Airports Commission

PROPOSAL FOR PROVIDING ADDITIONAL AIRPORT CAPACITY IN THE LONGER TERM

GOODWIN AIRPORT

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Image: Picto

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1.0 INTRODUCTION

1.1 This submission is made by Beckett Rankine Ltd a firm of marine consulting engineers based in Westminster and working worldwide. We have been assisted by specialist architects and planners in developing the concept of Goodwin Airport which is presented in this submission although, as these firms also work for major airport operators, they are not currently able to publicly associate themselves with this proposal.

1.2 In making this submission to the Airports Commission we are addressing the requirement for a long term solution to south-east England's need for airport capacity. It is our view that the long term solution needs to be determined first with any short term measures selected only once the long term plan is agreed. In this way short term measures can be selected so as to contribute toward the long term plan. Goodwin Airport will take around 7 years to construct from the time it obtains planning consent.

1.3 We have not addressed the question of whether there is a need for additional airport capacity or when that additional capacity will be required since the Commission has sought separate evidence on that matter. For the purposes of this submission we have instead made three key assumptions:

1. UK demand for air travel will continue to grow with passenger numbers more than doubling by 2050 as predicted by DfT in "UK Aviation Forecasts", January 2013.

2. Heathrow is currently operating, essentially, at capacity.

3. The UK needs to retain a hub airport in order for London to continue to be a world leading business and financial centre.

4. With the forecast doubling of traffic the hub airport will, in the medium to long term, require four runways with the possibility of adding more.

1.4 To accommodate the growth in air traffic Heathrow could be expanded to three and then four runways. However there is considerable opposition to the expansion of Heathrow and all three of the main political parties have stated that they are against it. With this level of political opposition we do not believe that additional runways at Heathrow are politically deliverable.

1.5 Other proposals have been made for the expansion of Gatwick, Stansted or Luton airports. Some proposals for Luton and Stansted involve their expansion to four runways in order to make them the UK's hub. Some proposals involve a multiple hub with two or three airports connected by high speed rail lines. Heathrow, Stansted, Luton and Gatwick all have well established local groups who oppose the construction of additional runways. These groups have already defeated previous proposals for airport expansion and any future expansion plans can be expected to meet vigorous opposition making expansion at these airports politically difficult and possibly undeliverable.

1.6 Concern over London's limited airport capacity in the face of ever increasing growth in air traffic is not a recent development; over the past 40 years there have been various proposals for new airports to be constructed with most of the proposals being sited in the Thames estuary. Some of these proposals have been little more than publicity exercises although there are two current proposals which have been worked up with sufficient detail for them to be assessed, they are:

- The Thames Hub proposal on the Isle of Grain by Foster and Partners www.fosterandpartners.com/ThamesHub

- TESTRAD's proposal for the Kentish Flats www.testrad.co.uk

1.7 As marine consulting engineers with long experience of working on projects on the river Thames we have taken a particular interest in these two schemes; we wanted to see if they met the requirements for a new hub airport and whether they were practically deliverable. As both Thames Hub and TESTRAD acknowledge on their scheme websites they are severely constrained in their design by their chosen locations.

1.8 The Thames Hub site is squeezed between one of Europe's largest gas import terminals and the main Thames shipping channels which restricts the separation on its runways and prevents future expansion.

1.9 TESTRAD have sited their scheme on the newly constructed Kentish Flats windfarm close to a shipping lane. The site has inadequate space on the reclamation for the airport terminal which is proposed to be located some 33 miles away at Ebbsfleet.

1.10 We believe that the constraints at the Thames Hub and TESTRAD sites are such that the schemes are unlikely to be practical. Their locations within environmental protection zones will also require the creation of very large compensating habitats and we cannot see where these can be located in the congested Thames estuary; neither scheme identifies how such compensation can be achieved in the material they have published to date.

1.11 If these latest proposals for an estuary airport do not meet the requirements for a new hub airport then, we asked ourselves, where it can be sited. We started our search by identifying what the functional requirements for a new hub airport might be.

2.0 THE SCHEME

2.1 Functional Requirements

2.1.1 For the purposes of our site search we have assumed that in the long term the UK will require:

- A four runway airport with the possibility of eventual expansion to five or even six runways
- The runways should be up to 4km long.
- To maximise capacity the runways should be capable of operating independently which, to meet CAA standards, requires them to have 1.5km separation.
- The airport should be capable of operating 24 hours a day, again to maximise capacity
- The airport should have good surface connections to London and the southeast

2.1.2 A four runway airport with 1.5km between runways is a large item of infrastructure occupying some 25km2 just for the runway area alone; the noise footprint of the airport covers a very much greater area of around 100km2. Finding a location in southeast England for such an item of infrastructure is, unsurprisingly, difficult. Southeast England is a densely populated area with a growing population; while this increasing population has an ever increasing desire to fly the population density also means that there is no land area where such a development can be located without adversely affecting a large number of people. And adversely affecting the lives of large numbers of people is problematic for politicians.

2.1.3 The gestation period of such a development of this size will span more than one term of parliament which means that the chosen site must be acceptable to the majority of politicians – and to achieve this there needs to be a minimum of voters who lose out by the development.

2.2 Site Options

2.2.1 We can think of no location in southeast England where a four runway airport might be acceptable to the population and their political representatives. So what about offshore sites in the Thames estuary?

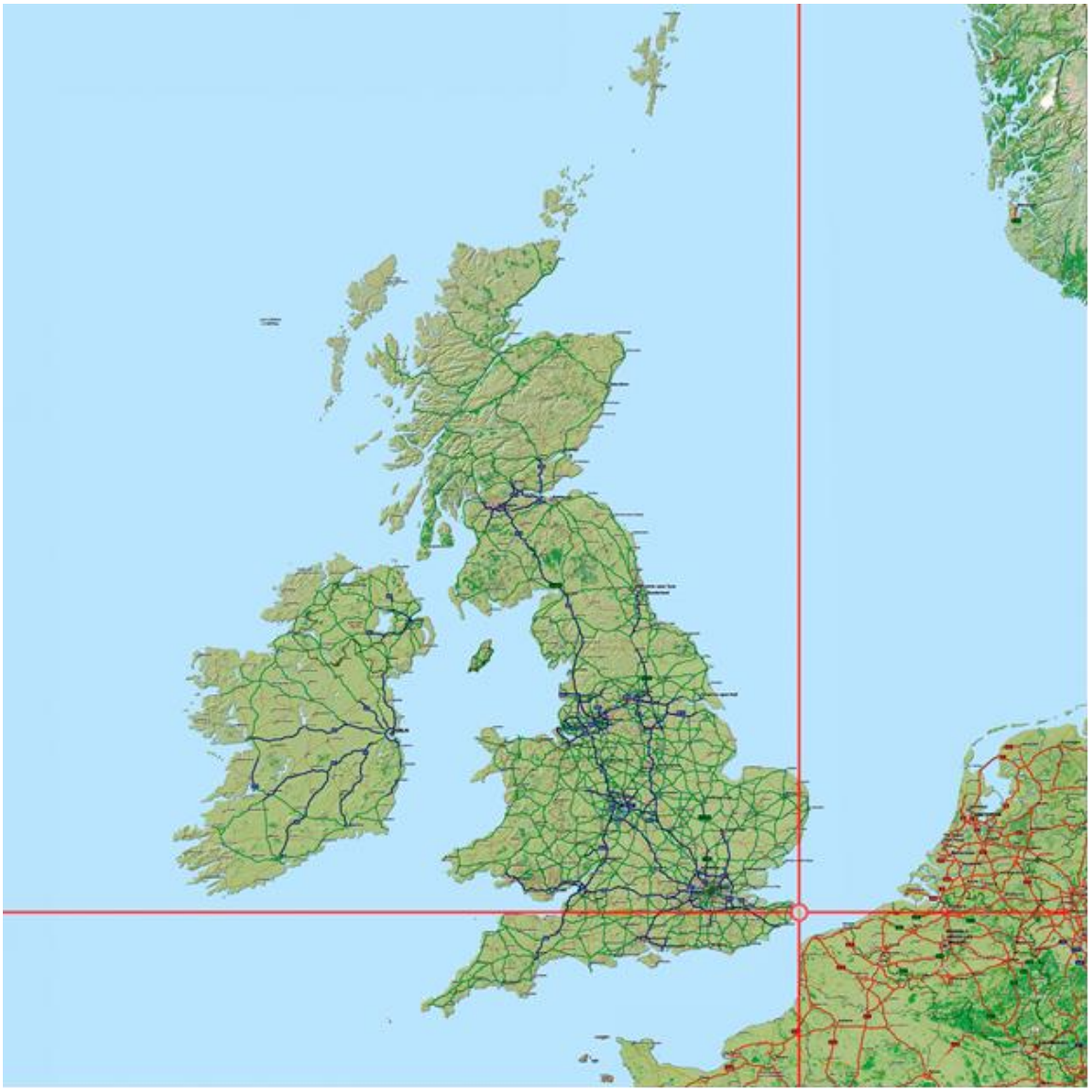
2.2.2 While the Thames estuary appears to be a large expanse of open water there are many constraints on development. The estuary contains some of the UK's busiest shipping lanes feeding into the Port of London and the Medway. The shallower areas of the estuary outside the shipping lanes are increasingly being developed for offshore windfarms. Between the constraints of shipping lanes and windfarms there is no large offshore site available in the estuary.

2.2.3 There are possible sites at the edges of the estuary adjacent to coast that are clear of windfarms and shipping lanes; one example being the Maplin sands, the site of a 1970s airport proposal. The Maplin sands are well aligned for runways but some other coastal sites involve either take-off or landing over residential areas. For example the Thames Hub proposal on the Isle of Grain has the town of Sheerness located a short distance from the end of its runways.

2.2.4 Possibly the greatest constraint on development in the estuary is the multiple environmental protection designations on the area which mean that any development would need to provide compensating habitat areas as mitigation. Virtually all of the estuary is covered by statutory environmental protection with the coastal areas, such as the Isle of Grain, subject to multiple designations; the reason for this is that these areas are also the most important for bird nesting and feeding.

2.3 Goodwin Sands

2.3.1 If a new hub airport cannot be reasonably located on shore in southeast England or in the Thames estuary the question is where it could be located? The answer, we propose, is on the Goodwin Sands which lie around 3km to the east of Deal.



2.3.2 The Goodwin Sands are an extensive area of sandbanks that are a notorious hazard to shipping having claimed numerous shipwrecks over the centuries; on account of the danger they present to shipping all shipping lanes pass well clear of the sands.

2.3.3 Large areas of the sands dry at low tide but are fully submerged at high tide, the sands are therefore not a bird breeding area and are not subject to any statutory environmental protection. There are no offshore windfarms on the sands nor is there any consent granted for a windfarm there. The site lies within UK territorial waters and belongs to the Crown Estate.

2.3.4 The Goodwin Sands represent a site which is ultimately large enough for the development of an airport with five or even six runways (if that number were ever required) each 1.5km apart. There is also space for a port to serve the development.

2.3.5 At around 71 miles from the centre of London the Goodwin Sands are further from central London than other proposals for a new hub airport; however the site is close to the HS1 rail link and travel times to London of circa 47 minutes can be achieved using existing train speeds on the HS1 link. An upgrade to HS1 to bring speeds in line with those that the Eurostar trains achieve in France would enable shorter journey times.

