




A Second Runway for Gatwick Appendix

A6

Surface Access



Arup

**Gatwick Airport R2 Surface
Access**

**Surface Access Assessment -
Technical Report**

May Submission Issue | 9 May 2014



This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Appendix A

Catchment, Connectivity and Quality of Life
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1 Introduction

1.1 Background

This report was commissioned by Gatwick Airport Limited as part of developing a surface access strategy to support a second runway at Gatwick. It sets out supporting analysis and evidence of surface access impacts and benefits in terms of building a second runway at Gatwick. It supports Gatwick's submission to the Airports Commission review of airport capacity in the UK.

The evidence provided in this report demonstrates that:

- The Runway 2 Airport Surface Access Strategy (R2 ASAS) proposals for a second runway at Gatwick and shows that deliverable solutions for road and rail are available that ensure sustainable access to support growth.
- The quality and breadth of connectivity of surface access at Gatwick is a particular strength and supports delivering a second runway in a sustainable way, consistent with Government policy and the Airports Commission criteria.

This evidence supports the proposition that The Commission should recommend Gatwick as the location for the next new runway in the UK.

1.2 Recent Growth at Gatwick

Gatwick is the second largest airport in the UK and the busiest point-to-point airport in Europe handling 35.2 million passengers in 2013. Gatwick competes for traffic with London's other main airports to achieve targeted growth. Gatwick is committed to maintaining a public transport mode share of over 40% through its 2012 ASAS with a stretch target of 45%. **Gatwick's public transport mode share in 2012 was 43.6% and is rising.**

London and the South East is an important, global market for airport demand and airline competition. This report will show that Gatwick is the most accessible airport for the London and South East air passenger market and is best placed to provide for future growth across all sectors. **Figure 1.1** shows a catchment of 3.2 million people in 30 minutes journey time and 14.8 million in 60 minutes journey time - by rail, public transport and by road – thus demonstrating **Gatwick's superior accessibility.**

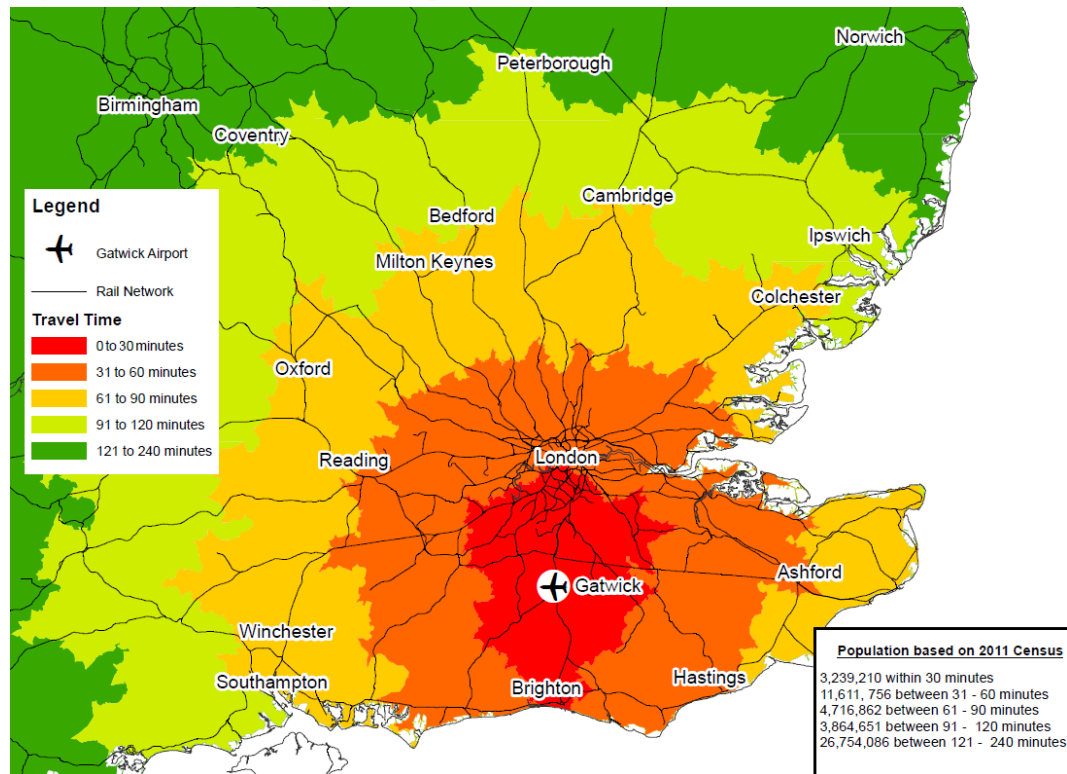
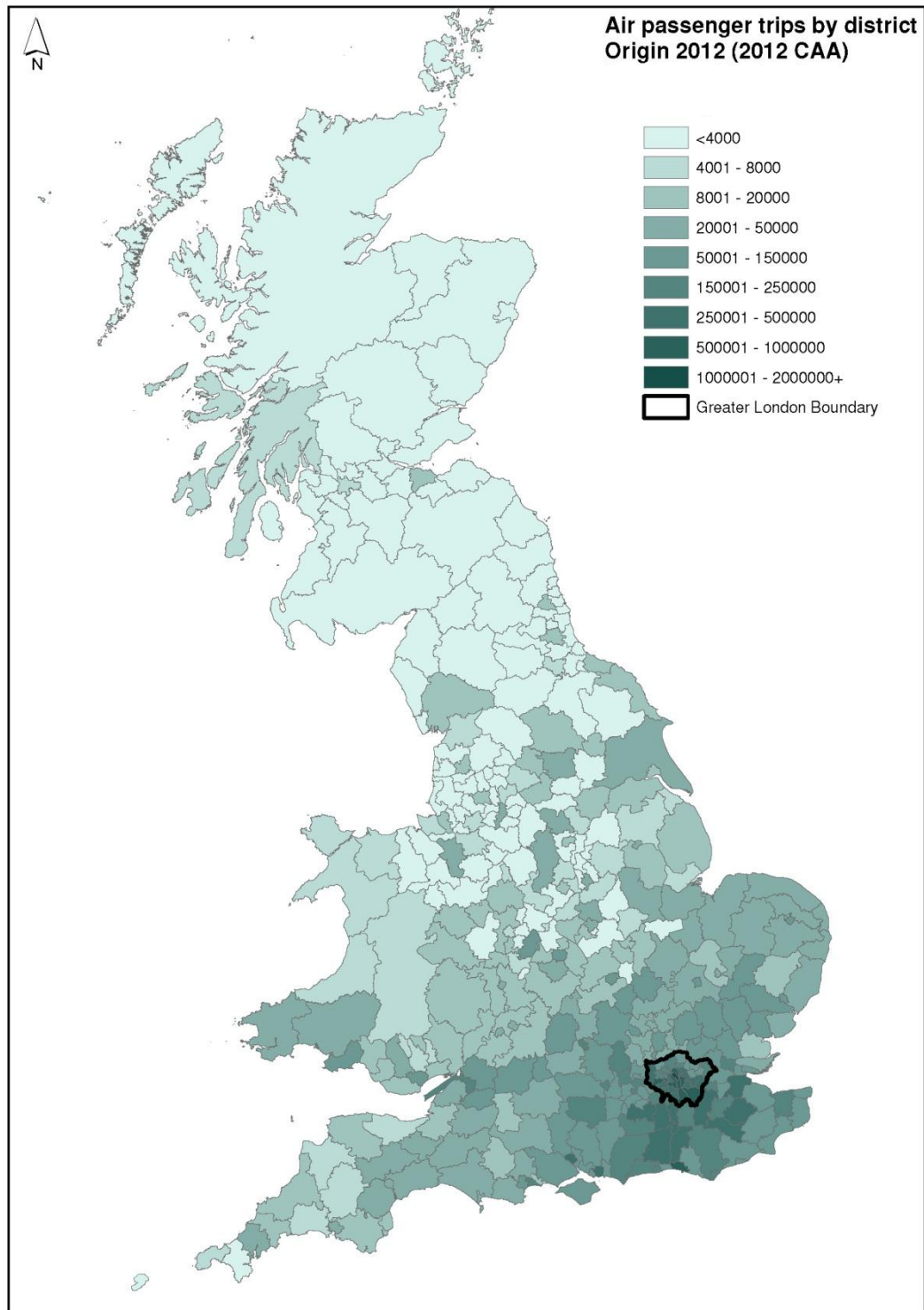
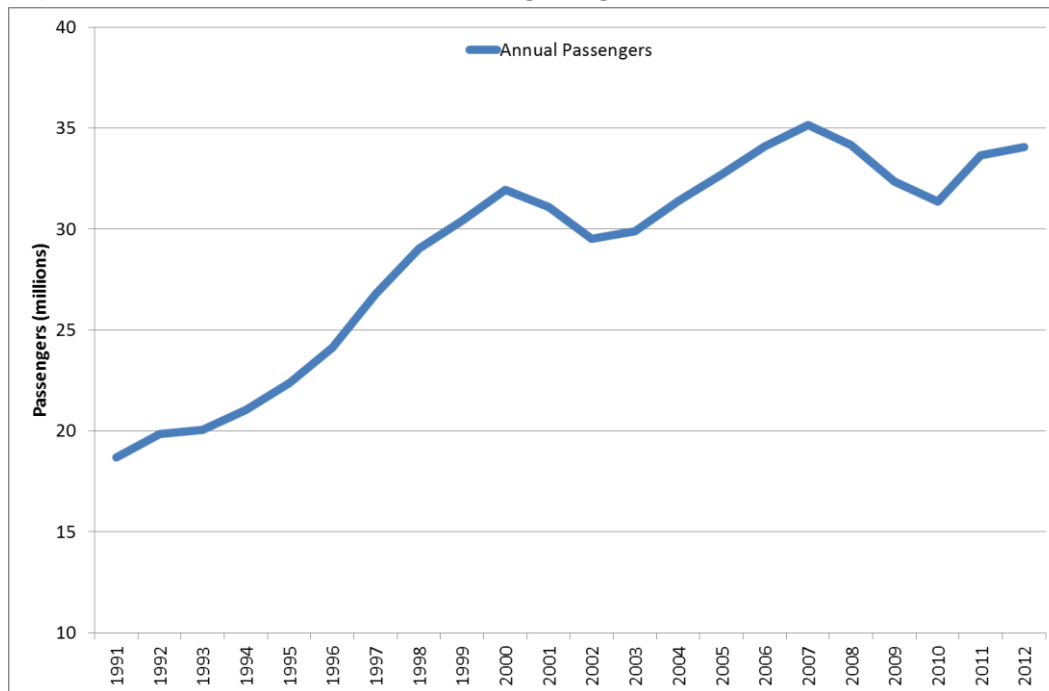
Figure 1.1: Gatwick Airport – Population by Journey Time

