RiverOak Strategic Partners

Manston Airport Development Consent Order 2018 Consultation

Preliminary Environmental Information Report (PEIR) Volume I Chapters 1-10

For consultation
January 2018

Scheme Name	Manston Airport DCO
Promoter's Name	RiverOak Strategic Partners Limited
Author	Wood
Document Number	TR020002/SC2018/02/01

Suite of Consultation Documents

1.1 As part of this second 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. The documents also provide further information about environmental considerations following further progression of environmental assessments, as well as a draft Noise Mitigation Plan that has been developed as part of the response to the 2,200 consultation responses that were received in response to the first statutory consultation held between 12 June and 23 July 2017 ('the 2017 consultation'). Further information is also provided on how the public can submit their feedback.

1.2 Similarly to the 2017 consultation, 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 a further 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:

1.3.1 an introduction to the consultation;

1.3.2 an updated preliminary environmental information report ('PEIR');

1.3.3 a non-technical summary of the PEIR;

1.3.4 an updated masterplan;

1.3.5 a Noise Mitigation Plan;

1.3.6 a Statement of Community Consultation;

1.3.7 an updated analysis of air freight and need; and

1.3.8 a feedback form.

RiverOak Strategic Partners

Manston Airport DCO EIA

Preliminary Environmental Information Report

January 2018

Amec Foster Wheeler Environment
& Infrastructure UK Limited

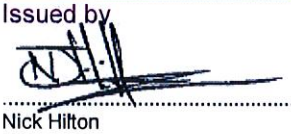
Report for

George Yerrall
RiverOak Strategic Partners
Audley House
London
W1K 6WF

Main contributors

Oliver Gardner
Andrea Kourra
Suzanne Burgoyne
Toby Gibbs
Angela Schembri
Geoff Dewick
Chris Johnson
Tom Wilson
Sally Dixon
Chris Cain
Martine Peirce
Alun Mcintyre
Mark Linsley
Liz Buchanan
Tim Haines
Ben Fretwell
Chris Constable
Victoria Donnelly
Mellissa Cutting
Vanessa Dahmoun
Barry Michelson
Ian Gates
Steve Wright
John Cookson
Oliver Bewes
James Trow
Colin Carter
Glyn Price
Bev Coupe
Kate Duff
Tom Dearing

Issued by



Nick Hilton

Approved by

Toby Gibbs

Amec Foster Wheeler

Floor 12
25 Canada Square
Canary Wharf
London E14 5LB
United Kingdom
Tel +44 (0) 203 215 1610

38199CL041i1

Copyright and non-disclosure notice

Third-party disclaimer

Management systems

This document has been produced by Amec Foster Wheeler Environment & Infrastructure UK Limited in full compliance with the management systems, which have been certified to ISO 9001, ISO 14001 and OHSAS 18001 by LRQA.

Document revisions

No.	Details	Date
1	Issue 1	08/01/2018

Executive summary

RiverOak Strategic Partners Limited (RSP) is seeking to secure the future of Manston Airport as a valuable regional and national asset by redeveloping the Manston Airport site as a freight airport. The proposals will provide much needed additional air freight capacity to the United Kingdom and also serve to relieve pressure from the other, already heavily congested, London and South East airports.

Under the Planning Act 2008 (the 2008 Act) the redevelopment of Manston Airport as a freight airport is considered a Nationally Significant Infrastructure Project (NSIP). This Preliminary Environmental Information Report (PEIR), part of a suite of consultation documents, published to seek public and stakeholder feedback on the Manston Airport proposals under Sections 42 and 47 of the 2008 Act, has been produced for the purpose of providing preliminary environmental information relevant to the proposals.

In June 2017 RSP published for consultation a PEIR, prepared to align with the requirements of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (2009 EIA Regulations). Since then the 2009 EIA Regulations have been amended.

This 2018 PEIR has been prepared to align with the requirements of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (2017 EIA Regulations). This 2018 PEIR updates the preliminary environmental information provided previously, where appropriate, and provides the preliminary environment information for the additional requirements of the 2017 EIA Regulations.

This PEIR presents the likely environmental effects of the proposals for Manston Airport in line with the 2017 EIA Regulations, to enable consultees to understand the likely significant environmental effects of the proposals and to help inform consultation responses.

Contents

1. Introduction

1.1.1 This report has been produced for the purpose of providing Preliminary Environmental Information in respect of an application RiverOak Strategic Partners Ltd (RiverOak) intends to make to re-open Manston Airport (the Project). The application would seek to authorise the redevelopment of Manston Airport as a freight airport including various associated development and other works (together referred to as the Proposed Development). This is further explained in **Section 1.4** below and in **Chapter 3** of this Preliminary Environmental Information Report (PEIR).

1.1.2 The site of the Proposed Development, shown in **Figure 1.1**[1], is within the district of Thanet in the county of Kent in the South East of the United Kingdom (UK).

1.1.3 The Proposed Development is a Nationally Significant Infrastructure Project (NSIP) under Part 3 of the Planning Act 2008[2] ("the 2008 Act") and therefore requires an application to be submitted for a Development Consent Order (DCO) under Section 14 of the 2008 Act.

1.1.1 The Proposed Development will provide additional air freight capacity to the UK and also serve to relieve pressure from the other, heavily congested, London and South East airports.

1.1.2 In producing this report, consideration has been given to the consultation requirements of sections 42 and 47 of the 2008 Act and the requirement of the Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (the 2017 EIA Regulations), and relevant Planning Inspectorate (PINS) Advice Notes. The relevance of the Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009 (the 2009 EIA Regulations) to the Proposed Development are discussed in **Paragraph 1.1.3.**

Consultation and the 2017 PEIR

1.1.3 The 2008 Act imposes duties on the promoters of NSIPs to consult those who would be directly affected by the Project, people with an interest in the land on which development would take place, the local community, local authorities and other statutory bodies and consultees. The PEIR has been prepared for the additional statutory consultation being held in January and February 2018. This is the third consultation on the Project. A non-statutory consultation took place from June to September 2016, a statutory consultation took place from June to July 2017. As part of the statutory consultation in the Summer of 2017, RiverOak had prepared and consulted on earlier report on the preliminary information (PEIR 2017) in accordance with the provisions of the 2009 EIA Regulations.

1.1.4 The proposals remain largely the same, but have been refined and developed as design has progressed and also in the light of the 2,200 responses received to the statutory consultation in summer 2017.

1.1.5 In May 2017 the 2017 EIA Regulations came into force. While RiverOak could still follow the 2009 requirements, to make sure that the assessment of the Proposed Development is as up to date as possible, RiverOak have taken the decision to follow the latest, somewhat stricter and more comprehensive requirements of the 2017 Regulations.

1.1.6 RiverOak is seeking feedback on the information presented in this PEIR. It will consider the feedback received and where relevant will use the feedback in the production of an Environmental

[1] This ES is supported by a number of Figures (drawings) provided in **Volume 3** of this ES. The Reader is directed to these Figures as they assist the understanding of the descriptions and assessments presented in the ES.
[2] Planning Act S23(4)(a)-(b) and (5)(a)-(b) (2008) Available online at http://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf [Checked 14/11/17].

Statement (ES) which would accompany the DCO application in accordance with the 2008 Act, the 2017 EIA Regulations and the 2009 EIA Regulations[3].

1.1.7 **Section 1.8** below sets out which parts of the new 'preliminary environmental information' have been added because RPS are following the 2017 EIA Regulations.

1.1.8 In summary, the main additional categories are the effects of climate change on the Project and the effects of the Project on climate change, impacts of waste, impacts on human health and major accidents and disasters. The main changes associated with the adoption of the 2017 EIA Regulations are summarised in **Table 1.1** in **Section 1.8**.

1.1.9 Comments received during the 2017 consultation are still being taken into account as RiverOak evolve development proposals. However, whilst this new consultation is not limited in its scope, it seeks to focus on the changes arising from the adoption of the 2017 EIA Regulations for the Project.

1.2 The Applicant

1.2.1 RiverOak are a UK registered company which has acquired all rights and interests, and assumed financial and operational responsibility, for the DCO in respect of Manston Airport, and the anticipated reopening and operation of the airport.

1.3 Airports and Airspace Management in the UK

1.3.1 The UK has a competitive privatised airport system with all of the major civilian airports owned and operated by private companies, corporations or individuals. There are a small number of regional airports which are in public ownership, but several of the main[4] passenger and air cargo airports are privately owned.

1.3.2 The oversight and regulation of the airports and civil aviation sector in the UK is undertaken by the Civil Aviation Authority (CAA), a statutory corporation that is part of the Department for Transport (DfT).

Box 1.1	**Civil Aviation Authority (CAA) and European Aviation Safety Agency (EASA)**
The CAA is the statutory corporation which oversees and regulates, either directly or indirectly, all aspects of civil aviation in the United Kingdom; it is a public coorporation of the Department for Transport. Any airport in the UK which is used for commercial passenger flights, public transport flights and/or flying training in aircraft above a specified weight, is required to obtain, from the CAA, an Aerodrome Licence. The EASA is an agency of the European Union (EU) with regulatory and executive tasks in the area of civilian aviation safety. Representatives from the member states national aviation authorities, such as the CAA, sit on the EASA's advisory bodies. From 31 December 2017 aerodromes in the UK which are open to public use and which serve commercial air transport, where operations using instrument approach or departure procedures are provided, and which have a paved runway of 800 metres or above, or exclusively serve helicopters, are required to comply with EASA regulations and obtain an EASA Certificate to replace their CAA Aerodrome Licence. Until the arrangements for the UKs exit from the EU are finalised, the standards and requirements of the EASA will continue to apply to airports and the aviation sector within the UK.	

1.3.3 The three main London airports, by passenger numbers, Heathrow, Gatwick and Stansted, are subject to some direct controls and restrictions from the DfT on movement number and noise effects. In addition to the three main London airports, numerous regional airports exist across the

[3] The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations (2009) Department for Communities and Local Government. Available online at http://www.legislation.gov.uk/uksi/2009/2264/contents/made [Checked 15/12/17].
[4] Classed as 'main' according to passenger numbers and air cargo volumes

UK, including in the south east. These are primarily passenger airports. This is discussed further in **Chapter 2**.

1.3.4 The management of the airspace within the UK is undertaken by the National Air Traffic Service (NATS) a public-private partnership in which the CAA currently holds a 49% controlling stake, 5% is held by staff and 46% is in private ownership. NATS are responsible for managing the airspace within the three UK Flight Information Regions (FIRs)[5], which includes the London FIR covering England and Wales.

1.4 Overview of the Proposals

1.4.1 There has been an operational airport at the Proposed Development site since 1916. Until 1998 it was operated by the Royal Air Force (RAF) as RAF Manston, and for a period in the 1950s was also a base for the United States Air Force (USAF).

1.4.2 From 1998 it was operated as a private commercial airport, known as Kent International Airport. The airport offered a range of services including scheduled passenger flights, charter flights, air freight and cargo, a flight training school, flight crew training and aircraft testing. In recent years it was operating as a specialist air freight and cargo hub servicing a range of operators. Although the airport was closed in May 2014, much of the airport infrastructure, including the runway, taxiways, aprons, cargo facilities and passenger terminal remain (**Figure 1.2**).

1.4.3 The Proposed Development shall consist of the following principal components:

- Runways and taxiways suitable for the take off and landing of a broad range of cargo aircraft
- an area for cargo freight operations able to handle at least 10,000 movements per year and associated infrastructure, including;
  - a new Air Traffic Control (ATC) tower;
  - a fire station and fire safety training area;
  - a fuel farm; and
- facilities for other aviation-related development, including:
  - a passenger terminal and associated facilities;
  - an aircraft teardown and recycling facility;
  - a flight training school;
  - a base for at least one passenger carrier;
  - a fixed base operation for executive travel; and
  - business facilities for aviation related organisations.

1.4.4 A detailed description of the Proposed Development is provided in **Chapter 3: Description of the Proposed Development**.

1.5 Defining an NSIP under The Planning Act 2008

1.5.1 The Proposed Development is considered to be a NSIP in accordance with the 2008 Act. This NSIP will help to provide much needed additional air freight and cargo handling facilities in the south-east of England in accordance with the Government's stated aim to maintain the UK's status

[5] NATS (2017) https://www.nats.aero/ae-home/introduction-to-airspace/ (Online) [Checked 09/11/17]

as a global hub for aviation by allowing for increased aviation capacity in the South East[6]. The need for development is discussed further in **Chapter 2: Need for Development and Development Alternatives.**

1.5.2 The Project falls under section 14(1)(i) of the 2008 Act as '*airport-related development*.' Section 23[2] sets out what that means, and this Project fulfils sections 23(4) and 23(5)(b), namely that this is the alteration of an airport, the effects of which '*is to increase by at least 10,000 per year the number of air transport movements of cargo aircraft for which the airport is capable of providing air cargo transport services*'.

1.5.3 The Proposed Development falls into this category as it involves an alteration of an airport that is located within England and which is expected to lead to an increase in airport capacity of at least 10,000 ATMs of cargo aircraft.

1.5.4 A DCO application must be submitted to the Planning Inspectorate[7] (PINS) and, where the development subject of a DCO application is 'Environmental Impact Assessment (EIA) Development' (discussed further in **Section 1.6**), that application must be supported by an ES reporting on the findings of the EIA process; as required by the 2008 Act, and the 2017 EIA Regulations.

1.6 The need for an Environmental Impact Assessment and purpose of the PEIR

1.6.1 EIA is a process which assesses the likely significant environmental effects of a Proposed Development. It provides decision-makers and the public with the environmental information needed to make sustainable decisions when determining applications for certain developments.

EU Directive 2014/52/EU

1.6.2 The legal basis for EIA was originally derived from European Community Directive 85/337/EEC[8] (then further amended by Directives 97/11/EC[9] and 2003/35/EC[10]), the amended directive being consolidated as Directive 2011/92/EU[11]. Subsequent to this, Directive 2011/92/EU has been substantially amended by Directive 2014/52/EU[12].

1.6.3 Directive 2014/52/EU applies in the UK as of 16 May 2017 and resulted in its transposition in to UK Law as the national Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (henceforth referred to as 'the 2017 Regulations').

1.6.4 The new 2017 regulations have come into force since the last consultation. RiverOak have therefore taken the decision that the EIA documentation that will accompany the DCO application,

[6] Airports Commission Final Report, July 2015. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf. [Checked on 09/11/17]
[7] The Planning Inspectorate (PINS) is responsible for examining the application and then making a recommendation to the Secretary of State for Transport as to whether or not development consent should be granted or refused
[8] Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment
[9] Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment
[10] Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC
[11] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification)
[12] Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

and this PEIR that will support a new period of statutory consultation, should be prepared in line with the requirements of the 2017 Regulations. This is to ensure a robust approach is undertaken to meet the new requirements.

1.6.5 The scoping report prepared in 2017 has been taken into account in completing the assessments contained within this PEIR. To avoid duplication, a revised scoping report has not been issued for the purposes of the statutory consultation in January and February 2018. However, any additional comments relating to the additional and revised provisions of the 2017 EIA Regulations, received in response to this PEIR, will be taken into account as appropriate. Further information in relation to the scoping approach is included in **Chapter 5** of this PEIR.

Need for EIA

1.6.6 EIA is required for certain developments under the 2017 EIA Regulations. Some NSIPs always require EIA (the EIA Regulations define these under Schedule 1), others only require EIA if they are likely to have significant effects on the environment by virtue of their nature, size or location (the EIA Regulations define these in Schedule 2).

1.6.7 In this instance, RiverOak is undertaking an EIA (in accordance with the 2017 EIA Regulations) under paragraph 10(e) of Schedule 2 because of the characteristics, location and potential impact of reopening Manston Airport. The ES being prepared seeks to ensure that any potentially significant effects of the Proposed Development on the environment are identified and considered and, where appropriate, avoided, mitigated or compensated.

1.7 Purpose of this Document

1.7.1 As noted above, this PEIR has been prepared on behalf of RiverOak as part of the requirements of the consultation process Sections 42 and 47 of the 2008 Act, and will enable consultees and other interested parties to develop their understanding of the likely environmental effects of the Proposed Development prior to finalisation of the ES.

1.7.2 Under the EIA Regulations, ‘preliminary environmental information’ denotes information referred to in Schedule 4, Part 1 of the EIA Regulations which has been compiled by the applicant and is reasonably required to assess the environmental effects of the development and any associated development.

1.7.3 As noted above, a previous consultation was undertaken in summer 2017. **Table 1.1** summarises the changes under the new regulations that are the focus of the current consultation and where these requirements are considered in the PEIR and the ES. **Table 1.2** describes where, within this PEIR, the information previously consulted on and also required by Schedule 4 of the EIA can be found although it should be noted that there are some updates to accommodate new information that has been gained as a result of design evolution, further collection of baseline data etc, during the period since the previous statutory consultation exercise.

1.7.4 This report provides preliminary information based on the development of the Project to date and data gathered up to this point, which will subsequently be provided in full and final form within the ES. As this information has been compiled at this stage in the pre-application process, the information is likely to be subject to further update and revision whilst the ES is being finalised. The limitations of the information presented in this PEIR are explained in the technical topic chapters (6-17).

1.8 Proposed Approach to the EIA (Summary)

1.8.1 The ES will be prepared on behalf of the applicant as part of the requirements of the application process for NSIPs that are EIA Developments as defined by the EIA Regulations. It will enable PINS, consultees and other interested parties to understand the likely environmental effects of the Proposed Development.

1.8.2 Schedule 4 of the 2017 EIA Regulations specifies what should be included in an ES. This includes *"A description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development..."*

1.8.3 Schedule 4 also specifies that the ES should include *" A description of the factors specified in regulation 5(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape."*

1.8.4 This ES will therefore include an assessment of the likely environmental effects of the proposed development that are considered likely to be significant. This reflects the above requirement of the 2017 EIA Regulations for an ES to assess in detail only those effects that are likely to be significant. The 2017 EIA Regulations do not define significance; the overall approach that has been taken to defining significance, as well as further information about the approach to preparing the ES are outlined in **Chapter 5**.

1.8.5 **Table 1.1** *Changes Resulting from the adoption of the 2017 Regulations and location of information within the PEIR*

Change in Regulations since the previous consultation	Document References
Applicant to ensure that the ES is prepared by competent experts and the application must be accompanied by a statement from the applicant outlining the relevant expertise or qualifications of such experts. (Para 14 (4))	To be included in the ES at **Chapter 5**
Requirement to ensure the HRA and EIA are coordinated (Para 26 (1))	HRA based on the outputs from ES/PEIR Chapters including Biodiversity, Noise, Air Quality, Surface Water, Land Quality and Hydrogeology.
Description of the reasonable alternatives to include 'comparison of the likely environmental effects' (Schedule 4, Para 2).	**Chapter 2** - Rationale and Alternatives
Risks to Human Health (Schedule 4 Para 5 (d))	**Chapter 15** - Human Health and HIA (Appendix X)
Climate Change (Schedule 4 Para 5 (f))	**Chapter 16** - Climate Change
Waste	**Chapter 3** – scheme description, CEMP and Resource Strategy Statement. Effects of Waste considered in ES specialist technical chapters.
Major Accidents and Disasters	**Chapter 17** - Major Accidents and Disasters
Monitoring	Specialist technical chapters, and scheme description

1.8.6 *Table 1.* summarises where, within this ES, the information required as a result of the changes resulting from the enactment of the 2017 EIA regulations can be found within this document and will be found in the ES, **Table 1.2** refers to those requirements of the 2009 EIA regulations that were the subject of the previous consultation, are still included in this (2018) PEIR and will still be included in the ES.

Table 1.1 Changes Resulting from the adoption of the 2017 Regulations and location of information within the PEIR

Change in Regulations since the previous consultation	Document References
Applicant to ensure that the ES is prepared by competent experts and the application must be accompanied by a statement from the applicant outlining the relevant expertise or qualifications of such experts. (Para 14 (4))	To be included in the ES at **Chapter 5**
Requirement to ensure the HRA and EIA are coordinated (Para 26 (1))	HRA based on the outputs from ES/PEIR Chapters including Biodiversity, Noise, Air Quality, Surface Water, Land Quality and Hydrogeology.
Description of the reasonable alternatives to include 'comparison of the likely environmental effects' (Schedule 4, Para 2).	**Chapter 2** - Rationale and Alternatives
Risks to Human Health (Schedule 4 Para 5 (d))	**Chapter 15** - Human Health and HIA (Appendix X)
Climate Change (Schedule 4 Para 5 (f))	**Chapter 16** - Climate Change
Waste	**Chapter 3** – scheme description, CEMP and Resource Strategy Statement. Effects of Waste considered in ES specialist technical chapters.
Major Accidents and Disasters	**Chapter 17** - Major Accidents and Disasters
Monitoring	Specialist technical chapters, and scheme description

Table 1.2 Location within this PEIR of the information previously consulted on under the requirements of Schedule 4 of the EIA Regulations 2009

Requirement of the 2009 Regulations, still Relevant under the 2017 Regulations	Topic Chapters and Document References
Description of the development	**Chapter 3**
Outline of the main alternatives	**Chapter 2**
Description of the aspects of the environment likely to be significantly affected and the likely significant effects	
Population	Landscape and visual [**Chapter 10**]; Noise [**Chapter 11**]; Air Quality [**Chapter 5**]; and Socio-economics [**Chapter 12**]; Traffic and Transport [**Chapter 13**].
Fauna	Biodiversity [**Chapter 7**].
Flora	Biodiversity [**Chapter 7**].
Soil	Land Quality [**Chapter 10**]
Water	Freshwater Environment [**Chapter 8**]
Air	Air Quality [Chapter 6]; Traffic and Transport [**Chapter 14**]
Climatic Factors	Freshwater Environment [**Chapter 8**]
Material assets, including the architectural and archaeological heritage	Historic Environment [**Chapter 9**]
Landscape	Landscape and Visual [**Chapter 11**]
The inter-relationship between the above factors	These are discussed within each chapter as appropriate.
Cumulative Effects	Cumulative Effects Assessment [previously Chapter 15, now **Chapter 18**]
Description of the measures to prevent, reduce and where possible offset any significant adverse effects on the environment	These are discussed within each specialist technical chapter as appropriate.
A non-technical summary	Non-Technical Summary
An indication of the difficulties encountered in compiling the required information	These are discussed within each section as relevant

1.9 Structure of this Document

1.9.1 This report is structured as follows:

- **Chapter 2** outlines the need for the Proposed Development and the reasonable alternatives that have been considered.
- **Chapter 3** describes the Proposed Development, including information on how it would be constructed and operated.
- **Chapter 4** provides an overview of the relevant planning policies to establish associated with the Proposed Development.
- **Chapter 5** summarises the approach that has been used to undertake the impact assessment.
- **Chapter 6** provides the assessment results of the Proposed Development effects on air quality.

- **Chapter 7** sets out the likely significant effects of the Proposed Development on biodiversity.
- **Chapter 8** sets out the effects of the Proposed Development on the freshwater environment.
- **Chapter 9** provides the results of an historic environment assessment on the Proposed Development.
- **Chapter 10** sets out the results of an assessment of the effects of the Proposed Development on land quality.
- **Chapter 11** sets out the landscape and vision assessment of the Proposed Development**.**
- **Chapter 12** provides the assessment of the likely significant noise impacts arising from the Proposed Development.
- **Chapter 13** sets out the socio-economics assessment of the Proposed Development.
- **Chapter 14** sets out the results of the traffic and transportation assessment of the Proposed Development.
- **Chapter 15** provides the relevant information associated with the assessment of impacts on Human Health.
- **Chapter 16** provides the relevant information associated with the assessment of the impact of the Proposed Development on Climate Change.
- **Chapter 17** provides the relevant information associated with the assessment of Impacts resulting from the risks associated with major Accidents and Natural Disasters.
- **Chapter 18** sets out the results of the cumulative effects assessment of the Proposed Development

Chapters 1 to 10 are provided in **Volume 1**.

Chapters 11 to 18 are provided in **Volume 2**.

All Figures referred to in this report, which are not embedded as part of the relevant chapter, are provided in **Volume 3**.

All Appendices referred to in this report are provided in **Volumes 4** to **11**.

2. The Need for the Proposed Development and the Alternatives Considered to Date

2.1 The need for the Proposed Development

2.1.1 The aviation sector is of vital importance to the UK economy and has been estimated to contribute an annual £52 billion or 3.4% to UK GDP[1]. In addition, the UK aviation services sector supports the wider UK economy, including British manufacturing, by carrying high value exports around the world, including to emerging markets. The total value of tradeable goods carried through UK airports in 2014 exceeded £140 billion, and an estimated 40%, by value, of the UK's trade with economies outside of the EU is carried by air[2].

2.1.2 The increase in demand for air transport seen over the preceding years is also forecast to continue in the period up to 2035. There are forecast to be 50% more flights in Europe in 2035 compared with 2012[3]. The demand for air freight is also set to increase by more than 50% across the period 2015 to 2035, with particularly strong growth forecast for the longer distance routes such as Europe-Asia (4.6% annually) and Europe-Africa (3.8% annually)[4] .

2.1.3 A large proportion of air freight is currently carried as 'belly hold' freight, i.e. in the hold of passenger aircraft, particularly in the UK. But the advantages of transporting air freight by dedicated air freighters, particularly for high-value goods, has led to a forecast increase in the number of airplanes in the worldwide freighter fleet of 70% from 2015 to 2035[4].

2.1.4 Should the UK be unable to meet the increased demand for air freight and air freighters, some 2.1 million tonnes of freight would be diverted elsewhere by 2050, mainly to Northern European airports[5].

2.1.5 London's six airports: Heathrow, Gatwick, Stansted, Luton, London City and Southend, facilitate around 76% of the UK's air freight. However, the Airports Commission report shows that all London airports will be at capacity by 2030. The South East is particularly hard hit by the lack of airport capacity with sustained losses in potential trade running at £2bn/year without additional runway capacity[6].

2.1.6 Further information on the UK aviation sectors, including a qualitative study of potential demand, has been undertaken by Azimuth Associates[7] (the Azimuth Report), and is included as part of the

[1] Oxford Economics (2015), Economic Benefits from Air Transport in the UK. Available from http://www.oxfordeconomics.com/my-oxford/projects/281929 [Checked on 10/11/17].
[2] Airports Commission (2015), Airports Commission: Final report. Available online at https://www.gov.uk/government/publications/airports-commission-final-report [Checked 10/11/17].
[3] Eurocontrol (2013), Challenges of Growth 2013: Summary Report. European Commission: Brussels. Available online at https://www.eurocontrol.int/sites/default/files/content/documents/official-documents/reports/201307-challenges-of-growth-summary-report.pdf [Checked on 10/11/17].
[4] Boeing (2016) World Air Cargo Forecast 2016-2017. Available online at http://www.boeing.com/resources/boeingdotcom/commercial/about-our-market/cargo-market-detail-wacf/download-report/assets/pdfs/wacf.pdf [Checked 10/11/17].
[5] York Aviation (2015), Implications for the Air Freight Sector of Different Airport Capacity Options. Available online at http://www.fta.co.uk/export/sites/fta/_galleries/downloads/air_freight/air-freight-implications-from-new-capacity.pdf [Checked 10/11/17].
[6] Centre for Business Research (2016). The Importance of Air Freight to UK Exports: The impact of delaying the runway capacity decision on UK international trade growth. Report for Let Britain Fly Campaign. Available from http://londonfirst.co.uk/wp-content/uploads/2016/09/Importance-of-air-freight-to-UK-exports-PDF-FINAL.pdf [Checked 16/11/17]
[7] Azimuth Associates (2017) Manston Airport: A National and Regional Aviation Asset – Volumes I to IV. Available online at http://rsp.co.uk/documents-page/ [Checked 10/11/17].

consultation materials. The Azimuth Report identifies a number of issues, which the Proposed Development aims to address, including:

- the lack of available slots at existing South East airports;
- 'bumping' of freight from passenger aircraft;
- security issues particularly with outsized cargo; and
- speed of turnaround and bottlenecks for air freight.

2.1.7 In addition to helping meet air freight capacity requirements, an airport at Manston would bring significant economic benefit to the area. Since the closure of the Pfizer plant near Sandwich in 2012 and Manston airport in 2014, east Kent has not been host to a significant high-tech employer. Reopening Manston is predicted to bring 4,000 direct and 30,000 indirect jobs to the local economy by 2038. To ensure the demand for skilled workers can be met locally RiverOak Strategic Partners (RiverOak) is also working with local educational institutions to establish complementary education and training programmes.

2.1.8 In promoting the Proposed Development, RiverOak have identified that a dedicated freight airport, that is an airport at which the needs of airfreight carriers and operators are given priority over passenger flights, could provide a significant contribution to meeting the wider need for increased airport capacity in the UK, as well as contributing significantly to the local economy in the long term.

2.2 Characteristics of an air freight airport

2.2.1 As has been outlined above and discussed in further detail in the Azimuth Report[8], there is an identified need for increased capacity for airfreight and for dedicated air freighters in the UK aviation sector. Whilst some additional capacity can be provided at existing passenger focused airports, including the six main London airports, there is insufficient capacity to meet both the existing forecast demand, or to allow the UK aviation sector, and wider UK economy, to grow and to capture new market share.

2.2.2 Aviation infrastructure is critical to the air freight industry. A survey of global competitiveness produced by the World Economic Forum[9] , showed that capacity constraints within the UK's air transport infrastructure are reducing competition and the desire to provide the highest quality service. Providing sufficient aviation capacity to meet future airfreight demand is, as stated in the study by Oxford Economics[10], the first step to encouraging future trade growth.

2.2.3 In the consideration of the needs case for the Proposed Development, and through the project evolution and design, a set of characteristics for a dedicated air freight airport have been established. These have formed the basis for both the consideration of alternatives and the design of the Proposed Development.

2.2.4 The characteristics of an optimal air freight airport, based on the developing or enhancing of an existing airport site, would include:

- a 2500m+ (non-grass) runway capable of supporting CAT II/III runway operations;
- existing airport infrastructure with the capacity to provide facilities for new airfreight operators according to demand;

[8] Azimuth Associates (2017) Manston Airport: A National and Regional Aviation Asset – Volumes I to IV. Available online at http://rsp.co.uk/documents-page/ [Checked 10/11/17].
[9] The Global Competitiveness Report (2016) World Economic Forum. (p354) Available online at https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1/ [Checked 10/11/17].
[10] Oxford Economics (2013), Impacts on the Air Freight Industry, Customers and Associated Business Sectors. (p8) Available online at www.oxfordeconomics.com/publication/download/259165 [Checked 10/11/17].

- licensed, or the ability to obtain a licence, from the European Aviation Safety Agency (EASA), or other relevant licensing organisation, for the operation of the types of aircraft currently used, and likely to be used in the future, by airfreight operators;
- capacity to accommodate dedicated air freighters and hold freight;
- availability of new slots for airfreight operators, and a flexibility of existing slots;
- air freight operations not constrained by passenger and other operations;
- airspace that is outside of the London Control Zone (CTR) to provide maximum flexibility and capacity for airport operations;
- good surface access to the strategic highways network, with no bottlenecks to access in or around the airport, with an additional advantage of a good connection to high quality public transport infrastructure; and
- located in the South East of England close to the main significant population and commercial centres, with as an additional advantage of a good connection to continental Europe.

2.3 Reasonable alternatives for an air freight airport

2.3.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 set out within Schedule 4, Part 2 the need to outline the reasonable alternatives considered by the developer.

2.3.2 In considering the reasonable alternatives consideration has been given to the characteristics of an air freight airport as outlined in **Section 2.2**, and the information on the current airport capacity and constraints within the UK aviation sector[11].

Do nothing

2.3.1 All six London airports will be at air freight handling capacity by 2030.

2.3.2 London and the South East is particularly hard hit by a lack of airport capacity with sustained losses in potential trade running at £2bn/year without additional runway capacity[12]. Without increased air freight handling capacity, the existing forecast demand will not be met and the UK aviation sector and wider UK economy will not be able to grow and to capture new market share. The option to do nothing is therefore not considered viable.

2.3.3 Sites within the UK capable of providing the facilities to meet the predicted air freight demand are limited and heavily constrained. Many sites that could have provided air freight capacity have been lost through redevelopment. To do nothing may result in the Manston Airport site being lost to the airport sector particularly given that there are development pressures to change its use.

2.3.4 In terms of the site itself, the do nothing option would result in a gradual deterioration of the existing infrastructure on the site. The implications of such decline are difficult to predict. However, there would be an inevitable 'return to nature' as vegetation takes hold and species move onto the abandoned site. This is likely to be offset by the continued decline of facilities and the likely socio-economic effects (misuse etc.) associated with an abandoned brownfield site in a semi-rural area.

[11] Azimuth Associates (2017) Manston Airport: A National and Regional Aviation Asset – Volumes I to IV. Available online at http://rsp.co.uk/documents-page/ [Checked 10/11/17].
[12] Centre for Business Research (2016). The Importance of Air Freight to UK Exports: The impact of delaying the runway capacity decision on UK international trade growth. Report for Let Bristain Fly Campaign. Available from http://londonfirst.co.uk/wp-content/uploads/2016/09/Importance-of-air-freight-to-UK-exports-PDF-FINAL.pdf [Checked 16/11/17]

Strategic Alternatives to Manston Airport

2.3.5 As outlined in paragraph 2.1.5, and in Azimuth Report I[11], at present 76% of the UK's air freight is currently carried through London's six main airports: Stansted, Heathrow, Gatwick, Luton, London City and Southend. However, all of these existing and mature airports are focused primarily on the passenger market with most of the freight carried as belly hold. A summary of the current air freight operations, and of the constraints to the increase in air freight, at these airports is provided below.

Stansted Airport

2.3.6 Cargo-only flights account for around 8% of ATMs at Stansted, and the airport is currently prevented from operating to its maximum capacity due to the conditions of its consent[13]. It seems likely that the airport's owners, Manchester Airport Group (MAG), will want to maximise the use of their infrastructure, in line with the DfT's desire to make full use of existing capacity but this is highly likely to focus heavily on the passenger market.

Heathrow Airport

2.3.7 In 2016 Heathrow handled approximately 65% of the UK's air freight, but very few dedicated cargo aircraft use the airport[14]. More than 99% of air freight at Heathrow is carried in the belly hold of passenger aircraft[15].

2.3.8 The addition of a third runway at Heathrow is unlikely to resolve the capacity issues for dedicated freighters. Since Heathrow's passenger market has been constrained for some years, it is likely that the new runway will be used to meet this existing demand. Heathrow's focus on passenger and belly hold markets is likely to continue to keep dedicated freighters out of the airport. This means that markets not served by passenger aircraft will remain unreachable for UK importers and exporters without a dedicated freighter operation.

2.3.9 In 2015, Heathrow Airport Limited announced their intention to overhaul their cargo facilities, with the key aim of reducing the current processing time to around four hours[16]. However, this is still considerably longer than Manston's previous and proposed processing times for freight[17]. Also, as the York Aviation figures show, there will be a shortfall of slots for dedicated freighters in the South East, likely to be in the region of 45,000 by 2050, even with the addition of a third runway at Heathrow[18].

2.3.10 As such, even with an operational third runway at Heathrow, Manston will still be vital to ensure the UK meets the needs, wherever possible, of the demand for air freight.

---

[13] Stansted – Local Rule 4 (2006) Uttlesford District Council. Available online at https://www.acl-uk.org/wp-content/uploads/2017/07/STN-Local-Rule-4-1.pdf [Checked 14/11/17].
[14] Civil Aviation Authority (2017) Freight by Aircraft Configuration 2016. Available online at https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport_data_2017_01/Table_15_Freight_by_Aircraft_Configuration.pdf. [Checked 10/11/17].
[15] Eurocontrol (2013), Challenges of Growth 2013: Summary Report. European Commission: Brussels. Available online at https://www.eurocontrol.int/sites/default/files/content/documents/official-documents/reports/201307-challenges-of-growth-summary-report.pdf [Checked on 10/11/17].
[16] Heathrow announces plan to double cargo volumes (2015) Heathrow Media Centre website. Available online at http://mediacentre.heathrow.com/pressrelease/details/81/Corporate-operational-24/5263 [Checked 10/11/17].
[17] Azimuth Associates (2017) Manston Airport: A National and Regional Aviation Asset – Volumes I to IV. Available online at http://rsp.co.uk/documents-page/ [Checked 10/11/17].
[18] York Aviation (2015), Implications for the Air Freight Sector of Different Airport Capacity Options (p19). Available online at http://www.fta.co.uk/export/sites/fta/_galleries/downloads/air_freight/air-freight-implications-from-new-capacity.pdf [Checked 10/11/17].

Gatwick

2.3.11 Gatwick handles very few dedicated freighters, although it has increased its annual tonnage from only 3,000 in 2014 to 73,000 tonnes in 2015. This lack of experience, which is a key element in the choice of a freight airport for operators[19], prevents Gatwick from being a serious competitor in the freight market. It has been forecast that with a second runway at Gatwick there would be a need for around 65,000 additional freighter movements per year from 2050 (York Aviation, 2015, p. 19); it can therefore be concluded that even with additional runways at both Heathrow and Gatwick the shortfall in capacity will equate to approximately 20,000 freighter movements.

Luton

2.3.12 Luton Airport is located close to the M1 and therefore well situated to access the UK's road network. The airport handles around 28,000 tonnes of cargo each year with DHL, MNG Airlines and British Airways operating dedicated freighters from the airport.

2.3.13 The current number of stands at Luton is unable to support significant growth[20]. Luton's business profile is similar to Stansted's in terms of the dominance of Low Cost Carriers, therefore the airport is focused on passenger traffic. It would therefore be improbable for the airport to provide a hub for dedicated freighters.

London City

2.3.14 London City has recently benefited from permission to build seven new aircraft stands, a parallel taxiway and extend the passenger terminal. However, the airport is focused on the passenger market and handled only 24 tonnes of freight in 2017[21]. London City has a short and constrained runway, at 1,900m, and is therefore unable to support a large freighter operation

Southend

2.3.15 Southend Airport is focused on the Low Cost Carrier passenger market, handling only five tonnes of freight in 2015[21], which is the last time it is recorded as handling freight[22]. Although extended in 2012, Southend's runway is too short for large aircraft and therefore unlikely to be suitable for long or mid-range freighter aircraft.

Other South East UK Airfields

2.3.16 Alternative options for increasing air freight capacity in the South East have been identified. However, as shown in the table below each are subject to fundamental constraints on their development and on their ability to meet the requirements outlined in **Section 2.2**.

[19] Kupfer, F., Kessels, R., Goos, P., Van de Voorde, E. and Verhetsel, A. (2016), The Origin Destination Airport Choice for All-Cargo Aircraft Operations in Europe. Transportation Research Part E, vol. 87, pp. 53-74.
[20] CAA (2014) Stansted Market Power Assessment; Annex 4. Available online at https://www.caa.co.uk/WorkArea/DownloadAsset.aspx?id=4294972551 [Checked 10/11/17].
[21] Civil Aviation Authority (2017) Freight by Aircraft Configuration. Available online at https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport_data_2017_01/Table_15_Freight_by_Aircraft_Configuration.pdf. [Checked 10/11/17].
[22] Civil Aviation Authority (2017) Freight by Aircraft Configuration 2016. Available online at https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport_data_2016_annual/Table_15_Freight_by_Aircraft_Configuration.pdf [Checked 18/12/17]

Table 2.1 Other airfields in the South East

Airfield	Main Constraints to airfield providing necessary freight capacity
Biggin Hill	Difficult road access to main M25 artery, restricted opening hours, short runway, runway direction and proximity to Gatwick Airport creates numerous airspace issues, residential location, experiences poor weather conditions due to elevated location.
Farnborough	Restricted number of movement particularly at weekends, only certain aircraft categories permitted.
Lydd	Short runway with considerable approach issues (including Ministry of Defence (MOD) Hythe firing range and proximity of Dungeness Power Station), rural location with relatively poor surface transport connectivity.
Northolt	Royal Air Force (RAF) station, safety issues raised due to proximity to Heathrow, difficulties integrating with London airspace, short runway.
Rochester	Grass runway.
Shoreham	Short runway, light aircraft use only.

Airports outside of the South East

2.3.17 As outlined in **Section 2.2** one of the key requirements for a dedicated air freight airport would be close proximity to the main UK commercial and population centres in the South East, with an additional advantage of easy access to continental Europe. None of the existing main London airports have the capability and/or willingness to focus primarily on air freight and air freighters, and, with the exception of the Proposed Development, none of the other airports in the South East has either the existing airport infrastructure or the ability for the new infrastructure to support air freight to be relatively easily created.

2.3.18 Outside of the South East the only airport that handles a significant volume of air freight is East Midlands Airport; this is a major integrator hub, focused on handling packages and parcels. This has led to a number of integrator carriers, such as DHL, TNT and UPS, setting up bases at East Midlands Airport for the handling of packages and parcels.

2.3.19 However, East Midlands serves a wide catchment area, with many of the business served by the airport located in the South East at some distance from the airport, with access hampered by congestion on the UK's road network in and around the Midlands and beyond. Therefore, total time taken to deliver from origin to final destination increases, particularly around the bottlenecks on some of the major motorways.

Manston Airport the Preferred Option

2.3.20 The requirements for an idealised air freight airport, as set out in **Section 2.2**, have been considered in relation to the Proposed Development.

2.3.21 Manston Airport is located outside of the London Air Traffic Control Zone, and flights approaching from the south and east, i.e. from Africa, or Europe, the Middle East and Asia, can save up to 45 minutes in flying time compared with other airports.

2.3.22 Manston Airport also has an existing 2,752m long paved runway, which, with only minor alterations and new navigational aids and equipment (see **Section 3.2**), would be able to obtain a license from the European Aviation Safety Agency (EASA) to allow it to handle the larger classes of aircraft, that are used and operated by air freight carriers.

2.3.23 In addition, as is shown in **Section 3.2**, Manston Airport has sufficient space for the construction of new air freight handling, storage and processing facilities, alongside the new aircraft stands and aprons. This would provide a significant advantage as it allows the freight handling, forwarding and integrating to be undertaken airside on the airport site, and minimises the need for the transfer of freight off the airport site for processing.

2.3.24 Whilst there are some disadvantages to the Proposed Development at Manston Airport, for example being located to the South East of London with increased road journey times to the North and West of London and the centres along the M4 corridor, these can minimised and offset by the proposals which include an existing 2,752m paved runway; dedicated air freight stands, aprons, handling, storage and processing facilities; prioritisation of freight with quick turnaround and unloading time of aircraft; and availability and flexibility of slots.

2.3.25 Taking the above into consideration, Manston Airport is considered to be the most suitable, viable choice for the location of a freight-focused airport in the South East of England due to its size, location and lack of airspace constraints. Indeed, the 2003 White Paper, The Future of Air Transport, acknowledged that Manston 'could play a valuable role in meeting local demand and could contribute to regional economic development' (Department for Transport, 2003, p.132[23]).

2.4 Consideration of on-site alternatives

2.4.1 In addition to the assessment of alternative sites for a dedicated air freight airport in the South East, the masterplanning process has also given consideration to on-site alternatives for individual elements and components of the Proposed Development. This has been undertaken as part of the on-going project evolution (see **Section 5.5**) as part of the project design process.

2.4.2 A number of alternative layouts, designs and configurations were considered for the air freight and cargo facilities. This included looking at the number of aircraft stands, apron design, taxiway layout and configuration, and size, location and layout of the associated freight handling and parking facilities. Whilst these were constrained by the need to provide sufficient capacity to meet the demands of the airfreight forecast, and to allow for the safe and efficient operation of the airport; opportunities to incorporate environmental measures into the design of the scheme have been considered.

2.4.3 At the current stage of design, it has now been possible to integrate additional environmental mitigation measures into the design and as such the masterplanning process continues to evolve. For the purposes of the assessments presented in **Chapters 6-17** of this PEIR the site layout described in **Chapter 3** has been assumed, however, where there are changes as a result of the current consultation or as a result of mitigation measures driven out of the Environmental Impact Assessment (EIA) process these will be incorporated in the final Environmental Statement (ES).

Site Access

2.4.4 Site access, including the access for Heavy Goods Vehicles (HGVs), passengers, staff, and fuel deliveries, was considered as part of this process. When Manston Airport was previously operating the airfreight, facilities used an access from the Spitfire Way (B2190), with all other parts of the airport accessed from Manston Road (B2050). Neither of these were designed to accommodate the volumes of traffic experienced when the airport was previously operational, and are considered insufficient for the traffic forecast for the Proposed Development.

2.4.5 Alternative access for the vehicles associated with the airfreight operations considered using the existing airfreight access, a new single airport access, located somewhere on Manston Road (B2050), or a new dedicated airfreight access. It was this option, to be located on the Spitfire Way (B2190), away from the existing residential receptors, that was considered to provide the most advantages, both operationally and in mitigation of any potentially significant environment effects.

[23] Department for Transport (2003), The Future of Transport, Cm 6046. London: The Stationery Office.

2.4.6 Further detail and design of the new accesses, including of the access for passengers and airport staff is discussed in **Chapter 3**, and **Chapter 14.**

Surface Water infrastructure

2.4.7 The design of the surface water capture, treatment and drainage system has also been subject to the consideration of on-site alternatives and options. The size, location and layout of the attenuation ponds, the surface water collection and drainage network, the water treatment facilities, and the options for the discharge of surface water from the site have also been considered.

2.4.8 Work is currently ongoing through the design process, capacity and condition surveys are being conducted on the existing discharge outfall and discussion on the capacity of the existing foul water network are being undertaken. More detail on these elements will be presented within the Drainage Strategy which will be included as part of the ES to be submitted in support of the Development Consent Order (DCO) application.

Fuel Farm

2.4.9 The location and design of the new airport fuel farm has also been the subject of consideration of alternatives within the airport master planning and design process. In selecting the location for the fuel farm consideration was given to the following:

- preference for location airside, with minimal disruption to other airport operational activities from the fuel farm;
- the operation of the fuel farm, including the method for delivery and transport of fuel around the airport, should be acceptable to the Civil Aviation Authority (CAA);
- good access for fuel tankers and other deliveries, preferably separate from the main airport access;
- ability to accommodate the new infrastructure and facilities required to meet the airport fuel storage requirements;
- a location outside of Groundwater Source Protection Zone 1 (SPZ1); and
- a location that meets any requirements of the Health & Safety Executive.

2.4.10 The currently preferred location for the new fuel farm, is the existing Jentex fuel facility in the southeast of the Proposed Development and there are ongoing discussions on the use of this site taking place with the Environment Agency (EA).

2.4.11 A technical note on the alternative fuel farm locations and design evolution has been prepared (**Appendix 2.1**)

3. Description of the Proposed Development

3.1 Requirements under the EIA Guidelines

3.1.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 2017 Regulations) require an Environmental Statement (ES) to provide a description of the location, design and size of the scheme to enable the likely significant environmental effects to be assessed and to enable the Planning inspectorate (PINS), the statutory consultees and the public to make a properly informed response. Schedule 4 of the 2017 Regulations requires the Environmental Impact Assessment (EIA), amongst other things, the following issues to be addressed:

- a description of the location of the development;
- a description of the physical characteristics of the whole development;
- a description of the main characteristics of the operational phase of the development; and
- an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.

3.1.2 The description of development below is also based on the requirements of the Planning Inspectorate's (PINS) Advice Note 9 which provides guidance in the use of the Rochdale Envelope approach in the case of an application for a Nationally Significant Infrastructure Project (NSIP).

3.1.3 The Rochdale Envelope refers to the judgment of Justice Jeremy Sullivan in the case of the Kingsway Business Park Application in Rochdale[1] where it was acknowledged that a degree of flexibility is required in the determination of outline planning applications. In this regard Justice Sullivan noted:

"*If a particular kind of project, such as an industrial estate development project (or perhaps an urban development project) is, by its very nature, not fixed at the outset, but is expected to evolve over a number of years depending on market demand, there is no reason why 'a description of the project' for the purposes of the directive should not recognise that reality"*

3.1.4 In the case of Manston airport, whilst certain aspects of the development, for example the length and breadth of the runway and taxiways can be 'fixed' for the purposes of the Development Consent Order (DCO) application, there will be other aspects, in particular the size and location of buildings that will be demand led and are therefore subject to the parameter planning approach allowed by the Rochdale judgment.

3.1.5 In summary, in the context of a DCO application for an NSIP, PINS Advice note 9 interprets the Rochdale judgment as follows:

- the application should acknowledge the need for details of a project to evolve over a number of years, within clearly defined parameters;
- the environmental assessment should take account of the need for such evolution, within those parameters, and should reflect the likely significant effects of such a flexible project in the ES; and
- taken with those defined parameters of the project, the level of detail of the proposals must be such as to enable a proper assessment of the likely environmental effects, and necessary mitigation - if necessary considering a range of possibilities.

3.1.6 It is with this guidance in mind that the Preferred Option for the development has been developed. The assessments contained in **Chapters 6 - 17** of this PEIR have, in all cases adopted a realistic

[1] R v Rochdale Metropolitan Borough Council ex parte Milne [2001] Env L.R. 22

worst case based on the parameters outlined below and shown on the illustrative masterplan at **Figure 3.4 and 3.5**.

3.2 Description of the Site and the Surrounding Area

The Application Site

3.2.1 The application site is on the existing site of Manston Airport, west of the village of Manston and north east of the village of Minster, in Kent. The town of Margate lies approximately 5km to the north of the site and Ramsgate approximately 4km to the east. Sandwich Bay is located approximately 4 - 5km to the south east. The northern part of the site is bisected by the B2050 (Manston Road), and the site is bounded by the A299 dual carriageway to the south and the B2190 (Spitfire Way) to the west. The existing site access is from the junction of the B2050 with the B2190. The location and redline of the site is shown on **Figure 3.1.**

3.2.2 The site covers an area of approximately 296ha (732 acres) and comprises a combination of existing buildings and hardstanding, large expanses of grassland, and some limited areas of scrub and/or landscaping. This includes the 2,748m long, 60m wide runway, which is orientated in an east-west direction across the southern part of the site. The existing buildings are clustered along the east and north west boundaries of the site, as shown on **Figure 3.2**, and include:

- a cargo handling facility comprising two storage warehouses 6 - 8m high, and one hangar 12m high, all finished with metal cladding, on an area of 5,200m^2, with gated entrances and a security box;
- a 12m high fire station building, constructed of brick and with a corrugated metal roof, on an area of 2,200m^2;
- a helicopter pilot training facility comprising two 10m high hangars with metal cladding, on an area of 950m^2 ;
- two 5m high museum buildings of brick construction, on an area of 2,000m^2;
- a 4m high terminal building, on an area of 2,400m^2;
- a 6m high air traffic control (ATC) building, including a 9m high viewing tower, on an area of 700m^2;
- a 12m high airplane maintenance hangar, with a taller 16m high movable section to enclose an airplane tail fin, on an area of 4,700m^2; and
- a fuel farm.

3.2.3 A network of hard surfacing, used for taxiways, aprons, passenger car parking, and roads connects the buildings to the runway and to the two main airport entrance points that are located in the east and west of the site. The buildings and facilities are generally surrounded by grassland which during previous airport operation this was kept closely mown. Landscape planting is limited to lines of ornamental trees and shrubs along some sections of the boundary such as the B2190, around some buildings and in car parking areas on the eastern edge. Post and wire security fencing of varying height runs alongside most of the airport perimeter.

3.2.4 The part of the site to the north of the B2050 (Manston Road), which bisects the centre of the site in a roughly east-west direction, is referred to as the ‘Northern Grass’. This part of the site is predominantly grassland, with some areas of hard standing, including a stretch of taxiway that formerly linked across to the main taxiway network. The two museums, the Spitfire and Hurricane Memorial Museum, and the Royal Air Force (RAF) Manston Museum, are located in the south western corner of the ‘Northern Grass’. A small number of other redundant buildings, such as the former RAF ATC tower, are also located on the ‘Northern Grass’.

Site History

3.2.5 The airport provided a variety of airport-related services from 1916 until it ceased operation in May 2014. It operated as RAF Manston until 1998, and was also a base for the United States Air Force for a period in the 1950s. From 1998 it operated as a private commercial airport with a range of services including scheduled passenger flights, charter flights, air freight and cargo, a flight training school, flight crew training and aircraft testing. More recently it operated as a specialist air freight and cargo hub. Much of the airport infrastructure, including the runway, taxiways, aprons, cargo facilities, and a passenger terminal still remains, with a number of the buildings still in use, including a helicopter pilot training centre, and the Spitfire and Hurricane and RAF Manston museums.

The Surrounding Area

3.2.6 The site is located within National Landscape Character Area 113: North Kent Plain. This encompasses a strip of land of approximately 90km in length bordering the Thames Estuary to the north and the chalk of the Kent Downs to the south. The site is also within the Thanet Landscape Character Area. This features a centrally domed ridge on the crest of which the airport is dominant. The area is generally characterised by open, large scale arable fields with long views.

3.2.7 The surrounding area is generally characterised by a moderate density of villages, small groups of residential properties and individual properties. These include:

- properties at Bell Davies Drive and Esmonde Drive to the north;
- properties at the southern end of Manston Court Road to the east of the airport;
- properties on the north side of the B2190 (Spitfire Way);
- properties on the northwest side of B2050 (Manston Road);
- properties along either side of Manston Court Road;
- properties at the southern end of Manston High Street; and
- those parts of Cliffsend adjacent to Canterbury Road West.

3.2.8 Not immediately adjacent but within 0.5 - 1km of the site are several smaller settlements including Manston, Minster, Cliffsend, Acol, Alland Grange Lane and Woodchurch.

3.3 Description of the Proposed Development

Summary Description

3.3.1 The aims and purpose of the Proposed Development are to reopen and develop Manston Airport into a dedicated air freight facility, which also offers passenger, executive travel, and aircraft engineering services. The facilities for air freight and cargo operations would be able to handle in excess of 10,000 air freight traffic movements per year, and the airport and facilities at the airport would be compliant with European Aviation Safety Agency (EASA), or other relevant licensing organisation standards. The existing site layout in the context of EASA requirements, and technical safeguarding in relation to the proposed layout, are shown on **Figures 3.3** and **3.26**, respectively.

3.3.2 A glossary of airport and aviation related terminology is included as **Appendix 3.1**.

3.3.3 A summary of the works to be undertaken as part of the proposed development are presented below:

- upgrade of Runway 28 to allow CAT II/III operations;

- realignment of the parallel taxiway (Alpha) to provide EASA compliant clearances to runway operations;
- construction of 19 EASA compliant Code E stands for air freight aircraft;
- installation of new high mast lighting for aprons and stands;
- construction of 65,500m² of cargo facilities;
- construction of a new ATC tower;
- construction of a new airport fuel farm;
- existing fire station refurbishment/replacement;
- construction of new fire training area;
- complete fit-out of airfield navigational aids (nav-aids);
- construction of new aircraft maintenance hangars;
- development of the 'Northern Grass Area' for airport related businesses;
- demolition of the redundant 'old' ATC Tower;
- relocation of the RAF Manston museum and enhancement of existing facilities for museums on the site;
- highway improvement works, both on and off site; and
- extension of passenger service facilities including an apron extension to accommodate an additional aircraft stand and doubling of the current terminal size.

3.3.4 The proposed zoning of different areas within the airport, and the proposed site layout are shown on **Figure 3.4** and **Figure 3.5**, respectively. Indicative visuals of the proposed development have been prepared and are shown on **Figures 3.6- 3.9**.

Manston Airport DCO Programme and Project Delivery

3.3.5 The submission of the DCO application is planned for the first quarter of 2018 following an additional period of statutory consultation, under section 42 of the Planning Act. Based on this programme and the anticipated determination period, the DCO may be granted in Q2 2019 and this timescale has been assumed when developing the construction/operational programme for this assessment.

3.3.6 The forecasting of the air freight and passenger movements for the airport, as discussed further below, has been conducted across a 20-year period from the granting of the DCO. This section outlines the programme for construction and then operation of Manston Airport from over this 20-year period.

3.3.7 The main activities to be undertaken during year 1 would be the construction activities required to return the airport to full operational use. The full reopening of the airport would therefore take place in year 2, currently expected to be Q4 2020, which would also see the start of the air freight services. Passenger services are anticipated to start in year 4, currently 2022.

3.3.8 Three further phases of construction, as described in more detail below, would follow in years 2-5, 5-12 and 12-18. During these three phases of construction the airport would remain operational.

3.3.9 Construction phasing is depicted on **Figures 3.27-3.30.**

Table 3.1 Outline Project Programme

Component	Start Date	End Date	Airport Year of Operation
Granting of DCO	Q2 2019	N/A	Yr. 1
Construction Phase 1	Q3 2019	Q4 2020	Yrs. 1-2
Opening of the Airport	Q4 2020	Q4 2020	Yr. 2
First Full Year of Freight Operations	Q1 2021	Q4 2021	Yr. 3
Construction Phase 2	Q4 2020	2023	Yrs. 2-5
Start of Passenger Services	Q1 2022	N/A	Yr. 4
Construction Phase 3	2023	2030	Yrs. 5-12
Construction Phase 4	2030	2036	Yrs. 12-18

Airport Masterplan Components

Runway, Taxiway, Apron and Stands

3.3.10 It is proposed that the existing 2,748m east-west aligned runway is retained for the reopened airport. Following the granting of the DCO, and prior to commencements of any construction activities a full assessment of the runway condition would be undertaken; it is likely that rehabilitation to improve the load bearing capacity for future aircraft operations and in order to be compliant to allow CAT II/III operations[2], would be required (for more information see Appendix 3.1). This is likely to require a 150mm overlay of bituminous materials across the runway; further details of the construction methodology for the runway rehabilitation works are presented below (see the Asphalt Pavement section of this chapter).

3.3.11 The operational part of the runway paved area is currently 60m wide. The original concrete paving for the Second World War runway, which was built very wide to accommodate simultaneous take-offs and safe landing for damaged aircraft, is up to 230m wide in places. The area of the runway to be refurbished covers a standard operational width of 45m with 7.5m shoulders (60m paved total).

3.3.12 The runway pavement improvement proposals are shown on **Figure 3.10.**

3.3.13 The existing parallel taxiway (Taxiway Alpha) is not compliant with EASA guidelines due to the separation distance from the runway to allow for the taxiing of larger classes of aircraft. Therefore, a new taxiway Alpha, plus associated taxiways to serve the new cargo stands, would be required. It is proposed that the new taxiways would be constructed in concrete. The works to Runway-Taxiway Alpha are shown on **Figure 3.11.**

[2] Category II and III runway operations refer to category of instrument landing systems (ILS) equipment which support the different categories of approach/landing operations. Category II is the minimum requirement to allow an airport to obtain EASA certification (see Box 3.1 below).

3.3.14 A total of 19 Code E[3] stands would be created to service the air freight operations, with new taxiways to service the stands and connect them to the runway. The total area for the new taxiway and airfreight stands would be approximately 255,000m^2.

3.3.15 The existing passenger apron, which can accommodate three passenger aircraft stands, would be retained. Some rehabilitation or refurbishment may be required in order that it is also made compliant with EASA guidelines. If required, this apron would be extended during construction phase 4 to provide an additional passenger aircraft stand.

3.3.16 The aircraft stands would be constructed using Pavement Quality Concrete (PQC). This is an industry standard form of construction due to its ability to withstand aircraft static loads in order to provide the required durability. Positive drainage, where the drainage has been designed so that all surface water run off flows into the airport drainage network, would be provided on all stand areas. High mast lights would provide the required lighting for operational aircraft stands. It is expected these would vary in height from 15m to 25m depending on Obstacle Limitation Surface (OLS)[4] requirements. OLS requirements in relation to the cargo area are shown on **Figure 3.12.**

3.3.17 It is assumed that all airport stands would incorporate fixed electrical ground power (FEGP) units, and therefore that the requirements for auxiliary power units (APU) would be minimal.

3.3.18 The area where the new stands and taxiways would be constructed, located to the north of the existing runway, currently has a gradient of more than 1.5%. In order to comply with the EASA guidance on airport design (document CS-ADR-DSN) the gradient for longitudinal slopes on taxiways should not exceed 1.5% and on an aircraft stand the maximum slope should not exceed 1% in any direction.

3.3.19 Therefore earthwork operations would be required in order to provide a suitable and compliant building platform for the taxiway, aprons and stands. This work would be completed during construction phase 1. It is estimated that approximately 300,000m^3 of material would be required. At this stage, a cut dispose-import solution is assumed by importing the required engineering fill material. Excavated material from the site would need to be disposed of, most likely off-site, and new engineering fill material imported for the construction. As an alternative the re-use of site won material, for example from the removal of existing taxiways and areas of hardstanding, would be considered where viable. However until an assessment of the suitability of this material is undertaken, it has been assumed that all engineering fill material will be imported.

3.3.20 Existing site contours and proposed contours are shown on **Figure 3.22a** and **Figure 3.22b**, respectively. Cross-sections of the proposed development are shown on **Figure 3.23**.

Air Traffic Control, Navigations Aids, Radar and Lighting

3.3.21 Much of the equipment formerly required to operate the airport has been removed, and many of the existing facilities and buildings would require refurbishment or replacing. Therefore, in order to allow the airport to obtain a CAA aerodrome licence, and to comply with relevant EASA guidance, new equipment and facilities are required.

3.3.22 The existing ATC building, located immediately to the north of the runway, is not in a location that would allow the controllers to safely and easily operate the new configuration of the re-opened airport, and therefore a new ATC facility would be required. A study is currently being completed regarding the provision of an offsite ATC facility. This could result in the removal of the ATC building and its replacement with a series of CCTV cameras which are linked to a remote ATC service. Until this study has been completed and discussions held with the CAA the assumption is that a new ATC building would be required and new equipment installed.

[3] Alphabetic code for defining aircraft size based on wingspan from A (smallest) to F (largest).
[4] The purpose of the OLS is to define the airspace around aerodromes to be maintained free from obstacles. This is comprised of numerous invisible slopes relating to the runway position and elevation.

3.3.23 The current proposal is for a new ATC facility to be located in the north west of the main airport site adjacent to the airfreight cargo stands, from where the controllers will have uninterrupted views of the runway, taxiways, both thresholds, and cargo stands.

3.3.24 The new ATC would have a maximum height of no more than 29m, including aerials, masts and other equipment to be located on the top. The design concept of the ATC will be completed for the DCO application, but currently two alternative options are being considered:

- a building design with a footprint of approximately 15m by 15m, this design incorporates offices and other facilities in the base and lower floors, with the control room located at the top, this would reduce the need for other offices elsewhere on the airport site; and
- a more traditional tower type structure, with the control room located at the top of a tower. This design can incorporate innovative design features that would make the control tower itself a landmark.

3.3.25 Indicative visuals of the ATC Tower are shown on **Figure 3.16c**. These visuals correspond to the second design concept outlined above.

3.3.26 A new radar would be required to replace the previous radar which was sold when the airport closed. The new radar would be installed using the existing radar tower located in the 'Northern Grass' area.

3.3.27 The former approach lights within the airport boundary have been removed so would need to be replaced. Outside the airport boundary the approach lights remain and at this stage it is anticipated that these would not require replacing. For Runway 28, additional approach lights would be required to meet the requirements for CAT II/III operations, but existing lights will be reused where possible.

3.3.28 The existing airfield ground lighting (AGL), located within the runway and taxiway surface would be replaced and additional lights installed on the new taxiways to comply with appropriate requirements.

3.3.29 The proposed lighting scheme is shown on **Figure 3.13.**

Air Freight and Cargo Facilities

3.3.30 The primary focus of the reopened airport would be airfreight, and in order to meet the anticipated demand from the airfreight forecast, new cargo facilities would be required. The layout of the cargo area is shown on **Figure 3.14**.

3.3.31 The cargo facilities, which would be constructed on the new building platform to be created for the taxiways and stands, would be built in phases as detailed in **Table 3.2** below to meet the demand and requirements of the airfreight forecast. The proposed contours for the cargo area are shown on **Figure 3.22c**.

3.3.32 Each cargo facility would have associated Heavy Goods vehicle (HGV) parking, storage and car parking. The new cargo facilities would cover approximately 65,500m^2 in total, with maximum building heights of 15m with a total storage and parking area of approximately 120,000m^2.

3.3.33 External wall finishes can be tailored to suit the end user requirements but a typical construction methodology would be for a steel portal framed building with CFA (Continuous Flight Auger) piled foundations. Wall cladding could be vertically and/or horizontally laid with feature panels to break up the exterior view. Coloured cladding could be used to signify key areas i.e. office units or the division between facilities. Early concept stage visualisations of the cargo facility show an aerofoil shaped building representing a plane's wing. The final facility may follow this or another architectural scheme.

3.3.34 Materials such as Kalzip, a standing seem aluminium roof and wall cladding system, could be used to create the required architectural building envelopes with polycarbonate sheets providing internal natural lighting. External lighting would be through tower lights and wall mounted units typical of

cargo and distribution facilities. Strategic tree planting would provide visual shielding to neighbouring areas.

3.3.35 The existing cargo facilities located in the north east of the site would be retained during Construction Phase 1 and used for airport operational buildings i.e. vehicle storage, as well as equipment, storage, laydown and working areas during Construction Phase 1. These buildings would be demolished during Construction Phase 3 in order to accommodate the new cargo facilities that would be built during this phase.

Passenger Terminal and Parking Facilities

3.3.36 The primary focus of the airport would be on air freight and cargo operations, but as detailed below it is anticipated that there would be passenger services from Year 3 of the airport's operation.

3.3.37 The existing terminal building is in a poor state of repair, and it is therefore considered that a new passenger terminal and other facilities would be required and that the old building would be demolished during Construction Phase 1. The new terminal would be located on the site of the existing terminal, and would be designed with sufficient capacity to meet the demands of the passenger forecast. The indicative design of the new terminal building is shown in **Figure 3.16a**, the design concept and layout of the new facilities will be confirmed for the DCO application and assessed in the ES.

3.3.38 The passenger facilities would use the existing passenger apron, with sufficient space for up to four additional aircraft stands if required. The layout of the passenger area is shown on **Figure 3.15**, and passenger facilities are shown on **Figure 3.18**.

3.3.39 The existing terminal car park, which provides approximately 860 spaces, would be extended to provide parking for an additional 826 vehicles. A long stay car park will also be provided with a further 760 parking spaces. Land is already available adjacent to the existing car park having been set aside for a previous airport masterplan proposal. Some general maintenance and new access/exit barriers would be needed to the existing car park. Parking facilities to the west of the site entrance from the B2050 (Manston Road) would provide staff parking.

3.3.40 The car park would also include new areas for taxi ranks, drop off/pick up, buses and coaches; the number of spaces for these modes of transport will be determined following the completion of the Transport Assessment (see **Chapter 14**). Car parking, public transport infrastructure and cycling facilities are shown on **Figure 3.17.**

Fuel Farm

3.3.41 The airport would require a new fuel farm facility to replace the existing facility, which is located on the 'Northern Grass' area and does not include sufficient storage or other facilities to meet the Proposed Development's needs. The new fuel farm would need to be located airside, i.e. not on the 'Northern Grass' area, for operational reasons in order to allow for the safe and efficient transport and delivery of fuel around the airport site. At present, it is assumed that fuel would be delivered to the airport via road tanker, however alternatives, such as delivery via rail will be investigated as potential longer-term options.

3.3.42 The currently preferred site for the new fuel farm is in the south east of the airport, on the site of the existing Jentex fuel facility. This is currently a separately operated fuel facility, but until the 1960s it was part of the airport site, and was the main fuel farm for the RAF airbase. Whilst the fuel farm would use the existing site, new tanks and other infrastructure would be required to meet the needs of the airport, and to ensure that the facility is adequately designed and fit for purpose. Discussions are taking place with the Environment Agency (EA) on the suitability and design of this site for use as a fuel farm for the airport.

3.3.43 Before the construction of the new facility the existing tanks and infrastructure would be decommissioned, and if required remediation of any contamination undertaken. A number of site investigations have been undertaken at the Jentex site, for more information see **Chapter 10**, and a number of old tanks have already been decommissioned. These site investigations have not

identified any significant contamination at the locations of the former tanks, but further site investigations would be undertaken to inform the detailed design of the fuel farm facility.

3.3.44 The new fuel farm facility will be designed and constructed using best available techniques (BAT), and will incorporate features such as above ground double skinned and bunded fuel tanks.

3.3.45 The new facility would also incorporate suitable protection and other measures to control and mitigate any risks to nearby residential and other property from an incident at the fuel farm. The design of these measures will be discussed and agreed with the Health and Safety Executive.

3.3.46 For ease of access, the facility would have its own access from the highway, and will utilise an existing but improved access from Canterbury Road West. A new airside/landside security facility would 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.

3.3.47 The EA and Southern Water (SW) have been consulted on several occasions throughout the development of the scheme and the principles surrounding the design of the fuel farm agreed. Further design information will be provided within the ES and both the EA and SW will continue to be consulted on the design of the fuel farm facility, and on the scope of any site investigations and remediation that may be required.

Site Access, Highway and Junction Improvements

3.3.48 The roads in the vicinity of the Proposed Development site, including B2050 (Manston Road), B2190 (Spitfire Way) and the Manston Road/Spitfire Way junction, have been identified as requiring improvement; Kent County Council (KCC) Highways Department has in place proposals to improve the public highway in this area as part of its Thanet Transport Strategy. The project will work with KCC to provide improvements, which are likely to include a signalised junction at the Manston Road/Spitfire Way junction, and other improvements to the local road network in the vicinity of the site.

3.3.49 It has been identified that a new airport access for the cargo/aircraft maintenance facility is required and, this is proposed on the B2190 (Spitfire Way) to the west of the existing access (**Figure 3.19**). This will be designed with sufficient capacity for the proposed airport operations and current proposals include a new roundabout to provide access to the airport. The detailed design of this and other highways and junction improvements will be undertaken following the completion of the Transport Assessment and in consultation with KCC Highway Department and Highways England.

3.3.50 A new network of internal roads for the air freight and cargo operations will also be constructed. These would include lorry and car parking areas for the air freight operations. These would allow the internal movement of all vehicles, ground service equipment and staff working in the air freight services, and minimise the number of movements on the public road network. Suitable security, customs and border check point facilities would be constructed at the site access points.

3.3.51 A landscaping zone between the new internal access road and the public highway, and along the boundary with B2190 (Spitfire Way) and B2050 (Manston Road) will be provided. The landscaping scheme will be designed so that is acceptable within the constraints of the aviation environment (see **Figure 3.20**).

3.3.52 An Airport Surface Access Strategy, Staff Travel Plan and Pedestrian and Cycle Access Strategy will be developed as part of the Traffic and Transport assessment (**Chapter 14**); these will identify suitable embedded measures which should be incorporated into the design of the scheme. The new elements to be considered as part of this are likely to include:

- traffic calming on less desirable routes;
- increased and enhanced facilities for taxis, buses and coaches for passengers and staff;
- a network of internal footpaths and cycle paths for staff use;
- upgrade and/or enhancement of existing pedestrian and cycle provisions within the vicinity of the airport site; and

- additional public service bus stops, and public bus service frequency and route changes (to be agreed with the local authority and bus route operators).

Outline Drainage Strategy

3.3.53 The surface water network would include interception, attenuation (winter and summer ponds) and pollution control facilities designed in accordance with industry best practice and agreed with the key stakeholders. Where appropriate this will utilise Sustainable Drainage Systems (SUDS) for the discharge to ground, existing connections to the public drainage system, or permitted discharge to Pegwell Bay. An outline drainage layout is shown in **Figure 3.21**. The outline drainage strategy is discussed further below.

3.3.54 The outline drainage strategy for the site is to provide positive drainage following the site's natural contours, discharging into two adjacent attenuation ponds (see **Figure 3.5** for the layout of the site). Prior to discharging into the ponds, the water would flow through interceptors (existing and new). The first of these ponds would treat contaminated runoff through the use of aerators, before discharging into the second pond. Flow into the 'clean' pond would be limited; the spillway would have a storage capacity of greater than a 1 in 30-year flood event. From the second pond, the clean water would be transported through the existing pumping system to be discharged from site.

3.3.55 Contaminated water is considered to be any runoff from the airfield or vehicle pavements. This includes roads, taxiways, yard areas and airfield aprons (i.e. de-icer and oil susceptible areas). 'Clean' runoff (i.e. from roof areas) may discharge into the second pond directly. During detailed design, it may be considered favourable to combine the clean/contaminated runoff to dilute any contaminants, this will be discussed in more detail with the EA and SW.

3.3.56 From the attenuation ponds clean or treated water would be pumped around the site to be discharged into Pegwell Bay via the existing discharge outfall; this runs from the airport site to a discharge point within the former Ramsgate Hoverport site (**Figure 3.24**). The first part of this system requires the pumping of water, but from the edge of the airport boundary the outfall is positive, i.e. gravity fed flow, following the natural land contours.

3.3.57 A survey of the existing storm drainage pipe has been conducted from the Proposed Development boundary to the Pegwell Bay outfall. The pipe was found to be in good repair and of a size expected to be sufficient to meet the site's discharge requirements.

3.3.58 Should it be the case that the existing pumping system is unable to accommodate the proposed drainage volumes, two options are available. The first is an upgrade to the existing pumping system, the second is an alternative pump system which could follow the eastern site boundary before connecting to the existing outfall into Pegwell Bay. The detailed design of the drainage, including of the pumping system, will be completed following receipt of consent for the Proposed Development, if granted.

3.3.59 Ongoing consultation with the EA and SW is informing the drainage strategy and design. An application for a new discharge consent may be required from the EA, and if so would be applied for following the detailed design of the drainage strategy following DCO consent.

Airport Fire Safety

3.3.60 The airport will require the provision of suitable firefighting facilities in order to meet its operational, safety and regulatory needs. The detailed design will consider the specific regulatory and end user requirements, but the preliminary design has identified the following areas that need to be considered:

- airside fire facilities;
- public firefighting team requirements; and
- internal building fire suppression systems.

Airside Fire Facilities

3.3.61 The airport will require new airside firefighting facilities to meet the increased level of airport operations and activities. The existing fire station, which can accommodate four fire tenders and has associated offices, welfare facilities, and an observation tower, would be replaced and a new facility constructed in the same location. This would need to be larger than the existing facility in order to incorporate the required number and size of fire tenders.

3.3.62 The existing Emergency Water System (EWS) tanks, of which there are two; each with a posted volume of 45,000L, would be reused. An assessment of their condition will be undertaken and if required new tanks installed using best available techniques.

3.3.63 A new fire training facility would be required on the airfield, and would be constructed at the eastern end of the runway. This will be sized according to the required firefighting code for the airfield and include suitable aircraft frames for mock rescues. The fire training ground will be appropriately sized, constructed with a lined (impermeable base) hardstanding and with a perimeter bund. This will incorporate a connection into the surface water drainage and treatment network to ensure the proper disposal of all fire water.

Public Firefighting Team Requirements

3.3.64 As a standard, fire hydrants are required at 90m intervals around the perimeter of large buildings. Unobstructed access is required to these for the use of firefighting teams. Alternative systems such as pond access or EWS tanks can be considered and would need to be sized and located according to perceived fire requirements.

3.3.65 As part of the detailed design process, fire hydrant locations would be provided around the perimeter of the cargo, terminal and hangar buildings. These buildings would also require potable water connections as part of their general use so provision of these hydrants would utilise this supply.

3.3.66 Alternatives such as additional EWS tanks could also be considered. The attenuation ponds may also provide a source of water for fire teams, detailed design of the attenuation ponds could include crash gates and paved or improved ground access routes to the ponds.

Internal Building Fire Suppression Systems

3.3.67 As a minimum, a mains fed sprinkler system would be required in each new cargo facility. Additional or improved facilities may be required depending on end user requirements and the type of operations occurring. These could include, for example, chemical additives to the water supply providing increased fire suppression if a large quantity of plastics are being stored in a facility.

3.3.68 For the proposed new hangar facilities bespoke fire systems may need to be designed and installed. An example of this may be floor mounted sprinklers designed to reach areas beneath aircraft wings and fuselages which may not be reached via ceiling mounted systems.

Other Development

3.3.69 The airport will require new offices, workshops, stores, welfare, and security facilities for staff. The exact requirements for these will be determined as part of the detailed design, but these would be located within or alongside other airport buildings and facilities, for example the air freight and cargo facilities, passenger terminal or ATC tower.

3.3.70 Sufficient staff and visitor parking, including disabled parking, would be provided to meet the relevant design standards. Facilities to encourage staff to cycle to work would also be provided.

3.3.71 The two existing museums on the site, the RAF Manston Museum and the Spitfire and Hurricane Memorial Museum, would remain and an area of land will be safeguarded for these facilities. The design options and siting of these facilities will be determined for the DCO application, but the current proposals reflect previous consultations retaining the museum in the south west corner of the ‘Northern Grass’ area. The proposals are shown illustratively on **Figure 3.4 and 3.5.**

3.3.72 The area north of the B2050 (Manston Road), the 'Northern Grass' area would be utilised for other aviation related purposes such as warehousing, offices and airport related business units, but will have no direct access for aircraft (**Figure 3.25**). The requirements for facilities airside mean that there will be limited available space within the main site for any expansion of aviation related businesses, and any activities that can be located landside would be located here. This may include any of the businesses or tenants located on the existing airport site.

3.3.73 The initial proposals for this area indicate that it could support multiple business units of various sizes and layouts with an approximate total floor space of 119,000m^2. Two new accesses would be provided from B2050 (Manston Road) to the 'Northern Grass' area, and a new internal highway network created. Loading and turning areas for HGVs, sufficient staff and visitor parking, including disabled parking, to meet the relevant design standards, and associated pedestrian and cycle infrastructure will all be provided within the 'Northern Grass' area. A safeguarding zone around the airport radar installation will be retained. The size of this area will be dependent on the type and specifications of the radar.

3.3.74 The airport would continue to provide facilities for aircraft maintenance, repair and overhaul (MRO). The existing MRO facility and hangar, which is located to the south of the terminal building, will be retained for use during the initial years of operation. A new MRO facility, with hangars capable of accommodating the largest types of aircraft (Code F), would be constructed in Construction Phase 2; the old hangar would be demolished at this stage. The MRO facility would be further extended in each of Construction Phases 3 and 4 to provide an additional hangar in each phase.

3.3.75 The current business aviation terminal and hangar, south of the passenger terminal, would be refurnished for use for Fixed Base of Operations (FBO), including for helicopter and heli-charter operations. The facilities for the flight school and training centre would also be retained in their existing location.

Utilities, Services and Use of Resources

3.3.76 In order to support the increased level of activity and development on the site additional services will be required; this is likely to include additional internal electrical substations, communication networks, and foul and potable water connections. A utility strategy is currently being developed in order to determine the requirements of the airport for each phase of operation and construction and will be completed in order to inform the final design of the Proposed Development for the DCO; the detailed design will be finalised following the completion of this strategy.

3.3.77 There is an existing internal electricity network that includes at least four substations. An assessment of the further load requirements is being prepared as part of the utility strategy; an initial assessment indicates that it is unlikely that an increase to the internal or external network will be required.

3.3.78 A new foul drainage network will be required for the new cargo facilities. This is currently being assessed within the utility strategy, which will take into account the removal of the existing foul drainage when the buildings along Spitfire Way are removed. Consultation with SW on the requirements of the Proposed Development have commenced, with meeting and discussion held with SW as part of the consultation and stakeholder engagement. Following the completion of the utility strategy they will be further consulted on the requirements and suggested solutions.

3.3.79 The proposed requirement for potable water is also being assessed in the utility strategy. This is being undertaken in consultation with SW.

3.3.80 A draft Resources Strategy Statement (RSS) was produced and was originally envisaged to be an appendix to the ES. However, given the adoption of the 2017 regulations, the findings of this work will now be reported within the ES itself. The RSS includes measures to manage, control and limit water and energy use, and waste production. The final version of the document adopts best practice and procedures from the aviation and other related sectors, and feed into the final design of the utilities strategy.

Construction Phases

3.3.81 As outlined above in **Table 3.1** construction will take place in four phases (see **Figures 3.27-3.30** for construction phasing plans). The initial phase of construction, following the grant of the DCO, will be the longest with an expected duration of 12 months. This phase will see a number of different construction activities undertaken in order to ensure that the airport is returned to operational use in Year 2. Phases 2 - 4 of the construction process will take place whilst the airfield is operational and will focus on delivering the increased infrastructure and facilities required to meet the demand of the air freight and passenger forecasts.

3.3.82 The phasing of the construction programme has been designed to ensure that the airport has sufficient capacity, in the form of aircraft stands, cargo facilities, access storage and parking areas, and taxiways and aprons to meet the demands of the air traffic forecasts (see **Table 3.7 and Table 3.8** below). The exact timing of construction phases 2 - 4 will be dependent on the growth in demand and take-up of capacity, but they are expected to be within the periods outlined in **Table 3.1** above.

3.3.83 **Table 3.2** below summarises how the construction of key components of the Proposed Development, that are required to meet the demands of the forecasts, will be phased:

Table 3.2 Project Construction Phases – Construction Figures by Phase

	Phase 1	Phase 2	Phase 3	Phase 4	Total
Aircraft Stands	8 (cargo), 3 (passenger)	6 (cargo)	2 (cargo)	3 (cargo), 1 (passenger)	23
Cargo Facilities	12,000m^2	16,000m^2	14,000m^2	23,000m^2	65,500m^2
Access, Storage and Parking	14,000m^2	24,371m^2	26,992m^2	34,766m^2	128,129m^2
Taxiway and Aprons	23,000m^2	64,240m^2	89,854m^2	78,346m^2	297,440m^2

3.3.84 The description of the activities to be undertaken during each construction phase, and the likely construction techniques, are indicative of the types of approach suitable for the infrastructure proposed. The information provided here is preliminary, detailed descriptions of these activities will be included within the final ES.

Construction Phase 1

3.3.85 To ensure that Manston Airport has the required infrastructure and facilities for airport operations to resume in Year 2, the majority of the construction for the redevelopment of the airport will be undertaken during Construction Phase 1. Therefore during this period the airport would not be operational, allowing the works to rehabilitate the runway, to install the new navigational aids and safety equipment, as well as the earthworks and taxiway construction, to be completed.

3.3.86 A summary of all of the construction activities, and of their general programming across Construction Phase 1 is provided below:

- site set-up and establishment;
- new site access and internal access roads;
- construction of surface water drainage system, including construction of attenuation ponds;

- installation of new and/or upgrade to existing site services and utilities;
- earthworks to create building platform;
- runway Rehabilitation (asphalt paving);
- construction of new taxiways, aprons and cargo stands (concrete paving);
- highway Improvements (Spitfire Way/Manston Road junction);
- construction of new air freight and cargo facilities;
- construction of new terminal building and car parking facilities;
- construction, refurbishment and/or relocation of existing business aviation, flight school and training, and helicopter/heli-charter services;
- construction/installation of new ATC, approach lights, airfield ground lighting, navigational aids and radar;
- construction of new Rescue and Fire Fighting Service facilities, and fire training ground; and
- landscaping along the boundary with B2190 (Spitfire Way) and B2050 (Manston Road).

3.3.87 A summary description of the construction methodology and techniques for the main construction activities to be undertaken during phase 1 is provided below. These methodologies are based on the preliminary information that is available to date, and where appropriate on worst-case assumptions on techniques and methodologies to be employed.

Earthworks

3.3.88 It is estimated that approximately 300,000m^3 of suitable construction material will be required to provide the EASA compliant building platform for the taxiway, aprons and stands. To minimise any construction waste a balancing of the cut and fill operations could be undertaken to reuse as much excavated material as possible, including utilising any lower lying areas on the 'Northern Grass' area for disposal.

3.3.89 At this stage, there is insufficient information to determine the existing earthwork materials suitability as an engineering fill material for use underneath the aircraft pavements. However, information from the construction of the East Kent Access Road indicates that the material could be suitable.

3.3.90 A complete soils investigation leading to a detailed earthworks strategy will precede any permanent earthworks operation. For the purposes of the PEIR, a worst-case scenario has been assumed, whereby no re-use is possible or appropriate, and all material required is imported.

3.3.91 The existing taxiways, aprons, stands and other areas of hardstanding that are not required would also be removed as part of these operations. It is proposed that much of this material can be broken up and recycled for use as the sub-base and base for the new taxiways, aprons and stands. Additional material could also be obtained from other on-site demolition materials. However an assessment of the engineering suitability of any materials would need to be carried out prior to re-use.

3.3.92 In areas where the existing ground levels are suitable the turf and topsoil will be stripped and stockpiled to allow excavation in preparation for pavement foundation works. Once removed the sub-soil would be excavated to a depth of 500mm in the works area to allow for the construction of the sub-base and base.

3.3.93 Where ground level reduction is required, this would be undertaken following the removal of the turf and topsoil by earth moving machinery, which includes tracked dozers/shovels, articulated dump trucks and blade levelling vehicles. Excavated material would be stockpiled for re-use on the airport site.

3.3.94 Where the ground level is to be raised this would also be undertaken following the removal of the turf and topsoil. Suitable grade and quality construction material would be used to raise the level, earth moving machinery which includes tracked dozers/shovels and articulated dump trucks would be used. The material would be compacted using compaction rollers to provide the finished platform for the pavement construction.

3.3.95 Existing site contours and proposed contours are shown on **Figure 3.22a** and **Figure 3.22b**, respectively. Cross-sections of the proposed development are shown on **Figure 3.23**.

Concrete Pavement

3.3.96 The paving for the new taxiway, aprons and stands will be constructed out of Pavement Quality Concrete (PQC). It is expected that a concrete batching plant would be set up in the site working area, and the materials and equipment needed stored in the site compound, and laydown area. The batching plant would incorporate a silo for the storage of cement which would have a maximum height of 20m.

3.3.97 The pavement would be completed in stages and will follow a sequential format. The initial stage will be a crushed stone load transfer layer, topped with a waterproof membrane to prevent water ingress to pavement construction.

3.3.98 The second stage would be to place a lean/semi dry concrete layer to absorb load transfer from the pavement to the load transfer layer. This would be followed by the installation of shutters to permit the laying of high strength concrete in sequential 6m bays. The bay layout is required to provide pavement flexibility under load and protect against thermal impact damage.

3.3.99 Once the shutters are placed, a high strength concrete layer approximately 300mm thick would be placed. The installation will be completed in 6m wide sections at a time. During the concrete placement, drainage channels will be placed to connect to the airport surface water drainage network.

Asphalt Pavement

3.3.100 Although the existing runway appears to be in good condition it will likely require rehabilitation in order to improve the pavement structure. The proposed technique will be the application of an asphalt overlay on top of the existing runway. The overlay will be applied across the entire runway width (45m) plus shoulders (2m x 7.5m).

3.3.101 An asphalt batching plant would be established in the site working area, and the materials and equipment needed stored in the site compound and laydown area. The process for the asphalt paving involves the construction of layers of asphalt using asphalt paver and planer truck, and the compaction of the asphalt using rollers to the desired thickness.

3.3.102 The asphalt batching plant and equipment will also be used to provide the materials for the highway improvements, internal road and lorry and car parking areas.

Building Construction and Foundations

3.3.103 The construction of the new air freight and cargo facilities, ATC tower, firefighting facilities and passenger terminal would all be undertaken during phase 1. The construction techniques and materials will vary according to the different needs and detailed design of these facilities. For example, the air freight and cargo facilities are likely to be steel portal framed buildings with wall cladding. The equipment to be used during these activities would include mobile cranes and extended working platforms.

3.3.104 The design and construction of the foundations needed for the buildings has not been determined at this stage, and the nature of the foundation design can only be confirmed once the geotechnical investigations, to be undertaken following the granting of the DCO as part of Construction Phase 1, are complete. For the purpose of the assessment it has been assumed that the foundations will be CFA (Continuous Flight Auger) piled foundations and therefore that a piling rig and associated

equipment will be required; this represents a worst case solution in terms of potential effects to ground and surface water receptors (see **Chapter 8** and **Chapter 10**).

Construction Phase 2

3.3.105 The airport would be operational for Construction Phase 2, which will constrain subsequent construction activities during this and other phases. Therefore in order to minimise disruption to airport operations, the construction activities that require the closing of the runway will be undertaken during Construction Phase 1, with activities during this and subsequent phases limited to those that can be carried out with minimal disruption to airport operations.

3.3.106 As detailed in **Table 3.2** the main infrastructure to be constructed during this phase would be the cargo aircraft stands, taxiways, aprons and associated cargo facilities, access, storage and parking areas.

3.3.107 In addition during this phase a new aircraft maintenance hangar, to accommodate the largest types of aircraft (Code F), would be constructed and the existing MRO hangar and facilities demolished.

3.3.108 The construction techniques for the concrete pavement and building construction during phase 2 would be the same as those during phase 1.

Construction Phase 3

3.3.109 As detailed in **Table 3.2** the main infrastructure to be constructed during this phase will be the cargo aircraft stands, taxiways, aprons and associated cargo facilities, access, storage and parking areas. To provide these facilities the existing cargo buildings adjacent to Spitfire Way would be demolished. The internal access road would be constructed in its permanent alignment.

3.3.110 An additional aircraft maintenance hangar would also be provided alongside the MRO facility. The second attenuation pond for the water treatment system, would be constructed during Phase 3.

3.3.111 The construction techniques for the concrete pavement and building construction during phase 3 would be the same as those during phase 1.

Construction Phase 4

3.3.112 As detailed in **Table 3.2** the main infrastructure to be constructed during this phase would be the cargo aircraft stands, taxiways, aprons and associated cargo facilities, access, storage and parking areas.

3.3.113 An additional aircraft passenger stand would be constructed next to the existing passenger apron. A further maintenance hangar would also be provided alongside the existing MRO facility.

3.3.114 The construction techniques for the concrete pavement and building construction during phase 4 would be the same as those during phase 1.

Construction Compound, Equipment and Hours of Operation

3.3.115 Compound areas will comprise offices, welfare facilities, vehicle parking and material storage areas, which will be located within the airport boundary. During Construction Phase 1 a construction compound, storage and working area would be established on an area of existing concrete hardstanding, near to the new access on B2190 (Spitfire Way). The existing airport hangars and buildings located in this area would be utilised for storage and office space in order to reduce the need for any temporary site cabins or facilities. The batching plants to be used during Construction Phase 1 would also be established in this area. Phase 1 construction operations are shown on **Figure 3.31**.

3.3.116 For subsequent construction phases (2 - 4), which will require a much smaller compound area, a site compound is proposed in the south east of the site, as shown in **Figure 3.31**.

3.3.117 Batching plants are expected to be utilised during Construction Phase 1 with the rehabilitation of the runway requiring asphalt material and the new apron stands/taxiways requiring concrete. A batching plant incorporates vertical silos for the storage of cement and bitumen. The maximum height of these silos would be 20m.

3.3.118 During Construction Phase 1 the working hours would be Monday to Friday 07:30 to 17:30, and Saturday 07:30 to 13.00. There would be no planned working on Sundays or Bank Holidays. During Construction Phases 2 - 4, when the airport would also be operational, construction may need to take place outside of these hours including at night. If required all activities undertaken during the night time will be analysed as part of the development of the Construction Environmental Management Plan (CEMP), and where possible noise reduction measures would be implemented to prevent noise and other nuisance.

3.3.119 The manpower on-site during Construction Phase 1 is anticipated to average 230, with a maximum of 630 forecast during the peak construction period.

3.3.120 To undertake the tasks required in Construction Phase 1 specialised construction plant and equipment will be required; the non-road mobile machinery (NRMM) and equipment likely to be utilised during Construction Phase 1 is set out in **Table 3.3** below:

Table 3.3 NRMM and Equipment by Construction Activity

Activity	Machinery Type	Number
Earthworks	Excavators	6
	Dump trucks	6
	Compaction equipment	4
Concrete Paving	Batching plant and loading shovel for aggregates	1
	Slipform paver and excavator/spreader	1
	Delivery trucks	4
Asphalt Paving	Batching plant and loading shovel for aggregates	1
	Planner and trucks	2
	Asphalt pavers	2
	Compaction rollers	3
Building Construction	Mobile crane	2
	Mobile extended working platform	2
	Pilling rigs (if required)	2

Other	Earth dump trucks	6
	360 tracked excavators	6
	Forklifts/Telescopic forklift/Telescopic man-lift	6
	Pumps	5
	Generator	5
	Pick-up trucks	10
	Small vans	10
	Road sweepers	2
	Skip trucks and skips	6

Construction Traffic Management and Logistics

3.3.121 A construction traffic management plan will be prepared the implementation of which will reduce construction traffic, designated HGV delivery routes to the strategic road network and limit hours of delivery to minimise nuisance and disruption to local communities. This will be included as part of the CEMP, a draft of which forms part of the PEIR at **Appendix 3.2** and an updated draft of which will form part of the suite of DCO application documents.

3.3.122 Access to the site for all construction vehicles will be from the new site access to be constructed on the B2190 (Spitfire Way), see **Figure 3.27**. From the wider strategic highway network (the A2/M2) construction vehicles will use the A299 (Thanet Way) (junction 7 of the M2), B2190 (Minster Road) (Minster Roundabout), and the B2190 (Spitfire Way).

3.3.123 Traffic signs would be installed in order to inform local road users of the construction access points and presence of HGVs.

3.3.124 It is estimated that construction traffic movements (with each movement being one arrival or departure to/from site) associated with earth moving operations during Construction Phase 1, would total 120 movements/day with 15,074 movements required for the earthworks during Construction Phase 1. Other construction traffic flow during Construction Phase 1 is estimated at 100 movements per day.

3.3.125 The exact number of construction traffic movements during Construction Phases 2 - 4 is unknown at this stage, but there will be no major earthwork operations during these phases. Therefore, based on these proposals it has been assumed as a worst-case scenario there will be 100 construction traffic movements per day during Construction Phases 2 - 4, more detail on these movements will be assessed within the ES.

3.3.126 The timings of deliveries to site would be managed to avoid arrivals and departures during peak morning and evening traffic periods.

3.3.127 As currently proposed the works will require no abnormal traffic loads. There would be a number of wide loads, for which appropriate wide load delivery and management plans will be incorporated

into the construction traffic management plan. Wide loads are likely to be required for the following equipment in particular:

- concrete batcher, four wide loads required;
- asphalt batcher, six wide loads required; and
- piling rig, two wide loads required per rig.

3.3.128 The earthmoving equipment and site cabins will travel to site on normal HGV loads not requiring any special arrangements.

3.3.129 A travel plan, which will be included as part of the CEMP, will be put in place which will set out how construction workers travel to site, including the use of sustainable transport modes.

Construction Materials and Waste

3.3.130 The bulk of the imported material will be hardstone for asphalt and pavement quality concrete, plus sands and gravels for use in the lower layers in the aircraft pavements and drainage.

3.3.131 The likely route for the delivery of the hardstone would be by road from the railhead at Sevington near Ashford or from Whitstable or Ridham. The sands and gravels could be from the same source or from a new processing plant at Ramsgate. There are other opportunities via Dover and The Isle of Grain. The source and travel route for the construction materials will be confirmed for the ES.

3.3.132 Approximate quantities of the main materials required for the construction of the Proposed Development during Construction Phase 1 are given in **Table 3.4** below.

Table 3.4 Construction Materials

Material	Quantity
Aggregates for pavement construction	400,000 tonnes
Fill for earthworks	300,000m^3
Ready mixed concrete	10,000m^3
Asphalt	75,000 tonnes
Building construction	12,000 tonnes
Miscellaneous	10,000 tonnes

3.3.133 Earthworks construction waste could be minimised by balancing the cut and fill operations for the new aircraft cargo stands and warehousing plus utilising any low areas on the grassed area including the Northern Grass area for disposal. At this stage there is not sufficient information to determine the existing earthwork materials' suitability as an engineering fill material underneath the aircraft pavements.

3.3.134 A complete geotechnical site investigation, leading to a detailed earthworks strategy, will precede any permanent earthworks operation.

3.3.135 Demolition arisings, where possible, will be recycled for use on site. This includes the material from the existing taxiways, aprons and stands that will be replaced, as well as any material from the

Second World War runway pavement which is no longer needed (see paragraph 3.2.10). If suitable, this material could provide the bulk of the subbase and base for the new stands and taxiway and reduce the volume of required materials and the number of construction related vehicle movements.

3.3.136 Wrapping and packing will be returned to the supplier.

Construction Environmental Management Plan

3.3.137 Each topic chapter identifies a number of embedded environmental measures that have been incorporated into the design of the construction of the Proposed Development in order to mitigate any potentially significant environment effects. In order to manage and minimise environmental effects from construction a CEMP will be produced; this is a key document that sets out the measures and how they would be delivered. This provides an overview of the standard construction management measures that would be implemented as part of the Proposed Development and incorporates the embedded environmental measures that form part of the proposals.

3.3.138 The CEMP aims to ensure that construction activities for the Proposed Development are carried out in accordance with legislation and best practice for minimising the effects of construction on the environment and local communities.

3.3.139 The objectives of the CEMP are to:

- provide a mechanism for delivering many of the embedded environmental measures described in the ES;
- ensure compliance with legislation through consultation with, and by obtaining necessary consents and licences from, statutory bodies;
- provide a framework for compliance auditing and inspection to ensure the agreed environmental aims are being met;
- ensure environmental best practices are adopted throughout the construction stage;
- ensure a prompt response should any unforeseen unacceptable adverse effects be identified during the works; and
- provide a framework for mitigating unforeseen or unidentified effects, should they occur.