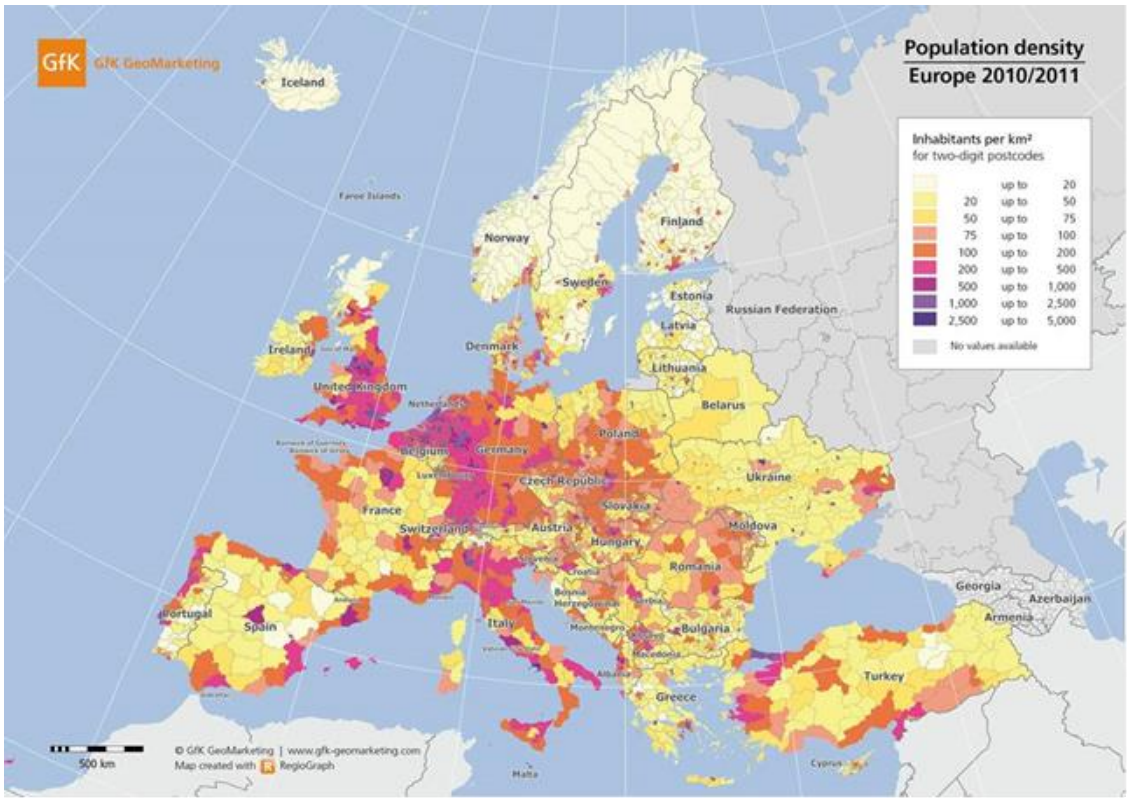


Illustration: GfK GeoMarketing

2.3.6 The map above shows the population density in Europe. Southeast England, the Low countries and northern France are all densely populated while areas such as Scandinavia and central France are relatively sparsely populated. The map shows that the Goodwin Sands are geographically close to the centre of the northern Europe

population so an airport on the sands would be ideally well placed to act as the hub airport for northern Europe.

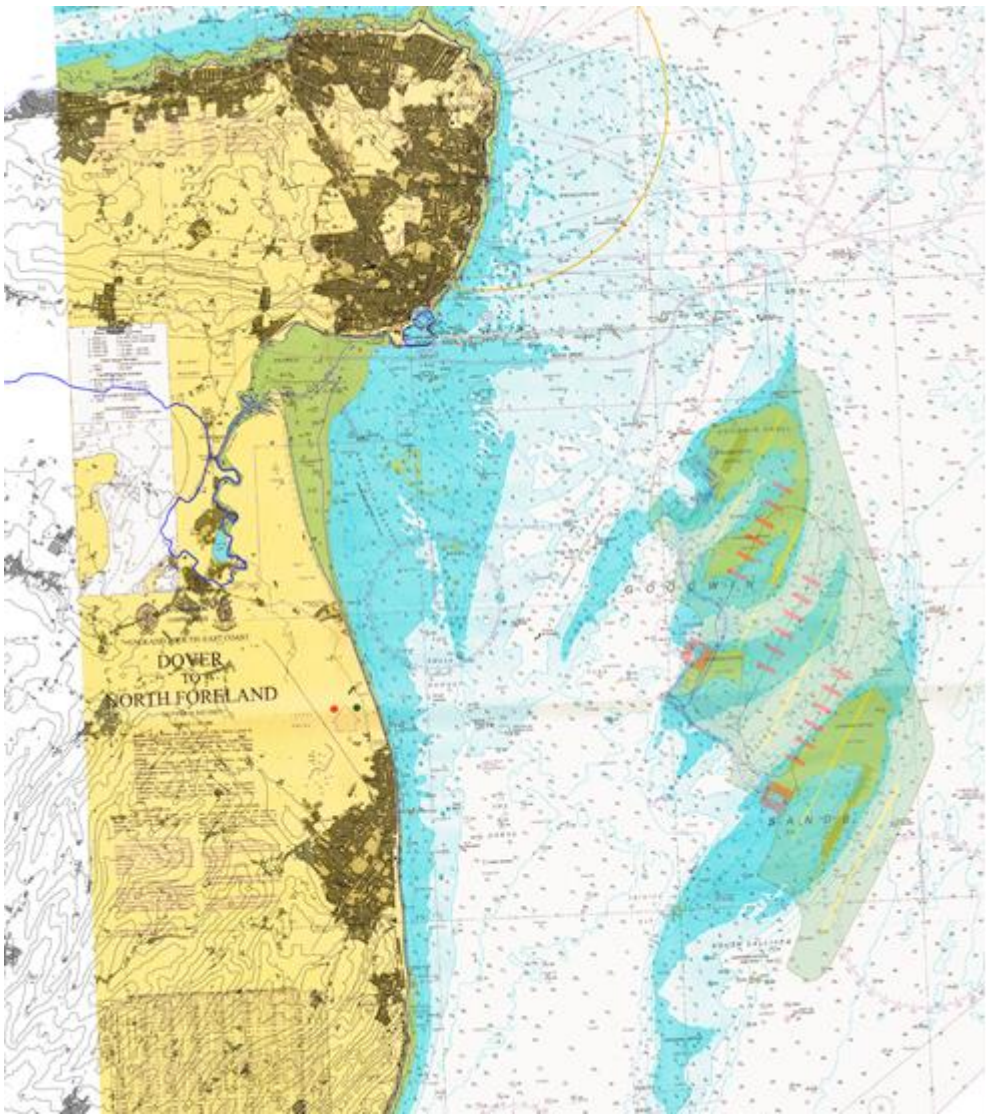
2.3.7 As far as we are aware no other airport proposal for southeast England has the site area, capacity, strategic location and international transport connectivity to serve as northern Europe's hub. Goodwin airport is, we believe, a unique opportunity for the UK to provide a hub airport that will serve to integrate us with while at the same time competing against our European neighbours. Only Goodwin Airport can reposition the UK's airport offering in this way.

3.0 GOODWIN AIRPORT

3.1 Project Description

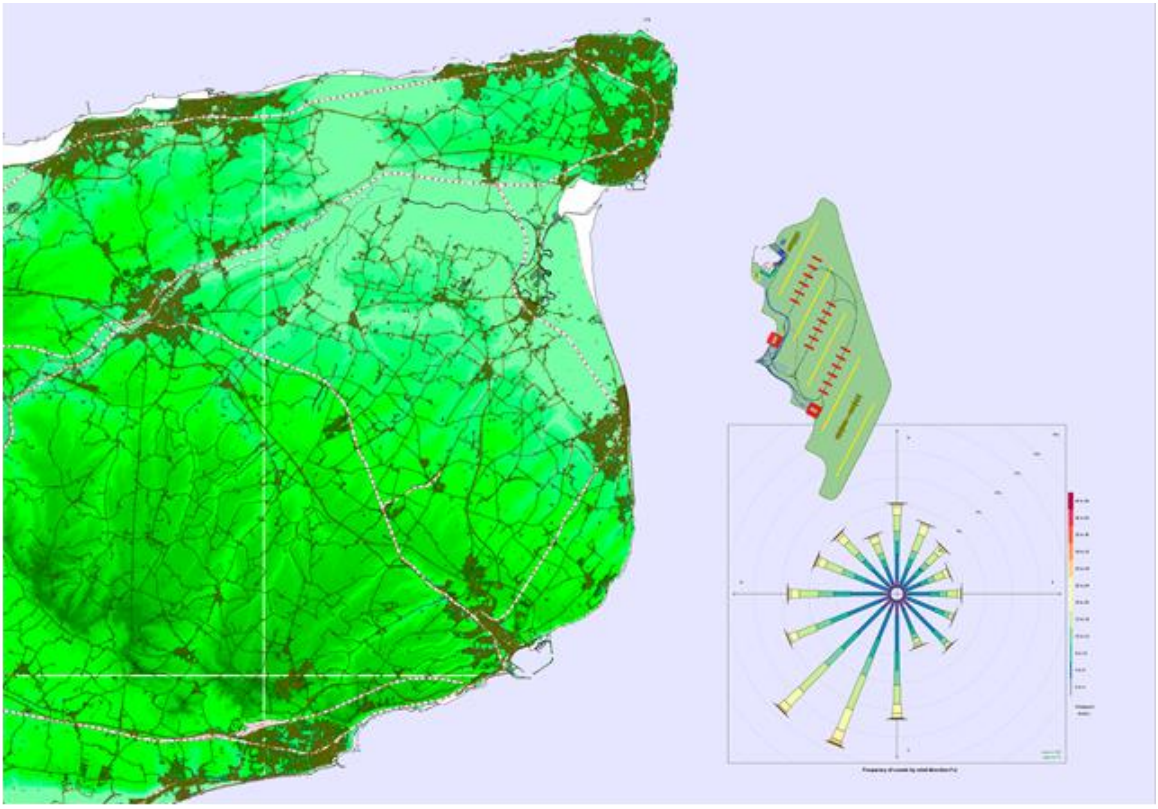
3.1.1 We have worked up an outline scheme for an airport on the Goodwin Sands to establish what could be accommodated on the site, to broadly determine its environmental and social impact and to prepare an estimate of the construction cost. The scheme presented below is not definitive and further work will be required to refine and develop the scheme.

3.1.2 The plan below shows a chart of the Goodwin Sands with the proposed airport island superimposed upon it. On the chart the areas coloured green dry at low water spring tides but are covered at high tide. The areas coloured darker blue have less than 5m of water depth at low tide while the areas coloured light blue have less than 10m of water at low tide. The proposed airport island is located mostly on areas with less than 5m of water at low tide.



The airport superimposed on UK Admiralty Chart 1828 - ©Crown Copyright 2012.

3.1.5 The figure below shows the proposed island layout in its long term configuration with five full length runways. The runways are aligned at 30 degrees to best match the prevailing wind direction. We have examined wind data from Manston airport and from the Sandettie light vessel to establish the prevailing wind which, as the wind rose on the plan shows, is remarkably consistent. An analysis of the time operations will be prevented due to crosswinds indicates that the lost time will be just under one day a year. For comparison Heathrow's downtime due to crosswinds, calculated the same way, is about half a day a year.



3.1.6 Aligning the runways with the prevailing wind means that the take-off and landing flightpaths are wholly over the sea and the airport can be operated without any low level flying over the land at all.

3.1.7 At the northern end of the airport island is a port zone; the port will have terminals for tankers to deliver fuel together with general cargo berths and, possibly, a marina. A cruise ship berth is also a possibility. Around the port are shown hotels and ancillary buildings for the airport.


Main Line Rail - Below Ground
Light Rail - Ground Level
Light Rail - Below Ground
Road - Ground Level
Road - Raised
Runways
Terminal Buildings and Satellites
Control Tower
Air Cargo Terminal
Other Buildings
Car Parking
Hotel and Associated Admin
Leisure and Retail
Business and Conference
Port Administration
Port Operations
Fuel Storage
Phase 1 Cargo Terminal
Fuel Farm
Short Sea Port (See Key for zone colours)
Note: Roads not shown within port area
Long Stay, Hotel and Conference Shuttle Bus to both Terminals
Northern Satellites
Middle Satellites
Southern Satellites
Terminal A
Sky Piers
Short Stay, Coaches and Drop-off (Multi Story)
Long Stay, Shuttle Bus to both Terminals
Terminal B
Short Stay, Coaches and Drop-off (Multi Story)
Sky Piers
Phase 2 Cargo Terminal

3.1.8 The two airport terminals are shown on the west side of the island located at the water's edge between the runways. The terminals will have panoramic views of The Downs and the Kentish coast. Each terminal has a number of satellites in 'toast rack' formation providing up to 216 aircraft slots per main terminal. A light rail or similar system will link the main terminals and the port area.

