed as high. The potential for contaminants mobilisation via baseflow is unknown. However, it is anticipated that if the Lord of the Manor PWS abstraction is in use, it would likely capture much of the groundwater. If it is not in use, the adit system would provide a potentially fast

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pathway to the coast. Therefore, mitigation measures will be incorporated into the CEMP and the construction phase pollution response plan – refer to **Table 10.4** - to protect the groundwater environment during the construction phase should also ensure that no potential pollutants reach Pegwell Bay so that the effects on coastal waters would be negligible and therefore not significant during the construction phase (i.e. combination of a high receptor sensitivity and negligible magnitude of effect).

10.10.3 In construction phases 2-4 it is envisaged that the site drainage network would be in place and discharges would be to Pegwell Bay. Such discharges would only take place once silt and any other potential pollutants (e.g. hydrocarbons) had been removed from site discharge. The receptor sensitivity has been assessed as medium and the magnitude of effect low.

10.10.4 Therefore it is not envisaged that there will be any potentially significant effects on coastal waters/Pegwell Bay and any associated designated sites during the construction phases.

10.10.5 In relation to pollution incidents due to removal of tanks at fuel storage areas (Jentex tank farm) during the construction phase, it is recommended these are appropriately decommissioned prior to removal. Based on a high receptor sensitivity and high magnitude of effect; the potential effects on coastal waters during the construction phase would be expected to be major adverse and therefore significant. Environmental measures for groundwater that have been incorporated into the Proposed Development should also ensure that no pollutants reach coastal waters. As for groundwater and due to the sensitivity of the receptor, additional measures will need to be developed in the Environmental Statement to mitigate the potential effects on coastal waters. The design of these measures will be discussed with the Environment Agency and Southern Water and will be further developed in the Environmental Statement so that the effects on coastal waters would be negligible and therefore not significant (i.e. combination of a high receptor sensitivity and low magnitude of effect).

Operational phase effects

10.10.6 The following operational phase effects have been identified:

- pollution incident due to future maintenance works (particularly any in ground maintenance works) that may disturb any residual contamination
- pollution incident due to spillages during re-fuelling
- pollution incident due to residual contamination being present as a result of the inappropriate re-use / use of contaminated fills and soils during the construction phase.
- pollution from spillages of oils and other chemicals
- pollution incident due to fire-fighting activities
- pollution incidents resulting from pesticide use

10.10.7 The receptor sensitivity has been assessed as high. The potential for contaminants mobilisation via baseflow is unknown. However, it is anticipated that

if the Lord of the Manor PWS abstraction is in use, it would likely capture much of the groundwater. If it is not in use, the adit system would provide a potentially fast pathway to the coast. Therefore, mitigation measures will be incorporated into the CEMP and the pollution response plan – refer to **Table 10.5** - to protect the groundwater environment during the operational phase should also ensure that no potential pollutants reach Pegwell Bay, resulting in expected negligible effects on coastal waters which are not significant (i.e. combination of a high receptor sensitivity and negligible magnitude of effect).

10.10.8 As stated in **Chapter 8: Freshwater Environment**, water treatment will take place on site in attenuation ponds and water will only be pumped to the discharge pipe from these ponds once appropriate quality standards are reached. It is proposed that there are two ponds on site, one of which will receive "dirty" run-off (for example that containing de-icer) and one receiving "clean" run-off. Water will only be discharged from the "dirty" run-off pond once treatment is complete and pumped discharge will only take place from the "clean" pond. These ponds will be sized to take account of the capacity of the pipe and pump and will appropriately consider the February 2016 update to the NPPF climate change allowances. Further details will be submitted with the site drainage plan and Flood Risk Assessment, which will accompany the DCO application. Both documents will be discussed with the Environment Agency prior to submission.

10.10.9 There is a risk of pollution incidents due to leakage from fuel storage tanks (Jentex tank farm) as new tanks and other infrastructure will be required to meet the needs of the airport, and to ensure that the facility is adequately designed and fit for purpose. The receptor sensitivity has been assessed as high and the magnitude of effect as high; the effects on coastal waters during operational phase would be expected to be major adverse, Environmental measures that have been incorporated into the Proposed Development in order to mitigate the effects on groundwater should ensure that no pollutants reach the coastal waters – refer to **Table 10.5**. Due to the sensitivity of the receptor and the high magnitude of effect, additional measures are likely to be developed in the Environmental Statement so that the effects on coastal waters would be negligible during the operational phase and therefore not significant (i.e. combination of a high receptor sensitivity and low magnitude of effect).

Decommissioning phase effects

10.10.10 The same environmental measures outlined for the construction phase would be incorporated for the decommissioning phase, therefore no potentially significant effects are anticipated.

Combined Effects

10.10.11 The combined Land Quality and Freshwater effects also coincide in relation to coastal water. The Hydrogeological Risk Assessment of **Chapter 8: Freshwater Environment** (**Appendix 8.1**, **Section 4**) includes an assessment of the risk to the groundwater environment from activities and suggests appropriate mitigation measures to be incorporated into the site's design and CEMP and should, be read alongside this chapter. In particular effects from uncontaminated sediment and turbidity effects are addressed in the Hydrogeological Risk Assessment of the freshwater environment chapter.

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10.11 Assessment of Effects on Soils

Construction phase effects

10.11.1 The effects on groundwater that have been identified for the construction phase apply also for soils. The environmental measures that will be implemented to protect the groundwater environment will ensure that that there are no potentially significant effects in the construction phase.

10.11.2 There is a risk of pollution incidents due to removal of tanks from fuel storage tanks (Jentex tank farm) during construction phase. The receptor sensitivity has been assessed as medium and the magnitude of effect as high; the effects on soils during construction phase would be expected to be major to moderate adverse, The environmental measures that have been incorporated into the Proposed Development– refer to **Table 10.4** – as well as the additional measures that will be developed in the Environmental Statement to mitigate the potential effects on groundwater should also ensure that the effects on soils would be negligible during construction phase and therefore not significant (i.e. combination of a medium receptor sensitivity and low magnitude of effect).

Operational phase effects

10.11.3 The effects on groundwater that have been identified for the operational phase apply also for soils. The environmental measures that will be implemented to protect the groundwater environment will ensure that that there are no potentially significant effects in the construction phase.

10.11.4 There is a risk of pollution incidents due to leakage from fuel storage tanks (Jentex tank farm) as new tanks and other infrastructure will be required to meet the needs of the airport, and to ensure that the facility is adequately designed and fit for purpose. The receptor sensitivity has been assessed as medium and the magnitude of effect as high; the effects on coastal waters during operational phase would be expected to be major to moderate adverse, The environmental measures that have been incorporated into the Proposed Development including an emergency response plan and appropriate design to current standards of all storage tanks – refer to **Table 10.5** – as well as the additional measures that will be developed in the Environmental Statement to mitigate the potential effects on groundwater should also ensure that the effects on soils would be negligible during the operational phase and therefore not significant (i.e. combination of a medium receptor sensitivity and low magnitude of effect).

Decommissioning phase effects

10.11.5 It is envisaged that decommissioning phase effects would be similar to construction phase effects, albeit with less ground disturbance due to piling. Good practice methods and the discussion of site specific approaches with the relevant statutory consultees should ensure that there are no potentially significant effects in the decommissioning phase.

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Combined effects

10.11.6 It is not anticipated that there will be any combined effects on soils providing each source is addressed appropriately and environmental measures incorporated in the CEMP.

10.12 Assessment of Effects on Building and Services

Construction phase effects

10.12.1 The discovery and potentially explosion of UXO could occur as a result of the construction activities. The sensitivity of buildings and services to UXO has been assessed as medium (important buildings to be constructed on-site with moderate value). The effects on human health have been assessed in **Section 10.8**. A detailed UXO threat and risk assessment will be undertaken prior to any ground works. With that measure in place, there is a high degree of certainty that the effects on buildings and services would be negligible during the construction phase (i.e. combination of a medium receptor sensitivity and negligible magnitude of effect) and therefore would be not significant.

Operational phase effects

10.12.2 The potential effects on buildings and services that could occur during the operational phase comprise;

- damage to property due to ingress and accumulation of ground gas resulting in explosion of site buildings;
- damage to property due to residual contamination being present as a result of the inappropriate re-use / use of contaminated fills and soils during the construction phase; and
- permeation of plastic pipes by contaminants.

10.12.3 The receptor sensitivity has been assessed as medium. The environmental measures outlined in **Table 10.5** and the intrusive site investigation that will inform the package of measures to be included in the detailed design are considered sufficient and will ensure the effects on buildings and services would be negligible (i.e. combination of a medium receptor sensitivity and negligible magnitude of effect) and therefore not significant during the operational phase.

Decommissioning phase effects

10.12.4 The same environmental measures outlined for the construction phase would be incorporated for the decommissioning phase, therefore no potentially significant effects are anticipated.

Combined effects

10.12.5 It is not anticipated that there will be any combined effects on buildings and services providing each source is addressed appropriately and environmental measures incorporated in the CEMP.

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10.13 Conclusions of preliminary significance evaluation

10.13.1 The Conclusions on the significance of all those effects that have been subject to assessment in **Sections 10.8** to **10.12** are summarised in **Table 10.11**.

Table 10.11 Summary of significance of effects

Receptor and effects	Significance Level	Rationale
Groundwater –– removal of tanks and leakage from tanks	Potentially Significant	Environmental measures have been incorporated into the Proposed Development including an emergency response plan and appropriate design to current standards of all storage tanks – refer to **Section 10.5** – as well as the additional measures that will need to be developed in the Environmental Statement
Coastal waters – removal of tanks and leak from tanks	Potentially Significant	Environmental measures have been suggested for incorporation into the Proposed Development including an emergency response plan and appropriate design to current standards of all storage tanks – refer to **Section 10.5** – as well as the additional measures that will need to be developed in the Environmental Statement
Soils	Potentially Significant	Environmental measures have been suggested for incorporation into the Proposed Development including an emergency response plan and appropriate design to current standards of all storage tanks – refer to **Section 10.5** – as well as the additional measures that will need to be developed in the Environmental Statement
Humans; **mobilisation of and exposure to existing potential contamination through soil disturbance, generation of dust during construction activities;** **exposure to contaminants/ Pollution incidents resulting from spillage due to spillages of oils and other chemicals**	Not Significant	Environmental measures and construction good practices described in **Table 10.4** to control exposure and prevent spreading of contamination have been suggested for incorporation into the CEMP. A survey and the removal of asbestos containing materials will be carried out.
Surface (coastal) and ground water: **mobilisation of and exposure to existing potential contamination through soil disturbance, generation of dust during construction activities;** **Pollution incidents resulting from spillage due to spillages of oils and other chemicals**	Not Significant	Environmental measures described in **Table 10.4** will be incorporated into the CEMP and the pollution response plan. They include avoidance of ground disturbance and potentially polluting activities within SPZ1, and agreement of piling approaches with the Environment Agency and Southern Water prior to commencement of construction works.
Soils - Pollution incidents resulting from spillage due to spillages of oils and other chemicals	Not Significant	The environmental measures that will be implemented to protect the groundwater environment will ensure that that there are no potentially significant effects in the construction phase.
Humans / Buildings and services - discovery and potentially explosion of UXO associated with construction process	Not Significant	A detailed UXO threat and risk assessment will be carried out in accordance with CIRIA C681 Chapter 5 on managing UXO risks prior to any intrusive works such as a ground investigation and the redevelopment of the site to determine any mitigation required to address this risk

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Receptor and effects	Significance Level	Rationale
Soils / Groundwater - pollution incidents resulting from the release of contaminants from building materials or construction activities	Not Significant	Environmental measures described in **Table 10.5** will be incorporated into the CEMP
Ground and coastal water - pollution incidents due to creation of pathways for the migration of potential contamination	Not significant	Environmental measures described in **Table 10.4** will be incorporated into the CEMP and the pollution response plan. They include avoidance of ground disturbance and potentially polluting activities within SPZ1, and agreement of piling approaches with the Environment Agency and Southern Water prior to commencement of construction works.
Humans / Buildings and services - health hazard / Damage to property due to due to ingress and accumulation of vapour or ground gas resulting in health hazard from vapour or explosion/ asphyxiation for users of site buildings	Not Significant	Following the site investigation, buildings will be designed to comply with The Building Regulations 2010 (SI 2010/2214) last amended 2013: Document C Site preparation and resistance to contaminants and moisture, including the where necessary, ground gas and vapour protection measures such as gas vapour membranes and sub-floor ventilation in buildings and ensuring appropriate ventilation exists in any confined spaces.
Humans - health hazard due to future maintenance works (particularly any in ground maintenance works) that may disturb any residual contamination	Not Significant	Environmental measures outlined in **Table 10.5** will be incorporated into the CEMP.
Humans / Soils / Ground and coastal water - health hazard due to / Pollution incidents resulting from spillages during re-fuelling	Not Significant	Environmental measures outlined in **Table 10.5** and those detailed in **Chapter 8: Freshwater Environment**, will be incorporated in the CEMP.
Humans / Buildings and services / Groundwater - health hazard / Damage to property due to residual contamination being present as a result of the inappropriate re-use / use of contaminated fills and soils during the operational phase	Not Significant	Environmental measures outlined in **Table 10.5** will be incorporated in the CEMP.
Soils / Ground and coastal water - pollution incidents resulting from spillage from fire-fighting training ground	Not Significant	Environmental measures outlined in **Table 10.5** and those detailed in **Chapter 8: Freshwater Environment**, will be incorporated in the CEMP.
Soils / Ground and coastal water - Pollution incidents resulting from pesticide use	Not Significant	Environmental measures outlined in **Table 10.5** and those detailed in **Chapter 8: Freshwater Environment**, will be incorporated in the CEMP.

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11. Landscape and Visual Impact Assessment

11.1 Introduction

11.1.1 This chapter sets out the results of a preliminary assessment of the landscape and visual effects of the Proposed Development.

11.1.2 This chapter should be read in conjunction with the Description of the Proposed Development (**Chapter 3**). Following a summary of the limitations of the PEIR, the chapter outlines the relevant policy, legislation and guidance that has informed the preliminary assessment, and the data gathering methodology that was adopted as part of the preliminary landscape and visual effects assessment. This leads on to a description of the overall baseline conditions, the scope of the assessment, and the assessment methodology. The chapter concludes with a summary of the results of the assessment at this point in time.

11.1.3 It has been undertaken in accordance with relevant guidance for undertaking landscape and visual assessments in the UK which is provided by the *Guidelines for Landscape and Visual Impact Assessment Third Edition* (hereafter referred to as *GLVIA 3*) (Landscape Institute (LI) and Institute of Environmental Management & Assessment (IEMA), 2013).

11.1.4 The European Landscape Convention (Council of Europe, 2000) which was ratified in the UK in 2007 defines landscape as:

"*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.*"

11.1.5 Landscape effects and visual effects are closely related, but do form separate assessments, the former relating to landscape and areas of landscape character, and the latter relating to the visual effects on views and visual amenity as experienced by people.

Limitation of the PEIR

11.1.6 As outlined in **Section 1.3**, the PEIR provides preliminary information based on the design of the Proposed Development to date and data gathered at this point, that will subsequently be provided in full and final form within the ES.

11.1.7 No assessment of potential effects associated with the lighting of the Proposed Development has yet been undertaken. Whilst an outline lighting design has been produced, the current level of design maturity lacks much of the information relating to parameters for illuminance/luminance, glare control or potential light spill required to undertake a meaningful assessment. The outline lighting design will be used to inform the scope of the lighting assessment. The scope of the lighting assessment will also be informed by the feedback received in response to this consultation.

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11.2 Policy and legislative context

11.2.1 A study of landscape and visual related planning policy, legislation and guidance at the national, regional and local level has been undertaken for the site and its locality in order to highlight any requirements which the Proposed Development needs to consider. It is always important that policies, legislation and guidance are taken into consideration as they help to define the scope of assessment and can inform the identification of particular local issues. Full details of all national and local planning policies relevant to the Proposed Development can be found in **Appendix 4.1** and a summary is provided below in **Table 11.1**.

Table 11.1 National and Local Planning Policies relevant to landscape and visual

Policy reference	Policy Information relevant to Landscape and Visual
Draft Airports National Policy Statement (NPS): new runway capacity and infrastructure at airports in the South East of England	
Paragraph 5.202	This paragraph states that for airport development, landscape and visual effects also include tranquillity effects. It clarifies that references to landscape should be taken as covering local landscape, waterscape and townscape character and quality, where appropriate.
Paragraphs 5.203 to 5.205	This section deals with the applicant's landscape and visual impact assessment (LVIA) and notes that the LVIA should reference any landscape character assessment and associated studies as a means of assessing landscape impacts. Paragraph 5.204 states that the assessment should include any significant effects during construction of the preferred scheme and / or the significant effects of the completed development and its operation (including for example surface access proposals or aviation activity) on landscape components and landscape character, including historic characterisation. The assessment should also include the visibility and conspicuousness of the preferred scheme during construction and the presence and operation of the preferred scheme and potential impacts on views and visual amenity. This should include any noise and light pollution effects, including on local amenity, tranquillity and nature conservation.
Paragraph 5.206	Paragraph 5.206 deals with mitigations and states that adverse landscape and visual effects may be minimised through appropriate design (including choice of materials), and landscaping schemes. Materials and designs for the airport should be given careful consideration.
Paragraphs 5.207 to 5.213	This section deals with the decision making process and landscape effects. Paragraph 5.212 sets out that where a local development document in England has policies based on landscape character assessment, these should be given particular consideration. In taking decisions, the Secretary of State will consider whether the preferred scheme has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to avoid adverse effects on landscape or to minimise harm to the landscape, including by reasonable mitigation.
Paragraph 5.214	This paragraph deals with visual impact and states that the Secretary of State will judge whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the development.
National Planning Policy Framework	
Policy 11: conserving and enhancing the natural environment	The planning system should contribute to and enhance the natural and local environment, protecting and enhancing valued landscapes. (Paragraph 109).
Draft Thanet Local Plan to 2031 Preferred Options Consultation (January 2015)	

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Policy reference	Policy Information relevant to Landscape and Visual
SP05: Manston Airport	Sets out requirements for development at the site of the Proposed Development. Bullets 2 and 3 are of particular relevance as they state that new build development is to be designed to minimise visual impact on the open landscape of the central island, especially with regards to the mass of buildings on the skyline in views from the south. It also requires the provision of an appropriate landscaping scheme, to be designed and implemented as an integral part of the development.
SP22: Protection and Enhancement of Thanet's Historic Landscapes	Development proposals should conserve and, where possible, enhance Thanet's local distinctiveness and visually sensitive skylines and seascapes. It sets out principles for each one of Thanet's six local landscape character areas that fall within the LVIA study area (as described in the Desk Study section, below). These principles include the following which may be relevant to the LVIA: 1) At Pegwell Bay, priority will be given to the conservation and enhancement of the natural beauty of the landscape over other planning considerations; 2) In the former Wantsum Channel area, new development will not normally be permitted; 3) In the Wantsum Channel North Shore Area, development will only be permitted that would provide opportunities for enhancement and would not damage the setting of the Wantsum Channel, and long views of Pegwell Bay, the Wantsum Channel, the adjacent marshes and the sea; 4) On the Central Chalk Plateau, a number of sites are identified for various development purposes. Where development is permitted by other policies in this plan, particular care should be taken to avoid skyline intrusion and the loss or interruption of long views of the coast and the sea, and proposals should demonstrate how the development will take advantage of and engage with these views; 5) At Quex Park, new development proposals should respect the historic character of the parkland and gardens; and 6) At the Urban Coast, development that does not respect the traditional seafront architecture of the area, maintain existing open spaces and long sweeping views of the coastline will not be permitted.
Thanet Local Plan (2006) Saved Polices	
CC1: Development in the Countryside	Development in the countryside will not be permitted unless there is a need for development that overrides the need to protect the countryside.
CC2: Landscape Character Areas	Seeks to protect Landscape Character Areas including those within the LVIA study area (as described in the Desk Study section, below and shown on Figure 11.11).
Dover Core Strategy (Adopted 2014)	
DM15: Protection of the Countryside	Seeks to protect the character and appearance of the countryside.
DM16: Landscape Character	Requires the protection of landscape character within the district.

11.3 Data gathering methodology

11.3.1 This section describes the desk study and surveys undertaken to inform the LVIA. In order to establish the baseline situation, landscape and visual data was obtained from the sources listed in **Table 11.2** to identify existing data about the site and the surrounding area.