3.3.140 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.

3.3.141 The CEMP will also include a communication strategy to manage public liaison, notification of construction items of note and the management of and responses to complaints.

3.3.142 Contractors selected for tender will be encouraged to be a member of the Considerate Constructors Scheme whereby membership evidences community awareness, competent management, efficiency, awareness of environmental issues and actively demonstrates neighbourliness.

Intrusive Investigations

3.3.143 During Construction Phase 1 any further surveys, investigations or other intrusive works that may be required in order to inform the detailed design of the airport, or to mitigate any potentially significant environmental effects, would be undertaken. These would be programmed to take place alongside, and if required in advance of, the construction activities.

3.3.144 The requirement for, and potential scope of, any surveys or investigations is discussed in more detail in the relevant chapters of this PEIR. But those works that are likely to be required are outlined below:

- Utilities and Services Survey;
- Geotechnical Site Investigations;
- Groundwater Investigations and Monitoring;
- Land Quality Phase 2 Intrusive Investigation;
- Contaminated Land Remediation; and
- Archaeological Mitigations.

Operational Phase

3.3.145 As outlined above, the programme for the Proposed Development will see the full reopening of the airport in Year 2, with passenger services expected to follow in Year 3. There would be some operational activities undertaken in Year 1, for example the development of the airport's operational and management procedures (see below), and the recruitment and training of direct airport staff. However for the purpose of the PEIR assessment it has been assumed that the operation of the Proposed Development will commence in airport Year 2.

3.3.146 The information for the operational phases of the Proposed Development, including the air traffic forecasting, has been prepared for RiverOak Strategic Partners Limited (RiverOak) by aviation consultants, Azimuth Associates[5] and Northpoint Aviation[6], and is presented in Manston Airport: A National and Regional Aviation Asset Volume III (Azimuth Associates 2017). The information, as relevant to the operational phase of the development and the assessment for the PEIR, is summarised below in the following sections:

- Airspace Routes Operational Procedures;
- Fleet Mix and Aircraft Types;
- Air Freight Forecast;
- Passenger Forecast;
- Other Airport and Aviation Related Services;
- Airport Hours of Operation and Staffing; and
- Airport Operational and Management Procedures.

3.3.147 RiverOak has produced a business plan for the Proposed Development which includes an air traffic forecast on a yearly basis, Manston Airport: A National and Regional Aviation Asset Volume III (Azimuth Associates 2017). The business plan and forecast have been produced through a combination of qualitative and quantitative assessment.

Airspace Route and Operating Procedures

3.3.148 In addition to obtaining approval for development consent under the Planning Act 2008, the Proposed Development will also require approval for the new airspace and operating procedures from the CAA. This approval is obtained via submission of an Airspace Change Proposal in accordance with Regulations laid down in CAA Publication 725. Preliminary discussions on this and other related topics have been held between RiverOak, the project team and the CAA.

[5] http://azimuthassociates.co.uk/
[6] http://aviation.wpengine.com/

3.3.149 It will be the Airspace Change Process that ultimately provides permission for the detailed operating procedures and airspace required by the airport and not the DCO. Following discussions with the CAA, it is anticipated that the airspace change application will be submitted as soon as the DCO has been accepted. In this way the consenting regimes will remain complimentary and duplication of effort for both RiverOak and the respective Regulators will be minimised.

Box 3.1 Civil Aviation Authority (CAA) and European Aviation Safety Agency (EASA)

The CAA is the statutory corporation which oversees and regulates, either directly or indirectly, all aspects of civil aviation in the United Kingdom; it is a public corporation of the Department for Transport. Any airport in the UK which is used for commercial passenger flights, public transport flights and/or flying training in aircraft above a specified weight, is required to obtain, from the CAA, an Aerodrome Licence. The EASA is an agency of the European Union (EU) with regulatory and executive tasks in the area of civilian aviation safety. Representatives from the member states national aviation authorities, such as the CAA, sit on the EASA's advisory bodies. From 31 December 2017 aerodromes in the UK which are open to public use and which serve commercial air transport, where operations using instrument approach or departure procedures are provided, and which have a paved runway of 800m or above, or exclusively serve helicopters, are required to comply with EASA regulations and obtain an EASA Certificate to replace their CAA Aerodrome Licence. Until the arrangements for the UKs exit from the EU are finalised, the standards and requirements of the EASA will continue to apply to airports and the aviation sector within the UK.

3.3.150 The final decision on exactly where aircraft will be routed will be decided as part of the CAAs Airspace Change Process. A number of factors will influence this decision including, but not limited to, flight testing, connectivity to the wider air traffic network and route development together with a further round of environmental assessment and public consultation. This does not mean that the assessment made in the ES, or even within this PEIR, are not however, sufficiently robust. What it does mean is that in order that an assessment of the operational effects of the Proposed Development can be undertaken as part of the PEIR (and later the ES) a set of expected flight routes and procedures have been prepared for the project. These provide a 'route envelope' which represent a worst case scenario for the operational airspace effects of the Proposed Development; the final refined design, which will likely result in an improved environmental situation, will then be agreed with the CAA through the Airspace Change Process. This approach of developing initial 'route envelopes' which allow public engagement to inform subsequent detailed route design and refinement is entirely in line with best practice and will be reflected in the CAAs revised airspace change process due for introduction in late 2017.

Flight Timings

3.3.151 Normal operating hours, or 'daytime', for scheduled passenger flights will be defined as 07.00 to 23.00. Passenger flights will not be scheduled outside of these operating hours with limited exceptions during a shoulder period from 06.00 to 07.00. Passenger flights during the shoulder period will be restricted by quota count which will be set following public consultation on the draft Noise Mitigation Plan.

3.3.152 Air freight operations will be predominantly during the daytime, 06.00 to 23.00, in accordance with operations at other similar air freight airports. There may be a requirement for night-time flights, the details of which will be determined as part of the on-going project design, taking account of feedback from the Statutory Consultation, and presented with the DCO and assessed within the ES. Freight night flights (between 2300 and 0600) will be restricted by quota count which will be set following public consultation on the draft Noise Mitigation Plan.

3.3.153 There will be a restriction on the noisiest aircraft operating at night with no aircraft with QC 8 or 16 being allowed to take off or land during the night (see draft Noise Mitigation Plan).

Aircraft Taxi Routes, Hold Points and Engine Ground Running Locations

3.3.155 The detailed design of the aircraft taxi routes, hold points and engine ground running locations will be such as to minimise taxi and hold times to ensure that departing aircraft move swiftly from parking stand to runway threshold for take-off and similarly arriving aircraft upon landing move quickly to the parking stand. These will be determined as part of the on-going design and presented, and assessed, within the ES.

Airside Ground Support Equipment

3.3.156 The airport will require the following airside ground support equipment (GSE), as listed in **Table 3.5**, as part of general airfield operations, the air freight and passenger operations. The numbers provided are worst case numbers based on the year 20 forecast traffic. Where practicable, electric and hybrid vehicles will be deployed and charging points installed. Aircraft power will be from fixed installations with diesel units only deployed on remote stands. Fuel tankers are included but there is the prospect that a hydrant system could be installed which would significantly reduce the need for these.

Table 3.5 Airside GSE

Activity	GSE Type	Number
Airfield General	4x4 (large)	10
	Sweepers	2
	Sicards	6
	Tractors (4x4)	4
	Mini-buses	5
	Flatbed truck	2
	Towable Av Gas bowsers	2
Firefighting	Major fire appliances	4
Passenger Operations	Unpowered stairs	6
	Powered stairs	2
	Small tugs	4

	Baggage trolleys	16
	Pushback tugs	2
	Aircraft de-icer	1
	Potable water vehicle	1
	Toilet vehicle	1
	Fuel tankers	2
Freight Operations	Small tugs	24
	Pallet dollies	240
	Diesel Ground Power Units (GPU)	6
	Powered stairs	20
	Unpowered stairs	6
	Fuel tankers (powered)	10
	Fuel tankers (towable)	10
	Aircraft de-icer	10
	Toilet vehicle	4
	Potable water	4
	Forklift trucks	35
	Pushback tugs	6
	High loaders	10

Fleet Mix and Aircraft Types

3.3.218 In preparing the Manston Airport business plan and aircraft forecasts, consideration has been given to the types of aircraft, both air freight and passenger, that are predicted to operate at the airport. This is based on information obtained from existing operations at other similar airports, information

from interviews with industry, publicly available information on the aircraft used by airline operators, and from the records from the previous operations at Manston Airport prior to its closure.

3.3.219 A list of the different aircraft types, including their International Air Transport Association (IATA) Code, the International Civil Aviation Organization (ICAO) aircraft approach category (a measure of the speed at which an aircraft approaches a runway for landing, but which is also used to classify airport infrastructure), and maximum landing weight (in metric tons), that are expected to operate at Manston Airport, and used in the forecasting, are presented below.

Table 3.6 Manston Airport Aircraft Types

Aircraft Type	IATA Code	ICAO Aircraft Approach Category	Maximum Landing Weight [metric tons]
Airbus A320-100[14]	320	C	66
Airbus A330-200[10]	332	E	180
Airbus A319 neo	319	C	64
Airbus A320 neo	320	C	67
Airbus A319	319	C	63
Boeing 787-8	788	E	172
Boeing 787-9	789	E	193
Boeing 747-800	748	E	306
Boeing 747-400	744	E	296
Boeing 757-200	752	D	90
Boeing 757-300	753	D	102
Boeing 737 MAX 8	7M9	C	74
Boeing 737 MAX 8	7M8	C	69
Boeing 737-800	73H	C	65
Boeing 737-900	73Y	C	66
Boeing 767-300ER	76V	D	136

Boeing 767-400ER	76Y	D	159
Boeing 777F	77X	E	261
Antonov An-124-100M	A4F	E	330
ATR 72-600	AT7	C	22
Boeing C-17 Globemaster III	C17	D	203
Ilyushin IL-86	IL7	D	175
Lockheed Hercules	LOH	D	70
Fokker 70	F70	C	37

Table 3.7 International Civil Aviation Organization (ICAO) aircraft approach speed category

Aircraft category	VAT	Range of speeds for initial approach (and reversal and racetrack procedures)	Range of final approach speeds	Maximum speeds for circling	Maximum speeds for intermediate missed approach	Maximum speeds for final missed approach
A	<91	90 - 150 (110*)	70 - 110	100	100	110
B	91 - 120	120 - 180 (140*)	85 - 130	135	130	150
C	121 - 140	160 - 240	115 - 160	180	160	240
D	141 - 165	185 - 250	130 - 185	205	185	265
E	166 - 210	185 - 250	155 - 230	240	230	275

VAT —Speed at threshold based on 1.3 times stall speed in the landing configuration at maximum certificated landing mass. '*' Maximum speed for reversal and racetrack procedures.

3.3.220 Manston Airport facilitates air traffic which is unscheduled, emergency or for other purposes. However the frequency of these flights is unknown and is considered unlikely to be more than a very small number of occasions per year, therefore they are very unlikely to contribute to the environmental impacts arising.

3.3.221 In order to mitigate the impact from the largest and noisiest types of aircraft, a restriction on certain types of aircraft using Manston Airport, except in emergency or other exceptional circumstances, would be implemented.

3.3.222 In line with standard air traffic forecasting practice, consideration has also been given in the forecast to changes in fleet mix over time. As new makes and models of aircraft become available the older aircraft will gradually be phased out of use and be replaced by new aircraft. Therefore the forecasts include an allowance to replace older aircraft with available new types.

Air Freight Forecast

3.3.223 The primary focus for the Proposed Development will be air freight operations, which are planned to resume in Year 2, spring 2020.

3.3.224 The principal types of markets and goods that Manston Airport is likely to service are:

- global import and export for parcels and packages;
- Africa particularly for the import of flowers, fruit and vegetables;
- China for the import of consumer goods and export of luxury items (included under niche freight operations, however, given the lack of firm evidence the forecast is extremely conservative);
- Middle East particularly for export markets including fish and shellfish;
- Pakistan including the import of clothing and the export of consumer goods;
- Russia for gas and oil equipment and the export of luxury items;
- South America for the import of perishable fresh produce; and
- US for a range of import and exports.

3.3.225 The primary focus of the Proposed Development will be to operate as a freight-focused airport to meet the specific need for additional capacity for air freight in the south east of England.

3.3.226 It has been forecast that a reopened and developed Manston Airport, with a focus on airfreight and cargo, could capture in the region of 300,000 – 350,000 tonnes of airfreight by 2040 and provide part of the solution to the problem of a shortfall in aviation capacity in the UK (Manston Airport: A National and Regional Aviation Asset Volume III p11-12 (Azimuth Associates 2017)). This would be from a combination of business returning to Manston Airport, the capture of market share from other airports (either because of better facilities at Manston Airport, shorter haulage distances from airports outside the UK or pressure for slots at these other airports) and from general market growth.

3.3.227 The air freight forecast has been produced using the following assumptions/calculations, see **Appendix 3.1: Glossary of Abbreviations and Airport Terms**:

- dedicated freight airlines (US) – 80% import / 20% export;
- dedicated freight airlines (Africa) – 100% import with a 5% backload from Year 3, rising to 10% in Years 5 and 6, with an additional 5% increase added every two years up to Year 20;
- airfreight integrator movements – 100% outbound with a backload (import) calculation of 20% included in Years 2 and 3, rising by an additional 5% every two years;
- airfreight integrator feeders – 100% inbound (import) traffic with 10% backload possibility added to Year 5, 15% to Year 9, and 20% thereafter;
- fresh fish and spider crabs – 100% export with a backload potential of 5% from Year 3 with an additional 5% added every two years thereafter;
- Middle East airlines – both import and export with backload possibilities;
- live animal operations – both in and outbound to show return journeys for most animals;
- Pakistani airlines – export from Manston with backloads starting at 10% rising slowly to 30%;

- Postal Services – export with a possibility of small backloads starting at 5% and rising gradually to 20%;
- Russian airlines – all export from Manston with strong backload possibilities starting at 50%, rising to 70%;
- niche freight operations – generally imports with backload potential commencing at 10% rising to 30% over time;
- military movements – outbound only; and
- humanitarian and medevac – outbound only.

3.3.228 A summary of the airfreight forecast, by year, for Manston Airport is shown in **Table 3.8** below. This shows air freight movements by aircraft class, the total air freight air traffic movements, total air freight volume in tonnes, and total air freight heavy goods vehicle movements.

Table 3.8 Manston Airport Air Freight Forecast

Year of Operation	Air Freight Class C ATM	Air Freight Class D ATM	Air Freight Class E ATM	Total Air Freight ATM	Total Air Freight Volume (tonnes)	Total Air Freight HGV Movements
1	0	0	0	0	0	0
2	1,882	1,974	1,396	5,252	96,553	9,903
3	2,194	2,052	1,558	5,804	108,554	11,427
4	3,650	4,314	1,736	9,700	167,091	18,064
5	3,754	4,314	1,868	9,936	173,741	19,305
6	3,858	4,392	1,894	10,144	181,436	20,736
7	4,482	4,470	1,920	10,872	192,908	22,695
8	4,690	4,548	1,946	11,184	200,673	24,324
9	4,898	4,548	1,946	11,392	216,765	27,096
10	5,002	4,626	1,972	11,600	212,351	27,400
11	5,202	4,811	2,051	12,064	222,377	29,650
12	5,410	5,003	2,133	12,547	234,508	32,346
13	5,627	5,204	2,218	13,048	244,690	34,956
14	5,852	5,412	2,307	13,570	256,989	38,072

15	6,086	5,628	2,399	14,113	270,579	41,628
16	6,329	5,853	2,495	14,678	283,904	45,425
17	6,582	6,088	2,595	15,265	296,594	49,432
18	6,846	6,331	2,699	15,875	312,344	54,321
19	7,119	6,584	2,807	16,510	324,838	59,061
20	7,404	6,848	2,918	17,170	340,758	64,906

3.3.229 In developing the forecast for the air freight HGV movements an assumed load of ten tonnes per HGV has been used for the initial period of the forecast. For later years this is reduced to five tonnes to allow for unladen arrivals and departures; however these are considered a worst case as in reality a percentage of the cargo will be tail to tail (arriving on one aircraft and departing on another).

Passenger Forecast

3.3.230 Although the primary focus of the Proposed Development will be to operate as a freight-focused airport, it is anticipated that in addition complementary passenger services would also be developed to provide an additional revenue stream to the airport, and also to provide a service to people in East Kent and Thanet.

3.3.231 A passenger forecast has been prepared as part of the business plan, Manston Airport: A National and Regional Aviation Asset Volume III p14 (Azimuth Associates 2017). As outlined above, passenger flights are forecast to start in airport Year 3, currently predicted to be Spring 2021.

3.3.232 The passenger forecast has been produced using market intelligence for the short to medium term forecasts, with a 4% increase year-on-year from airport Years 11 to 20. The forecast is based on the following assumptions:

- scheduled carrier operating a twice-daily shuttle service to a major hub Years 3 to 20;
- a low cost carrier basing two aircraft at Manston Airport Years 3 to 5 with 3,276 ATM, and three aircraft Years 6 to 10 with 4,914 ATM, and an annual increase to the ATM of 4% thereafter;
- charter flights operating a number of services equivalent to 200 ATM Year 3, 240 ATM Year 4, 280 ATM Years 5 -10, and an annual increase of 4% thereafter; and
- cruise ship flights for 26 weeks of the year with 1 flight (2 movements) per week Years 4 to 6, and 2 flights (4 movements) per week Years 7 to 10, and an annual increase 4% thereafter.

3.3.233 A summary of the passenger forecast, by year, for Manston Airport is shown in **Table 3.9** below. This shows the passenger ATM by aircraft class, the total passenger ATMs per year, and the total passenger numbers.

Table 3.9 Manston Airport Passenger Forecast

Year of Operation	Passenger Class C ATM	Passenger Class D ATM	Total Passenger Flight ATM	Total Passenger Numbers

1	0	0	0	0
2	0	0	0	0
3	4,932	0	4,932	662,769
4	4,972	52	5,024	679,868
5	5,012	52	5,064	686,672
6	6,650	52	6,702	695,295
7	6,650	104	6,754	975,591
8	6,650	104	6,754	975,591
9	6,650	104	6,754	975,591
10	6,650	104	6,754	975,591
11	6,858	108	6,966	1,011,587
12	7,074	112	7,186	1,049,022
13	7,299	117	7,416	1,087,954
14	7,532	122	7,654	1,128,44
15	7,775	127	7,902	1,170,553
16	8,028	132	8,160	1,214,347
17	8,291	137	8,428	1,259,892
18	8,564	142	8,707	1,307,259
19	8,849	148	8,997	1,356,521
20	9,144	154	9,298	1,407,753

3.3.234 Based on market intelligence, research from other airports, and historic information from previous operations at Manston Airport the assumptions have been made for the mode of transport for passengers and their UK origins/destinations.

3.3.235 Initially the passenger mode of transport is predicted to be 3% bus (including shuttle bus from Ramsgate mainline train station), 7% taxi, 45% car (parking on site) and 45% car (drop off/pick up). Through travel plan measures the airport would aim to increase the percentage of travel by sustainable modes for the later years of the forecast.

3.3.236 The UK origin/destination for the airport passengers is initially forecast to be from the local area. As the airport and passenger services mature and develop this is expected to change so that the percentage of airport passengers from Mid, North and West Kent, and from London is increased; but the core catchment area is expected to remain East Kent.

Other Airport and Aviation Related Services

3.3.237 In addition to the core business of air freight, and the complementary passenger services, Manston Airport would also serve as a base for a number of other airport and aviation related services. These are outlined in the following section, although full details of all of these services are not yet available; more details will be provided as part of the DCO application.

3.3.238 Fixed Base of Operations – the airport would provide a base for business aviation and executive travel, including for helicopter and heli-charter flights.

3.3.239 Flight School – it is anticipated that the existing flight school and training facilities, which are operated by TG Aviation, would be retained at the airport.

3.3.240 Maintenance, Repair and Overhaul – a number of businesses including AvMann Engineering, have been based at the airport working in MRO. The airport would continue to support and encourage these operations, and new MRO facilities would be constructed as part of Construction Phase 2.

3.3.241 Aviation Related Business – the Northern Grass area would provide facilities for a range of purposes which do not require direct airside access, such as warehousing, offices and airport related business units. The units available would be flexible to meet the needs of the tenants. The existing businesses and tenants on the airport site who do not need direct airside access will be offered alternative locations on the 'Northern Grass' area.

Airport Hours of Operation and Staffing

3.3.242 The airport will be capable of operating 24 hours a day all year round, and there will therefore need to be essential airport operations staff available at all times. In addition there will need to be a permanent security presence in the airport control room where there will be CCTV monitors and other security related systems. It is anticipated that those essential staff, including air traffic controllers, rescue staff and firefighting staff and security as detailed in **Table 3.10**, would be rostered on a 12 hours shift working pattern, with a week of four days on/three days off followed by three days on and four days off.

3.3.243 However the actual operating times of the airport and of ATMs will be dependent on the anticipated air traffic, and the rostering of the staff would be flexible to meet this demand. As outlined above the normal operating hours, or 'daytime', will be 07.00 to 23.00, but with limited exceptions during a shoulder period from 06.00 to 07.00 for certain passenger flights departing to Europe or arriving from the United States of America.

3.3.244 The remaining direct airport and other direct staff will be rostered according to the needs of the airport and the hours of operation. These are likely to be rostered evenly across the daytime hours of 07.00 to 23.00.

3.3.245 The airport administration staff, and the staff based in the aviation related business units on the 'Northern Grass' area would work traditional working hours, typically 08.00 to 18.00.

3.3.246 The forecast of the number of jobs which would be generated by the reopening of Manston Airport is included within the business plan and forecast prepared for RiverOak (Manston Airport: A National and Regional Aviation Asset Volume IV (Azimuth Associates 2017)). There are four categories of economic impact/job creation:

- **Direct Economic Impact.** The employment, income and GDP associated with the operation and management of activities at the airport, including the airport Resource Management System (RMS) on-site at the airport, and airport-related businesses located elsewhere near the airport. This includes activities by the airport operator, the airlines, airport ATC, general aviation, ground handlers, airport security, immigration and customs, aircraft maintenance, and other activities at the airport;
- **Indirect Economic Impact.** The employment, income and GDP generated by down-stream industries that supply and support the activities at the airport. For example, these could include: wholesalers providing food for in-flight catering, oil refining activities for jet fuel, companies providing accounting and legal services to airlines, travel agents booking flights, etc.;
- **Induced Economic Impact.** This captures the economic activity generated by the employees of the airport directly or indirectly connected to the airport spending their income in the national economy. For example, an airline employee might spend his/her income on food, restaurants, child care, entertainment, DIY and other items which, in turn, generate employment in a wide range of sectors of the general economy; and
- **Catalytic Impacts.** Also known as wider economic benefits, catalytic impacts capture the way in which the airport facilitates the business of other sectors of the economy. As such, air transportation facilitates employment and economic development in the national economy through a number of mechanisms.

3.3.247 In summary this forecast uses information and models from a range of different sources and studies to give an estimate for the number of direct, indirect/induced and catalytic jobs that would be generated, for the purpose of this forecast indirect and induced jobs are combined. These are based on the following formula (see Manston Airport: A National and Regional Aviation Asset Volume IV p17 (Azimuth Associates 2017)):

- 887 direct jobs per one million passengers or 100,000 tonnes of freight;
- 2,100 indirect/induced jobs for every 1,000 direct jobs; and
- 4,000 catalytic jobs (6,100 less 2,100) per 1,000 direct jobs.

3.3.248 Using this formula, and the Manston Airport forecasts in **Table 3.8** and **Table 3.9** the estimated total for direct, indirect and catalytic jobs by airport year of operation is shown in **Table 3.10** below.

Table 3.10 Manston Airport Direct, Indirect/Induced and Catalytic Jobs Forecast

Year of Operation	Freight tonnage	Passenger numbers	Direct jobs	Indirect/ induced jobs	Catalytic jobs	Total job creation
1	0	0	116	0	0	116
2	96,553	0	856	1,798	0	3,655
3	108,553	662,768	1,551	3,257	6,203	11,010
4	167,092	679,868	2,085	4,379	8,341	14,805
5	173,741	686,672	2,150	4,515	8,601	15,266
6	181,436	965,295	2,466	5,178	9,862	17,505

7	192,908	975,591	2,576	5,411	10,306	18,293
8	200,673	975,591	2,645	5,555	10,581	18,782
9	203,245	975,591	2,668	5,603	10,673	18,944
10	212,351	975,591	2,749	5,773	10,996	19,517
11	222,377	1,011,587	2,870	6,027	11,479	20,375
12	234,508	1,049,022	3,011	6,322	12,042	21,375
13	244,690	1,087,954	3,135	6,584	12,542	22,261
14	256,989	1,128,444	3,280	6,889	13,122	23,291
15	270,579	1,170,553	3,438	7,220	13,753	24,412
16	283,904	1,214,347	3,595	7,550	14,381	25,527
17	296,594	1,259,892	3,748	7,871	14,993	26,613
18	312,344	1,307,259	3,930	8,253	15,720	27,903
19	324,838	1,356,521	4,085	8,578	16,338	29,000
20	340,758	1,407,753	4,271	8,970	17,085	30,326

3.3.249 Of the direct jobs approximately 25% would be employed by the airport, with the remaining 75% employed by airlines, freight forwarders and integrators, onsite passenger services such as a travel agency, bar and restaurant, shops, as well as government roles in customs and immigration. The direct airport jobs would include:

- airlines;
- ground handling;
- airport and ATC;
- retail and other in-terminal services;
- airport security and passenger screening;
- customs, immigration and government jobs;
- ground transport;
- food and beverage; and
- MRO.

3.3.250 The direct airport jobs would be in a range of positions as forecast in **Table 3.11** below:

Table 3.11 Manston Airport Direct Airport Jobs by Position

Year of operation	Passenger services	Freight Services	Air Traffic Services	Rescue & Firefighting Services	Airport Operations	Airport Maintenance	Motor Transport	Site & Freight Security	Administration	Total
1	0	49	6	14	6	8	8	11	14	116
2	0	196	25	57	24	31	31	45	14	423
3	99	215	25	57	29	38	38	55	15	571
4	102	302	25	57	31	41	41	59	15	673
5	103	322	25	57	32	41	41	60	16	697
6	145	256	25	57	33	43	43	62	16	680
7	146	288	25	57	33	43	43	63	16	714
8	146	307	25	57	33	43	43	63	16	733
9	146	357	25	57	34	44	44	64	16	787
10	146	331	25	57	34	44	44	64	16	761
11	157	347	25	57	34	44	44	64	16	783
12	157	361	25	57	34	45	45	65	16	805
13	163	376	25	57	35	45	45	66	16	828
14	169	391	25	57	35	46	46	67	16	852
15	176	413	25	57	36	46	46	68	16	883
16	182	430	25	57	36	47	47	68	16	908

17	189	447	25	57	36	47	47	69	16	933
18	196	469	25	57	37	48	48	70	17	967
19	203	488	25	57	37	48	48	71	17	994
20	211	507	25	57	38	49	49	71	17	1,024

3.3.251 The majority of the direct airport employees would be those working in passenger and freight services. These roles include the ticket collections, passenger check-in, customer service and assistance, and baggage handling for passenger services, and freight handling, loading, packing and transport for the freight service positions. There will also be a number of office/administration roles, as well as management positions for both the passenger and freight services jobs.

3.3.252 The Rescue & Firefighting Services (RFFS) staff will be multi-skilled to allow freight handling and other duties to be carried out. As a general policy, it is anticipated that those recruited to RFFS will have at least one other skill related to either handling and/or maintenance. This approach allows a more stable working pattern prioritising aircraft servicing with default fall back activities during periods of reduced or zero air traffic.

Airport Operational and Management Procedures

3.3.253 In order to comply with the requirements of the CAA, EASA and other licensing authorities the airport will be required to develop and implement a number of management plans, procedures and policies as indicated in **Table 3.12** below. Additional plans and strategy documents will also be prepared as part of the general management of the airport, and/or to ensure implementation of mitigation for potential environmental effects (as embedded environmental measures - **Section 5.3**). Relevant industry standards, guidance and best practice will be followed, and where appropriate consultation will be undertaken with relevant stakeholders and consultees.

Table 3.12 Airport Management Plans, Procedures and Policies

	Purpose	Standard, Guidance or Best Practice	Consultee	Timeline
Emergency Plan	Details the incident alerting procedures and the initial action responsibilities for airport staff	ADR.OPS.B.005 EASA	Kent Fire & Rescue Service, Kent County Constabulary, South East Coast Ambulance Service, Thanet District Council (TDC)	Post DCO Consent

Emergency Response and Post-Crash Management Plan	Consolidated reference and action document for use of personnel in the event of a major incident or emergency		Kent Fire & Rescue Service, Kent County Constabulary	Post DCO Consent
Environmental Spillage Plan	For use by all company personnel for the identification, notification, containment and clean-up of all spillages, both inside and externally of a building or on the airfield		Kent Fire & Rescue Service, Environment Agency	Post DCO Consent
Wildlife Hazard Management Plan	Procedure to assess and manage the wildlife hazards on and in the vicinity of the aerodrome	CAA CAP 772	EA, Natural England	Post DCO Consent
Habitat Management Plan	Manage the habitat on the airport site in order to reduce the risks for bird strike	CAA CAP 772	EA, Natural England	Post DCO Consent
Long Grass Policy	Procedure for the management of all airport grass to deter most common hazardous birds found on an aerodrome	CAA CAP 772	EA, Natural England	Post DCO Consent
Waste Management Plan	Plan		EA	Post DCO Consent

Discharge Monitoring Procedure	Ensure compliance with discharge permit	Environmental Permitting Guidance Groundwater Activities, Environment Agency December 2010	EA	For DCO Submission
Environmental Policy	Overarching Airport Environmental Policy setting out a commitment to environmental principles			For DCO Submission
Operational Traffic Management Plan, Public Transport Access Strategy, Staff Travel Plan, Pedestrian and Cycle Access Strategy	Minimise, control and manage the traffic and transport effects associated with the operation of the airport		Highways England, KCC Highways, TDC	For DCO Submission

Decommissioning Phase

3.3.254 It is considered that the airport will be operational long into the future and consequently there will not be any requirement for decommissioning of the airport.

3.3.255 However, as part of the construction phase(s) for the airport there will be a requirement to decommission and remove old and existing equipment, infrastructure and facilities which are no longer required or considered fit for purpose. For the upgrading of aircraft pavements, for example runways, taxiway, aprons and stands, the usual technique is the place a new overlay on top of the existing older paved surfaces. Therefore for these works there is often no requirement for any decommissioning.

3.3.256 In addition across the lifetime of the Proposed Development, which is currently forecast to be 20 years but will very likely extend beyond this date, other equipment, infrastructure and facilities will need to be replaced.

3.3.257 Therefore these effects are considered and assessed, where appropriate, in the topic chapters.

4. Planning policy context

4.1 Introduction

4.1.1 This Chapter provides an overview of the relevant national, regional and strategic local planning policies to establish the policy context against which the proposals for the reopening of Manston Airport will need to be considered. Further detail is provided in **Appendix 4.1**. Further topic specific policies that have been considered are provided in the topic chapters (**Chapters 6-17**) within this document.

4.2 National Planning Policy

The Planning Act (2008)[1]

4.2.1 The Planning Act 2008 ('the 2008 Act'), which received Royal Assent on 26 November 2008, provides a development consent system for nationally significant transport, energy, water, wastewater and waste infrastructure projects.

4.2.2 The 2008 Act is the primary legislation which established the legal framework for applying for, examining and determining applications for Nationally Significant Infrastructure Projects (NSIPs) taking into account the guidance in National Policy Statements (NPSs).

4.2.3 It also makes provision for the creation of a new independent body, the Infrastructure Planning Commission (IPC), which has responsibility for examining NSIP applications for development consent and determining them where a relevant national policy statement is in place.

National Planning Practice Guidance (NPPG)[2]

4.2.4 On 6th March 2014, the Department for Communities and Local Government (DCLG) launched the planning practice guidance web-based resource.

4.2.5 In terms of planning practice guidance as it relates to aviation and airport planning, the NPPG does not introduce any additional guidance beyond that which is already captured by the National Planning Policy Framework (NPPF).

National Planning Policy Framework (NPPF)[3]

4.2.6 The NPPF was published in March 2012 and sets out the Government's planning policies for England and how these are to be applied (paragraph 1). It states that planning law requires applications to be determined in accordance with the Development Plan for the relevant area. This is unless material considerations indicate otherwise, and that the NPPF "must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions" (paragraph 2).

4.2.7 Paragraph 3 specifically states that the NPPF does not contain specific policies for nationally significant infrastructure projects for which particular considerations apply. These are to be determined in accordance with the decision-making framework set out in the 2008 Act and relevant

[1] The Planning Act (2008) Available online at http://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf [Checked 14/11/17].

[2] Planning practice guidance (2016) Department for Communities and Local Government. Available online at https://www.gov.uk/government/collections/planning-practice-guidance [Checked 14/11/17].

[3] National Planning Policy Framework (2012) Communities and Local Government. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf [Checked 14/11/17].

national policy statements for major infrastructure, as well as any other matters that are considered both important and relevant (which may include the NPPF). It also states that NPSs form part of the overall framework of national planning policy, and are a material consideration in decisions on planning applications (see Sections 4.2.19 to 4.2.13 on the NPS on Aviation).

4.2.8 Central to the NPPF is a "presumption in favour of sustainable development" (Paragraph 14). In terms of decision-taking, this means "approving development proposals that accord with the Development Plan without delay" (paragraph 14). Where the Development Plan is "absent, silent or relevant policies are out-of-date" (paragraph 14) the development should be restricted. Exceptions to the restricted granting of planning permission are if "any adverse impacts of doing so would significantly and demonstrably outweigh the benefits when assessed against the policies in the NPPF taken as a whole or if specific policies in the NPPF" (paragraph 14).

4.2.9 Within the NPPF, there are various references to the need for Local Authorities to work with other authorities and providers to:

> "*identify and protect, where there is robust evidence, sites and routes which could be critical in developing infrastructure to widen transport choice*" (Paragraph 41);
>
> *"to assess the quality and capacity of infrastructure for transport, water supply, wastewater and its treatment, energy (including heat), telecommunications, utilities, waste, health, social care, education, flood risk and coastal change management, and its ability to meet forecast demands* (Paragraph 162); and
>
> *"to take account of the need for strategic infrastructure including nationally significant infrastructure within their areas*." (Paragraph 162).

4.2.10 Further detail of those sections of the NPPF that are relevant to the Proposed Development are provided in **Appendix 4.1**.

4.2.11 The NPPF Technical Guidance was archived on 7th March 2013 and replaced by the new NPPG[4] launched on 6th March 2014.

Environmental Impact Assessment 2017 Regulations

4.2.12 As discussed in **Chapter 1**, Directive 2014/52/EU applies in the UK as of 16 May 2017 and resulted in its transposition in to UK Law as the National Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the 2017 Regulations').

4.2.13 The aim of Environmental Impact Assessment (EIA) is to protect the environment by ensuring that a local planning authority when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision-making process. The applicant is responsible for the preparation of the Environmental Statement (ES).

4.2.14 The ES must contain the information specified in regulation 18(3) and must meet the requirements of regulation 18(4). It must also include any additional information specified in Schedule 4 to the 2017 Regulations which is relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.

4.2.15 The location of the information required under the 2017 EIA Regulations was also described in **Chapter 1** of this report and as such is not repeated here.

[4] Planning practice guidance (2016) Department for Communities and Local Government. Available online at https://www.gov.uk/government/collections/planning-practice-guidance [Checked 14/11/17].

National Aviation Policy Aviation Strategy White Paper (expected 2018)

4.2.16 The Government has announced that the DfT is currently progressing work to develop a new strategy for UK aviation[5]. The Government will be consulting on this later this year, leading to publication of an Aviation Strategy White Paper in 2018.

4.2.17 The Government has published a call for an evidence consultation document to establish views on the approach the Government is proposing to take on a number of aviation issues identified to inform the Aviation Strategy. The consultation document is entitled *'Beyond the Horizon: The Future of Aviation in the UK'*[6]. The new strategy is proposed to focus on aviation covering the whole country and for a long-term strategy; with the consultation process examining the effect on all of the UK's regions.

4.2.18 It is recognised within the consultation document that before a new runway is built, for the UK to grow its domestic and international capacity, there is a need for existing runways throughout the UK to be more intensively utilised. Of particular interest is part of paragraph 7.20 which states:

> *"The Government agrees with the Airports Commission's recommendation that there is a requirement for more intensive use of existing airport capacity and is minded to be supportive of all airports who wish to make best use of their existing runways including those in the South East."*

Draft Airports National Policy Statement[7] (NPS) – February 2017

4.2.19 The Draft Airports NPS: *"New runway capacity and infrastructure at airports in the South East of England"* was published for consultation on 2 February 2017, with a revised draft published in October 2017. Together with other supporting documents and analyses, including the draft Appraisal of Sustainability [8](an appraisal of the potential social, economic and environmental impacts of the proposed policy in the draft Airports NPS) the Draft Airports NPS is included as **Appendix 4.2**. This follows the outcome of the work by the Airports Commission which published its final report[9] in July 2015. The Government subsequently announced on 25 October 2016 that a Northwest Runway at Heathrow Airport was its preferred scheme to deliver additional airport capacity in the South East of England[10]. Capacity at other airports is not addressed. This means that the Airports NPS will not form the basis for determination of this DCO application.

4.2.20 Although it will not form the basis for determination, the Airports NPS is still a relevant consideration for other applications for airports infrastructure in London and the South East of England (paragraph 1.10 and 1.36). Its policies will be a relevant consideration for the Examining Authority and Secretary of State (paragraph 1.12) in determining DCO applications, such as that proposed for Manston Airport, but it is not the primary basis of determination in the same way as it is for the Heathrow Northwest Runway[11]. The need to have regard to other matters which are both important and relevant to the determination of DCO applications is confirmed at Section 104(2)(d) of the 2008 Act.

---

[5] Written Statement to Parliament on Airport Capacity and Airspace Policy – 2nd February 2017.
[6] The Department for Transport (July 2017) 'Beyond the Horizon: The Future of Aviation in the UK'.
[7] Revised Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England (2017) Department for Transport. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/654123/revised-draft-airports-nps-web-version.pdf [Checked 14/11/17].
[8] Appraisal of sustainability: draft Airports National Policy Statement (2017) Department for Transport. Available online at https://www.gov.uk/government/publications/appraisal-of-sustainability-for-the-draft-airports-national-policy-statement [Checked 14/11/17].
[9] Airports Commission: final report (2015) Airports Commission. Available online at https://www.gov.uk/government/publications/airports-commission-final-report [Checked 14/11/17].
[10] Government decides on new runway at Heathrow (2016) Department for Transport. Available online at https://www.gov.uk/government/news/government-decides-on-new-runway-at-heathrow [Checked 14/11/17].
[11] Planning Act S23(4)(a)-(b) and (5)(a)-(b) (2008) Available online at http://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf [Checked 14/11/17].

4.2.21 The Airports NPS also does not affect wider aviation issues for which the 2013 Aviation Policy Framework and subsequent policy statements apply (paragraph 1.34[12]). The Government has also announced that the DfT is currently progressing work to develop a new strategy for UK Aviation. The Government will be consulting on this later in 2017 leading to publication of an Aviation Strategy White Paper in 2018 (see **Paragraphs 4.2.16 - 4.2.18** of this Chapter).

4.2.22 The relevant parts of the draft Airports NPS[13] to the Proposed Scheme are set out below:

- the reaffirmation that international connectivity is important to the success of the UK economy as it facilitates trade in goods and services and is particularly important for many of the fastest growing sectors of the economy (Paragraph 2.1.);
- the UK's airports are the primary gateway for vital time-sensitive freight services (Paragraph 2.2);
- the aviation sector benefits the UK economy through its direct contribution to GDP and employment, and by facilitating trade and investment, manufacturing supply chains, skills development, and tourism (Paragraph 2.4); and
- the importance of freight services is also acknowledged within the draft Airport NPS (see **Appendix 4.2** for further information).

4.2.23 The benefits for freight delivered by the Heathrow Northwest Runway was one of four strategic considerations to which the Government afforded particular weight in selecting it as its preferred scheme[14].

Airports Commission Final Report (July 2015)[15]

4.2.24 The independent Airports Commission was set up in late 2012 with a brief to find an effective and deliverable solution to increase aviation capacity in the South East as well as supporting the UK, and to make recommendations which will allow the UK to maintain its position as Europe's most important aviation hub.

4.2.25 The Airports Commission short-listed three options for this new capacity: one new north west runway at Heathrow Airport; a westerly extension of the northern runway at Heathrow Airport; and one new runway at Gatwick Airport. The Commission concluded that the proposal for a new north west runway at Heathrow Airport, in combination with a significant package of measures to address its environmental and community impacts presented the strongest case.

4.2.26 Specifically, in relation to Manston, the Commission throughout their considerations recognised that the air freight sector plays an important role in the UK economy, particularly to trade with emerging markets and other non-EU countries, and to many airlines. The Commission identified that the key sectors for air freight include perishables such as food and flowers and pharmaceutical products and medicines. These products need to be delivered in controlled environments within short shelf lives. Additionally, fast evolving high-tech products where several weeks of sea transit from the Far East might represent a significant proportion of the product's sales life is another key sector (Paragraphs 6.65 to 6.69).

---

[12] Revised Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England (2017) Department for Transport. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/654123/revised-draft-airports-nps-web-version.pdf [Checked 14/11/17].

[13] Revised Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England (2017) Department for Transport. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/654123/revised-draft-airports-nps-web-version.pdf [Checked 14/11/17].

[14] Department for Transport (February 2017) Consultation on Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England

[15] Airports Commission: final report (2015) Airports Commission. Available online at https://www.gov.uk/government/publications/airports-commission-final-report [Checked 14/11/17].

Airports Commission Discussion Paper 06: Utilisation of the UK's Existing Airport Capacity (June 2014)[16]

4.2.27 The Airports Commission during its investigation looked at the potential to redistribute demand away from London and South East airports. The study suggested that there is relatively little scope for redistribution but did recognise that regional airports and those serving London and the South East, other than Gatwick and Heathrow, play a crucial national role. This is especially so at a time when the major London airports are already operating very close to capacity.

Airports Commission Interim Report (December 2013)[17]

4.2.28 Further in relation to Manston Airport, the Airports Commission Interim Report (December 2013) in Appendix 2: *Assessment of Long-Term Options*[18], is supportive of Manston Airport recognising that it:

> "....presents some potential as a reliever airport, but does not address the larger question of London & South East capacity. The concept of reliever airports is considered in short and medium-term work. Please see Appendix 1 for further information."

4.2.29 It goes on to state that:

> "The Commission is supportive of the reliever airports concept. The Commission recognises that this may be the best way to cater for the needs of business users without disrupting the wider airport system..."

Aviation Policy Framework (March 2013)[19]

4.2.30 The Aviation Policy Framework (APF) was published in March 2013. It sets out the Government's objectives and principles to guide plans and decisions on airport developments.

4.2.31 Further detail of those sections of the APF that are relevant to the proposed development are provided in **Appendix 4.1**.

4.3 Regional Policy

4.3.1 This section sets out the regional policy that is relevant to the Proposed Development.

Local Transport Plan for Kent 4: Delivering Growth without Gridlock 2016-2031

4.3.2 Kent County Council (KCC) has published its new Local Transport Plan[20], which replaces the Local Transport Plan for Kent 2011-2016.

4.3.3 The plan sets out the County Council's position on aviation which is to maximize use of existing regional airport capacity, along with some expansion of existing airports and improved rail

[16] Discussion Paper 06: Utilisation of the UK's Existing Airport Capacity (2014) Airports Commission. Available online at https://www.aef.org.uk/uploads/Airports-Commission-utilisation-existing-capacity.pdf [Checked 15/11/17].
[17] Airports Commission: Interim Report (2013) Airports Commission. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/271231/airports-commission-interim-report.pdf [Checked15/11/17].
[18] Appendix 2: Assessment of Long-term Options: Interim Report (2013) Airports Commission. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/268620/airports-commission-interim-report-appendix-2.pdf [Checked 14/11/17].
[19] Aviation Policy Framework (2013) Department for Transport. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf [Checked 14/11/17].
[20] Local Transport Plan 4: Delivering Growth without Gridlock 2016-2031 (2016) Kent County Council. Available online at https://www.kent.gov.uk/about-the-council/strategies-and-policies/transport-and-highways-policies/local-transport-plan [Checked 14/11/17].

connections. In respect of Manston Airport, the plan recognises that it ceased to operate on 15th May 2014 and that the County Council's position as set out in the meeting of the County Council on 16th July 2015 is:

> "*That we the elected members of KCC wish it to be known that we fully support the continued regeneration of Manston and East Kent and will keep an open mind on whether that should be a business park or an airport, depending upon the viability of such plans and their ability to deliver significant economic growth and job opportunity*." [21]

4.3.4 The County Council is also seeking to deliver a new railway station to significantly improve rail connectivity to the area (Thanet Parkway Rail Station). The station will provide access to greater employment opportunities for local residents, and increase the attractiveness for investment in Discovery Park Enterprise Zone and numerous surrounding business parks in Thanet. It will also support local housing and any reopened airport at Manston. The estimated journey time from Thanet Parkway to London St. Pancras will be just over 20 minutes shorter than that from Deal to London St Pancras; therefore, the new station enhances the accessibility of the wider area of East Kent (Page 19).

The London Plan, 2015[22] (Consolidated with Alterations since 2011)

4.3.5 Under legislation establishing the Greater London Authority (GLA), the London Mayor has to produce a 'Spatial Development Strategy', which is known as 'The London Plan'. The London Plan was first adopted in July 2011, and has since been updated in 2013 and most recently in 2015.

4.3.6 Further detail of those sections of the London Plan 2015 that are relevant to the Proposed Development are provided in **Appendix 4.1**.

4.4 Local Planning Policy

4.4.1 In this section, summaries of the relevant planning policies contained within the statutory Development Plans of the following Local Planning Authorities are provided from:

- Thanet District Council (TDC);
- Dover District Council (DDC); and
- Canterbury City Council (CCC).

Thanet District Council

4.4.2 The Proposed Development is located entirely within the administrative authority of TDC.

4.4.3 The statutory Development Plan for TDC comprises:

- Thanet Local Plan (2006) (Saved Policies);
- Local Plan Proposals Map;
- Cliftonville Development Plan Document (February 2010); and
- Kent Waste and Minerals Local Plan (Saved Policies).

4.4.4 In addition, TDC are preparing a new Thanet Local Plan to 2031, at present this comprises:

- Draft Thanet Local Plan to 2031 Preferred Options (January 2015); and

[21] Scrutiny Committee: 9 June 2016 Minutes (2016) Kent County Council. Available online at https://democracy.kent.gov.uk/documents/s72979/Minutes%20of%20Previous%20Meeting.pdf [Checked 14/11/17].
[22] The London Plan (2016) Greater London Authority. Available online at https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan [Checked 14/11/17].

- Proposed Revisions to Draft Local Plan (Preferred Options) (January 2017).

Thanet Local Plan Saved Policies and Proposals Map[23]

4.4.5 An extract from the Local Plan Proposals Map showing the Proposed Development is provided in **Figure 4.1**.

4.4.6 The key planning policy designations that affect the Proposed Development and the area adjoining it, as shown on the Local Plan Proposals Map, are as follows:

- The airport boundary is defined on the Proposals Map (Policy EC2 – Kent International Airport);
- Policy EC4 – Airside Development Area;
- Policy EP13 – Groundwater Protection Zone;
- Policy CC2 – Central Chalk Plateau;
- The land to the east is designated for terminal related purposes (Policy EC5 – Land at, and east of the Airport Terminal); and
- The land to the west is designated for economic development (Policy EC1 – Manston Park, Manston).

4.4.7 Full details of these policies are provided in **Appendix 4.1**. In addition, details of relevant economic development and regeneration, housing and transport Local Plan saved policies are also provided in **Appendix 4.1**.

Environmental Protection

4.4.8 Full details of key relevant saved policies, including Policy EP5 (Local Air Quality Monitoring) and Policy EP7 (Aircraft Noise), are provided in **Appendix 4.1**

Draft Thanet Local Plan to 2031 Preferred Options (January 2015)[24]

4.4.9 Within the Draft Local Plan, Strategic Priority 1 looks to create additional employment and training opportunities, to strengthen and diversify the local economy and improve local earning power and employability.

4.4.10 TDC recognises that various options are available with regards to the future use of the Manston Airport site, as an operational airport and for aviation activities, as well as for other developments. It is acknowledged that these need to be explored and assessed for the wider area of the airport and its environs through the Development Plan making process. TDC is therefore seeking to designate the area as an "opportunity area" for which TDC will prepare an Area Action Plan (AAP) Development Plan Document. The AAP for Manston Airport will set out the development framework for the development and regeneration of the area. A consideration of the AAP should be the promotion, retention, development and expansion of the airport and aviation related operations. This should be supported by a feasibility study and a viable business plan.

4.4.11 The alternative option for the AAP should be to assess mixed-use development that will deliver significant new high quality skilled and semi-skilled employment opportunities, residential development, sustainable transport and community facilities.

4.4.12 Full details of the key relevant draft policies are provided in **Appendix 4.1**.

---

[23] Thanet Local plan 2006 Saved Policies (2006) Thanet District Council. Available online at https://www.thanet.gov.uk/your-services/planning-policy/thanets-current-planning-policy/thanet-local-plan-2006/ [Checked 14/11/17].

[24] Draft Thanet Local Plan to 2013 Preferred Options Consultation (2015) Thanet District Council. Available online at https://www.thanet.gov.uk/your-services/planning-policy/thanets-new-local-plan/draft-thanet-local-plan-to-2031-preferred-options-consultation-january-2015/ [Checked 14/11/17].

Proposed Revisions to Draft Local Plan (Preferred Options) (January 2017)

4.4.13 Following the publication of the draft Thanet Local Plan to 2031 Preferred Options (January 2015), TDC has suggested some focused changes to key policies, some of which are relevant to the Proposed Development. These changes have been set out in the Proposed Revisions to Draft Local Plan (Preferred Options) (January 2017) and were the subject of a public consultation exercise, running from the 19th January 2017 to the 17th March 2017.

4.4.14 TDC has significantly amended site specific draft Policy SP05 (Manston Airport) and commissioned an airport viability study by Avia Solutions. This was to look at whether an airport was a viable option for the site within the plan period to 2031. This report took into account national and international air travel and transport and the way in which it is likely to develop over the next 15 to 20 years. It also looked at previous reports and developments in national aviation. The September 2016 report concluded that airport operations at Manston are very unlikely to be financially viable in the longer term, and almost certainly not possible in the period to 2031.

4.4.15 Taking on board the conclusions of the airport viability report, and given the level of objectively assessed housing need, TDC considers that the best use for the 320ha brownfield airport site is for a mixed-use development primarily focused on residential. Revised Policy SP05 seeks to create an attractive sustainable free standing new settlement with a district centre featuring all the amenities needed for a town. The development would also deliver important links across Thanet, improve access to and from the site and provide open space and community facilities that the whole of Thanet can access.

4.4.16 Full details of key relevant revised draft policies are provided in **Appendix 4.1**

4.4.17 Based on the amendment to draft Policy SP05 (Former Airport Site) to provide a mixed-use settlement with residential provision, draft Policy SP11 (Housing Provision) has been revised to provide 2,500 residential dwellings at the Former Airport Site.

4.4.18 Section 8 of the proposed revisions state that land is safeguarded for key road schemes and junction improvements to support implementation of the Thanet Transport Strategy. The B2050 (Manston Road) and B2190 (Spitfire Way) by the airport are proposed for widening, junction improvements are proposed at Manston Road/Spitfire Way and at Manston Road/Manston Court Road. A new road is also proposed from Columbus Way (Manston Business Park) to Manston Road, Birchington.

4.4.19 TDC have advised that they are not expecting to adopt their New Local Plan before the end of 2019 at the earliest. In this context, and with reference to Paragraph 216 of the NPPF, very little weight can be given to the emerging plan policies. There are still unresolved objections including towards the approach to be taken towards Manston Airport and whether the new Local Plan is based on adequate, up-to-date and relevant evidence about the economic, social and environmental characteristics and prospects of the area.

4.4.20 Publication of the Pre-Submission Version of the full new Local Plan is expected in January 2018.

Dover District Council

4.4.21 The statutory Development Plan for DDC comprises:

- Dover District Core Strategy[25] (adopted September 2010);
- Dover District Land Allocations Local Plan [26](adopted January 2015);

[25] Dover District Local Development Framework Core Strategy (2010) Dover District Council. Available online at https://www.dover.gov.uk/Planning/Planning-Policy-and-Regeneration/PDF/Adopted-Core-Strategy.pdf [Checked 14/11/17].
[26] Dover District land Allocations Local Plan (2015) Dover District Countil. Available online at https://www.dover.gov.uk/Planning/Planning-Policy-and-Regeneration/PDF/Draft-Adopted-LALP-120115.pdf [Checked 14/11/17].

- Dover District Proposals Map[27]; and
- Dover District Local Plan (Saved Policies) (2002).[28]

4.4.22 A review of DDC's planning policy has not identified any planning policy of relevance to the reopening of Manston Airport. The Core Strategy only contains a reference to the location of Manston Airport.

4.4.23 DDC is about to commence a review of the Local Plan and has identified Manston Airport as a cross-boundary strategic priority for planning.

Canterbury City Council

4.4.24 The statutory Development Plan for CCC comprises:

- Canterbury District Local Plan (July 2017) and Proposals Map[29]; and
- Herne Bay Area Action Plan [30](adopted April 2010)

4.4.25 A review of CCC Development Plan documents has not identified any planning policy of relevance to the reopening of Manston Airport. However, the Local Plan does recognise that the NPPF encourages Local Authorities to plan proactively for the transport infrastructure necessary to support the growth of airports.

4.5 Other relevant plans and policies

4.5.1 The following plans and policies are also deemed to be relevant, further details of which are given in **Appendix 4.1**:

- Kent and Medway Growth and Infrastructure Framework[31] (September 2015);
- Kent and Medway's Growth Plan: 'Unlocking the Potential: Going for Growth'[32]; and
- Kent County Council - Manston Airport under private ownership: The story to date and the future prospects[33] (March 2015).

[27] Dover District Proposals Map (2010) Dover District Council. Available online at https://www.dover.gov.uk/Planning/Planning-Policy-and-Regeneration/Home.aspx [Checked 14/11/17].
[28] Dover District Local Plan Saved Policies (2002) Dover District Council. Available online at https://www.dover.gov.uk/Planning/Planning-Policy-and-Regeneration/Adopted-Development-Plans/Saved-Policies.aspx [Checked 14/11/17].
[29] Canterbury District Local Plan (2017) Canterbury City Council. Available online at https://www2.canterbury.gov.uk/media/1507001/Canterbury-District-Local-Plan-Adopted-July-2017.pdf [Checked 14/11/17].
[30] Here Bay Area Action Plan (2010) Canterbury City Council. Available online at https://www2.canterbury.gov.uk/media/512291/HerneBayAreaActionPlanlowres.pdf [Checked 14/11/17].
[31] Kent and Medway Growth and Infrastructure Framework (2015) Kent County Council. Available online [https://www.kent.gov.uk/__data/assets/pdf_file/0012/50124/Growth-and-Infrastructure-Framework-GIF.pdf [Checked14/11/17].
[32] Unlocking the Potential; Going for Growth (2013) Kent and Medway Economic Partnership. Available online at http://kmep.org.uk/documents/Unlocking_the_Potential_-_v.3.1_19.12.13.pdf [Checked 14/11/17].
[33] Manston Airport under private ownership (2015) Kent County Council. Available online at https://www.kent.gov.uk/__data/assets/pdf_file/0003/29541/Manston-Airport-position-statement.pdf [14/11/17].

4.6 Other Consents Needed

4.6.1 As outlined in **Section 1.1**, the principal legislation under which permission is required to enable the development to go ahead is the Act and a DCO application will be submitted to the PINS later this year.

4.6.2 The Proposed Development will also require other consents, licences and permits to enable it to be constructed and operated, and for which PINS is not the authorising body. These will be identified during the course of the EIA and appropriate consultations will take place with organisations such as the local planning and highway authorities, Civil Aviation Authority (CAA), Natural England (NE), the Environment Agency (EA) and others as appropriate.

4.7 Habitats Regulations Assessment

4.7.1 One Natura 2000 (European wildlife) site is located within 10km of the proposed development:

- Thanet Coast & Sandwich Bay Special Protection Area and Ramsar Site.

4.7.2 In addition to the assessment of potential effects on this site 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 undertake a screening exercise. The aim of the screening exercise is to determine whether this (or any other) site is likely to be significantly affected by the Proposed Development, either alone or in combination with other plans and projects. If significant effects are likely, there will be a need for an Appropriate Assessment to be carried out. The screening, any Appropriate Assessment and subsequent assessment form part of what is known as the HRA process.

4.7.3 Screening and any subsequent Appropriate Assessment will be undertaken by PINS (the 'competent authority'), drawing upon information about the likely effects of the Proposed Development on the designated sites that will be provided to it by RiverOak Strategic Partners (RiverOak). In undertaking its assessment, PINS is required to consult with NE. To facilitate the HRA process, Amec Foster Wheeler will also liaise with NE and other interested parties as appropriate in the preparation of an Evidence Plan[34] for the HRA.

[34] The Evidence Plan process is a non-statutory, voluntary process, which is used to agree with PINS, and other consultees, the information that needs to be supplied as part of the DCO application in order to ensure compliance with the Habitats Regulations Assessment.

5. Approach to preparing the Environmental Statement

5.1 Introduction

5.1.1 This Chapter of the Preliminary Environmental Information Report (PEIR) describes the next stage in the Development Consent Order (DCO) Application process which will be to prepare an Environmental Statement (ES) for submission to the Planning Inspectorate (PINS).

5.1.2 It should be noted that following recent consultation with PINS, the applicant has elected to adopt the 2017 Environmental Impact Assessment (EIA) Regulations in preparing the ES for the Proposed Development.

5.2 Environmental Impact Assessment process

5.2.1 The key characteristics of an EIA are that it is:

- **Systematic**, comprising a sequence of tasks defined both by regulation and by good practice, leading to the use of the information that is gathered to inform decision-making as to whether or not the Proposed Development should be allowed to proceed;
- **Analytical**, requiring the application of specialist skills from the environmental sciences;
- **Impartial**, its aim being to inform the decision-maker rather than to promote the project;
- **Consultative**, with provision being made for obtaining feedback from interested parties including local authorities and statutory agencies; and
- **Interactive**, whereby the proposals for the key stages of the development are progressively refined in response to environmental as well as technical considerations with a view to minimising the scheme's potential adverse environmental effects and maximising its environmental benefits.

5.2.2 The preparation of the ES is one of the key stages in the EIA process as it brings together information about any likely significant environmental effects. The PINS will use the information contained within the ES to inform its recommendation to the Secretary of State for Transport about whether the Proposed Development should be allowed to proceed.

5.2.3 The steps followed in the EIA process are summarised in **Box 5.1**. These are based on the 2017 EIA Regulations, government guidance and good practice. They require inputs not only from the team that prepares the ES, but in this case, also from RiverOak and PINS. Following a short section on terminology, the remainder of this Chapter provides further information about some of the key steps in the process.

Box 5.1 Key Steps in the EIA Process

- Defining the project, including consideration of the need for the project and the main alternatives for meeting this need;
- Deciding on the likely significant environmental effects that need to be assessed and how the necessary assessments will be carried out;
- Using the Scoping Report[1] as a basis for consulting over the scope of the assessment that is reported in the ES and refining the scope in response to the comments that are received (with this refinement process continuing as the proposals for the Proposed Development and the understanding of its environmental effects evolve);
- Assembling further information about the baseline environmental conditions that relate to the likely significant environmental effects;
- Determining whether this baseline is relevant to the assessment or whether it is more appropriate to predict how the baseline will have changed by the time that the development is constructed or operated;
- Identifying measures to avoid, reduce or compensate for adverse effects, or to increase the environmental benefits of the scheme, and liaising with the project design team to incorporate these (where possible) into the proposals, ensuring that the development proposals as amended are environmentally assessed;
- Ongoing consultation with statutory consultees and other interested parties, as appropriate;
- Assessing the magnitude and other characteristics of the environmental effects being assessed;
- Assessing the sensitivity (and where relevant, value) of identified receptors to changes resulting from the development;
- Identifying additional measures to avoid, reduce or compensate for adverse effects, or to increase the environmental benefits of the scheme;
- Evaluating the significance of the predicted effects;
- Collating the findings in an ES and summarising the findings in a Non-Technical Summary (NTS);
- Submission of the ES to the relevant competent authority;
- Decision-making, which may involve inter alia ongoing negotiation and requests for further information;
- Informing stakeholders of the decision on whether or not the development is to be permitted; and
- Ongoing environmental monitoring, assessment and other work, as required, including screening for the need for a further ES to be prepared in relation to the reserved matters development.

5.3 Environmental Impact Assessment terminology

5.3.1 In some ESs, the terms ‘impacts’ and ‘effects’ are used interchangeably, whilst in others the terms are given different meanings. Some use ‘impact’ to mean the cause of an ‘effect’ whilst others use the converse meaning. This variety of definitions has led to a great deal of confusion over the terms, both among the authors and the readers of ESs.

5.3.2 The convention used in this PEIR is to use ‘impacts’ only within the context of the term EIA, which describes the process from scoping through to ES preparation to subsequent monitoring and other work. Otherwise, this document uses the word ‘effects’ when describing the environmental consequences of the Proposed Development. Such effects come about as a result of:

- Physical activities that would take place if the Proposed Development were to proceed (e.g. vehicle movements during construction operations); or

[1] Note: the scoping report prepared in 2016 has been taken into account in completing the assessments contained within the EIA. A revised scoping report has not been issued as it would simply duplicate the consultation being carried out here. As such, any additional comments relating to the additional and revised provisions of the 2017 EIA Regulations, received in response to this PEIR, will be taken into account as appropriate.

- Environmental changes that are predicted to occur as a result of these activities (e.g. loss of vegetation prior to the start of construction work or an increase in noise levels). In some cases, one change causes another change, which in turn results in an environmental effect.

5.3.3 The environmental effects that are predicted to result are the consequences of the environmental changes for specific environmental receptors (e.g. for bats from the loss of roosting sites or foraging areas, or for people from an increase in noise levels, etc.).

This PEIR is concerned with assessing the effects of the Proposed Development, rather than the activities or changes that cause them. However, this requires that the activities involved with the construction and operation of the Proposed Development are understood such that the likely resultant changes can be identified, often based on predictive assessment work. An example of how a physical activity and environmental change can lead to an environmental effect is given in **Box 5.2**.

Box 5.2 Example of activities and environmental changes leading to an environmental effect
For a development that involves activities at various locations, mobile plant might undertake a number of activities related to the excavation of materials, including soils, and delivery of materials to the working area. These activities would lead to an increase in background noise levels that it might be determined could have significant effects on people living nearby and on wildlife. It would therefore be necessary to assess the change in noise levels, drawing on data from plant manufacturers to determine the amount of noise each item of plant would generate when undertaking excavation and other activities and comparing this with the baseline conditions in the absence of the Proposed Development. For each receptor that could be significantly affected, an assessment would be made of the effects caused by the change in noise levels.

5.4 Environmental Impact Assessment Scoping

5.4.1 EIA scoping involves identifying:

- the people and environmental resources (collectively known as 'receptors') that could be significantly affected by the Proposed Development;
- what aspects of the Proposed Development those receptors might be affected by (e.g. loss of habitat affecting a particular species); and
- the work required to take forward the assessment of these potentially significant effects.

5.4.2 The approach taken in the 2016 scoping exercise accords with PINS Advice Note Seven[2]. However, although the Scoping Report submitted by the applicant (RiverOak Investment Corp) in request of a Scoping Opinion, for reasons already explained in **Chapter 1**, no longer formally applies to these proposals, it seems sensible and perfectly reasonable, because the Proposed Development has remained the same, to use the Scoping Opinion received to guide the scope of the detailed assessment.

5.4.3 Furthermore, scoping did not stop once the Scoping Opinion was received. The scope of the assessment has been progressively refined subsequent to the receipt of the Scoping Opinion in response to comments from consultees, the environmental information resulting from survey or assessment work, and the evolution of the Proposed Development. Consultation, through meetings, correspondence and discussions, with prescribed and non-prescribed consultees has taken place throughout the preparation of this PEIR and to inform the 2017 statutory consultation.

5.4.4 For these reasons, it is not necessary to request a new Scoping Opinion. Rather the scope of assessment for those new topics that need to be considered as a result of this DCO application

[2] Advice Note Seven: Environmental Impact Assessment, screening and scoping (version 5). (2015) Planning Inspectorate. Available online at https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/03/Advice-note-7v4.pdf [Checked 14/11/17].

now being made under the 2017 EIA Regulations is documented within this PEIR giving consultees the opportunity to comment if they so wish.

5.4.5 The EIA Regulations state that an ES should not cover every aspect of the Proposed Development's environmental effects, but should focus on the aspects likely to have significant environmental effects. This approach was adopted for the 2016 Scoping Report, the 2017 PEIR and for this document (the 2018 PEIR). The same approach will be carried forward into the preparation of the ES.

5.4.6 Scoping was started at the outset of the work on the EIA, with the initial conclusions about potentially significant effects of the Proposed Development being set out in the EIA Scoping Report (**Appendix 1.1**). The preparation of this report was informed by the legislative and policy context relevant to the Proposed Development.

5.4.7 At the EIA scoping stage, the conclusion that is made about significance is usually based upon professional judgement. This is with reference to the Proposed Development description, and drawing on, as appropriate, available information about the magnitude and other characteristics of the potential changes that are expected to be caused by the Proposed Development. The receptors' sensitivity to the changes, the effects of the changes on relevant receptors, and the value of receptors is analysed and considered. If the information that is available at the EIA Scoping Report stage does not enable a robust conclusion to be reached that a potential effect is not likely to be significant, the effect is then taken forward for further assessment.

5.4.8 The Scoping Report for the Proposed Development set out what had been identified at that time to be the potentially significant environmental effects that needed to be considered in the ES. It outlined the approach to undertaking the assessments of these effects. The report was issued to PINS to inform its Scoping Opinion under the 2009 EIA Regulations (see **Section 1** of **Chapter 1** for more information). The scoping stage also enabled statutory and non-statutory organisations, and others with an interest in the Proposed Development (stakeholders) to comment on the proposed scope of the assessment. The PINS Scoping Opinion was issued on 10th August 2016 and is available on the PINS National Infrastructure Planning website[3] and included as **Appendix 1.2**.

5.4.9 The 2017 PEIR was issued in June 2017 as part of the statutory consultation process required under the Planning Act 2008[4]. It presented preliminary environmental information which has been incorporated into this revised 2018 PEIR.

5.4.10 As stated earlier the scope of the detailed assessment has evolved since the Scoping Opinion was received. This is as a result of a number of things including most particularly engagement with relevant parties such as:

- Relevant local authorities (planning, highways, flooding, ecology, environmental health, historic/conservation and landscape specialists) from:
  - Kent County Council (KCC); and
  - Thanet District Council (TDC);
- Environmental Agency (EA);
- Historic England (HE);
- Kent Wildlife Trust (KWT);
- Natural England (NE); and

[3] Scoping Opinion: Proposed Manston Airport (2016) The Planning Inspectorate. Available online at https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR020002/TR020002-000308-Scoping%20Opinion [Checked 14/11/17].
[4] Planning Act S23(4)(a)-(b) and (5)(a)-(b) (2008) Available online at http://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf [Checked 14/11/17].

- Southern Water (SW).

5.4.11 A number of other bodies have responded in writing as part of both the non-statutory and Statutory Consultation, for example the Civil Aviation Authority (CAA) and Ministry of Defence (MOD). Further information on their comments will be provided in the Consultation Report that will accompany the DCO application. Where the comments are relevant to the EIA this is identified in the applicable topic chapter in this document.

5.4.12 The technical chapters (**Chapters 6 - 17**) of this PEIR detail the scope of the assessment including its evolution in relation to effects considered to be significant and hence those that need to be subject to detailed assessment. These Chapters take into account comments received during the previous consultations including through the Scoping Opinion and comments received on the 2017 PEIR as well as regular engagement with relevant parties.

5.5 Project design and EIA scope evolution

5.5.1 Opportunities to avoid or reduce potential adverse effects, or to deliver environmental enhancements, may be identified even before the start of the EIA process. Further opportunities have been identified throughout the entirety of the EIA process. Some of these opportunities have become part of the Proposed Development for which consent is being sought.

5.5.2 The iterative process of design evolution, whereby design changes are made in response to environmental information and the amended Proposed Development is then subject to further assessment work. This leads to further design changes and continues through to the finalised proposals upon which the DCO application will be based.

5.5.3 Thus, it is the case that minor changes to the design of the scheme have been integrated as a result of the iterative design process and these were presented in **Chapter 3** of this report. As the assessment process continues, it may be necessary to integrate further environmental mitigation measures within the design. Any such changes will be reported within the ES either as part of the scheme description or as 'alternatives considered'.

5.5.4 Consideration of alternatives is part of the iterative process of EIA and a summary of the alternatives considered during the development of the Proposed Scheme has been included in **Chapter 2** of this PEIR.

5.5.5 The evolution of the design and the consideration of realistic alternatives has allowed the definition of a 'preferred option' which has subsequently been described as the Proposed Development. The approach taken during the development of the various assessments to be included in the ES has been to assess the effects of the Proposed Development as set out in **Chapter 3**, incorporating the mitigation measures that have been identified.

5.6 Identification of baseline conditions

Current baseline

5.6.1 A description of the aspects of the environment likely to be significantly affected by the Proposed Development is given in each of the topic chapters (**Chapters 6 - 17**). Desktop studies, consultation and field surveys have been used to identify the current conditions and environmental character of the area for each topic.

5.6.2 The nature of the sources of baseline data varies between topics, but in each case the data reflects the most up to date information for that topic that is available for inclusion in this PEIR.

5.6.3 The assessment of potentially significant effects requires a comparison to be made between the likely environmental conditions in the presence of the Proposed Development and in its absence (i.e. the 'baseline').

Future baseline

5.6.4 Whilst the baseline environment provides a description of the current baseline conditions, due to the length of the construction and operational programmes (see **Chapter 3**, **Section 3.3** and **Table 3.1**) it is appropriate to consider the changing nature of the environment in the event that the Proposed Development is not constructed or operated. This is referred to as the 'future baseline' and represents a 'do nothing' scenario. It cannot be assumed that the baseline conditions in the absence of the Proposed Development would be the same as at present (2018). This reflects changes resulting from human influences, such as new development or increased traffic which have the potential to modify the current environmental conditions.

5.6.5 The baseline information and data are being used to predict the likely future baseline conditions when the Proposed Development would be constructed and operated. It is against these predicted baseline conditions that the assessment has been carried out.

5.6.6 The nature of the future baseline will vary between the environmental topic chapters and is influenced by a combination of natural and man-made processes.

5.6.7 As only specific aspects of the environment are affected by differences between the current baseline and the future baseline, not all assessments will be influenced in the same way or to the same extent. For many topics, the future baseline will be the same as the current baseline. Specific features of the future baseline which affect the assessment are discussed in the relevant technical topic chapters of this PEIR.

5.6.8 The consideration of a future baseline introduces the potential for additional receptors (to those identified from the current baseline) to be potentially affected by the Proposed Development. For example, a new residential development (with a valid planning permission) would have the potential to result in additional residential receptors during the construction (for example construction noise, visual effects) and operation (affected by, for example operational noise, visual effects) of the Proposed Development.

5.6.9 For some of the environmental topics, an assessment against a set threshold was more appropriate due to the nature of the environmental topic and the availability of guidance documents typically used for such assessments.

5.7 Assessment years

5.7.1 The anticipated construction and operational programme for the Proposed Development is provided in **Section 3.3** of this PEIR. Construction works will be undertaken in four phases with phases 2 - 4 reflecting the expected growth in demand and take up of capacity. Phase 1 construction will commence in Spring 2019 and be completed by late 2020 (the opening year).

5.7.2 The assessment year (or years) for the assessment of construction effects vary between environmental topics and is dependent on a number of factors; for example, the geographical location of a receptor (or a group of receptors) and the specific Proposed Development component (or components) which are considered to give rise to an effect (or effects). Effects on receptors also have the potential to arise for a part of the construction phase or the entirety of the construction phase, for one of the construction phases or for all construction phases.

5.7.3 The assessment year (or years) for the assessment of operational effects also varies between environmental topics. The approach adopted is that the 'opening year' will be used as the basis of assessment of operational effects at which time the Proposed Development would be fully commissioned and operational. The operational assessment will also consider Year 6 and Year 20, as these represent the first year that 10,000 freight Air Traffic Movements (ATMs), and the year by which maximum capacity would be reached respectively.

5.7.4 Certain environmental topics have considered alternative years, where appropriate, to consider a reasonable worst-case scenario, and to consider effects both before and after the implementation of environmental measures.

5.8 Overview of assessment methodology

Introduction

5.8.1 For each topic, (for example, landscape and visual or noise) the detailed assessment of likely significant effects is being completed by those with relevant specialist skills drawing on their experience of working on other development projects, good practice in EIA and on relevant published information. For some topics, use will be made of modelling or other methodologies.

5.8.2 Each topic chapter in this report follows a common format (which will also be adopted for the ES), as outlined below:

- Introduction – which includes the limitations or assumptions that have been made in preparation of the chapter;
- Policy and legislative context – which provides a summary of the national and local planning policy information relevant to the particular topic;
- Data gathering methodology – explains the approach taken to baseline data collection including desk based and survey work completed and any relevant consultation on the approach;
- Overall baseline (where appropriate, further detail will be set out under **Section 8** on the assessment of potential effects);
- Environmental measures incorporated into the Proposed Development – which have been assumed to be implemented in order to avoid, reduce or compensate for adverse effects of the proposals. The assessment is therefore completed for a mitigated scheme;
- Scope of the assessment – this sets out the likely significant effects that have been given further consideration in the ES and those that have been scoped out as the effects are unlikely to be significant;
- Assessment methodology – each technical chapter explains the methodology used to predict the effects of the Proposed Development, including quantitative methods where relevant. An explanation is also provided as to how significance of effects has been determined with reference to published guidance, including draft guidance, where appropriate. The approach that has been used in evaluating the significance of effects is also explained. This involves a combination of professional judgement and a topic-specific significance evaluation methodology that draws on the results of the assessment work that has been carried out;
- Assessment of effects - where appropriate, dealing separately with each receptor or category of receptors that could be significantly affected – the assessment is made against the predicted future baseline and, in so doing, incorporates consideration of any cumulative effects. The need for any additional mitigation (over and above the measures that have been incorporated into the scheme) is also considered; and
- Conclusions of significance evaluation.

5.9 Combined and Cumulative Effects

5.9.1 The 2017 EIA Regulations include a requirement to give consideration to 'any indirect, secondary, **cumulative**, short, medium and long-term, permanent and temporary, positive and negative effects of the development'[5]; within the approach usually taken, and the one that will be adopted for the

[5] Schedule 4, Part 1, Paragraph 20 (2017) Environmental Impact Assessment Regulations. Available online at http://www.legislation.gov.uk/uksi/2017/571/pdfs/uksi_20170571_en.pdf [Checked 14/11/17].

Manston Airport EIA, is to distinguish between combined effects, and cumulative effects, see **Box 5.3**. This approach is consistent with the advice contained within PINS Advice Note 9[6].

Box 5.3 Combined Effects and Cumulative Effects – PINS Advice Note Nine
Combined effects are defined as the inter-relationships between topics which occur where a number of separate effects, e.g. noise and air quality, affect a single receptor such as fauna. These will be assessed, where appropriate, within the topic chapters. Cumulative effects are defined as the interaction of the Proposed Development and other 'major' developments (as defined by PINS Advice Note 9: Rochdale Envelope, p7) where there is the potential for combined environmental effects. Within the Manston Airport ES cumulative cffects will be assessed within a separate Cumulative Effects chapter. The approach adopted for Cumulatvie Effects Assessment is that presented within PINS Advice Note 17: Cumulative Effects Assessment.

Combined Effects

5.9.2 Typically, **combined effects** occur when different activities associated with a project act upon the same environmental receptor (e.g. the additive effect of noise from different sources upon local residents when noise from piling activities may occur at the same time as transport related noise and may act upon the same receptor(s) during the construction phase). In determining such effects, consideration would be given to the sensitivity of the receptor and the magnitude of environmental change. Combined effects are assessed in relation to a specific receptor, but here the effect could be caused by the interactions of different effects from project activities. Individually these may be insignificant (e.g. the interaction of noise disturbance and light pollution on bat foraging). Where appropriate, interactive combined effects across topic areas will be assessed, where the nature of the effect allows professional judgment to be applied.

5.9.3 The approach most commonly taken within EIA and that will be adopted for the combined assessment, is that effects such as increased noise or effects on visual receptors are assessed individually, against topic-specific criteria that are well established within standard EIA. Threshold limits for effects such as noise and air pollution are, for the purposes of establishing effects on human receptors, set at levels that, if exceeded, can have health or nuisance implications for the receptor. Therefore, if effects are concluded as 'acceptable' (i.e. noise levels at residential receptors meet acceptable noise criteria) and are therefore considered to be not significant, then the significance of the effect will not change when considered collectively with other non-significant effects. This is because such effects do not together, for the most part, cause combined effects. For example, increases in noise do not make the effects caused by an adverse effect on views worse for a human receptor.

Cumulative Effects

5.9.4 The EIA will consider the potential for **cumulative effects** associated with other development, i.e. whether the effects from the Proposed Development could be combined with similar effects from other schemes to result in significant cumulative effects. It is important to recognise that the baseline assessments in the EIA will include existing development. It is EIA best practice to consider the future baseline situation, which includes other schemes that are likely to be constructed or have not yet commenced but have a valid planning permission. In addition, proposed schemes which are the subject of a planning application (at the time of preparing the EIA), will also be considered.

5.9.5 The process for undertaking a Cumulative Effects Assessment (CEA) for an NSIP has been defined by the PINS and is set out within PINS Advice Note 17[7]. The guidance defines a four-stage process for a CEA as follows:

[6] Advice Note Nine, Rochdale Envelope (version 2). Planning Inspectorate, April 2012.
[7] Advice Note Seventeen, Cumulative Effects Assessment (version 1). Planning Inspectorate, December 2015.

- Stage 1: establish the NSIP Zone of Influence (ZOI) and identify long list of 'other development';
- Stage 2: Identify short list of 'other development' for CEA;
- Stage 3: Information gathering; and
- Stage 4: Assessment.

5.9.6 This approach will be adopted in the final ES however a cumulative effects assessment has not been included in the PEIR as it will be finalised on completion of all ES chapters.

5.10 Preparation of the ES by Competent Experts

5.10.1 One of the new requirements of the 2017 EIA Regulations is that the ES should 'include a statement from the applicant on the relevant expertise or qualifications of competent experts. In this case the PEIR has been prepared by Amec Foster Wheeler (now Wood) on behalf of the applicant (Riveroak Strategic Partners Limited).

5.10.2 Amec Foster Wheeler are an established multi-disciplinary consultancy accredited by the Institute of Environmental Management and Assessment (IEMA) as EIA Practitioners. They bring experience from numerous aviation projects including their long-term role at Heathrow Airport which complements broad experience of other airport and aviation related developments at Bristol, Cardiff, Newquay and Derry in the recent past.

5.10.3 The wider project team includes RPS who are undertaking the masterplanning for the airport as well as taking the lead on health impact assessment. In addition, a number of aviation specialists have been employed by the client to prepare numerous operations related studies including the business case and airport operations manual.

5.10.4 The ES will contain a full list of the competent experts involved in each of the technical studies as well as their relevant qualifications and experience. For the purposes of this PEIR, the names of the main contributors are shown on the cover page.

Contents

6. Air quality

6.1 Introduction

6.1.1 This chapter sets out an assessment of the effects of the Manston Airport project ("the Proposed Development") on air quality. An appendix to this chapter sets out the results of assessments of the effects of odour.

6.1.2 This chapter should be read in conjunction with the description of the Proposed Development (**Chapter 3**). Following a summary of the limitations of the Preliminary Environmental Information Report (PEIR), the chapter outlines the relevant policy, legislation and guidance that has informed the assessment (**Section 6.2**), and the data gathering methodology that was adopted as part of air quality assessment (**Section 6.3**). This leads on to a description of the scope of the assessment (**Section 6.4**), the overall baseline conditions (**Section 6.5** and **Appendix 6.2**), the environmental measures incorporated into the Proposed Development (**Section 6.6**) and the assessment methodology (**Section 6.7** and **Appendix 6.3**). The chapter concludes with the results of the assessment (**Sections 6.8–6.13**) and a summary of the significance of the Proposed Development's air quality impacts (**Section 6.14**).

6.1.3 The principal sources of air quality impacts are emissions to atmosphere from:

- Plant and equipment used during the construction phase;
- Road traffic generated during the construction phase;
- Aircraft and airside plant and equipment during the operation phase; and
- Road traffic generated during the operation phase.

6.1.4 The assessment calculates rates of emissions of air pollutants from the above sources and uses a dispersion model to calculate the resulting ground-level concentrations of air pollutants, averaged over both short and long time periods. These concentrations are then evaluated for significance in relation to the air quality standards and assessment levels set in legislation and in Government and international guidance.

6.1.5 Although the bulk of this section is concerned with local air quality, an assessment of odour impacts has also been carried out, and this is reported in **Appendix 6.4**.

6.1.6 The assessment makes a number of worst-case assumptions to ensure that the predicted impacts are not underestimated. In fact it is likely that the impacts are overestimated. The results should be interpreted acknowledging that they present a worst-case scenario.

Limitation of this PEIR

6.1.7 The nature of the modelling process means that it has not been possible to include the contribution from road traffic in contour plots, so when viewing the contour plots it should be borne in mind that concentrations close to major roads will be greater than those shown. However, the road traffic concentration has been included in the assessment of specific receptors where there is relevant exposure (**Sections 6.8–6.10**), so this does not affect the robustness of the assessment. For similar reasons, it has not been possible to include the contribution from road traffic in the ecological assessment of daily mean NO_x, but this is not expected to materially affect the conclusions of the assessment given the distance of roads from the sensitive ecological receptors.

6.1.8 No other technical difficulties have been encountered whilst preparing the Air Quality Chapter.

6.2 Policy, legislative and guidance context

6.2.1 A study of 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 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.

6.2.2 Full details of all national and local planning policies relevant to the Proposed Development can be found in **Appendix 4.1**. The following section outlines legislation and policy relevant to this air quality assessment.

EU legislation

Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe

6.2.3 Directive 2008/50/EC (the 'Directive')[1], which came into force in June 2008, consolidates existing EU-wide air quality legislation (with the exception of Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons) and provides a new regulatory framework for $PM_{2.5}$.

6.2.4 The Directive sets limits, or target levels, for selected pollutants that are to be achieved by specific dates and details procedures EU Member States should take in assessing ambient air quality. Regulated pollutants include sulphur dioxide (SO_2), nitrogen dioxide (NO_2), oxides of nitrogen (NO_x), particulate matter (PM_{10} and $PM_{2.5}$), lead (Pb), benzene (C_6H_6) and carbon monoxide (CO).

6.2.5 The limit and target levels relate to concentrations in ambient air. At Article 2(1), the Directive defines ambient air as:

> *"…outdoor air in the troposphere, excluding workplaces as defined by Directive 89/654/EEC where provisions concerning health and safety at work apply and to which members of the public do not have regular access."*

6.2.6 In accordance with Article 2(1), Annex III, Part A, paragraph 2 details locations where compliance with the limit values does not need to be assessed:

> *"Compliance with the limit values directed at the protection of human health shall not be assessed at the following locations*:
>
> *a) any locations situated within areas where members of the public do not have access and there is no fixed habitation;*
>
> *b) in accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply; and*
>
> *c) on the carriageway of roads; and on the central reservation of roads except where there is normally pedestrian access to the central reservation."*

Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

6.2.7 Directive 92/43/EEC (the 'Habitats Directive')[2], which originally came into force in 1994, provides for the designation and protection of 'European sites' of high nature value, the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites. It is transposed into English law as the Conservation of Habitats and Species Regulations 2010 (the Habitats Regulations). Sites which are important for habitats or species (as

[1] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050
[2] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043

listed in Annexes I and II of the Habitats Directive) are designated as Special Areas of Conservation (SACs).

6.2.8 The Habitats Regulations also regulate Special Protection Areas (SPAs) classified under Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive). These sites, SACs and SPAs, form a network termed Natura 2000.

6.2.9 The Habitats Regulations also provide for the control of potentially damaging operations, whereby consent may only be granted once it has been shown through 'appropriate assessment' that the proposed operation will not adversely affect the integrity of the site. When considering potentially damaging operations, the 'precautionary principle' must be applied; that is, consent cannot be given unless it is ascertained that there will be no adverse effect on the integrity of the site.

UK legislation

The Environment Act 1995

6.2.10 Part IV of the Environment Act 1995[3] requires that Local Authorities periodically review air quality within their individual areas. This process of Local Air Quality Management (LAQM) is an integral part of delivering the Government's Air Quality Objectives (AQOs).

6.2.11 To carry out an air quality review and assessment under the LAQM process, Government guidance formerly recommended a three-stage approach. This phased review process used initial simple screening methods and progresses through to more detailed assessment methods of modelling and monitoring in areas identified to be at potential risk of exceeding the objectives in the Regulations. From the 2016 reporting year, Defra introduced a streamlined process with a single Annual Status Report, on the grounds that local authorities had built up sufficient understanding of local air quality issues that the more elaborate procedure is no longer required.

6.2.12 Review and assessments of local air quality aim to identify areas where national policies to reduce vehicle and industrial emissions are unlikely to result in air quality meeting the Government's air quality objectives by the required dates.

6.2.13 For the purposes of determining the focus of Review and Assessment, Local Authorities should have regard to those locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective.

6.2.14 Where the assessment indicates that some or all of the objectives may be potentially exceeded, the Local Authority has a duty to declare an Air Quality Management Area (AQMA). The declaration of an AQMA requires the Local Authority to implement an Air Quality Action Plan, to reduce air pollution concentrations so that the required AQOs are met.

The Air Quality Standards Regulations 2010

6.2.15 The Air Quality Standards Regulations 2010 (the 'Air Quality Standards Regulations')[4] came into force on 11 June 2010 and transpose Directive 2008/50/EC into UK legislation. The limit values in Directive 2008/50/EC are transposed into the Regulations with attainment dates in line with the Directive. The limit values in the Air Quality Standards Regulations are generally referred to as Air Quality Standards (AQS).

6.2.16 AQS's are legally binding limits on concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects of sensitive groups or on ecosystems.

[3] Environment Act 1995. http://www.legislation.gov.uk/ukpga/1995/25/contents
[4] The Air Quality Standards Regulations 2010. Statutory Instrument 2010 No. 1001. http://www.legislation.gov.uk/uksi/2010/1001/pdfs/uksi_20101001_en.pdf

6.2.17 Similarly to Directive 2008/50/EC, the Air Quality Standards Regulations define ambient air as:

> *"…outdoor air in the troposphere, excluding workplaces where members of the public do not have regular access."*

6.2.18 Directve 2008/50/EC prescribes locations where compliance with the AQS (limit value) does **not** need to be assessed[5]:

> "*Compliance with the limit values directed at the protection of human health does not need to be assessed at the following locations:*
>
> *a) any location situated within areas where members of the public do not have access and there is no fixed habitation;*
>
> *b) on factory premises or at industrial locations to which all relevant provisions concerning health and safety at work apply; and*
>
> *c) on the carriageway of roads and on the central reservation of roads except where there is normally pedestrian access to the central reservation."*

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

6.2.19 The 2007 Air Quality Strategy for England, Scotland Wales and Northern Ireland[6] provides a framework for improving air quality at a national and local level and supersedes the previous strategy published in 2000. It imposes a number of obligations on local authorities to manage air quality. It does not directly impose obligations on developers.

6.2.20 Central to the Air Quality Strategy are health-based criteria for certain air pollutants; these criteria are based on medical and scientific reports on how and at what concentration each pollutant affects human health. The Air Quality Objectives (AQOs) derived from these criteria are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, over a specified averaging period. At paragraph 22 of the 2007 Air Quality Strategy, the point is made that the objectives are:

> *"…a statement of policy intentions or policy targets. As such, there is no legal requirement to meet these objectives except where they mirror any equivalent legally binding limit values…"*

6.2.21 The AQOs, based on a selection of the objectives in the Air Quality Strategy, were incorporated into UK legislation through the Air Quality Regulations 2000, as amended.

6.2.22 Paragraph 4(2) of The Air Quality (England) Regulations 2000 states:

> *"The achievement or likely achievement of an air quality objective prescribed by paragraph (1) shall be determined by reference to the quality of air at locations -*
>
> *a) which are situated outside of buildings or other natural or man-made structures above or below ground; and*
>
> *b) where members of the public are regularly present."*

6.2.23 Consequently, compliance with the AQOs should focus on areas where members of the general public are regularly present over the duration of the concentration averaging period specific to the relevant AQO.

[5] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. Paragraph 2, Part 1 of Schedule 1.
[6] Defra et al (2007) The Air Quality Strategy for England, Scotland Wales and Northern Ireland. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf

Other guideline values

6.2.24 In the absence of statutory standards for the other prescribed substances that may be found in the emissions, there are several sources of applicable air quality guidelines.

Air Quality Guidelines for Europe, the World Health Organisation (WHO)

6.2.25 The aim of the WHO Air Quality Guidelines for Europe[7] is to provide a basis for protecting public health from adverse effects of air pollutants and to eliminate or reduce exposure to those pollutants that are known or likely to be hazardous to human health or well-being. These guidelines are intended to provide guidance and information to international, national and local authorities making risk management decisions, particularly in setting air quality standards.

Environmental Assessment Levels (EALs)

6.2.26 The Environment Agency (EA) guidance note "Air emissions risk assessment for your environmental permit"[8] contains long and short-term Environmental Assessment Levels (EALs) for releases to air derived from a number of published UK and international sources. For the pollutants considered in this study, these EALs are equivalent to the AQS and AQOs set in force by the Air Quality Strategy for England, Scotland Wales and Northern Ireland.

6.2.27 The guidance note includes two additional EALs of relevance to this assessment. The first is a limit of 75 µg m^{-3} on the maximum daily mean NO_x at ecological receptors. This is based on guidance from the World Health Organization[7], which states:

> *"Experimental evidence exists that the CLE [critical level] decreases from around 200 µg m^{-3} to 75 µg m^{-3} when in combination with O_3 or SO_2 at or above their critical levels. In the knowledge that short-term episodes of elevated NO_x concentrations are generally combined with elevated concentrations of O_3 or SO_2, 75 µg m^{-3} is proposed for the 24 h mean."*

6.2.28 In general, current conditions in the UK are such that elevated concentrations of O_3 or SO_2 are rare. As such, it is considered that 200 µg m^{-3} is the more appropriate assessment level for daily mean NO_x. This has been accepted by Natural England[9].

Guidance on evaluation criteria

IAQM/EPUK guidance for human receptors

6.2.29 Although no official procedure exists for classifying the magnitude and significance of air quality effects from a new development for planning purposes, guidance issued by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK)[10] suggests ways to address the issue. In the IAQM/EPUK guidance, the magnitude of impact due to an increase/decrease in annual mean NO_2 and PM_{10} is described as “negligible”, “slight”, “moderate” or “substantial”, taking into account both the change in concentration at a receptor brought about by a new development as a percentage of the assessment level, and the actual concentration at that receptor.

6.2.30 It must be emphasised that these descriptors are not intended to be used robotically as a measure of the significance of a proposed development. As the IAQM/EPUK guidance states:

[7] World Health Organization (2000) Air Quality Guidelines for Europe, Second Edition. http://www.euro.who.int/__data/assets/pdf_file/0005/74732/E71922.pdf
[8] ‘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.
[9] Meeting on 5 September 2017.
[10] EPUK and IAQM, 2017. ‘Land-use Planning and Development Control: Planning for Air Quality’, v1.2.

"The overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered."

6.2.31 These descriptors are only designed for annual mean concentrations. Descriptors for short-term (daily or hourly) concentrations are not available.

EA guidance for human receptors

6.2.32 EA guidance[11] gives criteria for screening out source contributions in the context of environmental permit applications. Although intended for use in evaluating permit applications, it is often used for planning applications where no better guidance is available (particularly for ecological receptors). This guidance suggests applicants first perform a screening assessment and, if the results of that do not meet the screening-out criteria, then perform a detailed modelling assessment.

6.2.33 This guidance also introduces the terms 'process contribution' (PC), meaning the concentration or deposition rate resulting from the installation activities only, excluding other sources, and 'predicted environmental contribution' (PEC), meaning the total modelled concentration, equal to the PC plus the background contribution. These terms are commonly used in air quality assessments, even where the term 'process' is not strictly accurate, and so are used in this assessment with 'process' referring to the Proposed Development at Manston Airport.

6.2.34 For human receptors, there is no need for further assessment if the screening calculation finds that:

- both the following are met:
  - the short-term process contribution (PC) is less than 10% of the short-term air quality assessment level (AQAL); **and**
  - the long-term PC is less than 1% of the long-term AQAL;
- **or** both the following:
  - the short-term predicted environmental concentration (PEC, equal to PC plus background) is less than 20% of the short-term AQAL; **and**
  - the long-term PEC is less than 70% of the long-term AQAL

6.2.35 where the short-term PEC is calculated as the PC plus twice the long-term background concentration.

EA and IAQM guidance for ecological receptors

6.2.36 The EA guidance[11] also gives criteria for screening out source contributions at designated nature conservation sites.

6.2.37 For Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites and Sites of Special Scientific Interest (SSSIs), there is no need for further assessment if the screening calculation finds that:

- both the following are met:
  - the short-term PC is less than 10% of the short-term AQAL; **and**
  - the long-term PC is less than 1% of the long-term AQAL;
- **or**:

[11] Environment Agency (2016) '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.

- the long-term PEC is less than 70% of the long-term AQAL.

6.2.38 For local nature sites, emissions are insignificant if:

- the short-term PC is less than 100% of the short-term AQAL; **and**
- the long-term PC is less than 100% of the long-term AQAL.

6.2.39 Following detailed dispersion modelling, no further action is required if:

- the proposed emissions comply with Best Available Technique (BAT) associated emission levels (AELs) or the equivalent requirements where there is no BAT AEL; and
- the resulting PECs won't exceed AQALs.

6.2.40 IAQM guidance[12] provides further suggestions on circumstances where there is definitely an insignificant effect on a site in relation to the Habitats Directive. This guidance endorses the EA criteria above, noting that:

> *"The EA, in consultation with the conservation agencies, is the only organisation with any statutory responsibility that has set out principles and guidance for the assessment of air quality impacts on nature conservation sites. As a consequence, its thinking has been applied to other developments where such assessments are required, involving sources that are not industrial and not regulated by the EA. There is nothing inherently wrong with such an approach, provided that the underlying principles are followed."*

6.2.41 The IAQM guidance goes on to emphasise that these criteria are for screening out effects from further assessment, not an indication that there is an adverse impact:

> *"As the only available source of guidance that is relevant to this topic, the EA's approach to assessment has been widely adopted. Unfortunately, this has also led to many instances where the criterion for determining when a new source has an inconsequential effect has been wrongly used as a threshold for the onset of damage to a habitat. It is quite clear from studying the EA's original guidance and its more recent statements that this is a false interpretation. Instead, in cases where an air quality impact is greater than 1% of a critical level or critical load, this should serve only as a trigger to consider the matter in greater detail with the involvement of a qualified ecologist, to consider the likelihood of an adverse effect on the integrity of the habitat. Furthermore, it should be recognised that the criterion was set as 1% and not 1.0%. It may be considered by some that it is prudent to explore the likelihood of an adverse effect when the impact is, say 1.2% of a critical load, but the reality is that this was never the original intention of the methodology. The calculation of impacts is always subject to some uncertainty, especially where deposition is concerned. It would be more in the spirit of the original proposal to use 1% as a criterion if impacts that were clearly above 1% were treated as being potentially significant, rather than impacts that are about 1% or slightly greater.*
>
> *Regardless of these observations on the precision and accuracy of predicted impacts, it is the position of the IAQM that the use of a criterion of 1% of an assessment level in the context of habitats should be used only to screen out impacts that will have an insignificant effect. It should not be used as a threshold above which damage is implied and is therefore used to conclude that a significant effect is likely. It is instead an indication that there may be potential for a significant effect, but this requires evaluation by a qualified ecologist and with full consideration of the habitat's circumstances."*

[12] IAQM (2016) Use of a criterion for the determination of an insignificant effect of air quality impacts on sensitive habitats. January 2016.