3.1.9 Each runway is shown as 4km long with a 1.5km separation from its neighbour. Two control towers will be required to serve the five runways.

3.1.10 The connection to the shore consists of twin rail tunnels and twin road tunnels which will also carry the utility connections. Additionally fast ferry passenger services will run direct from each terminal to the shore. These passenger ferries will be able to run to Dover and Ramsgate and also to Richborough where there is space for a park and sail facility. Ferry services are a flexible mode of transport and further services from the airport terminals to France and/or Belgium will be possible.

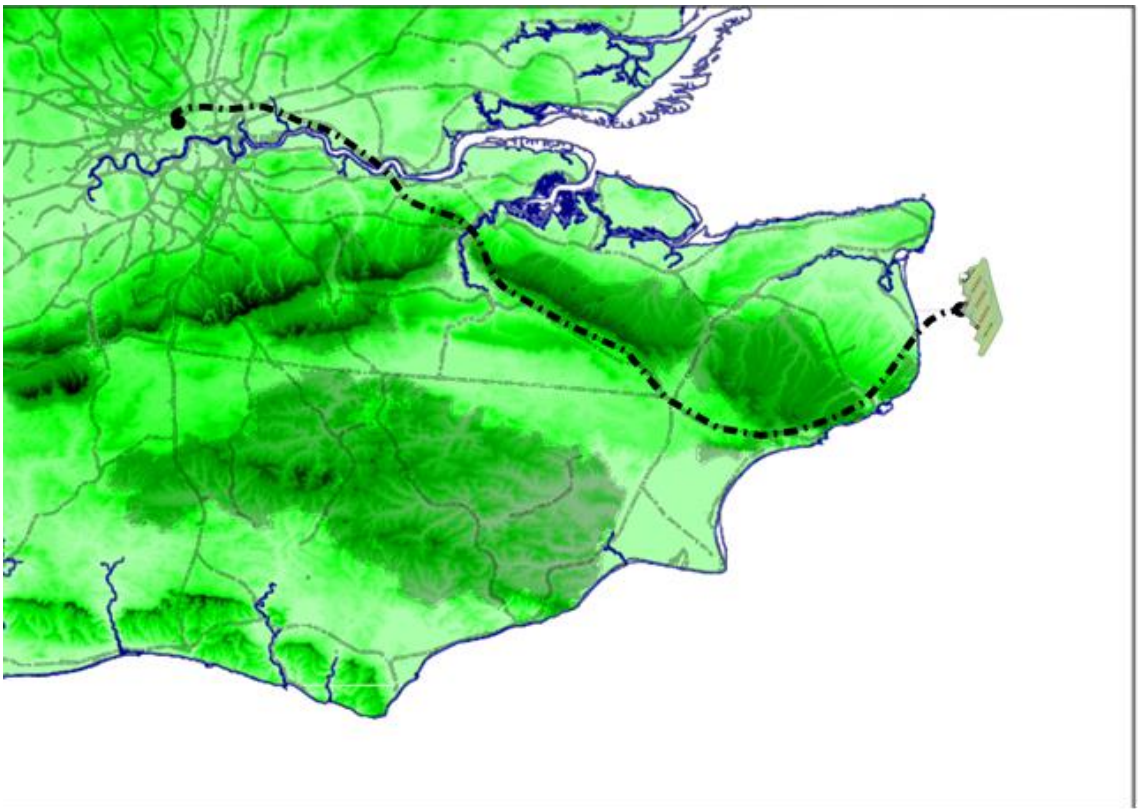
3.1.11 Looking to the future it is possible that there will be development of fuel efficient forms of aircraft such as wing in ground effect (WIG) aircraft. Pioneered in Russia WIG aircraft are now also being developed in China. If WIG aircraft do become a commercial proposition for over sea transport links Goodwin Airport will be ideally located for their deployment.

3.2 Surface Access - Rail

3.2.1 In order to provide resilience the 'surface' access to Goodwin Airport is by three modes of transport road, rail and ferry. Based on "CAA Passenger Survey Report 2011" our assumed modal split for Goodwin Airport is:
40% Rail, 40% Road and 20% Ferry – including "Park and Sail" fast ferries.

3.2.2 This assumes that of the passengers who travel by private means, half of the leisure passengers and none of the business passengers will use the "Park and Sail" service.

3.2.3 The twin rail tunnels will link in to the existing HS1 line just west of the Folkestone Eurostar terminal; at the airport the rail station is to be located directly beneath the north terminal building. Once the second terminal is built the rail line will be extended on to the south terminal. Much of the rail link will be in tunnel either beneath the sea or beneath the Kent Downs Area of Outstanding Natural Beauty.



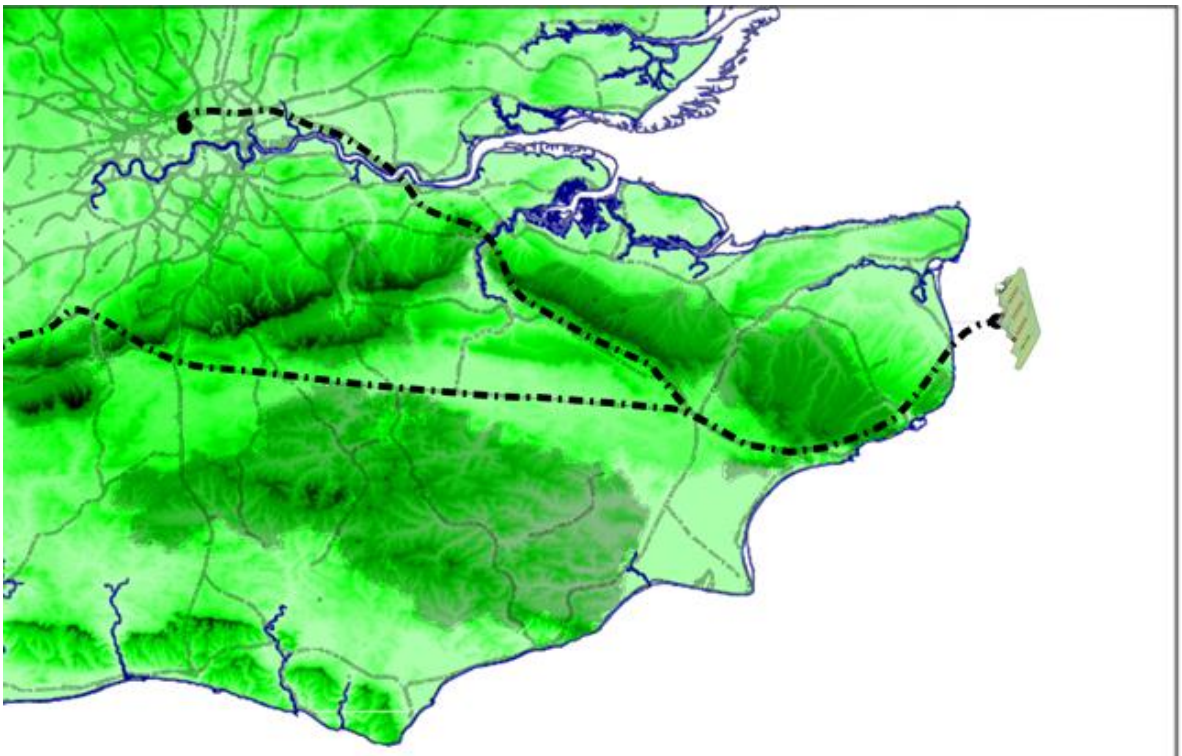
3.2.4 The link to HS1 will provide high speed rail services to Ebbsfleet, Stratford and St Pancras stations with journey times being as follows:

Destination	Time Taken – nearest minute
Ebbsfleet	37 minutes
Stratford	47 minutes
St Pancras	54 minutes
Calais	38 minutes
Lille	65 minutes
Brussels	104 minutes
Paris	118 minutes

Note: The above times to London can be improved by using a limited stopping service; the advertised St Pancras-Ashford- Calais service is 55 minutes, which is approximately 15 minutes shorter than the stopping service. This would give a St Pancras-Ashford- Goodwin time of 39 minutes.

3.2.5 The current South Eastern and Eurostar timetables show services on HS1 using a total of between 1 and 11 slots per hour during operational periods. If HS1 provides 16 slots per hour in each direction (as is specified in the HS1 Concession agreement - paragraph 7.2.1) then this leaves between 5 and 15 slots per hour available for the use of Goodwin Airport trains.

3.2.6 If only 5 slots per hour are used for 20 hours per day, then this gives a spare capacity of nearly 55 million passengers per year, using Class 373 train sets. The HS1 rail link therefore has sufficient spare capacity for the initial phase of the Goodwin Airport development; as traffic grows the link may need to be upgraded to increase its capacity and further work is required to determine how best that upgrade could be achieved.



3.2.7 Stratford and St Pancras stations serve north London well and to serve east London and the M25 we propose an enhancement of Ebbsfleet station. The existing park and ride facilities will need to be enlarged and a remote airport check-in terminal added to the station.

3.2.8 To best serve south London we would, in addition, like the Eurostar terminal at Waterloo to be reopened although this will depend upon the availability of track paths into Waterloo.

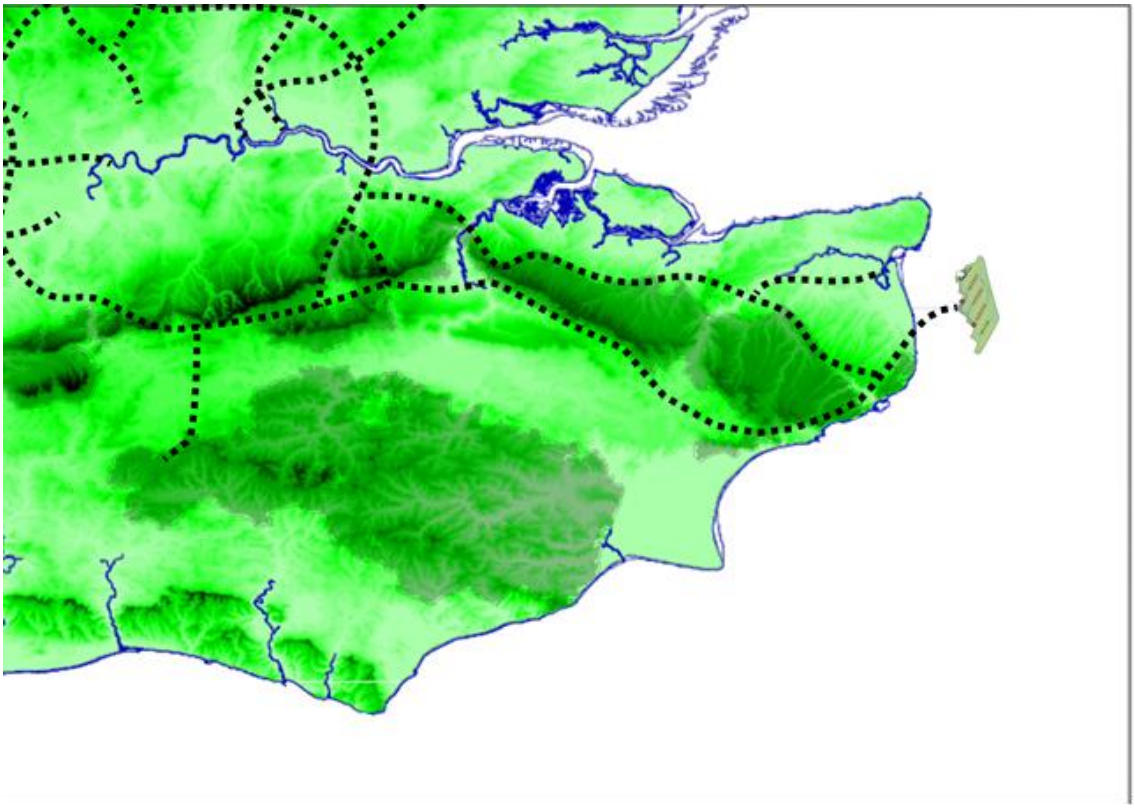
3.2.9 North, east and possibly south London can be directly served via HS1 but travelling into London to then travel to the airport is not desirable or quick for travellers living outside London. To serve communities south and to the west of London it is proposed to upgrade the direct, but currently slow speed, line from Ashford through Tonbridge to Redhill. This line can also, by means of junction improvements, be made to link to Gatwick airport, Guildford, Windsor and Reading and thereby to the West Country. The line will not be as fast as the HS1 link to London but will nevertheless provide a direct rail link to Goodwin Airport for much of Kent and Surrey with the possibility of extension further west. From Ashford to Goodwin the trains will share the high speed lines to the airport.