Figure 1.2 indicates the full extent of the Airport's air passenger catchment, which has been achieved due to the strength of Gatwick's road, rail, bus and coach connections to London, the South East and beyond. This accessibility supports Gatwick's goal of being the **best-connected airport in the UK** and demonstrates its widespread connectivity.

Figure 1.2: Gatwick Airport's Air Passenger Catchment

Source: Arup analysis of CAA Passenger Survey Data (2012)

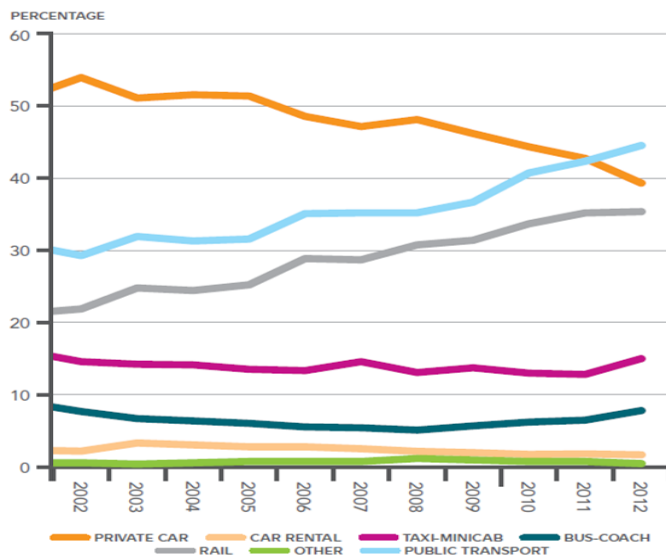
Figure 1.3 indicates the trend in annual air passenger figures since 1990. Gatwick is competitive in all sectors of the aviation market and offers a wide range of services, including legacy carriers, charter airlines, low cost carriers (LCC, in both short haul and long haul markets) and full service carriers (FSC). A large range of passengers, displaying diverse characteristics and needs, are attracted to Gatwick.

Figure 1.3: Gatwick's Annual Air Passenger Figures

Source: Gatwick Business Plan-January 2013

The impact of this passenger growth is widespread and provides considerable value to the UK economy. The economic contribution of the aviation sector is in excess of £50billion (3.8%) of UK Gross Domestic Product (GDP). Gatwick itself is estimated to have contributed over £2billion to the London and South East economy in 2012 and, as the UK's second largest international gateway, is a major economic hub in itself. The Airport has been instrumental in supporting the Gatwick Diamond which delivers approximately £13billion Gross Value Added (GVA) per annum. Because of Gatwick's excellent transport links, in particular via the Brighton Main line to South London and to the South Coast, access to employment and contribution to the regional economy extends beyond the Gatwick Diamond area in all directions. This also supports economic growth and helps to reduce unemployment in deprived communities by providing access to jobs across a wide range of sectors and skills.

At the same time that this growth in passenger numbers has occurred, **access by public transport has been growing at twice the rate**, meaning that the proportion of air passenger and employee trips accessing the airport by public transport, especially by rail, is increasing every year. This is expected to continue such that **the current stretch target of 45% public transport mode share by 2040 will be met in the next few years**. Consequently, new, more ambitious but no less achievable targets are set for this airport Masterplan assuming a second runway. The increase in public transport mode share and decline in private car use are shown respectively by the light blue line and the orange line in **Figure 1.4**.

Figure 1.4: Change in Mode Share 2002 to 2012 – Public Transport in Light Blue

Forecasts for air passenger growth have been developed by specialist consultants. These air traffic forecasts project out to 2050, though the assessments on surface access have been undertaken to 2040 demand to align with The Commission's requirements.

This report takes into consideration both the guidance and evaluation criteria from The Commission and supports Gatwick's R2 ASAS. As part of The Commission process, Gatwick has submitted short and medium term proposals for making best use of existing airport capacity, as well as a long term option for locating additional runway capacity at Gatwick.

Based on the submissions, The Commission accepted all of Gatwick's short and medium term recommendations on surface access and made the following announcements in late 2013:

- Letter from Sir Howard Davies to the Chancellor of the Exchequer, dated 26th November 2013, setting out The Commission's recommendations to Government for a short term (i.e. with no new runways) package of surface transport improvements including five for Gatwick, namely:
 - Recommendation 1: A significant upgrade of the station at Gatwick Airport through the construction of a new concourse and ticket hall with improved access to platforms, at a cost in the region of £180m.
 - Recommendation 2: Improving the suitability of Gatwick Express rolling stock for airport users through the franchising system.
 - Recommendation 3: Introduction of paperless ticketing facilities for journeys to and from Gatwick Airport station.
 - Recommendation 4: Government and Network Rail to work together to accelerate a plan for capacity enhancement of the Brighton Main Line.
 - Recommendation 5: A route strategy for the sections of the motorway network connecting to Gatwick, with a particular emphasis on the connections between the M25, M23 and the airport itself.

- The Commission's Interim Report, published on 17th December 2013, announcing that it is taking forward for further detailed study proposals for new runways at two locations as follows:
 - At Gatwick, the proposal for a new wide-spaced runway to the south of the existing runway.
 - The Heathrow Airport proposal for a new 3,500m runway to the northwest of the current runways.
 - Heathrow Hub's proposal to extend the existing northern runway to at least 6,000m, enabling it to operate as two independent runways.

The Interim Report sets out the programme for further engagement with shortlisted bidders and the next date for material to be submitted by Gatwick is 9th May 2014.

In January 2014, The Commission published draft Appraisal Objectives for surface access as follows:

- To maximise the numbers of travellers arriving at the airport on public transport, or promote green modes of transport;
- To accommodate the needs of other users of transport networks, such as commuters, intercity travellers and freight; and
- To enable access to the airport from a wide catchment area.

This document provides technical evidence to prove how Gatwick has met these objectives.

1.3 Surface Access at Gatwick

High quality, accessible and reliable surface access is critical to the success and attractiveness of the airport and Gatwick has set it at the heart of its passenger experience commitments and its objective to be London's airport of choice. Gatwick regularly checks its performance by gathering information from passengers on how well it is doing across all aspects of service provision. This includes a range of surface access measures, across all modes. This Quality of Service Monitor (QSM) provides an indication of how Gatwick and its surface access partners are performing in meeting expectations in terms of passenger experience. Gatwick's overall aim for surface access is to achieve a satisfaction score of 4.5 within a 1-5 range.

1.3.1 Gatwick Airport Surface Access Strategy and Vision

Gatwick's 2012 ASAS, 'Access Gatwick', was published in October 2012 and can be found at this link:

http://www.gatwickairport.com/PublicationFiles/business_and_community/all_publications/2012/lgw_asas_2012_web.pdf.

The Strategy's primary aim is that ***“surface transport at the airport, and to and from the airport, will deliver the outcomes to achieve the airport's passenger commitments and its objectives.”***

The vision is to:

- be the best connected and accessible UK airport, delivering integrated surface transport;
- contribute to the sustainable economic growth of the local community and of the UK economy; and
- lead the way for best practice in Surface Access Strategies, with innovation at its core.