National Planning Policy Framework (NPPF)

6.2.42 The NPPF[13] is a key part of the government's reforms to make the planning system less complex and more accessible. The framework acts as guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications.

6.2.43 Paragraph 124 of the NPPF states:

> *"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."*

6.2.44 Further detail in relation to air quality is contained in the air quality section of the planning practice guidance website[14].

Thanet District Council's Local Plan

6.2.45 Thanet District Council's (TDC) Local Plan was adopted in 2006, and 93 of the policies have been saved and remain in force. Of these, the policy with direct relevance to air quality is EP5 Local Air Quality Monitoring. This declares the objective "*to maintain the overall environmental quality of the district".* In particular, "*proposals for new development that would result in the national air-quality objectives being exceeded will not be permitted."*

6.2.46 TDC is preparing an updated Local Plan, with a draft issued for consultation in 2015[15]. In this draft, policy SP05 addresses Manston Airport, and says on the subject of air quality:

> *"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.*
>
> *... 5) The provision of an air quality assessment in compliance with the Air Quality Management Plan to demonstrate that the development will not lead to a harmful deterioration in air quality. Permission will not be given for development that would result in national air quality objectives being exceeded."*

6.2.47 The draft plan's main section on air quality states:

> *"16.18 Thanet generally has very good air quality; however there are areas at The Square in Birchington, the junction of Hereson Road/Boundary Road and High Street St Lawrence, Ramsgate where air quality is poor due to pollution from road transport.*
>
> *16.19 An urban wide Air Quality Management Area has been declared to enable effective management of air quality."*

6.2.48 It adds that development proposals must demonstrate:

> *"1) The cumulative effect of further emissions;*
>
> *2) The proposed measures of mitigation through good design and offsetting measures that would prevent the National Air Quality Objectives being exceeded or reduce the extent of the air quality deterioration. These will be of particular importance within the urban AQMA, associated areas and areas of lower air quality.*
>
> *Proposals that fail to demonstrate these will not be permitted."*

[13] National Planning Policy Framework. March 2012. https://www.gov.uk/government/publications/national-planning-policy-framework--2
[14] Guidance: Air quality. 6 March 2014. https://www.gov.uk/guidance/air-quality--3
[15] Thanet District Council. Draft Thanet Local Plan to 2031 Preferred options consultation. January 2015.

Kent and Medway Air Quality Partnership

6.2.49 The Kent and Medway Air Quality Partnership has prepared Air Quality Planning Guidance[16] aimed at local authorities, developers and consultants. The document pulls together planning policy and guidance, summarises the information that is required to support an application, describes the air quality assessment process, and discusses approaches to mitigation. It has no legal status but acts as a guidance note summarising requirements and best practice for managing air quality within the planning process.

6.3 Data gathering methodology

6.3.1 This section describes the desk study undertaken to inform the air quality assessment. In order to establish the baseline situation, air quality data was obtained from the sources listed in **Table 6.1** to identify existing data about the site and the surrounding area.

Desk Study

6.3.2 Information on the current concentrations of air pollutants was obtained from published monitoring and modelling studies, as summarised in **Table 6.1**.

Table 6.1 Information used in the preparation of this PEIR chapter

Source	Data
Air Pollution Information Service (APIS)	Mapped background deposition rates. Critical level and critical load information for nitrogen and acidity.
Department for Environment, Farming and Rural Affairs (Defra)	Mapped background air pollutant concentrations.
Environment Agency (EA)	Locations of sensitive ecological receptors.
MAGIC	Locations of sensitive ecological receptors.
Thanet District Council (TDC)	Air Quality monitoring data.

Survey work

6.3.3 In view of the extensive monitoring data available from TDC (see **Section 6.5)**, it was not considered that any additional monitoring was required for determining baseline concentrations. This was stated in the scoping document (**Appendix 1.1**) and the 2017 PEIR and the scoping opinion (**Appendix 1.2**) and the consultation responses **(Appendix 1.3)** did not raise any objection to this intention.

6.3.4 If the Proposed Development proceeds, the ZH3 Thanet Airport continuous monitor will be reinstated. This will serve to identify the actual effects of the development upon ambient air quality at that location.

Consultation

6.3.5 Since 2015 and throughout the undertaking of the survey and assessment work, RiverOak Strategic Partners (RiverOak) has engaged with consultees with an interest in potential air quality effects (see **Chapter 1** for more information). A non-statutory consultation took place from June to September 2016. A scoping report (**Appendix 1.1**), including a chapter covering air quality, was

[16] Kent & Medway Air Quality Partnership. Air Quality Planning Guidance. December 2015.

produced and submitted to the Planning Inspectorate who provided a scoping opinion (**Appendix 1.2**). A statutory consultation then took place from June to July 2017, consulting on the preliminary environmental information report (the 2017 PEIR) in accordance with the provisions of the 2009 EIA Regulations. The 2017 PEIR included results of a preliminary air quality assessment.

6.3.6 Organisations that were consulted include:

- The Planning Inspectorate (PINS);
- TDC;
- Public Health England (PHE); and
- Natural England.

6.3.7 A summary of the consultee comments and responses provided is provided in **Table 6.2** along with a response to identify how the matter is dealt with in this report.

Table 6.2 Consultee comments

Consultee	Comments and considerations	How addressed in this 2018 PEIR
PINS	It is proposed to scope out effects from pollutants such as SO_2, CO and VOCs on the basis of low background concentrations and low emission rates. The Secretary of State does not agree to scope this out. There is a lack of detailed justification to support scoping out of these pollutants based on the geographical distribution of likely pollutant sources, e.g. engine ground runs, relative to sensitive receptors and therefore the likelihood of short or long term exposure and exceedance of the relevant air quality objective.	Further discussion and justification is given in **Section 6.4**, Paragraphs 6.4.17 et seq.
PINS	It is proposed to scope out effects on workplace locations (Scoping Report paragraph 5.6.16). The Secretary of State does not agree to scope these effects out. The ES should provide an assessment of all receptors likely to be exposed to elevated levels of pollutants unless otherwise exempted under other legislation.	It is clear, both in the EU Directive (2008/50/EC) and in the Air Quality Standards Regulations 2010, that workplaces are not considered as relevant receptor locations. They are considered under Health & Safety legislation, where Workplace Exposure Levels (WELs) are set for certain air pollutants of occupational concern. This is the justification for scoping-out these locations as relevant receptors and is why they have not been included in this assessment.
PINS	It is proposed to scope out odour assessment from the air quality assessment based on the relatively small size of the development. The Secretary of State does not agree to scoping this out and considers that further justification is required based on the geographic location of potential odour sources and any potential sensitive receptors. The Applicant's attention is drawn to TDC's comments, contained in Appendix 3, in this regard. This justification must include reference to the potential for movement of contaminated material during construction. Otherwise, the applicant should provide an assessment in accordance with the relevant Institute of Air Quality Management (IAQM) standards.	An assessment of odour has been carried out in accordance with the IAQM Guidance and is provided as **Appendix 6.4**.

Consultee	Comments and considerations	How addressed in this 2018 PEIR
PINS	The Applicant identifies that the Proposed Development has potential to give rise to air quality effects during construction and operation from a range of sources. The Secretary of State agrees that changes in air quality should be assessed in relation to compliance with the European air quality limit values and with particular reference to AQMAs, such as the Thanet Urban Area AQMA. The Applicant should set out within the ES the proposed measures to minimise emissions from construction and operational activities.	The ES will include measures to minimise emissions from construction and operational activities as part of the Construction Environmental Management Plan (CEMP).
PINS	The Secretary of State is generally satisfied with the methodology proposed, which is based on industry standard methods and includes the assessment of effects on both human and non-human receptors. Specific sensitive human and non-human receptors are not identified within the scope. The ES must justify the choice of receptors selected and these must be identified and agreed with TDC and Natural England (NE) respectively.	The identification of receptors, and the methodology used in their identification, were set out in the previous 2017 PEIR and are repeated in this 2018 PEIR. Specific consultation with TDC and Natural England has been undertaken in order to reach agreement on the final selection of the receptors considered in the assessment, which are set out in **Section 6.4**.
PINS	Scoping Report paragraph 5.6.12 states that dispersion modelling 'may' be undertaken for operational activity and is unclear regarding the exact scope of the pollutants proposed to be assessed. The Secretary of State considers that dispersion modelling using the Aviation Environmental Design Tool (AEDT), as indicated in paragraph 5.6.13, is appropriate and should be based on the worst case scenario, assumed to be full operation by 2035. This should include on- and off-airport effects where relevant.	This assessment details the dispersion modelling carried out. As detailed in this 2018 PEIR (**Appendix 6.3**), AEDT was rejected after further consideration and an alternative modelling methodology was chosen which is considered more appropriate.
PINS	The Secretary of State agrees that traffic emissions should be assessed using ADMS-Roads, subject to the relevant EPUK/IAQM thresholds. Such information should inform the ecological assessments. In light of the proximity of the site to the Thanet Urban Area AQMA, the decision regarding whether detailed air quality assessment is undertaken should be based on all of the relevant indicative threshold criteria set out in Tables 6.1 and 6.2 of the EPUK/IAQM guidance, 'Land-Use Planning & Development control: Planning For Air Quality', May 2015.	The air quality road traffic assessment considers the potential for impacts upon biodiversity and protected ecological resources, in relation the Critical Levels and Critical Loads of nitrogen and nitrogen-related acidity. The threshold and magnitude of effect and significance criteria included in the EPUK/IAQM Guidance have been used.
PINS	The Applicant should set out in the ES any proposals for long term air quality monitoring of airport-related activities.	The previous airport operator funded TDC to operate a continuous monitor near the airport. RiverOak has agreed to reinstate this arrangement if the Proposed Development goes ahead.
PINS	The Applicant's attention is drawn to TDC's comments, contained in Appendix 3, in relation to potential impacts of emissions on climate change. The applicant should give consideration to the carbon footprint of the Proposed Development during construction and operation, demonstrating how the development will contribute to achieving the objective of reducing global greenhouse gas emissions set out in the Aviation Policy Framework (Department for Transport (2013).	**Chapter 16** includes a quantitative assessment of changes in emissions of carbon dioxide arising from the Proposed Development, together with an evaluation in relation to the proposed cap on aviation emissions of 37.5 Mt by 2050.

Consultee	Comments and considerations	How addressed in this 2018 PEIR
TDC	Odour assessment - it is agreed that there is not accepted methodology for undertaking odour assessment but noted that this work has been undertaken at other airports, and therefore there could be further assessment of the potential odour effects from the operation of the airport in order to allow for the effect to be scoped out from further assessment. A qualitative assessment of aircraft odour emissions given the history of odour complaints from the former airport use should also be provided in the ES.	This 2018 PEIR includes an assessment of odour in accordance with the IAQM Guidance (**Appendix 6.4**)
TDC	There is no reference to CO_2 emissions and climate change which is now general considered within EIA as best practice. The scale of the development is such that an assessment of the projects impact on the regions and the UK's carbon budget should be provided.	**Chapter 16** includes a quantitative assessment of changes in emissions of carbon dioxide arising from the Proposed Development, together with an evaluation in relation to the proposed cap on aviation emissions of 37.5 Mt by 2050.
TDC	An emissions mitigation assessment must be provided in accordance with Thanet District Council Air Quality Technical Planning guidance 2016.	An assessment is included in this 2018 PEIR (**Section 6.13**).
TDC	The air quality assessment should also include flight training school operations, fire training (plume dispersal) and airside aircraft maintenance emissions.	Flight training school operations are included in this assessment (see **Appendix 6.3**). There will be no fire training activities that lead to air quality emissions. No airside aircraft maintenance activities have been identified that lead to significant air quality emissions.
TDC	The applicant should also consider installation of a permanent air quality monitoring station on approval.	The previous airport operator funded TDC to operate a continuous monitor near the airport. RiverOak has agreed to reinstate this arrangement if the Proposed Development goes ahead.
Natural England	Natural England welcomes the recognition in this chapter 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.	Noted.
Natural England	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.	This 2018 PEIR in **Chapter 14** includes an assessment of impacts from road traffic in accordance with generally accepted criteria.

Consultee	Comments and considerations	How addressed in this 2018 PEIR
PHE	We note that the airport ceased activity in 2014 and have assumed that the Department for Environment, Food and Rural Affairs (Defra) background concentration maps take this closure into account. For the avoidance of doubt PHE requests that the proposer liaises with Defra to confirm that this is the case and that the Defra model does present a representative background level.	It is believed that the Defra background concentration maps include a contribution from the previous airport operation. However the small amount of double counting is considered acceptable as a conservative assumption.
PHE	The proposer intends to assess air quality from the operation of the airport using a combination of the Project for the Sustainable Development of Heathrow (PSDH) and the guidance issued by the International Civil Aviation Organization (ICAO) in 2011. In the absence of a specific UK methodology PHE accepts this as a reasonable approach. In the final EIA submission we recommend that the proposer should clearly identify how the two sets of guidance were utilised and provide a suitable rationale.	This 2018 PEIR provides sufficient detail of the methodology to allow it to be evaluated against best practice. Significant deviations from PSDH or ICAO methodologies are identified.
PHE	PHE is conscious that many substances have very low odour thresholds and that uncontrolled releases into the air may cause great public concern even if there is no demonstrable harm to public health. We recommend that the qualitative assessment should comprehensively identify all known potential sources of odour and include recommendations to minimise such odour emissions. The assessment should include both construction and operational phases.	The odour assessment (**Appendix 6.4**) identifies and assesses the main significant sources of odour.
PHE	The current EIA does not include an assessment of the impact of vehicle movements on local air quality either during the construction or operational phase of the development. Given the number of vehicle movements involved, PHE is not satisfied that the traffic related impacts on local air quality have been adequately assessed and we do not accept that the impacts are demonstrably de minimis. We understand that significant work remains to be done on the traffic surveys but recommend that the proposer works closely with the Local Authorities involved so that the traffic data can be used to model the air quality impacts in the local area, particularly given the existence of an air quality management area immediately adjacent to the proposed development.	As assessment of the impact of road traffic on air quality is included in this 2018 PEIR.
Natural England	We would welcome a discussion with your consultants as to how the ecological receptor locations set out in Table 6.5 were chosen.	Discussions with Natural England have taken place.
Natural England	Dust deposition We would advise that for designated nature conservation sites the zone within which ecological receptors sensitive to dust are assessed is extended from 50m to 200m.	Agreed.

6.4 Scope of the assessment

6.4.1 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.

6.4.2 The scope of the assessment has been informed by: the scoping study; consultee responses to the Scoping Report; the results of this 2018 PEIR assessment; consultee responses to the 2017 PEIR; the results of interim stages of the work; and the design of the Proposed Development.

Approach to identifying receptors

6.4.3 The modelled domain covers both a set of gridded receptors (to enable contour plots to be generated and interpolation to intermediate locations if required) and sets of specific receptors representing individual sensitive human and ecological locations.

Gridded receptors

6.4.4 A 7 km × 4 km Cartesian grid centred on the airport was modelled, with a receptor resolution of 100 m, to assess the impact of atmospheric emissions from the site on local air quality at locations where specific receptors were not included. This resolution is considered suitable for capturing the maximum contribution from site emissions, given that the emissions sources are spread over an area of several square kilometres in extent, and receptors of interest are more than 200 m from the nearest sources. This grid does not cover the full extent of the specific receptors, but is considered sufficient to cover the locations where the impacts are expected to be greatest.

Human receptors

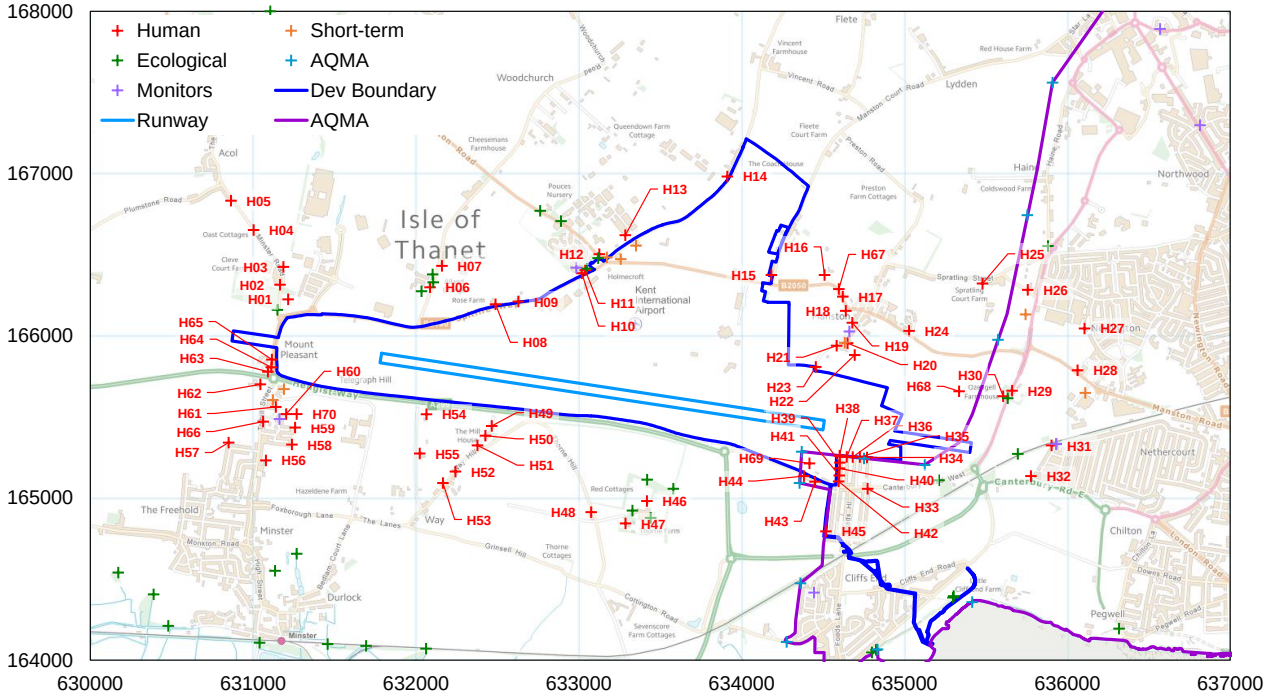
6.4.5 The receptors considered were chosen based on locations where people may be present and judged in terms of the likely duration of their exposure to pollutants and proximity to the site, following the guidance given in **Section 6.2** of this report. Not every location has been included as a specific receptor, but a selection has been made that covers the locations most likely to be affected by the Proposed Development and representative of wider locations. The gridded receptors can be used to fill in gaps if required.

6.4.6 Committed developments have been reviewed to determine where new locations of exposure may be created in future (e.g. new residential developments), and specific receptors for these have been chosen on the same basis as for existing locations of exposure.

6.4.7 While most human receptors are likely to have both long-term (annual mean) and short-term (typically hourly mean) exposure, a number of receptors will have only short-term exposure (e.g. churches, shops, museums). In addition, receptors have been selected representing the nearest edges of the AQMA. Details of the locations of human receptors are given in **Appendix 6.1** and **Figure 6.1** to **Figure 6.4**.

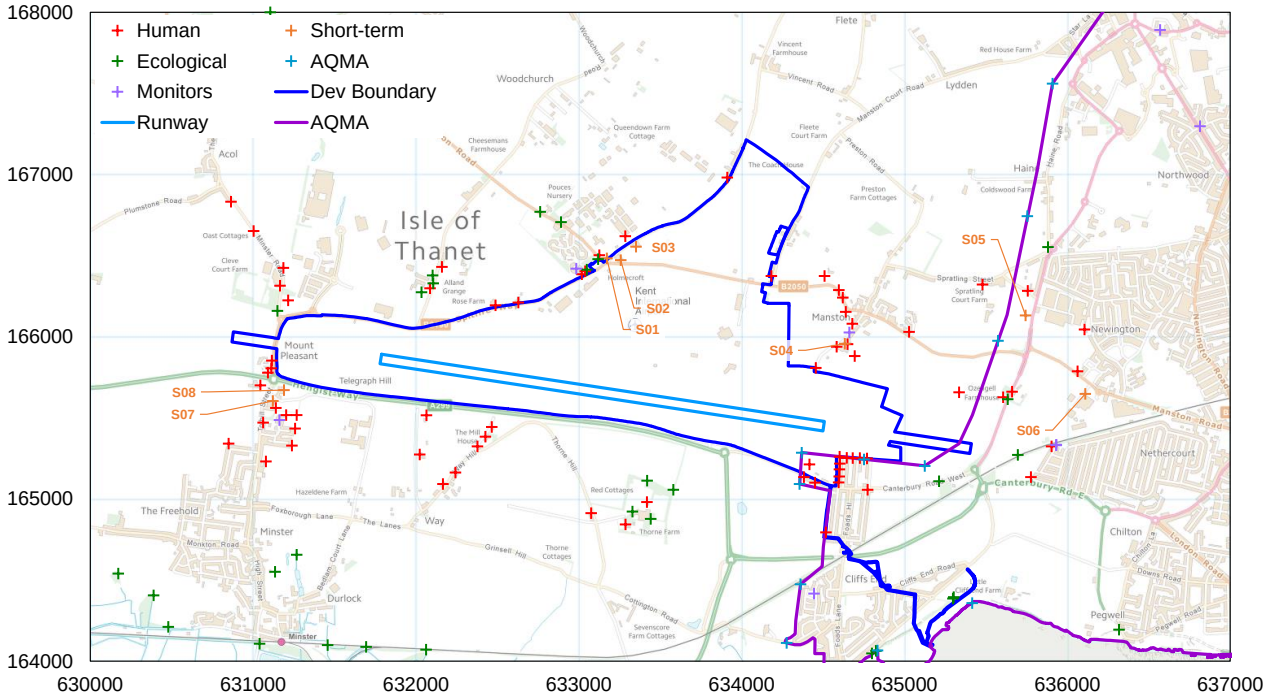
6.4.8 For the purposes of assessing air quality impacts, workplace locations have been excluded from the assessment in accordance with Schedule 1, Part 1, and Paragraph 2 of the Air Quality Standards Regulations 2010. These Regulations are detailed in **Section 6.2** of this report and do not differentiate between whether this is a workplace location under the control of the operator, or an off-site workplace location.

Figure 6.1 Locations of long-term human receptors



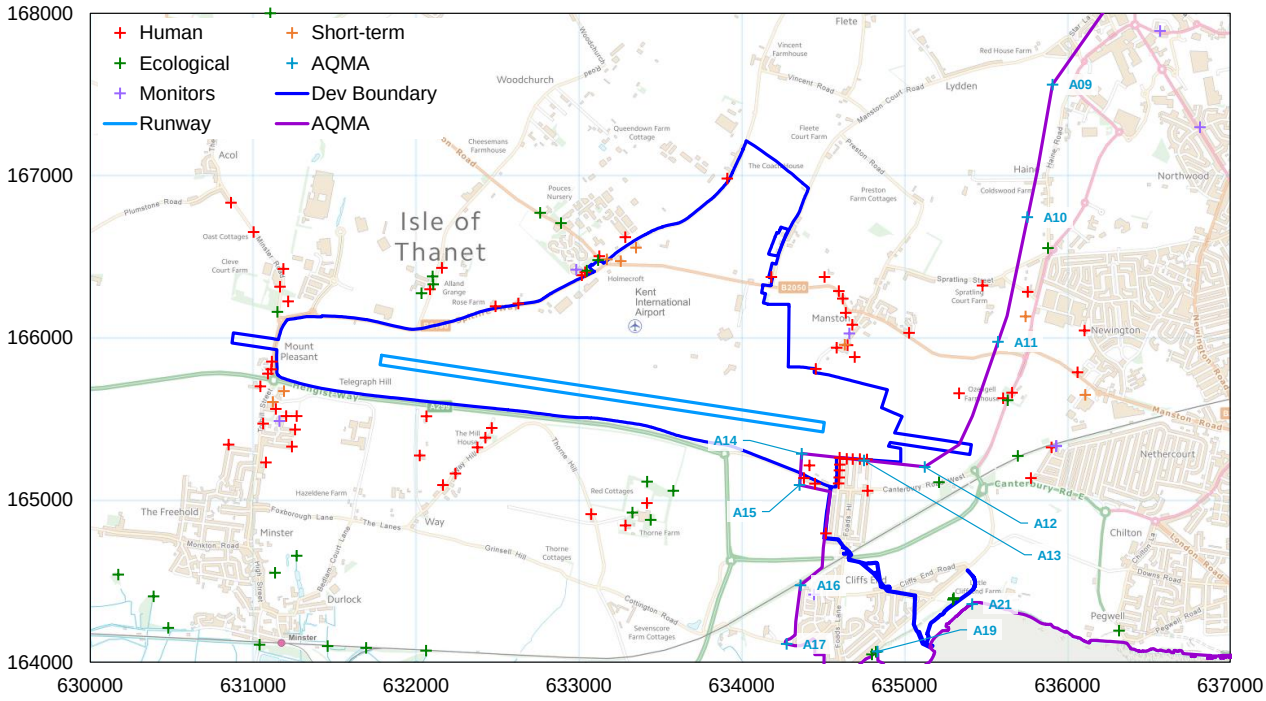
Contains Ordnance Survey data © Crown copyright and database right 2017.

Figure 6.2 Locations of short-term human receptors



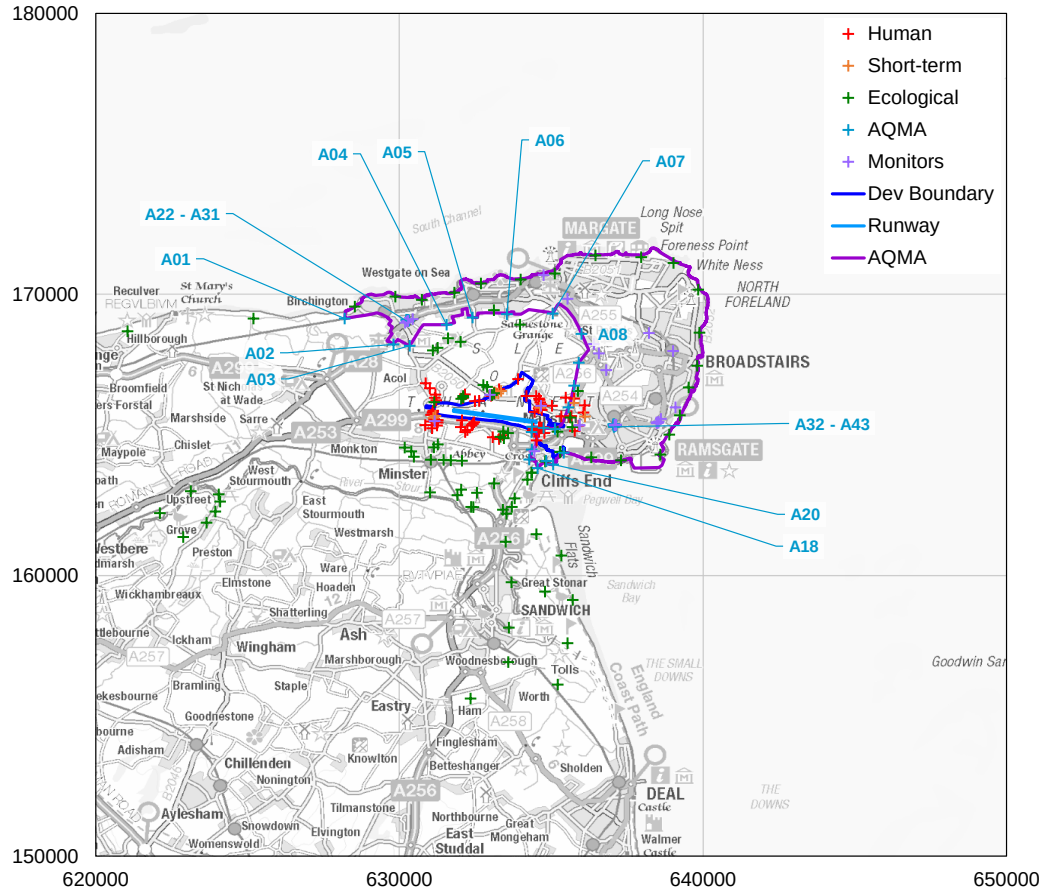
Contains Ordnance Survey data © Crown copyright and database right 2017.

Figure 6.3 Locations of AQMA receptors (near)



Contains Ordnance Survey data © Crown copyright and database right 2017.

Figure 6.4 Locations of AQMA receptors (far)



Contains Ordnance Survey data © Crown copyright and database right 2017.

Ecological receptors

6.4.9 The EA guidance note "Air emissions risk assessment for your environmental permit"[17] indicates that the impact of the installation should be evaluated at protected conservation areas that meet the following criteria:

- SPAs, SACs or Ramsar sites within 10 km of the installation (or within 15 km of coal or oil fired power stations); and
- SSSIs or local nature sites (ancient woods, local wildlife sites and national and local nature reserves (National Nature Reserves (NNR) and Local Nature Reserves (LNR)) within 2 km of the location.

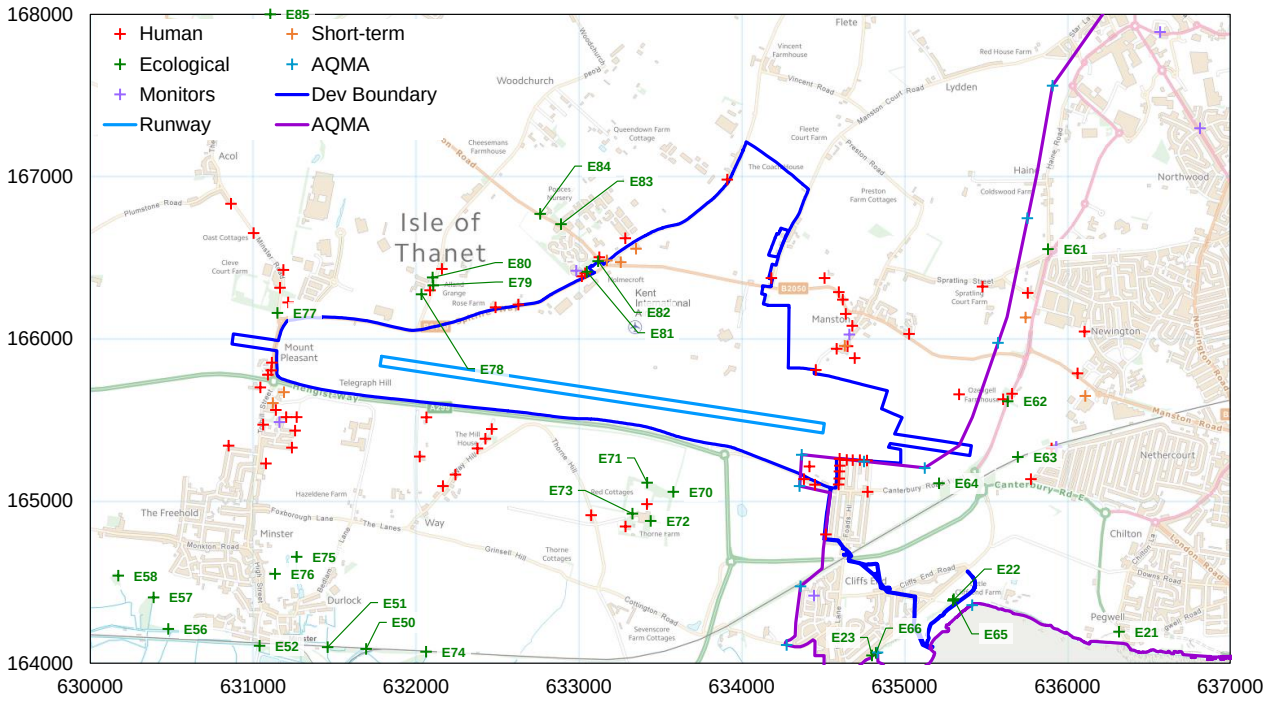
6.4.10 Following the above guidance, suitable ecological receptors have been included in the assessment. Local wildlife sites and local habitat sites were identified by a screening assessment provided by the EA. The receptors are detailed in **Appendix 6.1** and **Figure 6.5** and **Figure 6.6**.

6.4.11 Much of the northeast Kent coast is designated SPA, SAC, Ramsar, SSSI and/or NNR. The various designated areas have considerable overlap but do not coincide exactly. In view of the complexity of the designations, **Appendix 6.1** makes only brief efforts to identify which designated areas each receptor is in. The major designated areas are:

[17] Environment Agency (2016) '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.

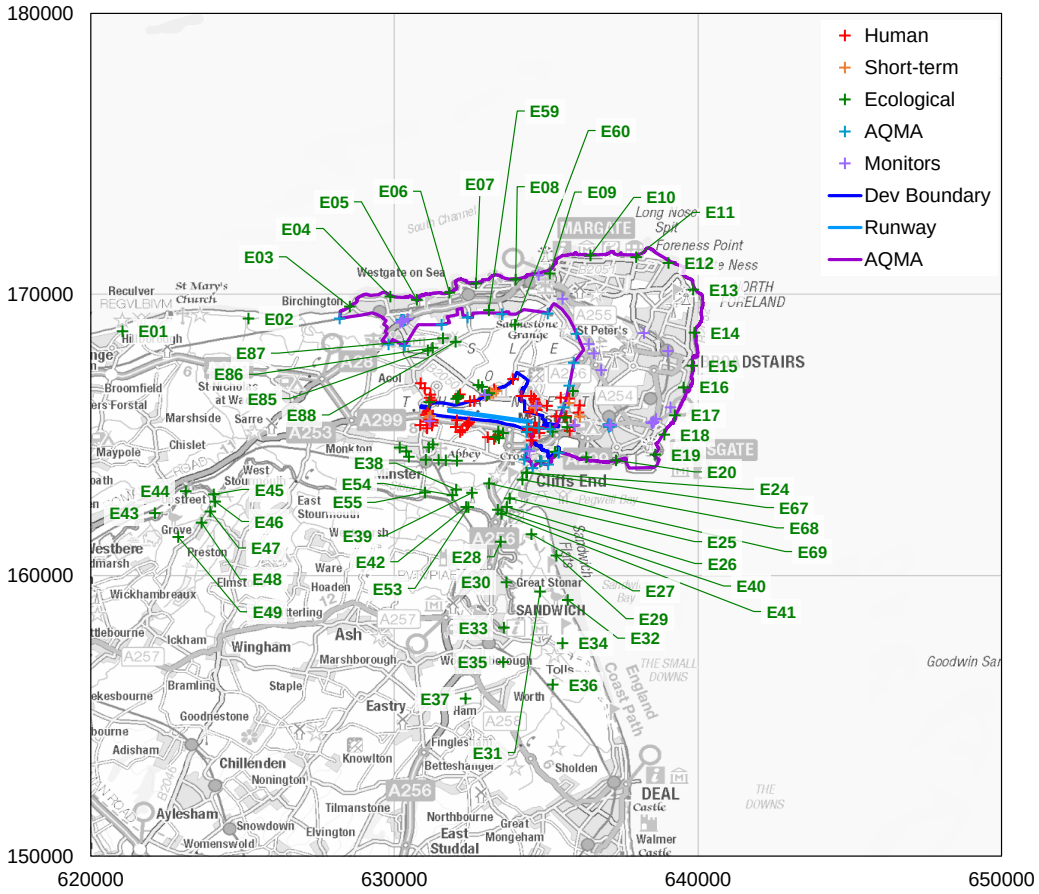
- Ramsar:
  - UK11070 Thanet Coast and Sandwich Bay;
  - UK11066 Stodmarsh;
- SAC:
  - UK0013107 Thanet Coast;
  - UK0013077 Sandwich Bay;
  - UK0030283 Stodmarsh;
  - UK0030371 Margate and Long Sands;
- SPA:
  - UK9012071 Thanet Coast and Sandwich Bay;
  - UK9012121 Stodmarsh;
  - UK9020309 Outer Thames Estuary;
- SSSI:
  - 1000403 Thanet Coast;
  - 1000318 Sandwich Bay to Hacklinge Marshes;
  - 1000324 Stodmarsh;
- NNR:
  - 1007228 Sandwich & Pegwell Bay.

Figure 6.5 Locations of ecological receptors (near)



Contains Ordnance Survey data © Crown copyright and database right 2017.

Figure 6.6 Locations of ecological receptors (far)

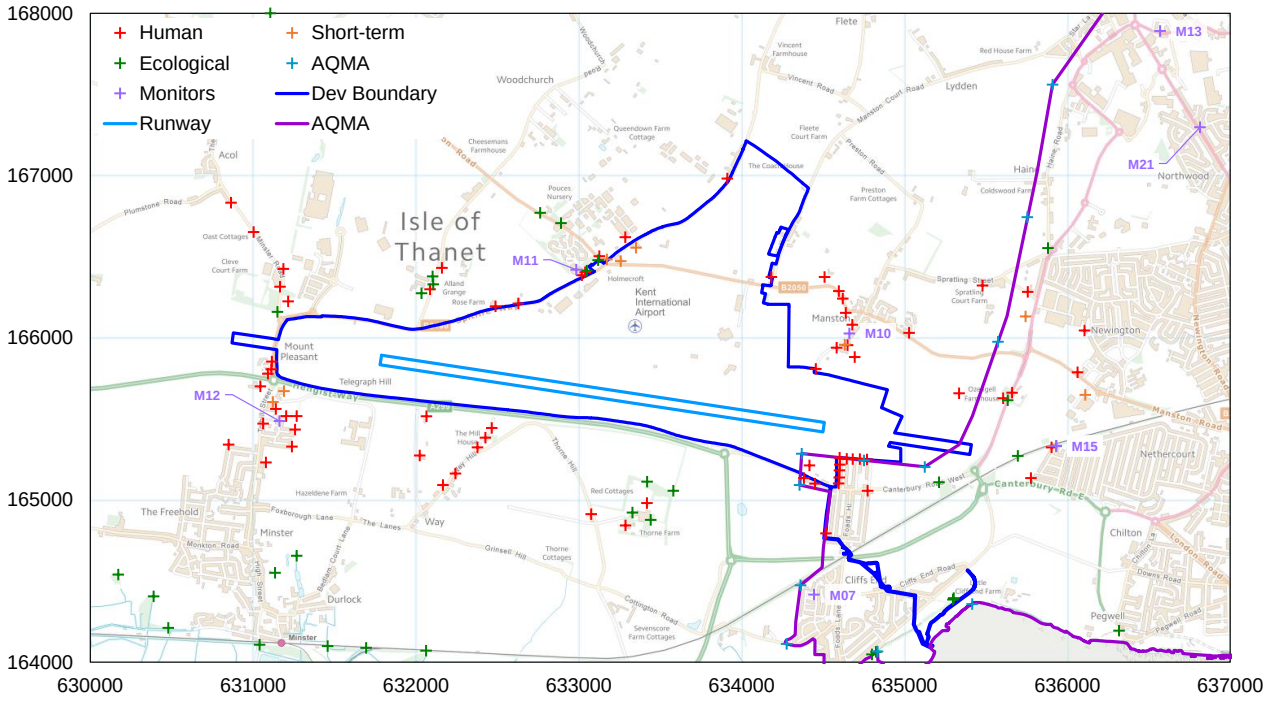


Contains Ordnance Survey data © Crown copyright and database right 2017.

Monitor receptors

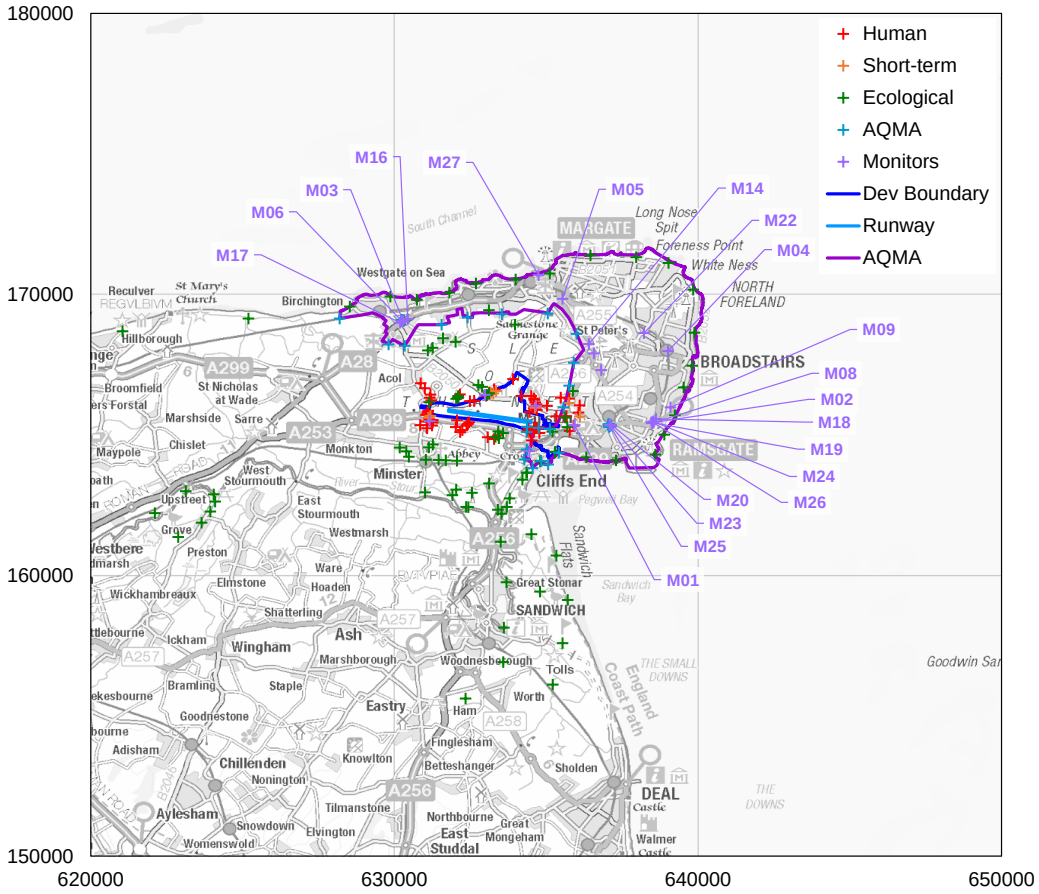
6.4.12 In order to allow modelled results to be compared against monitoring data, the monitoring locations have also been included as receptors, as detailed in **Appendix 6.1** and **Figure 6.7** and **Figure 6.8**.

Figure 6.7 Locations of monitor receptors (near)



Contains Ordnance Survey data © Crown copyright and database right 2017.

Figure 6.8 Locations of monitor receptors (far)



Contains Ordnance Survey data © Crown copyright and database right 2017.

Roadside receptors

6.4.13 As detailed in **Appendix 6.3**, roads were modelled using a transect of receptors for each road link, extending to 200 m from the road kerb in each direction. This approach makes it simple to determine the distance from the road at which a given concentration assessment level is exceeded, and to identify properties within that distance.

Spatial and temporal scope

6.4.14 The spatial scope of the assessment is defined by the receptors identified above.

6.4.15 In terms of temporal scope, it is proposed to assess the following calendar years:

- the opening year (Year 2);
- Year 6 (being the year at which the airport is forecast to reach 10,000 cargo movements per year); and
- Year 20.

6.4.16 Construction activity is expected to be spread over the first 18 years of the Proposed Development, but is conservatively assumed to be condensed into Years 2 and 6 (with construction completed before Year 20). This approach ensures that the peak construction years are captured by the assessment.

Potentially significant effects

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

Potentially significant effects on human health

6.4.18 Of the potential air quality impacts on human health, the most likely to constrain the acceptability of the Proposed Development is annual mean nitrogen dioxide (NO_2). Given that the airport will operate at a steady level of activity over time (except for daytime/night-time differences), it is much less likely that short-term (i.e. hourly mean) NO_2 concentrations will be constraining. Similarly, concentrations of other pollutants such as PM_{10} or $PM_{2.5}$ are unlikely to be the most constraining criteria. However, they have been included in the assessment to provide confidence in this conclusion.

Rationale for excluding other pollutants from this assessment

6.4.19 Other pollutants may also be emitted from airport and associated operations, including sulphur dioxide (SO_2), carbon monoxide (CO) and volatile organic compounds (VOCs). The justification for scoping out other pollutants is based largely on the Project for the Sustainable Development of Heathrow (PSDH). This project was set up by the Department for Transport in 2006 to investigate the environmental effects of a third runway at Heathrow Airport. It convened a panel of experts in air quality, aircraft technology, airport operations and related fields to develop a best practice methodology for assessing the air quality impacts of a third runway at Heathrow. Among the conclusions of the project[18] it states:

> *What are the pollutants of concern for all Panels?*
>
> *Key pollutants for assessment: NO_x, NO_2 and PM.*
>
> *Ozone: for role in atmospheric chemistry in dispersion models.*
>
> *Not required: benzene, 1,3-butadiene, carbon monoxide, lead, PAHs and sulphur dioxide.*
>
> *... Given the importance of ozone in the formation of nitrogen dioxide, the Panels decided that it would be appropriate to collate monitoring data for ozone within the study area. While ozone information is important for atmospheric chemistry effects in dispersion modelling, the technical Panels did not consider a priority area to be modelling the impact of Heathrow emissions on ozone concentrations.*
>
> *In summary, the pollutants for which subsequent assessments would be undertaken for DfT are therefore recommended to be nitrogen oxides (NO_X), nitrogen dioxide (NO_2), and particulate matter (PM).*

6.4.20 According to Defra's background concentration maps[19], background concentrations of SO_2, CO, benzene and 1,3-butadiene are lower in east Kent than in west London. (Background concentration maps of PAHs and lead are not available.) Emissions from the proposed activity at Manston Airport will, at their peak, be roughly 10% of emissions from Heathrow Airport[20]. Like Manston Airport, Heathrow Airport has sensitive receptors close to its boundary. It is, therefore, clear that the PSDH arguments for screening out pollutants apply even more strongly to Manston Airport.

6.4.21 Concentrations are sufficiently low across the country that Defra has not felt the need to update the background concentration maps for SO_2, CO, benzene and 1,3-butadiene since 2001. Monitoring

[18] Department for Transport. Project for the Sustainable Development of Heathrow - Report of the Air Quality Technical Panels. Undated. http://webarchive.nationalarchives.gov.uk/20080306053058/http://www.dft.gov.uk/print_view/3b723f5b612c85bc79a526ca27c9d370

[19] Defra. Background mapping data for local authorities. https://uk-air.defra.gov.uk/data/laqm-background-home.

[20] Based on preliminary calculations using early forecasts of air traffic.

of benzene was carried out by TDC until 2014, which found concentrations consistently within legal limits. TDC[21] states:

> *In June 2014 the laboratory used for the supply and analysis of benzene tubes ceased providing a service because Thanet was the only Local Authority monitoring the pollutant which meant is was [sic] no longer viable. With the closure of the airport and consistently low levels since monitoring began the decision was taken to discontinue benzene analysis.*

6.4.22 Moreover, Defra's guidance on local air quality management[22] includes advice on incorporating the effects of airports on local air quality management. This guidance states that only NO_x/NO_2 from airports need be assessed, saying:

> *7.16 Aircraft are potentially significant sources of NO_x emissions, especially during take-off, and therefore the main risk is related to potential exceedances of the NO_2 air quality objectives.*

6.4.23 In summary, a clear expert consensus shows that NO_x/NO_2, and to a lesser extent PM, are the only local air quality pollutants likely to be of potential concern from airport operations. If concentrations of NO_2 can be shown to be acceptable around the airport, it is highly unlikely that concentrations of other pollutants will be unacceptable. Therefore, they have not been assessed further.

Potentially significant effects on ecological sites

6.4.24 Concentrations of nitrogen oxides (NO_x) in air are associated with adverse effects on plant growth, and are included in this assessment.

6.4.25 In addition, emissions of nitrogen oxides and sulphur oxides to the air may result in deposition onto ecological sites, which may be sensitive to both nutrifying nitrogen and acid deposition. As discussed above, emissions of sulphur oxides are expected to be negligible, but the impact of nitrogen oxides on nitrifying and acid deposition are included in the assessment.

Pollutants considered

6.4.26 As noted above, the atmospheric emissions of a number of pollutants have been identified as requiring detailed dispersion modelling. The emitted pollutants of primary concern to the local environment are:

- Oxides of nitrogen (NO_x as NO_2); and
- Particulate matter less than 10 µm and 2.5 µm (PM_{10} and $PM_{2.5}$).

6.4.27 A brief description of each pollutant is given in **Table 6.3**.

[21] Thanet District Council. LAQM progress report. September 2014.
[22] Defra. Local Air Quality Management Technical Guidance (TG16). April 2016.

Table 6.3 Summary of the pollutants assessed

Pollutant	Description and effect on human health and the environment	Principal Sources
Oxides of nitrogen (NO_x)	Nitrogen dioxide (NO_2) and nitric oxide (NO) are collectively referred to as oxides of nitrogen (NO_x). It is NO_2 that is associated with adverse effects on human health. Most atmospheric emissions are in the form of NO which is converted to NO_2 in the atmosphere through reactions with ozone. The oxidising properties of NO_2 theoretically could damage lung tissue, and exposure to very high concentrations of NO_2 can lead to inflammation of lung tissue and affect the ability to fight infection. The greatest impact of NO_2 is on individuals with asthma or other respiratory conditions, but consistent impacts on these individuals is at levels of greater than 564 µg m^{-3}, much higher than typical UK ambient concentrations.	All combustion processes produce NO_x emissions. The principal sources of NO_x in the UK are road transport and power stations, each of which accounted for about a third of total UK emissions in 2013.
Particulate matter (PM_{10} and $PM_{2.5}$)	Particulate matter is the term used to describe all suspended solid matter. Particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}) is the subject of health concerns because of its ability to penetrate and remain deep within the lungs. The health effects of particles are difficult to assess, and evidence is mainly based on epidemiological studies. Evidence suggests that there may be associations between increased PM_{10} concentrations and increased mortality and morbidity rates, changes in symptoms or lung function, episodes of hospitalisation or doctors consultations. Recent reviews by the World Health Organisation (WHO) and Committee on the Medical Effects of Air Pollutants (COMEAP) have suggested exposure to a finer fraction of particles ($PM_{2.5}$) give a stronger association with the observed health effects. $PM_{2.5}$ typically makes up around two-thirds of PM_{10} emissions and concentrations.	Road transport, industrial processes and electricity generation. Other pollutants, including NO_2 and SO_2, have the potential to form secondary particulates which are often smaller than PM_{10}.

6.5 Overall Air Quality baseline

Current baseline

TDC monitoring

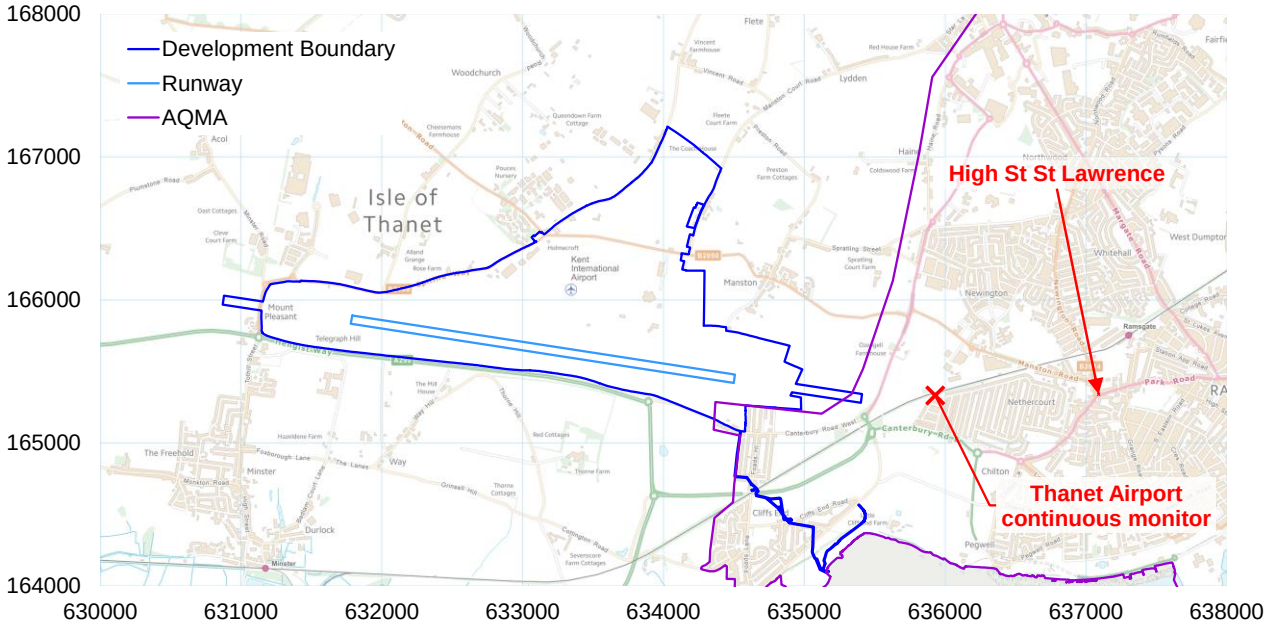
6.5.1 Under Part IV of the Environment Act 1995, TDC is required to periodically review and assess air quality within its area of jurisdiction. This process of LAQM is an integral process for achieving national air quality objectives (AQOs). Thanet's 2014 progress report[23] summarised the air quality in the district thus:

> *"Thanet generally has very good air quality; however there are areas at The Square in Birchington, High Street St Lawrence, Ramsgate and the junction of Hereson Road / Boundary Road, Ramsgate where air quality is poor due to pollution from road transport.*
>
> *"An urban wide AQMA has been declared to enable effective management of air quality."*

6.5.2 The boundary of the AQMA abuts the boundary of the airport and at its nearest point is just 180 m from the centre of the runway (see **Figure 6.9**). However, the nearest of the locations identified as having poor air quality (High Street St Lawrence, A255) is a roadside location approximately 2 km east of the eastern end of the airport.

[23] Thanet District Council, LAQM Progress Report, September 2014.

Figure 6.9 The vicinity of the Proposed Development, showing AQMA and continuous monitor



Contains Ordnance Survey data © Crown copyright and database right 2017.

6.5.3 Thanet undertakes a combination of continuous and passive monitoring within its jurisdictional area. There are currently two continuous monitoring stations, and a third was decommissioned in March 2016 following closure of the airport. Until March 2016, the nearest continuous monitoring station to the site was ZH3 Thanet Airport, which measured NO and NO_2 (the two components of NO_x) only. This was located approximately 1400 m east of the eastern end of the runway, on the edge of the built-up area of the conurbation (see **Figure 6.9**). Triplicate NO_2 diffusion tubes were collocated at this site (and are still operated).

6.5.4 The two continuous monitors which are still in operation are both roadside sites, and both measure fine particulate matter (PM_{10}) as well as NO_x (NO and NO_2). These are ZH4 Thanet Ramsgate Roadside, located in central Ramsgate, and ZH5 Thanet Birchington Roadside, located in Birchington. Concentrations at roadside locations are very sensitive to local conditions, notably traffic levels, proportion of heavy-duty vehicles, congestion, queues and canyon effects. As a result, monitoring at these two continuous monitors may or may not be representative of other roadside locations.

6.5.5 The ZH2 Thanet Margate Background continuous monitor was closed at the end of March 2013. It was located at Salmestone Primary School and was classified as an urban background site. This station monitored NO_x (NO and NO_2) only.

6.5.6 Details of the continuous monitors are given in **Appendix 6.2**.

6.5.7 Thanet also measures NO_2 at 24 passive monitoring (diffusion tube) locations (including eight triplicate sites). Two of these were first commissioned in 2015; the others have been in place since at least 2009. Details of the diffusion tubes are given in **Appendix 6.2**.

6.5.8 Measured annual mean NO_2 concentrations from Thanet's monitoring programme between 2007 and 2016 are detailed in **Appendix 6.2**. **Appendix 6.2** also shows the locations of the monitors labelled with the annual mean NO_2 concentration averaged over the available measurement years. This shows that concentrations above 20 µg m^{-3} are confined to roadside and urban centre locations. There is a modest decreasing trend at most monitors, averaging roughly 1 µg m^{-3} per year, which is consistent with trends elsewhere in the UK.

6.5.9 For context, the legal limit for annual mean NO_2 concentrations is 40 µg m^{-3}. The monitoring shows that at rural and urban background locations, concentrations are well below the legal limit. There

are some exceedances of the legal limit alongside busy roads. These results are typical of such locations in England.

6.5.10 Measured annual mean NO_x concentrations from Thanet's monitoring programme between 2007 and 2016 are detailed in **Appendix 6.2**.

6.5.11 Measured annual mean PM_{10} concentrations from Thanet's monitoring programme between 2007 and 2016 are detailed in **Appendix 6.2**. These are both roadside sites. The monitoring shows that at the monitoring locations, concentrations are well below the legal limit of 40 µg m^{-3}.

Defra's background mapped concentrations

6.5.12 The Department for Environment, Food and Rural Affairs (Defra) maintains a nationwide model (the Pollution Climate Mapping (PCM) model) of existing and future background air quality concentrations at a 1 km grid square resolution. The data sets include annual average concentration estimates for NO_x, NO_2, PM_{10} and $PM_{2.5}$, as well as other pollutants. The PCM model is semi-empirical in nature: it uses data from the national atmospheric emissions inventory (NAEI) to model the concentrations of pollutants at the centroid of each 1 km grid square but then calibrates these concentrations in relation to actual monitoring data. Concentrations represent background locations, not roadside locations or those particularly influenced by point sources.

6.5.13 The dataset was updated in 2016. Data are available for years from 2013 to 2030; modelled concentrations are generally decreasing over that time period. Since this update, Defra has issued its action plan to ensure that air quality limits are met in the shortest time possible across the country. While some of the actions are targeted at hot spots, others will have a wider impact and will tend to reduce concentrations around Manston more quickly. The effects of the action plan are not accounted for in the Defra concentration dataset.

6.5.14 The dataset for the Thanet area includes a contribution from existing aircraft and other activity on the airport. Defra provides a mechanism for subtracting out particular contributions, but for the present purposes the small amount of double-counting is considered to be acceptable.

6.5.15 Concentrations of NO_2, NO_x, PM_{10} and $PM_{2.5}$ from the Defra data for 2018 are given in **Appendix 6.2**. These are all well below the corresponding legal limits and typical of rural locations in England.

Comparison of monitoring with Defra data

6.5.16 Measured NO_2 concentrations at non-roadside monitors are compared with the Defra concentrations (both for 2016) for the corresponding grid square in **Table 6.4**. The measured concentrations are consistently significantly higher than the Defra concentrations, by 3 to 9 µg m^{-3}. This is partly because the monitoring results for 2016 were unusually high, due to prevailing meteorological conditions, something which cannot be taken into account in the forecasting models. The magnitude of this difference is broadly consistent with comparisons in other parts of the country for similar air quality assessments, although the ZH2 monitor shows an unusually large discrepancy.

Table 6.4 Monitored concentrations vs Defra concentrations for NO_2 (µg m^{-3})

Name	Classification	Measured	Defra	Difference
ZH2 Thanet Margate Background	Urban background	19.3*	10.6	8.7
ZH3 Thanet Airport	Suburban	14.7†	11.7	3.0
TH16	Background	16.7	9.4	7.3
TH27	Urban background	16.3	10.1	6.2
TH31	Urban background	14.7	9.5	5.2
TH32	Urban background	15.4	9.8	5.6
TH33	Urban background	16.5	10.3	6.2

*For 2013.
†For 2015.

6.5.17 Measured NO_x concentrations at non-roadside monitors are compared with the Defra concentrations for the corresponding grid square in **Table 6.5**. The measured concentrations are slightly higher than the Defra concentrations at ZH3 Thanet Airport, and considerably higher at ZH2 Margate Background.

Table 6.5 Monitored concentrations vs Defra concentrations for NO_x (µg m^{-3})

Name	Classification	Measured	Defra	Difference
ZH2 Thanet Margate Background	Urban background	26.0*	14.4	11.6
ZH3 Thanet Airport	Suburban	18.0†	16.0	2.0

*For 2011.
†For 2015.

APIS background mapped deposition rates

6.5.18 The Air Pollution Information System (APIS) website[24] provides information on background deposition of nitrogen and sulphur at sensitive ecological sites in the UK. APIS is widely recognised as the primary source of this information and will be used for the air quality assessment.

Baseline data selection and future baseline

6.5.19 In view of the fact that monitored NO_2 concentrations at background locations are somewhat higher than Defra concentrations, it is proposed to use monitored concentrations from the non-roadside monitors for the background contribution to total NO_2 concentrations. In 2016[25], monitored concentrations at these locations are in the range 14.3–19.3 µg m^{-3}, with an average of 16.2 µg m^{-3}. The higher concentrations are representative of built-up, non-roadside locations which characterise most of the sensitive human receptors. It is therefore proposed to use the highest value, 19.3 µg m^{-3}, as a conservative estimate of the background concentration of annual mean NO_2 at all receptors, except as stated in the following paragraph.

6.5.20 An exception are the receptors at The Square Birchington and St Lawrence, with a significant contribution from local, non-modelled roads, for which monitoring from nearby locations will be used for the NO_2 background. Specifically, for receptors at The Square Birchington, a background NO_2 concentration of 35.3 µg m^{-3} (equal to the 2007–2015 average measured at the ZH5 Thanet

[24] www.apis.ac.uk
[25] Using 2013 values for ZH2 Thanet Margate Background, the last year of monitoring at that site.

Birchington Roadside monitor) will be used; and for receptors at St Lawrence, a background NO_2 concentration of 38.0 µg m^{-3} (equal to the average of the 2007–2015 measurements at the TH54/64/65, TH66 and TH70/71/72 diffusion tube locations) will be used

6.5.21 For NO_x, the same approach is appropriate. It is therefore proposed to use 25.9 µg m^{-3} (equal to the average of the 2007–2011 average measured at ZH2 Thanet Margate Background and the 2007–2015 average measures at ZH3 Thanet Airport) as a conservative estimate of the background concentration of annual mean NO_x at all receptors.

6.5.22 For PM_{10} and $PM_{2.5}$, monitoring data is available for roadside locations only. The only background information comes from the Defra data. The Defra data will therefore be used to estimate the background concentration of annual mean PM_{10} and $PM_{2.5}$ at all receptors.

6.5.23 For determining background concentrations at near-road locations, a different approach is necessary. In order to be consistent with methodology for calculating concentrations (particularly NO_2 concentrations) near roads, the Defra maps will be used at these locations. Note that this methodology includes a model adjustment factor which corrects modelled concentrations to provide agreement with monitoring data, so the apparent underprediction of the Defra maps compared with monitoring is corrected for.

6.5.24 Background deposition rates of all pollutants will be taken from the APIS website, based on the most sensitive habitat feature at that designated site.

6.5.25 Note that these concentrations take into account existing sources of emissions, including those from Polar Helicopters operations at Manston Airport, and the Defence Fire Training and Development Centre (not part of Manston Airport).

6.5.26 As noted above, there is a slight trend in the monitoring data for concentrations to reduce over the years. This trend will be ignored for conservatism. The future baseline will therefore be assumed to be the same as the current baseline. For near-road locations, the projected Defra maps will be used for consistency across the roads methodology.

6.5.27 No information is available on future deposition rates, so these too will be assumed to be the same as the current baseline.

6.5.28 Committed developments have been reviewed to identify additional sources of emissions that are likely to arise in future. The main new developments of relevance are residential, which may generate additional road traffic. These have been included in the traffic model. No other developments have been identified which are likely to have a significant effect on air concentrations at receptors close to Manston Airport.

6.5.29 The background concentrations and deposition rates assumed in the modelling for this assessment are detailed in **Appendix 6.2** for each of the specific receptors.

6.6 Environmental measures incorporated into the Proposed Development

6.6.1 This section lists the environmental measures relevant to air quality which have been incorporated into the Proposed Development.

6.6.2 How these environmental measures influence the assessment of significance is discussed in **Section 6.7**. 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.

6.6.3 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 air quality effects is provided below in **Table 6.6**.

Table 6.6 Rationale for incorporation of environmental measure

Potential receptor	Predicated changes and potential effects	Incorporated measure
Construction Phase Measures		
Local road network	Dust soiling of the local road network as a result of trackout of dust and mud from vehicles entering and leaving the site during the construction phase	As part of the Construction Environmental Management Plan (CEMP) the contractor will produce and implement a Dust Management Plan (DMP); this will include details of measures to identify and reduce the risk, monitoring any dust and identify appropriate clean-up measures. Measures will include the use of a wheel wash, covering of all loads entering/leaving the site, and the use of water-assisted dust sweeper(s).
Human health and ecological receptors	Potential effect on human health and ecological receptors from dust during the construction phase	As part of the CEMP the contractor will produce and implement a DMP this will include details of measures to identify and reduce the risk, monitoring any dust and identify appropriate clean-up measures. Measures will include locating stockpiles away from site boundary/receptors, covering or damping down stockpiles, stockpile maintenance/management, and removal of materials from site.
Human health and ecological receptors	Potential effect on human health and ecological receptors from air quality effects from Non-Road Mobile Machinery, and vehicles during the construction phase	As part of the CEMP the contractor will include measures to reduce or limit air quality effects during the construction phase of the Proposed Development. Measures will include avoiding the use of diesel or petrol-powered generators and use mains electricity or battery-powered equipment where practicable; ensuring all vehicles switch off engines when stationary - no idling vehicles.
Operational Phase Measures		
Local Road Network	Congestion on the local road network	Agree and enforce a strict routeing agreement for incoming and outgoing HGV, avoiding, where possible, peak traffic flow hours in order to reduce congestion and queuing.
Human health and ecological receptors	Potential effects upon human health and ecological resources from vehicle emissions.	Agree and enforce delivery and dispatch schedules for HGV that avoid, where possible, causing congestion on the local road network and excessive emissions to atmosphere. Also, enforce a “no unnecessary idling” policy for all vehicles on the development site.
Human health and ecological receptors	Potential effects upon human health and ecological resources as a result of emissions from aircraft movements on the ground and during the LTO cycle.	Planning of aircraft arrival and departure scheduling to avoid, where possible, over-long idling, taxiing and hold times. Airfield layout design to minimise times taxiing and holding. Use of FEGP to minimise engine/APU use. Bans on older, dirtier aircraft.
Human health and ecological receptors	Potential effects upon human health and ecological resources as a result of emissions from aircraft ground support equipment (GSE).	Largely electric GSE fleet. Diesel GSE largely bought new and meeting current emissions standards. Planning of aircraft arrival and departure scheduling to avoid, where possible, over-long operation of liquid fossil-fuelled GSE.

6.7 Assessment methodology

Calculation of concentrations and deposition rates

6.7.1 This section briefly describes the modelling methodology used to calculate concentrations and deposition rates and their impacts for the assessment. More details are given in **Appendix 6.3**.

6.7.2 Emissions from the following sources have been calculated:

- Aircraft on the ground, including landing roll, taxi-in, taxi-out, hold, take-off-roll, auxiliary power unit (APU) usage, brake wear, tyre wear and testing ground runs;
- Aircraft in the air up to 3000 feet (914 m), including approach, initial climb and climb-out;
- Ground support equipment (GSE), including emergency diesel generators;
- Road traffic; and
- Construction activity, including construction-related road traffic.

6.7.3 Emissions are calculated using a bottom-up approach, based on multiplying activity levels by appropriate emission factors. Data on activity levels are provided by RiverOak, supplemented by data from comparable airports. Emission factors are from standard published sources.

6.7.4 Emissions are assigned to spatial elements based on layout drawings provided by RiverOak and standard aviation operational practice (for example for runway assignments). The spatially-defined emissions are then entered into the dispersion modelling tool ADMS (or ADMS-Urban for road sources), which calculates concentrations of pollutants at receptors. Deposition rates at ecological receptors are calculated from concentrations in air using standard deposition velocities.

6.7.5 Road vehicle emissions are modelled slightly differently: because these are extensive sources, they are modelled using transects of receptors. This allows impacts from road traffic to be assessed further from the airport than otherwise. Concentrations at sensitive locations near roads at a distance from the airport are presented separately in **Section 6.11**.

6.7.6 The resulting concentrations and deposition rates are assessed against the established assessment criteria. Imp[acts are evaluated using criteria from the Environment Agency (EA) and from the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK). The final evaluation of significance is based on professional judgement and expertise, in accordance with guidance from the IAQM.

6.7.7 Three operational years have been assessed:

- Year 2, representing the first year of aircraft operation;
- Year 6, representing the point at which the aircraft exceeds 10,000 movements per year; and
- Year 20, representing the worst case year in terms of likely emissions from aircraft and vehicular movements.

6.7.8 Throughout the modelling process, care has been taken not to risk underpredicting impacts. In fact, a number of conservative assumptions have been made (see **Appendix 6.3** for a summary list of conservative assumptions) which mean that impacts are very likely to be overpredicted, that is to say this is very much a worst-case assessment. As will be seen, the modelled air quality impacts are generally low, so it has not been necessary to use less conservative modelling to demonstrate that the Proposed Development will have low significance for air quality.

6.7.9

Significance evaluation methodology

Air Quality Assessment Levels

6.7.10 As documented above, there are a number of sources of legislation and guidance. These use a wide range of terms for assessment level — AQS, AQO, limit value, EAL, target, critical level, critical load and more. There are differences of meaning between terms, but often different authors refer to effectively the same assessment level under different names. This document follows IAQM/EPUK (2015) in using the term "Air Quality Assessment Level (AQAL)" (or just "assessment level") as a generic term for any of these things. A more specific term is used where it is helpful to do so (e.g. to clarify its legal status or to distinguish concentrations from deposition rates).

6.7.11 **Table 6.7** and **Table 6.8** set out those air quality assessment levels (Standards, Objectives, Guidelines and Critical Levels) that are relevant to this assessment, for concentrations in air at human and ecological receptors respectively. The sources for these have been described in **Section 6.2**. The assessment levels for NO_2, PM_{10}, $PM_{2.5}$ and annual mean NO_x derive from the EU ambient air directive 2008/50/EC, as transposed into English law and included in the Air Quality Strategy. The assessment level for daily mean NO_x derives from EA guidance.

Table 6.7 Air Quality Assessment Levels for human receptors

Pollutant	Type of standard	Averaging Period	Value (µg m^{-3})
NO_2	AQS	Annual mean	40
NO_2	AQS	1 hour mean, not to be exceeded more than 18 times a year (equivalent to 99.79th percentile)	200
PM_{10}	AQS	Annual mean	40
PM_{10}	AQS	24 hour mean, not to be exceeded more than 35 times a year (equivalent of 90.41th percentile)	50
$PM_{2.5}$	AQS	Annual mean	25

Table 6.8 Air Quality Assessment Levels for concentrations in air at ecological receptors

Pollutant	Type of standard	Averaging Period	Value (µg m−3)
NO_x	AQS	Annual mean	30
NO_x	Target for protected conservation areas	Daily mean	200

6.7.12 The APIS website contains information on applicable critical loads for various habitats and species.

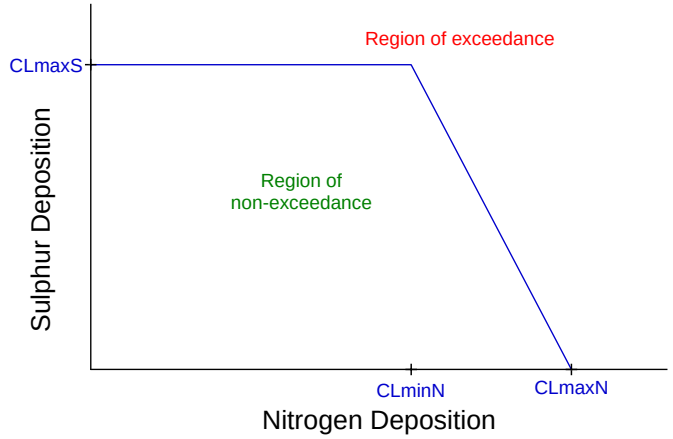
6.7.13 Eutrophication critical loads are given as a range and have units of kg N ha^{-1} y^{-1}. Generally, the lower end of the range should be used as a conservative assessment. The critical loads for acidification are more complicated, in that both the nitrogen and sulphur deposition fluxes must be considered at the same time. Therefore, a critical load function is specified for acidification, via the use of three critical load parameters:

- $CL_{max}S$ — the maximum critical load of sulphur, above which the deposition of sulphur alone would be considered to lead to an exceedance;
- $CL_{min}N$ — a measure of the ability of a system to "assimilate" deposited nitrogen (e.g. via immobilisation and uptake of the deposited nitrogen); and

- $CL_{max}N$ — the maximum critical load of acidifying nitrogen, above which the deposition of nitrogen alone would be considered to lead to an exceedance.

6.7.14 These three quantities define the critical load function shown in **Figure 6.10**.

Figure 6.10 Specimen Critical Load function for acidity



6.7.15 Information held on the APIS website has been reviewed in order to identify the main habitat/species features and their site relevant critical loads. These are summarised in **Appendix 6.3**.

Significance criteria

IAQM/EPUK guidance

6.7.16 For assessing the significance of impacts at human receptors, this assessment will follow the IAQM/EPUK guidance described above (Paragraph 6.2.29 et seq), using the impact descriptors defined in **Table 6.9**.

Table 6.9 Impact descriptors for increases in annual mean NO_2 and PM_{10} concentration (assessment level = 40 µg m^{-3})

Absolute concentration with Proposed Development, relative to assessment level	Increase in concentration relative to assessment level				
	0% (<0.2 µg m^{-3})	1% (0.2–0.6 µg m^{-3})	2–5% (0.6–2.2 µg m^{-3})	6-10% (2.2–4.0 µg m^{-3})	>10% (>4.0 µg m^{-3})
75% or less (<30.2 µg m^{-3})	Negligible	Negligible	Negligible	Slight	Moderate
76–94% (30.2–37.8 µg m^{-3})	Negligible	Negligible	Slight	Moderate	Moderate
95–102% (37.8–41.0 µg m^{-3})	Negligible	Slight	Moderate	Moderate	Substantial
103–109% (41.0–43.8 µg m^{-3})	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more (>43.8 µg m^{-3})	Negligible	Moderate	Substantial	Substantial	Substantial

The table is intended to be used by calculating percentages relative to the assessment level and then rounding the percentages to whole numbers. For convenience, the above table gives equivalent absolute concentrations for the case where the assessment level is 40 µg m^{-3} (e.g. for annual mean NO_2 or annual mean PM_{10}).

6.7.17 For ecological receptors, this assessment will use the EA criteria for screening out impacts that do not require further assessment (Paragraph 6.2.36 et seq), taking into account the IAQM interpretation of the EA criteria (Paragraph 6.2.40 et seq). Where it is not possible for the impact at a receptor to be screened out in accordance with this guidance, the impacts are evaluated further in the **Chapter 7: Biodiversity** and relevant Appendices.

Public exposure

6.7.18 Guidance from the UK Government and Devolved Administrations[26] makes clear that exceedances of the health based objectives should be assessed at outdoor locations where members of the general public are regularly present over the averaging time of the objective. As in **Section 6.2** this also excludes workplaces. **Table 6.10** provides an indication of those locations that may or may not be relevant for each averaging period.

Table 6.10 Examples of where the Air Quality Objectives should apply for human receptors

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens of residential properties[1].	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
Hourly mean	All locations where the annual mean and 24 and 8-hour mean objectives would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. Any outdoor locations at which the public may be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

[1] For gardens, such locations should represent parts of the garden where relevant public exposure is likely, for example where there is a seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.

6.8 Assessment of effects: Year 2

6.8.1 This section sets out the results of the dispersion modelling for Year 2 and compares predicted ground level concentrations against the assessment criteria detailed in **Section 6.7**. The predicted concentrations resulting from the Proposed Development (known as the process contribution or PC) are presented, along with the total predicted environmental concentrations (PEC), which include the background contribution from sources unrelated to the Proposed Development. These concentrations are then compared with the relevant air quality assessment level (AQAL: standard, objective, target or guideline value).

[26] Defra (2016) Local Air Quality Management Technical Guidance (TG16), April 2016.

6.8.2 Modelled concentrations include the contributions from operational activity on the airport such as aircraft (including at height beyond the airport boundary) and GSE, construction activity on and around the airfield, and road traffic (including construction-related road traffic).

6.8.3 For Year 2, it is assumed that Phase 1 construction activity lasts for the first three quarters of the year, and operational activity takes place over the remaining quarter, with no overlap. This represents the current proposed timescales. Concentrations from construction and from operation are broadly similar, so the overall results are not highly sensitive to this assumption.

6.8.4 This section addresses impacts at receptors with a few kilometres of the airport. The contribution from airport-related roads further afield is assessed in **Section 6.11**.

6.8.5 All concentrations reported in this chapter are the highest of five years of meteorology, for each receptor or grid point.

6.8.6 Results are given here for the receptors of greatest interest for each assessment criterion. Full results are available in a separate spreadsheet.

6.8.7 Please note that in the following tables, results are given to several decimal places. This is to enable comparison between receptors and between PC and PEC contributions. The number of decimal places should not be taken as providing any indication of the accuracy of the results.

Human health effects: Nitrogen dioxide (NO_2)

6.8.8 ***Summary**: No new or existing exceedances of the annual mean NO_2 objective or the hourly mean NO_2 objective are predicted. Impacts are negligible everywhere except at a small number of properties close to the airport boundary, where impacts are at most moderate, and in St Lawrence where the background is very high due to existing road traffic and the impact of the Proposed Development is slight. It should be remembered that this assessment uses a number of worst-case assumptions, so impacts are actually likely to be lower (better) than modelled. As a possible mitigation measure, impacts can be reduced further by using new construction plant.*

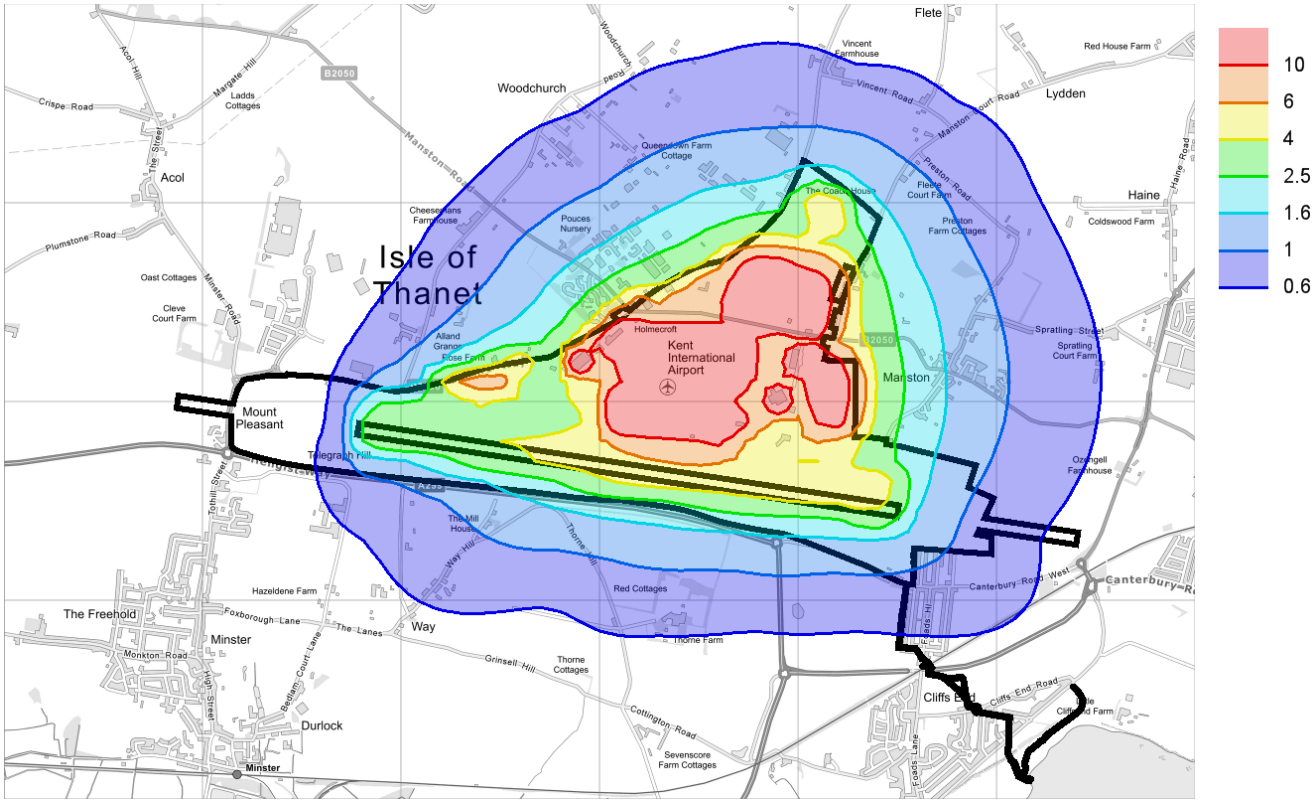
6.8.9 Predicted concentrations of annual mean NO_2 are given in **Table 6.11**, for those modelled receptors with an impact of "slight" or "moderate". At all other modelled receptors, the impact is "negligible". Contours of NO_2 PC (calculated as 70% of the NO_x PC; excluding roads contribution) in the vicinity of the airport are shown in **Figure 6.11**.

Table 6.11 Maximum PCs and PECs for annual mean NO_2, Year 2, assuming Stage IIIB construction plant

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H08	40	4.66	32.25	11.7%	80.6%	Moderate
H09	40	5.11	35.72	12.8%	89.3%	Moderate
H10	40	6.01	33.30	15.0%	83.3%	Moderate
H11	40	6.18	31.72	15.5%	79.3%	Moderate
H12	40	5.07	27.79	12.7%	69.5%	Moderate
H13	40	3.50	24.23	8.7%	60.6%	Slight
H14	40	2.33	24.77	5.8%	61.9%	Slight
H15	40	8.08	30.47	20.2%	76.2%	Moderate
H16	40	2.40	24.64	6.0%	61.6%	Slight
H17	40	2.11	31.04	5.3%	77.6%	Slight

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H23	40	2.69	21.99	6.7%	55.0%	Slight
A32	40	0.21	38.21	0.5%	95.5%	Slight
A33	40	0.22	38.22	0.5%	95.5%	Slight
A34	40	0.21	38.21	0.5%	95.5%	Slight
A35	40	0.21	38.21	0.5%	95.5%	Slight
A36	40	0.21	38.21	0.5%	95.5%	Slight
A37	40	0.21	38.21	0.5%	95.5%	Slight
A38	40	0.21	38.21	0.5%	95.5%	Slight
A39	40	0.21	38.21	0.5%	95.5%	Slight
A40	40	0.21	38.21	0.5%	95.5%	Slight
A41	40	0.21	38.21	0.5%	95.5%	Slight
A42	40	0.21	38.21	0.5%	95.5%	Slight
A43	40	0.21	38.21	0.5%	95.5%	Slight
M11	40	4.15	23.45	10.4%	58.6%	Moderate

Figure 6.11 Annual mean NO_2 process contribution (excluding roads), Year 2, assuming Stage IIIB construction plant



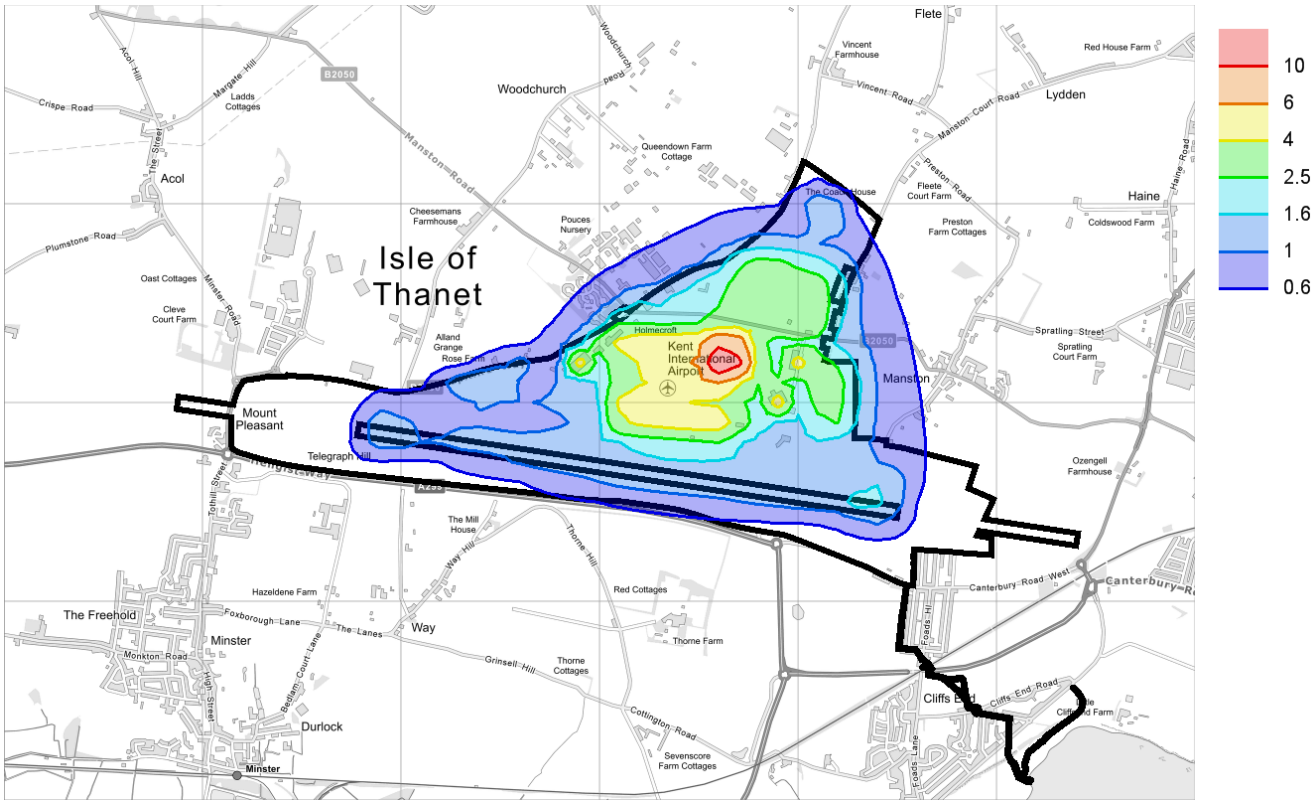
Contains Ordnance Survey data © Crown copyright and database right 2017.

6.8.10 In Year 2, the maximum annual mean NO_2 PEC at any relevant human receptor location near the airport is predicted as 36 µg m^{-3} or 89% of the AQAL at the H09 Pouces Cottages receptor. The modelled contribution from the airport here is 5.1 µg m^{-3}, but this receptor has a significant contribution from non-airport road traffic on the B2190 Spitfire Way. The greatest PC at any of the modelled receptors is 8.1 µg m^{-3} at the H15 Manston Court Road receptor. Under the IAQM/EPUK criteria, the impact at these receptors, as well as other receptors along Spitfire Way, is classed as moderate.

6.8.11 The locations classed as having a moderate impact are those with a PC greater than 4 µg m^{-3} (see top right cell in **Table 6.9**). These are shown by the yellow contour in **Figure 6.11**, which extends beyond the airport boundary to include properties along Manston Court Road and Spitfire Way.

6.8.12 The results above assume that construction plant only meets Stage IIIB emission standards. The contribution from construction activities is greater than that from operational activities. If construction plant are upgraded to moderately new equipment meeting Stage IV emission standards[27], then the total concentration is reduced substantially and the impact drops to negligible at all relevant receptors except H09, where the impact is classified as slight. This is shown in **Figure 6.12**.

Figure 6.12 Annual mean NO_2 process contribution (excluding roads), Year 2, assuming Stage IV construction plant



Contains Ordnance Survey data © Crown copyright and database right 2017.

6.8.13 At the St Lawrence receptors, the PC is 0.21 µg m^{-3} and the PEC is 38.2 µg m^{-3} in Year 2; the impact at these receptors is classified as slight. Using Stage IV plant for construction reduces the impact to negligible. At the Birchington receptors, the PC is 0.11 µg m^{-3} and the PEC is 35.4 µg m^{-3}; the impact at these receptors is classified as negligible.

[27] Equipment less than 6 years old in Year 2 will meet Stage IV.

6.8.14 Even with Stage IIIB equipment, the modelled annual mean NO_2 concentrations are all below 40 µg m^{-3} and well below 60 µg m^{-3}. Under the Defra TG(16) guidance, it is highly unlikely that there will be an exceedance of the 99.79 percentile hourly mean NO_2 AQAL.

6.8.15 No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs. It should be remembered that this is a worst-case assessment incorporating several conservative assumptions.

Human health effects: PM_{10}

6.8.16 ***Summary**: No new or existing exceedances of the annual mean PM_{10} objective or the daily mean PM_{10} objective are predicted. Impacts are negligible everywhere.*

6.8.17 Predicted concentrations of annual mean PM_{10} at all the modelled receptors have an impact of negligible under the IAQM/EPUK criteria. Concentrations for those receptors with the five greatest PCs and the five greatest PECs are given in **Table 6.12**.

Table 6.12 Maximum PCs and PECs for annual mean PM_{10}, Year 2, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H01	40	0.01	18.74	0.0%	46.8%	Negligible
H02	40	0.01	18.46	0.0%	46.1%	Negligible
H03	40	0.01	18.46	0.0%	46.1%	Negligible
H04	40	0.01	18.46	0.0%	46.1%	Negligible
H32	40	0.01	18.22	0.0%	45.5%	Negligible
H09	40	0.14	17.43	0.3%	43.6%	Negligible
H11	40	0.13	15.51	0.3%	38.8%	Negligible
H15	40	0.15	16.25	0.4%	40.6%	Negligible
S01	40	0.15	14.82	0.4%	37.0%	Negligible
S02	40	0.13	14.79	0.3%	37.0%	Negligible

6.8.18 The maximum annual mean PM_{10} PEC at any relevant human receptor location is predicted as 19 µg m^{-3} or 47% of the AQAL at the H01 Garden Cottage receptor. The modelled contribution from the airport here is just 0.01 µg m^{-3}. The greatest PC is 0.15 µg m^{-3} at the H15 Manston Court Road receptor, where the total PEC is 16 µg m^{-3} or 41% of the AQAL.

6.8.19 No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs. Under the IAQM/EPUK criteria, the impact at all receptors is classified as negligible.

6.8.20 Using the Defra formula to estimate the number of days where the daily mean PM_{10} is greater than 50 µg m^{-3}, no more than 2 days per year are greater than 50 µg m^{-3} at any receptor. This compares with 35 days per year permitted to be greater than 50 µg m^{-3}. There is therefore no likelihood of an exceedance of the daily mean PM_{10} AQAL.

Human health effects: $PM_{2.5}$

6.8.21 ***Summary**: No new or existing exceedances of the annual mean $PM_{2.5}$ objective are predicted. Impacts are negligible everywhere.*

6.8.22 Predicted concentrations of annual mean $PM_{2.5}$ at all the modelled receptors have an impact of negligible under the IAQM/EPUK criteria. Concentrations for those receptors with the five greatest PCs and the five greatest PECs are given in **Table 6.13**.

Table 6.13 Maximum PCs and PECs for annual mean $PM_{2.5}$, Year 2, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H01	25	0.01	12.89	0.0%	51.6%	Negligible
H02	25	0.01	12.73	0.0%	50.9%	Negligible
H03	25	0.01	12.73	0.0%	50.9%	Negligible
H04	25	0.01	12.73	0.0%	50.9%	Negligible
H32	25	0.01	12.37	0.0%	49.5%	Negligible
H08	25	0.10	11.79	0.4%	47.2%	Negligible
H09	25	0.11	12.03	0.4%	48.1%	Negligible
H10	25	0.11	11.11	0.5%	44.4%	Negligible
H11	25	0.12	10.99	0.5%	44.0%	Negligible
H15	25	0.15	11.37	0.6%	45.5%	Negligible

6.8.23 The maximum annual mean $PM_{2.5}$ PEC at any relevant human receptor location is predicted as 13 µg m^{-3} or 52% of the AQAL at the H01 Garden Cottage receptor. The modelled contribution from the airport here is just 0.01 µg m^{-3}. The greatest PC is 0.15 µg m^{-3} at the H15 Manston Court Road receptor, where the total PEC is 11 µg m^{-3} or 45% of the AQAL.

6.8.24 No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs. Under the IAQM/EPUK criteria, the impact at all receptors is classified as negligible.

Ecological effects: Annual mean nitrogen oxides (NO_x) concentrations in air

6.8.25 ***Summary**: Some exceedances of the annual mean NO_x objective are predicted where major roads pass close to designated ecological sites, mainly because of levels of emissions from existing road traffic. The additional contribution from the Proposed Development, including airport-related traffic, is small, less than 5% of the objective at any major ecological site. The impact at all local ecological sites is insignificant.*

6.8.26 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs, and the local nature sites with the five highest PCs and PECs. Note that some receptors are in the top five for both PC and PEC.

6.8.27 Predicted concentrations of annual mean NO_x at these selected receptors are given in **Table 6.29**. Contours of NO_x PC in the vicinity of the airport are shown in **Figure 6.20**, and over a wider area are shown in **Figure 6.21**.

Table 6.14 Maximum PCs and PECs for annual mean NO_x, Year 2, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Site type
E08	30	1.04	42.49	3.5%	141.6%	Major
E09	30	1.35	48.78	4.5%	162.6%	Major
E17	30	0.41	44.48	1.4%	148.3%	Major
E24	30	0.36	41.88	1.2%	139.6%	Major
E32	30	0.06	44.50	0.2%	148.3%	Major
E11	30	0.46	37.96	1.5%	126.5%	Major
E22	30	0.55	26.45	1.8%	88.2%	Major
E54	30	0.19	38.26	0.6%	127.5%	Local
E62	30	0.74	43.04	2.5%	143.5%	Local
E64	30	1.62	41.48	5.4%	138.3%	Local
E65	30	1.01	43.53	3.4%	145.1%	Local
E81	30	8.90	34.80	29.7%	116.0%	Local
E82	30	8.75	34.65	29.2%	115.5%	Local
E83	30	2.39	28.29	8.0%	94.3%	Local
E84	30	1.85	27.75	6.2%	92.5%	Local

6.8.28 The maximum modelled annual mean NO_x PEC at any relevant major environmental receptor (Ramsar, SPA, SAC and SSSI) is predicted as 49 µg m^{-3} or 163% of the AQAL at the E09 receptor, largely because it abuts the A28 through Margate. The modelled contribution from the airport here is 1.3 µg m^{-3}, which is the greatest PC at any of the modelled nationally- or internationally-designated ecological receptors, again because of the additional road traffic.

6.8.29 The maximum modelled annual mean NO_x PEC at any relevant local nature receptor (i.e. excluding Ramsar, SPA, SAC and SSSI sites) is predicted as 44 µg m^{-3} or 145% of the AQAL at the E65 receptor, representing Priority Habitat near Pegwell Bay. The modelled contribution from the airport here is 1.0 µg m^{-3}. The greatest PC at any of the modelled local nature receptors is 8.9 µg m^{-3} at the E81 receptor, representing a wooded area in the Priority Habitat Inventory near Spitfire Way. Under Environment Agency guidance[28], the PC at all local nature sites is less than 100% of the AQAL so can be screened out from further assessment.

Ecological effects: Nutrient nitrogen deposition

6.8.30 ***Summary**: While some exceedances of the critical loads for nitrogen are predicted, these are due to existing deposition rates and the additional contribution from the Proposed Development is insignificant.*

6.8.31 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs (as a percentage of the receptor-specific critical load), and the local

[28] '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.

nature sites with the five highest PCs and PECs. Note that some receptors are in the top five for both PC and PEC.

6.8.32 Modelled nutrient nitrogen deposition rates at these selected receptors are given in **Table 6.15**, along with the receptor-specific critical loads. Nutrient nitrogen background deposition rates at most of the modelled receptors are modelled to be at exceedance already, based on background deposition rates from APIS and without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

Table 6.15 Critical Loads assessment of nitrogen deposition, Year 2, worst receptors

Receptor	AQAL (kg N ha^{-1} y^{-1})	PC (kg N ha^{-1} y^{-1})	PEC (kg N ha^{-1} y^{-1})	% PC of AQAL	% PEC of AQAL	Site type
E30	8	0.01	15.69	0.1%	196.1%	Major
E43	5	0.00	14.28	0.1%	285.7%	Major
E44	5	0.00	14.28	0.1%	285.7%	Major
E48	5	0.00	14.28	0.1%	285.7%	Major
E49	5	0.00	14.28	0.1%	285.7%	Major
E20	8	0.02	10.80	0.3%	135.0%	Major
E21	8	0.04	10.82	0.5%	135.2%	Major
E22	8	0.06	10.84	0.7%	135.4%	Major
E23	8	0.04	13.48	0.5%	168.5%	Major
E24	8	0.03	13.47	0.3%	168.3%	Major
E79	10	0.28	26.18	2.8%	261.8%	Local
E80	10	0.26	26.16	2.6%	261.6%	Local
E82	10	1.76	27.66	17.6%	276.6%	Local
E84	10	0.37	26.27	3.7%	262.7%	Local
E86	10	0.06	25.96	0.6%	259.6%	Local
E81	10	1.79	21.11	17.9%	211.1%	Local
E83	10	0.48	19.80	4.8%	198.0%	Local

6.8.33 At the major environmental sites, the additional process contribution is at most 0.7% of the critical load at the E22 receptor representing Pegwell Bay. The PEC here is 135% of the critical load. At all modelled receptors, the PC is less than 1% of the critical load. Under EA guidance, where the PC at a major site is less than 1% of the critical load, it can be considered insignificant and does not need to be assessed further.

