Employment and Economic Assessment

Version 1

London Luton Airport Planning Application

London Luton Airport Operations Limited

December 2012

Halcrow

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Document history

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This document has been issued and amended as follows:

Version	Date	Description	Created by	Verified by	Approved by
1	21/11/12	Draft Employment Chapter	Roz Davies	Ken Lam	Andrew Price
2	07/12/12	Draft Employment and Economic Assessment Report	Roz Davies	Employment Assessment: Ken Lam Economic Assessment: Karan Monga	Andrew Price
	11/12/12	Final Employment and Economic Assessment Report	Roz Davies	Employment Assessment: Ken Lam Economic Assessment: Karan Monga	Andrew Price

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Appendix

1   Executive Summary

This report is an employment and economic assessment of London Luton Airport Operations Limited's (LLAOL) proposals to make improvements to London Luton Airport (the Airport) in order to facilitate its growth. The assessment supports a planning application and environmental impact assessment which LLOAL is submitting to Luton Borough Council (LBC). The proposed improvements to the Airport will cater for future air passenger growth from the current 9.45 million passengers per annum (mppa) to 17.8 mppa by 2028. This will be achieved without expanding the existing area of the Airport and will involve road access, terminal, and aircraft manoeuvring and parking improvements.

1.1   Report Structure

1.1.1   Background chapters

The report provides background to the employment and economic assessment of the planning application by presenting:

- a summary of the key developments that are proposed in the planning application;
- the national and local level policy context in relation to infrastructure and aviation within which the Airport needs to operate; and
- the current socio-economic conditions of Luton and the wider area that the Airport impacts upon.

1.1.2   Employment and economic assessments

The report presents the current (2011) level of employment at the Airport at 9.5 million passengers per annum (mppa), and the forecasts for employment for two future scenarios – the base case and the development case:

Base case: this assumes that passenger growth at the Airport will grow from 9.5 mppa to reach capacity of 12.4 mppa by 2018 and remain at that level until 2028 with no planned future developments.

Development case: this assumes that passenger growth at the Airport will grow to 17.8 mppa by 2028 enabled by the developments planned by LLAOL.

The employment estimates are presented as gross direct, indirect and induced employment.

These forecasts are used to inform a second stage of the assessment which identifies the economic impact of the Airport. This assessment is also presented for the present day, the base case scenario and the development case scenario.

1.1.2.1   The employment assessment

The employment assessment involved the preparation of an econometric analysis of factors that affect employment growth across Luton and similar airports in the UK.

The first phase of the employment modelling was to identify the key factors (i.e. the explanatory variables) that determine the growth of employment (i.e. the dependent variable), at airports that are of a similar type and size to London Luton. This

involved analysing time series across seven UK based airports, a process called panel data regression analysis. This analysis was used to develop an econometric function that represents the key factors that are statistically significant in influencing direct employment at these airports.

The second phase was to use the function in a forecasting model to project gross direct employment at London Luton Airport in 2028 in the base case (12.4 mppa) and development case (17.8 mppa) scenarios. Once the direct forecasts were prepared, estimates for indirect and induced employment were made, based on HM Treasury Green Book guidance, Department for Business Innovation and Skills (BIS) supporting research, and English Partnerships guidance on Additionality.

The current level of direct employment at the Airport is estimated to be 8,250 jobs, with an additional 2,700 jobs generated through supply chain and induced income effects on the local economy, defined in this report as the Core Impact Area.

The results of the modelling show that if the Airport grew to the maximum base case position of 12.4 mppa in 2028 there would be approximately 11,050 jobs directly generated by the Airport with an additional 3,650[1] jobs generated through the supply chain and induced income effects.

If the planned developments took place and the Airport grew to 17.8 mppa, the direct employment generated at the Airport will be approximately 13,350 with a further 4,400 jobs generated through the supply chain and induced income effects.

The total number of direct jobs that can be attributed to the planned development is estimated by subtracting the base case estimate from the development case estimate. A total of 2,300 direct jobs would be attributable to the planned developments and a further 750 through the supply chain.

1.1.2.2 The economic impact assessment

The economic value of the Airport in the current, base case and development case scenarios has been modelled based on two key effects that arise from the operation of the Airport. The first is the level of direct income injected into the local economy. The second is the level of government taxation revenues generated by the Airport.

The direct income injection into the local economy arising from the operation of the Airport has been based on three components:

- the wages of direct onsite and offsite workers;

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[1] Employment estimates/forecasts rounded to nearest 50 jobs

- local income arising from direct business expenditure on goods and services; and
- business profits that are likely to be invested back into the local economy.

The level of government taxation revenue associated with the Airport includes proceeds for central government such as business and personal taxes on the income generated by firms and workers and Air Passenger Duty; it also includes income generated for local government through business rates received from firms operating within the Airport boundary.

Impact of direct income in the local economy

The total income injection from the current operation of the Airport into the local economy is approximately £790[2] million in 2012 prices, of which approximately £200 million is a result of supply chain and induced income multiplier effects.

If the planned developments did not go ahead and the Airport growth was constrained to the base case scenario of 12.4 mppa, the annual income injected into the local economy by the Airport would be approximately £1.08 billion of which £270 million would be a result of supply chain and induced income effects.

If the Airport grows to 17.8 mppa by 2028 as planned, it would inject an annual income of £1.30 billion in 2028 into the Core Impact Area (including supply chain and induced income effects). Of this approximately £220 million would be attributable to the planned developments. The drivers of this increase would be from the wages and salaries of the increased number of workers, and the increase in business expenditure and profits.

Impact on government revenues

The current government revenues generated by the Airport are £220 million. These include business and personal taxes on income, business rates and Air Passenger Duty.

If the Airport grew in the base case scenario to 12.4 mppa, government revenues generated in 2028 would be £280 million.

If the Airport grew to 17.8 mppa by 2028 government revenues generated by the Airport would reach approximately £360 million, of which approximately £80 million would be attributable to the growth associated with the project. This is based on taxes paid by passengers and businesses to central government and business rates paid to local government.

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[2] Economic estimates/forecasts rounded to nearest £10 million

Total Economic Impact

Combining the figure for income injection into the local economy with the government revenues produces an estimate of the overall economic value of the Airport. The current economic value is approximately £1 billion. This is expected to grow to £1.4 billion in the base case scenario of 12.4 mppa in 2028. If the proposed developments went ahead and the Airport grew to 17.8 mppa, the economic value would be £1.7 billion. Therefore £300 million would be attributable to the growth planned in the proposals.

2   Introduction

Halcrow Group Ltd has been commissioned by London Luton Airport Operations Ltd (LLAOL) to prepare an employment and economic assessment of proposals to make improvements to London Luton Airport (the Airport) in order to facilitate its growth as part of a planning application and environmental impact assessment.

LLAOL is proposing to develop the Airport to cater for a projected increase in air passenger numbers from approximately 9.5 million passengers per annum (mppa) today to 17.8 mppa by 2028[3]. The aim of the proposal is to achieve this level of growth by maximising the use of existing infrastructure at the Airport. The key components of the proposal are improvements to the Airport's:

- Dualling of the road from the Holiday Inn roundabout to the Central Terminal Area
- Improvements to the public transport hub adjacent to the terminal
- Construction of a multi-storey car park and pedestrian link on the western side of the existing Short Term Car Park (STCP)
- Extension to the Mid Term Car Park (MTCP) and Long Term Car Park (LTCP)
- Improvements to the terminal building involving internal reorganisation and minor extensions and building works
- Construction of a new pier (Pier B)
- Construction of a new taxiway parallel to Taxiway Delta
- Taxiway extensions and rationalisation of aircraft parking areas with new stands replacing and improving existing stands.

This report presents the current employment and economic value generated by the Airport. It also presents the results of forecast modelling for future employment and the economic impact of the Airport for two scenarios:

- Base case: if the planned developments are not implemented, passenger numbers at London Luton Airport are expected to grow to 12.4 mppa by 2018 and remain at that level until 2028; and
- Development case: the developments planned by LLAOL enable passenger numbers to grow at the Airport to 17.8 mppa by 2028.

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[3] Civil Aviation Authority (2012): UK Airport Statistics 2012 -02. Table 1: Size of UK airports March 2011 -

February 2012. http://www.caa.co.uk/docs/80/airport_data/201202/Table_01_Size_of_UK_Airports.pdf

The report consists of ten chapters. After the Executive Summary and an introduction to the report in Chapter 2, Chapter 3 presents the background to the assessment and provides a description of the proposed improvements to the Airport.

Chapter 4 establishes the policy background for the proposed improvements. It reviews national and local level policies in relation to infrastructure and aviation in order to identify the extent to which these support the planned development at the Airport.

Chapter 5 presents a review of key socio-economic indicators for Luton and the wider area.

Chapter 6 presents the employment generated by the Airport in 2011, and forecasts of how this will change under the two scenarios.

Chapters 7 and 8 present the economic value of the Airport to the local economy in 2011 and an assessment of how that will change under the two scenarios.

Chapter 9 includes a qualitative assessment of the proposals.

The report's conclusions are set out in Chapter 10.

Annexes include a table showing the sources of data used in the assessment (Annex A), relevant references to other documents (Annex B), a technical annex on the employment modelling (Annex C) and a glossary of terms (Annex D).

3   **Background to the Assessment**

3.1   **Introduction**

This chapter provides background to, and a brief overview of, LLAOL's proposals for improvements at the Airport.

The demand for air travel at UK airports is expected to grow strongly over the next twenty years. In August 2011 the Department for Transport (DfT) published air travel demand forecasts projecting that air passenger numbers at London's airports will grow from 125mppa in 2010 to 180mppa by 2030[4]. Within this growth the Airport is projected to grow under a constrained growth scenario from 9.5 mppa today to 12.4 mppa by 2018 and continue operating at this capacity thereafter.

An employment study was conducted by Halcrow and PACEC in 2004 on the employment and housing implications of an extended or replacement runway at the Airport. A model was produced for this by PACEC to assess the impact of increased Airport passenger traffic on employment. This model is now over 8 years old and the assumptions and data need to be updated. Consequently Halcrow was asked by LLAOL to prepare a new model to forecast future employment at the Airport using the most up to date and reliable data.

In addition to forecasting employment, the economic impact of the projected growth at the Airport needs to be assessed. Such assessments have previously been carried out by Halcrow to inform economic impact assessments in 2006, 2010 and May 2012 using an Excel-based economic assessment model. This model has been updated with the most up to date data including the new employment forecasts and relevant assumptions to ensure that the economic assessment is robust.

3.2   **The LLAOL Master Plan Proposal**

LLAOL has published proposals to expand the capacity of the Airport over the next nineteen years until 2031, which is the last year of contract to operate the Airport. It has estimated that the Airport will have reached 17.8 mppa by this point. The proposals for improvements that would facilitate this growth are set out in full within

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[4] Department for Transport (2011): UK Aviation Forecasts 2011. London's airports include Heathrow,

Gatwick, Stansted, Luton and London City airports. http://www.dft.gov.uk/publications/uk-aviation-

forecasts-2011/

the Planning Supporting Statement. LLAOL's Masterplan document was published for public consultation in August 2012[5]. The Masterplan constitutes part of the pre-application planning engagement that was undertaken by LLAOL prior to the submission of its planning application in November 2012

The objective of the proposals is to enable an increase in passenger numbers by maximising the use of space within the existing boundary of the Airport. As set out in Chapter 2, LLAOL is proposing to do this through improvements to the Airport's access road, existing terminal building and the taxiway and aircraft stands. The percentage increase in passenger numbers due to these improvements is expected to be higher than the percentage increase in air traffic movements, reflecting the Airport's aim to make more efficient use of the runway taxiway and apron space by encouraging the use of bigger aircraft.

A map of the proposed improvements, with a red line showing the Airport boundary, is presented in Figure 3.1.

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[5] London Luton Airport Operations Limited (September 2012): Revised Masterplan Document Consultation Prior to Submission of Planning Application London's Local Airport

Figure 3.1 Map of proposed developments at the London Luton Airport site
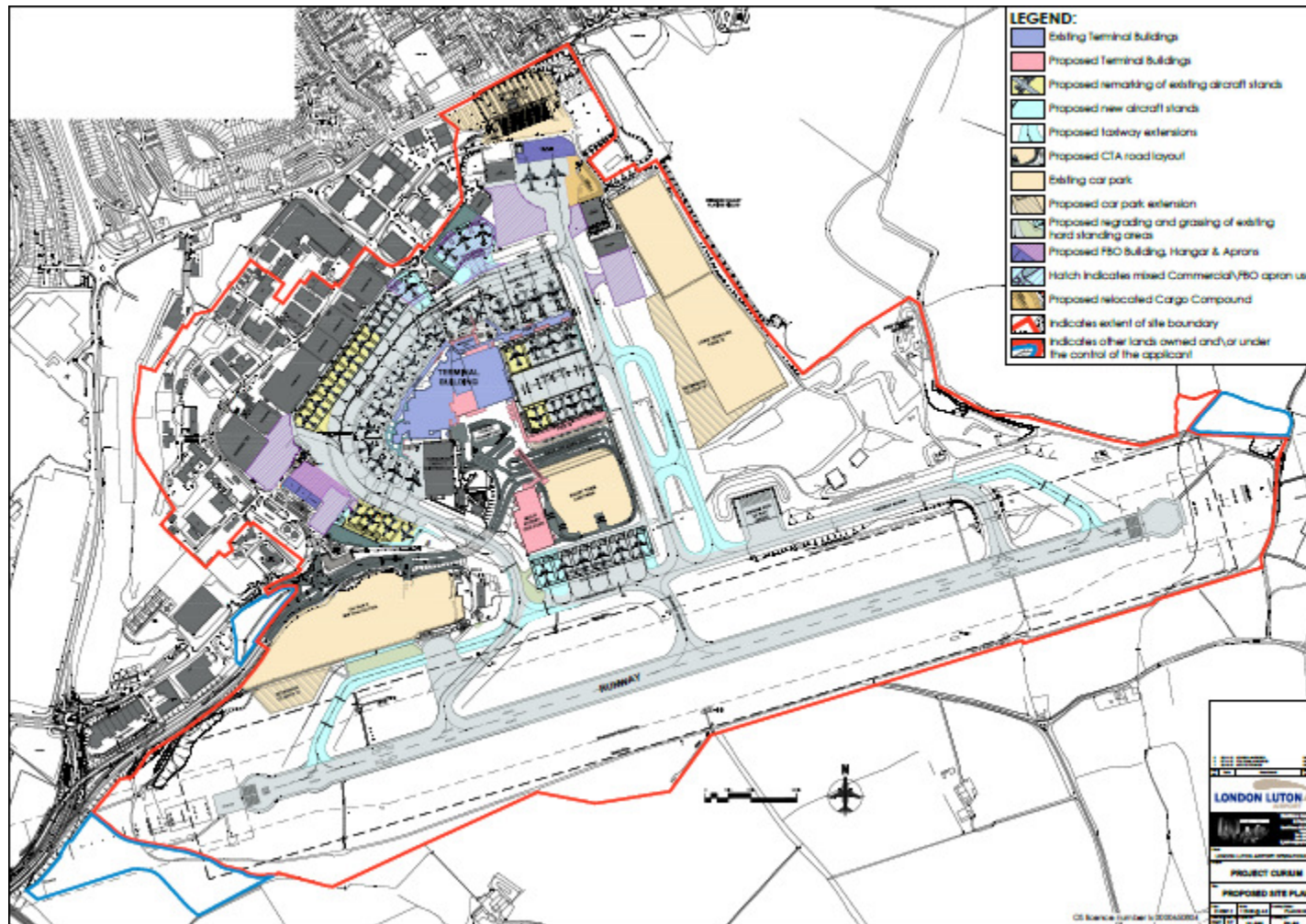
Source: LLAOL (Sept 2012) Revised Masterplan Consultation Document

3.2.1 Access road improvements and car parking

This involves dualling the section of Airport Way from the Holiday Inn Roundabout to the Central Terminal Area. The improvement will cater for the additional flows on the road network around the Airport which will occur as a result of the proposed development. Additional car parking is proposed within the Airport estate.

3.2.2 Terminal building improvements

The improvements to the Airport's terminal building will increase its capacity and enhance customer experience. The first significant improvement will be the construction of a two storey infill extension at the front of the building creating 5,300 square meters of additional space. The second significant development will be the construction of a new pier for aircraft boarding and disembarking providing 7,000 sq m of additional space.

3.2.3 Aircraft manoeuvring and parking improvements

The improvements to the aircraft manoeuvring and parking areas include creating new and extended parallel taxiways (which will require new operational processes), modifications to the existing aircraft parking apron areas and the provision of fifteen new stands. The South and West Aprons will be extended and additional strips of hardstanding will be provided.

4   Policy Review

4.1   Introduction

This chapter reviews relevant policy developments at national and local levels in order to provide the policy context for this employment and economic assessment of the proposed improvements to the Airport. The relevant policies and strategies that have been reviewed include:

- National policies - the Coalition Government's Programme for Government, the Plan for Growth; public expenditure plans; the National Infrastructure Plan; and policies for aviation and land use planning; and
- Local policies - the South East Midlands Local Enterprise Partnership Draft Business Plan, the Bedfordshire and Luton Joint Economic Development Strategy, the Luton Plan, the Luton Regeneration Strategy, and the Luton Local Transport Plan.

The proposals have been published in the midst of the deepest economic recession in recent times and at a time of significant change in policy formulation. Large areas of policy are being reviewed and revised by the government including: national aviation policy; the devolution of powers from the regions to the local level (as evidenced by the abolition of the Regional Development Agencies, the withdrawal of regional spatial and economic strategies and implementation of the Localism Act); and the introduction of a more streamlined National Planning Policy Framework (NPPF).

4.2   National Policy

Coalition's Programme for Government

When the Coalition Government came into power in 2010 it was faced with the worst financial and economic crisis in the UK's recent history. In response to this the government set out ambitions plans for recovery in 'Our Programme for Government'. In that document, the government identified the need to tackle the public sector deficit and ensure economic recovery as the most urgent issues facing Britain. It aimed to reduce the structural deficit over the course of this parliament through a mix of reduced public spending and tax increases. The Government immediately announced spending cuts of £6 billion to non-frontline services in 2010/11 in an emergency Budget and set up an Office of Budgetary Responsibility to produce independent economic forecasts. In addition it set out plans to reform the banking and regulatory system and support business growth through reduced regulation. Further spending cuts for later years (2011/12 to 2014/15) were announced in Spending Review 2010. Subsequent Budgets and Autumn Statements in 2011 and 2012 have confirmed the Government's commitment to its austerity programme. The Programme for Government also confirmed the cancellation of a third runway at Heathrow and ruled out new runways at Gatwick and Stansted.

The Coalition's Programme for Government is relevant for this employment and economic assessment in that it provides the highest level policy framework within which there is a need to encourage developments that support economic growth, such as the proposed improvements to the Airport.

The Plan for Growth

Early in 2011 HM Treasury and the Department for Business, Innovation and Skills set out a plan for bringing the economy back on a path of sustainable growth in the Plan for Growth. This document was published at the same time as the 2011 Budget and supports the aims set out in the Programme for Government document. The ambitions of the government are to create a better environment in the UK to encourage business and investment. In particular:

- to create the most competitive tax system in the G20;
- to make the UK one of the best places in Europe to start, finance and grow a business;
- to encourage investment and exports as a route to a more balanced economy; and
- to create a more educated workforce that is the most flexible in Europe.

The Plan for Growth recognises the need for improvements to the nation's infrastructure in order to facilitate growth in the economy. The government has identified £200 billion of public and private infrastructure funding over the next five years. The government also aims to radically change the planning system, with the goal of making it easier for developments to get through the planning process including the fast tracking of major infrastructure projects. The new NPPF, published in and implemented from March 2012, requires that planning applications should be considered with a presumption in favour of sustainable development.

The government also aims to encourage investment to help businesses and to do this the Plan proposes to establish Enterprise Zones and Local Enterprise Partnerships.

The 'Plan for Growth' is relevant to this impact assessment because it provides the economic growth context as to why infrastructure improvements, such as those at the Airport, are needed.

Draft Aviation Policy Framework

The Coalition Government's aviation policy has changed significantly since it came to power in 2010 from its initial position of making better use of existing airports and no expansion in the South East. Following an earlier consultation in 2011, the Government published a second consultation in July 2012 on a new sustainable aviation framework within which it would develop future aviation policies. This included its views on how to reduce the environmental impact of aviation and promote the role of regional airports. These consultations were issued in the context

of DfT's 2011 Aviation Forecasts which reflected the impact of the economic downturn on the demand for aviation and the impact of the Coalition's moratorium on runway expansion at Heathrow, Gatwick and Stansted. Compared to DfT's 2009 Aviation Forecasts, the new aviation forecasts projected lower levels of passenger growth, much of which would be spread around the UK at regional airports. In the central case, which reflected a constrained growth scenario, the number of UK air passengers is forecast to recover from 211 mppa in 2010 to 335 mppa in 2030 and 470 mppa by 2050. In this scenario the three largest London airports would be at capacity by 2030.[6]

However, in the 2011 Autumn Statement the Government recognised the importance to the economy of international connectivity and the need to address the constraint on hub airport capacity. As a result in September 2012 the Government asked Sir Howard Davies to chair an independent Airports Commission tasked with identifying and recommending to Government options for maintaining the UK's status as an international hub for aviation. That Commission will report in 2015.

National Infrastructure Plan

As set out in the 'Plan for Growth', infrastructure is viewed by the government as critical for supporting economic and social sustainability. The first National Infrastructure Plan (NIP) was launched in October 2010 alongside Spending Review 2010. Updates of the NIP were published alongside the Autumn Statements in November 2011 and December 2012.

The NIP includes proposals to develop a new strategy for coordinating public and private investment in infrastructure and to increase infrastructure spending through public and private sources.

In the 2011 NIP update the government expanded on its aims to increase infrastructure spending, estimating that over £250 billion is planned for infrastructure to 2015, two thirds of which will come from the private sector. This is £50 billion more than they stated in the Plan for Growth document. The estimate of infrastructure spending was further increased in £330 billion in the 2012 NIP update. The government aims to bring in new investors and explore new ways to finance projects. It also aims to give local authorities more flexibility to support projects. The NIP includes a consideration of the aviation sector.

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[6] This level of growth for London's three main airports is much lower than that projected in DfT's 2009 Aviation Forecasts which projected a 70mppa capacity shortfall for London's airports by 2030.

In the 2011 NIP the government confirmed its support for private investment by confirming that it planned to sign a Memorandum of Understanding with two groups of UK pension funds, and was working with the Association of British Insurers to set up an insurer's infrastructure investment forum. These two initiatives will secure £20 billion from the private sector.

In what is widely seen as a reversal of policy, the 2011 NIP included a commitment that the UK should retain its aviation hub status and in his Budget 2012 speech the Chancellor announced that the government will set out its thinking on this issue in the summer. The Government has confirmed that it plans to announce its new aviation policy framework in March 2013.

The 2011 NIP also presented an overview of the performance of UK infrastructure. It shows that aviation is the one area where performance has decreased since 2005 in terms of capacity, access and availability, service quality and reliability. Heathrow is now operating at near full capacity and over 80% of London's airport runway capacity (including London Luton Airport) was utilised in 2010, although runway capacity utilisation in the rest of the country was 30%.

In terms of London Luton Airport, the 2011 NIP states that it was operating at 53% of its capacity in 2010. It also presumes that the Airport could handle 12 mppa by 2030 and 17 mppa in 2050 under a constrained growth scenario. LLAOL's proposed developments to the Airport would enable the Airport to reach DfT's projected level of constrained growth by 2028.

The 2011 NIP also looks at the role of the rail network and, of relevance to London Luton Airport, states that the government will continue to implement the Thameslink programme to tackle overcrowding. This will include improving connectivity to Gatwick and London Luton Airports.

The NIP is relevant for this impact assessment because it sets out the policy framework and programme for UK infrastructure improvements such as those proposed at the Airport.

National Planning Policy Framework (NPPF)

The NPPF, published in March 2012 by the Communities and Local Government Department, sets out new guidelines for planning in the UK. It envisions a planning system that supports growth and new development, rather than acting as a hindrance, and includes a presumption in favour of sustainable development. Sustainable development is viewed in the framework as having three core elements which are:

- Economic - contributing to building a strong, responsive and competitive economy;
- Social - supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and
- Environmental - contributing to protecting and enhancing our natural, built and historic environment.

Local Plans will be the main documents that will guide decision making on whether to grant permission for developments. Where a Plan is absent there will be a

presumption that applications should be granted unless any adverse impacts outweigh the benefits.

The environment is heavily referred to in the framework. The Greenbelt will continue to be protected and proposed developments should contribute to conserving and enhancing the natural environment and reducing pollution.

