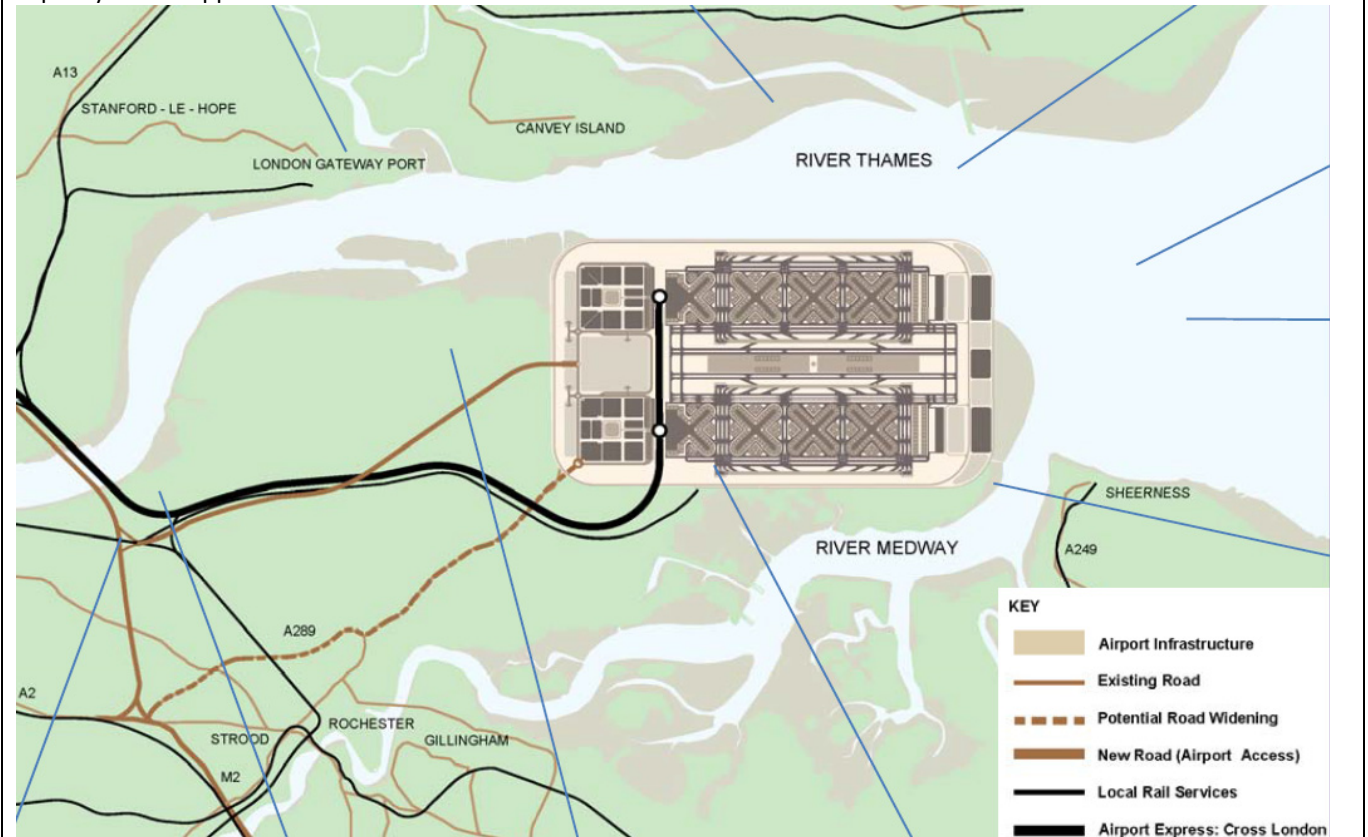


PROPOSAL TITLE:	Isle of Grain	Group:	New
SUBMITTED BY:	Mayor of London	Reference No.:	51

PROPOSAL

New four runway airport, developed on the Isle of Grain at the eastern end of the Hoo Peninsula on the north Kent coast, as a direct replacement for Heathrow. Partially constructed on reclaimed land with a total site area of 55km². The airport comprises four independent parallel runways in an East/West orientation, each 4,000m long.

Requires all supporting infrastructure (road and rail links, utilities, etc), plus settlements (with their supporting infrastructure) to accommodate direct and indirect employees to be constructed. Essentially a Government led initiative with the eventual sale of the airport and the land at Heathrow offsetting the upfront cost. Phase 1 of construction is from 2020 to 2029 and delivers infrastructure to support 90mppa. Phase 2 begins from 2026 to 2050, ultimately delivering capacity of 180mppa.