6.8.34 At the local nature sites, the additional PC is at most 18% of the critical load, at the E81 receptor, which represents deciduous woodland in the Priority Habitat Inventory near Spitfire Way. This is less than 100% of the assessment level, so under EA guidance, it can be considered insignificant and does not need to be assessed further.

Ecological effects: Acid deposition

6.8.35 ***Summary**: While some exceedances of the critical loads for acidity are predicted, these are due to existing deposition rates and the additional contribution from the Proposed Development is insignificant.*

6.8.36 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs (as a percentage of the receptor-specific critical load function), and the local nature sites with the five highest PCs and PECs (again as a percentage of the critical load function).

6.8.37 Modelled process contribution and background deposition rates are given in Table 6.16. A comparison with the critical load function is given in **Table 6.17**[29].

6.8.38 Background acid deposition rates at many of the modelled receptors are modelled to be at exceedance already, based on background deposition rates from APIS and without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

6.8.39 At the major environmental sites, the additional process contribution is at most 0.3% of the critical load function at the E22 receptor representing Pegwell Bay. The PEC here is 88% of the critical load.

6.8.40 The major receptor with the greatest PEC is E35, representing the Thanet Coast Ramsar site, where the PEC is 261% of the critical load function, but the PC is just 0.1% of the critical load function.

6.8.41 At the local nature sites, the additional PC is at most 1.2% of the critical load function, at the E81 receptor, which represents deciduous woodland in the Priority Habitat Inventory near Spitfire Way. The PEC here is modelled as 16% of the critical load function.

6.8.42 Under the EA criteria, the impacts at all modelled receptors, both major and local, can be considered insignificant and do not need to be assessed further.

Table 6.16 Acid deposition rates, Year 2, worst receptors

Receptor	Sulphur PC (keq ha^{-1} y^{-1})	Nitrogen PC (keq ha^{-1} y^{-1})	Sulphur background (keq ha^{-1} y^{-1})	Nitrogen background (keq ha^{-1} y^{-1})	Site type
E35	0	0.0003	0.25	1.12	Major
E37	0	0.0002	0.25	1.12	Major
E44	0	0.0003	0.22	1.02	Major
E48	0	0.0003	0.22	1.02	Major
E49	0	0.0003	0.22	1.02	Major
E21	0	0.0027	0.21	0.77	Major
E22	0	0.0039	0.21	0.77	Major
E23	0	0.0028	0.20	0.96	Major
E38	0	0.0014	0.20	0.96	Major
E39	0	0.0014	0.20	0.96	Major

[29] These are calculated using the same formulas as the APIS critical load function tool, but without rounding of intermediate values, so results differ slightly from those generated by the website tool.

Receptor	Sulphur PC (keq ha^{-1} y^{-1})	Nitrogen PC (keq ha^{-1} y^{-1})	Sulphur background (keq ha^{-1} y^{-1})	Nitrogen background (keq ha^{-1} y^{-1})	Site type
E65	0	0.0079	0.28	1.62	Local
E77	0	0.0054	0.24	1.64	Local
E86	0	0.0043	0.29	1.85	Local
E87	0	0.0040	0.24	1.64	Local
E88	0	0.0049	0.24	1.64	Local
E61	0	0.0086	0.24	1.33	Local
E72	0	0.0134	0.24	1.64	Local
E73	0	0.0144	0.24	1.64	Local
E81	0	0.1281	0.27	1.38	Local
E82	0	0.1259	0.29	1.85	Local

Table 6.17 Critical Loads assessment of acid deposition, Year 2, worst receptors

Receptor	Exceedance (keq ha^{-1} y^{-1})			Percent of critical load function			Site type
	PC	Background	PEC	PC	Background	PEC	
E35	No exceedance	0.84	0.84	0.1	260.5	260.5	Major
E37	No exceedance	0.84	0.84	0.0	260.5	260.5	Major
E44	No exceedance	0.70	0.70	0.0	228.8	228.8	Major
E48	No exceedance	0.70	0.70	0.1	228.8	228.8	Major
E49	No exceedance	0.70	0.70	0.1	228.8	228.8	Major
E21	No exceedance	No exceedance	No exceedance	0.2	87.3	87.5	Major
E22	No exceedance	No exceedance	No exceedance	0.3	87.3	87.6	Major
E23	No exceedance	0.04	0.04	0.2	103.3	103.5	Major
E38	No exceedance	0.63	0.64	0.3	220.5	220.8	Major
E39	No exceedance	0.63	0.64	0.3	220.5	220.8	Major
E65	No exceedance	0.04	0.05	0.4	102.2	102.6	Local
E77	No exceedance	0.06	0.07	0.3	103.3	103.6	Local
E86	No exceedance	0.33	0.33	0.2	118.2	118.5	Local
E87	No exceedance	0.07	0.07	0.2	103.9	104.1	Local
E88	No exceedance	0.07	0.07	0.3	103.9	104.1	Local
E61	No exceedance	No exceedance	No exceedance	0.5	86.3	86.7	Local
E72	No exceedance	No exceedance	No exceedance	0.7	97.9	98.6	Local

Receptor	Exceedance (keq ha^{-1} y^{-1})			Percent of critical load function			Site type
	PC	Background	PEC	PC	Background	PEC	
E73	No exceedance	No exceedance	No exceedance	0.8	97.9	98.7	Local
E81	No exceedance	No exceedance	No exceedance	1.2	15.0	16.2	Local
E82	No exceedance	No exceedance	No exceedance	1.1	19.5	20.7	Local

6.9 Assessment of effects: Year 6

6.9.1 This section sets out the results of the dispersion modelling for Year 6 and compares predicted ground level concentrations against the assessment criteria detailed in **Section 6.7**. The predicted concentrations resulting from the Proposed Development (known as the process contribution or PC) are presented, along with the total predicted environmental concentrations (PEC), which include the background contribution from sources unrelated to the Proposed Development. These concentrations are then compared with the relevant air quality assessment level (AQAL: standard, objective, target or guideline value).

6.9.2 Modelled concentrations include the contributions from operational activity on the airport such as aircraft (including at height beyond the airport boundary) and GSE, construction activity on and around the airfield, and road traffic (including construction-related road traffic).

6.9.3 For Year 6, it is assumed that Phase 3 construction activity lasts for the full assessment year, with the airport operating at the same time, so contributions from both sources are added together. This is a conservative assumption since Phase 3 construction is currently scheduled to take place over several years.

6.9.4 As previously noted, it is assumed that all Phase 3 construction plant is no more than 10 years old, and therefore meets Stage IV emission standards.

6.9.5 This section addresses impacts at receptors within a few kilometres of the airport. The contribution from airport-related roads further afield is assessed in **Section 6.11**.

6.9.6 All concentrations reported in this chapter are the highest of five years of meteorology, for each receptor or grid point.

6.9.7 Results are given here for the receptors of greatest interest for each assessment criterion. Full results are available in a separate spreadsheet.

6.9.8 Please note that in the following tables, results are given to several significant figures. This is to enable comparison between receptors and between PC and PEC contributions. The number of significant figures should not be taken as providing any indication of the accuracy of the results.

Human health effects: Nitrogen dioxide (NO_2)

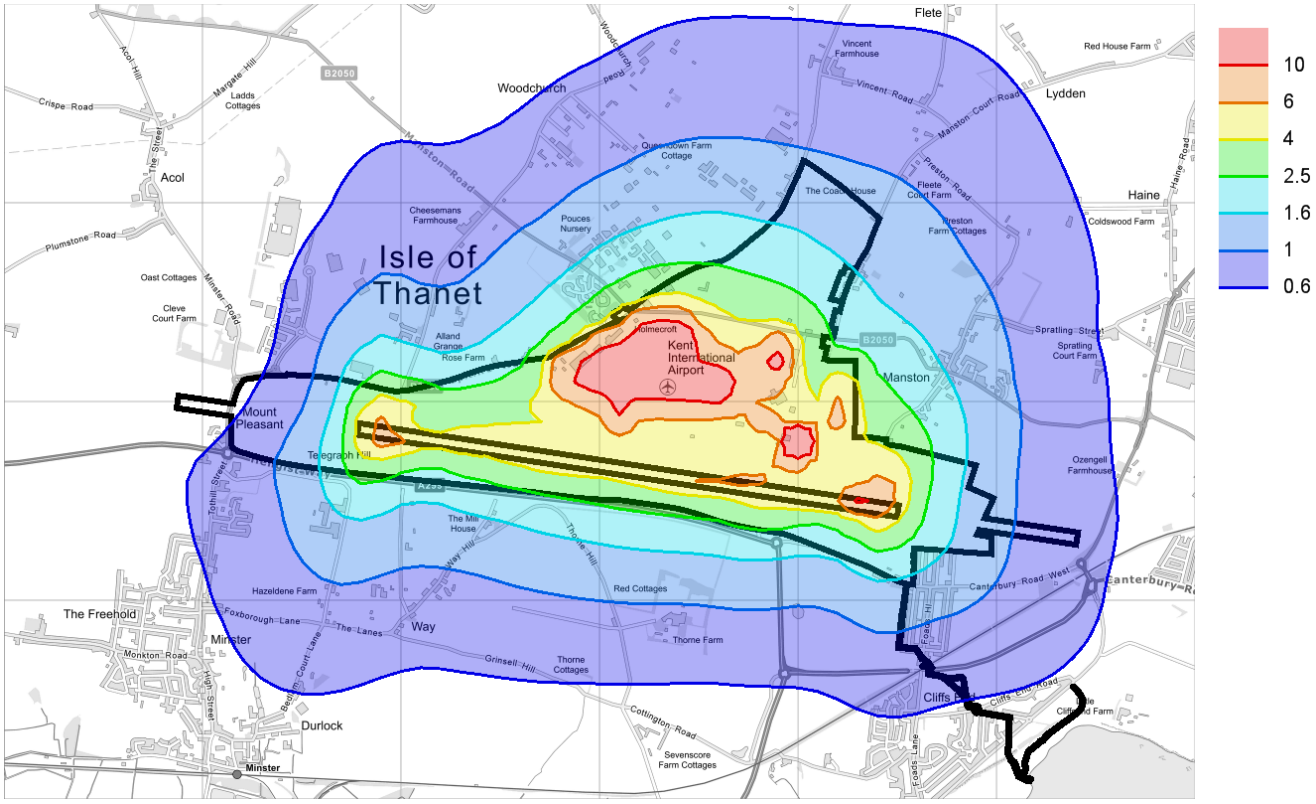
6.9.9 ***Summary**: No new or existing exceedances of the annual mean NO_2 objective or the hourly mean NO_2 objective are predicted. Impacts are negligible everywhere except at a small number of properties close to the airport boundary, where impacts are at most moderate, and in St Lawrence where the background is very high due to existing road traffic and the impact of the Proposed Development is slight. It should be borne in mind that this assessment uses a number of worst-case assumptions, and therefore impacts are likely to be lower (better) than modelled.*

6.9.10 Predicted concentrations of annual mean NO_2 at receptors are given in **Table 6.18**, for those modelled receptors with an impact of “slight” or “moderate”. At all other modelled receptors, the impact is “negligible”. Contours of NO_2 PC (calculated as 70% of the NO_x PC) in the vicinity of the airport (excluding road contribution) are shown in **Figure 6.13**.

Table 6.18 Maximum PCs and PECs for annual mean NO_2, Year 6

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H08	40	2.58	28.58	6.5%	71.5%	Slight
H09	40	3.19	31.67	8.0%	79.2%	Moderate
H10	40	4.54	30.42	11.3%	76.0%	Moderate
H11	40	4.48	28.86	11.2%	72.2%	Moderate
H12	40	3.64	25.73	9.1%	64.3%	Slight
H13	40	2.93	23.40	7.3%	58.5%	Slight
H15	40	2.48	24.43	6.2%	61.1%	Slight
H21	40	2.50	21.80	6.3%	54.5%	Slight
H23	40	3.66	22.96	9.2%	57.4%	Slight
A14	40	2.69	21.99	6.7%	55.0%	Slight
A32	40	0.26	38.26	0.7%	95.7%	Slight
A33	40	0.26	38.26	0.7%	95.7%	Slight
A34	40	0.26	38.26	0.6%	95.6%	Slight
A35	40	0.26	38.26	0.6%	95.6%	Slight
A36	40	0.26	38.26	0.6%	95.6%	Slight
A37	40	0.26	38.26	0.6%	95.6%	Slight
A38	40	0.25	38.25	0.6%	95.6%	Slight
A39	40	0.25	38.25	0.6%	95.6%	Slight
A40	40	0.26	38.26	0.6%	95.6%	Slight
A41	40	0.26	38.26	0.6%	95.6%	Slight
A42	40	0.26	38.26	0.6%	95.6%	Slight
A43	40	0.26	38.26	0.7%	95.7%	Slight
M11	40	3.41	22.71	8.5%	56.8%	Slight

Figure 6.13 Annual mean NO_2 process contribution (excluding roads), Year 6



Contains Ordnance Survey data © Crown copyright and database right 2017.

6.9.11 In Year 6, the maximum annual mean NO_2 PEC at any relevant human receptor location near the airport is predicted as 32 µg m^{-3} or 79% of the AQAL at the H09 Pouces Cottages receptor, including a large contribution of 9 µg m^{-3} from non-airport roads. The modelled contribution from the airport here is 3.2 µg m^{-3}. The greatest PC at any of the modelled receptors is 4.5 µg m^{-3} at the H10 Bell Davies Drive 1 receptor, where the PEC is 30 µg m^{-3} or 76% of the AQAL. Under the IAQM/EPUK criteria, the impact at these receptors and one other receptor on Spitfire Way is classed as moderate.

6.9.12 The locations classed as having a moderate impact are those with a PC greater than 4 µg m^{-3} (see top right cell in **Table 6.9**). These are shown by the yellow contour in **Figure 6.13**, which is largely confined to within the airport boundary except for parts of Bell Davies Drive close to Spitfire Way. At all other locations, the impact is slight or negligible.

6.9.13 At the St Lawrence receptors, the PC is up to 0.26 µg m^{-3} and the PEC is 38.3 µg m^{-3} in Year 6; the impact at these receptors is classified as slight. At the Birchington receptors, the PC is up to 0.16 µg m^{-3} and the PEC is 35.5 µg m^{-3}; the impact at these receptors is classified as negligible.

6.9.14 The modelled annual mean NO_2 concentrations are all below 40 µg m^{-3} and well below 60 µg m^{-3}. Under the Defra TG(16) guidance, it is highly unlikely that there will be an exceedance of the 99.79 percentile hourly mean NO_2 AQAL.

6.9.15 No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs. It should be remembered that this is a worst-case assessment incorporating several conservative assumptions.

Human health effects: PM_{10}

6.9.16 ***Summary:*** *No new or existing exceedances of the annual mean PM_{10} objective or the daily mean PM_{10} objective are predicted. Impacts are negligible everywhere.*

6.9.17 Predicted concentrations of annual mean PM_{10} at all the modelled receptors have an impact of negligible under the IAQM/EPUK criteria. Concentrations for those receptors with the five greatest PCs and the five greatest PECs are given in **Table 6.19**.

Table 6.19 Maximum PCs and PECs for annual mean PM_{10}, Year 6, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H01	40	0.05	18.79	0.1%	47.0%	Negligible
H02	40	0.04	18.49	0.1%	46.2%	Negligible
H03	40	0.03	18.49	0.1%	46.2%	Negligible
H04	40	0.03	18.48	0.1%	46.2%	Negligible
H32	40	0.05	18.28	0.1%	45.7%	Negligible
H10	40	0.31	15.98	0.8%	40.0%	Negligible
H11	40	0.31	15.75	0.8%	39.4%	Negligible
H23	40	0.39	16.08	1.0%	40.2%	Negligible
H54	40	0.32	17.40	0.8%	43.5%	Negligible
S02	40	0.33	15.00	0.8%	37.5%	Negligible

6.9.18 The maximum annual mean PM_{10} PEC at any relevant human receptor location is predicted as 19 µg m^{-3} or 47% of the AQAL at the H01 Garden Cottage receptor. The modelled contribution from the airport here is just 0.05 µg m^{-3}. The greatest PC is 0.39 µg m^{-3} at the H23 High Street 5 receptor, where the total PEC is 16 µg m^{-3} or 40% of the AQAL.

6.9.19 No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs. Under the IAQM/EPUK criteria, the impact at all receptors is classified as negligible.

6.9.20 Using the Defra formula to estimate the number of days where the daily mean PM_{10} is greater than 50 µg m^{-3}, no more than 2 days per year are greater than 50 µg m^{-3} at any receptor. This compares with 35 days per year permitted to be greater than 50 µg m^{-3}. There is therefore no likelihood of an exceedance of the daily mean PM_{10} AQAL.

Human health effects: $PM_{2.5}$

6.9.21 ***Summary:*** *No new or existing exceedances of the annual mean $PM_{2.5}$ objective are predicted. Impacts are negligible everywhere.*

6.9.22 Predicted concentrations of annual mean $PM_{2.5}$ at all the modelled receptors have an impact of negligible under the IAQM/EPUK criteria. Concentrations for those receptors with the five greatest PCs and the five greatest PECs are given in **Table 6.20**.

Table 6.20 Maximum PCs and PECs for annual mean $PM_{2.5}$, Year 6, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H01	25	0.04	12.93	0.2%	51.7%	Negligible
H02	25	0.03	12.75	0.1%	51.0%	Negligible

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H03	25	0.03	12.75	0.1%	51.0%	Negligible
H04	25	0.02	12.74	0.1%	51.0%	Negligible
H32	25	0.04	12.39	0.1%	49.6%	Negligible
H10	25	0.27	11.30	1.1%	45.2%	Negligible
H11	25	0.27	11.16	1.1%	44.7%	Negligible
H23	25	0.30	11.26	1.2%	45.0%	Negligible
H54	25	0.23	11.94	0.9%	47.8%	Negligible
A14	25	0.22	11.17	0.9%	44.7%	Negligible

6.9.23 The maximum annual mean $PM_{2.5}$ PEC at any relevant human receptor location is predicted as 13 µg m^{-3} or 52% of the AQAL at the H01 Garden Cottage receptor. The modelled contribution from the airport here is just 0.04 µg m^{-3}. The greatest PC is 0.30 µg m^{-3} at the H23 High Street 5 receptor, where the total PEC is 11 µg m^{-3} or 45% of the AQAL.

6.9.24 No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs. Under the IAQM/EPUK criteria, the impact at all receptors is classified as negligible.

Ecological effects: Annual mean nitrogen oxides (NO_x) concentrations in air

6.9.25 ***Summary:*** *Some exceedances of the annual mean NO_x objective are predicted where major roads pass close to designated ecological sites, mainly because of levels of emissions from existing road traffic. The additional contribution from the Proposed Development, including airport-related traffic, is small, less than 6% of the objective at any major ecological site. The impact at all local ecological sites is insignificant.*

6.9.26 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs, and the local nature sites with the five highest PCs and PECs.

6.9.27 Predicted concentrations of annual mean NO_x at these selected receptors are given in **Table 6.29**. Contours of NO_x PC in the vicinity of the airport are shown in **Figure 6.20**, and over a wider area are shown in **Figure 6.21**.

Table 6.21 Maximum PCs and PECs for annual mean NO_x, Year 6, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Site type
E08	30	1.32	39.83	4.4%	132.8%	Major
E09	30	1.76	45.12	5.9%	150.4%	Major
E17	30	1.03	42.04	3.4%	140.1%	Major
E24	30	0.84	39.98	2.8%	133.3%	Major
E32	30	0.16	40.76	0.5%	135.9%	Major
E22	30	0.72	26.62	2.4%	88.7%	Major
E54	30	0.32	35.88	1.1%	119.6%	Local

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Site type
E62	30	0.85	39.77	2.8%	132.6%	Local
E64	30	2.09	39.31	7.0%	131.0%	Local
E65	30	1.29	40.85	4.3%	136.2%	Local
E81	30	6.13	32.03	20.4%	106.8%	Local

6.9.28 The maximum modelled annual mean NO_x PEC at any relevant major environmental receptor (Ramsar, SPA, SAC and SSSI) is predicted as 45 µg m^{-3} or 150% of the AQAL at the E09 receptor, largely because it abuts the A28 through Margate. The modelled contribution from the airport here is 1.8 µg m^{-3}, which is the greatest PC at any of the modelled nationally- or internationally-designated ecological receptors, again because of the additional road traffic.

6.9.29 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 41 µg m^{-3} or 136% of the AQAL at the E65 receptor, representing Priority Habitat near Pegwell Bay. The modelled contribution from the airport here is 1.3 µg m^{-3}. The greatest modelled PC at a local nature receptor is 6.1 µg m^{-3} at the E81 receptor, representing deciduous woodland in the Priority Habitat Inventory near Spitfire Way, where the PEC is 32 µg m^{-3} or 107% of the AQAL.

6.9.30 Under EA guidance[30], the PC at all local nature sites is less than 100% of the AQAL so can be screened out from further assessment.

Ecological effects: Nutrient nitrogen deposition

6.9.31 ***Summary:*** *While some exceedances of the critical loads for nitrogen are predicted, these are due to existing deposition rates and the additional contribution from the Proposed Development is insignificant.*

6.9.32 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs (as a percentage of the receptor-specific critical load), and the local nature sites with the five highest PCs and PECs.

6.9.33 Modelled nutrient nitrogen deposition rates at these selected receptors are given in **Table 6.22**, along with the receptor-specific critical loads. Nutrient nitrogen background deposition rates at most of the modelled receptors are modelled to be at exceedance already, based on background deposition rates from APIS and without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

Table 6.22 Critical Loads assessment of nitrogen deposition, Year 6, worst receptors

Receptor	AQAL (kg N ha^{-1} y^{-1})	PC (kg N ha^{-1} y^{-1})	PEC (kg N ha^{-1} y^{-1})	% PC of AQAL	% PEC of AQAL	Site type
E30	8	0.01	15.69	0.1%	196.1%	Major
E43	5	0.01	14.29	0.1%	285.7%	Major
E44	5	0.01	14.29	0.2%	285.8%	Major
E48	5	0.01	14.29	0.2%	285.8%	Major

[30] '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.

Receptor	AQAL (kg N ha^{-1} y^{-1})	PC (kg N ha^{-1} y^{-1})	PEC (kg N ha^{-1} y^{-1})	% PC of AQAL	% PEC of AQAL	Site type
E49	5	0.01	14.29	0.2%	285.8%	Major
E20	8	0.03	10.81	0.4%	135.2%	Major
E21	8	0.05	10.83	0.6%	135.3%	Major
E22	8	0.07	10.85	0.9%	135.7%	Major
E23	8	0.06	13.50	0.8%	168.8%	Major
E24	8	0.05	13.49	0.6%	168.6%	Major
E79	10	0.41	26.31	4.1%	263.1%	Local
E80	10	0.38	26.28	3.8%	262.8%	Local
E82	10	1.13	27.03	11.3%	270.3%	Local
E84	10	0.37	26.27	3.7%	262.7%	Local
E86	10	0.09	25.99	0.9%	259.9%	Local
E78	10	0.47	18.95	4.7%	189.5%	Local
E81	10	1.24	20.56	12.4%	205.6%	Local
E83	10	0.46	19.78	4.6%	197.8%	Local

6.9.34 At the major environmental sites, the additional process contribution is at most 0.9% of the critical load at the E22 receptor representing Pegwell Bay. The PEC here is 136% of the critical load. At all modelled receptors, the PC is less than 1% of the critical load. Under EA guidance, where the PC at a major site is less than 1% of the critical load, it can be considered insignificant and does not need to be assessed further.

6.9.35 At the local nature sites, the additional PC is at most 12% of the critical load, at the E81 receptor, which represents deciduous woodland in the Priority Habitat Inventory near Spitfire Way. This is less than 100% of the assessment level, so under EA guidance, it can be considered insignificant and the local nature sites do not need to be assessed further.

Ecological effects: Acid deposition

6.9.36 ***Summary:*** *While some exceedances of the critical loads for acidity are predicted, these are due to existing deposition rates and the additional contribution from the Proposed Development is insignificant.*

6.9.37 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs (as a percentage of the receptor-specific critical load function), and the local nature sites with the five highest PCs and PECs (again as a percentage of the critical load function).

6.9.38 Modelled process contribution and background deposition rates are given in **Table 6.23**. A comparison with the critical load function is given in **Table 6.24**[31].

[31] These are calculated using the same formulas as the APIS critical load function tool, but without rounding of intermediate values, so results differ slightly from those generated by the website tool.

6.9.39 Background acid deposition rates at many of the modelled receptors are modelled to be at exceedance already, based on background deposition rates from APIS and without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

6.9.40 At the major environmental sites, the additional process contribution is at most 0.5% of the critical load function at the E22 receptor representing Pegwell Bay. The PEC here is 88% of the critical load.

6.9.41 The major receptor with the greatest PEC is E35, representing the Thanet Coast Ramsar site, where the PEC is 261% of the critical load function, but the PC is just 0.1% of the critical load function.

6.9.42 At the local nature sites, the additional PC is at most 1.0% of the critical load function, at the E73 receptor, which represents deciduous woodland in the Priority Habitat Inventory near Thorne Farm. The PEC here is modelled as 99% of the critical load function.

6.9.43 Under the EA criteria, the impacts at all modelled receptors, both major and local, can be considered insignificant and do not need to be assessed further.

Table 6.23 Acid deposition rates, Year 6, worst receptors

Receptor	Sulphur PC (keq ha^{-1} y^{-1})	Nitrogen PC (keq ha^{-1} y^{-1})	Sulphur background (keq ha^{-1} y^{-1})	Nitrogen background (keq ha^{-1} y^{-1})	Site type
E35	0	0.0005	0.25	1.12	Major
E37	0	0.0004	0.25	1.12	Major
E44	0	0.0006	0.22	1.02	Major
E48	0	0.0006	0.22	1.02	Major
E49	0	0.0005	0.22	1.02	Major
E22	0	0.0052	0.21	0.77	Major
E23	0	0.0043	0.20	0.96	Major
E38	0	0.0023	0.20	0.96	Major
E39	0	0.0020	0.20	0.96	Major
E42	0	0.0017	0.20	0.96	Major
E65	0	0.0104	0.28	1.62	Local
E77	0	0.0100	0.24	1.64	Local
E86	0	0.0062	0.29	1.85	Local
E87	0	0.0065	0.24	1.64	Local
E88	0	0.0077	0.24	1.64	Local
E72	0	0.0176	0.24	1.64	Local
E73	0	0.0189	0.24	1.64	Local
E75	0	0.0125	0.24	1.64	Local
E81	0	0.0882	0.27	1.38	Local
E82	0	0.0807	0.29	1.85	Local

Table 6.24 Critical Loads assessment of acid deposition, Year 6, worst receptors

Receptor	Exceedance (keq ha^{-1} y^{-1})			Percent of critical load function			Site type
	PC	Background	PEC	PC	Background	PEC	
E35	No exceedance	0.84	0.84	0.1	260.5	260.5	Major
E37	No exceedance	0.84	0.84	0.1	260.5	260.5	Major
E44	No exceedance	0.70	0.70	0.1	228.8	228.9	Major
E48	No exceedance	0.70	0.70	0.1	228.8	228.9	Major
E49	No exceedance	0.70	0.70	0.1	228.8	228.9	Major
E22	No exceedance	No exceedance	No exceedance	0.5	87.3	87.7	Major
E23	No exceedance	0.04	0.04	0.4	103.3	103.7	Major
E38	No exceedance	0.63	0.64	0.4	220.5	221.0	Major
E39	No exceedance	0.63	0.64	0.4	220.5	220.9	Major
E42	No exceedance	0.63	0.64	0.3	220.5	220.8	Major
E65	No exceedance	0.04	0.05	0.6	102.2	102.7	Local
E77	No exceedance	0.06	0.07	0.5	103.3	103.8	Local
E86	No exceedance	0.33	0.34	0.3	118.2	118.6	Local
E87	No exceedance	0.07	0.08	0.4	103.9	104.2	Local
E88	No exceedance	0.07	0.08	0.4	103.9	104.3	Local
E72	No exceedance	No exceedance	No exceedance	0.9	97.9	98.8	Local
E73	No exceedance	No exceedance	No exceedance	1.0	97.9	98.9	Local
E75	No exceedance	No exceedance	No exceedance	0.7	98.4	99.1	Local
E81	No exceedance	No exceedance	No exceedance	0.8	15.0	15.8	Local
E82	No exceedance	No exceedance	No exceedance	0.7	19.5	20.2	Local

6.10 Assessment of effects: Year 20

6.10.1 This section sets out the results of the dispersion modelling for Year 20 and compares predicted ground level concentrations against the assessment criteria detailed in **Section 6.7**. The predicted concentrations resulting from the Proposed Development (known as the process contribution or PC) are presented, along with the total predicted environmental concentrations (PEC), which include the background contribution from sources unrelated to the Proposed Development. These concentrations are then compared with the relevant air quality assessment level (AQAL: standard, objective, target or guideline value).

6.10.2 Modelled concentrations include the contributions from operational activity on the airport such as aircraft (including at height beyond the airport boundary) and GSE, and road traffic.

6.10.3 Note that there will be no significant construction activity during Year 20.

6.10.4 This section addresses impacts at receptors with a few kilometres of the airport. The contribution from airport-related roads further afield is assessed in **Section 6.11**.

6.10.5 All concentrations reported in this chapter are the highest of five years of meteorology, for each receptor or grid point.

6.10.6 Results are given here for the receptors of greatest interest for each assessment criterion. Full results are available in a separate spreadsheet.

6.10.7 Please note that in the following tables, results are given to several significant figures. This is to enable comparison between receptors and between PC and PEC contributions. The number of significant figures should not be taken as providing any indication of the accuracy of the results.

Human health effects: Nitrogen dioxide (NO_2)

6.10.8 ***Summary:*** *No new or existing exceedances of the annual mean NO_2 objective or the hourly mean NO_2 objective are predicted. Impacts are negligible everywhere except at a small number of properties very close to the airport boundary, where impacts are at most moderate, and in St Lawrence where the assumed background is very high due to existing road traffic and the impact of the Proposed Development is slight. It should be borne in mind that this assessment uses a number of worst-case assumptions, and therefore impacts are actually likely to be lower (better) than modelled.*

6.10.9 In view of the large number of modelled receptors, the following results are grouped by the general location of the receptors, and results are given for only a selection of receptors (those with the highest concentrations).

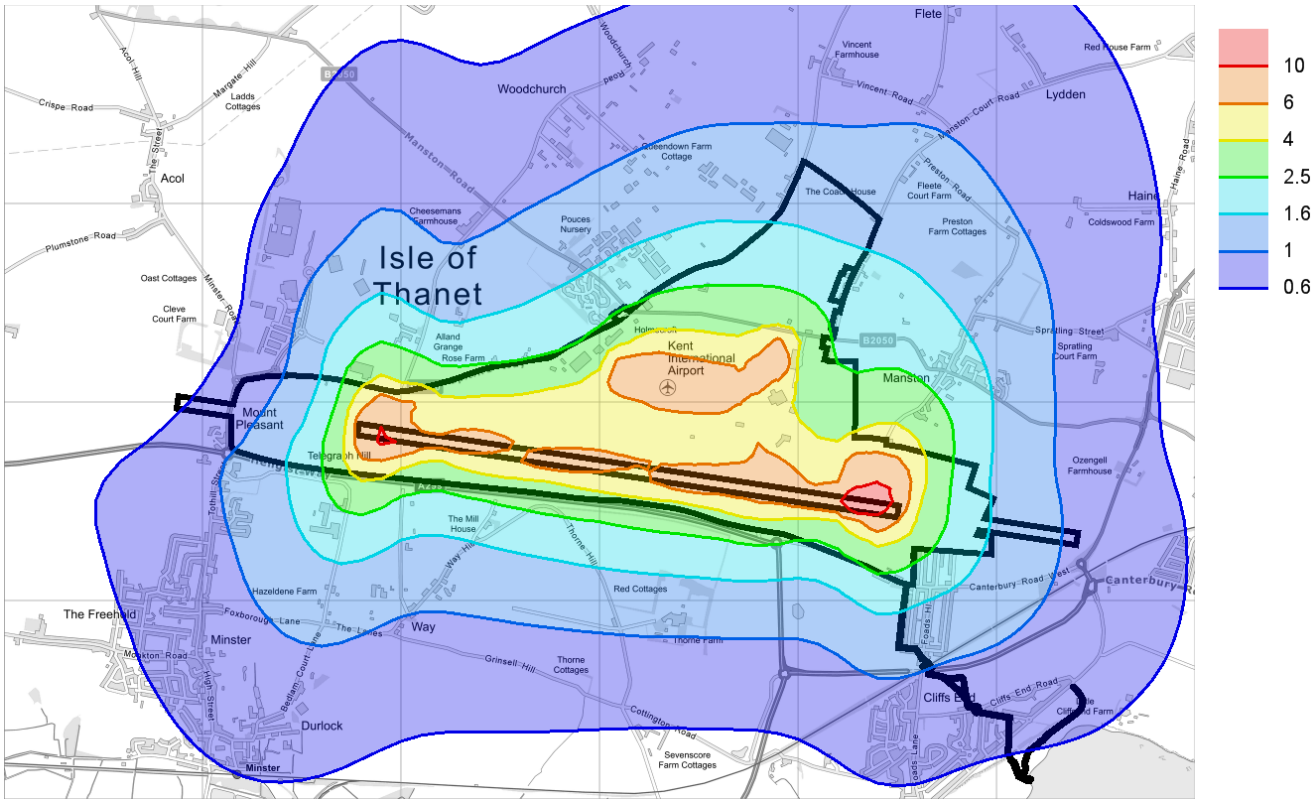
6.10.10 Predicted concentrations of annual mean NO_2 at receptors near the airport are given in **Table 6.25**, for those modelled receptors with an impact of "slight" or "moderate". At all other modelled receptors near the airport, the impact is "negligible". Contours of NO_2 PC (calculated as 70% of the NO_x PC; excluding roads) in the vicinity of the airport are shown in **Figure 6.14**.

Table 6.25 Maximum PCs and PECs for annual mean NO_2, Year 20, receptors near the airport

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H08	40	3.11	28.87	7.8%	72.2%	Slight
H09	40	3.35	31.49	8.4%	78.7%	Moderate
H10	40	2.73	28.41	6.8%	71.0%	Slight
H11	40	2.79	27.01	7.0%	67.5%	Slight
H12	40	2.44	24.44	6.1%	61.1%	Slight
H13	40	2.21	22.63	5.5%	56.6%	Slight
H15	40	2.62	24.56	6.6%	61.4%	Slight
H17	40	2.75	29.75	6.9%	74.4%	Slight
H18	40	2.59	28.74	6.5%	71.9%	Slight
H19	40	2.52	23.39	6.3%	58.5%	Slight
H20	40	2.93	23.02	7.3%	57.5%	Slight
H21	40	3.32	22.62	8.3%	56.5%	Slight
H22	40	2.98	22.28	7.5%	55.7%	Slight
H23	40	4.94	24.24	12.4%	60.6%	Moderate

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H35	40	2.25	21.55	5.6%	53.9%	Slight
H36	40	2.44	21.74	6.1%	54.4%	Slight
H37	40	2.62	21.92	6.6%	54.8%	Slight
H38	40	2.90	22.20	7.2%	55.5%	Slight
H39	40	2.61	21.91	6.5%	54.8%	Slight
H40	40	2.40	21.70	6.0%	54.3%	Slight
H43	40	2.27	21.57	5.7%	53.9%	Slight
H44	40	2.42	21.72	6.0%	54.3%	Slight
H49	40	2.22	25.30	5.6%	63.3%	Slight
H54	40	2.31	26.56	5.8%	66.4%	Slight
H69	40	3.14	22.44	7.8%	56.1%	Slight
A14	40	3.87	23.17	9.7%	57.9%	Slight
M10	40	2.63	21.93	6.6%	54.8%	Slight
M11	40	2.28	21.58	5.7%	54.0%	Slight

Figure 6.14 Annual mean NO_2 process contribution (excluding roads), Year 20, near the airport



Contains Ordnance Survey data © Crown copyright and database right 2017.

6.10.11 The maximum modelled annual mean NO_2 PEC at any relevant human receptor location near the airport is 31 µg m^{-3} or 79% of the AQAL at the H09 Pouces Cottages receptor. The modelled contribution from the airport here is 3.3 µg m^{-3}, but this receptor has a significant contribution of 9 µg m^{-3} from non-airport road traffic on the B2190 Spitfire Way. The impact here is classified as moderate.

6.10.12 The greatest PC at any of the modelled receptors is 4.9 µg m^{-3} at the H23 High Street 5 receptor, representing Bush Farm at the very southern end of Manston High Street. The PEC here is 24 µg m^{-3} or 61% of the AQAL. Under the IAQM/EPUK criteria, the impact at this receptor is classed as moderate. Receptors H09 and H23 are the only specifically modelled receptors classified as having a moderate impact.

6.10.13 The modelled annual mean NO_2 concentrations are all below 40 µg m^{-3} and well below 60 µg m^{-3}. Under the Defra TG(16) guidance, it is highly unlikely that there will be an exceedance of the 99.79 percentile hourly mean NO_2 AQAL.

6.10.14 No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs. It should be remembered that this is a worst-case assessment incorporating several conservative assumptions.

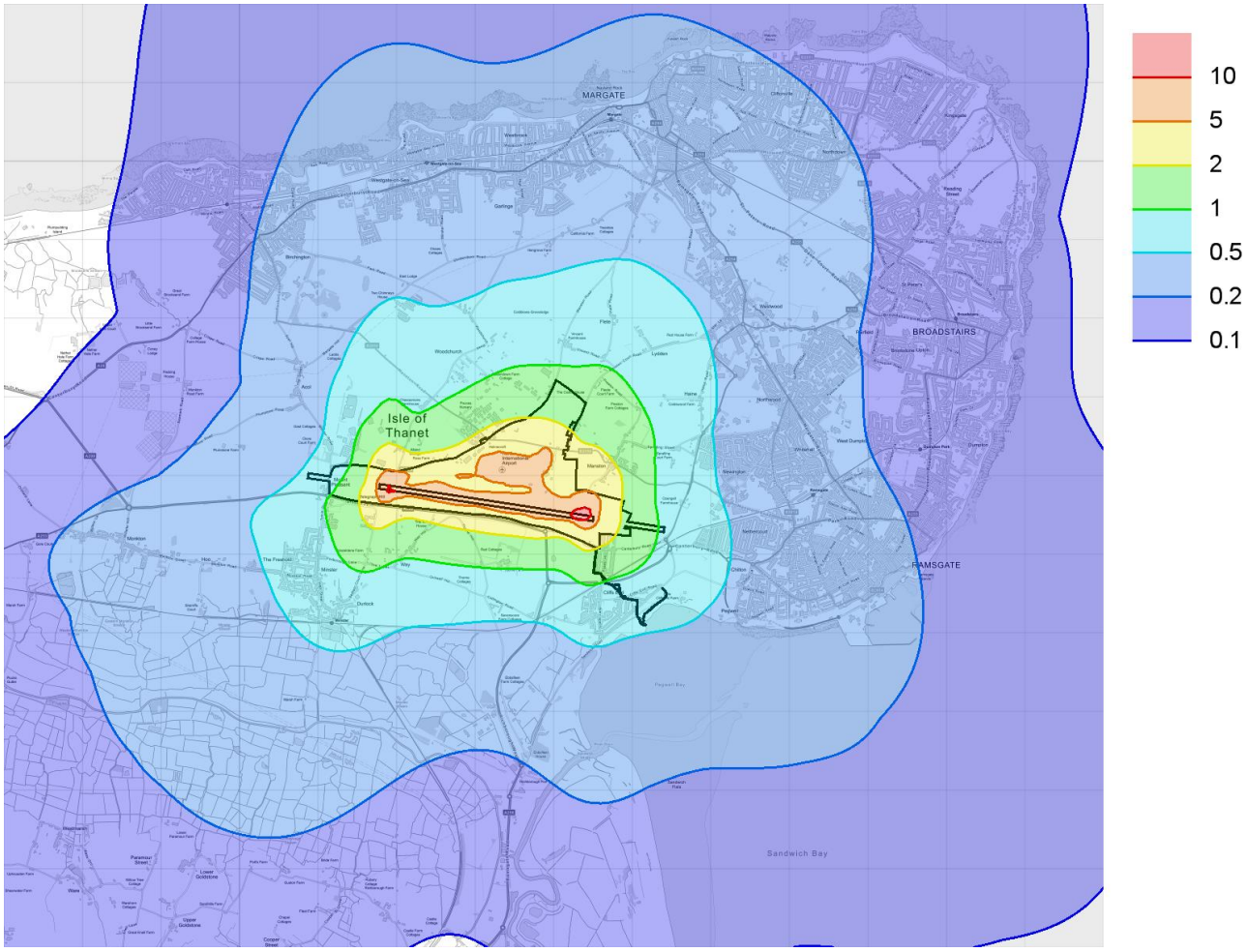
6.10.15 Considering receptors further away from the airport, the PC reduces but there are urban roadside locations where the background is higher. Concentrations have been modelled at groups of receptors in areas identified by TDC as being of particular concern, around the High Street St Lawrence and The Square Birchington. Modelled concentrations at these receptors are given in **Table 6.26**, and contours covering the urban area of Thanet district are shown in **Figure 6.15**.

Table 6.26 Maximum PCs and PECs for annual mean NO_2, Year 20, receptors in urban centres

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
A22	40	0.20	35.50	0.5%	88.8%	Negligible
A23	40	0.20	35.50	0.5%	88.8%	Negligible
A24	40	0.20	35.50	0.5%	88.8%	Negligible
A25	40	0.21	35.51	0.5%	88.8%	Negligible
A26	40	0.21	35.51	0.5%	88.8%	Negligible
A27	40	0.21	35.51	0.5%	88.8%	Negligible
A28	40	0.21	35.51	0.5%	88.8%	Negligible
A29	40	0.21	35.51	0.5%	88.8%	Negligible
A30	40	0.21	35.51	0.5%	88.8%	Negligible
A31	40	0.20	35.50	0.5%	88.8%	Negligible
M03	40	0.21	19.51	0.5%	48.8%	Negligible
A32	40	0.33	38.33	0.8%	95.8%	Slight
A33	40	0.33	38.33	0.8%	95.8%	Slight
A34	40	0.33	38.33	0.8%	95.8%	Slight
A35	40	0.33	38.33	0.8%	95.8%	Slight
A36	40	0.33	38.33	0.8%	95.8%	Slight

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
A37	40	0.33	38.33	0.8%	95.8%	Slight
A38	40	0.32	38.32	0.8%	95.8%	Slight
A39	40	0.33	38.33	0.8%	95.8%	Slight
A40	40	0.33	38.33	0.8%	95.8%	Slight
A41	40	0.33	38.33	0.8%	95.8%	Slight
A42	40	0.33	38.33	0.8%	95.8%	Slight
A43	40	0.33	38.33	0.8%	95.8%	Slight

Figure 6.15 Annual mean NO_2 process contribution (excluding roads), Year 20 (wider area)



Contains Ordnance Survey data © Crown copyright and database right 2017.

6.10.16 The maximum annual mean NO_2 PEC of these receptors is predicted as 38.3 µg m^{-3} or 96% of the AQAL at the A32 St Lawrence 1 receptor, representing St Laurence-in-Thanet Church. The modelled contribution from the airport here is just 0.33 µg m^{-3}, which is the greatest PC at any of the modelled receptors in this group. Under the IAQM/EPUK criteria, the impact at this receptor is classed as slight.

6.10.17 Impacts at the other modelled St Lawrence receptors are also classed as slight. Impacts at the receptors on The Square Birchington, where the PCs are 0.21 µg m^{-3} or below, are all classed as negligible.

6.10.18 It should be emphasised that the modelled PECs at St Lawrence and Birchington are dominated by the background contribution, which in turn is largely due to road vehicle emissions along busy and congested roads, and it is assumed that the background concentrations are unchanged from current (2007–2016) monitored concentrations at roadside locations. This is a highly conservative assumption, given that the monitoring data over that period shows a small but steady reduction in concentrations (about 0.4 µg m^{-3} per year at St Lawrence), and given the active measures to further reduce emissions from road vehicles which are expected to take effect over the next twenty years. A reduction of just 1 µg m^{-3} in the background concentration at St Lawrence would result in the airport impact at these receptors being classed as negligible.

Human health effects: PM_{10}

6.10.19 ***Summary:*** *No new or existing exceedances of the annual mean PM_{10} objective or the daily mean PM_{10} objective are predicted. Impacts are negligible everywhere.*

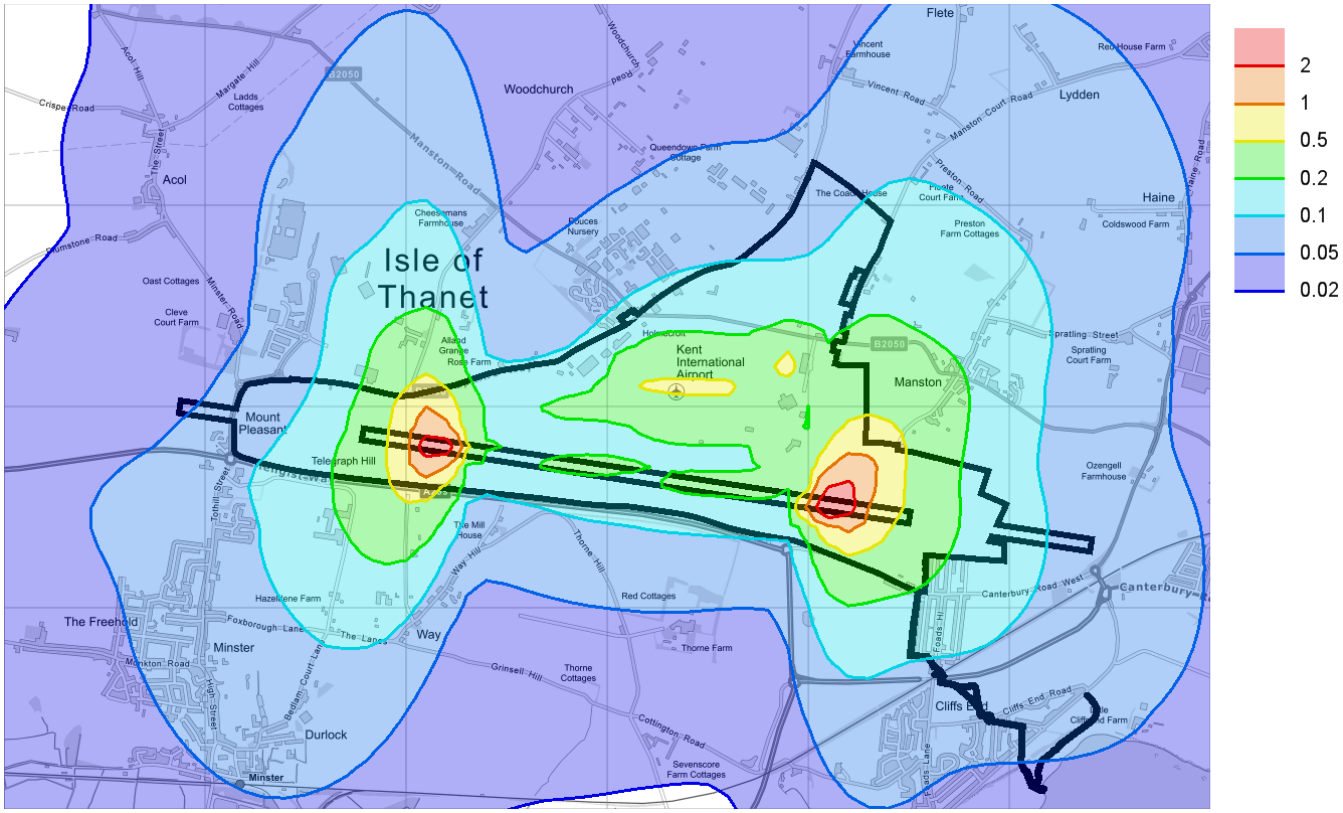
6.10.20 Predicted concentrations of annual mean PM_{10} at all the modelled receptors have an impact of negligible under the IAQM/EPUK criteria. Concentrations for those receptors with the five greatest PCs and the five greatest PECs are given in **Table 6.27**.

6.10.21 Contours of PM_{10} PC (excluding the road contribution) in the vicinity of the airport are shown in **Figure 6.16**. The contour plot clearly shows that the principal sources of PM_{10} are tyre and brake wear.

Table 6.27 Maximum PCs and PECs for annual mean PM_{10}, Year 20, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H01	40	0.07	18.86	0.2%	47.1%	Negligible
H02	40	0.05	18.50	0.1%	46.3%	Negligible
H03	40	0.05	18.50	0.1%	46.2%	Negligible
H04	40	0.04	18.49	0.1%	46.2%	Negligible
H32	40	0.07	18.46	0.2%	46.2%	Negligible
H17	40	0.34	17.54	0.8%	43.9%	Negligible
H21	40	0.34	16.03	0.9%	40.1%	Negligible
H23	40	0.55	16.24	1.4%	40.6%	Negligible
H54	40	0.48	17.65	1.2%	44.1%	Negligible
A14	40	0.42	16.11	1.1%	40.3%	Negligible

Figure 6.16 Annual mean PM_{10} process contribution (excluding roads), Year 20, near the airport



Contains Ordnance Survey data © Crown copyright and database right 2017.

6.10.22 The maximum annual mean PM_{10} PEC at any relevant human receptor location is predicted as 19 µg m^{-3} or 47% of the AQAL at the H01 Garden Cottage receptor. The modelled contribution from the airport here is just 0.07 µg m^{-3}. The greatest PC is 0.6 µg m^{-3} at the H23 High Street 5 receptor, representing Bush Farm at the very southern end of Manston High Street, where the total PEC is 16 µg m^{-3} or 41% of the AQAL.

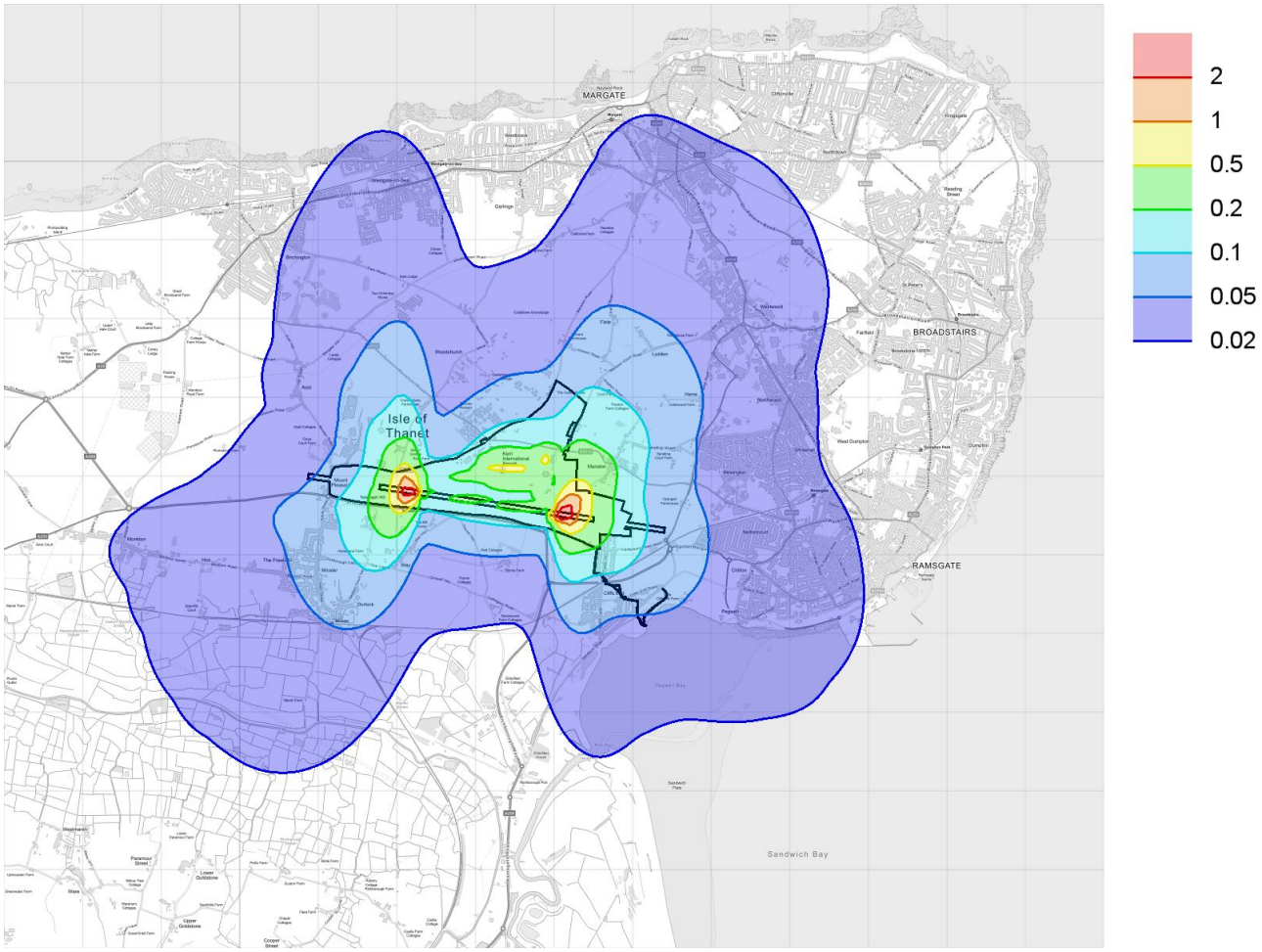
6.10.23 Under the IAQM/EPUK criteria, the impact at all receptors is classified as negligible.

6.10.24 Using the Defra formula to estimate the number of days where the daily mean PM_{10} is greater than 50 µg m^{-3}, no more than 2 days per year are greater than 50 µg m^{-3} at any receptor. This compares with 35 days per year permitted to be greater than 50 µg m^{-3}. There is therefore no likelihood of an exceedance of the daily mean PM_{10} AQAL.

6.10.25 No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs.

6.10.26 Contours covering the urban area of Thanet district are shown in **Figure 6.17**.

Figure 6.17 Annual mean PM_{10} process contribution (excluding roads), Year 20 (wider area)



Contains Ordnance Survey data © Crown copyright and database right 2017.

Human health effects: $PM_{2.5}$

6.10.27 ***Summary:*** *No new or existing exceedances of the annual mean $PM_{2.5}$ objective are predicted. Impacts are negligible everywhere.*

6.10.28 Predicted concentrations of annual mean $PM_{2.5}$ at all the modelled receptors have an impact of negligible under the IAQM/EPUK criteria. Concentrations for those receptors with the five greatest PCs and the five greatest PECs are given in **Table 6.28**.

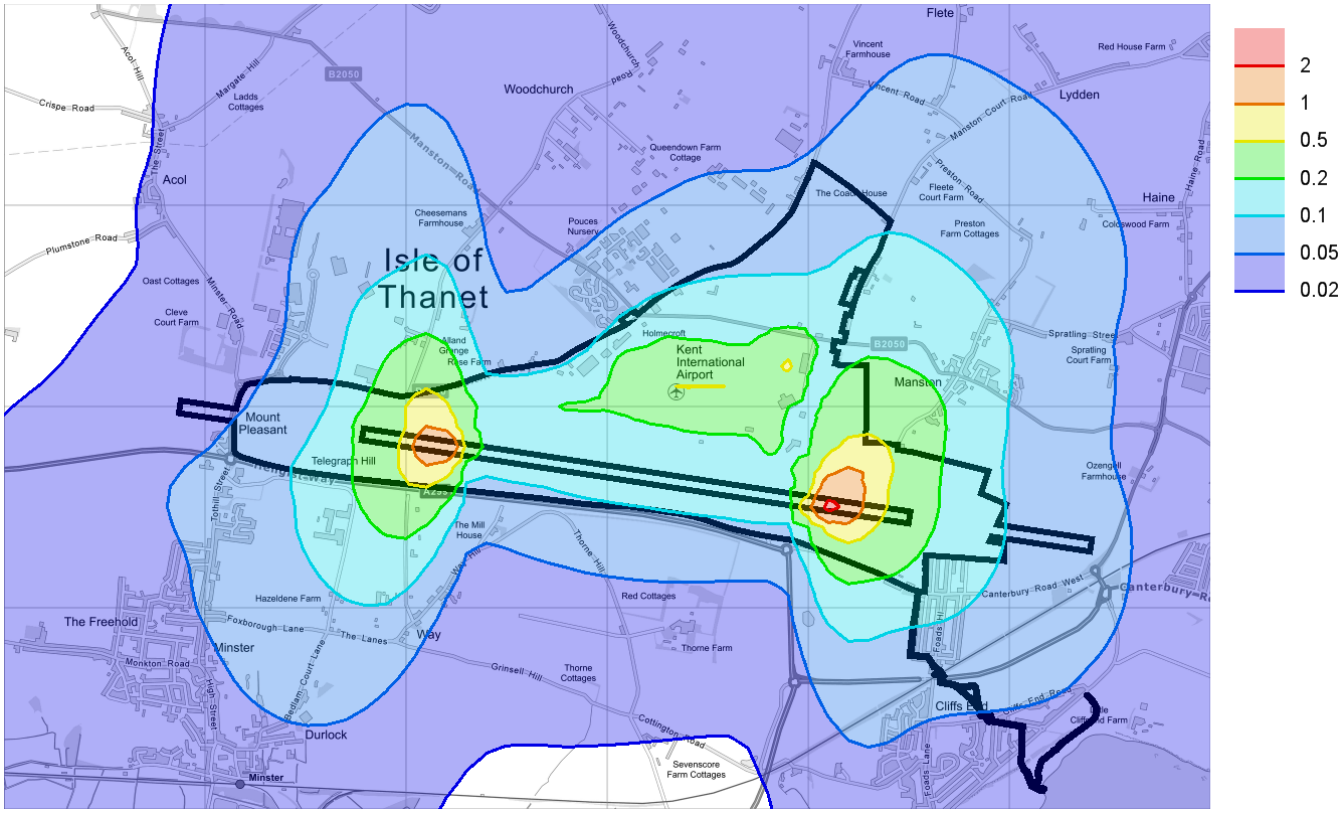
6.10.29 Contours of $PM_{2.5}$ PC (excluding road contribution) in the vicinity of the airport are shown in **Figure 6.18**. The contour plot clearly shows that the principal sources of $PM_{2.5}$ are tyre and brake wear.

Table 6.28 Maximum PCs and PECs for annual mean $PM_{2.5}$, Year 20, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H01	25	0.05	12.96	0.2%	51.8%	Negligible
H02	25	0.04	12.76	0.2%	51.0%	Negligible
H03	25	0.04	12.76	0.1%	51.0%	Negligible

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Impact
H04	25	0.03	12.75	0.1%	51.0%	Negligible
H32	25	0.05	12.49	0.2%	50.0%	Negligible
H17	25	0.23	12.08	0.9%	48.3%	Negligible
H21	25	0.26	11.21	1.0%	44.8%	Negligible
H23	25	0.41	11.36	1.6%	45.4%	Negligible
H54	25	0.34	12.10	1.4%	48.4%	Negligible
A14	25	0.31	11.26	1.2%	45.0%	Negligible

Figure 6.18 Annual mean $PM_{2.5}$ process contribution, Year 20, near the airport



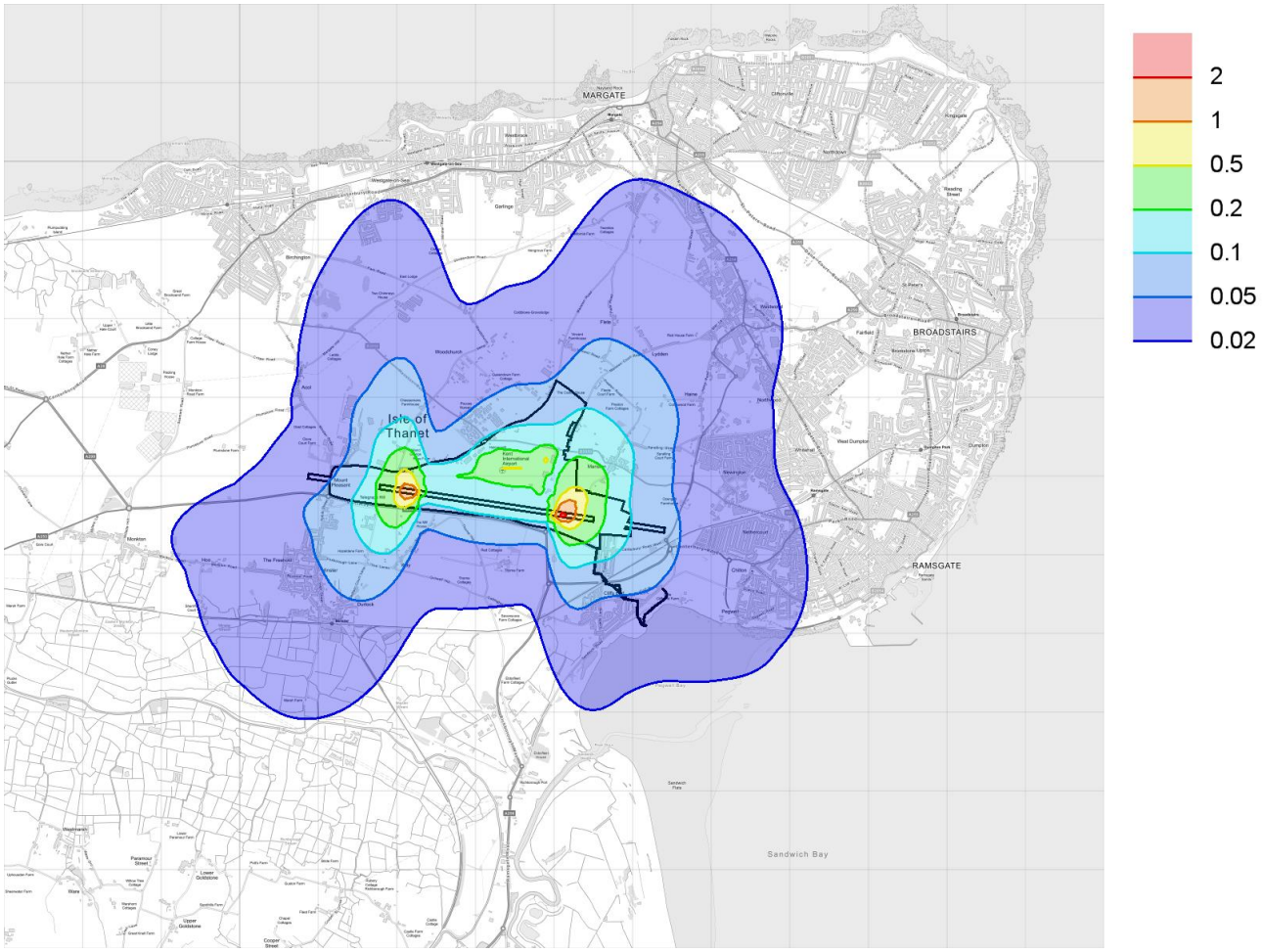
Contains Ordnance Survey data © Crown copyright and database right 2017.

6.10.30 The maximum annual mean $PM_{2.5}$ PEC at any relevant human receptor location is predicted as 13 µg m^{-3} or 52% of the AQAL at the H01 Garden Cottage receptor. The modelled contribution from the airport here is just 0.05 µg m^{-3}. The greatest PC is 0.41 µg m^{-3} at the H23 High Street 5 receptors, representing Bush Farm at the very southern end of Manston High Street, where the total PEC is 11 µg m^{-3} or 45% of the AQAL.

6.10.31 Under the IAQM/EPUK criteria, the impact at all receptors is classified as negligible. No existing or new exceedances are predicted, and the maximum concentrations are well below the AQALs.

6.10.32 Contours covering the urban area of Thanet district are shown in **Figure 6.19**.

Figure 6.19 Annual mean $PM_{2.5}$ process contribution (excluding roads), Year 20 (wider area)



Contains Ordnance Survey data © Crown copyright and database right 2017.

Ecological effects: Annual mean nitrogen oxides (NO_x) concentrations in air

6.10.33 ***Summary:*** *Some exceedances of the annual mean NO_x objective are predicted where major roads pass close to designated ecological sites, mainly because of levels of emissions from existing road traffic. The additional contribution from the Proposed Development, including airport-related traffic, is small, less than 7% of the objective at any major ecological site. The impact at local ecological sites is insignificant.*

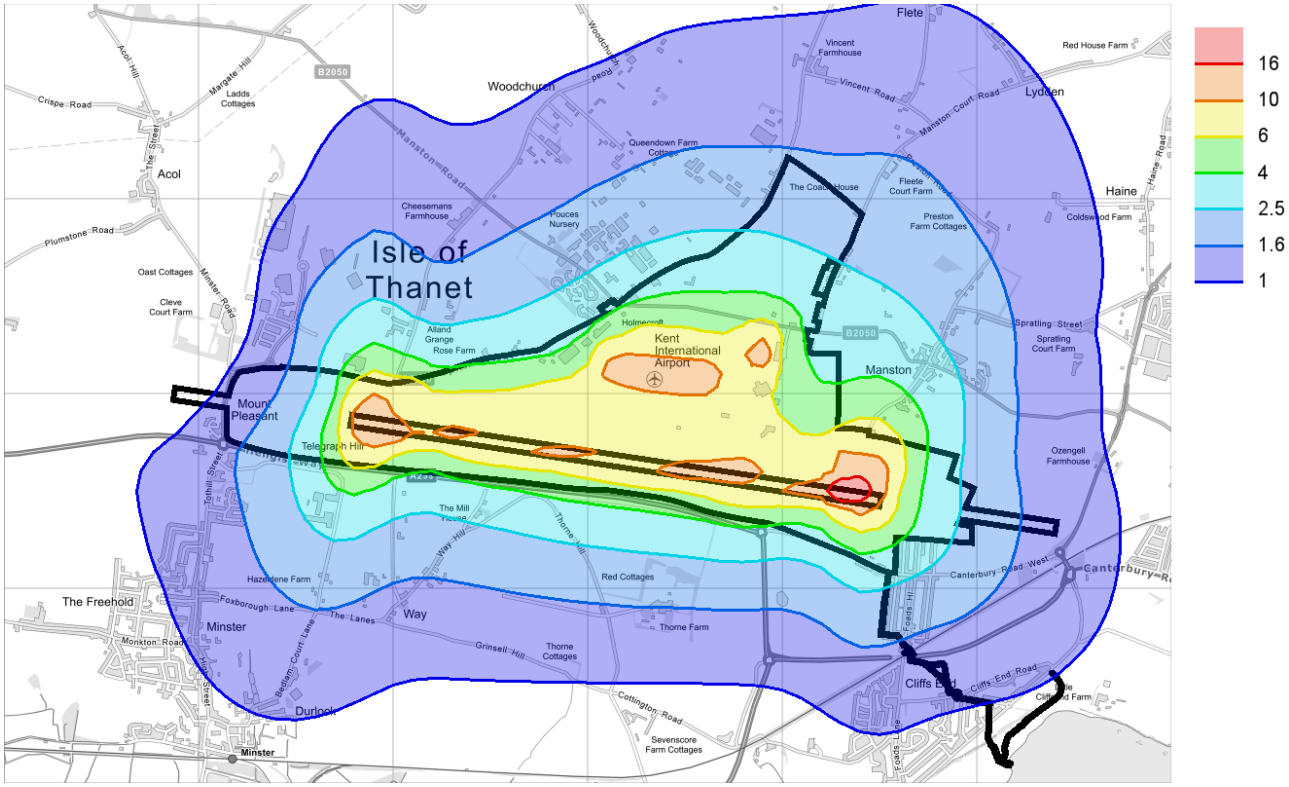
6.10.34 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs, and the local nature sites with the five highest PCs and PECs.

6.10.35 Predicted concentrations of annual mean NO_x at these selected receptors are given in **Table 6.29**. Contours of NO_x PC in the vicinity of the airport are shown in **Figure 6.20**, and over a wider area are shown in **Figure 6.21**.

Table 6.29 Maximum PCs and PECs for annual mean NO_x, Year 20, worst receptors

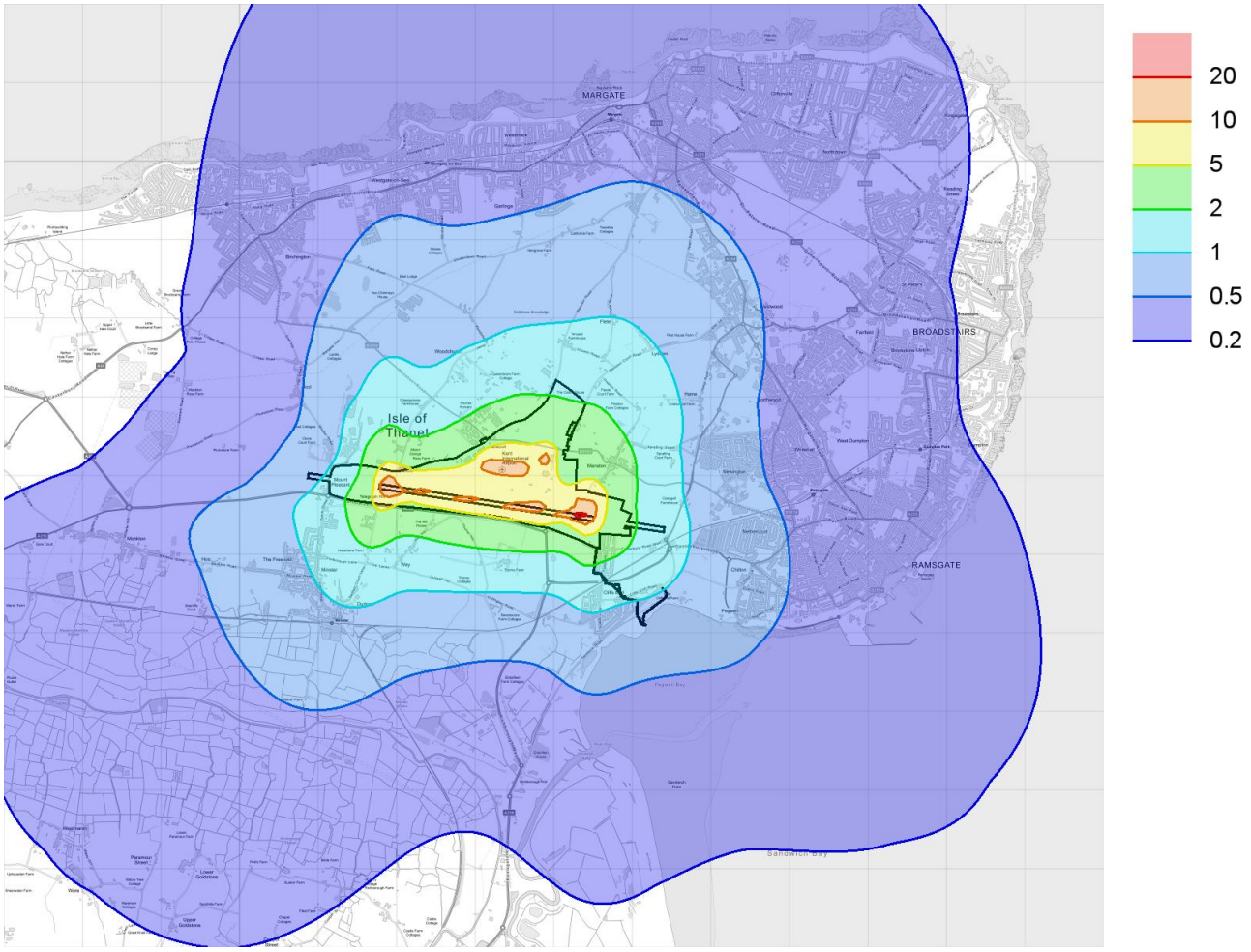
Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Site type
E09	30	2.02	44.95	6.7%	149.8%	Major
E17	30	1.42	42.06	4.7%	140.2%	Major
E18	30	0.79	39.75	2.6%	132.5%	Major
E24	30	1.15	40.12	3.8%	133.7%	Major
E32	30	0.22	40.15	0.7%	133.8%	Major
E08	30	1.51	39.70	5.0%	132.3%	Major
E22	30	0.93	26.83	3.1%	89.4%	Major
E54	30	0.41	35.67	1.4%	118.9%	Local
E62	30	1.05	39.56	3.5%	131.9%	Local
E64	30	2.55	39.49	8.5%	131.6%	Local
E65	30	1.56	40.85	5.2%	136.2%	Local
E70	30	2.08	31.91	6.9%	106.4%	Local
E78	30	3.37	29.27	11.2%	97.6%	Local
E79	30	2.82	28.72	9.4%	95.7%	Local
E80	30	2.58	28.48	8.6%	94.9%	Local
E81	30	3.61	29.51	12.0%	98.4%	Local
E82	30	3.48	29.38	11.6%	97.9%	Local

Figure 6.20 Annual mean NO_x process contribution (excluding roads), Year 20, near the airport



Contains Ordnance Survey data © Crown copyright and database right 2017.

Figure 6.21 Annual mean NO_x process contribution (excluding roads), Year 20 (wider area)



Contains Ordnance Survey data © Crown copyright and database right 2017.

6.10.36 The maximum annual mean NO_x PEC at any relevant major environmental receptor (Ramsar, SPA, SAC and SSSI) is predicted as 45 µg m^{-3} or 150% of the AQAL at the E09 receptor, largely because it abuts the A28 through Margate. The modelled contribution from the airport here is 2.0 µg m^{-3}, which is the greatest PC at any of the modelled nationally- or internationally-designated ecological receptors, again because of the additional road traffic.

6.10.37 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 41 µg m^{-3} or 136% of the AQAL at the E65 receptor, representing Priority Habitat near Pegwell Bay. The PC here is 1.6 µg m^{-3}. The greatest modelled PC at a local nature receptor is 3.6 µg m^{-3} at the E81 receptor, representing deciduous woodland in the Priority Habitat Inventory near Spitfire Way, where the PEC is 30 µg m^{-3} or 98% of the AQAL. Under EA guidance[32], the PC at all local nature sites is less than 100% of the AQAL so can be screened out from further assessment.

6.10.38 Generally, background concentrations of annual mean NO_x are comfortably below the limit of 30 µg m^{-3}, and the additional contribution from the Proposed Development is sufficiently small that there is no risk of new exceedances. However, close to roads concentrations may approach or exceed the limit, with quite large exceedances close to major roads. In some such roadside

[32] '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.

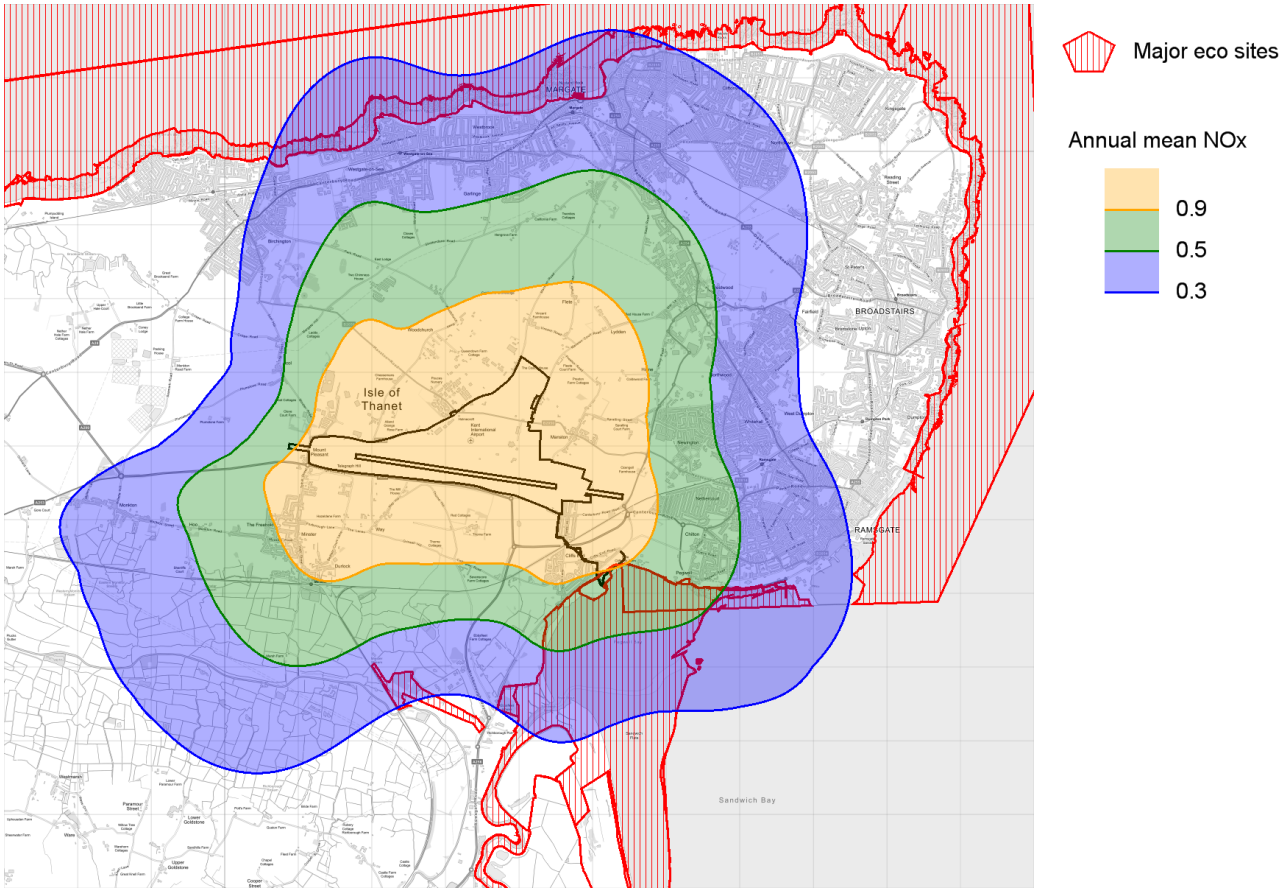
locations, it is possible that the extra contribution from the Proposed Development may create a new exceedance close to the road, or extend the area of exceedance slightly.

6.10.39 However, it should be emphasised that the modelled PECs are dominated by the background contribution, and it is assumed that the background concentrations are unchanged from current (2007–2016) monitored concentrations. This is a very conservative assumption, given that the monitoring data over that period shows a steady reduction in concentrations (about 1.4 µg m^{-3} per year at the ZH2 and ZH3 monitors), and in fact the assumed background concentration assumed here (25.9 µg m^{-3}, the 2007–2015 average at the two monitors) has not been exceeded since 2010. Moreover, the active measures are in place nationally and internationally to further reduce emissions from road vehicles and other sources which are expected to take effect over the next twenty years.

6.10.40 It should also be remembered that the modelling makes a number of worst-case assumptions about the emissions from the airport, so the PC is also likely to be overestimated.

6.10.41 No existing or new exceedances are predicted at any of the modelled receptors. However, under EA guidance, where the PC is greater than 0,3 µg m^{-3} at major ecological receptors, further assessment may be required. **Figure 6.22** shows the 0.3 µg m^{-3} contour overlaid on the major designated sites.

Figure 6.22 Annual mean NO_x process contribution (excluding roads), Year 20, showing major ecological sites



Contains Ordnance Survey data © Crown copyright and database right 2017.

Ecological effects: Maximum daily mean nitrogen oxides (NO_x) concentrations in air

6.10.42 ***Summary:*** *No new or existing exceedances of the daily mean NO_x objective are predicted. Impacts are insignificant everywhere.*

6.10.43 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs, and the local nature sites with the five highest PCs and PECs. For technical reasons, it is not possible to include the road contribution in the assessment of short-term criteria, because it is not possible to ensure that the hours of the year with the greatest airport contributions coincide with the hours of the year with the greatest road contributions.

6.10.44 Predicted concentrations of maximum daily mean NO_x at these selected receptors are given in **Table 6.29**.

Table 6.30 Maximum PCs and PECs for maximum daily mean NO_x, Year 20, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Site type
E20	200	9.91	61.71	5.0%	30.9%	Major
E21	200	13.31	65.11	6.7%	32.6%	Major
E22	200	20.04	71.84	10.0%	35.9%	Major
E23	200	11.46	63.26	5.7%	31.6%	Major
E24	200	12.58	64.38	6.3%	32.2%	Major
E62	200	23.08	74.88	11.5%	37.4%	Local
E63	200	24.80	76.60	12.4%	38.3%	Local
E64	200	27.89	79.69	13.9%	39.8%	Local
E75	200	21.56	73.36	10.8%	36.7%	Local
E76	200	21.11	72.91	10.6%	36.5%	Local

6.10.45 The maximum daily mean NO_x PEC at any relevant major environmental receptor (Ramsar, SPA, SAC and SSSI) is predicted as 72 µg m^{-3} or 36% of the AQAL at the E22 receptor, representing Pegwell Bay. The modelled contribution from the airport here is 20 µg m^{-3}, which is the greatest PC at any of the modelled nationally- or internationally-designated ecological receptors.

6.10.46 The maximum daily mean NO_x PEC at any relevant local nature receptor (i.e. excluding Ramsar, SPA, SAC and SSSI sites) is predicted as 80 µg m^{-3} or 40% of the AQAL at the E64 receptor, representing deciduous woodland in the Priority Habitat Inventory near the Lord of the Manor. The modelled contribution from the airport here is 28 µg m^{-3}, which is the greatest PC at any of the modelled local nature receptors.

6.10.47 No existing or new exceedances are predicted at any of the modelled receptors. Under EA guidance[33], the impacts at all modelled receptors, both major and local, can be screened out from further assessment.

[33] '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.

Ecological effects: Nutrient nitrogen deposition

6.10.48 ***Summary:*** *While some exceedances of the critical loads for nitrogen are predicted, these are due to existing deposition rates and the additional contribution from the Proposed Development is insignificant.*

6.10.49 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs (as a percentage of the receptor-specific critical load), and the local nature sites with the five highest PCs and PECs.

6.10.50 Modelled nutrient nitrogen deposition rates at these selected receptors are given in **Table 6.31**, along with the receptor-specific critical loads. Nutrient nitrogen background deposition rates at most of the modelled receptors are modelled to be at exceedance already, based on background deposition rates from APIS and without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

Table 6.31 Critical Loads assessment of nitrogen deposition, Year 20, worst receptors

Receptor	AQAL (kg N ha^{-1} y^{-1})	PC (kg N ha^{-1} y^{-1})	PEC (kg N ha^{-1} y^{-1})	% PC of AQAL	% PEC of AQAL	Site type
E31	8	0.02	15.70	0.2%	196.2%	Major
E43	5	0.01	14.29	0.2%	285.8%	Major
E44	5	0.01	14.29	0.2%	285.8%	Major
E48	5	0.01	14.29	0.2%	285.8%	Major
E49	5	0.01	14.29	0.2%	285.8%	Major
E20	8	0.04	10.82	0.5%	135.3%	Major
E21	8	0.06	10.84	0.8%	135.5%	Major
E22	8	0.09	10.87	1.2%	135.9%	Major
E23	8	0.08	13.52	1.0%	169.0%	Major
E24	8	0.06	13.50	0.8%	168.8%	Major
E79	10	0.57	26.47	5.7%	264.7%	Local
E80	10	0.52	26.42	5.2%	264.2%	Local
E82	10	0.70	26.60	7.0%	266.0%	Local
E84	10	0.37	26.27	3.7%	262.7%	Local
E86	10	0.12	26.02	1.2%	260.2%	Local
E78	10	0.68	19.16	6.8%	191.6%	Local
E81	10	0.73	20.05	7.3%	200.5%	Local

6.10.51 At the major environmental sites, the additional process contribution is at most 1.2% of the critical load at the E22 receptor representing Pegwell Bay. The PEC here is 136% of the critical load. At all other modelled receptors, the PC is less than 1% of the critical load. Under EA guidance, where the PC at a major site is less than 1% of the critical load, it can be considered insignificant and does not need to be assessed further. As the IAQM guidance points out, this is an approximate benchmark (“1% and not 1.0%”) and does not mean that where the PC is over 1% there will

necessarily be an adverse impact. It is therefore considered that these impacts do not need to be assessed further.

6.10.52 At the local nature sites, the additional PC is at most 7% of the critical load, at the E81 receptor, which represents deciduous woodland in the Priority Habitat Inventory near Spitfire Way. This is less than 100% of the assessment level, so under EA guidance, it can be considered insignificant and does not need to be assessed further.

Ecological effects: Acid deposition

6.10.53 ***Summary:*** *While some exceedances of the critical loads for acidity are predicted, these are due to existing deposition rates and the additional contribution from the Proposed Development is insignificant.*

6.10.54 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely the major environmental sites (SPAs, SACs, Ramsar sites and SSSIs) with the five highest PCs and PECs (as a percentage of the receptor-specific critical load function), and the local nature sites with the five highest PCs and PECs (again as a percentage of the critical load function).

6.10.55 Modelled process contribution and background deposition rates are given in **Table 6.32**. A comparison with the critical load function is given in **Table 6.33**[34].

6.10.56 Background acid deposition rates at many of the modelled receptors are modelled to be at exceedance already, based on background deposition rates from APIS and without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

6.10.57 At the major environmental sites, the additional process contribution is at most 0.6% of the critical load function at the E22 receptor representing Pegwell Bay. The PEC here is 88% of the critical load.

6.10.58 The major receptor with the greatest PEC is E35, representing the Thanet Coast Ramsar site, where the PEC is 261% of the critical load function, but the PC is just 0.1% of the critical load function.

6.10.59 At the local nature sites, the additional PC is at most 1.2% of the critical load function, at the E73 receptor, which represents deciduous woodland in the Priority Habitat Inventory near Thorne Farm. The PEC here is modelled as 99% of the critical load function.

6.10.60 Under the EA criteria, the impacts at all modelled receptors, both major and local, can be considered insignificant and do not need to be assessed further.

Table 6.32 Acid deposition rates, Year 20, worst receptors

Receptor	Sulphur PC (keq ha^{-1} y^{-1})	Nitrogen PC (keq ha^{-1} y^{-1})	Sulphur background (keq ha^{-1} y^{-1})	Nitrogen background (keq ha^{-1} y^{-1})	Site type
E35	0	0.0006	0.25	1.12	Major
E37	0	0.0005	0.25	1.12	Major
E44	0	0.0008	0.22	1.02	Major
E48	0	0.0009	0.22	1.02	Major
E49	0	0.0008	0.22	1.02	Major

[34] These are calculated using the same formulas as the APIS critical load function tool, but without rounding of intermediate values, so results differ slightly from those generated by the website tool.

Receptor	Sulphur PC (keq ha^{-1} y^{-1})	Nitrogen PC (keq ha^{-1} y^{-1})	Sulphur background (keq ha^{-1} y^{-1})	Nitrogen background (keq ha^{-1} y^{-1})	Site type
E22	0	0.0067	0.21	0.77	Major
E23	0	0.0057	0.20	0.96	Major
E38	0	0.0030	0.20	0.96	Major
E39	0	0.0026	0.20	0.96	Major
E42	0	0.0021	0.20	0.96	Major
E65	0	0.0135	0.28	1.62	Local
E77	0	0.0138	0.24	1.64	Local
E86	0	0.0083	0.29	1.85	Local
E87	0	0.0088	0.24	1.64	Local
E88	0	0.0101	0.24	1.64	Local
E72	0	0.0223	0.24	1.64	Local
E73	0	0.0237	0.24	1.64	Local
E75	0	0.0171	0.24	1.64	Local
E76	0	0.0152	0.24	1.64	Local

Table 6.33 Critical Loads assessment of acid deposition, Year 20, worst receptors

Receptor	Exceedance (keq ha^{-1} y^{-1})			Percent of critical load function			Site type
	PC	Background	PEC	PC	Background	PEC	
E35	No exceedance	0.84	0.84	0.1	260.5	260.6	Major
E37	No exceedance	0.84	0.84	0.1	260.5	260.5	Major
E44	No exceedance	0.70	0.70	0.2	228.8	228.9	Major
E48	No exceedance	0.70	0.70	0.2	228.8	228.9	Major
E49	No exceedance	0.70	0.70	0.1	228.8	228.9	Major
E22	No exceedance	No exceedance	No exceedance	0.6	87.3	87.9	Major
E23	No exceedance	0.04	0.04	0.5	103.3	103.8	Major
E38	No exceedance	0.63	0.64	0.6	220.5	221.1	Major
E39	No exceedance	0.63	0.64	0.5	220.5	221.0	Major
E42	No exceedance	0.63	0.64	0.4	220.5	220.9	Major
E65	No exceedance	0.04	0.05	0.7	102.2	102.9	Local
E77	No exceedance	0.06	0.07	0.8	103.3	104.1	Local
E86	No exceedance	0.33	0.34	0.5	118.2	118.7	Local

Receptor	Exceedance (keq ha^{-1} y^{-1})			Percent of critical load function			Site type
	PC	Background	PEC	PC	Background	PEC	
E87	No exceedance	0.07	0.08	0.5	103.9	104.4	Local
E88	No exceedance	0.07	0.08	0.6	103.9	104.4	Local
E72	No exceedance	No exceedance	No exceedance	1.2	97.9	99.1	Local
E73	No exceedance	No exceedance	No exceedance	1.2	97.9	99.2	Local
E75	No exceedance	No exceedance	No exceedance	0.9	98.4	99.3	Local
E76	No exceedance	No exceedance	No exceedance	0.8	98.4	99.2	Local

6.11 Assessment of effects from roads away from the airport: All years

6.11.1 Previous sections have presented assessments of the impacts of the Proposed Development close to the airport site, including the impact of airport-related and non-airport road traffic. However, the extra traffic generated by the Proposed Development may travel some distance and so generate impacts at greater distances from the airport. These more distant impacts are assessed in this section.

6.11.2 Although operational traffic flows and non-airport traffic flows tend to increase over time, construction traffic occurs predominantly in early years, and early years also have generally higher vehicle emission factors. The net effect is that impacts from road traffic are broadly similar in each of the three assessment years. It is therefore simpler for this section to consider all assessment years together.

6.11.3 In this section, only the impacts from road traffic are assessed, with the contribution from aircraft and the airfield being ignored. As shown in previous sections (e.g. Figure 6.15), the aircraft/airfield contribution is negligible more than a few kilometres from the airport, so this is a useful approach to understand the road impacts.

6.11.4 This section compares the impacts of airport-related traffic against baseline (Without Proposed Development) traffic. The airport-related traffic includes both operational traffic (including freight deliveries, fuel deliveries, passengers and staff) and construction traffic.

Human health effects: Nitrogen dioxide (NO_2)

6.11.5 The impact of the Proposed Development's road traffic on annual mean NO_2 concentrations is classified as "negligible" at all roadside locations and in all assessment years, except alongside the following two road links.

6.11.6 In all three assessment years, non-negligible impacts are predicted close to the A299 Thanet Way, west of the roundabout junction with A28/Potten Street Road. Modelled impacts here are greatest in Year 2. Modelled concentrations on the transect for Year 2 are given in **Table 6.34**.

Table 6.34 Modelled annual mean NO_2 concentrations, Year 2, transect across A299 Thanet Way

Distance from kerb (m)	AQAL (µg m^{-3})	Without Proposed Development		With Proposed Development		Impact
		Road contribution (µg m^{-3})	Total concentration (µg m^{-3})	Road contribution (µg m^{-3})	Total concentration (µg m^{-3})	
20	40	14.76	21.47	15.22	21.94	Negligible
15	40	16.95	23.67	17.48	24.20	Negligible
12	40	18.59	25.30	19.16	25.87	Negligible
10	40	19.87	26.59	20.48	27.20	Negligible
8	40	21.33	28.05	21.98	28.70	Negligible
6	40	23.05	29.76	23.74	30.45	Negligible
6	40	30.87	37.59	31.77	38.48	Slight
8	40	28.91	35.62	29.76	36.47	Slight
10	40	27.20	33.91	28.01	34.72	Slight
12	40	25.67	32.38	26.44	33.15	Slight
15	40	23.69	30.41	24.41	31.12	Slight
20	40	20.96	27.67	21.60	28.31	Negligible

6.11.7 **Table 6.34** shows that impacts from the additional traffic are negligible except within 20 m of the kerb. Concentrations are higher on the northern side of the road, as is to be expected from prevailing winds.

6.11.8 Properties within 20 m of the kerb have been identified using the MAGIC website's aerial photography and measurement tools[35]. Approximately 23 properties were identified within 20 m of the road, of which four are isolated properties (two at Frost Farm, 13 m from the road, one at Hawthorn Corner 15 m from the road, and one at Brookdene Farm 17 m from the road). The remainder are where the road passes Herne Bay; the closest property is about 8 m from the road, where the modelled PEC is 35.6 µg m^{-3} without the Proposed Development and 36.5 µg m^{-3} with the Proposed Development, an increase of 0.9 µg m^{-3}. This implies that approximately 23 properties would receive a "slight" impact from the traffic arising from the Proposed Development in Year 2. There are no "moderate" impacts at relevant receptors.

6.11.9 In Years 6 and 20, impacts are predicted as negligible more than 6 m from the kerb, so the impacts in Years 6 and 20 are negligible at all locations of relevant exposure.

6.11.10 In all three assessment years, "slight" impacts are predicted on the B2190 Spitfire Way. This location is immediately next to the airfield and has a non-negligible aircraft contribution, so is discussed in more detail in **Sections 6.8–6.10**, where the combined effects of road traffic and aircraft are assessed.

Human health effects: PM_{10}

6.11.11 The impact of the Proposed Development's road traffic on annual mean PM_{10} concentrations is classified as "negligible" at all roadside locations and in all assessment years.

[35] http://www.magic.gov.uk

6.11.12 The greatest increases compared to the Without Proposed Development are on the B2190 Spitfire Way. This location is immediately next to the airfield and has a non-negligible aircraft contribution, so is discussed in more detail in **Sections 6.8–6.10**, where the combined effects of road traffic and aircraft are assessed.

6.11.13 The greatest impacts are in Year 20. This is different from the situation with annual mean NO_2, partly due to the different fleet mixes (particularly the fraction of HDVs) in the two years, and partly due to changes in background concentrations which affect the chemistry of NO_2 formation. The increase in annual mean PM_{10} concentration is at most 0.5 µg m^{-3} at 1 m from the kerb. The modelled total concentration near this road is 18 µg m^{-3} or 45% of the AQAL.

6.11.14 In Years 2 and 6, the greatest increases at 1 m from the kerb on Spitfire Way are 0.2 µg m^{-3} and 0.4 µg m^{-3} respectively.

Human health effects: $PM_{2.5}$

6.11.15 The impact of the Proposed Development's road traffic on annual mean $PM_{2.5}$ concentrations is classified as "negligible" at all roadside locations and in all assessment years.

6.11.16 The greatest increases compared to the Without Proposed Development are on the B2190 Spitfire Way. This location is immediately next to the airfield and has a non-negligible aircraft contribution, so is discussed in more detail in **Sections 6.8–6.10**, where the combined effects of road traffic and aircraft are assessed.

6.11.17 The greatest impacts are in Year 20. This is different from the situation with annual mean NO_2, partly due to the different fleet mixes (particularly the fraction of HDVs) in the two years, and partly due to changes in background concentrations which affect the chemistry of NO_2 formation. The increase in annual mean $PM_{2.5}$ concentration is at most 0.3 µg m^{-3} at 1 m from the kerb. The modelled total concentration near this road is 12 µg m^{-3} or 48% of the AQAL.

6.11.18 In Years 2 and 6, the greatest increases at 1 m from the kerb on Spitfire Way are 0.12 µg m^{-3} and 0.23 µg m^{-3} respectively.

Ecological effects: Annual mean nitrogen oxides (NO_x) concentrations in air

6.11.19 The greatest increases in annual mean NO_x concentrations are in Year 2. This is different from the situation with annual mean NO_2, due to changes in background concentrations which affect the chemistry of NO_2 formation.

6.11.20 The greatest increases compared to the Without Proposed Development are on the B2190 Spitfire Way. This location is immediately next to the airfield and has a non-negligible aircraft contribution, and is discussed in more detail in **Sections 6.8–6.10**, where the combined effects of road traffic and aircraft are assessed. Modelled concentrations on the transect for Year 2 are given in **Table 6.35**.