4.3   Local Policy

At the local level policy is currently being realigned with the national level changes. The 2010 Local Growth White Paper set out a new approach to stimulating local economic growth, shifting power away from central government to local communities, citizens and independent providers. The focus is on recognising that where drivers of growth are local, decisions should be made locally. The Government plans to:

- shift power to local communities and business, enabling places to tailor their approach to local circumstances;
- promote efficient and dynamic markets, in particular in the supply of land, and provide real and significant incentives for places that go for growth; and
- support investment in places and people to tackle the barriers to growth.

The approach to local growth includes the abolition of Regional Development Agencies, the establishment of the first phase of 24 local enterprise partnerships and an increase in the size of the Regional Growth Fund.

Luton Borough Council (LBC) is now part of the South East Midlands Local Enterprise Partnership which is designed to encourage business growth. LBC is also currently preparing a new Luton Plan which will replace previous strategies as the key planning document for the area.

South East Midlands Local Enterprise Partnership (LEP) Draft Business Plan (2012-2013)

Following the abolition of the South East England Development Agency, the South East Midlands LEP was set up in 2011 as a partnership between the public and private sectors in order to promote the South East Midlands as a location for business and investment. The LEP covers ten borough and district authorities across the South East including LBC. The LEP's vision for the South East Midlands is as a diverse and competitive knowledge economy with first class infrastructure and high growth built on local private sector strengths, exports and job creation.

The LEP has prepared a draft Business Plan (2012-2013) setting out its partnership approach to encourage private sector led development and create the right environment for businesses to develop. The plan aims to deliver growth effectively and speedily by attracting businesses to the area, removing any barriers and developing partnerships between the public and private sectors. It aims to increase the number of new jobs in the area by one percent more than the national average rate of employment growth. The LEP regards the Airport as one of its key transport links and a key source of direct and indirect jobs.

In the coming months the LEP will be drawing up a Local Infrastructure Plan which will identify and prioritise key infrastructure projects in the area that aim to lead to a growth in jobs, businesses and homes. It will also implement a programme and

project management approach to the investment of the £13.1 million from the Growing Places Fund that has been allocated by the government to the South East Midlands.

Bedfordshire and Luton Joint Economic Development Strategy (Bedfordshire and Luton Economic Development Partnership, 2008)

Prior to the establishment of the LEP, LBC teamed with the former Bedfordshire County Council to develop a joint economic strategy. The strategy identified the main objectives and priorities for the area which were innovation, investment, competitiveness, entrepreneurship, community regeneration, employment restructuring, learning and skills, green economy, and infrastructure.

The strategy recognised the Airport as an important part of the local economic context. Transport infrastructure is highlighted as an important business location factor and the Airport viewed not only as an important local air transport facility but also as a notable generator of direct and indirect employment and economic growth for Luton. The strategy included development at the airport as one of its actions, with the outcome of significantly improved transport gateways and hubs, and the aim of leading to more jobs.

Given the abolition of BCC, this report assumes that this strategy has now lapsed.

Luton Plan 2001-2011 (Luton Borough Council)

LBC is currently formulating a new Luton Plan for the period 2011-2031. A six week public consultation took place during June and August 2012. .

The previous Luton Local Plan (2001-2011) has now expired although policy relating to the Airport has been 'saved'. It is a key document for the Airport because the Airport is recognised as one of seven action areas in the Plan. The Plan regards the Airport as an area of change and opportunity in Luton and it set out the key priorities in guiding its future development. The Plan recognises the important contribution that a successful airport can make to the regeneration and economic viability of Luton and the creation of new employment opportunities in the area. The Local Plan states that the Council will grant planning permission for development at the Airport provided that it:

- is airport related;
- is aligned to the national and regional government aviation policies;
- does not have major environmental impacts (particularly in relation to aircraft noise levels); and
- incorporates sustainable transportation measures, with an emphasis on promoting modal shift towards public transport while providing sufficient car parking facilities, principally at the Airport.

Luton Regeneration Strategy (Luton Borough Council, 2011)

Luton Borough Council's Regeneration Strategy is a brief document which sets six strategic objectives for the Borough:

- businesses able to compete with the best;
- a modern and diversified economy;
- more jobs, in all areas, for all groups;
- a more capable and skilled workforce;

- an environment to regenerate; and
- infrastructure for the 21st Century.

The strategy does not refer directly to the Airport. However it sets out plans to encourage new start ups and business through a high quality inward investment service, targeted growth through key growth sectors and Luton's first high technology business village.

Luton Local Transport Plan (Luton Borough Council, 2011-2026)

The Local Transport Plan for Luton presents the long term strategy for Luton until 2026 and an implementation plan to 2015. The transport vision for 2026 is for an integrated, safe, accessible and more sustainable transport system which aids economic regeneration of Luton and the growth area of Luton-Dunstable-Houghton Regis.

Environmental issues are high on the agenda. The plan puts emphasis on reducing CO_2 emissions and unnecessary car use. The plan also states LBC's plans to work with LLAOL and other organisations to reduce noise pollution.

The plan includes an aim to support Luton's growth as an international gateway in the context of growth at the Airport and ease of access to the new Channel Tunnel Rail Link Terminus at St Pancras. This assumption of growth at the Airport creates a positive context for LLAOL's development proposals. However the need to address environmental and pollution concern would need to be a key consideration.

4.4   Conclusion

At the national level the Coalition Government recognises that London's airports (of which Luton is regarded as one) are reaching capacity. The government issued a consultation on a new sustainable aviation framework in July 2012 focused on environmental impact and promoting the growth of regional airports. The government has also requested the establishment of an independent Airports Commission to identify and recommend options to the government for maintaining the UK's aviation hub status. The government is committed to increasing infrastructure spending as a driver of growth, is facilitating private sector investment in infrastructure and is making the planning system more supportive of new development in an attempt to boost the economy. Sustainability and the environment are key priorities which will need to be carefully considered in the development proposals. Aviation is pinpointed as a sector which could make contributions to significantly reducing carbon emissions.

At the local level the recent changes to local government, with the abolition of Regional Development Agencies, a focus on localism, and introduction of a new planning framework, have led to an overhaul of many policies and strategies which is still currently in progress. The Luton Plan has yet to be published, but existing plans recognise the importance of the Airport. For example the new Local Transport Plan aims to support Luton as an international gateway and assumes that there will be growth at the Airport. The environment is a high priority at the local level and would need to be a key consideration in development proposals at the Airport.

5 Socio-economic indicators

5.1 Introduction

This chapter presents the current economic and social indicators for Luton and the Airport's Core Impact Area.

The indicators are presented in five categories:

- Economic activity and unemployment;

- Industry and employment profile;

- Skills and qualifications; and

- Socio-economic classification and deprivation.

Core Impact Area

The core impact area is where the employment and economic value of the airport is likely to have the greatest impact upon. This has been defined as local authority districts that are within a 30 minute drive time radius and have at least 1% of direct airport employees residing in the area.

In order to identify which districts the employees reside in, up to date security pass data from LLAOL was analysed. The security pass data was incomplete but it was possible to identify approximately 2,400 full or partial postcodes from this data. These postcodes have been mapped in GIS to match them to district authorities.

The GIS analysis shows us that the district authorities with more than 1% of employees are very similar to the previous core impact area used for the 2004 Halcrow/PACEC model.

Approximately 78% of direct employees live within the core impact area and consequently the greatest impact of the Airport growth will be located within this area. The key districts (with over 1% of employees) are:

- Luton (42% of gross direct employees live in Luton)
- Central Bedfordshire (20%)
- North Hertfordshire (5%)
- St Albans (3%)
- Stevenage (2%)
- Milton Keynes (2%)
- Bedford (2%)
- Dacorum (2%)

Figure 5.1 – Map showing the Airport's Core Impact Area
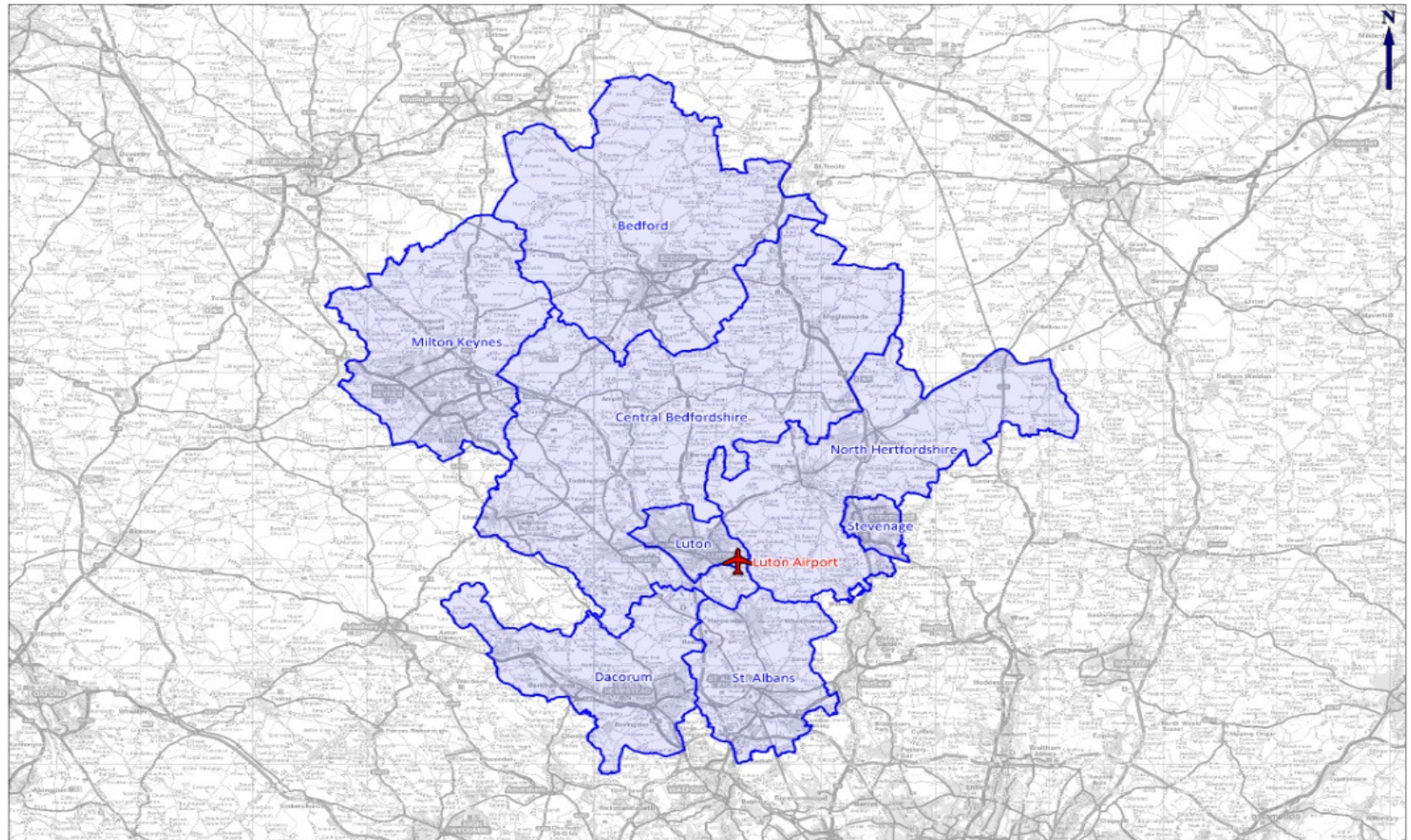
Source: Ordnance Survey Open Data – Boundary-Line (2011)

5.2   Economic Activity and Unemployment

5.2.1   Economic Activity

Economic activity is an officially defined term that refers to the proportion of the working age population that are either in employment or are registered as unemployed[7]. Data on economic activity rates has been taken from the 2011 Annual Population Survey (APS) obtained from the Government's NOMIS labour market statistics service[8].

Luton, which makes up one of the eight local authorities in the Core Impact Area, is an island of relative deprivation within the Area. Luton has lower levels of economic activity than other areas in the Core Impact Area. In the year between April 2010 and March 2011 the economic activity rate of Luton was 74% in comparison to 80% in the Core Impact Area. Luton also has lower economic activity levels than in the East of England (78.5%) and slightly lower levels than England (76%) as a whole.

Figure 5.2 – Economic activity rates, 2008-2011

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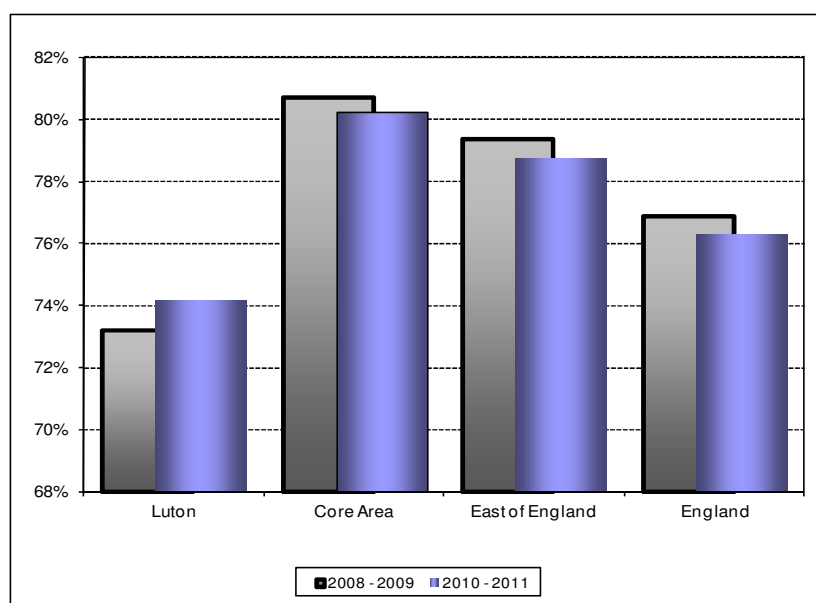
[7] National Statistics (2007) Definitions used for the 2007 Census Test in England and Wales

[8] Office for National Statistics NOMIS web sitehttp://www.nomisweb.co.uk/articles/644.aspx

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The APS data shows that over the period 2008/09 to 2010/11 the economic activity rate has declined in the Core Impact Area by about 1%, although this is the same level of decline as that in England. However, as Figure 5.2 shows, Luton has bucked this trend and increased its economic activity by almost 1% over that period.

Further disaggregation of the overall economic activity rates in Figure 5.3 shows that although the economic activity rate of people aged 25-49 in Luton is lower than in England, the rate for people aged 17-24 is the same as for England. Given that overall economic activity rates in Luton are lower than average, and the financial crisis in general has hit young people hardest, young people in Luton are doing comparatively well.

Figure 5.3 – Economic activity rates by age group, 2011
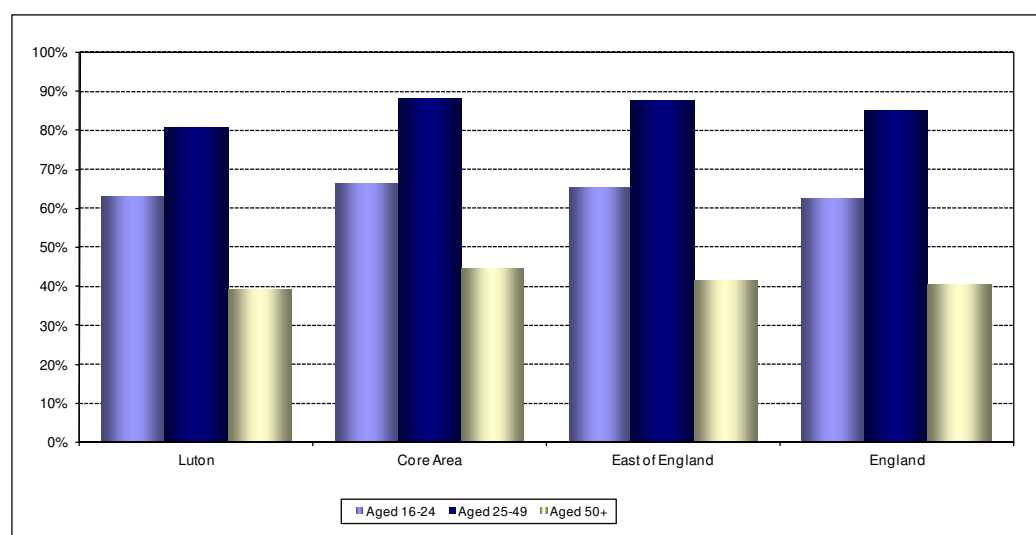
Source: Annual Population Survey, 2011 NOMIS

5.2.2   Unemployment

The unemployment rate for all working aged people in Luton was 8% in 2010/11; this was the same as the English average in 2010/11. In comparison unemployment in the Airport's Core Impact Area was lower at 6%. Consistent with our earlier finding about economic activity levels in Luton; the youth unemployment rate in Luton fell by 3% from 17% in 2008/09 to 14% in 2010/11. In comparison, youth unemployment in the Core Impact Area rose from 15% in 2008/09 to 20% in 2010/11. However Luton has higher levels of unemployment in older age groups. Overall the rate of unemployment in Luton for all working age people has decreased since 2008/09 from 11% to 8% which goes against the trend regionally and nationally where unemployment has increased from 6% to 8% (table 5.1).

Table 5.1 – Unemployment rates by age group, 2009 and 2011

	Luton	LLA Core Impact Area	East of England	England
	2009	2011	2009	2011
All people of working age	11%	8%	5%	6%
Aged 16-24	17%	14%	15%	20%*
Aged 25-49	10%	7%	5%	5%*
Aged 50-retirement	7%	6%	5%	4%*

(*Figure is estimate as data for every local authority is not available)

Source: Annual Population Survey, 2011 NOMIS

The rate of unemployment of UK born ethnic minorities is lower in Luton than it is in England as whole (see Table 5.2). The unemployment rate of UK born ethnic minorities has decreased slightly by 1% from 2008/09 to 2009/10 in comparison to England where unemployment amongst ethnic minorities has increased by 1% during this time period. This implies that UK born ethic minorities in Luton have been able to withstand the recession better than the national average.

Table 5.2 – Unemployment Rates by Ethnic Group, April 2009 – March 2010

	Luton		East of England		England	
	2009	2010	2009	2010	2009	2010
16+ White, UK born	11%	8%	5%	6%	6%	7%
16+ White, non-UK born	9%		4%	6%	5%	7%
16+ Ethnic minority, UK born	11%	10%	13%	13%	14%	15%
16+ Ethnic minority, non-UK born	11%	12%	6%	11%	10%	12%

Source: Annual Population Survey 2010 NOMIS

The issue of unemployment can also be assessed by looking at benefit claimant rates. The rate of claimants in Luton in January 2012 was 6.7%. This was higher than that for the other local authorities in the Core Impact Area which had claimant rates of between 2.5% and 5.2%. It was also higher than the English average of 5.1%. Figure 5.4 shows that the proportion of people claiming for over 6 months and more than one year in Luton is higher than the average for England.

Figure 5.4 – Rates and Durations of Claimant Count, January 2012
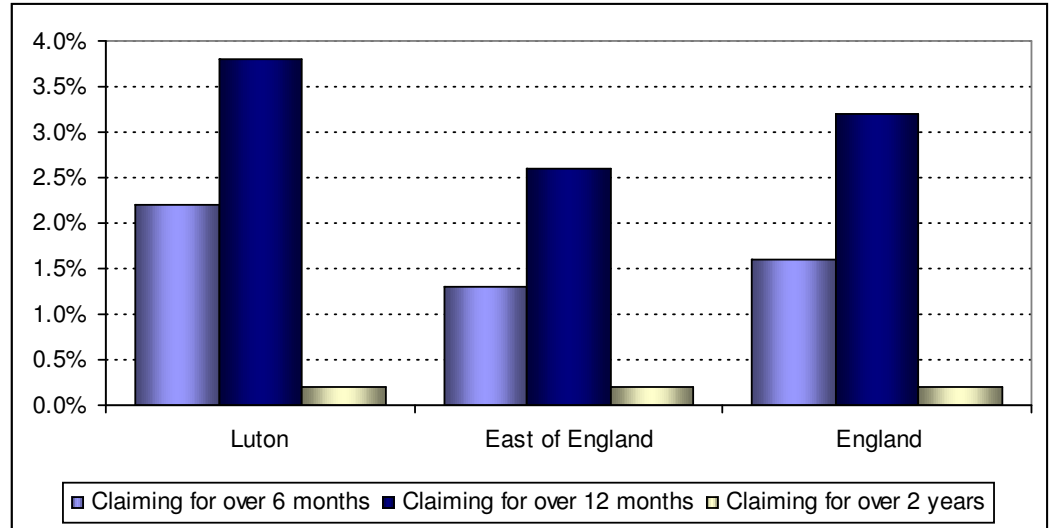
Source: NOMIS

The number of job vacancies advertised by Job Centre Plus in Luton and the Core Impact Area have increased slowly since 2009. There has been a 20% increase in actual vacancies advertised in Luton from January 2010 to January 2012, although Figure 5.5 shows that there has been a large variation in advertised vacancy rates over this period.

Figure 5.5 –Luton and Core Impact Area Monthly Job Centre Plus Vacancies,(presented as a proportion of the working age population) Jan 2010 – Jan 2012
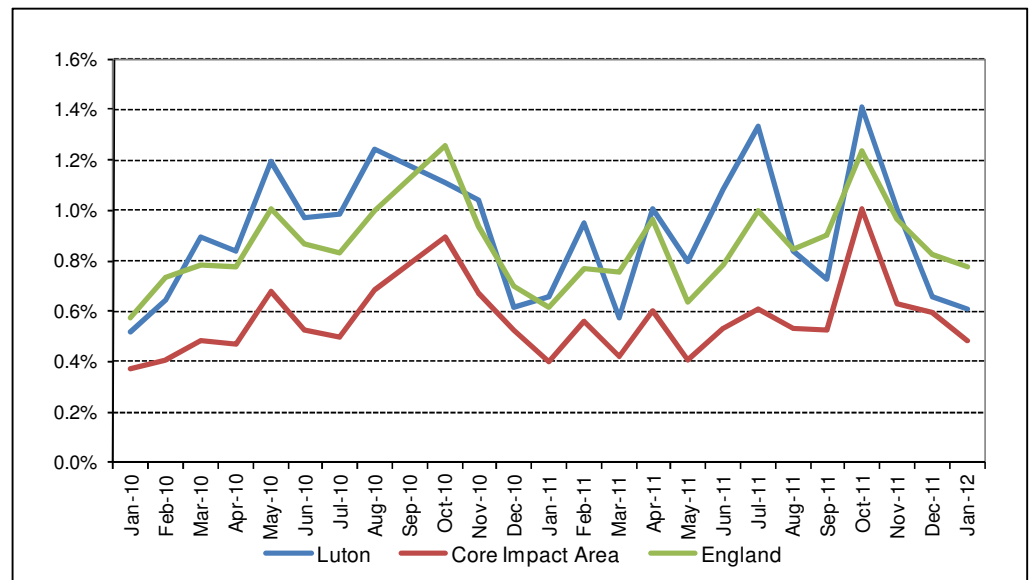
Source: Job Centre Plus Vacancies 2012, NOMIS

In summary this set of indicators has shown that Luton has a lower economic activity rate that the Core Impact Area and England as a whole. However, interestingly, the unemployment rate in Luton has been declining over time, where as in the Core

Impact Area and England as a whole it has increased due to the effects of the recession.

5.3 Industry and Employment Profile

This section looks at the types of industries, employment composition, occupations and the qualifications of employees in Luton and the Core Impact Area.

5.3.1 Industrial composition

The industries that make up the economy in Luton and the Core Impact Area[9] have been changing over recent years. Data on the number of business units from the Annual Business Survey 2008 and Neighbourhood Statistics 2011 shows that there has continued to be a decline in manufacturing industry in Luton. Table 5.3 shows that from 2007 to 2011 there was a 14% decrease in the number of manufacturing units. There has also been a dramatic decline in public administration and defence with a 56% reduction in Luton and a 24% reduction in the Core Impact Area. Luton has suffered from heavy public sector cut backs. However, more encouragingly, Luton has seen a 19% increase in the number of units in the professional, scientific and technical sector and a 35% increase in the health sector. Transport and storage units in Luton have increased by 6%. The Core Impact Area as a whole has not seen such large increases, with the exception of a 19% increase in health units, a 14% increase in finance and insurance and a 13% increase in units the professional, scientific and technical sector.

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[9] The industrial analysis is based on the following authorities for the core impact area due to availability of time series data: Luton, Central Bedfordshire, North Hertfordshire, St Albans, Stevenage, and Dacorum.