Table 11.2 Information used in the preparation of the PEIR

Source	Data
Ordnance Survey (OS)Mapping Landranger series - scale 1:50,000 (Sheet 179 Canterbury and East Kent, Dover and Margate)	Location of built form, roads, tourist attractions, woodland. Understanding of the topography and land use patterns.
OS Mapping Explorer series - scale 1:25,000 (Sheet 150 Canterbury & the Isle of Thanet)	Location of built form, roads, tourist attractions, woodland. Understanding of the topography and land use patterns.

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Source	Data
National Character Area (NCA) Profile 113-North Kent Plain (Natural England (NE), 2015)	Broad overview of key features, characteristics and sensitivities of the landscape of the site and surroundings at a national level.
Kent Historic Landscape Characterisation (Croft, Munby & Ridley, May 2001)	Considers how the present physical landscape reflects how people have exploited, changed and adapted to the physical environment through time, with respect to different social, economic, technological and cultural factors.
Landscape Assessment of Kent (Jacobs Babtie, Kent County Council (KCC), October 2004)	Key features, characteristics and sensitivities of the landscape of the site and surroundings at a county level
Thanet Landscape Character Areas (Thanet District Council (TDC), Updated August 2012)	Key features, characteristics and sensitivities of the landscape of the site and surroundings published at a district level
Dover District Landscape Character Assessment (Jacobs Babtie, Dover District Council (DDC), January 2006)	Key features, characteristics and sensitivities of the landscape within the southern part of the Study Area.
Campaign to Protect Rural England (CPRE)	Tranquillity Mapping (published 2007) (Note: the 2006 National Tranquillity Mapping data was provided on CD by Natural England in ESRI Raster format)
Campaign to Protect Rural England (CPRE)	Night Blight mapping (2016)
GoogleEarth Pro	Aerial photography dated September 2013

Desk Study

Study Area

11.3.2 The LVIA study area is shown on **Figure 11.1**. It encompasses a 5 km offset from the site boundary thereby providing a minimum separation distance of 5 km from any part of the Proposed Development. The study area has been selected with regard to previous experience of undertaking LVIAs for similar types of development allied with a review of the landscape context within which the Proposed Development will operate. This definition of the study area ensures that the LVIA will include any landscape and visual receptors with the potential to sustain significant landscape or visual effects as a consequence of the construction and operation of the Proposed Development. It accords with the principle of proportionality set out in paragraph 3.16 of *GLVIA 3* (LI & IEMA, 2013) that states:

"*The level of detail provided should be that which is reasonably required to assess the likely significant effects. It should be appropriate and proportional to the scale and type of development and the type and significance of the landscape and visual effects likely to occur*." (LI & IEMA, 2013).

Zone of Theoretical Visibility

11.3.3 In addition to the sources of data listed in **Table 11.2** reviewed as part of the desk study, a Zone of Theoretical Visibility (ZTV) map has been prepared for the Proposed Development and the baseline of the facilities associated with the non-operational airport. The ZTV illustrates theoretical visibility during the operational phase of the development and allows comparison of the theoretical visibility of the

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Proposed Development with that of the facilities and infrastructure associated with the current non-operational airport. The ZTV for the Proposed Development will be subject to refinement as more detailed design information becomes available for the Environmental Statement. Both ZTVs are shown on **Figure 11.2**.

11.3.4 The ZTVs used Ordnance Survey (OS) Terrain 5 digital terrain model (DTM) data. The DTM data was not amended to include vegetation and/or buildings to allow their screening effect to be incorporated in the ZTV calculation. Consequently the ZTVs calculated show a reasonable worst-case scenario.

11.3.5 The ZTV that illustrates the potential visibility of the facilities in the non-operational airport has been generated using the following parameters:

- former radar tower at a height of 22 m above ground level (AGL);
- aircraft maintenance hangar at a height of between 12 m and 16 m AGL;
- museum buildings at heights of 5 m AGL;
- FBO at height of 10.m AGL;
- former ATC building at a height of 12.m AGL; and
- buildings in freight area at heights of between 6 m and 12 m AGL.

11.3.6 The ZTV that illustrates the potential visibility of the Proposed Development during the operational period has been generated using the following parameters:

- ATC modelled at a height of 28 m above ground level (AGL);
- cargo facilities modelled at a height of 21 m AGL;
- proposed hangar modelled at a height of 29 m AGL; and
- commercial units within the Northern Area modelled at a height of 15 m AGL.

11.3.7 The ZTV for the Proposed Development will be refined as more mature design information becomes available and the ZTV generated for the Environmental Statement will be modified to take account of the impact of relevant earthworks forming part of the Proposed Development.

11.3.8 A ZTV has not been produced to illustrate potential visibility of construction activities as information regarding these activities (e.g. the height, location and deployment periods of cranes) is not available at this stage.

Survey Work

11.3.9 The desk study identified 14 photographic viewpoint locations for use in the landscape and visual assessment. The list of viewpoints and the rationale for the selection of each viewpoint is set out in **Table 11.3** alongside the type of viewpoint (as defined in paragraph 6.19 of *GLVIA 3* (LI & IEMA, 2013)) as follows:

- representative viewpoints, selected to represent the experience of different types of visual receptor, where large numbers of viewpoints cannot all be included individually and where significant effects are unlikely to differ;

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- specific viewpoints, chosen because they are key and sometimes promoted viewpoints within the landscape; and
- illustrative viewpoints, chosen specifically to demonstrate a particular effect or specific issues.

11.3.10 Viewpoint locations are shown on **Figure 11.2**.

Table 11.3 Proposed photographic viewpoint locations

Viewpoint Ref	Viewpoint Name	Approximate grid reference	Reason for selection	Type of viewpoint (GLVIA3)
1	Western edge of Manston	TR34619, 66204	Provides the most open, publically available view potentially available to residents in the closest settlement to eastern components of the Proposed Development, in particular the passenger facilities and the maintenance, repair and overhaul facilities.	Representative
2	Southern edge of Woodchurch	TR32555, 67104	Illustrative of periodic, open, middle distance views available to a variety of visual receptors to the north-west.	Illustrative
3	Vincent Road between Vincent and Flete Farms	TR34481, 67555	One of closest publically accessible locations to the north of Proposed Development, in particular the secondary business infrastructure components.	Illustrative
4	A299 island at northern edge of Minister	TR31075, 65824	Closest and most open views potentially available to residents in Minster and key view for westbound vehicular receptors on A299.	Specific
5	PRoW close to Pumping Station on Manston Road	TR31818, 67449	Representative of open views available from middle distance locations to north-west that are available to recreational and vehicular visual receptors. Exceptionally open views to south and east.	Representative
6	High Street on southern edge of Garlinge, Margate	TR33496, 68881	Representative of open southerly views available from the southern fringe of Margate.	Representative
7	Southern edge of Acol	TR30872, 66840	Middle distance views from the west that are only available to residents in the terraced row in southern edge of Acol.	Specific
8	Public bird hide at Pegwell Bay Country Park	TR34129, 63123	Popular recreational facility and one of limited number of publically accessible locations in the Stour Valley	Specific
9	Nash Road, western edge of Broadstairs	TR35654, 68600	Illustrative of the limited number of open, middle distance south-westerly views from the Westwood area.	Illustrative
10	Location of South Saxon way in Stour valley	TBC	Illustrative of the northern views available from some open sections of this regional trail and other limited publically accessible locations in the closest part of the Stour Valley	Illustrative
11	St. Michael's Avenue, Northdown, Margate	TR37931, 69886	Representative of locations in Margate and Broadgate where open, long distance, south-western views are sometimes available.	Representative
12	Richborough Road south of Richborough Castle	TR32147, 59997	Illustrative of the periodic open views available from the southern side of the Stour	Illustrative

			Valley and in particular form some locations close to the tourist attraction of Richborough Castle Roman Fort	
13	A28 at north-eastern edge of St. Nicholas at Wade	TR27110, 66485	Representative of long distance, very open views from west, in particular those available to residents on edge of this settlement.	Representative
14	Northern side of River Stour Bridge at Plucks Gutter	TR26978, 63441	Representative of long distance, very open views from the south-west and another section of South Saxon Way	Representative

11.3.11 A preliminary site survey was carried out in April 2016 and a second field survey was completed in November 2016 to inform the baseline and the selection of viewpoints.

11.3.12 All photography and data recording has and will continue to be undertaken in accordance with the LI's *Advice Note 01/11 Photography and photomontage in landscape and visual impact assessment* (LI, 2011) and Scottish Natural Heritage's (SNH) *Visual Representation of Wind Farms Version 2.2* (SNH, 2017). Whilst the SNH guidance is specifically intended for use in relation to on-shore wind farms, much of its content is applicable to all types of large-scale development.

Consultation

11.3.13 RiverOak has engaged with consultees with an interest in potential landscape and visual effects as part of the ES scoping exercise and in relation to specific landscape and visual issues. A Scoping Report (**Appendix 1.1**) including a chapter covering LVIA, was produced and submitted to PINS in June 2016, and a response from PINS in the form of a Scoping Opinion was received in August 2016 (**Appendix 1.2**).

11.3.14 The pertinent organisations that were consulted (with regard to the landscape and visual effects) include:

- Natural England (NE);
- Thanet District Council (TDC);
- Kent County Council (KCC); and
- Dover District Council (DDC).

11.3.15 A summary of the consultee comments and responses is provided in **Table 11.4** below:

Table 11.4 Consultee comments

Consultee	Comments and considerations	How addressed in this PEIR
PINS (Scoping Opinion August 2016)	The Secretary of State notes that consultation with relevant consultees, such as KCC and Thanet and Dover Councils, in relation to landscape and visual matters has not yet commenced, and recommends that the methodology, extent of the study area,	TDC, KCC and DDC were asked to comment on the appropriateness of proposed viewpoints (as set out in Table 11.3 of this document) in November 2016, but no comments have yet been provided.

Consultee	Comments and considerations	How addressed in this PEIR
	potential receptors, and location of viewpoints is agreed with them at the earliest opportunity. It is noted that it is proposed to scope out effects on the North Kent National LCA (and any other LCAs outside the ZTV) (discussed above); the Applicant is referred to the Secretary of State's comments above.	The scope of the LVIA proposed in the Scoping Report has therefore been retained for the PEIR.
PINS (Scoping Opinion August 2016)	The Secretary of State notes and welcomes that the landscape and visual assessment will include use of a ZTV. The ES should describe the model and methodology used and provide information on the area covered and the timing of any survey work. The ZTV should take account of any land raising activities at the airport. The Secretary of State notes that the location of viewpoints will be agreed with the local authorities.	The ZTV to be included in the ES will be generated using a model that takes account of any land raising activities. The final design of any such activities will be informed by the feedback received in response to this consultation.
PINS (Scoping Opinion August 2016)	The Proposed Development includes large structures on the site. The Secretary of State recommends that careful consideration is given to the form, siting, and use of materials and colours in terms of minimising the visual impact of these structures. The potential effects of the required airport lighting on night-time views should be taken into account. The Applicant's attention is drawn to TDC's comments, contained in Appendix 3, in this regard. The Secretary of State recommends that photomontages and wirelines of the Proposed Development are provided with the ES, and include night-time visualisations, bearing in mind the need for extensive night-time lighting across the site.	Careful consideration has been given to the form, siting, and use of materials and colours in terms of minimising the visual impact of these structures. A set of Manston Airport Design Principles that will be used to ensure that all elements of the Proposed Development are designed to a high standard. No assessment of potential effects associated with the lighting of the Proposed Development has yet been undertaken. Whilst an outline lighting design has been produced, the current level of design maturity lacks much of the information relating to parameters for illuminance/luminance, glare control or potential light spill required to undertake a meaningful assessment. The outline lighting design will be used to inform the scope of the lighting assessment. The scope of the lighting assessment will also be informed by the feedback received in response to this consultation. Potential effects of the required airport lighting on night-time view will be assessed and photomontages and wirelines of the Proposed Development will be provided within the ES. A small number of draft visualisations have been included in the PEIR in Appendix B.
PINS (Scoping Opinion August 2016)	No information is provided in relation to potential mitigation other than a brief reference in paragraph 10.6.10 to mitigation planting. The Applicant should consider in the ES how measures proposed to mitigate landscape and visual effects, such as planting, may relate to other topics, for instance impacts on ecological receptors. Appropriate cross-reference should be made between related topics in the ES, such as Biodiversity, and Historic Environment.	More detail on mitigation with cross reference to other topics
PINS (Scoping Opinion August 2016)	Figure 10.3, in Appendix C, shows the long distance walking and cycling routes that fall within the LVIA study area. It identifies National Cycle Route 1 as crossing the south of the study area, although this is not referenced in the Scoping Report. The Applicant should ensure that this receptor is included in the EIA.	The visual effects on users of National Cycle Route 1 has been considered and assessed in the PEIR. The route of national Cycle Route 1 within the LVIA study area is shown in Figure 11.8.

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Consultee	Comments and considerations	How addressed in this PEIR
NE (Scoping Opinion August 2016)	NE advised that based on the distance of the proposal site from the Kent Downs Area of Outstanding Natural Beauty (AONB) it did not believe that any impacts on tranquillity from increased overflying would be sufficiently significant to meet its current criteria for engagement with landscape casework.	The Kent Downs AONB is not included in the LVIA.
TDC (Viewpoint consultation November 2016)	TDC were asked to advise on the appropriateness of the viewpoints proposed to be included in the LVIA. No response has been received.	No alteration to proposed viewpoint schedule.
KCC (Viewpoint consultation November 2016)	KCC were asked to advise on the appropriateness of the viewpoints proposed to be included in the LVIA. KCC responded that no advice would be provided in the absence a Planning Performance Agreement.	No alteration to proposed viewpoint schedule.
DDC (Viewpoint consultation November 2016)	DDC were asked to advise on the appropriateness of the viewpoints proposed to be included in the LVIA. KCC responded that no advice would be provided in the absence a Planning Performance Agreement.	No alteration to proposed viewpoint schedule.

11.4 Overall landscape and visual baseline

11.4.1 The landscape and visual baseline is supported by the following figures:

- Figure 11.1 LVIA Study Area;
- Figure 11.2 Zone of Theoretical Visibility and Viewpoint Locations;
- Figure 11.3a Annotated Daytime Viewpoint Photography: Viewpoints 1 & 2;
- Figure 11. 3b Annotated Daytime Viewpoint Photography: Viewpoints 3 & 4
- Figure 11.3c Annotated Daytime Viewpoint Photography: Viewpoints 5 & 6;
- Figure 11.3d Annotated Daytime Viewpoint Photography: Viewpoints 7 & 8;
- Figure 11.3e Annotated Daytime Viewpoint Photography: Viewpoints 9 & 11;
- Figure 11.3f Annotated Daytime Viewpoint Photography: Viewpoints 12 & 13;
- Figure 11.4a Annotated Night-time Viewpoint Photography: Viewpoints 1 & 7;
- Figure 11.4b Annotated Night-time Viewpoint Photography: Viewpoint 14;
- Figure 11.5 Principal Settlements whose residents are included in Visual Assessment;
- Figure 11.6 Large groups of properties whose residents are included in Visual Assessment;

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- Figure 11.7 Small groups of properties whose residents are included in Visual Assessment;
- Figure 11.8 Long distance recreation routes;
- Figure 11.9 Recreation destinations;
- Figure 11.10 Individual and groups of Public Rights of Way whose users are included in Visual Assessment;
- Figure 11.11 Landscape Character Areas;
- Figure 11.12 Comparative Tranquillity Levels;
- Figure 11.13 Comparative Light Pollution Levels
- Figures 11.14a -11.14c Visualisation 1
- Figures 11.15a - 11.15c Visualisation 2

Current baseline

Landscape and visual context

Topography and drainage

11.4.2 Within the study area, elevations range from sea level to approximately 55 m Above Ordnance Datum (AOD). The landform is shown on **Figure 11.1**.

11.4.3 The Proposed Development site and its immediate surroundings are located at an elevation of between 40m and 55m AOD. To the south and west of the site, the River Stour and the River Wantsum with their surrounding marshland areas (e.g. Minster Marshes, Ash Level, Wade Marsh) have a lower topography of approximately 10-30m AOD. The topography reflects the history of Thanet, which until approximately 1000 years ago was an island, cut off from the mainland by the Wantsum Channel, until it silted up. The distinctive topography is noted in the *Landscape Assessment of Kent* (Jacobs Babtie/KCC, 2004) as follows:

"The island quality is preserved in the way that Thanet rises out of the marshes to a modest height of about 50 metres. The landscape falls into two distinct types, based on local topography. These are the flat plateau top above the 40 metre contour and the sloping backdrop to the marshes between 20 and 40 metre contour." (Jacobs Babtie/KCC, 2004).

11.4.4 The western edges of Ramsgate and Broadstairs extend westwards onto the chalk plateau that forms the central part of the Isle of Thanet and upon which the Proposed Development is located. The western parts of these settlements are at elevations which are comparable to that of the Proposed Development site of between 40m and 50m AOD.

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11.4.5 In the north and east of the study area, the towns of Birchington, Margate, Broadstairs and Ramsgate all occupy elevations of between 5 and 50m AOD and are characterised by steep chalk cliff faces down to the sea.

Vegetation and land use

11.4.6 Manston Airport closed in 2014, but some of the airport and associated infrastructure and buildings remain on site, including:

- a cargo handling facility comprising two storage warehouses 6-8m high, and one hanger 12m in height, all finished with metal cladding and covering an area of 5,200m² with gated entrance and security box;
- a fire station building, 12m in height covering an area of 2,200m² and constructed of brick with a corrugated metal roof;
- a helicopter pilot training facility comprising two 10m high hangers with metal cladding and covering an area of 950m²;
- two museum buildings of brick construction, 5m high and covering 2,000m² ;
- a 4m high airport terminal building on an area of 2,400m². This is located on the eastern edge of the site and is surrounded by large expanses of hard surfacing to its east and west which was used as stands for aircraft and car parking for passengers, respectively;
- air traffic control building, 6m high including a viewing tower approximately 9m high, covering an area of 700m²;
- large aircraft maintenance hangar covering 4,700m² and approximately 12m high with a taller approximately 16m high movable section to enclose an aircraft tail fin;
- network of hard surfacing used for taxi ways, aprons and roads connect the buildings to the runway and to the two main entrance points that are located in the east and west; and
- post and wire security fencing of varying height runs alongside most of the perimeter.

11.4.7 Vegetation within the site is minimal, but includes:

- expanses of short mown grass around the runways and adjacent buildings;
- avenue of tree planting along sections of B2190 Spitfire Way (both inside the site boundary and immediately outside but adjacent to the boundary on the grass verge outside the perimeter fence);
- short avenue of trees in the south east corner of the site, within the site boundary where it follows the route of Canterbury Road West; and
- areas of overgrown scrub planting along sections of the fence line.

11.4.8 Within the wider LVIA study area there are a range of land uses with the primary one being arable fields which cover approximately 60% of the land in the south, west and centre of the LVIA study area. The fields are medium to large in size

and often have no boundary fence or hedgerow, creating an extensively open landscape. To the north-west of the site boundary, between Woodchurch Road and the Defence Fire Training and Development Centre, lies an area of paddocks. Here, the fields are smaller in scale and separated by post and wire fencing, which again facilitates clear and expansive views across the surrounding landscape, although in the south-eastern direction of the Proposed Development site views of the non-operational airport are screened by the extensive tree cover within the extensive Defence Fire Training and Development Centre.

11.4.9 Immediately surrounding the Proposed Development site, the arable landscape is frequently interspersed with scattered non-residential built form. Examples include the buildings and facilities associated with the non-operational airport itself, the collection of buildings in northern Minster at the junction between the A299 and Tothill Street immediately south-west of the Proposed Development site boundary (which include a petrol station, fast food restaurants and a hotel), the Defence Fire Training and Development Centre located to the north-west of Manston Road and a concentration of buildings to the north of the B2190/B2050 including Manston Business Park, Bell Helicopter Heli Charter on Spitfire Way and Reclamat Recycling Centre east of Woodchurch Road to the north-east of the site. The tallest and consequently the most widely visible built elements within and around the Proposed Development site are the former radar facility which is sited within the northern part of the site close to Manston Road and a telecommunications mast located west of Manston Road to the north of the Defence Fire Training and Development Centre. The latter is illuminated at night-time.

11.4.10 Tree cover is often low in the arable agriculture areas between settlements. There are few substantial woodland blocks in the study area and tree cover is more typically associated with belts of trees along the perimeter of caravan parks e.g. Preston Parks, around farmsteads and other residential properties located in otherwise open tracts of countryside or sometimes on the edge of settlements e.g. along sections of the boundary of Manston.

11.4.11 Where small woodland blocks do occur, they are typically found within the open spaces of the towns of Margate, Broadstairs and Ramsgate. Examples include those found at Margate Cemetery and Hartsdown Park. Quex Park also has many mature trees including small woodland blocks.