ASSESSMENT SUMMARY

Broadly similar scheme to others on the Hoo Peninsula or nearby in the Thames Estuary, proposing an east London replacement for Heathrow. All schemes offer a substantial reduction to noise affected populations with the closure of Heathrow, however all remove protected habitats which would require replacement and demonstration of no alternative and overriding public need to construct over.

Although positioned on the eastern end of the peninsula (with only a small local population), as the largest of the estuary options providing the greatest capacity, it affects the largest population with noise although, even then, the population affected is small compared to the system benefit. As the largest on-shore scheme, it has the greatest capital cost substantially higher than development at existing airports or new sites with better existing surface access.

The early phases of the proposed development would only replace the lost capacity at Heathrow, with the fuller build-out required to add capacity to the system. The four-runway configuration provides the largest capacity of the estuary options.

Although the scheme adds to capacity, its cost, location and environmental impact are challenging.

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OVERVIEW

Approach	Government led initiative to acquire Heathrow, construct the new airport and supporting infrastructure, transfer operations and redevelop Heathrow site before sale of both assets.					Opening Year 2029			
Capacity	The proposed opening phase only replaces the capacity lost on the closure of Heathrow. Subsequent development increases system capacity.		Runways ATM pax	Airport	Net				
				4	520,000	2			
				1,000,000		90			
				180					
Cost (£bn)	The off-shore location and extent of surface access requirement significantly increase the cost.		Airport	Access	Other	Sub Total	Including Risk/OB		
			29.8	9.2	1.8	40.8	85.6		
Surface Transport	A new high speed branch line to HS1, airport express rail line to Waterloo via Essex and Canary Wharf, and extension of Crossrail 1 to the airport is proposed. Expansion of London termini platform capacity will be needed, and there may be capacity issues with HS1 in accommodating the proposed level of service. Additional capacity on around 60% of the M25 is proposed, at considerable expense, but there are likely to be other highway capacity requirements that have not been identified. Strategy relies on achieving high public transport targets.			1 hr isochrone	12				
				2 hr isochrone	20				
				London centre	33 miles				
Economic									
Borough	Dartford	Gravesham	Medway UA	Maidstone	Swale				
Unemployment (%)	7.0	9.1	9.5	6.7	7.5				
Ave. Salary (£/yr)	29,510	28,106	27,378	28,236	28,085				
Borough	Havering	Thurrock UA	Basildon						
Unemployment (%)	9.6	7.7	8.1						
Ave. Salary (£/yr)	30,378	28,033	28,553						
County	Medway UA	Kent exc UAs	Thurrock UA	Essex exc UAs	Outer London E&NE				
GVA (£/capita)	13,631	15,883	14,956	16,707	13,428				
Environment	Larger footprint (55km²) than Foster Isle of Grain proposal (24km ²) with potential for increased impacts on designated sites (1830ha intertidal/subtidal habitat loss compared to 1,700ha for Foster proposal, plus 8 ancient woodlands). Highest number of properties to be lost for all Thames Estuary schemes (4 villages compared to 3 for IAAG and 1 each for Fosters and Metrotidal).			57 LA_{eq}	Airport	Net			
				55 L_{DEN}	8.2k	(233,000)			
					7,000				
					31.5k				
					24,000				
	SAC¹	SPA¹	Ramsar	CA¹	AONB¹	SSSI¹	Listed Buildings	SAM¹	Houses Lost
		2	2			2	21	2	~2000
							18	7	2,190

¹ SAC: Special Areas of Conservation; SPA: Special Protection Areas; CA: Conservation Area; SSSI: Site of Special Scientific Interest; SAM: Scheduled Ancient Monument.

