Report from ASA on BAA's SG2 proposals

Contents

Glossary

Aircraft stand	The bays provided on aprons for parked aircraft.
Air Transport Movement	An air transport movement is a landing or departure by an aircraft operating a civilian, commercial passenger or cargo flight. An aircraft movement is counted as either one arrival or one departure.
Apron	Area defined for the stationing of aircraft for the embarkation and disembarkation of passengers, the loading and unloading of cargo, and for parking.
APD	Air Passenger Duty
Available Seat Mile	Definition of capacity, one seat carried one mile.
BAR UK	Board of Airline Representatives in the UK
BATA	British Air Transport Association
CATM	Cargo Air Transport Movement
CAA	UK Civil Aviation Authority
Central terminal area	The public area around the terminal buildings/s containing car parking, transportation, facilities, hotels, offices etc.
CIP	Capital Investment Plan
Code F aircraft	ICAO design code for aircraft with a wingspan from 65 metres to less than 80 metres, such as the Airbus A380.
Cross-taxiways	The taxiway system linking two separate runways.
dBA	Sound is measured in decibels (dB) with the usual form of measurement being 'A weighted' dB(A) such that sound levels measured in dBA correspond to what the human ear hears.
DfT	Department for Transport
EIA	Environmental Impact Assessment
ES	Environment Statement
ETS	**(**EU) Emissions Trading System
G1 Application	The Planning Application submitted by BAA in April 2006 under Section 73 of the Town and Country Planning Act, 1990 to increase the limit of 'condition ATM1' and remove 'condition MPPA1'.
General Aviation	General Aviation consists of all private and business aviation, including executive or corporate operations, flying club activity,

	and commercial operations by small aircraft such as air taxi, agricultural work and flying training.
Generation 2 (G2)	The name of the project to deliver a second runway and other associated infrastructure at Stansted Airport
GPDO	General Permitted Development Order
IMP	Interim Masterplan
LCC	Low cost carrier
Leq	A way of describing all types of noise, also in widespread use for describing aircraft noise. Leq is measured in A-weighted decibels, which means that it is weighted with a frequency that mimics the sensitivity of human hearing to different sound frequencies.
Listed buildings	Buildings identified on the English Heritage statutory list as being historically and/or architecturally important.
Load factor	The percentage of revenue passenger miles (RPM) to available seat miles (ASM). A key measurement of how efficiently an airline is utilising capacity.
PATM	Passenger Air Transport Movement
PCBP	Price Control Business Plan
Public Safety Zone (PSZ)	Areas of land at both ends of the runway within which development may be restricted in order to control the number of people on the ground at risk in the event of a aircraft accident.
MPPA	Million passengers per annum
Mixed mode	A method of operating two-runways allowing both take-offs and landing on each.
NATS	National Air Traffic Services
Northside	The area of Stansted Airport located to the north of the existing runway which accommodates General Aviation, car parking and other ancillary activities.
NOx	Oxides of nitrogen produced during combustion of fuel
Parallel taxiways	The single or dual taxiway system running adjacent to and parallel to the runway
PATM	A scheduled or charter passenger aircraft movement
PSZ risk contours	The area of risk (defined probability level) of being killed as a result of an aircraft accident
RAB	Regulatory Asset Base. The amount of money that represents in financial terms the reasonable cost of past investment that

	has yet to be recovered from users and which the regulator believes the company should be permitted to seek to recover.
RAT	Rapid Access Taxiway
RET	Rapid Exit Taxiway
Revenue Passenger Mile	Revenue per passenger carried one mile
SACC	Stansted Airport Consultative Committee
Segregated mode	A method of operating a pair of runways where one runway is used by departing aircraft and the other runway is used by arriving aircraft.
SERAS	The Government's South East and East of England Regional Air Services Study
Site of Special Scientific Interest (SSSI)	Nationally important areas of biodiversity and geological conservation value
T1 / T2	Terminal 1 / Terminal 2
TAAM	Total Airspace and Airport Model (simulation modelling package)
Turnround	The operation of unloading, servicing, and loading an aircraft between its arrival at, and departure from, the airport.
UDC	Uttlesford District Council
WAML	West Anglia Mainline Railway
White Paper	The Air Transport White Paper *'The Future of Air Transport'* published by the DfT in December 2003.
Yield	The amount of passenger revenue received for each Revenue Passenger Mile

Executive Summary

i) This report has been prepared by Alan Stratford and Associates Limited in association with Gleeds in response to a brief from the Competition Commission. It provides a review of the masterplan options for and the cost of the development of a second runway, terminal and other associated infrastructure at London Stansted Airport designated as Generation 2 (G2). It also assesses the need for the development in the context of forecasted air traffic levels and capacity constraints at Stansted and at other airports in London and the South East.

ii) The study, which was carried out in the context of the Competition Commission's review in the supply of airport services by BAA and other investigations, was undertaken through the provision of information from BAA and other industry stakeholders including the Department for Transport (DfT), National Air Traffic Services (NATS) and the Stansted Airline Consultative Committee (SACC).

iii) The G2 proposals represent the development of Stansted to enable it to expand from the expected capacity of its single runway of 35-40 mppa (million passengers per annum) to around 68 mppa. Following a consultation process between December 2005 and March 2006, BAA published its preferred G2 masterplan option (Option A operated in segregated mode) in January 2007 and submitted a Planning Application to Uttlesford District Council in January 2008.

iv) The financial viability of the G2 scheme is dependent on the air traffic forecasts, the level of airport charges and the overall capital costs of the development. BAA's traffic projections are based on an econometric model of traffic demand and airport capacity constraints in London and the South East over the period to 2030.

v) Whilst BAA have developed and to some extent calibrated their econometric model, it is inevitable that certain judgements are applied to derive the model elasticities and other parameters. The traffic forecasts for Stansted are based on the premise that it will attract both traffic from within its own catchment area and overspill traffic from other capacity constrained London airports.

vi) BAA's Base Case forecasts (as submitted in their G2 Planning Application) assume that the second runway and appropriate additional terminal/apron capacity will be in place by 2015, with further phases of airfield infastructure provided through to 2030 in line with traffic level requirements. It is also assumed that a second runway at Heathrow would be built by 2020.

vii) BAA's Base Case G2 forecasts show Stansted's passenger traffic increasing as follows:

BAA's SG2 Traffic Forecasts

2007	23.8 mppa	-
2015	38 mppa	BAA spot year forecast
[✂]	**[✂]**	**[✂]**
[✂]	**[✂]**	**[✂]**
2030	68 mppa	G2 capacity level

viii) Despite significant changes to their G1 forecasts in the 2008 CIP (Capital Investment Programme), BAA have not published revised G2 projections. [✂]

ix) We are concerned that BAA's traffic forecasts are too optimistic, particularly in the period to 2015. It is unlikely that recent market trends at Stansted (eg an estimated 4-5% decline in annual passengers in 2008 with potentially a further decline in 2009 due to the grounding of Ryanair based aircraft and other capacity reductions) will be quickly reversed. These impacts may become a little clearer following Ryanair's announcement of its planned capacity reductions at Stansted for Winter 08/09, which is expected imminently after the publication of this report (July 2008).

x) We also feel that BAA's projections of long-haul and cargo traffic are over-optimistic under their Base Case assumptions – although should the second runway at Heathrow not proceed, these would clearly increase substantially. In particular, there is a history of long-haul service failures at Stansted, including most recently the collapse of Maxjet and Eos and the planned withdrawal of American Airlines route to New York (JFK). It is possible that BAA's traffic overspill assumptions may not be valid, particularly for overseas originating passengers. In the case of cargo, we would expect some increase due to the lack of slots at other London airports, although BAA's projected growth rate to 2015 (=15.6% pa) is highly aggressive and is not borne out by recent market trends.

xi) Forecasts for passenger traffic at Stansted have also been produced by the Department for Transport (DfT) and by the Stansted Airline Consultative Committee (SACC).[1] DfT's Base Case forecasts, suggest that traffic levels could reach 40 mppa in 2015 and 72.5 mppa in 2030 (in excess of Stansted projected capacity of 68 mppa). The DfT forecasts however use a 2005 base year, which, in our opinion, results in over-estimates of current traffic in 2008 and throughout the G2 period. The SACC's 2006 review of Stansted forecasts made some initial projections of future demand derived by looking at the drivers of the growth of existing routes and the introduction of new routes at Stansted, rather than on the basis of assumed overspill demand from other London airports. These show lower rates of growth than BAA forecasts, particularly under scenarios which explicitly take into account a much higher price elasticity of demand in respect of future airport charges under G2. Under SACC's 'optimistic' scenario with low price elasticity, traffic levels would attain 49 mppa by 2030, whilst under a 'realistic' scenario with high price elasticity, these are projected to be 33.4 mppa by this date. We understand, however, that SACC has recently updated its forecasts.

[1] Revised forecasts prepared by the SACC were submitted to the Competition Commission towards the end of the study period. These are not assessed in this report.

xii) Our own traffic projections are based broadly on BAA and DfT growth rates, with adjustments for recent market trends and slightly less optimistic assumptions on oil prices and environmental charges (and their consequent impact on air fares). In our 'most likely case' scenario, passenger traffic is forecasted at 30.2 mppa at 2015 and at 58.4 mppa in 2030. This suggests that the G2 project should be delayed until around 2017/2018. Cargo tonnage is projected at 390,000 tonnes per annum at 2015 (BAA = 650,000 tonnes) and 812,000 tonnes per annum at 2030 (BAA = 1,120,000 tonnes). We have not however assessed the financial implications of these reduced forecasts.

xiii) The passenger traffic forecasts produced can be summarised as:

	2015	**2030**
BAA	38 mppa	68 mppa
DfT (Base Case)	40 mppa	72.5 mppa
SACC (Optimistic – Low Price Elasticity)	33.5 mppa	49 mppa
SACC (Realistic – High Price Elasticity)	22.9 mppa	33.4 mppa
ASA (Base Case)	30.2 mppa	58.4 mppa

xiv) BAA used a staged mechanism titled an 'optioneering' process in order to 'rigorously develop and refine' its masterplan layout options for the expansion of Stansted for G2. This process delivered a short-list of options for public consultation.

xv) Following a four month consultation process, BAA announced its preferred option (Option A representing a wide spaced parallel runway operated in segregated mode) in January 2007. This represented a change from their previously preferred option (Option A in mixed mode) due to a reduction in the expected capacity gained through mixed mode operations. We believe that BAA's decision to change its preferred option was justified in the circumstances, although we are surprised that this was not made in the first instance.

xvi) Whilst there was some interaction between BAA and airline users (as represented by SACC) during the consultation phase, this was limited. We are concerned that the alternative option proposed by SACC - a close parallel runway (Option D) with a 595m stagger and a second terminal to the south east of the existing terminal - was only evaluated in detail by BAA in a joint workshop held with SACC shortly before the announcement of their preferred option in January 2007.[2] In our view, this assessment was not particularly rigorous nor was it based on BAA's most up-to-date costs.

xvii) Despite this, we believe that BAA made the correct decision in preferring its Option A layout due to the poor operational performance of the Option D masterplan in terms of aircraft taxiing times, the increased population exposure to aircraft noise and the marginally lower overall cost. We also feel that SACC's proposed location for the second terminal is inferior to BAA's preferred location due to the extended distance (approx 1,000m) between the T1/rail station complex and T2, which would require a passenger bussing operation. In addition, due to the limited apron space available for the second terminal and the need to relocate certain cargo and hangar facilities, the longer-term capital costs of SACC's Option D are slightly higher than those of Option A.

[2] Further proposals and related cost estimates for an alternative to the SACC scheme were submitted by Ryanair to the Competition Commission during the course of the study. These are evaluated in a separate report

xviii) Given the predominance of low cost carriers at Stansted, we have examined the possibility that the second terminal should be a dedicated low cost facility, although BAA has not committed itself to the type of terminal to be provided. We have looked at other low cost terminal facilities at other airports, although these generally cater for lower capacities (up to 15 mppa) than that proposed by BAA (33 mppa). It is possible that more than one additional terminal might be provided, although this would be expected to increase capital costs.

xix) Our teminal benchmarking analysis suggests that the unit cost (per sq metre of floor area) for such facilities is rather lower than shown in BAA's costings. We have reduced these rates in our own 'Minimum Cost' option.

xx) We recognise that SACC feel that the second terminal should be built and operated through competitive tendering. We recognise that this may lead to cost efficiencies although it is unclear how the regulatory process would work in these circumstances. BAA intend to provide a terminal capacity of 15 mppa (with a fit-out for 10 mppa) at Phase 1 which would suggest that other airlines, rather than Stansted largest carrier, Ryanair, who already handle some 16 mppa at the airport, are unlikely to move to the new facility.

xxi) The capital costs of all options considered incorporate blight costs (for land and property acquisition or loss of value). These amount to some £110.1m in the case of Option A, £134.4m for BAA's Option D and £133.2m for SACC's Option D. All these figures, however, include net property acquisition costs of £16.9m incurred as a result of a legal commitment to honour the land boundary defined for a wide spaced parallel runway (similar to Option A) as defined in the Government White Paper on Air Transport. This would, however, reduce the difference of £25m between the overall costs (as estimated by BAA) of Option A (£2,269m) and Option D (£2,294m). SACC's Option D costs (as estimated by BAA) amount to a higher figure of £2,487m.

xxii) BAA has included some provisioning for A380 operations in terms of the additional landtake to allow for future taxiway widening which is estimated at 11 hectares. They have estimated that the additional cost of safeguarding for Code F but building for Code E aircraft is approximately £6m. Whilst we are not as optimistic as BAA in our forecasts for increased long haul and cargo traffic (and consequently the likelihood of significant A380 operations), we believe that this extra provisioning cost is reasonable in view of the possible longer-term benefits. Any decision for the upgrading of the runway and taxiway system (approx £29m) would need to be taken on the basis of expected A380 traffic at the time.

xxiii) BAA's Option A in segregated mode is probably the least cost masterplan layout although there are some slight anomalies in BAA's costings, particularly for the SACC variants. In any event, any minor differences in the costs between each option are not material in comparison to the technical considerations.

xxiv) Our benchmarking of terminal costs suggests that a new low cost (or predominantly low cost) terminal might be delivered for around £1,875 per sq m (excluding baggage system costs) in comparison to BAA's figure of £2,200 per sq m. Similar savings can be made for pier and satellite costs.

xxv) We have prepared a "minimum cost" option based on what we believe is an achievable scheme within the specification and parameters that BAA have so far defined in their Planning Application and we are confident that such a scheme would meet the needs of most airport users. We recognise, however, that BAA may envisage a scheme with a higher specification which would incur further costs. Our analysis therefore does not

necessarily suggest that BAA's costs are incorrect but rather that their implied specification may be too high for future airline and passengers using the airport.

xxvi) On this basis, we believe that BAA's Option A costs can be reduced from around £2.3 billion to £1.8 billion based on the full provision of 68 mppa airport capacity at 2030. Should, however, the costs be based on the provision of capacity to support our projected throughput of 58 mppa at 2030, then these costs would be reduced to around £1.6 billion, with the balance incurred after this date.

xxvii) These projected capital costs can be summarised as follows:

SG2 Project – Total Projected Capital Costs (at 2Q 2005 prices)

BAA Option A (BAA's own costs)	£2,269m
BAA Option D (BAA's own costs)	£2,294m
SACC Option D (BAA's costs)	£2,487m
BAA Option A (Consultant's 'Minimum Cost' option (Total G2)	£1,846m
BAA Option A (Consultant's 'Minimum Cost' option (Estimate to 2030)	£1,600m (approx)

1 Introduction

1.1 Background

This report has been prepared by Alan Stratford and Associates Limited in association with Gleeds in response to a brief from the Competition Commission. It provides a review of the masterplan options for and the cost of the development of a second runway, terminal and other associated infrastructure at London Stansted Airport designated as Generation 2 (G2). It also assesses the need for the development in the context of forecasted air traffic levels and capacity constraints at Stansted and at other airports in London and the South East.

This study has been undertaken in the context of the Competition Commission's investigation into the supply of airport services by BAA in the UK. BAA operates seven UK airports: Heathrow, Gatwick, Stansted, Southampton, Edinburgh, Glasgow and Aberdeen. The Competition Commission is responsible for a review of price controls (regulated airport charges) at Stansted for a five year period from 1st April 2008 in response to proposals by the Civil Aviation Authority and for an appraisal of the framework and options for economic regulation at the airport.

The study has been conducted through the provision of information by and discussions with BAA, the Department for Transport (DfT) and National Air Traffic Services (NATS). We have also held several meetings with the Stansted Airline Consultative Committee (SACC). We have not, however, consulted representatives of local residents, community groups or the airport's passengers. The views of local residents and community groups were put forward during the consultation phase for BAA's development proposals and we have endeavoured to reflect these in our analysis. The airport's passengers do not seem to have been specifically consulted by BAA although they have attempted to assess 'passenger experience' themselves in selecting their preferred masterplan option.

The following sections of this report provide a review of the air traffic forecasts prepared by BAA, DfT and SACC, an analysis of the consultation and selection process undertaken by BAA to derive its preferred masterplan option for G2, our own evaluation of the masterplan options and an assessment of the likely costs of the development. We have also prepared our own assessment of a 'minimum cost' option. Our conclusions are given in Section 5 of the report.

2 Air traffic forecasts

2.1 Context

The air traffic forecasts for the Stansted Generation 2 (G2) project underpin the entire development and provide the basis for assessing when incremental additional capacity should be provided and the likely revenue that can be achieved. But whilst the traffic forecasts are crucial from both a planning and a business perspective, it must be noted that they are subject to considerable uncertainty, especially in the longer-term. This is particularly true at Stansted, which is predicted to grow (at least partially) on the basis of overspill demand from Heathrow and Gatwick, which are likely to be full or will suffer from a shortage of runway slots over the next 25 years. As such, the traffic growth rate at Stansted can be expected to be higher (but potentially more variable) than that of the London airports as a whole.

BAA and the DfT have spent considerable time developing forecasting models to inform policy and strategy in the future development of London's airports. This section describes these models and shows the key results in terms of the latest published (and unpublished) forecasts.

In the case of BAA, the latest Stansted G2 forecasts have been submitted as part of the Planning Applications submitted to Uttlesford District Council in March and April 2008. These covered projected passenger and cargo throughput, air transport movements (ATMs) and aircraft movements, as well as projected peak hour passenger and stand demand for capacity planning purposes. The G2 forecasts have also been broken down by aircraft type for noise assessment purposes although these figures are not analysed in this report.

DfT's forecasts focus primarily on passenger (rather than cargo) demand and projected ATMs. The DfT have no specific requirement to evaluate capacity requirements at the macro-level eg the size of any additional terminals at individual airports or the number of additional stands needed to meet projected demand. The latest DfT passenger forecasts were published in November 2007.

In the case of Stansted, the Stansted Airline Consultative Committee (SACC) prepared its own forecasts as part of the consultation process for both the Stansted Generation 1 and Generation 2 developments. We understand that these forecasts will be updated in the next 1-2 months, but in the interim, we have evaluated their initial forecasts. We also present some 'top-line' forecasts of our own – based on an evaluation of those made by BAA, DfT and SACC – together with suitable adjustments to take account of traffic patterns at Stansted in 2007 and the first four months of 2008 and the potential future changes in the key demand drivers such as air fares and fuel costs. Our own estimates of the likely range of traffic forecasts at Stansted are presented in Section 2.9.

2.2 Government policy towards airport development in London and the South East

UK air travel has increased five-fold over the past 30 years and is projected to increase by between two and three times current levels by 2030. In 2007, UK airports handled a total of 240.1 million terminal passengers, of which 139.6 million (58.0%) were handled by the principal London area airports (Heathrow, Gatwick, Stansted, Luton and London City). Stansted itself handled 23.8 million passengers, representing 9.9% of total UK traffic.

In order to accommodate future growth the government published a new UK airports policy in 2003, following a four year consultation process commencing with.a number of regional

studies which were published in 1999. The 2003 White Paper on *The Future of Air Transport* stated that future airport development was crucial to the expansion of the UK economy, but that growth should be focused at certain airports and proceed with respect to minimising environmental impact. The White Paper included traffic forecasts prepared by the Department for Transport under different airport development scenarios and outlined a policy framework for the provision of new runways (and other associated airport infrastructure) over the next 30 years.

The White Paper recommended development as soon as possible (expected at the time to be around 2011/2012) of a wide-spaced second runway at Stansted, with strict environmental controls, as the first new runway to be built in the South East. Further development of Heathrow was supported provided that stringent environmental limits could be met, including a new runway as soon as possible after the new runway at Stansted. In this context the Department for Transport suggested that that there would be a substantially better chance that the limits could be met in the 2015-2020 period. The White Paper also concluded that no action should be taken to overturn the 1979 planning agreement that prevented construction of a second runway at Gatwick before 2019 – although it stated that there would be a strong case on its merits for a wide-spaced second runway at Gatwick after 2019 and that land should be safeguarded for such a runway, in case it becomes clear in due course that the conditions that for the construction of a third Heathrow runway could be met.

The Department for Transport published a Progress Report on the White Paper in December 2006. This provided revised traffic forecasts under a number of traffic growth scenarios including the impact of higher or lower GDP growth, the carbon costs, oil prices, and radiative forcing factors. The Progress Report endorsed the development of additional runways at Stansted and Heathrow.

In April 2006, BAA submitted a Planning Application to make better use of the existing runway at Stansted by relaxing aircraft movement constraints imposed by planning conditions. This was expected to increase capacity to around 35 million passengers per annum. The planning application was refused by Uttlesford District Council in November 2006. BAA appealed against this decision and a public inquiry was held which commenced in May 2007 and concluded some five months later in October 2007. The Inspector's recommendation was originally expected by December 2007 and was delivered to the Secretary of State in January 2008. A decision is now expected in September/October 2008. The necessary airport infrastructure development to achieve this passenger throughput has been termed as Stansted Generation 1 (G1). Under the terms of the proposed Planning Consent, BAA entered into a voluntary agreement that traffic levels at the airport would not exceed 35 million passengers per annum.

In December 2005, BAA published a consultation document, *Stansted Generation 2 Consultation*, on possible options for a second runway at Stansted Airport. This provided outline details of four potential masterplan options for a two-runway airport (Options A-D) and a high level assessment of each of the options in terms of costs, operational performance and environmental impacts. The consultation documents also put forward BAA's preferred option for a 3,048 metre wide-spaced parallel runway (Option A operated in mixed mode). Following a four month public consultation period and some further consultation with a range of consultees, including the SACC and other airport users (see Section 3), BAA put forward a revised preferred option (Option A operated in segregated mode) in their *Development Proposal: Generation 2* document published in January 2007. This preferred option (with some minor modifications) was submitted within four planning applications made to Uttlesford District Council covering the construction of the second runway, the provision of airport buildings, improved road access and change of land usage from agricultural to nature conservation and/or landscaping. It is currently anticipated that a

public inquiry for the development would commence in early 2009. BAA currently envisage that Phase 1 of the Generation 2 (G2) development, designed to accommodate an additional throughput of around 10 million passengers a year, would be completed by 2015. Further phases would be required at a later stage to achieve Stansted's maximum capacity of 68 million passengers per annum.

2.3 Historical pattern of air traffic in London and the South East

To assess Stansted's potential growth pattern, it is useful to review traffic growth in the London and South East over the past twenty years. Between 1987 and 2007, total air passenger traffic at UK reporting airports increased from 86.0 million to 240.7 million terminal passengers per annum, representing an average growth of 5.3% per annum. Over the same period, air passengers at London area airports which, in 2007, accounted for some 58% of total UK traffic, grew by some 4.6% per annum. This lower growth rate reflects the capacity constraints at some of the London airports, primarily Heathrow and Gatwick, and a trend towards the development of point-to-point services from the UK's regional airports.

At Stansted, traffic has grown from just 0.7 million passengers per annum in 1987 to 24.1 million passengers in 2007. Substantial annual increases were achieved in 1991 (+46.8% per annum) as a result of the launch of Ryanair services from the airport and over the period 1997-2000 (+30.3% per annum) following a rapid expansion of Ryanair's route network and the introduction of new generation B737-800 aircraft. Given the availability of peak time slots and the opportunities for significant discounts for airport charges, Stansted was particularly popular for the burgeoning low cost carrier (LCC) market. In 1992, the UK's second largest LCC, Easyjet, acquired a network of routes at Stansted through the purchase of a rival LCC, Go, and has continued to grow its route network at the airport. The breakdown of passenger traffic at the principal London area airports over the period 1992-2007 is summarised in Table 2.1.

Table 2.1 Total Terminal Passengers – UK Airports – 1992 - 2007

Mppa	1992	1997	5 year annual growth	2002	5 year annual growth	2007	5 year annual growth
Heathrow	45.0	57.8	5.2%	63.0	1.7%	67.9	1.5%
Gatwick	19.8	26.8	6.2%	29.5	2.0%	35.2	3.6%
Stansted	2.3	5.4	18.1%	16.0	24.5%	23.8	8.2%
Luton	1.9	3.2	10.6%	6.5	15.0%	9.9	8.9%
London City	0.2	1.2	44.2%	1.6	6.7%	2.9	12.7%
Total London area airports	69.3	94.4	6.4%	116.7	4.3%	139.6	3.7%
Total UK airports	106.1	146.7	6.7%	188.8	5.2%	240.7	5.0%

Source: CAA statistics

An analysis of the growth of the low cost carrier market at Stansted is shown in Table 2.2.