Table 5.3 – Business Units in Luton and the Core Impact Area

Industry	Luton			Core Impact Area		
	2007	2011	% change	2007	2011	% change
Manufacturing	402	345	-14%	2,499	2,340	-6%
Construction	750	720	-4%	5,250	5,190	-1%
Motor trades	191	205	7%	1,256	1,230	-2%
Wholesale	345	315	-9%	2,185	2,095	-4%
Retail	732	720	-2%	3,966	3,840	-3%
Transport & storage	232	245	6%	1,405	1,340	-5%
Accommodation & food services	363	355	-2%	2,164	2,245	4%
Information & communication	339	365	8%	3,658	3,765	3%
Finance & insurance	125	110	-12%	841	955	14%
Property	163	170	4%	1,235	1,265	2%
Professional, scientific & technical	491	585	19%	6,019	6,830	13%
Business administration & support services	633	490	-23%	3,916	3,255	-17%
Public administration and defence	114	50	-56%	304	230	-24%
Education	153	150	-2%	1,119	1,075	-4%
Health	292	395	35%	1,641	1,950	19%
Arts, entertainment, recreation & other services	399	325	-19%	2,949	2,765	-6%
Total	5,750	5,545	-4%	40,433	40,370	0%

Source: Annual Business Survey 2008 and Neighbourhood Statistics 2011

5.3.2   Employment by industry

An analysis of employment in Luton shows that the largest sectors are public administration, education and health, followed by distribution, hotels and restaurants. Figure 5.6 below shows that, in comparison to the Core Impact Area, there is a greater proportion of people working in transport and communications, and distribution and hotels, and fewer people working in banking, finance and insurance.

Figure 5.6: Employment break down by sector in Luton and Core Impact Area, April 2010- March 2011
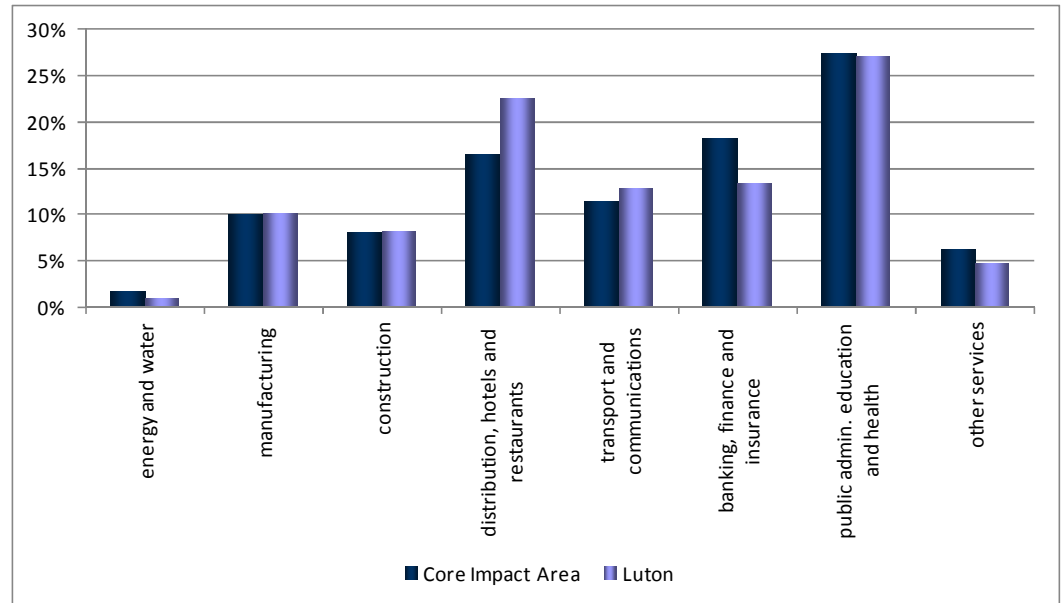
There is a noticeable difference in Luton in the composition of sectors by ethnicity. Table 5.4 shows that white people are more likely to work in construction or manufacturing, whereas people that are from non-white groups are more likely to work in hotels, transport and communications and banking sectors.

Table 5.4: Employment by ethnic group in Luton, April 2009- March 2010

	% 16+ whites in employment	% 16+ non-whites in employment
Agriculture and fishing	-*	-*
Energy and water	1%	-*
Manufacturing	14%	8%
Construction	11%	5%
Distribution hotels and restaurants	16%	21%
Transport and communication	13%	18%
Banking, finance and insurance	15%	20%
Public administration, education and health	25%	27%
Other services	5%	1%
Total	100%	100%

*Estimates not available

Source: Annual Population Survey 2011 NOMIS

5.3.3   Occupational structure

Occupation data from the Annual Population Survey (Table 5.5) shows that the largest group in Luton in 2011 was people working in elementary occupations which accounts for 16% of all people in employment. This was higher than the English average of 11% for this group. The largest occupational group in England as a whole is professional occupations at 19% compared to 14% in Luton. The Core Impact Area in contrast had a higher proportion working in professional occupations than the average in England at 21%.

Table 5.5: Occupations of People in Employment: April 2010 – March 2011

	Luton	LLA Core Impact Area	East of England	England
Managers, directors and senior officials	7%	12%	11%	10%
Professional occupations	14%	21%	20%	19%
Associate prof & tech occupations	11%	14%	14%	14%
Administrative and secretarial occupations	12%	13%	12%	11%
Skilled trades occupations	13%	10%	11%	11%
Caring, leisure and other service occupations	11%	8%	9%	9%
Sales and customer service occupations	8%	7%	7%	8%
Process, plant and machine operatives	9%	5%	6%	6%
Elementary occupations	16%	10%	10%	11%

Source: Annual Population Survey, NOMIS

In summary this section shows us that the largest industries in Luton are public administration, education and health and distribution and hotels. Jobs in Luton tend to require lower skills than the Core Impact Area and England as a whole. However, there is a growing number of business units in higher skilled industries in, for example, the professional, scientific and technical sectors. This is particularly important in relation to the economic impact assessment. The projected growth of the Airport would benefit Luton by supporting the growth of higher skilled industries,

both through direct job creation and by creating a more enabling environment for investment.

5.4 Skills and Qualifications

The qualifications of the economically active population in Luton are, on average, lower than the Core Impact Area and in England. Almost double the proportion of working age people in Luton do not have any qualifications compared to England. APS data shows that 12% of people did not have any qualifications in Luton, compared to just 7% across England in 2010. Likewise just 27% of people in Luton were educated to NVQ Level 4 or above, compared to 36% across England in 2010.

Figure 5.7 shows the level of qualifications of the economically active population in the Core Impact Area are higher than those in Luton. In 2010 38% of the working age population in the Core Impact Area was educated to Level 4 NVQ or above. This is 11% higher than in Luton and 2% higher than the rate for England. Just 6% of the working age population in the Core Impact Area had no qualifications. This was half the rate in Luton and 1% lower than the rate for England. The qualifications for the Core Impact Area had improved since 2008/09 when 10% of the working age population had no qualifications and 29% had Level 4 NVQ or higher.

Figure 5.7 – Qualification Levels of Working Age Population, January 2010 – December 2010
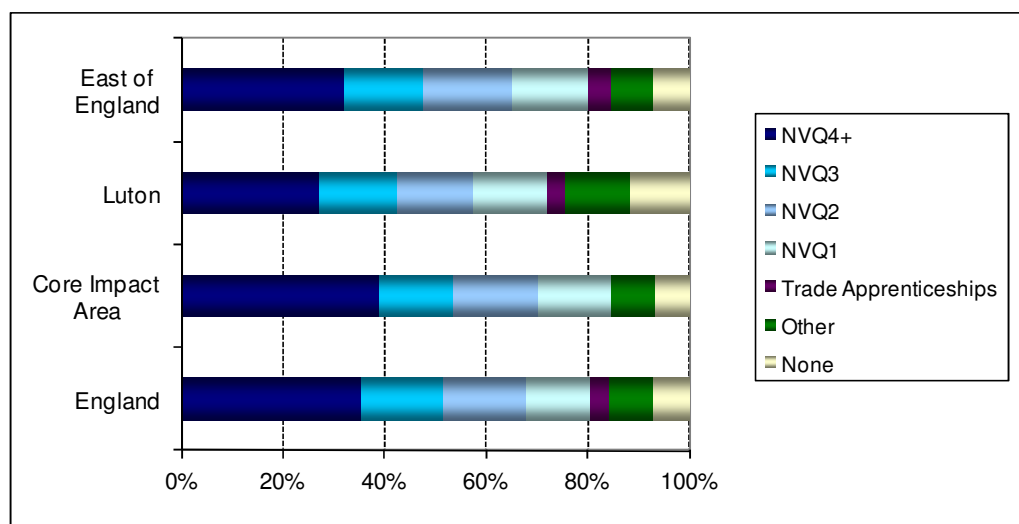
Source: Annual Population Survey, NOMIS

The education and qualifications of young people in Luton appear to becoming more on a par with those in England as a whole. 2010 APS data shows us that 47.3% of people aged 16-19 in Luton had 5 or more GCSEs at grades A to C compared to 46.5% in England as a whole. In the Core Impact Area 49% of people aged 16-19 have 5 or more GCSEs at grades A to C.

In summary this section has shown the skills and qualifications of the working age population in Luton are lower than average and they match the low skills level required for the industry types in the city. In comparison, qualification levels in the Core Impact Area are higher than average. However the education and qualifications of young people in Luton are improving.

5.5   Socio Economic Classifications and Deprivation

This section presents income and deprivation levels in Luton and the Core Impact Area.

5.5.1   Weekly earnings

The average gross weekly earnings, both for residence based and workplace based workers, are lower in Luton than in the Core Impact Area and England as a whole. The average residence based earnings are also lower in Luton than workplace earnings showing that many of the better paid jobs in Luton are taken by people living outside the area. This finding, complemented by the lower than average skills and qualifications levels in Luton, shows that there is a skills and qualifications gap in the area that prevents residents from taking advantage of the best job opportunities. In comparison, in the Core Impact Area, residents are taking home higher wages than those that commute into the area to work.

Over time, wages in Luton have not been increasing in line with England. The average resident based gross weekly wage in Luton increased by £14 from 2009 to 2011, whereas the average wage in England increased by £19 in this time. Workplaces wages in Luton have actually gone down since 2009 from £597 to £574 in 2011.

Table 5.6: 2011 Average gross weekly earnings

	Residence based gross weekly earnings		Workplace based gross weekly earnings	
	2009	2011	2009	2011
Luton	£522	£536	£597	£574
LLA Core Impact Area	£651	£665	£595	£608
East of England	£617	£637	£568	£580
England	£598	£617	£597	£616

Source: Resident based earnings and Workplace based earnings, NOMIS2011

5.5.2   Deprivation levels

The Indices of Multiple Deprivation (IMD) from 2010 show that Luton is amongst the most deprived local authorities in the country. In comparison, the local authorities in the Core Impact Area on average are amongst the least deprived. The IMD are indicators of social disadvantage and include data on income, employment, health and disability, education, skills and training, barriers to housing and services, crime, and living environment. On a ranking of 1 to 326, where 1 is the most deprived and 326 is the least deprived, Luton is ranked at 60th and nearby St Albans is ranked at 316th position. Deprivation is unevenly spread across the Core Impact Area with Luton containing most of the deprivation (see Figure 5.8). Stevenage is ranked 158th, Bedford is ranked at 169, Milton Keynes is ranked at 211, Dacorum is ranked at position 266, and North Hertfordshire is at rank 282.

Figure 5.8: 2010 Indices of Multiple Deprivation in Core Impact Area
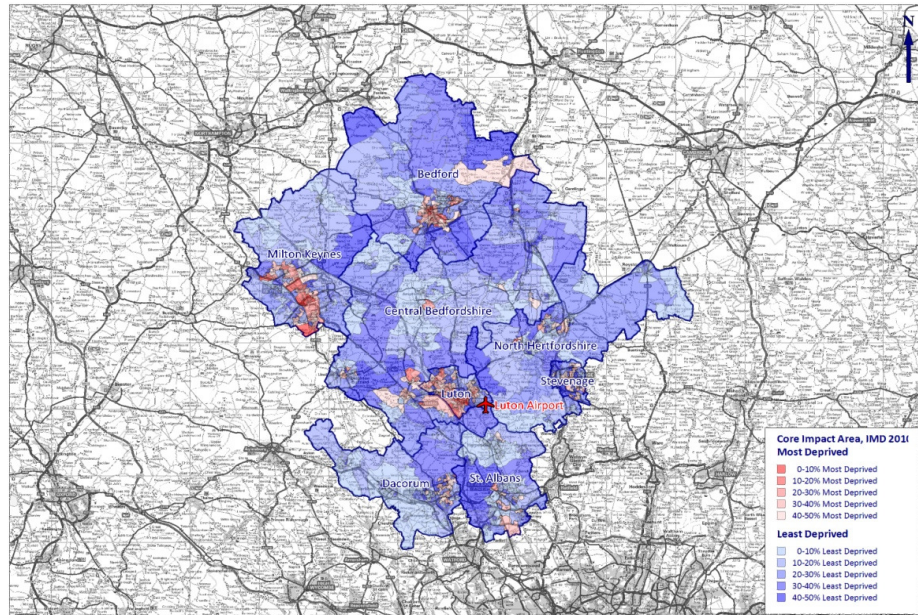
Source: Ordnance Survey Open Data –Boundary-Line (2011); Communities and Local Government (2010) English Indices of Deprivation

The Acorn demographic classifications for Luton confirm the relative deprivation in the area in comparison to the UK average. However an analysis of the results shows that the differences between Luton and the national average lie within the wealthier quartiles. The proportion of Luton's population that is categorised as 'wealthy achievers' is lower at 9% than the national average of 24%. Although there are a smaller proportion of people in Luton that are in the uppermost wealthy quartile, the proportion that is in the poorest quartile (20%) is actually similar to the national average at 21%.

Figure 5.9: Acorn Classifications – Luton Population Profile 2012
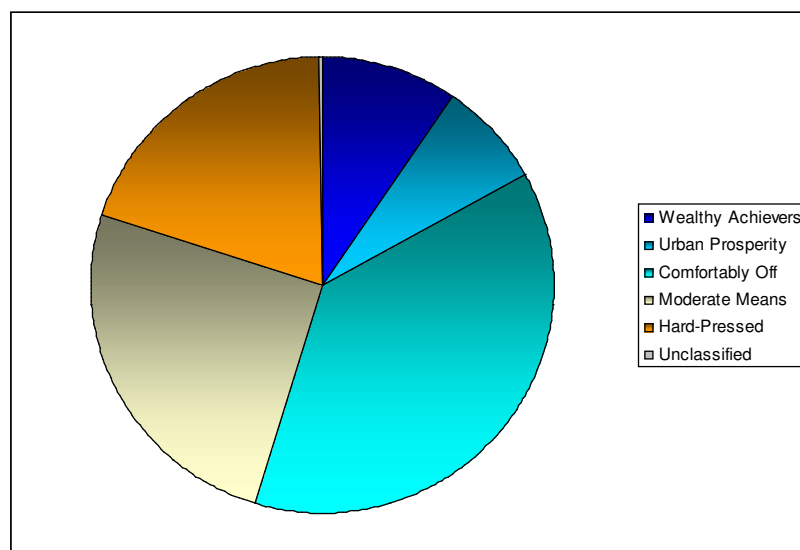
Source: CACI Acorn Population Profile Report 2012

Table 5.7: Acorn Classifications break down in Luton and the UK in 2012

Acorn Category	Group Profile	Population	Pop. in Luton	UK Pop.
Wealthy Achievers	Wealthy Executives, Affluent Greys, Flourishing Families	19,170	9.40%	24.40%
Urban Prosperity	Prosperous Professionals, Educated Urbanites, Aspiring Singles	14,989	7.40%	12.40%
Comfortably Off	Starting Out, Secure Families, Settled Suburbia, Prudent Pensioners	76,906	37.90%	27.20%
Moderate Means	Asian Communities, Post-Industrial Families, Blue-Collar Roots	51,541	25.40%	13.80%
Hard Pressed	Struggling Families, Burdened Singles, High-Rise Hardship, Inner City Adversity	39,723	19.60%	20.70%
Unclassified		589	0.30%	1.50%
Total Population		202,329	100%	100%

Source: CACI Acorn Population Profile Report 2012

In summary this section has shown that Luton is relatively deprived in comparison to the national average. Wages are lower and Luton ranks low in the IMD. However an analysis of the Acorn demographic classifications shows that, although Luton does not have as many wealthy people as the UK on average, the majority of people in Luton are on moderate means or comfortably off. The proportion of people that are in the poorest quartile is the same as the national average.

5.6   Summary

This chapter shows that Luton's economic activity rate is lower than the wider Core Impact Area. The manufacturing sector is continuing to decline but the IT, finance and property sectors are growing. The local population have, on average, fewer qualifications than England as a whole and people outside of Luton are taking more professional, higher paying jobs in the area.

6 Employment Assessment

6.1 Introduction

This chapter presents the current employment generated by London Luton Airport, and the forecast employment for growth scenarios. The first is the base case scenario where it has been assumed by LLAOL that the Airport will grow to 12.4 mppa by 2018 and remain at 12. 4 mppa until 2028 with no planned future developments. The second is the scenario where the planned developments go ahead and the Airport reaches a projected 17.8 mppa by 2028. The employment estimates are presented for both gross direct employment and indirect and induced employment as a result of the operations of the Airport.

The chapter also describes the methodology used to generate the forecasts in a non technical way. A more technical description of the methodology is presented in Annex C.

The chapter is structured into the following sections:

- background to the forecasts;
- methodology for forecasting gross direct employment;
- data collection and model variables;
- the approach to the employment modelling;
- scenarios and results for gross direct employment;
- indirect and induced employment; and
- labour supply analysis

6.2 Background

There have previously been attempts to project future employment at London Luton Airport for a range of development scenarios. PACEC and Halcrow produced an employment model in 2004 for the East of England Regional Assembly and the East of England Development Agency. This model forecasted employment at the Airport and the related housing and labour supply that would be required for a range of growth scenarios including an extended or replacement runway at the Airport. The results of the model were used to inform economic impact assessments produced in 2006, 2010 and 2012 by Halcrow. The Halcrow/PACEC model is now over 8 years old and the assumptions and data need to be updated. Consequently Halcrow was asked by LLAOL to prepare a new model to forecast future employment at the Airport using the most up to date and reliable data, and revised assumptions.

6.3   Methodology for forecasting gross direct employment

Sections 6.4, 6.5 and 6.6 present the methodology that has been used to produce the new employment forecasts. In summary, an econometric modelling approach was used which involved several key stages. Before undertaking the development of the employment model, a thorough data collection and review exercise was carried out. The first stage of the employment modelling was to identify the key factors (i.e. the explanatory variables) that determine the growth of employment (i.e. the dependent variable), at Airports that are a similar type and size to London Luton. This involved analysing time series across seven UK based airports[10], a process called panel data regression analysis. This analysis was used to develop an econometric function that represents the key factors that are statistically significant in influencing direct employment at these airports.

The second stage was to use the function in a forecasting model to project gross direct employment at London Luton Airport in 2028 for the base case (12.4 mppa) and development (17.8 mppa) scenarios. Once the direct forecasts were prepared, estimates for indirect and induced employment we made, based on HM Treasury Green Book guidance, Department for Business Innovation and Skills (BIS) supporting research, and English Partnerships guidance on Additionality.

6.4   Data collection and model variables

A data gathering and review process to obtain the most robust model inputs was undertaken for both the employment data (dependent variable), and the explanatory factors.

6.4.1   Dependent variable: Employment

This sub section reviews the data sources for employment and their robustness. These are:

- LLAOL's Annual Monitoring Reports[11];
- the Interdepartmental Business Register;
- LLAOL Airport Security Pass Data; and

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[10] The seven airports in the panel data regression analysis were London Luton, Stansted, Liverpool, Manchester, Bristol, Birmingham and Newcastle.

[11] The employment estimates in the Annual Monitoring Reports are prepared for LLAOL by Luton Borough Council (LBC)

- NOMIS Business Register and Employment Survey /Annual Business Enquiry.

The Annual Monitoring Reports present estimates for current direct onsite and offsite (combined) employment generated by the Airport. This data has been used to prepare previous employment forecasts and economic impact assessments. However the robustness of this data as a historical dataset is limited as the methodology for collecting the data has varied across the years. Prior to 2010 a primary employment survey was undertaken, and this was supplemented by data from the Interdepartmental Business Register (IDBR). Since 2010 the employment data has been taken solely from the IDBR. This change in methodology means that the data can not be used as robust historical time series because it is not possible to accurately compare one year's data to another. Further, such data is not available consistently across the other airports that have been included in the regression analysis.

The IDBR is a nationwide data set covering 99% of economic activity in the UK. The data is based on three sources, traders registered for VAT, incorporated businesses registered at Companies House and other employers operating a Pay As You Earn (PAYE) scheme. This is the most reliable and detailed data set for estimating employment. It has been used for the last two years of the AMRs but this is not sufficient for use as a time series dataset in a regression analysis. The dataset is not publically available and consequently Halcrow does not have access to use the data from previous years.

An alternative dataset of direct employment is the data collected by LLAOL from Airport security passes for employees that enter restricted areas of the Airport. However not all employees who work at the Airport have a pass and the data that is collected is incomplete and skewed towards certain employment types. Therefore it does not represent a robust data set.

A further alternative data source is the Nomis Business Register & Employment Survey (BRES). This is a national, publically available data set which is based on a sample survey of businesses. The BRES was previously called the Annual Business Inquiry (ABI). The advantages of the data set are that it is a consistent source of employment data across the country and can be used to source employment estimates for all the airports included in the regression analysis. Using both the BRES and ABI, it is also possible to extract robust historical time series data. A consistent data set can be achieved for the years 2003 to 2011 which is a longer time period than any other data source that we were able to access. Historical data back to 2003 provides sufficient data points for robust econometric analysis across the airports. The data is based on Standard Industrial Classifications (SICs) which enables detailed breakdown of the types of employment at the Airport. It is used by the Office for National Statistics to inform the IDBR. Consequently the BRES/ABI has been used as the main data source for the employment modelling in this report.

6.4.2   Direct onsite and offsite employment

Direct employment is the employment that is generated by the activities at the Airport. This can be categorised as direct onsite and direct offsite. The direct employment was estimated for both Luton and the other airports that were included in the regression analysis. The estimate of direct employment was based on the most detailed geographical level for which the BRES/ABI is available, which is, the Lower

Super Output Area (LSOA) and on key employment types that are linked to airport activity. LSOAs are statistically and spatially defined areas with approximately 1,500 residents. Measures of proximity and social homogeneity are factored into the size of the LSOAs. In order to carry out a consistent approach for the regression analysis across the airports the assessment was based on the LSOAs that cover the airport sites capturing direct onsite and some offsite employment. Using ESRI Geographical Information Systems (GIS) software the LSOAs which covered the physical site of the airports were identified. In the majority of cases one LSOA covers the whole airport site. The airport site at London Luton fits almost completely within one LSOA, and all of its specific air transport employment was assigned to this LSOA. In the case of Liverpool and Newcastle the airport sites stretch across two LSOAs, and Stansted, the largest airport that was assessed, covered 3 LSOAs.

The spatial area for direct onsite and offsite employment at London Luton Airport was further refined to inform the forecasting model as follows:

Direct onsite: The direct onsite area for London Luton Airport has been defined by LLAOL as the Airport site and is identified by a red line boundary (see figure 6.1). All employment within this area is regarded as direct onsite. The red line boundary fits within one LSOA with the exception of a small part of the runway.

Direct offsite: The direct offsite area has been defined using the postcode locations of known offsite businesses and using the LSOAs within which these postcodes fall. This postcode information was obtained from two sources: a list of direct businesses from LLAOL/TOR, and additional offsite roads which are identified in the LLAOL Annual Monitoring Reports. The postcodes of these businesses and roads were mapped using ESRI GIS. This analysis showed that the direct offsite employment at London Luton Airport fits within two LSOAs. These are presented in figure 1. There are three outlier postcodes outside the two LSOAs. These have been excluded from the analysis in order to not over estimate employment.

Figure 6.1 Map to show the location of direct onsite and offsite employment at London Luton Airport

Source: Halcrow (2012); ESRI GIS (2012)

6.4.3 Employment types

The employment that is located within the LSOAs covering the onsite and offsite area can be refined to focus on employment types that are specifically airport related. The SIC codes which are used in the BRES to define employment types are categorised at several levels from 18 broad groupings down to detailed levels of employment with 615 groupings in the four digit class. The two digit division, which consist of 88 different industry groupings, has been used to inform the employment modelling. Where necessary, more detailed, four digit class, have also been identified.