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ECONOMY

Borough	Dartford	Gravesham	Medway UA	Maidstone	Swale
Unemployment (%)	7.0	9.1	9.5	6.7	7.5
Ave. Salary (£/yr)	29,510	28,106	27,378	28,236	28,085
Borough	Havering	Thurrock UA	Basildon		
Unemployment (%)	9.6	7.7	8.1		
Ave. Salary (£/yr)	30,378	28,033	28,553		
County	Medway UA	Kent exc UAs	Thurrock UA	Essex exc UAs	Outer London E&NE
GVA (£/capita)	13,631	15,883	14,956	16,707	13,428

Impact on Industry

A new airport at the east end of the Hoo peninsular with four independent runways would provide a net increase of two runways assuming Heathrow is closed. This might provide sufficient capacity to meet hub airport demand through to at least 2050. This creates benefits by allowing new services and reducing operational costs due to operation of a more efficient airport and by allowing significant improvements in connectivity over time. However this may be offset in part by increased landing charges to recover capital costs of construction, and being less well located for the airline’s prime passenger market. It will free up land at Heathrow helping address demand for land for housing.

Airports A four runway hub airport would provide sufficient capacity to meet anticipated hub airport demand and could attract network traffic away from Gatwick. It may also restrict growth at Southend Airport and London City and inhibit development of Manston, but otherwise there is relatively little impact on other regional airports. It may see an increase in services to airports in the North of England, Scotland and Northern Ireland, which would enhance regional connectivity.

Airlines As with any other major airport on an estuarial site, airlines using Heathrow and others seeking to use it would benefit from the increase in capacity allowing new direct routes, higher frequencies, reduced delays, because of sufficient capacity for resilience. Greater competition and significantly reduced airline ‘slot’ values will have a countervailing effect on some airlines. Interline traffic would have more potential to increase, enhancing the viability of more direct routes, particularly by airlines based at the new hub. LCC and charter airlines would likely face more choice of airports, as some network traffic may transfer out of Gatwick because of the greater interlining opportunities.

Passengers As with any other large hub airport on an estuarial site, passengers will benefit from increased capacity at the new site via delay reductions, a greater choice of destinations/enhanced frequencies, more competition (reducing fares) and faster terminal throughput times. But travel times and costs would increase on average for typical customers, but less so than for typical estuarial sites, as it provides for a river crossing to SW Essex (though such a cross-river connection could also be provided for other estuarial airport proposals if attractive). Though with reduced travel times in Kent, Essex and E London.

Local & Regional Economic Impacts

The airport would be located in Medway district, and close by to the Borough of Gravesham, an area of relatively high unemployment and low economic activity for the SE. It is also close by Thurrock, due to the cross river connection, and not far from Havering, the latter being an area of high unemployment and low economic activity. The new site would provide an expanded airport with sufficient capacity to meet expected short to medium term demand would facilitate growth of new and existing industries in aviation, airport and aviation support services and travel, tourism, logistics and other related sectors, to service the growth in passenger and freight demand met by the new airport. Most of these businesses will have relocated from the vicinity of Heathrow. The immediate effect would be to increase commercial property development in the vicinity of the new site, but there will also be significant potential to redevelop the Heathrow site for both commercial purposes and residential development. The agglomeration effects of the existing Heathrow/Thames Valley/M4 corridor could be diluted significantly, as such businesses may prefer to locate closer to the new airport on either side of the Thames estuary. Reduced noise impacts are likely to have a modestly positive effect on land prices to the east of the Heathrow site, offset by some smaller negative impacts closer to the new airport. There would be significant dislocation of employment, with many employees needing to relocate, although relative housing prices around nearby towns may mean this is affordable for many assuming supply meets demand. Existing commuters in the Thames estuary may experience increased congestion and travel costs, despite the improved transport connections.

National Economic Impacts

The main impacts come from the provision of new capacity, enabling more flights and connectivity, and the increase in business and leisure trips, and trade in goods and services (and the indirect effects on inward investment. Increased choices of flights and airlines, reducing travel time and fares should generate significant consumer/welfare benefits. The benefits would be offset to some extent by higher access costs from London (although lower costs for Kent, Essex and E London).