3.2.10 This means that 16% of passenger journeys could be direct to the airport without having to change in London. This figure is based passenger journeys through Heathrow originating from the South West or counties in the South East that do not need to travel through London (2011 CAA Passenger Survey).

3.3 Surface Access - Road

3.3.1 As with the rail links the road connection is to have multiple connections both to the M20 at Folkestone and also via the A2 to the M2. The A2 in east Kent has been upgraded considerably in recent years and should be sufficient for the initial stages of the airport's development. As the airport grows further upgrades to the road will be required. The M20 has substantial spare capacity.

3.3.2 Passengers arriving at the airport by car will be able to be dropped off at the airport terminals; short stay car parks will be provided on the airport island together with some premium long stay parking facilities. Larger long stay car parks will be located on the mainland with passengers then travelling to the airport by fast ferry or by coach, depending upon where the long stay car park is located.

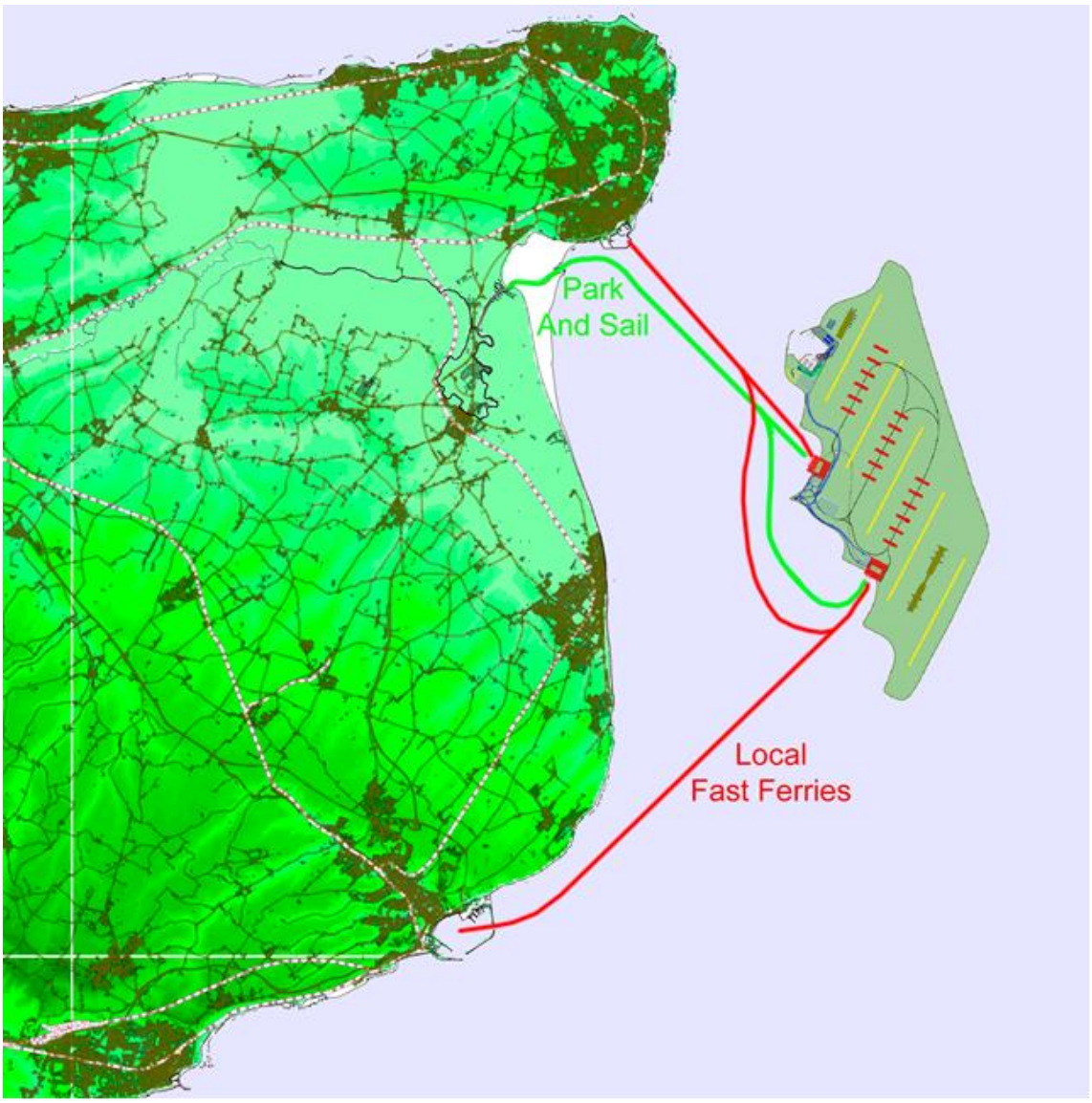


3.4 Surface Access - Ferry

3.4.1 Multiple ferry services are proposed running direct to the airport terminals which will include ferry terminals, similar to the SkyPiers at Chek Lap Kok airport in Hong Kong, although at Goodwin the terminals will be integrated with the terminal building.

3.4.2 The ferry services will be able to serve a park and sail facility at Richborough and also provide services to Ramsgate and Dover. It is not expected that the local ferries will carry a large proportion of the arriving passengers but a 15-20 minute travel time they will provide a valuable facility for the airport workforce and travellers who stay in an hotel on the mainland before or after a flight.

3.4.3 The construction of the airport island will provide improved shelter to the water space between the island and the mainland which will benefit the operation of fast ferries. In this semi-sheltered water 200-300 seater ferries will be able to operate at speeds in excess of 20 knots so the 5 nautical miles journey from the north terminal to Ramsgate harbour would take around 18 minutes.



3.4.4 Ferry services direct to France or Belgium are not envisaged at this stage as there are already excellent ferry services to Dover, however direct international services could be easily added if there was demand for them.

3.4.5 The development of passenger ferry technology has advanced greatly in recent years and further developments to both hull form and propulsion systems are in the pipeline; Goodwin Airport will be well placed to make the most of these developments.

3.5 Phasing the Development

3.5.1 Goodwin Airport will be constructed in two, or perhaps more, distinct phases. The first phase of construction is likely to be the north section of the island, with sufficient reclaimed land for three runways and the port. Also included will be the mainland link tunnels, upgrades to the M20, the link railway to HS1 and upgrades to rail infrastructure allowing travel to Reading from the airport avoiding the capital.

3.5.2 The second phase is the construction of the southern half of the island, the upgrades to the A2 to convert it into a Motorway and increase road capacity to the link tunnel, an increase in capacity at the Richborough site and further upgrades to rail infrastructure to allow for the extra passengers.

Phase 1

3.5.3 Below is shown the layout for Phase 1 of the project. By completion, Phase 1 will consist of two distinct areas.

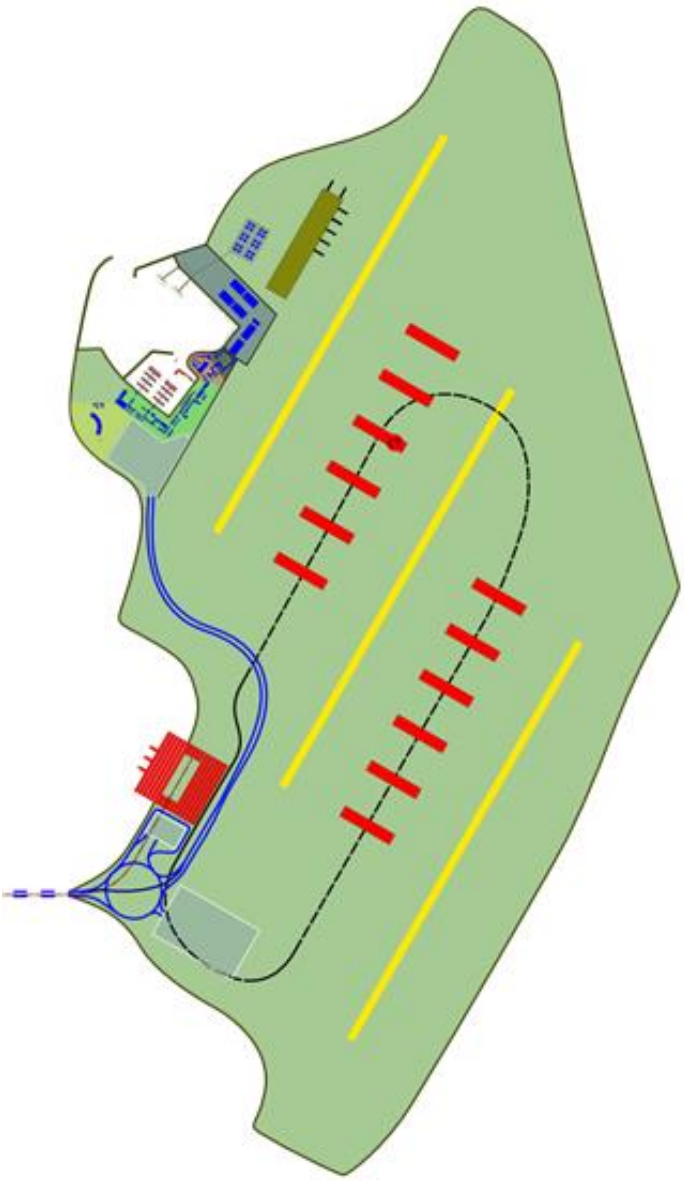
3.5.4 The Airport, this covers the majority of the island and consists of the following:

- Three independent runways
- The North Terminal Building
- Three sky piers
- The primary control tower
- 12 Satellites
- A simple light rail system – mostly underground, but above ground at the terminal station
- A station for the high speed rail to the mainland
- Short and Long term parking
- The tank farm
- The freight terminal
- A link to the harbour area

3.5.5 The Harbour area is at the north end of the island. It consists of:

- Conference facilities
- Hotel facilities
- A marina
- Retail facilities
- Marina-side Restaurants and other leisure facilities.

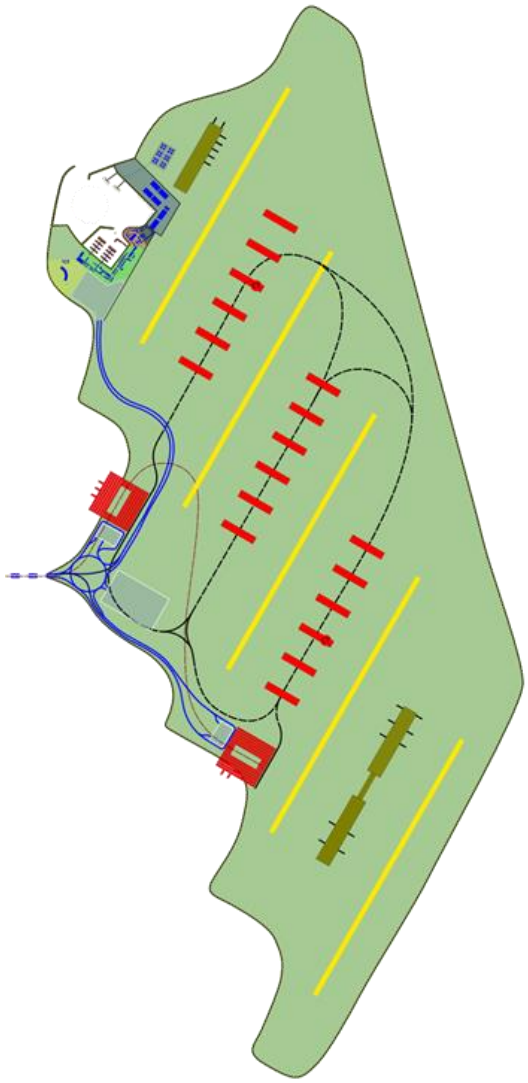
3.5.6 The Phase 1 development provides 216 aircraft stands in the satellite terminals and will have a capacity of 90m passengers a year.