Table 6.35 Modelled annual mean NO_x concentrations, Year 2, transect across B2190 Spitfire Way

Distance from kerb (m)	AQAL (µg m^{-3})	Without Proposed Development		With Proposed Development	
		Road contribution (µg m^{-3})	Total concentration (µg m^{-3})	Road contribution (µg m^{-3})	Total concentration (µg m^{-3})
20	30	13.74	23.06	15.57	24.89
15	30	16.43	25.75	18.65	27.97
12	30	18.68	28.00	21.22	30.54
10	30	20.57	29.89	23.38	32.70

Distance from kerb (m)	AQAL (µg m^{-3})	Without Proposed Development		With Proposed Development	
		Road contribution (µg m^{-3})	Total concentration (µg m^{-3})	Road contribution (µg m^{-3})	Total concentration (µg m^{-3})
8	30	22.86	32.18	26.00	35.32
6	30	25.81	35.13	29.37	38.69
5	30	27.60	36.92	31.41	40.73
4	30	29.68	39.01	33.80	43.12
3	30	32.09	41.41	36.54	45.86
2	30	35.06	44.39	39.94	49.27
1	30	38.92	48.25	44.35	53.68
1	30	32.01	41.33	36.42	45.75
2	30	28.53	37.86	32.46	41.78
3	30	25.92	35.24	29.47	38.79
4	30	23.84	33.16	27.10	36.42
5	30	22.06	31.38	25.07	34.39
6	30	20.56	29.88	23.35	32.67
8	30	18.11	27.43	20.55	29.87
10	30	16.23	25.55	18.41	27.73
12	30	14.70	24.02	16.66	25.98
15	30	12.90	22.22	14.60	23.92
20	30	10.77	20.09	12.16	21.48

6.11.21 The greatest total concentrations of annual mean NO_x are along the A299 Thanet Way, west of the roundabout junction with A28/Potten Street Road. Modelled concentrations on the transect for Year 2 are given in **Table 6.36**.

Table 6.36 Modelled annual mean NO_x concentrations, Year 2, transect across A299 Thanet Way

Distance from kerb (m)	AQAL (µg m^{-3})	Without Proposed Development		With Proposed Development	
		Road contribution (µg m^{-3})	Total concentration (µg m^{-3})	Road contribution (µg m^{-3})	Total concentration (µg m^{-3})
20	30	28.40	36.35	29.36	37.31
15	30	32.95	40.91	34.06	42.02
12	30	36.41	44.37	37.64	45.59
10	30	39.17	47.13	40.49	48.45

Distance from kerb (m)	AQAL (µg m^{-3})	Without Proposed Development		With Proposed Development	
		Road contribution (µg m^{-3})	Total concentration (µg m^{-3})	Road contribution (µg m^{-3})	Total concentration (µg m^{-3})
8	30	42.36	50.31	43.78	51.74
6	30	46.15	54.10	47.70	55.65
5	30	48.32	56.28	49.95	57.90
4	30	50.84	58.80	52.55	60.51
3	30	53.62	61.58	55.42	63.38
2	30	56.87	64.83	58.78	66.74
1	30	60.90	68.86	62.94	70.90
1	30	81.69	89.65	84.46	92.41
2	30	77.08	85.04	79.70	87.65
3	30	73.33	81.29	75.82	83.77
4	30	70.04	78.00	72.42	80.37
5	30	67.00	74.95	69.27	77.22
6	30	64.33	72.28	66.51	74.46
8	30	59.62	67.58	61.65	69.60
10	30	55.61	63.57	57.50	65.46
12	30	52.08	60.03	53.84	61.80
15	30	47.59	55.54	49.20	57.16
20	30	41.53	49.48	42.94	50.89

Ecological effects: Nutrient nitrogen deposition

6.11.22 The greatest increases in nitrogen deposition rates are in Year 20.

6.11.23 The only roads that have an increase in traffic flows above screening thresholds and that pass within 200 m of a designated ecological site are as follows:

- the A299 west of the airport passes 170 m from the Swale Ramsar, SPA and SSSI;
- the A299 west of the airport passes 45 m from the Foxes Bottom LNR and 170 m from the Seasalter Levels LNR;
- the A256 south of the airport passes 60 m from the Thanet Coast and Sandwich Bay Ramsar and SPA and the Sandwich Bay SAC.
- the A256 south of the airport passes adjacent to the Sandwich Bay to Hacklinge Marshes SSSI;
- the A256 south of the airport passes 150 m from the Sandwich and Pegwell Bay NNR.

6.11.24 In addition, several roads pass within 200 m of various local wildlife sites and protected habitat sites.

6.11.25 The major ecological sites identified above all have a minimum critical load for nitrogen deposition of 8 kg N ha^{-1} y^{-1}, except The Swale for which the minimum critical load is 15 kg N ha^{-1} y^{-1}.

6.11.26 The A256 south of the airport passes adjacent to the Sandwich Bay to Hacklinge Marshes SSSI. In Year 20, at 1 m from the road, the additional nitrogen deposition from the Proposed Development is 0.12 kg N ha^{-1} y^{-1} or 1.5% of the critical load, given a critical load of 8 kg N ha^{-1} y^{-1}. The additional contribution drops to below 0.08 kg N ha^{-1} y^{-1} or 1.0% of the critical load within 10 m of the kerb. In Years 2 and 6, the increase is less than 1% of the critical load even at 1 m from the kerb. The additional contribution is therefore considered insignificant in any of the assessment years, based on the EA criterion that a PC of less than 1% of the AQAL at a major ecological site may be considered insignificant.

6.11.27 At 60 m from the A256, representative of the Ramsar, SPA and SAC, the additional contribution is just 0.03 kg N ha^{-1} y^{-1} or 0.3% of the critical load in Year 20, and is lower in the other assessment years. The additional contribution from this road at the NNR is even smaller. The additional contribution is therefore considered insignificant in any of the assessment years.

6.11.28 The A299 west of the airport passes 170 m from the Swale Ramsar, SPA and SSSI. In Year 20, at 170 m from the road, the additional nitrogen deposition from the Proposed Development is 0.03 kg N ha^{-1} y^{-1} or 0.4% of the critical load, given a critical load of 8 kg N ha^{-1} y^{-1}. In Years 2 and 6, the increase is even smaller. The additional contribution is therefore considered insignificant in any of the assessment years.

6.11.29 At 45 m from the A299, representative of the Foxes Bottom LNR, the additional contribution is just 0.1 kg N ha^{-1} y^{-1} or 1.3% of the critical load in Year 20, and is lower in the other assessment years. The additional contribution is therefore considered insignificant in any of the assessment years, based on the EA criterion that a PC of less than 100% of the AQAL at a local nature site may be considered insignificant.

6.11.30 Considering all the roads that may pass near a local nature site, the greatest additional nitrogen deposition (assuming a deposition factor appropriate to woodland) is 1 kg N ha^{-1} y^{-1} at 1 m from the kerb in Year 20, and lower in the other assessment years This is less than 100% of any critical loads, so is therefore considered insignificant in any of the assessment years, based on the EA criterion that a PC of less than 100% of the AQAL at a local nature site may be considered insignificant.

Ecological effects: Acid deposition

6.11.31 The greatest increases in acid deposition rates are in Year 20.

6.11.32 The A256 south of the airport passes adjacent to the Sandwich Bay to Hacklinge Marshes SSSI. In Year 20, at 1 m from the road, the additional acid deposition from the Proposed Development is 1.6% of the critical load function for this site. The additional contribution drops to below 1.0% of the critical load function within 15 m of the kerb. In Years 2 and 6, the increase is less than 1% of the critical load even at 1 m from the kerb. The additional contribution is therefore considered insignificant in any of the assessment years, based on the EA's criterion that a PC of less than 1% of the AQAL at a major ecological site may be considered insignificant.

6.11.33 At 60 m from the A256, representative of the Ramsar, SPA and SAC, the additional contribution is under 0.2% of the critical load function for this site in Year 20, and is lower in the other assessment years. The additional contribution from this road at the NNR is even smaller. The additional contribution is therefore considered insignificant in any of the assessment years.

6.11.34 The A299 west of the airport passes 170 m from the Swale Ramsar, SPA and SSSI. In Year 20, at 170 m from the road, the additional nitrogen deposition from the Proposed Development is less than 0.3% of the critical load function for this site. In Years 2 and 6, the increase is even smaller. The additional contribution is therefore considered insignificant in any of the assessment years.

6.11.35 No acidity critical load information is available for the Foxes Bottom LNR or other local nature sites.

6.12 Assessment of air quality effects from construction dust and decommissioning

Construction phase effects

6.12.1 For the earthworks and concreting phases of the development, a risk-based construction dust assessment will be carried out, in accordance with the IAQM Guidance and the results are presented in the Air Quality Chapter of the ES.

Decommissioning phase effects

6.12.2 It is envisaged that decommissioning phase effects would be similar to construction phase effects, with use of similar diesel-powered construction plant and equipment and the potential for dust associated with the demolition activities. However, there will be considerably less earth-moving and site grading, which will substantially reduce emissions. In addition, decommissioning will not coincide with operational activities, so impacts are expected to be appreciably lower than those assessed above for construction.

6.13 Monetisation of air quality effects

6.13.1 The impacts of modelled concentrations of NO_2 and PM_{10} have been monetised using the approach recommended by WebTAG[36]. Various approaches to monetisation of air quality impacts and improvements have been suggested, including in TDC Air Quality Technical Planning Guidance[37]. However, most recommendations are explicitly or implicitly mainly addressed to schemes where the main air quality impact is due to increased road traffic. Such approaches use emissions from road traffic as a surrogate for air quality impact; these are usually called “damage cost” assessments.

6.13.2 Given that the Proposed Development at Manston Airport will mainly have impacts from aircraft emissions, which have a very different source–receptor relationship from road traffic emissions, such approaches are not suitable. Given that detailed dispersion modelling of the emissions has already been carried out for the Manston Airport proposal, a more appropriate approach is an impact pathway approach (I-PA). In this, the total population exposure is calculated by multiplying the number of households exposed to a given pollution level, and then summing over all pollution levels. This gives a population exposure measured in household µg m^{-3}. This can then be multiplied by a cost factor to obtain an estimated cost of the air quality impact.

6.13.3 For this assessment, population exposure has been calculated by using a database which provides, for each postcode, the coordinates of the centre of the postcode and the number of households within that postcode. For each postcode, the concentrations of NO_2 and PM_{10} are determined from the gridded modelling results, and these are multiplied by the number of households within that postcode. The results are then summed over all postcodes in the study area to give the population exposure to the two pollutants. Results are given in **Table 6.37**.

Table 6.37 Population exposure (household µg m^{-3})

Pollutant	Year 2	Year 6	Year 20
NO_2	4,586	11,161	16,528
PM_{10}	364	875	1,271

[36] Department for Transport (2015) TAG Unit A3 Environmental Impact Appraisal. https://www.gov.uk/government/publications/webtag-tag-unit-a3-environmental-impact-appraisal-december-2015

[37] Thanet District Council (2016) Air Quality Technical Planning Guidance. August 2016.

6.13.4 Cost factors are taken from WebTAG. For NO_2, final I-PA factors have not been published but are provided in a "Forthcoming changes" document from the Department for Transport[38]. Factors for the case where PM_{10} costs are calculated separately are used. The PM_{10} factors are from the TAG data book[39]. The factors are summarised in **Table 6.38**. A base year of 2010 is used throughout.

Table 6.38 Cost factors (£ per (household µg m^{-3}))

Pollutant	Central	Low	High
NO_2 damage costs (with PM)	32.2	12.9	51.5
PM_{10}	92.72	48.59	105.36

6.13.5 Calculated costs for different cost factor estimates (central, low and high) are given in **Table 6.39**. The total cost uses the central estimate for the PM_{10} cost factor, but the low estimate for the NO_2 cost factor. This is based on recent advice from the Committee on the Medical Effects of Air Pollutants (COMEAP)[40] which suggests that the current best evidence leads to a coefficient of 1.0092 per 10 µg m^{-3} annual average NO_2, when considering NO_2 in isolation from other pollutants. This is close to (but slightly lower than) the 1.01 coefficient used for the low estimate of damage costs in the WebTAG document.

Table 6.39 Calculated costs (£)

Pollutant	Year 2			Year 6			Year 20		
	Low	Central	High	Low	Central	High	Low	Central	High
NO_2	59,154	147,655	236,157	143,972	359,373	574,774	213,214	532,208	851,203
PM_{10}	17,692	33,761	38,363	42,500	81,100	92,155	61,734	117,801	133,861
Total		92,915			225,072			331,015	

6.13.6 These cost estimates should be interpreted with caution. As well as the considerable uncertainty in the cost factors, the dispersion modelling was designed to provide a conservative estimate of impacts for evaluation against regulatory limits, and as such contains a number of sources of conservatism, as described in the methodology section. More realistic assumptions are likely to result in lower cost estimates.

6.13.7 Cost estimates have not been adjusted or discounted to other years.

6.14 Conclusions of preliminary significance evaluation

6.14.1 The Conclusions on the significance of all those effects that have been subject to assessment in **Sections 6.8** to **6.10** are summarised in **Table 6.42**.

[38] Department for Transport (2017) Forthcoming Change to WebTAG: Revised NOx damage costs. March 2017.
[39] Department for Transport (2017) WebTAG Databook. Release v1.8.2, October 2017.
[40] COMEAP (2017) Annex A – Refined COMEAP recommendations letter. July 2017. In: Defra, UK Plan for tackling roadside nitrogen dioxide concentrations. Technical report. July 2017.

Table 6.40 Summary of significance of effects: Year 20

Impact type	Significance Level	Rationale
Human health effects: Annual mean NO_2	Not significant	There are no new or existing predicted exceedances of the AQAL at receptors around the airport. The impact is classified as moderate under IAQM/EPUK criteria at some properties close to the airport and also fronting onto roads, but properties are all at least 10% below the AQAL. In view of the conservatism of the modelling, this impact is considered to be of low to medium significance. At receptors where the existing concentrations of NO_2 are high, around High Street St Lawrence and The Square Birchington, the modelled contribution from the airport is no more than 0.3 µg m^{-3}, which is classified as a slight impact under the IAQM/EPUK criteria. However, this assumes that there is no reduction from current levels, whereas the current trend is for concentrations to fall by approximately 0.4 µg m^{-3} per year, and a drop of just 1 µg m^{-3} in background concentrations will reduce the impact classification to negligible. This impact is therefore not considered significant.
Human health effects: Hourly mean NO_2	Not significant	Given that the annual mean NO_2 concentrations are well within the 40 µg m^{-3} AQAL, it is not considered credible that there will be any exceedance of the hourly mean NO_2 AQAL.
Human health effects: Annual mean PM_{10}	Not significant	Annual mean PM_{10} concentrations are everywhere well below the AQAL and the impact of the airport is negligible under the IAQM/EPUK criteria. This impact is therefore not considered significant.
Human health effects: Daily mean PM_{10}	Not significant	The daily meanPM_{10} is estimated to be greater than 50 µg m^{-3} on no more than 2 days per year. The AQAL specifies that there should be no more than 35 days per year greater than 50 µg m^{-3}, so it is not considered credible that there will be any exceedance of the daily mean PM_{10} AQAL.
Human health effects: Annual mean $PM_{2.5}$	Not significant	Annual mean $PM_{2.5}$ concentrations are everywhere well below the AQAL and the impact of the airport is negligible under the IAQM/EPUK criteria. This impact is therefore not considered significant.
Human health effects: Other pollutants	Not significant	As discussed in Section 6.4, it is highly unlikely that any other pollutants will be as significant as NO_2, so other pollutants are no considered significant.
Ecological effects: Annual mean NO_x	Significance not yet established	Some Ramsar, SAC, SPA and SSSI receptors do not meet the EA criteria for not requiring further assessment, largely because of existing background concentrations. These sites will be considered further in **Chapter 7**. All modelled local nature sites meet the EA criteria for not requiring further assessment.
Ecological effects: Nutrient nitrogen deposition	Significance not yet established	Some Ramsar, SAC, SPA and SSSI receptors do not meet the EA criteria for not requiring further assessment, largely because of existing background deposition rates. These sites will be considered further in **Chapter 7**. All modelled local nature sites meet the EA criteria for not requiring further assessment.
Ecological effects: Acid deposition	Not significant	All modelled receptors meet the EA criteria for not requiring further assessment.
Air quality effects: NO_x and particulates from construction activity on site	Not significant	Included in assessment above.

Impact type	Significance Level	Rationale
Air quality effects: NO_x and particulates from traffic and transport	Not significant	Included in assessment above.
Air quality effects: construction dust	Significance not yet established	A risk-based construction dust assessment, in accordance with the IAQM Guidance, will be carried out and the results presented in the ES.

Contents

7. Biodiversity

7.1 Introduction

This Chapter sets out the results of the preliminary assessment of the potentially significant effects of the Proposed Development on biodiversity[1], both within the site boundary and the surrounding area where appropriate. This Chapter should be read in conjunction with the initial Preliminary Environmental Information Report (PEIR) (2017), **Chapter 3**, **Chapter 5** and the No Significant Effects Report (NSER) located in **Appendix 7.1**, which details the effects on internationally designated sites.

Following a summary of the limitations of this PEIR (2018), the Chapter outlines:

- the relevant policy, legislation and guidance that has informed the assessment;
- the data gathering methodology adopted as part of the biodiversity assessment;
- a description of the overall baseline conditions;
- the scope of the assessment;
- the assessment methodology;
- assessment of effects on each biodiversity receptor; and,
- a summary of the significance evaluation containing preliminary conclusions on the likely significance of environmental effects.

This Chapter focusses on the potentially significant effects of the construction and operation of the Proposed Development on notable and legally protected habitats and species. Potential effects on nature conservation interests both within and outside of the bounds of the Proposed Development site have been considered and include:

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

In terms of the activities associated with the Proposed Development, potential effects may be associated with the:

- Construction of cargo facilities, hangers, aircraft stands, taxiways and associated infrastructure (e.g. fuel farm, road junctions);
- Operation of aircraft and associated activities (e.g. aircraft loading, taxiing etc.) 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.

This Chapter includes an assessment of the potential effects on nationally and locally designated sites and species of nature conservation interest. For internationally designated sites, this Chapter draws upon an NSER (**Appendix 7.1)** which provides the necessary information for the competent authority (in this case the Secretary of State for Transport) to undertake a Habitats Regulations Assessment (HRA) under the

[1] This is in accordance with Schedule 4, paras 1(c) &5(b) of the Infrastructure Planning (EIA) Regulations 2017), which states that “the characteristics of development must be considered with particular regard to the use of natural resources, in particular land, soil, water and biodiversity.

Conservation of Habitats and Species Regulations 2017 (SI 2017 No. 1012) (the 'Habitats Regulations')[2]. The NSER is supported by evidence gathered from desk studies, field surveys, and air quality (AQ) and noise modelling. The NSER details the assessment process that permitted the conclusion that no significant effect is likely at any European wildlife site as a result of the Proposed Development being implemented, either alone or in combination with other plans and projects.

Limitation of the PEIR

As outlined in **Chapter 1, Section 1.7,** the PEIR provides preliminary information based on the current understanding of the Proposed Development and data gathered up to this point, both of which will be supplemented by further information as the Proposed Development develops. This information will subsequently be provided in full within the Environmental Statement (ES).

7.1.1 Baseline information related to the site has been collected. However, due to a lack of access to the site during March to late August 2017, some assumptions with regard the baseline have been made. However, based on assumptions made when considering data gathered from the desk study, existing baseline survey results and using professional judgement, likely worst-case effects have been considered.

7.1.2 Access permitting, additional baseline surveys are planned from late January/ early February[3] to early September 2018, with the findings of these surveys allowing any assumptions to be assessed.

7.1.3 The decision as to whether to carry out further survey was influenced by two factors:

- the potential presence of valued ecological receptors (VERs) in the zone of influence; and
- the potential for potentially significant effects to arise as a result of development.

Factors which influenced the survey programme for 2018 included:

- incomplete data due to previous Site access constraints; and
- the need to inform the design and planning of site specific design and development of mitigation in advance of the Development Consent Order (DCO) determination being made.

7.2 Policy, legislation and guidance

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 to highlight any requirements which the Proposed Development needs to consider. A summary of the relevant national and local policies with regard to biodiversity is provided in **Table 7.1**, with full details of all national and local planning policies relevant to the Proposed Development presented in **Appendix 4.1.**

Table 7.1 National and Local Planning Policies relevant to Biodiversity

National Planning Policy Framework (NPPF)[4]	**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*".**

[2] The Conservation of Habitats and Species Regulations 2017. Available online at: https://www.legislation.gov.uk/uksi/2017/1012/contents/made [Checked 02/01/17].
[3] Subject to change depending on when access to the Site is granted.
[4] Communities and Local Government (CLG) (2012) *National Planning Policy Framework*, CLG, London.

	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.*"
Thanet District Council Local Plan[5]	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*

[5] Thanet District Council (TDC) *The Thanet Local Plan 2006: Saved Policies*, TDC, Thanet. Available online at : https://www.thanet.gov.uk/your-services/planning-policy/thanets-current-planning-policy/thanet-local-plan-2006/ [Checked 06/12/2017]

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

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

- The Habitats Regulations;
- Natural Environment and Rural Communities Act 2006[6] (the NERC Act);
- Countryside and Rights of Way Act 2000[7] (the CRoW Act);
- Hedgerow Regulations 1997[8];
- Protection of Badgers Act 1992[9];
- Wildlife and Countryside Act 1981[10] (WCA) (as amended); and
- National Parks and Access to the Countryside Act 1949[11] (as amended).

[6] Natural Environment and Rural Communities Act (2006) Natural England. Available online at http://www.legislation.gov.uk/ukpga/2006/16/contents [Checked 06/12/17].
[7] Countryside and Rights of Way Act (2000) Natural England. Available online at http://www.legislation.gov.uk/ukpga/2000/37/contents [Checked 06/12/17].
[8] Hedgerow Regulations (1997) Natural England. Available online at http://www.legislation.gov.uk/uksi/1997/1160/contents/made [Checked 06/11/17].
[9] Protection of Badgers Act (1992) Natural England. Available online at http://www.legislation.gov.uk/ukpga/1992/51/contents [Checked 06/12/17].
[10] Wildlife and Countryside Act (1981) Natural England. Available online at http://www.legislation.gov.uk/ukpga/1981/69 [Checked 06/12/17].
[11] National Parks and Access to the Countryside Act (1949) Natural England. Available online at National Parks and Access to the Countryside Act [Checked 06/12/17].

Relevant guidance

Other guidance relevant to the biodiversity assessment includes:

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, (Ed 2.) (2016) Chartered Institute of Ecology and Environmental Management (CIEEM), Winchester.
- Collins, J (ed.) (2016). Bat Surveys for professional Ecologists: Good Practice Guidelines (Ed3) The Bat Conservation Trust, London.
- 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.
- Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation: Froglife Advice Sheet 10 (1999) Froglife. Halesworth;
- Gent, A.H. and Gibson, S.D., Eds. (1998). *Herpetofauna Workers' Manual*. Joint Nature Conservation Committee, Peterborough. Revised and reprinted 2003.
- Great crested newt mitigation guidelines (2001) English Nature, Peterborough.
- NE, EA and Defra[12] guidance from: https://www.gov.uk/guidance/construction-near-protected-areas-and-wildlife#protected-species
- Rodwell, J.S. (2006). *National Vegetation Classification: Users' Handbook*. Joint Nature Conservation Committee, Peterborough;
- Rodwell, J.S., (ed.) (1992) *British Plant Communities. Volume 3. Grassland and Montane Communities*. Cambridge University Press.
- Planning Inspectorate Advice Note Ten: Habitat Regulations Assessment relevant to nationally significant infrastructure projects (V7) (2016) The Planning Inspectorate. Bristol
- Wildlife Hazard Management at Aerodromes. CAP 772. (2014) Civil Aviation Authority (CAA).

7.3 Data gathering methodology

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

Desk Study

A data-gathering exercise was undertaken to obtain information relating to statutory and non-statutory biodiversity sites, priority habitats and species, and legally protected and controlled species (**Appendix 7.2**). In line with the CIEEM guidance (2016), 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**).

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)[13];

[12] Department for Environment, Food and Rural Affairs.
[13] SACs are designated under Article 4(4) of Directive 92/43/EEC.

- candidate SACs[14];
- Sites of Community Importance (SCIs)[15];
- Special Protection Areas (SPAs)[16];
- Listed or proposed Ramsar sites, potential SPAs, possible/proposed SACs[17]; and
- Sites identified or required as compensatory measures for adverse effects on other European sites[18].

Nationally important sites:

- Sites of Special Scientific Interest (SSSIs)[19]; and
- National Nature Reserves (NNRs).

Local Nature Reserves (LNRs)

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 (LWS).

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)[20];

[14] Candidate SACs are designated under Article 4.1 of Directive 92/43/EEC.
[15] SCIs are sites that have been nominated or submitted by Member States and entered onto the list of sites compiled by the European Commission that form (along with SACs and SPAs) the Natura 2000 network. SCIs are subject to the provisions of Article 6(2) of Directive 92/43/EEC. SCIs are afforded full protection by law under the Conservation of Habitats and Species Regulations 2010 (regulation 8(1)(b)).
[16] SPAs are classified pursuant to the requirements of Directive2009/147/EC (Article 4). As European Sites they are provided with full protection by law under the Conservation of Habitats and Species Regulations 2010.
[17] Government policy in England (see paragraph 118 of the NPPF) protects Ramsar sites, potential SPAs and possible SACs as if they were fully classified SPAs or a fully designated SACs.
[18] Government policy in England (see paragraph 118 of the NPPF) is that any such compensatory land or water must itself be protected as if it were a fully classified SPA or a fully designated SAC.
[19] Some SSSIs also wholly or partially fall within a European Site boundary.
[20] The JNCC prepared guidelines to assist in the selection of SPAs (The Birds Directive: Selection guidelines for Special Protection Areas). Stage 1 of the two stage process identifies those areas used regularly by 1% or more of the Great Britain (or in Northern Ireland, the all-Ireland) population of a species listed in Annex I of the Birds Directive in any season. The JNCC undertakes reviews of the SPA network and populations of its qualification species at roughly decadal intervals with the last (third) review published in 2016.

- National importance: Priority habitats and species of principal importance (HPI and SPI[21]) 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[22];
- 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); and
- Borough/district importance: Habitats and species listed in the Borough/District Biodiversity Action Plan (BAP).

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 document, 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 the *Wildlife and Countryside Act 1981*), given that the Proposed Development does not include any proposals relating to the sale of species, and
  - species that are listed in Schedule 1 of the *Wildlife and Countryside Act 1981* that are 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.

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 15km of the site;
- bat roosts within 5km of the site;

[21] Habitats and Species of Principle Importance (HPI and SPI).
[22]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.

- non-statutory sites of biodiversity interest located on or within 2km of the site;
- records of priority habitats and priority, legally protected and controlled species to a distance of 1km from the site[23]; and
- water bodies (potential great crested newt (GCN) breeding habitat) located on or within 0.5km of the site[24].

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.

Table 7.2 Information used in the preparation of this Chapter

Source	Data
The Government's Multi-Agency Geographic Information for the Countryside (MAGIC) website[25]	Statutory biodiversity sites; priority habitats; granted European Protected Species (EPS) mitigation licence applications (to 03.07.2017); SSSI Impact Risk Zones (IRZs)[26]
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 records were extracted from the KOS online database, for all species within 5km of the site (http://birdgroups.co.uk/kos/default.asp, accessed in August 2016); Pegwell Bay bird reports.
British Trust for Ornithology (BTO)	Wetland Bird Survey (WeBS) survey data.
Sandwich Bay Bird Observatory (SBBO)	Provided a map showing the main locations for wintering golden plover in the Sandwich Bay area, derived from ongoing SBBO studies into the species.
Civil Aviation Authority (CAA)	Historical data (2007-2017) on birdstrike at Kent International Airport.
Google Earth	Review of satellite imagery for identification of biodiversity interest features e.g. water bodies, connectivity features.
National Biodiversity Network (NBN)[27]	Records of legally protected and priority species
UK Biodiversity Action Plan (UKBAP)[28]	UK Priority BAP species/habitats

[23] It was considered that effects were unlikely on such sites, habitats and roosts beyond these distances and that they were sufficient to identify VERs.
[24] The study area extent is based upon 500 m being the generally accepted distance which GCN will move from their breeding waterbodies to utilise suitable areas of surrounding terrestrial habitat (assuming no barriers to movement). 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 (English Nature, 2001. Great crested newt mitigation guidelines. English Nature, Peterborough.)
[25] Multi-Agency Geographic Information for the Countryside (MAGIC) (2017) DEFRA. Available online at www.magic.defra.gov.uk [Checked 06/12/17].
[26] 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.
[27] National Biodiversity Network (NBN) (2017) Available online at https://nbn.org.uk/ [Checked 06/12/17].
[28] UK Biodiversity Action Plan (2016) Joint Nature Conservation Committee. Available online at http://jncc.defra.gov.uk/page-7342 [Checked 06/12/17].

Source	Data
Kent Biodiversity Action Plan (KBAP) [29]	KBAP species and habitats
NE[30]	Section 41 NERC Act 2006 species (SPI) and habitats (HPI) of principal importance; updated 14/05/2014
Ecological Appraisals provided for development projects at or in close proximity to the Proposed Development 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. Nesting birds and potential foraging and roost habitat for bats, and habitat for the four widespread reptiles were reported in publicly available documents associated with these developments. No evidence of other protected or notable species were reported.

For ecological impact assessment (EcIA) the baseline is normally informed initially by a Preliminary Ecological Appraisal (PEA), comprised of a desk study and an extended Phase I habitat survey. These together provide the context for determining what further (Phase 2) survey is required to provide sufficient information about potential receptors.

In this case, existing baseline data for the Proposed Development Site was reasonably comprehensive, particularly as a result of the Stone Hill Park (SHP) planning application which largely comprised the same area as the current DCO application and included an extended Phase 1 habitat survey. Therefore, while access restrictions meant that it was not possible to undertake an extended Phase 1 habitat survey within the Proposed Development Site, existing information and the subsequent 'ground-truthing' exercise allowed a habitat map to be produced, this being provided as **Figure 7.3**. The ground-truthing exercise involved a walk-over survey to verify if existing data, which included that from the SHP planning application and other sources, remained accurate and this approach was subsequently agreed with NE[31].

The following desk study information used in this Chapter are shown in **Table 7.3**.

Table 7.3 Completed baseline surveys from the SHP Proposal

Survey requirement	Survey specification	Survey area	Survey date
Habitats	An extended Phase 1 habitat survey of the site was completed in accordance with good practice guidance.	Study area	June 2015
Bats (roost: building inspections)	External and internal (where possible) inspections were undertaken at each of the buildings on the site to determine potential to support roosting bats. Evidence indicating current or historic use of the buildings by bats was also searched for in accordance with good practice.	Site	June and October 2015
Bats: hibernation roost	A total of 28 nights of automated detector data were gathered in each of two buildings; inspections for hibernating bats by a NE licensed bat ecologist on each visit were also undertaken.	Site	January to March 2016
Great crested newt (GCN)	Four water bodies, one within the site boundary and three within 500m of the Proposed Development were assessed	Site and within 500 m	April 2016

[29] Kent Biodiversity Action Plan (2017) Kent Biodiversity Partnership. Available online at http://www.kentbap.org.uk/habitats-and-species/ [Checked 06/12/17].
[30] http://publications.naturalengland.org.uk/publication/4958719460769792
[31] Baseline Data Collection Methodology and PEIR Meeting between Amec Foster Wheeler and Natural England on 03/11/2016.

Survey requirement	Survey specification	Survey area	Survey date
	for their suitability to support GCN. Potentially suitable water bodies were subsequently surveyed to determine presence or likely absence of GCN, along with eDNA[32] sampling; in accordance with good practice guidance.		
Birds: wintering birds	Four visits i.e. one visit each month. Methods included the use of a combination of vantage point and walked survey; the location of all birds seen and heard was mapped. Surveys were completed with regard to methods outlined within current good practice guidance.	Site	November 2015 to February 2016 inclusive

The scientific names of all species cited in the text are included in **Appendix 7.11**.

Survey Work

The following baseline survey programme was undertaken by Wood in 2017 at the Proposed Development Site:

- Off-Site non-breeding (over-wintering) bird surveys were undertaken due to the proximity of the Thanet Coast and Sandwich Bay SPA and Ramsar site, and the Sandwich Bay to Hacklinge Marshes SSSI, which are important or designated for their wader and waterfowl interest. These covered land up to 2km from the Proposed Development Site boundary, which was considered to include an area within which wintering farmland birds might be affected by the Proposed Development. The primary aim of these off-Site surveys was to determine the extent of use of the farmland surrounding the site by birds (in particular, golden plover) and were carried out once per month from September to March. Distribution counts of waterfowl in Pegwell Bay were also undertaken to determine the current population size, and distribution and usage by each waterbird species in the Bay. These were undertaken over one day per month, from October to March, over a six hour diurnal period capturing a partial tidal cycle within each visit. When possible survey dates coincided with daytime high tides.
- GCN: waterbodies on site and within 500m of the site boundary were assessed using the Habitat Suitability Index[33] (HSI) and screened for their suitability for breeding GCN; with any potentially suitable ponds identified requiring follow-up detailed surveys to determine presence/absence/population size as appropriate[34].
- Bats: activity and roost surveys following current good practice detailed in the Bat Conservation Trust's guidelines (2016) for sites with moderate habitat quality for bats:
  - Activity surveys to help identify any foraging and commuting areas, involving manual transects and the deployment of static recorders. Four bat activity transects were surveyed once per month (from dusk) between April and October 2017 inclusive (i.e. seven visits in total). Bat activity is also recorded through the use of static monitoring devices, deployed for five nights at two locations per transect (eight locations in total) on seven occasions (i.e. monthly between April and October inclusive).
  - Buildings/structures on Site were inspected externally and internally to look for any evidence of bats and identify any roost potential. These building inspection surveys have been reported[35] (details available within **Appendix 7.6**). A ground–based assessment of trees on Site was also undertaken in late November 2017 after leaf fall to permit better visibility. Data analysis is on-going and any trees with potential roost features will subsequently be

[32] Environmental DNA
[33] http://www.narrs.org.uk/documents/HSI%20guidance.pdf
[34] https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects
[35] Babec Ltd. November 2017. Manston Airport, Kent: Building inspection for bats and barn owls and reptile presence / likely absence survey. Babec Ltd, Partridge Green, West Sussex. **Appendix 7.6**.

categorised according to their level (low, moderate or high) of potential to support roosting bats, the category then determining any subsequent level of survey.

- Reptiles: presence / likely absence surveys using 1,000 felts and 500 tins were undertaken over the site grassland throughout September 2017 (detailed within the reptile presence / absence survey report, November 2017 (Babec Ltd), **Appendix 7.6**). No reptiles were recorded during the surveys. Survey methodology was based upon current good practice guidance of Froglife (1999)[36].
- Barn owl: built structures and trees were inspected for barn owl nesting/roost sites in autumn 2017 (see **Appendix 7.6**).
- Terrestrial invertebrates: an invertebrate scoping survey on Site was undertaken in August 2017 (reported in a Technical Note[37], **Appendix 7.7**) upon which a survey programme for 2018 was designed (see next section).
- Badger: presence / absence surveys for badgers involving looking for any sign of badgers within the majority of the site and up to 30m from it was undertaken in autumn 2017.

It was not possible to accomplish the full suite of planned survey (see 2017 PEIR) due to access restrictions to the Site between late February and late August 2017, resulting in the need for further survey. Baseline surveys to be completed in 2018 include:

- Bats:
  - activity surveys (static and manual) to be completed between April and July 2018 employing the same effort as in 2017. During one of the visits, the activity survey is to comprise a dusk and pre-dawn activity survey; and
  - roost surveys: emergence/re-entry surveys and hibernation surveys will be undertaken in 2018 for those buildings/structures/trees identified with roost suitability in 2017.
- Breeding birds: territory mapping surveys within the Site and, where public access permits, a 100m buffer. These will be based upon the British Trust for Ornithology (BTO's) Common Bird Census (CBC) methodology and will comprise six visits to the entire site from March to June 2018 inclusive[38]. Survey for barn owl will follow Shawyer (2011)[39].
- Reptiles: It was not possible to survey small areas (c. 4ha) of the site in 2017 due to access restrictions with the aim being that these will be surveyed in April 2018[40]. If presence / likely absence survey in these unsurveyed areas reveal reptiles, a population size class survey will be undertaken (assuming access is available).
- Terrestrial invertebrates: a survey programme was designed based upon the 2017 scoping survey, which is aimed at sampling those species/assemblages which the Site is most likely to support over the main period of invertebrate activity over April to September 2018 (focussing on May-July 2018 inclusive).
- Botanical Interest: National Vegetation Classification[41] (NVC) survey methodology will be employed in 2018 to identify grassland communities identified as being of botanical interest.

[36] 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.
[37] Wood. October 2017. Technical Note: Manston Airport DCO EIA: Invertebrate scoping survey August 2017. Appendix 7.7.
[38] https://www.gov.uk/guidance/wild-birds-surveys-and-mitigation-for-development-projects
[39] 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.
[40] The areas to be surveyed for reptiles in 2018 are shown in Figure 2 of the reptile presence / absence survey report, November 2017 (Babec Ltd) Appendix 7.6.
[41] 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.

- Badger: Survey of the land north of the B2190 (Spitfire Way) recently added to the site, and any land off site (land parcel 1362, Appendix 7.10), identified for provision of biodiversity compensation, will be surveyed in early 2018.

A summary of the biological surveys, along with desk study information, to inform the preparation of this chapter is provided in **Table 7.4**. The detailed methodologies for, and results of, these surveys are described in the respective baseline technical reports. These accompany this PEIR chapter and are detailed within **Appendices 7.2** to **7.10**.

Table 7.4 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
	Extended phase 1 habitat survey of Order Limits extension: Outfall corridor, and land north of Spitfire Way	Site and surrounding land (to 30m)	September 2017 October 2017
	Extended phase 1 habitat survey of Land parcel 1362 (potential compensation site)	Site and surrounding land (to 30m)	October 2017
Legally controlled species	Presence/absence survey	Site and surrounding land (to 50m)	September-December 2017 Jan-Mar and May-July 2018
Great crested newt (GCN)	Assessment of water bodies' suitability for GCN	All water bodies on surrounding land (up to 500m)	April 2017
	Presence/absence survey	Not required. GCN scoped out from assessment	N/a
Reptiles	Presence/absence survey	Areas of suitable habitat within the site	September 2017
	Presence/absence survey	Areas of Site (c. 4 ha) without access in 2017	April, May 2018
	Population size class estimate	Areas of suitable habitat within the site, if required	April – July 2018
Bats (roost)	External/internal building inspections	54 buildings within the site	September/October 2017
		17 buildings with no access in 2017	Jan-Mar 2018
	Survey of buildings for bat summer roost potential	All appropriate buildings within the site	May – September 2018
	Survey of buildings for bat hibernation (winter) roost potential	Any appropriate building within the site	Late[42] January - February 2018
	Ground-based tree assessments	All appropriate trees on Site	December 2017
	Survey of potential tree roosts	All appropriate trees on Site	May - September 2018
Bats (activity)	Static automated bat activity survey	Site only	August – October 2017 April – July 2018

[42] It was originally planned that hibernation surveys would begin in early January 2018 although with Site access restrictions, access is currently (03/01/218) not likely until late January/early February 2018, subject to change depending on when access to the Site is granted.

Survey requirement	Survey specification	Survey area	Survey programme
	Bat activity transect survey	Representative habitats within the site	August – October 2017 April – July 2018
Birds (breeding)	Six walkover (CBC territory mapping) surveys	Site and land parcel 1362 and surrounding land to 100m	March – June 2018
Birds (wintering)	Functional habitat surveys: golden plover and other key species	Land up to 2km from the site boundary	September 2016 – March 2017
	Pegwell Bay distribution counts	Pegwell Bay south to the River Stour	October 2016 - March 2017
Invertebrates	Site assessment	Site	August 2017
	Presence/absence sampling survey	Areas of suitable terrestrial habitat within the site	April - September 2018
Badger	Presence / absence survey	Site and surrounding land (to 30m)	September – October 2017
Botanical interest	NVC sample survey	Areas of suitable land within the site	(May), June 2018

Consultation

Since 2015 and throughout the undertaking of the survey and assessment work, RiverOak has engaged with consultees with an interest in potential biodiversity issues. A Scoping Report (**Appendix 1.1**[43]), including a chapter covering biodiversity, was produced and submitted to the Planning Inspectorate (PINS) who provided a Scoping Opinion (**Appendix 1.2**) which although no longer formally associated with this application is still relevant (see **Chapter 4**). Responses were also received on the biodiversity chapter within the 2017 PEIR.

In addition to the statutory and non-statutory public consultations associated with the provision of the Scoping Opinion, in response to statutory consultation in 2017 and engagement on the development of the masterplan, organisations that were directly consulted include:

- PINS;
- Natural England (NE);
- Environment Agency (EA);
- Kent County Council (KCC);
- Thanet District Council (TDC);
- The Royal Society for the Protection of Birds (RSPB);
- The Kent Wildlife Trust (KWT); and
- Kent Downs Area of Outstanding Natural Beauty Unit.

More specifically meetings have been held with NE and the KWT[44], who latterly indicated that, although they would still like to be consulted, they might not participate in further meetings due to resource constraints . RSPB confirmed (by email[45]) that they do not wish to meet or participate in the Evidence Plan process for the Proposed Development other than responding (or not) to the public consultation materials and/or application documents as these are released. Information and an opportunity to engage in the HRA process

[43] Consultee responses on the Scoping Report with regard to Biodiversity are provided in the 2017 Biodiversity PEIR chapter.
[44] The contact at KWT was Vanessa Evans.
[45] Dated 09/11/2016, from Dora Querido, Conservation Officer, South-east Regional Office.

has been provided to KCC and TDC. Consultation with NE continues in regard to ongoing assessment and the HRA process.

7.4 Overall biodiversity baseline

Current baseline

The desk study and ground-truthing survey in February 2017 indicates that the Proposed Development Site comprises a combination of hardstanding and buildings, large expanses of grassland and some limited areas of scrub and/or domestic landscaping. The desk study 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. Furthermore bats are potentially likely to roost in suitable buildings and trees (potentially on site), and forage within the vicinity. An outline baseline is provided here with a more detailed baseline provided for those receptors taken through to impact assessment.

Overall the site provides low quality foraging and commuting habitat for bats. The ground-truthing exercise identified that the site has large areas of semi-improved neutral grassland and extensive areas of hard-standing, which includes a runway, aircraft taxiing areas and buildings (**see Figure 7.3**). The site is exposed and the grassland is managed by cutting, providing low quality foraging habitat for bats. Bat activity on the site would likely be concentrated along the margins; such as western and eastern boundaries of B2050 (Manston Road) and the hedgerows to the extreme north of the site and to the west of the runway.

The SHP desk study (ES Volume 2, April 2016) reported two bat roost records within a 1km grid square which potentially fall within the site boundary. These records are for a common pipistrelle roost (1km grid square overlaps the west of the site boundary) and an unidentified bat species (1km grid square over laps the east of the site boundary), further information relating to the sizes of the roosts or roost type was not available. The next closest roost is located, 2.4km to the south west of the site, with a peak count of 668 individual soprano pipistrelles utilising the maternity roost; this count was undertaken in July and included juveniles on the wing. Typically, this roost supports between 250 and 350 fully grown (adult) bats[46].

Within 5km of the site there were 125 bat records 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 genus level (*pipistrellus Sp*.) with six records of *Chiroptera sp.*

Building inspections in autumn 2017 revealed evidence of bats within four buildings (B8, B16, B17 and B41, **Appendix 7.6**) within the site. The results of the inspection indicate the presence of a hibernation roost within building B8, day / transitional roosts within buildings B16 and B41, and a night roost within building B17. No bats or evidence of bats was recorded in buildings B33 or B54, which were previously confirmed as bat roosts in 2015/16. A further 32 buildings were assessed as having the potential to support roosting bats (two buildings with high potential, six with moderate potential and 24 with low potential) as they incorporate potential roosting features.

The site is likely to support breeding bird assemblages associated with farmland and urban habitats including some SPI, 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.

Both skylark and grey partridge have been recorded on Site during recent surveys and, although these visits were outside the breeding season, it is considered that the site is used for breeding by both species. The grassland on Site provides both suitable skylark nesting habitat and foraging habitat for chick provisioning. However, the suitability of the habitat for nesting could be impaired by the management regime. It is possible that grassland mowing might destroy some nests although, as they are ground nesters, this is likely to be through destruction from the wheels of passing machinery rather than the pass of mower blades which appear to be set high enough above the ground to prevent nest destruction.

[46] Amec Foster Wheeler (June 2017) Manston Airport DCO EIA Ecological Desk Study (Appendix 7.2).

The site provides some suitable nesting habitat for nesting grey partridge but also good foraging habitat for chicks and young birds. Breeding grey partridge might also nest in thick vegetation along hedges (favoured nesting habitat[47]) in surrounding arable land with broods subsequently moving onto the site to feed in the grassland, which provides a richer invertebrate chick food resource than surrounding arable.

The regular and frequent informal public access/dog walking to the existing grassland area north of Manston Road (extending to about 40ha), along with the continued mowing regime, reduce the quality of this area to breeding ground nesting species such as skylark and grey partridge.

Building inspections in autumn 2017 (see **Appendix 7.6**) found no evidence of nesting barn owls although two buildings (B11 and B52, Figures 7.4 & 7.5) were assessed as having the potential to support these as they contained suitable nesting features. Further inspection of these buildings is planned for 2018, along with other buildings with restricted access in 2017. Checks of all trees on Site in November 2017 did not reveal any potential barn owl nesting features.

Considering the findings of the building inspections and the quality of the habitats on and around the Site, it is considered that no more than a single pair of barn owl would nest on Site.

It is considered that the design of the buildings on Site provide very few opportunities for nesting for other bird species of conservation concern such as house sparrow and starling, and any breeding would be in low numbers. Similarly with notable bird species, such as dunnock, that may nest in hedgerows and small trees. It is considered that the lack of such suitable nesting habitat on site would result in small numbers of such species breeding on site.

Two water bodies were identified within the site: a balancing pond and an 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. During the Site visit in 2017 it was considered that neither feature provides suitable breeding habitat for GCN. The accompanying desk study revealed no records for the site or within 2km and identified three ponds with a radius of 500m from the site, which might be suitable for GCN. Survey, including eDNA testing, for the SHP proposal confirmed that, although suitable terrestrial habitat occurs on Site, GCN was absent from suitable aquatic habitat on and within 500m of the site, and therefore it was concluded that this species is absent from the site.

The 2017 desk study identified one record of GCN since 2000, which was from Monkton Chalk Pit Nature Reserve in 2011, 2.9km to the west of the site. GCN 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[48] database within at least 10km of the Proposed Development site.

No reptiles were recorded during the autumn 2017 presence/absence survey of the majority of the site. A single adult common lizard was however recorded basking along the western Site boundary (adjacent to Minster Road) during felt/tin placement on 23rd August 2017. Considering the negative results of the presence/absence surveys, this single record indicates this was a transient reptile; though if it was resident, Froglife guidance[49] indicates that at best that, a low population of common lizard might be present along the southern most section of the western site boundary.

Small areas (c. 4ha) of the site were not included in the 2017 presence/absence survey including the 'brownfield' land (the former car park) at the eastern end of the site. These unsurveyed areas are shown in Figure 2, **Appendix 7.6**). In addition, presence/absence surveys are required (see **Appendix 7.9**) at the land north of Spitfire Way (c.0.3ha), a recent addition to the proposed development Site and suitable reptile habitat is present in this area. Surveys of these areas are planned for spring 2018. These as yet unsurveyed areas, although considerably smaller than the remaining parts of the site, provide, through a greater complexity of habitat types, more suitable reptile habitat than the large expanse of mown grassland that covers much of the rest of the site. Features such as daytime refuge/hibernation sites along with basking

[47] Snow, D.W. & Perrins, C.M. 1998. *The Birds of the Western Palearctic. Concise Edition*. Oxford University Press, Oxford.

[48] Multi-Agency Geographic Information for the Countryside (MAGIC) (2017) DEFRA. Available online at www.magic.defra.gov.uk [Checked 06/12/17].

[49] Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

sites and good habitats for invertebrate prey result in areas that might contain high densities of one or more of the widespread reptile species (e.g. common lizard and slow worm).

The desk study and survey revealed two water bodies on and six within 50 m of the site (detailed within **Appendix 7.2, Figure 7.2)**, with a summary of each provided in **Table 7.5**.

Table 7.5 Water body assessment

Water body number	On/Off Site	Access (Y/N) [50]	Screened in/out
1	On	Y	Screened out: unsuitable habitat: fish present, vertical concrete walls.
2	On	Y	Screened out: unsuitable as above ground tank with no access for amphibians
3	Off	Y	Screened out: unsuitable habitat (agricultural reservoir)
4	Off	N	Unable to screen in/out as no access and no data
5	Off	N	No access but screened out: separated from Site by the A299
6	Off	Y	Screened out: not present
7	Off	N	Not applicable - no access
8	Off	Y	Screened out: artificial garden pond with heavy use by ducks
9	Off	Y, restricted view	Screened out: no standing water

As a result of the findings of the desk study and waterbody assessments, it was concluded that GCN are likely to be absent from the site and suitable aquatic habitat within 500m of it. GCN were scoped out from further assessment.

Walkover surveys of the site did not reveal any evidence of badger. In February and August 2017, potential setts along the northern boundary of the site indicated by the desk study were found to have collapsed with no sign of recent mammal activity. In addition, that part of the site south of the B2050 (Manston Road) is surrounded by a security fence and no sign of damage to this was noted that would allow badgers onto the runway section of the site. As a result of these findings, it is concluded that badger setts are likely absent from the site and badger has been scoped out from further assessment.

The invertebrate scoping survey in August 2017 revealed that the managed grassland, which comprises most of the habitat on the Site, is uniform in structure; has limited topographical variation; limited area of bare ground; and, is semi-improved character. Though invertebrates will be present, the expectation is that this assemblage will not be exceptional, and some species, especially solitary bees and wasps, may be in part dependent on peripheral features and habitats, especially for nesting sites. Species diversity and interest are considered likely to be higher in other comparatively small areas of open habitats where there is:

- varied structure, including bare and sparsely vegetated ground, unmanaged tall herbs, and complex mosaics;
- varied substrates;
- locally varied topography; and
- varied floristic composition, including good populations of a number of important food plants that are not present, or rare, in the managed grassland.

[50] Permission to access the offsite waterbodies was sought but was not obtained for 4, 5 and 7.

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 7.6**.

Table 7.6 Desk Study: Statutory Sites (in order of distance from Order Limits)

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.	0m 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).	0m 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*.	0m 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.	0m 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.	0m 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	~150m North East
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.	~2,500m 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 site extends to 379, 823.81 ha	~3,400m North and North West

Site	Status	Description	Approximate Distance from Site
Thanet Coast	SSSI	The Thanet Coast is particularly noted for its bird populations, supporting both internationally and nationally important numbers of wintering birds, and outstanding assemblages of both terrestrial and marine plant species are present within its various constituent habitats, 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.	~4,300m East
Margate and Long Sands	SCI[51] (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.	~7,700m 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.	~7,700m 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 present 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
Stodmarsh	Ramsar	The site supports six British Red Data Book wetland invertebrates, two nationally rare and five 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

[51] 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
Bishopstone Cliffs	LNR	A clifftop grassland important for insects, with some rare species, 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

There is one non-statutory site located within 2km of the site boundary: Minster Marshes LWS (LWS ref. TH12), which contains grazing marsh and woodland. The LWS is located approximately 1.6km to the south of the site.

Future baseline

7.4.1 It is anticipated that the management of the site will continue as it is and up to the point of the Proposed Development, the future baseline of the site is therefore unlikely to be materially different to that which exists now. It is therefore appropriate to use the current baseline for the purpose of the assessment.

7.4.2 In the absence of the Proposed Development, or any other development, further dereliction is likely to occur and small parts of the site where management is limited/ non-existent will become more dominated by scrub.

7.4.3 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 4km per year and contraction of range and species richness (Huntley *et al*., 2007[52]). For example, there is increasing evidence that the overwintering distributions of many coastal waders in the UK have shifted in recent decades in response to warming. In the last decade, this has resulted in declines in usage of east coast sites in favour of The Netherlands, although during recent cold winters, this trend has been partially reversed (Pearce-Higgins and Holt, 2013[53]).

7.4.4 There are likely to be similar climate change impacts on all other biodiversity. For example, analysis of distribution data for a range of vertebrate (e.g. amphibians, freshwater fish and mammals) and invertebrate groups (e.g. damselflies, spiders and millipedes) has shown range extension northward and uphill in Britain over approximately 25 years in response to the changing climate. For example, out of a total of 329 species with range limits in Britain analysed across 16 taxa, 275 species shifted northwards at their range margin and 52 shifted south. The same analysis showed that 227 species shifted to higher altitude and 102 species shifted to lower

[52] 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.
[53] Pearce-Higgins, J.W & Holt, C.A. 2013. Impacts of climate change on waterbirds. Marine Climate Change Impacts Partnership: Science Review: 149-154. http://mccip.cefastest.co.uk/media/1268/2013arc_sciencereview_16_wbir_final.pdf

altitude. The average northwards shift across all species was 31-60km and a mean increase in altitude of 25m (Hickling *et al*. 2006[54]).

7.4.5 However, in the short to medium term, it is anticipated that the baseline will remain similar, albeit the diversity and abundance of individual species with the floral and faunal assemblage may vary.

7.5 Environmental measures incorporated into the Proposed Development

The influence of environmental mitigation on 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 scheme, the effect of this is taken into account during the assessment since they are inherent in the scheme design. In some cases, a potential effect may require no further consideration following incorporation of appropriate environmental measures into the scheme.

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 in **Table 7.6**.

Table 7.6 Rationale for incorporation of environmental measures

Potential receptor	Predicated changes and potential effects	Incorporated measure
Designated sites	Pollution/eutrophication from site discharges	Discharge of treated 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 EA.
Habitats	Habitat loss	Compensation through off-site habitat creation at the c. 36ha land parcel 1362 (**Appendix 7.10**). Habitats will be managed specifically for the biodiversity value to be higher quality than that occurring on-Site.
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 WCA 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.

[54] Hickling, R., Roy, D., Hill, J., Fox, R. & Thomas, C. (2006). The distributions of a wide range of taxonomic groups are expanding northwards. *Global Change Biology*, 12: 450-455.

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[55] 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 NE 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, describing the approach that would be followed to avoid contravening the *WCA1981* (as amended) (WCA) and The *Habitats* Regulations. Where required, this would involve obtaining an EPS mitigation licence through NE 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 much of the site will be unsuitable for bats once operational with extensive site and building lighting. Consequently compensation for foraging/habitat/roost loss and any enhancements (including the installation of bat barns/boxes) are provided off-Site within land parcel 1362.
Breeding birds	Disturbance to/loss of foraging habitat/breeding sites/shelter	Off-site habitat provision in the c.36ha land parcel 1362[56] for ground nesting farmland birds e.g. skylark and grey partridge. Created habitats, improving the quality of that lost on site, to have particular species-specific measures and managed for farmland birds.
Reptiles	Kill/injure reptiles	Method statement and tool box talks are required to avoid contravening the WCA. 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. Any reptile populations in the remaining unsurveyed areas (c.4ha) will be captured and translocated to suitable habitats (e.g. with hibernacula, compost heaps, log/brash piles and basking areas) on site (south of the existing southern perimeter fence) and off-site (land parcel 1362).

[55] A 'toolbox talk' is a short presentation to the workforce on an aspect of a particular topic.
[56] See Appendix 7.10 for an extended phase 1 habitat survey report of land parcel 1362.

Potential receptor	Predicated changes and potential effects	Incorporated measure
Terrestrial invertebrates	Disturbance to/loss of foraging habitat/breeding sites	Compensation through habitat treatments on site (e.g. maintenance of a stressed vegetation community along runway edges by permitting short vegetation to grow on shallow substrate upon runway surface), and habitat creation on-site south of the current southern perimeter fence and within land parcel 1362. Created habitat will be specifically designed with diverse features to encourage invertebrates (e.g. including features typical of open mosaic habitat.
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** and would be implemented during the construction phase of work. Noise control measures have been assessed in **Chapter 12**. 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. Any effects during the operation phase are covered in the assessment section.
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 Construction Environmental Management Plan (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 8** details further measures.

7.6 Scope of the assessment

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

The scope of assessment has been informed by: the scoping study; consultee responses to the Scoping Report and the 2017 PEIR; the results the baseline survey work detailed in **Section 7.4**; and the Proposed Development design.

Approach to identifying receptors

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.

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 mitigation measures that have been incorporated into the scheme, which might reasonably be expected to be effective (see **Section 7.5**).

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

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

Potential receptors

This section identifies the potential receptors that have been identified based on desk study, survey, professional judgement and on the consultation response received from PINS. The receptors listed in **Table 7.6** have the potential to be significantly affected by the Proposed Development and are taken forward for further assessment.

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 PEIR (and that will be used in the 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.

Assessment of the effects of the Proposed Development on biodiversity was undertaken with reference to CIEEM's Guidelines for Ecological Impact Assessment in the United Kingdom[57]. The assessment focused on legally protected and otherwise important biodiversity resources (see **Boxes 7.1** and **7.2**).

The starting point for the 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 whose presence was not likely to result in any relevant legislation being contravened, and that did not therefore require further assessment (i.e. that were 'scoped out' of the assessment).

For sites/habitats/species that meet the criteria in **Box 7.1** and / or **7.2**, 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 Environmental Impact Assessment (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
- 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.

[57] Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (Ed 2) (2016) CIEEM. Accessed at http://www.cieem.net/data/files/Publications/EcIA_Guidelines_Terrestrial_Freshwater_and_Coastal_Jan_2016.pdf [Checked 06/12/17].

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, due to the small size of the population. On this basis it would not need to be assessed further (i.e. it would be 'scoped out' of the assessment).

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 Proposed Development 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 (from noise, visual and light, drainage) 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.

Initially, a 15km radius was used as the search area and potential ZoI for the Proposed Development (to ensure incorporation of potential flight paths), with the intention of extending or reducing the ZoI as more information and baseline data became available. For example, the air quality assessment informed the original ZoI with regards to the potential distance over which deposition of nitrogen and other emissions may typically be detected. Over 15km, 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 7.3**, **Table 7C.1**.

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 and/or for which legislation could be contravened (see Table 7A.1 and Table 7B.1, **Appendix 7.3**). The table also identifies the potential effects that need to be assessed. The NSER will detail the assessment of those receptors covered by the Habitats Regulations.

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 (through pollution and/or scour) of treated 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.
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 (through pollution and/or scour) of treated 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.
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 water.
Sandwich and Pegwell Bay NNR	Biodiversity conservation value Legal status	*National Parks and Access to the Countryside Act 1949* and *the WCA 1981*(as amended)	There is potential for direct effects resulting from a deterioration in air quality, increased deposition and from the discharge (through pollution and/or scour) of treated water.

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
Sandwich Bay to Hacklinge Marshes SSSI	Biodiversity conservation value Legal status	*WCA 1981* (as amended)	There is a potential for direct effects to the foraging habitat of over-wintering birds from the discharge (through pollution and/or scour) of treated 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.
Thanet Coast SSSI	Biodiversity conservation value Legal status	*WCA 1981* (as amended)	There is potential for direct effects resulting from a deterioration in air quality and increased nutrient nitrogen 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.
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 WCA 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	*WCA 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 due to the noise/ aircraft visibility resulting from aircraft movements.
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 due to the noise/ aircraft visibility resulting from aircraft movements.
Preston Marshes SSSI	Biodiversity conservation value Legal status	*WCA 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 WCA 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	*WCA 1981* (as amended)	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.

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	*WCA 1981* (as amended)	Land take/land cover change (habitat removal); management changes resulting in reduction in habitat. Potential effects on birds due to damage or destruction of active nests.
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)) *WCA 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.
Reptiles	Legal status	NERC Act 2006 section 41 species of principal importance *WCA 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 Habitats of Principal Importance	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.
Coastal and floodplain grazing marsh	Biodiversity conservation value	NERC Act 2006 section 41 Habitats 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 Habitats of Principal Importance	There is potential for direct effects resulting from a deterioration in air quality and increased deposition.

Cumulative assessment

The biodiversity assessment considers the potential effects of the Proposed Development in combination with other schemes. 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 inspectorate's programme of projects; and those identified in development plans and other plans which are reasonably likely to come forward. The schemes included in the cumulative assessment are detailed in **Chapter 18.**

Spatial and temporal scope

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 (detailed in **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 is 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).

Effects on biodiversity (designated sites sensitive to air quality effects) associated with emissions (see **Table 7.7**) 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) are assessed. Assessments 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[58] and the Environmental Protection UK/Institute of Air Quality Management (EPUK/IAQM)[59].

The study of associated noise (**Chapter 12**) and air quality (**Chapter 6**) related effects during the operational phase have been informed by the outcome of modelling based upon the location of the aircraft flight paths, and are based upon worst-case (Year 20) assessments.

Potentially significant effects

7.6.2 Based on the assessment methodology set out in **Section 7.7**, **Table 7.7** above 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 ecological 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.

7.6.3 The environmental changes that are likely to be caused by the Proposed Development where a valued receptor is considered sensitive to these, and which therefore have the potential to cause significant effects and/or contravention of wildlife legislation, have been identified as:

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

7.7 Assessment methodology

Information for the assessment derives from the results of the desk study, baseline surveys, traffic, air quality and noise modelling. Other information is sourced from relevant published information (on potential biodiversity receptors' status, distribution, sensitivity to environmental changes and ecology), and professional knowledge of ecological processes and functions.

For each scoped-in receptor, effects were assessed against the predicted future baseline conditions for that receptor (assumed to be as the current baseline as noted in **Section 7.4**) during construction and operation. Air quality and noise modelling are based upon a worst-case scenario. This future baseline has been defined using information as defined in 7.4.22 about the likely future use and 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 scheme to affect biodiversity receptors.

Throughout the assessment process, findings about potential likely significant effects were used to inform the definition of requirements for additional baseline data collection and the identification of environmental

[58] Contained within Volume 11, Section 3 of the Design Manual for Roads and Bridges (DMRB) guidance.
[59] IAQM, 2015. 'Land-Use Planning & Development Control: Planning for Air Quality'.

measures to incorporate into the scheme design (in order to avoid or reduce adverse effects or to deliver enhancements). Measures to comply with relevant policies and legislation have also been included. The results of the assessment reflect the final scheme design (i.e. incorporating the environmental measures).

For each receptor, the assessment deals with the effects of construction, together with the effects of the operational airport. As more information was progressively available about the Proposed Development and about the populations of important and legally protected species, the scope of the assessment was refined to focus on those receptors that have the potential to be significantly affected by the Proposed Development. Each scoped-in receptor was then subject to further assessment work that addressed how the receptor was 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.

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

Negative effects

A negative 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 CIEEM[60] 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; and
- 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.

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.

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

Positive effects

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.

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.

[60] Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (Ed 2) (2016) Chartered Institute of Ecology and Environmental Management, Winchester.

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

Baseline conditions

Current baseline

Thanet Coast and Sandwich Bay SPA (and Ramsar) is located at the north-eastern tip of Kent in southern England approximately 925m south east of the former airport boundary. However, with the extension of the Order Limits to include the outfall corridor to its discharge point at Pegwell Bay this element of the Proposed Development Site lies adjacent to the SPA/Ramsar site. The designated sites are coastal consisting of a long stretch of rocky shore, adjoining areas of estuary, sand dune, maritime grassland, saltmarsh and grazing marsh. The designations hold important numbers of the following species:

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

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).

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

Golden plover (Non-breeding)

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

The Thanet Coast & Sandwich Bay SPA was originally designated in part for the internationally important non-breeding population of golden plover that it supports. Nationally important numbers of non-breeding golden plover are also notified features of the Sandwich Bay to Hacklinge Marshes SSSI and Thanet Coast SSSI. However, as part of the third Joint Nature Conservation Committee (JNCC) SPA review (Stroud *et al*., 2016[61]), golden plover was removed as a designated species from the SPA (likely due to declining numbers), although this change is currently unratified. The UK population was estimated to be 420,000 birds in winter (Musgrove *et al*., 2013[62]).

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 and roosting on intertidal areas of Pegwell 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 these were largely confined to the area by the outflow of the river Stour, which is about 1.1km south of the outfall discharge.

Analysis of KOS desktop records of golden plover exceeding 300 birds in the last ten years suggests several important locations for this species in the wider locality besides Pegwell Bay, including:

- The fields around Nicholas St Wade, approximately 4.4km to west-north-west of the site boundary, have several records including an exceptional count of 3,950 feeding on winter wheat in 2003; and

[61] 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.
[62] Musgrove, A., Aebischer, N., Eaton, M., Hearn, R., Newson, S., Noble, D., Parsons, M., Risely, K. and Stroud, D. (2013). Population estimates of birds in Great Britain and the United Kingdom. *British Birds, 106*: 64-100.

- An occasional roost has been recorded at the north end of Stodmarsh (600 birds were recorded in 2006), some 6.6km west-south-west of the site.

No golden plover were recorded within the site during bird surveys undertaken for the proposed Stone Hill Park development in winter 2015/16 (WSP|PB, 2016)[63], or during the surveys in 2016/17. However, there was no site access during the 2016/17 surveys, and site coverage from the perimeter was only about 75% although the non-visible part of the site was mainly runway, a habitat not favoured by golden plover.

Henderson & Sutherland (2017)[64,65] and Griffiths (2004[66]) and data provided by the SBBO and KOS show that golden plover occur on both intertidal and inland areas in and around Pegwell Bay in winter. A range of roost sites were used, including Pegwell Bay, but also inland on farmland. Henderson & Sutherland (2017) divided their survey area into a number of Recording Survey Areas (see Ecological Desk Study Report, Table 4.2 and Figure 4.4, **Appendix 7.2**). The only records of golden plover within 2km of the site were those in their Recording Area 15 to the east of the site. In that area, fields of ploughed/fallow land closer to Pegwell Bay were used for feeding and roosting in the first half of the winter (though some areas were unsuitable because of the tall *Brassica* crops, particularly in the east), as follows:

- A flock of 402 birds was roosting and foraging in a field adjacent to the south-east of the site on 13th November 2016;
- A flock of 53 roosting in a different field (1.3km west of the site) on 27th November; and
- A flock of 43 roosting on 31 December in the same field as 13th November record.

No golden plover were recorded in this recording area in January and February 2017. A March survey was not undertaken in this Recording Area.

The localities most frequently used by the highest numbers of roosting and foraging golden plover were to the south of the proposed development Site, the closest of which is approximately 3.5km from the site on arable farmland in the Ash Levels (the Henderson & Sutherland (2017)[67] Recording Survey Area 7 (see Ecological Desk Study Figure 4.4, **Appendix 7.2**).

Results from the surveys in 2002/03 (Griffiths, 2004) and 2016/17 (Henderson & Sutherland, 2017) indicate that numbers of golden plover have declined in the Sandwich Bay / Thanet area during the intervening years, from a high tide peak count of 4,962 birds (in January 2003) to only 1,536 (in late January 2017).

BTO WeBS core count[68] data for Pegwell Bay also shows a decline in the peak count of golden plover in Pegwell Bay over the period 2000/01 to 2014/15. A summary of the WeBS data is provided in **Table 7.8**.

Table 7.8 Peak monthly counts of golden plover in Pegwell Bay, from winters 2000/01-2014/15

Winter	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Peak count	Month
2000/01	196	414	41	950	3,160	4,000	1,070	1,404	4,000	Feb
2001/02	0	840	2,680	6,000	7,000	2,000	3,750	3,711	7,000	Jan

[63] For the SHP ES, once monthly walkover surveys were undertaken within the site from November 2015 to February 2016 inclusive.
[64] Surveys for golden plover and lapwing were undertaken across the wide area from the north coast of Thanet to Sandwich Bay, twice-monthly from November 2016 to March 2017 inclusive. The work was broadly a repeat of the surveys carried out in winter 2002/03 (Griffiths, 2004).
[65] Henderson, A. & Sutherland, M. (2017) Numbers and distribution of Golden Plovers in the Thanet Coast and Sandwich Bay SPA during the winter of 2016/2017.
[66] Griffiths, M. (2004). Numbers and distribution of the wintering golden plover population in and around the Thanet Coast and Sandwich Bay SPA in 2002/2003. English Nature Research Report Number 569. English Nature: Peterborough
[67] Henderson, A. & Sutherland, M. (2017) Numbers and distribution of Golden Plovers in the Thanet Coast and Sandwich Bay SPA during the winter of 2016/2017.
[68] There are two types of WeBS count: a Core Count involving a large number of sites (around 2,800), and Low Tide Counts involving a relatively much smaller number of counts of feeding birds at low tide.

Winter	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Peak count	Month
2002/03	0	1,350	2,450	190	5,800	4,710	150	2,441	5,800	Jan
2003/04	62	1,410	6,240	5,500	8,000	1,125	14	3,193	8,000	Jan
2004/05	95	0	3,830	5,200	5,330	4,500	920	3,312	5,330	Jan
2005/06	79	2,070	550	7,000	1,900	2,500	595	2,099	7,000	Dec
2006/07	11	663	3,730	945	2,900	4,170	80	1,785	4,170	Feb
2007/08	25	1,500	4,500	5,500	5,000	4,200	0	3,454	5,500	Dec
2008/09	0	0	2,000	3,500	3,230	3,150	5	2,377	3,500	Dec
2009/10	0	700	1,200	60	753	1,100	410	703	1,200	Nov
2010/11	132	160	3,400	51	2,000	0	0	1,148	3,400	Nov
2011/12	1	1,100	1,350	3,000	3,500	0	0	2,237	3,500	Jan
2012/13	1	180	2,000	2,820	4,330	2,820	285	2,072	4,330	Jan
2013/14	16	530	820	1,050	1,093	0	0	701	1,093	Jan
2014/15	1	0	1,147	2,456	0	760	0	1,454	2,456	Dec

Turnstone (non-breeding)

The Thanet Coast & Sandwich Bay SPA and Ramsar site are designated for their internationally important non-breeding numbers of turnstone. The SPA qualifying population of turnstone (of 940 individuals, 5-year peak mean counts from 1991/2-1995/6) represent 1.4% of the Western Palearctic population.

Turnstone occur almost exclusively in coastal habitats, foraging and resting on rocky shorelines and beaches, and will also forage along the tidelines on sandy beaches and on mudflats. The site and surrounding farmland provide no opportunities for foraging or resting turnstone, and therefore the species is unlikely to occur outside of shoreline habitats. Consequently, effects are only anticipated during the operational phase as the occurrence of the species in any numbers within Pegwell Bay is too distant from the site to be affected by activities onsite during construction.

The Thanet Coast Turnstone monitoring report (Hodgson, 2016[69]) concluded from six surveys, undertaken from 2001 – 2010, that the population of turnstone within the SPA varied from 1,087 to 1,335 birds, 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 in 2016 (single count) confirmed this decline, with 583, 664 and 537 birds recorded respectively. It was suggested in Hodgson (2016) that prior to high tide, the turnstones from the Thanet Coast & Sandwich Bay SPA flew to join a roost, 2.5km west of Whitstable Harbour on the north Kent coast, within the Swale SPA and some 18km north-west of the site. This suggestion was based on results from coastal survey plots. It would therefore appear that turnstone

[69] Hodgson, I. (2016). *Thanet Coast Turnstone (Arenaria interpres) monitoring, January – February 2016*. Report to Natural England. Sandwich Bay Bird Observatory Trust: Sandwich.

follow the coastline around Thanet and do not undertake overland movements; as would be expected for this species. WeBS Core Count Survey results indicate that turnstone concentrations within the Thanet Coast & Sandwich Bay 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. Over the five winter periods between 2010 and 2015, peak counts ranged from 7 to 65 (see Ecological Desk Study Report, Table 4.3; **Appendix 7.2**).

Little tern (breeding)

Little tern is a qualification feature of the Thanet Coast & Sandwich Bay SPA. It qualifies under Article 4.1 of the Birds Directive 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 (Stroud *et al*. 2016) of the SPA designated species, it was suggested little tern be removed, due to recent absence from the SPA, although this change is as yet unratified.

Little tern almost exclusively occurs in coastal habitats, nesting and foraging along shorelines and beaches. The site and surrounding farmland provides no opportunities for foraging, resting or nesting little tern, and therefore the species is unlikely to occur in this area.

Little tern no longer breeds within the Thanet Coast & Sandwich Bay SPA. Little terns previously bred in summer at Shell Ness (north of Sandwich Bay) and near Plumpudding on the North Thanet coast. When the tide is in the little tern colony at Shell Ness would feed in the shallow coastal waters of Pegwell/Sandwich Bay and in the lower part of the Stour River. Given the absence of this qualifying interest species from the SPA, no likely significant effects are considered during either construction or operation of the Proposed Development.

Future baseline

In the absence of development, it is assumed that the site 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 – Golden Plover non-breeding

7.8.1 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. 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 the noise / physical presence of aircraft from aircraft movements during operation of the site. Also, during the operational phase, there is potential that the activity/noise from the airport could create a barrier effect causing any birds that regularly fly over the site to alter any normal flight paths to move around the airport. Disturbance and displacement could result from aircraft noise and visual disturbance, and also from noise associated with any onsite pyrotechnical bird scaring methods.

7.8.2 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)[70]. For the purposes of understanding European and National context and in order to determine significance, with respect to effects on the SPA population, **Table 7.9** presents a breakdown of population sizes and selection/significance thresholds[71].

[70] Natura 2000 Standard Data Form: Thanet Coast and Sandwich Bay SPA. http://jncc.defra.gov.uk/

[71] 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).

Table 3.9 Golden plover populations and selection thresholds

Golden Plover		Population sizes (individuals)	1% Selection/ Significance thresholds
Bio-geographic population[72] (Iceland & Faroes/ E. Atlantic Coast)		930,000	9,300
GB population		400,000	4,000
Thanet Coast & Sandwich Bay SPA	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	N/A
	2010/11 to 2014/15 five-year mean peak Pegwell Bay 'roost' count	**3,285**	**33**

Construction phase effects

Construction displacement - habitat loss

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 is also likely to be variable and fluctuating, it has a greater potential to cause disturbance than a general 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.

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 was collected whilst Manston Airport was still operational.

Survey of farmland habitat around the site in 2016/17 has shown limited use by golden plover of functional habitat adjacent within 750m of the site (Henderson & Sutherland (2017)[73]; Winter Bird Survey Report, **Appendix 7.5**). Between September 2016 and February 2017 inclusive, few golden plover were recorded, with generally five or less birds noted within 2km of the site. An exception to this, was during the November survey when a flock of 530 golden plover was recorded in an arable field immediately to the south of the site at its eastern end (Amec Foster Wheeler, 2017a). Soon after this record, the field was cultivated and no further records were obtained from that location. This flock was also recorded during the surveys reported in Henderson & Sutherland (2017).

The desk study and winter bird surveys indicate that golden plover do not make regular use of farmland within 750m of the site, although birds may use it opportunistically, depending upon suitability of crop type. Golden plover rarely remain faithful to a single site throughout the winter but tend to use a number of sites dependant on food availability and weather conditions (Percival, 2007[74]). The site is located adjacent to an extensive area of arable farmland (to the west, north and south), and therefore any birds displaced by the Proposed Development are likely to find alternative foraging sites within their usual foraging ranges. This is supported by the desk study and survey results in that birds were generally recorded at any one location

[72] An area of animal, in this case bird, and plant distribution having similar or shared characteristics throughout.
[73] Henderson, A. & Sutherland, M. (2017) Numbers and distribution of Golden Plovers in the Thanet Coast and Sandwich Bay SPA during the winter of 2016/2017.
[74] Percival, S. M. (2007). *Predicting the Effects of Wind Farms on Birds in the UK: The Development of an Objective Assessment Method*. In Birds and Wind Farms: Risk Assessment and Mitigation. de Lucas, M, Janss, G. and Ferrer, M. (eds). Lynx Edicions, Barcelona

during only part of the non-breeding season period, suggesting that they were foraging widely, moving to alternative feeding sites in response to changing crop structure, food availability and weather conditions.

Golden plover are very much dependent upon the presence of suitable foraging areas during autumn and winter. Mason & MacDonald (1999)[75], in their study of wintering populations of golden plover (and lapwing) in north-east Essex, found that the species showed a strong association for winter cereals. Much of the foraging activity of golden plover was recorded in fields of cereal less than 100mm in height, with records on other crop or habitat types such as cereal stubble and rape being rare. Kirby (1997[76]) identified many other factors that might influence the changing use of a site by golden plover. One of the main food sources for both species are earthworms, which occur in much higher densities in the early stages of an arable crop rotation, with very few present in fields that have been under continuous arable cultivation for three or more years (Kirby, 1997). Large open fields are most favoured (Kirby 1997, Mason & MacDonald 1999) and during prolonged periods of hard weather, when the ground has been frozen for at least three days, golden plover move from arable fields to grassland, where invertebrate prey remains more accessible. Where grassland is not present, the birds often leave the area for warmer climes such as in France and on the Iberian Peninsula (Kirby, 1997).

It should also be noted that these studies focus on the use of habitats during the day, and that golden plover are known to use different foraging habitats during the night (Gillings *et al*., 2005[77]). A study of plovers on Thanet during 2016 (M. Sutherland, unpublished data[78]) involving eight paired visits by day and night provided little evidence one way or the other as to whether the nocturnal distribution differed substantially from the diurnal. It was thought that, while locally, birds may be more dispersed at night, it is unlikely that the broad distribution patterns across the various survey areas would be substantially different from that recorded by day (Henderson & Sutherland, 2017).

To conclude, the presence of golden plover on farmland adjacent to the site is likely to be strongly influenced by crop management, in particular, the rotation and relative proportions of rape and winter wheat, the latter providing the bare ground habitat favoured for foraging birds in autumn and early winter. Results from the desk study and surveys indicate that the area within 750m of the site does not form an important part of the foraging grounds for the SPA population of golden plover.

Given that the functional habitat surveys and other desk study data (e.g. Henderson & Sutherland, 2017) indicates that farmland within 750m of the site is not used on a regular basis by important numbers of golden plover (with a count of 530 birds in a single month) 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. The main roost site for the species (on Pegwell Bay) is located more than 1km from the site, and thus is predicted not to be affected by construction of the Proposed Development.

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 effects upon these species.

Operational phase effects

Operational displacement - habitat loss due to aircraft flights and bird scaring activities

Once the airport is operational, there is potential for foraging and roosting golden plover to be displaced from arable land, grazing marshes and intertidal habitats (used for roosting) 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 not possible.

[75] Mason, C.F. & MacDonald, S.M. (1999). Habitat use by Lapwings and Golden Plovers in a largely arable landscape. Bird Study: 1999 46: p89-99.
[76] Kirby, J.S. (1997). Influence of environmental factors on the numbers and activity of wintering Lapwings and Golden Plovers. Bird Study (1997) 44, p97-110
[77] Gillings, S., Newson, S.E., Noble, D.G. & Vickery, J.A. 2005. Winter availability of cereal stubbles attracts declining farmland birds and positively influences breeding population trends. Proc. R. Soc. Ser. B 272: 733–739.
[78] Referred to in: Henderson, A. & Sutherland, M. (2017). Numbers and distribution of Golden Plovers in the Thanet Coast and Sandwich Bay SPA during the winter of 2016/2017. A report for Natural England in March 2017.

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 deter golden plovers from using otherwise suitable habitat up to a distance of 1km.

There is little documented evidence on the visual and auditory disturbance effects of aircraft on birds and much of this comes from studies that have focussed on geese, ducks, swans and seabirds. Those studies involving waders (such as golden plover) 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.

A literature review was undertaken on bird disturbance by aircraft (Amec Foster Wheeler, 2017). Results from this literature review and other studies indicate that beyond an altitude of 500m and 1km distance, golden plover are unlikely to be disturbed by the visual presence of flying aircraft.

An indicative figure of locations overflown by aircraft below 500ft (152.4m) is shown in **Figure 6.6**. It should be noted that no aircraft are currently operating from the airport and therefore the figure is based on indicative vertical climb profiles, operating procedures and flight paths. The actual procedures and flight paths will be consulted on after the DCO through the CAA's Airspace Change Process (ACP) and the ACP will provide opportunities for engagement with local communities and other stakeholders. The ACP will likely follow the process outlined in the draft ACP guidance CAP1520. The assessment into the effects of disturbance due to the presence of aircraft in flight will be determined once further clarity has been obtained as to the locations of the flight paths, and through ongoing consultation with NE in early 2018.

Noise levels in excess of 80dB (LAeq[79]) have been recorded as causing the more severe disturbance incidents in a number of studies, primarily in duck species. However, some degree of habituation is likely to occur, should aircraft departures and arrivals become regular and predictable. NE have indicated a preference for the assessment to be determined on the basis of using the LAmax[80] metric. The area of land (at ground level) where noise levels in excess of 80dB LAmax are predicted during the day (07.00 to 23.00) and night (23.00 to 07.00) are shown in **Figures 6.1a and 6.1b** respectively[81].

Results from the desk study (Amec Foster Wheeler, 2017b) and the Functional Habitat and the Pegwell Bay distribution surveys (Amec Foster Wheeler, 2017a) indicate that golden plover do not utilise farmland or intertidal habitats for foraging and roosting within the area where 80 dB LAmax is exceeded (see **Figure 6.1a** and **6.1b**). The roosting areas for golden plover in Pegwell Bay are located outside the area where aircraft are predicted to fly over at altitudes of less than 500m (see **Figures 6.4** and **6.6**) and are at their closest, 1.5km from the airport runway (beyond the 1km ground-level, lateral disturbance distance). Desk study and survey data also indicate that use of the farmland by golden plover in these areas is also low (see **Figure 6.3**). In view of this, the effects of displacement to golden plover by noise and visual presence from aircraft are considered not significant.

Results from the desk study and surveys also indicate that golden plover do not utilise farmland or intertidal habitats within 1km of the site on a regular basis. In view of this, the effects of displacement to golden plover by bird scaring activities are also considered not significant.

Operational - displacement (barrier effects)

> Unlike turnstone (the other qualifying/notification wader species of the Thanet Coast and Sandwich Bay SPA and Ramsar Site), golden plover frequently move to inland farmland areas to forage. Movements to and from inland areas and the coast result in the Proposed Development forming a barrier to the movement of golden plover between these sites. If the birds have to undertake flights of greater distance due to the presence of the airport, this could result in increased energy expenditure and lost foraging time, leading to increased mortality. However, golden plover fly considerable distances between foraging areas and roost sites during winter and it is unlikely that a flight deviation around the airport would result in a perceptible effect with regards to mortality rates.

[79] LAeq indicates average exposure noise level (BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures' BS7445-1:2003). BS 7445 provides guidance for describing and measuring noise from all sources. The standard recommends equivalent continuous A-weighted sound pressure level (LAeq) as the most appropriate basic noise indicator.

[80] Lmax is the RMS (root mean squared) maximum level of a noise source or environment.

[81] The different coloured shaded areas denote the mean number of daily events where 80 dB LAmax will be exceeded, taking into account the anticipated flight paths, and combination of different aircraft types/ models that are planned to be in operation in Year 20 when the number of flights will have reached their anticipated peak (worst case scenario).

Nonetheless, the distribution of golden plover surrounding the airport and their likely flight paths between roost and foraging areas has been considered.

Results from the desk study (**Appendix 7.2**) and surveys (**Appendix 7.5**) indicate that much of the golden plover population roosts at Pegwell Bay, and forages on farmland to the south and south west (more than 3km to the south of the site). The likely flights of golden plover between their main roost site and foraging areas is thus unlikely to take them across the site, or vicinity of flight paths of low flying aircraft. In addition, CAA data obtained during part of the previous operational period for Manston Airport (2007-13) revealed only one record of golden plover collision with aircraft, indicating that the airport did not lie on a regular flight path for this species.

In view of the lack of CAA records of golden plover, likely flight paths, the levels of flight activity over the Site, it is unlikely that the Proposed Development would have a barrier effect (i.e. a significant effect is not predicted).

Combined Effects

None of the proposed or consented schemes identified in the cumulative impacts assessment (**Chapter 18**) are predicted to lead to the loss of significant areas of suitable foraging and roosting habitat (farmland) for golden plover. These developments are not located in close vicinity to areas where important concentrations of golden plover are known to occur and therefore are not predicted to cause significant levels of disturbance. In view of this, no in-combination effects are anticipated.

Predicted effects and their significance - Turnstone non-breeding

Operational Phase

Operational displacement - habitat loss due to aircraft flights

There is the potential for foraging and roosting turnstone in Pegwell Bay to be adversely affected by auditory and visual disturbance caused by over-flying aircraft, and aircraft departing and arriving at the airport.

Results from the desk study (**Appendix 7.2**) and the Pegwell Bay Distribution Survey (**Appendix 7.5**) indicate that turnstone do not utilise intertidal habitats for foraging and roosting within the area where 80dB LAmax is exceeded (see Figures 6.1a and 6.1b, **Appendix 7.1**), or where aircraft fly over at altitudes of less than 500m (see Figures 6.6 and 6.7, **Appendix 7.1**). In addition, the main foraging and roosting areas for turnstone in Pegwell Bay are located more than 1km from the airport runway (beyond the 1km ground-level, lateral disturbance distance). There is no historical evidence to suggest that turnstone were displaced from areas of Pegwell Bay close to the flight paths during the period when the airport was previously operational, and conversely, numbers of turnstone have declined since operation ceased (Hodgson, 2016[82]).

There is some evidence to indicate that turnstone will readily habituate to disturbance (Cutts *et al*., 2009[83]) and that this species does not flush (fly away) until approached at very close distance (see **Appendix 7.4**). Borgmann (2010[84]) recorded an average distance at which wintering turnstone were flushed due to walkers of only 12m (the equal lowest value of all the species studied). Smit & Visser (1993) in their studies on the effects of human-related disturbance on waders and wildfowl in the Wadden Sea found that turnstone were flushed due to human presence at an average distance of 47m (compared to 211m for curlew), the lowest value of the nine species studied. Results from disturbance studies on waders in Findhorn Bay (Scotland) also found that turnstone reacted to human disturbance (such as the presence of dog-walkers) at much shorter distances (in this case, an average of 14m) than most other wader species (Holloway, 1997[85]).

[82] Hodgson, I. (2016). *Thanet Coast Turnstone (Arenaria interpres) monitoring, January – February 2016*. Report to Natural England. Sandwich Bay Bird Observatory Trust: Sandwich.
[83] Cutts, N., Phelp, A. & Burdon, D. (2009). *Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance*. Report to Humber Institute of Estuarine and Coastal Studies, University of Hull.
[84] Borgmann, K. L. (2010). A Review of Human Disturbance Impacts on Waterbirds. *Audubon California*, 376 Tiburon, California 94920
[85] Holloway, S. (1997). *Winter Distribution and Disturbance of Wildfowl and Waders on Findhorn Bay*. BTO Research Report 179. British Trust for Ornithology, Thetford.

To conclude, there is no evidence to suggest that turnstone will be disturbed by noise or the presence of aircraft in flight from the Proposed Development, and as such, the effects in respect of displacement are considered not significant.

Combined Effects

None of the proposed or consented developments identified in the cumulative impacts assessment (ES Chapter 18) are predicted to lead to the loss of significant areas of suitable foraging and roosting habitat (intertidal mudflats and rocky shores) for turnstone. These developments are not located in close vicinity to areas where important concentrations of turnstone are known to occur and therefore are not predicted to cause significant levels of disturbance. In view of this, no in-combination 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

There is a potential for direct effects to the foraging habitat of over-wintering birds from the discharge of treated 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 the discharge on habitats could be through contamination (via pollutants, for example, from fuel spills), through eutrophication (through increased nitrate or phosphate levels) and through scour (through forceful discharge onto intertidal sediments).

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.

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 (detailed within **Table 7.10**):

Table 7.10 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.

In addition to the Annex 1 habitat detailed within **Table 7.10**, humid dune slacks are present as a qualifying feature, but not a primary reason for selection of the site as a SAC.

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

The existing drainage arrangements at the site divert rainfall to a sea outfall at Pegwell Bay. This outfall is of sufficient size to accept peak flows without surcharging.

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 CEMP and put in place to protect the groundwater environment during the construction phase, should also ensure that no potential pollutants reach Pegwell Bay.

7.9.1 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 discharges will only take place once silt and any other potential pollutants (e.g. hydrocarbons) have been removed from site discharge.

7.9.2 The drainage strategy is based upon a 30l/s pump capacity. The outfall structure, with a series of four incomplete barriers that reduce the flow rate of the discharge to Pegwell Bay, has been designed to prevent scour to intertidal habitat.

7.9.3 Following the incorporation of the environmental measures it is concluded that all effects on Pegwell Bay will be Negligible. Therefore it is concluded that there will be no significant effects on Pegwell Bay or any associated designated sites during the construction phase.

Operational phase effects

7.9.4 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 EA pertaining to the site itself.

7.9.5 Surface water will be collected in a drainage system and transferred to attenuation ponds where it will be treated as necessary. 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. From the ponds, the water will be pumped into drains that flow into the outfall. The flow of water exiting the outfall into Pegwell Bay will be controlled by the rate at which it can be treated in the ponds and pumped into the drains. The system is designed to cope with a 1 in 100 years flood event[86].

7.9.6 The appropriate design of the site drainage system, the regulation of the site discharge through an environmental permit and the design of the outfall discharge 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 of the site.

Combined Effects

7.9.7 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 EA, will 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. As such, it is concluded that there will be no in-combination effects.

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 emissions that might affect sensitive habitats is nitrogen oxide[87] (NO_x[88]). Road and air traffic emissions may increase the ambient NO_x 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 soils.

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.

The full scope of the air quality assessment, the air quality baseline, assessment methodology and assessments (covering both ecological and human receptors) are detailed in **Chapter 6**.

The criteria for identification of ecological receptors is set out in **Section 6.4.9** of **Chapter 6**, with the receptors detailed in **Table 6.6**, and their location shown in **Figure 6.5** (those near the Proposed Development) and **Figure 6.6** (those further away from the site).

Assessment of air quality effects from construction activity on site

Construction phase effects

Effects might arise on designated nature conservation sites/priority habitats sensitive to changes in air quality up to 200m from roads used by traffic accessing the Proposed Development site.

7.10.2 Various types of diesel-powered construction plant and equipment will be deployed on the development site during the earthworks, concrete and asphalt pavement and building erection works. These items will consist of excavators, dump trucks, concrete and asphalt batching plants,

[86] Full details of the on-site water management are provided in 38199cr058i1 – Manston Airport DCO EIA – Flood Risk Assessment.
[87] 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, and Table 6.8).
[88] Nitrogen oxides were taken to be nitrogen dioxide (NO_2) + nitrogen/nitric oxide (NO).

cranes, piling rigs, pumps and generators. An emissions inventory for the air pollutants NO_x and fine particulate matter will be compiled and a dispersion model will be set-up to estimate the ambient air quality effects arising from these emissions, in combination with background air quality and the emissions from construction-related road traffic.

Construction phase effects from traffic and transportation

Road traffic generated during the construction phase might also effect 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.

Operational effects from traffic and transportation

Road traffic generated during the operational phase might also effect 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.

Operational phase effects from aircraft Year 20 (worst case)

7.10.3 This section sets out the results of the dispersion modelling and compares predicted ground level concentrations against the assessment criteria detailed in **Sections 6.2, 6.4 and 6.7**. The predicted concentrations resulting from the process (i.e. the process contribution (PC)) are presented along with background concentrations and the percentage contribution that the predicted environmental concentrations (PEC) would make towards the relevant standard, objective or guideline value.

7.10.4 All concentration figures are the highest of five years of meteorology, for each ecological receptor or grid point.

7.10.5 This section presents results for Year 20, the year with the peak number of aircraft movements ('worst case').

7.10.6 Pollutant (NO_x) concentrations in air have been assessed according to the relevant air quality assessment levels for ecological receptors (see **Sections 6.7** [**Table 6.8**] and **6.2**) with assessment of annual mean and maximum daily mean NO_x. The NO_x concentrations in air values for these are 30 and 200µg m^{-3} [89], respectively.

Annual mean nitrogen oxides (NO_x) concentrations in air

7.10.7 In view of the large number of modelled receptors, results are given for only a selection of the worst receptors, namely:

- SPAs, SACs, Ramsar sites and SSSIs (collectively referred to as major environmental sites) with the five highest PCs and PECs; and
- the local wildlife sites with the five highest PCs and PECs.

7.10.8 The limited number of receptors used is justified by the limited predicted concentrations of annual mean NOx at these locations. Full results are provided in a spreadsheet of supplementary information appended to the Air Quality Chapter.

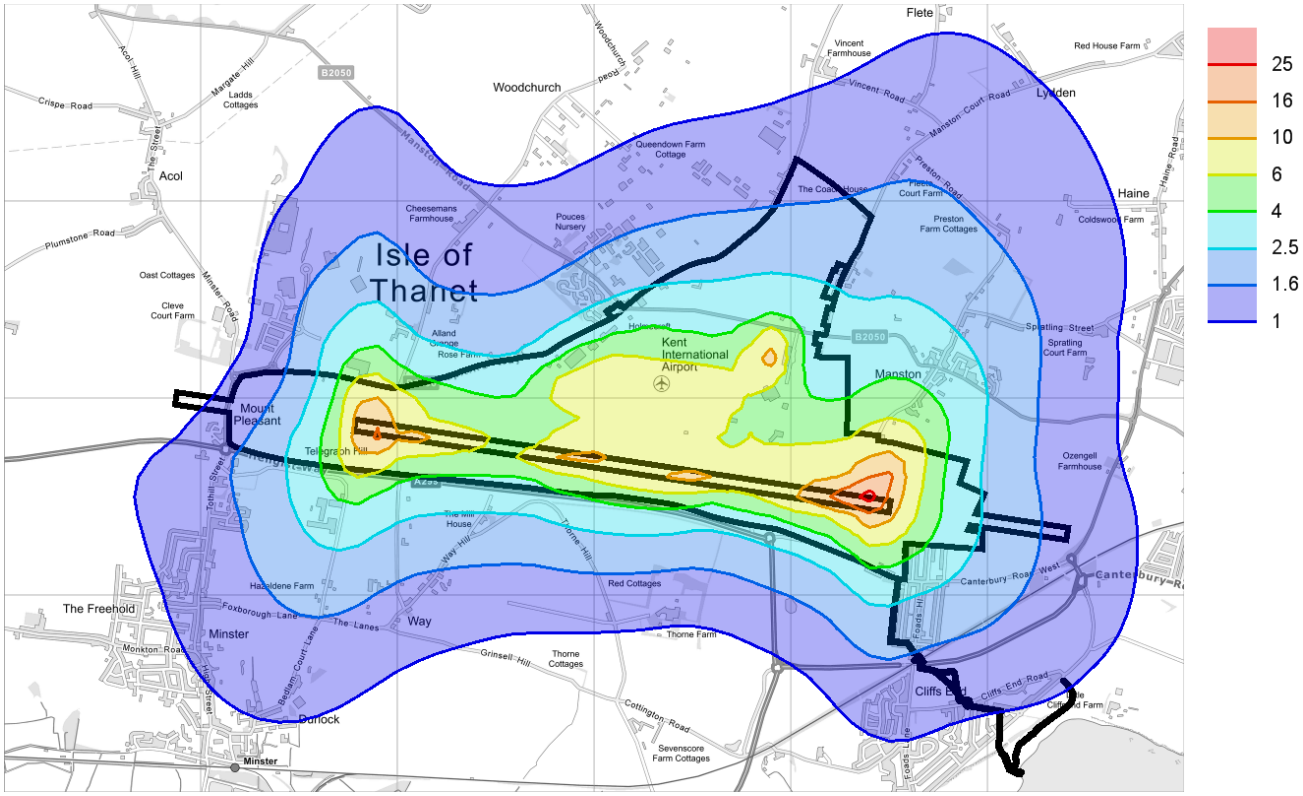
7.10.9 Predicted concentrations of annual mean NO_x at these selected receptors are given in **Table 7.1**. Contours of NO_x Process Contribution (PC) in the vicinity of the airport are shown in **Figure 7.**, and over a wider area are shown in **Figure 7.**.

[89] The concentration of an air pollutant is given in micrograms (one-millionth of a gram) per cubic metre air.