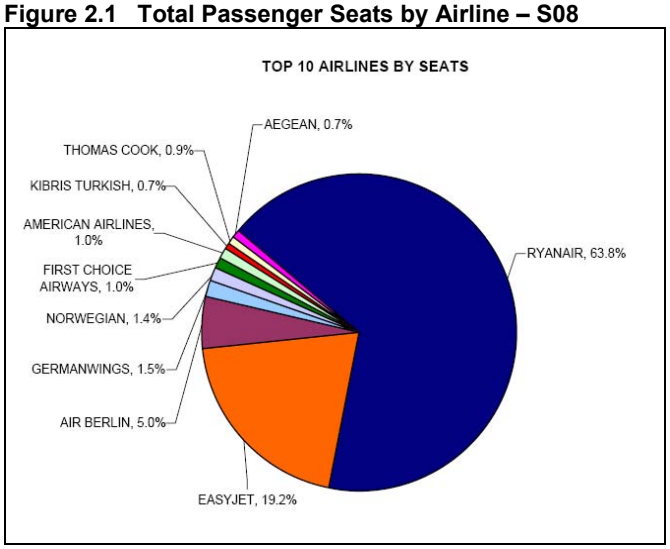
Table 2.2 London Stansted Airport – Low Cost Carrier market – 1997-2007

	1997	2002	5 year annual growth	2007	5 year annual growth
Passengers (mppa)					
LCCs	1.5	13.8	55.7%	22.1	9.8%
Total	5.4	16.0	24.5%	23.8	8.2%
LCCs - % of total	28.1%	86.0%	-	92.8%	-
ATMs (000)					
LCCs	16.0	115.5	48.6%	166.1	7.5%
Total	84.3	155.1	13.0%	262.4	11.1%
LCCs - % of total	18.9%	74.5%	-	63.3%	-

Source: CAA and BAA statistics

The proportion of total passenger seats (capacity) by individual airline as scheduled over Summer 2008 is given in Figure 2.1.

Figure 2.1 Total Passenger Seats by Airline – S08



Source: ACL

In terms of recent market trends, LCC passenger growth at Stansted has averaged some 9.8% per annum between 2002 and 2007. This was however, significantly stronger in the first two years of this period. Indeed there is evidence to suggest that LCC growth at Stansted has declined in comparison to that at Gatwick, Luton and at regional airports. This impact is highlighted in Table 2.3.

Table 2.3 London Stansted and Gatwick Airports[1] Terminal Passengers by Type - 2004-2007

Mppa	2004	2005	Annual growth	2006	Annual growth	2007	Annual growth
Stansted							
LCCs	19.3	20.5	6.4%	22.0	7.6%	22.1	0.0%
Other	1.6	1.6	0%	1.7	6.3%	1.7	0%
Total	20.9	22.0	5.3%	23.7	7.7%	23.8	0.4%
Gatwick							
LCCs	4.9	6.4	31.3%	7.7	19.8%	8.6	12.3%
Other	26.5	26.3	-0.7%	26.4	0.4%	26.6	0.8%
Total	31.4	32.7	4.1%	34.1	4.3%	35.2	3.2%

[1] LCC traffic data not available for Luton airport Source: CAA and BAA statistics

Preliminary statistics for passenger traffic at Stansted for January-April 2008 show that traffic levels have declined by some 4.6% in comparison to the equivalent period in 2007.

The trends in cargo traffic at Stansted over the period 2004-2007 are shown in Table 2.4 below.

Table 2.4 London Stansted Airport
Cargo traffic (by type) - 2004-2007

Tonnes (000)	2004	2005	Annual growth	2006	Annual growth	2007	Annual growth
Passenger aircraft (Bellyhold cargo)	1,382	1,347	-2.5%	1,948	44.6%	1,486	-23.7%
Freighter aircraft	224,390	235,698	5.0%	222,364	-5.7%	202,261	-9.0%
Total	225,772	237,045	5.0%	224,312	-5.4%	203,747	-9.2%

Source: CAA and BAA statistics

This analysis suggests that there has been a significant decline in cargo handled at Stansted over the past two years, the reasons for which BAA are unable to fully explain. However, in the period January-March 2008, cargo tonnage increased marginally (+0.6%) over the corresponding three months in 2007.

2.4 Airport capacity in London and the South East

2.4.1 Key capacity constraints

The principal airports in London and the South East all currently have certain capacity constraints due to a combination of one or more factors including the number and length of their runways, airspace restrictions, the number and size of the passenger terminal (s) and the number of aircraft stand positions. Other criteria include the nature of runway operations for multiple runway airports (i.e.: whether these are operated in mixed or segregated mode), the size of aircraft used, the homogeneity of these aircraft types and average load factors. These criteria limit the number of theoretical hourly aircraft movements / Air Transport Movements and consequently the overall passenger throughput. Together with any planning limits on the maximum number of annual ATMs (or aircraft movements), these determine the available scheduling capacity at each airport.

In the case of hourly runway movement capacity, the determining factors are the (ATC) separation standards applied for arrivals and departures traffic, which themselves are based on wake vortex and radar separation criteria and runway occupancy times, which are dependent on the runway configuration, including the number of high-speed turnoffs.

Using these criteria, NATS are responsible for declaring the theoretical hourly runway movement capacity at the three principal London airports, Heathrow, Gatwick and Stansted. This figure is derived after extensive assessment using fast-time simulation modelling. Based on typical aircraft movement schedules, the maximum hourly movement capacity is calculated assuming that the average overall ATC-related delay does not exceed 10 minutes at each of these airports. This process gives rise to a profile of hourly capacity levels for both arrivals and departure movements, known as slots. The hourly runway capacity profile contains ‘fire breaks’, which represent strategic allowances within the capacity limits to cope with operational disturbances or recoup any build-up of traffic delays.

As indicated above, the hourly runway movement level is dependent on the nature of operations. At a two runway airport, such as Heathrow, it is possible to operate under segregated mode in which arriving aircraft are allocated to one runway and departing aircraft to the other or under mixed mode in which both runways would be used simultaneously for a mix of arrivals and departures. The advantage of mixed mode is that arriving and departing aircraft would be shared between the two runways, rather than being concentrated at any one time on a single runway. At present (Summer 08), the scheduling capacity at Heathrow

under segregated mode is an average of 39.8 arrival and 40.6 departure movements per hour during the operational day (i.e.: a total of 80.4 movements)[3]. These figures are derived from a combination of the theoretical modelled capacity together with a planning restriction of a maximum of 480,000 ATMs in a single year. In any event, it is unlikely that the theoretical hourly rate (or the overall annual number of ATMs) would be much higher than the planning levels. Should these planning constraints be lifted, the introduction of mixed mode could be expected to increase hourly movement by around 15% to approximately 92 movements per hour. The level of capacity improvement under mixed mode does, however depend on the nature of the traffic using the airport as the benefits from the optimal sequencing of departures and arrivals streams between the two runways to reduce wake vortex separations is determined by the homogeneity of the size of aircraft using the airport. As a result, the expected improvements from mixed mode under a two runway airport at Stansted (and hypothetically at Gatwick should a second runway be built) are less than that at Heathrow.

In the case of a single runway airport, all operations are effectively mixed mode in that arrival and departure flights use the same runway. The theoretical maximum hourly runway movement rate will therefore vary according to the aircraft size mix, any airspace constraints and the availability of high-speed runway turn-offs. From a scheduling standpoint, the hourly movement capacities need to be adjusted to cater for the optimal profile of arrivals and departure flights during the day. At Gatwick, the scheduled summer season hourly runway movement capacity is currently an average of 47.0 movements per hour over the operational day (0500-2300 hours), with a peak hour rate of 50 movements per hour. At Stansted, the summer season (S08) scheduled runway movement capacity is lower at an average of 43.2 movements per hour, with a similar peak hour rate of 50 movements per hour. During the winter season, similar lower capacity limits apply. The scheduled hourly movement capacity at Stansted is shown in Table 2.5.

Table 2.5 London Stansted Airport - Scheduled Runway Movement Capacity

Hour (GMT)	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	Ave
Summer 2008																		
Arrivals	24	28	25	24	25	28	28	24	24	28	28	28	30	28	27	24	31	26.7
Departures	34	30	28	24	25	28	28	24	24	28	28	28	30	28	28	24	24	27.1
Total	44	50	44	38	41	50	46	38	41	44	42	47	50	48	42	41	38	43.3
Winter 2008																		
Arrivals	-	24	28	25	24	25	28	28	24	24	28	28	30	28	27	20	27	26.4
Departures	-	33	31	27	24	25	28	28	24	24	28	28	28	28	28	22	27	26.9
Total	-	44	48	44	38	40	50	44	38	38	44	42	44	50	48	34	38	42.5

Source: Airport Coordination Limited

It should be noted that the Stansted figures take account of a current planning constraint of a maximum of 241,000 ATMs per year. BAA have, however, applied for a relaxation of this limit as part of the G1 Public Inquiry. Should Planning Permission be granted they expect that the total number of ATMs would rise to approximately 264,000 in order to handle a theoretical G1 capacity of approximately 40 mppa).

At all airports, it may be possible to improve slightly in the level and resilience of maximum hourly runway capacities over the next 20-30 years due to improved ATC technologies. These include reductions in wake vortex separations due, for example, to time rather than distance-based separation standards and, where they do not exist already, the construction

[3] Heathrow – Summer 2008 – Initial Coordination Report - ACL

of high-speed exits to reduce runway occupancy times. We have discussed these issues with NATS, which considers that any future increase in maximum hourly runway capacities is unlikely to be significant. It would be for the airport operator, through the capacity declaration process, ultimately to determine how any additional capacity is used, in other words whether to create additional slots or whether to improve delay/resilience performance.

Whilst these capacities represent a theoretical maximum number of slots available for flight arrivals and departures, to determine the achievable passenger (and cargo) throughput at each of these airports it is necessary to consider the utilization of these slots, the type of aircraft using the airport and average load factors. These are discussed in Section 2.4.2 below.

2.4.2 Slot availability / utilisation

Although these hourly scheduling and annual ATM capacities apply at the principal London area airports, the current pattern of demand and operational constraints varies between individual airports.

In the case of Heathrow, the demand is such that almost every slot is allocated throughout the day. In Summer 2008, some 98.4% of all available slots were assigned by the coordinator, Airport Coordination Limited, (ACL) to incumbent airlines through grandfather rights, were sold or transferred to other airlines or were allocated to new entrants. In practice, however, not every allocated slot is utilized, either because an airline withdraws the service at the last minute or a slot is missed due to a flight delay. This proportion is relative low – representing approximately 0.1-0.3% of all available slots. A further constraint on the allocation of slots at some airports (including Stansted) is the availability of terminal capacity. If the overall hourly passenger flow from allocated flight arrivals and departures exceeds the capacity of the terminal(s), then the runway slots will need to be re-allocated by the Coordinator to meet this constraint.

The proportion of available slots allocated at the principal London area airports in typical weeks in Winter 07/08 and Summer 08 are shown in Tables 2.6 and 2.7 below:

Table 2.6 London Area Airports – Slots Allocated
Typical week – Winter 2007/08 – 0600-2259 local time

	Scheduling capacity	Allocated	%
Heathrow	9562	9407	98.4%
Gatwick	5705	5430	95.2%
Stansted	5187	3672	70.8%
Luton	3416	1716	50.2%
London City	3876	1945	50.2%

Source: ACL

Table 2.7 London Area Airports – Slots Allocated
Typical week – Summer 2008 – 0600-2259 local time

	Scheduling capacity	Allocated	%
Heathrow	9289	9048	97.4%
Gatwick	5208	4442	85.3%
Stansted	5061	3221	63.6%
Luton	3264	1695	51.9%
London City	3395	2006	59.1%

Source: ACL

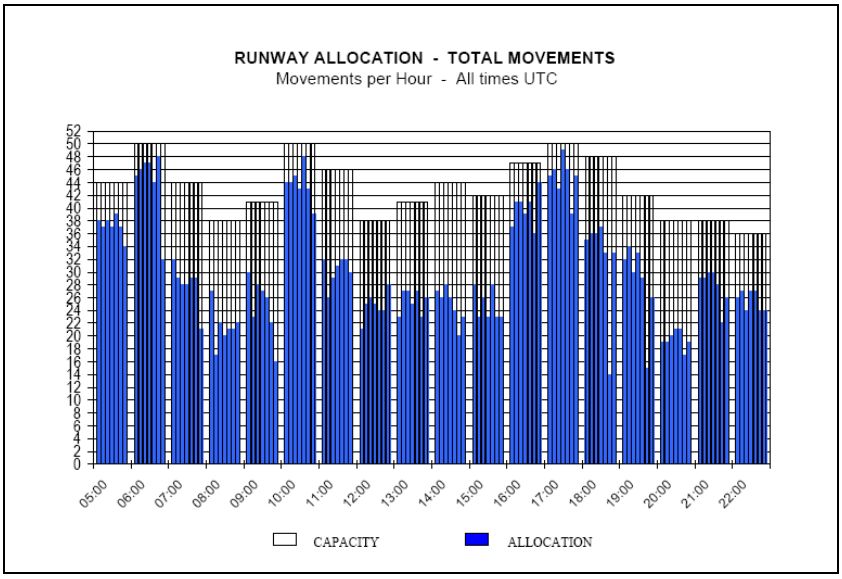
Any capacity constraint (at any time of day) will reduce the level of forecasted unconstrained demand that can be allocated to an airport. Under its present configuration (two runways under segregated mode), there is virtually no opportunity for growth at Heathrow. At Gatwick, there is a limited number of unallocated slots available, some of which originate

from the relaxation of the Traffic Distribution Rules at the London airports in 1991. These, however, are mainly at off-peak times (eg 1900-2200 hours) and are therefore less attractive to airlines. Although a higher proportion of slots are available at the other London area airports, airlines find it increasingly difficult to schedule the necessary flight rotations at this (and other) airports as slot fill up. All of these factors tend to reduce the level of constrained demand.

The daily profile of slot utilization at Stansted throughout the day is illustrated in Figure 2.2 which shows allocated movements against runway scheduling capacity during an average day during Summer 2008. This indicates that there is a significant level of unallocated runway movement capacity at non-peak times (e.g. between 0800-1000 and 1100-1600). At Stansted, some 63.6% of total scheduling capacity is allocated which, on the somewhat crude assumption that, say 92% of capacity could theoretically be allocated on a single runway and the average number of passengers per ATM rises by 1.5% per annum, suggests that the total passenger capacity of Stansted as a single runway airport in 2015 is approximately 23.8 x 92/63.6 x 1.015^{7} = 38 mppa.

We recognise that this figure is slightly higher than BAA's proposed planning cap of 35 mppa under G1 which is subject to final ratification of Planning Consent.

Figure 2.2 London Stansted Airport – Hourly Runway Movement Allocation – Summer 2008 (Source: ACL)



2.4.2 Aircraft size and load factor assumptions

To calculate overall annual passenger capacity at an airport, it is necessary to consider the total number of Passenger ATMs (PATMs) available – after deducing any allowances for Cargo ATMs (CATMs) and other aircraft movements and the average aircraft size (in terms of Passengers per PATM. In the latter case, the average aircraft size will be a function of the nature of the routes offered (e.g. LCCs, international short-haul, long haul, domestic etc) and typical load factors.

At most UK airports, the average number of passengers per PATM has grown in recent years due to the increase in long-haul traffic, the use of larger aircraft types within each market segment (such as the B737-800 replacing earlier B737 types in the LCC/short haul sectors) and increases in average load factors.

The breakdown of terminal passengers per PATM by the five principal London area airports in 1997 and 2007 is shown in Table 2.8.

Table 2.8 London Area Airports – Terminal Passengers per PATM – 1997 v 2007

	Passengers per PATM (1997)	Passengers per PATM (2007)	Change (%)
Heathrow	135	143	5.9%
Gatwick	119	136	14.3%
Stansted	72	131	81.9%
Luton	90	123	36.7%
London City	35	38	8.6%

Source: CAA statistics

Based on these limits, the current and expected capacities at the three principal London airports are as follows:

Table 2.9 London Heathrow Airport – Current and Expected Capacity

Two runways - Segregated mode	
- Hourly movement rate (ave)	79-88
- Annual ATMs (2007)	477,098
- Annual ATM capacity (Planning limit)	480,000
- Annual passenger capacity (at 2030)	90-95 mppa
Two runways - Mixed mode	
- Hourly movement rate (BAA estimate)	91-101
- Annual ATM capacity (BAA estimate)	540,000
- Annual passenger capacity (at 2030)	102-107 mppa
Three runways	
- Hourly movement rate (ave)	121-135
- Annual ATM capacity (BAA estimate)	720,000
- Annual passenger capacity (at 2030)	115 mppa

Table 2.10 London Gatwick Airport – Current and Expected Capacity

Single runway	
- Hourly movement rate (ave)	46-50
- Annual ATMs (2007)	260,420
- Annual ATM capacity (BAA estimate)	275,000
- Annual passenger capacity (at 2030)	45 mppa

Table 2.11 London Stansted Airport – Current and Expected Capacity

Single runway	
- Hourly movement rate (ave)	42-43
- Annual ATMs (2007)	193,516
- Annual ATM capacity (Proposed planning limit – equivalent)	264,000
- Annual passenger capacity (Proposed planning limit)	35 mppa
- Annual passenger capacity (Theretical at 2015)	38 mppa
- Annual passenger capacity (Theoretical at 2030)	40-42 mppa
Two runways (Segregated mode)	
- Hourly movement rate (ave)	79-88
- Annual ATMs (BAA estimate)	480,000
- Annual passenger capacity (at 2030)	68 mppa
Two runways (Mixed mode)	
- Hourly movement rate (ave)	85-94
- Annual ATMs (BAA estimate)	515,000
- Annual passenger capacity (at 2030)	73 mppa

2.5 Airport development options

In addition to the Stansted Generation 2 (and the earlier Generation 1) projects, a variety of infrastructure development options have been proposed to increase the capacity of the London area airports or to alleviate future traffic demand. These are described in more detail in Section 4.

2.5.1 Stansted Generation 1 (G1) development

The Stansted Generation (G1) project represents the phased development of the airport to increase its capacity from its current level of around 25 mppa to 35 mppa by 2015. To achieve this, BAA submitted a Planning Application to Uttlesford District Council on 26 April 2006 to increase the current planning limit of 241,000 ATMs to 264,000 ATMs per annum. This Planning Application was rejected by Uttlesford District Council on 30 Novmber 2006. BAA subsequently appealed against this decision and a Public Inquiry was held between 30 May–19 October 2007. Prior to the Inquiry, BAA made a unilateral agreement to cap passenger movements under the development to 35 mppa, in order to align planning consent conditions with the environmental assessment undertaken. The Inspector's decision on the G1 development is expected in Autumn 2008.

To accompany the G1 Planning Application, BAA published an Interim Masterplan in May 2006. This shows the future land use and infrastructure development at the airport to handle 35 mppa (as forecasted at 2015) and the further development of Stansted as a single runway airport to 40 mppa. It should be noted, however, that a relaxation of the proposed planning cap would be necessary for any development beyond this limit.

2.5.2 Stansted Generation 2 (G2) development

Once Stansted's throughput reaches about 35 mppa, future growth would be severly constrained by the lack of suitable slots. To maximise longer-term growth, Stansted would require a second runway and additional terminal / apron capacity. As currently proposed, the Stansted Generation 2 (G2) project would involve construction of a second wide-spaced in 2015 when passenger traffic is expected achieve 38 mppa. This would be accompanied by a second terminal, additional apron capacity and other airport infrastructure. In addition, surface access to the airport would be improved through a new access road from and additional capacity at the M11 Junction 10, an extension to the airport rail station and enhanced public transport interchange (PTI) facilities. At Phase 1 of the G2 development, the second terminal would have an overall capacity of 15 mppa but the related pier and terminal fit-out would initially be provided to 10 mppa. Subsequent phases of G2 will increase capacity to the maximum limit of a two runway airport (68 mppa), which is projected to be attained in around 2030.

2.5.3 Mixed mode operations at Heathrow airport

As discussed in Section 2.4.1, hourly runway capacity at Heathrow could potentially be increased through the introduction of mixed mode rather than the current segregated mode of operation. These proposals, together with those for a potential third runway (see Section 2.5.4), were the subject of a public consultation exercise which was completed in February 2008.

Mixed mode could potentially deliver an extra 15% runway capacity at Heathrow by around 2015, allowing up to 540,000 flights per year, compared with today's limit of 480,000. It is also possible, however, that mixed mode could be deployed on a partial basis (e.g. at certain times of day) thus providing a reduced capacity increase or alternatively it could be used to reduce delays.

It is expected that a Government decision on the possible introduction of mixed mode and/or a third runway will be made at the end of 2008

2.5.4 Third runway at London Heathrow

In its 2003 White Paper, the Government indicated that it supported the concept of a third runway at Heathrow airport provided local environmental constraints, including noise and air quality were met. In the Government's view, this would not be possible before some time in the period 2015-2020. The White Paper proposed that a shortened (2,200m) runway should be provided to the north of the A4 and that, theoretically, this would increase Heathrow's capacity from its present 480,000 ATMs on a gradual basis to up to a maximum of 702,000 [this figure was initially published as 720,000 in error—the corrected figure is now shown] ATMs per annum.

As discussed in Section 2.5.3, a further Government announcement about the third runway is expected in late 2008. There are strong political lobbies both in favour and against expansion of Heathrow so both a 'go' and a 'no go' option should be considered in the context of this study on the Stansted G2 development. Although we understand that the current government is committed to the implementation of the recommendations of the White Paper which supported a third runway at Heathrow provided strict environmental constraints are met.

2.5.5 Other airport development in London and the South East

The 2003 White Paper ruled out a second runway at Gatwick until at least 2019 due to a legal agreement with West Sussex County Council, although it did support the safeguarding of land for a possible development after this date. In BAA's 2006 masterplan for Gatwick Airport, an option for a second runway some 1,035 metres to the south of the existing one is put forward should a third runway at Heathrow not prove to be possible or Stansted or Luton's capacity fall short of expectations. A third terminal would be built between the two runways.

The White Paper also supported the maximum use of Luton and London City as single runway airports. In the case of Luton, further development at the current airport site is constrained by the land topography, and as a consequence of this, Abertis, put forward a proposal[4] for a replacement runway to increase passenger throughput from its current level (9.9 mppa in 2007) to 35.3 mppa by 2030. These proposals have now been shelved due to cost. Although Abertis has not subsequently published a new masterplan, it is believed that further apron and terminal capacity can be provided at the current site to handle up to around 22-25 mppa.

London City Airport, which in 2007 handled some 2.9 million passengers, is similarly constrained by land topography. To expand capacity, additional aircraft stands and a terminal extension would need to be built over the King George V Dock adjacent to the airport. The airport's masterplan[5], which was published in 2006, suggests that capacity could potentially increase to 3.5 mppa by 2015 and to 8.0 million by 2030.

[4] Core Strategy: A Consultation: Project 2030, London Luton Airport, October 2005
[5] London City Airport Masterplan, November 2006

2.5.6 Airport development at UK regional airports

The White Paper recognised that some overspill of the unconstrained traffic demand for the London area airports could be fulfilled by the UK's regional airports. Birmingham International Airport has now scrapped its plans for a second runway, but still intends to build additional terminal capacity to enable it to handle around 27 mppa by 2030. Given the overlap of catchment areas this may have some impact on traffic development at Stansted. The UK's third largest airport, Manchester is forecasted to expand to around 50 mppa by 2030, and could be expected to capture some overspill long-haul traffic that might otherwise use the London area airports. Southampton airport's masterplan[6] includes two alternative plans for terminal development and forecasts that passenger throughput could rise to 6 mppa by 2030. This would provide the opportunity to capture London area airport overspill traffic, particularly within Heathrow's catchment area.

2.6 BAA's traffic forecasts

BAA traffic forecasts cover a range of different time horizons and include long-term forecasts (10-30 years) used for planning strategy, medium-term forecasts (4-10 years) for the Capital Investment Programme, short-term forecasts (1-3 years) for business and financial planning and ultra-short term forecasts (1 week to 6 months) for manpower rostering etc. The long-term forecasts used for BAA's G2 traffic projections were based on an econometric model of market demand at the London area airports, although the early year forecasts were supported by shorter-term forecasting techniques such as extrapolation of current trends and market intelligence (e.g. proposed new services etc).

The following sections of the report describe BAA's forecasting methodology based on the information provided to us, the key variables used in BAA's forecasting model and their elasticities, Stansted airport's catchment area and the method of allocating future unconstrained demand within the London area to Stansted and other airports. We also show the key results of BAA's current forecasts (as given in the 2008 CIP and submitted with the G2 Planning Application) and our own comments on these forecasts. It should be noted that as our brief only covers an appraisal of the G2 forecasts, we only analyse traffic levels over the period 2015 – 2030. This therefore assumes that the start level (ie traffic levels at Stansted at 2015) is as predicted by BAA (35 mppa). This may, in practice, be lower or higher than this figure. We broadly test the potential variability of BAA's G2 forecasts by testing alternative scenarios, including variations in key determinant factors such as future GDP, air fares and the oil price and other options for the provision of additional capacity at the London airports, including the introduction of mixed mode at Heathrow and a possible second runway at Gatwick. Our own projections of the potential range of traffic demand at Stansted under a number of potential development scenarios are given in Section 2.9.