Phase 2

3.5.7 Phase 2 is illustrated below. It will include more land reclamation and additional development including:

- Two more independent runways
- The southern-most runway is to be used primarily for freight
- A new freight handling facility
- The South Terminal Building
- Two additional sky piers
- 6 more satellites giving a total of 316 stands
- The secondary control tower
- An extension to the mainline railway allowing direct travel from the mainland to the south terminal
- An extension to the island road network and more short term parking, near the South terminal
- An extension to the light rail system serving the south terminal and the six new satellites.



4.0 ECONOMIC FACTORS

4.1 Demand and Capacity

4.1.1 The DFT Aviation Forecasts, published in January 2013, predict demand for air travel through to 2050. The forecasts are produced for both constrained and unconstrained cases, the constrained case being limited by airport capacity. The unconstrained case calculates the underlying demand for air travel in the absence of airport capacity limits.

4.1.2 We have designed Goodwin Airport to be able to cope with the proportion of demand that Heathrow already handles, but the size of Goodwin will allow us to be closer to the unconstrained case.

4.1.3 At present, Heathrow handles approximately a third of UK air traffic (Civil Aviation Authority - UK Airport Statistics: 2012). If this trend continues then the future demand for aviation at the UK's hub airport would be as follows:

Year	Low	Mid	High
2010	66	66	66
2015	69	72	75
2020	75	81	87
2025	81	90	98
2030	87	100	112
2035	92	111	129
2040	98	121	151
2045	104	135	176
2050	109	149	206

4.1.4 We have chosen the mid range forecast and designed an airport capable of handling 150 million passengers per year by the end of Phase II. However, by their nature, forecasts will inevitably change over time with the development of new technologies and shifts in social, political & economic fortunes.

4.1.5 Therefore we have designed our scheme to be adaptable to both lower and higher rates of growth. Due to the location of the proposal, further scope for expansion is possible by additional land reclamation. On the other hand, if the low end forecast proves to be more accurate, then Phase II of the project can be deferred thus avoiding a costly “White Elephant”.

4.2 Impacts on the UK economy through the provision of international connectivity

4.2.7 Assuming that there is an increase in demand for aviation in the UK as forecast by the DfT the nation could simply rely on other European airports to serve as the UK’s hub airport. The candidates are Amsterdam Schiphol, Frankfurt, Paris Charles de Gaulle and possibly even Madrid. This is in effect the ‘do nothing’ option which successive governments have adopted since the Maplin airport scheme was dropped in the 1970s.

Schipol airport is certainly willing to serve as the UK's hub; they already serve 23 UK airports as opposed to the 7 served by Heathrow and are pressing ahead with expansion with plans for their sixth runway.

4.2.8 As marine consulting engineers we are not well qualified to put the economic case for why the UK needs to retain a hub airport so instead we quote from others better qualified to put the case.

4.2.9 First a quote from the Financial Times of 19 October 2011; "There are three options: an extra Heathrow runway, a new airport, or ceding London's [global financial] leadership. However it dresses it up, Britain's government has opted for the third."

4.2.10 According to the Aviation Foundation the UK has the second biggest aerospace industry in the world (http://www.aviationfoundation.org.uk/Fast-Facts/). In 2007 the aviation sector added 0.7% of total GVA to the UK economy, if we include the aviation supply chain, this increases to 1.5%. It also provides 0.5% of UK employment – 0.85% if we include the supply chain. According to Oxera reducing the UK to a group of feeder airports would have a disastrous impact on these numbers (The contribution of aviation to the UK economy – November 2009).

Alternative figures:

Some alternative figures are provided by Oxford Economics - Economic Benefits from Air Transport in the UK - published 2011 (using 2009 data)
Aviation sector = £49.6 billion = 3.6% of UK GDP, however that includes the indirect as well as direct contribution so it could be argued that this should be reduced to £21.3B or maybe £37.6B.
Aviation sector = 921,000 jobs, similarly this could be reduced to 326,000 or 672,000 jobs.

4.2.11 Reducing the UK to feeder status will inevitably have impacts on the rest of the economy. Fewer, or no, direct destinations reduces access to markets, especially emerging markets.

4.2.12 There must also be a long term economic impact of the UK losing its hub airport. The UK is geographically near the edge of Europe but the City of London is financially at Europe's heart. If visitors to London have to change planes in Frankfurt, then they must be more inclined to do business in Frankfurt than London.

4.2.13 Summary: it would damage the UK economy to reduce UK aviation. Even if we stay where we are, other European hubs continue to grow larger and take our business, so our only hub could be reduced to feeder status anyway. Goodwin Airport offers the unique opportunity for the UK to position itself as the principal hub for northern Europe.

4.3 Impacts on the Local Economy – West London

4.3.1 In order for any new airport to operate as an effective hub, Heathrow airport would have to be scaled down or even closed. This would not happen overnight since the design and construction period for a new airport will take around 7 years allowing airport employees time to plan their relocation. However no new hub airport, such as Goodwin, could compete with an ongoing hub operation at Heathrow. We propose that following the opening of Goodwin airport the bulk of airlines, including British Airways, would move their operations to Goodwin.

4.3.2 The capacity of Goodwin will be such that it will not only be able to accommodate the major carriers but also low cost airlines offering feeder services from regional UK airports as well as European airports. This greater capacity and unrestricted operating hours will enable Goodwin to operate as a much more effective hub than Heathrow.

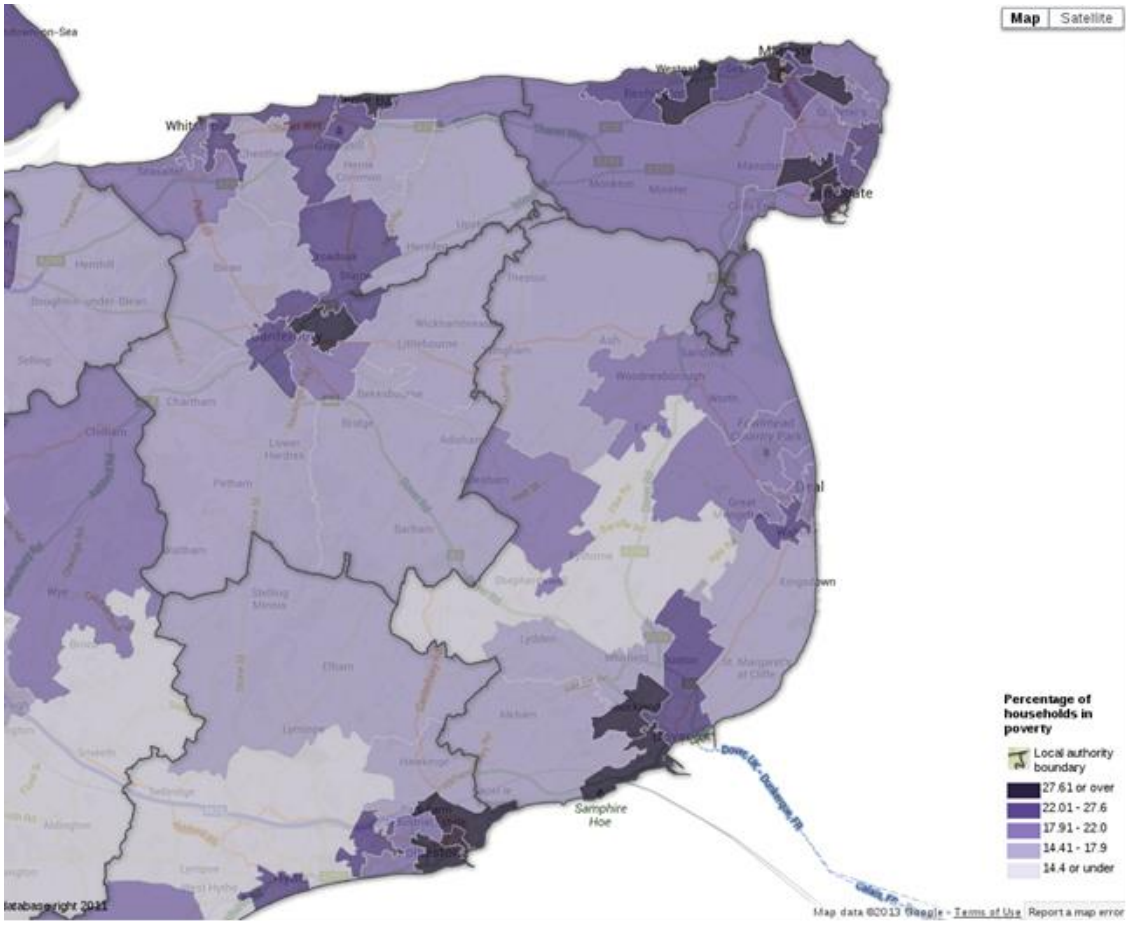
4.3.3 Concern has been expressed over the economic impact of the closure of Heathrow and the 'loss' of jobs that would result. Of course no jobs would actually be lost they would just be displaced to the new airport and, because the new airport will be larger, additional jobs will be created. At present Heathrow directly employs 76,600 people on site. While some of these people would move from the Heathrow to Goodwin, many may choose not to. Therefore the site at Heathrow needs to be redeveloped in a way that creates sufficient jobs to maintain the balance of employment in the locality.

4.3.4 The Heathrow estate is large, equivalent to the area of a London borough such as Kensington and Chelsea. The site is well served by road and underground rail and will become better connected once Crossrail is completed. The redevelopment of Heathrow presents a major opportunity for the creation of a new London district which will have wider regeneration effects over the surrounding areas. With the blight of noise pollution lifted areas such as Richmond, Kew, Teddington, Windsor and Brentford will all benefit.

4.3.5 It is beyond the scope of this proposal to plan the redevelopment of Heathrow but we believe there will be many options and developers interested in such a large, well connected site close to central London. Residential use may produce the largest return but the site could also lend itself to use as a technology park; as Canary wharf has become a financial centre in East London so Heathrow could be the 'Silicon Valley' of West London. Whatever new use is made of the Heathrow estate it will not become a deprived area as the result of Heathrow's closure; it is far too well connected for that and good connections are the key to successful regeneration.

4.4 Impacts on the Local Economy – East Kent

4.4.1 The construction and operation of Goodwin Airport will have a major impact upon the economy of East Kent. Currently East Kent contains some of the most deprived areas in the south of England. The diagram below by the Office of National Statistics shows poverty in Kent. As can be seen, many of the areas in need of jobs, Ramsgate, Margate, Dover/Folkestone are ports. These are to be connected the airport island by ferry services and will be principal catchment areas for employment, supplemented by Ashford and the Medway towns. The siting of a new airport needs to take into consideration the benefit the development can bring by way of regeneration and the relief of poverty; sited as it is close to some of the most deprived areas in the south of England, Goodwin Airport is uniquely able to relieve that poverty.



Source: Office of National Statistics - "Households in poverty estimates for MSOAs, England and Wales, 2007/08".

4.4.2 Currently Heathrow directly employs around 76,600 people; Goodwin would , once fully operational, employ substantially more than this because it will be handling many more passengers and will be much larger than Heathrow. We envisage that up to 164,000 people will be employed at the airport although advances in automation will have a tendency to reduce this number

4.4.3 East Kent currently has a workforce numbering around 306,000 and while many of the airport's jobs will be drawn from this area many workers will be drawn from further afield in the rest of Kent but also from Surrey, East London and the Pas de Calais region of France. Kent County Council has introduced policies to encourage investment and employment generation in East Kent with the principal initiative being 'Grow for it in East Kent' details of the initiative are on the website www.growforiteastkent.com

4.5 Consumer impacts

4.5.1 Heathrow is claimed to be one of the most expensive airports in Europe for users. In part the reason for this is the fact that the airport is operating at full capacity and has to ration its landing slots; this rationing of landing slots by price squeezes out low cost operators. A further consequence of the lack of spare slots is that Heathrow has progressively dropped its domestic flights inpreference to more profitable longer haul flights. Without a comprehensive domestic feeder service Heathrow cannot operate effectively as the UK's hub airport; indeed for those in the north of the country Heathrow has probably already lost its hub function. Feeder services from UK regional airports to Schipol are more numerous and generally significantly cheaper than flying via Heathrow.