There are two key SIC codes that relate specifically to airport employment. These are "air transport" and "service activities incidental to air transportation". In addition to these key employment types, a variety of other employment exists at the Airport. In order to identify the employment demand associated with the Airport development we used SIC groupings identified in Experian business data and refined these using Nomis BRES data. The Experian data on businesses and employment is available by postcode and business. Consequently it was possible to refine the analysis down to the postcodes that had been identified as having onsite and offsite employment.

The Experian data uses the 2003 SIC codes to categorise each business. The amount of employment in each SIC in the Experian data was compared to the BRES data. Both datasets were required for this process because the employment data in Experian is not as reliable as the BRES data. The Experian employment figures are an approximation based upon the company's total employment. The names of the businesses, the SIC that have been attributed to them, the site employment of the business according to Experian and the employment for that specific SIC code in Luton's two LSOAs from the BRES were all factored in to identify the relevant types of employment at the Airport. Where there were very few employees identified for a

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particular SIC in the Experian business data compared to the BRES employment data, common sense judgement was used to assess whether or not to include this data.

We identified a range of employment estimates at the Airport based on the SIC codes, ranging from a low to a high estimate. The three estimates are:

- ❖ **Low estimate:** low estimate of employment based on conservative list of SICs and small geographical area for direct employment (one LSOA).
- ❖ **Mid estimate:** low estimate as above plus additional employment from the second LSOA. This is the most realistic estimate of employment as it reflects a larger geographical area that direct employment is located within. An uplift of 1.32, based on Nomis BRES data, was applied to the first LSOA to represent the proportion of employment that is located in the second LSOA.
- ❖ **High estimate:** optimistic assumption of employment based on a larger SIC code list, and using uplift of 1.46 to represent the larger amount of direct employment in the second LSOA.

Table 6.1 presents the 2007 SIC codes included in the low, mid and high estimates of employment.

Table 6.1 Range of Low and High list of employment SIC groupings used to inform modelling

SIC groupings	Low and mid estimate	High estimate
Agriculture, Fishing and Mining	-	-
Extraction, Mining, Quarrying	-	-
Manufacturing	25, 26, 28, 30, 33 + 4 level codes	10, 23, 25, 26, 28, 30, 33 + 4 level codes
Electricity, Gas, Water supply and Recycling	-	-
Construction	41 + 4 Level codes	41 + 4 Level codes
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	46, 47, + 4 Level codes	46, 47, 95 + 4 Level codes
Hotels, Restaurants and Leisure	55, 56	55, 56
Air Transport and Supporting Activities (including Training)	51, 52, 23 + 4 level code	51, 52, 23 + 4 level code
Other transport, storage and communication	49--53 + 4 Level codes	49--53 + 4 Level codes
Business Services, Public Administration and Other Services (including Health Services)	64, 66, 70, 77, 84 + 4 level codes	62, 63, 64, 65, 66, 68, 70, 77, 81, 84, 96 + 4 level codes

Source Halcrow employment estimate using NOMIS 2007 SICs

6.4.4 Explanatory variables: the key variables that affect employment

The employment at the Airport is dependent upon a range of factors or variables. The initial list of variables was compiled by undertaking a literature review of existing studies on airport employment drivers and with input from an expert airport planner.

This initial list was narrowed down to a list of variables for which reliable data was readily available and consistently sourced over a sufficient time period. It was possible to source all of the variables identified in Table 6.2, except the land use variables.

These variables can be understood within five broad categories:

- Traffic;
- Cargo;
- Passenger and traffic characteristics;
- Socio-economic variables;
- and airport specific variables.

Table 6.2 List of explanatory variables that were identified as possible factors affecting employment

Category	Variable	Notes	Source
TRAFFIC	ANNUAL PASSENGERS	See detailed breakdown below*	CAA Airport statistics (historic); LLAOL forecasts (future)
	ANNUAL AIR TRAFFIC MOVEMENTS (ATMS)	Further split into passenger, business and cargo atms	
CARGO	CARGO TONNAGE	Further split into freight and mail cargo	CAA Airport statistics (historic); LLAOL forecasts (future)
	SHARE OF TONNAGE THAT FLIES BY DEDICATED AIRCRAFT	Dedicated aircraft freight is separate to belly hold freight	
*PASSENGER /TRAFFIC CHARACTERISTICS	% PASSENGERS WHO ARE BUSINESS/LEISURE	By pax	CAA Airport statistics
	% PASSENGERS WHO ARE UK / FOREIGN RESIDENTS	By pax	
	% TRAFFIC WHICH IS DOMESTIC/INTERNATIONAL	By ATMs and pax	
	% TRAFFIC WHICH IS NO FRILLS	By ATMs and pax	CAA Bespoke Report
	% TRAFFIC WHICH IS SCHEDULED	By ATMs and pax	CAA Airport statistics
SOCIO-ECONOMIC FACTORS	UK GDP GROWTH	Total and per capita	ONS
	REGIONAL GVA	Actual and growth, total and per capita	

Category	Variable	Notes	Source
	REGIONAL GROSS DOMESTIC HOUSEHOLD INCOME	Actual and growth	
	AIR WAGES : LOCAL WAGES	The ratio of median wages locally and for the air industry (SICs 52 and 52.23) differ	Annual Survey of Hours and Earnings (ASHE) (ONS)
	RECESSION	This was set up as a dummy variable for the years 2008-11, and as a lagged dummy variable from 2009.	
LAND USE	AIRPORT RELATED e.g. terminal and taxiways	Data unavailable in a usable format	-
	COMMERCIAL SPACE	Data unavailable	-
	EMPLOYMENT CENTRE	Data unavailable	-
EMPLOYMENT	LOCAL EMPLOYMENT	Lagged the dependent variable	Business Register and Employment Survey/ Annual Business Inquiry (BRES/ABI)
	REGIONAL POPULATION	Actual and growth	BRES/ABI

Source: CAA, ONS, NOMIS, BRES/ABI; ASHE

The majority of the airport related data was gathered from the Civil Aviation Authority (CAA) website and a bespoke report produced by CAA for this study. The Socio-economic factors were sourced from the Office for National Statistics (ONS).

Land use data was not available in a usable form for the analysis. However, the use of panel data regression analysis automatically includes a 'fixed effect' for each airport, by making an airport specific adjustment to the value of the constant in the generic function produced by the regression analysis. The generic function is translated into separate functions for each airport and these differ by their fixed values. This reflects inherent differences between the airports are captured within the modelling, even without the presence of airport characteristic variables.

6.5 Employment Modelling Stage 1: Identifying the approach to econometric regression analysis

To identify which variables have a significant impact on airport employment and to produce a function that contains these explanatory variables, a panel data regression across a range of airports was the chosen approach to econometric modelling.

There were two key reasons for this, one based upon the advantages of panel data regression, and the other a result of the data constraints that were faced:

1. Panel data regression can analyse multiple cross-sections across a historic time series, and can therefore robustly assess employment drivers for airports of different sizes to Luton. This provides us with an analysis which covers both Luton's current traffic levels and also its potential future traffic (the development scenario, to 17.8 mppa)

2. Employment data could only be reliably sourced for nine data points from 2003-11 for London Luton Airport alone which is not sufficient to prepare and validate the econometric function. A minimum of 30 data points are required to create such a function. Consequently the use of comparable airports in the study increases the number of data points and helps improve the robustness of the analysis.

A range of UK airports that are similar to Luton in terms of flight and passenger characteristics, both in the current and development scenarios, were included in the analysis. These airports were narrowed down to a final seven including London Luton.

Table 6.3 Airports included in regression analysis

Airport	2011 Pax
London Luton	9.45 mppa
Stansted	18.1 mppa
Manchester	18.9 mppa
Birmingham	8.62 mppa
Bristol	5.78 mppa
Newcastle	4.35 mppa
Liverpool	5.25 mppa

Source CAA 2011; LLAOL 2011

Continuous data for the variables was set up in econometric software to undertake regression analysis to form a function that explains the historic direct employment levels at the Airport. To identify the final form of the function, standard econometric tests were carried out to ensure that any variables which were not significant in explaining employment at the Airport were omitted. Statistical test were also

performed to ensure there were not any symptoms of estimation bias or errors displayed in the final econometric equation.

The following tests were undertaken to ensure statistical robustness:

– T-statistics and P-values for each variable – these assess the probability that the variable is significant in explaining airport employment;
– The R2 statistic was used to assess the overall explanatory power of the function, this describes how much of the employment is explained by the included variables; and
– Various other econometric tests were used to ensure the function did not contain serious biases, such as relationships within its prediction errors.

These tests are explained in detail in the Technical Annex.

6.5.1   Employment model functional form:

It was quickly identified that annual passengers was the best single traffic driver of airport employment, as it alone explained a large portion of employment and much more than ATMs. Cargo tonnage was also important in explaining employment. However, given the high level of covariance between passengers and cargo tonnage, a combined variable called million work load units (mwlu) was used in the model.

Once the key air traffic driver for airport employment had been identified, the process continued for testing the impact of additional explanatory variables. In particular, regional GVA growth, regional GVA per head growth, UK GDP growth and the percentage of air passengers traffic that was 'no frills' were shown to have some degree of explanatory power. However, the impact of these variables on the overall explanatory power, or fit, of the model was marginal.

One variable did satisfy both criteria of increasing the model's explanatory power whilst keeping to high probability levels; was lagged employment. The level of the employment in any one year is partially explained by the level of employment in the previous year.

The function therefore that robustly explains direct airport employment includes the employment level for the previous year, the annual mwlu and an airport fixed effect constant.

The final function that was used to forecast employment at Luton was:

$$Y_t = c + a Y_{t-1} + b \text{MWLU}_t + \text{FE}_i + e_t$$

Where:

- Y = gross direct employment at London Luton Airport
- t = the period t (year t)
- c = the function's constant – this reflects the fixed gross employment that is observed across all identified airports
- Y_{t-1} = lagged direct employment, by one year
- a = the coefficient associated with Y_{t-1}
- mwlu = million work load units – this is a measure of both annual passengers and cargo tonnage combined[12]
- b is the coefficient associated with mwlu
- FE_i = fixed effect associated with airport "i" – this reflects the fixed gross employment that is observed specific to London Luton Airport
- e_t = error term in year t

The following table shows the coefficients and probability values for the included variables for the mid estimate forecast. Variables were only included if their explanatory power was significant. The variables in the function have t-statistics and p-values that indicate they have a probability of more than 95% of explaining direct employment.

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[12] One mwlu is equal to one million passengers per year or one hundred thousand tonnes of freight

Table 6.4 Table to show the coefficients of the final function (function for mid estimate)

Variable	Coefficient	Probability (1 – p-value)	T-stat value
Constant	1903.7		
MWLU	215.8	99.9	3.4
Employment last period, Yt-1	0.3	98.0	2.4
Fixed Effect	London Luton = 850.5		

Source Halcrow modelling 2012 (please note in interpreting the coefficients and their relative size, it is important to note that they reflect the units in which the data was entered in to the model)

The coefficients show that gross direct employment has a direct positive relationship with historic employment at the Airport and the Airport's annual passengers and cargo tonnage.

The final function has an R^2 value of 98.16% which indicates that a very high proportion of the employment is explained by the included variables.

The high employment estimate has likewise been fitted to the functional form above, where its own coefficients are slightly different and subsequently produce higher forecasts of direct employment. Using the high employment estimate also results in a function with strong explanatory power, with an R^2 value of 98.4%.

The full results for both employment estimate functions are found in the Technical Annex.

6.6 Employment Modelling Stage 2: Forecasting employment growth

The next stage of the modelling was to use the final function to project gross direct employment at the Airport for the base case and development scenarios. In order to prepare the forecasting model, projections were required for all the explanatory variables in the function for all periods from 2012 to 2028. The Airport projections for annual passengers, ATMs and cargo tonnage were provided by LLAOL for 2012 to 2028 for both scenarios.

As the forecasts have been based upon historical employment data, any productivity gains which were experienced during the period of 2003-11 are reflected in the resultant econometric function. In using this function to forecast future employment, the implicit assumption is that a historical trend in productivity will continue to 2028.

The proposed econometric function was tested for validity by undertaking backcasting analysis to see how the function fits the historical data. This was done by taking Luton's historical position in terms of explanatory variables and seeing how close the predicted employment of the function fitted actual employment for that period. The Technical Annex describes this process in more detail. The average forecasting error for Luton 2003-11 was 1% for the mid estimate and 5% for high

estimate. This demonstrates a good historical fit on average and provides further confidence for using the resulting econometric function to forecast direct employment at London Luton Airport.

6.7 Scenarios and Results

This section presents the current employment estimate at London Luton Airport, and the results of the forecast model for both the base case scenario where the Airport is projected to reach 12.4 mppa in 2018 and remain at capacity thereafter to 2028, and the development scenario where the Airport are projected to increase to 17.8 mppa in 2028.

As mentioned in section 6.4 a range of low, medium and high forecasts have been modelled for gross direct employment for both the base case and development scenarios. These estimates are presented for:

- Current employment
- Base case scenario employment forecast – no new developments (2028)
- Development scenario employment forecast (2028)

The mid estimate has been taken as the most realistic estimate of future employment at the Airport. There are two key reasons for this. Firstly the estimate of employment is based on SIC codes that are more closely related to Airport activity. The SIC codes have been based on a review of businesses located at the Airport, and on a review of the BRES data. The estimates for current employment within each industrial grouping match well with alternative estimates of employment at the Airport. Secondly, two chosen LSOAs in the mid estimate match most closely with the geographic location of the direct onsite and offsite businesses, based on a detailed analysis of the postcode locations of direct onsite and offsite businesses.

The forecasts have been broken down into the following groupings:

- Gross direct onsite and offsite (combined)
- Full time and part time
- Industrial groupings

All employment estimates have been presented as full time equivalents (FTEs) unless stated otherwise. One part time job is estimated to be 0.5 of a full time equivalent based on an analysis of the average hours worked by a part time worker using the Nomis annual survey of hours and earnings.

6.7.1 Current Employment

The 2011 gross direct employment at London Luton Airport, based on the BRES data, is 8,250. This is relatively similar to the estimate of 8,100 in the latest (2011) Annual Monitoring Report published by LLAOL. Table 6.5 shows the range of low to high estimates of current employment based on the BRES data. All figures have been rounded to the nearest 50.

Table 6.5 Range of current direct employment estimates for London Luton Airport (2011)

	Low	Medium	High
Current Estimate of Employment	6,100	8,250	9,500

Source Halcrow 2012, BRES 2011

Table 6.6 shows the current gross direct employment at and around the Airport broken down into the ten broad industrial groupings that we have constructed from the NOMIS SIC codes.

Table 6.6 Current direct employment (2011) for the mid estimate by industrial grouping

SIC GROUPINGS	FULL TIME	PART TIME	FTEs
Agriculture, Fishing and Mining	0	0	0
Extraction, Mining, Quarrying	0	0	0
Manufacturing	1,300	100	1,350
Electricity, Gas, Water Supply and Recycling	0	0	0
Construction	0	0	0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	500	450	750
Hotels, Restaurants and Leisure	200	250	300
Air Transport and Supporting Activities (including Training)	3,350	450	3,550
Other transport, storage and communication	1,400	300	1,550
Business Services, Public Administration and Other Services	650	150	750
Total	**7,400**	**1,700**	**8,250**

Source Halcrow 2012, BRES 2011

6.7.2   Base case Scenario

LLAOL provided Halcrow with a detailed breakdown of the passenger and cargo numbers and movements for each year from 2011 to 2028 for the base case scenario. They project that the existing maximum capacity of London Luton Airport is 12.4 mppa which would be reached by 2018 and remain at maximum capacity then onwards until 2028 without the proposed developments going ahead.

These projections have been applied to the econometric function and result in a forecast for gross direct employment of 11,050 (mid estimate). This is a growth of 2,700 new direct jobs at and around the Airport site since 2011.

Table 6.7 Range of base case direct employment estimates for London Luton Airport (2028)

	Low	Medium	High
Base case Employment Forecast	8,300	11,050	13,550

Source Halcrow 2012

These forecasts can be broken down by the ten high level industrial groupings and by part time and full time employment.

Table 6.8 Base case mid estimate direct employment forecasts by industrial grouping (2028)

SIC GROUPINGS	FULL TIME	PART TIME	FTEs
Agriculture, Fishing and Mining	0	0	0
Extraction, Mining, Quarrying	0	0	0
Manufacturing	1,600	100	1,650
Electricity, Gas, Water supply and Recycling	0	0	0
Construction	0	0	0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	700	600	1000
Hotels, Restaurants and Leisure	250	350	450
Air Transport and Supporting Activities (including Training)	4,700	650	5,050
Other transport, storage and communication	2,000	450	2,250
Business Services, Public Administration and Other Services	600	150	650
Total	**9,900**	**2,250**	**11,050**

Source Halcrow 2012

6.7.3 Development Scenario

LLAOL forecast that the proposed developments at London Luton Airport will lead to a growth in the capacity and usage of the Airport to 17.8 mppa by 2028. They provided Halcrow with a detailed breakdown of the forecasts for passenger and cargo numbers and movements which have been applied to the econometric function. This results in forecast direct employment at the Airport in 2028 of 13,350 based on the mid estimate of employment.

Table 6.9 Range of low to high forecasts of direct employment for London Luton Airport for the development scenario (2028)

	Low	Medium	High
Future (development scenario) Forecast for Employment	10,100	13,350	17,450

Source Halcrow 2012

Table 6.10 presents the (mid estimate) employment projections by full and part time jobs and broad SIC groupings.

Table 6.10 Development scenario mid estimate direct employment forecasts by industrial grouping (2028)

SIC GROUPINGS	FULL TIME	PART TIME	FTEs
Agriculture, Fishing and Mining	0	0	0
Extraction, Mining, Quarrying	0	0	0
Manufacturing	1,950	100	2,000
Electricity, Gas, Water supply and Recycling	0	0	0
Construction	0	0	0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	850	700	1,200
Hotels, Restaurants and Leisure	300	450	550
Air Transport and Supporting Activities (including Training)	5,700	750	6,100
Other transport, storage and communication	2,450	550	2,700
Business Services, Public Administration and Other Services	700	150	800
Total	**12,000**	**2,700**	**13,350**

Source Halcrow 2012

Figure 6.2 presents the annual percentage growth in employment during the forecast period for the development scenario. There is a continuous growth in employment across the study period, but the number of new employees generated per mppa decreases over time. This reflects annual productivity gains in the airline industry, and that a proportion of the employment at the Airport is fixed and does not grow with an increase in traffic.

In the base case scenario, annual productivity has been assumed to remain stationary once airport capacity is reached in 2018. This is a conservative estimation as in practice some degree of productivity gains in airport employment is likely to continue despite traffic level reaches capacity. The Technical Annex further assesses the trends in both historical and forecast employment figures for the base case and development scenarios.

Figure 6.2 Employment and mppa forecasts for the development scenario
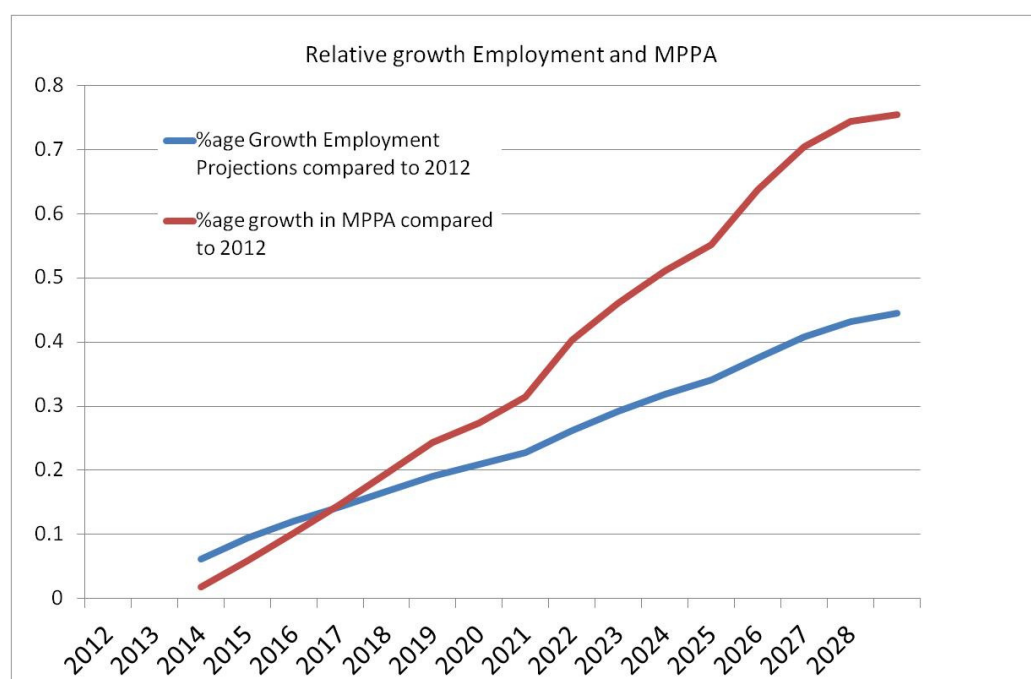
Source Halcrow 2012, LLAOL 2012

The forecasts of total direct employment have factored in both fixed and variable types of employment at the Airport, as broadly identified by the functional form. The breakdown of employment by broad SIC grouping has assumed a fixed proportional split based on current employment mix. Therefore, whilst the total employment figures have factored in fixed and variable employment, the breakdown by employment types, as presented in the scenario forecast sections above, simply assume the same grouping breakdowns as the current day split of employment and must therefore be considered with caution.

A series of sensitivity analysis to assess the impact on employment growth of different traffic levels from their projected levels has been conducted. Assumptions and results of the sensitivity analysis are described in the Technical Annex.

6.8 Calculating Indirect and Induced Employment (for mid forecast estimates)

The impact of the development on the supply chain and the impact of the employees spending their wages in the local economy can be estimated using indirect and induced multipliers. The composite multiplier of 1.33 for infrastructure projects at the sub regional level, identified in the BIS 2009 additionality research[13], has been applied to estimate the indirect and induced employment for the current, base case and development scenarios. This multiplier is similar to values used in other airport developments studies and generates a conservative estimate of indirect and induced employment. For example a recent study into employment at Stansted airport by BAA also used a similar multiplier to calculate indirect and induced employment. The effects of applying the multiplier are presented in Table 11 for the current day employment, and both the base case and development scenarios.

Current employment

The current direct employment generated by the Airport is approximately 8,250 FTE jobs. Using the composite multiplier to calculate the additional jobs generated through the supply chain and wider spending, we estimate a further 2,700 jobs are generated. The total current direct, indirect and induced employment equates to 10,950 jobs.

Base case scenario

Applying the composite multiplier to the gross direct employment forecasted in the base case scenario, results in a total of 3,650 indirect and induced jobs. The combined forecasted direct, indirect and induced employment generated at the Airport in the base case scenario totals 14,700 jobs.

Development scenario

Applying the multiplier to the gross direct employment forecasted in the development scenario indicates that 4,400 indirect and induced jobs would be generated when the Airport reaches 17.8 mppa. The combined forecasted direct, indirect and induced employment generated at the Airport in the development scenario totals 17,750 jobs.

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[13] Department for Business Innovation and Skills (Oct 2009) BIS Occasional Paper No 1 – Research to improve the assessment of additionality

Table 6.11 base case estimate of gross direct, indirect and induced employment (2028)

Gross employment forecasts	Current Employment	Base case Scenario	Development Scenario
Direct onsite	8,250	11,050	13,350
Indirect and induced	2,700	3,650	4,400
Total gross employment	**10,950**	**14,700**	**17,750**

Source Halcrow 2012

6.9   Employment growth attributable to the planned developments

The direct employment generated at the Airport as a result of the planned development can been calculated by subtracting the forecast base case direct employment from the employment projected for the development scenario.

Table 6.12 Direct employment generated as a result of the planned developments

Development scenario employment forecast		Base case employment forecast		Direct employment attributable to the planned developments
13,350	_	**11,050**	=	**2,300**

Source Halcrow 2012

The total direct employment that would be generated as a result of the planned developments at the Airport is 2,300 jobs.

Displacement and leakage have not been calculated as part of this assessment.

- Displacement is the proportion of jobs that would lead to other employment being displace elsewhere
- Leakage is the proportion of jobs that would leak outside the core impact area.

It is a common approach across airport employment studies to present figures as gross and to not calculate displacement and leakage due to the unique and specific characteristic of each airport developments.

In order to estimate the number of indirect and induced jobs generated by the planned developments, the indirect and induced jobs generated in the base case scenario are subtracted from the development scenario. Table 6.13 indicates that a total of 750 indirect and induced jobs can be attributed to the planned developments.

Table 6.13 Indirect and induced employment

Development scenario employment forecast		Base case employment forecast		Indirect and induced employment attributable to the planned developments
4,400	–	3,650	=	750

Source Halcrow 2012

Overall, we observe that a total of 3,050 jobs, an increase of 21% from the base case employment, can be generated as a result of the planned developments at Luton Airport.