2.6.1 Modelling methodology

This section describes BAA's modelling methodology. It should initially be pointed out that any model of this type is a mathematical representation which attempts to predict human behaviour (i.e. the likelihood of passenger travel). This will ultimately depend on a complex interaction of both economic and consumer attitudinal factors, which may or may not be possible to properly reflect in straightforward mathematical functions. As such it may be subject to considerable variation and fluctuation. Whilst we understand that BAA's model (or more specifically the elasticities of key variables such as GDP and air fares) seems to have been partially calibrated against historic data or correlated with other studies, there will

[6] Southampton Airport Masterplan, November 2006

inevitably be an element of judgement in the choice of the modelling variables, the elasticities chosen and in the forecasted values of the variables (i.e. future air fares, oil prices etc). Furthermore, it is possible that the values of these elasticities may change dependent on the value of the variable itself. As an example, demand may be highly sensitivity to changes in price when fares are comparatively low, but less sensitive when they are higher. Historically, BAA claim to have had a good record in forecasting traffic levels at Stansted – although this has not been in the context of long-term forecasts within a capacity constrained scenario for the major London airports. Whilst we recognise that traffic forecasting models of this type are essential for planning purposes, it is important that the full range of scenarios, elasticities etc are tested through sensitivity analysis etc. In their Planning Application, BAA only provided forecasts for the 'with' and 'without' development cases, although it is understood that they will undertake sensitivity analysis in advance of the Public Inquiry.

For the purposes of the G2 forecasts, BAA used its econometric forecasting model, which is designed in two modules. The first module is used to build forecasts of unconstrained traffic demand in the London area (which may originate from outside the South East or from transfer traffic). BAA designate this as their 'Orange Model'. The key assumptions which drive the model are primarily economic and include future (forecasted) GDP, the level of foreign trade and the real cost of air fares. Included within the real cost of air fares are allowances for future aircraft fuel costs (based on oil prices), environmental charges including emission trading and airport charges. Separate econometric models have been developed for each market segment except charter (e.g. UK-originating short-haul leisure, non-UK short-haul business etc) with different elasticities (or 'gearings') applied to each modelling variable.

Based on these unconstrained forecasts of traffic demand in the London area, BAA has developed a procedure for allocating traffic to individual airports and, where this exceeds the available capacity (ie an 'overspill' situation), modelling algorithms for reallocating traffic to other London airports with available capacity or for assuming that traffic is 'lost' from the London airports system. This allocation model uses a 'pecking order' for the types of overspill traffic – with transfer and leisure market passengers more likely to be lost from the system that other market sectors.

2.6.2 Modelling variables and elasticities

BAA's Orange Model

BAA's Orange Model was based on unconstrained traffic demand across a range of markets and incorporated a range of forecasted modelling variables and associated elasticities. The key elements of this analysis are summarised in Table 2.12 below.

The markets covered business, leisure, charter and transfer traffic (broken down by UK and non-UK residents) between London and the South East and the following geographical areas:

- Other UK (domestic)
- Ireland
- European Union
- Other Short Haul
- Japan
- North America
- Middle East & Central Asia
- East Asia
- South Asia

- Australia, New Zealand & Pacific
- Caribbean & Latin America
- Africa

For each of these markets, an econometric model of traffic demand was built based on a series of modelling variables using their forecasted annual growth (or decline) to 2030 and an estimated elasticity relating the sensitivity of traffic demand to these changes. The key modelling variables were as follows:

Table 2.12 BAA Traffic Forecasting Model – Key Variables

	Forecasted Annual Change (%)[1]		Elasticity[1]
	2008-2015	**2016-2030**	
UK GDP	+1.5% to +2.5% pa	+2.1% to 2.3% pa	1.6-1.7
UK Consumer Expenditure	+1.2% to +2.5% pa	+2.0% to +2.3% pa	0.8-1.7
Non-UK Consumer Expenditure	+1.1% to +4.6% pa	+2.0% to 2.3% pa	0.8-1.7
Air Fares	-3.0% to +4.1% pa	-0.5% to -0.1% pa	-0.65 (approx)
Trade	+2.5% to +4.8% pa	2.2% to 5.3% pa	1.0-1.2
Channel Tunnel Effect	-0.5% to -1.0% pa	-	-
Rail Competition	-0.5% pa	-0.1% to 0.0% pa	-
Regional Diversion	-0.5% to -0.4% pa	-0.4% to -0.5% pa	-

[1] Dependent on traffic type Source: BAA

In terms of the principal variables, the average forecasted annual increase in UK GDP and Consumer Expenditure was around 2.2% pa to 2015 and 2.1% pa between 2016 and 2030. The average forecasted change in air fares, whilst variable by traffic type and geographic region, was forecasted to decline by an average of 0.5% pa between 2009-2030.

We understand from BAA that the impact of the oil price (e.g. on aircraft fuel prices and through its wider macro-economic effect) was taken into account within the forecasted level of air fares. Under BAA's base case model adopted in Autumn 2007 this is assumed to be $65 / barrel to 2010, $60 / barrel from 2011-2015, $55 / barrel from 2016-2025 and $60 / barrel from 2026-2030.

In the case of airport charges, it is assumed in the Orange Model that these will remain at current levels (in real prices), despite the fact that these will rise on a relative basis at both Heathrow and Gatwick. An adjustment to the forecasted demand at Stansted is, however, made within the Traffic Allocation model for the impact of higher charges from both the G1 and G2 projects. Any future changes in APD (Air Passenger Duty) are assumed to be included in the forecasted annual change in air fares. In the case of environmental charges BAA have, in their latest set of forecasts, made an adjustment to the aggregative unconstrained demand forecasts to allow for the introduction of the ETS (EU Emissions Trading Scheme) in 2011 within the EU and in 2012 outside the EU, based on ICF modelled CO_2 prices.

The latest set of BAA G2 forecasts (as submitted for the Planning Application in January 2007) assumed that the total unconstrained demand in the London and South East is 182 mppa in 2015 increasing to 283 mppa in 2030.

Traffic Allocation Model

To derive the level of constrained demand at individual London Airports, BAA initially make certain assumptions on the level of current and future capacity at each airport based on the expected development scenario over the period to 2030. BAA's Base Case scenario assumes that G1 will be introduced at Stansted in 2015 and a third runway will be provided at Heathrow by 2020. Gatwick, Luton and London City will develop through 'maximum use' (i.e. no additional runways) and mixed mode operations will not be introduced at Heathrow.

These scenarios provide the following passenger and ATM capacities at London / South East airports over the period 2008-2030.

The demand by market segment and by ground origin / destination is then allocated across each airport based on the primary airport catchment area and, in the case of any overspill where demand exceeds capacity, by a series of algorithms to fit traffic to 'second' and 'third choice' airports (or alternatively it is considered to be lost to the London/SE airports system). An example of the primary airport catchment areas by market segment and ground origin / destination is given below.

Once the constrained level of traffic demand is calculated, BAA makes a further adjustment to the STN G2 forecasts to allow for the impact of increased airport charges (averaging £8.50 per passenger between 2010-2030). This uses similar price elasticities to those used in the Orange Model. Should the resulting level of traffic demand at STN still exceed the runway (or terminal) capacity, this is reduced to the capacity level.

2.6.3 Key results

This section shows the results of the traffic allocation model in terms of future passenger demand at Stansted in the period to 2016/17 (i.e. G1 and just beyond) and from 2015-2030 (G2). The latest set of G1 forecasts were prepared in March 2008, to accompany the 2008 CIP, whilst those for G2 were calculated in November 2007 and were submitted with the Planning Application made in January 2008.

Although the 2008 CIP forecasts show lower projected traffic in 2008/09 than the earlier 2007 CIP forecasts, they have assumed that growth rates will be higher between 2009/10 and 2014/15 – with the result that, at 2015, the figure of 38 mppa (to trigger the G2 project) is attained. We believe that BAA's assumption that growth rates will somehow 'catch up' to reach this figure is unrealistic. BAA have pointed out to us that there have historically been fluctuations in demand from year to year and that traffic may 'bounce back'. The difficulty is that the growth rates in the period 2009/10 – 2014/15 seem too high on fundamental grounds – and there is no reason to suppose that some of the key drivers such as fuel prices, ETS etc will become more favourable in these years.

BAA's G1 forecasts are given in Table 2.13 and those for G2 in Table 2.14.

Table 2.13 BAA Passenger Forecasts – London Stansted Airport - CIP 2007 and 2008

Mppa	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	17/18	16/17	G1 %pa
Passengers (CIP 2008)	22.7	23.5	24.7	26.6	28.5	31.0	33.0	38.0	41.5	45.0	-
Annual growth (%)		3.5%	5.1%	7.7%	7.1%	8.8%	6.5%	15.2%	9.2%	8.4%	6.4%
Passengers (CIP 2007)	25.3	26.2	27.3	28.6	30.0	31.5	33.0	38.0	41.5	45.0	-
Annual growth (%)		3.6%	4.2%	4.8%	4.9%	4.0%	4.8%	15.2%	9.2%	8.4%	4.5%
Difference (2008 v 2007)	-2.6	-2.7	-2.7	-2.0	-1.5	-0.5	-	-	-	-	-1.9%

Source: BAA CIP 2008 & 2009

As can be seen from the figures, the passenger growth rates for CIP 2008 forecasts increase steadily up to 2012/13, then decline in 2013/14, presumably due to a lack of runway capacity or possibly the early construction impacts of G2. In 2014/15, growth increases more rapidly – although this might be expected one year later (i.e. after the second runway is operational).

Our view of BAA's CIP 2008 forecasts is that growth rates between 2010/11 and 2104/15 seem too optimistic and it is difficult to justify how these should be higher than the earlier CIP

2007 projections. As a result, the traffic level at 2015 (i.e. the proposed introduction of G2) would be reduced.

Table 2.14 BAA G2 Passenger Forecasts[1] – London Stansted Airport (Per G2 Planning Application)

	2015	[✂]	[✂]	2030	G2 %pa
Passengers (mppa)	38	[✂]	[✂]	68	-
Annual growth	8.7%	[✂]	[✂]	4.7%	4.0%
PATMs (000)	279	[✂]	[✂]	452	-
Annual growth	8.6%	[✂]	[✂]	3.3%	3.3%
Aircraft Movements (000)	316	[✂]	[✂]	495	-
Annual growth	9.1%	[✂]	[✂]	3.0%	3.0%
Passengers per PATM	136.2	[✂]	[✂]	150.4	-
Annual growth	0.2%	[✂]	[✂]	0.7%	0.7%

[1] Figures rounded to nearest whole number Source: BAA

The G2 passenger forecasts show a reduced traffic growth rate of 3.9% pa between 2015-2020, declining to 3.3% pa between 2021-2025, but increasing to 4.7% pa between 2026-2030 (presumably due to the shortages of capacity at other London airports by this date). The breakdown by passenger market is given in Table 2.15 below:

Table 2.15 BAA G2 Passenger Forecasts[1] – London Stansted Airport (Per G2 Planning Application) – Breakdown by Market Type

Passengers (mppa)	2006	2015	2030	G2 - %pa
Domestic	2.7	3.6	5.9	-
Annual growth	-	3.2%	3.3%	3.3%
Short-haul	20.7	30.3	49.3	-
Annual growth	-	4.3%	3.3%	3.3%
Long-haul	0.3	4.1	12.8	-
Annual growth	-	33.7%	7.9%	7.9%
Total	23.7	38	68	-
Annual growth	-	5.4%	4.0%	4.0%

[1] Figures rounded to nearest whole number Source: BAA

BAA believes that there will be growing demand for long-haul traffic at Stansted building from an initial base of 4.1 mppa in 2015 – particularly from the high growth economies of SE Asia – although they have been unable to provide specific details of any current interest from long-haul airlines. In the medium to longer-term, they believe that Stansted will attract low-cost long-haul services, such as those to the USA proposed by Ryanair. There is, however, no evidence to suggest that the low-cost short-haul model can be applied to long-haul and we note that Michael O'Leary of Ryanair has not further endorsed his proposed plan.

Given the history of failed long-haul services, including the recent collapse of the trans-Atlantic business airlines Eos and Maxjet and the planned withdrawal of American Airlines at the airport, and the fact that long-haul services are likely to consolidate at Heathrow and Gatwick (possibly at the expense of some short-haul and charter services), we do not believe these long-haul traffic growth rates are achievable.

BAA cargo forecasts are based on a simpler econometric model based on historic trends in the UK cargo market, UK GDP and trade growth and adjustments for the impact of ATM capacity constraints at Heathrow and Gatwick. Further adjustments are made for the expected increase in bellyhold cargo at Stansted due to long-haul traffic and for future constraints on night-time movements (e.g. by dedicated freighters).

BAA's G2 cargo forecasts are given in Table 2.16.

Table 2.16 BAA G2 Cargo Forecasts[1] – London Stansted Airport (Per G2 Planning Application)

	2007	[✂]	2015	[✂]	[✂]	2030	G1 %pa	G2 %pa
Cargo handled (000 tonnes)	204	[✂]	650	[✂]	[✂]	1120	-	-
Annual growth	-8.9%	[✂]	15.6%	[✂]	[✂]	3.7%	15.6%	3.7%
CATMs (000)	10	[✂]	22	[✂]	[✂]	28	-	-
Annual growth	-9.1%	[✂]	9.5%	[✂]	[✂]	1.6%	9.5%	1.6%
Cargo handled per CATM (tonnes)	20.4	[✂]	29.5	[✂]	[✂]	40	-	-
Annual growth	0.2%	[✂]	4.7%	[✂]	[✂]	2.0%	4.7%	2.0%

[1] Figures rounded to nearest whole number Source: BAA

BAA's results suggest that a very high level of growth will be achieved up to 2015, based on the fact that Heathrow (and to a lesser extent Gatwick) are slot constrained for freighter only traffic and that Stansted represents the only alternative London airport. We understand that all cargo growth will be achieved both to 2015 and beyond will be achieved within the current night-time noise Leq contour, thereby implying that the growth will be derived from day-time rather than night-time cargo flights. Given the nature of some cargo operations, particularly the express carriers / integrators, we are doubtful whether this can be achieved.

In their response to questioning on these issues, BAA state that they expect that total national air freight will rise about 3.7m metric tonnes by 2015, representing an average rate of annual growth of 4.1% pa. BAA's London airports represent about 74% of the national air freight total. In 2004, Stansted accounted for 13% of the BAA London airport total, but this would rise to 22% by 2015. Their confidence in their cargo forecasts was based on a combination of availability of slots, the current market presence (which includes three major integrators, Fedex, UPS and TNT) and the fact that the emerging long-haul (passenger) carriers at Stansted would be able to carry bellyhold cargo.

We do not feel that these cargo forecasts are realistic, particularly in view of the stagnation of the cargo market at Stansted in 2006/2007. In practice, from a distributional standpoint, other UK airports may be preferred by cargo operators and shippers, particularly if these have night-time slots available (e.g. Nottingham East Midlands Airport). Further analysis on this, including our own cargo forecasts for Stansted, is given in Section 2.9.5.

2.6.4 [✂]

[✂]

Table 2.17 [✂]

	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

2.6.5 Sensitivity analysis

[✂] we have been informed that BAA has not undertaken any sensitivity or scenario analysis on the G2 forecasts, although it has told us that it reserves the right to do this nearer the time of a possible Public Inquiry. We find this surprising in view of the downwards revisions made to the G1 forecasts and the general trends in oil prices and airline fares.

BAA have, however, undertaken some sensitivity tests on our behalf based on our own model assumptions, although they stress that these should not be taken as official BAA forecasts. The model assumptions are as follows:

- **Scenario A** - A 1% reduction in forecasted UK GDP / Consumer Expenditure from 2010-2030

- **Scenario B** – No change in real air fares (from 2010-2030)

- **Scenario C** – A 1% annual increase in real air fares and an ICF 'tough scenario' assumption re-the EU ETS. (This assumes that, by 2030, the cost of carbon will be approximately double that of the current ETS target level)

- **Scenario D** – A 2% annual increase in real air fares and an ICF 'tough scenario'.

The increase in real air fares would either arise through higher oil prices or through other measures eg increases in APD or other taxes. We believe that the use of the ICF 'tough scenario' is justified as the current ETS carbon emissions targets are significantly below Kyoto levels and some increase in the longer-term would seem inevitable.

Table 2.18 G2 Passenger Forecasts[1] – London Stansted Airport (BAA Traffic Forecasting Model based on ASA Assumptions)

	2007	2015	2020	2025	2030	G1 %pa	G2%pa
Per Planning Application (Jan 08)	23.8	38	46	54.5	68	-	-
Annual growth	0.3%	6.0%	3.9%	3.4%	4.5%	6.0%	4.0%
ASA Scenario A	23.8	36.8	40.1	51.8	67.1	-	-
Annual growth	0.3%	5.6%	1.7%	5.3%	5.3%	5.6%	4.1%
ASA Scenario B	23.8	37.8	41.7	53.5	68	-	-
Annual growth	0.3%	6.0%	2.0%	5.1%	4.9%	6.0%	4.0%
ASA Scenario C	23.8	35.9	38.3	41.2	48.6	-	-
Annual growth	0.3%	5.3%	1.3%	1.5%	3.4%	5.3%	2.0%
ASA Scenario D	23.8	34.5	35.8	38	43.9	-	-
Annual growth	0.3%	4.8%	0.7%	1.2%	2.9%	4.8%	1.6%

The results of the model suggest that traffic levels at 2015 are largely unaltered – although this may be due to the fact that the G2 forecasts do not seem to account for recent traffic trends and early year projections eg to 2010. As in BAA's own Base Case figures, the traffic levels at 2015 seem too high, although the growth rates decline between 2015 and 2020 under all Scenarios A-D. This is rather surprising in view of the fact that Stansted would have additional slots from 2015 onwards. BAA told us that this arises due to the impact of R3 at Heathrow in 2020 – although it is not certain whether Stansted-based airlines would move to Heathrow in this year. We suspect that the negative impact on Stansted would be more gradual over a 2-3 year period after 2020. Any reduced traffic levels in the early years of the G2 development are likely to severely affect its financial viability, although this is not assessed in this report.

2.7 DfTs traffic forecasts

2.7.1 Modelling methodology

The DfT's passenger traffic forecasts are prepared through a two-stage process similar to that used by BAA. Forecasted unconstrained national air travel demand is projected using the 'National Air Passenger Demand Model', which combines time-series econometric models and projections of key driving variables with 'market maturity' assumptions to forecast national air travel demand assuming no UK airport capacity constraints. The second stage (the 'National Air Passenger Allocation Model') takes account of the capacity constraints by allocating passengers to individual airports based on a Passenger Choice Model, by converting this demand into ATM forecasts and using a demand re-allocation routine to account for ATM capacity constraints.

Further details on the DfT forecasts, including the detailed methodology and a summary of 'top-line' results are given in 'UK Air Passenger Demand and CO2 Forecasts', published in November 2007.

2.7.2 Modelling variables and elasticities

National Air Passenger Demand Model

The National Air Passenger Demand Model is disaggregated by individual market based on:

- The global region travelled to or from, whether the passenger is a UK or an overseas resident, the journey purpose (e.g. business or leisure), whether the passenger is on an international scheduled, international charter or domestic flight and whether the passenger is making an international to international connection.

- The key variables determining demand varied by market segment. These are:
    - GDP
    - Consumer Expenditure
    - Air Fares
    - Exchange Rates
    - Environmental impacts including an emissions charge based on the shadow price of CO2 emissions and a 'radiative forcing factor' of 1.9 to account for the warming effect of non-carbon emissions

Projected air fares were based on a combination of fuel (oil) prices, fuel efficiency growth and expected non-fuel airline costs. Of these, oil prices were expected to fall from $65 / barrel in 2006 to $53 / barrel in 2030. Non-fuel airline costs were expected to fall in real terms up to 2020 – with a maximum decline of 4-5% pa in the short-haul and domestic sectors between 2006-2010.

The elasticities used were also dependent on market segment, averaging around -0.44 for air fares and between 1.4 – 2.1 for GDP (income)

National Air Passenger Allocation Model

This model evaluates the likelihood of airport choice for each type of passenger travelling to or from some 455 geographic zones in the UK. The model is based on a combination of factors including:

- The time and money cost of accessing the airport by road or by public transport
- The flight duration and frequency
- Air fares
- Travellers' preferences for particular airports; and
- Travellers' value of time (which varies by journey purpose)

The 'theoretical' model was calibrated against actual 2005 CAA airport choice data.

In assessing the traffic levels at individual airports, the National Air Passenger Allocation Model considered a range of airport development scenarios, with various runway and/or terminal capacity assumptions. These included:

Scenario – s12s2 (Base Case)

Maximum use of existing airport capacity plus Stansted R2 (480,000 ATMs in 2015), Heathrow R3 (605,000 ATMs in 2020 rising to 702,000 ATMs in 2030)

Scenario – s12s2mm2

As above, but with Heathrow Mixed Mode (480,000 ATMs – 2010-2015 rising to 540,000 ATMs – 2015-2020)

Scenario – s07

Maximum use of existing airport capacity plus Stansted R2 (480,000 ATMs in 2015), but no further development of Heathrow.

The runway and terminal capacities varied over the period to 2030, although it should be noted that DfT assumed a significantly higher runway and terminal capacity at Stansted than BAA by 2030 (480,000 ATMs and 82 mppa)

The key results of the DfT forecasting model under each scenario are shown in Section 2.7.3

2.7.3 Key results

The DfT's Base Case scenario shows passenger traffic at Stansted rising by some 6.0% pa over the period between 2005-2015 and by 4.0% pa between 2016-2030. The growth rate over the G1 period to 2015 is lower than that now projected by BAA (6.9% pa) due to the fact that earlier BAA G1 forecasts have not been adjusted to take account of virtually zero growth at Stansted between 2006-2008. DfT's Base Case growth rates over the period from 2016-2030 are similar to those of BAA.

There would seem little doubt that DfT's Base Case passenger forecasts to 2010 are too aggressive – given the current economic climate in the UK, oil (fuel) price levels and the expected increase in air fares over the next 1-2 years.

Table 2.19 DfT Passenger Forecasts (Nov 2007) – London Stansted Airport Scenario - s12s2 – Base Case

Mppa	2005	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
Terminal Passengers (000)	22.3	28.5	40.0	54.9	61.9	72.4	-	-
% Annual growth	-	5.0%	7.0%	6.5%	2.4%	3.2%	6.0%	4.0%
ATMs	179.5	219.9	283.9	400.6	435.8	493.6	-	-
% Annual growth	-	4.1%	5.2%	7.1%	1.7%	2.5%	4.7%	3.8%

DfT's forecasts for Scenario s12s2mm2 are given in Table 2.20. Whilst these also appear to over-estimate traffic demand at Stansted (particularly between 2005-2015), the impact of Mixed Mode would appear to reduce traffic levels by around 7.2% pa in 2015 declining to 2.5% pa in 2030 in comparison with the Base Case.

Table 2.20 DfT Passenger Forecasts (Nov 2007) – London Stansted Airport Scenario s12s2mm2 – Base Case plus LHR Mixed Mode (2015-2020)

Mppa	2005	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
Terminal Passengers (000)	22.3	28.5	37.1	52.6	59.2	70.6	-	-
% Annual growth	-	5.0%	5.4%	7.2%	2.4%	3.6%	5.2%	4.4%
ATMs	179.5	219.9	271.8	375.4	419.0	479.0	-	-
% Annual growth	-	4.1%	4.3%	6.7%	2.2%	2.7%	4.2%	3.8%

In Scenario S07, the impact of no third runway at Heathrow increases demand by 14.1% pa above that of the Base Case in 2025, with reduced increases of 8.0% pa in 2020 and 2.8% pa in 2030.

Table 2.21 DfT Passenger Forecasts (Nov 2007) – London Stansted Airport Scenario – S07 – Stansted R2 only

Mppa	2005	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
Terminal Passengers (000)	22.3	28.5	40.6	59.3	70.6	74.4	-	-
% Annual growth	-	5.0%	7.3%	7.9%	3.5%	1.1%	6.2%	4.1%
ATMs	179.5	219.9	287.3	433.9	495	493	-	-
% Annual growth	-	4.1%	5.5%	8.6%	2.7%	-0.1%	4.8%	3.7%

Source: DfT UK Air Passenger Demand and CO_2 Forecasts – Nov 2007

2.7.4 Sensitivity analysis

To test the sensitivity of the National Air Passenger Demand forecasts, DfT produced a series of model runs with changes to the projected values of key variables. The unconstrained demand forecasts were then allocated to each airport using the Base Case scenario capacity constraints (s12s2).

The changes to the projected model variables were as follows:

Table 2.22 DfT National Air Passenger Demand Model – Sensitivity Analysis Changes to Projected Model Variables

Lower GDP growth	GDP grows 0.5% pa slower
Higher GDP growth	GDP grows 0.5% pa higher
Higher Carbon Cost	Shadow cost of carbon raised by 20%
Lower Carbon Cost	Shadow cost of carbon lowered by 10%
Higher Oil Price	2030 oil price raised to $60 / barrel
Lower Oil Price	2030 oil price lowered to $25 / barrel
Higher Radiative Forcing Factor	Radiative forcing factor raised to 4
Lower Radiative Forcing Factor	Radiative forcing factor lowered to 1
Higher Airline Non-Fuel Costs	Airline non-fuel costs lowered by 5% pa 2005-2020
Lower Airline Non-Fuel Costs	Airline non-fuel costs raised by 5% pa 2005-2020
Lower Fuel Efficiency	Share of ACARE-consistent aircraft entering service in 2030 reduced to 5%
Higher Fuel Efficiency	Share of ACARE-consistent aircraft entering service in 2030 raised to 50%

Based on these scenarios, the projected passenger traffic levels at Stansted over the period 2010-2030 are given in Table 2.23.