The key targets for the 2012 ASAS are to:

- achieve 40% public transport mode share for air passengers and staff by the time the airport reaches 40 million passengers per annum (mppa);
- identify feasible measures to achieve a stretch target of 45% public transport mode share once the 40% target at 40mppa has been achieved; and
- achieve a quality service rating of 4.5 (1 is the lowest, 5 is the highest) for all surface access transport modes and facilities by the time the airport reaches 40mppa.

Accordingly the 2012 ASAS can be considered to be best practice and provides a robust foundation on which to build the R2 ASAS for a second runway.

The 2012 ASAS describes a vision for future journeys in 2030, both for passengers and staff, linking these to emerging and future technologies including smartphone technology, smart parking, luggage collection, electric vehicles as well as more sustainable buses and trains which use lower energy and make less noise. Gatwick aims to be at the heart of innovation for the entirety of a person's journey. These future journeys start on page 6 of the 2012 ASAS, at the link below. These visionary journeys are still relevant to the R2 ASAS.

http://www.gatwickairport.com/PublicationFiles/business_and_community/all_publications/2012/lgw_asas_2012_web.pdf.

The 2012 ASAS acknowledges Gatwick's role as an important regional transport hub, both as an interchange and as a destination. The following principles guide its structure:

- well governed;
- knowledgeable;
- connected;
- safe and sustainable;
- a place of work; and
- innovation – through challenging targets.

Based on the above, the new R2 ASAS has a series of strategic priorities, based on these principles, which will help support growth at Gatwick with a single runway and achieve the UK's short term aviation capacity and connectivity needs. It is notable that The Commission's Interim Report and UK Government's National Infrastructure Plan, both published in December 2013, recognise these short term priorities as of national economic importance. As a result, committed infrastructure improvements have been identified that will help deliver Gatwick's priorities.

1.3.2 Short and Medium Term

Gatwick Airport submitted its priorities for surface access in the short to medium term to The Commission in May 2013. In its submission, Gatwick sets out the reasoning behind the belief that better surface access links are needed to:

- maintain/improve Gatwick's public transport offer;
- cater for short and medium term growth; and
- attract carriers to Gatwick thereby increasing the connectivity of London to the rest of the World.

The surface access measures presented by Gatwick to The Commission in May 2013 were all published as recommendations in The Commission's Interim Report in December 2013, with the exception of an upgrade of the direct rail service to Reading from one to two trains per hour, which is expected as part of the next Great Western Franchise award from 2016. This gives added support for Government to deliver these improvements, as evidenced in the National Infrastructure Plan published in December 2013.

This period falls within the forward plan periods for the Department for Transport, Highways Agency and Network Rail, but not in their current confirmed financial delivery plans. Gatwick is therefore working with all industry partners to demonstrate that the limited additional infrastructure required can demonstrate good economic value and benefit both the commuter and the air passenger creating a win-win for both.

Committed improvements for rail enhancement have been approved by the Government and therefore support both Gatwick's continued growth and sustainable surface access mode share. Gatwick is actively supporting the following rail commitments to deliver capacity and high quality sustainable access:

- Key outputs from the Thameslink Programme and combined Thameslink/Southern/Great Northern Franchise (TSGN or New Thameslink Franchise 2015-2018);
- Quality improvements to Gatwick Express rolling stock for a non-stop service meeting air passenger needs as part of the New Thameslink Franchise, from 2015;
- Redhill station upgrade that will facilitate a second train per hour from Reading to Gatwick in Great Western Franchise (2016-2019); and
- The Gatwick Gateway of which railway station concourse improvements form part, building on the current programme of improvements (2016-2019 for delivery post 2019).

Gatwick is already in discussion with rail industry partners and Government regarding the case for supporting air passenger growth and getting best value for money from the rail network. Rail is a key element of Gatwick's surface access strategy and improving its connectivity is a major strength in supporting sustainable growth.

Road upgrades are also committed. For highways, the completion in 2014 of improvements on the A23 south of Gatwick (at Handcross – Warninglid) and on the M25 Junctions 5 to 7 ("Managed Motorways" hard shoulder running) are

expected within the next 18 months. Further capacity improvements are planned including a “Smart Motorways” scheme for the M23 Junctions 8 to 10 that adds capacity through hard shoulder running and variable speed limits. This was announced in the July 2013 and reiterated in the December 2013 National Infrastructure Statement by the Chancellor.

1.3.3 Long Term

Gatwick is projected to have a target capacity with one runway of approximately 47 million passengers per annum (mppa) by 2040, representing close to 30% growth above current throughput. Gatwick is committed to maintaining sustainable growth and delivering a high public transport mode share. Over the long term the importance of catering for air passengers on rail services to and from Gatwick, along with growth in the proportion of passengers travelling by express coach and local bus are priorities. These priorities are mirrored in the R2 ASAS, which is the focus of this report.

Plans for further enhancement of the Brighton Main Line have been prepared by Network Rail. These improvements have the potential to increase capacity as well as improving reliability and resilience on this busy part of the network. This report identifies the relevance of these further enhancements to supporting a second runway at Gatwick, with rail access the most important individual mode for air passengers.

1.4 Developing a Surface Access Strategy to support a second runway at Gatwick

Representative Masterplans have been developed based on two options which provide a basis for initial assessment of capacity, costs and impacts so high level business cases can be developed. These options and basic capacity characteristics are described in **Table 1.1**.

Table 1.1: Masterplan Options

Option	Description	Demand (MPPA)				
		2012	2025	2030	2040	2050
0	One Runway (planned growth)	35	44	46	47	-
3	Two Runways (wide spaced, independent)	-	53	65	83	95

A surface access strategy for Option 3 was developed to ensure that the impact of air passenger and employee demand for onward travel could be accommodated without deterioration in the level of service and accessibility offered. Therefore, options were tested that deliver the required capacity to accommodate growth and compared them with committed improvements in local and regional networks. Implied in this approach is supporting a progressive increase in mode share for public transport, both in air passenger and employee mode of access.

The surface access strategy for Option 3 is developed from the following:

- The physical layout of the Masterplan, its dimensions and impacts on surrounding access and transport networks;
- Future demand based on air traffic forecasts;

- Integration of committed improvements and investment in transport networks and services that serve Gatwick;
- Development of additional capacity enhancements to meet overall demand (taking account of background growth); and
- Consideration of other surface access measures and initiatives that will deliver quality and accessibility, particularly in favour of public transport.

This report also considers the importance of surface access for The Commission in selecting the most appropriate location for the next investment in significant aviation capacity. For this reason, before describing the demand forecasts and impact assessment, this report sets out both the relevant planning policy and guidance and the baseline conditions for surface access at Gatwick. This baselining provides important context for the assessment, especially in relation to comparing Option 3 with current conditions.

1.5 Structure of Report

Chapter 2 summarises the policy and planning context within which airport expansion and surface access improvements are being considered. It also highlights any relevant guidance documentation from The Commission.

Chapter 3 outlines the assessment methodology used to build the evidence base to supports the case for Gatwick.

Chapter 4 summarises the baseline conditions in relation to existing Gatwick travel demand and current surface access provision.

Chapter 5 provides details of the forecast travel demand for Gatwick.

Chapter 6 to **Chapter 9** assess the transport effects of changes in travel demand forecast at Gatwick on the Rail Network, Bus and Coach Network, the Strategic Highway and Local Roads. This includes modelling of capacity.

Chapter 10 describes walking and cycling provision. In total 9km of cycle paths and 9km of pedestrian rights of way are created by the proposed scheme.

Chapter 11 introduces the Gatwick Gateway – a public transport interchange centred on the railway station, with an integrated bus and coach facility, centralised car rental and cycle hub.

Chapter 12 describes connectivity, catchment and quality of life benefits associated with Gatwick's proposals.

Chapter 13 sets out resilience and reliability for both rail and road, with **Chapter 14** describing Gatwick's logistics strategy, including potential for construction by rail.

Chapter 15 links the technical analysis in this document back to the R2 ASAS.

2 Policy and Planning Context

The Gatwick Masterplan (2012) sets out that Gatwick will continue to deliver on its commitments and obligations around sustainable growth, captured in the legal agreement with Crawley Borough Council and West Sussex County Council, as well as the 'Decade of Change' sustainability strategy which sets out its goals and targets. In January 2013, Gatwick also published a revised 10 year Business Plan to 2024, "A New Deal at London Gatwick", which reinforces its commitment to investment and to sustainable growth.

The 2012 Masterplan notes that on-going engagement with business partners and stakeholders is central to the way Gatwick is run and it wants to ensure that the best interests of all those involved with the airport are represented, through continuous dialogue and feedback.

This chapter explores relevant planning policies at the national, regional and local level in relation to developing a surface access strategy for Gatwick with a second runway. **Table 2.1** summarises these relevant policy references relevant to Gatwick.