11.4.12 However levels of tree cover are higher in the area around the northern half of the Proposed Development site as a consequence of the coalescence of the tree cover within Manston and Woodchurch, especially the Defence Fire Training and Development Centre.

Settlement and infrastructure patterns

11.4.13 The principal settlements within the LVIA study area comprise the coastal towns of Ramsgate (population of approximately 40,000), Broadstairs (population of approximately 23,500) and Margate (population of approximately 61,000). These towns are sprawling and merge to form an almost continuous belt of development along the northern and eastern fringes of the LVIA study area. This belt of development extends southward and westwards towards the Proposed Development site although separation is maintained by agricultural land varying in width between 0.5km and 3km. The closest part of Ramsgate is the site of the

Westwood Cross Retail Park which contains some of the largest scale and tallest built development in these principal settlements.

11.4.14 Villages within the study area include Minster, Monkton and Cliffsend located to the south of the site, Nicholas at Wade and Acol to the west and Manston to the east. These are interspersed by the hamlets of Plucks Gutter, Gore Street and Brooks Corner to the west and Lydden to the east. Beyond these villages and hamlets are occasional individual and small groups of residential properties and farmsteads located alongside minor rural lanes. Most of these settlements are located at slightly lower elevations than the Proposed Development site and the reviews of aerial photography and site visits show that their curtilages frequently contain moderate levels of tree cover and are sometimes bounded by tall hedgerows/shelterbelts.

11.4.15 There is a notable absence of settlement across the low-lying marshes located at the bottom of the valley of the River Stour to the south of the Proposed Development site with the South-East Main Rail Line marking the transition point (with the exception of the hamlet of Plucks Gutter).

11.4.16 Thanet Earth, located to the west of the Proposed Development site is a large industrial agriculture / plant factory project consortium and the largest greenhouse complex in the UK. The site covers 90haand incudes seven glasshouses, a research centre, packhouse, small number of dwellings, four reservoirs and a combined heat and power system. There are also large scale warehouse-type modern developments located to the west of the Proposed Development site accessed by Columbus Avenue and Merlin Way east of Acol. Solar farms are also a recent introduction to the landscape including the extensive Manston Solar Farm to the north-east of the site boundary and Thorne Solar Farm located on the southern side of the A299 close to the southern boundary of the site besides the northern edge of Cliffsend.

11.4.17 A number of 132kV overhead lines also cross the LVIA study area. These commence at the Richborough Substation located between the A256 and River Stour approximately 4km to the south of the Proposed Development site. From here, a dual line travels in a north-westerly direction towards Monkton Marshes where it divides with one 132kV line heading north and then east towards Broadstairs. The southernmost line continues west towards Canterbury and has recently been subject of a DCO application for its removal and replacement with a 400kV line as part of National Grid plans. The proposed new 400kV line will be included in the assessment of cumulative effects included in the ES. A third 132kV line heads southwest and then south from the Richborough Substation.

Transport network

11.4.18 The dense and evenly dispersed settlement pattern has resulted in in a relatively dense network of ‘A’, ‘B’ and minor roads.

11.4.19 ‘A’ roads within the LVIA study area are as follows:

- The A299 which enters the western fringes of the LVIA study area to the north of St Nicholas at Wade as a dual carriageway and continues west along the southern boundary of the site to Cliffsend and the eastern suburbs of Ramsgate. From here, it continues as a single lane ‘A’ road to the Port of

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Ramsgate. The lighting columns alongside sections of the A299 are cumulatively visually prominent in some views from the south.

- The A28 which passes Sarre on the western edge of the LVIA study area and continues in a north-easterly direction through Birchington and Margate.
- The A253, a short link road which connects the A28 with the A299 to the west of the Proposed Development site.
- The A254 is a non-primary route that commences in the centre of Margate at a roundabout with the A28. It continues in a south-easterly direction to Ramsgate where it terminates at a T-junction with the A255 and A299 in the centre of Ramsgate.
- The A255 commences at a junction with the A254 in Margate before following a route between Margate and Ramsgate passing through Broadstairs. It joins the A299 at a roundabout at Chilton on the edge of Ramsgate.
- The A256 commences on the outskirts of Broadstairs. At its junction with the A299 at Cliffsend, it becomes a dualled primary route and heads south between Minster Marshes and Pegwell Bay towards Great Stonar. At this point it exits the LVIA study area and continues south towards Dover.

11.4.20 Beyond the 'A' routes, a network of 'B' roads and rural roads cross the landscape. Rail lines through the study area include the Kent Coast Line/Javelin high speed train link which follows a coastal route and connects London St Pancras International with the towns of the north Kent coast including Margate, Broadstairs and Ramsgate. A second Javelin high speed line, the Ashford to Ramsgate (via Canterbury West) line, also connects Margate, Broadstairs and Ramsgate with St Pancras International, and passes through the centre of the LVIA study area. The Folkestone and Dover branch line, via Sandwich, also passes through the LVIA study area to the south of the Proposed Development site.

Recreational use

11.4.21 Parts of the study area are popular holiday and recreational destinations and consequently a number of amenity assets are present such as campsites, equestrian centres and beaches. Key destinations for visitors and local residents are set out in paragraphs 11.4.21 to 11.4.33 and Tables 11.5, 11.6 and 11.7, below.

Long distance footpaths

11.4.22 The defined study area contains a network of promoted long distance walking routes, the distribution of which are shown in **Figure 11.3**. These are as follows:

- Saxon Shore Way: This route follows the ancient Kent coastline, which now is in some places miles inland. It connects Gravesend on the banks of the River Thames with Hastings on the south coast. It is 257 km long in total, approximately 9 km of which is within the LVIA study area. Within the southern part of LVIA study area the Saxon Shore Way follows the route of the River Stour at a relatively low elevation.

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- Turner and Dickens Walk: This route connects Margate to Broadstairs and is approximately 8 km long. It is almost entirely located within the LVIA study area with the exception of the eastern-most approximately 200 m within Broadstairs. Much of the Walk follows an ancient footpath between St Peter's and St John's churches.
- Thanet Coastal Path: This coastal route connects Reculver (approximately 3 km to the west of the LVIA study area boundary) with Pegwell Bay which is located approximately 2 km south of the Proposed Development site. The route is approximately 32 km in length of which approximately 27 km is within the LVIA study area.
- Stour Valley Walk: A route connecting the source of the River Stour at Lenham with its confluence at Pegwell Bay. It is approximately 96 km long. Approximately 2.5 km of the eastern-most section of the Stour Valley Walk is within the LVIA study area as it heads north along the coast towards Pegwell Bay.
- Wantsum Walk: A walk between Herne Bay and Birchington along the Wansum River. Overall the Walk is 40 km long. Approximately 8 km of the route is located within the LVIA study area as it crosses the A299, travelling northwards to the coast and then east along the coastline to Birchington.
- England Coast Path: The Folkestone to Ramsgate section of this new National Trail is open to the public and follows the coastline to the south of Ramsgate. To the north of Ramsgate the Ramsgate to Whitstable section of the route was approved by the Secretary of State for Environment, Food and Rural Affairs in December 2016. Work is now underway to prepare this section of tehr England Coast Path for public use and new access rights are expected to come into force along the route in late 2017.

Cycle routes

11.4.23 In addition to the long distance walking routes, two cycle routes lie within the LVIA study area as follows:

- Sustrans National Cycle Route 1: This long distance cycle route connects Dover and the Shetland Islands via the east coast of England and Scotland. A short section, approximately 2km long follows the southern boundary of the LVIA study area in the vicinity of Richborough Castle.
- Viking Coastal Trail Cycle Route: This is a circular route which travels from Reculver through Margate, Broadstairs and Ramsgate and then travels inland to return to Reculver being routed through Minster, Monkton and St. Nicholas at Wade. It is 51.4 km long with an estimated 40 km of the Route being within the LVIA study area. The section between Minster and Cliffsend is routed approximately 1 km south of the Proposed Development site.

Country Parks

11.4.24 The Pegwell Bay Country Park is the only country park within the study area and forms part of the Sandwich and Pegwell Bay National Nature Reserve (NNR). It is approximately 29 ha in size. A small section of the southern part of the country

park is not publicly accessible as it is a sensitive wildlife area, but the majority of the area is publicly accessible with a network of mown and surface paths, picnic areas, car parking and play areas. It is a country park which advertises the attractive views that can be experienced of Sandwich and Deal to the south-west and the cliffs of Ramsgate to the north-east.

Open access land

11.4.25 Within the LVIA study area there is a short section of land on the coastal margin that is defined as open access land under the Countryside and Rights of Way Act 2000 (open access land) which follows the coastline from Ramsgate Marina, westwards and southwards, as far as the southern extent of the study area. The width of the access land varies and includes both areas of land and sea. However, the landward extent of the access land is typically very narrow and is defined by the location of the England Coast Path.

Parks and gardens open to the public

11.4.26 Within the towns of Birchington, Margate, Broadstairs and Ramsgate located in the northern and eastern part of the LVIA study area there are numerous parks that offer a range of amenities including playgrounds and sports pitches. The location and description of these parks is provided in **Table 11.5** and their locations shown in **Figure 11.4**.

Table 11.5 Publicly accessible parks and gardens within the study area

Ref (see Figure 11.9)	Publicly accessible parks and gardens	Distance from the site	Description
1	**Northdown Park**	Approximately 4.5km north east	The park was originally part of Northdown House, a Georgian house that still stands at the southern edge of the park in a wooded setting. The park has formal walled gardens nearer the house, and open spaces with more natural woodland and a children's play area to the northern end. The park also has two areas where public access is restricted. The park slopes gently from a high point in the south to a low point in the north.
2	**Hartsdown Park and Tivoli Park**	Approximately 3km north east	The land that now forms Hartsdown Park was originally owned by the Hatfield family. Hartsdown Park has tennis courts and a play area. It adjoins the Hartsdown Football Club. There are football and cricket pitches within the park. Tivoli Park is located adjacent to the south-eastern boundary of Hartsdown Park. In 1830, Le Jardin de Tivoli was described as 'one of the most beautiful and romantic spots in Thanet'. Originally designed as a pleasure garden, Tivoli Park has in recent years been left unmanaged and is now a designated nature reserve. There are many mature trees and several pathways.
3	**Quex House**	Approximately 2km north west	Quex Park itself is 250 acres of parkland and gardens with Quex House and other buildings situated just south-east from Birchington. The Park houses the Powell-Cotton Museum and the house gardens and park holds visitor attractions, leisure activities, and retail food and drink outlets

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Ref (see Figure 11.9)	Publicly accessible parks and gardens	Distance from the site	Description
4	**Dane Park**	Approximately 4km north east	Dane Park was donated to the residents of Margate in the late 19th century. The main entrance is through ornamental wrought iron gates in Park Road. There are surfaced paths around and through the park. It has a children's play area. The northern section of the park has many mature trees planted in small groups creating an enclosed character. The southern section of the park is less wooded and more open.
5	**Crispe Park**	Approximately 2km north	A small park within a residential setting in the town of Birchington. It is mainly amenity grassland with a playground in the centre and a block of woodland to the west. It is separated from the adjacent housing and the A28 to the south by narrow belts of mature trees.
6	**King George Memorial Park**	Approximately 4km east	King George VI Memorial Park occupies a cliff top position overlooking the English Channel between Ramsgate and Broadstairs, it gently slopes from a high point in the west to a low point in the east and therefore faces away from the site. The park is a combination of open amenity grassland and woodland areas. The Viking Coastal Trail and Thanet Coastal Path (both sharing the same route) pass through the eastern section of the park. The King George VI Memorial Park is also an important heritage site in Thanet. It was formed out of the grounds of East Cliff Lodge, the home for over fifty years of the nineteenth-century philanthropist Sir Moses Montefiore. The house was demolished in the 1950s but the stable courtyard survives and the early nineteenth-century Italianate glasshouse is built against its outer side.
7	**Ellington Park**	Approximately 1.5 km east	Located within a residential area of Ramsgate. Large expanse of amenity grassland intersected by tree lined paths. The park has a range of amenity features including a playground, bowling green, Edwardian band stand and a miniature railway. The park contains many mature trees, including small groups of mature trees around the perimeter.
8	**Nethercourt Park**	Approximately 1 km south east	Located within a residential area of Ramsgate. Amenity grassland with a playground in the north west corner. Well populated with mature trees, particularly around the boundaries of the park.
9	**Royal Esplanade Gardens**	Approximately 2km south east	Gardens located in Ramsgate between the Royal Esplanade and Westcliff Promenade facing onto the sea front. The park includes a boating lake, a bowling green and a pitch and put.
10	**Dane Valley Woods**	Approximately 4km north east	This is a 13 acre community managed woodland on the outskirts of Margate. The initiative was started in 2003 and since then 5,770 trees have been planted[166].
11	**Windmill Community Gardens**	Approximately 4km north east	This is a food growing project which has been operational since 2004, transformed from derelict land. The Gardens are open to the public for a limited time, most days of the week. It is located adjacent to Dane Valley Woods, on the outskirts of Margate.

[166] http://danevalleywoods.org/about/

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Ref (see Figure 11.9)	Publicly accessible parks and gardens	Distance from the site	Description
12	**Spencer Square**	Approximately 2.5km south east	A square in the centre of Ramsgate. There are three tennis courts located in the south west of the site and the remainder of the square is paved with planting beds and benches.
13	**Pierremont Park**	Approximately 4.9km east	A small park within Broadstairs. Pierremont Park was originally the gardens to Pierremont Hall. The house still exists within the park. The park now includes formal planting around a pergola, informal planting under mature trees, seating, and a children's play area.
14	**Albion Place Gardens (Ramsgate)**	Approximately 3.1km east	Albion Place Gardens is an early-19th-century public garden extending to 0.36ha.

Sports and recreation grounds

11.4.27 **Table 11.6** describes the sports and recreation grounds located within the LVIA study area and their locations are shown in **Figure 11.9**.

Table 11.6 Sports and recreation grounds within the study area

Ref (see Figure 11.9)	Sports and recreation ground	Distance from the site	Description
1	**Manston Golf Club**	Approximately 1km to the east	Nine hole golf course and driving range. The golf course is largely flat and fairly open with only occasional tree groups planted within the course and along its boundary.
2	**Manston Riding Centre**	Approximately 0.3km to the north	Located at the end of a track off Alland Grange Lane. A belt of mature overgrown hedgerow surrounds the riding centre.
3	**Minster Recreation Ground**	Approximately 1.5km to the south	Grass football pitch, Multi Use Games Area,, skatepark and sports pavilion
4	**Westgate and Birchington Golf Club**	Approximately 3km to the north	Eighteen hole golf course to the west of Westgate on Sea. Spans both sides of the railway line.
5	**Memorial Recreation Ground**	Approximately 4km to the east	Amenity grassland with a playground, bowling green and tennis courts.
6	**Birchington Recreation Ground**	Approximately 2.5km to the north	Amenity grassland with sports pitches
7	**St. Peter's Recreation Ground**	Approximately 4km to the east	Amenity grassland with sports pitches
8	**Broadstairs Cricket Club**	Approximately 4.5km to the east	Mown grass with cricket square and cricket nets.
9	**Hartsdown Park**	Approximately 4 km to the north/north-east	A football ground, home to Margate FC.

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Ref (see Figure 11.9)	Sports and recreation ground	Distance from the site	Description
10	**Margate Lawn Tennis Club**	Approximately 4km to the north/north-east	Located to the east of Trivoli Park Avenue and separated from it by a hedgerow approximately 1.5m in height.
11	**Warre Recreation Ground**	Approximately 1.5km to the east	Recreation ground in a residential area of Ramsgate, immediately south of the railway line. Boundaries of the recreation ground are marked by occasionally and gappy groupings of mature trees.
12	**St Augustines Golf Club**	Approximately 1.5km to the south	An 18 hole golf course located on low lying ground close to Pegwell Bay. Fairways are lined with mature trees and the northern and western boundaries are lined by hedgerows and tree belts.
13	**Stonelees Golf Centre**	Approximately 1.8km to the south	A nine hole course with occasional tree groups but generally open boundaries.
14	**Prince's Golf Club**	Approximately 4km to the south	A coastal 27 hole course on low lying ground adjacent to Sandwich Flats

Nature reserves open to the public

11.4.28 Sandwich and Pegwell Bay National Nature Reserve covers 615 ha and is located within 1 km of the south-eastern edge of the Proposed Development siteat its nearest point. The Reserve is made up of a complex mosaic of habitats: inter-tidal mudflats, saltmarsh, shingle beach, sand dunes, ancient dune pastures, chalk cliffs, wave cut platform and coastal scrubland. The reserve is of international importance for its waders and wildfowl and is partly open to the public with a network of nature trails and viewing hides.

11.4.29 Monkton Nature Reserve is a 16 ha former chalk quarry site. It is located approximately 3 km west of the site boundary. The site is densely covered with trees and scrub.

11.4.30 The locations of these nature reserves are shown on **Figure 11.9**.

Caravan and camping sites

11.4.31 The Kent coast and the towns of Broadstairs, Margate and Ramsgate are popular tourist destinations resulting in numerous campsites, caravan site and holiday parks within the study area. It is likely that a proportion of the caravan sites are used for permanent residences as opposed to holiday lets. These are set out in **Table 11.7** and their locations are shown in **Figure 11.9**.

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Table 11.7 Caravan and camping sites and holiday parks within the LVIA study area

Ref (see Figure 11.9)	Caravan/camping site	Distance from the site	Description
1	**Nethercourt Touring Park**	Approximately 1km east	A site for camping and touring caravans. Set within a residential area on the western outskirts of Ramsgate. The site is gently sloping from a high point in the east to a low point in the west. Belts of mature trees separate the site into land parcels.
2	**Manston Court Caravan Site**	Approximately 0.4km east	This site includes permanently located holiday lets as well as pitches for touring caravans and tents. Located in a field to the north west of Manston, off Manston Court Road. The field is bound by hedgerow with hedgerow trees and there are ornamental hedgerows within the site
3	**Preston Parks**	Approximately 0.7km east	The site includes permanent holiday homes and also pitches for camping and for touring caravans. Located on the northern edge of Manston on both the east and west of Preston Road. The boundary is a combination of coniferous hedgerow, brick walls, concrete walls and tree planting.
4	**Birchington Vale Holiday Park**	Approximately 2km north	The site includes permanent holiday homes and also pitches for camping and for touring caravans. Located south of Quex House, on the south side of Shottendane Road, in an agricultural setting approximately 1km south of Birchington. Sections of the boundary to the park are contained by hedgerow although the south eastern and eastern boundaries are open and unvegetated. To the north, south and east much of the boundary is marked by mature trees and hedgerow. The western boundary facing Quex House is more open and not bound by hedgerow.
5	**Quex Holiday Park and Campsite**	Approximately 2km north	The site is located immediately north of Birchington Vale Holiday Park, on the north side of Shottendane Road in includes permanent holiday homes and also pitches for camping and for touring caravans. The site is level and wooded in parts.
6	**Pegwell Bay Caravan Park**	Approximately 1.5km south east	The site contains permanent holiday homes/static caravans. It is located in the far south west of Ramsgate on the coast, overlooking Pegwell Bay.
7	**Wayside Caravan Park**	Approximately 0.7km south	A touring caravan and camping site located on the southern edge of the hamlet of Way, approximately 500m east of Minster. The caravan park is located on flat ground at an elevation of approximately 15m AOD and has a boundary of hedgerow and mature trees to the west and along much of the northern and southern boundaries. The eastern boundary is marked by coniferous hedgerow.
8	**Bradgate Holiday Park**	Approximately 1km north	Holiday homes/static caravan site located on the western edge of the hamlet of Lydden. The site gently slopes from a high point in the west to a low point in the east. The eastern boundary is defined by the settlement edge of Lydden. To the west, south and north the boundary is a combination of hedgerow with hedgerow trees and a belt of woodland and scrub approximately 5m in height.