The sensitivity analysis indicated that a higher oil price significantly reduces growth up to 2015 (=5.5% pa) – although, rather surprisingly, the rate of growth appears to be higher between 2016-2030 under a high oil price scenario (=3.9% pa) than under a low oil price case (=3.2%). A similar 'reversal' situation applies both in the case of the cost of carbon and aircraft non-fuel costs.

It is our view that since the DfT forecasts at Stansted for all these scenarios for the period 2005-2008 were considerably higher than the out-turn figures, the projected passenger throughput in later years is likely to be over-estimated.

Table 2.23 DfT Passenger Forecasts (Nov 2007) – London Stansted Airport Scenario Analysis

Mppa	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
Base case	28.5	40.0	54.9	61.9	72.4	6.0%	4.0%
Low GDP	26.7	37.9	49.4	52.5	62.1	5.4%	3.3%
High GDP	30.8	43.5	60.3	69.3	74.3	6.9%	3.6%
Lower oil	32.2	46.9	62.7	70.6	75.1	7.7%	3.2%
High oil	28.0	37.3	48.7	54.8	66.0	5.3%	3.9%
Low cost of carbon	30.2	41.1	55.2	62.7	71.3	6.3%	3.7%
High cost of carbon	28.8	39.8	53.1	59.8	71.3	6.0%	4.0%
Low radiative forcing	30.7	40.9	56.3	62.9	73.7	6.3%	4.0%
High radiative forcing	25.8	37.5	46.7	54.4	64.3	5.3%	3.7%
Low aircraft non-fuel costs	29.7	42.6	56.5	64.1	73.2	6.7%	3.7%
High aircraft non-fuel costs	28.1	39.7	52.9	58.4	70.5	5.9%	3.9%
Low fuel efficiency	28.6	40.2	54.8	61.1	71.4	6.1%	3.9%
High fuel efficiency	28.5	40.1	54.8	61.9	71.5	6.0%	3.9%

Dependent on the scenario chosen, the overall growth rates for the G1 period (2005-2015) vary between 5.3% and 6.9% pa – whilst those for G2 (2016-2030) range between 3.3% and 4.0%. These are therefore lower than BAA's current projections of 7.1% pa for G1 and 4.0% for G2.

2.8 SACC's traffic forecasts

The SACC, through its consultants, York Aviation, prepared traffic forecasts in May 2006[7] in response to earlier forecasts put forward by BAA for the Interim Master Plan, the G1 and G2 developments and the 2006 CIP. As such, they may be considered to be rather out-of-date – and we understand that the SACC is considering preparing revised forecasts by the end of July 2008.[8] Despite this, we believe that it is valid to compare the SACC forecasts with those produced by BAA and DfT as they are based on a 'bottom-up' rather than a 'top-down' approach.

We review SACC's forecasting methodology in Section 2.8.1 and the key results in Section 2.8.2.

2.8.1 Forecasting methodology

SACC's passenger forecasts at Stansted are based on the view that market growth at a particular airport is to a significant extent supply driven through the provision of additional

[7] SACC Stansted Airlines Consultative Committee – Stansted Airport Forecasts Report – York Aviation – May 2006
[8] Revised forecasts were submitted to the Competition Commission towards the end of the study period and are not considered in this report

airline capacity, particularly on new routes. They believe that, in 2005, there was clear evidence emerging of market maturity on an individual route basis – and demonstrated that typically 41% of growth at Stansted had come from the introduction of new routes rather than growth on existing routes over the previous 5 years. On the basis that there was little evidence that the growth of Stansted had been as a result of routes spilling out from other London airports, the SACC believed that it was more appropriate to project the growth of the market at Stansted by extrapolating from the current performance, which had been driven by low airport charges. (In 2004/05, the average charges paid by airlines to BAA, after any discounts was £2.61 per passenger).

SACC argued that any significant increases in airport charges, due to both G1 and G2, passed through to passengers would significantly reduce demand at Stansted because of the high price elasticity of demand, particularly for low cost services. The SACC examined the price elasticity of demand by looking at the revealed impact of a changes in airport charges on rates of passenger growth at UK airports overall, which takes into account both the elasticity of passenger demand and airline supply side considerations. The implied demand elasticity is higher than assumed by BAA's figure of (-0.65) but not inconsistent with price elasticities derived for the overall market by the CAA.

The SACC's report stated that 'Stansted could be handling up to 42 mppa by 2015 assuming that airport charges and incentives to new route introductions remain roughly at current levels in real terms'. Similarly their analysis suggested that 'demand at Stansted would be in the range 50-60 mppa by 2030 assuming that airport charges and incentives to new route introduction remain roughly at current levels in real terms'.

2.8.2 Key results

Based on their derived price elasticities, the SACC calculated projected unconstrained traffic demand in which the level of airport charges and discounts remained at current levels (£2.61 per passenger), and with two further projections with the airport charges at the proposed G2 levels (=£8.50 per passenger) without discounts. These three cases were assessed under two scenarios (an 'optimistic' and a 'realistic' projection). These results are shown in Table 2.24 below.

Table 2.24 SACC Passenger Forecasts (May 2006) – London Stansted Airport

Mppa	2005	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
Optimistic Projection								
Unconstrained	22.0	33.4	42.1	49.2	55.7	61.5	6.7%	2.6%
Low elasticity to airport charges	-	29.7	33.5	39.2	44.4	49.0	4.3%	2.6%
High elasticity to airport charges	-	26.2	26.9	31.5	35.6	39.3	2.0%	2.6%
Realistic Projection								
Unconstrained	22.0	30.0	34.7	40.6	45.9	50.7	4.7%	2.6%
Low elasticity to airport charges	-	26.6	28.6	33.5	37.9	41.8	2.7%	2.6%
High elasticity to airport charges	-	23.4	22.9	26.8	30.3	33.4	0.4%	2.5%

Source: SACC

The SACC results suggest that annual traffic growth rates could potentially be as low as 0.4% pa during the G1 period between 2005-2015 and 2.5% pa between 20 16-2030 if airport charges rise to the level suggested by BAA as necessary to fund the G2 project. The SACC has acknowledged, however, that these figures needed updating and has supplied the Competition Commission more recently with fully modelled results, derived from an airport allocation model, which takes into account both recent market trends and higher fuel prices and models the effect of different levels of airport charges through a 'shadow pricing' mechanism.

2.9 Consultant's projections

2.9.1 Methodology

As requested in the Terms of Reference for this assignment, we provide an analysis of the range of potential forecasted passenger and cargo traffic levels at Stansted for the G2 development (ie over the period 2015-2030) although, inevitably this will also include an appraisal of the G1 forecasts (as the start point for the G2 projections).

Our methodology is to look broadly at the latest forecasts produced by DfT and BAA and to adjust these, as required, for the out-turn results at Stansted over the past 18 months and for any immediate impact on growth over the next 1-2 years (eg the anticipated grounding of Ryanair aircraft). Further details of these Ryanair capacity reductions are expected to be announced shortly after the publication of this report. In the medium to long-term, we note the possible effect of significantly higher oil prices, which commentators have suggested could reach US$150-200 / barrel (in real prices) – although there has been considerable fluctuation during 2008 to date. We are also rather concerned about the continued reduction in real air fares suggested in the BAA and DfT models in view of the financial situation of many airlines both in the UK and other parts of the world. Air fares are also likely to be impacted both by future environmental charges (eg the ETS) and possibly by continued increases in APD. It has been argued that the likely CO_2 reductions under the current ETS scheme fall significantly short of Kyoto targets and that the scheme will need to become significantly tougher. Indeed it is not inconceivable that, in the longer-term, the aviation sector itself may need to meet *absolute* targets in carbon emissions which would need to be implemented through suitable taxes. This would effectively cap the growth that could be achieved, irrespective of other trends or any carbon trading mechanisms. We do not, however, regard this as the most likely scenario.

Inevitably, in the longer-term (eg 2015 and beyond), there is likely to be some reduction in passengers' propensity to fly (and probably a reduction in the growth rate of LCC traffic) as business travel becomes less essential (due to video conferencing etc) and the limit on passengers' time for leisure travel. These impacts are reflected in BAA and Dft's lower growth rates for G2 in comparison with G1.

Our projections are made for high, low and 'most likely' case scenarios under three airport development scenarios, as follows:

- ***Scenario 1*** - Stansted G2 (2015), Heathrow R3 (2020) ie similar to BAA and DfT Base Case
- ***Scenario 2*** - Stansted G2 (2015), Gatwick R2 (2022)
- ***Scenario 3*** - Stansted G2 (2015) only

We initially felt that it would be appropriate to include a scenario for the introduction of mixed mode at London Heathrow by, say, 2015. Our view now, however, is that, if introduced, this is more likely to be used to reduce delays rather than increase capacity.

2.9.2 Scenario 1

Under Scenario 1 ('Most Likely' Case), we assume that passenger traffic for the remainder of 2008 will decline by 7.5% based on the monthly figures to June and the proposed cuts in Winter 2008 by Ryanair and easyJet. We anticipate further cuts by Ryanair and easyJet in 2009, resulting in a further 3% reduction in traffic in this year. By 2010, it is expected that there will be an economic recovery in both the UK and Europe and we anticipate annual traffic growth of around 6% pa until 2015. This figure, which is based on a combination of

BAA and DfT's estimates, reflects the likely overspill demand from Heathrow and Gatwick. Between 2015-2020, we anticipate that traffic will grow by around 5.5% (assuming that the G1 development proceeds), but subsequently falls to 3.5% pa between 2020-2030. and to 3.0% pa between 2026-2030 due primarily to spare capacity at Heathrow and declining propensity to fly. Our resulting traffic growth rates are therefore significantly lower than BAA's forecasts in the G1 period (3.1% pa in comparison to 7.1% pa) but are slightly higher in the G2 period (4.5% pa rather than 4.0% pa). Our increased figure for the G2 period can be explained by our higher projected growth rate between 2016-2020 when surplus capacity is available at Stansted but not at other London airports.

The Scenario 1 ('Most Likely' Case) forecasts suggest that at the theoretical start date of G1 in 2015, passenger traffic will be approximately 30.2 mppa and by 2030 this will have attained 58.4 mppa.

In the Scenario 1 (High and Low Cases), these traffic growth rate are amended to reflect the typical spread within the DfT's high and low cases. In the 'High' case, traffic at 2015 is projected to be 32.0 mppa and by 2030 to be 68.0 mppa (ie G2 capacity). In the 'Low' case, passenger throughput is projected at 25.8 mppa in 2015 and at 42.2 mppa by 2030.

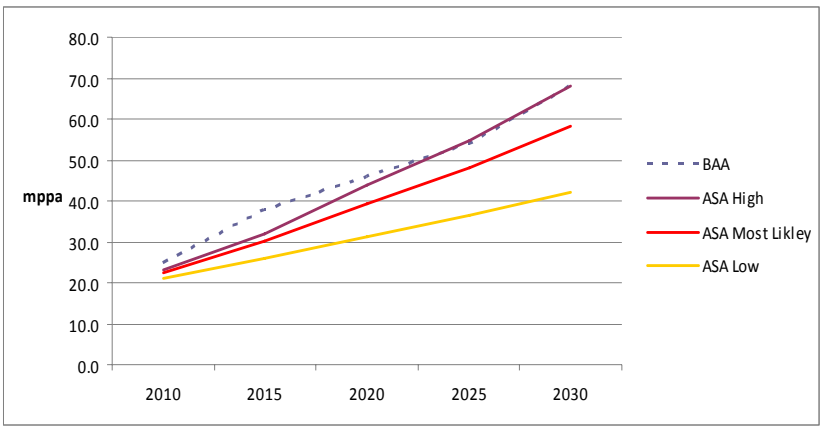
The Scenario 1 passenger forecasts are presented in Table 2.25.

Table 2.25 Consultant's Passenger Forecasts – London Stansted Airport - Scenario 1

Mppa	2007	2008	2009	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
High Case	23.7	21.9	21.9	23.3	32.0	43.8	54.6	68.0	-	-
% Annual Growth	0.3%	-7.5%	0.0%	6.5%	6.5%	6.5%	4.5%	4.5%	3.8%	5.2%
Most Likely Case	23.7	21.9	21.3	22.5	30.2	39.4	48.0	58.4	-	-
% Annual Growth	0.3%	-7.5%	-3.0%	6.0%	6.0%	5.5%	4.0%	4.0%	3.1%	4.5%
Low Case	23.7	21.9	20.6	21.2	25.8	31.4	36.4	42.2	-	-
% Annual Change	0.3%	-7.5%	-6.0%	3.0%	4.0%	4.0%	3.0%	3.0%	1.1%	3.3%

Our Scenario 1 projections compared against those of BAA's SG2 Planning Application forecasts are shown graphically in Figure 2.3.

Figure 2.3 London Stansted Airport
ASA v BAA Traffic Forecasts - Base Case Scenario



2.9.3 Scenario 2

In Scenario 2, traffic growth follows a similar pattern to the Base Case above to 2022 (the assumed date of introduction of the second runway at Gatwick), then increases at a slightly higher rate to 2030.

The Scenario 2 passenger forecasts are given in Table 2.26.

Table 2.26 Consultant's Passenger Forecasts – London Stansted Airport - Scenario 2

Mppa	2007	2008	2009	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
High Case	23.7	21.9	21.9	23.3	32.0	43.8	55.9	71.4	-	-
% Annual Growth	0.3%	-7.5%	0.0%	6.5%	6.5%	6.5%	5.0%	5.0%	3.8%	5.5%
Most Likely Case	23.7	21.9	21.3	22.5	30.2	39.4	49.1	61.2	-	-
% Annual Growth	0.3%	-7.5%	-3.0%	6.0%	6.0%	5.5%	4.5%	4.5%	3.1%	4.8%
Low Case	23.7	21.9	20.6	21.2	25.8	31.4	37.0	43.5	-	-
% Annual Change	0.3%	-7.5%	-6.0%	3.0%	4.0%	4.0%	3.3%	3.3%	1.1%	3.5%

2.9.4 Scenario 3

In Scenario 3, the traffic growth rates are similar to Scenario 1 to 2020, with a higher rate beyond 2020 as Stansted would be [the] only London airport with surplus capacity. Under the Scenario 3 ('Most Likely' case), Stansted will reach its G2 (two runway) capacity by around 2031.

Table 2.27 Consultant's Passenger Forecasts – London Stansted Airport - Scenario 3

Mppa	2007	2008	2009	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
High Case	23.7	21.9	21.9	23.3	32.0	45.9	62.9	68.0	-	-
% Annual Growth	0.3%	-7.5%	0.0%	6.5%	6.5%	7.5%	6.5%	6.5%	3.8%	5.2%
Most Likely Case	23.7	21.9	21.3	22.5	30.2	39.4	51.5	67.3	-	-
% Annual Growth	0.3%	-7.5%	-3.0%	6.0%	6.0%	5.5%	5.5%	5.5%	3.1%	5.5%
Low Case	23.7	21.9	20.6	21.2	25.8	34.6	44.1	56.3	-	-
% Annual Change	0.3%	-7.5%	-6.0%	3.0%	4.0%	6.0%	5.0%	5.0%	1.1%	5.3%

2.9.5 Cargo forecasts

In the case of cargo traffic, we recognise that overall market growth in the UK is currently flat, with Stansted apparently stabilising the decline experienced during 2006 and 2007. In the medium to long-term, we are not as optimistic about cargo growth at Stansted as BAA. It is true that Heathrow is slot constrained – however, according to Air Cargo World Online[9] shippers currently appear to prefer Manchester (which has a mix of bellyhold and dedicated freighter traffic) due to its better road connections and distribution opportunities within the UK. (Shippers have cited the slowness of the M25 as one reason for this). In practice, dedicated freighter traffic is likely to prefer airports with few night-time restrictions (such as Nottingham East Midlands Airport).

We accept that in the longer-term, Stansted may get some bellyhold traffic from long-haul routes, particularly to/from SE Asia – although we suspect that many of the long-haul services will be 'low cost' (as proposed by Ryanair), where bellyhold cargo is likely to be discouraged.

Our cargo forecasts, therefore, are broadly based on Boeing's[10] long-term global forecast of 6.1% growth between 2006-2026 and Airbus's forecast[11] of 5.8% pa between 2007-2026 – with some adjustments for slot constraints at Heathrow, BAA's (largely unsubstantiated) claims of 'significant interest' from freighter operators wishing to operate from Stansted and the impact of potentially increasing (but limited) bellyhold cargo from long-haul passenger flights from around 2015 onwards.

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[9] 'UK's Freighter Squeeze' – Air Cargo World Online – 2 December 2007
[10] Boeing website
[11] Airbus website

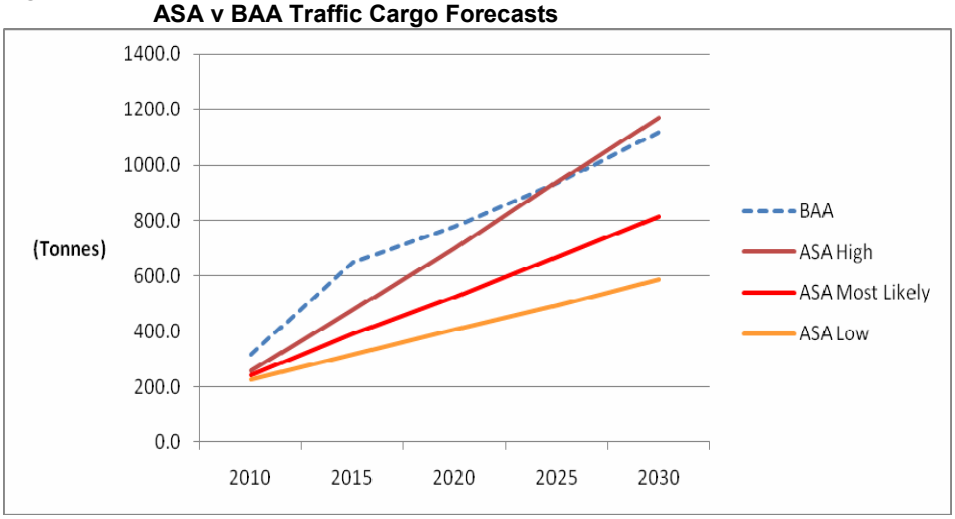
Under Scenario 1 ('Most Likely' case), the cargo tonnage handled approximately doubles form its current level by 2015 and doubles again by 2030. The tonnage achieved by 2030 is, however, significantly less than forecasted by BAA (1,120,000 tonnes pa). Our Scenario 1 cargo forecasts are shown in Table 2.28.

Table 2.28 Consultant's Cargo Forecasts – London Stansted Airport - Scenario 1

Tonnes handled (000s)	2007	2008	2009	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
High Case	204	208.1	228.9	258.6	476.5	700.2	937.0	1167.7	-	-
% Annual Growth	-8.9%	2.0%	10.0%	13.0%	13.0%	8.0%	6.0%	4.5%	11.2%	6.2%
Most Likely Case	204	206.0	220.5	242.5	390.6	522.7	667.1	811.6	-	-
% Annual Growth	-8.9%	1.0%	7.0%	10.0%	10.0%	6.0%	5.0%	4.0%	8.5%	5.0%
Low Case	204	204.0	212.2	227.0	318.4	406.4	494.4	587.2	-	-
% Annual Change	-8.9%	0.0%	4.0%	7.0%	7.0%	5.0%	4.0%	3.5%	5.7%	4.2%

Our Scenario 1 cargo projections compared against those of BAA's SG2 Planning Application forecasts are illustrated in Figure 2.3.

Figure 2.3 London Stansted Airport
ASA v BAA Traffic Cargo Forecasts



In Scenario 2, the level of cargo handed is reduced due to the increased slot availability at Gatwick from 2022.

Table 2.29 Consultant's Cargo Forecasts – London Stansted Airport - Scenario 2

Tonnes handled (000s)	2007	2008	2009	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
High Case	204	208.1	228.9	258.6	476.5	700.2	982.0	1241.5	-	-
% Annual Growth	-8.9%	2.0%	10.0%	13.0%	13.0%	8.0%	7.0%	4.8%	11.2%	6.6%
Most Likely Case	204	206.0	220.5	242.5	390.6	522.7	699.4	863.3	-	-
% Annual Growth	-8.9%	1.0%	7.0%	10.0%	10.0%	6.0%	6.0%	4.3%	8.5%	5.4%
Low Case	204	204.0	212.2	227.0	318.4	406.4	518.6	625.0	-	-
% Annual Change	-8.9%	0.0%	4.0%	7.0%	7.0%	5.0%	5.0%	3.8%	5.7%	4.6%

Under Scenario 3, the level of cargo handled does increase more rapidly between 2020 and 2030 due to the capacity constraints at Heathrow, with our projected tonnage handled by 2030 similar to that forecasted by BAA.

Table 2.30 Consultant's Cargo Forecasts – London Stansted Airport - Scenario 3

Tonnes handled (000s)	2007	2008	2009	2010	2015	2020	2025	2030	G1 %pa	G2 %pa
High Case	204	208.1	228.9	258.6	476.5	767.5	1180.8	1656.2	-	-
% Annual Growth	-8.9%	2.0%	10.0%	13.0%	13.0%	10.0%	9.0%	7.0%	11.2%	8.7%
Most Likely Case	204	206.0	220.5	242.5	390.6	600.9	842.8	1127.9	-	-
% Annual Growth	-8.9%	1.0%	7.0%	10.0%	10.0%	9.0%	7.0%	6.0%	8.5%	7.3%
Low Case	204	204.0	212.2	227.0	318.4	457.1	611.7	780.7	-	-
% Annual Change	-8.9%	0.0%	4.0%	7.0%	7.0%	7.5%	6.0%	5.0%	5.7%	6.2%

3 Optioneering process

BAA used a staged mechanism titled an 'optioneering' process in order to 'rigorously develop and refine' options for the expansion of Stansted for G2. This process delivered a short-list of options for public consultation.

3.1 Consultant advice

Together with their own experts, BAA has used the following external consultants during the design development process: Grimshaws (architects), TPS (TPOP Assessment and Planning Support), Turner and Townsend (Process Mapping), WSP (Mechanical and Electrical and Biomass Fuel), Caillion/Schal (Construction Logistics), Whitby Bird (Structural Review), Mason Land Surveys (Land Surveys), Arup (Fire Strategy), NATS (Airfield Modelling), Black & Veatch (Water Engineering and Biomass Fuel), HED Design (Landscaping), Forward Group, Chapman Taylor (Retail Design) and DTZ Pieda (Protected Land Use Reporting).[12]

3.2 Airline and public consultation

During the optioneering and consultation process, BAA endeavoured to consult with airline users at Stansted in line with statutory requirements under the Airports Act. The principal mechanism for this was through the Stansted Airline Consultative Committee (SACC). This is a democratically elected body although in practice much of the day-to-day operation of the SACC is undertaken by representatives of two low cost airlines, Ryanair and Easyjet, and SACC's own specialist consultants. Whilst Ryanair and Easyjet account for some 83% of Stansted's passengers, it might perhaps be questioned as to whether it is fully representative of all current and future passenger and cargo airlines using the airport. For a variety of reasons, not all connected with the G2 development itself, BAA discussions with the SACC were not particularly constructive (see Section 3.3) although BAA maintain that they have still selected the best option.

A public consultation phase for the G2 development was undertaken between 9th December 2005 and 24th March 2006 following publication of its consultation document[13] outlining seven main masterplan layout options. This involved a series of road shows, exhibitions and meetings with local resident and community groups. The results of this consultation exercise are summarised in Section 3.3.2 and we have endeavoured to reflect these in our own assessment. A more detailed report[14] on the responses to the G2 public consultation was published in September 2006.

3.3 Optioneering process in detail

The process aimed, without pre-determination of the number of options being sought, to select a masterplan "for the purposes of the proposed outline planning application, which would take into account commercial and other important planning considerations".[15]

Stage 1 and Stage 2 assessed families of potential designs on a technical basis (operational acceptability and physical feasibility) and aimed to discontinue options. Stage 3 and 4 continued the technical appraisal but focused on preferred solutions. Experts representing

[12] BAA-CC2008-684-Q32 Schedule of reports by consultant.
[13] Stansted Generation 2: December 2005 Consultation
[14] A Report on Responses to Stansted Generation 2: Public Consultation Document, Avia Solutions, September 2006
[15] BAA-CC2008-670-Masterplan Selection design and costs, pg 1.

environmental, surface access, cost, engineering, architectural design and airfield design took part and the BAA Executive took decisions at key intervals. The goal was to assess a broad range of possibilities considering a necessary balance of "the long term planning of the airport, the success of the planning application as well as commercial considerations." [16]

Stage 1 aimed to find operationally and physically feasible options based on a runway length of 3,500m with the necessary associated apron, taxiway and terminal infrastructure to accommodate the growth. The existing runway and terminal were to stay in situ.[17] Some 336 options were reviewed of which 36 options were carried forward to Stage 2. Selection seems to have been made by agreement in which the more logical options in terms of flexibility, operational performance and passenger preference (in terms of proximity to surface access links) were taken forward to Stage 2.

Stages 2 and 3 added the consideration of the mode of operation and spatial relationships. Physical and operational feasibility was assessed on the position of the runway relative to its capability to operate, land take taking operation mode into consideration and the possible requirement to provide additional rail links. Of the 36 options carried forward to Stage 2, 18 remained for further consideration and were brought forward to Stage 3. Again, no scoring system was used. Records were kept as to how or why particular options were maintained or rejected in the form of minutes and meeting notes. No target was set for the number of options which would remain beyond this stage.