The approach to developing the R2 ASAS also considers the Sift Criteria (May 2013) and the subsequent Appraisal Objectives (April 2014) identified by The Commission for surface access.

The relevant sift criteria for surface access is:

- An estimate of the surface access requirements for both existing and/or new infrastructure – reflecting the capacity and accessibility of the surface transport networks serving the airport.
- How the R2 ASAS provides effective surface access for passengers, businesses and freight, including the following questions:
 - Will sufficient capacity be provided for expected future demand?
 - How will the R2 ASAS impact on local traffic and congestion?
 - What is the expected access mode split between public and private transport.
- How the R2 ASAS will change journey times from major business and population centres for airport users.

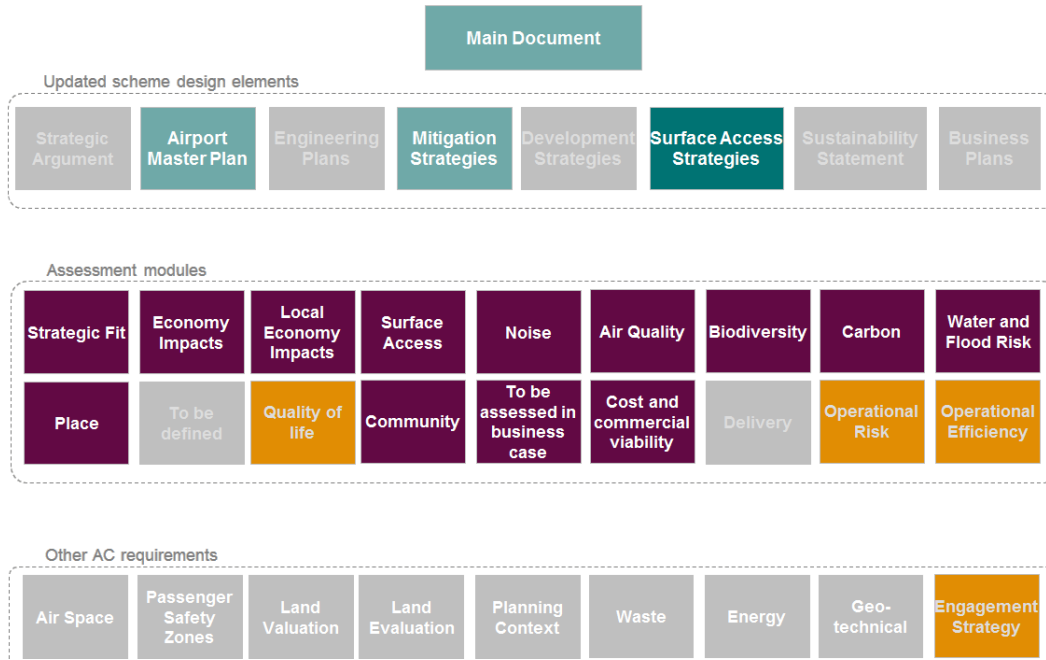
The primary appraisal objectives for the R2 ASAS are taken from Appraisal Module 4 Surface Access and are as follows:

- To maximise the numbers of travellers arriving at the airport on public transport, or promote green modes of transport;
- To accommodate the needs of other users of transport networks, such as commuters, intercity travellers and freight; and
- To enable access to the airport from a wide catchment area.

Explicit in meeting these criteria, the R2 ASAS needs to demonstrate its ability to deliver sufficient capacity and connectivity; a high quality end-to-end passenger experience; financial, economic and environmental sustainability; and sensitivity to social and community needs.

In addition and as per Table 4.1 of The Commission's Appraisal Framework, surface access links across and integrates with other *Scheme Design Elements* and *Assessment Modules* as shown graphically in **Figure 2.1**.

Figure 2.1: R2 Surface Access Strategy and Linkages (Airports Commission)



In terms of *Scheme Design Elements*, surface access is a fundamental design consideration and therefore forms part of the Main Document and the Airport Masterplan. It also informs the Sustainability Assessment in terms of mitigating air quality, carbon, noise, biodiversity and community impacts. Surface access is also identified by The Commission in terms of Mitigation Strategies “to limit detrimental and enhance positive impacts on the environment and local communities”. Accordingly, surface access solutions for Gatwick have been planned both to encourage sustainable modes and to provide capacity for airport users and other users of transport networks.

Accordingly, when considering the *Assessment Modules*, Gatwick has linked surface access to Quality of Life (shown in orange), noting that Gatwick is proposing enhancements which will improve accessibility and connectivity for people who live or work around the airport. For example, Gatwick is committed to an enhanced public transport interchange, the Gatwick Gateway, as described in Chapter 11, which will provide local residents, employees and employers with 24/7 public transport connectivity from the Gatwick region to the rest of the UK.

All other relevant *Assessment Modules* are shown in purple and are as per The Commission's Appraisal Framework, in terms of understanding environmental, social and economic impacts.

Gatwick has also added a second *Assessment Module*, namely Operational Risk and Operational Efficiency, given surface access has implications for reliability and resilience as well as passenger experience, ease of access to the airport and phasing of development.

Table 2.1: Summary of key policies, guidance and strategies

Policy	Summary relevant to Gatwick
National	
National Infrastructure Plan (December 2013)	Included an additional sum for the further development of Gatwick Airport railway station to provide an expanded concourse and improved passenger facilities. This will be required to accommodate planned growth before the introduction of a second runway but will be designed to accommodate forecast growth to 2050 and beyond. The NIP also confirmed that the Gatwick to London services will be included in a planned trial of smart ticketing in the South East.
The strategic road network and the delivery of sustainable development (September 2013)	DfT Circular 02/2013 provides the latest guidance by which the Highways Agency will assess sustainable development and economic growth whilst safeguarding the primary function and purpose of the strategic road network.
Aviation Policy Framework (March 2013)	Core principles of collaboration and transparency, through greater stakeholder engagement and an agreed evidence base for aviation growth both in hub capability and point-to-point services. Focus on sustainable surface access as a way of protecting customers' rights and improving passenger experience.
Network Rail Industry Strategic Business Plan 2014-2019 (January 2013)	Increasing capacity on main commuter routes and providing more efficient use of existing assets through longer trains and better resilience. Target on reduce crowding and supporting growth on the busiest corridors.
National Planning Policy Framework (March 2012)	Presumption in favour of sustainable development and working with neighbouring authorities and stakeholders on the transport investment necessary to support the growth of airports.
Command Paper Reforming our Railways: Putting the Customer First (2012)	Stresses the importance of Government, airport operators and local authorities to develop options for improving rail links in order to achieve sustainable surface access.
Government Plan for Growth (2011)	Highlights the importance of transport for accessing markets and attracting business. Poor infrastructure that undermines London's competitiveness will lead to new investment and jobs going overseas, not elsewhere in the UK.
Government Tourism Policy (2011)	Identifies surface access as having an important role to play in relation to wider tourism strategies and presents tourism as offering one of the fastest and most efficient ways to deliver rapid economic growth.
White Paper Creating Growth, Cutting Carbon: Making Sustainable Local Transport Happen (2011)	A vision for a greener and safer transport system and improved quality of life in communities, assisted by 'soft' measures (i.e. not requiring significant infrastructure investment) to increase the use of low carbon transport to access airports and for traffic demand management solutions.
South East Airports Taskforce Report (2011)	Emphasis on modernising infrastructure to improve performance and deliver a better passenger experience, placing this as critical to delivering sustainable growth with an overriding philosophy of "better, not bigger".
Eddington Transport Study (2006)	Positions high quality and efficient surface access to airports as strategically influential in supporting growth.
Regional	
London Plan, Draft Further Alterations to the London Plan (Jan 2014)	Policy 2.3 of the London Plan sets out that the Mayor will (and other relevant partners/regions should) engage with relevant agencies beyond London to identify and develop timescales and mechanisms for coordinating planning and investment in corridors of city region importance which connect London with the wider city region, including the Wandle Valley (a development corridor aligning