4.5.2 A new hub airport at Goodwin would face no such constraints on expansion, and with 24 hour operating capability the runway capacity will be maximised – unlike at Heathrow which is constrained by its night time noise limits. With increased capacity the airport will be able to handle regional services by low cost airlines as well as long haul flights by the major carriers. While there are many factors involved in the pricing of flights the lifting of constraints on airport capacity ought to lower airport charges and thereby airfares; the consumer will be the beneficiary.

4.5.3 The consumer will also benefit from Goodwin being a new state of the art airport with fully integrated services and connections. Unlike any current UK airport Goodwin Airport's terminals will be sited directly above a high speed international rail station. The terminals will be directly connected to ferry services as well as to the motorway network.

4.5.4 Unlike existing UK airports Goodwin Island will have ample space for expansion for the foreseeable future. Being an island there is also no opportunity for residential development to progressively creep up and surround the airport. The airport will have no neighbours.

4.5.5 The absence of neighbours is a crucial advantage since no new runway capacity is likely to be deliverable without a political consensus. No MP wants additional runway capacity built in their constituency. Any MP who does support such a development in, or even close to, their constituency can be expected to lose their seat at the next election. Nevertheless many MP's accept that the nation needs more runways. The advantage of Goodwin Airport is that it is not located in, or even directly adjacent to, any parliamentary constituency. It is not located in any district or county council. Nobody lives there and, even when developed, nobody need live there. It is in nobody's back yard and, furthermore, there will be no overflying of anyone's back yard. Unlike other airport proposals there is, so far as we are aware, no environmental protection group established to stop Goodwin Airport; indeed our proposals have been welcomed in East Kent as well as in northern France and in Belgium. If there is any scheme for new runway capacity in southeast England that is capable of achieving political consensus then that scheme is Goodwin Airport.

5.0 ENVIRONMENTAL IMPACTS

5.1 Climate change

5.1.1 The most effective way to reduce greenhouse gas emissions from UK aviation is to reduce the number of flights; this would also negate the need for more airport capacity in the UK. However, the global impact of this would be diminished somewhat because the flights that use the UK as a hub would simply use another European hub instead, so they would still take place. It would also have a damaging effect on the UK economy.

5.1.2 In a world where there is an increasing number of flights, it is imperative to ensure that these flights have the minimum environmental impact. Avoidable aircraft emissions arise from:

- Aircraft being held in stacks awaiting a landing slot
- Aircraft queuing on taxiways awaiting a take-off slot
- Aircraft climbing at steeper angles than are economical in order to reduce noise footprint

5.1.3 Capacity is the major factor which will reduce greenhouse emissions, through two mechanisms. At the moment, according to "UK CAA Runway Resilience Study – Final Report, December 2008", over 1.1 million minutes is spent in holding patterns every year. That is time spent burning fuel, producing pollutants and going nowhere.

5.1.4 By providing considerable extra runway capacity Goodwin Airport will avoid the need for aircraft to stack awaiting a landing slot. Similarly extra capacity will minimise the need for taxiway queuing. As Goodwin's take-off and landing is entirely over water there will be no need for noise limitation measures that consume additional fuel.

5.1.5 Additionally, being a new airport designed from scratch, the layout of taxiways and terminals will be efficiently designed from an operating perspective rather than being a compromise, designed around existing features. The position of Goodwin will allow both mixed mode and 24 hour working, allowing the flights to be distributed more evenly across runways and throughout the day.

5.1.6 Due to the position of the UK the majority of passengers from Heathrow, 57%, travel to the East, whereas 29% travel West. With the world economic centre of gravity drifting Eastwards, this trend is likely to become more pronounced. Hence an airport sited to the East will reduce the length of flights, thus reducing emissions. For the majority of

flights, this will be a small proportion of the entire distance travelled, but for others, Berlin for example, this is more than a 10% reduction in emissions.

5.1.7 There are two classes of environmental impacts associated with any large project, Local Impacts and Global Impacts.

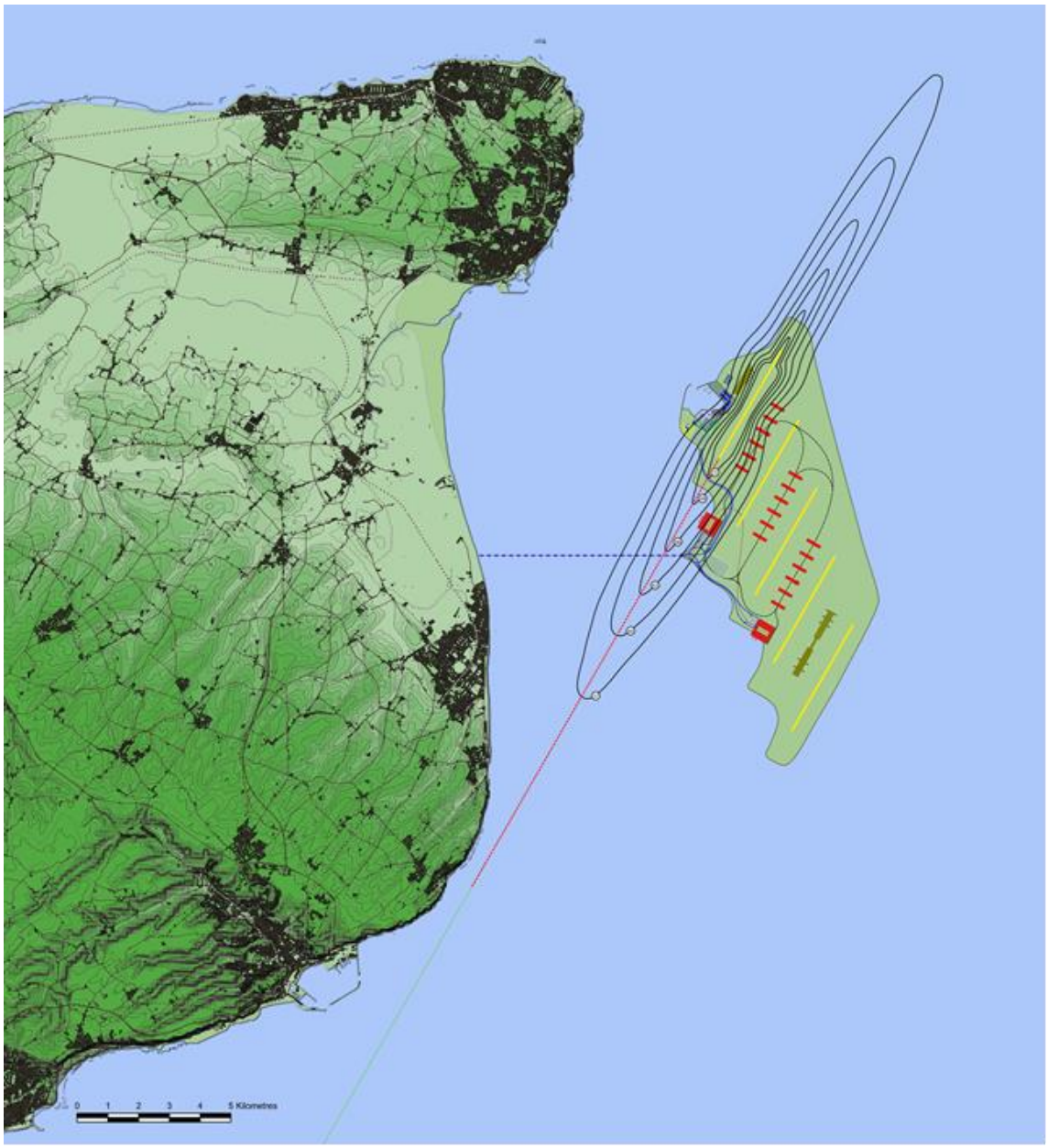
5.2 Local impacts - Noise

5.2.1 The position and alignment of the Goodwin Airport runways means that there is no overflying of the coast. While flight paths will need to be agreed with NATS we believe that flightpaths need not interfere with those from other airports with the exception of Manston airport. It is envisaged that Manston airport would close once Goodwin was operational with the Manston site being redeveloped for other uses, possibly as a support facility for Goodwin. Manston, and particularly its night flights, faces strong local opposition from the Residents of Ramsgate and also from Herne Bay and Whitstable; the airport's closure would relieve these communities from the noise nuisance they currently experience.

5.2.2 The illustration below shows noise contours for the Goodwin Airport runway closest to the coast; the noise contours are derived from those at Gatwick airport. As well as the contours the axis of the runway is also shown as a red line. Only the northern runway noise contour is shown as this is the nearest to the coast.

5.2.3 The outer contour is the 57dB contour which is the level the Government considers to be the onset of significant community annoyance. In West London 95,500 households with 228,700 residents live within Heathrow's 57dB limit according to the CAA (2010). At Goodwin Airport not a single household or resident will be affected by the airport's noise footprint and the airport will be virtually inaudible at the coastline.

5.2.4 The true flight paths will not be planned until later in the detailed design process. However, the position of the UK means that more than 70%, of international flights from Heathrow are to destinations to the South or West or East of the UK, so most international flights would be assumed to leave UK airspace soon after take-off without overflying the mainland at all.



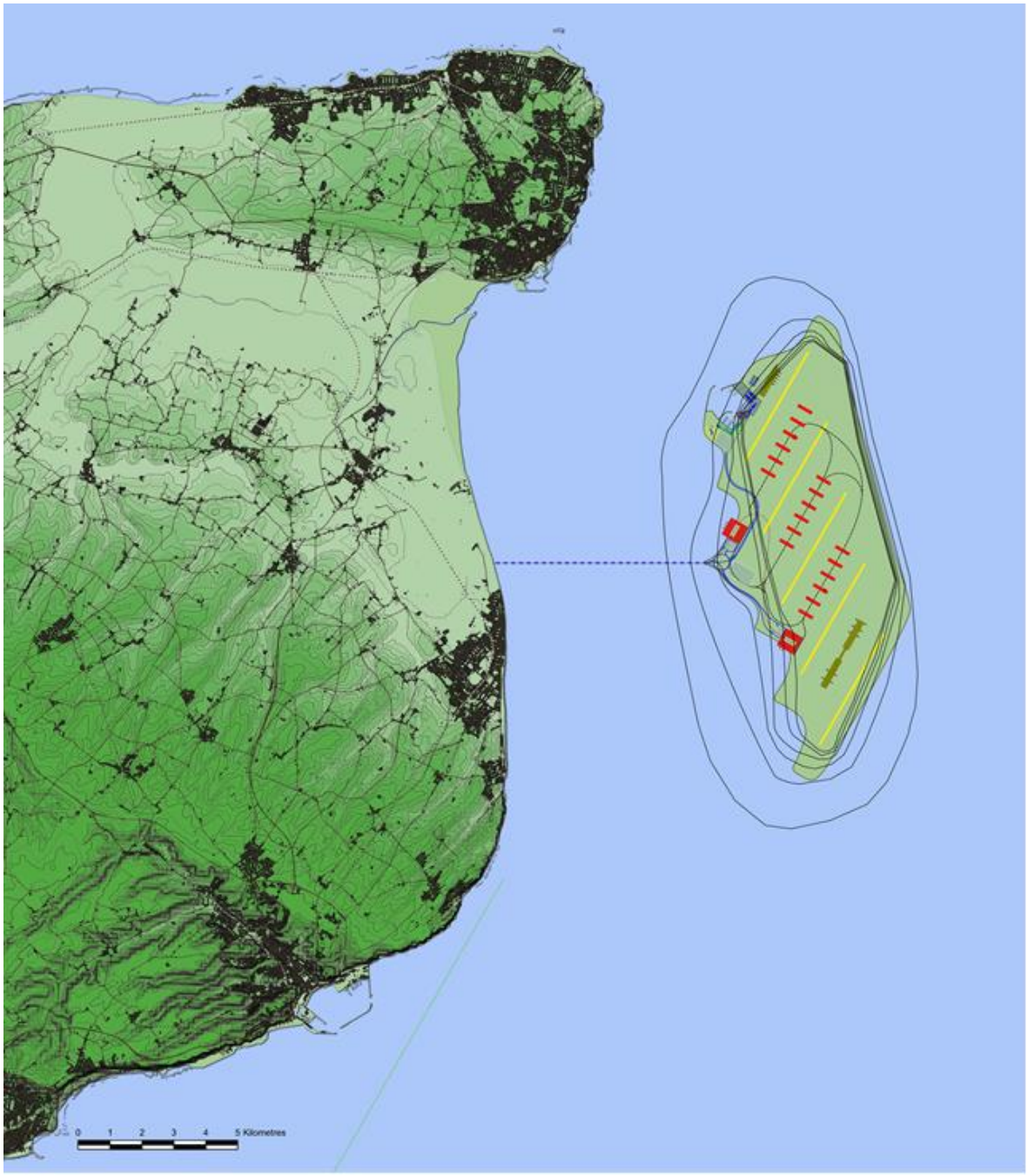
Predicted Noise contours from Goodwin Airport north runway.