Both Stages 2 and 3 used Head Criteria (see Figure 3.1) which were determined by both the SG2 project team and the SG2 Executive. No relative weighting was attached to the Head Criteria of Operation, Flexibility, Passenger Experience and Economic and no scoring system was used at any stage other than a Red – relatively poor, Amber, and Green – relatively good rating. The forum for work was discussion workshops. As such it is not possible to determine if operational flexibility in affect took precedence over costs. Costs, as outlined were mostly defined on a per passenger basis meaning their accuracy as a guide is a function of the accuracy of the number of passenger forecast during that investment phase.

Figure 3.1 Head Criteria and Objectives[18]

Head-Criteria	BAA Head Objectives
Operation	To optimise operational efficiency and effectiveness for all airport users
Flexibility	To be responsive to changing circumstances without unnecessarily adding cost
Passenger Experience	To provide an appropriate level of passenger service
Economic	To maximise the likelihood of achieving a positive Net Present Value under a range of business scenarios, at the lowest cost to airport users

*****Environment formed a 5th criterion with a good/poor performance assessed by Environmental specialists.

Stage 4A. Senior executives were involved in the decision on the masterplans to be carried forward to the next Stage. Stage 4 opened with 7 Options. These mixed the variables of runway location, terminal location and operational mode:

[16] BAA-CC2008-670-Masterplan Selection design and costs, section 1.3, pg 2.
[17] BAA-CC2008-670-Masterplan Selection design and costs, section 1.9, pg 3.
[18] BAA-CC2008-670-App A BAA table of Objectives.

Table 3.2 Summary of Variables among December 2005 Options

Runway location	Two Choices	• North east • North west
Terminal location	Three Choices	• At right angles to T1 • Behind T1 • North east on same plane as the runway direction
Operational mode	Two Choices	• Segregated mode • Mixed mode

The Stage 4 objectives[19] were to prepare the masterplans to a quality suitable for public consultation, to enable BAA to form a view of its preferred masterplan and for BAA to make a final decision on scheme selection following the consultation. This Stage took into account surface access provisions and the number of terminals to be operated.

At this point BAA moved away from the White Paper runway length of 3,500m and opted for a runway of equal length to the existing runway, 3,048m. Prior to this stage it was felt the runway length would not have materially affected Option choice. The decision at this point for an equal length runway was based on traffic forecasts, operational, environmental and cost considerations. Studies showed that runways of 2,500m, 3,000m and 3,500m would accommodate a forecast capacity of 70-80% of passengers, 90-95% of passengers and 100% of passengers respectively. NATS modelled the most suitable departure and arrivals routes against their implications for Option A mixed mode finding it might "not be possible to maintain independent runway operations" at shorter lengths. At 2,500m about 25 flights per day would be affected.

For the purposes of Option A (in segregated mode), BAA state that "simple, predictable and reliable operations for the airlines there are strong arguments for having the two runways of the same length." These arguments were not identified although they do make some general comments that the benefits of a shorter runway are often small and that for the purposes of SG2 any reduction is best made from the North rather than South end of Option A. Responses during the consultation did suggest a shorter runway than the proposed 3,048m. BAA however focussed on comparing the gains from the longer White Paper 3,500m. A further reduction to 2,500m was analysed. Gains from 3,500m to 3,048m were greater (at £26m) than that for 3.048m to 2,500m (at £24m). A decision was made for an equal length runway. BAA state with reference to construction costs that "the lowest cost reduction occurred in masterplan 19 (Option D) but this was partly because runway lengths of less than 3,048m were not considered as this masterplan operates in segregated mode only". The decision on runway length seems to have been taken with a focus on the original preferred mixed mode Option A.

Stage 4B ran from December 2005 through to January 2007, the point at which BAA announced the preferred Option. The stage balanced the benefits of the Options against adverse effects by measuring performance against a stated Objective or sub-objective.

Options B and C were felt not to perform, a view mirrored in the consultation responses. A decision would take into account necessary changes in the level of information to be included for planning purposes, comments received during consultation and any new knowledge which the team had accumulated since the end of Stage 4A.[20] During this stage the SG2 project team were able to incorporate, the newly modelled NATS ATM data[21], a choice for one new terminal, and the decision to limit land take to the existing North and

[19] BAA-CC2008-670-Masterplan Selection design and costs, section
[20] BAA-CC2008-670-Masterplan Selection design and costs, Section 1.44 pg 8
[21] NATS undertook new modelling which lead to a reduced capacity for mixed mode to 91mph (movements per hour) and increased capacity for segregated mode to 86mph.

Northwest boundary. New surface access information available included moving the proposed new M11 junction 8B further south, a new A120 junction and the removal of the requirement to provide a rail link to the south.

Three alternative masterplans were developed by BAA based on the layout proposals made by the SACC in response to the December 2005 Consultation. These were subject to the same level of detail as the three original Stage 4B plans (although we have subsequently found some anomalies in the capital cost estimates):

- Alternative Option A in mixed mode
- Alternative Option A in segregated mode
- Alternative Option D in segregated mode

3.4 Appraisal and decision

All six options, the three existing and three new January alternatives were appraised against the same Head Criteria and sub-Criteria. These were presented to BAA in October 2006. BAA Option A in segregated mode was chosen as the preferred masterplan layout.

Further masterplan design and appraisal work was conducted with the SACC in January 2007. The SACC aim was to develop the least cost solution between Option A and D. The output of a two day workshop held on the 15th and 16th of January 2007 was appraised against the standard criteria.

3.4.1 SACC draft proposal

The challenge is the absence of a consistent concrete plan from the SACC. In their focus on the need to agree 'the principles' within which the design would evolve, BAA have continued their planning using internal experts and third party experts. As a result the SACC ideas were neither developed separately nor in conjunction with BAA over a period of time long enough for the SACC to feel they were given valid consideration.

In summary, the SACC proposed:

- Option D as their preferred option due to land take
- That the runway stagger could be shifted to further reduce land take
- To reduce the main and rapid exit taxiways (RETs) and to exclude Code F provision
- The terminal be placed approx 1,000m metres nearer to the southern end of the existing runway at Taylor's End such that its design and height not be dictated by the proximity of T1
- A two storey pier design
- The use of buses rather than a tracked transit system between T1 (and the rail station and T2

3.4.2 Summary of preferences

Table 3.2 summarises the key advantages and disadvantages as seen by BAA and the SACC.

Table 3.2 Summary of Advantages and Disadvantages by Organisation

	Option A (Segregated Mode)	Option D – Alternative SACC design	Preference
BAA	• Operational efficiency • Passenger connectivity via CTA design • Resource Flexibility • Phasing flexibility • Resilience of wide-spaced runway to incidents • Environmental performance	• Physical conflicts with rail* and GA • Apron congestion • Longer taxi distances • £100m surface costs move to Phase 1 • Runway crossings • Greater disruption during build • Higher property take • Passenger transit needed	Option A Segregated mode
SACC	• Wide-spaced costly • Excessive land take • Terminal area excessive	• Reduced land take • Terminal separation enables independent design from T1	Option D ACC alternative*

*The SACC have an evolving view on their preferred design. Initial plans to significantly reduce stagger to Option D by 959m were reduced to 595m due to a conflict with the existing rail link. A revised preferred design was promised in April 2008 but not forthcoming. The SACC also offered to review their preferred option during the course of our investigation for inclusion in our report although this has been delayed, we understand through a lack of available resources.

Other responses received during the consultation phase, many of which stated that the response should not be taken as an endorsement of expansion, are summarised in Table 3.3

Table 3.3 Summary of preferences from other respondents

Other respondents	Preferred Option
NATS	Option A
ThomsonFly	Option A
Great Yarmouth Borough Council, Northamptonshire County Council, Federation of small businesses, most residents, CBI East of England, London Chamber of Commerce and Industry	Option A
English Nature, Countryside Agency	Option A – segregated
East of England Development Agency Forest Heath District Council	Option D

3.5 BAA preferred option decision

Between May 2006 and January 2007 BAA worked through stakeholder feedback, the results of new airfield modelling and refined the design options accordingly. These changes resulted in a decision at the end of January 2007 to carry Option A (segregated mode) forward for planning purposes. The Planning Applications were submitted in March and April 2008.

As the design work continued changes which were applicable to all Options were made. For example reduced runway separation for both modes of A, reduction in taxiways between runways, a reduction in apron accommodation of Code F aircraft, the relocation of some ancillary facilities to the Northside and a change to the car parking provision to the north-west were applied across all Options. Work continued to retain listed structures and minimise land take and were required to design out the impact with landscaping.

Examples of the design criteria suiting the LCC can be seen in some design decisions. The apron layout is configured for 'back-of-stand' parking and taxi times are 3mins shorter in Option A (segregated mode). 100% pier service is beyond BAA's usual goals and they are dual level as per Sat (Satellite) 3 rather than with an additional mezzanine level. Gate space is also designed to accommodate additional waiting and queuing space as is necessary where seats are not pre-allocated. These measures which enable fast turns and minimise terminal infrastructure are modelled to suit the Low Cost Carrier.

3.6 Summary

BAA's decision took into consideration the required regional and local planning policies, the need to present a proposal of adequate design quality, the need to accommodate all expansion including associated services 'on-airport', with sustainability in mind.

The more detailed work with the SACC, representing the airlines, however, has been done late, allowing little confidence that their views were evaluated to the same depth as BAA's emerging preferred option.

BAA and their consultants have done a long and rigorous exercise to gain an operationally feasible and flexible solution. Allowing the process to evolve with an airline engagement level not much greater than the local community ignores the key importance of airlines as the airport customer. BAA has failed to harness their superior expertise in airport operations and the expert advice of their independent consultants in working with the airlines towards a mutually beneficial expansion.

4. Overview of Option A and Option D (and variants)

4.1 Introduction

This section describes the key elements of the preferred BAA wide spaced parallel runway option (Option A in Segregated Mode), other options put forward by BAA including their close spaced parallel runway option (Option D) and alternative layouts for Option D as put forward by the SACC. It also reviews the terminal requirements and options for G1 (including the possibility of a low cost terminal), the additional surface access requirements, the blight compensation scheme, the potential for upgrading the infrastructure for A380 operations and the possibility of operating in mixed mode at some future date.

4.2 Option A

Option A involves two eastern central parallel runway masterplan options in which a new 3,048m runway is located some 2,200m east of the existing runway. Land use layouts have been designed for the two runways operated either in segregated mode or mixed mode. Dual parallel taxiways would be located north east of the existing apron to connect the two runways, which are linked by a cross-taxiway arrangement.

In their consultation document[22] BAA stated that its then-preferred choice, Option A in mixed mode, would provide for a maximum capacity of some 76 mppa in comparison to a capacity of 63 mppa operated in segregated mode. Subsequent modelling by NATS, however, indicated that, due to the homogeneity of the forecasted aircraft mix for predominately low cost short haul traffic, these capacities should be revised to 73 mppa for mixed mode and 68 mppa for segregated mode. Given this relatively low capacity gain and the fact that new airspace regulations would need to be introduced for longer continuous descent approaches (CDAs) which BAA felt could not be guaranteed by the time of a G2 Planning Inquiry, it changed its preferred layout to Option A in segregated mode.

The main features of Option A are similar for both segregated and mixed mode although the overall land take was originally higher (627 hectares) under mixed mode than under segregated mode (524 hectares). BAA have subsequently reduced this figure to 480.5 hectares in their Planning Application. The main features of Option A comprise:

- A new 95,000 sq m terminal, piers and associated apron at right angles to and some 400m to the east of the existing terminal. In this location, the new terminal would have direct walking access to the existing airport rail station
- A new 3048m runway and taxiway system designed for Code E aircraft but set out in a position which would safeguard the possibility of upgrading to Code F (A380) aircraft in the future. Further details on the implications of this are given in Section 4.9
- New airside infrastructure including a control tower, land drainage, fuel farm and hydrant system, airside roads, tunnel and other airside facilities
- Additional car parking provision
- New surface access improvements
- A public transport (bus and coach) interchange
- Rail station upgrades

[22] Stansted Generation 2: December 2005 Consultation

The precise specification of these facilities has altered during the consultation stage and, following the announcement of BAA's preferred option in the subsequent period leading up to the Planning Applications submitted in March and April 2008. In addition the land acquisition and blight costs have reduced to reflect a smaller overall landtake.

BAA's capital costs for Option A (mixed mode) in December 2005 and Option A (segregated mode) in January 2007 (at 2005 constant prices), are given in Section 5.

4.3 Option D

Option D involves a north western close parallel runway masterplan layout in which the two runways can only be operated 'independently' in segregated mode. They could also be operated in a form of 'dependent' mixed mode but the closeness of the runways would result in a capacity the same or less than independent segregated mode. As in Option A, this layout will provide for a maximum capacity of 68 mppa.

As discussed in Section 3, Option D was initially put forward as one of the seven masterplan layouts in BAA's consultation document. During the consultation process, SACC suggested their own variant of Option D with a reduced stagger of 975 m between the two runways and a new terminal and apron area to the south west of the existing terminal. This was then re-interpreted by BAA to endeavour to obtain an operationally feasible layout. These three variants of Option D are described in Sections 4.3.1 – 4.3.3.

4.3.1 Option D (BAA)

BAA's Option D had the lowest landtake (480 hectares) of the seven masterplans considered in the consultation document. Apart from the location of the second runway and its associated taxiway system and the introduction of landscape and acoustic noise bunds to the north west of the airfield site, all other aspects of the BAA's Option D masterplan layout are similar to those in Option A, including the new terminal and apron complex sited some 400m to the east of the existing terminal.

Although this option was evaluated during the consultation process, BAA preferred Option A (in Segregated Mode) for operational reasons (see Section 4.5) and because it represented the lowest cost option (see Section 5). Option D in Segregated Mode, however, showed a larger population (6,890) within the 57 dBA Leq air noise contour (the onset of noise disturbance) at 2030 than Option A (4,649). Apart from the views expressed by SACC, most local community groups also favoured Option A.

4.3.2 Option D (595m stagger)

Following on from SACC's proposals for a revised Option D, BAA prepared an appraisal and a costing for its original Option D with a 595m stagger of the new close parallel runway (ie a 595m displacement to the SW). This was discussed at the joint BAA/SACC workshop held in January 2007.

Apart from the runway displacement, which BAA believe will slightly increase the total runway construction and airfield costs (see Section 5), the main differences between this and BAA's original Option D involve:

- Extension of the rail box to tunnel portal at the south west end of the displaced runway. This is necessary as the runway will cross over this rail box.
- Local road diversions including a bridge for the rail crossing to the west of the displaced runway outside the airport boundary

- Demolition and re-provision of the Metro hangar to the eastern side of the Northside Hangar area as this would infringe the Obstacle Clearance Surface (OCS) of the displaced runway

BAA has calculated that the overall landtake requirements for the Option D with a 595m stagger is 440 hectares in comparison to 466 hectares for BAA's Option D. They argue, however, that any cost savings from this are outweighed by the additional cost items described above.

The comparative costs of SACC/BAA's Option D (with a 595m stagger) as costed by BAA in January 2007 are shown in Section 5.

4.3.3 Option D (595m stagger and new T2 location to SW of T1)

In addition to the 595m stagger for Option D, the SACC also proposed that the new terminal is sited approx 1,000m to the south west of the existing terminal on the southern side of the current runway. This option, however, would have a number of implications for other airfield infrastructure both in the short and long-term development of G2.

The land area available for this second terminal and its associated apron is limited and would require some re-provisioning of existing buildings on the southern side of the present runway. BAA believes that the largest apron that could be constructed would handle a maximum of 22 mppa and would require:

- Demolition and re-provision of Endeavour House
- Demolition and re-provision of Taylors End Industrial Units
- Relocation of the Fire Training Ground
- Additional local road diversions

BAA have also stated that night-working would be required as this work would be carried out in the vicinity of a live airfield and would require modification to the Runway 1 parallel taxiway. As an offset to these additional costs, the second terminal to the south west of T1 would require a reduced forecourt and public area in comparison to a terminal to the east of T1 and a diversion to a gas main would no longer be required.

Given that the space available for a second apron would provide enough capacity to support a second terminal with a throughput of approx 22 mppa and therefore a second terminal of a commensurate size. Given the distance of approx 1,000m between the two terminals and the rail station and T2, a bus transfer system would need to be introduced.
Additional baggage transfer costs due to the distance between the two terminals would also be incurred.

The remaining 11 mppa terminal capacity to support G2 would need to be provided by extending T1 and its pier and apron facilities. The extension of the terminal would occur to its southside, avoiding the need to demolish the existing Raddison Hotel, located to the north side.

The requirements for extending the existing terminal facilities to reach a capacity of 35+11 (=46) mppa are as follows:

- Construction of a new pier and apron to the north-east side of T1 (i.e. Satellite 5), although this would result in a pier with maximum walking distances exceeding 850m
- Reconfiguration of T1 in order to achieve the balance of accommodation between arrivals and departures

It is arguable as to whether the T1 extension should be made prior to the construction of T2 or once T2 reaches its capacity of 22 mppa.

The primary disadvantage of this option is that passengers accessing T2 from the rail station or transferring between the two terminals would require a bussing operation, thereby diminishing the passenger experience at the airport. Together with the fact that this option is likely to be more expensive than one with the terminal within reasonable walking distance from the rail station, we can see no advantage for this – although we accept that there may be some benefit to low cost operators in co-locating a new low-cost terminal with other facilities (eg their own hangars).

As the proposed T2 development would be within the current airport boundary, there is no additional or change in the landtake requirements beyond those for Option D with a 595m stagger (Section 4.3.2 above).

The comparative capital costs for this option are shown in Section 5.

4.3.4 Option D (975m stagger and new T2 location to SW of T1)[23]

In their initial discussion prior to the January 2007 workshop, SACC put forward the concept of staggering the close parallel runway by 975m to the south west (as well as the new T2 location). Whilst this greater displacement might theoretically provide some further reduction in landtake requirements for the runway itself, BAA argued that operations would breach the Obstacle Clearance Surfaces of many of the hangar buildings on the eastern side of the Northside area (i.e. additional to the Metro hangar) and would displace planned car parking in the area. On this basis, BAA proceeded to make a full appraisal and costing of a 595m rather than a 975m staggered runway.

Our discussions with SACC suggest that they do now accept that a 975m displacement would not be cost-effective as it would restrict any further development in the Northside area, requiring additional landtake at other areas (eg to the east of the current airport boundary). We concur with this view.

4.4 Other potential G2 development options

As discussed earlier in Section 3, a variety of masterplan options were evaluated at each stage of the Optioneering process. We do not intend to discuss these in great detail as we are satisfied that the most appropriate options were considered in the consultation document or have been put forward by SACC and subsequently assessed (at least in part) by BAA. For the sake of completeness, however, we provide a brief review of Options B and C as presented in the consultation document and the possibility of a shortened second runway (either under Option A or D).

4.4.1 Option B

Option B provides for two eastern parallel runways in which the separation between the runways is 2,450m rather than 2,274m (as in Option A). As in Option A, the second terminal and apron would be sited to the east of the existing terminal. This layout option most closely resembles that proposed in the 2003 Air Transport White Paper and could potentially be operated in either segregated or mixed mode. The BAA's 2005 Consultation Document indicated that the comparative costs of Option B under either mode were some £100-120m higher than those for Option A, with a negligible difference in overall environmental impact.

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[23] Ryanair put forward proposals and costs for an Option D layout and terminal design to the Competition Commission during the course of the study period. These are evaluated in a separate report.

4.4.2 Option C

Option C represents a two eastern near parallel runway layout with a separation of 1,800m between the runways. Again this could potentially be operated in either segregated or mixed mode and the second terminal would be located between the two runways to the east of the existing terminal. Whilst Option C had slight advantages over Option D in terms of noise, this was counteracted by greater landtake requirements. The overall costs, however, for Option C in Segregated Mode (£2,290m) are similar to those of Option A in Segregated Mode (£2,280m).

4.4.3 Shortened second runway

BAA considered runway length during Stage 4a, prior to the 2005 Consultation exercise and asked for views on this issue in the consultation documentation.

Theoretically the second runway could be reduced from 3,048m to around 2,600m provided that this was used for arrivals movements only and certain larger freighter aircraft were excluded. Theoretically, this would provide some savings in total landtake and in runway / taxiway construction costs. This reduction would, however, not be possible for under the Option D layouts (or their variants) as air traffic operations require arriving aircraft to land on the nearest runway threshold on approach and departing aircraft to take-off on the furthest threshold which is not possible when the airport is operating under 'Easterlies' (i.e. take-offs and landings in an easterly direction)[24].

Whilst a shortened runway would be technically possible under Option A (or Option B or C), BAA rejected this as the village of Takeley to the south west of the second runway would be overflown under 'Easterlies'

4.5 Comparative operational performance

BAA have informed us that the operational performance of the seven main options considered in the consultation document were assessed through an evaluation of the average taxiing times per turnaround for all passenger and cargo movements. These were measured using NATS's TAAM model.

The results indicated that the average taxi times per turnaround (the addition of average arrival and departure taxi times) were 22.4 minutes for Option A and 25.4 minutes for Option D. It should be noted, however, that average taxi times in the TAAM model tend to be 5-10% longer than those experienced in practice.

BAA's interpretation of SACC's Option D was not modelled using TAAM so equivalent results are not available. However an alternative of Option A with a T2 relocated to the site of the existing cargo/maintenance facilities was tested using NATS's 'Real Time Simulation Tool'. BAA told us that NATS had advised them that controllers had great difficulty in handling maximum movement rates due to the location of the new apron. BAA believe that, had their interpretation of SACC's Option D (or SACC own Option D variant) been modelled these would have a poorer operational performance than Option A (or their version of Option D).

In addition to modelling taxiing times for each option, NATS also advised BAA on the necessary taxiway system to support peak hour movement operations at G2 capacity levels. Their advice indicated that a single parallel taxiway system should be able to support a

[24] Easterly operations are dependent on the prevailing wind direction and represent approx 30% of all Stansted movements

single runway capacity of 40-45 movements per hour in comparison with a full dual taxiway system of approx 50 movements per hour. By removing the second taxiway, there was a landtake saving of approx 12.5 hectares and a cost saving of approx £21m. On this basis BAA decided to remove the northern section of the second parallel taxiway.

In view of the nature of these layouts, we concur with this analysis and accept these findings.

4.6 Proposed BAA terminal development

A number of different terminal location, capacity, costing and funding options emerged during the design and optioneering phases for the G2 development. The main issues concern:

- The location of the second terminal (T2) and possibly additional terminals
- The capacity of adjacent airside aprons and related piers
- The taxiway layout / provision and the operational efficiency (eg taxiing times) in accessing either terminal from either runway configuration
- Any impacts the usage and therefore the financial viability of T2 might have on the usage and financial viability of T1
- The impact on landside access, including linkages between airport rail station, car parking and the bus/coach interchange and T2 and transfers between T1 and T2
- The quality of service provision and facilities for T2 and for additions to T1, including the proposed Satellite 4 and possibly Satellite 5 piers
- The specifications for and capital cost of T2, including the possible development of a 'low-cost' terminal which the SACC believe might be operated independently following a competitive tender.

Under BAA's preferred Option A (and under its own appraisal of Option D and Option D with a 595m stagger), T2 is to be built some 400m at right angles and to the east of T1. This configuration would allow for direct interconnection with the existing rail station and T1 through a system of passenger walkways. Under BAA's proposals for Phase 1, T2 would be constructed to provide a building shell capable of handling 15 mppa, but would be fitted out for 10 mppa. Further phases of capacity would be added based on passenger demand.

SACC have expressed a preference that the new terminal is built some 1000m to the south east of T1, on the southern side of the current runway and adjacent to the new Ryanair hangar. This terminal location has been explored by BAA under the Option A, Option D and Option D (with a 595m stagger) variants. In this instance, T1 would be connected by bus links to T2, the airport rail station and the existing bus/coach interchange facility. At this location, the new terminal would have sufficient apron/stand capacity for up to 21-22 mppa, although a further 11-12 mppa would need to be provided through a further extension of T1 (through a fifth pier e.g. Satellite 5). Given the long distance between T1 and Satellite 5, which would also require a passenger bus connection, we believe that this further extension of T1 would be more appropriate at the end, rather than the beginning of the G2 development (i.e. to increase terminal capacity from 57 to 68 mppa).

In order to construct T2 at this location, an existing airport building, Endeavour House, would need to be demolished. Certain buildings scheduled under the G1 development, including the proposed Hangar 8 and the business park maintenance units to the south of the existing

runway would be compromised and would need to be sited elsewhere. There would also be some diversion of local roads to provide access to T2 although some cost savings would be made due to the reduced road frontage in comparison to T1 in BAA's preferred location. As T2's apron is sited in the area designated for cargo development under BAA's preferred terminal location, all new cargo facilities would be sited on the eastern side of the airport. In addition and irrespective of the runway configuration adopted, this location of T2 would require an additional parallel taxiway to feed into the main taxiway network. This requirement was identified during the operational modelling carried out by NATS as part of the overall airfield planning evaluation. Whilst there might be some minor benefits to some airlines in co-locating their terminal, apron and hangar facilities, there are significant disadvantages with SACC's preferred T2 location, including the need to provide a bus transfer to T2 from the rail station, the increased taxiing times to and from the two runways (see Section 4.5) and the capital costs of T2 at this location in comparison with that preferred by BAA.