Policy	Summary relevant to Gatwick
	the Wandle Valley from Wandsworth to Croydon, including Gatwick Airport). The Plan sets out that a focused approach will be taken to integrating existing and new transport infrastructure with land use and development capacity both within London and across its borders. This will provide the basis for greater economic synergies between the constellation of business locations in and around London, supported by more effective cross border working arrangements.
London Infrastructure Plan (expected Summer 2014)	High level assessment of the full range of infrastructure delivery in the city is underway, looking at how it is managed currently and what could be improved, and considering London's strategic infrastructure needs up to 2050. The Mayor recognises that London's infrastructure under pressure and London's population is increasing. A final report is expected to be produced in Summer 2014. This could be of relevance to Gatwick.
Transport for London Business Plan (December 2013)	Focuses on three main requirements: driving London's employment and population growth, putting customers at the heart of business and making life in London better for all. It recognises that to drive growth TfL must maintain underlying infrastructure and maximise benefit from the existing network, ensuring reliability and increasing capacity.
Network Rail Long Term Market Studies (October 2013)	Strategic goals, long term demand and conditional outputs for four key markets, including London and the South East. Goals based on economic (capacity and connectivity), environmental and quality of life indicators subject to affordability and value for money. The Market Study provides a framework for growth, estimating demand and identifying how rail can support growth. The Route Plans identifies the services and network enhancements required to deliver the identified growth, including a conditional output specification for airport services.
Enterprise M3 LEP. Strategy for Growth <i>Strategy and Action Plan (May 2013)</i>	Recognises that investment must be made to improve linkages to Gatwick and highlights current capacity issues in relation to Gatwick Airport.
Network Rail Sussex Route Plan (January 2013)	The longer-term strategy for the Route is focused on enhancing the capacity of the Route to meet the forecast traffic growth whilst undertaking a renewal programme to address sustainability and asset performance.
Coast to Capital LEP and the Gatwick Diamond	<p>The Coast to Capital LEP identifies transport links as one of the cornerstones for achieving growth and that maintaining and improving connectivity is of critical importance to becoming a globally competitive economy. Its Strategic Economic Plan (2014) proposes investment in critical transport infrastructure, including within the heart of the Gatwick Diamond.</p> <p>The Gatwick Diamond is located within the Coast to Capital LEP. The Gatwick Diamond Future Plan (2012) focuses on creating the conditions to support development within the Diamond that will meet the needs of existing and future employers and communities. The transport network is acknowledged as one of the greatest economic assets in achieving this ambition. The Gatwick Diamond Local Strategic Statement (2012) sets out its long-term transport strategy will focus on 'increasing connectivity and improving access to services and employment opportunities'. It emphasises the important role Gatwick plays as a multi-modal transport hub as well as an employment magnet.</p>
London & South East RUS (July 2011)	Sets out the infrastructure enhancements that are planned to support the provision of additional capacity on the Brighton Main Line.
London Mayor's Transport Strategy (May, 2010)	Focus on efficient and effective connectivity at all levels and the importance of adequate airport capacity provision serving the South East is recognised. Seeks to improve access to London's airports for passengers and staff and supports new rail capacity.

Policy	Summary relevant to Gatwick
Sussex RUS (Route Utilisation Strategy, January 2010)	Identifies that Gatwick's surface access strategy must reconcile local commuter demand with business air passenger requirements.
Great Western RUS (March 2010)	Recognises that Reading is a key interchange point for air passengers travelling to and from Gatwick and looks at ways at increasing the level of service.
South London Partnership, The Ambitions for Growth in South London, Draft	Recognises that priority rail investment schemes in south London should include improving access to Gatwick Airport.
Local	
West Sussex Local Transport Plan 2011-2026	Identifies three challenges that need to be addressed to support growth in the Gatwick Diamond: poor rail connectivity between Gatwick and the Thames Valley and areas north of London and to the east and west; growing congestion on the strategic road network; and further road traffic leading to increased noise and emissions with resulting health and environmental issues.
Surrey Local Transport Plan 2011-2026	Identifies the need to enhance the capacity of the existing line between Reading and the Airport.
East Sussex Local Transport Plan 2011-2026	Highlights that the rail network is constrained by shortcomings in the infrastructure.
Kent Local Transport Plan 2011-2026	Identifies an aspiration to introduce direct rail services between Ashford and the Airport and to improve accessibility from the East Kent Coastal towns and the rural communities throughout the county.
Crawley Local Development Framework Core Strategy (October 2008) and Emerging Local Plan 2015-2030	Recognises the importance of the Airport and specific policies in the local plan refer to two objectives: to ensure that the growth in business at the airport is associated with measures which limit its impact on the surrounding area and to ensure that the land potentially required for future development at the airport is protected. Other saved policies refer to the need to ensure that the Airport focuses on sustainable access modes.
Local Plans – other neighbouring districts (Reigate and Banstead Borough Council, Mole Valley District Council, Horsham District Council, Mid Sussex District Council, Tandridge District Council)	All focus on the role Gatwick plays in supporting economic growth and the need to improve accessibility and connectivity to and from the Airport whilst minimising the impact of Gatwick on the local area.

3 Assessment Methodology for Supporting Evidence

3.1 Introduction

This chapter describes the assessment methodology to support the development of the R2 ASAS for Gatwick. It provides evidence supporting Gatwick's proposal to The Commission that Gatwick be chosen as the location for the next new runway in the UK. It identifies the overall assessment approach, the assumptions used and the detailed modelling approach taken to reviewing the impact of the additional demand of passengers, staff and goods predicted at Gatwick.

The method and the inputs described have been discussed with key stakeholders in a series of meetings held throughout 2013 and dialogue is ongoing.

3.2 Approach

For all of our modelling, we have taken the approach of **testing the most conservative or “highest impact” case for each mode in order to provide a robust understanding of capacity on future surface access networks.**

Demand for passengers and employees is as per the air traffic forecasts used in developing the overall Masterplan. A specialist consultant has produced detailed forecasts for the annual busy day for 2040 and a stress-test to 2050. The foundation of these forecasts is the current **busiest day of the year** as compared to movements on the average day. Airport constraints inevitably occur as traffic increases – there is less spare capacity across the whole day on the busy day than on other days. This effect is termed ‘peak spreading’, and has been modelled using the forecasts between the present day and 2040. The outputs have been validated by benchmarking against comparable values at other airports, with due consideration given to the inherent ‘peakiness’ of various traffic segments at Gatwick and the other benchmark airports.

2040 busy day airport schedule data has been incorporated into matrices corresponding to demand on transport networks for a **future 2040 busy day in September**. September was chosen as it represents one of the busiest months of the year for general background traffic and also falls outside main holiday periods which skew background traffic volumes and mode share on the network. The DfT and Highways Agency would therefore refer to September as a “neutral” month, meaning no factoring of traffic flows needs to take place to take account of seasonal or holiday variation.

For rail, modelling has been undertaken on the “highest impact” mode share, namely a 50% mode share for 2040, as part of an overall public transport mode share of 60% for passengers.

For road, modelling has been undertaken on the “highest impact” mode share, namely the current mode share of 60% of passengers accessing the airport by car maintained to 2040. This does not reflect the enhancements in rail and public transport capacity and connectivity which form part of the R2 ASAS and will drive a much higher mode share for public transport.

In addition, we have stress-tested surface access networks assuming another decade of growth to 2050 in order to demonstrate resilience in the networks for even more future growth.

We therefore have a **high degree of confidence in the modelling analysis and the findings.**

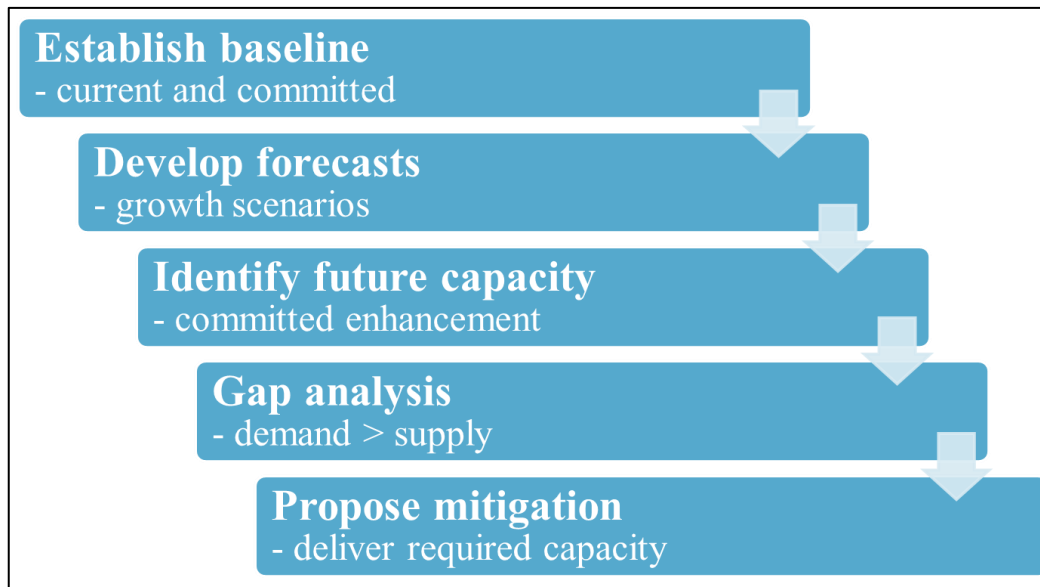
3.3 Outline Methodology

The approach to the methodology has been developed with consideration of current guidance on producing Transport Assessments. This includes:

- DfT Guidance on Transport Assessment (March 2007): National guidance that sets out the level and scope of a Transport Assessment;
- DfT Circular 02/2013: The strategic road network and the delivery of sustainable development (including supporting HA protocols); and
- West Sussex County Council (2007) Transport Assessment Methodology Guidance.