Table 7.11 Maximum PCs and PECs for annual mean NO_x, Year 20, worst receptors

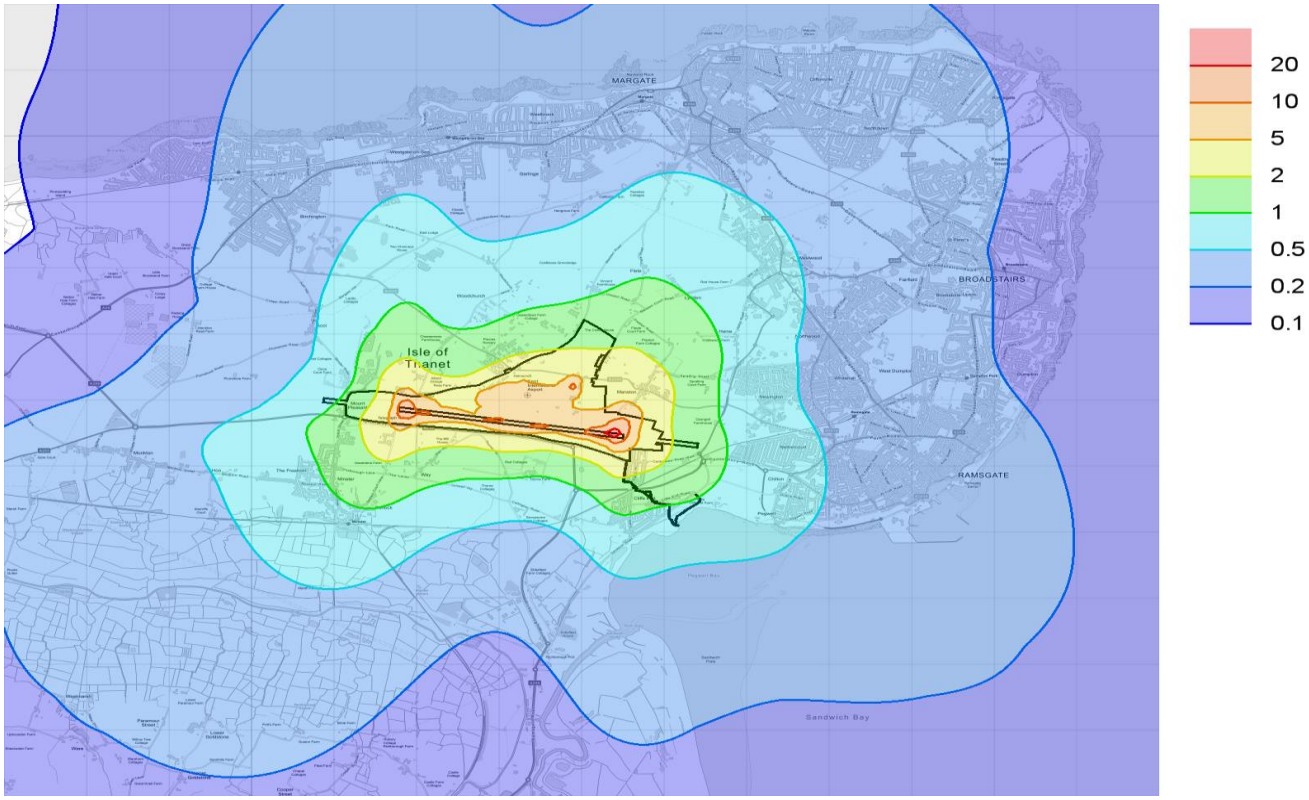
Receptor[90]	AQAL[91] (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Site type[92]
E20	30	0.42	26.32	1.4%	87.7%	Major
E21	30	0.60	26.50	2.0%	88.3%	Major
E22	30	0.94	26.84	3.1%	89.5%	Major
E23	30	0.79	26.69	2.6%	89.0%	Major
E24	30	0.59	26.49	2.0%	88.3%	Major
E78	30	2.96	28.86	9.9%	96.2%	Local
E79	30	2.43	28.33	8.1%	94.4%	Local
E80	30	2.25	28.15	7.5%	93.8%	Local
E81	30	2.96	28.86	9.9%	96.2%	Local
E82	30	2.72	28.62	9.1%	95.4%	Local

Figure 7.6 Annual mean NO_x process contribution (PC), Year 20, near the Proposed Development Site



[90] The receptors are detailed in **Table 6.6** above, and their location shown in **Figure 6.5** (those near the Proposed Development) and **Figure 6.6** (those further away from the Proposed Development).
[91] AQAL = Air quality assessment level. A generic term to embrace air quality standards, air quality objectives, targets, limit values, critical levels, critical loads, etc. This term is promulgated by IAQM/EPUK (see glossary and abbreviations, Table 6.1).
[92] Major refers to European and nationally designated sites and local refers to LWS and priority habitats.

Figure 7.7 Annual mean NO_x process contribution (PC), Year 20, in the wider area



7.10.10 The maximum annual mean NO_x PEC at any relevant major environmental receptor (Ramsar, SPA, SAC and SSSI) is predicted as 27µg m^{-3} or 89% of the Air Quality Assessment Level (AQAL) at the E22 receptor, representing Pegwell Bay. The modelled contribution from the airport here is 0.9 µg m^{-3}, which is the greatest PC at any of the modelled nationally/internationally-designated ecological receptors.

7.10.11 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 29µg m^{-3} or 96% of the AQAL at the E78 receptor, representing deciduous woodland in the Priority Habitat Inventory at Alland Grange (c.190m north of the site/ B2190 (Spitfire Way). The modelled contribution from the airport here is 3.0µg m^{-3}, which is the greatest PC at any of the modelled local nature receptors. Under EA guidance[93], where the short and long-term PC is less than 100% of the short or long-term environmental standard, then emissions do not need to be assessed any further.

7.10.12 It should be emphasised that the modelled PECs are dominated by the background contribution, and it is assumed that the background concentrations are unchanged from current (2007–2016) monitored concentrations. This is a very conservative assumption, given that:

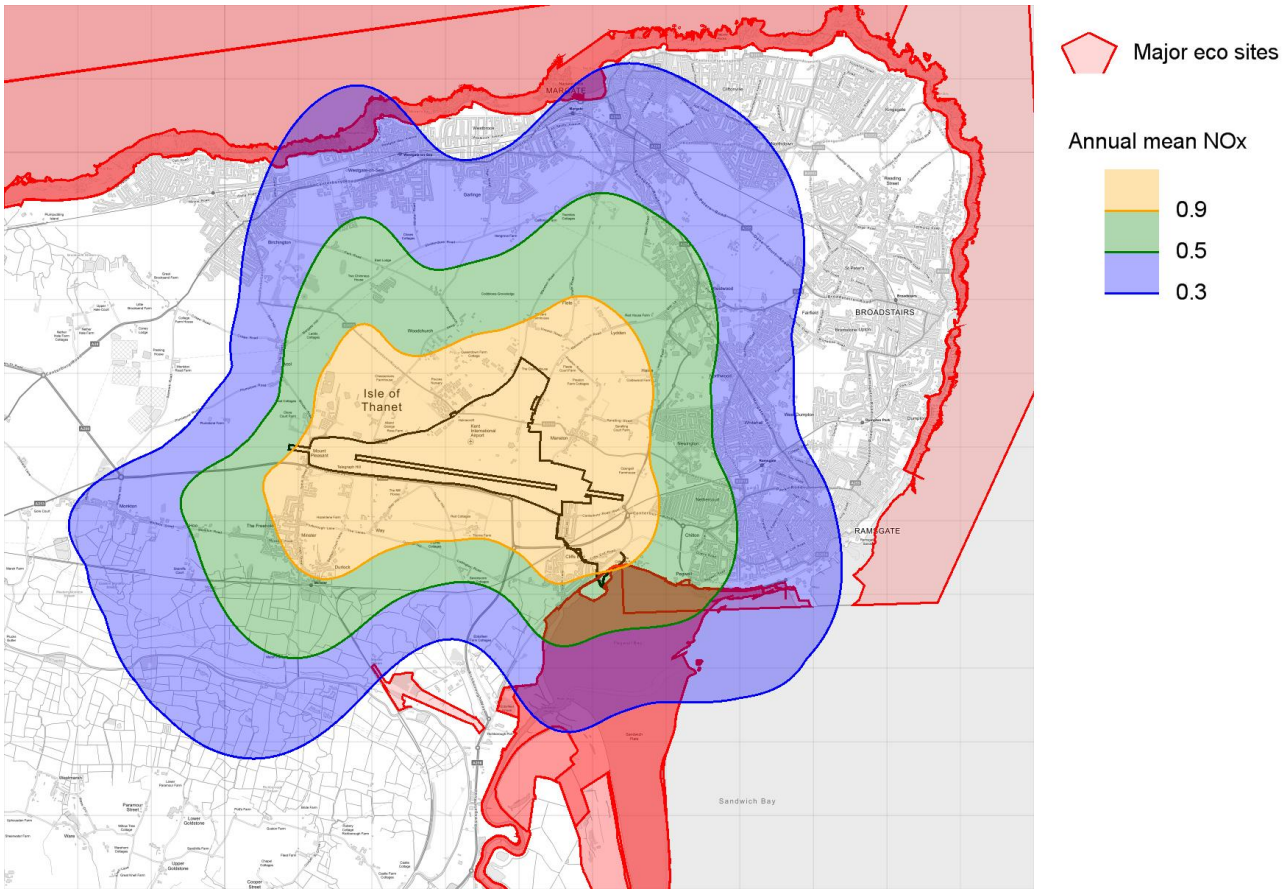
- the monitoring data over the 2007-2016 period shows a steady reduction in concentrations (about 1.4µg m^{-3} per year at the ZH2 and ZH3 monitors[94]); and
- the assumed background concentration assumed here (25.9µg m^{-3}, which was the 2007–2015 average at the two monitors) has not been exceeded since 2010.

7.10.13 Moreover, the active measures in place nationally and internationally to further reduce emissions from road vehicles are expected to have an increasingly significant effect over the next twenty years.

[93] '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.
[94] See Table 6.9 and Figure 6.10 in the Chapter 6: Air Quality.

7.10.14 No existing or new exceedances are predicted at any of the modelled receptors. However, under EA guidance, where the PC is greater than 0.3µg m^{-3} at major ecological receptors, further assessment may be required. **Figure 7.** shows the 0.3µg m^{-3} contour over the major designated sites.

Figure 7.8 Annual mean NO_x process contribution, Year 20, showing major ecological sites



Maximum daily mean nitrogen oxides (NO_x) concentrations in air

7.10.15 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely:

- SPAs, SACs, Ramsar sites and SSSIs with the five highest PCs and PECs; and
- the local wildlife sites/habitats with the five highest PCs and PECs.

Full results are provided in a spreadsheet of supplementary information appended to the Air Quality Chapter.

7.10.16 Predicted concentrations of maximum daily mean NO_x at these selected receptors are given in **Table 7.12**.

Table 7.42 Maximum PCs and PECs for maximum daily mean NO_x, Year 20, worst receptors

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Site type
E20	200	9.68	61.48	4.8%	30.7%	Major
E21	200	13.35	65.15	6.7%	32.6%	Major

Receptor	AQAL (µg m^{-3})	PC (µg m^{-3})	PEC (µg m^{-3})	% PC of AQAL	% PEC of AQAL	Site type
E22	200	19.89	71.69	9.9%	35.8%	Major
E23	200	10.95	62.75	5.5%	31.4%	Major
E24	200	12.81	64.61	6.4%	32.3%	Major
E57	200	20.73	72.53	10.4%	36.3%	Local
E62	200	22.30	74.10	11.1%	37.0%	Local
E63	200	26.09	77.89	13.0%	38.9%	Local
E64	200	29.90	81.70	15.0%	40.9%	Local
E75	200	20.61	72.41	10.3%	36.2%	Local

7.10.17 The maximum daily mean NO_x PEC at any relevant major environmental receptor (Ramsar, SPA, SAC and SSSI) is predicted as 72µg m^{-3} or 36% of the AQAL at the E22 receptor, representing Pegwell Bay. The modelled contribution from the airport here is 20µg m^{-3}, which is the greatest PC at any of the modelled nationally/internationally designated ecological receptors.

7.10.18 The maximum daily mean NO_x PEC at any relevant local nature receptor (i.e. excluding Ramsar, SPA, SAC and SSSI sites) is predicted as 82µg m^{-3} or 41% of the AQAL at the E64 receptor, representing deciduous woodland in the Priority Habitat Inventory near the Lord of the Manor (which is ~230m south of the eastern landing light array, by the Lord of the Manor A299/A256 roundabout). The modelled contribution from the airport here is 30µg m^{-3}, which is the greatest PC at any of the modelled local nature receptors.

7.10.19 No existing or new exceedances are predicted at any of the modelled receptors. Under EA guidance[95], the effects at all modelled receptors, both major and local, can be screened out from further assessment as significant effects are not predicted.

Nutrient nitrogen deposition

In view of the large number of modelled receptors, results are given for only a selection of receptors, namely:

- SPAs, SACs, Ramsar sites and SSSIs with the five highest PCs and PECs (as a percentage of the receptor-specific critical load); and
- the local wildlife sites/priority habitats with the five highest PCs and PECs.

Full results are provided in a spreadsheet of supplementary information appended to the AQ chapter.

Modelled nutrient nitrogen deposition rates at these selected receptors are given in **Table 7.53**, along with the receptor-specific critical loads (note that of the Local receptors, E79, E80 and E82 are in the top five for both PC and PEC). Nutrient nitrogen background deposition rates at most of the modelled receptors are modelled to be at exceedance already, based on background deposition rates from the Air Pollution Information System (APIS) website[96] and without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

[95] '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.

[96] The Air Pollution Information System (APIS) website (www.apis.ac.uk) provides information on background deposition of nitrogen and sulphur at sensitive ecological sites in the UK. APIS is widely recognised as the primary source of this information and will be used for the air quality assessment.

Table 7.5 Critical Loads assessment of nitrogen deposition, Year 20, worst receptors

Receptor	AQAL (kg N ha^{-1} y^{-1})	PC (kg N ha^{-1} y^{-1})	PEC (kg N ha^{-1} y^{-1})	% PC of AQAL	% PEC of AQAL	Site type
E31	8	0.01	15.69	0.2%	196.2%	Major
E43	5	0.01	14.29	0.2%	285.8%	Major
E44	5	0.01	14.29	0.2%	285.8%	Major
E48	5	0.01	14.29	0.2%	285.8%	Major
E49	5	0.01	14.29	0.2%	285.8%	Major
E20	8	0.04	10.82	0.5%	135.3%	Major
E21	8	0.06	10.84	0.8%	135.5%	Major
E22	8	0.09	10.87	1.2%	135.9%	Major
E23	8	0.08	13.52	1.0%	169.0%	Major
E24	8	0.06	13.50	0.7%	168.7%	Major
E79	10	0.49	26.39	4.9%	263.9%	Local
E80	10	0.45	26.35	4.5%	263.5%	Local
E82	10	0.55	26.45	5.5%	264.5%	Local
E84	10	0.27	26.17	2.7%	261.7%	Local
E86	10	0.12	26.02	1.2%	260.2%	Local
E78	10	0.60	19.08	6.0%	190.8%	Local
E81	10	0.60	19.92	6.0%	199.2%	Local

Of the major environmental sites, the additional process contribution is at most 1.2% of the critical load at the E22 receptor representing Pegwell Bay, and further assessment will be undertaken for the ES to determine if the impact could lead to an adverse effect. The PEC here is 136% of the critical load, although it should be emphasised that the modelled PECs are dominated by the background contribution (see section 7.10.18). At all other modelled receptors, the PC is less than 1% of the critical load. Under Environment Agency guidance, where the PC at a major site is less than 1% of the critical load, it can be considered insignificant and does not need to be assessed further. As the IAQM guidance points out, this is an approximate benchmark (*"1% and not 1.0%")* and does not mean that where the PC is over 1% there will necessarily be an adverse effect.

At the local wildlife receptors, the additional PC is at most 6% of the critical load, at the E78 receptor, which represents deciduous woodland in the Priority Habitat Inventory 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.

Acid deposition

7.10.20 In view of the large number of modelled receptors, results are given for only a selection of receptors, namely:

- SPAs, SACs, Ramsar sites and SSSIs with the five highest PCs and PECs (as a percentage of the receptor-specific critical load function); and

- the local wildlife sites/habitats with the five highest PCs and PECs (again as a percentage of the critical load function). Note that of the Local receptors, E77 is in the top five for both PC and PEC.

Full results are provided in a spreadsheet of supplementary information appended to the Air Quality Chapter.

7.10.21 Modelled process contribution and background deposition rates are given in **Table 7.64**.

Table 7.64 Acid deposition rates, Year 20, worst receptors

Receptor	Sulphur PC (keq[97] ha^{-1} y^{-1})	Nitrogen PC (keq ha^{-1} y^{-1})	Sulphur background (keq ha^{-1} y^{-1})	Nitrogen background (keq ha^{-1} y^{-1})	Site type
E35	0	0.0006	0.25	1.12	Major
E37	0	0.0004	0.25	1.12	Major
E44	0	0.0008	0.22	1.02	Major
E48	0	0.0008	0.22	1.02	Major
E49	0	0.0007	0.22	1.02	Major
E21	0	0.0043	0.21	0.77	Major
E22	0	0.0068	0.21	0.77	Major
E23	0	0.0057	0.20	0.96	Major
E24	0	0.0042	0.20	0.96	Major
E38	0	0.0025	0.20	0.96	Major
E65	0	0.0136	0.28	1.62	Local
E77	0	0.0142	0.24	1.64	Local
E86	0	0.0083	0.29	1.85	Local
E87	0	0.0087	0.24	1.64	Local
E88	0	0.0096	0.24	1.64	Local
E72	0	0.0150	0.24	1.64	Local
E73	0	0.0163	0.24	1.64	Local
E75	0	0.0172	0.24	1.64	Local
E76	0	0.0152	0.24	1.64	Local

A comparison with the critical load function is given in **Table 7.75**[98].

[97] Kilo equivalents deposited per hectare per year (keq ha^{-1} y^{-1}). Keq = Kilo equivalent. The unit eq (a keq is 1,000 eq) refers to molar equivalent of potential acidity resulting from e.g. sulphur, oxidised and reduced nitrogen e.g.1 keq N ha^{-1} yr^{-1} is equal to 14 kg N ha^{-1} yr^{-1}.

[98] These are calculated using the same formulas as the APIS critical load function tool, but without rounding of intermediate values, so results differ slightly from those generated by the APIS website tool.

Table 7.75 Critical Loads assessment of acid deposition, Year 20, worst receptors

Receptor	Exceedance (keq ha^{-1} y^{-1})			Percent of critical load function			Site type
	PC	Background	PEC	PC	Background	PEC	
E35	No exceedance	0.84	0.84	0.1	260.5	260.6	Major
E37	No exceedance	0.84	0.84	0.1	260.5	260.5	Major
E44	No exceedance	0.70	0.70	0.1	228.8	228.9	Major
E48	No exceedance	0.70	0.70	0.2	228.8	228.9	Major
E49	No exceedance	0.70	0.70	0.1	228.8	228.9	Major
E21	No exceedance	No exceedance	No exceedance	0.4	87.3	87.6	Major
E22	No exceedance	No exceedance	No exceedance	0.6	87.3	87.9	Major
E23	No exceedance	0.04	0.04	0.5	103.3	103.8	Major
E24	No exceedance	0.04	0.04	0.4	103.3	103.7	Major
E38	No exceedance	0.63	0.64	0.5	220.5	221.0	Major
E65	No exceedance	0.04	0.05	0.7	102.2	102.9	Local
E77	No exceedance	0.06	0.07	0.8	103.3	104.1	Local
E86	No exceedance	0.33	0.34	0.5	118.2	118.7	Local
E87	No exceedance	0.07	0.08	0.5	103.9	104.3	Local
E88	No exceedance	0.07	0.08	0.5	103.9	104.4	Local
E72	No exceedance	No exceedance	No exceedance	0.8	97.9	98.7	Local
E73	No exceedance	No exceedance	No exceedance	0.8	97.9	98.8	Local
E75	No exceedance	No exceedance	No exceedance	0.9	98.4	99.3	Local
E76	No exceedance	No exceedance	No exceedance	0.8	98.4	99.2	Local

7.10.22 Background acid deposition rates at many of the modelled receptors are modelled to be at exceedance already, based on background deposition rates from APIS and without any additional contribution from the airport; no account is taken of reductions in deposition rates in future years.

7.10.23 At the major environmental sites, the additional process contribution is at most 0.6% of the critical load function at the E22 receptor representing Pegwell Bay. The PEC here is 88% of the critical load.

7.10.24 The major receptor with the greatest PEC is E35, representing the Thanet Coast Ramsar site, where the PEC is 261% of the critical load function, but the PC is just 0.1% of the critical load function.

7.10.25 For the local wildlife sites/habitats, the additional PC is at most 0.9% of the critical load, at the E75 receptor, which represents deciduous woodland in the Priority Habitat Inventory near Minster (approximately 1km south of the western end of the site). The PEC here is modelled as 99% of the critical load function.

7.10.26 Under the EA criteria, the effects at all modelled receptors, both major and local, can be considered insignificant and do not need to be assessed further.

Combined Effects

7.10.27 Traffic and aircraft combined: any effects to be confirmed with further air quality modelling data.

7.11 Assessment of effects to bat assemblage

Current baseline

7.11.1 Overall the site provides low quality foraging and commuting habitat for bats. The ground-truthing exercise in February 2017 identified that the site has large areas of semi-improved neutral grassland and extensive areas of hard-standing, which includes a runway, aircraft taxiing areas and buildings (see **Figure 7.3**). The site is exposed and the grassland is managed by cutting, resulting in low value habitat for foraging bats. Bat activity on the site would likely be concentrated along the margins; such as western and eastern boundaries of the B2050 (Manston Road) and the hedgerows to the extreme north of the site and to the west of the runway.

7.11.2 The SHP desk study (ES Volume 2, April 2016) reported two bat roost records within a 1km grid square which potentially fall within the site boundary. These records are for a common pipistrelle roost (1km grid square overlaps the west of the site boundary) and an unidentified bat species (1km grid square over laps the east of the site boundary), further information relating to the sizes of the roosts or roost type was not available. The next closest roost is located, 2.4km to the south west of the site, with a peak count of 668 individual soprano pipistrelles utilising the maternity roost; this count was undertaken in July and included juveniles on the wing. Typically, this roost supports between 250 and 350 fully grown (adult) bats[99].

7.11.3 Within 5km of the site there were 125 bat records since 2000, of at least six species: common pipistrelle (*Pipistrellus pipistrellus*); Nathusius' pipistrelle (*P. nathusii*); soprano pipistrelle (*P. pygmaeus*); brown long-eared (*Plecotus auritus*); Natterer's (*Myotis nattereri*) and serotine (*Eptesicus serotinus*); some records are only allocated to genus level (*pipistrellus Sp*.) with six records of *Chiroptera sp.*

Stone Hill Park Survey Data (2015-2016)

7.11.4 External building assessments included within the SHP extended Phase 1 habitat survey found a number (52+) of buildings/structures within the site. The majority of buildings were considered to have negligible or low potential for roosting bats. Roost potential (in accordance with best practice at the time[100]) for buildings/ structures was assessed through external inspections and revealed:

- 34 with negligible potential;
- 20 with low potential;
- two with medium potential;
- one with high potential; and
- four with confirmed roosts (within buildings[101] 16, 33, 41 and 54).

7.11.5 Many of the building consist of large aircraft hangars with sheet metal construction and ancillary buildings of modern construction many of which are very small (e.g. various electrical sub-station buildings).

7.11.6 Bat activity survey work for the SHP application was undertaken in September 2015 and covered four transects within the site, with a dusk and a pre-dawn activity survey being undertaken within the same 24-hour period. Bat activity at the site was low with three species of bat being identified:

99 Amec Foster Wheeler (June 2017) Manston Airport DCO EIA Ecological Desk Study (Appendix 7.2).
100 Hundt, L. (2012) Bat Surveys – Good Practice Guidelines, 2nd Edition. Bat Conservation Trust, London
101 All building numbers in this section refer to the buildings shown in Figures 7.4 & 7.5).

common pipistrelle, soprano pipistrelle and noctule. The highest level of activity was found at the eastern end of the former runway, with 21 common pipistrelle passes and one soprano pipistrelle pass during the dusk and dawn activity survey, with activity being concentrated along the hedgerow boundary. Activity levels at the remaining transects were very low: transects one (four passes), transect two (four passes), and transect four (four passes).

7.11.7 Automated detector survey work was also undertaken for five consecutive nights in September 2015 (**Figure 7.4**). A total of five bat species were recorded within the site which included common pipistrelle (80%), soprano pipistrelle (10%), serotine (5%), noctule (3%), Nathusius' pipistrelle (single call, automated detector location 1b) and common or Nathusius' pipistrelle species (single call at 40khz, automated detector location 2b) registering the lowest number of calls (1% of the total calls each). Common/soprano pipistrelles were found at all automated detector locations. Noctule and serotine passes were recorded within the centre of the site, south of the B2050 (Manston Road) (automated detector 2b, having three calls each) and a single serotine pass was also recorded along the eastern boundary near to the junction of B2050 Manston Road and Manston Court Road (automated detector 1a). The location with the highest number of bat calls, almost 43% of total calls recorded was recorded at automated detector 4a (to the west of the site, towards Spitfire Way). Furthermore, the earliest bat call was a common pipistrelle, at automated detector location 4a, 23 minutes after sunset. Common pipistrelle bats typically emerge from their roosts around 20-30 minutes after sunset, so it would suggest that the bat had been roosting nearby. A common pipistrelle bat was also recorded 33 minutes before sunrise (automated detector 1a), which again suggests that the bat could be returning to a roost nearby.

7.11.8 Hibernation survey work was conducted between January and March 2016 on B33, B43 and B18. All three structures had static bat detectors in place, however no echolocating bats were recorded. B33 was inspected and found to have a hibernating brown long-eared bat. B43 could not be accessed but a static detector was placed inside; although the structure was not confirmed to be a hibernation roost, the hibernation potential is still considered high. B18 was inspected on five occasions, during which no roosting bats were found.

Survey Results 2017

A total of 71 buildings were externally assessed between August and October 2017 (see **Appendix 7.6**). Each building was assessed and placed into a category identifying its bat roosting potential, in accordance with current best practice[102], as shown in **Table 7.16**. **Figures 7.4** and **7.5** details locations of buildings, activity transects and automated detector survey work.

Table 7.16 Summary of Bat Roosting Potential for all Buildings on Site, August – October 2017

Overall Potential to support roosting bats*	Building Reference Number*	Total number of buildings in Category
Confirmed Roost	B8, B16, B17, B33, B41 and B54	6
High	B1 and B43	2
Moderate	B5, B18, B28, B29, B39 and B53	6
Low	B2, B3, B6, B7, B11, B14, B15, B22, B25, B27, B34, B40, B44, B45, B46, B47, B50, B52, B56, B61, B62, B63, B64 and B66.	24
Negligible	B4, B9, B10, B12, B13, B19, B20, B21, B23, B24, B26, B30, B31, B32, B35, B36, B37, B38, B42, B48, B49, B51, B55, B57, B58, B59, B60, B65, B67, B68, B69, B70 and B71.	33

[102] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). The Bat Conservation Trust, London.

*Highest potential stated for each building.

Note: The location of each building is shown on Figure 7.4. Note B1 is an underground bunker and B18 is a ground-level bunker.

7.11.9 Initial survey work has demonstrated that at least six bat species use the site. However, this could potentially be up to 11 species taking into account other species known from Kent and that make use of the habitats found on the site.

7.11.10 In addition to the 71 buildings, there are approximately 130 trees on site, many of which are relatively young, less than 30 years old and of simple growth form which have limited suitability for bats. That said, a preliminary roost assessment of trees will be conducted to determine their potential roosting status and there may be a small number of trees with bat roost potential.

7.11.11 Many of the confirmed roosts and potential roosts have more than one potential roost type e.g. a building may have the potential for hibernation and also day roosting. Based on initial survey data, the current status of on Site roosts and potential roost categories within buildings is as follows:

- maternity roosts:
  - no confirmed roosts;
  - three buildings with moderate potential; and
  - eight with low potential.
- hibernation roosts:
  - two confirmed roosts (B8 and B33);
  - one building with high potential;
  - two with moderate potential; and
  - 18 with low potential.
- day/transitional roosts:
  - four confirmed roosts (B16, B33, B41 and B54);
  - one building with high potential;
  - five with moderate potential; and
  - 25 with low potential.
- night/feeding roosts:
  - one confirmed roost (B17); and
  - 12 buildings with low potential.

7.11.12 **Table 7.17** shows confirmed roost information based upon the current initial level of survey. Further internal inspections, hibernation surveys, transect surveys and emergence/re-entry surveys are required to inform bat usage of the site and to inform roost characterisation.

Table 7.17 Current Confirmed Bat Roost Information

Building Reference	Current status	Potential Status	Bat present	2015 Surveys – droppings found	2017 Surveys – droppings found
B8	Confirmed hibernation roost.	Moderate potential as day/transitional roost. Low potential as night /feeding roost.	-	-	25 brown long-eared droppings and *Myotis* sp. droppings

B16	Confirmed day/transitional roost.	Moderate maternity roosting potential. Low potential for hibernation bats.	-	15 pipistrelle sp. droppings	Three brown long-eared droppings
B17	Confirmed night/feeding roost.	Low potential for hibernating bats.	-	-	40 brown long-eared droppings
B33	Confirmed hibernation, day/transitional roost		Single brown long-eared hibernating	20 brown long-eared droppings and one pipistrelle sp. dropping.	-
B41	Confirmed day/transitional roost.	Low potential to support maternity roosting and hibernating bats	-	Approximately 10 pipistrelle sp. droppings	30 pipistrelle sp. droppings
B54	Confirmed day/transitional roost.	Low potential to support maternity roosting and hibernating bats	-	2 pipistrelle sp. droppings present	-

Note: (i) droppings have not yet been subject to DNA analysis so species considered likely present based on visual character of droppings have been indicated; (ii) Preliminary information only, further roost characterisation surveys are planned in 2018.

7.11.13 **Table 7.18** provides a preliminary interpretation of the likely roosting status and the potential conservation significance of the 6 building roosts identified, which has been assessed in line with the criteria set out in the bat mitigation guidelines[103]. Where the exact status of a roost or species' population is uncertain, for example if the survey results were ambiguous, a precautionary approach has been taken, and the higher level of value assumed.

Table 7.18 Preliminary Interpretation of likely Roosting Status by Species

Species	**Availability of foraging/commuting habitat**	**+Preliminary interpretation of likely roosting status on the site according to species (refer to Figures 7.4 & 7.5 for building references)**	***Activity recorded on the site**
Brown long-eared bat	Hedgerows and treelines are present on the western and eastern boundaries of Manston Road, and provide opportunities for foraging, connecting suitable habitat, despite built-up patches that are artificially lit. Foraging and commuting habitats are sub-optimal for this species which is a woodland specialist and shows preference for dark flight routes.	B33 is a confirmed hibernation site for brown long-eared bat. A single bat was found in B33 during inspections undertaken in January/February 2016 (SHP). B33 supports an individual brown long-eared or possibly on a precautionary basis a small roost of up to three bats of this common species B8 is a confirmed hibernation site for brown long-eared bat. 25 brown long-eared droppings were recorded inside the building during winter surveys. Based on current information B33 and B8 would be of **moderate conservation significance** for the hibernation sites respectively at a Site context. B17 (40 droppings) has been confirmed as a day/transitional roost and would be of **low conservation significance** if occupied by individual bats. B16 (3 droppings) has been rated as moderate potential for a maternity colony, if found would be of **medium conservation significance**.	No brown long-eared calls were identified during static and transect detector survey (although this is likely to be due in part to the quiet calls of this species leading to under-detection). It is anticipated that there will be very low levels of foraging and/or commuting recorded across the site, which would be primarily along boundary features.

[103] Mitchell-Jones, A.J. (2004). Bat Mitigation Guidelines. English Nature, Peterborough. Figure 4 (guidelines for proportionate mitigation) introduces a sliding scale of conservation significance according to roost status.

Species	Availability of foraging/commuting habitat	+Preliminary interpretation of likely roosting status on the site according to species (refer to Figures 7.4 & 7.5 for building references)	*Activity recorded on the site
Common pipistrelle	Suitable foraging habitat is available across the site, along boundary features with some trees and hedgerows, as well as around artificial lights and landscaped areas. This species is a habitat generalist and will opportunistically forage around street lamps, scrub, hedgerows, trees and other features.	Buildings 16, 41, and 54 had droppings present and have been confirmed as day/transitional roosts (likely common or soprano pipistrelle – subject to DNA analysis). B41 and 54 have been rated as having low potential to support maternity or hibernation roosts, having potential to support only small numbers of bats. Based on this judgement these buildings would be classed as **low conservation significance**. B16 has been rated as moderate potential for a maternity colony which, if found, would be of **medium conservation significance**.	Low levels of Common pipistrelle activity were recorded on the site. Of the species recorded during the static and transect surveys this was by far the most frequently occurring species, with 77.22% of calls (61 in total) during the September 2015 monitoring period (five nights at eight locations). A total of 34 common pipistrelle calls were recorded during the September 2015 dusk/dawn activity surveys across all four transects at the site.
Soprano pipistrelle	Suitable foraging habitat is available across the site, along boundary features with some trees and hedgerows, as well as around artificial lights and landscaped areas. Aside from a balancing pond and an emergency water supply tank, the site lacks the water bodies with which soprano pipistrelles are typically associated.	Buildings 16, 41, and 54 droppings present and have been confirmed as day/transitional roosts (likely common or soprano pipistrelle – subject to DNA analysis). B41 and 54 have been rated as low maternity and hibernation potential having the potential to support low to small numbers of bats if this is the case they would be classed as **low conservation significance**. B16 has been rated as moderate potential for a maternity colony; if found it would be of **medium conservation significance**.	Very low levels of soprano pipistrelle foraging and commuting were recorded across the site. Static detectors found a total of eight calls (10.13%) at eight locations during the September 2015 5 days of monitoring. A total of two soprano pipistrelle calls were recorded during the September 2015 dusk/dawn activity survey across all four transects at the site.
Nathusius' pipistrelle	Some suitable foraging habitat is available particularly along western and eastern boundaries of Manston Road. The site does, however, lack woodland and large water bodies which Nathusius' pipistrelle is usually associated. Although considered one of the UK's rarer bats, this species is recorded more frequently in the south-east region.	No roosts identified. If any of the trees support an individual or small numbers of this species, the roost would be **of medium-high conservation significance** due to the rare status of this species in the UK.	Very low levels of foraging and commuting recorded across the site. With a single confirmed call and a single possible call during static detector monitoring. Static detectors recorded one call (1.27%), during the September 2015 (5 days of monitoring).
Noctule	Suitable foraging habitat is available across the site. Areas include boundary features such tree lines, hedgerows, and across landscaped grassland areas within the centre of the site.	No roosts currently identified. If any of the buildings support small numbers of this species, the roost would be **of medium-low conservation significance**. If, however the roost supports a maternity colony of noctule, the roost is considered to be of **medium-high conservation significance**. In the absence of further data, the higher level of importance is assumed.	Very low levels of noctule activity were recorded at the site Static detectors found three call (3.8%), during the September 2015, five days of monitoring. One noctule call was recorded during the September 2015 dusk/dawn activity survey across all four transects at the site.
Leisler's bat	Suitable foraging habitat is available across the site. Areas include boundary features such tree lines,	No roosts currently identified. If any buildings support small numbers of this rarer species, the roost would be of **medium-low conservation significance**.	No activity currently identified. Although, there is the potential for low levels of activity.

Species	Availability of foraging/commuting habitat	+Preliminary interpretation of likely roosting status on the site according to species (refer to Figures 7.4 & 7.5 for building references)	*Activity recorded on the site
	hedgerows, and across landscaped grassland areas within the centre of the site.	If, however the roost supports a maternity colony of Leisler's, the roost is considered to be of **medium-high conservation significance**. In the absence of further data, the higher level of importance is assumed.	
Serotine	Suitable foraging habitat is available across the site. Areas include boundary features such tree lines, hedgerows, and across landscaped grassland areas within the centre of the site.	No roosts currently identified. If any buildings support small numbers of this rarer species, the roost would be of **medium-low conservation significance.** If, however the roost supports a maternity colony of serotine, the roost is considered to be of **medium-high conservation significance**. In the absence of further data, the higher level of importance is assumed.	Very low levels of serotine activity were recorded. Static detectors found four calls (5.06%), during the September 2015 (5 days of monitoring).
Daubenton's bat	The site lacks woodland habitat for foraging opportunities. Boundary features Hedgerows and treelines are present on the western and eastern boundaries of Manston Road, and provide opportunities for foraging, connecting suitable habitat, despite built-up patches that are artificially lit. With the exception of a balancing pond and emergency water supply, the site lacks the open water habitat with which Daubenton's bat are typically associated.	B8 had a possible Myotis sp. dropping present and has been confirmed as a hibernation site. If this building were to support small numbers of this common species, the roost would be of **medium conservation significance**.	No Myotis passes were recorded. It is anticipated that very low levels of activity would occur along boundary features and in darker areas of the site.
Natterer's bat	The site lacks woodland habitat for foraging opportunities. Hedgerows and treelines are present on the western and eastern boundaries of Manston Road, and provide opportunities for foraging, connecting suitable habitat, despite built-up patches that are artificially lit.	B8 had a possible Myotis sp. dropping present and has been confirmed as a hibernation site. If this building were to support small numbers of this common species, the roost would be of **medium conservation significance**.	No Myotis passes were recorded. It is anticipated that very low levels of activity would occur along boundary features and in darker areas of the site.
Whiskered bat	The site lacks woodland habitat for foraging opportunities. Hedgerows and treelines are present on the western and eastern boundaries of Manston Road, and provide opportunities for foraging, connecting suitable habitat, despite built-up patches that are artificially lit.	B8 had a possible Myotis sp. dropping present and has been confirmed as a hibernation site. If this building were to support small numbers of this common species, the roost would be of **medium conservation significance**.	No Myotis passes were recorded. It is anticipated that very low levels of activity would occur along boundary features and in darker areas of the site.
Brandt's bat	The site lacks woodland habitat for foraging opportunities. Hedgerows and treelines are present on the western and eastern boundaries of Manston Road, and provide opportunities for foraging, connecting suitable habitat, despite built-up patches that are artificially lit.	B8 had a possible Myotis sp. dropping present and has been confirmed as a hibernation site. If this building were to support small numbers of this common species, the roost would be of **medium conservation significance**.	No Myotis passes were recorded. It is anticipated that very low levels of activity would occur along boundary features and in darker areas of the site. .

Species	Availability of foraging/commuting habitat	+Preliminary interpretation of likely roosting status on the site according to species (refer to Figures 7.4 & 7.5 for building references)	*Activity recorded on the site

+Preliminary interpretation of likely roosting status: based on SHP hibernation survey work at B33 and the 2017 internal inspections of B8, 16, 17, 33, 41 and 54. No emergence or pre-dawn surveys have yet been undertaken, hence professional judgement has been used to make a preliminary assessment of the potential significance of roosts if present.

Limitations

7.11.14 Currently the survey data do not meet the current minimum standards for survey effort set out in the good practice guidance for bats[104] as survey effort on 2017 was constrained by access restrictions to the Site. The preliminary assessment of roost status and activity in **Table 7.18** has been based on limited data which include:

- automated detector survey work for September 2015 (five nights at eight locations) from the SHP ES;
- dusk/dawn activity survey at four transects across the site during September 2015 from the SHP ES;
- hibernation surveys at B33, B43 and B18 from the SHP ES; and
- building inspections for bats between 21st August and 17th October 2017 (of which six buildings could not be inspected due to safety concerns and 11 buildings could not be accessed).

Further survey work is required to accurately confirm the types and status of any bat roosts within confirmed and potential bat roost and to demonstrate bat activity and usage at the site.

7.11.15 Additional survey work for 2018 includes completion of the roost characterisation on the six confirmed roosts and 32 structures with potential roost suitability. This will include appropriate levels of inspection, use of static recorders and dusk/re-entry surveys; bat activity survey through manual walked transects and the use of static recorders from April to July inclusive. Ground assessment of some 130 trees on site will identify trees with bat roost potential, which will then be subject to further survey. These surveys will involve a combination of emergence and/or pre-dawn roost re-entry surveys and aerial inspections (either by climbing or using a ladder or mobile elevated work platform) to inspect cavities, splits etc. as appropriate.

Future baseline

7.11.16 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 and, therefore, it is unlikely that bat populations onsite would increase.

Construction phase effects

Measures to prevent death or injury of individual bats

7.11.17 There is the potential for individual bats to be killed, injured or disturbed during site clearance prior to development. Based on the results of the survey work to date, common pipistrelle, soprano pipistrelle, brown long-eared bat and *Myotis* sp. bats are most at risk from harm or disturbance, as

[104] Collins, J (ed.) (2016). Bat Surveys for professional Ecologists: Good Practice Guidelines (Ed3) The Bat Conservation Trust, London.

these species are known to/considered most likely to occur in buildings or trees that will be demolished/refurbished or pruned/felled.

7.11.18 All British bat species are protected by both UK[105] and European[106] legislation. This means that a licence is needed in order to carry out any otherwise illegal activities. A licence for the Proposed Development at Manston would only be granted if the three tests specified in the Habitats Directive are met. These are:

- there is 'no satisfactory alternative';
- the development is 'not detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range'; and
- it is 'in the interests of public health and public safety, or other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment'.

7.11.19 In light of these legal considerations, mitigation measures will be provided on land located within or in very close proximity to the Manston site (e.g. within land parcel 1362) to maintain the favourable conservation status of the sites' bat populations.

7.11.20 Post-consent, a European Protected Species (EPS) mitigation licence would need to be obtained from NE prior to demolition or modification of all buildings or modification or felling of trees identified as bat roosts. These will also include further buildings or trees identified as roosts during further roost characterisation surveys to be undertaken in 2018.

7.11.21 As part of the licence application, a Method Statement (MS) will be produced detailing measures, which will ensure as far as possible that no bats are harmed during modification, refurbishment or demolition of buildings, as well as setting out detailed requirements for the provision of replacement roost sites. Such mitigation will include the careful removal of potential roost spaces by hand under the supervision of a suitably licensed bat ecologist, phased building removal and timing of work to avoid sensitive periods in the bat life cycle such as breeding and hibernation (typically May – August and November – February respectively).

7.11.22 Should a tree roost be identified, an EPS licence will be required and mitigation/compensation measures would be detailed as part of the application for the licence. Where trees have the potential to support roosting bats, but no bat roost has been identified, they will be soft-felled as a precaution. All contractors working on the trees will be made aware of the potential for bats to occur, and be provided with a copy of a MS in advance of the works. Trees will be section felled, and parts of the tree containing potential roost features will be lowered to the ground gently, with holes/raised bark orientated upwards to allow any concealed bats to escape overnight. Works will be timed to avoid the main bat breeding and hibernation periods (May – August and November – March respectively). A similar approach will be adopted, under licence, for trees supporting bat roosts, although felling of these trees will be directly supervised by a suitably qualified ecologist.

7.11.23 With the measures incorporated into the Proposed Development, including a comprehensive Ecological Mitigation Strategy, there will be no contravention of the legislation protecting bats, and provision of roosting opportunities across the site will be an enhancement on what is currently available for bats. As such, there will be no significant effects from roost destruction.

Land-take/land-cover change through demolition or refurbishment of structures or removal of trees resulting in death or injury of bats during construction activities, leading to contravention of UK legislation

7.11.24 The majority of buildings on site will be demolished or, if retained, extensively refurbished to accommodate the Proposed Development. In the absence of roost characterisation surveys, it has been assumed that the potential loss of roosts within buildings and trees at the site on a worst-case scenario basis, considering likely species present based on: confirmed presence of a bat, initial indications of droppings and percentage number of species found during preliminary activity and static monitoring survey work (from September 2015 for the SHP baseline).

[105] British bats are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended).
[106] British bat species receive further protection under Regulation 41 of the *Conservation of Habitats and Species Regulations 2017*.

7.11.25 Subject to further survey work, it has been assumed that the loss of three buildings which potentially contain (not yet confirmed) small-moderate maternity roosts for common pipistrelle, soprano pipistrelle and/or brown long-eared bats. These would be of medium conservation significance in the context of this site, these species are common and widespread in the UK[107], and the loss of these roosts would not be expected to have a significant effect on the national or local bat populations of these species.

7.11.26 It has been assumed that five hibernation roosts will be lost (two confirmed and three potential, see **Section 7.11.10**) within buildings likely to be supporting brown long-eared, *Myotis* sp., common pipistrelle or soprano pipistrelle species. These would be of medium conservation significance in the context of the site, with these species being common and widespread in the UK. The hibernacula are likely to support very low numbers of common species and their loss would not be expected to have a significant effect on bat populations of these species.

At a site level, the loss of a further five buildings has been assumed with these buildings potentially (not confirmed) containing individual or small numbers of roosting bats (transitional, or night feeding roosts). In addition, the loss of five individual or small roosting sites within trees (not confirmed) consisting of individual or small roosts has been assumed. The majority of these roosts are assumed to consist of low or small numbers of common species such as common or soprano pipistrelle, brown long-eared bats being of low conservation status at a site level. It has also been assumed that a small number of these roosts could consist of individual or small numbers of roosting *Myotis* sp. (such as Natterer's, Daubenton's, whiskered and or Brandt's), or of serotine, noctule or Leisler bats; if any of these roosts are present they would be of medium-low conservation status at a site level. Should an individual or small number of Nathusius' be found to be roosting it would be of moderate-high conservation status at a site level given the rarity of this species at national level. The loss of these potential (not confirmed) individual or small numbers of roosting bats would not be expected to have a significant effect on bat populations of these species.

Summer Roost compensation

7.11.27 The detailed specification of a purpose-built building to provide summer roost compensation will be provided within an EPS licence application. It is assumed[108] that a purpose-built building will be provided to replace the loss of roost space for three potential maternity roosts consisting of low-moderate numbers of bats targeting common pipistrelle, soprano pipistrelle and brown long-eared bat species and five transitional roosts (individual roosting or small number of bat species, see **Section 7.11.8**). The location of the roost space has yet to be determined although is likely to be located in the south of Land Parcel 1362[109], approximately 1km from the southern boundary of the site, near to an existing hedgerow boundary (**Figure 7.4**). The roost would be placed in the southern section of the land parcel to minimise the effects of lighting, noise and risk of bat collision from the aircraft and vehicle traffic.

7.11.28 The design of the compensation roost building is likely to be brick built with a dark tiled or slate roof and will provide a suitable thermal regime to support a maternity roost of common pipistrelle, soprano pipistrelle or brown long-eared bats. The roof will be lined internally with traditional bituminous felt, which will be loose-fitting with tears to permit bats to access and roost between felt and tiles, particularly for common and soprano pipistrelle bats, in addition to an internal cavity wall. Access points (bat slates) will be incorporated into the roof, with tears in the felt below, to ensure that bats can access the loft space. A loft space of greater than 2m in height will accommodate potential brown long-eared bats. The provision of additional roosting cavities will be provided inside such as bat bricks and or soffit boards.

7.11.29 This building will be constructed in advance of demolition of any bat roosts on the site. Human access to roosting areas within the structure will be restricted to suitably licensed bat ecologists for the purposes of monitoring and maintenance. Entrances will be facing vegetation, but providing a clear unobstructed flight-line to the roost space and external lighting will be avoided.

[107] BCT (August 2014). The state of the UK's bats 2014. National Bat Monitoring Programme Population Trends.
[108] At this stage the provision of offsite mitigation for bats and the other receptors such as birds is still to be agreed with the landowner. Full details to be provided within the ES.
[109] An extended phase 1 habitat survey report and plan of land parcel 1362 are provided in Appendix 7.10.

Winter Roost compensation

7.11.30 The detailed specification of a purposed built building to provide winter roost compensation will be provided within an EPS licence application. A purpose-built bunker is currently proposed and is likely to be installed off-site to the south of Land Parcel 1362 to compensate for five (potential) hibernation roosts comprising of a low or small number of bat species; brown long-eared, *Myotis* sp., common pipistrelle or soprano pipistrelle species. Within the bunker there will be features providing crevices for bats to hibernate.

Tree Roost Compensation

7.11.31 Bat boxes will be placed along hedgerows on suitable trees or artificial surface such as poles along tree lines on-site along the northern boundary (approximately five boxes) and off-site along the existing tree line along the west of Land Parcel 1362 (approximately five boxes). They will be positioned so that bats have a clear flight to the box entrance, with space below where they can land. Boxes will be placed approximately 5m high using headless or domed nails, not fully hammered in, to allow the tree to push the box off as it grows without splitting. No trees with bat roosting features will be removed until replacement bat boxes have been installed.

Roost Compensation Monitoring

7.11.32 Licensed bat surveyors will monitor the effectiveness of roost compensation and on-going maintenance. A detailed monitoring programme will be provided within the Method Statement of the EPS licence. This will enable an assessment of whether the bat populations have responded favourably to the proposed mitigation, and identify the need for any minor amendments or additional measures to increase the success of this strategy. The monitoring programme will include, as a minimum:

- annual check of bat boxes between May and September for at least five years;
- monitoring of temperature and humidity within newly created bat shelter in June and July for at least two years post creation so that desired conditions could be corrected where necessary;
- twice annual internal inspection and emergence surveys of the bat shelter in June and July for at least five years post building roost demolition;
- monitoring of temperature and humidity within newly created bunker from December to February for at least two years post creation, so that conditions can be compared to existing hibernaculum and to allow any variation from the desired conditions to be corrected; and
- twice annual inspection of bat bunkers in January and February for at least five years post bunker demolition.

7.11.33 Full details of mitigation roost provision for the site will be outlined within the EPS licence. Licensed bat surveyors will monitor the effectiveness of roost compensation at Land Parcel 1362 and on-going maintenance. A detailed monitoring programme of the mitigation will be provided within the Ecological Mitigation Strategy. This will enable an assessment of whether the bat populations have responded favourably to the proposed mitigation/compensation, and identify the need for any minor amendments or additional measures to increase the success of this strategy.

7.11.34 After completion of the monitoring, the results of the translocation and monitoring will be documented in a report, with a copy of the results supplied to NE, Kent and Medway Biological Records Centre and the Kent Bat Group. This report will be made publicly available so that lessons can be learnt for future bat mitigation schemes. In addition, a short annual monitoring report will be submitted to the aforementioned organisations after each year's monitoring.

Land-take/land-cover change (habitat removal) resulting in loss or degradation of faunal foraging and commuting habitat

7.11.35 The foraging and commuting value for bats at the site is currently low. The site was an operational airport until recently (2014) with associated activity, noise and lighting. Much of the proposed development Site contains hardstanding (c.99ha) and mown grassland (c.190ha). Furthermore, to

discourage the presence of birds to reduce the risk of bird strike, treelines and hedgerows on the site are limited in extent, concentrated predominantly along the northern portion of the site, such as Manston Road and Manston Court Road. The Proposed Development incorporates additional hardstanding and buildings on site with a (c.23ha) reduction in grassland habitats, with remaining grassland mown. Given the low use of the site by foraging and commuting bats, any change, degradation or loss of habitats on Site are not predicted to have a significant effect on the conservation status of bats.

Increase in artificial light levels during the construction phase resulting in temporary loss or degradation of roosting, foraging and commuting habitat, and causing disruption to the behaviour of fauna

7.11.36 Spill of construction related lighting onto roosts will be avoided through directional lighting during the construction phase, unless it is existing lighting. Where security lighting is required during construction, this will be operated on motion sensors using directional LED lighting and aimed only where necessary, with no light spill onto known or potential roost sites or key flight-lines. Nocturnal light spill onto hibernation sites will also be avoided between November and March inclusive. This will avoid effects of lighting on bat roosts during the construction phase.

7.11.37 The site was an operational airport, which required lighting until 2014. It is anticipated that there would be an increase in lighting at the site during construction. However, given the low use of the site by bats foraging and commuting bats the effect is not anticipated to be significant in conservation terms.

Increase in noise or vibration during the construction phase resulting in disturbance to bats and/or degradation of foraging habitat

7.11.38 Noise levels during the 20 year construction programme are associated with construction works, vehicle movements, aircraft flyover and taxi-ing, landing/take off noise. These could interfere with the ability of bats to roost and echolocate and, therefore, to forage and commute. It is proposed that alternative compensation roosts be erected off Site to the south of Land Parcel 1362 to mitigate effects. Bat exclusion will take place under an EPS licence, in advance of construction works near to roosting sites, to avoid disturbance to bats.

7.11.39 The effects from aircraft events in the day time and night time periods are likely to be short in duration in terms of take-off, landing and flyovers and so it is anticipated that there will be no significant effect, particularly in relation to the amount of foraging time available which will remain unaffected. Furthermore, bats on the site already exhibit a high tolerance to background noise e.g. from the site being used as an airport until 2014 and the A299. Mitigation roosts are to be placed to the south of Land Parcel 1362 and so roosting bats will experience the same back ground noise as neighbouring human receptors. As such it is not anticipated that noise associated with construction, vehicle movement and aircraft movement will have a significant effect on roosting and foraging bats.

7.11.40 Overall, it is anticipated that there would be a slight adverse effect on bat species as a result in a change to noise levels in the area. However, this is not anticipated to be significant.

Increased vehicle and aircraft movements during the construction phase leading to collisions between fauna and construction traffic, causing death or injury

7.11.41 Traffic accidents may result in direct mortality of bats as a result of bats colliding with vehicles or aircraft when flying across roads and around the airport. Little research has been undertaken in the UK to establish levels of bat injury and mortality caused by this factor, however some studies have demonstrated the effectiveness of mitigation techniques[110]. For road traffic accidents, species at greatest risk are likely to be brown-long eared bat and Myotis species, which tend to fly low and close to vegetation, such as tree lines and hedgerows.

7.11.42 Species that often fly across open habitats, such as noctule, Leisler's and serotine bats, are not completely reliant on linear landscape features, and are likely to occasionally commute to forage over the airfield grassland. More suitable foraging and commuting habitats are present around the airport perimeter and within the surrounding countryside, which is better connected to linear habitat and landscape features. Based on initial bat activity surveys these surrounding, varied and

[110] Wilson, S. (2011). A Review of Bat Mitigation in Relation to Highway Severance. Highways Agency.

connected habitats, provide better foraging habitats than the airfield grassland habitat. As such, there is likely to be only a limited risk of small numbers of bats commuting or foraging across the airfield and therefore a low risk of collisions between aircraft and bats. Data for bat strikes by aircraft and vehicles at the site is unknown. That said, the site was an existing airport with a vehicle and aircraft movements until 2014 and the A299 is a busy existing road network.

7.11.43 It is predicted that vehicle movements on site will have a slight adverse effect on bats however this would not be considered significant given the low use of the site by foraging and commuting bats.

Operational phase effects

Operational lighting of development areas

7.11.44 There will be increase in permanent lighting levels across the site. This increase in lighting, particularly around the runway, aviation car park and passenger terminal would likely deter and cause barrier/severance effects on a low number of foraging and commuting bats in this immediate area. Based on the current low levels of usage and limited value of habitat present for foraging bats within this area there would be a slight adverse effect on foraging and commuting bat species as a result of an increase in lighting at the site. However, this would not be considered to be significant.

Increase in airborne aircraft noise or vibration resulting in disturbance to bats and/or degradation of foraging habitat

7.11.45 Noise levels during the operational phases associated with the cumulative effects of aircraft flyover noise and landing take off noise could feasibly interfere with the ability of bats to roost, in addition to echolocate, and therefore forage and commute and have a slight adverse effect. However, the effects from aircraft events in the day time and night time periods are likely to be short in duration in terms of take-off, landing and flyovers and so it is anticipated that there will be no significant effect, particularly in relation to the amount of foraging time available which will remain unaffected.

7.11.46 Overall, it is anticipated that there would be a slight adverse effect on bat species as a result in a change to noise levels in the area. However, this is not anticipated to be significant.

Increased vehicle and aircraft movements resulting in death or injury of bats

7.11.47 As previously mentioned in **Sections 7.11.29 - 7.11.31**, given the limited risk of small numbers of bat species commuting across or foraging over the airfield and the short duration of intermittent periods when bats are present in this area it is predicted that an increase in aircraft movements will have a slight adverse effect on bats. However, this is not anticipated to be significant.

Combined Effects

7.11.48 No combined effects are anticipated.

Conclusion

Further bat activity surveys and roost characterisation surveys will take place (see **Section 7.11.14 and Table 7.3**). This will allow for an accurate determination of current roosting status on site and will inform a full impact assessment and whether any and what sort of mitigation is required.

An EPS licence will be obtained from NE prior to demolition or modification of all buildings identified as bat roosts in addition to any tree roosts identified. As part of the licence application, a MS will be produced detailing measures, which will ensure as far as possible that no bats are harmed during the demolition or modification of buildings or felling or pruning of tree roosts, as well as setting out detailed requirements for the provision of replacement roost sites. The provision of adequate roosting space and roosting opportunities at Land Parcel 1362 will mitigate for any roosts to be lost as a result of the development. In obtaining an EPS licence, and adhering to a MS and Ecological Mitigation Strategy it will ensure that the risk of death or injury to bats as a direct result of construction activities is minimised, such that legislation will not be contravened.

7.11.49 In summary it is anticipated that there would be an increase in hardstanding and buildings on site, reducing grassland foraging resource. However, given the low use of the site by bats foraging and commuting bats this is not anticipated to result in a significant effect.

There is also predicted to be an increase in lighting from the airport which would likely deter and cause barrier/severance effects on a low number of foraging and commuting bats in the immediate area. Based on the current low levels of usage and limited value habitat within this area there would be a slight adverse effect on bat species as a result in a change to the lighting within this area.

There would also be a slight adverse effect on bat species as a result in a change to noise levels in the area from flyover, landing and take-off of aircraft. However this is not anticipated to result in a significant effect.

There is the limited risk of small numbers of bat species commuting across or foraging over the airfield colliding with aircraft and vehicles. It is predicted that an increase in traffic movements will have a slight adverse effect on bats.

Overall, it is considered that there will be a permanent adverse effect on bat populations, albeit the viability of the populations would not be compromised, and none of the effects is considered to be significant in EIA terms.

7.12 Assessment of effects on reptiles

Current baseline

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

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 cannot be discounted, especially as the site is sufficiently large and undisturbed to have maintained self–sustaining populations.

7.12.1 Following the placement of artificial refugia (1,000 felts [1000 x 500 mm] and 500 tins [500 x 500 mm]) from 21st-24th August 2017, seven presence/absence surveys were undertaken under appropriate weather conditions (temperatures between 10 and 18O C, and avoiding strong winds and rain). Artificial refugia were distributed across all suitable reptile habitat within the site, with a higher density of refugia deployed in the most suitable reptile habitats. Each survey involved checks of all artificial refugia and were spread between the 7th – 29th September, an optimal survey month for reptiles.

7.12.2 The survey methodology followed current good practice and the reptile presence / absence surveys are detailed in the following baseline survey report: Manston Airport, Kent: Building inspection for bats and barn owls and reptile presence / likely absence survey; see **Appendix 7.6**.

7.12.3 No reptiles were recorded during these surveys although a single adult common lizard was recorded basking along the western site boundary (adjacent to Minster Road) during felt/tin placement on 23rd August 2017.

7.12.4 Considering the negative survey results, this single record would indicate, if this was not a transient animal, that, and in accordance with Froglife guidance[111], a low population of common lizard might be present along the southern most section of the western site boundary.

Small areas (c. 4ha) of the site were not included in the 2017 presence/absence survey (as there was no access) including the ‘brownfield’ land (the former car park) at the eastern end of the site. These unsurveyed areas are shown in Figure 2 in **Appendix 7.6**). In addition, presence/absence surveys are required of the

[111] Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

land (c.0.3ha) north of the B2190 (Spitfire Way) (see **Appendix 7.9**) recently added to the Order Limits. Surveys are planned of these areas in spring 2018.

Future baseline

The current baseline is yet to be fully determined[112], 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, and any reptile populations, with the ongoing existing Site management, are not likely to change.

Construction phase effects

7.12.5 For this assessment it is considered that there is a low population of common lizard within the perimeter fence in the south-west of the site. Due to the good habitat quality of the as yet surveyed areas it is considered that there are high populations of common lizard and slow worm in these areas. The Desk Study (see **Appendix 7.2**) revealed no records of adders and grass snake is considered likely absent due to the negative results from the presence/absence survey and the lack of water bodies within the unsurveyed areas.

7.12.6 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. The method statements would cover 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).

7.12.7 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.

7.12.8 Due to the limited extent of construction activity, and current management, in the south-west of the site, effects on the low population of common lizard will be mitigated by an appropriate method statement. Where high populations of common lizard and slow worm are encountered, animals will be translocated to a donor/compensation site (land parcel 1362; see **Appendix 7.10**) to the south of the site. An area of similar extent although of higher quality for reptiles, will be created at this location in advance of translocation. A trapping exercise and translocation will occur prior to any site work and once the donor site is sufficiently mature to receive any reptiles.

7.12.9 Monitoring of the reptile population within the receptor site will occur every two years for six years beginning the year after translocation. The results of the monitoring will permit any adaptive management required to ensure continued effective delivery of suitable reptile habitat. Further monitoring will be implemented if significant intervention is required as a result of monitoring results.

7.12.10 To conclude, as a result of land take of c. 4ha of areas with assumed high populations of two common reptile species, it is considered that there will be a permanent adverse effect on reptile populations at the local level. Survey of these areas in 2018 will confirm reptile presence and any population levels. Mitigation and compensation measures remove the risk of incidental injury/mortality and provide suitable habitat to maintain viable populations at existing levels. Therefore, none of the effects are considered to be significant in EIA terms.

Operational phase effects

No significant effects are expected at the operational phase as the measures (translocation/habitat creation) in place to mitigate or avoid incidental injury/mortality from the new development will have been put in place during the construction phase.

[112] The baseline surveys planned for 2018 are detailed at section 7.3.10 and in Table 7.4.

Combined Effects

None of the proposed or consented developments identified in the cumulative impacts assessment (**ES Chapter 18**) are predicted to lead to the loss of significant areas of suitable reptile habitat. However, any potential direct effects (i.e. that might cause incidental injury/mortality) would require mitigation to ensure legal compliance. In view of this, no combined effects are anticipated.

7.13 Assessment of effects on breeding birds

Current baseline

The site provides suitable habitat for a variety of breeding birds. Hedgerows, scrub and trees are limited in extent although do provide opportunities, as do the buildings, for nesting passerines such as house sparrow, starling, song thrush and dunnock. All of these are SPI with all, except dunnock, also being red-listed BoCC (see **Box 7.1**). The site grassland, the most extensive Site habitat, provides nesting habitat for skylark, grey partridge and meadow pipit. All three species have been recorded on Site.

Skylark is an SPI, and is also BoCC red-listed due to a long-term decline in the UK breeding population, including a 29% decline in the South East England Region from 1995-2015[113]. Skylark is described as a widespread and common but declining resident in Kent, and a common winter visitor and passage migrant[114]. The species principally breeds in arable farmland in the county, but is also found in a wide variety of other open habitats including grassland, saltmarshes and sand dunes. The decline is primarily due to the move from spring to autumn cereal sowing, which has led to a reduction in the food supply in winter, and less nesting opportunities in spring (Clements *et al*., 2015). The estimated breeding population in Kent has declined from 30,000-40,000 territories during 1988-94, to 20,000-28,000 during 2008-13[115].

Ungrazed grasslands and improved semi-natural grasslands hold some of the highest nesting densities of skylark of any habitat in lowland England (Brown *et al*., 2000[116]). In these habitats, the nesting densities of skylarks were found to range from 29 to 52 pairs per km^2/100ha. With almost 200ha of ungrazed grassland, it is estimated, based upon these figures that the site could support up to 104 pairs of breeding skylark.

Grey partridge is an SPI and is BoCC red-listed due to severe, long-term decline in the UK breeding population, including a 79% decline from 1995-2015 in the South East England Region, which includes Kent (Harris et al., 2017[117]). The species principally breeds in arable farmland in Kent, but is also found in open grassland, marshes, sand dunes and vegetated shingle (Taylor *et al*., 1984[118]). Grey partridge is described as a once widespread resident in Kent that has declined considerably in recent years, and now occurring primarily in coastal areas, particularly in Thanet/ eastern coastal areas of the county (Privett [ed] 2016)[119]. The estimated breeding population in Kent has declined from 2,000-4,000 pairs during 1988-94, to 600-1,200 during 2008-13 (Clements et al., 2015[120]). There has also been a marked contraction in the distribution of the species in Kent, having been recorded in 551 tetrads (2 x 2km squares) in 1967-73, and only 165 in 2008-13.

It is estimated (Game Conservancy Trust, 2007[121]) that expected densities of grey partridge in sub-optimal landscapes are two or four pairs per km^2 /100ha). In habitats were conditions are more ideal (e.g. the non-agricultural grassland of the site) densities, even without species-specific management, could be expected to be four or eight pairs per km^2. Higher densities can be found when species-specific management techniques are applied such as predator control or the provision of grassy margins, beetle banks and conservation

[113] Harris, S.J., Massimino, D., Gillings, S., Eaton, M.A., Noble, D.G., Balmer, D.E., Procter, D. & Pearce-Higgins, J.W. (2017). The Breeding Bird Survey 2016. BTO Research Report 700 British Trust for Ornithology, Thetford.
[114] Privett, K. [ed] (2016). Kent Bird Report 2014. Kent Ornithological Society.
[115] Clements, R., Orchard, M., McCanch, N. & Wood, S. (2015). Kent Breeding Bird Atlas 2008-13. Kent Ornithological Society.
[116] S. Browne, J. Vickery & D. Chamberlain (2000). Densities and population estimates of breeding Skylarks *Alauda arvensis* in Britain in 1997, Bird Study, 47:1, 52-65: http://dx.doi.org/10.1080/00063650009461160
[117] Harris, S.J., Massimino, D., Gillings, S., Eaton, M.A., Noble, D.G., Balmer, D.E., Procter, D. & Pearce-Higgins, J.W. (2017). The Breeding Bird Survey 2016. BTO Research Report 700 British Trust for Ornithology, Thetford.
[118] Taylor, D.W., Davenport, D.L. & Flegg, J.J.M. (1984). The Birds of Kent. Kent Ornithological Society.
[119] Privett, K. [ed] (2016). Kent Bird Report 2014. Kent Ornithological Society.
[120] Clements, R., Orchard, M., McCanch, N. & Wood, S. (2015). Kent Breeding Bird Atlas 2008-13. Kent Ornithological Society.
[121] Game Conservancy Trust. Grey Partridge News. Issue 7: Summer 2007. GCT, Fordingbridge.

headlands in arable crops. There are no species-specific measures operated on Site for grey partridge although it is possible that some such habitat measures are adopted nearby off-site, with some land included within entry level agri-environment schemes especially to the north of the Proposed Development. Predators, such as foxes and badgers, may operate at much reduced levels in the main part of the site where the security fence reduces egress by such animals. It is possible therefore that the site might hold up to 20 pairs of grey partridge.

Breeding bird surveys to be undertaken between April and June 2018 will provide information on the species breeding within the site and the approximate numbers of pairs/territories of each.

Future baseline

7.13.1 It is anticipated that existing management practices will continue in the short to medium term and it is therefore likely that in the absence of the Proposed Development, a similar breeding bird assemblage to that currently will be present. It is therefore appropriate to use the current baseline for the purpose of the PEIR.

Construction phase effects

7.13.2 The physical activity associated with the construction phase could result in disturbance/displacement of nesting birds. 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 and nesting sites. Measures incorporated into the scheme, such as those to remove the potential to damage or destroy active nests, will prevent legal non-compliance (see **Table 7.6**).

7.13.3 As a result of construction there will be a c.20ha reduction in the extent of grassland. Most grassland in the vicinity of the runway will be maintained with loss of grassland north of Manston Road. The regular and frequent informal public access/dog walking to the existing grassland area (extending to about 40ha) north of the B2050 (Manston Road), along with the continued mowing regime, reduce the quality of this area to breeding ground nesting species such as skylark and grey partridge. The grassland surrounding the existing runway with no public recreational activity provides better quality nesting habitat for ground nesting birds, and this area will largely remain on the operational site, albeit subject to disturbance from construction/runway upgrade activity.

7.13.4 To ensure that the conservation status of SPI/red-listed BoCC is maintained, appropriate habitat, using plant species appropriate for the changing climate, will be created prior to commencement of construction within the c.36ha compensation site south of the Proposed Development. The arable area within the compensation field will contain ‘skylark plots’ at a density of 2 per ha. These plots will provide nesting and foraging habitat for skylark and other farmland passerines, as well as foraging habitat for grey partridge. In addition, a 6m wide tussocky grass buffer strip will be created around the field boundary that are managed appropriately for ground nesting birds. Further measures will include the creation of a beetle bank through the field centre.

7.13.5 The number of pairs of breeding birds will be monitored for at least five years from the first breeding season successful post-habitat creation. This will enable adaptive management of any of the measures in place to enhance the nesting suitability of the compensation site. Any changes to the type of measures implemented will generate further monitoring.

Operational phase effects

The physical activity and associated noise and lighting of operations could result in the disturbance/displacement of nesting birds. In addition, onsite measures to reduce the risk of bird strike could also disturb or displace nesting birds. However, no significant effects are expected at the operational phase as the measures in place to compensate or avoid effects from the new development will have been put in place prior to commencement of the construction phase.

Combined Effects

None of the proposed or consented developments identified in the cumulative impacts assessment (**ES Chapter 18**) are predicted to lead to the loss of significant areas of suitable foraging and nesting habitat for breeding birds with any conservation status (e.g. SPI or red-listed BoCC). However, any potential direct effects (i.e. that might cause loss of active nests) would require mitigation to ensure legal compliance. In view of this, no combined effects are anticipated.

7.14 Assessment of effects to breeding barn owl

Current baseline

Barn owl, a Schedule 1 species under the Wildlife & Countryside Act 1981 (as amended), has been recorded on the site. Survey undertaken for SHP found evidence of roosting in a single building in June 2015. SHP suspected barn owl(s) roosted although did not nest within the site. During building inspections undertaken in autumn 2017[122] for this DCO proposal, evidence of barn owls (in the form of pellets) were found in three buildings but nesting was not suspected as, although two of the buildings with pellets contained features that could be used for nesting, no evidence of nesting attempts was found.

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

Survey work is planned in 2018 to identify any breeding barn owl on the Proposed Development site.

Future baseline

7.14.1 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.

Construction phase effects

The physical activity, noise and lighting 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. Construction works could be timed to avoid (or maintain a 200m buffer) from any nest sites during the breeding season until young fledge (March – December inclusive) to prevent contravention of WCA Schedule 1. However, due to birdstrike risk and potential effects upon barn owls, nesting barn owls cannot be maintained on the operational site, and therefore replacement nest sites will be provided prior to the construction phase.

The preferred prey of barn owl is small mammals that live in rough grassland[123]. Rough grassland is characterised by having a layer of thatch, dead grass stems just above the ground surface, providing good cover and therefore ideal conditions for small mammals. The management (mowing and removal of cut material) of the site grasslands, continued since the closure of the former airport, is undertaken to prevent a thatch layer developing, in accordance with CAP 772 measures as a deterrent to attracting raptors to aerodromes to reduce birdstrike. Therefore the site grassland does not provide optimal foraging habitat for barn owl. Much of the surrounding land is arable farmland that provides poor foraging habitat for barn owls.

Any nest site will be removed outside the breeding season prior to construction and a new alternative nest site would be installed at a sufficient distance away to prevent use of the site. Such a locality will be near to a

[122] See Appendix 7.6: Manston Airport, Kent: Building inspection for bats and barn owls and reptile presence / likely absence survey 2017.
[123] Snow, D.W. & Perrins, C.M. 1998. *The Birds of the Western Palearctic. Concise Edition*. Oxford University Press, Oxford.

sufficient area of appropriate grassland for foraging and at least 1km distant from any dual carriageway or other similar roads. In so doing, there would be no significant effects to the local barn owl population.

Operational phase effects

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.

Combined Effects

None of the proposed or consented developments identified in the cumulative impacts assessment (**ES Chapter 18**) are predicted to lead to the loss of significant areas of suitable foraging habitat or nest sites for barn owl. In view of this, no combined effects are anticipated.

7.15 Assessment of effects to terrestrial invertebrates/invertebrate assemblage

Current baseline

The desk study provided records of over 150 species of invertebrates within 5km of the site, since 2000. Of these, 13 species are classified as Notable A[124], 69 species as Notable B[125] with 53 species classified as IUCN Red-listed[126]. 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 has also been recorded near the Site although there is no suitable habitat on Site for this species.

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.

A scoping walkover was carried out by a professional entomologist (Peter Kirby) on 22nd August 2017 to undertake an assessment of the invertebrate potential of the site.

During the walkover survey, a total of 169 invertebrate species were recorded, of which nineteen have a formal (red data book or nationally scarce) conservation status and two are new to Britain. Further detail is provided in the Manston Airport Invertebrate Scoping Survey report (see **Appendix 7.7**).

The sample of invertebrates taken is sufficient to demonstrate that such interest is not negligible. The fact that species with formal conservation status comprise more than 10% of the recorded fauna suggests high species quality, but in practice a large proportion of these species are in groups which have not been recently reviewed and the formal status of some is open to doubt. Kent is, anyway, rather rich in species with formal conservation status simply because of its geographical location, and relatively ordinary places can support multiple nationally scarce species.

[124] 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.

[125] 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.

[126] 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.

None of the species with formal status is particularly unexpected for the area or the habitats although collectively informative. Unsurprisingly, they are all associated with open habitats, but some are characteristic of very open and sunny habitats, and many are familiar components of rich assemblages on open calcareous habitats elsewhere in the south east. Considering the limitations of the walkover survey the number of scarce aculeates[127] with restricted distribution is impressive and suggests that this group might prove of substantial interest. Furthermore, the populations of some of the scarcer species appeared to be large.

The two species new to Britain are both leafhoppers of the genus *Tettigometra*. Both are assumed to be recent colonists, and to have limited conservation significance.

The scoping survey concluded that the site has high potential for invertebrates of open habitats. Factors favouring high interest are:

- large area;
- favourable geographical location;
- long history of open conditions;
- high floristic diversity;
- large populations of some important invertebrate foodplants; and
- varied structure, including bare and sparsely vegetated ground, managed grassland, and unmanaged or lightly managed tall herbs.

The managed grassland which comprises most of the habitat on the site is compromised in its potential by its uniform structure; limited topographical variation; limited area of bare ground; and its semi-improved character.

Though substantial invertebrate interest may be present, the expectation is that this will not prove exceptional, and some species, especially solitary bees and wasps, may be in part dependent on peripheral features and habitats, especially for nesting sites. Diversity and interest are considered likely to be higher in other open habitats than in the mown grassland. Higher interest overall in these areas is favoured by:

- varied structure, including bare and sparsely vegetated ground, unmanaged tall herbs, and complex mosaics;
- varied substrates;
- locally varied topography; and
- varied floristic composition, including good populations of a number of important foodplants not present, or rare, in the grassland.

To identify the site's value for invertebrates and identify the presence of individual species as well as determining any presence of particular assemblages surveys are planned for April to September 2018 with the main survey effort focused on May-July inclusive. The surveys planned for 2018 will involve the following standard methods: sweep-netting, beating, suction sampling, pitfall trapping, water traps, targeted netting and direct observation.

Future baseline

7.15.1 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.

[127] A group of hymenoptera that possess a sting – the bees, wasps and ants.

Construction phase effects

7.15.2 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 notable 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, are to be provided off-Site. The off-Site areas include the land between Hengist Way (the A299) and south of the existing southern perimeter fence in the west of the site, and the reptile compensation area in land parcel 1362. Measures would include the creation of a mosaic and variety of habitats valuable to 'brownfield' invertebrates including: sparsely vegetated mounds with predominantly south-facing (dry/warm) aspects, bare (sandy) ground, small shallow scrapes to provide ephemeral pools (e.g. less than 5m^2 and not large enough to attract water birds); unvegetated mounds of spoil/rubble. 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.

7.15.3 Monitoring of the invertebrate habitat will occur to monitor effectiveness of implanted measures and enable adaptive management.

Operational phase effects

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.

Combined Effects

None of the proposed or consented developments identified in the cumulative impacts assessment (**ES Chapter 18**) are predicted to lead to the loss of significant areas of suitable habitat for invertebrates. In view of this, no combined effects are anticipated.

7.16 Conclusions of preliminary significance evaluation

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 7.19**

Table 7.19 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 the ES with additional survey/desk study data, information on flight paths and results from noise/vibration modelling.

Receptor and effects	Significance Level	Rationale
		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 the 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.
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/ compensation 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 for off Site mitigation.
Breeding birds: Land take/land cover change (habitat removal); management changes resulting in reduction in nesting/foraging habitat	Not significant	Environmental Measures and habitat specific mitigation/ compensation would render residual effects to a level which would not affect the receptor's Favourable Conservation Status
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 Invertebrates: 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

Contents

8. Freshwater environment

8.1 Introduction

8.1.1 This Chapter sets out the results of the assessment of the effects of the Proposed Development on the freshwater environment (including potential effects on water quality, resources and flood risk). It should be read in conjunction with the Proposed Development description in **Chapter 3**.

8.1.2 Following a summary of the assessments that support the Chapter, 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.

8.1.3 **Table 8.1** details the work that has been done to support this PEIR (PEIR (2018)), and the additional work that will be undertaken to inform the Environmental Statement (ES). Where reference is made to the PEIR that was consulted on in Summer 2017, it is referred to as PEIR (2017).

Table 8.1 Technical reports supporting this assessment

Technical assessment	Work undertaken to inform the PEIR (2018)	Work to be undertaken to complete the Environmental Statement (ES)
Hydrogeological Impact Assessment (HIA)	Revised HIA which takes into account the initial PEIR (2017) responses and further consultation with the Environment Agency (EA) and Southern Water (SW) with regards to the details of mitigation measures and the design/location of the fuel farm (see **Appendix 8.1**).	Finalised assessment taking account of PEIR (2018) consultation comments.
Flood Risk Assessment (FRA) and Drainage Strategy (DS)	Draft FRA (see **Appendix 8.2**). Draft DS (see **Appendix A** of **Appendix 8.2**)	Finalised FRA and Outline DS.
Water Framework Directive Assessment	Assessment of Water Framework Directive (WFD) compliance is contained within the technical chapters.	WFD addendum note, which: - Lists the WFD water bodies screened in for assessment; - Identifies all activities impacting on WFD water bodies; and - Signposts the sections of the ES which address these impacts. In compliance with the Planning Inspectorate (PINS) advice note 18[1].

8.1.4 Constraints on land access mean that no intrusive investigations have been undertaken to inform this application. The scope of any works post-consent will be agreed with the EA, Thanet District Council (TDC) and SW prior to commissioning.

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

[1] *The Planning Inspectorate Advice Note 18: The Water Framework Directive* https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf

requirements that the development scheme needs to consider. A summary of the relevant policy documents is detailed in **Table 8.2**.

Table 8.2 National and local planning policies relevant to the freshwater environment

Policy Reference	Policy Information
National Policies	
Draft Airports National Policy Statement (NPS): new runway capacity and infrastructure at airports in the South East of England 2017	The airports NPS sets out key considerations in relation to potential adverse impacts on flood risk and water quality and resources from airport developments.
Soil Strategy for England 'Safeguarding Our Soils' (Department for Environment, Food and Rural Affairs (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) 2012	The NPPF 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	
Thanet Local Plan 2006 Policy EC2 – Kent International Airport[2]	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.
Thanet Local Plan 2006 Policy EP13 - groundwater protection zones[2]	Development located within groundwater Source Protection Zones (SPZs), 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.
TDC Flood and coastal erosion risk management policy statement[3]	Provides a public statement of the Council's approach to flood and coastal erosion risk management within the district.
Kent County Council (KCC) Drainage and Planning Policy Statement[4]	This policy statement sets out how KCC, as Lead Local Flood Authority (LLFA) and statutory consultee, will review drainage strategies and surface water management provisions associated with applications for major development.
Emerging Local Policies	
Draft Thanet Local Plan Policy SE04 (Ground Water Protection Zones)[5]	Proposals for development within the groundwater SPZs 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 EA to determine their suitability in terms of the impact of any drainage on the groundwater aquifer.

[2] Thanet Local Plan 2006 https://www.thanet.gov.uk/your-services/planning-policy/thanets-current-planning-policy/thanet-local-plan-2006/ [checked 12/12/2017]
[3] Flood and coastal erosion risk management policy statement, 2013 https://www.thanet.gov.uk/media/3597307/Thanet-DC-Flood-and-Coastal-Erosion-Risk-Management-Policy-Statement-September-2013.pdf [checked 12/12/2017]
[4] Drainage and Planning Policy Statement, KCC, 2017 https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies/drainage-and-planning-policy-statement [checked 12/12/2017]
[5] Draft Thanet Local Plan to 2031 Preferred Options Consultation, TDC, 2015 https://www.thanet.gov.uk/media/3432043/Final-Thanet-Preferred-Option-Draft-Local-Plan-Inovem-Inc-Appendices-with-cover.pdf [checked 12/12/2017]

8.2.2 The policies above have been taken into account in the assessment in **Sections 8.8 - 8.12**, alongside the legislative requirements below. Full details of all national and local planning policies relevant to the Proposed Development can be found in **Appendix 4.1**.

Legislative requirements

8.2.3 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 Environmental Permitting (England and Wales) Regulations (EPR) 2010 together with subsequent amendments[6];
- Floods and Water Management Act 2010[7];
- The Town and Country Planning (Environmental Impact Assessment) Regulations 2017[8];
- The European Union (EU) Floods Directive (2007/60/EC), as enacted into domestic law by the Flood Risk Regulations 2009[9];
- Environmental Quality Standards Directive (2008/105/EC), as enacted into domestic law by The Environmental Permitting (England and Wales) Regulations 2016[10];
- The EU Water Framework Directive (2000/60/EC) (WFD), as enacted into domestic law by the:
  - The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015[11],
  - The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[12];
- Water Act 2003[13];
- Environment Act 1995[14];
- Land Drainage Act 1991[15];
- Water Resources Act, 1991[16];
- Environmental Protection Act 1990[17]; and

[6] The Environmental Permitting (England and Wales) Regulations (EPR) 2010 together with subsequent amendments. Available online at https://www.legislation.gov.uk/ukdsi/2010/9780111491423/contents [checked 12/12/2017]
[7] Floods and Water Management Act 2010 https://www.legislation.gov.uk/ukpga/2010/29/contents [checked 12/12/2017]
[8] http://www.legislation.gov.uk/uksi/2017/571/pdfs/uksi_20170571_en.pdf
[9] The Flood Risk Regulations, 2009 http://www.legislation.gov.uk/uksi/2009/3042/contents/made [checked 12/12/2017]
[10] http://www.legislation.gov.uk/uksi/2016/1154/contents/made
[11] The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. Available online at http://www.legislation.gov.uk/uksi/2015/1623/pdfs/uksiod_20151623_en_auto.pdf [checked 12/12/2017]
[12]The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available online at https://www.legislation.gov.uk/uksi/2017/407/contents/made [checked 12/12/2017]
[13] Water Act 2003 https://www.legislation.gov.uk/ukpga/2003/37/contents [checked 12/12/2017]
[14] Environment Act 1995 https://www.legislation.gov.uk/ukpga/1995/25/contents [checked 12/12/2017]
[15] Land Drainage Act 1991 https://www.legislation.gov.uk/ukpga/1991/59/contents [checked 12/12/2017]
[16] Water Resources Act, 1991 https://www.legislation.gov.uk/ukpga/1991/57/contents [checked 12/12/2017]
[17] Environmental Protection Act 1990 http://www.legislation.gov.uk/ukpga/1990/43/contents [checked 12/12/2017]

- Control of Pollution Act 1974[18].

Guidance and strategies

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

- Pollution Prevention Guidance Notes (PPG)[19,20];
- The EA's approach to groundwater protection, March 2017 Version 1.0[21], and its predecessor Groundwater Protection: Principles and Practice (GP3). EA, August 2013 version 1.1[22];
- CIRIA Report C532: Control of water pollution from construction sites;
- CIRIA Report C649: Control of water pollution from linear construction projects – site guide;
- CIRIA Report C692: Environmental good practice on site (third edition);
- CIRIA Report C698: Site handbook for the construction of Sustainable Urban Drainage Systems (SuDS);
- CIRIA Report C753: The SuDS manual;
- Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: Guidance on pollution prevention, EA, May 2001[23]; and
- Piling into contaminated sites, EA[24].

8.2.5 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 the following:

- Preliminary Flood Risk Assessment (KCC, 2011)[25];
- Thanet Stage 1 Surface Water Management Plan (KCC, 2013)[26];

[18] Control of Pollution Act 1974 https://www.legislation.gov.uk/ukpga/1974/40 [checked 12/12/2017]
[19] Pollution Prevention Guidance notes (2014) EA. Available online at http://webarchive.nationalarchives.gov.uk/20140328090931/http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx [Checked 04/12/17].
[20] The PPG notes were withdrawn by the EA in December 2015. This was because the EA 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.
[21] The Environment Agency's approach to groundwater protection, March 2017 Version 1.0 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/658135/LIT_7660.pdf [checked 12/12/2017]
[22] Groundwater Protection: Principles and Practice (GP3). EA, August 2013 version 1.1 https://www.gov.uk/government/publications/groundwater-protection-principles-and-practice-gp3 [checked 12/12/2017]
[23] http://webarchive.nationalarchives.gov.uk/20140329082415/http://cdn.environment-agency.gov.uk/scho0501bitt-e-e.pdf
[24] http://webarchive.nationalarchives.gov.uk/20140329082414/http://cdn.environment-agency.gov.uk/scho0202bisw-e-e.pdf
[25] Preliminary Flood Risk Assessment (Kent County Council (KCC), 2011) https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies/preliminary-flood-risk-assesment [checked 12/12/2017]
[26] Thanet Stage 1 Surface Water Management Plan (KCC, 2013) https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies/surface-water-management-plans/thanet-surface-water-management-plan [checked 12/12/2017]

- Flood Risk to Communities: Thanet (KCC, 2017)[27];
- Strategic Flood Risk Assessment (TDC, 2009)[28];
- Thanet District Council Local Plan Core Strategy (TDC, 2017)[29];
- River Stour Catchment Flood Management Plan (EA, 2009)[30];
- Stour Abstraction Licensing Strategy (EA, February 2013)[31]; and
- South East River Basin District River Basin Management Plan (EA, February 2016)[32].

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** with respect to the site and its surrounding area.

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
Climate	Meteorological Office (Met. Office) http://www.metoffice.gov.uk/public/weather/climate
Water Quality	EA http://www.environment-agency.gov.uk/maps/ EA http://environment.data.gov.uk/catchment-planning/
Flood Risk	EA 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 FRA (Entec, 2009).
Hydrogeology	EA 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

[27] Flood Risk to Communities: Thanet (KCC, 2017) https://www.kent.gov.uk/__data/assets/pdf_file/0011/71669/Flood-risk-to-communities-in-Thanet.pdf [checked 12/12/2017]
[28] https://www.thanet.gov.uk/your-services/planning-policy/evidence-base/strategic-flood-risk-assessment/
[29] https://www.thanet.gov.uk/your-services/planning-policy/thanets-new-local-plan/local-plan/
[30] https://www.gov.uk/government/publications/stour-catchment-flood-management-plan
[31] https://www.gov.uk/government/publications/stour-catchment-abstraction-licensing-strategy
[32] https://www.gov.uk/government/publications/south-east-river-basin-district-river-basin-management-plan

Topic	Source of Information
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 private water supply records EA 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) Site Improvement Plan (SIP) (Natural England, 2014).
Site Drainage	RPS, 2017, Masterplan Drawings (**Chapter 3 Figures**)

8.3.2 The study area can be seen on **Figure 8.1** and has been defined as follows:

- The WFD surface waterbodies[33] that receive drainage from the site; and
- The WFD groundwater bodies that underlie the site.

8.3.3 Defined in this way, the study area includes any dependent groundwater abstractions within 1km of the site. The rational for this distance is that if effects can be shown to be mitigated within this radius of the development, then it can be inferred that more distant dependent abstractions will also be protected. This radius includes all hydrologically connected public water supply (PWS) abstractions.

Desk study

8.3.4 A desk study has been undertaken to establish the baseline environment within the study area, using the sources outlined in **Table 8.3**. This has been supported by the production of a draft HIA (**Appendix 8.1**) that provides a comprehensive picture of the hydrogeological baseline environment.

Survey work

8.3.5 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.

8.3.6 No intrusive investigations have been undertaken on site due to land access constraints; further details see **Chapter 10** (**Table 10.4**). Such investigations are expected to form a Development Consent Order (DCO) requirement, and the scope of any works will be agreed with the EA, TDC and SW prior to commissioning.

Consultation

8.3.7 Since 2015 and throughout the undertaking of the walkover surveys and preliminary assessment work, RiverOak Strategic Partners (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 then provided a

[33] Under the WFD, the EA has produced nine River Basin Management Plans (RBMPs) 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 water bodies, and assessed the ecological and chemical status of each water body and identified where status improvements were required to meet WFD targets.

scoping opinion (**Appendix 1.2**). A summary of the Secretary of State's (SoS) comments is provided in **Table 8.4** below, together with a response to identify how the matter is dealt with in this report.

Table 8.4 Issues raised in the SoS scoping opinion

Comments and considerations	How addressed in this PEIR (2018)
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.
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 SW.	A draft HIA (**Appendix 8.1**), prepared in line with "The Environment Agency's approach to Groundwater Protection", has been produced to accompany the PEIR; the EA report has replaced GP3 (see **Section 8.2**). The HIA has been produced in discussion with the EA and SW. No intrusive works will be undertaken prior to submission of the DCO. It is expected that these will form a DCO requirement, and the scope of any works will be agreed with the EA, TDC and SW prior to commissioning.
The effect of the proposals on the objectives of the WFD, as set out in the South East River Basin Management Plan (RBMP), should be assessed.	A WFD addendum note will be produced for the ES, which: - Lists the WFD water bodies screened in for assessment - Identifies all activities impacting on WFD waterbodies - Signposts the sections of the ES which address these impacts. This note will be in compliance with the guidance PINS advice note 18[34]. In this PEIR (2018) the baseline WFD environment has been established and likely effects on WFD receptors have been identified, as well as appropriate draft mitigation measures.
The FRA should be developed in consultation with the EA and the LLFA, in this case KCC.	An NPPF-compliant draft FRA (**Appendix 8.2**) has been produced, the scope of which has been agreed with KCC and EA.
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 SW for proposed drainage attenuation ponds.	A draft site drainage plan (**Appendix 8.2**) has been submitted with the second issue of the PEIR, the premise of which has been discussed with the EA, TDC, KCC and SW.
Mitigation measures should be addressed and the SoS 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. Ongoing monitoring should also be addressed and agreed with the relevant authorities to ensure that any mitigation measures are effective.	Draft mitigation and monitoring measures of this type have been detailed in this document.
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 SoS 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.

[34] *The Planning Inspectorate Advice Note 18: The Water Framework Directive* https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf

8.3.1 Following receipt of the scoping opinion, the 2017 PEIR was prepared and submitted to PINS, who then provided a Section 42 consultation response. A summary of the relevant consultee comments is provided in **Table 8.5** below, together with a response to identify how the matter is dealt with in this report.

Table 8.5 Section 42 consultation responses

Consultee	Comments and considerations	How addressed in this PEIR (2018)
EA	Any objection on the grounds of inappropriate use in SPZ1 for a PWS may carry limited weight in planning terms. We would therefore seek to work with applicants to ensure maximum environmental controls are in place for any agreed return to airport use.	**Table 8.6** contains a summary of all conversations with the EA on this issue, and the HIA (**Appendix 8.1**) contains the agreed mitigation measures. **Appendix 2.1** contains more information on fuel farm design.
	We would want to agree in advance the scope and location of any new site investigation activity. We would suggest some further site investigation and assessment may be required for key hotspots, i.e. fuel tanks to support the full DCO submission. At the very least, a full summary of all existing ground investigation information should be drawn together and interpreted appropriately.	The applicant will agree the scope and location of any such works with the EA and SW prior to commencement. This is expected to form a DCO requirement. **Chapter 10** contains a summary of all prior ground investigations.
	To protect the underlying adit system and SPZ1, we would seek the bulk of existing runway and taxiways to be kept and not dismantled.	The bulk of the existing runways and taxiways will be kept. The paved area is considered to present a Foreign Object Debris (FOD) hazard, however the EA's concerns about removal have been noted. In order to mitigate against any potential FOD hazard, it is proposed to overlay the extended paved area with asphalt as part of the initial construction phase. Further detail on this issue can be found in **Chapter 3, Section 3.3**.
	We would need to see a full options appraisal for any fuel depot location and agree full designs and containment processes for any agreed location.	This has been included in **Appendix 2.1**. The options appraisal has been discussed with the EA (see **Table 8.6**)
	A full Construction Environmental Management Plan (CEMP) will need to be agreed with us for all phases of works. Operational pollution prevention plans would also need to be agreed and should consider best practice and also available innovative measures for spillage management. We can discuss this further with the applicant, but for fire safety and hydrocarbon contaminant control we note there are new products available as well as traditionally used measures.	A draft CEMP will be appended to the ES.
	Drainage management of cargo, heavy goods vehicle (HGV) transit areas and car parking would need positive safe drainage to manage pollution risks. Early indications are that this can be achieved by outline proposals. They would need to be agreed in full at some point if development is to progress.	The proposed DS is in **Appendix 8.2**, and includes proposals for positive safe drainage to manage pollution incidents.
	Proposals for storage of any materials for firefighting will need agreement with us and particular materials may not be approved if there is a risk of loss to ground of some types firefighting foams for instance.	Plans for the storage of any materials for firefighting will be agreed with the EA. This is expected to form a DCO requirement.

Consultee	Comments and considerations	How addressed in this PEIR (2018)
	The Proposed Development will be acceptable if the measures detailed in the Environmental Impact Assessment (EIA) submitted with this application are implemented, specifically: • Measures taken to prevent contaminants entering the surface water system (including, but not limited to, sediment, fuel, oil, building aggregates); • Hazardous liquid stored further than 10m from any surface waters or surface water gullies during the construction phase; • If there are concerns over potential impacts on the environment; works are halted and we are consulted immediately; • We are consulted on any changes to the design of the surface water system; and • We are consulted to ensure that the water quality discharge is varied in accordance with current design proposals.	Measures for the protection of controlled waters from the mobilisation of contaminants can be found in **Chapter 10**. Hazardous liquid will be stored further than 10m from any surface water or gullies. This measure will be included in the CEMP and the operational phase Environmental Management Plan (EMP). The CEMP and Code of Construction Practise (CoCP) will include measures for the monitoring of the water environment and procedures for stopping work and consulting with the EA if any pollution incidents are observed. The EA will be consulted on the final design of the surface drainage system. This is expected to form a DCO requirement. A water discharge activities permit under EPR for the regulation of the quality of the discharge of waters to Pegwell Bay will be applied for. This is expected to form a DCO requirement.
	We recommend that: • Personnel are trained on the use of spill kits where applicable, and other mitigation measures are outlined in the spill response plan; • Penstock valves (existing or new) are considered during the design phase of the surface water system, and relevant personnel trained in the use of the emergency system; • A review of the use of any pesticides on the grassed areas is undertaken to prevent pollution to groundwater or run-off in to surface water drains; and • Outfalls to surface waters are monitored regularly during the construction phase and works halted if pollution is observed.	These measures will be put in place and included in the CEMP, CoCP and EMP. These documents will be agreed with the EA prior to construction and operation. This is expected to form a DCO requirement.
	All foul drainage will need agreement, and any decommissioned existing drains should be removed to ensure they do not offer pathways for contaminant transport into the ground.	This agreement with be sought from SW, and initial discussion has already taken place along these lines. Measures for the protection of controlled waters from the mobilisation of contaminants through intrusive works can be found in **Chapter 10.**
	Any construction that requires piling would need to agree piling designs with us based on a risk assessment carried out in accordance with our guidance.	The approach to any on-site piling will be agreed with SW and the EA 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 Contamination: Guidance on pollution prevention[35]" and "Piling into contaminated sites"[36].