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Ref (see Figure 11.9)	Caravan/camping site	Distance from the site	Description
9	**The Foxhunter Park**	Approximately 2.5km south west	A holiday park with permanent holiday homes/static caravans located on the southern edge of the village of Monkton. A belt of woodland marks the eastern and southern boundary and separates the site from the adjacent arable fields. A narrower belt of trees defines the south western boundary while the western edge is defined by hedgerow. To the north is the settlement of Monkton.
10	**Acol Caravan Park**	Approximately 1.2km north west	A holiday park with permanent holiday homes/static caravans located on the northern edge of the settlement of Acol at a fork in the road between Acol Hill and Margate Hill. North of the site the land use is arable. The caravan park is separated from the arable fields by fence approximately 2m in height and a belt of tall (over 10m high) trees. The site slopes gently from a high point in the north-east corner to a low point in the south-west corner.
11	**Frost Farm**	Approximately 4.5km north west	A small campsite located approximately 150m north of Nicholas at Wade, immediately south of the A299. It is surrounded by paddocks and separated from them by hedgerow.
12	**St. Nicholas Camping Site**	Approximately 4.5km north west	A site for touring caravans and camping located on a field on the north-western edge of Nicholas at Wade. The boundary of the field to the north, south and west is defined by hedgerow approximately 3 metres high. To the east is an avenue of mature trees.
13	**Dog and Duck Caravan Park**	Approximately 5km south west	A site of permanent caravan holiday homes set within a rural setting on the southern banks of the River Stour. The site is separated from the surrounding landscape by a belt of mature trees and overgrown hedgerow.

Public Rights of Way and Bridleways

11.4.32 The individual public rights of way (PRoWs) in close proximity to the Proposed Development site are show on **Figure 11.10**. A single bridleway (reference TR8) is the only PRoW) to be partly routed within the Proposed Development site. The TR8 runs south from the B2050 at its junction with Manston Court Road for approximately 300 m before turning 90 degrees to the east to join the High Street (at Bush Farm) in Manston. It follows the existing fenceline of the non-operational airport along a section of the boundary that is otherwise open and unvegetated. Consequently people (recreational visual receptors) using TR8 possess clear views into the south-eastern part of the Proposed Development site with the existing Aircraft Maintenance Building and Passenger Terminal Building being the most readily apparent facilities associated with the non-operational airport . A network of bridleways (TR9 and TR10) continue eastwards from the High Street in southern Manston to join the A256 on the outskirts of Ramsgate. Tree cover and overgrown hedgerows minimise the availability of views across most of the Proposed Development site from TR9 & TR10 with the exception of the eastern end of the runway.

11.4.33 To the north-east of the Proposed Development site, north of Manston, there are six PRoWs which cross the arable and pasture fields, some of which are bounded by tall hedgerows and vegetation in adjacent gardens of residential properties and

caravan parks. These six PRoWs connect rural roads between Manston and Northwood and heading north between Manston and Lydden. These are PRoWs are coded TR22, TR23, TR24, TR25, TR26 and TR31.

11.4.34 Other PRoWs located in close proximity to the Proposed Development site and highlighted on Figure 11.10 include:

- TR32 which links Canterbury Road West (which forms the southern boundary of the Proposed Development site) with Cottington Road to the south-west of Cliffsend;
- TE29 which runs south from the A299 west of Mount Pleasant to meet the northern fringes of Minster;
- TE18 which heads west from Minster Road to join Plumstone Road to the west of the Proposed Development site boundary; and
- TE16 which follows a north-easterly route from Minster Road to Manston Road to the north of the Proposed Development site boundary.

11.4.35 Elsewhere across the LVIA study area, the fields are traversed by a network of PRoWs at varying densities. The highest concentration is found to the east of the Proposed Development site, linking different parts of Margate, Broadstairs and Ramsgate. A moderately dense network of PRoWs also cross the low lying Minster Marshes and Ash Level to the south of the Proposed Development connecting the villages and hamlets with the River Stour and the Saxon Shore Way.These PRoWs have been grouped together on the basis of geographical distribution, connectivity and direction to the Proposed Development site. The result has been to define eight discrete groups of PRoWs as shown on **Figure 11.10**.

Tranquillity

11.4.36 **Figure 11.12** illustrates the results of Campaign to Protect Rural England's (CPRE's) Tranquillity Mapping, which shows the likelihood of finding tranquillity in any given locality and is relative on a regional level (i.e. South-East England). This is based on a methodology which was developed by Northumbria University on behalf of CPRE and the then Countryside Agency (now NE) in 2007. The data is subject to the limitations inherent in many large-scale desk-based studies and should only form an initial indication of the relative levels of tranquillity that are experienced in the LVIA study area. More detailed observations wil be obtained through subsequent field survey work.

11.4.37 **Figure 11.12** indicates that the lowest levels of tranquillity within the LVIA study area are associated with the northern and eastern fringes, coinciding with the towns of Ramsgate, Broadstairs, Margate and Birchington. Along this coastal strip, the high proportion of built form, overt signs of human impact and the dense road and rail network with associated movement and noise disturbance are likely to reduce tranquillity levels. By contrast, Minster Marshes, Monkton Marshes and Ash Level in the southern part of the LVIA study area are considered to be the most tranquil parts of the study area. This is likely to be due to the presence of limited built form and a general absence of road and rail infrastructure which, allied with high levels of openness of the landscape, perceived naturalness and the

presence of the River Stouralthough as noted in **paragraph 11.4.17** this area is traversed by 132kV overhead power lines. This high level of tranquillity extends east to cover Pegwell Bay and Sandwich Flats where the visibility of the sea is, under the CPRE methodology, deemed to be a positive contributing factor to tranquillity.

11.4.38 The Proposed Development site itself is likely to display moderate to low levels of tranquillity. The lower levels are likely to be found within the northern part of the site, extending north and east to cover Manston and south across Minster. Between this area and the coastal settlements, tranquillity is indicated to be moderate, reflecting its proximity to the urban development and presence of 'A' and 'B' roads. It is likely that when the airport was operating prior to its closure in 2014, levels of tranquillity were reduced in comparison with the current baseline situation.

Dark skies

11.4.39 **Figure 11.13** illustrates 'Night Blight' mapping released by CPRE in June 2016. This maps England's light pollution and dark skies and is based on satellite imagery gathered throughout September 2015. Further field survey work including night-time photography has been undertaken as part of the landscape and visual baseline collection (see annotated night-time viewpoint photography in **Figures 11.4a** and **11.4b**) and commentary is provided as part of the visual baseline.

11.4.40 **Figure 11.13** indicates that the brightest levels of radiance are found in isolated pockets within the LVIA study area including at the Port of Ramsgate (with associated light houses) and at Thanet Earth. Other high levels of radiance are concentrated along the coastal zones encompassing Ramsgate, Broadstairs, Margate and Birchington as a result of high levels of highway lighting and floodlighting. Levels of radiance decrease inland to become more moderate although increasing again around the northern and western parts of the Proposed Development site. Lower levels of radiance are associated the less settled southern parts of the LVIA study area around Ash Level in particular where from the absence of settlements and road networks result in limited sources of light.

11.4.41 **Figure 11.13** illustrates the levels of night-time lighting associated with the Proposed Development site after the closure of Manston Airport in April 2014. As such, it is likely that the levels of radiance at the Proposed Development site indicated on the figure are lower than those associated with the historic use of the site.

Landscape Character

National Character Areas

11.4.42 The Proposed Development site and the LVIA study area are located entirely within the *National Character Area (NCA) 113: North Kent Plain* (NE, 2015). This NCA encompasses an approximately 90 km long strip of land bordering the Thames Estuary to the north and the chalk of the Kent Downs in the south. The NCA comprises an open, low and gently undulating landscape characterised by its arable use. The chalk outlier of Thanet, on which the Proposed Development site is located, is identified as a key feature that is a discrete and distinct area

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characterised by its dominant agricultural use stemming from the highly quality, fertile soils.

11.4.43 The key characteristics of NCA 113: North Kent Plain are:

- "*An open, low and gently undulating landscape, characterised by high quality, fertile, loamy soils dominated by agricultural land uses.*
- *The area's geology is dominated by Palaeogene clays and sands, underlain by the Chalk.*
- *Geologically a chalk outlier – and historically an island separated from the mainland by a sea channel -Thanet forms a discrete and distinct area that is characterised by its unity of land use, arising from the high quality fertile soils developed in thin drift deposits over chalk.*
- *A diverse coastline (both in nature and orientation), made up of cliffs, intertidal sand and mud, salt marshes, sand dunes and shingle beaches. Much of the coastal hinterland has been built on, and the coast itself has been modified through the construction of sea walls, harbours and piers.*
- *Large arable/horticultural fields with regular patterns and rectangular shapes predominating, and a sparse hedgerow pattern.*
- *Orchards and horticultural crops characterise central and eastern areas, and are often enclosed by poplar or alder shelterbelts and scattered small woodlands.*
- *Woodland occurs on the higher ground around Blean and in smaller blocks to the west, much of it ancient and of high nature conservation interest.*
- *The Stour and its tributaries are important features of the eastern part of the NCA, draining eastwards into the North Sea, with associated wetland habitats including areas of grazing marsh, reedbeds, lagoons and gravel pits. The River Medway cuts through the NCA as it flows into the Thames Estuary.*
- *Other semi-natural habitats include fragments of neutral, calcareous and acid grassland, and also heathland.*
- *The area has rich evidence of human activity from the Palaeolithic period. Key heritage assets include Roman sites at Canterbury, Reculver and Richborough; the Historic Dockyard at Chatham; military remains along the coast; and historic parks and buildings.*
- *Large settlements and urban infrastructure (including lines of pylons) are often visually dominant in the landscape, with significant development around Greater London and the Medway Towns, as well as around towns further east and along the coast. Major rail and road links connect the towns with London.*" (NE, 2015).

County level landscape character

11.4.44 At a county level landscape character is defined by the *Kent Historic Landscape Characterisation* (Croft, A.; Munby, N. and Ridley, M, 2001) and the *Landscape Assessment of Kent* (Jacobs Babtie/KCC, 2004) which includes previous assessments of condition and sensitivity of landscape character areas (LCAs).

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Whilst these county level documents are over a decade old they continue to provide useful context to the district level landscape character assessments.

11.4.45 The *Kent Historic Landscape Characterisation* (Croft, A.; Munby, N. and Ridley, M, 2001) locates the Proposed Development site within the Historic LCA (HLCA) 18 – Isle of Thanet. This HLCA is comprised mainly of two Historic Landscape Types (HLTs): post-1801 settlement (HLT 9.6) and irregular fields bounded by roads, tracks and paths (HLT 1.14). The latter is described as a relativity recent phenomenon and overlies potentially earlier landscapes of similar character. Urban developments of Margate and Ramsgate are considered to be integral elements within HLCA 18.

11.4.46 The *Landscape Assessment of Kent* (Jacobs Babtie/KCC, 2004) locates the Proposed Development site and much of the LVIA study area within the Thanet LCA. This features a centrally domed ridge with the former airport "*dominant on the crest*" of this ridge. Other features include open, large scale arable fields with long views. The Thanet LCA is assessed as having a poor condition due to the *"vulnerability of the farmed landscape, lack of natural habitats and the negative impact of recent development"* (KCC, 2004). However, the sensitivity of the Thanet LCA is described as "*very high*" due to the presence of open views and very strong sense of place.

District level landscape character

11.4.47 At a district level two published landscape character assessments cover the study area; *Landscape Character Areas* (TDC, 2012) and the *Dover District Landscape Character Assessment* (DDC, 2006). The distribution of LCAs within the LVIA study area is shown in **Figure 11.11** and the key characteristics and pertinent information in these two published assessments for the LCAs is summarised in **Table 11.8**.

Table 11.8 Landscape character areas within the study area

Landscape Character Area	Description
Thanet Landscape Character Assessment Update (TDC, 2012)	
Pegwell Bay LCA	"*Pegwell Bay is an extensive area of mixed coastal habitats, including mudflats, saltmarsh and coastal scrub. These habitats form an open and relatively unspoilt landscape, with a distinctive character. The area possesses a sense of remoteness and wildness despite the relative proximity of development. Among its most important features in the area is the unique sweep of chalk cliffs viewed across Pegwell Bay from the south. This landscape creates large open skies*." (TDC, 2012)
The Former Wantsum Channel LCA	"*This area includes all the flood plain of the River Stour, and historically represents the former sea channel, the Wantsum Channel, which previously separated the Isle of Thanet from mainland Kent and which silted up over several centuries. The area is characterised by a vast, flat, open landscape defined by the presence of an ancient field system, defined by an extensive ditch and dyke system, the sea walls and isolated groups of trees. These elements provide important visual evidence of the physical evolution of the Wantsum Channel and, like other marsh areas in Kent, produce huge open skies*." (TDC, 2012)

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Landscape Character Area	Description
The Former Wantsum North Shore LCA	"*This area largely comprises the distinctive and often quite steep hill slopes* *Leading down from the Central Chalk Plateau to the former Wantsum Channel. The landscape is very open with few features and the former shoreline is more distinct in some places than in others, with the variation in the contour pattern. From the upper slopes it affords extensive views across the whole of the former Wantsum Channel to the slopes on the opposite banks and in many places to the sea. The former shoreline is more distinct in some places than in others, with the variation in the contour pattern. However, it also provides the unique setting of the former channel side villages of Minster, Monkton, Sarre and St Nicholas, and the smaller, originally farm based, settlements of Shuart, Gore Street and Potten Street. These elements provide important visual evidence of the growth of human settlement, agriculture and commerce in the area.* *The openness of this landscape provides wide and long views of the former Wantsum Channel area and Pegwell Bay. The area also possesses a large number of archaeological sites (including scheduled ancient monuments); numerous listed buildings (including Minster Abbey, the churches at Minster, Monkton and St Nicholas, and Sarre Mill); and the historical landing sites of St Augustine and the Saxons, Hengist and Horsa*." (TDC, 2012)
The Central Chalk Plateau LCA	"*The central part of the District is characterised by a generally flat or gently undulating landscape, with extensive, unenclosed fields under intensive arable cultivation. This open landscape is fragmented by the location of large scale developments such as the airport, Manston Business Park and a sporadic settlement pattern to the north of the airport. The character of this area is also defined by the proximity of the edges of the urban areas*." (TDC, 2012)
Quex Park LCA	"*The Park is unique within the Thanet context, comprising a formal and extensive wooded parkland and amenity landscape within an otherwise open intensively farmed landscape. It possesses a formal landscape structure and gardens that act as an effective setting to Quex House. The parkland is intensively cultivated between the tree belts, with limited grazing pasture remaining. Two important historic features of the Park are the Waterloo Tower and a round castellated brick tower to the north of the main House*." (TDC, 2012)
The Urban Coast LCA	"*The urban areas of Thanet form an almost continuous conurbation along the coast between Pegwell Village and Minnis Bay. With the exception of the Green Wedges, this area is heavily urbanised. The coastal strip is characterised by the presence of traditional seaside architecture, active harbour areas and beaches and some extensive public open clifftop areas. The pattern of bays and headlands provides long sweeping views of the coast*." (TDC, 2012)
Dover District Landscape Character Assessment (DDC, 2006)	
Little Stour Marshes	• "*Flat topography* • *Alluvium soils* • *Pasture land* • *Drainage ditches as field boundaries* • *Occasional hawthorn and willow, reeds and flax along ditch lines* • *Dark patches of sedges in wetter areas* • *Drove roads lead up to eastern boundaries* • *No roads or buildings within character areas* • *Footpaths follow waterways* • *Extensive views across open arable farmland* • *Exposed*." (DDC, 2006)

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Landscape Character Area	Description
Ash Level	• "*Flat topography* • *Alluvium soils* • *Arable and pastoral use* • *Grazed primarily by cows* • *Small fields* • *Ditches define field boundaries* • *Occasional hawthorn or willow, reeds and flax along ditch lines* • *Sedges define wetter areas* • *No roads or buildings* • *Few footpaths in north-south direction* • *Unenclosed* • *Open views.*" (DDC, 2006)
Preston and Ash Horticulture Belt	• *"Relatively flat topography* • *Variety of plants and market garden character* • *Orchards dominant* • *Linear plantations* • *Field use characterises field size* • *Poplar shelter belts* • *Native hedgerows and tree clumps* • *Narrow winding lanes* • *Footpath and bridleways network* • *Variety of building types including Kentish oast houses and large timber barns* • *Sense of enclosure and limited views."* (DDC, 2006)
Richborough Castle	• "*Higher knoll of land* • *Flint castle remains* • *Manmade landform features, such as amphitheatre* • *Mown grass* • *Narrow winding lanes* • *Surrounding arable fields* • *Native hedgerows* • *Variety of building types and ages* • *Open views of surrounding area.*" (DDC, 2006)
The Sandwich Corridor	• *"Flat landscape* • *Broad native hedgerows and tall metal fencing along roads* • *Huge, modern buildings with brick and glass dominant* • *Large car parks* • *River Stour and boat culture* • *Associated mudflats and bird life* • *Large lake* • *Industrial pockets* • *Straight, wide main road* • *Limited views due to buildings dominating landscape.*" (DDC, 2006)

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Landscape Character Area	Description
Sandwich Bay	• "*Flat to gently undulating topography* • *Dunes* • *Sand and shingle* • *Sea kale and sea holly along shingle* • *Occasional scrub* • *Birdlife* • *Wide expanse of sea* • *Golf courses* • *Coarse coastal grasses* • *Some farmland* • *Large houses in open plan estate* • *Few roads* • *Seasonal change* • *Exposed landscape with extensive views out to sea.*" (DDC, 2006)

11.4.48 The Proposed Development site is sited within the Central Chalk Plateau LCA. This LCA is characterised by flat or gently undulating topography, slight elevation in comparison with neighbouring LCAs, relative openness and extensive views. Manston Airport and other large scale developments are identified in the *Landscape Character Areas* (TDC, 2012) as contributing to the fragmentation of the open character along with the sporadic settlement pattern. Policy SP22 in the *Draft Thanet Local Plan to 2031 Preferred Options Consultation* (TDC, 2015) which is entitled '*Protection and Enhancement of Thanet's Historic Landscape*' states that in this LCA development proposals should avoid skyline intrusion, and the loss or interruption of long views. Developments must be demonstrated to take advantage of and engage with views.

Landscape Designations

11.4.49 There are no landscape designations within the LVIA study area.

11.5 Environmental measures incorporated into the Proposed Development

11.5.1 This section lists the environmental measures relevant to landscape and visual which have been incorporated into the current design of the Proposed Development.

11.5.2 How these environmental measures influence the assessment of significance is discussed in **Section 11.6**. However the broad approach adopted is that where achievable and agreed, environmental measures have been incorporated into the development proposals, and the effect that those environmental measures have on the significance of potential effects is taken into account during the assessment. In some cases a potential effect may require no further consideration following incorporation of appropriate environmental measures.

11.5.3 A summary of the environmental measures that have been incorporated into the development proposals to date in order to avoid, reduce or compensate for potential adverse landscape and visual effects is provided below in **Table 11.9**.

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11.5.4 It should be noted that the environmental measures incorporated into the design of the Proposed Development at this stage of design maturity largely take the form of guiding principles and generic measures which have been used to inform the outline design. These principles are subject to a continuous process of refinement and will be incorporated into a set of Manston Airport Design Principles that will be used to ensure that all elements of the Proposed Development are designed to a high standard. The Manston Airport Design Principles will accompany the DCO submission for the Proposed Development. These principles will be used to inform the design of any specific mitigation measures that may also need to be embedded into the final proposed design. Design principles and embedded mitigation measures will also be informed by the feedback received in response to this statutory consultation.

Table 11.9 Rationale for incorporation of environmental measure

Potential receptor	Predicated changes and potential effects	Incorporated measure
Landscape elements: trees within the site boundaries	Potential loss or damage to valued vegetation (including tree roots as a result of construction activity) and screening elements	Vegetation /tree survey and protection plans considered as part of the design process. Construction activities to be carried out in accordance with *BS 5837: 2012 Trees in relation to design, demolition and construction. Recommendations* in order to protect trees and other vegetation. New tree planting to be undertaken to replace that lost. The design of new planting will be located to deliver screening, such as along Spitfire Way where a 20-30m wide and 1650m long landscape belt is currently proposed. Proposed tree and shrub species will be subject to restrictions to mitigate bird attraction. There may also be opportunities for a new landscape to be created around the proposed drainage attenuation ponds.
Landscape character	Direct or indirect effects on valued characteristics, special qualities and character	Incorporation of enhanced landscape/architectural design, the provision of a landscape masterplan and landscape management to reduce effects of landscape character and ensure that the nature of these effects is neutral or positive as far as possible. The use of building materials, detailing and finish for the roofs and facades of proposed buildings that respond in a positive way to the existing landscape context.
All visual receptors overlapped by the ZTV within the study area	Changes to existing views, visual amenity and scenic quality: • Introduction of new large scale features to the view; • Alteration to the landscape character of the view; • Loss of or disruption to existing views of skylines; • Changes to perceptions if movement through increased traffic (including HGV) and air movements; and • Visual effects resulting from light pollution	The generic types of mitigation the preliminary assessments have assumed to be incorporated into the Proposed Development design include: • Architectural design of buildings. The Masterplan Narrative (RPS, February 2017) states that: "*wall cladding could be vertically and /or horizontally lain with feature panels to break up the exterior view. Coloured cladding could be used to signify key areas or the division between facilities*". It also notes that early concept stage visualisation of the cargo facility show an aerofoil shaped building representing a plane's wing. The final facility may follow this or another architectural scheme. • Landscape design along Spitfire Way and around the proposed drainage attenuation ponds. The detail design of such measures will be subject to the ongoing iterative design and assessment process.