One further possible location for the new terminal is in the 'Northside' area to the west of the airfield. This terminal location would only be possible under BAA's Option D layout. Whilst we understand that BAA has not fully evaluated this possibility, we believe that the extended distance to the T1/rail station complex (requiring bus journeys of at least 10 minutes), together with the need to relocate the long-term car parking in this area, would make this option unrealistic. Irrespective of the nature and specification of the terminal, we believe that BAA's T2 location is the only most realistic long-term option.

In terms of specification, BAA has not stated a preference for the nature of the terminal although it is recognised that this may potentially be dedicated for LCC use. At some airports, such as Frankfurt Hahn and Marseilles, a dedicated LCC terminal has been constructed at a reduced capital cost in comparison to a conventional airport terminal for all types of carrier. Such facilities tend to have smaller check-in areas due to the reduced level of baggage carried, fewer lounges and other seating areas and, in many cases, less sophisticated baggage handling systems. Most dedicated LCC terminals have a maximum capacity of between 3 – 6 mppa, whereas the proposed T2 facility is likely to handle up to 33 mppa in the longer term. (It is conceivable that several terminals might be built – but this is unlikely to be cost effective). It is not known whether a larger dedicated LCC facility is feasible although the baggage system, which can represent up to 10-15% of total terminal costs, would undoubtedly be more complex.

Table 4.1 provides a benchmarking analysis of LCC terminals based on an analysis carried out by Jacobs Consultancy on behalf of the Commission for Aviation Regulation in Ireland. This analysis suggests that, whilst the comparative size of the terminal is broadly similar (as measured in total floor area per mppa at capacity), the projected T2 cost is relatively high, although its should be recognised that only the Kuala Lumpur terminal has a capacity over 6 mppa and that, in this instance, the construction costs are likely to be substantially lower than those in Europe. BAA have commented that, due to their size and nature, such benchmark comparisons are not valid although we would argue that, in the absence of any other information, they do at least suggest the SG2 T2 costs are on the high side. BAA has not provided us with benchmarking data for the size of T2, although they point out that it will be approximately 6% smaller than T1 on a comparable 'per mppa' basis.

Table 4.1 SG2 – LCC Terminal Benchmarking

	SG2 T2 Option A SM	Marseille	Budapest	KL LCC New Terminal	Schipol New Pier H&M	Frankfurt Hahn
Capacity (mppa)	33	3.5	n/a	10-15	4 (est)	5.6
Total Floor Area	93,000	7,532	7,990	35,290	6,150	18,500
Pax/ m^2	354.8	464.7	n/a	425.0	650.4	302.7
Total Cost (€ m)	314.4 (2005)	16.4 (2003)	35 (2005)	23 (2006)	30 (2005)	25 (1993-2006)
Total Cost (€ m) per mppa	9.5	4.68	n/a	1.53 (15mppa)	7.5	4.46

Source: Jacobs Consultancy Review of dedicated low-cost airport passenger facilities, May 2007

Ryanair have supplied to us a design proposal[25] for a 15 mppa LCC terminal at Dublin airport, although we understand that this has not been adopted by Dublin Airport Authority or sanctioned by the regulator, the Commission for Aviation Regulation. These proposals show the phased development of a multi-level terminal and piers which is not dissimilar to that put forward by BAA. The unit cost rates used by the architects (in 2002) were €2,745 per sq m (=£2,172 per sq m) for the terminal and €2,682 per sq m (=£2,122 per sq m) for the piers.

In terms of cost, we recognise that BAA believes that an appropriate building specification is needed for the Design and Access Statement in order to achieve Planning Consent. Nevertheless, we feel that their unit rates for T2 construction and fit-out (£2,300 per square metre) are too high and could be reduced in line with new terminal construction at other UK (regional) airports.

A further factor to consider is which airlines will use T1 and which T2 once the new terminal is constructed. We believe that it is unlikely that any airline would wish to move to T2 unless it could transfer all its operations to the new terminal. In the case of Ryanair, this would suggest that the minimum capacity of T2 at Phase 1 should be at least 20-22 mppa (Ryanair currently handle approximately 16 mppa at Stansted). It would also potentially reduce the throughput in T1 to around 15 mppa. This would significantly reduce aeronautical and commercial revenue in T1 to the extent that is highly doubtful that it would be financially viable under any form of ownership or operational structure.

We understand that it is SACC's view that the new terminal should be developed and operated under competitive tendering. We recognise that this could potentially lead to some capital and operating cost savings, although it is not possible to directly quantify these. It is also Easyjet's view (although not necessarily that of Ryanair or the SACC as a whole) that T2 could proceed before the construction of the second runway, if necessary. We recognise that, from an operational standpoint and in terms of passenger experience, that T1 becomes less attractive as traffic levels grow to 35 mppa and that there may be some operating cost savings by providing two competing terminals, although we are uncertain whether this would be financially viable on an overall basis.

4.7 Conclusions re-G2 masterplan options

In view of the improved operational performance in terms of taxiing times and potential delay performance, the relative noise exposure and the marginally lower overall capital costs, we believe that BAA has made the correct decision to prefer Option A – and, in view of the low capacity benefits from mixed mode, this should be operated in segregated mode. Similarly we feel that the optimal position for the second terminal is to the east of T1 as proposed

[25] Dublin Airport – New Terminal and Pier Facilities, Bruce Shaw Architects (on behalf of Ryanair), 2002

under Option A due to the extended distance between T1 and the rail station and T2 in SACC's Option D (595m stagger) and the higher capital costs involved.

Despite this, we believe that there are significant opportunities to reduce the cost of Option A – particularly for the terminal and various other ancillary costs. These potential cost reductions are described in our 'minimum cost' option shown in Section 5.

4.8 Review of BAA's blight scheme for G2

4.8.1 Site acquisition and blight costs

In any major infrastructure project – railways, highways, power stations as well as airports - fundamental to the successful award of a Planning Permission is the demonstration of measures to minimize and mitigate adverse environmental effects of the construction and operation of the project. Standards and expectations are continuing to rise, together with increasing national and international legislation concerned with environment, pollution and human rights. The need to demonstrate a responsible and sympathetic approach to the concerns of the communities in the vicinity of any such project is essential in the implementation process.

4.8.2 Initial BAA SG2 related blight scheme

Prior to the 2003 Aviation White Paper being published, the DfT asked BAA to set out ; *"……proposals for a voluntary scheme to provide protection and/or redress for residential property owners who would otherwise suffer informal blight following publication of the White Paper* …..".

BAA replied with initial ideas, based on earlier experience, and reflecting examples and precedents previously created in response to the impact of major infrastructure developments, not solely airport related, but also other large rail, highway and other areas such as power generation. These ideas were necessarily tentative, since the BAA did not have clear knowledge of what policies might be set out in the White Paper. Once published in December 2003, the White Paper set out Government policy on this matter (White Paper Para 12.16):

"The prospect of airport development will in many cases have a wider impact on property values in the period before statutory protection is available. This is often referred to as 'generalised blight'. There is no statutory remedy for this, but we accept that people should have access to some form of redress, for example to help them relocate before the development takes place, if they need to do so. Arrangements are therefore being made for non-statutory schemes to be brought forward locally by the airport operator to deal with the problem of generalized blight where runways are supported by this White Paper or where land is safeguarded for future development. These schemes will complement the proposals for noise mitigation discussed in Chapter 3 [of the White Paper]."

This was interpreted by BAA, and other UK airports affected such as Birmingham where an additional runway outside of its existing operational boundary was also proposed, as a firm statement of policy that needed clear consideration in any planning proposal for major expansion in response to the White Paper. By the time the White Paper was published the basis for the Stansted SG2 development proposal was settled. Paragraph 11.40 of the White Paper stated:

"On balance, taking into account all relevant factors, and in the light of the responses to consultation, the Government now supports the development of a second runway at Stansted as the first new runway to be built in the South East. We expect it could be

completed by around 2011 or 2012. The new runway would be the wide-spaced runway option presented in the consultation document, as shown on the map below."

This, from BAA's perspective, clarified the Stansted development option, confirmed a requirement for blight schemes to address generalised blight and allowed BAA to confirm the preparation of an application for the additional runway.

At the same time, considerable concern being expressed in the vicinity of the airport regarding evidence of generalised blight beginning to emerge over a much wider area than covered by the existing BAA schemes. Consequently, BAA felt it necessary to respond by implementing an enhanced blight scheme.

4.8.3 Blight schemes developed

In response to the White Paper, two voluntary blight schemes were introduced which applied to the runway location and the extended airport boundary of the Stansted second runway development proposal. This covered:

- A Home Value Guarantee Scheme (HVGS), launched in April 2004 to address generalised blight for property owners whose homes fell within the expanded airport boundary as indicated in the 2003 White Paper.
- A Home Owner Support Scheme (HOSS), introduced in September 2004 following public consultation, to support those who own property beyond the expanded airport boundary and within the 66dBA Leq noise contour forecast for 2030 for the new runway location indicated in the White Paper.

In addition, a third voluntary scheme was created:

- A Special Cases Scheme (SCS), introduced in November 2004 for those close to the expanded boundary of the airport as indicated in the White Paper, but who are outside the defined boundary of the HOSS. Qualification was based on a severe medical condition which makes it necessary for the applicant to move. Qualifying applicants would also need to demonstrate difficulty selling their home at a fair value because of the prospects of the new runway development.

When the HVGS and the HOSS were introduced BAA accepted the likelihood that the boundaries defining eligibility could change as work on the design of a new runway and associated infrastructure progressed. The December 2005 document stated that BAA expected to publish revised HVGS and HOSS boundaries at the same time announcing the second runway development proposal. The promise to honour the commitment to those who were within the originally defined boundaries, no matter how the design were to develop was reiterated, and BAA would continue to process applications to all three schemes, in accordance with that commitment.

The subsequent proposals for a two-runway airport, including the changes in runway location and the change in operating mode, affected the boundaries of the HVGS and the HOSS. New boundaries were determined on the same basis as those used to identify the original voluntary blight scheme boundaries, but applied to the circumstances of the runway and extended airport boundary locations finally proposed.

The proposals for a two-runway airport did not include any new properties under the HVGS. For HOSS a number of new properties were included, due the position of the proposed runway has moving to the south west of the location originally indicated in the White Paper. The chosen segregated mode operations also increased slightly the area of the forecast 66 dBA Leq contour to the north-east of the new runway.

New home owners included in the HOSS were contacted, and the terms available to them explained. In addition, homeowners who were within the boundary of one of the other shortlisted options in the December 2005 document, were also contacted in order to explain that since the proposed boundary of the airport would not change again their home would not now be required for an expanded airport.

4.8.4 Broadened scope of SG2 Options

Following legal action by the Stop Stansted Expansion (SSE) group, Uttlesford District Council, Essex County Council, Hertfordshire County Council and East Hertfordshire District Council, the White Paper was subsequently subject to Judicial Review, with a judgment in February 2005. Anticipating the outcome of the Judicial Review, BAA had already started to consider layout alternatives other than those indicated in the White Paper (a wide spaced parallel second runway). Such an outcome had not been anticipated at the time that the White Paper was published and the new blight scheme established. Consequently, BAA incurred costs which needed to be recovered irrespective of which development option was now chosen.

With the publication in December 2006 the Government's White Paper review [*The Future of Air Transport Progress Report: DfT 2006].* There was acknowledgment that the blight schemes introduced by BAA at Stansted were supported by Government and reflected the policy set out in the White Paper as follows:

"The prospect of airport development can have an impact on property values in the period before statutory protection is available, leading to generalised blight. The Future of Air Transport White Paper recognised this and proposed that non-statutory schemes be brought forward locally by airports where necessary. We welcome the fact that master plans have, in most part, acted as a catalyst for airports to bring forward schemes to address generalised blight. We encourage other airports to follow the examples already set by some airports:

Stansted

BAA has introduced voluntary non-statutory schemes to address the blight associated with the proposed development of Stansted. The first scheme enables homeowners within the proposed expanded airport boundary to sell to BAA for the full, unblighted market value of their property. The second aims to stabilise the housing market and provide financial support to homeowners close to the proposed expanded airport boundary where the prospect of increased aircraft noise is greatest." [Paragraph 3.20]

The blight costs for BAA Options A and D and SACC Option D are given in Table 4.1 below:

Table 4.1 SG2 Masterplan Options – Blight Costs (including Land Acquisition)

HOSS	£24.1m	£24.9m	£24.9m
Property Acquisitions (HVGS)	£41.9m	£65.9m	£65.9m
Part 1 claims	£30.0m	£30.0m	£30.0m
Land	£14.2m	£13.7m	£12.5m
Total	£110.1m	£134.4m	£133.2m
HOSS	£24.1m	£24.9m	£24.9m

We understand that costs are included for properties within the original Air Transport White Paper boundary or noise contours defined under the White Paper, consistent with BAA's commitments to honour the property schemes for properties originally affected. The costs are expressed net of income from the disposal of properties not required for a particular option.

To support this, BAA has provided us with an analysis which shows the net property acquisitions and the impact (or legacy costs) of this White Paper Commitment.

Table 4.2 SG2 Property Acquisition Costs

	BAA Option A (SM) (Scheme Announcement)	**BAA Option D (SM)** (Variances to Scheme Announcement)	**BAA Option D (SM)**
Gross purchases	£75.6m	+£49.0m	£124.6m
Disposals	£33.7m	+£25.0m	£58.7m
Net costs	£41.9m	+£24.0m	£65.9m

The analysis shows that Option D blight costs have been inflated by some £16.9m representing the net costs of Option A (£41.9m) less any further disposals of properties acquired under the White Paper Commitment that would not be required if Option D were selected (£25.0m). Whilst this might seem to result in an unjust cost comparison between Option D and Option A, BAA would argue that this inevitable from a legal standpoint and should be regarded as sunk expenditure. In our view, this choice of Option A is still justified by its superior operational performance.

We have also been asked to assess whether the blight schemes offered by BAA are too generous in comparison to similar developments. We acknowledge that the DfT stated that the BAA schemes conformed to their recently published policy on blight compensation, although they did not comment further than this. We also confirm that that a similar blight scheme (within the 66 Leq noise boundary) was also recently adopted by Birmingham International Airport in respect of the second runway (although this has now been shelved). We cannot find any evidence to support the view that the blight schemes are, per se, too generous. It should also be noted that any compensation claim is, in any case, subject to audit / arbitration by RICS and other, if disputed by either side.

4.9 Review for upgrading infrastructure for A380 operations

BAA's forecasts suggest that by approx 2030, 3 million passengers (equivalent to 4.4% of total throughput) and a proportion of cargo will be flown on A380 (Code F) aircraft. The introduction of Code F aircraft would require some widening of both existing and new taxiways associated with the G2 development, as well as Code F stands and, in the case of passenger operations, some adaptation of the terminal and additional boarding bridges.

BAA has not stated a likely date for the necessary infrastructure changes to be made, although this would be some time after 2015 (i.e. in Phase II or later). In their Phase I costs, BAA have included some provisioning for A380 operations in terms of the additional landtake to allow for future taxiway widening which is estimated at 11 hectares. They have estimated that the additional cost of safeguarding for Code F but building for Code E arcraft is approximately £6m. Whilst we are not as optimistic as BAA in our forecasts for increased long haul and cargo traffic (and consequently the likelihood of significant A380 operations), we believe that this extra provisioning cost is reasonable in view of the possible longer-term benefits. Any decision for the upgrading of the runway and taxiway system (approx £29m) would need to be taken on the basis of expected A380 traffic at the time.

4.10 Potential for future mixed mode operations at Stansted

As requested in our brief, we have examined the options for whether BAA's Option A operated in segregated mode could be switched to mixed mode in the future. BAA have told us that they did not wish to prejudice the G2 Planning Application by putting forward Option A in mixed mode when relative little additional capacity would be obtained (5 mppa) and new airspace procedures for longer Continuous Descent Approaches would be needed, which have not been sanctioned by ICAO. Any switch to mixed mode would therefore require further Planning Consent. Whilst no detailed analysis has been undertaken on the comparative environmental impact of Option A in mixed and segregated mode following the capacity adjustments made during the consultation phase, it seems clear that noise levels (in terms of

the population level exposed to 57 dBA Leq) would increase significantly under mixed mode for relatively little additional capacity improvement.

That said, there is no physical reason why mixed mode could not be introduced using the proposed Option A layout – subject to the provision of additional terminal and other airfield capacity – and NATS have indicated that the difficulties relating to the changes in airspace procedures are likely to be resolved in the medium term. BAA has not assessed the cost of providing the additional 5 mppa terminal and other airfield capacity.

It is also possible that mixed mode might be introduced at Stansted to improve the level of delays rather than increase capacity (as has been proposed at Heathrow). As the total number of ATMs would be unchanged, the increase in noise levels would be less than that for mixed mode operations solely to increase capacity.

If mixed mode was introduced to increase capacity, additional facilities (e.g. stands and taxiways) that cannot be accommodated within the planning application land boundary would be needed. If it was used to reduce delays rather than increase capacity, additional land may be required and there could be a significant change in the air noise impacts.

4.11 Phasing of Capital Costs

To assess the phasing of the G2 capital costs, we have examined the breakdown of the G2 terminal, pier and apron provision in relation to the expected incremental traffic demand at each defined phase. This is shown for BAA's preferred layout, Option A in segregated mode in Table 4.2 below:

Table 4.2 BAA Option A (SM) – Phasing of Incremental Capacity

	Phase 1	Phase 2	Later Phases	Total
Incremental capacity	10 mppa	5 mppa	18 mppa	33 mppa
% of G2 total	30.3%	15.2%	54.5%	100.0%
Terminal (sq m)	42,300	8,460	50,607	101,367
% of G2 total	41.7%	8.3%	49.9%	100.0%
Piers (sq m)	36,788	6,492	39,424	82,704
% of G2 total	44.5%	7.8%	47.7%	100.0%
Aprons (sq m)	278,503	49,148	42,174	369,825
% of G2 total	75.3%	13.3%	11.4%	100.0%

Given the fact that the second terminal shell is built for 15 mppa at Phase 1 but only fitted out for 10 mppa, and the peak hour passenger throughput (which determines the design size of the new terminal) is likely to be more peaked in the early phase of G2, we believe that the sq m floor provision (and therefore the capital cost of the terminal building) is appropriately phased throughout the G2 period. Indeed it is arguable as to whether capacity of more than 10 mppa should be provide at Phase 1. A similar argument applies to the pier provision and costs.

In the case of the aircraft stands and aprons, it is clear that there is significant upfront expenditure in Phase 1. Based on BAA's forecasts, some 65% of all passenger and 100% of all cargo stands required for G2 will be built at the onset of Phase 1 – despite that the fact that only 33% of incremental terminal capacity is built at this date and the volume of cargo handled is about one half that expected by 2030. This can, however, be explained by the fact that the number of stands is determined by peak time requirements (essentially overnight parking positions) which, by definition, will be relatively higher than the overall traffic levels during Phase 1. We are therefore satisfied that BAA's proposed phasing of these facilities is appropriate.

5 Capital Costs

5.1 Approach

This section of the report responds to the cost enquiry elements of the Competition Commission's brief to review BAA's proposed investment at Stansted SG2.

The first part of this section of the report sets out our approach to the strategic review of the costings of the options and is contained in Sections 5.2 to 5.6. The aim of these sub-sections is to set out the information reviewed as part of the study and to record some factual evidence on key areas of the comparative data which identifies the key cost driver differences between the options considered by BAA during its development process.

The second part of this section of the report sets out our approach to reviewing BAA's costs for the terminal buildings and associated facilities and is contained in Section 5.7. This section provides an insight into terminal benchmarking and utilises available benchmark information to establish what an appropriate level of investment might be for the proposed terminal buildings and associated facilities at Stansted.

The third part of this section of the report sets out our approach to establishing a minimum cost option and is contained in Section 5.8. This Section sets out a minimum cost option which the Competition Commission can consider further for discussion with BAA and the airlines. This utilises as a logical baseline and for direct comparison purposes BAA's Option A SM selected in January 2007 which has been further developed by BAA and submitted for Planning Approval early in 2008.

Conclusions which follow from this Capital Costs section of the report are incorporated into Section 6 of the report.

5.2 Options Evaluated

The options we evaluated for this study are as described in Section 4 above. The options are as follows:

- BAA Option A (mixed mode) - December 2005
- BAA Option A (segregated mode) – December 2005
- BAA Option D (segregated mode) - December 2005
- BAA Option A (segregated mode) - January 2007 (BAA's preferred option)
- BAA Option D (segregated mode) - January 2007
- SACC/BAA Option D (595m runway stagger) - January 2007
- SACC Option D (595m runway stagger and revised T2 location) - January 2007

BAA have provided additional costing information to that provided in their published documents in respect of each of the options. The information provided is in excel spreadsheet format and has generally been prepared on behalf of BAA by its cost consultants for the SG2 development programme with various inputs from both within BAA and a number of other consultants involved in development of the options. All costs are shown in 2005 prices.

SACC produced a cost summary in direct comparison with BAA Option A (segregated mode) – January 2007 with a 959m stagger which gave a total investment cost of £1,006 million for

a 10 mppa development. The basic assumptions in costing this option are that capacity is reduced from 35 mppa to 10 mppa in respect of terminal, piers, satellites and baggage handling, there is a 15% reduction in the length of taxiway, car parking is reduced pro rata to the reduced passenger forecasts, land acquisition, blight, site clearance and preparation and management costs are reduced pro rata, risk allowance is reduced to 10% (on construction costs only) and surface access costs are funded by surface access users. Whilst the assumptions made are at a high level reasonable, it seems unrealistic for SACC to make some of the changes eg omitting the surface access costs completely, allocating the risk allowance solely to construction costs and keeping the construction efficiency factor. Our comments are made without specific discussion with SACC around their assumptions and we have not carried out any substantial analysis of the costings or commented on the SACC option further in this report. In any event, we note that the SACC's estimates have now been superseded by the more recent detailed estimates relating to the specific low cost terminal scheme put forward by Ryanair. Our detailed assessment of this later scheme is discussed in another report.

It should be noted that a number of minor changes to the specification and potential cost of BAA's preferred layout (Option A in segregated mode) have occurred since the announcement of the scheme in January 2007. These changes have been incorporated in the specification given in the G2 Planning Application submitted in early 2008, but have not so far been costed by BAA. We are of the view that these changes do not materially affect the choice of the most appropriate scheme.

The total amounts proposed by BAA for investment in each of the options considered are summarised as follows:

Table 5.1 Summary of Total Capital Costs by Option

Option	Date	Investment (£million)
BAA Option A (Mixed mode)	Dec 2005	2,715
BAA Option A (Segregated mode)	Dec 2005	2,280
BAA Option D (Segregated mode)	Dec 2005	2,289
BAA Option A (Segregated mode)	Jan 2007	2,269
BAA Option D (Segregated mode)	Jan 2007	2,294
SACC/BAA Option D (Segregated mode – 595m stagger)	Jan 2007	2,337
SACC Option D (Segregated mode – 595m stagger and revised T2 location)	Jan 2007	2,487

A specific meeting to review costs was held with BAA and their representatives in BAA's offices at Gatwick Airport on 29 April 2008 to discuss the information which was available to allow us to carry out the cost related analysis required by the study. BAA agreed during the meeting to provide full detailed cost breakdowns associated with each of the options which were described in the documents published in December 2005 and January 2007.

BAA provided further breakdown of the cost information following the meeting.

The approach to completing this part of the study has been to seek information from BAA to substantiate each of the cost heads within the options and to analyse and compare the data received and seek to understand any differences and anomalies.

This section of the report does not make assessment of any fundamental or detailed technical considerations associated with each option. Any such technical comments are discussed elsewhere in other sections the report.

5.3 Strategic Review of Costings

BAA have developed each of the December 2005 Options A and D in a standardised format and with a consistent level of detail. This has provided a relatively clear comparison between the detail of the options.

The figures analysed as part of this study for the December 2005 options are developed to a consistent level of detail. This demonstrates a commitment to make a fair selection between the options in terms of costings.

The various Option D January 2007 figures are less well detailed in terms of their quantified breakdown in the later phases of development. It is our opinion that this detail may have been produced at some stage by BAA or their relevant consultants in preparing the costings but does not appear to have been recorded and incorporated into the excel spreadsheets provided. We believe this less detailed information arises as a result of BAA's selection of and concentration on Option A. This is an understandable approach when the clearly stated and preferred option has been selected and stated in a published document. We have prepared our own assessment of the quantities associated with each of the later phases of the various Option D January 2007 proposals for the purpose of the analysis and review contained in this report.

The figures analysed as part of this study for the four January 2007 options are not developed to a consistent level of detail. There is less development of the later phases of the four Option D schemes. This demonstrates a focus on the preferred option (ie Option A) in terms of costings.

BAA has further developed Option A (segregated mode) January 2007 which was submitted for planning approval in early 2008. The changes that have occurred are relatively minor and include reduction in land take amounting to a total of 43.9 hectares (approximate 10% of total land requirements) and certain environmental mitigation measures. We have not analysed the information submitted as part of the planning application and such analysis does not form part of the brief for this study. BAA informed us verbally in the cost meeting on 29 April 2008 that the estimate for the scheme submitted for planning approval has not been updated but that BAA "considers the total investment to be broadly in line with the total investment cost stated in January 2007" ie £2,269,000. We have therefore not been able to review the costs associated with the latest scheme and suggest that the Competition Commission consider whether it is appropriate or relevant to request an updated scheme costing associated with the planning application submission.