5.3 Air quality

5.3.1 Monitoring and improving local air quality is becoming more important, both socially and legally. On the 1 May 2013, Lord Carnwath of the UK supreme court ruled that the UK had breached article 13 of the “air quality directive”, 2008/50/ec.

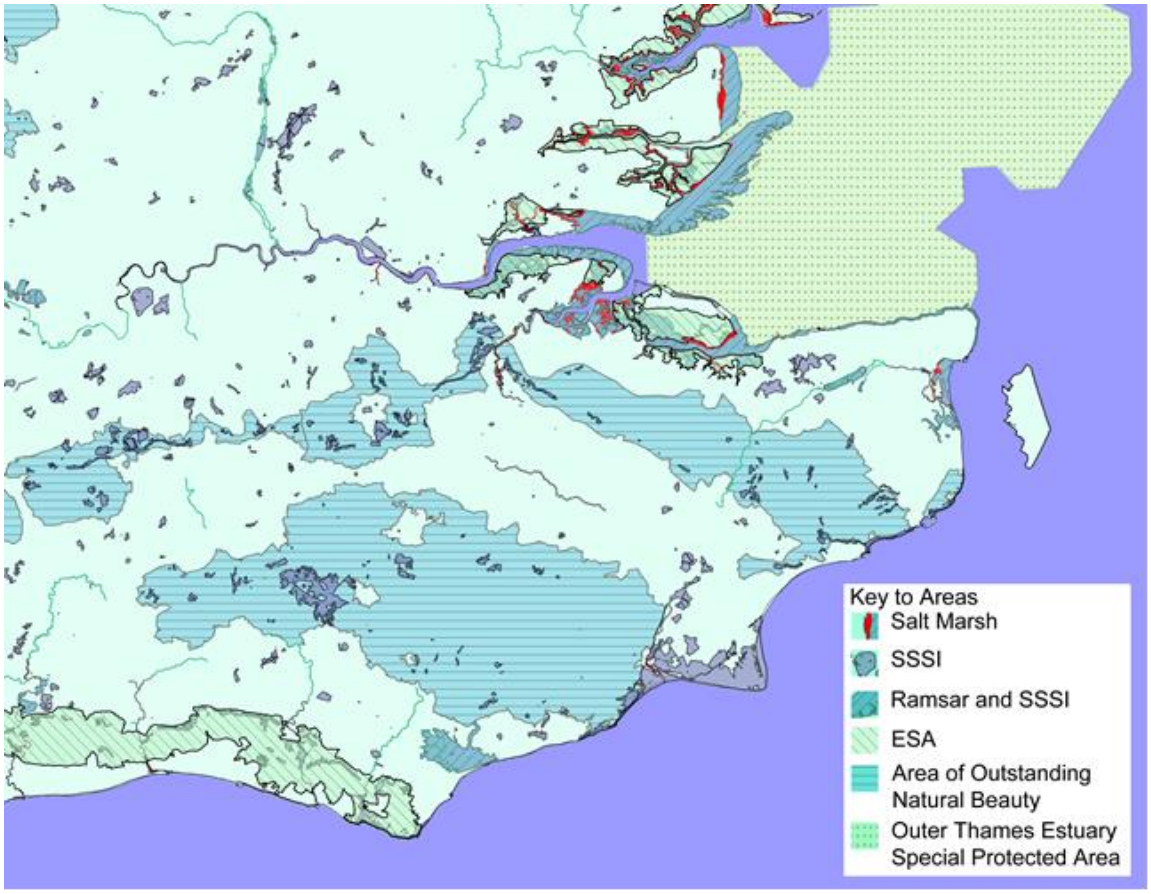
5.3.2 Any increase in traffic at the Heathrow can only make matters worse. Whereas moving our hub airport offshore would help to remove a major source of pollutant from the mainland.

5.3.3 As an example of the contribution of pollution by the airport, below is shown a plot of expected nox produced by the airport. The outer contour shows nox at 5µg/m3. This is based on information from Heathrow air quality strategy 2011-2020. While more detailed modelling will need to be done prior to construction the airport's offshore location combined with the prevailing south-westerly winds mean that any pollutants are well dispersed before they reach land.



5.4 Other Local Environmental Impacts

5.4.1 As can be seen from the diagram below, the site for Goodwin airport lies outside any current special protection areas, ramsar sites or sites of special scientific interest. The site has been considered for designation as a marine conservation zone, but the government decided not to include it the 2013 tranche so the site remains free of statutory environmental protection. The closest protected area is the nature reserve and salt marsh in Pegwell bay, which lies five miles away; this area will not be affected by the airport.



5.4.2 Bird strike is a concern for all airports and particularly coastal airports. The coastal zone is an area where seabirds birds roost, nest and feed in the intertidal zone. Areas of mudflat and salt marsh are particularly valuable as wetland habitats which is reflected in the environmental protection these areas experience. The Goodwin sands consist of sand, not mud, so they are not supportive of the benthic community which wading birds eat. Furthermore, being offshore and submerged at high tide no birds nest there. Consequently the risk of bird strike at Goodwin Sands will be relatively low although

measures may be required to prevent the island, once reclaimed, from becoming a bird nesting area.

5.5 Wrecks

5.5.1 It has been estimated that the Goodwin Sands may have been the site for a thousand shipwrecks or more since mediaeval times, the true number will never be known. The sands shift over time under the action of the tides and the waves fluidising the sand and from time to time a once buried wreck becomes exposed. There are currently six wrecks designated as historic wrecks by English heritage on the sands, of these the most important is probably the Stirling castle. Since becoming exposed, and designated, a few years ago the Stirling castle has experienced rapid deterioration, as tends to happen.

5.5.2 We have discussed these protected wrecks with representatives from English heritage and they have advised us that those protected wrecks that might be damaged by the construction of the island should be excavated and recorded. Wrecks that remain buried within the island can stay there although the opportunity for archaeologists to excavate them would be considered especially if a wreck will become covered by a permanent structure.

5.5.3 In essence the wrecks are no impediment to the construction of the airport although some of them may require excavation, much the same as any other development taking place above historic remains.

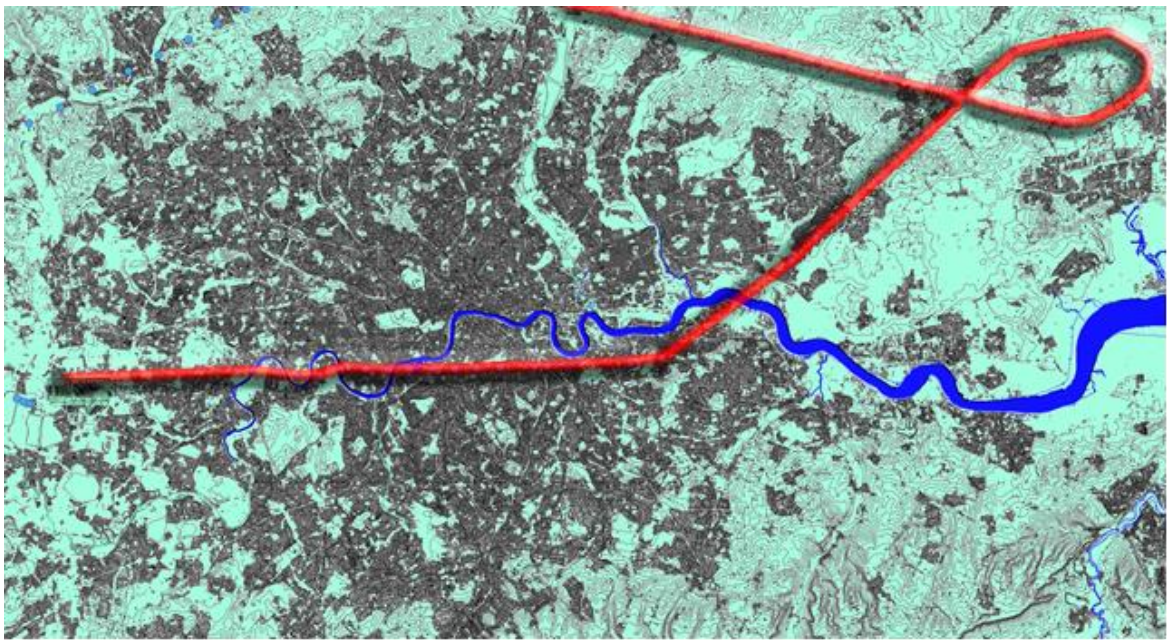
5.6 Fog

5.6.1 The incidence of fog is a concern for any airport. Visibility records have been analysed from Manston and the Sandettie light vessel and compared to Heathrow; this preliminary exercise indicates that the incidence of fog at the site is essentially the same as at Heathrow. Some of the records we have examined indicate that the incidence of fog in the inner Thames estuary is 30% higher than at either Goodwin or Heathrow.

5.7 Operational Risk and Safety

5.7.1 Aviation is a relatively safe mode of transport although no transport system can be risk free. The minimisation of operational risk should however be a factor that is considered when deciding the location of a new airport. In recent years there have been several incidences when major accidents over London were only narrowly avoided. In 2008 BA Flight 38 arriving from Beijing experienced engine failure and landed short of the runway at Heathrow; had the failure happened a few seconds the aircraft would have landed in a residential area with disastrous consequences.

5.7.2 In 2012 BA 762 took off from Heathrow with its engine cowls unsecured. The loss of the cowls caused the rupture of a fuel line and an engine fire which the activation of the fire extinguishers could not fully extinguish. With faults on both the aircraft's engines, one engine still on fire but shut down, the captain had little time to decide what to do. He decided to return to Heathrow. This meant flying his severely disabled aircraft with its full load of fuel at low altitude over central London. The risk, and possible consequence, of this action could have been catastrophic although fortunately the aircraft was safely landed at Heathrow. A plot of ba762's flight path is shown below.



5.7.3 While flight BA762 was landed safely the event highlighted the operational risk of siting a major airport close to a city with flight paths overflying the city. When something goes wrong, as it did to flight BA762, it is the plane's captain who is responsible for making the decision what to do. The captain's sole priority, understandably, is to get his aircraft

down safely. He does not necessarily have the full information about what is wrong with his aircraft and, as in this case, had no way of knowing whether he would also lose his second engine as he flew over London. He had little time to react and could not be expected to carry out a consequence analysis considering the likely result if he lost his second engine as he overflew central London at low altitude with a full fuel load.

5.7.4 While a pilot in an emergency situation cannot be expected to carry out a full risk assessment the designers of an airport can and should do such an assessment. And the risk of catastrophic events should be minimised. The easiest way of minimising risks is to site the airport runways so that no population centre has to be overflown at low altitude, either routinely or in an emergency. Goodwin airport meets this operational safety criterion.