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11.6 Scope of the assessment

11.6.1 This section sets out information on the process by which receptors were identified; the details of the receptors that could potentially be affected by the Proposed Development; and the potential effects on receptors that could be caused by the Proposed Development.

11.6.2 Whilst the relevant EIA regulations (The Infrastructure Planning [Environmental Impact Assessment] Regulations 2009) require that this assessment focuses upon those receptors most likely to experience significant landscape and visual effects, it is also important that a precautionary approach is adopted in defining the spatial and temporal scope of the assessment, in order that all of the potentially significant landscape and visual effects can be captured by the assessment.

11.6.3 The scope of assessment has been informed by:

- relevant guidance (in particular that provided by GLVIA 3);
- consultee responses to the Scoping Report; and
- the professional judgement of the qualified technical specialists who have undertaken the LVIA.

Approach to identifying receptors

11.6.4 Within the context of the framework outlined above, the identification of receptors has been informed by the results of the work detailed in **Section 11.4**; and the preliminary Proposed Development design. In accordance with the guidance provided by GLVIA 3, potential receptors are considered to include those who may reasonably be expected to have the potential to sustain significant adverse effects in relation to:

- direct landscape effects (i.e. loss or degradation of landscape elements that may be physically affected by the Proposed Development and changes to the character of the landscape hosting the Proposed Development as a result of alterations to the fabric of that landscape);
- indirect landscape effects (i.e. changes to the character of landscape surrounding the Proposed Development as a result of alterations to the appearance or other perceptual characteristics of the wider landscape); and
- visual effects (i.e. changes to the views available to people).

11.6.5 The first step in identifying receptors to be included in the LVIA was the definition of the LVIA study area as described in paragraph 11.3.2. This has been defined as a 5 km offset from the Proposed Development site boundary and represents the maximum spatial scope of the landscape and visual assessment. The following landscape and visual receptors are excluded from the LVIA on the basis of their spatial relationship to the LVIA study area:

- all nationally or locally designated landscape located wholly outside the LVIA study area;
- all nationally or locally defined landscape character areas located wholly outside the LVIA study area; and

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- all visual receptors located outside the LVIA study area.

11.6.6 The second step in identifying receptors to be included in the LVIA was the establishment of a potential effects pathway. In relation to receptors that might be subject to direct landscape effects, no effects pathway is considered to be present for any landscape elements or character areas that are not located wholly or partly within the boundary of the Proposed Development. In relation to receptors that might sustain indirect landscape effects or visual effect, the potential effects pathway is considered to be visual and dependent upon the availability of views of the Proposed Development. The method used to calculate the ZTV of the Proposed Development is described in paragraphs 11.3.3 to 11.3.7. The following landscape and visual receptors are excluded from the LVIA on the basis of their spatial relationship to the ZTV:

- all nationally or locally designated landscape located wholly outside the ZTV;
- all nationally or locally defined landscape character areas located wholly outside the ZTV; and
- all visual receptors located outside the ZTV.

11.6.7 The third and final step in identifying receptors to be included in the LVIA was a consideration of the sensitivity of the receptors to the changes that are likely to occur. All landscape character areas included in the LVIA following steps one and two, described above, are considered to be of a sufficiently high sensitivity to have the potential to sustain significant effects as a result of the Proposed Development. In relation to visual receptors, all receptors within the categories: people at their place of residence; people within their community; people engaged in outdoor recreation; and people using the transport network are also considered to be of a sufficiently high sensitivity to have the potential to sustain significant effects as a result of the Proposed Development.

11.6.8 With regards to people at their place of work, GLVIA 3 (LI and IEMA, 2013) states the following within the context of visual receptors likely to be less sensitive to visual change:

11.6.9 "*People at their place of work whose attention may be focused on their work or activity, not on their surroundings, and where the setting is not important to the quality of working life (although there may on occasion be cases where views are an important contributor to the setting and the quality of working life)*."

11.6.10 People at their place of work are therefore only included in the LVIA where views are an important contributor to the setting and the quality of working life. No such receptors have been identified in relation to the Proposed Development.

Potential receptors

11.6.11 This section identifies the potential receptors that have been identified based on the factors listed at paragraph 11.6.7 above and on the Scoping Opinion received from PINS. The receptors listed in **Table 11.10** are considered capable of being significantly affected and will therefore be taken forward for further assessment.

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Table 11.10 Potential receptors

Receptor	Distance from site boundary	Reason for selection
Landscape receptors		
Landscape elements located within the Proposed Development Site	Within the site	Potential for direct and indirect effects from proposed construction and operational activities
NCA 113: North Kent Plain	Host NCA	Potential for direct and indirect effects upon NCA's key characteristics arising from proposed construction and operational activities
Pegwell Bay LCA	Approximately 1 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational activities
The Former Wantsum Channel LCA	Approximately 1.5 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational activities
The Former Wantsum North Shore LCA	Adjacent to the site boundary	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational activities
The Central Chalk Plateau LCA	Host LCA	Potential for direct and indirect effects upon LCA's key characteristics arising from proposed construction and operational activities
Quex Park LCA	Approximately 1.5 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational phase activities
The Urban Coast LCA	Approximately 0.4 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational phase activities
Little Stour Marshes LCA	Approximately 4.7 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational phase activities
Ash Level LCA	Approximately 2.8 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational phase activities
Preston and Ash Horticulture Belt LCA	Approximately 4.6 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational phase activities
Richborough Castle LCA	Approximately 4.7 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational phase activities
The Sandwich Corridor LCA	Approximately 2.9 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational phase activities
Sandwich Bay LCA	Approximately 2.5 km	Potential for indirect effects upon LCA's key characteristics arising from proposed construction and operational phase activities
Visual Receptors		

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Receptor	Distance from site boundary	Reason for selection
Residential visual receptors within LVIA study area and the Proposed Development ZTV	Up to 5.0 km	Potential for changes to baseline views as a consequence of construction and operational phase activities. Groupings of this category of visual receptors are shown in **Figures 11.5 – 11.7**
Recreational visual receptors within LVIA study area and the Proposed Development ZTV	Up to 5.0 km	Potential for changes to baseline views as a consequence of construction and operational phase activities. Groupings of this category of visual receptors are shown in **Figures 11.8 - 11.10**

Spatial and temporal scope

Spatial scope

11.6.12 The spatial scope of the LVIA includes:

- all landscape elements located within the boundary of the LVIA (these will be identified and assessed in the ES once the Proposed Development has achieved a level of design maturity to allow potentially affected elements to be identified with certainty);
- all national and local landscape character areas located within the boundary of the Proposed Development;
- all national and local landscape character areas located wholly or partly within both the LVIA study area and the ZTV of the Proposed Development; and
- all visual receptors located wholly or partly within both the study area and the ZTV of the Proposed Development that fall within the following categories:
  - people at their place of residence;
  - people within their community including parks and public open spaces;
  - people engaged in outdoor recreation; and
  - people using the transport network.

Temporal scope

11.6.13 With regard to the timeframe of the assessment, both the construction and operational phases have been considered at this preliminary assessment stage based on the following provisional timescales:

- at the period during the construction phases when the greatest level of construction activity is being undertaken;
- at the first winter after the commencement of the operational period (to account for any increase in visibility due to seasonal leaf loss); and

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- at the summer 14 years after the commencement of the operational period i.e. Year 15 when all construction activities are scheduled for completion (when any mitigation planting will be established and fully effective in landscape and visual terms).

Potentially significant effects

11.6.14 The potentially significant effects from the Proposed Development, which are subject to further discussion in this chapter, are summarised below.

- Potential effects on landscape character as a result of the construction and operational activity associated with the redevelopment and reopening of Manston Airport. The assessment will be undertaken upon the limited number of Dover and Thanet LCAs that are completely or partially located within the study area and the development ZTV.
- Potential effects upon NCA 113 – North Kent Basin.
- Potential effects upon tranquillity will be assessed within the context provided by the defined key characteristics of the different LCAs.
- Potential effects upon the views and visual amenity of visual receptors within the LVIA study area and Proposed Development ZTV as a result of construction activity required to reopen Manston Airport. These will be principally the construction activities required for the cargo facility, fuel farm, hangars and new aircraft stands.
- Potential effects upon the views and visual amenity of visual receptors within the LVIA study area and the Proposed Development ZTV as a result of the operation of the reopened Manston Airport. These will be principally the operational activities at the cargo facility, fuel farm, hangers and new aircraft stands but will also include the movements of aircraft on the ground and when taking off and landing (air traffic movements – ATMs), movement of vehicles and plant within and around the Proposed Development and operational lighting requirements.

11.6.15 Assessment of each of the following effects has led to the conclusion that they are unlikely to be significant and do not require any further assessment:

- Potential effects on any LCA within the study area that are entirely outside the development ZTV as without a visual effects pathway it is highly unlikely that effects could be sustained by other potential effects pathways.
- Potential effects on visual receptors that are located within the study area but outside the Proposed Development ZTV. This is because in the absence of a visual effects pathway linking a visual receptor to the Proposed Development it is highly unlikely that visual effects could be sustained.

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11.7 Assessment methodology

Methodology for predicted effects

11.7.1 The methodology for the LVIA has been undertaken in accordance with best practice guidance and the methodology as set out here, which is based on the *Guidelines for Landscape and Visual Impact Assessment, Third Edition* (*GLVIA 3*) (LI & IEMA, 2013).

11.7.2 Additional guidance has been taken from, but not limited to, the following key publications:

- Advice Note 01/11 Photography and photomontage in landscape and visual impact assessment (LI, 2011); and
- Visual Representation of Wind Farms Version 2.2 (Scottish Natural Heritage (SNH), 2017).
- Technical Guidance Note 02/17 Visual representation of development proposals. (LI, 2017); and
- Technical Information Note 01/2017 Tranquillity – An overview. (LI, 2017).

11.7.3 The assessment of the significance of landscape and visual effects is, according to *GLVIA 3* "*an evidence-based process combined with professional judgement*." (LI & IEMA, 2013). All assessments and judgements must be transparent and capable of being understood by others. Levels of landscape and visual effects are determined by consideration of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that would result from the reopening and redevelopment of Manston Airport.

Landscape effects

11.7.4 Landscape effects are defined by the Landscape Institute in *GLVIA 3* (LI & IEMA, 2013), paragraphs 5.1 and 5.2 as follows:

"*An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the Proposed Development may influence in a significant manner*."

Evaluating landscape sensitivity to change

11.7.5 The sensitivity of a landscape receptor e.g. an LCA, to a particular development is determined by the susceptibility of that landscape receptor and its value. The methodology describes landscape sensitivity as high, medium or low and is assessed by taking into account the landscape receptor's landscape value and landscape capacity or susceptibility to the changes identified as the result of the construction and subsequent operation of a particular Proposed Development.

11.7.6 Further guidance on the evaluation of landscape sensitivity and the criteria for assessing value and susceptibility is set out in paragraphs 5.39 – 5.47 of *GLVIA 3* (LI & IEMA, 2013) and summarised below.

Landscape value

11.7.7 *GLVIA 3* (LI & IEMA, 2013) defines landscape value as:

> "*The relative value that is attached to different landscapes by society*" (LI & IEMA, 2013).

11.7.8 A consistent approach has been applied to determining the landscape value of the individual landscape character receptors considered in the landscape assessment. This utilises a range of factors to help understand the value of a particular landscape, as follows:

- Landscape designations: whether an area of landscape is recognised by statute (i.e. National Parks), is a heritage coast, a locally designated landscape or is undesignated;
- Landscape quality/condition: a measure of the physical state of the landscape (i.e. the intactness of the landscape and the condition of individual elements);
- Rarity: the presence of rare elements or features in the landscape or the presence of a rare landscape character type;
- Conservation interests: the presence of features of wildlife or historical and cultural interest which add value to the landscape;
- Recreational value: evidence that the landscape is valued for recreational activity where experience of the landscape is important;
- Perceptual aspects: a landscape may be valued for its perceptual qualities, notably tranquillity; and
- Associations: some landscapes are associated with particular people, such as artists or writers, or events in history.

11.7.9 **Table 11.11** draws from the advice provided in *GLVIA 3* (LI & IEMA, 2013) and provides further guidance and examples of landscape value.

Table 11.11 Assessing value

Landscape Value Criteria	**Landscape sensitivity category:**		
	High	Medium	Low
Designations:	Internationally or nationally designated landscape	Non-designated or 'ordinary' landscapes and landscape features.	A 'non-landscape' or area of land-use associated with mineral extraction, heavy industry, landfill, large scale construction (which may be temporary) or dereliction.
Landscape quality, condition and intactness:	A landscape/features recognised to be of high landscape quality and in	A landscape/features that are of a reasonable or medium quality	A landscape/features that are in a poor condition with a

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Landscape Value Criteria	Landscape sensitivity category:		
	High	Medium	Low
	excellent or good condition with a 'strong' intact/unified and distinctive character. Constant/mature landscape with strong time depth. Management plans aim for conservation.	and condition with an intact and recognisable character. Constant or improving state. Management plans aim for conservation and enhancement.	fragmented or indistinct landscape character. The landscape may be in a declining state. Management plans aim for enhancement and restoration.
Scenic quality:	A landscape of high aesthetic appeal supported by recognised tourist/visitor literature. There are little or no detracting features.	A landscape of moderate or 'ordinary' aesthetic appeal. There may be some detracting features.	A landscape of limited or no aesthetic appeal with detracting features, including noise, traffic movement and/or odours.
Rarity and representativeness:	A landscape or features that are rare and valued in a national or regional context that is supported by designation.	A landscape or features that are uncommon but, not particularly valued or supported through designation.	A landscape or features that are common and not rare
Conservation interest and associations:	A landscape with rich and diverse cultural, historic, nature conservation value and recognised literary or artistic associations with international/national designation.	A landscape with some cultural or nature conservation features and interest with regional/local designation	A landscape with few or no cultural or nature conservation features and interest.
Recreation value:	High recreational/tourist value indicated through landuse (parks/sports facilities etc.) and the density/hierarchy of recreational routes.	A landscape of moderate recreational value, as indicated by landuse and density/hierarchy of recreational routes.	A landscape of limited recreational value, where an appreciation of the landscape has a limited contribution to the public's recreational experience.
Perceptual aspects:	Highest levels of CPRE mapped tranquillity. Strong perceptions of 'wildness' or naturalness and dark skies.		Developed landscapes which are the antithesis of tranquillity 'wildness' or naturalness. Light intrusion occurs.

Landscape susceptibility to change

11.7.10 *GLVIA 3* (LI & IEMA, 2013) defines landscape susceptibility to change as follows:

"This means the ability of the landscape receptor to accommodate the Proposed Development without undue consequences for the maintenance of the baseline situation…" (LI & IEMA, 2013).

11.7.11 *GLVIA 3* (LI & IEMA, 2013) also emphasises that susceptibility to change is dependent on the types of development proposed. Paragraph 5.42 states:

"*Some of these existing assessments may deal with what has been called 'intrinsic' or 'inherent' sensitivity, without reference to a specific type of development. These cannot reliably inform assessment of the susceptibility to change since they are carried out without reference to any particular type of development and therefore do not relate to the specific development proposed. Since landscape effects in LVIA are particular to both the specific landscape in question and the specific nature of the development, the assessment of susceptibility must be tailored to the project.*" (LI & IEMA, 2013).

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11.7.12 **Table 11.12** provides further guidance and examples of landscape susceptibility, which considers the capacity or ability of the landscape receptor, by virtue of its particular physical, visual or perceptual characteristics to accommodate the Proposed Development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.

Table 11.12 Assessing susceptibility

Susceptibility criteria	Landscape sensitivity category		
	High	**Medium**	**Low**
Generally: Landscape possessing combinations of physical, visual or perceptual characteristics that indicate:			
Landscape	High susceptibility to proposed change and low capacity for the Proposed Development.		Low susceptibility to proposed change and high capacity for the Proposed Development.
Examples of physical elements/characteristics:	Elements or combinations of characteristics such as of small scale landscapes with complex landform, patterns and enclosed spaces, susceptible to development.	Elements or combinations of characteristics such as medium to large scale landscapes with more open, simple landform and patterns with some capacity for development.	Elements or combinations of characteristics such as large scale and simple landscapes, where similar development is already part of the baseline character and there is capacity for development.
Examples of visual characteristics:	Susceptibility to alteration of regionally/locally valued skylines, views, vistas and landmarks. Areas with a strong visual relationship with surrounding landscapes/setting and limited visual/light intrusion.	Combinations of broad and simple skylines with few landmarks and change already present. A landscape where light intrusion and some movement is present.	Combinations of broad and simple skylines lacking in landmarks, where development change movement, light intrusion and/or visual intrusion is present.
Examples of perceptual characteristics:	Perceptions of tranquillity, 'wildness' or naturalness, time depth and/or related special qualities with low levels of light intrusion that would be susceptible to development.	Perceptions of moderate tranquillity, 'wildness' or naturalness with limited time depth, presence of light intrusion and some development capacity.	Landscapes lacking in tranquillity, wildness and/or remoteness, subject to land use change, and with development capacity.

11.7.13 The manner in which the value and susceptibility are combined to determine landscape sensitivity is a matter for informed professional judgement and the following matrix shown in **Table 11.13** has been used as a guide to assist this process. In terms of landscape value, national and international landscape designations are generally accorded the highest assessment value.

Table 11.13 Overall landscape sensitivity

Overall landscape sensitivity		Susceptibility		
		High	**Medium**	**Low**
Value	**High**	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

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Magnitude of landscape change

11.7.14 The magnitude of landscape change or degree of change resulting from the redevelopment and operation of the Proposed Development is described as high, medium, low or negligible, in accordance with *GLVIA 3* (LI & IEMA, 2013) paragraph 3.27 use of 'word scales'. In those instances where, due to mitigation, there would be no magnitude of landscape change, then this justification is also recorded in the landscape assessment. The magnitude of landscape change is described by reference to its size and scale, geographical extent and duration/reversibility in accordance with *GLVIA 3* (LI & IEMA, 2013), paragraph 5.48-52 that can be summarised as follows.

- Size or Scale:
  - The size or scale of landscape change is described via a simple word scale to describe the extent or proportion of loss or addition of landscape elements, the degree to which the perceptual characteristics of the landscape may be altered and whether the effect changes the key characteristics, critical to its distinctive character overall.
- Geographical Extent:
  - The geographical extent of the effect is distinct from the size and scale of effect and there may for example be a medium loss of landscape elements affecting a large geographical area, or a high level addition of new development affecting a very localised area, both resulting in a high magnitude of landscape change. The geographical extent is described at a site level within the development boundary, within the immediate setting of the site, at the scale of the landscape character type or area assessed or on a larger scale, affecting several landscape character types or areas.
- Duration and reversibility:
  - In accordance with *GLVIA 3* (LI & IEMA, 2013) this is a separate, but linked consideration and the duration of an effect may be described as temporary (short term 0-5 years, medium term 5-10 years or long term 10-20 years) or permanent. The development may also be considered in terms of whether the effects are reversible.

11.7.15 Examples and further guidance on the evaluation of the magnitude of landscape change are described in **Table 11.14.**

Table 11.14 Magnitude of landscape change

Magnitude of landscape change	Key determining criteria
High	A large scale change that may include the loss of key landscape elements/characteristics or the addition of new uncharacteristic features or elements that would alter the perceptual characteristics of the landscape. The size or scale of landscape change could create new landscape characteristics and may change the overall distinctive landscape quality and character, typically, but not always affecting a larger geographical extent.

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Magnitude of landscape change	Key determining criteria
Medium	A medium scale change that may include the loss of some key landscape characteristics or elements, or the addition of some new uncharacteristic features or elements that could alter the perceptual characteristics of the landscape. The size or scale of landscape change could create new landscape characteristics and may lead to a partial change in landscape character, typically, but not always affecting a more localised geographical extent.
Low	A small scale change that may include the loss of some landscape characteristics or elements of limited characterising influence, or the addition of some new features or elements of limited characterising influence. They may be a small partial change in landscape character, typically, but not always affecting a localised geographical extent.
Negligible	A very small scale change that may include the loss or addition of some landscape elements of limited characterising influence. The landscape characteristics and character would be unaffected.

11.7.16 The assessment also identifies areas where no landscape change is predicted. In these instances '*No Change*' has been inserted into the magnitude of change column of the assessment tables and the resulting level of effect identified as '*None*'. This commonly occurs where no intervisibility (presence of a line of sight between two locations) exists between the landscape receptor and the Proposed Development.