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SURFACE ACCESS

Time/Distance to Central London 24 minutes 33 miles	1 hr isochrone population 12	Key required upgrade schemes
Journey times to other population centre Birmingham 1hr 12 mins Manchester 1hr 32 mins (via HS2)	2 hr isochrone population 20	<ul style="list-style-type: none"> ▪ New high speed rail line to St Pancras ▪ New airport express rail line to Waterloo via Essex and Canary Wharf ▪ Eastern extension to Crossrail ▪ London termini platform capacity enhancements ▪ New airport access road ▪ Lower Thames Crossing Option C ▪ Capacity enhancements to the A2 and A228 ▪ Widening the M25 from the M1 to the A243 junctions
Rail Infrastructure Capacity Analysis		
The proposal suggests access to London via HS1 to St Pancras, via a new express rail line to Waterloo and via an eastern extension to Crossrail. It claims peak demand for the airport of 21,000 public transport passenger trips and 7,000 staff return trips between 7:00 and 8:00 (presumably daily). It would be useful to validate that existing lines and termini have sufficient capacity to cater for the airport-related demand, and to validate whether the proposed new airport express rail line to Waterloo is essential to cater for the demand, given the addition of this line would be particularly expensive.		
Highways Capacity Analysis		
The proposal suggests widening existing roads and the construction of new access roads in addition to capacity enhancements on existing roads such as the A2, A228 and M25. A new Lower Thames Crossing provides access to Essex and the M25 to the north (relying upon a variant of Lower Thames Crossing Option C), connecting the M2 and M25 Motorways slightly east of its proposed alignment. From here a major junction to the airport would need to be constructed. Widening of the M25 from the M1 in the north to the A243 in the south west is a significant project in its own right. Even with the stated 65% public transport mode split target, it is likely that significant capacity enhancements will be required to the local and sub-regional road networks.		
Accessibility to Population & Business centres		
A non-stop high speed service to St Pancras (taking 29 minutes) with onward connection to HS2 could potentially also allow through trains from the HS2 line to serve the airport, connecting the West Midlands and the north to the airport. An Airport Express service to central London would also service Canary Wharf, London Bridge and Waterloo (28 minutes). An extension to Crossrail and improved local links would help serve local populations and employees. Journey time for car journeys would be noticeably longer.		
Accessibility to Transport Interchanges		
Key transport interchanges directly served by the proposed rail services include: St Pancras; Ebbsfleet; Stratford; Canary Wharf; Farringdon; Tottenham Court Road; Old Oak Common London Bridge and Waterloo.		
Accessibility to Workforce		
The proposal has strong public transport links to local towns in the North Kent and Medway area and to South Kent via the proposed Thames Crossing and to east London. Further analysis is necessary to determine whether this could meet the modal assumptions made for staff especially given their dispersed nature and twenty four hour shift patterns.		
Modal Split Assumptions		
The surface access strategy is based on a 65% public transport share for passengers . A mode share for staff is not explicitly stated however they suggest that 7,000 out of 9,000 passengers at peak times would use public transport (which equates to 78%). These mode shares seem high for both passengers and employees especially given their likely dispersed locations and shift hours and we have asked the sponsor for what measures they plan to implement to achieve this target. It is also much higher than at Heathrow where 41% of staff use public transport.		
Potential Wider Use		
The proposed road and rail connections are mostly airport-specific and are unlikely to have significant wider benefits. The main exception is the airport Express Service from London Riverside to Waterloo which could be shared between airport and non-airport passengers offering relief to the Jubilee Line and improving connections between south west London and Canary Wharf with 'Crossrail type' through services. The project would improve links from London Riverside (Dagenham) and Central London. Improving rail links between Kent and Essex could help better integrate the Thames Estuary region however the submission does not provide any details for these services.		

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ENVIRONMENT

Overall noise impact	Only 31,500 people within 55 Lden contour @2050 (180mppa).						Airport	Net	
	Significant system reduction on the closure of Heathrow.						57 LA _{eq}	8.2k 7,000	(233,000)
							55 L _{DEN}	31.5k 24,000	
	SAC	SPA	Ramsar	AONB	SSSI	CA	Listed Buildings	SAM	Houses Lost
	-	5	2	-	2		21 18	2 7	~2000 2,190
Air Quality <u>Qualitative risk assessment provided for 2034 and 2050 for non-compliance for N02, PM10 and PM2.5 standards. This assessed proximity of airport and new/widened roads to AQMAs and proximity of these to residential areas. Small area of compliance risk identified for airport, but with mitigation likely that new hub airport could be consistent with relevant legal frameworks.</u> <u>For roads – high risk of compliance breach from 2034 for sections of the M25 and sections of the A2 (locations of AQMAs), but assume no high risks remain by 2050 with improved vehicle technology.</u> <u>Other Airports:</u> As for all new hub options, potential for some local air quality benefits through removal or reduction of Heathrow airport’s contribution to local NO ₂ . Luton airport would close for this option, with removal of airport and related traffic contribution to air emissions locally							Mitigation Plan <u>Maximise public transport use and restrict access to Low emission vehicles only.</u>		
Noise <u>For Phase 2 (2050 @ 180mppa): 31,500 new people exposed to Lden over 55dB - stated as 5% of Heathrow population affected by noise at this same level; - 8,200 people affected by noise at 16hr LAeq over 57dB; 1600 people affected by 50dB at night assuming night-time operations confined to two centre runways.</u> Independent noise modelling for comparison provided the following results: <ul style="list-style-type: none"> 57LAeq: 7,000 people affected; 55Lden: 24,000 people affected. The population affect by 57LAeq represents a net reduction of 233,000 given the closure of Heathrow.							Mitigation Plan <u>Operational measures such as orientation of runways and flight paths, noise abating operational procedures and restricting location of new residential and employment buildings close to airport.</u>		