5.7.5 Other risks to operations such as fog, and bird strike have been considered above. Goodwin is comparable to Heathrow in both respects and is considerable better than sites in the Thames estuary.

5.7.6 Cross winds have been minimised at Goodwin by aligning the runways with the prevailing south-westerly wind which limits annual downtime due to crosswinds to less than one day. Other airports, existing and proposed, are not so well aligned with the exception being Stanstead.

6.0 FEASIBILITY

6.1 Feasibility Considerations – Affordability

6.1.1 The scheme presented in the attached drawings has been worked up sufficiently to determine that the scheme is feasible and to enable an outline costing to be prepared. The scheme will require further refinement and design development once it has been short listed by the Government. The scheme is defined by a number of parameters the principal ones being:

- The alignment of the runways which is dictated by the prevailing wind direction and the need to avoid noise nuisance at the coast
- The airport island is positioned by the requirement to maximise the use of the sandbanks thereby minimising fill volumes and also avoiding shipping lanes
- The level of the runways has been set at just above the highest areas of the sands to minimise fill volumes. Coincidentally this is the same level as the runways at Schipol
- The island will require a sea wall or polder around it (as protects much of Holland). The height of the bund dictates its distance off the end of the runways to clear the flight surface.
- 4km long runways have been shown as this is the maximum that might be required. Shorter runways would allow a smaller island and reduced costs.
- Runway separation of 1.5km has been shown for all runways in order to permit fully independent runway operation. Closer runway spacing would permit a smaller island and reduced costs or, if required, more runways.
- From a 19th century borehole the Goodwin Sands are believed to consist of sand to a depth of around 25m overlying chalk. Site investigations will be required but if this soils structure is correct then the sands will form a sound formation for the airport once they are protected by a sea wall bund.

6.1.2 A budget cost estimate has been prepared for the first phase of Goodwin Airport with three operational runways as follows:

Item	Cost
Construction of the Island	£3,500,000
Link To Mainland	£1,200,000
The Harbour	£1,200,000
Roads, Rail and Runways	£11,400,000
Improve Existing Infrastructure	£3,000,000
Buildings and Structures	£8,700,000
Equipment and Systems	£10,200,000
Total	**£39,200,000**

6.1.3 This estimate does not include for the cost of land acquisition which for the airport site is assumed to be free of charge since it is already in Government ownership. There will be some land acquisition costs associated with the on shore transport link improvements which have not been costed.

6.1.4 Ultimately we envisage that the UK government would be the principal funder for any new airport (whether it is at Goodwin or in the Thames estuary). The cost for Gooodwin Airport at £39.2bn is comparable to the estimated cost of £42.6bn for the HS2 rail link which is also to be government funded. There are though possibilities for the private sector to defray at least part of the cost although more work is required to determine the viability of these ideas.

6.1.5 East Kent was once known for its coal mines and the carboniferous soil strata beneath the chalk run out beneath the sea. Today Deal is one of the test sites for shale gas extraction by fracking. There has been much resistance to onshore fracking but fracking offshore on Goodwin island could avoid any adverse impact on communities. It needs to be confirmed that suitable shale layers exist below the Goodwin Sands but the incorporation of a shale gas plant on the island, together with a power station, could make a significant financial contribution to the development.

6.1.6 Other options for funding include a joint venture with an overseas infrastructure investor. While the construction of a new offshore island might seem ambitious it is a common practice in parts of the Middle East and we believe that there are state backed enterprises who would be interested in the project. However before testing the interest

for this funding source Goodwin Airport first needs to be shortlisted in the list of proposals available. With the large number of schemes for new runway capacity currently under consideration investors cannot be expected to commit to any one until the list in contention shortens down.

6.1.7 While the cost of a new airport is high it is perhaps useful to consider the cost of doing nothing. The current constrained capacity at Heathrow results in fewer people flying to the UK than otherwise would; without more runway capacity this constraint will only worsen. The cost of these flights 'lost' by capacity constraint is not a straightforward calculation and is open to interpretation, but during 2010 the Eyjafjallajokull volcano ash plume prevented a considerable amount of air traffic to the UK. The net cost to the UK of that event was calculated at £233 (2010 prices) per lost passenger journey.

6.1.8 The capacity difference between the unconstrained condition with Goodwin and the Heathrow constrained case is up to 60 million passengers per year. This is equivalent to almost a £14 billion net loss to the UK economy per year. Thus if the project were to cost £39.2 to build, it would pay for its self in under three years.
(Ref: The Economic Impact of Air Travel Restrictions – Oxford Economics).

6.1.9 Further benefits would accrue from the investment in infrastructure, the creation of jobs and soft benefits, for instance, improvement in international standing through having the best airport in the world and Europe's northern hub.

6.2 Feasibility Considerations – Deliverability

6.2.1 While Beckett Rankine are not experienced in building new airports we are experienced in the design of major marine infrastructure projects. One of our largest projects has been the design of the expansion of Ras Laffan port in Qatar. Following its expansion Ras Laffan is the largest man made harbour in the world and, coincidentally, is about the same size as the first phase of Goodwin Airport. We commenced design of the port in 2004 and construction commenced in 2006 with substantial completion and commencement of operations in 2009, just five years later. Goodwin is a more complex project than Ras Laffan as it includes subsea tunnels and some complex buildings, nevertheless it would be possible to design and build the first phase in seven years.

6.2.2 To this timescale needs to be added the time for obtaining consents which took about a year for Ras Laffan but can be expected to take considerably longer for a major project in the UK. The consent process will, however, lie in the hands of the Government since the Goodwin Sands lie outside the jurisdiction of any local planning authority.

6.2.3 It is likely that any scheme for new runway capacity will require government money for the project; if not directly for the runway itself then for the associated off site infrastructure improvements to roads and rail connections. EU competition rules prevent governments from providing funding that benefits one airport against its competitors. Thus any major investment in an airport will require EU approval. The EU values projects that promote integration and cross border cooperation. Goodwin Airport is, amongst the current airport proposals, uniquely positioned to deliver both these objectives.

6.2.4 At the invitation of the organisation Opale Link www.opalelink.org we have presented our proposals at press conferences in Calais and Boulogne where they have been enthusiasticall welcomed by both the French and Belgian press. The Opale Link organisation's purpose is to promote closer co-operation between the coastal regions of northern France and southeast England and they see Goodwin Airport as a valuable contributor to their objective. They have advised us that Goodwin Airport would bring jobs and prosperity to communities on both sides of the English Channel. A letter of endorsement from Johann Duhoo the Président du Cercle Côte d'Opale Synergie is attached. This international support for Goodwin Airport will facilitate obtaining EU approval for the scheme's funding.

6.2.5 Construction of Goodwin Airport island is relatively straightforward using well established techniques for land reclamation as practiced for generations in Holland. Because the island will be constructed on sand, not silts and peat, settlement, such as has occurred at Kansai airport island in Japan, should not be a problem.

6.2.6 There is a significant volume of tunnelling required which will be predominantly in chalk, the chalk spoil will be used in the island construction. This will not provide sufficient fill for the whole island but other large projects generating very large volumes of spoil, such as HS2 and the Thames Tideway Tunnel works, have yet to identify a destination for their spoil. Combined these two projects will produce the majority of the fill required for the Goodwin island construction.

7.0 FLEXIBILITY

7.1 Adaptability to Future Demand

7.1.1 There are a number of drivers to the technological development of air travel and they do not all pull in the same direction or have similar results. The principal drivers are economy, particularly fuel economy and the reduction of carbon emissions, and speed of travel.

7.1.2 The search for economy is leading to larger and lighter aircraft with more advanced engines. Longer runways may assist these aircraft. Goodwin Airport runways are 4km and could be extended further in the future if required. Another development which can deliver economy is the WIG aircraft discussed earlier in this document. It is too early to say whether WIG craft will become a commercial proposition around the North Sea and Channel but Goodwin Airport will be able to handle them if they do.

7.1.3 A number of aircraft manufacturers are working on the development of supersonic passenger aircraft with Boeing currently testing their 'son of Concorde' design with assistance from NASA. Even faster are designs for HOTOL space planes. Such designs are still some way from commercial production although they can be expected to become reality in 10-20 years or so which is well within the life of a new airport. These aircraft can be expected to require long runways and they will almost certainly be nosier than sub-sonic passenger aircraft. Goodwin Airport will be ideally placed to handle them.

7.1.4 Other aircraft types could also be handled, for example a helicopter terminal could be provided adjacent to the port zone. Hovercraft and their variants (there is a prototype hoverWIG) could be easily handled if required. The site and its location provide the ultimate in flexibility with operations unhindered by neighbouring uses.

8.0 SUMMARY

8.1 A Long Term Solution

8.1.1 In the past UK airport development has been carried out to meet short term requirements without any long term strategy in place. Thus there has been progressive increase in capacity at various airports, especially Heathrow, without any overall plan as to where nation's airport capacity should be located in the longer term. By adopting this series of incremental steps the development of the nation's airport capacity has not, with the benefit of hindsight, gone in the desired direction. Indeed the next incremental step at Heathrow, the short third runway, has now been abandoned in the face of local opposition and all three main political parties have said they are against any further expansion at there.

8.1.2 We believe that to embark upon any new substantive short term measures for the provision of extra capacity before deciding what the long term solution is compromises the selection of the best long term plan.

8.1.3 Once a long term strategy is determined any short term measures can be chosen as stepping stones toward that long term goal.

8.1.4 This submission is therefore to propose a long term solution to south-east England's airport capacity needs. By long term we mean the next 30-50 years and beyond.

8.1.5 Key to any proposal is its deliverability and for a long term project spanning several parliaments political deliverability is critical.

8.1.6 A hub airport is a very large item of infrastructure and, as it brings with it noise and atmospheric pollution, it is not a good neighbour. No politician wants such a development in their constituency. The answer therefore is to site it in nobody's constituency far enough away from any neighbours not to affect them.

8.1.7 The UK is fortunate in having the Goodwin Sands sandbank which is strategically well placed for such a development. The scheme has the following key advantages:

- The site is large enough for 5 or more full length runways
- Runways spaced for independent operations
- All take-off and landing wholly over water enabling 24 hour operations

- No community will be affected by aircraft noise
- No city centre overflying so associated risk is avoided
- The site is not subject to any environmental protection
- The site is vacant and already in Government ownership
- Close to HS1 rail link enabling 46 minute journey time to London St Pancras
- High speed rail link into Channel Tunnel and TGV network
- Additional rail links to serve south and west England
- Multiple road links via M20 and A2/M2
- The airport will bring regeneration to the most deprived area in southern England
- The airport will promote integration with northern Europe
- The airport will be flexible enough to handle all likely future aircraft types.

8.1.3 While there is no ideal solution to southeast England's airport needs (if there was it would have been identified by now) we believe that the advantages of Goodwin Airport make it the most sustainable and deliverable of the options available and we commend it to the Airports Commission.

For further details of the Goodwin Airport proposal please see www.GoodwinAirport.com or contact

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Cercle
Côte d'Opale Synergie

AEROPORT DE GOODWINSANDS
Mr Tim BECKETT
Beckett Rankine - 270 Vauxhall Bridge Road
London SW1V 1 BB UK

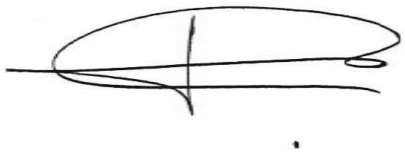
Dear Sir,

We follow with great attention your efforts to develop the **Goodwin airport** project.

This concept seems extremely constructive for all the people of north-west Europe. Indeed, its strategic position allows considering a complementary continental customer traffic to be added to actual London usage.

Furthermore, we note with interest the almost total absence of harmful effects of this airport built over the sea

So, we are fully supporting this initiative.



Johann DUHOO
Président du Cercle Côte d'Opale Synergie

Each individual activity, however small it may be, when it is in synergy with many others, shows strength, power. Then, reality becomes unavoidable.
The Cercle cote d'Opale Synergie was created for this purpose. A handful of individuals, women and men, wished to gather in a circle of friendliness and cordiality, heavily involved in the economic, political and administrative local life. Their goal is to galvanize their efforts in the purpose of development of our Cote d'Opale.*

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