The amount of any change in construction costs over time (generally an increase) is forecast on a quarterly basis and varies depending on the state of health of the construction market in the UK. This is generally reflected in prices provided by construction contractors in the marketplace and measured, recorded on a sample basis and published by the Royal Institution of Chartered Surveyors (RICS) in the form of the BCIS Indices. The level of these indices has increased by between 4 and 6 % per annum since 2Q05.

In order to bring the costs reported by BAA up to current day (2Q08) the total investment amount will need to be increased by between 12 to 18%. Further increases may also be necessary to forecast the total cost to the mid point of construction in line with the BCIS indices.

Actual expenditure on the development is therefore very likely to be in excess of the costs stated by BAA. At some stage we would expect BAA to align the figures to current day costs which will also be forecast through to completion in the early stages as a minimum for the proposed Phase 1 works. This would generally be carried out once the development

timescales become more realistic and firm which for the purposes of this development we would expect to be following planning approval.

5.4 Review of Capital Costs

BAA provided a breakdown of each of the total investment costs for the options considered in this study which are shown against the following costs heads:

- Terminals
- Piers and satellites
- Baggage system
- Runway and airfield
- Airside infrastructure
- Car parks
- Airport roads
- Public transport facilities
- Other landside infrastructure
- Utilities
- Site acquisition and blight
- Site clearance and preparation
- Site management and logistics
- Design and project management
- BAA project and other costs
- Construction efficiency factor
- Risk allowance

Costs stated by BAA and in this report are the estimated construction costs at 2nd Quarter 2005 (2Q2005) prices which BAA use as their base date all of the costings produced for the proposed options for the development of Stansted G2.

The costs in the following Sub-sections 5.4.1 to 5.4.11 inclusive are net of on-costs (including site management and logistics, design and project management, BAA project and other costs, construction efficiency factor and risk allowance). Such on-costs are generally proportional to each of the construction cost heads. This is a standard way of presenting construction costs in the UK construction market.

5.4.1 Terminals

The terminal building costs for the options are:

Table 5.2 SG2 – Terminal Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	100	177	277
BAA Option A – Dec 2005 (Segregated mode)	102	82	184
BAA Option D – Dec 2005 (Segregated mode)	102	82	184
BAA Option A – Jan 2007 (Segregated mode)	108	141	249
BAA Option D – Jan 2007 (Segregated mode)	108	141	249
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	108	141	249
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	138	195	330 *

* includes £36m transfer coaches/bussing

The scope of each option includes some or all of the following:

- Terminal
- Above ground link to pier
- Below ground walkway to satellite

BAA have generally costed the terminal buildings at £2,200/m2. We consider this is a reasonable cost allowance when taking into account the fact that a specification and service level have not been established. A lower cost per m2 is achievable with compromise on material quality and passenger service standards. BAA in their own low cost terminal design presentation (May 2008) suggest a benchmark of £2,053/m2 is achievable (excluding baggage handling costs of £379/m2).

The costs associated with SACC Option D includes works to both T1 and T2. In this option the total cost for works to T2 is £ 210 million as this is now smaller (22 mppa) and the total cost for works to T1 is £104 million for extension and reconfiguring works. This option also includes £16 million for phasing costs. BAA has included a line item of £36 million for transfer coaches/operating costs which for the purposes of reporting clarity we have added to this line item.

The terminal costs for the BAA segregated mode options between December 2005 and January 2007 have been influenced by the higher ultimate capacity being assumed for segregated mode operations (increased by BAA to 68 mppa from 63 mppa).

The terminal floor areas of each of the options are:

Table 5.3 SG2 – Terminal Floor Areas by Option

Option	Phase 1 sq m	Later Phases sq m	Total G2 sq m
BAA Option A – Dec 2005 (Mixed mode)	48,000	68,000	108,000
BAA Option A – Dec 2005 (Segregated mode)	41,000	32,000	73,000
BAA Option D – Dec 2005 (Segregated mode)	41,000	32,000	73,000
BAA Option A – Jan 2007 (Segregated mode)	42,000	51,000	93,000
BAA Option D – Jan 2007 (Segregated mode)	42,000	51,000	93,000
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	42,000	51,000	93,000
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	103,000

There is a reasonable level of consistency in the sizing and costing of all options with the exception of SACC Option D which appears uneconomic in its make up both in terms of costs and delivery of mppa per £ of investment. This is due to the relative sizing of T2 and the T1 extension needed in comparison to a single new terminal.

In respect of the difference between the terminal areas of the SACC Option D Jan 2007 and the other Jan 2007 options BAA stated on 14 July 2008 “in the SACC Option D masterplan the size of Terminal 2 is constrained and therefore the existing terminal has to be extended by two bays. It has been assumed that this will be a less efficient way of delivering the required passenger processing space because of the constraints imposed by the form of the existing terminal.

5.4.2 Piers and Satellites

The pier and satellite building costs for the options are:

Table 5.4 SG2 – Pier and Satellite Building Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	116	151	267
BAA Option A – Dec 2005 (Segregated mode)	145	79	224
BAA Option D – Dec 2005 (Segregated mode)	145	79	224
BAA Option A – Jan 2007 (Segregated mode)	109	156	265
BAA Option D – Jan 2007 (Segregated mode)	109	142	251
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	109	142	251
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	104	126	230

The scope of each option includes some or all of the following:

- Satellite/pier/gate room
- Passenger boarding bridges
- Fixed links and nodes
- Passenger travelators
- Vertical circulation core

The main differences between the costs of each of the options are accounted for by the m2 areas of the facilities which are:

Table 5.5 SG2 – Pier and Satellite Building Floor Areas by Option

Option	Phase 1 sq m	Later Phases sq m	Total G2 sq m
BAA Option A – Dec 2005 (Mixed mode)	41,000	52,000	93,000
BAA Option A – Dec 2005 (Segregated mode)	52,000	28,000	80,000
BAA Option D – Dec 2005 (Segregated mode)	52,000	32,000	84,000
BAA Option A – Jan 2007 (Segregated mode)	37,000	45,000	82,000
BAA Option D – Jan 2007 (Segregated mode)	37,000	41,000	78,000
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	37,000	41,000	78,000
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	73,000

The 2007 options include additional items for passenger bridges, travelators and vertical circulation cores which were not included in the 2005 options. The overall costing of the options remains fairly consistent as the overall m2 area of the facilities are reduced and the additional items noted added.

The pier areas have been measured from the masterplans for all three options. While the total pier provision in each option is designed to serve the same number of pier served stands, there are differences in the configuration of the aprons which results in small differences in the total pier length required for each masterplan option. In other words, in terms of pier length, some masterplan layouts are more efficient than others. An example is that BAA Option A has a single sided pier serving Terminal 2 whereas the piers in SACC Option D and BAA Option D are all double sided, which are more space efficient."

5.4.3 Baggage System

The baggage system costs for the options are:

Table 5.6 SG2 – Baggage System Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m	£ per sq m
BAA Option A – Dec 2005 (Mixed mode)	25	26	51	472
BAA Option A – Dec 2005 (Segregated mode)	25	12	37	507
BAA Option D – Dec 2005 (Segregated mode)	25	12	37	507
BAA Option A – Jan 2007 (Segregated mode)	25	12	37	398
BAA Option D – Jan 2007 (Segregated mode)	25	12	37	398
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	25	12	37	398
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	25	14	39	379

The scope of each option includes:

- Departures
- Arrivals

BAA stated in the cost meeting that the benchmark they used for baggage handling systems is £500/m2 based on terminal building areas.

We consider that a benchmark of £500/m2 for a baggage system is at the upper end of the cost range for an international terminal building baggage handling system.

The costs applied by BAA to the 2005 options are £472/m2 and £507/m2 however the costs applied to the 2007 options reduce to £398/m2 and £379/m2.

BAA in their own low cost terminal design presentation (May 2008) suggest a benchmark of £379/m2 is achievable for a baggage handling system.

We believe a figure of £375/m2 is realistic for this scale of facility based on the projects we have benchmarked. This figure is slightly higher than the BAA figure of £379/m2 once a reduction is made for BAA's construction efficiency factor of 5%.

5.4.4 Runway and Airfield

The runway and airfield costs for the options are:

Table 5.7 SG2 – Runway and Airfield Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	306	172	478
BAA Option A – Dec 2005 (Segregated mode)	299	69	368
BAA Option D – Dec 2005 (Segregated mode)	289	52	341
BAA Option A – Jan 2007 (Segregated mode)	253	87	340
BAA Option D – Jan 2007 (Segregated mode)	269	92	361
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	276	92	368
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	285	127	412

The scope of each option includes some or all of the following:

- Earthworks
- Runway
- Shoulders
- Taxiways including apron taxiway/taxilanes
- Aircraft stand/aprons
- Tug and equipment areas
- Apron equipment
- Instrument landing system (ILS)
- Surface movement radar
- Instrumented runway visual range (IRVR)

- VHF receiver aerial
- Distance measuring equipment
- Digitally resolved direction finder
- Approach lighting
- Other

The majority of the difference in cost between BAA Option D - Dec 2005 and BAA Option D – Jan 2007 is an increase in the quantity of taxiway (including apron taxiway/taxilanes) of circa 56,000m2.

The other differences between the costs of each option are accounted for by the quantities for each item which are detailed in the following comparison tables:

Earthworks

Table 5.8 SG2 – Earthworks Costs by Option

Option	Phase 1 000 m^3	Later Phases 000 m^3	Total G2 000 m^3	Average Depth m
BAA Option A – Dec 2005 (Mixed mode)	5,667	0	5,667	0.900
BAA Option A – Dec 2005 (Segregated mode)	5,384	0	5,383	1.028
BAA Option D – Dec 2005 (Segregated mode)	4,983	0	4,983	1.039
BAA Option A – Jan 2007 (Segregated mode)	5,384	0	5,384	1.075
BAA Option D – Jan 2007 (Segregated mode)	4,983	0	4,983	1.020
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	4,983	0	4,983	1.020
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	5,079	0	5,079	1.283

The earthworks are priced at a rate of £6.50/m3. We consider this to be high for a major earth moving exercise of this nature where we assume all material will remain on the site based on earthmoving carried out at Manchester Airport. The quantities are generally consistent with the exception of SACC Option D which appears high when considering the average depth of earthworks across the site relative to the other options. The average depth across the site is calculated by taking the earthworks volume and dividing by the site area.

Runway

Table 5.9 SG2 – Runway Areas by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	137	51	188
BAA Option A – Dec 2005 (Segregated mode)	137	51	188
BAA Option D – Dec 2005 (Segregated mode)	137	51	188
BAA Option A – Jan 2007 (Segregated mode)	137	38	175
BAA Option D – Jan 2007 (Segregated mode)	137	38	175
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	137	38	175
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	183

The runways are priced at a rate of £265/m2 in the 2005 options. This rate is reduced to £210/m2 in the 2007 options following review by BAA. We believe a lower rate is achievable based on data available from Manchester Airport. The quantities are consistent with the exception of SACC Option D which is greater than the other 2007 options.

Shoulders

Table 5.10 SG2 – Shoulder Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	41	41	82
BAA Option A – Dec 2005 (Segregated mode)	41	41	82
BAA Option D – Dec 2005 (Segregated mode)	40	40	80
BAA Option A – Jan 2007 (Segregated mode)	38	40	78
BAA Option D – Jan 2007 (Segregated mode)	38	40	78
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger**)**	38	40	78
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	79

The shoulders are priced at a rate of £210/m2. We consider this rate is realistic for budget purposes but should be bettered based on data available from Manchester Airport. The quantities are consistent across all of the options.

Taxiways including apron taxiway/taxilanes

Table 5.11 SG2 – Taxiway Areas by Option

Option	Phase 1 000 sq m	Later Phases 000 sq m	Total G2 000 sq m
BAA Option A – Dec 2005 (Mixed mode)	744	362	1,106
BAA Option A – Dec 2005 (Segregated mode)	721	101	822
BAA Option D – Dec 2005 (Segregated mode)	654	45	699
BAA Option A – Jan 2007 (Segregated mode)	597	249	846
BAA Option D – Jan 2007 (Segregated mode)	606	249	855
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	606	249	855
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	849

The taxiways are priced at a rate of £209/m2 in the 2005 options. This rate is reduced to £185/m2 in the 2007 options following review by BAA. We believe a lower rate is achievable based on data available from Liverpool Airport. The quantities are consistent across all of the options.

Aircraft stand/aprons

Table 5.12 SG2 – Aircraft Stand / Apron Areas by Option

Option	Phase 1 000 sq m	Later Phases 000 sq m	Total G2 000 sq m
BAA Option A – Dec 2005 (Mixed mode)	295	276	571
BAA Option A – Dec 2005 (Segregated mode)	235	104	339
BAA Option D – Dec 2005 (Segregated mode)	309	89	398
BAA Option A – Jan 2007 (Segregated mode)	279	91	370
BAA Option D – Jan 2007 (Segregated mode)	278	129	407
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	278	129	407
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	563

The aircraft stand/aprons are priced at a rate of £185/m2. We believe a lower rate is achievable based on data available from Liverpool Airport. The quantities are consistent with the exception of SACC Option D which is significantly greater than the other 2007 options.

Tug and equipment areas

BAA Option A (SM) Jan 2007 includes circa £6.6 million for this item.

BAA Option D Jan 2007 and BAA Option D Jan 2007 (595m stagger) includes circa £1.5 million for this item.

SACC Option D Jan 2007 does not include an allowance for this item. This approach is inconsistent.

Other

SACC Option D Jan 2007 includes £5 million for night working for the new parallel taxiway to R1, £0.15 million for breakout existing taxiway connections and £19 million for working in the vicinity of the live airfield.

These were considered by BAA to be necessary in the construction of this masterplan layout and other options do not include costs for these items.

5.4.5 Airfield Infrastructure

The airfield infrastructure costs for the options are:

Table 5.13 SG2 – Airfield Infrastructure Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	98	28	126
BAA Option A – Dec 2005 (Segregated mode)	95	22	117
BAA Option D – Dec 2005 (Segregated mode)	95	22	117
BAA Option A – Jan 2007 (Segregated mode)	76	25	101
BAA Option D – Jan 2007 (Segregated mode)	74	31	105
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	74	31	105
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	70	31	101

The scope of each option includes some or all of the following:

- Control tower and ATC facilities
- Land drainage (including balancing ponds)
- Fuel farm and hydrant system
- Environmental/noise barriers
- De-icing stores
- Snow base
- Fire crash and rescue
- Fire engines
- Apron control centre
- Hardstanding area
- Airside roads – hard surface
- Airside vehicles station
- Sanitation facility
- Airside passenger transfers T1 to T2
- Airside road tunnel

All six options include a 75 m high control tower and ATC facilities at a cost of £20 million. We consider this is a reasonable cost for this size of tower.

Land drainage (including balancing ponds)

Table 5.14 SG2 – Land Drainage Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	35	0	35
BAA Option A – Dec 2005 (Segregated mode)	32	0	32
BAA Option D – Dec 2005 (Segregated mode)	27	0	27
BAA Option A – Jan 2007 (Segregated mode)	26	0	26
BAA Option D – Jan 2007 (Segregated mode)	21	0	21
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	21	0	21
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	19	0	19

The land drainage is priced at a rate of £6.00/m2. We consider this to be a reasonable allowance.

The quantities of land drainage are provided in m2 as follows:

Table 5.15 SG2 – Land Drainage Quantities by Option

Option	Phase 1 000 sq m	Later Phases 000 sq m	Total G2 000 sq m	Site Area Ratio-%
BAA Option A – Dec 2005 (Mixed mode)	4,500	0	4,500	71.7
BAA Option A – Dec 2005 (Segregated mode)	3,783	0	3,783	72.2
BAA Option D – Dec 2005 (Segregated mode)	3,600	0	3,600	75.0
BAA Option A – Jan 2007 (Segregated mode)	2,834	0	2,834	59.0
BAA Option D – Jan 2007 (Segregated mode)	2,650	0	2,650	56.9
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	2,650	0	2,650	56.9
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	2,350	0	2,360	55.5

The quantity of land drainage reduces between the 2005 and the 2007 options. The quantities are consistent across the 2007 options.

Fuel farm and hydrant system

Table 5.16 SG2 – Fuel Farm and Hydrant System Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	19	18	37
BAA Option A – Dec 2005 (Segregated mode)	19	12	31
BAA Option D – Dec 2005 (Segregated mode)	19	12	31
BAA Option A – Jan 2007 (Segregated mode)	11	17	28
BAA Option D – Jan 2007 (Segregated mode)	10	19	29
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	10	19	29
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	25

The quantities and rates are consistent across the options with the exception of SACC Option D which appears understated.

The scope of works indicates a site wide fuel system with a 6 tank farm serving the following number of stands:

Table 5.17 SG2 – Fuel Farm and Hydrant System Costs – No of Stands Served by Option

Option	Phase 1 No	Later Phases No	Total G2 No
BAA Option A – Dec 2005 (Mixed mode)	51	38	89
BAA Option A – Dec 2005 (Segregated mode)	51	12	63
BAA Option D – Dec 2005 (Segregated mode)	51	12	63
BAA Option A – Jan 2007 (Segregated mode)	56	34	90
BAA Option D – Jan 2007 (Segregated mode)	48	42	90
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	48	42	90
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	81

The quantities and rates are consistent across the options with the exception of SACC Option D Jan 2007(595m stagger and revised T2 location) which appears understated.

5.4.6 Car Parks

The car parks costs for the options are:

Table 5.18 SG2 – Car Park Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	33	80	113
BAA Option A – Dec 2005 (Segregated mode)	33	43	76
BAA Option D – Dec 2005 (Segregated mode)	33	43	76
BAA Option A – Jan 2007 (Segregated mode)	33	70	103
BAA Option D – Jan 2007 (Segregated mode)	33	70	103
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	33	70	103
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	103

The scope of each option includes some or all of the following:

- Surface parking LTP and MTP
- Short stay
- Surface parking – staff
- Reconfigure existing car park roads
- Boundary realignment

Car park costs of construction are estimated on a cost per space basis.

The summary of total car parking spaces per option is as follows:

Table 5.19 SG2 – Total Car Parking Spaces by Option

Option	Phase 1 No	Later Phases No	Total G2 No
BAA Option A – Dec 2005 (Mixed mode)	18,900	37,800	56,700
BAA Option A – Dec 2005 (Segregated mode)	18,975	18,552	37,527
BAA Option D – Dec 2005 (Segregated mode)	18,975	18,552	37,527
BAA Option A – Jan 2007 (Segregated mode)	18,684	30,362	49,046
BAA Option D – Jan 2007 (Segregated mode)	18,684	30,362	49,046
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	18,684	30,362	49,046
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	21,980	27,064	49,044

BAA use a cost per space for costing the car parking provision.

We consider the rates to be realistic for budget purposes but should be bettered based on information gathered on numerous at grade and multi storey car par schemes across the UK. This may involve some compromise on the BAA car parking standard.

5.4.7 Airport Roads (and contribution to DfT costs)

The airport roads (and contribution to DfT costs) for the options are:

Table 5.20 SG2 – Airport Roads Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	221	53	274
BAA Option A – Dec 2005 (Segregated mode)	221	46	267
BAA Option D – Dec 2005 (Segregated mode)	228	47	275
BAA Option A – Jan 2007 (Segregated mode)	142	143	285
BAA Option D – Jan 2007 (Segregated mode)	136	127	263
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	136	127	263
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	229	38	267

The scope of each option includes:

- New M11 junction
- North access road
- Toll plazas
- Local road diversions
- Forecourt/PTI/public space
- Roads – single carriageway
- Roads – dual carriageway
- Reconfigure existing roads and temporary car parking

The G2 scheme requires a number of surface access improvements both within and outside the airport boundary. These include an additional junction (8b) on the M11 and spur road to the airport, a new junction to the A120 and access road, local road diversions and new airport roads.

The costs of these improvements were identified in the 'Development Proposal' published in January 2007. In February 2007, however, BAA published its surface access consultation document showing the overall road and rail strategy for G2 and in June 2007 they released a further consultation document on the rail schemes themselves. These subsequent consultation documents identified additional surface access improvements not shown in the 'Development Proposal' including the widening of the M11 between Junctions 6-8, an additional bore and track for the Stansted Airport Rail Tunnel and a contribution towards the maintenance of all off-airport surface access schemes.

As far as the BAA's contribution of costs for off-airport schemes is concerned, they have indicated that they comply with the provisions of the 2003 Government White Paper on the Future of Air Transport which states that…*'The airport operator will be expected to contribute to the costs of rail and road improvements to the extent that these are required to cater for airport traffic. Their contribution is likely to be substantial, in particular for provision for increased rail capacity.'* We are aware, however, that SACC take a different viewpoint on this and believe that users should fund these schemes. It is possible that this may, in part, be possible through a road toll scheme to access the airport.

BAA have indicated that the M11 and A120 junction and access road costs will be borne fully by the G2 project as these are dedicated to the airport. [✂]

We understand that BAA have benchmarked their projected costs against the M25 widening scheme and the spur road for T5. In general, we concur with the broad level of costs shown with the possible exception of the Stansted Rail Tunnel, where we feel that their full contribution may have been conceded for the purposes of demonstrating compliance for Planning Consent rather than an equitable split between users.

Whilst the total amounts in the cost heads are similar there are a number or areas of variance in the figures provided. Despite BAA recasting the figures in line with previous formats they have not provided the split between the phases.

5.4.8 Public Transport Facilities (and contribution to Network Rail costs)

The public transport facilities costs for the options are:

Table 5.21 SG2 – Public Transport Facility Costs[1] by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	38	35	73
BAA Option A – Dec 2005 (Segregated mode)	38	35	73
BAA Option D – Dec 2005 (Segregated mode)	38	35	73
BAA Option A – Jan 2007 (Segregated mode)	6	10	16
BAA Option D – Jan 2007 (Segregated mode)	6	10	16
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	6	10	16
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	20	0	20

[1] Includes contribution to NetworkRail

The scope of all of the options includes for a transport interchange at circa £10 million – but they exclude the costs of the additional bore and track for the Stansted Rail Tunnel (approximately £120m).

We understand that it has been agreed with the DfT that the full capital costs of the Stansted Rail Tunnel will be borne by BAA, despite the fact that only four out of the six existing rail services at peak hours relate to the Stansted Express and a proportion of the Stansted Express passengers are not airport users. [✂]

The BAA December 2005 options also include a major extension to the rail terminal split between phases 1 and 2.

BAA Option A Jan 2007, BAA Option D Jan 2007 and SACC/BAA Option D Jan 2007 (595m stagger) include £6 million of works to the rail station in phase 1.

SACC Option D (595m stagger and revised T2 location) includes vertical circulation to the rail station, a T1 to T2 transfer access bridge over the railway and alterations to the existing roads at circa £10 million.

5.4.9 Other landside Infrastructure

The other landside infrastructure costs for the options are:

Table 5.22 SG2 – Other Landside Infrastructure Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	35	1	36
BAA Option A – Dec 2005 (Segregated mode)	32	1	33
BAA Option D – Dec 2005 (Segregated mode)	31	1	32
BAA Option A – Jan 2007 (Segregated mode)	34	1	35
BAA Option D – Jan 2007 (Segregated mode)	33	1	34
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	61	1	62
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	33	2	35

The scope of each option includes:

- Landscaping
- Boundary treatment
- Landside/airside
- Access control post
- Landside passenger transfers T1 to T2
- Transport maintenance base
- Offices
- Fire station (landside)
- Energy centre
- Taxi feeder
- Car hire pick up/drop off
- Coach/bus layover

The major cost variance in SACC Option D Jan 2007 (595m stagger and revised T2 location) includes for the introduction of four new items of circa £28 million including extension of the rail box, demolish and re-provide metro hangar, relocate fire training ground and a bridge for the rail crossing.

The area of landscaping included for each of the options is:

Table 5.23 SG2 – Landscaping Areas by Option

Option	Phase 1 000 sq m	Later Phases 000 sq m	Total G2 000 sq m	Site Area Ratio %
BAA Option A – Dec 2005 (Mixed mode)	4,500	0	4,500	71.7
BAA Option A – Dec 2005 (Segregated mode)	3,783	0	3,783	72.2
BAA Option D – Dec 2005 (Segregated mode)	3,600	0	3,600	75.0
BAA Option A – Jan 2007 (Segregated mode)	3,783	0	3,783	78.7
BAA Option D – Jan 2007 (Segregated mode)	3,600	0	3,600	77.3
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	3,600	0	3,600	77.3
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	3,600	0	3,600	84.7

The landscaping is priced at a rate of £5/m2. We consider the rates to be realistic for budget purposes but should be bettered once a specific landscape scheme is developed which we would expect to be based on mostly low maintenance grassed areas and a minimum of planting to the majority of the areas noted. The quantities and site area ratio percentages are consistent with the exception of SACC Option D Jan 2007(595m stagger and revised T2 location) which appears high.

The length of boundary treatment (red line) included for each of the options is:

Table 5.24 SG2 – Length of Boundary Treatment (Red Line) by Option

Option	Phase 1 m	Later Phases m	Total G2 m
BAA Option A – Dec 2005 (Mixed mode)	16,140	0	16,140
BAA Option A – Dec 2005 (Segregated mode)	10,328	0	10,328
BAA Option D – Dec 2005 (Segregated mode)	14,893	0	14,893
BAA Option A – Jan 2007 (Segregated mode)	15,882	0	15,882
BAA Option D – Jan 2007 (Segregated mode)	14,893	0	14,893
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	14,893	0	14,893
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	4,811	0	4,811

The boundary treatment is priced at a rate of £200/m. We consider this rate to be realistic for budget purposes. The quantities are consistent with the exception of SACC Option D Jan 2007(595m stagger and revised T2 location) which is clearly an error.