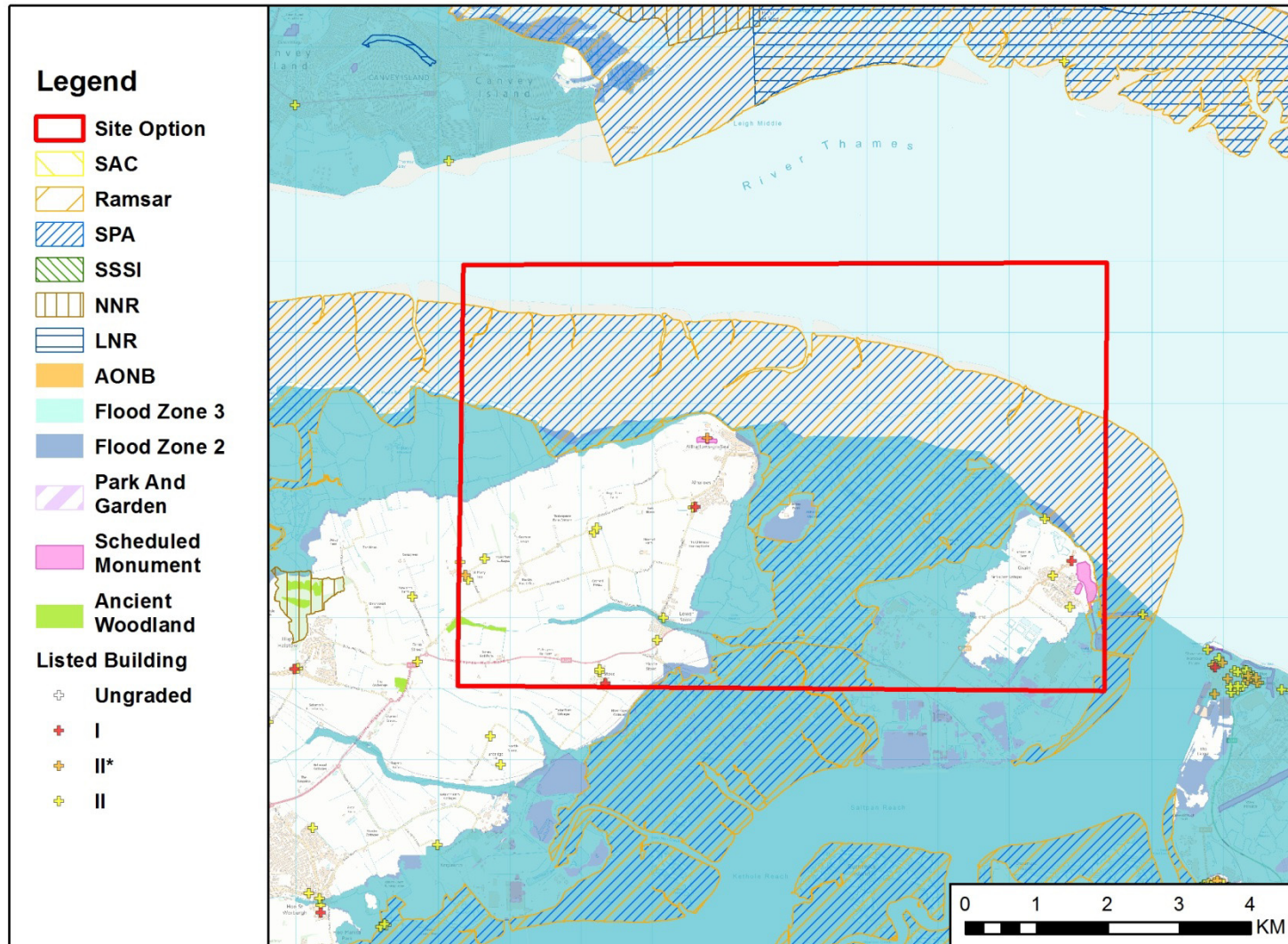
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<p>Designations <u>European designated sites (SPAs and a Ramsar) would be impacted along with nationally designated sites (SSSIs).</u> Approx 40% of the site is located within the boundaries of 2 SPA/Ramsar sites and another 2 SPAs are located within 5km. Footprint indicates potential direct impacts on 8 designated Ancient woodlands (not impacted by Fosters Isle of Grain proposal).</p> <p><u>Direct effect on 1,830ha intertidal and sub-tidal habitat - and significant effects on Natura 2000 sites unlikely to be avoidable and therefore compensation i.e. replacement habitat needed.</u></p> <p><u>Thames Estuary 2100 plan estimates 6-7 billion of investment in Thames tidal defences, continuing floodplain management and intertidal habitat replacement will be required to 2100. Developing appropriate mitigation and compensation measures for the airport could contribute to more strategic issues identified in TE2100.</u></p> <p>Will need to follow process under Habitats Regulations (implementing EU Habitats and Birds directives) and undertake Appropriate Assessment, demonstrate no alternatives and overriding public interest and provide compensatory measures.</p> <p>Further significant potential impacts from surface access and associated developments. Possible further impacts associated with coastal geomorphology changes. Bird strike risk measures would cause further additional impacts.</p> <p><u>21 listed buildings and 2 SMs directly affected.</u> Analysis of GIS datasets indicates that a further 5 SMs could be directly impacted.</p>	<p>Mitigation Plan <u>Habitat enhancement and replacement.</u> States examples exist in Europe and elsewhere but none given.</p>
<p>Climate Change <u>High level assessment for 2050 based on DfT 2050 demand forecasting compared to Heathrow today and 2050 constrained. Due to technology improvements, larger planes, and more efficient hub operations, CO₂ per passenger would be lower at Hub both currently and in 2050 (130-140 kg/passenger compared to 280 and 200 for Heathrow today and in 2050 respectively)</u> although based on overall greater passenger numbers at the Hub.</p> <p><u>Also greater potential for technology improvements and modal shift for public transport having lower surface access emissions than Heathrow does today</u> although many of these improvements may also be possible for Heathrow in the future also.</p>	<p>Mitigation Plan None specified but implies efficiency potential in design and operation</p>
<p>Other Issues <u>Additional impacts on RSPB reserves and protected species noted. Landscape and visual impacts noted but no impacts on protected landscapes. Site is subject to coastal flood risk.</u> Approximately 30% of the airport footprint in Flood Zone 3 (high probability), and 30% in Flood Zone 2 (medium probability).</p> <p><u>Potential impact on water courses and coastal processes (geomorphology). Additional impacts on other historic and pre historic remains.</u></p> <p>Significant impacts from surface transport and additional development, agricultural land loss and agricultural land quality impacts, displacement of industrial development and contaminated land not covered, each of which may be considerable.</p>	<p>Mitigation Plan <u>Further desk studies and surveys.</u> <u>Design to reduce visual /landscape impacts.</u> <u>Flood defence to 1in 200 annual chance flood event.</u> <u>Hydrodynamic model of Hoo peninsula and coastal process model.</u></p>