Table 6.14 Total employment attributable to planned developments

Employment attributable to planned developments	Employment forecasts
Direct onsite	2,300
Indirect and induced	750
Total employment	**3,050**

Source Halcrow 2012

6.10 Labour supply analysis

This section presents a high level analysis of the availability of labour in Luton and the Core Impact Area to fill the new jobs that will be generated by the growth of London Luton Airport. Two key aspects have been assessed; firstly, whether the number of workers available in Luton is sufficient to take up the additional jobs from the Airport development, and secondly whether the required skills are available in Luton and the wider core impact area.

Assessment 1) Number of workers available

The number of workers that will be available in the Core Impact Area in 2028 to fill the new jobs generated by the growth of the Airport has been broadly estimated from the number of economically active people registered as job seekers. The following presents a breakdown of the variables used in this estimation, and the data sources:

Table 6.15: Variables used for labour and skills supply analysis

Variable	Current (2011)	Source	Projection 2028	Sources
Working age population	132,800	NOMIS annual population survey	154,00	NOMIS start grown by East of England population profiles
Total population	203,600	NOMIS annual population survey	237,150	NOMIS start grown by East of England population profiles
Workplace employment	97,600	Cambridge Economics	127,250	Cambridge Economics
Resident employment	82,850	Cambridge Economics; East of England Forecast Model	107,250	Cambridge Economics; East of England Forecast Model
Unemployment	8,000	NOMIS annual population survey	7,550	NOMIS start grown by East of England unemployment profile
Total economically active (resident empl + unempl)	90,850	NOMIS; Cambridge Economics	114,800	NOMIS; Cambridge Economics

In 2011 Luton's population of economically active people, (resident employment and the unemployed), was 90,850. This is projected to grow to approximately 114,800 by 2028. The available economically active population, those that are unemployed and looking for work, in 2011 was 8,000. This is projected to decrease to 7,550 in 2028.

The number of people who are looking for work has been compared to the additional jobs generated as a result of the Airport's growth in both the base case and development scenarios. For both scenarios there is sufficient availability of potential workers people who are projected to be economically active and without employment - within Luton to take up these jobs.

Table 6.16 availability of workforce to take up new jobs

Scenario	Employment forecast (2028)	Employment growth since 2011	Available workforce to take up new jobs
Current (2011)	8,250	n/a	8,000
Base case	11,050	2,800	7,550
Development	13,350	5,100	7,550

Assessment 2) Quality of Labour Supply

There are enough people to fill the additional jobs to 2028 if these airport employees all came from within the Luton district. But there are two important aspects to consider, firstly, only 42% of current employees at the Airport come from the Luton area and surrounding Core Impact Area districts such as Central Bedfordshire and North Hertfordshire supply a large proportion of the remaining workers. And secondly, there is a requirement for specific skills and different occupational types at the Airport.

It is important therefore to understand the breakdown of skill requirements at the Airport to 2028 and of the potential workforce (the available economically active population). To make this assessment, occupational levels have been used as a proxy as they can be broken down for both the local area and the SIC industrial groupings, relevant to the airport employment, from NOMIS' population survey.

In recognising that the skill level (and occupational level, as a proxy) of the economically active population who are not in employment is likely to be lower than those employed, an adjustment has been applied to the occupational proportions that apply to the available economically active population. This adjustment was based upon 2011 ONS employment data by applying UK-wide ratios of employment: unemployment for each occupational level (by current and previous employment) to Luton's employment. This produced estimates of the required number of jobs in the occupational categories in 2028.

By then comparing the occupational requirements of the Airport to the available occupational levels within the Luton area we were able to identify skill/occupational shortfalls across the period as below:

Table 6.17: Forecast employment growth at London Luton Airport and availability of labour supply by skills type.

Occupational level	2028 forecasts of airport employment	2028 forecast of available workforce in Luton	Projected deficit (maximum in any one year)
Managers, directors and senior officials	650	200	450
Professional occupations	350	600	
Associate prof & tech occupations	350	450	
Administrative and secretarial occupations	550	850	
Skilled trades occupations	750	10500	
Caring, leisure and other service occupations	300	700	
Sales and customer service occupations	250	1000	
Process, plant and machine operatives	1100	650	400
Elementary occupations	950	2050	
Total	**5,100**	**7,550**	**850**

There is a forecast shortfall of labour skills in Luton in two key occupational areas: managers, directs and senior officials, and process, plant and machinery operatives. This labour would need to be supplied from elsewhere within the core impact area. A high level analysis of the labour supply in the core impact area revealed that the shortfall of skills can be supplied from this area. In particular, Milton Keynes and Central Bedfordshire are likely to have a large supply of managers, directors and senior officials and Bedford and Dacorum have a relevant process, plant and machine operative supply of labour. The accessibility to these labour markets is reasonable as all areas are within a short drive time from the Airport.

In summary it is likely that the new jobs generated at the Airport can be met by the labour supply within Luton and the core impact area. Due to the particular skills requirements needed for the new jobs, some of the new employees will need to come from across the core impact area rather than relying on Luton alone.

This labour analysis relies upon the assumptions that:

- Additional employment at the Airport follows the same occupational breakdown as current airport employment
- The UK-wide breakdowns of unemployment within occupational levels (as per their previous employment) can be applied as a proxy for the make up of skills within the economically active population without a job for Luton; and
- The occupational levels within Luton's workplaces reflect the resident population's occupational levels

These assumptions are based on existing observed trends in the labour market. Potential changes in available skills sets in Luton (and wider area) arising from labour market dynamics have not been modelled as part of this analysis.

6.11   Summary

In summary this chapter has presented the methodology for projecting future employment generated by London Luton Airport. The chapter has also presented the current employment generated by the Airport and the results of forecasting the employment for two key scenarios:

1. Base case: passenger growth at London Luton Airport to 12.4 mppa by 2018 and remain at 12. 4 mppa until 2028 with no planned future developments
2. Development case: passenger growth at London Luton Airport to 17.8 mppa by 2028 enabled by the developments planned by LLAOL.

The current direct onsite and offsite employment generated by the Airport is estimated to be 8,250 jobs. A further 2,700 jobs are generated through indirect and induced effects.

Without any planned developments at the Airport, the gross direct employment would be 11,050 in 2028. In comparison, the total gross direct employment generated by the Airport in 2028 in the development scenario is 13,350 jobs. This is 5,100 more jobs the current day. The actual direct employment that can be attributed to the planned developments and associated growth to 17.8 mppa is **2,300 jobs.**

In addition to direct employment, additional jobs would be generated through indirect and induced effects. It is estimated that once the Airport reaches 17.8 mppa a total of 4,400 jobs will exist through indirect and induced effects. Of which, **750 induced and indirect jobs** can be associated to the planned developments at the Airport.

Table 6.18 Employment forecasts for current, base case and development scenarios in 2028

Employment	Current Day	Base Case	Development Case	Base Growth	Development Growth	Total Growth
Gross Direct	8,250	11,050	13,350	2,800	2,300	5,100
Gross Indirect and Induced	2,700	3,650	4400	950	750	1,700
Total Gross Employment	**10,950**	**14,700**	**17,750**	**3,750**	**3,050**	**6,800**

Source Halcrow 2012

7 Current Economic Value of the Airport

7.1 Introduction

The approach used to estimate the current annual economic value of the Airport is based on an economic model developed using Excel. It relies on data inputs from a number of sources, including Business Register and Employment Survey (BRES) and Experian. These are combined to establish two components of economic impact.

The first component, referred to as direct income injection, consists of:

1. the wages and salaries of direct onsite and offsite airport workers that are spent in the local economy;

2. local income arising from direct business expenditure on goods and services; and

3. business profits likely to be invested back into the local economy.

Further multiplier impacts arise from these direct income injections into the local economy. These include the supply chain effect of local spending by businesses and the induced income effect from household spending in the local economy. These two effects are captured by a composite multiplier of 1.33.

The second component is government revenues generated as a result of the Airport's operations. This includes revenues for central government from business and personal taxes on the income generated by firms and workers. It also includes income generated for local government through business rates received from firms operating within the direct on-site and direct off-site Airport boundary. Revenue raised from Air Passenger Duty (APD) also contributes to the income generated by the government.

The current annual economic value has been assessed using the most up to date data available for each of the inputs of the model. A summary of the data sources and dates of publication is provided in Annex A. The employment data is based on BRES 2011. The data matches the current estimate of employment presented in the employment modelling. Data relating to wages and salaries, taxes, APD, and business rates are all based on the most recently available sources. The latest Experian data for 2012 has also been used within the assessment.

7.2   Direct Income Injection

7.2.1   Wages and Salaries

Our estimate for the wages and salaries of Airport workers is based on:

1. total gross direct employment of 8,250 people at the Airport based on 2011 Business Register Employment Survey (BRES) data.

2. annual average per capita employee remuneration data (gross wage levels) . The source of this data was the wage rates in Experian's 2012 National Business Database for workers at on-site and off-site businesses at the Airport.

For each Standard Industrial Classification (SIC), the 2011 employment levels at the Airport have been multiplied by the average wage rates for Airport workers to estimate employee gross remuneration, inclusive of income tax and employees national insurance contributions. Table 7.1 shows that total employee remuneration, inclusive of income tax and employees' National Insurance contributions, for workers at the Airport in 2012 is estimated to be £334 million.

To estimate the income injection into the local economy, tax and NI contributions have been deducted from the total employee remuneration figure to produce a net figure. The tax and NI have been estimated at £88 million per annum. The wages and salaries less tax and NI is approximately £245 million. It has been assumed that there is a strong correlation between total net employment remuneration and its injection into the local economy. However the strength of the correlation has not been assessed for this report.

Table 7.1: Employment, average wages and employee remuneration at London Luton Airport

Industry (Grouping of Standard Industrial Classification)	Employment by Sector	Average Wages	Total Employee Remuneration
Agriculture, Forestry and Mining	-	£0	£0
Extraction, Mining and Quarrying	-	£0	£0
Manufacturing	1,350	£43,382	£58.57
Electricity, Gas, Water supply and Recycling	-	£0	£0
Construction	-	£40,663	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	750	£18,123	£13.59
Hotels, Restaurants and Leisure	300	£15,329	£4.60
Air Transport and Supporting Activities (including Training)	3,550	£49,260	£174.87
Other transport, storage and communication	1,550	£39,856	£61.78
Business Services, Public Administration and Other Services (including Health Services)	750	£27,272	£20.45
Total (including Tax and NI)	**8,250**		**£333.86**
Tax and employee NI contributions			£88.41
Direct Injection (excl. Tax and NI)			**£245.46**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

7.2.2 Direct business expenditure

Our estimate of direct expenditure by businesses at the Airport is based on:

a) The estimated sectoral split of employees at the Airport, as shown in Table 7.1 and described above;

b) Estimates of average turnover per employee, for businesses at the Airport based on data from Experian's 2012 National Business Database.

For each type of employment, the current number of jobs at the Airport has been multiplied by the average turnover per employee to estimate the total turnover of Airport businesses. Table 7.2 shows that businesses at the Airport generate an annual turnover of approximately £1.9 billion.

Table 7.2: Employment, average turnover per employee and total turnover of businesses at London Luton Airport

Industry (Grouping of Standard Industrial Classifications)	Employment by sector	Average Turnover Per Employee	Total Turnover (£ million)
Agriculture, Fishing and Mining	-	£0	£0
Extraction, Mining, Quarrying	-	£0	£0
Manufacturing	1,350	£127,384	£171.97
Electricity, Gas, Water supply and Recycling	-	£0	£0
Construction	-	£149,295	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	750	£171,987	£128.99
Hotels, Restaurants and Leisure	300	£54,790	£16.44
Air Transport and Supporting Activities (including Training)	3,550	£391,575	£1,390.09
Other transport, storage and communication	1,550	£73,053	£113.12
Business Services, Public Administration and Other Services (including Health Services)	750	£157,918	£118.44
Total	**8,250**		**£1,939.16**

Source: BRES (2011), Experian (2012), Halcrow (2012)

To calculate the direct business expenditure injection in to the local economy, business turnover needs to be adjusted to exclude profits, taxes and remuneration.

Data from Experian's National Business Database (2012) suggests that the pre-tax profit margin for a sample of businesses at the Airport is 2.9% of business turnover. Based on this margin, pre-tax profits have been estimated at £57 million. Contributions paid by businesses towards Employers National Insurance and VAT have been estimated at £25 million, or 1.3% of business turnover for a sample of businesses at the Airport (based on Experian's National Business Database (2012)).

Deducting pre-tax profits and employee contributions to National Insurance and VAT provides an estimate of business expenditure on goods and services. To avoid double counting, wages and salaries paid to workers have also been deducted. This then leaves an estimate of the value of business expenditure by businesses at the Airport. However, the Annual Business

Survey (2011) suggests that the ratio between Business Turnover and GVA (a proxy for economic output) for the air transport sector is 22.2%, as shown in Table 7.3 below[14]. It is assumed that the 'Air Transport' sector is reflective of core and supporting activities at Luton Airport. Therefore, it is assumed that 22% of annual turnover (after employee wages, profits and taxes) is considered as GVA contribution to the local economy.

Table 7.3: Derivation of Direct Business Expenditure in the Local Economy

Stage	Description	Value (£million)
A	Total Turnover	£21,474
B	Total GVA	£4,776
C = B/A	GVA as a Proportion of Turnover	22.2%

Source: ABS (2011), Halcrow (2012)

Based on this percentage, 22% of business expenditure will provide a direct income injection into the local economy. Table 7.4 shows this injection to be worth £339 million.

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[14] Due to a lack of information on the ratio between turnover and GVA at local level, the ratio is based on UK figures.

Table 7.4: Direct business expenditure into local economy, £ million

Turnover of businesses at London Luton Airport	**£1939.16**
Average Pre Tax profit margin of sample businesses at LLA as a % business turnover (for which information is available)	2.9%
Pre tax profit for businesses at Luton Airport	£56.95
Total employee remunerations of workers at Luton airport	£333.86
Average Social Security and VAT as a % of business turnover for sample businesses at Luton Airport	1.3%
Employers contribution to Social Security and VAT	£25.28
Business Expenditure	£1,523.06
% of business activities of firms at Luton Airport that are within the core catchment area	22%
Direct Business Expenditure in the local economy	**£338.74**

Source: BRES (2011), Experian (2012), Halcrow (2012)

7.2.3 Direct profits

Table 7.5 shows that the combined annual pre tax profit of businesses at the Airport is estimated at £57 million. Data from Experian's National Business Database showed that average level of corporation tax paid by a sample of businesses at the Airport represented 0.9% of their annual turnover (based on Experian's National Business Database (2012)). Applying this percentage to all businesses at the Airport produces an estimate of total corporation tax of £18 million. Deducting these taxes from pre-tax profits provides an estimate for retained profits of £39 million. However, the factor generated in Table 7.4 above suggests that only 22% of these retained profits can be considered as direct business profits accountable to the local economy. Therefore, as shown in Table 7.5, the direct income injection from direct profits is estimated to be £9 million.

Table 7.5: Direct profits, £ million

Approximate Pre Tax Profit generated at Luton Airport	**£56.95**
Average tax on profit as a % of turnover by businesses (for which information is available)	0.9%
Approximate Tax payable on profit generated at Luton Airport	**£17.56**
Retained profits for businesses at Luton Airport	£39.39
Direct profits accountable to the local economy	**£8.76**

Source: BRES (2011), Experian (2012), Halcrow (2012)

7.2.4   Multiplier Effects

The composite multiplier effect of 1.33, which is based on BIS Additionality research, has been applied to the estimate of wages and salaries, direct business expenditure and direct profits injected into the local economy.

Table 7.6 presents the total income injection in to the local economy generated by LLAOL employees and businesses of £789 million per annum.

Table 7.6: Total income injection in to local economy (millions)

Wages and salaries of workers (excluding tax and NI)	£245.46
Direct business expenditure	£338.74
Direct profits accountable to the local economy	£8.76
Composite Multiplier Effect	£195.68
Total income injection	**£788.64**

Source: BRES (2011), Experian (2012), Halcrow (2012)

7.3   **Government Revenues**

This component includes income for central and local government from the Airport's operations e.g. business and personal taxes on the income generated by firms and workers. It also includes business rates payable by firms and Air Passenger Duty.

7.3.1   Taxes paid by businesses

Table 7.7 provides estimates of corporation tax, employers' National Insurance contributions and VAT. The combined value of these taxes is estimated at £43 million.

Table 7.7: Taxes paid by businesses, £ millions

Corporation tax	**£17.56**
Employers' national insurance contribution and VAT	**£25.28**
Taxes paid by businesses at Luton Airport annually	**£42.85**

Source: BRES (2011), Experian (2012), Halcrow (2012)

7.3.2   Taxes paid by workers

Table 7.8 shows income tax and employees National Insurance contributions that would be paid in relation to average wages for each SIC grouping (as shown in Table 7.1). The table indicates that the tax payable by workers at the Airport is approximately £88 million.

Table 7.8: Tax paid by Workers

Industry (Grouping of Standard Industrial Classifications)	LLA Employment	Per capita annual National Insurance	Per capita annual income tax	Total tax on wages and salaries (millions)
Agriculture, Fishing and Mining	-	£0	£0	£0
Extraction, Mining, Quarrying	-	£0	£0	£0
Manufacturing	1,350	£4,185	£7,233	£15.41
Electricity, Gas, Water supply and Recycling	-	£0	£0	£0
Construction	-	£3,969	£6,511	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	750	£1,261	£2,003	£2.45
Hotels, Restaurants and Leisure	300	£852	£1,444	£0.69
Air Transport and Supporting Activities (including Training)	3,550	£4,320	£9,587	£49.37
Other transport, storage and communication	1,550	£3,870	£6,349	£15.84
Business Services, Public Administration and Other Services (including Health Services)	750	£2,362	£3,833	£4.65
Total	**8,250**			**£88.41**

Source: BRES (2011), Experian (2012), Halcrow (2012)

7.3.3   Business Rates

The Valuation Office Agency provides estimates of rateable values for individual properties. The current rateable value for properties at the Airport area is estimated to be approximately £21 million. However, the rateable value of a property is not the final business rates bill that is paid. The final business rates bill is calculated and collected by local authorities after a business rate multiplier is applied to rateable values. For the financial year 2012/13, the business rate multiplier is set by the Department for Communities and Local Government at 0.458[15]. Application of the business rate multiplier results in a final business rates bill of some £9m for businesses in the vicinity of London Luton Airport. A detailed breakdown of this estimate by specific post codes is provided in Table 7.9.

Table 7-9: Rateable value of commercial premises within London Luton Airport

Postcode	Draft Rateable Values as of 2012
LU2 9NH	£321,400
LU2 9QH	£121,000
LU2 9NL	£557,250
LU2 9LU	£17,888,125
LU2 9PD	£50,500
LU2 9EX	£237,300
LU2 9LX	£14,250
LU2 9LY	£105,000
LU2 9NQ	£3,400
LU2 9NW	£797,500

[15]http://www.voa.gov.uk/rli/static/HelpPages/English/help/help022-

about_the_business_rate_multiplier.html

LU2 9NY	£58,500
LU2 9NZ	£281,000
LU2 9PE	£161,750
Total	£20,596,975
Business Rate Multiplier	0.458
Business Rates Bill	£9,433,415

Source: Valuation Office Agency (2012)

7.3.4   Air Passenger Duty

Air Passenger Duty (APD) is levied by the UK Government, and collected by the carrier or agent issuing the ticket and charged to the customer at the time of ticket purchase. The data on APD has been estimated by the Airport. It is based on the number of departing passengers broken down by categories for distance travelled, and on the charges for each category. Table 7.10 presents a detailed breakdown of APD incurred by passengers at the Airport in 2011-12. Approximately £74 million was generated for central government through this tax. The value of APD generated at LLA has decreased since the 2009 impact assessment was conducted. The reason for this is that APD was restructured in 2009.

Table 7-10: Annual Air Passenger Duty estimated by London Luton Airport (2012)

Airline Category	Air Passenger Duty per Passenger (£)	Number of departure passengers	Air Passenger Duty (£millions)
Band A (0 - 2,000 miles)	£13	4,908,613	63.81
Band B (2,001 – 4000 miles)	£65	155,624	10.12
Total	-	5,064,237	73.93

Source: London Luton Airport Operations Ltd (LLAOL)

In summary, combining the taxes from businesses and wages, the business rates and the APD shows the operations of the Airport supports an annual income of £215 million for central and local government functions.

Table 7-11: Annual Government Income generated from London Luton Airport (millions)

Direct government income	
Taxes from Businesses	£42.85
Taxes on wages (including Social Security)	£88.41
Business Rates	£9.43
Air Passenger Duty	£73.93
Total	**£214.61**

Source: Valuation Office Agency (2012), BRES (2011), Experian (2012), Halcrow (2012) London Luton Airport Operations Ltd (LLAOL)

7.4   Summary

Combining the total income injection (Table 7.6) with the total government revenue (Table 7.11) produces the annual economic value of the Airport. **It is estimated that the Airport generates an annual economic value of approximately £1.0 billion (see Table 7.12).**

Table 7-12: Estimated economic value of London Luton Airport to the regional economy (millions)

Direct income Injection	
Wages and salaries of workers (excluding tax and NI)	£245.46
Direct business expenditure	£338.74
Direct profits accountable to the local economy	£8.76
Composite Multiplier Effect	£195.68
Direct Government Income	
Taxes from Businesses	£42.85
Taxes on wages (including Social Security)	£88.41
Business Rates	£9.43
Air Passenger Duty	**£73.93**
Annual Economic Value of Luton Airport	**£1,003.25**

Source: Valuation Office Agency (2012), BRES (2011), Experian (2012), Halcrow (2012) London Luton Airport Operations Ltd (LLAOL)

8 Economic Assessment of Proposals

8.1 Introduction

This chapter presents the estimated economic impacts of the proposals, both during the construction and operational phases.

The chapter is structured in two key sections. These are:

- The employment and economic impact from the construction phase (2014-2023); and
- The employment and economic impact of the operations phase in 2028.

8.2 Methodological considerations

At the operational stage the assessment has been largely calculated on the same basis as the current economic value that was presented in Chapter 7 with some additional considerations. The modelling has been based upon 17.8mppa in 2028. Whilst construction work is planned to be completed by 2023, it will take time for passenger numbers to build up and reach a peak of 17.8 mppa. Therefore the future impact year that has been used for the assessment is 2028 by which time the growth in air passenger numbers is forecast to reach 17.8mppa.

In order to compare the value of the planned proposals, a comparison has been made with the situation that would occur if the proposals did not go ahead: referred to as the base case scenario. The advice from the Airport is that the use of additional physical capacity is limited by the schedules of the airlines and the need to retain current customer experiences. Nevertheless, the base case scenario is predicted to result in an increase in air passenger movements (to 12.4mppa) and an increase in employment at the Airport (to 11,050) by 2028. This scenario has also been assumed in the Environmental Statement.

The impacts of the proposals and associated growth have been calculated by subtracting the base case economic impact of the Airport operations from the total economic value with development in 2028

The following assumptions have been made in the calculations for the operational impact:

- A sectoral breakdown of employment at the Airport for each scenario is taken directly from Halcrow's employment modelling exercise;

- No account has been taken of the effect of inflation, (i.e. average employee remuneration and per capita output for all industrial classifications in 2028 are expressed in current price levels (2012);
- Levels of pre-tax profits, tax payable on profits, VAT and employer's National Insurance Contributions as a percentage of business turnover in 2028 will be same as those currently achieved by businesses at the Airport;
- Personal income tax rates and the level of employees' National Insurance Contributions are the same as current levels;
- The composite multiplier effect for operations of the Airport in 2028 is assumed to be same as for the current estimates;
- The rateable values of commercial properties within the direct on-site and direct off-site boundaries of the Airport in 2028 are identical to current rates; and
- The per capita rates of Air Passenger Duty for domestic, EEA and other international destinations for 2028 (at 2012 prices).

8.3   Construction Impact

The main impact during the construction phase is likely to be employment related to the development. Given their scope, the proposals will lead to the creation of significant new full time and part time construction jobs during the construction phase.

The estimate of construction related employment has been derived from the total construction costs. The construction cost estimate is £105 million[16]. It has not been possible to source a development cost breakdown for the application site detailing the proportion of costs attributable to labour costs and without this information the estimation of the number of construction jobs can not be verified.

Therefore due to data limitations, the number of gross new construction jobs has been calculated according to the total construction cost of the

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[16] This figure has been assumed for the purposes of the assessment. However, it may fluctuate.

development proposals and the average output per employee in the construction industry (based on Annual Business Survey, 2011). Further, application of a composite multiplier of 1.33 will capture induced and indirect construction employment resulting from the development proposals. Using these inputs, Table 8.1 calculates the number of gross new construction jobs at 100 Full Time Equivalents (FTEs).