11.7.17 In accordance with the relevant EIA Regulations (The Infrastructure Planning [Environmental Impact Assessment] Regulations 2009) the level of landscape effect is also described in terms of the effect's duration (permanent/temporary) direct/indirect (as defined by *GLVIA 3* (LI & IEMA, 2013) resulting directly from a Proposed Development or as an indirect consequence), positive (beneficial)/neutral/negative (adverse) and or whether it is cumulative. In describing the level of landscape effect the assessment text will clearly and transparently set out the professional judgements that have been made in determining sensitivity and how the value and susceptibility of the receptor has been assessed; and in determining magnitude and how the size and scale, geographical extent and duration of the effect has been taken into account.

Visual effects

11.7.18 Visual Effects are concerned wholly with the effect of the Proposed Development on views, and the general visual amenity and are defined by the Landscape Institute in *GLVIA 3* (LI & IEAM, 2013), paragraph 6.1 as follows:

> "*An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views*."

11.7.19 Visual effects are identified for different receptors (people) who will experience the view at their place of residence, within their community, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view; and

- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

11.7.20 The assessment process involves iterative design and the reassessment of any remaining residual effects that could not otherwise be mitigated or 'designed out'.

11.7.21 The level of visual effect (and whether this is significant) is determined through consideration of the *'sensitivity'* of each visual receptor (or range of sensitivities for receptor groups) and the *'magnitude of change'* that would be brought about by the reopeningt of Manston Airport and operation of the Proposed Development. The visual assessment unavoidably involves a combination of both quantitative and subjective assessment and wherever possible a consensus of professional opinion has been sought through consultation and internal peer review.

Zone of Theoretical Visibility (ZTV) Analysis

11.7.22 A plan mapping the Zone of Theoretical Visibility (ZTV) has been used to analyse the extent of theoretical visibility of the Proposed Development or part of it, across the LVIA study area and to assist with viewpoint selection. The ZTV does not, however, take account of the screening effects of buildings, localised landform and vegetation. As a result, there may be some locations in the LVIA study area which, although shown as falling within the ZTV, where adjacent vertical features such as banks, fences, walls and vegetation which would in reality otherwise preclude visibility from these locations

11.7.23 The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the likely theoretical visibility.

Viewpoint Analysis

11.7.24 Proposed viewpoints are shown on **Figure 11.2**. Viewpoint analysis is used to assist the LVIA and is conducted from agreed viewpoints within the study area that have been agreed with consultees, in particular local planning authorities. The purpose of this is to assess both the level of visual impact for particular receptors and to help guide the design process and focus the assessment. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer limit beyond which there would be no further significant effects. The assessment involves visiting the viewpoint location and viewing visualisations (wirelines, photomontages or other forms of computer generated imagery) prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather and good visibility and also considers seasonally reduced leaf cover. The viewpoint analysis will be included in the ES, when a full suite of visualisations will be available.

Evaluating Visual Sensitivity to Change

11.7.25 In accordance with Paragraphs 6.31-6.37 of *GLVIA 3* (LI & IEAM, 2013) the sensitivity of visual receptors takes account of the susceptibility of the receptor to visual change and the value of the baseline view available to them. These are described as high, medium or low. The main factors to consider are the

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occupation or activity of the receptor (people) at particular locations, the extent to which their attention or interest may therefore be focused on appreciation of the landscape in the view and the importance or popularity of the views and/or typical numbers of viewers. These are assessed by reference to Ordnance Survey maps, observations made during site visits and, where available, to publicly available information on user numbers, for example the number of visitors to a tourist destination. Other factors include the location and context of the viewpoint (in terms of the landscape value, quality, and capacity of the area within the view).

11.7.26 The factors that will be considered in defining the levels of visual susceptibility are as follows:

- Visual receptor: Whilst it is accepted that people will undertake a range of different activities, their visual experience of the Proposed Development and its operation will change according to where they are, and what they are doing. The primary activity of the receptor at the viewpoint is therefore a key determinant of visual sensitivity. Residents and other individuals engaged in outdoor recreation, where the focus of the activity is the enjoyment of the landscape are assessed to be of high sensitivity. People who are travelling are assessed to be less sensitive (medium or low) unless the route is specifically signed as a scenic driving route; and people engaged in sport or recreation which does not involve or depend upon appreciation of views of the landscape and people at work are assessed as the least sensitive (low).
- Frequency: The popularity and/or number of viewers are also important factors to consider. Landmarks/tourist attractions and national trails visited and used by large numbers of people are likely to be more sensitive than those which are less visited. Exceptions include motorways where, although there are large numbers of receptors these are generally considered to be of lower visual sensitivity and appreciation of scenic quality is unlikely to be their primary motivation in undertaking a motorway journey and their high speed will make appreciation of views more difficult.

11.7.27 The factors which will be considered in defining the value attached to views by receptors will take account of:

- any recognition of the value attached to a particular view in relation to heritage assets or through planning designations; and
- any indications of value provided by guidebooks, tourist literature, provision of car parking and/or provision of interpretation materials.

11.7.28 Examples and further guidance on the evaluation of visual sensitivity are described in **Table 11.15.**

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Table 11.15 Visual receptor sensitivity

Visual receptor sensitivity	Key determining criteria
High	All of the receptors in this category would generally include residents, tourists/visitors, walkers, cyclists and horse riders, either stationary or travelling through the landscape, and/or undertaking outdoor recreational activities where the focus of the activity is an appreciation of the landscape. ▪ Residential properties or settlements and related community outdoor spaces. ▪ Outdoor tourist and visitor attractions. ▪ Recreational routes (national trails, long distance footpaths and PRoWs; Sustrans national cycle routes (NCR); open access land/beaches and recognised scenic driving routes) People generally, undertaking recreational activity where the focus of the activity is an appreciation of the landscape (outside internationally or nationally designated landscapes).
Medium	This category generally covers: people travelling through the landscape on road, rail or other transport routes as rail passengers and road users and people undertaking recreational and sporting activities where it is likely that their surroundings have some influence upon their enjoyment (e.g. angling and golfing).
Low	This category generally covers: people for whom their surroundings are unlikely to be a primary concern or affect how they undertake their current activity. Receptors are likely to include people at their place of work, people travelling on main roads through built up areas, dual-carriageways or motorways or taking part in activities not involving an appreciation of the landscape (e.g. playing team sports).

Evaluating the magnitude of change to the view

11.7.29 The magnitude of visual change will be described as high, medium, low, or negligible which is in accordance with the guidance on the use of 'word scales' provided in Paragraph 3.27 of *GLVIA 3* (LI & IEAM, 2013). In those instances where the Proposed Development would not be visible, due to vegetation screening, then this is also recorded as '*No Change*' in the magnitude of change column of the assessment tables and the resulting level of effect identified as '*None*'.

11.7.30 The magnitude of visual change will be assessed taking into account the baseline presence of the non-operational airport and will be described by reference to its size and scale, geographical extent and duration/reversibility in accordance with *GLVIA 3* (LI & IEAM, 2013) as follows:

- Size and Scale:
  - Scale of change: The scale of change in the view is determined by the loss or addition of features in the view and changes in the composition and extent of view affected. This can in part be described objectively by reference to the numbers and scale of new objects visible and the horizontal/vertical field of view that these new objects will occupy. Other descriptors such as 'dominant', 'prominent', 'noticeable' and 'negligible' can also be used to describe the scale of change.
  - Contrast: The degree of contrast or integration that will be generated by the introduction of any new features or changes in the landscape that will arise with the existing or remaining landscape elements and characteristics in terms of form, scaler, mass, line, height, colour and texture. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and have a higher magnitude of change.

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- Speed: The speed at which the Proposed Development may be viewed will affect how long the view is experienced (continuously, intermittently, glimpsed or repeatedly and sequentially along a route) and the likelihood of the development being noticed by people travelling in cars or trains compared to those who may be walking/riding/cycling and able to stop and 'take in' a view.
- Screening: A development may be wholly or partly screened by landform, vegetation (including seasonal effects due to hedgerow management and seasonal variations in deciduous leaf cover) and/or buildings. Conversely visual receptors with open views, particularly from landscapes where such views are a key characteristic, are likely to be able to see a greater proportion or all of the Proposed Development.
- Skyline/background: Whether a development would be viewed against the skyline or a background landscape may affect the level of contrast and magnitude, for example, skyline developments may appear more noticeable, particularly where they affect open and uninterrupted horizons.

- Geographical Extent:
  - Distance: The separation distance from the Proposed Development can be measured objectively. Distance often provides a strong indicator of the magnitude of visual change, subject to any intervening screening of the development by landform, vegetation, or buildings.
  - Angle of view: The angle of view may be considered in terms of whether the development will be seen directly in front of a visual receptor or if it will be seen more obliquely. Road users are generally more aware of the views in the direction of travel, whilst train passengers are more aware of views perpendicular to their direction of travel. Elevated views are likely to reveal more of the Proposed Development, whereas low level views are more likely to be screened by intervening built form and vegetation.
  - Geographical extent of area over which the changes would be visible. This can be defined by the distance, area and the horizontal and vertical field of view affected.
- Duration and reversibility:
  - In accordance with *GLVIA 3* (LI & IEAM, 2013) this is a separate, but linked consideration and the duration of an effect may be described as temporary (short term 0-5 years, medium term 5-10 years or long term 10-20 years) or permanent. The development may also be considered in terms of whether the effects are reversible.

11.7.31 Further guidance on the evaluation of the magnitude of visual change is provided in **Table 11.16.**

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Table 11.16 Magnitude of visual change

Magnitude of Visual Change	Key determining criteria
High	A large and prominent change to the view, appearing in the fore to middle ground and involving the loss/addition of a number of features which is likely to have a strong degree of contrast and involving little screening. The view is likely to be experienced at static or low speed and is more likely to be continuously/sequentially visible from a route.
Medium	A moderate and prominent/noticeable change to the view, appearing in the middle ground and involving the loss/addition of features and a degree of contrast with the existing view. There may be some partial screening. The view is likely to be experienced at static or low to medium speed and is more likely to be intermittently or partially visible from a route.
Low	A noticeable or small change, affecting a limited part of the view that may be obliquely viewed or partly screened and/or appearing in the background landscape. This category may include rapidly changing views experienced from fast-moving road vehicles or trains.
Negligible	A small or negligible change to the view that may be obliquely viewed and mostly screened and/or appearing in the distant background or viewed at high speed over short periods and capable of being missed by the casual observer.

11.7.32 In accordance with the relevant EIA Regulations (The Infrastructure Planning [Environmental Impact Assessment] Regulations 2009) the level of visual effect is also described in terms of the effects duration (permanent/temporary), positive (beneficial/neutral/negative (adverse) and or whether it is cumulative. In describing the level of visual effect the assessment text will clearly and transparently set out the professional judgements that have been made in determining visual sensitivity and how the value and susceptibility of each visual receptor has been assessed; and in determining magnitude and how the size and scale, geographical extent and duration of the effect has been taken into account.

Evaluating Positive/Neutral and Negative Effects

11.7.33 In describing whether the nature of the effects would be positive (beneficial)/neutral/negative (adverse).

11.7.34 However, not all change, including high levels of change, is necessarily negative. The LVIA considers architectural and aesthetic factors such as the visual composition of the landscape in the view together with the Proposed Development, which may or may not be reasonably accommodated within the scale and character of the landscape as perceived from the receptor location as follows:

- positive of beneficial effects would include landscape mitigation and enhancement, combined with good landscape and architectural design quality resulting in a development that can be reasonably well accommodated within the scale and landscape setting or context;
- neutral visual effects include changes that neither add nor detract from the quality and character of an area including development that appears reasonably well accommodated within the scale and setting or context and also includes negligible magnitudes of change; and
- negative effects are likely to result from poor design quality such as the scale of development relative to the underlying landscape scale and landscape setting or context, or other visual factors that may reduce scenic quality, such

that the development may appear dominating, over intrusive, overbearing, or oppressive for example.

1.1.1 The identification of negative effects can be used to formulate more effective mitigation and lead to the reduction in residual effects.

Significance evaluation methodology

11.7.35 The level of landscape and visual effects will be determined with reference to landscape or visual sensitivity and the magnitude of landscape or visual change experienced. For each receptor the evaluation process will be informed by use of a matrix as shown below.

Table 11.17 Matrix of EIA Significance

Magnitude of Change	Sensitivity of Receptor		
	High	**Medium**	**Low**
High	Significant	Significant	Not significant
Medium	Significant	Not significant	Not significant
Low	Not significant	Not significant	Not significant
Negligible	Not significant	Not significant	Not significant

11.7.36 In line with the emphasis placed in *GLVIA 3* (LI &IEMA, 2013) upon application of professional judgement, the adoption of an overly mechanistic approach through reliance upon a matrix as presented in **Table 11.17** will be avoided. This will be achieved by the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor over and above the outline assessment provided by the use of the matrix. Wherever possible cross references will be made to baseline figures and/or to photomontage visualisations in order to support the rationale.

11.8 Assessment of effects on NCA 113: North Kent Plain

Construction phase effects

11.8.1 This NCA covers an extensive, generalised area that is highly varied and diverse. Amongst its key characteristics are the "*Large settlements and urban infrastructure (including lines of pylons) are often visually dominant in the landscape, with significant development around Greater London and the Medway Towns, as well as around towns further east and along the coast. Major rail and road links connect the towns with London*." The NCA profile also notes how the "*The impact of development is exacerbated by the expansive and open nature of the low lying*

landscape." The value and susceptibility of this NCA are both assessed as being Medium. Overall landscape sensitivity is therefore assessed as being Medium. Whilst it is recognised that there will undoubtedly be some areas of landscape that are of a higher and lower sensitivity within this extensive LCA, the sensitivity assessment contained within **Appendix 11.1** explores this in more detail at a district LCA level.

11.8.2 At the scale of the NCA, construction activities within the Manston Airport site are is unlikely to have a characterising influence. Any cranes which may be deployed (the number, height and duration of activity is still to be determined) and taller construction elements such as a concrete batching plant would have an influence across the greatest geographical area but present above a relatively narrow proportion of the skyline that is already characterised by tall vertical pylons. Ground level construction activities, associated movement of vehicles and any localised increases in noise levels would be concentrated within the existing envelope of the non-operational airfield, with minimal loss of landscape elements to facilitate the construction activities and would not be of a scale that is sufficient to have a characterising influence upon the NCA. The magnitude of change across the NCA as a whole is likely to be Low or Negligible and the effects on this receptor are therefore considered **Not Significant**.

Operational phase effects

11.8.3 The operational phase, commencing in Year 2 with the number of air traffic movements (ATMs) (both freight and passenger) increasing year on year until Year 20 would see the operation of a number of large-scale cargo facilities, aircraft hanger and air traffic control tower which in themselves are unlikely to have a characterising influences given the surrounding landscape context which is already host to a number of large scale developments. The greatest levels of change will be associated with the ATMs with the likely modal showing aircraft arrivals and departures heading from/in an easterly and westerly direction. These ATMs have the potential to disrupt existing levels of tranquillity across the greatest geographical area. Ground level movements of aircraft and other vehicles are likely to locally disrupt tranquillity levels. There will also be an increase in lighting and heavy goods vehicles on the local road network. The magnitude of change across the NCA is likely to be Negligible and the effects on this receptor are therefore considered **Not Significant**.

Decommissioning phase effects

11.8.4 The decommissioning phase outlined in Chapter 3 is based on the decommissioning and removal of existing buildings and facilities that are no longer required. The effects of this on a receptor as extensive in scale as the NCA would be barely discernible. The magnitude of change across the NCA is likely to be Negligible and the effects on this receptor are therefore considered **Not Significant**.

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Combined Effects

11.8.5 The combination of the effects from the different phases and of landscape and visual effects with other relevant assessments will be undertaken and reported on as part of the ES.

11.9 Assessment of effects on the host LCA: The Central Chalk Plateau

11.9.1 The value of this LCA is assessed as Medium and its susceptibility as Low. The overall landscape sensitivity of this LCA is therefore assessed as Low. Full details of the sensitivity assessment are provided in **Appendix 11.1**.

Construction phase effects

11.9.2 The construction activities will be concentrated within the boundaries of the non-operational airport and given the levels of screening provided the coalescence of intervening vegetation and built development allied to the relative similarity in the elevation of the Proposed Development of much of the landscape within this LCA, construction activities, particularly those at ground level are unlikely to be readily discernible. The exception relates to the presence of more elevated construction activities, such as the use of cranes or concrete batching plant and the gradual erection of the taller structures within the site including the cargo facilities, aircraft hanger and air traffic control tower which may be prominent from localised areas in close proximity to the site with their role diminishing further north and west. However, these activities would take place in a landscape which is already characterised by existing large-scale built form and occasional masts and transmitter towers thereby limiting its characterising influence.

11.9.3 The level of activity and disturbance within the Manston Airport site allied with increased numbers of vehicle through the landscape have the potential to affect perceptual characteristics such as tranquillity the degree of which will be dependent on final predicted traffic volumes. Whilst high levels of change are expected within the boundary of the site itself, the magnitude of change across the LCA as a whole is likely to be Medium to Low. The effects on this receptor are therefore considered **Not Significant**.

11.9.4 These effects are subject to further analysis pending finalisation of the design and the evaluations given should be considered provisional.

Operational phase effects

11.9.5 Operational phase effects on this host LCA are less likely to be associated with the presence of the large-scale built form given the existing occurrences of other large and extensive buildings within this landscape and more likely to be associated with the disturbance generated by the arrival and departure of aircraft, increased levels of lighting and increases in the numbers of heavy goods vehicles on the local road network. These all have the potential to disrupt levels of tranquillity in a landscape deemed to be of moderate to moderately low tranquillity. These effects on tranquillity may be perceived to a greater level within the more rural landscape towards the western extent of this LCA, where westbound departures (equating to 70% of departures) and 30% of arrivals will pass overhead. The magnitude of

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change across the LCA is likely to be Medium or Low and the effects on this receptor are therefore considered **Not Significant**.

Decommissioning phase effects

11.9.6 The decommissioning phase outlined in Chapter 3 is based on the decommissioning and removal of existing buildings and facilities that are no longer required. The effects of this activity would be small in scale. The magnitude of change across the LCA is likely to be Negligible and the effects on this receptor are therefore considered **Not Significant**.

Combined Effects

11.9.7 The combination of the effects from the different phases and of landscape and visual effects with other relevant assessments will be undertaken and reported on as part of the ES.

11.10 Assessment of effects on other Thanet LCAs

11.10.1 Other than the host LCA, Thanet LCAs within the study area are Pegwell Bay, the Former Wantsum Channel, the Former Wantsum North Shore, Quex Park and the Urban Coast. Landscape sensitivity assessments for all of these LCAs are contained within **Appendix 11.1** and are summarised in Table 11.18, below.

Table 11.18 Summary of the Sensitivity Assessments for Thanet LCAs

LCA Reference	Overall Value	Overall Susceptibility	Overall Landscape Sensitivity
Pegwell Bay	High	Medium	High
The Former Wantsum Channel	Medium	Medium	Medium
The Former North Shore	Medium	Medium	Medium
Quex Park	High	Low	Medium
The Urban Coast	Medium	Low	Low

Construction phase effects

11.10.2 There are likely to be limited effects on the Quex Park, Pegwell Bay and the Urban Coast LCAs during the construction phase with intervisibility between these LCAs and the site is limited by intervening vegetation (such as the tree cover around Quex Park or scrub on the landward side of Pegwell Bay) or the high concentration of built form within the coastal conurbations. Where occasional partial views may be available, ground level activity is unlikely to be discernible. Elevated activities may be present on the skyline from localised locations often beyond existing pylons but are unlikely to have any characterising influence due to increasing separation distances. The magnitude of change across these LCAs is likely to be Low or Negligible and the effects on this receptor are therefore considered **Not Significant**.

11.10.3 For the remaining two Thanet LCAs located to the south of the Manston Airport Site (the Former Wantsum Channel and the Former Wantsum North Shore), construction activities sited close to the edge of the chalk plateau and the gradual erection of the large scale infrastructure such as the cargo facilities, aircraft hanger and air traffic control tower may intrude into northern skyline views from within these LCAs. This would have an urbanising influence over what is a generally rural landscape. The magnitude of change across these LCAs is likely to be Medium or Low and the effects on this receptor are therefore considered **Not Significant**.

Operational phase effects

11.10.4 The effects on the Quex Park LCA are likely to be similar to those described for the construction phase given the limited intervisibility between this area and the site. The magnitude of change across these LCAs is likely to be Low or Negligible and the effects on this receptor are therefore considered **Not Significant**.