The methodology is summarised in **Figure 3.1** and covers the following approach:

- Collate the baseline information for travel demand and surface access to Gatwick along with listing the committed schemes that will be in place before the relevant assessment years.
- Provide forecasts of travel demand for Gatwick in future years – these are the air traffic forecasts described in the Air Traffic Forecast report and summarised in Chapter 5 of this report.
- Assign Gatwick travel demand to the relevant rail and highway networks.
- Assess performance of the public transport services and the highway network to compare the different growth scenarios to determine the effects, if any, of the proposed increase in travel demand at the Airport.
- Identify proposed measures which would provide adequate mitigation of any adverse impact that is identified. In addition, establish whether any additional mitigation is required and whether there are any residual impacts.
- Assess performance of potential transport measures that could improve access by public transport and cycling and reduce the need to travel by car.
- Understand how proposals facilitate other users of transport.
- Assess if there are any exogenous impacts from proposals e.g. city centre terminals.

Figure 3.1: Overall Assessment Methodology.

3.4 Assumptions

3.4.1 Incremental Change

The assessment methodology was based on examination of the effects of the incremental growth between the following scenarios:

- Option 0: Base case – assuming no airport capacity developments beyond those already permitted at Gatwick, Heathrow and Stansted.
- Option 3: Gatwick Runway 2 (wide spaced mixed mode).

3.4.2 Years for Assessment

The assessment years have been agreed to align with The Commission's appraisal objectives including:

- 2012 – baseline year for comparison.
- 2025 – opening year for additional runway.
- 2040 – in line with The Commission's requirements, modelling has been undertaken at a 2040 assessment year when two runways will be operating. 2040 is also indicative of Highways Agency requirements for comparing proposed mitigation against the ability of the existing network to accommodate traffic. Note that given the scale and nature of the development, the assessment period may be amended at the discretion of the Secretary of State for Transport, relevant to a wider political and economic imperative (as per Circular 02/2013).
- 2050 – of its own accord, Gatwick has also undertaken a sensitivity test to 2050 to consider the ultimate future capacity of a wide spaced runway option and to prove that surface transport networks perform well even at this further horizon.

3.4.3 Baseline Conditions

2012 travel demand and surface access conditions have been analysed to provide sufficient data to enable the development of transport models and the subsequent validation of the models, against a different dataset.

3.4.4 Committed and Potential schemes

A series of committed transport schemes have been included in the relevant baseline assumptions. In this context, committed schemes are those within published business plans and strategies, with confirmed sources of funding and/or Government endorsement. Information on the committed schemes has been and continues to be discussed with the Highways Agency, The Department for Transport, Transport for London, Network Rail, West Sussex and Surrey County Councils and Crawley Borough Council to ensure the assumptions made are reasonable and the modelling robust.

The committed schemes are summarised in **Table 3.1** with details of which scenarios they have been included in, based on projected or known start dates.

Note that there are no committed schemes with an expected delivery after 2025. The table also notes two potential schemes – Crossrail 2 and HS2, not yet committed but supported by Government subject to a successful business case, that are of direct relevance for surface access capacity and catchment to Gatwick. These are major, strategic improvements of national importance that have wide reaching benefits.

These committed schemes form the basis on which to build the R2 ASAS for a second runway. In turn, the R2 ASAS sets out the requirements and a plan for achieving milestones and targets for surface access, including a higher public transport mode share.

On 17th April, The Commission provided its Supplementary Advice Note on Surface Transport Baselines. The schemes assumed in this analysis reflect this advisory note. Modelling of rail capacity out to 2040 reflects the Extended Baseline including proposed capacity enhancements to the Brighton Main Line in CP6 (2019-2024) programme as well as improvements in the Clapham Junction area.

Table 3.1: Assumed Committed Schemes

Stakeholder	Scheme (assumed completion)	Mode	2025	2030 onwards
Transport for London	Crossrail (2018)	Rail	<ul style="list-style-type: none"> Will expand the city's rail capacity by 10% 	
Transport for London	Victoria Line (2013)	Tube	<ul style="list-style-type: none"> More trains will be added – up to 33 trains an hour at peak times, will carry about 10,000 more passengers an hour overall 	
Transport for London	Victoria Station (2018)	Rail /Tube	<ul style="list-style-type: none"> The finished station will offer about 3 times the capacity of the current station The station caters to around 82 million passengers per year at the moment, but this is expected to increase to 100 million by 2020 	
Transport for London	Northern Line (2014)	Tube	<ul style="list-style-type: none"> Capacity increased by 20%, will carry the equivalent of an extra 11,000 passengers an hour 	
Transport for London	Sub Surface Lines – Circle Line & Hammersmith and City Line (2018)	Tube	<ul style="list-style-type: none"> Overall capacity increased by 65% (some improvements have already been made), meaning about 17,000 more passengers an hour 	
Transport for London	Sub Surface Lines – District Line (2018)	Tube	<ul style="list-style-type: none"> Capacity increased by 24%, meaning about 10,000 more passengers an hour 	
Transport for London	Sub Surface Lines – Metropolitan Line (2018)	Tube	<ul style="list-style-type: none"> Capacity increased by 27%, meaning about 9,500 more passengers an hour 	
Network Rail	Arun Valley Resignalling (2014)	Rail	<ul style="list-style-type: none"> Will increase route reliability and reduce variable delays 	
Network Rail	East Sussex Resignalling (2013)	Rail	<ul style="list-style-type: none"> Will increase route reliability and reduce variable delays 	
Network Rail	Proposed investment to improve capacity and capability in CP5 (2019)	Rail	<ul style="list-style-type: none"> Will increase route capacity by 45% (Sussex Routes) meaning about 11,500 more passengers an hour 	
Network Rail	Thameslink (2018)	Rail	<ul style="list-style-type: none"> Increasing trains in each direction through central London by up to 300% (peaking at up to 24 per hour) Longer trains (12 cars). An increase from a maximum of 8 cars at present. 	
Highways Agency	Dartford Free Flow Crossing (2014)	Road	<ul style="list-style-type: none"> Reduce variable delays and improve throughput at the tolled crossing 	
Highways Agency	M25 Junctions 5-7 Managed Motorways (2015)	Road	<ul style="list-style-type: none"> Will allow the hard shoulder to be used as a running lane, and will increase the capacity by 25-30%. Currently under construction. 	
Highways Agency	M25 Junctions 8-10 Controlled Motorways (2015)	Road	<ul style="list-style-type: none"> Will improve safety and reliability of journey times through speed control via overhead gantry signals 	
Highways Agency	A23 Handcross to Warninglid (2014)	Road	<ul style="list-style-type: none"> Will improve traffic flow by widening the existing road, and will improve safety at an accident hotspot 	
Highways Agency	M23 J8-10 Smart Motorways	Road	<ul style="list-style-type: none"> Will allow the hard shoulder to be used as a running lane, and will increase the capacity by 25-30%, with associated junction improvements on M25 and M23. This project is identified in the National Infrastructure Plan of December 2013. 	
Potential schemes of National Importance				
Transport for London	Crossrail 2 (post 2025)	Rail		<ul style="list-style-type: none"> New south-west to north east cross-London rail link linking Wimbledon and Clapham Junction with St Pancras and Tottenham Hale
Network Rail	HS2 (Phase 1 – 2026)	Rail		<ul style="list-style-type: none"> HS2 will run up to 14 trains per hour in each direction for Phase 1, rising to 18 for Phase 2. There will be up to 1,100 seats per train

3.5 Modelling Process

3.5.1 Approach

Transport modelling can be used to assess the impact of future growth on the quality and reliability of surface access. For the development of the R2 ASAS for a second runway at Gatwick, modelling informs the development of demand and supply measures required to maintain a standard of surface access that is sustainable, provides for background growth in the South-East and facilitates the expansion of Gatwick. This section defines the approach to highway and public transport modelling using suitable strategic and local models which have a good representation of Gatwick and its surrounding transport network.