Table 8.1: Construction Impacts

Stage		Construction related impact	Quantity
A		Cost of Construction	£105,000,000
B		Average annual output per employee in construction industry	£104,000
C	(B x10)	Average output per FTE[17] in construction industry	£1,400,000
D	(A / C)	Direct construction jobs created	75
E		Composite multiplier effect	33%
F	(D x E)	Indirect and induced jobs created	25
G	(D + F)	Total jobs created	100

Source: English Partnerships; LLAOL

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[17] FTE is assumed to represent an employment opportunity lasting for ten years

8.4 Operational Impacts

This section presents the economic impact during the operational stage when the construction is complete and the Airport has reached 17.8 mppa.

8.4.1 Impact on Employment

The impact on employment has been based on LLAOL's assumption that the proposals will increase passenger numbers from 9.5 mppa in 2011 to 12.4 mppa in 2028 in the "do nothing" base case scenario and 17.8 mppa with development. Halcrow's employment modelling exercise assessed the impact of air passenger movements on employment and found that when the Airport reaches 12.4 mppa, gross direct employment supported in the Core Impact Area will be 11,050. When the Airport reaches 17.8 mppa, gross direct employment supported increases to 13,350. These employment figures are presented in Table 8.2.

Table 8.2: Project Gross Employment, by sector and scenario

Industry (Grouping of Standard Industrial Classifications)	Current Scenario (2012)	Base case Scenario (2028)	Development Scenario (2028)
Agriculture, Fishing and Mining	0	0	0
Extraction, Mining, Quarrying	0	0	0
Manufacturing	1,350	1,650	2,000
Electricity, Gas, Water supply and Recycling	0	0	0
Construction	0	0	0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	750	1,000	1,200
Hotels, Restaurants and Leisure	300	450	550
Air Transport and Supporting Activities (including Training)	3,550	5,050	6,100
Other transport, storage and communication	1,550	2,250	2,700
Business Services, Public Administration and Other Services (including Health Services)	750	650	800
Total Employment	8,250	11,050	13,350

Source: Halcrow (2012), LLAOL

The employment figures indicate an increase in gross direct Airport related employment in the region of 2,800 by 2028, even without development. Once

the development proposals are included, the impact is projected to be in the order of a further 2,300 new FTE jobs.

8.5 Income injection into the local economy – Base case Scenario

8.5.1 Wages and Salaries

The projected gross employment figure above of 11,050, which was generated from Halcrow's employment modelling on the impact of passenger increases on Airport employment, has been used to inform the wages and salaries of workers. Annual per capita employee remuneration for the industrial classifications presented in the table below were originally derived from Experian's 2012 National Business Database results for on-site and off-site businesses at the Airport.

Total annual employee remuneration, including income tax and employees' contribution to National Insurance, for future workers at the Airport under the "do nothing" base case scenario is estimated to be £453 million. The injection into the local economy will be exclusive of tax and NI contributions, which are estimated at £120 million per annum. The direct injection in to the local economy by wages and salaries is £332 million.

Table 8.3: Wages and salaries

Industry (Grouping of Standard Industrial Classifications)	LLA Employment by Sector	Average Wage Rate for LLA businesses (Experian and Annual Survey of Hours and Earnings)	Total Employee Remuneration £million
Agriculture, Fishing and Mining	-	£0	£0
Extraction, Mining, Quarrying	-	£0	£0
Manufacturing	1,650	£43,382	£71.58
Electricity, Gas, Water supply and Recycling	-	£0	£0
Construction	-	£40,663	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	1,000	£18,123	£18.12
Hotels, Restaurants and Leisure	450	£15,329	£6.90
Air Transport and Supporting Activities (including Training)	5,050	£49,260	£248.77
Other transport, storage and communication	2,250	£39,856	£89.67
Business Services, Public Administration and Other Services (including Health Services)	650	£27,272	£17.73
Total (including tax and NI)			**£452.77**
Total (excluding tax and NI)			**£332.38**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.5.2 Direct business expenditure

Direct expenditure is a key component of the overall income injection of the Airport operations. It has been calculated based on:

- The sectoral split of future employment estimate as shown in Table 8.4.
- The annual per capita turnover split by the Standard Industrial Classifications, this is presented in Table 8.4. The data is based on Experian's 2012 National Business Database.

The future employment levels have been multiplied by the average turnover per employee. This has been expressed in 2012 prices. Future inflation has not been accounted for. The analysis suggests that businesses at the Airport will generate an annual turnover of approximately £2.65 billion in 2028, under the "do nothing" base case scenario.

Table 8.4: Business Turnover

Industry (Grouping of Standard Industrial Classifications)	LLA Employment by Sector	Average Turnover Per Employee for LLA businesses	Total Turnover (millions)
Agriculture, Fishing and Mining	-	£0	£0
Extraction, Mining, Quarrying	-	£0	£0
Manufacturing	1,650	£127,384	£210.18
Electricity, Gas, Water supply and Recycling	-	£0	£0
Construction	-	£149,295	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	1,000	£171,987	£171.99
Hotels, Restaurants and Leisure	450	£54,790	£24.66
Air Transport and Supporting Activities (including Training)	5,050	£391,575	£1,977.45
Other transport, storage and communication	2,250	£73,053	£164.37
Business Services, Public Administration and Other Services (including Health Services)	650	£157,918	£102.65
Total	11,050		£2,651.30

Source: BRES (2011), Experian (2012) and Halcrow (2012)

To calculate the projected direct business expenditure injection in to the local economy business turnover needs to be adjusted to exclude profits, taxes and remunerations.

Experian's National Business Database (2012) calculates pre-tax profits at £78 million, based on the average pre tax profit margin for a sample of businesses at the Airport. The margin has been estimated to be 2.9% of business turnover.

Contributions paid by businesses towards Employers National Insurance and VAT have been estimated at £35 million, or 1.3% of business turnover for a sample of businesses at the Airport (based on Experian's National Business Database (2012)).

To avoid double counting, wages and salaries for workers have been deducted to approximate the value of business expenditure incurred by organisations at the Airport. Pre tax profits and taxes have also been deducted.

As discussed in Chapter 7, data sourced from the Annual Business Survey suggests that the ratio of business turnover to GVA within the air transport sector is 22%. In this context, 22% of business expenditure by businesses at the Airport can be accounted as direct income injection into the local economy. Therefore, the future annual direct business expenditure in to the local economy in 2028 under the "do nothing" base case scenario is estimated at £464 million (Table 8.5).

Table 8-5: Direct business expenditure, £ million

Turnover of businesses at Luton Airport	**£2,651.30**
Average Pre Tax profit margin of sample businesses at LLA as a % business turnover (for which information is available)	2.9%
Pre tax profit for businesses at Luton Airport	£77.87
Total employee remunerations of workers at Luton Airport	£452.77
Average Social Security and VAT as a % of business turnover for sample businesses at Luton Airport	1.3%
Employers contribution to Social Security and VAT	£34.57

Business Expenditure (excluding employee remuneration profit and taxes)	£2,086.09
% of business activities of firms at Luton Airport that are within the core catchment area	22%
Direct Business Expenditure in the local economy	**£463.96**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.5.3   Direct profits

The future combined annual pre tax profit of businesses at the Airport in 2028 under the "do nothing" base case scenario is estimated at £78 million (see table 8.6). Data from Experian's National Business Database showed that the average level of corporation tax paid by a sample of businesses at the Airport represented 0.9% of their annual turnover. Table 8.6 shows that applying this percentage to all businesses at the Airport produces an estimate of total corporation tax of £24 million. Deducting these taxes from pre-tax profits provides an estimate for retained profits of £54 million. However, earlier analysis about the proportion of business expenditure occurring within the core impact area suggests that only 22% of these retained profits can be considered as GVA contribution to the local economy. Therefore, as shown in Tables 8.6, the direct income injection from direct profits is estimated to be £12 million.

Table 8.6: Direct profits, £ million

Approximate Pre Tax Profit generated at Luton Airport	**£77.87**
Average tax on profit as a % of turnover by businesses (for which information is available)	0.9%
Approximate Tax payable on profit generated at Luton Airport	£24.01
Retained profits for businesses at Luton Airport	£53.86
Direct profits accountable to the local economy	**£11.98**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.5.4 Multiplier Effects

Applying the composite multiplier of 1.33 to annual estimates for direct business expenditure and direct profits accountable to the local economy, suggests an annual economic value of £267 million for the supply chain effect and induced effects of business operations at the Airport.

The table below presents the summary of total income injection in to the local economy that is projected to be generated by the Airport's employees and businesses in 2028 under the "do nothing" base case scenario. In total it is estimated that the future economic value of the Airport to the local economy will be £1.08 billion per annum.

Table 8.7: Total income injection in to local economy (£ millions)

Wages and salaries of workers (excluding tax and NI)	£332.38
Direct business expenditure	£463.96
Direct profits accountable to the local economy	£11.98
Supply chain multiplier effect (indirect effect)	£266.75
Total income injection	**£1,075.07**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.6 Government Revenues – Base case Scenario

The government revenues component includes income for central and local government from the Airport's operations, e.g. business and personal taxes on the income generated by firms and workers. It also includes business rates payable by firms and Airport tax incurred from passengers.

8.6.1 Taxes paid by businesses

Table 8.8 below provides estimates of corporation tax, employer's National Insurance contributions, and VAT respectively. The combined value of these taxes is estimated at £59 million.

Table 8.8: Taxes paid by businesses, £ millions

Tax on profits / Corporation tax	£24.01
Employers contribution to Social Security and VAT	£34.57
Taxes paid by businesses at Luton Airport annually	**£58.58**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.6.2 Taxes paid by workers

Table 8.9 shows that applying the rate bands for income tax and employees National Insurance contributions suggest the tax payable by workers at the Airport in 2028 under the "do nothing" base case scenario will be approximately £120 million.

Table 8.9: Tax paid by Workers

Industry (Grouping of Standard Industrial Classifications)	LLA Employment	Per capita annual National Insurance	Per capita annual income tax	Total tax on wages and salaries (millions)
Agriculture, Fishing and Mining				
Extraction, Mining, Quarrying				
Manufacturing	1,650	£4,185	£7,233	£18.84
Electricity, Gas, Water supply and Recycling				
Construction	-	£3,969	£6,511	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	1,000	£1,261	£2,003	£3.26
Hotels, Restaurants and Leisure	450	£852	£1,444	£1.03
Air Transport and Supporting Activities (including Training)	5,050	£4,320	£9,587	£70.23
Other transport, storage and communication	2,250	£3,870	£6,349	£22.99
Business Services, Public Administration and Other Services (including Health Services)	650	£2,362	£3,833	£4.03
Total	**11,050**			**£120.39**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.6.3 Business Rates

The current rateable value for properties at the Airport area is estimated to be approximately £21 million. This is assumed to remain constant through to 2028 under the "do nothing" base case scenario. Application of the business rate multiplier results in a final business rates bill of some £9m for businesses in the vicinity of London Luton Airport. A detailed breakdown of this estimate by specific post codes is provided in Table 8.10.

Table 8.10: Rateable value of commercial premises within London Luton Airport

Postcode	Draft Rateable Values as of 2012
LU2 9NH	£321,400
LU2 9QH	£121,000
LU2 9NL	£557,250
LU2 9LU	£17,888,125
LU2 9PD	£50,500
LU2 9EX	£237,300
LU2 9LX	£14,250
LU2 9LY	£105,000
LU2 9NQ	£3,400
LU2 9NW	£797,500
LU2 9NY	£58,500
LU2 9NZ	£281,000
LU2 9PE	£161,750
Total	£20,596,975
Business Rate Multiplier	0.458
Business Rates Bill	£9,433,415

Source: Valuation Office Agency (2012)

8.6.4 Air Passenger Duty

The estimated APD for the base case scenario was obtained directly from the Airport in today's prices. The table below presents a detailed breakdown of air passenger tax that would be incurred by passengers at the Airport in 2028 under the "do nothing" base case scenario. Approximately £96 million would be generated for central government through this tax.

Table 8.11: Estimated Annual Air Passenger Duty generated at London Luton Airport in 2028 (in 2012 prices)

Airline Category	Air Passenger Duty per Passenger (£)	Number of departure passengers	Air Passenger Duty (£ million)
Band A (0 - 2,000 miles)	£13	5,972,471	£77,642,124
Band B (2,001 – 4000 miles)	£65	282,018	£18,331,157
Total		6,254,489	£95,973,281

Source: LLAOL (2012)

8.6.5   Summary: Government Income

The operations of the Airport in 2028 under the "do nothing" base case scenario, will support an annual income of £284 million for central and local government functions, as shown in Table 8.12.

Table 8-12: Annual Government Income generated from Luton Airport (£ millions)

Direct government income	
Taxes from Businesses	£58.58
Taxes on wages (including Social Security)	£120.39
Business Rates	£9.43
Air Passenger Duty	£95.97
Total	**£284.37**

Source: LLAOL (2012), Valuation Office Agency (2012), BRES (2011), Experian (2012) and Halcrow (2012)

8.7   Summary of Base case Scenario

This section has presented an assessment of the economic value of the Airport in 2028 under the "do nothing" base case scenario. **The total projected annual economic value of the Airport in 2028 is £1.36 billion. This represents an increase in economic value of £356m compared to the current value of London Luton Airport.** Table 8.13 presents a breakdown of the key components of this figure. The first component of the economic value is the direct annual income injection into the local economy, this is projected to be £808 million in 2028. This income injection will indirectly create a further annual economic value of £267 million as a result of supply chain and induced income multiplier effects. The second component, government revenue of the operation of the Airport in 2028 is projected to be £284 million.

Table 8.13: Annual Economic Value £ millions (2028)

Direct income injection to the local economy	
Wages and salaries of workers (excluding tax and NI)	£332.38
Direct business expenditure	£463.96
Direct profits accountable to the local economy	£11.98
Sub Total	**£808.33**
Composite multiplier effect	£266.75
Direct government income	
Taxes from Businesses	£58.58
Taxes on wages (including Social Security)	£120.39
Air Passenger Duty	£95.97
Business Rates	£9.43
Sub Total	**£284.37**
Total Value of the Airport	**£1,359.45**

Source: LLAOL (2012), Valuation Office Agency (2012), BRES (2011), Experian (2012) and Halcrow (2012)

8.8   Income injection into the local economy – Development Scenario

8.8.1   Wages and Salaries

The projected gross employment figure for the development scenario is 13,350. This estimate represents the impact of passenger increases on airport employment and has been used to inform the wages and salaries of workers. Annual per capita employee remuneration for the industrial classifications presented in the table below were originally derived from Experian's 2012 National Business Database results for on-site and off-site businesses at the Airport.

Total annual employee remuneration, including income tax and employees' contribution to National Insurance, for future workers at the Airport under the development scenario is estimated to be £547 million. The injection into the local economy will be exclusive of tax and NI contributions, which are estimated at £145 million per annum. The direct injection in to the local economy by wages and salaries is £401 million.

Table 8.14: Wages and salaries

Industry (Grouping of Standard Industrial Classifications)	LLA Employment by Sector	Average Wage Rate for LLA businesses (Experian and Annual Survey of Hours and Earnings)	Total Employee Remuneration £million
Agriculture, Fishing and Mining	-	£0	£0
Extraction, Mining, Quarrying	-	£0	£0
Manufacturing	2,000	£43,382	£86.76
Electricity, Gas, Water supply and Recycling	-	£0	£0
Construction	-	£40,663	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	1,200	£18,123	£21.75
Hotels, Restaurants and Leisure	550	£15,329	£8.43
Air Transport and Supporting Activities (including Training)	6,100	£49,260	£300.49
Other transport, storage and communication	2,700	£39,856	£107.61
Business Services, Public Administration and Other Services (including Health Services)	800	£27,272	£21.82
Total (including tax and NI)			**£546.86**
Total (excluding tax and NI)			**£401.47**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.8.2   Direct business expenditure

Direct expenditure is a key component of the overall income injection of the Airport operations. It has been calculated based on:

- The sectoral split of future employment estimate as shown in Table 8.15.
- The annual per capita turnover split by the Standard Industrial Classifications, this is presented in Table 8.15. The data is based on Experian's 2012 National Business Database.

The future employment levels have been multiplied by the average turnover per employee. This has been expressed in 2012 prices. Future inflation has not been accounted for. The analysis suggests that businesses at the Airport will generate an annual turnover of approximately £3.20 billion in 2028, under the development scenario.

Table 8.15: Business Turnover

Industry (Grouping of Standard Industrial Classifications)	LLA Employment by Sector	Average Turnover Per Employee for LLA businesses	Total Turnover (millions)
Agriculture, Fishing and Mining	-	£0	£0
Extraction, Mining, Quarrying	-	£0	£0
Manufacturing	2,000	£127,384	£254.77
Electricity, Gas, Water supply and Recycling	-	£0	£0
Construction	-	£149,295	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	1,200	£171,987	£206.38
Hotels, Restaurants and Leisure	550	£54,790	£30.13
Air Transport and Supporting Activities (including Training)	6,100	£391,575	£2,388.61
Other transport, storage and communication	2,700	£73,053	£197.24
Business Services, Public Administration and Other Services (including Health Services)	800	£157,918	£126.33
Total	**13,350**		**£3,203.47**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

To calculate the projected direct business expenditure injection in to the local economy business turnover needs to be adjusted to exclude profits, taxes and remunerations.

Experian's National Business Database (2012) calculates pre-tax profits at £94 million, based on the average pre tax profit margin for a sample of businesses at the Airport. The margin has been estimated to be 2.9% of business turnover.

Contributions paid by businesses towards Employers National Insurance and VAT have been estimated at £42 million, or 1.3% of business turnover for a sample of businesses at the Airport (based on Experian's National Business Database (2012)).

To avoid double counting, wages and salaries for workers have been deducted to approximate the value of business expenditure incurred by organisations at the Airport. Pre tax profits and taxes have also been deducted.

As discussed in section Chapter 7, data sourced from the Annual Business Survey suggests that the ratio of business turnover to GVA within the air transport sector is 22%. In this context, 22% of business expenditure by businesses at the Airport can be accounted as direct income injection into the local economy. Therefore, the future annual direct business expenditure in to the local economy in 2028 under the development scenario is estimated at £561 million (Table 8.16).

Table 8-16: Direct business expenditure, £ million

Turnover of businesses at Luton Airport	£3,203.47
Average Pre Tax profit margin of sample businesses at LLA as a % business turnover (for which information is available)	2.9%
Pre tax profit for businesses at Luton Airport	£94.09
Total employee remunerations of workers at Luton Airport	£546.86
Average Social Security and VAT as a % of business turnover for sample businesses at Luton Airport	1.3%
Employers contribution to Social Security and VAT	£41.77
Business Expenditure (excluding employee remuneration profit and taxes)	£2,520.76
% of business activities of firms at Luton Airport that are within the core catchment area	22%
Direct Business Expenditure in the local economy	**£560.64**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.8.3   Direct profits

The future combined annual pre tax profit of businesses at the Airport in 2028 under the development scenario is estimated at £94 million (see table 8.17). Data from Experian's National Business Database showed that the average level of corporation tax paid by a sample of businesses at the Airport represented 0.9% of their annual turnover. Table 8.17 shows that applying this percentage to all businesses at the Airport produces an estimate of total corporation tax of £29 million. Deducting these taxes from pre-tax profits provides an estimate for retained profits of £65 million. However, earlier analysis about the proportion of business expenditure occurring within the core impact area suggests that only 22% of these retained profits can be considered as GVA contribution to the local

economy. Therefore, as shown in Tables 8.17, the direct income injection from direct profits is estimated to be £14 million.

Table 8.17: Direct profits, £ million

Approximate Pre Tax Profit generated at Luton Airport	£94.09
Average tax on profit as a % of turnover by businesses (for which information is available)	0.9%
Approximate Tax payable on profit generated at Luton Airport	£29.01
Retained profits for businesses at Luton Airport	£65.07
Direct profits accountable to the local economy	**£14.47**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.8.4 Multiplier Effects

Applying the composite multiplier of 1.33 to annual estimates for direct business expenditure and direct profits accountable to the local economy, suggests an annual economic value of £322 million for the supply chain effect and induced effects of business operations at the Airport.

8.8.5 Summary of income injection for development scenario

The table below presents the summary of total income injection in to the local economy that is projected to be generated by the Airport's employees and businesses in 2028 under the development scenario. In total it is estimated that the future economic value of the Airport to the local economy will be £1.30 billion per annum.

Table 8.18: Total income injection in to local economy (millions)

Wages and salaries of workers (excluding tax and NI)	£401.47
Direct business expenditure	£560.64
Direct profits accountable to the local economy	£14.47
Supply chain multiplier effect (indirect effect)	£322.27
Total income injection	**£1,298.85**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

Subtracting the income generated in the base case scenario from the
development case reveals that a total of £224m income can be attributed to
the planned developments at the Airport

Table 8.19 Impact of planned developments on income injected into the local economy

Development forecast		Base case forecast		Income injection attributable to the planned developments
£1,299 million	–	£1,075 million	=	£224 million

Source Halcrow 2012

8.9   Government Revenues – Development Scenario

The government revenues component includes income for central and local
government from the Airport's operations, e.g. business and personal taxes
on the income generated by firms and workers. It also includes business
rates payable by firms and airport tax incurred from passengers.

8.9.1   Taxes paid by businesses

Table 8.20 below provides estimates of corporation tax, employer's National
Insurance contributions, and VAT respectively. The combined value of these
taxes is estimated at £71 million.

Table 8.20: Taxes paid by businesses, £ millions

Tax on profits / Corporation tax	£29.01
Employers contribution to Social Security and VAT	£41.77
Taxes paid by businesses at Luton Airport annually	**£70.78**

Source: BRES (2011), Experian (2012) and Halcrow (2012)

8.9.2   Taxes paid by workers

Table 8.21 shows that applying the rate bands for income tax and employees
National Insurance contributions suggest the tax payable by workers at the
Airport in 2028 under the development scenario will be approximately £145
million.

Table 8.21: Tax paid by Workers

Industry (Grouping of Standard Industrial Classifications)	LLA Employment	Per capita annual National Insurance	Per capita annual income tax	Total tax on wages and salaries (millions)
Agriculture, Fishing and Mining				
Extraction, Mining, Quarrying				
Manufacturing	2,000	£4,185	£7,233	£22.84
Electricity, Gas, Water supply and Recycling				
Construction	-	£3,969	£6,511	£0
Wholesale, Retail and Repair of motor vehicles, motorcycles and personal and household goods	1,200	£1,261	£2,003	£3.92
Hotels, Restaurants and Leisure	550	£852	£1,444	£1.26
Air Transport and Supporting Activities (including Training)	6,100	£4,320	£9,587	£84.83
Other transport, storage and communication	2,700	£3,870	£6,349	£27.59
Business Services, Public Administration and Other Services (including Health Services)	800	£2,362	£3,833	£4.96
Total	**13,350**			**£145.39**

8.9.3   Business Rates

The current rateable value for properties at the Airport area is estimated to be approximately £21 million. This is assumed to remain constant through to 2028 under the development scenario. Application of the business rate multiplier results in a final business rates bill of some £9m for businesses in the vicinity of London Luton Airport. A detailed breakdown of this estimate by specific post codes is provided in Table 8.22.

Table 8-22: Rateable value of commercial premises within London Luton Airport

Postcode	Draft Rateable Values as of 2012
LU2 9NH	£321,400
LU2 9QH	£121,000
LU2 9NL	£557,250
LU2 9LU	£17,888,125
LU2 9PD	£50,500
LU2 9EX	£237,300
LU2 9LX	£14,250
LU2 9LY	£105,000
LU2 9NQ	£3,400
LU2 9NW	£797,500
LU2 9NY	£58,500
LU2 9NZ	£281,000
LU2 9PE	£161,750
Total	£20,596,975
Business Rate Multiplier	0.458
Business Rates Bill	£9,433,415

Source: Valuation Office Agency (2012)

8.9.4 Air Passenger Duty

APD is levied by the UK Government, and collected by the carrier or agent issuing the ticket and charged to the customer at the time of ticket purchase. The estimated APD was obtained directly from the Airport in today's prices. The table below presents a detailed breakdown of air passenger tax that would be incurred by passengers at the Airport in 2028 under the development scenario. Approximately £135 million would be generated for central government through this tax.