11.10.5 The presence of the built structures within the site is likely to have very limited characterising influence on the Pegwell Bay LCA and Urban Coast LCA. Here, operational effects are more likely to be associated with the overhead presence of aircraft, most probably light aircraft the case of Pegwell Bay and arrival of aircraft on a flight path above Ramsgate. Other changes within the Urban Coast LCA are likely to be associated with a potential increase in flows of heavy goods vehicles along the local road network through the coastal conurbations. These changes to the perceptual characteristics of tranquillity are unlikely to be readily discernible within the Urban Coast LCA given the existing low levels of tranquillity and high levels of movement currently experienced. They may however be some disturbance to the high levels of tranquillity experienced at Pegwell Bay due to the occasional presence of aircraft overhead. The magnitude of change across these LCAs is likely to be Medium or Low and the effects on this receptor are therefore considered **Not Significant**.

11.10.6 With regard to the two Thanet LCAs to the south, the intrusion of large-scale built structures on the skyline, additional lighting and the movement of aircraft along the runway will all have an urbanising influence on the generally undeveloped nature of these areas. The western parts of the LCAs will also be subject to the presence of overhead aircraft as 70% of departures head in a westerly direction towards St Nicholas at Wade (within the Former Wantsum North Shore LCA) before either heading south over Sarre or north to the west of Birchington. This overhead presence and associated noise is likely to disturb the moderately high levels of tranquillity found within these LCAs. The magnitude of change across these LCAs is likely to be High or Medium and the effects on this receptor may therefore considered **Significant**.

Decommissioning phase effects

11.10.7 The decommissioning phase outlined in Chapter 3 is based on the decommissioning and removal of existing buildings and facilities that are no longer required. The effects of this activity would be very small in scale. The magnitude of change across these LCAs is likely to be Low or Negligible and the effects on this receptor are therefore considered **Not Significant**.

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Combined Effects

11.10.8 The combination of the effects from the different phases and of landscape and visual effects with other relevant assessments will be undertaken and reported on as part of the ES.

11.11 Assessment of effects on Dover LCAs

11.11.1 The Dover LCAs (Ash Level, Richbrorough Castle, The Sandwich Corridor and Sandwich Bay) all lie to the south of the River Stour and typically share common characteristics of wide open views, high levels of tranquillity and limited built form, with the exception of The Sandwich Corridor. A landscape sensitivity assessment for these LCAs is contained in **Appendix 11.1** and is summarised in Table 11.19, below.

Table 11.19 Summary of the Sensitivity Assessments for Dover LCAs

LCA Reference	Overall Value	Overall Susceptibility	Overall Landscape Sensitivity
Ash Level	Medium	High	High
Richborough Castle	High	High	High
The Sandwich Corridor	Low	Low	Low
Sandwich Bay	High	Medium	High

Construction phase effects

11.11.2 Construction phase effects are likely to be limited to the distant presence of taller construction activities associated with the use of cranes and gradual emergence of the taller infrastructure within the site such as the cargo facilities, aircraft hanger and air traffic control tower above the horizon formed by the edge of the chalk plateau. At distances in excess of 3km, these activities are likely to intrude above a small section of the wide distant horizon and beyond a series of tall vertical pylons, which are locally prominent. As such the construction activities unlikely to have a characterising influence due to the increasing separation distances. The magnitude of change across these LCAs is likely to be Low or Negligible and the effects on this receptor are therefore considered **Not Significant**.

Operational phase effects

11.11.3 The operational effects on these LCAs will be associated with distant presence of large-scale infrastructure and lighting above a small section of the horizon and aircraft as it arrives or departs in an easterly or westerly direction. Whilst these LCAs currently possess high levels of tranquillity, the separation distance would ensure that any disturbance to these existing levels is small in scale. The magnitude of change across these LCAs is likely to be Low or Negligible and the effects on this receptor are therefore considered **Not Significant**.

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Decommissioning phase effects

11.11.4 The decommissioning phase outlined in Chapter 3 is based on the decommissioning and removal of existing buildings and facilities that are no longer required. The effects of this activity would not be discernible at distances in excess of 3km. The magnitude of change across these LCAs is likely to be Negligible and the effects on this receptor are therefore considered **Not Significant**.

Combined Effects

11.11.5 The combination of the effects from the different phases and of landscape and visual effects with other relevant assessments will be undertaken and reported on as part of the ES.

11.12 Assessment of effects on visual receptors

Construction phase effects

Residential visual receptors in principal settlements.

11.12.1 The sensitivity of these visual receptors is assessed as High.

11.12.2 The distribution of these visual receptors is shown in **Figure 11.5**. Under the current baseline the facilities at the non-operational airport are not visible to the overwhelming majority of these visual receptors, especially for those residing in the more populous settlements of Ramsgate, Broadstairs, Margate and Birchington. This is because the residential visual receptors' requisite views out of these settlements are screened and foreshortened by nearby and intervening built development and vegetation. This screening will continue to be effective for the construction activities as outlined in Chapter 3. A limited number of residential visual receptors in properties located on the edge of these four settlements do possess views towards the Proposed Development. However site visits and viewpoint photography e.g. Viewpoint 11, **Figure 11.3e**, demonstrate that even where partial views are available in the direction of the Proposed Development, the coalescence of intervening vegetation and built development allied to the relative similarity in the elevation of the Proposed Development and these principal settlements will be highly likely to screen any views of the different construction activities The magnitude of change experienced by these visual receptors is likely to be Low or Negligible and the effects on these receptors are therefore considered **Not Significant**.

11.12.3 A proportion of residential visual receptors in some of the closer and less populous principal settlements will have views of some of the construction activities. This would include residential receptors in some parts of Manston, Cliffsend, and Minster where some properties possess open views to parts of the Proposed Development. The detailed visual changes will be assessed in the visual assessment in the Environmental Statement but will primarily be generated by the construction of the most extensive elements such as the cargo facility, the business park and the new aircraft hangar facility. Nevertheless, as shown in the two visualisations from northern Manston and southern Woodchurch (see **Figures**

11.14a-c and **Figures 11.15a-c**), the presence of even moderate levels of intervening tree cover can serve to screen construction activities in views available to residential visual receptors in the closest principal settlements. The magnitude of change experienced by these visual receptors is likely to be High or Medium and the effects on these receptors may therefore be considered **Significant**.

Residential visual receptors in smaller settlements and other residential properties located outside settlements.

11.12.4 The sensitivity of these visual receptors is assessed as High.

11.12.5 **Figures 11.6 & 11.7** show that beyond the principal settlements residential visual receptors are distributed at a moderate density across most of the LVIA study area. The main exception is the lower sides of the Stour Valley in the southern part of the LVIA study area. Several of the viewpoints shown in **Figures 11.3a-f** e.g. Viewpoints 3, 5, 6 and 9, show that the buildings and facilities at the non-operational airport cannot be seen even when residential receptors possess relatively open outward views in the relevant direction. The viewpoints also show that other large scale commercial buildings and vertical elements such as telecommunications masts are often present in views. It is highly likely that the combination of existing screening and intervening topography will severely limit the availability of views of construction activities to these residential visual receptor groups. Detailed assessments for each of the groups of residential receptors identified on **Figures 11.6 & 11.7** will be provided in the visual assessment. The magnitude of change experienced by these visual receptors is likely to be Low or Negligible and the effects on these receptors are therefore considered **Not Significant**.

11.12.6 There are exceptions to this summary of the effects that will be generated by the construction activities for residential visual receptors. There are several groups of residential properties located in close proximity to sections of the boundary of the Proposed Development whose residents possess open or only partially screened views of the closest part(s) of the non-operational airport where large-scale construction activities are proposed. Examples include the ribbon development along the western side of Manston Road close to the north-west boundary of the Proposed Development and properties located alongside Manston Court Road on a section of the eastern boundary of the Proposed Development. The magnitude of change experienced by these visual receptors is likely to be High or Medium and the effects on these receptors may therefore be considered **Significant**.

11.12.7 Residential receptors located close to the southern boundary of the Proposed Development do not have baseline views of the facilities at the non-operational airport. This is due primarily due these properties being located at a lower elevation in comparison with the non-operational airport. However the ZTV in **Figure 11.2** shows that where residents possess open northern views, some of the construction activities associated with the proposed facilities such as the upgraded runway and different phases of the cargo facilities will be visible above sections of the northern horizon. These construction activities will likewise be visible to some of the limited number of residential visual receptors located in properties on the southern upper slope of the Stour Valley, albeit in views over separation distances of 4-5km and in the context of extensive northern views. An example of the type of view available to residential visual receptors in this area is

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provided in Viewpoint 12 in **Figure 11.3f**. Significant visual effects would be unlikely to arise over such separation distances but the magnitude of visual changes that will be experienced by these residential visual receptors as a consequence of construction activities will be assessed in detail in the visual assessment. The magnitude of change experienced by these visual receptors is likely to be Low or Negligible and the effects on these receptors are therefore considered **Not Significant**.

Visual receptors using the transport network

11.12.8 The sensitivity of these visual receptors is assessed as either Medium or Low.

11.12.9 This category of visual receptors includes people in vehicles using 'A', 'B' and minor roads as well as passengers on the two rail routes that traverse the LVIA study area. Although **Figure 11.2** indicates that a high proportion of these routes will be located in the ZTV for at least some of the construction activities, site visits and viewpoint analysis indicates that these visual receptors' views of construction activities will be relatively limited. In addition to the factors common to all groups of visual receptors concerning the screening provided by nearby and intervening built development, especially for sections of routes in urban areas, views for this category of visual receptor are further reduced by the tendency for views for vehicular receptors to be restricted to views in the direction of travel and for views to rail passengers to be restricted to perpendicular to the direction of travel.

11.12.10 The preliminary visual assessment concludes that the highest magnitudes of visual change generated by the construction activities are likely to be sustained by vehicular receptors on some of the closest sections of the road network. With regard to the most numerous group of transport receptors; those in vehicles on 'A' roads, the highest magnitudes of visual change are likely to be limited to visual receptors in east and westbound vehicles using the section of the A299 routed along the southern boundary of the Proposed Development. Construction activities associated with the runway, cargo facilities and aircraft hangars are likely to be prominent albeit short-lived elements in views. Views from other sections of A299 and other 'A' roads are likely to be severely limited, short-lived and partial. The magnitude of change experienced by these visual receptors is likely to be Medium or Low and the effects on these receptors are therefore considered **Not Significant**.

11.12.11 With regard to vehicular visual receptors using 'B' and other roads the highest magnitudes of visual change will be experienced as follows:

- when travelling along a section of the B2190 (Spitfire Road) where a revised road layout will be constructed;
- the section of the B2050 (Manston Road) that is routed across the Proposed Development close to the business park and attenuation ponds to the north and the cargo facilities and new passenger terminal and carpark to the south;
- the section of Manston Road along the Proposed Development's north-western boundary;
- the section of Manston Court Road along part of the Proposed Development's eastern boundary; and

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- the section of Canterbury Road West west of Cliffsend close to the eastern part of the runway.

11.12.12 The visual assessment will provide a detailed assessment of effects upon these routes by sub-dividing them into sections and differentiating between vehicular visual receptors travelling in opposite directions.

11.12.13 Views from other sections of 'B' and other roads are likely to be severely limited, short-lived and partial even where routed close to the Proposed Development due to the coalescence of intervening vegetation and built development. For routes in the lower parts of the Stour Valley to the south of the Proposed Development intervening rising topography will also serve to limit view availability. The magnitude of change experienced by these visual receptors is likely to be Medium or Low and the effects on these receptors are therefore considered **Not Significant**.

11.12.14 Visual receptors on rail routes are likely to have highly restricted views as the majority of the rail routes in the LVIA study area are routed through urban areas or along the northern slope of the Stour Valley where rising intervening topography would restrict the number of construction activities potentially visible. The magnitude of change experienced by these visual receptors is likely to be Low or Negligible and the effects on these receptors are therefore considered **Not Significant**.

Recreational visual receptors using long distance recreational routes

11.12.15 The sensitivity of these visual receptors is assessed as High.

11.12.16 **Figure 11.8** shows that the majority of the long distance walking and cycling routes are routed along the coast i.e. towards the edge of the LVIA study area. Consequently recreational receptors' views towards the Proposed Development are restricted by the high level of built development that is sited alongside much of the coast and the low elevation of the routes. Along these sections of routes such as the England Coast Path, the Thanet Coast Path and the Viking Coastal Trail Cycle Route construction activities will not be visible to recreational receptors due to screening.

11.12.17 Sections of Saxon Shore Way and the Viking Coastal Trail Cycle Route that are routed inland and therefore closer to the Proposed Development, potentially provide recreational receptors with more open, closer and extensive views of construction activities above sections of the northern or eastern horizon. The visual assessment will provide a detailed assessment of the manner in which some construction activities will be intermittently visible. The magnitude of change experienced by these visual receptors is likely to be Low or Negligible and the effects on these receptors are therefore considered **Not Significant**.

Recreational visual receptors using the Public Rights of Way network

11.12.18 The sensitivity of these visual receptors is assessed as High.

11.12.19 The visual assessment will include a detailed assessment of construction effects upon recreational visual receptors walking, riding or cycling along the closest individual PRoWs as identified on **Figure 11.10**. Site visits and preliminary

assessment indicate that localised high levels of screening have the consequence that recreational receptors using some of these close distance PRoWs such as TE16, TR23 and TR31 have no views of any of the facilities at the non-operational airport. Consequently they are unlikely to have views of any of the construction activities. However the absence or low levels of screening available to recreational receptors using some other PRoWs such as TR8 and TR32 would ensure that these recreational receptors will have extensive, close distance views of some of the construction activities resulting in high magnitudes of visual change. The magnitude of change experienced by these visual receptors is likely to be High or Medium and the effects on these receptors are therefore considered **Significant**.

11.12.20 The baseline gathers together the more distant PRoWs into eight groups based upon geographical location and therefore direction of view and separation distance from the Proposed Development. The generally low levels of tree cover away from settlements and the curtilages of individual residential properties has the consequence that views towards the Proposed Development from some sections of these PRoWs are often relatively open. This is especially true for the four groups located to the south of the Proposed Development (groups E-H) where the topography of the Stour Valley will also be an important influence on the magnitude of visual change generated by construction activities. The magnitude of change experienced by these visual receptors is likely to be Low or Negligible and the effects on these receptors are therefore considered **Not Significant**.

Recreational visual receptors visiting attractions such as parks, gardens, nature reserves and other outdoor recreational facilities

11.12.21 The sensitivity of these visual receptors is assessed as High.

11.12.22 The LVIA study area contains a strong resource of these types of recreational destinations as evidenced in **Tables 11.5 & 11.6**. However a detailed review of **Figure 11.9** allied with site visits demonstrates that a high proportion of these parks, gardens, sports and recreation grounds are located outside the ZTV for the Proposed Development. In addition even where recreational destinations are located within the ZTV they are often located in the extensive urban area formed by the amalgamation of the principal settlements of Ramsgate, Broadstairs, Margate and Birchington. Consequently recreational visual receptors visiting destinations such as Crispe Park in Birchington or Nethercourt Park in Ramsgate have no views of any facilities at the non-operational airport due to nearby built development and tree cover. These screening elements will likewise ensure that recreational visual receptors at these destinations will have no views of the construction activities.

11.12.23 There remain a small number of recreational destinations that are located outside of the principal settlements and within the ZTV. Examples include Manston Riding Centre, Quex Park and Sandwich and Pegwell Bay National Nature Reserve. The visual assessment will focus upon these destinations providing an assessment based the detailed baseline. In the case of the latter two examples preliminary assessment based upon site visits is that tree and scrub cover within Quex Park and parts of the Nature Reserve (see Viewpoint 8 shown on **Figure 11.3d**) that are publically accessible severely restrict the availability of views towards the Proposed Development and consequently of the construction activities. The

magnitude of change experienced by these visual receptors is likely to be Low or Negligible and the effects on these receptors are therefore considered **Not Significant**.

Recreational visual receptors at caravan, camping and holiday parks

11.12.24 The sensitivity of these visual receptors is assessed as High.

11.12.25 The preliminary assessment set out in **paragraphs 11.8.22 – 23** also partly applies to this group of recreational visual receptors, however a higher proportion of the caravan, camping and holiday parks located in the LVIA study area are sited within the ZTV and outside the principal settlements. Nevertheless the site visits demonstrate that an inherent design consideration for many of these facilities (a proportion of which form permanent residences as opposed to being temporary holiday destinations) is the need to provide their visitors or residents with a strong sense of enclosure and privacy through provision of boundary planting and/or fencing. The visual assessment will include a detailed assessment of the availability of the requisite outward views from each caravan, camping and holiday park listed in **Table 11.7** and the magnitude of visual change that construction activities at the Proposed Development will generate for each site. The magnitude of change experienced by these visual receptors is likely to be Low or Negligible and the effects on these receptors are therefore considered **Not Significant**.

Operational phase effects

11.12.26 As set out in **Table 3.1**, the airport will be operational from Year 2 with the consequence that there will be an overlap with the construction period given that construction activities are scheduled to continue until the completion of Phase 4 at the end of Year 15. With regard to the preliminary assessment of visual effects for the operation of the ground facilities at the Proposed Development it is apparent that the visual effects of the operation of components such as the cargo facilities, the business park and the passenger terminal building will be substantially the same as the effects generated by their construction. Indeed the need to utilise cranes for the construction of some of the facilities will be likely to result in visual effects being visible to a greater number of visual receptors for construction activities. Also there is the potential for some visual effects to be reduced as a consequence of the maturation of landscape works proposed for some areas within the Proposed Development.

11.12.27 Consequently if a visual receptor will have no view of the construction of a particular component they would be unlikely to have a view of the operation of the same component. As such the preliminary assessment of the visual effects described for the construction period in **paragraphs 11.8.1 – 25** are valid for the overlapping operational period up to Year 15 and subsequent operation to Year 20 with certain exceptions.

11.12.28 The exceptions relate principally to the visual effects generated by the movement vehicles at ground level within and around the Proposed Development and to the air traffic movements (ATMs) of the cargo and passenger aircraft as set out in **Tables 3.7** and **3.8**. At the time of the preparation of the PEIR the level of information available is insufficient to allow for detailed assessment of how the

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proposed ground level movements and ATM will impact upon individual groups of visual receptors. Nevertheless some preliminary observations can be made.

11.12.29 **Paragraph 3.2.144** states that there will be a likely modal split of westerly/easterly aircraft arrivals of 70% easterly i.e. approaching over Ramsgate and 30% westerly i.e. approaching over Herne Bay. The modal split for departures is the reverse i.e. 30% easterly i.e. departing over Ramsgate and 70% westerly although the latter group will subsequently subdivide between aircraft flying north in a corridor between Birchington and Reculver and south, initially over Sarre. This indicates that the ATMs are likely to be more visible to visual receptors located to the east and west of the Proposed Development as well as visual receptors located in close proximity to the runway.

11.12.30 Ground level movements of aircraft and other vehicles will be primarily visible where visual receptors have close distance, open views to a part of the operational Proposed Development in particular the runway, the taxiways, the aircraft stands and the passenger terminal carpark. These components and the associated movements are most likely to visible for visual receptors located in close proximity to the southern half of the Proposed Development. This is likely to include residential visual receptors on the south-western edge of Manston; residential visual receptors in properties on Manston Road and Manston Court Road; residential visual receptors in properties on the northern edge of Cliffsend, Minster and Way; and in some properties on Alland Grange Lane. With regard to vehicular visual receptors the movements are likely to be particularly visible from the closest sections of A299 and the B2050 as well as the full length of the B2190. The limited number of PRoWs routed in close proximity to the Proposed Development has the consequence that views of ground level operational movement is likely to be restricted to recreational receptors using PRoWs TR8 and TR22.

11.12.31 Initial assessments of the highest level of effect likely to be experienced by each visual receptor group during the operational period are summarised below and a rationale for each provided in Table 11.21.

Residential visual receptors in principal settlements.

11.12.32 The sensitivity of these visual receptors is assessed as High. The highest magnitude of change experienced by these visual receptors is likely to be High and the effects likely to be experienced by a small proportion of these receptors are therefore considered **Significant**.

Residential visual receptors in smaller settlements and other residential properties located outside settlements.

11.12.33 The sensitivity of these visual receptors is assessed as High. The highest magnitude of change experienced by these visual receptors is likely to be High and the effects likely to be experienced by a small proportion of these receptors are therefore considered **Significant**.

Visual receptors using the transport network

11.12.34 The sensitivity of these visual receptors is assessed as either Medium or Low. The highest magnitude of change experienced by these visual receptors is likely to

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be Medium and the effects likely to be experienced by these receptors are therefore considered **Not Significant**.