[35] Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: Guidance on pollution prevention, EA, 2001 http://webarchive.nationalarchives.gov.uk/20140329082415/http://cdn.environment-agency.gov.uk/scho0501bitt-e-e.pdf [checked 12/12/2017]

[36] Piling into contaminated sites, EA, http://webarchive.nationalarchives.gov.uk/20140329082414/http://cdn.environment-agency.gov.uk/scho0202bisw-e-e.pdf [checked 12/12/2017]

Consultee	Comments and considerations	How addressed in this PEIR (2018)
	We would need to agree the location and configuration of any cement or asphalt batching plant during construction activities, this should be as far from the SPZ1 area as possible and designed to ensure all drainage is positively controlled.	This approach is agreed and the location/configuration of the plant will be agreed with the EA. This is expected to form a DCO requirement.
	Any new taxiway drainage will have to tie in to positive drainage controls, to guard against accidental spillages on the taxiway.	This approach is agreed and the final site drainage plan will be signed off by the EA prior to construction. This is expected to form a DCO requirement.
Natural England	Chapter 8 – Freshwater Environment 8.10.1 – We note the intention for all site discharge in Construction Phase 1 to be contained on site and discharged to the site sewer network, following treatment by siltbusters or similar, or taken off-site. We understand that further details will come in the CEMP but would appreciate some more clarity at this stage as to what this proposal actually means. Does this mean that during the initial construction phase there will be no discharge from the airport down to the designated sites at Pegwell Bay?	Further details on construction phase drainage will be provided with the ES. The construction drainage arrangements will change through phases 1-4. All drainage arrangements which include Pegwelll Bay will be discussed with NE and the EA prior to the commencement of works.
	8.10.2 – We note that for all subsequent construction phases the intention is to discharge to Pegwell Bay once silt and any other potential pollutants (e.g. hydrocarbons) have been removed, and would welcome further detail on exactly how this will be achieved.	Measures will comprise construction best practise and will be regulated by an Environmental Permit from the EA. Further details will be included in the draft CEMP that will accompany the ES.
	Natural England accepts that the most likely discharge option during the operation of the airport would be via the existing outfall at Pegwell Bay, and that the EA is the primary regulator for you to work with on this. However, given the multiple designations at Pegwell we would welcome ongoing oversight and potential input into the site drainage strategy. We maintain the position that we would not wish to see any reduction in the quality of this discharge from what was previously permitted.	A draft version of the site drainage strategy has been submitted with this PEIR for comment. The quality of the discharge water's will be agreed with the EA and NE prior to the commencement of works, these will be of sufficient quality to ensure no adverse effect at Pegwell Bay.
KCC	[The PEIR (2017)] **Table 8.1** indicates that a Hydrogeological Risk Assessment [HRA, otherwise known as the HIA], FRA and DS will all be produced to inform the forthcoming ES. KCC, as LLFA, would welcome the opportunity to engage with the applicant's consultants at the earliest possible stage of their preparatory works to ensure its requirements and recommendations are fully incorporated into the final DS.	Agreed. The site drainage proposals have been shared with KCC. See **Table 8.9**.
TDC	It is noted that a CEMP is to be submitted as part of a DCO to reduce effects of pollution from the construction phase. The CEMP must be informed by the findings of intrusive investigation works. Please note that any works must be carried out in a strictly controlled manner to ensure that contaminants are not exposed and releases allowed to air, land or controlled waters, which could cause pollution.	No intrusive works will be undertaken prior to DCO submission. However, the CEMP will be informed by these intrusive works prior to the construction phase. This is expected to form a DCO requirement.
Public Health England	We request that the proposer works with the EA to consider the possible releases to water, possible exposure pathways and potential risks to public health. A suitable summary of these risk assessments, and if necessary, control measures should be included in the final DCO application.	Agreed, the EA has been engaged in the manner. Draft risk assessment can be found in the HIA (**Appendix 8.1**) and **Chapter 10**.
	The submitted documentation indicates that though there are no PWS abstractions located within the site boundary, a number of people and organisations abstract water from groundwater or ponds/lakes up to 1km outside the site	Noted.

Consultee	Comments and considerations	How addressed in this PEIR (2018)
	boundary (six located within 500m, and a further three up to 1km from the site boundary). The abstractions are for private water undertaking, PWS and agriculture.	

8.3.2 In addition to this formal scoping consultation, informal consultations have been held with the EA, SW, TDC and KCC to establish the scope of the assessment. These have comprised the meetings summarised in **Table's 8.6-8.9** respectively.

Table 8.6 Summary of meetings with the EA

Date of meeting	Key points of discussion
11th 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 not known 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 EA receives 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 the discharge would need to be permitted and water quality considered in the DS. The EA 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 where there is fuel. Sustainable Drainage Systems (SuDS) would need careful consideration and are best outside SPZ1.[37] **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.[38] The EA and SW hold water quality monitoring data from boreholes around the site which should be requested. The closest SW source is 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 Western Adit[39] associated with the area of SPZ1 under the runway is thought to be at about 0 m above Ordnance Datum (mAOD), so approximately 40m - 50m below ground level (mbgl). It is unknown if there are additional shafts associated with it. The SPZ delineation is very basic (50m circle) so the EA considers that the SPZ1 could potentially be larger. Further consultation with SW 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 feeding the Lord of the Manor[40] 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 that an accurate conceptual model (source, pathway, receptors) is established. However, the EA would need to understand the distribution of contaminants across the site so that future work didn't

[37] SPZ1 is defined as the zone around a groundwater abstraction in which contaminants have a 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 m.
[38] Further information on ground contamination can be found in **Chapter 10: Land Quality** of this PEIR.
[39] The Western adit is a horizontal passage leading into the Lord of the Manor groundwater abstraction to increase flow to the source.
[40] The Lord of the Manor source is the SW borehole in close proximity to the site. Further details are given the baseline description.

Date of meeting	Key points of discussion
	result in their mobilisation. The EA would not want to see intrusive works near the adit or within SPZ1, and acknowledges the desire of SW 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 south east 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 EA stated that it 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 EA is happy with the construction of ponds for water attenuation and treatment, prior to discharge to Pegwell Bay, however, it stated the following caveats: • Ponds would need to be properly constructed with sufficient operational control measures; • Need to ensure that the '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 EA 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, and 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 EA welcomed this approach. **Local sewer network**: The EA 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 that will be submitted as a part of the DCO. **Discharge Permit**: The EA 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 EA indicated that it was likely that a discharge permit would be required to regulate the Pegwell Bay Discharge. The EA 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 EA indicated that this would need to be discussed with TDC and KCC 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.

Date of meeting	Key points of discussion
	Hydrogeological Conceptual Model: SW and Amec Foster Wheeler (working for SW) have undertaken a lot of work on a conceptual model for the site. SW has 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 EA accepted that the SW information represented the best information available and that they would not expect additional information to be collected. **HRA**: The HRA (HIA) 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 SW. The EA requested that the Land Quality Phase 1 and the HRA are linked and cross-referenced where appropriate. **Nitrate in groundwater**: The EA stated that Thanet is a priority area for groundwater, with the main issue being nitrates. Therefore, the EA has 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 EA would therefore seek to similarly engage with the operators of Manston Airport. **Embedded mitigation measures**: The Proposed Development 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 EA would be involved in their design. The EA requested that there is a condition that all documents are 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 FRA and DS 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 is 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 EA has 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 EA groundwater protection policies (published 14th March 2017) state that the EA will not support any 'new' bulk fuel storage in SPZ1. It was noted that the site is only partly within SPZ1. The EA 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 the Local Authority.
16th May 2017	**Thanet Chalk**: The Chalk on Thanet is highly sensitive due to the lack of alternative water resources. The EA 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, then that would give the EA additional powers to enforce pollution prevention measures. **Fuel Farm**: The EA would like to see within the ES 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, the EA requires that the location of the fuel farm is justified and it is demonstrated that all alternatives have been explored. The EA will 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 EA 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 EA reiterated a point from previous meetings, that it expects 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 a previous meeting, the EA is not happy with any drainage to ground or the use of soakaways on the site. The EA is happy with discharge to the sea, but is not sure of the exact permitting position because some of the discharge will be treated. There are unlikely to be volume constraints.
15th September 2017	**Fuel Farm Location**: Six options for the fuel farm, including an off-site location as requested by the EA, were identified and assessed against the fuel farm requirements. This was a qualitative assessment, and the full details will form part of the ES to accompany the DCO. In summary, the option for a new fuel farm on the Jentex site performs best of all of the options.

Date of meeting	Key points of discussion
	Fuel Farm Design: The design has been produced to meet operational requirements for fuel storage and delivery, but also to address environmental and safety and risk considerations as identified in the HIA. This includes measures such as: • New double-skinned tanks within a new dedicated impermeable bund, sealed drainage, interceptor and anti-pollution control valve, and parking for airside bowser fleet; • The tanker unloading and bowser refuelling areas will also be bunded, and will have a sealed drainage system with no gravity discharge route to the site outfall; and • The tanks would be located at the western end of the Jentex and would be within SPZ2, and as far from SPZ1 as possible on the Jentex site. The fuel farm would be south of the Western Adit. These measures will also be incorporated onto the parking areas and internal access roads, which will all be connected to the drainage system. The EA acknowledged that the design has moved the fuel farm outside of SPZ1 but stated that the design of the fuel farm should include innovative solutions that go-beyond BAT. Examples would include hydrophobic materials, underlying substrate filter drains, monitors beneath the bunds, and bowser parking areas. The EA gave some examples of companies working in Kent who had developed innovative design solutions. **Hydrogeological Impact Assessment update**: Additional modelling has been undertaken since the first issue of the PEIR (2017) to look at the risk to the adit from an incident at a fuel farm located at the Jentex site. The model used was the EA East Kent Groundwater Model, with the adit represented as a series of "pumping" wells. The pumping rate was the recent accrual pump rate of 3.5 Ml/d (license value is 11.2 Ml/d and SW has estimated the Peak deployable output of 5.2 Ml/d and minimum of 2.81 Ml/d). The model results have shown that: • The majority of the water entering the Western Adit comes from the north; • Flow beneath fuel farm is both to the north (adit) and south (coast); • Groundwater flowing north is a small (0.05%) proportion of the water pumped out of the adit; • Travel times are long; and • The zone of stagnation, the point where flow stops flowing north, is close to the fuel farm. The EA requested that additional model analysis to confirm any eastward movement will be undertaken. The EA stated that it would require some groundwater monitoring, and the location of this monitoring would be dependent on the final design of the fuel farm. **Potential for runway removal**: The Civil Aviation Authority (CAA) may require the removal of redundant taxiway/runways for operational and safety reasons. The EA noted that the EA and SW have both previously stated that they would not want material above the adit and within SPZ1 to be removed if can be left in-situ. Concerns include: • Depth of material above adit is unknown, it is also seen to provide some protection to the adit; • Details of the removal process are unknown, it may result in turbidity in the adit; and • It is not known what, if any, contaminants may be within or below the surface which may be mobilised by the construction. Therefore, the EA would object any removal of the existing taxiway/runway within SPZ1 without more details of proposed techniques and further site investigation works. **DS Update**: The drainage system will be designed so that there would be no off site flooding for a 1% Annual Exceedance Probability (AEP) event with a 40% climate change allowance (scenario agreed with KCC as LLFA). All surface water will be captured, attenuated within two ponds, treated and then discharged to Pegwell Bay via an existing pump and outfall. The discharge rate will be limited to a pump rate of 30 l/s. The EA stated that SuDS could be considered in some areas for roof water, for example on the 'Northern Grass' area. Different treatment methods will be considered, such as light liquid separator, activated sludge aeration tank and/or forced bed aeration, to treat pollutants which will include exhaust fumes, fuel and lubricant spillages, and de-icing and washing agents. The EA asked for an opportunity to review and comment on the types of de-icer to be used, so that where possible lower risk alternatives can be used. **Discharge Permit to Pegwell Bay**: The EA stated that as the discharge to Pegwell Bay would be surface water, then it would not normally require a discharge permit. A possible solution would for a discharge permit to control the quality of the discharge from the contaminated pond to the clean pond. **Condition of the discharge pipe to Pegwell Bay**: The EA asked about the condition of the pipe. The pipe is in good condition, and therefore only limited works are expected to be needed. However, if required a new pumping station would be installed and redundant infrastructure removed as part of the project. The ownership of the pipeline will be part of the DCO process, currently it is not clear who is responsible for the pipeline.

Date of meeting	Key points of discussion
	Removal of sewers and drainage systems: There is no specific EA guidance, but the EA stated that techniques such as blocking with concrete would be considered as appropriate.

Table 8.7 Summary of meetings with SW

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 SW would require mitigation measures which minimise the use of, or target the interception of TCE's. SW is not concerned about changes to aquifer recharge rate due to new airport concrete infrastructure. **Site Drainage**: The site is private so SW 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. SW'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 SPZ 1 and SPZ 2 and as far as practically possible away from the adit. **Water Use:** SW 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. SW 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 SW is around the construction activities, for example deep piling. Any foundations should be designed to avoid deep piling where possible, SW will 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, SW 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. SW 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.
22nd February 2017	**Site Drainage**: SW 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**: SW 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.

Date of Meeting	Key points of discussion
	If any piling is to be used methods must be used to minimise ground disturbance. **Site Investigations**: SW 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.

Table 8.8 Summary of meetings with TDC

Date of Meeting	Key points of discussion
5th July 2017	**Approach to Assessment:** The assessment is primarily concerned with the importance of the Chalk Thanet aquifer which underlies much of the site. The EIA and design teams are working closely to ensure that the design and operation of the airport is updated and that modern best practice and procedures are implemented. **Protection of Groundwater quality:** There will be no discharge to ground on site, this has been requested by SW, and the existing surface water discharge to Pegwell Bay will be used. Surveys have indicated that this is in a good condition and that with some minor works it will be suitable. SW have indicated that its main concerns are effects to the Thanet aquifer and the Lord of the Manor borehole and adit (that runs under the runway) from turbidity, nitrates and hydrocarbons. • Turbidity will result from any construction works (e.g. pilling) on or near the adit, these will be minimised and managed. • Nitrates can result from poor sewerage and drainage, so those on site will upgraded as part of the project. The location and design of the airport fuel farm, as well as the re-fuelling of aircraft, is being managed and designed in order to reduce risks from hydrocarbons. This is taking BAT and current EA guidance and advice into consideration. The fuel farm studies also include a site selection/options appraisal and a safety and risk assessment (including risks to environment). The fuel farm will be on the former Jentex site, but the facility will be new.

Table 8-9 Summary of meetings with KCC

Date of Meeting	Key points of discussion
30th August 2017	The outline DS (submitted with the PEIR (2017)) was discussed. **Following this meeting KCC issued a response regarding the Outline DS (for full details see Appendix 8.2). This response has been summarised below.** **Outline DS**: KCC provide no specific direction as to the form of the drainage measures that should be included within the drainage design, but would encourage consideration of the policies as stated within the KCC Drainage and Planning Policy Statement. It is noted that as the development is an airport operation there may be specific requirements which override the policy statement. KCC would encourage full consideration of sustainable drainage measures, given the water quality benefits that may be provided. **Discharge to Pegwell Bay**: Design will be undertaken with an assumed pumped discharge rate of 30l/s and outfall sewer line diameter of 900mm. KCC agreed that utilisation of the Pegwell Bay Outfall was appropriate. KCC noted that this discharge destination in its own right will not require attenuation, but in relation to pump operation and water quality treatment storage for water will be

Date of Meeting	Key points of discussion
	required. Any detailed submission will be expected to be supported by a condition survey of the outfall pipe. **Discharge to ground**: KCC noted that there should be no expectation of discharge to ground due to potential contamination issues and underlying geology. **Drainage system design:** KCC noted the following: • The volume of the attenuation basins may depend more on treatment requirements and timing of storm events with respect to pump operations; • Additional design requirements for the ponds may be specified by firefighting requirements. KCC will take direction from other authorities with respect to any additional considerations e.g. underground tanks rather than surface features; • Surface water catchment areas should be delineated. Not all drainage catchments will require treatment e.g. roof areas. Separation of 'clean' from 'dirty' areas should be provided as much as possible/feasible; • A reduction of impermeable areas is considered as much as possible, not given drainage network constraints but given the additional water quality treatment that will be required. • Consideration should be given to the inclusion of permeable pavements, even if lined, to provide for treatment and reduce any additional attenuation volumes which may be required. This may be applicable to areas outside of aviation operations; • KCC's Drainage and Planning Policy Statement with respect to drainage design criteria, and in particular: no surcharge for 1 in 30 year rainfall events, allowance of above ground flooding for 1% AEP rainfall event, although any surface water must remain within the site and not flood any property; and • Design must allow for 20% climate change but assess sensitivity of the system to 40% allowance.

8.4 Overall freshwater environment baseline

Current baseline

Topography and climate

8.4.1 The Manston Airport site[41] is on relatively high ground, mainly at an elevation between 45-50 mAOD. 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 westernmost corner of the site. North of the runway the site level declines to approximately 40mAOD in the west, at the Spitfire Way Junction (crossroads of the Manston Road (B2050) and Spitfire Way (B2190) carriageways), forming the start of the headwater valley for the Brooksend Stream, while remaining at 45-50mAOD in the northernmost part of the site. The site red line boundary (RLB) also encompasses the line of the buried pipeline to Pegwell Bay, which extends from the southern portion of the site at about 50mAOD to the outfall point in Pegwell Bay.

8.4.2 The average annual rainfall recorded at Manston between 1981 and 2010 was 592.5mm (Source: Met Office, see **Table 8.3**).

Surface watercourses and other water features

8.4.3 There are no river watercourses on or adjacent to the site (see **Figure 8.1**), partly due to the high permeability of the underlying Chalk. A series of water channels and streams that form part of the Minster Marshes are located more than 1km to the south of the main site. The buried pipeline lies in closer proximity to the north-western extent of this system, but aerial photography indicates that it does not cross any surface water features. Minster Marshes drain south into the River Stour, 3km south of the site, which flows east into Sandwich and Pegwell Bays. Currently runoff from the

[41] Note to reader on terminology. References to the Manston Airport site should be taken to refer to the airport site, excluding that part of the Red Line Boundary (RLB) which covers the buried pipeline. Where the reference includes the full RLB this has been made clear in the text.

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.

8.4.4 Ordnance Survey (OS) mapping indicates a drainage channel on the opposite side of the road at the northernmost 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 westernmost boundary of the site. A covered reservoir is located approximately 0.5km north of the site, and one further uncovered reservoir located 0.3km from the southern boundary.

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

Soils and land use

8.4.7 The LANDIS soils database (see **Table 8.3**) 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.

8.4.8 Although Manston Airport ceased operation in 2014, the 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.

8.4.9 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

8.4.10 The BGS mapping indicates that the bedrock geology underlying the entire of the site is the upper Newhaven Chalk (previously the Margate Chalk), overlain by the sands and silts of the Thanet Formation just outside 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 Deposits, comprising wind-blown sands with clay and silt, and Made Ground, in the form of fill material with cinders, chalk, and building rubble.

8.4.11 Further detail on the site's underlying geology can be found in **Appendix 8.1** (HIA).

Hydrogeology and groundwater vulnerability

8.4.12 Online EA mapping and discussions with the EA and SW indicates that the Manston Airport site is underlain by a Principal aquifer, associated with the underlying Chalk, which can provide high levels of water storage. This aquifer supports local Public Water Supplies (PWS). The Thanet Formation has been classed as a Secondary A aquifer by the EA. A Secondary A aquifer is defined as a permeable layer capable of supporting water supplies at a local rather than strategic scale.

8.4.13 The Manston Airport site is located entirely within a groundwater SPZ catchment[42]. The inner zone (SPZ1), where risk of contamination from pollution causing activities is greatest, is identified in an area at the eastern end of the site and 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

[42] The Environment Agency have defined 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

site. The remainder of the site falls within the wider SPZ catchment area (SPZ3). These SPZs can be seen on **Figure 2.2** of **Appendix 8.1**.

8.4.14 The entire Manston Airport site is also located within a Safeguard Zone (SGZ)[43] and a groundwater Nitrate Vulnerable Zone (NVZ)[44], as shown on **Figures 2.3** and **2.4** respectively of **Appendix 8.1**.

8.4.15 Further detail on the site's underlying hydrogeology can be found in **Appendix 8.1** (HIA).

Abstractions

8.4.16 There are no licensed abstractions located within the Manston Airport site boundary, but a number of people and organisations are licensed to abstract water from groundwater or ponds/lakes up to 1km outside the main site boundary. The abstractions are for private water undertaking, PWS and agriculture. Abstractions licensed for non-PWS purposes have been taken from the Envirocheck Report[45] and are listed in **Table 8.10**. It is assumed that where no permit end date is provided in the Envirocheck Report that the abstraction is currently operational.

Table 8.10 Licensed abstractions within 1km 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
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

8.4.17 TDC has confirmed that there are no known private water supplies within a 2km radius of the centre of the Manston Airport Site.

8.4.18 There a number of PWS boreholes located in the vicinity of the site, all licensed to SW. These are described in more detail in **Appendix 8.1,** and their locations are shown on **Figure 3.2** of **Appendix 8.1**. The closest abstraction point is the Lord of the Manor source, located to the south west of the site boundary. One of the adits which feeds this source, the so-called Western Adit, lies underneath the runway (see **Figure 3.3** of **Appendix 8.1**). The draft HIA (**Appendix 8.1**) includes the results of work to delineate the catchment of the Lord of the Manor PWS around the site, the results of which can be seen in **Figure 3.4** of **Appendix 8.1**.

[43] 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.
[44] NVZs are areas designated as being at risk from agricultural nitrate pollution. They include about 58% of land in England. DEFRA reviews NVZs every four years to account for changes in water pollution. https://www.gov.uk/guidance/nutrient-management-nitrate-vulnerable-zones
[45] Envirocheck report dated 2016 (reference 82787389_1_1)

8.4.19 The 2013 River Stour Abstraction Licensing Strategy (ALS)[46] 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

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

- A discharge consent held by the Modern Jet Support Centre Ltd, which discharged site drainage to land, and was revoked in 2004; and
- 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 EA (detailed in **Table 8.6**) have indicated that it is understood that this discharge consent was never live due to the change in site owner.

8.4.21 There are a further ten permitted discharges identified up to 500m outside the RLB, and a further nine located up to 1km from the RLB. 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[47], then the discharge is currently operational. Consequently, ten of the permitted discharges (identified in **Table 8.11**) are assumed to be currently operational.

Table 8.11 Discharges within 1km 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
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

[46] Environment Agency (2013) Stour Abstraction Licensing Strategy.
[47] Envirocheck report dated 2016 (reference 82787389_1_1)

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

Flood risk

8.4.22 EA 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% (1 in 1000) chance of flooding occurring each year). The nearest flood risk is coastal flooding associated with Pegwell Bay, located approximately 2km south east of the site. There is no risk of flooding to the site from reservoirs.

8.4.23 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.

8.4.24 Groundwater within the Thanet District is not identified to be of strategic concern, but a Strategic Flood Risk Assessment (SFRA)[48] completed for TDC recommended that flooding from groundwater, surface water and foul water drainage networks are considered at a 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.

8.4.25 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.

8.4.26 Further detail on the sources of flood risk to the site can be found in **Appendix 8.2**.

Site drainage

8.4.27 The site has a significant north - south fall, with the runway at the site's highpoint. The main site outfall is at the south-eastern site boundary, and comprises 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 being investigated by RiverOak, although it is considered at this stage to be a private airport sewer.

8.4.28 An existing pumping station is located adjacent to the passenger apron. This supplies a 300mm diameter pipe that runs along the site's western boundary and enters into a gravity system around the runway threshold. This then runs along the sites southern edge before discharging into the outfall to Pegwell Bay.

8.4.29 The condition of the pipe and outfall in Pegwell Bay has been surveyed to support the PEIR application. A survey in April 2017 indicated that the pipe and outfall are in good condition, but that some work may need to be done to repair the scour-protection infrastructure at the discharge end of the pipe. Further detail can be found in the Outline DS (**Appendix A** of **Appendix 8.2**).

WFD classifications

8.4.30 Under the WFD, the EA has produced nine RBMPs 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 water bodies to achieve Good Ecological Status[49] and to ensure no deterioration from current status. The Manston Airport site is located within the South East River Basin District.

[48] Entec (2009) Thanet District Strategic Flood Risk Assessment.

[49] 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

Surface water bodies

8.4.31 The 2009 RBMP water bodies 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 water body. 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 drains direct to Minnis Bay. No WFD water bodies are formally identified in this area and therefore no 2015 water quality conditions are reported, or objectives documented within the EA Catchment Data Explorer[50]. However, these stretches of water are still protected by legislation (see **Section 8.2**), and can be improved where local actions and assessments deem it to be a priority.

8.4.32 The southern part of the Proposed Development is located within the Monkton and Minster Marshes surface water body (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 8.12** provides the current water quality, objectives and mitigation measures identified for this water body and the downstream River Stour water body (East Kent Coast Operational Catchment). This latter water body encompasses the tidally influenced lower reaches of the Stour, as well as Pegwell Bay. Neither of the two water bodies are currently of good status, although mitigation measures have been identified that will provide improvement from the current status by 2027 for both water bodies.

Table 8.12 Surface water body status, objectives and mitigation (South East RBMP[51])

WFD Water body (Water body type)	2015 Overall Water body 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.	Moderate by 2027	Reduce diffuse pollution at source. Mitigate/remediate diffuse pollution effects on receptor. Mitigate/remediate point source effects on receptor.

[50]Catchment Data Explorer (2017), EA. Available online at http://environment.data.gov.uk/catchment-planning/ [Checked 04/12/17].
[51] South East River Basin District: River Basin Management Plans (2015) Environment Agency. Available online at https://www.gov.uk/government/collections/river-basin-management-plans-2015#south-east-river-basin-district-rbmp:-2015 [Checked 04/12/07].

WFD Water body (Water body type)	2015 Overall Water body status (ecological status)	Reasons for failure to meet Good	Overall Objective	Types of mitigation measures anticipated
		Confirmed Source: Point source pollution from waste water.		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

8.4.33 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 water body is of poor status (as a result of poor status for both quantitative and chemical components), with an overall water body 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 area's Chemical Drinking Water Protected Area (DrWPA) and General Chemical Test. These measures are viewed as unaffordable to implement in advance of 2027 without creating disproportionate burdens for particular sectors or parts of society. Any solution delivering more rapid outcomes would also be at odds with the 'polluter pays' principle.

8.4.34 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 the HIA within **Appendix 8.1.**

Conservation sites

8.4.35 The north coast of the Isle of Thanet, located approximately 3.5 km 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 to the south east. Together these bays are part of designated National Nature Reserve (NNR), RAMSAR, SSSI, SPA and SAC sites, which are described more fully in **Chapter 7** of this report. The proposed Manston Airport development site, due to the proximity of Sandwich and Pegwell Bay SSSI, has been identified as falling within the associated SSSI risk zones[52].

8.4.36 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[53]) 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.

[52] 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.
[53] 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

8.4.37 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

8.4.38 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.

8.4.39 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 Projections 2009 (UKCP09)[54]. 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.

8.4.40 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.

8.4.41 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

8.4.42 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 and 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; and
- Full operation phase (2036 onwards): climate change will cause further variation from baseline climatic patterns.

8.5 Environmental measures incorporated into the Project

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 8.13** (construction phase) and **Table 8.14** (operation phase). A more exhaustive discussion of the mitigation measures that are to be deployed for the protection of the baseline water environment is presented in the HIA (**Appendix 8.1, Section 4.4.3**).

[54] Environmental good practice on site (Ed.3) (2010) Construction Industry Research & Information Association. Report C692. London: Construction Industry Research & Information Association

Table 8.13 Rationale for incorporation of environmental measures in the construction phase

Potential receptor	Predicated changes and potential effects	Incorporated measure
Surface and groundwater	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 and 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 SW 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 groundwater	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 spill kits, booms, bunding and absorbent material. • The bulk of the existing runways and taxiways will be kept as they afford protection to the adit in SPZ1. In order to mitigate against any potential FOD hazard (a concern raised by the CAA), it is proposed to overlay the extended paved area with asphalt as part of the initial construction phase.
Surface and groundwater	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, and the location and configuration of the plant will be agreed with the EA. • 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 on-site 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.

Potential receptor	Predicated changes and potential effects	Incorporated measure
Groundwater	Piling increasing turbidity of groundwater at the Lord of the Manor source.	• The approach to any on-site piling will be agreed with SW and the EA 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 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 SW. • Discharge rates from the site will not exceed current sewer capacity, and these rates will be agreed with SW to ensure appropriate storage is provided on site during the construction phase.

Table 8.14 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 environment.	• An outline site DS has been developed (see **Chapter 3**). 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 and tankers enters the groundwater environment as a potential pollutant.	The following aspects can be considered within the fuel farm design following BAT principles, but these would be reviewed and revised once the final scheme is agreed with the EA and SW. • Primary containment is around the design of the fuel tanks and associated pipework (materials, thickness); • Secondary containment takes a number of forms. In this case is includes a double skin on a tank; • Bunding also provides a further level of secondary containment, affording containment to pipework and equipment associated with the tank, but outside of the double skin. The appropriate sizing of bunding around the tanks. Guidelines require that the bunding must have the capacity to contain the largest predictable spill. This is achieved by providing the largest of either 110% capacity of the largest tank within the bund or 25% of the total capacity of tanks within the bund. For this tank farm a high level of integrity is embedded in the design, and each tank is located in an individual bund, so that only one tank is

Potential receptor	Predicated changes and potential effects	Incorporated measure
		contained within one bund with 110% of the capacity of the tank plus an allowance for 1:100 rainfall event. Bunds to be constructed with adequate protection against collision and designed in accordance with standards; • Comprehensive areas of hardstanding across the site with an associated active drainage capture system to collect all surface drainage and hence and any leaks; • Containment with sealed drainage systems would be applied to bunds and fuel points, preventing the accidental entry of contaminants into sewer/stormwater drainage network; • Oil interceptors and anti-pollution control valves would be installed to surface water runoff from internal roads; • Systems of leak detection would be established beneath the tanks; • The tank, pipework and loading/unloading would be equipped with shutdown to provide effective isolation. Where required this would include automatic detection and isolation systems (e.g. to protect against overfill of tank) and • Appropriate areas of hardstanding, parking and operational buildings would be constructed for the airside bowser fleet
Groundwater	Spillage during re-fuelling enters the groundwater environment as a potential pollutant.	• 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. • Personnel will be trained in the use of spill kits where applicable, and suitable mitigation measures will be outlined in the spillage Environmental Response Plan.
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 i.e. 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 i.e. 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	• Pesticides will only be applied to hardstanding areas with active drainage to water treatment works.

Potential receptor	Predicated changes and potential effects	Incorporated measure
	environment as a potential pollutant.	• 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 EA. The Water Discharge Activities permit will consider appropriate measures to ensure the protection of the downstream designated sites and discussed with NE prior to the commencement of works.
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 SW 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 SW. • 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 EMP, Emergency Response and 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 with a 40% allowance for climate change. Discharge from these ponds will be via a pipe into Pegwell Bay. The pump will have a maximum capacity of 30l/s. The final site drainage design will be agreed with the EA. • Foul sewer capacity will be appropriately sized in consultation with SW and the EA.

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 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 the incorporation of appropriate environmental measures.

8.5.3 A draft CEMP will be submitted with the ES. The CEMP will detail the mitigation 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 SW, the EA and TDC, as appropriate.

8.6 Scope of the assessment

8.6.1 This section sets out information regarding the process whereby potential 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 the study area outlined in **paragraph 8.3.2**. All receptors associated with this study area have been included in the assessment and are listed in **Table 8.15**.

Potential receptors

8.6.4 This section lists the potential receptors that have been identified based on the above considerations and on the consultation response received from PINS. The receptors listed in **Table 8.15** are considered capable of being potentially significantly affected and will therefore be taken forward for further assessment.

Table 8.15 Potential receptors

Receptor	Receptor reference no.	Distance from RLB	Reason for selection
Kent Isle of Thanet Chalk WFD groundwater body and aquifer	GW1	Underlies the site	The WFD groundwater body and aquifer underlies the site and supports nationally important abstractions.
Thanet Formation Secondary A aquifer	GW2	Adjacent to the site's northern boundary	The designated aquifer lies adjacent to the site boundary and could support locally important abstractions.
SWPWS sources	GW3	<0.5km	The adit which supplies the Southern Water Lord of the Manor Source lies under the site boundary.
Other licensed groundwater abstractions	GW4	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.
Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD transitional water body.	SW1	Underlies the southern portion of the site, around the runway.	The site lies within the boundary of this surface water body.
Pegwell Bay (and associated designated sites)	SW2	Adjacent	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

Receptor	Receptor reference no.	Distance from RLB	Reason for selection
			considered for use in the operation site drainage network.
PWS infrastructure	IN1	On- and off-site	Changes in water demand at the site has the potential to effect water availability in the PWS network.
On- and off-site public sewer network	IN2	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.
Site users & infrastructure	FR1	On site	Site users/infrastructure can be effected by changes to flood risk on the sites, specifically the site's surface water drainage regime and response to surface water flooding.
Off-site users & infrastructure	FR2	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.

Spatial and temporal scope

Spatial Scope

8.6.5 The spatial scope of the assessment has been considered for four sets of receptor categories, based on the **Table 8.15** potential receptor listing:

- Surface water: Surface water receptors have been defined as those which are downstream of the site (SW receptors in **Table 8.15**). Since there is no surface water flowing over the site, surface water receptors are defined as the WFD surface water body which the site lies partially within (SW1), and Pegwell Bay and other designated sites that receive site drainage (SW2);
- Groundwater: Groundwater receptors (GW receptors in **Table 8.15**) have been defined as the Chalk WFD groundwater body and aquifer (GW1) that underlies the site, the Thanet Formation Secondary A Aquifer (GW2) which lies adjacent to the site (GW3 and 4);
- Infrastructure: Infrastructure receptors (IN receptors in **Table 8.15)** are considered to be the on- and off-site public sewer network (IN1) and the water availability in the PWS network (IN2); and
- Flood risk: Flood risk receptors (FR receptors in **Table 8.15)** are considered to be on-site users (FR1) and adjacent off-site users (FR2).

Temporal scope

8.6.6 The temporal scope of assessment has been considered in the following way:

- The Outline DS (**Appendix A** of **Appendix 8.2**) includes a 40% allowance for climate change in designing the volume of on-site storage;
- The assessment of the construction phase effects considers the effects from all four of the construction phases as outlined in **Chapter 3**. Where there are different potential effects from each construction phase, these are outlined and each assessed separately; and

- The assessment of the operation phase effects considers 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**.

Likely significant effects

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

- Potential [adverse] effects on the groundwater quality in the Chalk WFD groundwater body and aquifer (GW1), the Thanet Formation Secondary A Aquifer (GW2), and the dependent abstractions (GW3 and 4) during the construction and operational phases of the Proposed Development. Effects that could arise from these activities include an increase in turbidity of the underlying groundwater, or pollution from the leakages and spillages of oils, fuels or other chemicals.
- Potential [adverse] effects on Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD transitional water body (SW1) during the construction and operational phases of the Proposed Development. Effects that could arise include as a result of site run-off during the construction phase, or from surface water discharges during the operation.
- Potential [adverse] effects on Pegwell Bay (and associated designated sites) (SW2) during the construction and operational phases of the Proposed Development. The effects that could arise include through the proposed use of the existing surface water discharge system, which discharges into Pegwell Bay.
- Potential [adverse] effects on the capacity of the public water supply network (IN1) and public sewer network (IN2) 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 [adverse] effects on flood risk receptors (on and adjacent to the Proposed Development, FR1 and FR2 respectively) during the construction and operational phases of the Proposed Development. Effects could arise as a result of changes to site drainage and discharge.

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 these receptors have been identified taking into account best practice and guidance for construction and operation of Manston Airport. The approach used is consistent with that developed by the Institute of Environmental Management and Assessment (IEMA)[55].

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

[55] 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 8.16** and **8.17** respectively. 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 8.16**. 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 8-16 Definitions of receptor sensitivity

Value/Sensitivity	Criteria	Example
Very High	Water 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 (SAC, SPA, Ramsar), where the designation is based specifically on water features. Strategically important groundwater PWSs. 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	Water environment 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 (SSSI, NNR), where the designation is based specifically on water features. Receptor WFD water body: all relevant WFD elements are currently attaining at least good status/potential. Licensed non-public 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 water features. Receptor WFD water body: all relevant WFD elements are currently attaining a status/potential of moderate or low. Licensed non-public water supply abstractions that are small relative to the available resource, or where raw water quality is not critical e.g. cooling water, spray irrigation. Unlicensed potable water abstractions e.g. private domestic water supplies. 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 that do not support human health, and are	Non-reportable WFD river water bodies, usually coastal catchments with an area of <10km^2 that the EA is not required to monitor, classify or report on. Unlicensed non-potable water abstractions e.g. livestock watering.

Value/Sensitivity	Criteria	Example
	of only limited economic benefit. Features that are resilient to flooding.	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 (pre-mitigation) or residual (post-mitigation) 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. This includes a consideration of the duration and reversibility of the change, and relevant legislation and/or policy standards and guidance. **Table 8.17** provides examples of how various magnitudes of change have been determined with respect to water features.

Table 8.17 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 or failure of water company infrastructure. Change in flood risk resulting in potential loss of life or major damage to property and infrastructure. Measurable 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 or the functioning of water infrastructure. Change in flood risk resulting in potential for moderate damage to property and infrastructure. Measurable 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	Measurable 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 or water company infrastructure. Change in flood risk resulting in potential for minor damage to property and infrastructure. Measurable 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	No measurable 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 or impacts on water company infrastructure.

	affect its use/integrity	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. No measurable decrease in surface water discharge or increase in flood storage from baseline to provide any betterment.

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 8.18**. 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 8-18 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

8.8 Assessment of effects on the WFD groundwater bodies and aquifers and dependent abstractions

Introduction

8.8.1 This assessment of effects on the groundwater receptors (GW1-4) takes account of the environmental measures referenced in **Section 8.5** i.e. it is an assessment of residual (post-mitigation) effects.

Construction phase effects

8.8.2 The construction phase has the potential to be likely 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 groundwaters as a result of sediment mobilisation and ground disturbances; and
- Pollution from the spillages of concrete, oils, fuels or other chemicals.

8.8.3 Further details regarding the hazards associated with the construction phase are provided in the HIA (**Appendix 8.1, Section 4.4.2**).

8.8.4 Phase 1 will have the largest 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 there is still the potential for piling.

8.8.5 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 that will be conducted in construction Phase 1. These investigations and the final design of the foundations will be agreed in advance with the EA and SW. 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.

8.8.6 Environmental measures referenced in **Section 8.5** and the HIA (**Appendix 8.1, Section 4.4.3**) will be included in the site's CEMP. Of most relevance to the effects of construction on groundwater is the minimisation of ground disturbance within SPZ 1 and the agreement of any approaches to piling prior to the commencement of construction. All final construction methods will be confirmed with the EA and SW prior to the commencement of works.

8.8.7 It is concluded that the combination of construction good practice and site-specific measures for the protection of the Chalk aquifer, together with further consultation with the EA and SW, will result in no likely significant effects on the groundwater receptors GW1-4 during the construction phase. The summary presentation of these potential effects can be found in **Table 8.19**.

Table 8.19 Assessment of construction phase effects on the WFD groundwater bodies and aquifers and dependent abstractions

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
GW 1: Kent Isle of Thanet Chalk WFD groundwater body and aquifer	High	Negligible	Not Significant
GW2: Thanet Formation Secondary A aquifer	High	Negligible	Not Significant
GW3: SW PWS sources	Very High	Negligible	Not Significant
GW4: Other licensed groundwater abstractions	Medium -High	Negligible	Not Significant

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. Further details regarding the hazards associated with the operational phase are provided in the HIA (**Appendix 8.1, Section 4.4.2**).

8.8.9 Environmental measures referenced in **Section 8.5** and the HIA (**Appendix 8.1, Section 4.4.3**) are to be incorporated into the site's design and EMP. Of most relevance to the effects of site operations on groundwater is:

- The increase of turbidity of the underlying groundwaters as a result of sediment mobilisation and ground disturbances; and
- Pollution from the spillages or leakage of oils, fuels, de-icers or other chemicals from pipes, fuels storage areas, aprons and other infrastructure.

8.8.10 The potential impact of a breach or spillage at the proposed fuel farm during the operational stage has formed an important part of the stakeholder consultation (see **Table 8.6**) and was noted in the Section 42 responses. Since the 1st PEIR further discussions have been held with the EA with

respect to the incorporation of Best Available Techniques (BAT) into the design of this site (see **Table 8.6**). Further mitigation measures to manage this risk are suggested as follows:

- regular inspection of tanks and operating facilities and tank integrity monitoring programme would be required;
- regular inspection of bunds and impermeable surfaces;
- implementation of strict fuel delivery and control systems; and
- detailed emergency response procedure/plan in the event of a failure.

8.8.11 The ES will provide further details on the development of the Fuel Storage Area mitigation measures.

8.8.12 Following the incorporation of these additional mitigation measures the HIA concludes that the environmental measures, to be incorporated into site operation and design, will only result in a low or negligible residual risk for all potential sources of contamination (see **Table 4.7** of **Appendix 8.1**). **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 Storage Area design.

8.8.13 It is concluded that the combination of good practice and site-specific measures for the protection of the Chalk aquifer, together with further consultation with the EA and SW and the site-specific design mitigation measures listed above, will result in there being no likely significant effects on the groundwater receptors GW1-4 during the operation phase. The summary presentation of these potential effects can be found in **Table 8.20**.

8.8.14 A summary WFD Assessment will accompany the ES to provide an accessible summary of how the Proposed Development will not impede the achievement of WFD objectives in the WFD groundwater body. This will be in compliance with PINS advice note 18.

Table 8.20 Assessment of construction phase effects on the WFD groundwater bodies and aquifers and dependent abstractions

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
GW 1: Kent Isle of Thanet Chalk WFD groundwater body and aquifer	High	Negligible	Not Significant
GW2: Thanet Formation Secondary A aquifer	High	Negligible	Not Significant
GW3: SW PWS sources	Very High	Negligible	Not Significant
GW4: Other licensed groundwater abstractions	Medium -High	Negligible	Not Significant

Decommissioning phase effects

8.8.15 Decommissioning effects have been scoped out of the assessment Ground and Surface Water effects as the Airport is envisaged to operate in perpetuity.

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

Introduction

8.9.1 This assessment of effects on the surface water receptor SW1 takes account of the environmental measures referenced in **Section 8.5** i.e. it is an assessment of residual (post-mitigation) effects.

Construction phase effects

8.9.2 The construction phase has the potential to be likely to have a significant adverse effect on surface water quality. This would be through the following mechanisms:

- The generation of sediment laden run-off; and
- Pollution from the spillages of concrete, oils, fuels or other chemicals.

8.9.3 Environmental measures referenced in **Section 8.5** are to be incorporated into the site's CEMP and CoCP. 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, which is a 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. The construction site drainage plan will be agreed with the EA, NE and SW prior to the commencement of works.

8.9.4 It is concluded that the combination of good practice and site-specific measures for the protection of receptors GW1-4 will result in no likely significant effects on the surface water receptor SW1 during the operation phase. The summary presentation of these potential effects can be found in **Table 8.21**.

Table 8.21 Assessment of construction phase effects on the Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD Transitional water body

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
SW 1: Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD Transitional water body	Medium	Negligible	Not Significant

Operational phase effects

8.9.5 The construction phase has the potential to be likely to have an adverse effect on quality of the surface water. This would be through the following mechanisms:

- The generation of sediment laden run-off; and
- Pollution from the spillages of oils, fuels or other chemicals.

8.9.6 Environmental measures referenced in **Section 8.5** are to be incorporated into the site's design and EMP. In a similar manner to the construction phase 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.

8.9.7 It is concluded that the combination of good practice and site-specific measures for the protection of receptors GW1-4 will also result in no potentially significant effects on the surface water receptor SW1 during the operation phase. The summary presentation of these potential effects can be found in **Table 8.22**.

Table 8.22 Assessment of operational phase effects on the Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD Transitional water body

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
SW 1: Monkton and Minster Marshes (River) WFD surface water body and downstream River Stour WFD Transitional water body	Medium	Negligible	Not Significant

8.9.8 A summary WFD Assessment will accompany the ES to provide an accessible summary of how the Proposed Development will not impede the achievement of WFD objectives in the WFD surface water bodies. This will be in compliance with PINS advice note 18.

Decommissioning phase effects

8.9.9 Decommissioning effects have been scoped out of the assessment Ground and Surface Water effects as the Airport is envisaged to operate in perpetuity.

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

Introduction

8.10.1 This assessment of effects on the surface water receptor SW2 takes into account the environmental measures referenced in **Section 8.5** i.e. it is an assessment of residual (post-mitigation) effects.

Construction phase effects

8.10.2 The construction phase has the potential to have an adverse effect on water quality at Pegwell Bay. This would be through the following mechanisms:

- The generation of sediment laden run-off entering the sites drainage system in an uncontrolled manner; and
- Pollution from the spillages of concrete, oils, fuels or other chemicals entering the sites drainage system or reaching Pegwell Bay through groundwater inflows.

8.10.3 Environmental measures referenced in **Section 8.5** will be included in the site's CEMP. Of particular relevance to Pegwell Bay is the design of the site drainage system, the outfall of which is located in Pegwell Bay.

8.10.4 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. 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, de-icer) have been removed from site discharge. The quality of all

discharges will be regulated by a Water Discharge Activity permit from the EA and the detail of the drainage arrangements in the construction phase will be agreed with the EA and NE prior to the commencement of works.

8.10.5 Additional measures (**Tables 8.13** and **8.14**) have also been incorporated into the sites design and will be in the draft CEMP. These have been put in place to protect the groundwater environment during the construction phase and should also ensure that no potential pollutants reach Pegwell Bay.

8.10.6 It is concluded that the combination of good practice and site-specific measures for the protection of receptors GW1-4, the use of good practise in the treatment and storage of site drainage and the agreement of detailed site drainage strategies with the EA and NE will result in no potentially significant effects on the surface water receptor SW2 during the construction phase. The summary presentation of these potential effects can be found in **Table 8.23**.

Table 8.23 Assessment of construction phase effects on the Pegwell Bay (and associated designated sites)

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
SW 2: Pegwell Bay (and associated designated sites)	Very High	Negligible	Not Significant

Operational phase effects

8.10.7 The operational phase has the potential to be likely to have a significant adverse effect on water quality at Pegwell Bay. This would be through the following mechanisms:

- The generation of sediment laden run-off entering the sites drainage system in an uncontrolled manner; and
- Pollution from the spillages of concrete, oils, fuels or other chemicals entering the sites drainage system or reaching Pegwell Bay through groundwater inflows.

8.10.8 Environmental measures referenced in **Section 8.5** will be included in the site's EMP.

8.10.9 It is proposed that the site discharge is through the current discharge pipe into Pegwell Bay at a maximum rate of 30l/s. 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 have been sized to attenuate site run off for the 1% AEP storm plus a 40% climate change allowance. Site discharge will be regulated by a Water Discharge Activities Permit from the EA to Pegwell Bay and will meet standards appropriate for the protection of the designated sites. Further details can be found in **Appendix 8.2**.

8.10.10 It is concluded that the combination of good practice and site-specific measures for the protection of receptors GW1-4, the use of good practise in the treatment and storage of site drainage and the agreement of detailed site drainage strategies with the EA and NE will result in no likely significant effects on the surface water receptor SW2 during the construction phase. The summary of these potential effects can be found in **Table 8.24**.

Table 8.24 Assessment of operational phase effects on the Pegwell Bay (and associated designated sites)

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
SW 2: Pegwell Bay (and associated designated sites)	Very High	Negligible	Not Significant

8.10.11

Decommissioning phase effects

8.10.12 Decommissioning effects have been scoped out of the assessment Ground and Surface Water effects as the Airport is envisaged to operate in perpetuity.

8.11 Assessment of effects on the capacity of the PWS infrastructure and public sewer network

Introduction

8.11.1 This assessment of effects on the infrastructure receptors (IN1 and IN2) incorporates the environmental measures referenced in **Section 8.5** i.e. it is an assessment of residual (post-mitigation) effects.

Construction phase effects

8.11.2 The construction phase has the potential to have an adverse effect on the capacity of PWS infrastructure and the public sewer network. This would be through the following mechanisms:

- Increased water demand at the site causing sporadic decreases in the reliability of the local supply; and
- Increased discharge from the site in Phase 1 of the construction period causing capacity issues downstream of the site.

8.11.3 Environmental measures referenced in **Section 8.5** and the HIA (**Appendix 8.1, Section 4.4.3**) will be included in the site's CEMP. RiverOak will agree construction phase water and foul water demands with SW prior to the commencement of works and this will be included in the ES.

8.11.4 Following this it is concluded that it is likely any significant effects will be negligible. The summary of these potential effects can be found in **Table 8.25**.

Table 8.25 Assessment of construction phase effects on the capacity of the PWS infrastructure and public sewer network

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
IN1: PWS infrastructure	High	Negligible	Not Significant
IN2: On- and off-site public sewer network	High	Negligible	Not Significant

8.11.5

Operational phase effects

8.11.6 The operational phase has the potential to be likely to have an adverse effect on the capacity of PWS infrastructure and the public sewer network. This would be through the following mechanisms:

- Increased water demand at the site causing a long-term decrease in the reliability of the local supply; and
- Increased foul discharge from the site causing capacity issues downstream of the site.

8.11.7 Environmental measures referenced in **Section 8.5** will be included in the site's CEMP.

8.11.8 RiverOak will formally request a capacity check of the local water supply and sewage systems from SW and agree sustainable levels of supply and discharge. In addition, a Resources Strategy Statement will be submitted with the ES to demonstrate how water efficiency measures will be incorporated into the site's design.

8.11.9 It is concluded that likely significant effects will be negligible. The summary of these potential effects can be found in **Table 8.26**.

Table 8.26 Assessment of operation phase effects on the capacity of the PWS infrastructure and public sewer network

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
IN1: PWS infrastructure	High	Negligible	Not Significant
IN2: On- and off-site public sewer network	High	Negligible	Not Significant

Decommissioning phase effects

8.11.10 Decommissioning effects have been scoped out of the assessment Ground and Surface Water effects as the Airport is envisaged to operate in perpetuity.

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

Introduction

8.12.1 This assessment of effects on the flood risk receptors (FR1 and FR2) incorporates the environmental measures referenced in **Section 8.5** i.e. it is an assessment of residual (post-mitigation) effects.

Construction phase effects

8.12.2 The construction phase has the potential to have an adverse effect on flood risk receptors. This would be through the following mechanisms:

- Changes to the site run-off volumes and site drainage regime causing an increase in surface water flood risk to off-site receptors; and
- Changes to the site drainage regime causing an increase in flood risk to on-site receptors.

8.12.3 Environmental measures referenced in **Section 8.5** will be included in the site's CEMP.

8.12.4 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.

8.12.5 It is concluded that any likely significant effects will be negligible. The summary presentation of these potential effects can be found in **Table 8.27**.

Table 8.27 Assessment of construction phase effects on Flood Risk Receptors: On and adjacent development

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
FR1: Site users & infrastructure	High	Negligible	Not Significant
FR2: Off-site users & infrastructure	High	Negligible	Not Significant

Operational phase effects

8.12.6 The construction phase has the potential to be likely to have a significant adverse effect on flood risk receptors. This would be through the following mechanisms:

- Changes to the site run-off volumes and site drainage regime causing an increase in surface water flood risk to off-site receptors; and
- Changes to the site drainage regime causing an increase in flood risk to on-site receptors.

8.12.7 Environmental measures referenced in **Section 8.5** will be included in the site's EMP.

8.12.8 During the operational phase, all site drainage will be similarly contained and discharged through the Pegwell Bay pipe. The system will be designed to mitigate onsite flood risk for the 1%AEP plus 30% climate change event and offsite flood risk for the 1%AEP plus 40% climate change event. Therefore, there will be no increase in uncontrolled site run-off as a result of the increase in hardstanding. A draft FRA and Outline DS can be found in **Appendix 8.2**.

8.12.9 Following this it is concluded that all effects will be negligible. The summary presentation of these potential effects can be found in **Table 8.28**.

Table 8.28 Assessment of operational phase effects on Flood Risk Receptors: On and adjacent development

Receptor ID: Receptor name	Sensitivity	Magnitude	Significance
FR1: Site users & infrastructure	High	Negligible	Not Significant
FR2: Off-site users & infrastructure	High	Negligible	Not Significant

Decommissioning phase effects

8.12.10 8.8.15 Decommissioning effects have been scoped out of the assessment Ground and Surface Water effects as the Airport is envisaged to operate in perpetuity.

8.13 Conclusions of preliminary significance evaluation

8.13.1 The conclusions regarding the significance of all those effects that have been subject to assessment in **Sections 8.8** to **8.12** are summarised in **Table 8.29**.

Table 8-29 Summary of significance of adverse effects

Receptor	Significance Level	Rationale	Further work to be undertaken to support the ES
GW1: Kent Isle of Thanet Chalk WFD groundwater body and aquifer	Not Significant	Mitigation measures designed to protect the most sensitive proximate receptors – the SW PWS abstractions and associated mitigation will also serve to protect these receptors (see GW3).	A WFD Assessment will be produced to demonstrate how the site will not compromise the achievement of WFD objectives in this water body.
GW2: Thanet Formation Secondary A aquifer	Not Significant	Mitigation measures designed to protect the most sensitive proximate receptors – the SW PWS abstractions and associated mitigation will also serve to protect these receptors (see GW3).	No additional work is required.
GW3: SW PWS sources	Not Significant	Construction phase effects can be avoided by good practice construction measures and an approach to piling agreed with SW and the EA. 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 SW and the EA. This rationale has been elaborated upon in the draft HIA accompanying this PEIR submission (see **Appendix 8.1**)	Detailed of the design of mitigation measures will be submitted with the ES. Appropriate measures will also be included in the CEMP, EMP and CoCP, and incorporated into the Statement of Common Ground (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 HIA will be produced and submitted with the ES.
GW4: Other licensed groundwater abstractions	Not Significant	Mitigation measures designed to protect the most sensitive proximate receptors – the SW PWS abstractions and associated mitigation will also serve to protect these receptors (see GW3).	No additional work is required.
SW1: 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.	Finalisation of site drainage design and appropriate sizing of attenuation ponds. A WFD Assessment will be produced following a second round of consultation.
SW2: Pegwell Bay (and associated designated sites)	Not Significant	The pathway between the site and Pegwell Bay is the site discharge pipe. Discharges from the site will be regulated via a Water Discharge Activity Permit from the EA, and this will ensure no adverse effect on Pegwell Bay and associated designated sites.	Additional design detail on how the point of regulation for the Permit, and how this will be managed through the construction phases. The appropriate sizing of on-site water treatment and attenuation areas. Documentation of these discussions in the SOCG.

Receptor	Significance Level	Rationale	Further work to be undertaken to support the ES
IN1: PWS 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 be instigated wherever possible on-site.	A Resources Strategy Statement will be submitted with the ES to document water efficiency measures. Site water demand will be agreed with SW through the SOCG process.
IN2: On and off site public sewer network	Not Significant	The site discharge foul sewer will be capable of a 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 SW and documented in the SOCG.
FR1: Site users	Not Significant	A draft FRA and DS has been produced in consultation with the EA, KCC and TDCl.	A finalised FRA and DS will be produced.
FR2: Off-site users	Not Significant	A draft FRA and DS has been produced (**Appendix 8.2**) in consultation with the EA, KCC and TDC.	A finalised FRA and DS will be produced.

Contents

9. Historic Environment

9.1 Introduction

9.1.1 This chapter sets out the results of an historic environment assessment on the Proposed Development and should be read in conjunction with the scheme description (**Chapter 3**).

9.1.2 Following a summary of the limitations of this Preliminary Environmental Information Report (PEIR) 2018, the chapter outlines the relevant policy, legislation and guidance that has informed the preliminary assessment, the baseline data gathering methodology and the overall baseline conditions. An assessment of the potentially significant effects of the development is then presented. The chapter concludes with a summary of residual effects and an evaluation of their significance.

9.1.3 The historic environment is defined, following the Draft Airports National Policy Statement (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]

Limitations of the Preliminary Environmental Information Report 2018

9.1.5 This assessment is based on visits to the site (see **Section 9.3.6)**, desk-based research and the results of any known previous archaeological investigations within the site and study area.

9.1.6 While the desk-based research has identified areas of specific archaeological potential or historic significance, previously unrecorded archaeological remains may be present within the site. In particular, it is acknowledged that the Northern Grass (**Figure 3.1)** has not been subject to intrusive investigation. This potential for previously unrecorded archaeological remains has been considered within this PEIR and appropriate environmental measures are set out to ensure that these effects can be managed. An indicative Archaeological Written Scheme of Investigation will be provided with the Environmental Statement (ES) chapter submitted as part of the application for development consent.

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.

9.2.2 Full details of all national and local planning policies relevant to the Proposed Development can be found in **Appendix 4.1**. The following section outlines legislation and policy relevant to this assessment.

Legislative requirements

9.2.3 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.

[146] Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England, October 2017, Paragraph 5.186

9.2.4 The *Infrastructure Planning (Environmental Impact Assessment Regulations) 2017/572*[147] require decision-makers to have regard to landscapes and sites of historical, cultural or archaeological significance.

9.2.5 Under the *Ancient Monuments and Archaeological Areas Act 1979*[148], subsequently amended by the *National Heritage Acts 1983*[149] *and 2002*[150], 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*[151] require decision-makers to have regard to the desirability of preserving the scheduled monument or its setting.

9.2.6 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*[152]. 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*[153] require decision-makers to have regard for the desirability of preserving listed buildings, any features which contribute to their special interest and their settings.

9.2.7 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*[154] require decision-makers to have regard for the desirability of preserving the character and appearance of conservation areas.

9.2.8 *The Hedgerow Regulations 1997*[155] 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 Development Consent Order (DCO) which would require removal of a hedgerow has been granted as detailed in *The Infrastructure Planning (Interested Parties and Miscellaneous Prescribed Provisions) Regulations 2015*[156].

9.2.9 Key aspects of legislation and planning policies relevant to this assessment are set out in **Table 9.1**

[147] National Infrastructure Planning (EIA Regulations) 2017, S3, Reg 9(1), 2. -(1). Available online at www.legislation.gov.uk/uksi/2017/572/pdfs/uksiem_20170572_en.pdf. [Checked 29/11/2017]
[148] Ancient Monuments and Archaeological Areas Act 1979, Chapter 46, Part I. Available online at www.legislation.gov.uk/ukpga/1979/46. [Checked 29/11/2017]
[149] National Heritage Act 1983, Chapter 47, 32-38. Available online at www.legislation.gov.uk/ukpga/1983/47/contents. [Checked 29/11/2017]
[150] National Heritage Act 2002, Chapter 14, 1-8. Available online at www.legislation.gov.uk/id/ukpga/2002/14 [Checked 29/11/2017]
[151] Infrastructure Planning (Decisions) Regulations 2010, 3, 1-3. Available online at www.legislation.gov.uk/ukdsi/2010/9780111490266/regulation/3. [Checked 29/11/2017]
[152] Planning (Listed Buildings and Conservation Areas) Act 1990, Chapter 9, Part 1, Chapter I Available online at www.legislation.gov.uk/ukpga/1990/9/part/I/chapter/1. [Checked 29/11/2017]
[153] Infrastructure Planning (Decisions) Regulations 2010, 3, 1-3. Available online at www.legislation.gov.uk/ukdsi/2010/9780111490266/regulation/3. [Checked 29/11/2017]
[154] Infrastructure Planning (Decisions) Regulations 2010, 3, 1-3. Available online at www.legislation.gov.uk/ukdsi/2010/9780111490266/regulation/3. [Checked 29/11/2017]
[155] The Hedgerow Regulations 1997, Section 4-5. Available online at www.legislation.gov.uk/uksi/1997/1160/contents/made. [Checked 29/11/2017]
[156] The Infrastructure Planning (Interested Parties and Miscellaneous Prescribed Provisions) Regulations 2015, 5. Available online at www.legislation.gov.uk/id/uksi/2015/462. [Checked 29/11/2017]

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 (HE).
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 (revised October 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 HE 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 average noise contour. 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 (NPPF) (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 (both designated and non-designated) 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 129	The particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) should be identified and assessed, taking account the available evidence and any necessary expertise. This is in order to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.

Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
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.
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.
Paragraph 141	Information about the significance of the historic environment gathered as part of plan-making or development management should be made publicly accessible. Developers are required to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. Copies of evidence should be deposited with the relevant Historic Environment Record and any archives with a local museum or other public depository. The ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.
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

9.2.10 Guidance on the implementation of the NPPF is provided by the Planning Practice Guidance, published by the Department for Communities and Local Government and available online. HE have produced guidance on how to assess the impacts upon the setting of heritage assets and 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. The full title of this guidance and a summary description are given in **Table 9.2**.

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 HE on how to implement the historic environment policies included in the NPPF.
Historic England **The Setting of Heritage Assets (2015)**	Guidance from HE demonstrating how to assess the impacts upon the setting of a heritage asset.
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 (as requested by the planning inspectorate (PINS) and in agreement with Kent County Council (KCC; **Table 9.3**). The area excludes a boundary amendment to include the pipeline towards Pegwell Bay which is intended for reuse with no intrusive works or visible infrastructure, see **Figure 9.1**); and
- additional data collected on significant sites beyond the 1km study area as identified in consultation with KCC (see **Table 9.4**).

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

- KCC Historic Environment Record (HER);
- KCC Historic Landscape Characterisation data (HLC);
- HE Archive (formerly National Monuments Record);
- HE National Heritage List for England spatial datasets;
- HE National Record of the Historic Environment (NRHE);
- Kent Archives and Local History Service;
- KCC heritage maps;
- Thanet District Council (TDC) conservation area mapping;
- Royal Air Force (RAF) Museum, Hendon, London;
- Spitfire and Hurricane Memorial Museum and RAF Manston Museum, Manston Airport;
- 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 and comparative light pollution levels produced for **Chapter 11**;

- 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;
- British Geological Survey Mapping (http://www.bgs.ac.uk/geoindex/);
- National Library of Scotland Map Library (NLSML); and
- Other published and online sources as necessary.

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

Desk Study

9.3.5 An archaeological desk-based assessment (**Appendix 9.1**) has been undertaken in accordance with the principles laid down in the CIfA Standards and Guidance for Archaeological Desk-Based Assessments[157]. This has been supported by the production of gazetteers of designated heritage assets, from the HE Archive, within the 1km study area (**Figure 9.1**), and of other heritage assets and events, from the HE 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 KCC (**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. Site visits to inform the assessment of the setting of designated heritage assets was conducted on 8th November 2017,

9.3.7 Archaeological trial trenching in support of planning application OL/TH/16/0550 was in progress during the site walkover survey. The results of this evaluation have not yet been released and, if and when they become available, will inform future examination. This information may not be available prior to the DCO application.

9.3.8 Access has not been granted for further intrusive investigations or assessment of historic structures within the site. Discussion with KCC has identified a potential need for further intrusive investigations, particularly in the Northern Grass area (see **Table 9.5**; Simon Mason, pers. comm.). HE have confirmed in their consultation response to the 2017 consultation that they are satisfied archaeological works could be secured by requirements on any DCO (see **Table 9.5**). The scope of evaluation works will be decided following consultation with KCC and HE.

Consultation

Environmental Impact Assessment (EIA) Scoping

9.3.9 Since 2016 and throughout the undertaking of the survey and assessment work, RiverOak Strategic Partners (RiverOak) has engaged with consultees with an interest in potential historic environment resource effects (see **Section 9.3.10 and Section 9.3.12)**. A scoping report (**Appendix 1.1**), including a chapter covering historic environment resources, was produced and submitted to the Planning Inspectorate (PINS) on 30 June 2016 who provided a Scoping Opinion on 10th August 2016. (**Appendix 1.2**). This Scoping Opinion has informed the scope of detailed assessment significantly. It is worth noting that no changes to the scope of works arising from the

[157] CIfA 2014. *Standards and Guidance for Archaeological Desk-Based Assessments.* Available online at www.archaeologists.net/sites/default/files/CIfAS&GDBA_2.pdf. [Checked 10/08/2017]

adoption of the 2017 EIA Regulations for this project are expected and as such the methodology described below will be used in the preparation of the ES.

9.3.10 Organisations that were consulted by PINS for the scoping report include:

- KCC Heritage Conservation Group;
- The Trust for Thanet Archaeology;
- HE; and
- TDC.

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

Table 9.3 Consultee comments and responses to EIA Scoping

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.	Indirect effects on assets outside the proposed site boundary are considered within the study area. No offsite works are required and so there are no direct effects on heritage assets outwith the site boundary.
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 with KCC 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 heritage assets beyond the 1km radius which may experience an effect as a result of the Proposed Development have been identified through consultation; this process of identification was informed by the ZTV and carried out in conjunction with the Landscape and Visual Impact Assessment 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 study areas and additional heritage assets for consideration are detailed in the assessment.
PINS	The inter-relationships between the historic environment and landscape and visual impact assessment should be considered in both chapters.	The inter-relationship with LVIA is considered within this chapter.

Consultee	Comments and considerations	How addressed in this PEIR
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 have been considered during the assessment process (see **Section 9.4.44)**
KCC	Requests that the Kent Historic Environment Record (HER), 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.	Scheduled Monuments Monastic grange and pre-Conquest nunnery at Minster Abbey (List entry 1016850) and Saxon Shore fort, Roman port and associated remains at Richborough (List entry 1014642), in addition to the conservation areas of Ramsgate, Broadstairs and Minster, have been included in this assessment and the desk-based assessment **Appendix 9.1**.
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.	Historic assets are assessed by phase and feature type within the desk-based assessment. A phased site plan of the built heritage assets on the site is provided in **Figure 9.4**.
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 partially available via the Kent Planning portal. The available results are used to inform this study. Targeted trial trenching has recently been conducted as part of the Stone Hill Park planning application; however, at the time of writing the results were not available.
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. These assets are considered within the assessment.
KCC	HE and the TDC Conservation Officer (CO) will lead on the issues relating to the setting of designated heritage assets.	HE and the TDC CO have been and will continue to 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 are considered within the desk-based assessment **Appendix 9.1**.
KCC	It is not clear how the potential impact of flight noise over heritage assets will be included in the assessment.	The methodology for assessing impact of flights on heritage assets is described.
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. The museums at Manston have also been consulted, in addition to the RAF Museum based at Hendon and other sources.

Consultee	Comments and considerations	How addressed in this PEIR
Historic England	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.	The baseline conditions have been assessed using all available evidence. Further intrusive investigations will be required post-application. An indicative Archaeological Written Scheme of Investigation will be provided with the ES chapter. Harm to assets will be avoided or minimised through the relocation of some elements of some of the development in order to avoid or minimise disturbance to high sensitivity assets identified during future investigations, and by archaeological investigation.
Historic England	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.	An Archaeological Written Scheme of Investigation will be provided with the ES chapter.
Historic England	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 the settings of designated assets within and outside site boundary has been considered in the desk-based assessment (**Appendix 9.1**). Accurate visual representations of the levels of possible harm are provided in the LVIA, **Chapter 11**. Approach to use of photomontages has been agreed with HEand KCC in advance.
Historic England	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 in the planning statement which will accompany the submitted application.

9.3.12 In addition to this formal scoping consultation, informal consultation was held with HE, KCC and the Trust for Thanet Archaeology to establish the scope of the assessment. Details are provided 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, HE (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 Weatherlees 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, that 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 a view of the runway from the museums should be maintained in any development scheme. It was confirmed the assessment would look at the operational aspects of the airport and how this impacts upon heritage assets, such as potential noise impacts upon conservation areas.

		PK stated HE would look to agree a statement of common ground before DCO submission and would hope this could be signed by KCC.
8 May 2017	Ges Moody (GM), Trust for Thanet Archaeology	Archaeological and heritage potential within the area was discussed. GM proposed that there was strong potential for encountering archaeology. GM explicitly referenced the wide number of prehistoric and Romano-British remains found within the immediate area, especially during the road construction along the edge of the DCO area. The topographical ridge extending through the site, and the potential prehistoric significance of the visible location, and the known location of significant bronze age barrow sites in close proximity to the site were additionally noted. The results of previous phases of archaeological investigation on the site, mainly near the customs/terminal buildings were discussed, along with a brief discussion of the Stonehill Park planning excavation (GM had not visited the site during these excavations). The heritage of the airport was discussed, including its contribution to the local history & development of the wider area (specifically the creation of married quarters housing, and development surrounding the airport).GM stressed the importance of retaining the setting and connection to the airport of the two museums, based on their historic locations.
30 October 2017	Simon Mason, Kent County Council	Availability of the evaluation report associated with the Stone Hill Park application (OL/TH/16/0550) was discussed and it was established that KCC had not yet received it. SM advised that he would like to see further intrusive investigation, particularly in the Northern Grass area. It was stressed that as yet unknown archaeological results could have the potential to necessitate preservation in situ, depending on significance. A building survey of historic buildings on or related to the airport, produced subsequent to the HER data collection, was requested from and provided by KCC.

Statutory consultation

9.3.13 Statutory Consultation took place over a period of six weeks between 12 June and 23 July 2017 ('2017 Statutory Consultation') in accordance with sections 42, 47 and 48 of the Act[158]. Prescribed and nonprescribed consultees and members of the public were included in the consultation. Various methods of consultation and engagement were used in accordance with the Statement of Community Consultation (SoCC), including letters, website, public exhibitions, publicity and advertising, Inspection of Documentation at selected locations and parish and town council briefings.

9.3.14 As part of the 2017 Statutory Consultation, a PEIR[159] was issued for wider consultation. The 2017 PEIR included results of a preliminary historic environment assessment.

9.3.15 A summary of the consultee comments received in relation to that draft is provided in **Table 9.5** along with a response to identify how the matter has been dealt with in this PEIR.

Table 9.5 Summary of consultee comments and responses

Consultee	Comments and considerations	How addressed in this PEIR
Historic England	Noted that the draft Airports National Planning Statement will become relevant when adopted and is consistent with the National Planning Policy Framework, and that all of the NPPF is relevant, in particular paragraphs 128, 129, 132-135, 139 and 141 from Section 12.	The draft Airports National Planning Statement and relevant NPPF paragraphs have been considered in this assessment.

[158] Planning Act S23(4)(a)-(b) and (5)(a)-(b) (2008) Available online at http://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf [Checked 14/11/17].
[159] RiverOak (2017) Manston Airport Development Consent Order Preliminary Environmental Information Report Volumes 1 to 9. Available online at http://rsp.co.uk/documents-page/ [Checked 10/11/17]

Consultee	Comments and considerations	How addressed in this PEIR
Historic England	Noted a gap in understanding of the Northern Grass area as based on field evaluation.	Due to access constraints, this will be addressed post-application. It is recognised that given this gap in understanding, alterations to the project design may be required to preserve significant assets in situ. An Archaeological Written Scheme of Investigation will be provided with the ES chapter.
Historic England	Noted that an enhanced level of understanding of historic environment effects is required and is satisfied that further studies, to include intrusive investigations, will be required if sufficient information for a DCO application to be accepted as appropriately detailed is to be made available.	The scope of works will be discussed with KCC, TDC and HE as appropriate. An Archaeological Written Scheme of Investigation (WSI) will be provided with the ES chapter.
Historic England	In order that NPPF para 139 might be correctly applied the assessment of the significance of buried archaeological remains must be part of an appropriate Environmental Statement.	An understanding of the potential presence and significance of heritage assets within the site has been developed from available sources. Where required, further intrusive surveys will be conducted before any work takes place on site.
Historic England	All heritage assets can have a setting and this can make a contribution to their significance, even if this is not of a level that might be equal to a designated heritage asset. Consideration of setting therefore needs to address all heritage assets	All known heritage assets within the agreed study area and those identified in consultation with KCC beyond the study area are assessed within this PEIR, based on available data.
Historic England	There is likely to be a role for "preservation by record" but some assets may merit avoidance of the impact, for example by changes in the location, design or method of construction for elements of the project. If there are nationally significant but non-designated archaeological assets, then under para 139 of the NPPF these must be considered as if they were designated. According to para 141 of the NPPF the significance of all archaeological remains at the site and the effect of the proposal upon these should be assessed.	The presence of known assets has been considered in the proposal design. Direct and indirect impacts of the Proposed Development on designated and non-designated heritage assets is assessed in this PEIR.
Historic England	A full desk-based assessment of buildings/structures within the airport boundary is proposed to help inform which of these might be considered as heritage assets and if so this will also enable consideration of how the setting of these would be affected. It is proposed that mitigation of harm to built heritage assets would principally be by a programme of building recording as reflected in a WSI to be submitted with the Environmental Statement. It is potentially premature to assume that this is the appropriate means of mitigation. Should any of the buildings or structures be of a sufficient level of significance that listing or scheduling might be relevant as then designated heritage assets the advice of the NPPF, and specifically paras 132-134, would apply. The option to preserve any buildings or structures were they to become listed should be allowed for in the master plan. There could be a risk to the proposal should at a critical juncture buildings or structures be put forward for consideration of listing or go on to be confirmed as new designated heritage assets. Were any buildings or structures to become listed at the site this would then enhance the need to understand what their setting contributes to their significance and how this might be affected by the proposal. Even if nothing within the airport boundary was ever to become listed or scheduled consideration of setting is still relevant for the designated heritage assets which are in close proximity to the site.	An assessment of the buildings within the Manston Airport site is included in the desk-based assessment (**Appendix 9.1**). As far as possible, the preservation of historic buildings or structures of particular interest, whether designated or not, will be included in the final project design, see **Chapter 3**. An Archaeological Written Scheme of Investigation will be provided with the ES chapter. Setting of designated and non-designated assets within the study area and of identified assets outside of the study area is considered in the desk-based assessment.

Consultee	Comments and considerations	How addressed in this PEIR
Historic England	Encouraged consideration of how the museums might continue to work in unison and how they might retain visual connections with the airfield and in particular its runway. The potential for historic aircraft to operate from the site and not be squeezed out by the freight operation could be important to protecting the heritage significance of the airfield.	Both museums are being retained on the site, and their siting is considered in the masterplan, see **Chapter 3**.
Historic England	We have identified some high grade designated assets which are part of the same broad Wantsum Channel and Isle of Thanet landscape as the airport and consideration of views from these should form part of an appropriate assessment. Richborough castle as a part of the National Collection of Historic properties (now managed by English Heritage Trust) is one such example and the nunnery at Minster another, but we will wish to agree which locations and assets should be considered and by what means. A wire frame model of the maximum extent of new structures might be one approach.	High grade assets, as determined in consultation with KCC and HE are included in this PEIR. For wire frame models and visualisations see **Chapter 11,** LVIA**.**
Historic England	Airports operate on a 24 hours basis and the lighting required for this should be considered for any heritage assets for which night time darkness is a part of the appreciation of their significance.	Lighting is addressed in the desk-based assessment (**Appendix 9.1**) and this PEIR, including assessment for potential night flights subject to agreed operating restrictions.
Historic England	Illustrations for setting purposes may be integrated with the proposed LVIA process but views specifically for heritage purposes may also be necessary.	Views were taken specifically for heritage purposes, see **Chapter 11**, LVIA.
Historic England	Consideration of setting is often approached primarily as a visual matter and this is important but there can be other effects upon setting and how this relates to the experience of an asset. Noise and activity are two examples of this. We shall be interested in the assessment of heritage assets which may be affected by airport related noise and we shall be particularly interested in anywhere noise, or rather the lack of it, is part of the existing operation of a historic site and/or how its significance can be best appreciated.	Potential noise impact is addressed in this PEIR and the desk based assessment (**Appendix 9.1**).
TDC	In relation to the impact on heritage assets, there may be non-designated heritage assets not identified in the Kent County Council Historic Environment Record which could be affected by the proposal, and the assessment criteria should make provision for these potentially being identified through the DCO process.	Designated and non-designated heritage assets are considered in this PEIR and the desk based assessment (**Appendix 9.1**).
TDC	The approach to the use of photomontages for the visual representations of the levels of possible harm should be agreed with the Council as well as HE.	Photomontages of views from the heritage assets agreed in consultation with HE and KCC and supplied with the LVIA (**Chapter 11**) have been used to inform the assessment of indirect effects in this PEIR and the desk based assessment (**Appendix 9.1**).

Consultee	Comments and considerations	How addressed in this PEIR
TDC	From the [2017] PEIR, it appears that you seek to rely upon information from trial trenching carried out in support of the current planning application for the redevelopment of the airport site to assess future studies. It is important to note the agreed trial trenching was connected to the proposed layout of that scheme, with no trial trenching on the northern grass area. Given the extent of development on the section of land within your proposal, it is considered highly likely that you will be required to carry out your own trial trenching in this location to support your DCO submission, however we defer to KCC to comment.	Due to limitations on access for intrusive surveys, specific information requirements will be addressed when access can be obtained. The scope of further intrusive survey will be discussed with KCC, TDC and HE. An Archaeological Written Scheme of Investigation will be provided with the ES chapter. It is recognised that given the gap in understanding, alterations to some of the project design may be required to preserve significant assets in situ in the northern grass area.
KCC	Noted that the results of archaeological field survey are needed to understand the potential impacts of development and that this proposal may require separate additional works to that of the Stone Hill Park planning application (OL/TH/16/0550).	Field survey will be carried out as necessary and as access to the site can be obtained. The scope of works will be agreed with KCC, TDC and HE. An Archaeological WSIwill be provided with the ES chapter.
KCC	Noted that the results of survey work are needed to understand the impact of the Proposed Development on buried archaeology and on historic structures in the airfield. Preliminary discussions have been undertaken, however, the scope of survey work needed should be discussed in further detail with KCC Heritage Conservation and HE.	Field survey will be carried out as necessary and as access to the site can be obtained. The scope of these works will be discussed with KCC, TDC and HE. A desk-based assessment included in this PEIR (**Appendix 9.1**) assesses the impact of the development on known heritage assets.
KCC	The response to KCC Heritage Conservation Comment on the need for archaeological evaluation implies a reliance on the results of the survey works carried out for the Stone Hill Park planning application. It is acknowledged that the results of this work will be a data source, it may be that the parameters of those surveys which were specifically targeted against the Stone Hill Park proposals do not cover the parameters of the proposal for which a Development Consent Order is sought. The timetable for when the results of the surveys referred to is made available is also a matter that may influence the production of an informed Environmental Statement.	Further survey of areas outside of the Stone Hill Park proposal will be addressed when access can be obtained. The scope of these works will be discussed with KCC, TDC and HE. It is recognised that given the gap in understanding, some alterations to some of the project design may be required to preserve significant assets in situ in the northern grass area. This assessment is based on data available as of November 2017.
KCC	The Historic Environmental baseline will need to be strengthened in the forthcoming desk study by a closer examination of the records mentioned and the buried archaeological landscape, and in particular its articulation and significance explained. The baseline presented sets out as a summary of mainly HER entries and does not explain how they come together into a particularly rich and significant archaeological landscape.	Addressed in this PEIR and the desk-based assessment (**Appendix 9.1**).
KCC	There are likely to be remains that merit avoidance of impact from the proposal and where mitigation by investigation is an inadequate approach. The need for a decision to be informed by an appropriate and targeted level of survey and evaluation is paramount. Similarly, it is hoped that non-designated historic aviation features are retained as part of the development proposals to ensure that what remains of the historic sense of place is maintained for the future.	As far as possible, the preservation of heritage assets of particular interest on the site, as identified during the desk-based research, will be included in the final project design, see **Chapter 3**.
KCC	The setting of the Minster Abbey Scheduled Monument should be included in the assessment. There is also a need to recognise the impact of the proposals on historic landscapes, including the former Wantsum Sea Channel	Addressed in this PEIR and the desk-based assessment (**Appendix 9.1**)

Consultee	Comments and considerations	How addressed in this PEIR
KCC	Care should be taken in developing proposals to move the two museums to avoid both direct impacts and indirect effects caused by changes in accessibility, the inter relationship and relationship with the airfield heritage. The potential for enhancement is recognised.	Both museums are being retained on the site, and their siting considered in the masterplan, see **Chapter 3**.
KCC	The should be a recognition that non-designated heritage assets can be of high significance both individually (and the Thanet District has a unique, rich and distinctive archaeological heritage) and cumulatively, as buried landscapes or their contribution to heritage themes that provide a distinctive character to the place	Addressed in this PEIR and the desk-based assessment (**Appendix 9.1**)
KCC	The use of a two-level approach may only set out the most significant effects and suggests that lesser effects are not significant. There may be examples especially where Medium Change on Medium Heritage Significance is considered Significant. This could particularly be the case with cumulative effects.	The method used in this assessment allows for professional judgement where a two-level approach is insufficient to identify significance related to other, external, factors.
KCC	It is understood that there will be detailed design of construction works at a later phase, however, the Environmental Statement needs to set out clearly the parameters within which the effects of the proposals are appropriately understood so that decisions on the approach to mitigation can be reached.	This assessment assesses the potential impact of the development and should be read in conjunction with **Chapter 3**
KCC	It is premature to promote a scheme of archaeological investigation as providing a measure of mitigation. The buried archaeological resource may warrant a scheme of preservation to be agreed in the first instance and where this is not appropriate, mitigation through investigation.	As far as possible, the preservation of heritage assets of particular interest on the site, as identified during the desk-based research, will be included in the final project design, see **Chapter 3**. Further intrusive works will be discussed with KCC, TDC and HE. An Archaeological WSI will be provided with the ES chapter.
KCC	Built heritage assets within the airport contribute to the historic sense of place of the airfield and should be retained as far as possible. They need to be considered in cumulative terms as well as their individual significance. Direct Effects on Archaeology – the rationale that the archaeology impact can be largely mitigated through investigation is premature and there are likely to be remains that warrant preservation. The further work should include the results of archaeological survey and evaluation tailored for the present proposals. Submitting an outline proposal at application stage will constrain incorporation of preservation measures in the mitigation. Likewise, the significance of the built heritage assets needs to be understood early in design and used to inform the masterplanning of the proposal and detailed design.	Group significance is addressed as part of this PEIR and in the desk-based assessment (**Appendix 9.1**). As far as possible, the preservation of heritage assets of particular interest on the site, as identified during the desk-based research, will be included in the final project design, see **Chapter 3**.

9.4 Overall Historic Environment baseline

Current baseline

9.4.1 The historic environment baseline is presented in detail in the desk-based assessment (**Appendix 9.1**). A summary is provided below.

Topography and geology

9.4.2 The Proposed Development site is mainly situated at an elevation between 45-50m above ordnance datum (AOD). 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.

9.4.3 Telegraph Hill, at the west end of the site, is a high point in the surrounding landscape, and one of the highest in the Thanet District. The existing runway is sited along the length of a ridge running east from Telegraph Hill.

9.4.4 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.

Historic Landscape

9.4.5 The site lies within an area of local and regional historic significance due to its location on the Isle of Thanet. Until approximately 1000 years ago, this area of north-east Kent was an island separated from the mainland by the Wantsum Channel until it silted up in the 16th century, creating a unique landscape, with its development and activities governed by its geographical position.

9.4.6 Intensification of settlement and agricultural activity from the Bronze Age reflects the growing importance of the Wantsum Channel and the unique cultural development of the wider region. Cropmarks on Telegraph Hill, as a high point in the landscape, may have served as a focal point for the Bronze Age funerary activity identified as part of the East Kent Access Road investigations.

9.4.7 The Romans landed at Richborough in AD43 and utilised the Wantsum Channel as a defensible gateway to the River Stour and on to Canterbury. Residential and agricultural activity continued into the medieval and post-medieval periods with the area close to the site dominated by agricultural activity, represented by a series of informal enclosures.

9.4.8 The strategic importance of the region reshaped its history in the modern period. Close proximity to Europe enabled the site to play an important role in the Defence of Britain during the two World Wars and continuing aviation use.

Designated Heritage Assets

9.4.9 A gazetteer of designated heritage assets within the 1km study area is provided as **Appendix 9.2**, those within the 1km study area are shown on **Figure 9.1**.

9.4.10 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. The setting of the WHS is primarily defined by a series of short to medium distance views described in the World Heritage Site Management Plan (2001). Settings of the listed buildings within the WHS are, with the exception of the Cathedral, defined by their visual, functional and associative links with related and nearby structures within the urban core of Canterbury.

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

- 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). The primary value of this SM is evidential, deriving from surviving below ground remains. Its setting is influenced by its location on a ridge with views south and east toward the sea.

- Enclosure and ring ditches sited 180m east-northeast of Minster Laundry (List Entry 1004203). 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. The primary value of this SM is evidential and below ground. Its setting is influenced by its location on a south-facing slope with views south toward the River Stour.

9.4.12 Beyond the study area a further two significant heritage assets merit consideration:

- The scheduled monument Monastic grange and pre-Conquest nunnery at Minster Abbey (List Entry 1016850) is located c. 1.3km to the south of the site. Situated on low-lying ground near the eastern edge of the town of Minster, the nunnery (List entry 1012674), built in AD 741, is represented by below ground traces of buildings and associated remains, which survive beneath the 12th-century Benedictine monastic grange (List entry 1223807). The grange survives in the form of standing buildings, water-filled fishponds and associated below ground remains. The standing buildings are Listed Grade I. As the nunnery is below ground, its primary value is the archaeological evidence contained in the below ground remains. The setting of the listed buildings associated with the grange is defined by their visual and associative links with one another. The low-lying level of the ground at this location, surrounded by high walls serves to limit external views, enhancing a setting of isolation and tranquility.

- The Saxon Shore fort, Roman port and associated remains at Richborough (List entry 1014642) is located c. 5km to the south of the site. The earliest known use is as an Early Iron Age Farmstead. The Roman invasion force landed here in AD 43 and constructed a temporary camp. This became a Roman military and naval supply base, followed by a Roman port and associated settlement which was fortified in the 3rd century. Within the area of the Saxon Shore fort scheduled monument lies the grade I Richborough Castle (List entry 1363256). The castle contains the remains of the Roman settlement of *Rutupiae*, and the three sides of the late-3rd century Saxon shore fort, with additional areas dating to the 10th and 12th centuries. The original coastal setting on an island in the Stour Estuary has been lost over time as a result of the silting of the Wantsum Channel and the remains of the fort are now located on a slight hill, with other parts of the scheduled moment located on slightly higher ground to the south and on lower ground to the north. The main contribution of the setting of Richborough castle is now more immediate and related to the visible earthworks and standing walls but longer distance views across the former Wantsum Channel enhance its setting.

9.4.13 There are no listed buildings within the site, however there are 24 listed buildings surrounding the site within the 1km study area. These are outlined in **Table 9.6** and shown on **Figure 9.1**.

Table 9.6 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

List Entry	Name	Grade	Direction and Distance from Site Boundary
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

9.4.14 The conservation area of Acol lies partially within the 1km study area.

9.4.15 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.

9.4.16 There are no Registered Battlefields in Kent.

Non-designated Heritage Assets

9.4.17 A gazetteer of non-designated heritage assets (HER) within the 1km study area is provided in **Appendix 9.3**, these are shown on **Figure 9.2a-h**.

9.4.18 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.

9.4.19 A summary of the archaeological baseline is presented below. A more detailed assessment is provided in the full desk-based assessment (**Appendix 9.1**).

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

9.4.20 The prehistoric period encompasses the evolution from earlier pre-anatomically modern human and close human relatives to modern Homo 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.

9.4.21 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.

9.4.22 Two Palaeolithic flints have been found within the site boundary (TR 36 NW 546, TR 36 NW 55[160]). Within the study area a potentially in-situ Middle Palaeolithic lithic working site (TR 36 NW 489), a Lower to Middle Palaeolithic handaxe (TR 36 NE 2403), Mesolithic tranchet axe (TR 36 SW 366) and residual Mesolithic artefacts (TR 36 NE 577) are known. This evidence indicates potential transient occupation in the area during this period.

9.4.23 Evidence for Neolithic activity is found in the study area and represented by a settlement (TR 36 NE 598), domestic features containing Neolithic pottery (TR 36 SE 737; TR 36 SE 737; TR 36 SE 319) and ex-situ finds (TR 36 NE 634; TR 36 NE578; TR 36 NW482; TR 36 NW 504).

9.4.24 An enclosure and round barrow, possibly dating as early as the Neolithic, are recorded as cropmarks at the western end of the site (TR 36 NW 210) on Telegraph Hill. A high point in the landscape, it may be associated with other Bronze Age barrows excavated on the site (TR 36 NW 34; TR 36 NE 54) and potentially a focal point for a wider prehistoric funerary landscape.

9.4.25 Evidence for Bronze Age occupation takes the form of a potential hoard which has since dispersed by ploughing (TR 36 NW 193), pottery (TR 36 NW 470), eleven pieces of residual worked Bronze Age flint (TR 36 NW 487), and a curving ditch containing pottery dating to c.1000 BC (TR 36 NW 466).

9.4.26 Iron Age domestic activity and settlement is known from evidence 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). 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). Geophysical survey works carried out as part of the Stone Hill Park housing development application identified a number of anomalies that were interpreted as elements of prehistoric activity[161].

9.4.27 Beyond the prehistoric evidence identified on the site itself, the study area includes a large amount of prehistoric archaeology, including sites of settlements, burials, and cemeteries, and finds of flint and metal artefacts. The intensification of domestic, agricultural and funerary activity and changes in land use during this period emphasises the growing importance of the Wantsum Channel.

Roman

9.4.28 The Romans landed at Richborough in AD 43 and began to settle the area. The strategic location of the Wantsum Channel created a defensible gateway to the River Stour and beyond to Canterbury and London, and forts were built at either end (Richborough and Reculver) to defend against Saxon attacks in the 3rd century. The period is characterised by dense settlement patterns and proliferation of Roman structures throughout the south east including the forts, roads, and

[160] Historic Environment Record (HER) reference
[161] WSP 2016 Land at former Manston Airport, Historic Environment Desk Based Assessment

settlements. Evidence for roads and settlement has been found on or in very close vicinity to the site.

9.4.29 The route of a Roman Road is believed to have followed 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 WWII (TR 36 NW 209) while Roman ditches, gullies, pits and cremations were found during 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). Geophysical survey works carried out as part of the Stone Hill park housing development application identified a number of anomalies that were interpreted as elements of Romano-British activity[162].

9.4.30 Roman activity is widespread within the study area. Several settlements, field systems, road, cemetery sites, buildings and quarries, in addition to finds of pottery, coins, brooches and other objects, are typical of Roman activity known from the South East of Britain.

Early Medieval

9.4.31 Anglo Saxon activity in the area is primarily represented by funerary activity, most notably the Scheduled Monument of Ozengell Grange Anglo-Saxon inhumation cemetery (1004228). 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). Within the study area, numerous cemeteries (TR 36 NW 240; TR 36 SW229; TR 36 SE 739; TR 36 NW 1144; TR 36 NW 1143; TR 36 NW 1160), burials (TR 36 NW 383; TR 36 NE 26; TR 36 NW 189; TR 36 NW 195; TR 36 SE 686); barrow and/or ring ditch crop marks (TR 36 NE 87; TR 36 NW 123; TR 36 NW 172; TR 36 NW 178; TR 36 NW 179; TR 36 NW 214; TR 36 NW 214; TR 36 SE 23) and high status burials (TR 36 NW 186) are known. Geophysical survey works carried out as part of the Stone Hill Park housing development application identified a number of anomalies that were interpreted as elements of early-medieval activity[163].

9.4.32 On the site, there is little evidence for domestic or agricultural activity. Isolated early medieval findspots from the site include an early-medieval bead and iron knife (TR 36 NW 216), coins (TR 36 NW 498; TR 36 NW 499) and fragments of mid-Saxon to medieval pottery (TR 36 NW 471). The study area, however, suggests sustained and continued Anglo-Saxon activity, represented by settlements, buildings, trackways and findspots of coins and jewellery.

Medieval

9.4.33 The first specific documentary evidence for settlement in the vicinity of the site comes from the medieval period with a large settlement noted at Minster in the Domesday survey of 1086. 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 on a geophysical survey of the site recently completed in support of the planning application for Stone HillStonehill Park. Dunstrete was an important east-west aligned routeway across Thanet, a portion of which runs through the southern part of the site and was apparently observed in geophysical surveys carried out as part of the Stone Hill Park planning application[164].

9.4.34 On the site, medieval features including ditches and pits and finds of pottery, a medieval copper alloy buckle (TR 36 NW 471, MKE80179, TR 36 NW 468) indicate domestic or agricultural occupation of the site. This is typical of the study area, which primarily consists of farmsteads,

[162] WSP 2016 Land at former Manston Airport, Historic Environment Desk Based Assessment
[163] WSP 2016 Land at former Manston Airport, Historic Environment Desk Based Assessment
[164] WSP 2016 Land at former Manston Airport, Historic Environment Desk Based Assessment

buildings, and numerous enclosures. Industrial activity is also present in the form of a settlement with industrial activity (TR 36 NE 121) and a quarry (TR 36 NW 481).

Post Medieval

9.4.35 During this period the Wantsum Channel silted up and the land was reclaimed, with the marsh areas of the former channel being used as pasture land for sheep.

9.4.36 As one of the richest agricultural areas in the country, the area of the site and its vicinity remained heavily rural and agricultural in nature during the post-medieval period, but saw increasing 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). Supporting the agricultural industry, the farmstead, Foster's Folly, on the eastern edge was a loose courtyard plan farmstead with buildings to two sides of the yard (MKE87020). Two flour mills are also known from the site, and are pictured on old Ordnance Survey maps of 1839 and 1972 (TR 36 NW 1107).

9.4.37 The study area is dominated by these activities. There are twenty-six farmsteads, of which Bush Farm (MKE87023), Rose Farm (MKE88749), Manston Court (MKE87018) and Pouces (MKE86971) are located closest to the site boundary. There are sixteen incidences of quarrying, primarily chalk pits, including a small chalk pit at Pouces Cottages (TR 36 NW 1125), Mount Pleasant Chalk pit (TR 36 NW 337) and Dellside chalk pit (TR 36 NW 328) located close to the site boundary.

Modern

9.4.38 Expansion is observed in the modern period for the major townships, especially Ramsgate to the East. Increasing trade at the ports of Ramsgate and Margate following the Reformation and a surge in tourism created by the introduction of the railway linking London to these seaside towns in the mid-1840s, greatly increased the wealth of the region. The most significant change in the region sees the agricultural fields of the site itself converted for aviation use (TR 36 NW 432).

9.4.39 The airport had its origins in the early years of World War I and was later used extensively in WWII, with the remains of several WWII structures still extant on the site (see **Appendix 9.1**, Table 4.2). 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 an Air Fire Training Centre was established on the site. It was designated one of the country's MEDAs (Master Emergency Diversion Airfield) for both military and civilian flights. In 1999 RAF Manston closed and the airfield became a civilian airfield, which ceased aviation activity in 2014, with the exception of a helicopter training facility that remains operational.

9.4.40 The study area also contains structures related to the use of Manston as an airfield, which can be considered to be of group value with those on the site (see **Appendix 9.1**, Table 4.3)

9.4.41 In summary, 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, and are included the gazetteer provided in **Appendix 9.3**.

Archaeological Events

9.4.42 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.

9.4.43 A gazetteer of archaeological events is provided in **Appendix 9.4**.

Current Baseline Summary

9.4.44 Overall the evidence indicates a long history of human activity and occupation both on the site and within the study area, from earliest prehistory to the modern period. Development of the site throughout the 20th and 21st Century, in addition to heavy bombing during the wars and crash sites caused by emergency landings, will have disturbed and truncated archaeologically sensitive levels in some areas of the site; however, substantial buildings have been largely limited to the sides of the site, with the runway area to the south and centre portion of the northern area experiencing less development due to the nature of its use as an airfield.

Future baseline

9.4.45 In the absence of the Proposed Development, the future baseline is likely to remain relatively stable. Within the order limits, there may be some building decay (dependent on use) and no intrusive work would be expected. In terms of setting, industrial and residential development in the local area, particularly around Ramsgate Road, are likely to have a cumulative effect on lighting pollution and may have a visual effect on assets with intervisibility. Most assets are enclosed within residential areas or surrounded by vegetation, and so no significant change to setting is anticipated. Future developments may give rise to some change of setting to Richborough Castle, based on topography and the long-distance views this affords.

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, agreed environmental measures are incorporated into the design of the Proposed Development. The effect that those environmental measures have on the significance of potential effects is taken into account during the assessment process. 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 in order to avoid, reduce or compensate for potential adverse effects on historic environment features during the construction phases is provided in **Table 9.7**.

Table 9.7 Environmental measures incorporated into 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. Potential harm to non-designated assets has been assessed in the desk-based assessment (**Appendix 9.1**). The assessment identified potential for assets of national, regional and local significance. Based on topography, the area along and to the south of the ridgeline, along which the runway is located, is identified as being archaeologically sensitive.	Harm or loss of archaeological interest will be avoided or minimised. Where possible the design of the scheme retains historic buildings and avoid locations of greater archaeological potential on site. Disturbance in the areas to the south of and to either end of the runway will be limited to services and lighting.
Designated Heritage Assets	Change to setting arising from visibility can harm the contribution made to the significance of designated heritage assets by that setting. Potential harm to the setting of designated heritage assets has been assessed in the desk-based assessment (**Appendix 9.1**). The	Temporary hoardings and bunds will potentially be used to reduce noise and visual impact to the setting of designated heritage assets during construction.

Potential receptor	Predicated changes and potential effects	Incorporated measure
	assessment identified that change to setting should be low to negligible during the construction phase for all designated heritage assets.	
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 construction work access. Changes to non-designated structures and location of heritage assets within the airport (see **Appendix 9.1** for details of assets and **Chapter 3** for changes).	Removing temporary construction features to restore plan and character of airport where possible. Reuse and/or relocation of historic structures where feasible, including the museums (see **Chapter 3**).

9.5.4 A summary of the environmental measures that have been incorporated into the development proposals 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 9.8 Environmental measures incorporated into 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 and lighting 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. An operational noise mitigation strategy containing further details is presented in **Chapter 12, Noise**.

9.6 Scope of the assessment

9.6.1 This section sets out information on:

- identification of potential receptors that could be affected by the Proposed Development; and
- the potential effects on identified receptors that could be caused by the Proposed Development.

9.6.2 The scope of assessment has been informed by:

- the scoping study[165];
- consultee responses to the Scoping Report and the 2017 PEIR;
- the historic environment baseline (**Section 9.4)**; and
- the Proposed Development design (**Chapter 3**).