Table 8.23: Estimated Annual Air Passenger Duty generated at London Luton Airport in 2028 (in 2012 prices)

Airline Category	Air Passenger Duty per Passenger (£)	Number of departure passengers	Air Passenger Duty (£ million)
Band A (0 - 2,000 miles)	£13	8,546,544	£111,105,077
Band B (2,001 – 4000 miles)	£65	373,931	£24,305,535
Total		8,920,476	£135,410,612

Source: LLAOL (2012)

8.9.5 Summary of Government Income for Development Scenario

The operations of the Airport in 2028 under the development scenario will support an annual income of £361 million for central and local government functions, as shown in Table 8.24.

Table 8-24: Annual Government Income generated from Luton Airport (£ millions)

Direct government income	
Taxes from Businesses	£70.78
Taxes on wages (including Social Security)	£145.39
Business Rates	£9.43
Air Passenger Duty	£135.41
Total	**£361.02**

Source: LLAOL (2012), Valuation Office Agency (2012), BRES (2011), Experian (2012) and Halcrow (2012)

In order to identify the government income that would be attributable to the planned developments the government income generated by the base case scenario has been subtracted from the development scenario. This shows that a total of £77 million would be attributable to the planned developments at the Airport.

Table 8.25 Impact of planned developments on government revenues

Development forecast		Base case forecast		Government revenue attributable to the planned developments
£361 million	–	£284 million	=	£77 million

8.10   Chapter Summary

This chapter has presented an assessment of the economic impact of the development proposals and the projected associated growth of the Airport as a result of both the base case scenario and the development scenario. Table 8.26 presents the forecasts for the economic value in the base case and the development scenarios and the growth attributable to the planned developments. The first component of the economic value is the direct annual income injection into the local economy; this is projected to be £1.3 billion in 2028 under the development scenario. Of which 322 million would be generated through supply chain and induced income effects. **A total of £224 million is attributable to the growth planned with the development proposals.**

The second component, government revenue of the operation of the Airport in 2028 is projected to be £361 million under the development scenario. **Of which £77 million is attributable to the growth planned with these proposals.**

The total projected annual economic value of the Airport in 2028 as a result of the "do nothing" base case scenario is £1.36 billion. The total projected annual economic value of the Airport in 2028 as a result of the development scenario is £1.66 billion. The difference in projected economic value between the base case and development scenarios is £300m. This value is attributable to the application proposals and the associated planned passenger growth.

Table 8.26: Annual Economic Value £ millions (2028)

Direct income injection to the local economy			
Scenario	Development Case	Base case Case	Difference
Wages and salaries of workers (excluding tax and NI)	£401.47	£332.38	£69.08
Direct business expenditure	£560.64	£463.96	£96.67
Direct profits accountable to the local economy	£14.47	£11.98	£2.49
Sub Total	**£976.58**	**£808.33**	**£168.25**
Composite multiplier effect	**£322.27**	**£266.75**	**£55.52**
Direct government income			
Taxes from Businesses	£70.78	£58.58	£12.20
Taxes on wages (including Social Security)	£145.39	£120.39	£25.01
Air Passenger Duty	£135.41	£95.97	£39.44
Business Rates	£9.43	£9.43	£0
Sub Total	**£361.02**	**£284.37**	**£76.65**
Total Value of the Airport	**£1,659.87**	**£1,359.45**	**£300.42**

Source: LLAOL (2012), Valuation Office Agency (2012), BRES (2011), Experian (2012) and Halcrow (2012)

9 Qualitative Assessment of the Proposals

This chapter presents a qualitative assessment of the economic impacts of the proposals. It is structured in two sections. Firstly it presents the significance of impact of the proposals using the standard criteria set out for conducting Environmental Impact Assessments (EIAs). Secondly it presents the contributions of the proposals to national and local policy.

9.1 Significance of the Impacts:

This section presents an assessment of the significance of the impact of the proposals using the impact significance criteria that are widely used for conducting EIAs. The assessment has been carried out as a qualitative assessment based on available knowledge and professional judgment. In these circumstances the following generic approach to predicting significant effects has been developed with reference to relevant guidance.

There are three components to the impact criteria. The first assesses the level of importance/sensitivity of the project. The second component assesses the magnitude of its impact in terms of whether they are negative or beneficial impacts. The third identifies the significance of the impact of the project by combining the importance/sensitivity of the project with the magnitude of the impact.

9.1.1 Stage 1: Determining the importance/sensitivity of the resources/receptor

Receptors likely to be affected by the development proposals have been identified within the defined study area. The importance and/or sensitivity of the identified receptor/resource has then been determined using the following terminology:

- High sensitivity/importance;
- Medium sensitivity/importance;
- Low sensitivity/importance; and
- Negligible sensitivity/importance.

9.1.2 Stage 2: Magnitude/nature of impact

The nature and characteristics of the impact were then established and described to enable the magnitude of impacts to be determined. The impacts have been quantified where possible and the known characteristics clearly stated.

The magnitude of the impact has been assessed against the following scale:

Table 9.1: Magnitude Scale

Major	considerable impact (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards
Moderate	limited impact (by extent, duration or magnitude) which may nonetheless be considered significant in the context of the site and/or surrounding areas
Minor	slight, very short term or highly localised impact of no significant consequence
Negligible	an impact on a resource/receptor of insufficient magnitude to affect the use/integrity.

The nature of the impacts has been expressed as:

- Adverse – detrimental or negative impacts to a receptor; or
- Beneficial – advantageous or positive impact to a receptor.

Where adverse or beneficial impacts have been identified, these have been described as:

- short, medium or long-term;
- direct or indirect; and
- permanent or temporary.

In the context of the proposals, short to medium term impacts are generally considered to be those associated with the demolition and construction phase of the proposals. Long-term impacts relate to those issues that will have a lasting effect on the site and surrounding area once the proposed development is complete.

9.1.3 Stage 3: Significance of the effect

The assessment of significance is based on a combination of characteristics of the impact and the sensitivity of the receptor. The matrix set out in Table 9.2 has been used to determine the significance level of the environmental effect.

Table 9.2: Significance of the effect

		Importance of the Resource			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Impact	**Major adverse**	Major significant effect	Moderate significant effect	Minor significant effect	Minor significant effect
	Moderate adverse	Moderate significant effect	Moderate significant effect	Minor significant effect	No significant effect
	Minor adverse	Minor significant effect	Minor significant effect	No significant effect	No significant effect
	Negligible	No significant effect	No significant effect	No significant effect	No significant effect
	Minor beneficial	Minor significant effect	Minor significant effect	No significant effect	No significant effect
	Moderate beneficial	Moderate significant effect	Moderate significant effect	Minor significant effect	No significant effect
	Major beneficial	Major significant effect	Moderate significant effect	Minor significant effect	Minor significant effect

The levels of significance effect (either beneficial or adverse) can be defined as follows:

Table 9.3: Significance of the effect

Major significant effect	Significant change leading to impacts of national or international importance. Likely to affect a large number of people on a permanent basis.
Moderate significant effect	Change leading to impacts of regional or local importance. Likely to affect a small number of people on a permanent basis.
Minor significant effect	Change leading to impacts of some local interest or importance. Likely to have a temporary impact on a small number of people.
No significant effect	Change that is unlikely to lead to impacts that effect either the local economy. Feature affected is of little interest or importance.

The significance has been assessed for several key aspects of the proposals at both the construction and operational stages.

1. At the construction stage the significance of the impact on employment and other impacts has been assessed;

2. At the operational stage, the significance of the employment impacts, the economic value impacts, and the wider economic impacts has been assessed.

The results of the assessment are presented in Table 9.4 and have been elaborated on in the following paragraphs.

Table 9.4: Significance of Predicted Impacts

Receptor	Stage 1 Importance/ sensitivity	Impact	Stage 2 Magnitude/ Nature	Stage 3 Significance
Construction Impact: Employment	Medium sensitivity	Long term beneficial	Major	Moderate significant impact
Construction Impact: Other	Low sensitivity	Both benefits and disbenefits in the short term	Minor	Minor significant impact
Operational Impact: Employment	Major Importance	Beneficial - long term, direct and indirect, permanent	Major	Major Significant Effect
Operational Impact: Economic Value	Medium Importance	Beneficial – long term, direct and indirect, permanent	Moderate	Moderate Significant Effect
Wider Economic Impacts	Medium Importance	Beneficial – long term, direct and indirect, permanent	Moderate	Moderate Significant Effect

9.1.4 Qualitative Impacts of the Construction Phase

The construction stage of the proposals would have a moderate positive significant impact on employment in the Core Impact Area. It would be a short term positive impact creating construction jobs during the 2013 to 2023 period. It would have a minor significant impact on other construction related impacts such as government revenues and business disruption.

Extensive modelling would be required in order to establish the potential scale of the economic disbenefits from the construction phase. However, some main issues in relation to disruption that may be created and potential

mitigation measures have been explored, based on a review of the LLAOL Construction Programme and Draft Planning Application.

The dualling of the Airport access road will be 'off-line' and thus should minimise traffic delays during the construction period. However it is possible that there may be some traffic disruption resulting in increased journey times, vehicle operating costs and carbon emissions for vehicles using the road during the construction period. The main mitigation strategy for this would be to carry out as much of the construction work at night when the Airport is largely closed, although it may not be possible to avoid some disruption during the day.

It is unclear whether, during the construction period, the terminal and taxiway improvements will have any impact on the number of flights or passenger numbers or passenger experience at the Airport. For example there is a risk that there could be longer check-in queues, and it could take longer to taxi to and from the runway. However, works will be undertaken and phased so as to minimise any disruption.

9.1.5 Qualitative Impacts of the Operational Phase

At the operational stage, the impact on employment would be a major positive significant impact. The total new jobs that would be created by the development scenario (compared to the base case) are 2300. Based on current employment rates this would lead to an increase in the employment rate in the Core Impact Area by approximately 0.4%. This is a clear positive long term benefit of the improvements and Airport growth.

In terms of the impact on economic value, the application proposals and the associated growth will directly lead to a total of £300 million in economic value for the Core Impact Area and for government revenues. This again is a clear economic benefit and has been regarded as a positive moderate significant impact.

In addition, other impacts at the operational stage include impacts on traffic congestion and noise and air pollution. The almost doubling in the size of the Airport will significantly increase road traffic levels at, and around, the Airport. Modelling of the knock on impacts of this growth on the local road network has been undertaken in the Transport Assessment that accompanies this application. The impact of the road dualling has been assessed in the environmental impact assessment and the journey time disbenefits for existing traffic on roads around the Airport have been evaluated. The noise, air quality, road accident and carbon impacts have also been examined. A suggested mitigation strategy for this is set out in the Transport Assessment and Travel Plans.

9.2 Contribution of the proposals to policy priorities

This section looks at the contribution that the proposals would make to national planning and local policy and economic priorities. In terms of national level planning, the proposals would enable the Airport to grow in relation with nationally projected passenger growth. The Department for Transport's 2011 UK Aviation Forecasts identified that with constrained growth (without a new runway but with the option of new planning applications) the Airport could reach 15 mppa by 2030, and 17 mppa by 2050. The proposals also support to the Government's plans to increase investment in infrastructure as set out in the Government' Plan for Growth document. The proposals also support economic development creating much needed employment and income injection into the local economy and an increase in government revenues.

At the local level, the application proposals would support the objectives of the Regeneration Strategy and the Local Transport Plan. A large proportion of the jobs generated will be high value and will contribute to the local economy providing skilled jobs. This is particularly important for Luton which has suffered from a lack of highly skilled jobs in the employment market. The growth of the Airport would have a positive impact on regeneration of Luton's employment market, and would help fulfil the objectives set out by the Council in the Local Regeneration Strategy. These objectives include creating a modern and diversified economy, more jobs for all groups, and infrastructure for the 21st Century.

By enabling the Airport to expand to cater for an increase to 17.8 mppa, this would enable the opening up of new flight routes and would strengthen Luton's economy with a more connected Airport. It would help to create a positive environment for Luton to regenerate and supports the Luton Local Transport Plan's vision for a transport system that aids economic regeneration of Luton and the growth of the area. It will facilitate Luton's growth as an international gateway. The Local Enterprise Partnership has also identified the Airport as a key transport link.

The Luton Plan outlines that development at the Airport would be considered if it is Airport related; if it is aligned to the national and regional government aviation policies; if it does not have major environmental impacts and if it incorporates sustainable transportation measures, with an emphasis on promoting a modal shift towards public transport.

In terms of the environmental impact of the proposals, an extensive environmental impact assessment has been carried out to identify the scale of the environmental impacts and their mitigation where appropriate.

Opportunities for sustainable transportation within the proposed Airport improvements, in particular public transport, have been assessed in a full Transport Assessment and Travel Plan. This looks at a range of measures designed to build on the current public transport options available to passengers.

In summary, the proposals support policy at both the national and local levels.

10   Conclusion

This final chapter summarises the key employment and economic impacts of the current operation of London Luton Airport and the projected future impact of both the base case and development scenarios.

Employment assessment

The Airport currently at 9.5 mppa generates approximately 8,250 direct onsite and offsite jobs and 2,700 indirect and induced jobs. The employment model prepared for this report forecasts that if the Airport grows to the constrained base case projection of 12.4 mppa, direct employment would grow to approximately 11,050 jobs and indirect and induced employment would grow to 3,650 jobs. If the planned developments went ahead and the Airport grew to 17.8 mppa in 2028, direct employment generated by the Airport would reach 13,350 and indirect and induced employment would grow to 4,400 jobs. This would be a growth of 5,100 direct and 1,700 indirect and induced jobs since the present day.

The total direct employment that could be attributable to the planned developments is forecast to be 2300 jobs and the indirect and induced employment would be approximately 750 jobs.

The socio economic context data for Luton shows that the area faces the issue of a low skilled employment market and relatively low skilled workers. The growth of the Airport would create much needed high value jobs. It would also strengthen Luton's position as an international transport hub. This would help to create an enabling environment for economic regeneration in the area.

Economic assessment

The current overall economic impact of the operations of the Airport is £1 billion. The projected economic impact of the operations of the Airport for the base case scenario, where the Airport is projected to grow to 12.4 mppa in 2028, is projected to be £1.4 billion. If the planned developments went ahead and the Airport grew to 17.8 mppa by 2028 the economic impact of the Airport would be £1.7 billion. This is a growth of £700 million since the present day. An economic value of £300 million would be attributable to the planned developments.

Annex A: Table of Data Sources

Employment Assessment

Category	Variable	Source
TRAFFIC	ANNUAL PASSENGERS	CAA Airport statistics (historic); LLAOL forecasts (future)
	ANNUAL AIR TRAFFIC MOVEMENTS (ATMS)	
CARGO	CARGO TONNAGE	CAA Airport statistics (historic); LLAOL forecasts (future)
	SHARE OF TONNAGE THAT FLIES BY DEDICATED AIRCRAFT	
*PASSENGER /TRAFFIC CHARACTERISTICS	% PASSENGERS WHO ARE BUSINESS/LEISURE	CAA Airport statistics
	% PASSENGERS WHO ARE UK / FOREIGN RESIDENTS	
	% TRAFFIC WHICH IS DOMESTIC/INTERNATIONAL	
	% TRAFFIC WHICH IS NO FRILLS	CAA Bespoke Report
	% TRAFFIC WHICH IS SCHEDULED	CAA Airport statistics
SOCIO-ECONOMIC FACTORS	UK GDP GROWTH	ONS
	REGIONAL GVA	
	REGIONAL GROSS DOMESTIC HOUSEHOLD INCOME	
	AIR WAGES : LOCAL WAGES	Annual Survey of Hours and Earnings (ASHE) (ONS)
EMPLOYMENT	LOCAL EMPLOYMENT	Business Register and Employment Survey/ Annual Business Inquiry (BRES/ABI)

Category	Variable	Source
	REGIONAL POPULATION	Business Register and Employment Survey/ Annual Business Inquiry (BRES/ABI)

Economic Assessment

Model element	Data	Source	Date
Direct Income Injection to the Local Economy	Wages and salaries of workers (excluding income tax and employees contribution to NI)	Business Register and Employment Survey	2011
		Halcrow's Employment Modelling	2012
		Experian	2012
		Halcrow Payroll	2012
	Direct business expenditure	Business Register and Employment Survey	2011
		Halcrow's Employment Modelling	2012
		Experian	2012
		Annual Business Survey	2011
	Direct profits accountable to the local economy	Business Register and Employment Survey	2011
		Halcrow's Employment Modelling	2012
		Experian	2012
		Annual Business Survey	2011
Multiplier Effect	Composite Multiplier Effect	Halcrow's Employment Modelling	2012
Direct government income	Taxes from Businesses	Experian	2012
	Taxes on wages (including Social Security)	Experian	2012
		Halcrow Payroll	2012
	Air Passenger Duty	LLAOL	2012
	Business Rates	Valuation Office Agency	2012

Annex B: References

Bedfordshire and Luton Economic Development Partnership (2008) Bedfordshire and Luton Joint Economic Development Strategy

BIS (October 2009) BIS Occasional Paper Number 1 – Research to Improve the Assessment of Additionality

Communities and Local Government, July (2011) Draft National Planning Policy Framework

Department for Business Innovation and Skills (Oct 2009) BIS Occasional Paper No 2 – Research to improve the assessment of additionality

Department for Communities and Local Government (2010) The English Indices of Deprivation, Local Authority District Summaries

Department for Transport (March 2011) Developing a Sustainable Framework for UK Aviation

Department for Transport (August 2011) UK Aviation Forecasts

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Gujarati, D and Porter D (2009) Basic Econometrics

HM Government (2010) The Coalition – Our Programme for Government

HM Treasury and Department for Business, Innovation and Skills (BIS) (March 2011) The Plan for Growth

HM Treasury November (2011) Autumn Statement

HM Treasury November (2011) National Infrastructure Plan

HM Treasury December (2012) National Infrastructure Plan Updated

Luton Borough Council (2001) Luton Plan 2001-2011

Luton Borough Council (2011) Luton Regeneration Strategy 2011

Luton Borough Council (2011) Luton Local Transport Plan 2011-2026

London Luton Airport Operations Limited (September 2012): Revised Masterplan Document Consultation Prior to Submission of Planning Application London's Local Airport

Halcrow and PACEC (2004) Employment and Housing Implications of an Extended or Replacement Runway at London Luton Airport: A Report Commissioned Jointly by East of England Development Agency and East of England Regional Assembly

South East Midlands Local Enterprise Partnership (LEP) (2012) Draft Business Plan

11 Annex C Employment Modelling

11.1 Introduction

This annex has three aims:

a) it describes the statistical tests that were carried out to test the robustness of the econometric model;

b) it presents the co-efficients and probability values for the low, mid and high estimates for historical airport employment; and

c) it discusses some key issues that were addressed in the modelling.

11.1.1 Statistical tests

The following statistical tests which were carried out during the modelling are described in detail here:

- Covariance in the explanatory variables
- Serial correlation test
- Panel unit root tests
- Variable t-statistics and p-values
- The Fixed Effects significance
- The variance of model residuals and
- Back casting

Test 1) Covariance in the explanatory variables

Covariance (or collinearity) is a measure of how the values of two or more explanatory variables in an econometric model change together. Where the magnitude of this change is significant, represented by a high correlation coefficient in the model, it demonstrates that the explanatory variables are not independent. The presence of covariance affects the predictive ability of the model as the coefficients and statistical significance levels of the independent variables are unstable and not necessarily statistically valid.

The covariance analysis we carried out concluded that the model should not contain certain pairs of variables due to their high correlation coefficient. In particular the air traffic variables are highly correlated and thus air traffic needed to be included in the model using one of the following options:

- Million workload units (Mwlu);
- Annual passengers;
- Annual ATMs;
- Passenger ATMs and Cargo ATMs;
- Scheduled & non-scheduled ATMs / pax ;or
- Frills and No-Frills ATMs / pax

Table C1 below identifies some pairs of highly correlated variables.

Table C1: Pairs of highly correlated variables

Variable 1	Variable 2	Correlation coefficient
UK GDP GROWTH	REGIONAL GVA GROWTH	0.96
CARGO TONNAGE	ANNUAL PAX	0.92
CARGO TONNAGE	CARGO ATMS	0.87
CARGO TONNAGE	PASSENGER ATMS	0.86
LOCAL POPULATION	AIR:LOCAL AVERAGE PAY	0.69
% PAX SCHEDULED	% PAX NO FRILLS	0.68
% PAX UK RESIDENTS	% PAX ON INTERNATIONAL FLIGHTS	-0.65
% FREIGHT BY DEDICATED ATM	PASSENGER ATMS	0.61

Using this analysis we were able to propose valid combinations of explanatory variables that explain historical employment levels. Importantly, the analysis highlighted that cargo tonnage cannot feature in a model with separate passenger traffic variables.

Test 2) Serial correlation test

The data was tested for the presence of serial correlation. Serial correlation occurs when the residuals or error terms (which represent those factors that also explain employment levels but have not been included as variables in the model) are correlated with each other over time causing errors in the model. The presence of serial correlation means that explanatory significance is incorrectly attributed to the explanatory variables in a model, resulting in an overestimate of the R2 value which is a measure of the model's overall explanatory power.

The Durbin-Watson test was used to assess whether there was any serial correlation in the data. The result of this test, the D-W test statistic, ranges from 0 to 4 with a statistic around 2 indicating that there is no serial correlation present.

Our low – mid employment and high employment functions had D-W statistics of 1.7 and 1.73 respectively. The proximity of these results to 2 indicates there is no first order serial correlation. Therefore our modelling would not exhibit serial correlation

and we can robustly pursue with a regular OLS (Ordinary Least Squares) estimation method technique for the modelling.

Test 3) Panel unit root tests

Unit root tests assess whether the time series data is stationary which means that the mean and variances of the data are not dependent on the passage of time. It is important to test for stationarity in time series data because its presence can result in invalid coefficients and statistical inferences about the model.

Using the panel data specific test of common roots – the Levin, Lin and Chu test – it was possible to reject the hypothesis of stationarity in the model at a 95% level of probability.

Test 4) The Fixed Effects significance

It was important to test the joint significance of the fixed effects estimates in the econometric function because it determines whether the fixed effects for the various airports included in the panel data regression analysis are significant in explaining each airport's departure from the average function. This test provided us with a 99.86% probability that the fixed effect term was a significant explanatory variable across the airports.

Test 5) The variance of model residuals

Once a function is proposed, it is important to assess the profile of its residuals and in particular to test for the presence of heteroscedasticity. This is where the residuals, over time, display a relationship such that there is either covariance between the errors in period i and period j, or the variance of the errors is dependent upon the passage of time.

To test for the presence of heteroscedasticity we employed the Breusch-Pagan-Godfrey (BPG) test to assess how the residuals are related to the function itself over time. An auxillary regression is run with the squared residuals from the model. Using the BPG test statistic we were able to accept the hypothesis of homoscedastic errors at the acceptance level of 95% probability i.e. that there is no covariance of the residuals and their variances are not time dependent.

Test 6) Backasting

Backcasting – the process of using a forecasting model to produce historic estimates - was carried out in order to validate the econometric function's predictive capability.

On average the backcasting for London Luton Airport is very good in that it produces differences in estimated employment levels, compared to actual employment, of 1% and 5% using the Y2 and Y1 models respectively. However the backcasting exhibits a common shape across the backcast years of 2003-11, as shown in Figures C1 and C2 below.