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PEOPLE

<p>Housing <u>The Isle of Grain and wider Hoo peninsula are sparsely populated.</u> The footprint map indicates potential loss of housing in the villages of Grain, Allhallows, Allhallows-on-Sea and Lower Stoke. <u>Housing gain through redevelopment of Heathrow (~80,000 new houses) and additional housing (35,000) in Thames Gateway area. Improved access to housing for communities around hub.</u></p>	<p>Demolished <u>~2,000</u> 2,190</p>
<p>Vulnerable Groups <u>Vulnerable groups not addressed specifically. Noted that higher levels of deprivation exist (in Swale, Medway, Gravesham and Dartford) than national average.</u></p>	
<p>Quality of Life <u>Noise and air quality benefits – considerable net gains for large population around Heathrow. Some noise and air quality disbenefits around new hub, but improved employment and housing access significant contribution to health and quality of life.</u> <u>A reduction in net out-commuting from 49,000 in 2012 to 5,000 in 2050.</u> Temporary losses with employment loss and transition time likely to most adversely affect vulnerable groups with less mobility and flexibility.</p>	
<p>Wider Social Impacts <u>Reference is made to wider economic benefits especially Eastern wedge and Thames Gateway and national economic benefits.</u> Impact on remaining communities on the Hoo Peninsular. There are likely to be additional impacts from in-migration of working population in terms of increased pressure on services such as health, housing and education and changes to population mix and health issues. Additional pressure on housing and housing/rental could reduce affordability for the existing population. Social impacts at Heathrow and Luton would depend on redevelopment of the airport sites and the extent they can provide for housing and employment needs.</p>	