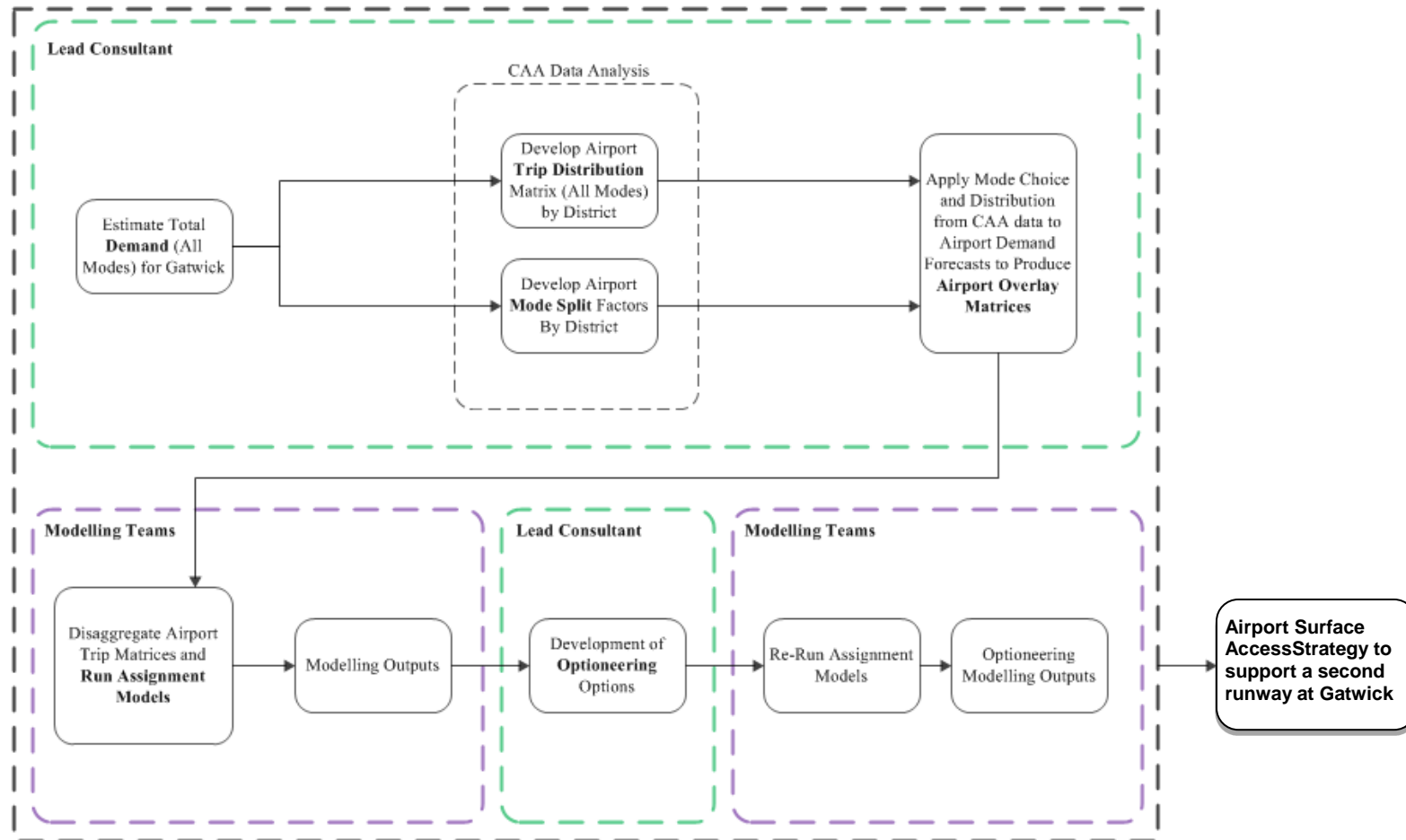
In summary the modelling tasks and approach can be summarised as follows:

- **Task 1 Define Assumptions** – Clearly define assumptions to be used during data analysis and modelling, including future year committed schemes.
- **Task 2 Trip Generation** – Understand total passenger and employee demand and goods traffic generated by Gatwick under each future growth scenario and each forecast year.
- **Task 3 Trip Distribution** – Estimate the distribution of the commuter and passenger trips with appropriate considerations to changes in market segments and catchment area as a result of airport expansion.
- **Task 4 Mode Split** – Apply an appropriate mode split for air passengers and employees accessing Gatwick.
- **Task 5 Assignment** – Undertake assignment model runs based on demand for different surface access modes to Gatwick.
- **Task 6 Outputs** – Produce outputs from the assignment model runs that can be used to identify stress on the network and help target mitigation measures to provide additional capacity.
- **Task 7 Optioneering** – Identify measures to address weaknesses or constraints in the transport networks and develop mitigation measures.
- **Task 8 Optioneering Outputs** – Produce outputs to demonstrate the effectiveness of the options tested through the assignment modelling.

3.5.2 Model Inputs

Three separate models have been used to undertake the analysis. These comprise strategic rail (PLANET South) and highway (SATURN) models – these have been previously validated and used by the Department of Transport and the Highways Agency to test transport schemes of national importance – and a local VISSIM microsimulation model developed specifically for Gatwick. **Figure 3.2** illustrates the modelling methodology.

The development of demand matrices for air passenger and employee demand is as provided by specialist forecasting consultants and are contained in the air traffic forecast report. These matrices have been applied to the zoning structure of the appropriate models to use as “overlays” of airport trips.

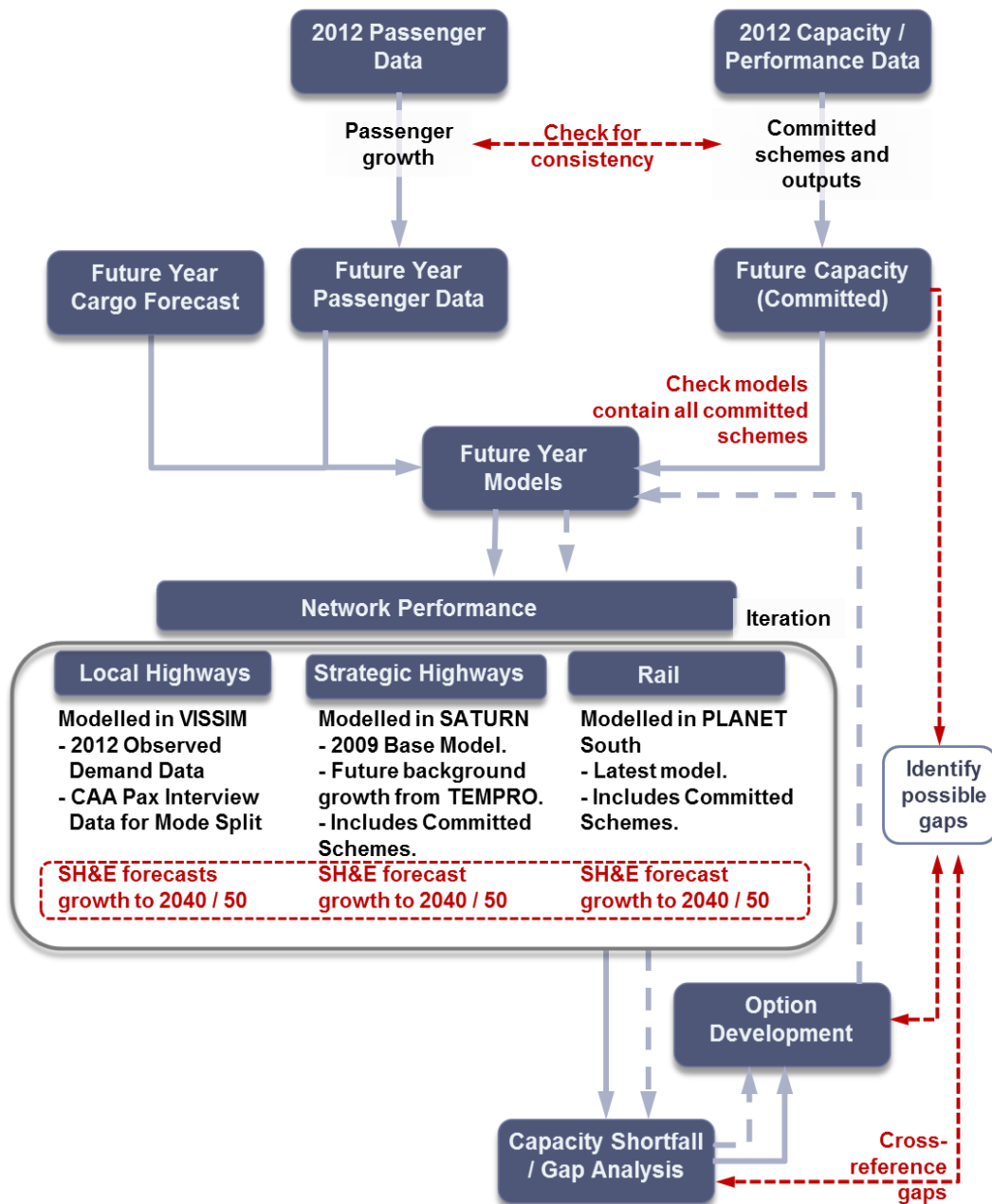
Figure 3.2: Modelling Methodology Flow Chart

3.5.3 Development of mitigation options

An option analysis phase follows the initial modelling phase and is depicted in **Figure 3.3**. This involves a review of the outputs of the modelling produced in the previous step. Outputs have been used for the identification of stress points on the network and for the development of mitigation measures. Following this, the assignment models have been re-run to test the benefits of mitigation.