[165] RiverOak (2017) Manston Airport Development Consent Order Preliminary Environmental Information Report Volume 5, Appendix 1,1. Available online at http://rsp.co.uk/documents-page/ [Checked 10/11/17]

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 (**Appendix 9.1**).

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 sensitivity of the receptors;
- The extent to which the receptor will be affected by changes that are expected to result from the Proposed Development;
- The likely magnitude, duration and other characteristics of the effects; 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 has been undertaken to examine the potential locations of archaeological heritage assets compared to the Proposed Development layout, to ascertain the potential for heritage assets to be affected.

Indirect effects

9.6.7 Indirect effects are defined 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.

Defining setting

9.6.8 Setting is not explicitly defined in statute. It is defined in the NPPF[166] 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*." [167]

9.6.9 HE guidance[168] follows this definition, and sets out a methodology for considering any effects on the significance of heritage assets arising from change to setting. This methodology comprises five steps:

- Step 1: identify which heritage assets and their settings are affected.
- Step 2: assess whether, how and to what degree these settings make a contribution to the significance of the heritage asset(s).

[166] Department for Communities and Local Government, 2012. Annex 2: Glossary, National Planning Policy Framework.
[167] Department for Communities and Local Government, 2012. Annex 2: Glossary, National Planning Policy Framework.
[168] Historic England, 2015. The Setting of Heritage Assets' Historic Environment Good Practice Advice in Planning: 3

- Step 3: assess the effects of the Proposed Development, whether beneficial or harmful, on that significance.
- Step 4: explore the way to maximise enhancement and avoid or minimise harm.
- Step 5: make and document the decision and monitor outcomes.

9.6.10 Assessment of settings is most commonly associated with designated heritage assets, but non-designated heritage assets can also be affected by change to setting. In accordance with Step 1, the scope of the assessment has been established with reference to a Zone of Theoretical Visibility (ZTV) of the Proposed Development, and a desk-based appraisal and subsequent site visits to identify those assets with settings which might be sensitive to change arising from development. This has included the additional heritage assets of the Monastic Grange at Minster and Richborough Castle as requested by KCC. This process of appraisal has been an iterative process which commenced with initial consultation and has been refined through subsequent studies and engagement with consultees. The results of this process of identification of assets and their heritage significance is detailed in the desk-based assessment (**Appendix 9.1**) which follows Step 1 of the 5-step sequential process set out in the HE guidance.

Potential receptors

9.6.11 The identification of receptors is based on relevant guidance, the methodology outlined above and the professional judgement of a qualified technical specialist who has undertaken the desk study (**Appendix 9.1**) for the site location.

Potential receptors of Direct Effects

9.6.12 There are a number of previously identified archaeological heritage assets which have been identified as areas of high or medium potential and could be affected by the Proposed Development:

- Palaeolithic remains or deposits of palaeoenvironmental and geoarchaeological interest;
- features associated with prehistoric occupation and funerary activity;
- features associated with Roman occupation;
- features associated with early-medieval occupation and funerary activity;
- features associated with landscape exploitation, including agricultural and industrial activity in the Medieval and Post Medieval periods;
- First and Second World War military features associated with aviation use.

9.6.13 Due to the scale of archaeological remains identified within the site and in the immediate area the potential receptors have been presented in **Table 9.9** according to the archaeological periods they fall into

Table 9.9 Potential receptors directly affected by the Proposed Development

Potential receptor by archaeological period	Location	Summary of evidence
Deposits likely to contain Palaeolithic and Mesolithic material	Within site and in the vicinity of the site	Head and gravel deposits, likely to contain Palaeolithic and Mesolithic material, have been recorded within the site, although it is believed that these deposits survive only in localised areas.

Potential receptor by archaeological period	Location	Summary of evidence
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 identified within the site and in the area around the site is consistent with a pattern of rural settlement in East Kent. Evidence includes roads, settlements, 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. Burial grounds in this area confirm funerary exploitation of the landscape, particularly associated with the ridgeline and the west coast of Thanet more generally. The documented early history of Minster, to the south of the site confirms settlement in the area from this period.
Medieval	Within the site and in the surroundings	A portion of the medieval trackway, *Dunstrete,* an important east-west aligned routeway across Thanet, runs through the southern part of the site. Settlement in the area around the site includes villages, hamlets and isolated farms that have their 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 has been defined by the later WWII use of the site as an emergency runway, and has been progressively altered during the development of the site.

9.6.14 There is also potential for previously unrecorded archaeological features to be present. This is considered further, primarily in the desk-based assessment (**Appendix 9.1**), which is summarised in the baseline description and considered in the assessment of effects.

Potential receptors of indirect effects

9.6.15 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.

9.6.16 The desk-based assessment considered non-designated as well as designated heritage assets as potential receptors of significant indirect effects (**Appendix 9.1, Section 5.2**). Heritage assets identified as potentially subject to significant adverse indirect effects comprised the following:

- Designated assets within the 1km study area as detailed in **Appendix 9.2**;

- Two scheduled monuments outside of the study area, Monastic grange and pre-Conquest nunnery at Minster Abbey (List Entry 1016850) and Saxon Shore fort, Roman port and associated remains at Richborough (List Entry 1014642);
- Non-designated assets related to airfield use as detailed in **Appendix 9.1** (Tables 4.2 and 4.3); and
- Ramsgate, Broadstairs, Minster and Acol Conservation Areas.

9.6.17 The desk-based assessment examined heritage assets present within a 60dB average noise envelope likely to be produced by the airport. The methodology and rationale for this was based upon that detailed in HE's Aviation Noise Metric Study[169]. It referred to the baseline established for the 2017 PEIR report (**Chapter 12,** Table 12.10; 12.11).

9.6.18 The desk-based assessment also included an assessment of the influence of lighting on change to setting, based on comparative baseline light levels produced for the 2017 PEIR report (**Chapter 11**, **Figure 11.2**).

9.6.19 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. Assets with no potential for adverse effects to setting were scoped out of requiring further consideration and will not be assessed further. Some of these assets share common features with assets requiring further consideration but will not be affected either by virtue of intervening screening or increased distance from the Proposed Development.

Spatial and temporal scope

9.6.20 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 they have been identified through consultation with HE and KCC.

The construction period of the Proposed Development will take place over four construction phases. Operational effects are based on the Year 20 after development baseline, by which time operations at the Airport will have reached their peak (see **Chapter 3** for further detail).

Potentially significant effects

9.6.21 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 (WW1), 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 arising through change to the settings of designated and undesignated heritage during the operational phase of the Proposed Development. These effects may arise

[169] Temple Group Ltd. 2014. *Aviation Noise Metric - Research on the Potential Noise Impacts on the Historic Environment by Proposals for Airport Expansion in England*, Project. No. 6865

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
- The Proposed Development includes 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 indirect effects arising from change in setting, follows the approach set out by HE (2015)[170]. In this case, the potential for loss of heritage significance is most likely to occur as a result of intervisibility or direct views between the asset and the development. Change to views of an asset from a third viewpoint, even where there is no direct intervisibility between development and asset, may also be relevant.

9.7.3 In addition to purely visual considerations, other effects of the development, such as operational lighting or noise, may also have an effect, although this is normally only relevant in relatively close proximity to the Proposed Development. These effects are understood in terms of the relationship of the asset with its current setting and may be positive, enhancing the heritage significance of the asset, or value-neutral or harmful, depending on the nature of the change, the character of the setting and its contribution to the heritage significance of the asset.

Significance evaluation methodology

9.7.4 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. An assessment of effects on an asset involves an 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.

9.7.5 The conservation of the significance of heritage assets is considered in HE guidance, in which change is characterised as an inevitable process, but one that can be managed[171]. 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 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

[170] Historic England, 2015. The Setting of Heritage Assets' Historic Environment Good Practice Advice in Planning: 3
[171] English Heritage, *Conservation Principles.* London: English Heritage 2008

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[172].

9.7.6 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[173]. 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.

9.7.7 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 9.100 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 Nationally and internationally significant non-designated archaeological sites
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
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

9.7.8 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.

[172] National Planning Policy Framework paragraph 126
[173] 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

9.7.9 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 HE guidance[174] 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.

9.7.10 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. While subjective, this decision is based on professional judgement and an informed understanding of the potential change arising through development, the asset, its significance and the contribution of its present setting within a frame of reference defined by guidance (as issued by HE) and planning policy. The decision of whether an effect is harmful or not is a matter of fact and degree that is explained in the individual assessments, and therefore does not bias the assessment.

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

Table 9.11 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.

Determination of significance

9.7.12 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, depending on the heritage significance of the asset and the exercise of professional judgement.

Table 9.12 EIA Significance assessment matrix

	Magnitude of Change			
Receptor heritage significance	**High**	**Medium**	**Low**	**Negligible**

[174] Historic England, 2015. The Setting of Heritage Assets' Historic Environment Good Practice Advice in Planning: 3

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 buried archaeology within the site area

9.8.1 This assessment of effects incorporates the environmental measures referenced in **Section 9.5**. It characterises the potential archaeological significance of the remains and the magnitude of change in the terms set out at **Tables 9.10, 9.11 and 9.12**.

Predicted effects and their significance

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, post-Medieval and modern periods. 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, works for aircraft stands, cargo facilities, access, storage and parking have the greatest potential to impact upon archaeological remains due to the extensive land area under construction. 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.

Mitigation

9.8.4 While desk-based assessment is predictive, it has allowed us to characterise the potential date and nature of the archaeological remains which are anticipated to be present, and to set the results of the Stonehill Park geophysical survey[175] into context. It is acknowledged that the characterisation that we have developed is tentative, and that further geophysical and intrusive survey would allow that characterisation to be refined, allowing greater confidence in the assessment that is set out.

9.8.5 Archaeological investigation works will be undertaken during phase 1 of the development. These works will be agreed with KCC's Heritage advisors. It is recognised that there is potential for archaeological features of high significance to be present on the site, and that they could be subject to a high adverse effect, which would, in the absence of mitigation, be significant and adverse. However, where a scheme of archaeological investigation is combined with engineering design and proposals to avoid the most significant archaeological remains, it is anticipated that the magnitude of change would be reduced. This will be achieved through flexibility in design, particularly in the Northern Grass area, and a programme of archaeological excavation and recording where avoidance is not possible. In the case of particularly significant heritage assets, this effect may remain significant even after archaeological mitigation has been carried out, although it is anticipated that the majority of effects could be effectively mitigated to result in no significant effects.

9.8.6 Intrusive evaluation will also help to refine and characterise the presence of head deposits to allow effective mitigation to be implemented. The results of the investigations and detail of construction

[175] WSP, 2016. Land at former Manston Airport, Historic Environment Desk Based Assessment

impacts will be discussed with KCC's Heritage advisors to determine an appropriate programme of geoarchaeological recording to mitigate any adverse effects.

9.8.7 It is concluded that the adoption of such a scheme of archaeological investigation would confirm the presence or absence of archaeological heritage assets and would provide mitigation of any loss of archaeological interest that may arise as a result of development. Identification and recording of previously unknown heritage assets as a result of the development will serve to enhance knowledge in this region.

9.9 Assessment of effects on built heritage within the site area

Current baseline

9.9.1 While not listed, extant buildings and features both on and just outside the site can be considered to have some significance for historical interests pertaining to the history of the site and, more broadly, as architectural or structural components of RAF and USAF military history and the development of civil aviation in the UK. Their setting is directly related to the historic function of these buildings as part of an airfield complex.

Predicted effects and their significance

Construction phase effects

9.9.2 The Proposed Development requires the alteration, movement or removal of historic buildings and structures on the site (as identified in **Appendix 9.1, Table 4.2)**.

Mitigation

9.9.3 Historic structures and features within the site boundary have been incorporated into the Proposed Development. Both museums and the memorial garden are being retained. The runway itself, a key feature of its historic past, will be brought back into use. A survey[176] commissioned by KCC into heritage structures on the site notes the importance of other buildings and features. The RAF Battle HQ is noted to merit a special recording effort. Further investigation and assessment of these structures is required to ascertain their current condition, desirability and feasibility for incorporation in the final design. This will be assessed further in the ES. Structures which will not be retained will be subject to an appropriate level of building recording, to be agreed with KCC, in order to create a permanent record of these assets. It is recognised that some of these assets represent a high magnitude of change on medium significance assets which would, in the absence of mitigation, be significant adverse. However, where a scheme of archaeological recording to mitigate against loss of archaeological interest is combined with proposals to preserve the most significant assets, it is anticipated that the magnitude of change would be reduced to low and that no significant effect would arise.

Operational phase effects

9.9.4 Where retained, those buildings identified as having group value pertaining to the history of the site and, more broadly, as an architectural or structural component of RAF military history and beyond (**Appendix 9.1, Table 4.2**), will have their setting enhanced by renewed use of the site as an airfield. For the majority, it is association with the airfield which forms their primary value, and not views between contemporary buildings. Illumination of these assets and noise associated with operational activity has the potential to enhance setting, by reflecting former function. Where retained, the magnitude of change is assessed as low-medium on low-medium significance receptors, giving rise to a not significant effect.

[176] Taylor, R and Smith, V, 2016. Survey of Buildings and Structures associated with Manston Airport and the Surrounding Areas (available from KCC HER)

Decommissioning phase effects

9.9.5 Further changes to the historic buildings fabric is not anticipated during decommissioning and no direct effects are anticipated. Cessation of aviation activities at the site would reverse the beneficial effects of retaining these structures in the context of a working airfield.

9.10 Indirect effects on off-site designated heritage assets

Construction phase effects

9.10.1 Designated heritage assets beyond the 1km study area, as identified in **Figure 9.3**, have the potential to be affected by change in their settings caused by the Proposed Development.

9.10.2 Visibility of construction compounds and other temporary construction activities may present a change in the setting of heritage assets in close proximity to the airport and within the ZTV. These effects would be temporary for the duration of the construction on site. These would represent very limited change to the existing views towards the airport, and any change would be limited to the construction period. These activities would also be at least partially screened by existing bunding, planting and structures within the site.

9.10.3 During the construction phase of the Proposed Development the airport would not be operational, and there would be no aviation noise. Mitigation measures (see **Chapter 12**), will reduce construction noise and control potential impacts upon people, businesses and the natural and historic environment, meaning that it would not contribute to any adverse indirect effects.

9.10.4 The magnitude of change is assessed as negligible on high archaeological significance receptors, giving rise to a no significant effect.

Operational phase effects

9.10.5 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 visually affected by the operational effects of this scheme.

9.10.6 Within the 60dB average 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 affect the experience of the asset, whilst within a contemplative garden with water 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.

9.10.7 The setting significance and assessment of potential operational effects was considered for all agreed designated heritage assets in the desk-based assessment (**Appendix 9.1, section 5.2**). Those identified as being subject to potential effects are further assessed for EIA significance in **Table 9.13**.

Table 9.13 Assessment of effects on setting significance of designated heritage assets

Asset	Significance and contribution of setting	Assessment of effect
Enclosure and ring ditches sited 180m east-northeast of Minster Laundry (List Entry 1004203)	The primary value of this scheduled monument is evidential and below ground. No archaeological remains are observable at ground level and so views towards the asset do not contribute to	The airport is visible from the asset. There is potential for this asset to be associated with assets identified at the west end of the runway. The asset is positioned on a south-facing slope and

	setting. Views from the asset may contribute to setting, as associated with the wider landscape character.	the views south to the River Stour are most likely to have influenced the choice of location. Although within a 60dB noise contour (**Figure 9.5**), the setting of the site is not dependent on tranquillity. It lies adjacent to the A299 and the Minster Laundry industrial estate, and is currently subject to high levels of traffic noise. The asset is below ground and so light does not affect setting. Light from the adjacent Minster Laundry industrial estate is already a readily discernible element of the asset's night-time setting. **Archaeological significance: High** **Magnitude of change: Low** **EIA Significance: Not significant**
Saxon Shore fort, Roman port and associated remains at Richborough (List Entry: 1014642)	The raised location of grade I Richborough Castle (List Entry 1363256) and the airport means that long distance visibility between the two sites is present; however, the main value of the setting of Richborough castle is now more immediate and related to the visible earthworks and standing walls. The original coastal setting has been lost over time and the remains now lie within a rural setting. The rest of the scheduled monument lies at lower levels, and its value is primarily evidential, with the structure of the Saxon shore fort itself (List Entry 1363256), being the primary aesthetic concern.	The asset is located at 5km distance from the site. Long-distance views include the airfield and other large developments such as Thanet Earth. These views are inhibited by topography, as the ridgeline creates a plateau which screens much of the airport site. Maximum noise level contours at 60dB, even for the largest planes do not reach as far as Richborough Castle. The castle is subject to noise from the railway and the A256. The site is not usually open during night-time hours, and so long-distance views of operational lighting at the airfield will not affect normal visitor experience. **Archaeological significance: High** **Magnitude of change: Low** **EIA Significance: Not significant**
Cleve Court and Cleve Lodge (List Entry 1224683)	The value of this Grade II* Listed Building primarily lies in its group value with associated buildings within the same complex.	There is no direct intervisibility between the asset and the airfield. While lighting may be visible at distance through the foliage at certain times of year, this asset will not be directly illuminated by airfield lighting and is currently indirectly subject to similar low levels of light pollution from a nearby industrial area. The grounds of Cleve Court and Cleve Lodge fall within the 60dB noise contour, but the buildings do not. While the setting is not dependent on tranquillity it may affect the sense of rural setting in part of the grounds. It does not affect the buildings. **Archaeological significance: High** **Magnitude of change: Low** **EIA Significance: Not significant**
Prospect Inn (List Entry: 1224448)	This Grade II Listed Building is currently part of a Holiday Inn hotel. Formerly	Close to the airfield, visibility from Prospect Inn to the airfield is currently

	frequented by airmen stationed at Manston, this building is associated with the historic aviation use of the site.	obscured by topography. Visibility of flights taking off from the airport will enhance setting given the historic links. Prospect Inn lies within the 60dB noise contour, but is adjacent to the A229, and so daytime noise is unlikely to have an adverse impact. The property will not be directly lit by the airport and is already affected by street lighting. Due to its function, any distant visible lighting associated with the airport would enhance the historic relationship. **Archaeological significance: High** **Magnitude of change: Low** **EIA Significance: Not significant**

Mitigation

9.10.8 Further mitigation of change to setting of off-site heritage assets is not proposed, as boundary design and treatment to screen new development, aircraft movements and standing aircraft in views of and from off-site heritage assets, and to reduce potential noise impacts from within the site have been considered as embedded measures of the design of the Proposed Development.

Decommissioning phase effects

9.10.9 The airport is anticipated to be operational for many years. There are no current plans for decommissioning. At such time, designated heritage assets beyond the boundary of the airport, may experience change to setting as a result of the decommissioning of the airport. These can be anticipated to reverse any adverse change in the setting of heritage assets in close proximity to the site or within ZTV of the Proposed Development.

9.10.10 The cessation of aircraft movements would result in the reversal of any change to setting arising from aviation noise. There may be limited change to setting arising from construction noise, but it is anticipated that this would not be of sufficient volume to have an effect.

9.11 Conclusions of significance evaluation

9.11.1 The Conclusions on the significance of all those effects that have been subject to assessment in **Sections 9.8** to **9.10** are detailed in **Appendix 9.5** and summarised in **Table 9.14**.

Table 9.14 Summary of significance of effects

Receptor and effects	Magnitude of change	Heritage significance	EIA significance	Rationale
Direct construction phase effects on undesignated and previously unrecorded archaeological remains within the site boundary	Low-negligible (based on appropriate mitigation)	Early Prehistoric: Medium-High; Later Prehistoric: Medium-High; Roman: Medium Early Medieval: Medium-High Medieval: Low Post-medieval: Low	Not significant following implementation of agreed scheme of avoidance and mitigation. Effects may remain significant where avoidance measures cannot be implemented.	It is recognised that while the desk-based assessment and archaeological disturbance plan have identified the presence/absence of known remains across the site of the Proposed Development site based on available knowledge, adjustment may be required following receipt of pending reports and a programme of further archaeological investigations in phase 1, especially in the northern grass area. An Archaeological

Receptor and effects	Magnitude of change	Heritage significance	EIA significance	Rationale
		Modern: Medium-High		Written Scheme of Investigation will be provided with the ES chapter. Effects would be permanent but can be largely mitigated by an appropriate programme of avoidance, investigation and recording targeted on areas where site investigation and surface profiling surveys identify deposits of interest. This will result in preservation in situ or enhanced knowledge as a result of the development which will contribute to the mitigation of adverse effects.
Change to Historic Buildings within the airport boundary	Low - Medium	Low-Medium	Not significant	The setting and significance of buildings within the airport boundary was assessed in the desk-based assessment (**Appendix 9.1**). A phase plan is provided in **Figure 9.4**. Further assessment in the ES will establish the condition, desirability and feasibility for retention of built heritage assets in the final design. Those not retained will be subject to an appropriate level of building recording which will create a permanent record. This programme of retention and recording will lead to enhancement or new knowledge thereby contributing to the mitigation of any adverse effects. In terms of setting, the development will inevitably result in changes to the setting of retained assets; however, reuse of the airfield for aviation purposes reflects the recent historic use of the site, thereby enhancing setting.
Designated heritage assets within the 1km boundary and extended study area as requested by KCC and HE	Negligible-Low	High	Not significant	The potential impact of the proposal upon the contribution made to significance by setting of designated assets within the 1km boundary and others identified by HEand KCC was assessed in the desk-based assessment (**Appendix 9.1**). Overall, the potential impact is low. 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 persist throughout the operational period and have consequently been considered as permanent. Embedded measures which would minimise adverse change to setting (e.g. acoustic and visual screening) will be considered in the ES.

Contents

10. Land Quality

10.1 Introduction

10.1.1 This chapter sets out the results of an 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**) and the previous Preliminary Environmental Information Report (PEIR) (2017)[1]. Following a summary of the limitations of this PEIR, the chapter outlines the relevant policy, legislation and guidance that has informed the assessment, and the data gathering methodology that was adopted as part of the land quality 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 this PEIR

10.1.3 The baseline information informing this PEIR is derived from a desk study and a site visit, carried out in accordance with the Environment Agency (EA) Model Procedures for the Management of Land Contamination (Contaminated Land Report (CLR) 11), 2004[2]. The site visit did not include the outfall route to Pegwell Bay and service routes from the highway to the outfall pipeline and a waste storage area located adjacent to the west of the site. No intrusive investigations have been undertaken to date as it is not considered unlikely that having the data that would be derived from such investigation would significantly change the findings of this chapter and therefore the ability to gain development consent. Intrusive investigation will therefore be carried out post consent with the approach to undertaking these already under discussion with the EA, Southern Water and the Thanet District Council (TDC).

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. Information on relevant policies can be found in **Table 10.1**. 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.

10.2.2 Full details of all national and local planning policies relevant to the Proposed Development can be found in **Appendix 4.1**. The following section outlines legislation and policy relevant to this assessment.

Table 10.1 National and Local Planning Policies relevant to Land Quality

Legislation or Policy Reference	Legislation Summary or Policy Information relevant to Land Quality
European Policies:	

[1] Preliminary Environmental Information Report (vol.2) (2017) Manston Airport Development Consent Order. RSP. Available online at http://rsp.co.uk/documents/rsp-documents/04-peir-volume-2-chapters-7-to-11/ [Checked 30/11/17].
[2] CLR 11 Model Procedures for the Management of Land Contamination (2004) Environment Agency. Available online at https://www.claire.co.uk/index.php?option=com_content&view=article&id=187&catid=45&Itemid=256 [Checked 21/11/17].

Legislation or Policy Reference	Legislation Summary or Policy Information relevant to Land Quality
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.
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.
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 and 2017	Requires that the EIA identify, describe and assess the direct and indirect significant effects of the proposed development on human health, biodiversity, land, soil and water. As per Schedule 3 Regulation 9(1): the characteristics of development must be considered with particular regard to (c) the use of natural resources, in particular land soil water and biodiversity; (d) the production of waste; € pollution and nuisances; (f) the risk of major accidents and/or disasters relevant to the development concerned […]; (g) the risks to human health (for example due to water contamination or air pollution).
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,

Legislation or Policy Reference	Legislation Summary or Policy Information relevant to Land Quality
	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 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 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.
Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England, October 2017	Land use including open space, green infrastructure and Green Belt, Section 5.109: Construction and operation of airport facilities is a potential source of contaminative substances (for example, through de-icing or leaks and spills of fuel). Where pre-existing land contamination is being considered through development, the objective is to ensure that the site is suitable for its intended use. Risks would require consideration in accordance with the contaminated land statutory guidance as a minimum. Water quality and resources: Section 5.172: Development may result in an increased potential for impacts on the water environment, especially the quality of the surface and groundwater through the discharge of waters contaminated with de-icer along with hydrocarbons and other pollutants; Section 5.173: The applicant should make sufficiently early contact with the relevant regulators, including the Environment Agency, for abstraction licensing and environmental permitting, and with the water supply company likely to supply the water. Where the proposed development is subject to an environmental impact assessment and the development is likely to have significant adverse effects on the water environment, the applicant should ascertain the existing status of, and carry out an assessment of, the impacts of the proposed project on water quality, water resources and physical characteristics as part of the Environmental Statement (ES).
Local Policy:	
Thanet Local Plan (2006) (Saved Policies) and 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.
Thanet Local Plan (2006) (Saved Policies) and 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 […];

Legislation or Policy Reference	Legislation Summary or Policy Information relevant to Land Quality
	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.
Thanet Local Plan (2006) (Saved Policies) and 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 (KCC)'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. KCC confirmed that the site does not lie within a Mineral Safeguarding Area as defined by the Kent Minerals and Waste Local Plan 2013-30 Policies Maps.
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.
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
Construction Industry Research and Information Association (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)
Health and Safety Executive (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)

Legislation or Policy Reference	Legislation Summary or Policy Information relevant to Land Quality
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.

10.3.2 The site was defined by the red line boundary (see Figure 1.1).

- Searches of regulatory and historical information were made within 1km radius around the site of the Proposed Development (see Appendix 10.1); and
- Additional data was collected on controlled water receptors beyond the 1km study area (Pegwell Bay and Sandwich Bay) from the MAGIC website, which provides authoritative geographic information about the natural environment from across government, and the regulatory search to assess their sensitivity.

10.3.3 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 this PEIR

Source of Information	Details of information used in this 2018 PEIR
British Geological Survey (BGS) mapping website[3]	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?"[4]	Aquifer designations, groundwater protection zones, catchment and surface water quality, etc.
MAGIC website[5]	Land-based designations
Environment Agency catchment data search[6]	Information held by Environment Agency on the water environment which supports and builds upon the data in the river basin management plans.

[3] Geology of Britain viewer (2017) British Geological Survey. Available online at http://mapapps.bgs.ac.uk/geologyofbritain/home.html [Checked 15/11/17].
[4] What's In Your Backyard? (2017) Environment Agency. Available online at http://apps.environment-agency.gov.uk/wiyby/default.aspx [Checked 15/11/17].
[5] MAGIC website (2017) Natural England. Available online at http://www.natureonthemap.naturalengland.org.uk/home.htm [Checked 15/11/17].
[6] Catchment Data Explorer (2017) Environment Agency. Available online at http://environment.data.gov.uk/catchment-planning/ [Checked 15/11/17].

Source of Information	Details of information used in this 2018 PEIR
Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66: 2008[7]	Assessment methodology of receptors sensitivity
Envirocheck report dated 2016 (reference 82787389_1_1)[8]	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[9]	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[10]	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[11]	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. Planning Applications F/TH/09/0637 [12]	Ground investigation report
Site Investigation Tank 2, Base Validation, Jentex[13]	Ground investigation report
Preliminary Unexploded Ordnance (UXO) Risk Assessment (reference P5188[14]**)**	Kent International Airport Ltd, Kent International Airport, Manston, Ramsgate, Kent, CT12 5BL
Spitfire and Hurricane Memorial Museum, Manston, Kent[15]	Historical website for the site and its surroundings

[7] Guidance for the Safe Development of Housing on Land Affected by Contamination (2008) NHBC, Environment Agency, Chartered Institute of Environmental Health. Available online at http://www.nhbc.co.uk/NHBCpublications/LiteratureLibrary/Technical/filedownload,33595,en.pdf [Checked 15/11/17].
[8] Envirocheck report dated 2016 (reference 82787389_1_1)
[9] Land Quality Assessment Phase One: Desk Study Land Quality Statement. Project No. 10133. Final Report (1998) GIBB Environmental.
[10] Geo-environmental Assessment, Jentex petroleum: GEA-18996-15-134 (2015) Idom Merebrook Ltd.
[11] Geo-environmental Assessment Report, Jentex – Supplementary Assessment, GEA-18996B- 16-144 (2016) Idom Merebrook Ltd.
[12] F/TH/09/0637 | Erection of mast for primary and secondary radar installations with associate transmitter and receiver building, within compound enclosed by 2.9 metre fence and associated substation. Kent International Airport, Manston, (2010) Jacobs. Available online at https://planning.thanet.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=ZZZZMWQEBJ103 [Checked 15/11/17].
[13] Site Investigation Tank 2, Base Validation: Jentex. Ref: 07R898 (2007) Randall & Walsh Associates
[14] Preliminary Unexploded Ordnance (UXO) Risk Assessment (Ref P5188): Bomb Search (2016) Landmark Information Group Ltd
[15] Spitfire and Hurricane Memorial Museum website (2017) RAF Manston Spitfire & Hurricane Memorial Trust. Available online at http://www.spitfiremuseum.org.uk/ [Checked 15/11/17].

Source of Information	Details of information used in this 2018 PEIR
Thanet District Council, Environmental Protection Manager	The Council provided a map for details of landfill sites near the site (EA Landfill Atlas Data)[16]; • 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); • 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

10.3.4 A Phase 1 Geoenvironmental Desk Study was undertaken to inform the Land Quality assessment (**Appendix 10.1**) in accordance with the EA CLR 11[17]. The purpose of this study 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 the Guidance for the Safe Development of Housing on Land Affected by Contamination report [18] that states "*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*."

10.3.5 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;
- Review of preliminary UXO Assessment Report[14];
- 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

10.3.6 A site walkover was undertaken by an Amec Foster Wheeler (now Wood) environmental consultant from 7th to 9th February 2017 to obtain additional information about the site's current setting and any potential land quality issues. It did not include the outfall route to Pegwell Bay and service

[16] Appendix F Environmental Search Thanet District Council of Appendix 10.1
[17] Model Procedures for the Management of Land Contamination: Contaminated Land Report 11 (2004) Environment Agency. Available online at http://webarchive.nationalarchives.gov.uk/20140328160926/http://cdn.environment-agency.gov.uk/scho0804bibr-e-e.pdf [Checked 15/11/17].
[18] Guidance for the Safe Development of Housing on Land Affected by Contamination (2008) NHBC, Environment Agency, Chartered Institute of Environmental Health. Available online at http://www.nhbc.co.uk/NHBCpublications/LiteratureLibrary/Technical/filedownload,33595,en.pdf [Checked 15/11/17].

routes from the highway to the outfall pipeline and a waste storage area located adjacent to the west of the site. At this stage of the assessment these exclusions does not affect the overall assessment in the PEIR.

Consultation

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

10.3.8 Organisations that were consulted by PINS include:

- The EA; and
- TDC.

10.3.9 A summary of the Scoping Opinion comments relevant to Land Quality and how they are addressed in this 2018 PEIR is provided in **Table 10.3**.

Table 10.3 Consultee comments on the Land Quality issues presented in the scoping report

Consultee	Comments and considerations	How addressed in the 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 Construction Environmental Management Plans (CEMPs). Drafts of such plans should be provided with the Development Consent Order (DCO) application.	Environmental measures expected to be incorporated into the Proposed Development are listed in **Section 10.5** of this 2018 PEIR. A CEMP will be provided as part of 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 2018 PEIR. A 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) (Manston Airport, Kent, Draft Geoenvironmental Desk Study, Amec Foster Wheeler, March 2017) 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)[19], and the UXO studies should be carried out in accordance with CIRIA Guide C681 -	A Phase 1 Land Quality Assessment (LQA) has been carried out in accordance with CLR11 and is attached as **Appendix 10.1** of this 2018 PEIR. A Preliminary UXO Risk Assessment has been undertaken for the site and included in Appendix B of the Phase 1 LQA. (Appendix 10.1) 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

[19] CLR 11 Model Procedures for the Management of Land Contamination (2004) Environment Agency. Available online at

Consultee	Comments and considerations	How addressed in the PEIR
	Unexploded ordnance (UXO): A guide for the construction industry.	Chapter 5[20] on managing UXO risks, 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 (**Appendix 10.1)** and a proposed intrusive investigation have been initiated with the EA. The intrusive investigation will be undertaken post consent, and will be agreed following consultation with EA and TDC.
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 (**Appendix 10.1**) has assessed the risk to Pegwell Bay. Control measures have been detailed and assessed in **Sections 10.5** and **10.8** to **10.12** this 2018 PEIR. In addition, control measures 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.	For 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 2018 PEIR.
EA	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 (**Appendix 10.1**)
EA	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:	A Phase 1 LQA (**Appendix 10.1**) has been carried out in accordance with CLR11. It includes recommendations for a staged intrusive investigation. The intrusive investigation will be undertaken post consent. BS 10175, Investigation of potentially contaminated sites – Code of Practice[22] has been used to prepare the Phase 1 LQA and will be used to design the intrusive investigation.

https://www.claire.co.uk/index.php?option=com_content&view=article&id=187&catid=45&Itemid=256 [Checked 21/11/17].

[20] Unexploded ordnance (UXO): C681 (2009) CIRIA. London.

[22] Investigation of potentially contaminated sites. Code of practice (BS 10175:2011+A1:2013) British Standards Institution.

Consultee	Comments and considerations	How addressed in the PEIR
	1. Follows the risk management framework provide in CLR11, Model procedures for the management of land contamination [21] 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 https://www.gov.uk/government/collections/land-contamination-technical-guidance	MCERTS[23] accredited methods for testing contaminated soils at the site will be used. The land contamination technical guidance[24] pages on the direct.gov website have been consulted.
EA	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 (**Appendix 10.1**) and a proposed intrusive investigation have been initiated with the EA and Southern Water. Details of the consultations are provided in Table 10.4.
TDC	The Environmental Impact Assessment (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 (**Appendix 10.1)** has been carried out in accordance with CLR11. A site walkover was carried out from 7th to 9th February 2017. The findings have been included in the Phase 1 LQA.
TDC	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	A Phase 1 LQA (**Appendix 10.1)** has been carried out in accordance with CLR11. It includes a review of previous site investigation reports and TDC and the EA data, recommendations for a staged intrusive investigation. Discussions about the findings of the Phase 1 LQA and a proposed methodology for an intrusive investigation have been initiated with the EA and Southern Water.

[21] https://www.claire.co.uk/index.php?option=com_content&view=article&id=187&catid=45&Itemid=256

[23] MCERTS: Performance standard for laboratories undertaking chemical testing of soil (2014) Environment Agency. Available online at https://www.gov.uk/government/publications/mcerts-performance-standard-for-laboratories-undertaking-chemical-testing-of-soil [Checked 21/11/17].

[24] Land contamination: technical guidance (2016) Environment Agency. Available online at https://www.gov.uk/government/collections/land-contamination-technical-guidance [Checked 16/11/17].

Consultee	Comments and considerations	How addressed in the PEIR
	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.	
TDC	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.
TDC	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 CEMP.	Environmental measures expected to be incorporated into the Proposed Development are listed in **Section 10.5** of the PEIR. A draft CEMP will be provided with the DCO application.

10.3.10 A summary of the consultee comments on the previous PEIR (2017) and responses provided in this PEIR is provided in **Table 10.4**.

Table 10.4 Consultee comments on the previous PEIR (2017)

Consultee	Comments and considerations	How addressed in this PEIR
TDC	Draft Phase 1 Geo-environmental report – It is noted that breaking of aircraft at the former airport is not included and should also be added as a potential contaminant source within the conceptual model.	Previous Reports do not mention this as historic activity, nor does TDC in the data provided in response to our request ref WK/201616961. Maintenance of aircraft is addressed as potential contaminant source in our Phase 1 LQA provided in **Appendix 10.1**. Amec Foster Wheeler (now Wood) has sent a request to TDC to provide further details on whether this activity happened at the site and any information on the nature and location of these activities. Any information provided will be included in the ES.
TDC	In addition to EA requirements in relation to groundwater, the Council should be consulted regarding the scope of the proposed intrusive investigations, and any subsequent remediation requirements, as these are material planning considerations.	TDC will be consulted regarding the scope of the proposed intrusive investigations, and any subsequent remediation requirements, as these are material planning considerations. It is specified in **Section 10.8** of this PEIR – Construction phase effects - that: “an intrusive investigation will be

Consultee	Comments and considerations	How addressed in this PEIR
		undertaken before construction to determine if there is any evidence of contamination, the programme and scope of these investigations will be agreed, following consultation with the EA, TDC Environmental Health Officer and other stakeholders as appropriate."
TDC	Within the PEIR significance evaluation for land quality, negligible magnitude of the adverse effects on human health and groundwater has been considered for the application site itself, with the proviso that appropriate investigation and mitigation will be undertaken to safeguard sensitive receptors. However, a number of 'site specific measures' will be required to address effective identification, protection, containment, attenuation, management and recovery of potential contaminants at the site during the construction and operational phases. These are yet to be agreed by the regulators.	'Site specific measures' required to address effective identification, protection, containment, attenuation, management and recovery of potential contaminants at the site during the construction and operational phases are being discussed with the regulators, including the EA, and TDC,. The measures will be incorporated into the finalised CEMP for the construction phase and in an aerodrome manual that will be produced for the operational phase in accordance with CAP 168[25]..
TDC	Although the likelihood is low, impacts of a plane crash outside contained areas must also be considered as part of the PEIR. This has not been looked at in the preliminary significance evaluation and it is understood that further work is currently being undertaken by Amec Foster Wheeler to address this. Manston airport benefits from a particularly wide (and long) runway. However, the adverse effects for this scenario should be considered in conjunction with appropriate emergency and pollution response plans. These must have capacity to prevent potential spread of contamination (e.g. fuels and fire retardant foams), which could impact the public water supply or SSSI at Pegwell Bay following an incident; including possible damage to impermeable hardstandings.	An aerodrome manual will be produced for the operational phase in accordance with CAP 168[26]. The manual will include measures: • To manage the availability of aviation fuel and its storage, handling and quality control; • To manage the removal of disabled aircraft to comply with regulatory requirements relating to accidents, incidents and Mandatory Occurrence Reporting (MOR); • That ensure the integrated management of response to an aircraft incident/accident taking account of the complexity and size of the aircraft operations. See also **Chapter 17: Major accident and disasters**.
TDC	The magnitude of effects on human health from UXOs are described as negligible provided detailed threat and risk assessments are completed prior to groundworks. Additional precautions may need to be considered as part of the CEMP however as effects may be significant should unsuspected munitions be encountered during any digging operations. Further specialist advice is required regarding the UXO assessment and any necessary precautions.	This will be done in a phased approach, with additional assessment carried out as part of the site investigation. Future work relating to UXO will follow CIRIA guidelines (details are in **Table 10.1**). The finalised CEMP will be informed by the findings of the site investigation.
TDC	The requirements for siting and options for above ground tanks must be explored with Environment Agency. A relevant Bristol airport case study is referenced in the PEIR and further details should be provided.	The majority of the Jentex site is in Source Protection Zone (SPZ) 2. The meetings with the regulators (EA, TDC and SW) regarding the possible re-use of the Jentex site are summarised in **Table 10.5, Table 10.6** and **Table 10.7** and detailed in **Chapter 8: Freshwater Environment**

[25] Licensing of Aerodromes: CAP168. Ed10. (2014) Civil Aviation Authority. Available online at http://publicapps.caa.co.uk/docs/33/CAP%20168%20Licensing%20of%20Aerodromes.pdf [Checked 16/11/17].
[26] Licensing of Aerodromes: CAP168. Ed10. (2014) Civil Aviation Authority. Available online at http://publicapps.caa.co.uk/docs/33/CAP%20168%20Licensing%20of%20Aerodromes.pdf [Checked 16/11/17].

Consultee	Comments and considerations	How addressed in this PEIR
TDC	It is noted that a CEMP is to be submitted as part of the DCO to reduce effects of pollution from the construction phase. The CEMP must be informed by the findings of intrusive investigation work. Please note that any works must be carried in a strictly controlled manner to ensure that contaminants are not exposed and releases allowed to air, land or controlled waters, which could cause pollution, harm or nuisance. Construction works must also comply with the Control of Pollution Act 1974 [27](e.g. any works likely to cause nuisance to neighbouring properties must not commence prior to 8:00am with stated weekday working hours are 07:30-17:30hrs).	The current proposal is to include an outline CEMP as part of the application, with a requirement that a full CEMP is produced and consulted upon with key consultees as a DCO requirement. It would include the measures described in the Land Quality and Freshwater Environment Chapters of this 2018 PEIR to prevent mobilisation of and exposure to existing potential contamination during construction activities. Please refer to **Table 10.5.** Construction works will be carried out in accordance with relevant legislation and policy and good practice industry techniques for the protection of the environment from construction activities. These will be outlined in the outline CEMP submitted as part of the DCO submission.
EA	Any objection on the grounds of inappropriate use in a Source Protection Zone 1 (SPZ1) for a public water supply may carry limited weight in planning terms. We would therefore seek to work with applicants to ensure maximum environmental controls are in place for any agreed return to airport use.	Consultations with the EA are ongoing.
EA	We would want to agree in advance the scope and location of any new site investigation activity. We would suggest some further site investigation and assessment may be required for key hotspots, i.e. fuel tanks and ASTs, to support the full DCO submission. At the very least a full summary of all existing ground investigation information should be drawn together and interpreted appropriately.	It is specified in **Section 10.8** that: “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 following consultation with the EA, TDC as appropriate.” A summary of the existing ground information is presented in **Section 10.4**.
EA	To protect the underlying adit system and SPZ1, we would seek the bulk of existing runaway and taxiways to be kept and not dismantled.	As stated in **Table 10.8** and **Table 10.9** and in **Sections 10.8** to **10.12**, ‘any removal of contamination beneath the existing runway will be risk based and will weigh advantages of contamination removal against removal of the runway’.
EA	We would need to see a full options appraisal for any fuel depot location and agree full designs and containment processes for any agreed location.	Discussion on fuel farm design measures was held with the EA on 15th September and 3rd November 2016, and 6th March, 16th May, 15th September and 3rd November 2017. The additional measures detailed during these meetings and acknowledged by the EA have been incorporated into **Table 10.8** and **Table 10.9** and assessed in **Sections 10.8** to **10.12**.
EA	Any new taxiway drainage will have to tie in to positive drainage controls, to guard against accidental spillages on the taxiway.	Please refer to **Table 10.8** and **Table 10.9** and **Sections 10.8** to **10.12** as well as **Chapter 8: Freshwater Environment.**
EA	A full CEMP will need to be agreed with us for all phases of works. Operational pollution prevention plans would also need to be agreed and should consider best practice and also available innovative measures for spillage management. We can discuss this further with the applicant, but for fire safety and	An outline CEMP will be included as part of the application, with a requirement that a full CEMP is produced and consulted upon with key consultees as a DCO requirement – refer to **Table 10.8**.

[27] Control of Pollution Act (1974) Environment Agency. Available online at https://www.legislation.gov.uk/ukpga/1974/40 [Checked 16/11/17].

Consultee	Comments and considerations	How addressed in this PEIR
	hydrocarbon contaminant control we note there are new products available as well as traditionally used measures.	An aerodrome manual will be produced for the operational phase in accordance with CAP 168. The manual will comprise measures: • to manage the availability of aviation fuel and its storage, handling and quality control; • to manage the removal of disabled aircraft to comply with regulatory requirements relating to accidents, incidents and Mandatory Occurrence Reporting (MOR); • that ensure the integrated management of response to an aircraft incident/accident taking account of the complexity and size of the aircraft operations Further information available in **Chapter 8: Freshwater Environment.**
EA	Any spoil re-use on site will have to be agreed with us and managed under appropriate frameworks with verification reporting. Mobile treatment permits may have to be deployed to enable re-use of certain materials, the location would have to be agreed with us and be outside sensitive SPZ areas.	It is stated in **Table 10.5** that 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. **Table 10.6** confirms that soil to be re-used will be controlled under the CL:AIRE Definition of Waste: Development Industry Code of Practice[28] to confirm they are suitable both chemically and geotechnically.
EA	Drainage management of cargo, HGV transit areas and car parking would need positive safe drainage to manage pollution risks. Early indications are that this can be achieved by outline proposals. They would need to be agreed in full at some point if development is top progress.	Please refer to **Table 10.8, Table 10.9** and **Sections 10.8** to **10.12** as well as **Chapter 8: Freshwater Environment.**
EA	If / when existing buildings and infrastructure are demolished then appropriate site assessment will be needed under footprints to ensure any historic contamination risk is fully understood and addressed. This is especially relevant for any chemical or fuel storage areas, including the current Jentex site. Temporary surface water management or cover systems may be needed of exposed footprints until any remediation has been completed.	Subject to confirming which buildings will be demolished, these areas likely to be targeted as part of the site investigation.
EA	Proposals for storage of any materials for firefighting will need agreement with us and particular materials may not be approved if there is a risk of loss to ground of some types firefighting foams for instance.	The materials proposed for firefighting and the appropriate storage of these will be agreed following discussion with the EA and the Fire service. Measures will be included in the aerodrome manual that will be produced for the operational phase in accordance with CAP 168.
EA	All foul drainage will need agreement and any decommissioned existing drains should be removed to	This is covered in the drainage strategy in **Chapter 8: Freshwater Environment**

[28] The Definition of Waste: Development Industry Code of Practice. Version 2 (2011) CL:AIRE. Available online at http://www.carbonaction2050.com/sites/carbonaction.ciobrebuild.io1dev.com/files/document-attachment/Definition%20of%20Waste.%20Development%20Industry%20Code%20of%20Practice.pdf [Checked 16/11/17].

Consultee	Comments and considerations	How addressed in this PEIR
	ensure they do not offer pathways for contaminant transport into the ground.	
EA	We would need to agree the location and configuration of any cement or asphalt batching plant during construction activities, this should be as far from the SPZ1 area as possible and designed to ensure all drainage is positively controlled.	Addressed in **Table 10.5**: 'A designated area, the location and configuration of which will be agreed following consultation with the EA, 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'.
EA	Any construction that requires piling would need to agree piling designs with us based on a risk assessment carried out in accordance with our guidance.	This is specified in **Table 10.5**: 'Suitable foundation design and piling method will be implemented to prevent migration of any potential/residual contamination and will be agreed following consultation with Southern Water and the EA prior to the commencement of works.' And further discussed in **Sections 10.9** and **10.11.**
Kent County Council (KCC)	The application site does not lie within a Mineral Safeguarding Area as defined by the Kent Minerals and Waste Local Plan 2013-30 Policies Maps[29]. Therefore KCC, as Minerals and Waste Planning Authority, does not consider there to be any associated Mineral Safeguarding issues.	Reference has been removed from **Table 10.1**
Public Health England (PHE)	The potential for spillages and releases during the development phases is not fully discussed or developed in the current version of the EIA. The current documentation relies on the assumption that the CEMP and normal construction site good practice will be able to address these issues as they arise.	A Health Impact Assessment has been developed and is included within **Chapter 15: Health and Wellbeing**. The CEMP will outline the drainage and runoff controls likely to be required.
PHE	PHE accepts that the CEMP is the mechanism that will be used to control the majority of these potential impacts but believes that it should be developed in response to a suitable and sufficient risk assessment. A satisfactory assessment will need to identify any chemicals or substances which may be released into the environment, consider pathways by which sensitive receptors may be exposed and assess the significance of any such releases. PHE recommends that this risk assessment process should be documented and included in the final version of the EIA.	A Health Impact Assessment has been developed and is included within **Chapter 15: Health and Wellbeing**. The phase 1 desk study outlines the potential soil contaminants and it is proposed to only excavate and remove soil where is poses a risk. Where possible hardstanding will be left in place. The CEMP will outline the controls likely to be required and how those controls will be developed.
PHE	In operation, the airport and supporting infrastructure will require the storage and use of a number of chemicals including fuel, de-icing fluids, lubricants etc. A number of these chemicals have the potential to cause impacts on the local population if they are exposed by releases to air, land or water.	A Health Impact Assessment has been developed and is included within **Chapter 15: Health and Wellbeing.** An aerodrome manual will be produced for the operational phase in accordance with CAP 168. The manual will include measures: • To manage the availability of aviation fuel and its storage, handling and quality control; • To manage the removal of disabled aircraft to comply with regulatory

[29] Mineral safeguarding maps: Minerals and Waste Local Plan 2013-2030 (2016) Kent County Council. Available online at https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/planning-policies/minerals-and-waste-local-plan/minerals-and-waste-local-plan# [Checked 16/11/17].

Consultee	Comments and considerations	How addressed in this PEIR
		requirements relating to accidents, incidents and Mandatory Occurrence Reporting (MOR); • That ensure the integrated management of response to an aircraft incident/accident taking account of the complexity and size of the aircraft operations. The outline of controls to be incorporated in the design of the fuel farm and run-off of de-icer area included in **Table 10.9**
PHE	PHE recommends that the major chemicals and substances of concern be identified and that the final EIA includes an inventory of these chemicals and substances, an assessment of their risk to human health and details of how these risks will be managed.	A Health Impact Assessment has been developed and is included within **Chapter 15: Health and Wellbeing**. An aerodrome manual will be produced for the operational phase in accordance with CAP 168. The manual will include measures: • To manage the availability of aviation fuel and its storage, handling and quality control; • To manage the removal of disabled aircraft to comply with regulatory requirements relating to accidents, incidents and Mandatory Occurrence Reporting (MOR); • That ensure the integrated management of response to an aircraft incident/accident taking account of the complexity and size of the aircraft operations.
PHE	Where available, the most recent UK environmental standards for the appropriate media (e.g. air, water, and/or land) and health-based guideline values should be used when quantifying the risk to human health from chemical pollutants. Where UK standards or guideline values are not available, those recommended by other organisations including the European Union, and World Health Organisation, subject to suitable explanation and justification, should be used.	The relevant and recommended environmental standards will be used at the site investigation and detailed quantitative risk assessment stage.
PHE	In general terms, PHE is satisfied with the approach taken to assessing land quality and notes that a programme of intrusive site investigation to identify and characterise contamination across the site will be undertaken if required. The applicants state that they will seek to agree a remediation programme with the EA and Thanet District Council. PHE is satisfied with this approach and will make additional comments at the DCO stage, once the Local Authority and EA positions have been clarified and the final reports are available.	The Phase 1 desk study will be submitted together with this PEIR and the ES chapter for Land Quality. The scope and design of the site investigation to be carried out post consent will be agreed following consultation with TDC, Southern Water and the EA.
PHE	The documentation proposes to scope out the potential for impacts on human health from spills and leaks associated with mechanised plant during the construction phase. It is argued that this position is justified on the basis that any spills or leaks are likely to be limited, and those that might occur will be managed and controlled by the use of best practice. PHE is of the opinion that, in the absence of a CEMP, it is difficult to justify the assumption that adequate controls will be in place. Consequently we recommend that leaks and	A generic risk assessment has been carried out, however mitigation will be dealt with in the outline CEMP, which as specified in **Table 10.8** will be prepared following consultation with the EA and TDC.

Consultee	Comments and considerations	How addressed in this PEIR
	spills should not be scoped out until such time as the CEMP has been produced and both Thanet District Council and the EA are happy that the proposed controls are adequate.	
PHE	There is currently no Waste Management Plan for the operational phase of the site and the timeline for the development places this document outside the DCO process. In terms of waste produced during the construction phase the documentation once again refers as the CEMP as a key management document. As the CEMP is not yet available PHE is unable to provide detailed comments at this time and will consider the matter further at the application for DCO stage.	Waste handling procedures for the operational phase will be included in the aerodrome manual. Soil waste produced during construction phase will be will be controlled under the CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2).[30] The proposal is to include an outline CEMP as part of the application, with a requirement that a full CEMP is produced following consultation with key consultees, such as EA, as a DCO requirement.
PHE	PHE notes that a report from the Defra Radiation Protection Services 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. PHE requests that the nature and extent of potential radioactive material be further considered and that the potential for radiological contamination and any necessary handling / decontamination procedures be included in both the discussions on land contamination and the CEMP (once written). PHE reserves the right to make further comments once more detailed information is provided at the application for DCO stage.	Radium has been added to burning area in **Section 10.4.37**– Current/Historic Activities and in the preliminary risk assessment of the Phase 1 LQA (**Appendix 10.1**). The further site investigation will screen arisings especially areas of ash or waste tips for radioactivity. This will allow any necessary mitigation to be addressed.
PHE	The submitted documentation indicates that there are no public water supply abstractions located within the site boundary, but that a number of people and organisations abstract water from groundwater or ponds/lakes up to 1km outside the site boundary (6 located within 500m, and a further 3 up to 1km from the site boundary). The abstractions are for private water undertaking, public water supply and agriculture.	Information about water supply abstractions is provided in **Section 10.4**.
PHE	Given the known issues of land contamination and the potential for further releases into the environment during future operations, there is the potential for exposure of the public via ground or surface waters. We note that there are a number of permitted discharges to land, ground water and the saline estuary and are concerned that there may be the potential for recreational uses of the area to be inadvertently exposed to releases form the site.	Please refer to **Chapter 8: Freshwater Environment**. Any discharges would be covered by permitting regime.
PHE	We request that the proposer works with the EA to consider the possible releases to water, possible exposure pathways and potential risks to public health. A suitable summary of these risk assessments and, if necessary, control measure should be included in the final DCO application.	An assessment of the Proposed Development's effects on controlled waters, including Pegwell Bay, has been carried out in **Section 10.10.** Please also refer to **Chapter 8: Freshwater Environment.**

[30] The Definition of Waste: Development Industry Code of Practice. Version 2 (2011) CL:AIRE. Available online at http://www.carbonaction2050.com/sites/carbonaction.ciobrebuild.io1dev.com/files/document-attachment/Definition%20of%20Waste.%20Development%20Industry%20Code%20of%20Practice.pdf [Checked 16/11/17].

Consultee	Comments and considerations	How addressed in this PEIR
		A Health Impact Assessment has been developed and is included within **Chapter 15: Risks to Human Health**.

10.3.11 The Phase 1 LQA(**Appendix 10.1**)has been provided to the EA and TDC for review and the comments are listed in **Table 10.4**

10.3.12 Further consultations with the EA, Southern Water and TDC have been undertaken post-scoping. These have comprised the meetings listed in **Table 10.5, Table 10.6** and **Table 10.7**. More information regarding discussions about site drainage and flood risk can be found in **Chapter 8: Fresh Water Environment**.

Table 10.5 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 SPZ 1.[31] 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. The EA 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 [32] 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 feeding the Lord of the Manor[33] 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

[31] 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.
[32] An Adit is a horizontal passage leading into the Lord of the Manor groundwater abstraction to increase flow to the source.
[33] 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
	an accurate conceptual model (source, pathway, receptors) is established. However the EA would need to understand the distribution of contaminants across the site so that future work did not result in their mobilisation. The EA 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 RSP 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: EA 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. CEMP: EA 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 EA welcomed this approach. Local sewer network: The EA requested that the project confirm the capacity, condition and ownership of the foul sewer network on site. Clean water requirements: Discharge Permit: The EA 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 EA indicated that it was likely that a discharge permit would be required to regulate the Pegwell Bay Discharge. The EA agreed to confirm whether this would be necessary and confirm if it would regulate quantity as well and quality. 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 EA 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 EA requested that the Land Quality Phase 1 and the HRA are linked and cross-referenced where appropriate. Nitrate in groundwater: The EA stated that Thanet is a priority area for groundwater, with the main issue being nitrates. Therefore the EA 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 EA would therefore seek to similarly engage with the operators of Manston Airport.

Date of meeting	Key points of discussion
	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 EA would be involved in their design. The EA requested that is be a condition that all documents and reviewed and signed off by all relevant consultees. Fuel Farm: RSP 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 EA 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 EA groundwater protection policies (published 14 March 2017) state that the EA will not support any 'new' bulk fuel storage in SPZ1. It was noted that the site is only partly within SPZ1. The EA 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 EA indicated that the Thanet Chalk was a candidate water protection zone – to highlight the sensitivity of the water resources situation, however it has 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 EA would like to see within the ES 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 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 EA 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 EA 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 EA are not happy with any drainage to ground or use of soakaways on the site. The EA 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.
15th September 2017	Fuel Farm design and Safety & Risk: The EA acknowledged that the design has moved the fuel farm outside of SPZ1 but stated that the fuel farm should include innovative solutions that go-beyond BAT. Measure should also be incorporated onto the parking areas and the internal roads/access route to be used for the bowsers to access to/from the fuel farm. Bunding capacity for the total combined tank volume would be required, and adequate containment will be needed for all loading/unloading tanks/storage areas. And that EA would want to see more detail on the design and the proposed mitigation measures to be incorporated. Hydrogeological Impact Assessment update: Additional modelling has been undertaken since the 1st issue of the PEIR (2017) to look at the risk to the adit from an incident at a fuel farm located at the Jentex site. The model used was the EA East Kent Groundwater Model, with the adit represented as a series of "pumping" wells. The pumping rate was the recent accrual pump rate of 3.5 Ml/d (license value is 11.2 Ml/d and SW has estimated the Peak deployable output of 5.2 Ml/d and minimum of 2.81 Ml/d). The model results have shown that: • The majority of the water entering the Western Adit comes from the north; • Flow beneath fuel farm is both to the north (adit) and south (coast); • Groundwater flowing north is a small (0.05%) proportion of the water pumped out of the adit; • Travel times are long; and • The zone of stagnation, the point where flow stops flowing north, is close to the fuel farm. The EA requested that additional model analysis to confirm any eastward movement will be undertaken. The EA stated that it would require some groundwater monitoring, and the location of this monitoring would be dependent on the final design of the fuel farm. Drainage Strategy and Potential for runway removal: The Civil Aviation Authority (CAA) may require the removal of redundant taxiway/runways for operational and safety reasons. The EA

Date of meeting	Key points of discussion
	noted that the EA and Southern Water have both previously stated that they would not want material above the adit and within SPZ1 to be removed if can be left in-situ. Concerns include: • Depth of material above adit is unknown, it is also seen to provide some protection to the adit; • Details of removal process are unknown, it may result in turbidity in adit; and • It is not know what, if any, contaminants may be within or below the surface which may be mobilised by the construction. Therefore the EA would object any removal of the existing taxiway/runway within SPZ1 without more details of proposed techniques and further site investigation works. The EA asked for an opportunity to review and comment on the types of de-icer to be used, so that where possible lower risk alternatives can be used. As the discharge to Pegwell Bay would be surface water the EA would not normally require a discharge permit. A possible solution would be for a discharge permit between the two treatment ponds. Condition of the discharge pipe to Pegwell Bay: The EA asked about the condition of the pipe. The pipe is in good condition, and therefore only limited works are expected to be needed. However, if required a new pumping station would be installed and redundant infrastructure removed as part of the project. The ownership of the pipeline will be part of the DCO process, currently it is not clear who is responsible for the pipeline.
3rd November 2017	Fuel farm design to incorporate innovative design measures: The EA confirmed that they were happy with the level of detail shown for the Fuel Farm and that no specific additional details were requested. However acknowledgement of this was not confirmation that no further comments would be made. Updated drainage strategy to include confirmation of works for old taxiway/runway: RPS outlined the need for a runway drainage for operational part of existing runway to maintain the runway free of surface water, and also the need for electrical ducting for lighting. This will require penetrations through the existing runway. The EA would prefer that penetrations are limited where the runway overlies the adit and questioned the need for penetrations. They would like to see solutions that minimise penetration and details of how penetrations will be constructed to avoid creating pathway for drainage. The EA would only require removal of contamination where there was a clear risk – if no unacceptable risk it would be better to leave in place. Updated hydrogeological risk assessment: The EA accepted the approach taken is groundwater flow modelling – no contaminant transport modelling will be undertaken. The risks to groundwater will be assessed in a qualitative risk assessment and emphasis placed on mitigation measures to avoid spills to ground.

Table 10.6 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 40-50m below ground level (bgl)), 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.

Date of Meeting	Key points of discussion
	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 RSP 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.
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 ground shaking 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 RSP 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.

Table 10.7 Summary of meetings with Thanet District Council

Date of meeting	Key points of discussion
5th July 2017	Freshwater Environment Amec Foster Wheeler gave an overview of the works undertaken in relation to the Freshwater Environment. The works are looking at the importance of the chalk Thanet Aquifer which underlies much of the site. The EIA and design teams are working closely to ensure that the design and operation of the airport are updated and that modern best practice and procedures are implemented. There will be no discharge to ground, this has been requested by Southern Water, and the existing surface water discharge to Pegwell Bay will be used. Surveys have indicated that this is in a good condition and that with some minor works it will be suitable. Southern Water have indicated that their main concerns are effects to the Thanet Aquifer and the Lord of the Manor Borehole and adit (which runs under the runway) from turbidity, nitrates and hydrocarbons.

Date of meeting	Key points of discussion
	Turbidity will result from any construction works (e.g. pilling) on or near the adit, these will be minimised and managed. Nitrates can result from poor sewerage and drainage, those on site will upgraded as part of the project. The location and design of the airport fuel farm, as well as the re-fuelling of aircraft, is being managed and designed in order to reduce risks from hydrocarbons. This is taking (BAT and current EA guidance and advice into consideration. Amec Foster Wheeler stated that the fuel farm studies are also include a site selection/options appraisal, and safety and risk assessment (including risks to environment). The fuel farm will be on the former Jentex site, but the facility will be new. Land Quality Amec Foster Wheeler gave a brief overview of the works and issues surrounding land quality. A Phase 1 Geo-environmental Desk Study has been completed. There are a number of potential sources of contaminated associated with the former airport operation. This assessment is closely linked to that for the Freshwater Environment as most of the potential receptors are water related. TDC asked about the potential effects/risk from incidents outside of the fuel farm. Amec Foster Wheeler confirmed that this was also be picked up by the wider Safety and Risk studies being undertaken. Amec Foster Wheeler also confirmed that the risks from Unexploded Ordnance (UXO) had also been identified and that this would be addressed.

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[34]) 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 above ordnance datum (AOD) in the east of the site and 40.25 m AOD in the southeast of the site. Based on the hydrogeological map[35], the groundwater flow direction is assumed to be towards the south-east.

10.4.4 The site lies entirely within a groundwater 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

[34] Groundwater mapping (2017) Environmental Agency. Available online at 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 [Checked16/11/17].
[35] Hydrogeological map of the Chalk and Lower Greensand of Kent, sheet no. 3, 1:126,720, published 1970

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. TDC 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 – Envirocheck report Appendix 10.1. The source consists of two wells, Lord of the Manor and Whitehall (the latter is disused and sealed) with three adits[36]. 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[37]) – refer to the draft Hydrogeological Impact Assessment in **Chapter 8: Freshwater Environment**. 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 (WFD)[38].

10.4.8 The groundwater sensitivity is assessed as very high[39]. 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 quality status within the WFD as issued on the EA website[6].

10.4.10 Thanet coast is located approximately 900m southeast of the site boundary. The coastal water sensitivity is assessed as moderate to high[40]. 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. The site drainage ultimately discharges to Pegwell Bay.

[36] An Adit is a horizontal passage leading into the Lord of the Manor groundwater abstraction to increase flow to the source

[37] Aquaterra: Lord of the Manor Constraints Investigation (Desk Study) (2007) pp. 42 Prepared for Southern Water.

[38] Catchment Data Explorer (2017) Environment Agency. Available online at http://environment.data.gov.uk/catchment-planning/OperationalCatchment/3282/classification?item=106&status=all [Checked 16/11/17].

[39] Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66 (2008) NHBC/ CIEH / Environment Agency.

[40] Guidance for the Safe Development of Housing on Land Affected by Contamination (2008) NHBC, Environment Agency, Chartered Institute of Environmental Health. Available online at http://www.nhbc.co.uk/NHBCpublications/LiteratureLibrary/Technical/filedownload,33595,en.pdf [Checked 15/11/17].

10.4.11 The surface water sensitivity is assessed as moderate to low[41] due to the potential for pollutant transmission to water located 2.5km from site via baseflow or via an interconnected unclassified drain or stream.

10.4.12 Additional information is provided in **Chapter 8: Freshwater Environment.**

Ecologically Sensitive Land Use

10.4.13 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)[42].

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

Current / Historic Land Use

10.4.15 Based on historical mapping the site was grassland and agricultural land from 1873 to 1915[43]. 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.

10.4.16 Information obtained from the Spitfire museum website[44] 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[45]. 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 heavy bombers. During the 1950s 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 (product is understood to contain carbon-tetrachloride)[46].

10.4.17 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

---

[41] Guidance for the Safe Development of Housing on Land Affected by Contamination (2008) NHBC, Environment Agency, Chartered Institute of Environmental Health. Available online at http://www.nhbc.co.uk/NHBCpublications/LiteratureLibrary/Technical/filedownload,33595,en.pdf [Checked 15/11/17].

[42] MAGIC website (2017) Natural England. Available online at http://www.natureonthemap.naturalengland.org.uk/home.htm [Checked 15/11/17].

[43] Envirocheck report dated 2016 (reference 82787389_1_1)

[44] Spitfire and Hurricane Memorial Museum website (2017) RAF Manston Spitfire & Hurricane Memorial Trust. Available online at http://www.spitfiremuseum.org.uk/ [Checked 15/11/17].

[45] The Miliary Airfields of Britain – Southern England (2006) Ken Delve, Crowood. (ISBN 1-86126-729-0)

[46] Process of extinguishing fires: US 1010870 (1911) Pyrene Mfg Co. / Google patents. Available online at https://www.google.com/patents/US1010870 [Checked 21/11/17].

the site by 1995[47]. The RAF operation of the site finished in 1999[48] and the airport became Kent International Airport operating civilian air traffic (cargo and passenger flights). Kent International Airport ceased operations in 2014[49]. 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.

10.4.18 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[43], has reduced in the number of tanks since 1995[43]. 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

10.4.19 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[50].

Soils

10.4.20 The soils on and directly surrounding the site are classed as variably permeable urban soils of high leaching potential.[51]

Waste disposal / Landfilling

10.4.21 Based on the available information, there are six historical landfills in the close surroundings of the site (within a 500m distance)[43]. 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

10.4.22 Five reports have been reviewed for the assessment.

Land Quality Assessment Phase One: Desk Study land Quality Statement 1998[52], hereafter referred as "GIBB report"

10.4.23 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.

10.4.24 The observations from this report have been used to inform Sections 3.4 and 3.7 of the Phase 1 LQA (**Appendix 10.1**).

---

47 Envirocheck report dated 2016 (reference 82787389_1_1)
48 RAF Manston (2017) Spitfire and Hurricane Memorial Museum, Manston, Kent. Available online at http://www.spitfiremuseum.org.uk/rafmanston [Checked 21/11/17].
49 Commercial Viability of Manston Airport (2016) AviaSolutions. Available online at https://www.thanet.gov.uk/media/3500741/Final-Report-for-TDC-Manston-Airport-Viability-Oct2017_2.pdf [Checked 21/11/17].
50 Ministry of Agriculture Fisheries and Food. Post 1988 Agricultural Land Classification and www.magic.gov.uk
51 Envirocheck report dated 2016 (reference 82787389_1_1)
52 Land Quality Assessment Phase One: Desk Study land Quality Statement. Project No. 10133 – Final report (1998) GIBB Environmental.

Geo-environmental Assessment, Jentex petroleum, Cliffsend, Kent, 2015[53]

10.4.25 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 below ground level (bgl) and 15 trial holes dug to 4m bgl. The western part of the site was not included in the investigation.

10.4.26 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.

10.4.27 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. This supplementary investigation is described below.

Geo-environmental Assessment Report, Jentex – Supplementary Assessment, Cliffsend, Kent, 2016[54]

10.4.28 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.

10.4.29 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.

10.4.30 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 to be not significant.

Kent International Airport Manston, Radar Mast development, Phase 1 and 2 Contaminated Land Assessment, 2010[55]*.*

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

[53] Geo-environmental Assessment, Jentex petroleum, Cliffsend, Kent, Jentex GEA-18996-15-134 (2015) Idom Merebrook Ltd

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

[55] F/TH/09/0637 | Erection of mast for primary and secondary radar installations with associate transmitter and receiver building, within compound enclosed by 2.9 metre fence and associated substation. Kent International Airport, Manston, (2010) Jacobs. Available online at https://planning.thanet.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=ZZZZMWQEBJ103 [Checked 15/11/17].

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 off-site 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, 2007[56]

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

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

collected from 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 Scotland & Northern Ireland Forum For Environmental Research (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 in February 2017. More details are provided in **Appendix 10.1**.

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

10.4.39 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[57].

- Burning grounds: A burning area previously identified to the east of the fire station (Building (Bldg.) 869)[58] 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. There is a potential for radium to be present from historic activities in this area. It is located on an asphalted area but extends towards a grassed area. There is no bund.

10.4.40 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. 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.

10.4.41 Significant quantities of de-icing chemicals used to be stored in the current MT area. It was not known whether specific containment measures were in place.

10.4.42 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.

10.4.43 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.

- 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.

10.4.44 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.

10.4.45 Radiological sources: A report from the Defence Evaluation and Research Agency (DERA) Radiation Protection Services included within the GIBB report suggested that, as with many RAF

[57] Process of extinguishing fires: US 1010870 (1911) Pyrene Mfg Co. / Google patents. Available online at https://www.google.com/patents/US1010870 [Checked 21/11/17].
[58] Refer to Section 3.7 and Figures 1.1 to 1.4 of Appendix 10.1 and Land Quality Assessment Phase One: Desk Study land Quality Statement. Project No. 10133 – Final report (1998) GIBB Environmental

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.

10.4.46 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.

10.4.47 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**.

10.4.48 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

10.4.49 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.

10.4.50 The outfall route to Pegwell Bay and service routes from the highway to the outfall pipeline and a waste storage area located adjacent to the west of the site could not be visited.

10.4.51 The risk rating of the potential linkages range from low to high – refer to **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

10.4.52 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 Proposed environmental measures for the Proposed Development

10.5.1 A summary of the proposed environmental measures in order to avoid, reduce or compensate for potential adverse Land Quality effects is provided in **Table 10.8** . Effects of turbidity on groundwater are addressed in **Chapter 8: Freshwater Environment**.

10.5.2 The environmental measures include a site investigation which will inform the need for mitigation within the Proposed Development. The site investigation and associated mitigation measures will be agreed with the regulators, including the EA, TDC and other stakeholders as appropriate, and incorporated into the final development as outlined below. 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 10.8 Proposed effects and environmental mitigation measures for the construction phase

Potential receptors	Predicated changes and potential effects	Proposed mitigation 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 through the DCO..
		• The findings of the intrusive investigation will inform the package of measures to be included within the detailed design.
		• Any removal of contamination beneath the existing runway will be risk based and will weigh advantages of contamination removal against removal of the runway.
		• A construction environmental management plan (CEMP) will be prepared and agreed following consultation with the EA and other relevant stakeholders if necessary prior to commencement of works. A draft outline CEMP will be submitted as part of the DCO application It will include a plan addressing the following pollution 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 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 following consultation with the EA and the relevant local authority as appropriate 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

Potential receptors	Predicated changes and potential effects	Proposed mitigation measure
		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 construction process	• 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[59] and the Management of Health and Safety at Work Regulations 1999[60]. • 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. • 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) in accordance with current guidelines. In addition measures to control spillages from the construction process also set out in the **Chapter 8: Freshwater Environment** will 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. • The bulk of the existing runways and taxiways will be kept as they afford protection to the adit in SPZ1. In order to mitigate against any potential FOD hazard (a concern raised by the CAA), it is proposed to overlay the extended paved area with asphalt as part of the initial construction phase.
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 [61] 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. This will be done in a phased approach, with additional assessment carried out as part of the site investigation. Future work relating to UXO will follow CIRIA guidelines (please refer to **Table 10.1**). The finalised CEMP will be informed by the findings of the site investigation and mitigation implemented in the construction phase.
Soils / Ground water	Pollution incidents resulting from the release of contaminants from building materials or	• 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 and implemented in the construction works. Suitably qualified and experienced geo-environmental engineers would be used to supervise the ground works.

[59] Control of Substances Hazardous to Health (COSHH) (2002) Health and Safety Executive. Available online at http://www.hse.gov.uk/nanotechnology/coshh.htm [Checked 21/11/17].
[60]The Management of Health and Safety at Work Regulations (1999) Health and Safety Executive. Available online at http://www.legislation.gov.uk/uksi/1999/3242/contents/made [Checked 21/11/17].

Potential receptors	Predicated changes and potential effects	Proposed mitigation measure
	construction activities	• 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". • Any removal of contamination beneath the existing runway will be risk based and will weigh advantages of contamination removal against removal of the runway. • Remediation of potential residual contaminants at the Jentex tank farm will be undertaken, subject to risk-based assessment.
Humans / Groundwater/ coastal water	Pollution incidents due to removal of tanks during construction phase	• Procedures will be incorporated into the CEMP to prevent mobilisation of fuel and these will be implemented as part of the construction phase. • Safety precautions will be implemented and will include preparing an emergency response plan within the site health and safety documentation. • Remediation of potential residual contaminants at the Jentex tank farm will be undertaken, subject to risk-based assessment.
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, the location and configuration of which will be agreed following consultation with the EA, 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 – subject to risk-based assessment - 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 10.9 Proposed effects and environmental mitigation measures for the operational phase

Potential receptor	Predicated changes and potential effects	Proposed mitigation measure
Humans / Buildings and services	Health hazard / Damage to property due to ingress and accumulation of	• Following the site investigation, buildings will be designed to comply with Building Regulations 2017[62] including, where necessary, ground gas and vapour protection measures such as gas vapour membranes and sub-floor

[62] Building Regulations (2017) Department for Communities and Local Government. Available online at https://www.gov.uk/government/policies/building-regulation [Checked21/11/17]. http://www.legislation.gov.uk/uksi/2017/856/pdfs/uksi_20170856_en.pdf

Potential receptor	Predicated changes and potential effects	Proposed mitigation measure
	vapour or ground gas resulting in health hazard from vapour or explosion/ asphyxiation for users of site buildings	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 and subsequent risk assessment will identify any remediation requirement. Any removal of contamination beneath the existing runway will be risk based and will weigh advantages of contamination removal against removal of the runway • 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 be 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 through compliance with the Control of Substances hazardous to Health (COSHH) Regulations 2002[63] and the Management of Health and Safety at Work Regulations 1999.[64] • 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 in accordance with current guidelines • Re-fuelling will be in designated areas with active drainage areas and fuel interceptors. Different treatment methods will be considered, light liquid separator, activated sludge aeration tank and/or forced bed aeration, to treat pollutants with will include exhaust fumes, fuel and lubricant spillages. • Control levels and alarms will be used to identify leaks or overflows. Fuelling system will include automatic shut off of drainage system whilst vehicles will be on refuelling stand.
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. • The fuel farm will largely be located in SPZ2 with only a small piece in SPZ1. All fuel infrastructure will be in SPZ2 (according to most recent development plans (dated 26/10/2017)).

[63] Control of Substances Hazardous to Health (COSHH) (2002) Health and Safety Executive. Available online at http://www.hse.gov.uk/nanotechnology/coshh.htm [Checked 21/11/17].
[64] The Management of Health and Safety at Work Regulations (1999) Health and Safety Executive. Available online at http://www.legislation.gov.uk/uksi/1999/3242/contents/made [Checked 21/11/17].

Potential receptor	Predicated changes and potential effects	Proposed mitigation measure
		• Design will be undertaken beyond BAT and will include: bund construction, specification of double bunded tanks, bund to be underlain by impermeable membrane (e.g. visqueen), joints to be sealed with a hydrophobic sealant to prevent leakage, and concrete to include self-sealing material (e.g. xypex) and to be specified to water impermeable standard with additional reinforcement to limit cracks to e.g. <0.2 mm • 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. Fuelling system will include automatic shut off of drainage system whilst vehicles will be on refuelling stand. In the bunded area, sump drainage will be to a low point from where it will be manually pumped into the drainage system (if clean) or to tanker if contaminated. All pipes will go over the bund wall (no below ground pipes).
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. • Firewater will be retained in site drainage pipes through provision of oversized pipes with automatic shut off to prevent discharge to Pegwell Bay.
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, are proposed for the Proposed Development		
Groundwater	Contaminated run-off generated by de-icer storage and use	• Application of de-icer will only be in designated areas with active drainage where the run-off is lead to water treatment lagoons. • Different treatment methods will be considered to treat de-icing and washing agents. • Consultation on the types of de-icer to be used will be undertaken with the EA, so that were possible lower risk alternatives could be used.

10.5.3 The above proposed measures are standard industry practice for addressing contamination risks, although exact details would be confirmed following further site investigation.

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 10.4; and
- the 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 and site walkover 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 design, 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
- Relevant best practice and guidance where specialist methodologies have been developed as detailed below.

Potential receptors

10.6.6 This section identifies the potential receptors that have been identified based on the above factors and on the consultation response received from PINS, including from the EA and TDC. The receptors listed in **Table 10.10** are considered capable of being significantly affected and will therefore be taken forward for further assessment.

Table 10.10 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**	Onsite	The Phase 1 LQA(**Appendix 10.1**) preliminary risk assessment has identified risks from current and historic sources

Receptor	Distance from site boundary	Reason for selection
(off-site neighbours)– operational phase		
Buildings and Services	Onsite	The Phase 1 LQA (**Appendix 10.1**) 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 (**Appendix 10.1**) has identified risks from current and historic sources
Controlled Waters: Principal Aquifer in bedrock	Onsite	The Phase 1 LQA (**Appendix 10.1**) has identified risks from current and historic sources

Spatial and temporal scope

10.6.7 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 – The spatial scope has been defined in section 10.3.2.

- 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;
- 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. The site drainage ultimately discharges to Pegwell Bay;
- Groundwater: Groundwater receptors have been defined as the Kent Isle of Thanet Chalk 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.

10.6.8 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.

10.6.9 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.

10.6.10 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

10.6.11 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 CLR 11. The preliminary risk assessment approach is:

- 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 (**Appendix 10.1**).

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 10.11** Where a receptor could reasonably be placed within more than one value

and sensitivity rating, professional judgment has been used to determine which rating would be applicable.

Table 10.11 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 10.12**.

Table 10.12 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. *Beneficial* Removal of all identified contaminant linkages that pose a risk to receptors.	*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. *Beneficial* Removal of all identified contaminant linkages that pose a risk to receptors.	*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. *Beneficial* Removal of all identified contaminant linkages that pose a risk to receptors.	*Adverse* Catastrophic damage to crops, buildings or property. *Beneficial* Removal of all identified contaminant linkages that pose a risk to receptors.	Significant harm to humans is defined in Defra circular 01/2006 – contaminated land[214] 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).
Medium	*Adverse* Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs. *Beneficial* Removal of the majority of identified contaminant linkages so that risks to receptors are reduced.	*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. *Beneficial* Removal of the majority of identified contaminant linkages	*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. *Beneficial* Removal of the majority of identified contaminant linkages	*Adverse* Significant damage to crops, buildings or property. *Beneficial* Removal of the majority of identified contaminant linkages	Significant harm to humans is defined in Defra circular 01/2006 – contaminated land[214] 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.

[214] Circular 01/2006 Environmental Protection Act 1990: Part 2A Contaminated Land, September (2006) Department for Environment, Food and Rural Affairs (Defra). Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69309/pb12112-circular01-2006-060817.pdf [Checked 21/11/2017].

		so that risks to receptors are reduced	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*	

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 10.13**. 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 very high, 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 10.13 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 human receptors

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 receptors through direct contact, ingestion and / or inhalation of impacted soils. The receptors' sensitivity has been assessed as high. A Health Impact Assessment has been included within this PEIR as **Chapter 15: Risks to Human Health**. In addition, environmental measures and construction good practices to control exposure and prevent spreading of contamination have been suggested for incorporation into the site's CEMP and will be implemented in the construction phase, as well as a survey and removal of asbestos containing materials – refer to **Table 10.8**. 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 following consultation with the EA, TDC 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 receptors would be negligible (i.e. 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. This will be done in a phased approach, with additional assessment carried out as part of the site investigation. Future work relating to UXO will follow CIRIA guidelines (refer to **Table 10.1**). The finalised CEMP will be informed by the findings of the site investigation and

updated with findings and proposed mitigation from the site investigation. With these, yet unknown, measure in place, there is a high degree of certainty that the effects on human receptors 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 receptors' sensitivity has been assessed as high and the magnitude of effect as high; the effects on human receptors 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 10.8**. Remediation of potential residual contaminants will be undertaken, subject to risk-based assessment. Controls on areas requiring excavation are likely to include minimising the exposed excavation areas, managing stockpiles to control runoff and covering stockpile to minimise dust and odour. In addition the following measures will be included in the CEMP and implemented in the construction phase:

- For existing fuel storage decommissioning phase:
  - All services will be traced:
  - All fuel lines and tanks will be emptied, cleaned and degassed prior to removal; and
  - The management of soil contamination will be informed by the site investigation to define and delineate impacted areas.
- For new fuel storage commissioning phase:
  - A commissioning plan will be designed and followed; and
  - All lines and tanks will be checked by competent people prior to commissioning.

10.8.4 It is expected that with these measures in place the potential effects on human receptors would be negligible and therefore not significant during the construction phase.

Operational phase effects

10.8.5 The potential effects on human receptors 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.

10.8.6 With the environmental measures outlined in **Table 10.9** 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 receptors 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

10.8.7 The same approach as for the construction phase would be undertaken for the decommissioning phase, therefore no potentially significant effects are anticipated except for decommissioning of tanks and infrastructure at the fuel storage areas (Jentex tank farm). The environmental measures

that will be incorporated in the construction phase – refer to **Table 10.8** as well as the additional measures that have been developed in this PEIR will be implemented to mitigate the potential effects on human receptors.

Combined Effects

10.8.8 It is anticipated that there will not be any significant combined effects on human receptors providing that each potential contamination 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 and implemented in the construction phase.

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; and
- 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 following consultation with the EA 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 will be incorporated into the CEMP and will be implemented in the construction phase – refer to **Table 10.8**. They include avoidance of ground disturbance and potentially polluting activities within SPZ1, and agreement of piling approaches following consultation with the EA and Southern Water prior to commencement of construction works. Any removal of contamination beneath the existing runway will be risk based and will weigh advantages of contamination removal against removal of the runway.

10.9.5 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 EA and Southern Water, will result in negligible magnitude of effect upon a high receptor sensitivity, and therefore no potentially significant effects during the construction phase.

10.9.6 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. Remediation of potential residual contaminants will be undertaken, subject to risk-based assessment. 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 10.8. Controls on areas requiring excavation are likely to include minimising the exposed excavation areas, managing stockpiles to

control runoff and covering stockpile to minimise dust and odour. In addition the following measures will be included in the CEMP and implemented in the construction phase:

- For existing fuel farm decommissioning phase:
  - All services will be traced:
  - All fuel lines and tanks will be emptied, cleaned and degassed prior to removal; and
  - The management of soil contamination will be informed by the site investigation to define and delineate impacted areas.
- For new fuel farm commissioning phase:
  - A commissioning plan will be designed and followed; and
  - All lines and tanks will be checked by competent people prior to commissioning.

10.9.7 It is expected that with these measures in place 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

10.9.8 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; and
- 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.

10.9.9 The receptor sensitivity has been assessed as high. The environmental measures outlined in **Table 10.9**, 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).

10.9.10 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 10.9**.

10.9.11 Following discussion with the EA and Southern Water the following additional mitigation measures have been included to manage this risk:

- The fuel farm will largely be located in SPZ2 with all fuel infrastructure located in SPZ2;
- Design will be undertaken to BAT and will include:
  - bund construction;
  - specification of double bunded tanks;
  - bund to be underlain by impermeable membrane (e.g. visqueen);
  - joints to be sealed with a hydrophobic sealant to prevent leakage; and

- concrete with self-sealing material (e.g. xypex) and specified to water impermeable standard with additional reinforcement to limit cracks to <0.2 mm.

- Fuelling system will include automatic shut off of drainage system whilst vehicles will be on refuelling stand;
- In the bunded area, sump drainage will be to a low point from where it will be manually pumped into the drainage system (if clean) or to tanker if contaminated. All pipes will go over the bund wall (no below ground pipes);
- Groundwater flow modelling has been undertaken to feed into the Hydrogeological Risk Assessment (**Chapter 8: Freshwater Environment, Appendix 8.1**).

10.9.12 With these additional measures in place, it is expected 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).

Decommissioning phase effects

10.9.13 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

10.9.14 The combined Land Quality and Freshwater effects coincide in relation to groundwater. The Hydrogeological Impact 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 included in the CEMP and implemented in the construction phase / incorporated into the site's design 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. The residual risks, after mitigation has been put in place, were assessed as negligible to low.

10.9.15

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; and
- 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 pathway to the coast. Therefore, mitigation measures that will be incorporated into the CEMP and the construction phase pollution response plan and implemented in the construction phase – refer to **Table 10.8** - to protect the groundwater environment during the construction phase will 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 To avoid pollution incidents due to removal of tanks at fuel storage areas (Jentex tank farm) during the construction phase, it is recommended the tanks are appropriately decommissioned prior to removal and remediation of residual contaminants be undertaken, subject to risk-based assessment. 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.

10.10.6 Environmental measures for groundwater that have been incorporated into the Proposed Development will ensure that no pollutants reach coastal waters. Controls on areas requiring excavation are likely to include minimising the exposed excavation areas, managing stockpiles to control runoff and covering stockpile to minimise dust and odour. In addition the following measures will be implemented and included in the CEMP:

- For decommissioning phase:
  - All services will be traced:
  - All fuel lines and tanks will be emptied, cleaned and degassed prior to removal; and
  - The management of soil contamination will be informed by the site investigation to define and delineate impacted areas.
- For commissioning phase:
  - A commissioning plan will be designed and followed; and
  - All lines and tanks will be checked by competent people prior to commissioning.

10.10.7 With these additional measures in place it is expected 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

10.10.8 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; and
- pollution incidents resulting from pesticide use.

10.10.9 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 that will be implemented and incorporated into the CEMP and the pollution response plan to protect the groundwater environment during the operational phase will 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).

10.10.10 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[66]. Further details will be submitted with the site drainage plan and Flood Risk Assessment, which will form part of the DCO application.

10.10.11 Firewater will be retained in site drainage pipes through provision of oversized pipes with automatic shut off to prevent discharge to Pegwell Bay.

10.10.12 Different treatment methods will be considered to treat de-icing and washing agents. Consultation on the types of de-icer to be used will be undertaken with the EA, so that where possible lower risk alternatives could be used.

10.10.13 There is a risk of pollution incidents due to leakage from fuel storage tanks (Jentex tank farm). 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 10.9**. Due to the sensitivity of the receptor and the high magnitude of effect, additional measures have been developed. They include:

- The fuel farm will largely be located in SPZ2 with all fuel infrastructure located in SPZ2;
- Design will be undertaken to BAT and will include:
  - bund construction;
  - specification of double bunded tanks;
  - bund to be underlain by impermeable membrane (e.g. visqueen);
  - joints to be sealed with a hydrophobic sealant to prevent leakage; and
  - concrete with self-sealing material (e.g. xypex) and specified to water impermeable standard with additional reinforcement to limit cracks to <0.2 mm.
- Fuelling system will include automatic shut off of drainage system whilst vehicles will be on refuelling stand;
- In the bunded area, sump drainage will be to a low point from where it will be manually pumped into the drainage system (if clean) or to tanker if contaminated. All pipes will go over the bund wall (no below ground pipes);

[66] Flood risk assessments: climate change allowances (2016) Environment Agency. Available online at https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances [Checked 21/11/2017].

10.10.14 It is expected that with these additional measures in place 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

10.10.15 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

10.10.16 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 3.4**) includes an assessment of the risk to the groundwater environment from activities and suggests appropriate mitigation measures to be included in the CEMP and implemented during construction phase / incorporated into the site's design 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. The residual risks, after mitigation has been put in place, were assessed as negligible to low.

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 the 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. Environmental measures have been incorporated into the Proposed Development– refer to **Table 10.8**. Controls on areas requiring excavation are likely to include minimising the exposed excavation areas, managing stockpiles to control runoff and covering stockpile to minimise dust and odour. In addition the following measures will be implemented and included in the CEMP:

- For existing fuel farm decommissioning phase:
  - All services will be traced:
  - All fuel lines and tanks will be emptied, cleaned and degassed prior to removal; and
  - The management of soil contamination will be informed by the site investigation to define and delineate impacted areas.
- For new fuel farm commissioning phase:
  - A commissioning plan will be designed and followed; and
  - All lines and tanks will be checked by competent people prior to commissioning.

10.11.3 With these additional measures in place it is expected 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

10.11.4 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.

10.11.5 There is a risk of pollution incidents due to leakage from fuel storage tanks (Jentex tank farm).

10.11.6 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. Environmental measures proposed include an emergency response plan and appropriate design to current standards of all storage tanks. These are to mitigate the potential effects on groundwater and will also ensure that the effects on soils would be negligible during the operational phase. These would ensure the effects are not significant (i.e. combination of a medium receptor sensitivity and low magnitude of effect).

Decommissioning phase effects

10.11.7 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.

Combined effects

10.11.8 It is not anticipated that there will be any combined effects on soils providing each source is addressed appropriately and environmental measures implemented and incorporated in the CEMP.

10.12 Assessment of Effects on Building and Services

Construction phase effects

10.12.1 The discovery and potential 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. This will be done in a phased approach, with additional assessment carried out as part of the site investigation. Future work relating to UXO will follow CIRIA guidelines (refer to **Table 10.1**). The finalised CEMP will be informed by the findings of the site investigation and updated with findings and proposed mitigation from the site investigation. With these, yet unknown, measures 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 10.9** and the intrusive site investigation that will inform the package of measures to be

included in the detailed design are considered sufficient. They 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 implemented and incorporated in the CEMP.

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 10.14**.

Table 10.14 Summary of significance of effects

Receptor and effects	Significance Level	Rationale

Groundwater –– removal of tanks and leakage from tanks	Not 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 and remediation of residual contaminants be undertaken, subject to risk-based assessment – refer to **Section 10.5** – as well as the additional measures that have been developed in this PEIR following discussion with the regulators:
		Construction phase:
		Controls on areas requiring excavation are likely to include minimising the exposed excavation areas, managing stockpiles to control runoff and covering stockpile to minimise dust and odour. In addition the following measures will be included in the CEMP and implemented in the construction phase:
		• For decommissioning phase:
		  ○ All services will be traced:
		  ○ All fuel lines and tanks will be emptied, cleaned and degassed prior to removal; and
		  ○ The management of soil contamination will be informed by the site investigation to define and delineate impacted areas.
		• For commissioning phase:
		  ○ A commissioning plan will be designed and followed; and
		  ○ All lines and tanks will be checked by competent people prior to commissioning.
		Operation Phase:
		• The fuel farm will largely be located in SPZ2 with all fuel infrastructure located in SPZ2;
		  ○ Design will be undertaken to BAT and will include:
		  ▪ bund construction;
		  ▪ specification of double bunded tanks;
		  ▪ bund to be underlain by impermeable membrane (e.g. visqueen);
		  ▪ joints to be sealed with a hydrophobic sealant to prevent leakage; and
		  ▪ concrete with self-sealing material (e.g. xypex) and specified to water impermeable standard with additional reinforcement to limit cracks to <0.2 mm.
		• Fuelling system will include automatic shut off of drainage system whilst vehicles will be on refuelling stand;
		• In the bunded area, sump drainage will be to a low point from where it will be manually pumped into the drainage system (if clean) or to tanker if contaminated. All pipes will go over the bund wall (no below ground pipes)

Receptor and effects	Significance Level	Rationale
Coastal waters – removal of tanks and leak from tanks	Not 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 and remediation of residual contaminants be undertaken, subject to risk-based assessment – refer to **Section 10.5** – as well as the additional measures that have been developed in this PEIR following discussion with the regulators **Construction phase:** Controls on areas requiring excavation are likely to include minimising the exposed excavation areas, managing stockpiles to control runoff and covering stockpile to minimise dust and odour. In addition the following measures will be included in the CEMP and implemented in the construction phase: • For decommissioning phase: o All services will be traced: o All fuel lines and tanks will be emptied, cleaned and degassed prior to removal; and o The management of soil contamination will be informed by the site investigation to define and delineate impacted areas. • For commissioning phase: o A commissioning plan will be designed and followed; and o All lines and tanks will be checked by competent people prior to commissioning. **Operation Phase:** • The fuel farm will largely be located in SPZ2 with all fuel infrastructure located in SPZ2; • Design will be undertaken to BAT and will include: o bund construction; o specification of double bunded tanks; o bund to be underlain by impermeable membrane (e.g. visqueen); o joints to be sealed with a hydrophobic sealant to prevent leakage; and o concrete with self-sealing material (e.g. xypex) and specified to water impermeable standard with additional reinforcement to limit cracks to <0.2 mm. • Fuelling system will include automatic shut off of drainage system whilst vehicles will be on refuelling stand; • In the bunded area, sump drainage will be to a low point from where it will be manually pumped into the drainage system (if clean) or to tanker if contaminated. All pipes will go over the bund wall (no below ground pipes).

Receptor and effects	Significance Level	Rationale
Soils– removal of tanks and leak from tanks	Not 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 and remediation of residual contaminants be undertaken, subject to risk-based assessment – refer to **Section 10.5** as well as the additional measures that have been developed in this PEIR following discussion with the regulators: **Construction phase:** Controls on areas requiring excavation are likely to include minimising the exposed excavation areas, managing stockpiles to control runoff and covering stockpile to minimise dust and odour. In addition the following measures will be included in the CEMP and implemented in the construction phase: • For decommissioning phase: o All services will be traced: o All fuel lines and tanks will be emptied, cleaned and degassed prior to removal; and o The management of soil contamination will be informed by the site investigation to define and delineate impacted areas. • For commissioning phase: o A commissioning plan will be designed and followed; and o All lines and tanks will be checked by competent people prior to commissioning. **Operation Phase:** • The fuel farm will largely be located in SPZ2 with all fuel infrastructure located in SPZ2; • Design will be undertaken to BAT and will include: o bund construction; o specification of double bunded tanks; o bund to be underlain by impermeable membrane (e.g. visqueen); o joints to be sealed with a hydrophobic sealant to prevent leakage; and o concrete with self-sealing material (e.g. xypex) and specified to water impermeable standard with additional reinforcement to limit cracks to <0.2 mm. • Fuelling system will include automatic shut off of drainage system whilst vehicles will be on refuelling stand; • In the bunded area, sump drainage will be to a low point from where it will be manually pumped into the drainage system (if clean) or to tanker if contaminated. All pipes will go over the bund wall (no below ground pipes).
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 10.8** to control exposure and prevent spreading of contamination have been suggested for incorporation into the CEMP and implementation in the construction phase. A survey and the removal of asbestos containing materials will be carried out.

Receptor and effects	Significance Level	Rationale
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 10.8** will be implemented and 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[67] 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. This will be done in a phased approach, with additional assessment carried out as part of the site investigation. Future work relating to UXO will follow CIRIA guidelines (refer to **Table 10.1**). The finalised CEMP will be informed by the findings of the site investigation and updated with findings and proposed mitigation from the site investigation.
Soils / Groundwater - pollution incidents resulting from the release of contaminants from building materials or construction activities	Not Significant	Environmental measures described in **Table 10.9** will be incorporated into the CEMP and implemented
Ground and coastal water - pollution incidents due to creation of pathways for the migration of potential contamination	Not significant	Environmental measures described in **Table 10.8** will be implemented and 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)[68] last amended 2013: Document C Site preparation and resistance to contaminants and moisture[69], 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.

[67] Unexploded ordnance (UXO): C681 (2009) CIRIA. London.
[68] The Buildings Regulations (2010) Department for Communities and Local Government. Available online at https://www.gov.uk/government/publications/the-building-act-1984-and-building-regulations-2010-circular-07-2010 [Checked 21/11/2017].
[69] Approved Document C – Site preparation and resistance to contaminants and moisture (2013) Department for Communities and Local Government. Available online at https://www.planningportal.co.uk/info/200135/approved_documents/65/part_c_-_site_preparation_and_resistance_to_contaminates_and_moisture [Checked 21/11/2017].

Receptor and effects	Significance Level	Rationale
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 10.9** will be implemented and 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 10.9** and those detailed in **Chapter 8: Freshwater Environment**, will be implemented and 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 10.9** will be implemented and 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 10.9** and those detailed in **Chapter 8: Freshwater Environment**, will be implemented and incorporated in the CEMP.
Soils / Ground and coastal water - Pollution incidents resulting from pesticide use	Not Significant	Environmental measures outlined in **Table 10.9** and those detailed in **Chapter 8: Freshwater Environment**, will be implemented and incorporated in the CEMP.