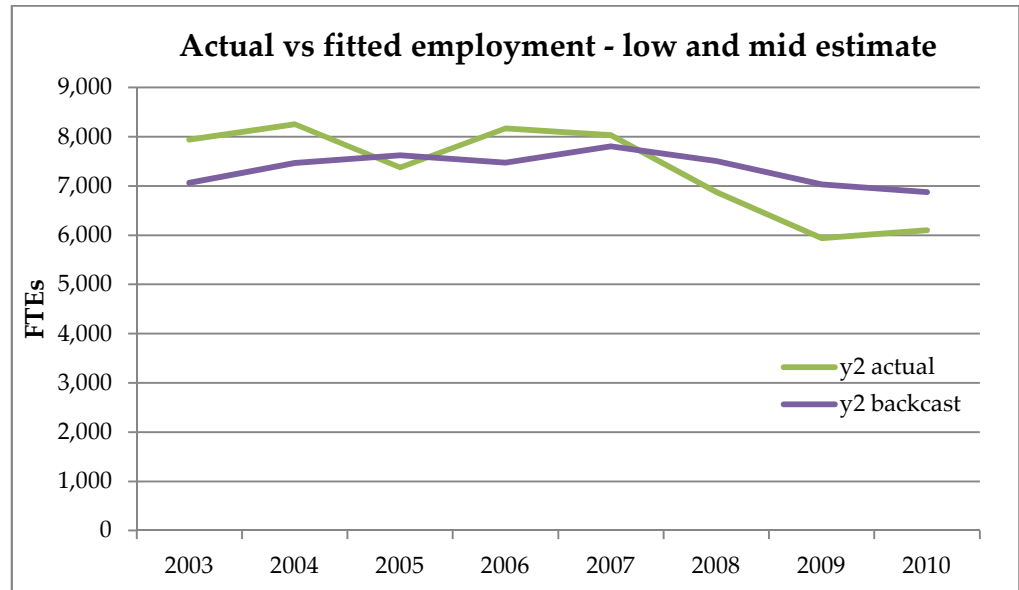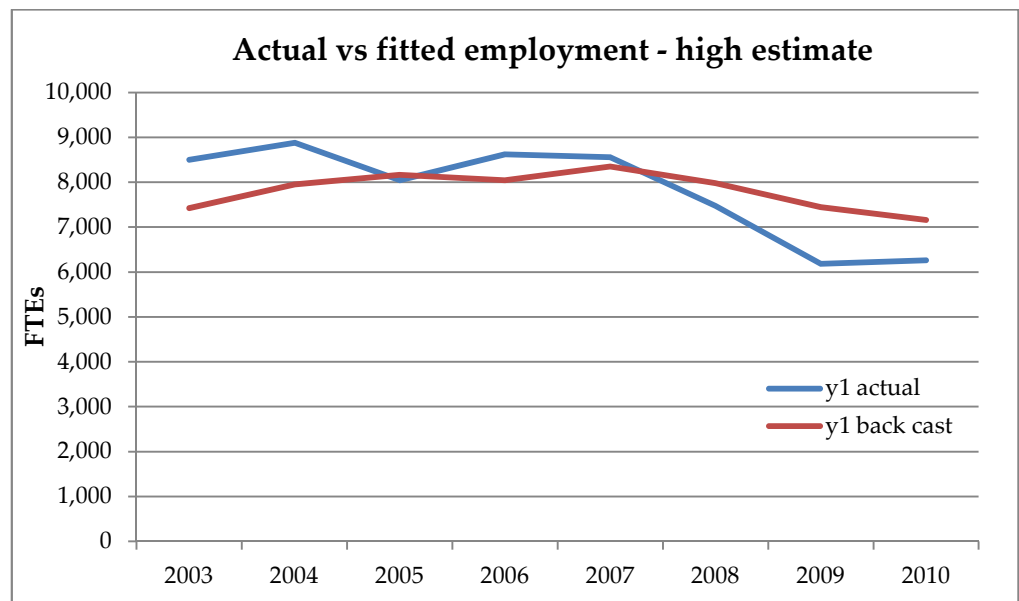*Figure C1: Actual vs fitted employment - low and mid estimate*

Actual vs fitted employment - low and mid estimate

Legend:
- y2 actual
- y2 backcast

Figure C2: Actual vs fitted employment – high estimate

Actual vs fitted employment - high estimate

Legend:
- y1 actual
- y1 back cast

The model's fitted values begin as an underestimate of the actual employment data, they then fit pretty well for the years 2005-08. The model then predicts higher employment than the levels observed historically for the latter backcasting years.

However, overall the backcasting analysis helps validate our econometric function and we can be confident in using it to forecast future employment levels.

11.1.2   Co-efficients and probability values.

This section presents the co-efficients and probability values for the low, mid and high estimates for historical airport employment; and

The final function that was used to forecast employment at Luton was:

$$Y_t = c + aY_{t-1} + bMWLU_t + FE_i + e_t$$

Where:

- Y = gross direct employment at London Luton Airport
- t = the period t (year t)
- c = the function's constant – this reflects the fixed gross employment that is observed across all identified airports
- Y_{t-1} = lagged direct employment, by one year
- a = the coefficient associated with Y_{t-1}
- mwlu = million work load units – this is a measure of both annual passengers and cargo tonnage combined[18]
- b is the coefficient associated with mwlu
- FE_i = fixed effect associated with airport "i" – this reflects the fixed gross employment that is observed specific to London Luton Airport
- e_t = error term in year t

This model was applied to both the low and mid estimates (Y2) and the high estimate (Y1) for historical employment.

Table C2 below shows the coefficients and probability values for the included variables for the low and mid employment estimate function. The probability of each variable being a significant explanatory variable is presented as 1 – the p-value associated with the variable. Variables were only included if their explanatory power was significant. This meant that we only included variables whose t-statistics and p-values indicated that they had a probability of more than 95% of explaining direct employment and thus we could be confident in their inclusion and associated coefficient.

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[18] One mwlu is equal to one million passengers per year or one hundred thousand tonnes of freight

Table C2: Coefficients and probability values for low and mid employment estimate function

Variable	Coefficient	Probability (1 – p-value)	T-stat value
Constant	1903.702		
MWLU	215.7785	99.86	3.38
Employment last period, Yt-1	0.338556	98.01	2.41
Fixed Effect	Luton = 850.5434		

Source Halcrow modelling 2012

This function has an R2 value of 98.16% showing that a very high proportion of the employment is explained by the included variables.

Table C3 below shows the coefficients and probability values for the included variables for the high employment estimate function. The same rules for the probability of each variable being a significant explanatory variable is as before.

Table C3: Coefficients and probability values for high employment estimate function

Variable	Coefficient	Probability (1 – p-value)	T-value
Constant	1242.663		
MWLU	291.0883	99.98	4.1046
Employment last period, Yt-1	0.393214	99.61	3.0335
Fixed Effect	Luton = 635.5091		

Source Halcrow modelling 2012

This function has an R2 value of 98.4% showing that a very high proportion of the employment is explained by the included variables.

For both functions, the coefficients show that employment has a direct positive relationship with previous employment and a combined variable measuring the Airport's annual passengers and cargo tonnage.

11.2   Key issues

The following four key issues were addressed in producing the forecasts. They are:

- Explaining the difference in growth between the base case and the development forecasts;
- Sensitivity testing

11.2.1 Explaining the difference in growth between the base case and the development forecasts

The base case and development scenarios display a closely matched growth trend to 2018 where the base case capacity of 12.4 mppa is reached. After this point airport traffic for the base case scenario stops growing beyond 2018, and its associated employment level remains constant after this point. This assumes therefore that once the Airport reaches capacity, productivity is stagnant. This is a result of productivity being implied as a trend in the number of employees per million passengers in the econometric function, where productivity gains only occur when traffic levels change. This is a conservative estimation of productivity. In reality one would expect some degree of productivity gains in airport employment to continue despite traffic levels remaining stationary. The sensitivity analysis in this annex, demonstrates the impact on additional employment if this assumption was altered.

Figure C3: Forecast employee to mwlu ratios for base case and development scenarios
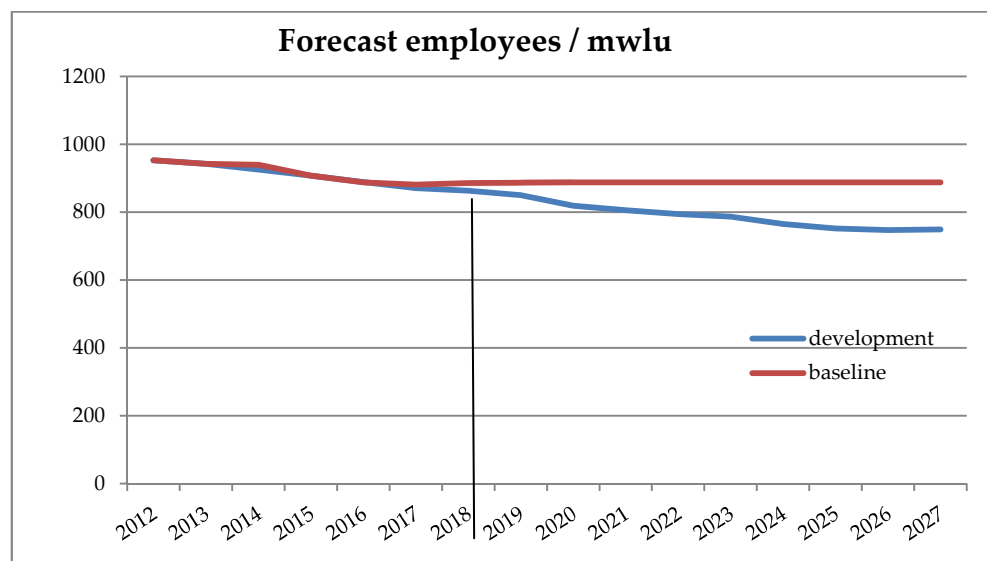
The development scenario shows a decreasing rate of growth from 2018 onwards, with proportionally fewer employees per million passengers between the present day and the development scenario than between the present day and the base case. This is due to productivity increases.

Productivity has been modelled indirectly through the metric of employees per mppa. The following figure illustrates implied labour productivity at Luton Airport between 2003 and 2011 based on the mid historical airport employment estimate from NOMIS.

Figure C4: number of jobs per million passengers per annum historically
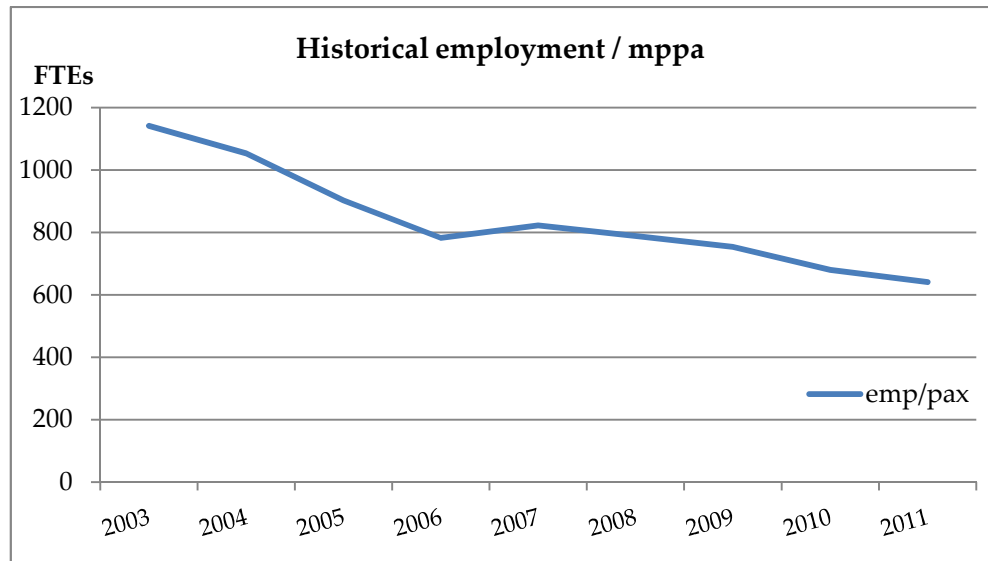
Examining figure C4 we observe an average annual decrease of 6.8% in the number of employees per million passengers. This loosely reflects annual productivity gains in the airline industry, and implies that the marginal employment increase for the handling of the next million increment of passengers generally declines over time.

Figure C5: Forecast of employees per million passengers in the development scenario
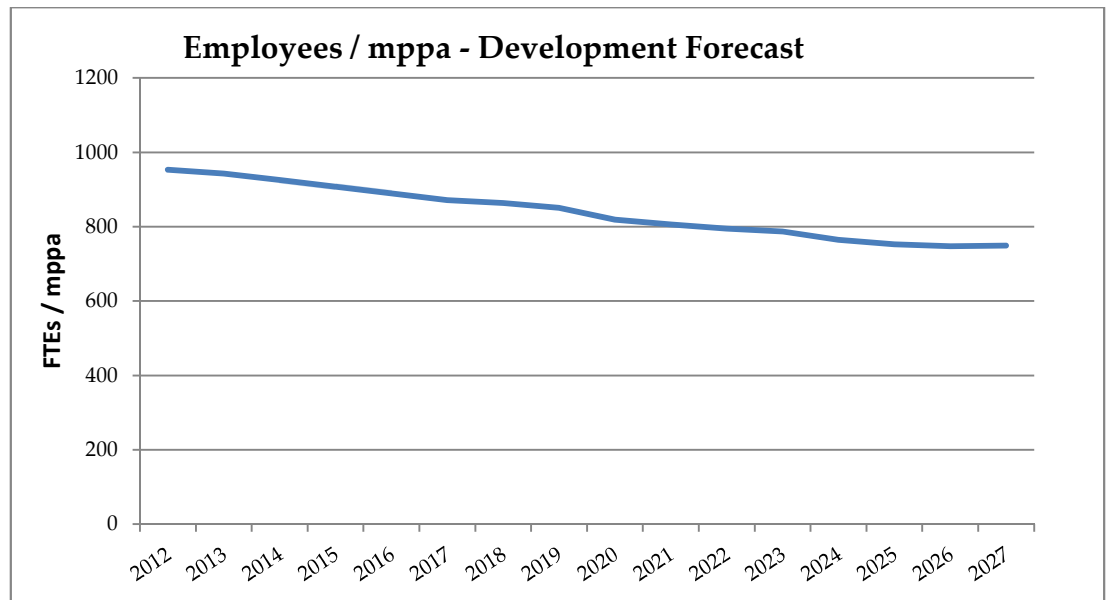
The forecast for the development scenario represents an average annual reduction of 1.3% over the period to 2028, which is a less pronounced reduction than the historical trend. This is a more sensible long term level to capture future productivity gains at

the Airport given that the historical downward trend in productivity has slowed down in recent years.

11.2.2 Variations in growth of employment types

The forecasts of total direct employment have factored in to them both fixed and variable types of employment at the Airport, as broadly demonstrated by the functional form.

However, the breakdown of employment by broad SIC groupings does not reflect any expectations for how certain employment types will grow, remain constant or decline as traffic grows over time to 2028. Analysis was undertaken on the other included airports, across the study time period, to assess whether airports of a larger size had a different SIC group breakdown to the current day at London Luton Airport, or had experienced a change in their SIC group breakdowns as traffic grew. The analysis did not however provide any conclusive evidence for how these industrial groupings change with traffic growth.

Whilst there are industry expectations as to how certain types of employment will grow or decline over time (and as traffic grows), without solid qualitative evidence for an expected change to Luton's SIC grouping breakdown we were unable to incorporate any such change into our modelling. It should also be noted that the ten SIC groupings used here are broad. As a result, even where evidence exists, for example on how specific airport tasks are expected to become increasingly automated over time, the employment related to those tasks only covers a small portion of employment within its relevant SIC grouping..

11.2.3 Employment time series data

The employment data from NOMIS came from two databases. The original Annual Business Inquiry (ABI) database was superseded in 2009 by an updated database, the Business Register and Employment Survey (BRES). The employment data obtained from ABI between 2003 and 2008 used the 2003 categorisation of SIC codes and the data from BRES used the 2007 categorisation of SIC codes. As a result there was a need to align the 2003 codes to the 2007 codes to produce a consistent employment time series data set across the historic period. This was achieved by using a NOMIS SIC code conversion document, that set out how the 2003 and 2007 codes related to each other, and by creating some additional employment categories for the Airport employment SIC codes.

The historic employment data displayed a larger reduction in employment at London Luton Airport from 2008 onwards than would be expected as a result of the UK's economic recession. Some of the comparable airports also experienced a significant drop in employment between 2008 and 2009, though none were as significant as at London Luton, whilst for others' employment actually grew.

There are several possible reasons for the drop in employment:

- It could be partially due to a wider trend reflecting methodological changes to NOMIS;
- It could be due to the recession - A dummy variable for the economic recession was tested in our modelling. However neither a simple year dummy variable from 2008/09 to 2010/11, nor a lagged dummy variable,

was shown to be a significant and valid explanatory variable for airport employment;

- ONS informed us that the drop in employment was caused to a certain extent by the restructuring and takeovers of large companies operating in the Luton area.

11.2.4   Sensitivity Testing

Three sensitivity tests – Tests 1 to 3 - were carried out in order to assess the impact on the future employment estimates if airport traffic does not to meet its projected levels for the development scenario. A further test- Test 4 - altered the assumption of no productivity growth beyond 2018 (when capacity is met) for the base case scenario. The sensitivity tests were:

- **Test 1**: The growth in passenger numbers continues to 2018 as forecast, but once 12.4mppa is hit in 2018 the growth in passenger number thereafter is assumed to be 80% of its forecast year on year growth.

- **Test 2**: The final 2028 pax and cargo figures for the development scenario are assumed to be 90% of the central case projections (17.83mppa). Over the forecast period these are scaled up using the same profile as the central case forecast. We assumed base case capacity remains as 12.4mppa.

- **Test 3**: The final 2028 pax and cargo figures for the development scenario are assumed to be 80% of the central case projections (17.83mppa). Over the forecast period these are scaled up in the same shape as current. We assumed base case capacity remains as 12.4mppa.

- **Test 4**: The base case forecasts do not result in a constant employee / mppa ratio after 2018 but rather productivity gains continue at their previous annual rate of 0.84%.

Figures C6 and C7 below show the difference between the reported employment forecasts and the estimates in these tests.

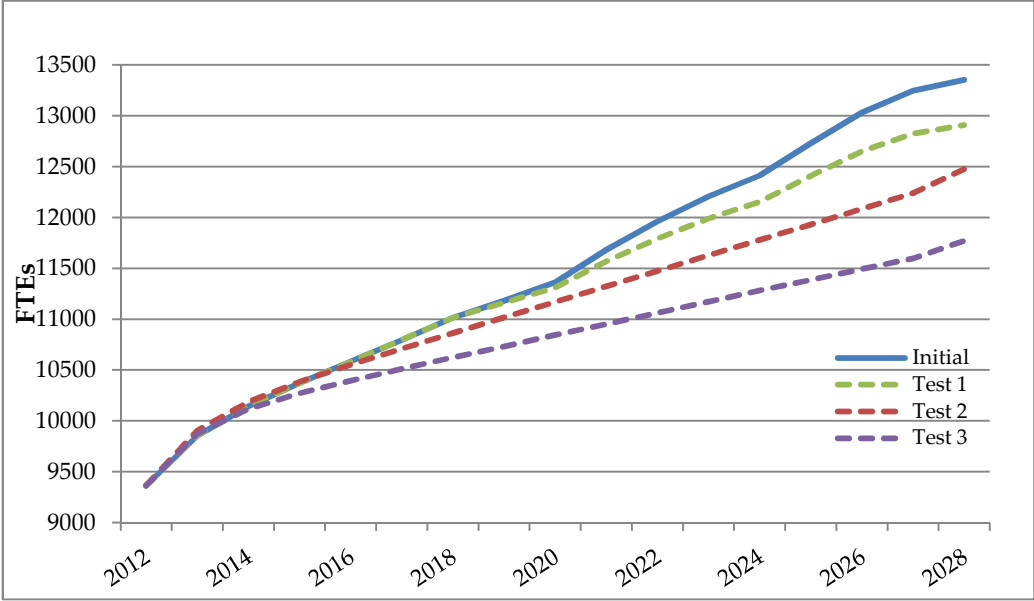*Figure C6 Sensitivity analysis of development forecast*

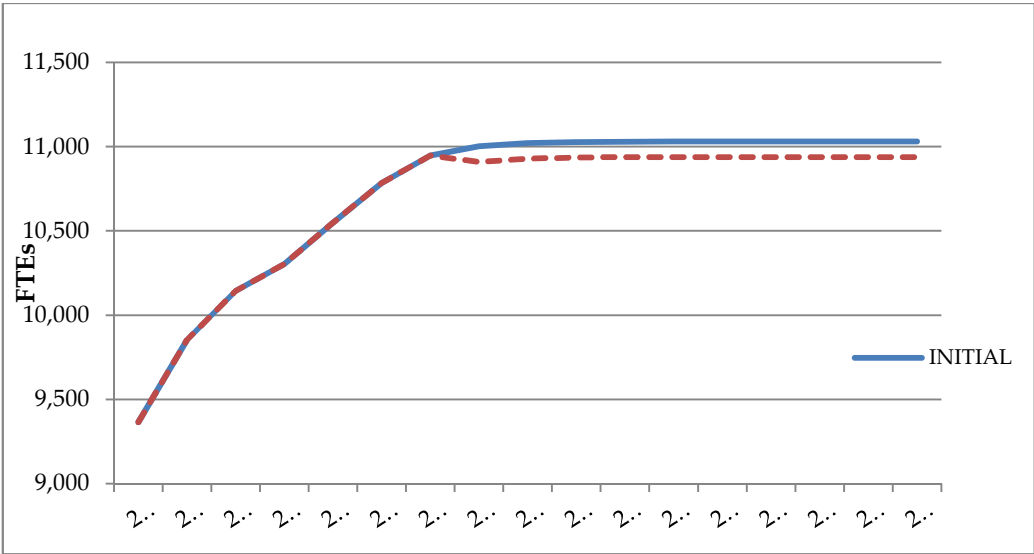*Figure C7 Sensitivity analysis of base case employment forecasts*

Table C4 below shows the 2028 gross employment figure for these scenarios, and their difference to the reported gross employment for the development scenario.

Table C4: Sensitivity scenarios

SCENARIO	2028 Mid estimate	2028 additional gross jobs (development compared to base case)
FORECASTED TO 17.8 MPPA	13,350	2,300
TEST 1	12,907	1,876
TEST 2	12,475	1,444
TEST 3	11,769	7,38
TEST 4	Base case – 10,938	2,412

Annex D: Glossary of Terms[19]

1. ATMs: Air traffic movements

2. Backcasting analysis
    Applies a function on (historical) actual inputs to assess how well it fits the actual outputs

3. Coefficient of correlation
    A measure of the degree of association between two variables

4. Collinearity
    The presence of exact linear relationships between any of the explanatory (X) variables

5. Covariance
    The product of two variables' expected deviations from their means

6. Cross sectional data
    Data which is observed from various subjects at one point in time, in this case different airports

7. Direct employment
    Employment generated directly by the operations of the Airport

8. Dependent variable
    Represents the output or effect that is to be tested, in this case the direct employment

9. Econometric function
    Specifies the relationships between dependent and explanatory variables

10. Econometric modelling
    Used in the report to refer to determining the statistical relationships between dependent and explanatory variables

11. Error term
    Represents all the factors that affect the dependent variable but which are not taken into account explicitly, it is inherent to any econometric function

12. Explanatory variables
    Variables which explain an output or effect that is measurable

13. Fixed Effect

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[19] Many of the definitions have drawn from the following source: Gujarati, D and Porter D (2009) Basic Econometrics

Consistent estimators in a function that represent the differing intercepts of subjects in data where subjects are not homogenous

14. Forecasting error
    The difference between the actual and predicted (forecast) outputs

15. FTEs: Full Time Equivalents

16. Function constant (intercept)
    A function parameter which is a constant quantity, crudely it equals the value of the dependent variable when the value of the explanatory variables is 0.

17. Heteroscedasticity
    Where the variance of the error term is not constant, but depends on some factor in the function, for example the error term may become larger over time or across different cross sections

18. Indirect effects
    Outputs generated through the supply chain associated with the Airport activities

19. Induced effects
    Outputs generated as a result of spending of employees in the local economy

20. LSOA: Lower Super Output Area

21. Model errors
    See residual term def 24.

22. Mppa: Million passengers per annum

23. Mwlu: Million work load units
    An industry term which is equivalent to 1 million passengers and/or 100,000 tonnes of cargo

24. Panel data
    Data are elements of both time series and cross-section data.

25. Panel data regression analysis
    Statistical method for estimating the relationship between dependent and explanatory variables where there is both a time series and cross-sectional element to the data

26. Panel unit root tests
    Unit root tests assess the presence of stationarity (see def 38.), the value of the specific test statistics is assigned a probability value to determine whether the presence of stationarity can be rejected or not

27. Pax: Airport passengers

28. P-values
    The probability value, or exact level of significance, of a test statistic. It is the lowest significance level at which a hypothesis can be rejected. For example a p-value of 0.05 means there is a 5% probability that the hypothesis being tested can be rejected, or alternatively 95% probability that it cannot be rejected.

29. Regression Analysis
    Statistical method for estimating the relationship between dependent and explanatory variables

30. Residuals
    Estimates from the sample regression function of the error term, these capture the affects of the dependent variable not explicit in the estimated function

31. R²
A summary measure of how well the regression fits the data, the 'goodness of fit'.

32. Serial correlation
Correlation between members of a series of observations ordered by time (time series data) or space (cross sectional data)

33. Significant bias
Where expected or average values of the estimated coefficients are not equal to their true value

34. Standard error
Measures the precision of the estimated coefficients

35. Stationarity
Where the mean and variance of a time series do not vary systematically over time

36. Statistically significant
This term has been used to relate to results that have a 95% probability that they true.

37. Standard Industrial Classifications (SICs)
Classifies business establishments and other statistical units by the type of economic activity in which they are engaged.

38. Time series
A sequence of data observations which are ordered over time

39. T-test statistic
This is used to test statistical hypotheses, where the value of the t-statistic determines whether it is statistically significant and therefore whether a hypothesis can be rejected.