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COST

Capital Cost	£bn
Phase 1 estimated at £47.3 bn including 34% risk, unadjusted for bias. Phase 2 estimated at £21.0 bn including 21% risk, unadjusted for bias. Submission does not explicitly identify exclusions from these cost estimates.	Airport 29.8
	Access 9.2
	Other 1.8
	Sub-Total 40.8
	Risk 16.3
	Optimism Bias 28.5
	Total 85.6
Key Risks	
<ul style="list-style-type: none"> ▪ Nature of reclaimed land platform poses increased risk of differential settlement. ▪ Relocation of LNG facility. ▪ Surface access. ▪ Marine habitat compensation and coastal flood/erosion protection measures. ▪ Sea Bed Licences. 	
Risk and Contingency Allowances	
40% contingency adopted for all costs. 50% optimism bias applied.	
Surface Access Costs	
£9.2bn estimate for road and rail links based on requirement for infrastructure identified by independent analysis.	
Other Off-Airport Costs	
An allowance of £0.3bn has been included within the independent cost analysis for Marine habitat compensation and coastal flood/erosion protection measures. An allowance of £1bn has been made for a contribution to the relocation of the National Grid’s LNG Facility. A further £0.5bn has been included to cover other typical environmental mitigation measures.	
Summary Comments	
The general approach in the submission appears reasonable, but underestimates optimism bias. Costs associated with the closure of Heathrow have been excluded.	

OPERATIONAL VIABILITY

Capacity	Runways	Airport	Net
The proposed opening phase only replaces the capacity lost on the closure of Heathrow. Subsequent development increases system capacity.		4	2
	ATM	1,000,000	520,000
	pax	180	90
Resilience, Reliability and Efficiency			
The proposal supports independent parallel approaches, but dependent within runway pairs. The proposal could be defined to meet resilience targets.			
Safety			
There does not appear to be any need to overfly significant population centres on final approach or immediately after departure. The removal of approaches to Heathrow over central London would increase system safety.			
The LNG facility to the south infringes the obstacle limitation surfaces and would negatively impact operations, particularly during periods of low visibility.			
The Kentish Flats windfarm may conflict with radar and may require relocation.			
Bird strike would represent an unusually high threat compared to inland airport locations. Fog may also present a significant hazard, although its greatest negative impact maybe on capacity.			
Scalability			
Although the proposal is defined within an identified boundary, it appears that additional capacity could be developed if required, although this would be either further into the estuary, or closer to the LNG facility.			
Airspace			
The proposal would require significant considerable airspace design in terms of relocating the boundaries of the London Terminal Manoeuvring Area (LTMA), SIDs, STARS and interfaces with en route airspace. The LTMA would extend from the new airport in the east to Gatwick in the South, Luton and Stansted in the north. This would be a major reconfiguration and would also require international consultation and agreement. Given the long-term nature of the option and the likely airspace and air traffic management developments under SESAR, restructuring maybe achieved as part of the on-going development process, however this is not certain. International boundaries may require amendment.			

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DELIVERY

Timescale

Government led initiative to acquire Heathrow, construct the new airport and supporting infrastructure, transfer operations and redevelop Heathrow site before sale of both assets. Hybrid Bill by 2019; government acquires Heathrow and land by 2021, with new hub and surface access built by 2029; Heathrow land redeveloped by 2032.

Sources of funding

Scheme is government-funded and delivered via SPV except some new road links via PPPs with potential government underwriting of demand risk.

Commercial Deliverability

Even with government grant the scale of private financing challenge is very significant, but may be achievable subject to regulatory structure and comprehensiveness of government support package. Raises major taxpayer value for money questions plus could impact government balance sheet treatment. Without grant funding landing charges would need to rise to levels that are likely to be unsustainable if the airport were to remain competitive.