The length of landside/airside fencing included for each of the options is:

Table 5.25 SG2 – Length of Landside / Airside Fencing by Option

Option	Phase 1 m	Later Phases m	Total G2 M
BAA Option A – Dec 2005 (Mixed mode)	10,260	0	10,260
BAA Option A – Dec 2005 (Segregated mode)	0	0	0
BAA Option D – Dec 2005 (Segregated mode)	11,347	0	11,347
BAA Option A – Jan 2007 (Segregated mode)	10,328	0	10,328
BAA Option D – Jan 2007 (Segregated mode)	11,347	0	11,347
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	11,347	0	11,347
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	15,707	0	15,707

The landside/airside fencing is priced at a rate of £400/m. We consider this rate to be realistic for budget purposes. The quantities are consistent with the exception of SACC Option A Jan 2007(595m stagger and revised T2 location) which appears high.

5.4.10 Utilities

The utilities costs for the options are:

Table 5.26 SG2 – Utilities Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	74	19	93
BAA Option A – Dec 2005 (Segregated mode)	68	18	86
BAA Option D – Dec 2005 (Segregated mode)	49	11	60
BAA Option A – Jan 2007 (Segregated mode)	80	21	101
BAA Option D – Jan 2007 (Segregated mode)	46	20	66
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	46	20	66
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	48	20	68

The scope of each option includes:

- Water
- Sewerage
- Gas diversions
- Gas connection to site and on site distribution
- Electricity
- Substation/power distribution
- Fire main
- Telecoms

The major cost variance in BAA Option A2007 includes £30 million for a gas diversion.

5.4.11 Site Acquisition and Blight

The site acquisition costs for the options are:

Table 5.27 SG2 – Site Acquisition Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	19	0	19
BAA Option A – Dec 2005 (Segregated mode)	15	0	15
BAA Option D – Dec 2005 (Segregated mode)	12	0	12
BAA Option A – Jan 2007 (Segregated mode)	14	0	14
BAA Option D – Jan 2007 (Segregated mode)	14	0	14
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	14	0	14
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	13	0	13

The site areas purchased for each of the options are:

Table 5.28 SG2 – Site Areas Purchased by Option (Hectares)

Option	Phase 1 (ha)	Later Phases (ha)	Total G2 (ha)
BAA Option A – Dec 2005 (Mixed mode)	627.3	0	627.3
BAA Option A – Dec 2005 (Segregated mode)	523.7	0	523.7
BAA Option D – Dec 2005 (Segregated mode)	479.7	0	479.7
BAA Option A – Jan 2007 (Segregated mode)	480.5	0	480.5
BAA Option D – Jan 2007 (Segregated mode)	466.0	0	466.0
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	466.0	0	466.0
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	425.0	0	425.0

The site area purchase price per hectare for each of the options is:

Table 5.29 SG2 – Site Areas Purchase Price Per Hectare by Option

Option	Phase 1 (£/ha)	Later Phases (£/ha)	Total G2 (£/ha)
BAA Option A – Dec 2005 (Mixed mode)	29,500	0	29,500
BAA Option A – Dec 2005 (Segregated mode)	29,500	0	29,500
BAA Option D – Dec 2005 (Segregated mode**)**	25,000	0	25,000
BAA Option A – Jan 2007 (Segregated mode)	29,500	0	29,500
BAA Option D – Jan 2007 (Segregated mode)	29,500	0	29,500
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	29,500	0	29,500
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	29,500	0	29,500

The Option D land acquisition costs have risen between December 2005 and January 2007 because a higher price per hectare was used in 2007. Whereas £25,000 per hectare was assumed for this option in 2005, it was decided to apply a uniform rate of £29,500 per hectare across all options in the 2007 analysis.

The blight costs for each of the options are:

Table 5.30 SG2 – Blight Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	142	0	142
BAA Option A – Dec 2005 (Segregated mode)	141	0	141
BAA Option D – Dec 2005 (Segregated mode)	208	0	208
BAA Option A – Jan 2007 (Segregated mode)	96	0	96
BAA Option D – Jan 2007 (Segregated mode)	121	0	121
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	121	0	121
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	121	0	121

As indicated in Section 4.8, both BAA and SACC Option D costs are inflated by some £16.9m due to the White Paper boundary commitment.

5.4.12 Site Clearance and Preparation

The site clearance and preparation costs for the options are:

Table 5.31 SG2 – Site Clearance and Preparation Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	45	6	51
BAA Option A – Dec 2005 (Segregated mode)	41	5	46
BAA Option D – Dec 2005 (Segregated mode)	39	5	44
BAA Option A – Jan 2007 (Segregated mode)	40	5	45
BAA Option D – Jan 2007 (Segregated mode)	45	5	50
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	45	5	50
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	45	0	45

The costs of each option are based on the site area multiplied by a rate of £5 per m2 plus £20 million for ecological/archeological works except SACC Option D Jan 2007 (595m stagger with revised T2 location) which has a figure of £25 million.

The scope of each option includes:

- Site clearance

- Demolition
- Services diversions
- River diversion
- Site establishment (compounds, plaza, rail head, temporary road bridge)
- Other (unspecified)
- Ecological/archeological works

The area of preparatory works included for each of the options is:

Table 5.32 SG2 – Preparatory Works Area by Option

Option	Phase 1 000 sq m	Later Phases 000 sq m	Total G2 000 sq m
BAA Option A – Dec 2005 (Mixed mode)	5,018	1,255`	6,273
BAA Option A – Dec 2005 (Segregated mode)	0	0	0
BAA Option D – Dec 2005 (Segregated mode)	3,838	959	4,797
BAA Option A – Jan 2007 (Segregated mode)	3,960	1,047	5,007
BAA Option D – Jan 2007 (Segregated mode)	3,838	1,047	4,885
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	3,838	1,047	4,885
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	TBA	TBA	3,960

The preparatory works are priced at a rate of £5/m2. We consider this rate to be realistic for budget purposes.

The area for BAA Option A Dec 2005 is consistent with the land purchase area of 627.3 ha.

The area for option BAA Option D Dec 2005 is consistent with the land purchase area of 479.7 ha.

The areas for the 2007 options do not match the land purchase areas of 480.5, 466.0, 466.0 and 425.0 hectares noted in Section 4.4.11.

5.4.13 Site Management and Logistics

The site management and logistics costs for the options are:

Table 5.33 SG2 – Site Management and Logistics Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	63	49	112
BAA Option A – Dec 2005 (Segregated mode)	63	27	90
BAA Option D – Dec 2005 (Segregated mode)	62	25	87
BAA Option A – Jan 2007 (Segregated mode)	49	33	82
BAA Option D – Jan 2007 (Segregated mode)	50	39	89
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	52	39	91
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	53	34	87

This cost head has been priced based on 6% of forecast expenditure.

The scope of each option includes:

- Provision of site transport
- Staff car parking
- Site security
- Facilities management
- Waste management
- Environmental monitoring
- Plant and equipment
- Operation of logistics facilities

We have not received any BAA benchmark data to justify the percentage used which we consider, when taking on board the general levels of unit rates pricing throughout the options, may be high. This view seems to be shared by Currie and Brown in their report for IATA dated February 2006 although not specifically related to the development at Stansted they discuss base costs and project specific costs, which require further explanation. This is a difficult area to estimate and is likely to be the subject of further detailed analysis by BAA as the project develops.

5.4.14 Design and Project Management

The design and project management costs for the options are:

Table 5.34 SG2 – Design and Project Management Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	126	89	215
BAA Option A – Dec 2005 (Segregated mode)	127	49	156
BAA Option D – Dec 2005 (Segregated mode)	124	46	170
BAA Option A – Jan 2007 (Segregated mode)	98	66	164
BAA Option D – Jan 2007 (Segregated mode)	101	77	178
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	105	77`	182
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	105	68	173

The scope of each option includes:

- Architectural design
- Structural design
- Airfield design
- Services and infrastructure design
- Landscape design
- Commercial management
- Project management
- Product integration

For the purposes of the G2 cost assessment these are taken as a fixed percentage (12%) of total capital costs representing a total of £98m in Phase I and £66m in later Phases.

BAA have clarified that these costs are for the scope of works items post planning approval.

5.4.15 BAA Project and Other Costs

The BAA project and other costs for the options are:

Table 5.36 SG2 – BAA Project and Other Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	142	30	172
BAA Option A – Dec 2005 (Segregated mode)	142	16	158
BAA Option D – Dec 2005 (Segregated mode)	141	15	156
BAA Option A – Jan 2007 (Segregated mode)	143	22	165
BAA Option D – Jan 2007 (Segregated mode)	144	26	170
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	145	26	171
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	145	23	168

The scope of each option includes:

- Systems integration – linking with existing airport systems, at same level as T5
- Project costs – public enquiry and planning
- Central support

The cost for Systems Integration in each option is £20 million.

The cost for public enquiry and planning is £80 million for options A2005 and D2005. This increases to over £90 million for options A2007 and D2007.

We have been advised that this cost category covers all external consultancy fees associated with the detailed planning and design of the new G2 facilities and the related surface access improvements. These are employed in the following main categories:

- Airport Design and Civil Engineering
- Surface Access Modelling
- Environmental and Economic Impact Studies
- Airspace Design
- Legal, Planning and Financial

We have been provided with details of the expenditure to date, the key outputs and the consultants used which is summarised in Table 5.35 below.

Table 5.35 SG2 – Design and Project Management Expenditure

Category	Expenditure to date (as at 31 March 2008)
Airport Design and Civil Engineering	£9.1m
Surface Access Modelling and Design	£25.2m
Environmental and Economic Impact Studies	£11.1m
Legal, Planning and Other	£10.6m
Total	£56.1m

This assessment shows that some 57% of the expected external consultancy expenditure in Phase I has already been incurred.

We have endeavoured to assess whether this expenditure to date seems reasonable by reviewing some of the key reports produced. In the case of the airport design and civil engineering work, much of the expenditure involved the production of design drawings for the SG2 consultation and the subsequent Planning Application and BAA have pointed out to us that that the technical requirements for the Planning Application (including the Design and Access Statement) were very stringent. [✂]

Despite this we are of the view that the level of consultancy expenditure on surface access projects, which currently exceeds 15% of overall BAA expenditure and will undoubtedly increase further, is too high. Much of this appears to be due to detailed modelling work – the results of which are subject to the variability of the G2 air traffic forecasts, thereby negating much of the level of detail required. We also are concerned about the costs of the legal, planning, financial and other consultancy work undertaken to date (£10.8m) – which largely relate to the strategic approach to the G2 Planning Application and to issues raised by Judicial Reviews. This also seems high in view of the general level of work required at this stage, although we anticipate that this will increase due to the legal work required for a G2 Public Inquiry.

The cost for Central Support is based on 4% of forecast expenditure.

BAA has advised that this category shows the costs associated with the preparation of the G2 Planning Application and the conduct of the Planning Inquiry for the project. It includes the costs incurred in the study of the runway masterplan options, costs associated with preparing a planning application and the costs of taking the proposals through the planning system. The category also includes the costs of providing central coordination and management of the Phase 1 development. Central support costs would include:

- Managing the construction process
- Delivering cost-savings through the supply chain
- Operating a system of project controls
- Central IT services
- Project insurances

BAA has estimated the costs for central support as a fixed percentage – 4% of total capital costs. On this basis, the breakdown of SG2 Phase 1 costs in this category are:

- Costs to the end of the Planning Inquiry - £90m
- Systems integration - £20m
- Central support (4%) - £33m

This represents a total Phase 1 expenditure of £143m. In later Phases, the costs represent just the central support component and total £22m.

5.4.16 Construction Efficiency Factor

The construction efficiency factor costs for the options are:

Table 5.37 SG2 – Construction Efficiency Factor – Cost Reductions by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m
BAA Option A – Dec 2005 (Mixed mode)	-64	-44	-108
BAA Option A – Dec 2005 (Segregated mode)	-64	-24	-88
BAA Option D – Dec 2005 (Segregated mode)	-63	-23	-86
BAA Option A – Jan 2007 (Segregated mode)	-50	-33	-83
BAA Option D – Jan 2007 (Segregated mode)	-52	-38	-90
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	-54	-38	-92
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	-50	-37	-87

BAA have applied a percentage of circa 5% to each of the options to target savings in the total project costs.

Whilst this is a reasonable target to set there are no specific areas against which these savings are expected to be achieved.

5.4.17 Risk Allowance

The risk allowance costs for the options are:

Table 5.38 SG2 – Risk Allowance Costs by Option

Option	Phase 1 £m	Later Phases £m	Total G2 £m

BAA Option A – Dec 2005 (Mixed mode)	209	118	327
BAA Option A – Dec 2005 (Segregated mode)	211	65	276
BAA Option D – Dec 2005 (Segregated mode)	216	63	279
BAA Option A – Jan 2007 (Segregated mode)	166	90	256
BAA Option D – Jan 2007 (Segregated mode)	174	102	276
SACC/BAA Option D – Jan 2007 (Segregated mode – 595m stagger)	180	102	282
SACC Option D – Jan 2007 (Segregated mode – 595m stagger and revised T2 location)	196	73	269

BAA have applied 13.7% of project costs to each of the options to create a risk allowance.

Whilst we acknowledge that a risk allowance should be included in project budgets we consider that, given the broad nature of the estimates and the fact that substantial parts of the budgets are based on target costs per m2, the percentage included by BAA is at the high end of the allowance which could be included at this stage.

We have not seen evidence of a risk register or risk based approach to calculating the 13.7% allowance. Whilst there are no “norms” for risk percentages we have calculated a low end of the scale risk allowance for inclusion in the “minimum cost” option of 7.5%.

The calculation[26] of these percentages is shown below in Table 5.39 below:

Table 5.39 Consultant’s ‘Minimum Cost’ Option Calculation of Risk Allowance (%)

Facility	Maximum	Minimum
Terminal	2.5%	5%
Piers and satellites	2.5%	5%
Baggage system	2.5%	5%
Runway and airfield	10%	20%
Airfield infrastructure	10%	20%
Car parks	5%	10%
Airport roads	10%	20%
Public transport facilities	10%	20%
Other Landside facilties	10%	20%
Utilities	15%	30%
Site acquisition and blight	10%	20%
Site clearance and preparation	10%	20%
Design and project management	8%	5%
BAA project and other costs	8%	5%

We consider that a risk allowance is an overall figure to be included in estimates to cater for both generic and specific project risks. This proposed development given its scale and nature certainly carries inherent risk which could be identified, documented and managed by implementing a formal risk management process.

[26] The figures relate to the percentages applied for risk allowance. They represent the range of cost expected against each of the cost headings based on our assessment of the confidence level of delivering that particular element of the project within the cost stated in either the BAA Option or the "minimum cost" option.

Our view is that contingency is or should be included in the rates allowed against each of the specific work items identified as part of the total investment costs proposed by BAA and should not be combined with or linked to the risk allowance.

In later phases, BAA has included a £45.0m additional allowance for 'live working' whilst the G2 scheme is in operation. We do not believe that this level of expenditure is justified and that adjustments could be made to both the G2 and G1 operations to defray most of this additional expenditure. For the purposes of the 'minimum cost' option, any additional costs are assumed to be absorbed into our overall risk allowance.

5.5 Summary of Total Capital Costs by Option

A summary of the total capital costs by option is provided in Table 5.1 in Section 5.2.

5.6 High Level Benchmarks with Other Airport Developments

We have carried out a high level benchmarking of the costs of the proposed SG2 terminal buildings with terminal building costs from other airport developments.

The benchmarking has to be carried out at cost per m2 level as BAA do not currently have any further information in respect of the buildings to be constructed as part of SG2. The design development has not progressed but a simple cost allowance is included in the overall cost of investment.

BAA's "Stansted Generation 2: December 2005 Consultation" states on page 53 in paragraph 6 that "the unit cost of £2,300/m2 for terminal space is based on a provisional assumption that new terminal facilities would be of broadly the same quality as the existing terminal. As we explain in Section D, we would like to hold further discussions with the airlines on this subject".

The Options considered and completed in January 2007 reduce the unit cost included in the investment proposal for the terminal to £2,200/m2 (excluding baggage handling costs).

Our own terminal benchmarking indicates that a terminal for Stansted SG2 might be expected to be delivered in the range of £2,100 to £2,400/m2 (including baggage handling costs). This is designated as follows:

- Stansted options are coded in red
- BAA airport data is coded in yellow
- Other airports are coded in blue
- Airports 1-4 are 'low cost' regional smaller airports
- Airports 5-8 are of 'international hub status'

For the purposes of this study and report we intend to use an average rate between these options at £2,250/m2 (including baggage handling costs) and have split the costs from our benchmark data at £1,875/m2 for the terminal building and £375/m2 for the baggage handling system.

5.7 Minimum Cost Option

We have been asked to briefly consider an alternative minimum cost option by applying benchmarking data and strategic technical knowledge to suggest an alternative cost target to

the Competition Commission which may be used as a target for producing a lower cost development for Stansted Generation 2.

This alternative can only be considered in light of the limited time our team has had to consider this particular aspect of the study when compared to the substantial amount of time, cost and effort applied by BAA and its consultant team during the course of their development of the options for development of Stansted Generation 2 over a number of years.

The figures can therefore only act as an indicator for discussion in setting a lower threshold for investment. If it is the intention that the figures are to be used for any significant purpose we recommend further work is carried out by or on behalf of the Competition Commission to further consider what options to reduce costs are available to BAA in discussion with its customers.

Our minimum cost option shows where reductions in quality, space or reduced build costs could represent a value engineering approach with a lower quality and level of service terminal and development as a product which is likely to involve passengers in queuing and walking unaided some considerable distances.

In order to complete this brief exercise we have taken the figures provided for BAA Option A (segregated mode) January 2007 and taken a view on quantities and rates to arrive at a minimum cost option. We are fully aware that our assumptions in some cases may not be realistic but may allow the Competition Commission to enter into debate with BAA with a view to reducing total investment costs. We have seen evidence during the course of this study that BAA is already moving in the direction of seriously considering its investment options for Stansted with for example the production of a “low cost terminal design presentation”.

The costs reductions achieved under our ‘Minimum Cost’ option as are summarised in Table 5.39.

Table 5.39 Consultant’s ‘Minimum Cost’ Option v BAA Option A (SM) – Jan 2007 (Q2 2006 prices)

(£m – 2005 prices)	BAA Option A (SM)	Minimum Cost' Option	% Variance
Terminal	248.7	194.8	-21.7%
Pier/ Satellite	265.4	191.8	-27.7%
Baggage	37.3	34.8	-6.5%
Runway & Airfield	339.5	295.9	-12.9%
Airfield Infrastructure	101.9	90	-11.6%
Car Parks	103	92.1	-10.6%
Airport Roads	244.3	227.7	-6.8%
Public transport facilities	15.9	15.1	-5.0%
Other landside infrastructure	34.8	32.1	-7.7%
Utilities	100.9	95.6	-5.2%
Sub-total 1	1,491.70	1,269.90	-14.9%
Site acquisition & blight	110.2	99.3	-9.9%
Site clearance & preparation	45	37.6	-16.4%
Site management & logistics	89.5	63.5	-29.1%
Design & project management	179	127	-29.1%
BAA project & other costs	169.8	120.4	-29.1%
Sub-total 2	2,085.20	1,717.70	-17.6%
Construction efficiency factor	-90.3	-	-100.0%
Sub-total 3	1,994.90	1,717.70	-13.9%
Risk	273.7	128.8	-52.9%
Total	2,268.60	1,846.50	-19.7%

This alternative minimum cost option indicates that a total investment of circa £1.8 billion representing a 19% cost reduction may be achievable if the assumptions made in producing the figures are correct. These figures, however, assume that the full capacity throughput of 68 mppa is achieved by 2030. In our view, this may not be achieved. Based on terminal and

other airport infrastructure provision for our forecasted ‘most likely’ throughput of about 58 mppa by 2030, we would anticipate that this figure might be reduced to around £1.6 billion with the balance of the investment required (essentially additional terminal and pier provision and related on-costs for the full G1 capacity) incurred after this date.

6 Conclusions

We have made a detailed appraisal of the G2 project at London Stansted Airport in terms of the likely traffic levels, the most favourable masterplan layout and the potential costs of each masterplan option. Whilst there are still some gaps in our analysis, we feel confident that we can draw some tentative conclusions, although we have not carried out a detailed appraisal of the financial viability of the G2 scheme in the light of possible changes to the forecasted traffic levels or costs.

6.1 Traffic Forecasts

We have examined BAA's traffic forecasting modelling methodology and its output in terms of the G2 traffic forecasts submitted with the Planning Application made in March 2008 and the subsequent internal review carried out in April 2008.

We are not as optimistic as BAA in terms of both passenger and cargo growth rates at Stansted, particularly in the period to 2015. Passenger traffic at Stansted has declined by some 4.6% for the first half of this year due to a combination of rising air fares through high oil prices and increased APD and the present economic climate. Further declines can be anticipated for the reminder of 2008 and in 2009 due to the expected grounding of Ryanair aircraft and other capacity reductions. Cargo traffic declined by 9.2% in 2007 although it has remained static in 2008. In the light of these changes, BAA revised its G1 forecasts for the 2008 CIP, although no adjustment has been made to its projected G2 forecast of 38 mppa by 2015.

Whilst current market fluctuations should not necessarily be indicative of longer-term trends, it seems unlikely that there will be any long-term decline in real air fares due to the impact of higher fuel costs, APD and environmental charges such as the EU Emissions Trading Scheme. Our 'most likely' case forecasts, which are based on a combination both BAA and DfT's forecasts, with adjustments where appropriate, suggest that passenger throughput at Stansted at 2015 will be approximately 30.2 mppa, with the G2 'trigger point' of 35 mppa attained in around 2017/2018. By 2030, we project that Stansted will be handling around 58 mppa.

We are rather pessimistic about the possible growth of long-haul and cargo traffic at the airport and there is little evidence to support BAA's projected passenger growth rate of 7.9% pa over the G2 period and its cargo growth rate of 15.6% pa to 2015. There is a history of long-haul failures at Stansted which suggests that it may not have the appropriate 'image' for this type of traffic, particularly for overseas-originating passengers. In the case of cargo, we believe that there is some scope for growth due to a lack of slots at other London airports, but many cargo operators prefer non-London airports for distribution purposes.

We understand that BAA are reserving the right to update their forecasts nearer the date of the likely Public Inquiry for the G2 scheme. BAA would have to be able to justify its case for G2 should Stansted traffic levels still be in decline at the time of the inquiry.

6.2 Preferred masterplan layout option

We have examined the advantages and disadvantages of BAA's preferred option, Option D in segregated mode, BAA's Option D and two varients of Option D proposed by SACC.

Whilst we were concerned about the limited interaction between BAA and SACC in the appraisal and choice of masterplan layout and the fact that the costs of SACC's proposed options were not fully accurate, we are of the view that BAA's Option A (a wide spaced parallel runway system) with the second terminal located some 600m to the east of the present terminal and rail station is the most favourable layout. This option provides the best operational performance in terms of taxiing times and is probably marginally less expensive (BAA estimate that Option A will cost some £25m less than Option D although this is reduced to some £8m if the impact of the legal commitment to honour the blight scheme resulting from the Government White Paper on Air Transport is removed).

In terms of terminal location, we have examined SACC's proposals to site this to the south west of the existing terminal, but we see no merit in this as it would require a bussing operation from the rail station and there would only be sufficient apron space for a facility of around 22-23 rather than 33 mppa. Furthermore, aircraft taxiing times are increased at this location. Similar considerations apply for other terminal locations such as the 'Northside' area to the west of the airfield.

We have examined the possibility that the second terminal should be a dedicated low cost facility, although BAA has not committed itself to the type of terminal to be provided. We have looked at other low cost terminal facilities at other airports, although these generally cater for lower capacities (up to 15 mppa) than that proposed by BAA (33 mppa). It is possible that more than one additional terminal might be provided, although this would be expected to increase capital costs.

We recognise that SACC feel that the second terminal should be built and operated through competitive tendering. We recognise that this may lead to cost efficiencies although it is unclear how the regulatory process would work in these circumstances. BAA intend to provide a terminal capacity of 10 mppa at Phase 1 which would suggest that other airlines, rather than Stansted largest carrier, Ryanair (who already handle some 16 mppa at the airport), are likely to move to the new facility.

6.3 Capital costs

We have reviewed the capital costs for the main options and we conclude that BAA's Option A (in segregated mode) is probably the least cost masterplan layout although there are some slight anomalies in BAA's costings, particularly for the SACC variants. In any event, any minor differences in the costs between each option are not material in comparison to the technical considerations.

We believe that there are potentially several areas in which cost savings could be achieved for BAA preferred Option A layout. Our benchmarking of terminal costs suggests that a new low cost (or predominantly low cost) terminal might be delivered for around £1,875 per sq m (excluding baggage system costs) in comparison to BAA's figure of £2,200 per sq m. Similar savings can be made for pier and satellite costs. Further reductions may be achievable in site management and logistical, design and project management and BAA project and other costs. It might also be anticipated that some cost-savings might be achieved at the procurement stage, although there would appear to be little incentive under the present regulatory system for this to be achieved.

The cost of the G2 scheme will ultimately depend on the level of specification of the facilities provided. Our assessment suggests that a suitable scheme in line with the requirements of

most current airport users could be delivered for around £1.8 billion based on the full provision of 68 mppa airport capacity at 2030. Should, however, the costs be based on the provision of capacity to support our projected throughput of 58 mppa at 2030, then these costs would be reduced to around £1.6 billion, with the balance incurred after this date.