Recreational visual receptors using long distance recreational routes

11.12.35 The sensitivity of these visual receptors is assessed as High. The highest magnitude of change experienced by these visual receptors is likely to be Low and the effects likely to be experienced by these receptors are therefore considered **Not Significant**.

Recreational visual receptors using the Public Rights of Way network

11.12.36 The sensitivity of these visual receptors is assessed as High. The highest magnitude of change experienced by these visual receptors is likely to be High and the effects likely to be experienced by a small proportion of these receptors are therefore considered **Significant**.

Recreational visual receptors visiting attractions such as parks, gardens, nature reserves and other outdoor recreational facilities

11.12.37 The sensitivity of these visual receptors is assessed as High. The highest magnitude of change experienced by these visual receptors is likely to be Low and the effects likely to be experienced by these receptors are therefore considered **Not Significant**.

Recreational visual receptors at caravan, camping and holiday parks

11.12.38 The sensitivity of these visual receptors is assessed as High. The highest magnitude of change experienced by these visual receptors is likely to be Low and the effects likely to be experienced by these receptors are therefore considered **Not Significant**.

Decommissioning phase effects

11.12.39 As described in paragraphs 3.2.185 – 186 the decommissioning phase refers to the need to remove old and existing equipment, infrastructure and facilities throughout the construction period (and the operational period up to Year 15). Amongst the facilities to be removed that under the baseline situation are visually prominent in some views available to visual receptors are the existing passenger terminal, the ATC building, the fuel farm and the buildings in the freight area south-east of B2190. Consequently with regard to the visual assessment the decommissioning phase is combined with the construction phase. The detailed visual assessments for the closest visual receptors will take into account the impacts arising from the decommissioning of relevant existing infrastructure and facilities.

Combined Effects

11.12.40 Any combined effects between visual assessment and other topics will be identified and assessed in the Environmental Statement.

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11.13 Conclusions of preliminary significance evaluation

11.13.1 The Conclusions on the significance of all those effects that have been subject to assessment in **Sections 11.8** to **11.12** are summarised in **Tables 11.20** and **11.21**. The emerging details of the design and operation of the Proposed Development and the consequent limited nature of the visualisations that have been available for the PEIR have resulted in the visual assessment PEIR by necessity providing assessments for large combined groups of visual receptors. The visual assessment to be included in the subsequent Environmental Statement will provide a detailed assessment of the visual effects sustained by visual receptors that are identified in the baseline in **Section 11.4** and **Figures 11.5 – 11.10**.

Table 11.20 Summary of significance of landscape effects

Receptor and effects	Significance Level	Rationale
Construction Phase		
NCA 113: North Kent Plain Direct or indirect effects on key characteristics	Not Significant	At the scale of the NCA, construction activities within the Manston Airport site are is unlikely to have a characterising influence. Ground level and elevated construction activities, associated movement of vehicles and any localised increases in noise levels would be concentrated within the existing envelope of the non-operational airfield and would not be of a scale that is sufficient to have a characterising influence upon this large and diverse NCA.
Host LCA: The Central Chalk Plain Direct or indirect effects on key characteristics	Not Significant	The sensitivity assessment undertaken for this LCA concluded that it had a low sensitivity to the type of change proposed. Whilst high levels of change and disturbance would occur within the site boundary during the construction phase, the effects upon the wider landscape within this LCA would not be significant. This is in part due to the levels of screening provided the coalescence of intervening vegetation and built development allied to the relative similarity in the elevation of the Proposed Development of much of the landscape within this LCA, which means that construction activities, particularly those at ground level are unlikely to be readily discernible. Any elevated construction activities such as the assembly of the taller buildings within the site would take place in a landscape that is already characterised by existing large-scale built form and occasional masts and transmitter towers thereby limiting its characterising influence.
Thanet LCAs (Pegwell Bay, the Former Wantsum Channel, the Former Wantsum North Shore, Quex Park and the Urban Coast) Indirect effects on key characteristics	Not Significant	There are likely to be limited effects on the Quex Park (Medium landscape sensitivity), Pegwell Bay (High landscape sensitivity) and the Urban Coast (Low landscape sensitivity) LCAs during the construction phase with intervisibility between these LCAs and the site is limited by intervening vegetation or the high concentration of built form within the coastal conurbations. The two Thanet LCAs located to the south of the Manston Airport Site, the Former Wantsum Channel and the Former Wantsum North Shore are both assessed as being of Medium landscape sensitivity. Construction activities sited close to the edge of the chalk plateau and the gradual assembly of the large-scale infrastructure may intrude into northern skyline views from within these LCAs and would have an urbanising influence over what is a generally rural landscape although not to the scale that would be significant.

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Receptor and effects	Significance Level	Rationale
Dover LCAs (Ash Level, Richbrorough Castle, The Sandwich Corridor and Sandwich Bay) Indirect effects on key characteristics	Not Significant	Landscape sensitivity of these LCAs is assessed as High (with the exception of The Sandwich Corridor which is assessed as Low) given the wide open views and high levels of tranquillity Construction phase effects are likely to be limited to the distant presence of taller construction activities above the horizon formed by the edge of the chalk plateau. However, these activities are unlikely to have a characterising influence due to the increasing separation distances in excess of 3km.
Operation Phase		
NCA 113: North Kent Plain Direct or indirect effects on key characteristics	Not Significant	The operation of large-scale cargo facilities, aircraft hanger and air traffic control tower are unlikely to have a characterising influence given the surrounding landscape context that is already host to a number of large-scale developments. The greatest levels of change will be associated with the air traffic movements that have the potential to disrupt levels of tranquillity although not to a scale that would lead to significant landscape effects given the extent and diverse nature of this NCA.
Host LCA: The Central Chalk Plain Direct or indirect effects on key characteristics	Not Significant	Operational phase effects on this host LCA are less likely to be associated with the presence of the large-scale built form given the existing occurrences of other large and extensive buildings within this landscape and more likely to be associated with the disturbance generated by the arrival and departure of aircraft, increased levels of lighting and increases in the numbers of heavy goods vehicles on the local road network. These all have the potential to disrupt levels of tranquillity in a landscape deemed to be of moderate to moderately low tranquillity. Whilst medium to high magnitudes of change may be expected, the low sensitivity of this LCA means that effects will be not significant. These effects are subject to further analysis in the ES pending finalisation of the design and the evaluations given should be considered provisional.
Thanet LCAs (Pegwell Bay, the Former Wantsum Channel, the Former Wantsum North Shore, Quex Park and the Urban Coast) Indirect effects on key characteristics	Significant	The effects on the Quex Park LCA are unlikely to be significant given the limited intervisibility between this area and the site and existing moderate level of tranquillity. Whilst there may be some disruption to these levels it is unlikely to be of a scale that would lead to significant landscape effects. The presence of the built structures within the site is also unlikely to have a characterising influence on the Pegwell Bay LCA and Urban Coast LCA. Here, operational effects are more likely to be associated with the overhead presence of aircraft on flight path over Pegwell Bay and Ramsgate. These changes to the perceptual characteristics of tranquillity are unlikely to be readily discernible within the Urban Coast LCA given the existing low levels of tranquillity and high levels of movement currently experienced. They may however be some disturbance to the high levels of tranquillity experienced at Pegwell Bay due to the occasional presence of aircraft overhead. With regard to the two Thanet LCAs to the south, the intrusion of large-scale built structures on the skyline, additional lighting and the movement of aircraft along the runway immediately to the north will all have an urbanising influence on the generally undeveloped nature of these areas. The western parts of the LCAs will also be subject to the presence of overhead aircraft. This overhead presence and associated noise is likely to disturb the moderately high levels of tranquillity found within these LCAs with the potential for significant landscape effects to occur. These effects are subject to further analysis in the ES pending finalisation of the design and the evaluations given should be considered provisional.

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Receptor and effects	Significance Level	Rationale
Dover LCAs (Ash Level, Richbrorough Castle, The Sandwich Corridor and Sandwich Bay) Indirect effects on key characteristics	Not Significant	The operational effects on these LCAs will be associated with distant presence of large-scale infrastructure and lighting above a small section of the horizon and aircraft as it arrives or departs in an easterly or westerly direction. Whilst these LCAs currently possess high levels of tranquillity, the separation distance would ensure that any disturbance to these existing levels is small in scale.

Table 11.21 Summary of significance of visual effects

Receptor and effects	Significance Level	Rationale
Construction Phase		
Residential visual receptors in principal settlements **Changes in baseline views due to introduction of new infrastructure and facilities and associated construction activities allied with the removal of existing visual elements within non-operational airport**	Significant	The introduction of a range of new infrastructure and facilities and the associated plant movement, temporary laydown areas, earthworks and crane activity allied with the removal of some elements in baseline views has the potential to result in high magnitudes of visual change for some residential visual receptors who are accorded high visual sensitivity. Significant visual effects are most likely to be sustained by residential visual receptors in properties that are located on the edge of the closest principal settlements who possess outward views in the direction of the Proposed Development i.e. a proportion of residents in Manston, Cliffsend, and Minster. In the view available to these residential visual receptors new temporary and/or permanent elements could be introduced into views, including above intervening screening built development and vegetation. Where residential visual receptors in these principal settlement sustain significant effects from construction activities, these are most likely to be as a result of the temporary presence of cranes above the intervening vegetation or topography. A large majority of residential visual receptors in the principal settlement within the ZTV will not sustain significant effects. This is due to a combination of the separation distance from the Proposed Development and the screening provided by the coalescence of large amounts of intervening built development and tree cover.

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Receptor and effects	Significance Level	Rationale
Residential visual receptors in smaller settlements and individual properties outside settlements **Changes in baseline views due to introduction of new infrastructure and facilities and associated construction activities allied with the removal of existing visual elements within non-operational airport**	Significant	The introduction of a range of new infrastructure and facilities and the associated plant movement, temporary laydown areas, earthworks and crane activity allied with the removal of some elements in baseline views has the potential to result in high magnitudes of visual change for some residential visual receptors who are accorded high visual sensitivity. Significant visual effects are most likely to be sustained by residents in properties in smaller settlement or individual properties that are located in close proximity to the Proposed Development and possess open or only moderately screened views towards areas within the Proposed Development where the taller and/or more extensive infrastructure and facilities will be under construction. Significant effects are most likely to arise where residential visual receptors will sustain views of more than one construction activity, for example crane activity and the presence of a temporary laydown area. There is limited potential for significant visual effects to be sustained by a small number of residential visual receptors in properties located at greater separation distance from the Proposed Development. Significant effects could arise where an individual or small group of residential visual receptors possess a particularly open view and the plateau location of the Proposed Development results in the facilities at the non-operational airport being visually prominent on a section of the horizon. This situation only arises for a small number of properties on the upper slopes of the Stour Valley in the southern part of the LVIA study area. . The large majority of residential visual receptors in this category do not possess views of any infrastructure and facilities at the non-operation airport under the baseline. This is due to the effect of the plateau topography allied with the coalescence of intervening screening elements, especially those in close vicinity to the Proposed Development such as tree cover in parts of Woodchurch and within the Defence Fire Training and Development Centre. In addition although tree cover is low across many rural parts of the LVIA study area, the resultant sense of exposure has resulted in many small groups and isolated properties possessing substantial tree cover and/or hedgerows within their curtilages providing screening for their residents' views.
Visual receptors using the transport network. **Changes in baseline views due to introduction of new infrastructure and facilities and associated construction activities allied with the removal of existing visual elements within non-operational airport**	Not Significant	As set out in **Table 11.15** visual receptors in this receptor category are accorded either medium or low visual sensitivity. The requisite open, close distance views required for the potential high magnitude of visual change that would therefore be required for significant visual effects to arise are only available from a small proportion of the road transport network in the LVIA study area. Even where such views are available i.e. from a section of A299, a section of B2050 and the short B2190, such views are short-lived and the existing facilities at the non-operational airport are often the most prominent elements in the transient views available to vehicular visual receptors.
Recreational visual receptors using long distance paths and cycleways. **Changes in baseline views due to introduction of new infrastructure and facilities and associated construction activities**	Not Significant	For recreational receptors using the large majority of the various long distance paths and cycleways routed within the LVIA study area there would be no potential for significant visual effects to be sustained. The routing of a high proportion of the routes at low elevation along or close to the coast results in long sections being located outside the ZTV. Where sections of the routes are within the ZTV they are also frequently routed through the principal settlements, hence recreational visual receptors views in the direction of the Proposed Development are screened by high levels of nearby built development. With regard to paths and cycleways routed inland, the closest long distance cycleway is at a lower elevation and is on the edge of the ZTV. Other inland sections are located at least 3km away from the Proposed Development and sometime recreational receptors views in the direction of the Proposed Development benefit from screening provided by nearby vegetation cover.

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Receptor and effects	Significance Level	Rationale
Recreational visual receptors using the public rights of way (PRoW) network. **Changes in baseline views due to introduction of new infrastructure and facilities and associated construction activities allied with the removal of existing visual elements within non-operational airport**	Significant	Recreational visual receptors will only be likely to sustain significant visual effects when using a small number of the limited PRoW resource present in the close proximity to the Proposed Development. For these recreational visual receptors the introduction of a range of new infrastructure and facilities and the associated plant movement, temporary laydown areas, earthworks and crane activity allied with the removal of some elements in baseline views has the potential to result in high magnitudes of visual change. The PEIR concludes that PRoWs whose users are most likely to sustain significant visual effects are TR8, TR22 and TR32 due to their proximity to the eastern edge of the Proposed Development and the low levels of screening along at least a portion of their routes. Other individual PRoWs located in close proximity to the Proposed Development benefit from either high levels of adjacent and/or intervening vegetation cover e.g. TE16 or already provide their users with views of closer large scale commercial development of a similar scale, height and mass to that in the Proposed Development e.g. TE18. These baseline conditions result in the magnitudes of visual change likely to be sustained by recreational visual receptors using these PRoWs being too low to generate significant visual effects. The PEIR concludes that recreational visual receptors using the eight groups of more distant PRoWs as defined in **Section 11.4** are unlikely to sustain significant visual effects. This conclusion is based upon separation distance often combined with the inability of recreational visual receptors to see facilities at the non-operational airport under baseline conditions due to the coalescence of intervening built development. The role of intervening screening is exacerbated in the northern half of the LVIA study area by the relatively flat plateau topography.
Recreational visual receptors visiting attractions such as parks, gardens, nature reserves and other outdoor recreational facilities. **Changes in baseline views due to introduction of new infrastructure and facilities and associated construction activities allied with the removal of existing visual elements within non-operational airport**	Not Significant	A high proportion of these attractions within the LVIA study area are located outside the ZTV. Of those attractions located within the ZTV, a considerable number are located in the principal settlements strongly reducing the potential for recreational receptors to possess views towards the Proposed Development. For recreational visual receptors visiting the residual group of attractions the likelihood of high magnitudes of visual change at parks and gardens is reduced by the high levels of tree cover within and around the perimeter of the parks and gardens e.g. Quex Park. With regard to the recreational visual receptors using sports and recreation grounds it is important to note that as set out in **Table 11.15** recreational visual receptors using these facilities for team sports in particular are not ascribed with high visual sensitivity making them less susceptible to sustaining significant visual effects.
Recreational visual receptors at caravan, camping and holiday parks./ **Changes in baseline views due to introduction of new infrastructure and facilities and associated construction activities allied with the removal of existing visual elements within non-operational airport**	Not Significant	Most of the caravan, camping and holiday parks are located in the ZTV and outside of the principal settlements. Nevertheless the PEIR confirms that most of these facilities benefit from high levels of internal and particularly perimeter screening. Consequently recreational receptors located within the facilities would be unlikely to have views outward views in the direction of the Proposed Development and hence views of any of the previously listed construction activities being undertaken.
Operational Phase		

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Receptor and effects	Significance Level	Rationale
Residential visual receptors in principal settlements	Significant	The operation of a range of new infrastructure and facilities in combination with ground level vehicular and aircraft movements and the scheduled ATM as set out is Section 3 with the potential to result in high magnitudes of visual change for some residential visual receptors who are accorded high visual sensitivity. In general the operation of the facilities and infrastructure would be unlikely to generate higher magnitudes of visual change for visual receptors in comparison with the construction of those facilities and infrastructure. This is due to the removal of potential construction period visual elements including cranes, temporary laydown areas and earthworks as well as the gradual maturation of the proposed landscape planting alongside the B2050 and the attenuation ponds. There is also potential for the detailed external design of the main facilities to allow these facilities to be interpreted by visual receptors as being more visually attractive than the facilities within the non-operational airport that are present in these visual receptors' baseline views. As per the construction phase any significant effects are likely to be restricted to a small proportion of the residential visual receptors that are located on the edge of some of the closer principal settlements, primarily Manston, Minster and Cliffsend. However the incremental visual effects generated by the ground level movements and ATM must also be included within the visual assessment. Preliminary information concerning the modal split and routes to be followed by aircraft arriving at and departing from the operational airport have been provided in Section 3. However the visual assessment in the Environmental Statement will need to take the role of these movements in some residential receptors' views into account when assessing the potential for significant visual effects to arise. Similarly the visual assessment will need to include consideration of the lighting required for the night-time operations. At the time of the PEIR a lighting plan has been provided but consideration of the effect of lighting on all categories of visual receptor will require more information to be available on illuminance, luminance, glare control and light spill.
Residential visual receptors in smaller settlements and individual properties outside settlements	Significant	The main rationale for this category of visual receptors is as set out in the construction phase and in the rationale for residential visual receptors in the principal settlements above. Significant visual effects are more likely to be sustained by residential visual receptors at properties in close proximity, especially where low levels or no screening is available and there is no likelihood of such screening being provided as part of the Proposed Development. For the large majority of visual receptors in this category that are located away from the immediate environs of the Proposed Development the potential for significant effects would be low. Significant effects would only potentially be sustained if a highly valued, poorly screened view towards the Proposed Development were to be substantially modified as a consequence of the operation of the new infrastructure and facilities.
Visual receptors using the transport network	Not Significant	The main rationale for this category of visual receptors is as set out in the construction phase and in the rationale for residential visual receptors in the principal settlements above. The visual assessment will include detailed consideration of the potential for the take-off and landing of aircraft to contribute to operational visual effects that will sustained by vehicular visual receptors using the nearby section of A299, the nearby section of B2050 and the B2190 as the closest roads to the main operations.
Recreational visual receptors using long distance paths and cycleways	Not Significant	The main rationale for this category of visual receptors is as set out in the construction phase and in the rationale for residential visual receptors in the principal settlements above.

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Receptor and effects	Significance Level	Rationale
Recreational visual receptors using the public rights of way (PRoW) network	Significant	The presence in some close distance views of new, sometimes large-scale, facilities and infrastructure elements allied with operational movements and lighting is likely to result in significant effects being sustained by recreational visual receptors using a small number of PRoWs routed in close proximity to the Proposed Development. The individual PRoWs whose users will be most likely to sustain significant effects are as set out for the construction phase. The PEIR did not identify any additional individual PRoWs whose users are likely to sustain significant visual effects in the operational phase. As with most other categories of visual receptor the absence of plant and activities related to construction activities would generally reduce the visual role of the Proposed Development. Where views are available the appearance of the main facilities and the maturation of landscape planting could result in reduced or beneficial visual effects in comparison with the baseline situation. The visual assessment will include detailed assessments for the operational period for each of the individual PRoWs. For the majority of both the individual PRoWs and the eight groups of more distant PRoWs the PEIR concludes that the minimal visual role of the operational facilities and infrastructure would be likely to result in recreational visual receptors using these PRoWs sustaining negligible or low magnitudes of visual change and therefore effects that will be not significant.
Recreational visual receptors visiting attractions such as parks, gardens, nature reserves and other outdoor recreational facilities	Not Significant	The main rationale for this category of visual receptors sustaining visual effects assessed as not significant is as set out in entry for the construction phase. The visual assessment in the Environmental Statement will include any incremental visual effects that may be sustained by individual groups of recreational receptors in this category from the details of the modal split of aircraft arrivals and departures.
Recreational visual receptors at caravan, camping and holiday parks	Not Significant	The main rationale for this category of visual receptors sustaining visual effects assessed as not significant is as set out in the construction phase. The visual assessment in the Environmental Statement will include any incremental visual effects that may be sustained by individual groups of recreational receptors in this category from the details of the modal split of aircraft arrivals and departures.
Decommissioning Phase		
The decommissioning of a high proportion of the infrastructure and facilities associated the non-operational airport during the construction phase of the Proposed Development will be addressed in detail in the visual assessment for relevant individual visual receptors in the construction phase component of the visual assessment in the Environmental Statement.		