Optioneering has been iterative and options have been developed in parallel to the modelling work

Figure 3.3: Optioneering Phase



The results of the option analysis phase are discussed in the following sections:

- **Chapter 6** provides an assessment of the transport effects on the rail network;
- **Chapter 7** analyses the express coach network;
- **Chapter 8** assesses the impact on the strategic highway network; and
- **Chapter 9** examines how future demand changes local access requirements including local bus networks, car parks, taxi and car rental provision.

3.6 Stakeholder Engagement

Through the process of regular stakeholder meetings, GAL has ensured that the proposed methodology has been discussed and where necessary amended to meet any issues raised. The R2 ASAS has also been discussed at the Transport Forum. The main stakeholders consulted are:

- Highways Agency
- Network Rail
- Department for Transport
- West Sussex County Council
- Surrey County Council
- East Sussex County Council
- Kent County Council
- Crawley Borough Council
- Brighton and Hove Council
- Transport for London
- MetroBus
- National Express
- Gatwick Diamond
- Sustrans
- East Sussex Rail Alliance
- Passenger Advisory Group (PAG)
- British Vehicle Rental and Leasing Association (BVRLA)
- Airport Cars (Gatwick)
- Freight Transport Association
- Commission for Passenger Transport

This stakeholder engagement will continue to ensure that these stakeholders are informed and fully included as the proposals for Gatwick continue to be developed.

4 Baseline Conditions

In order to evaluate the success of the R2 ASAS to deal with future conditions, it is important to understand the existing demand and supply for surface access.

4.1 Existing Gatwick Travel Demand

The main sources of data for travel demand are:

- The Civil Aviation Authority (CAA) – for passenger data; and
- Gatwick Employee surveys and travel to work surveys.

The CAA undertakes regular independent surveys of the air passengers using Gatwick and this is a primary source of information about the patterns of travel by air passengers.

Gatwick carries out employee surveys and travel to work surveys for airport employees every five years. The latest staff survey, carried out in 2012, indicated that there were over 21,000 employees on the airport representing 230 companies.

4.1.1 Air passengers

Currently Gatwick is Europe's busiest point-to-point airport, with only 8% of passengers transferring between flights. This high proportion of terminating passengers places significant emphasis on surface access capacity.

Detailed knowledge about passengers (who, what, when, why and how people are travelling to and from Gatwick) is vital to deliver, monitor and review the effectiveness of the R2 ASAS. This knowledge must be at sufficient detail and diverse in nature. It should cover air passengers, employees, commuters and logistics supporting the operation of the airport.

In 2011, passenger numbers grew to 33.6 million and 34.2 million in 2012, against the impact of the economic downturn in the UK and the world economy. The trend indicates that demand for air travel will increase at Gatwick.

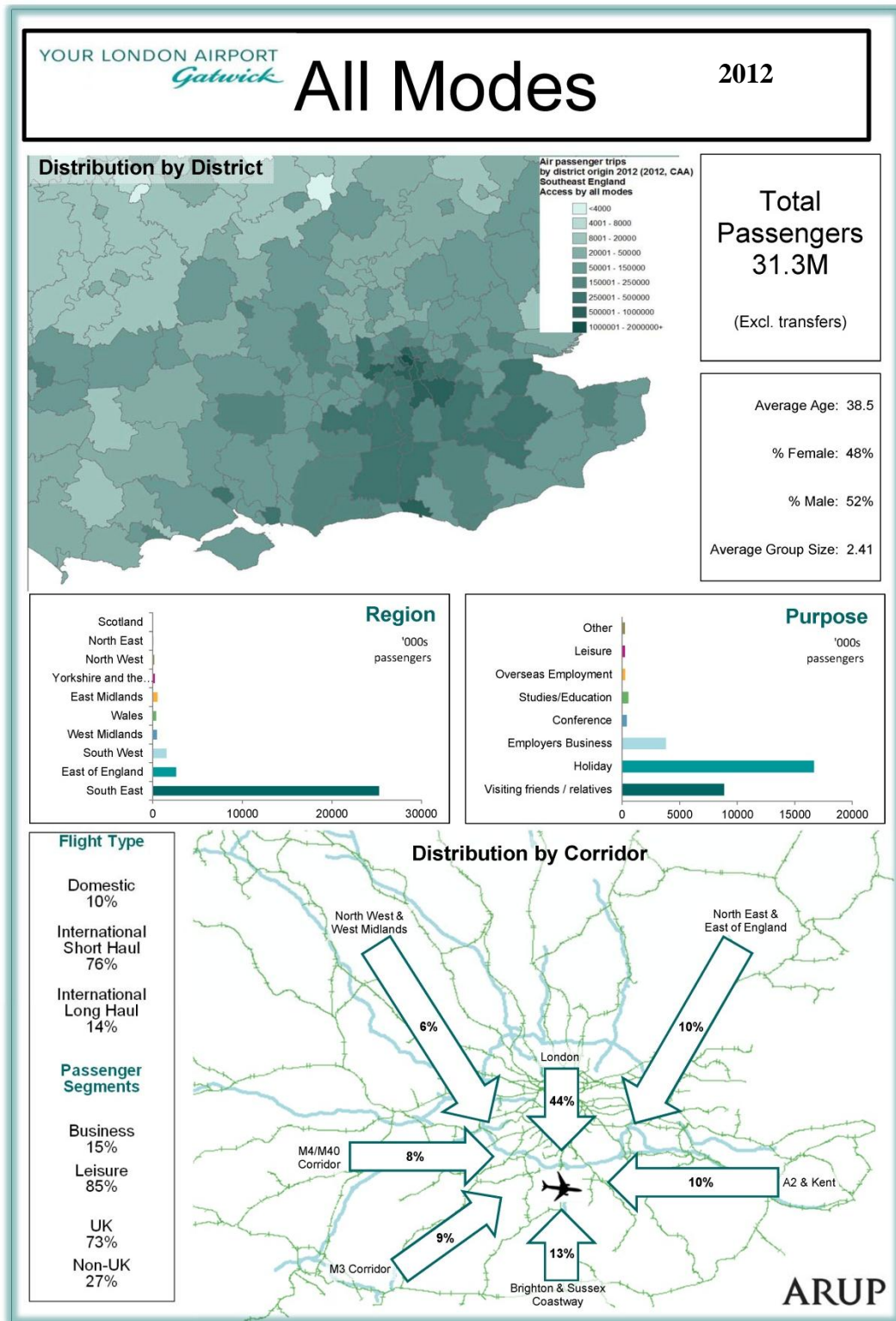
2013 saw 35.8 million annual passengers travelling through Gatwick. Projections for 2014 indicate further growth with Norwegian Air announcing the launch of low-cost flights to the USA from Gatwick next year, in addition to current European operations. easyJet, Gatwick's largest customer, flies 37% of the total number of passengers at the airport. easyJet announced a 51% rise in annual profits to £478m in November 2013 indicating a robust platform for growth.

76% of flights from Gatwick are short haul international flights, which provide vital connectivity to European business centres. Of the passengers not transferring in 2012, 22.8 million passengers were UK based travellers and 8.4 million were foreign based travellers which has implications for mode share. Over 4.7 million Gatwick passengers were business travellers. Better surface transport connectivity is important for developing business customer confidence and provides vital access to input and output markets and increases collaboration.

CAA passenger data has been analysed by mode for non-transfer passengers, which helps to illustrate the distribution of passenger origins and mode of access.

Figure 4.1 provides an illustration of the summary analysis, showing data for all surface access modes from the 2012 CAA passenger survey.

Figure 4.1: Summary Analysis for non-transfer passengers at Gatwick – All Modes



Gatwick has the greatest accessibility by long distance public transport of any of the three main London airports. Gatwick has a catchment of 3.2 million people in 30 minutes journey time and 14.8 million in 60 minutes journey time - by rail, public transport and by road.

Public transport mode share for air passengers at Gatwick has been increasing steadily over recent years. **Table 4.1** shows the mode share results from the CAA 2012 survey data with public transport mode shares highlighted.

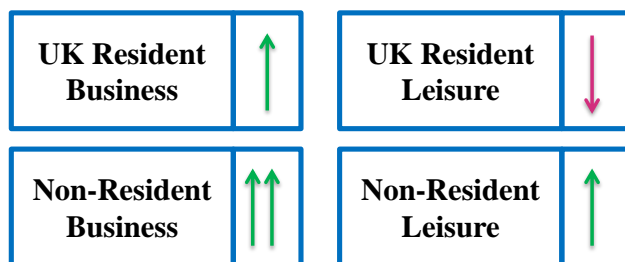
Table 4.1: Surface access mode share for Gatwick air passengers

2012				
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Private car	38.1	40.0	44.6	34.6
Hire car	1.9	1.7	1.4	2.1
Taxi/ Minicab	10.5	13.8	17.4	14.7
Bus/ Coach	9.0	8.6	6.2	8.2
Rail	40.4	35.5	30.1	40.1
Subtotal for Public Transport	49.4	44.1	36.3	48.3
Other	0.1	0.4	0.4	0.2

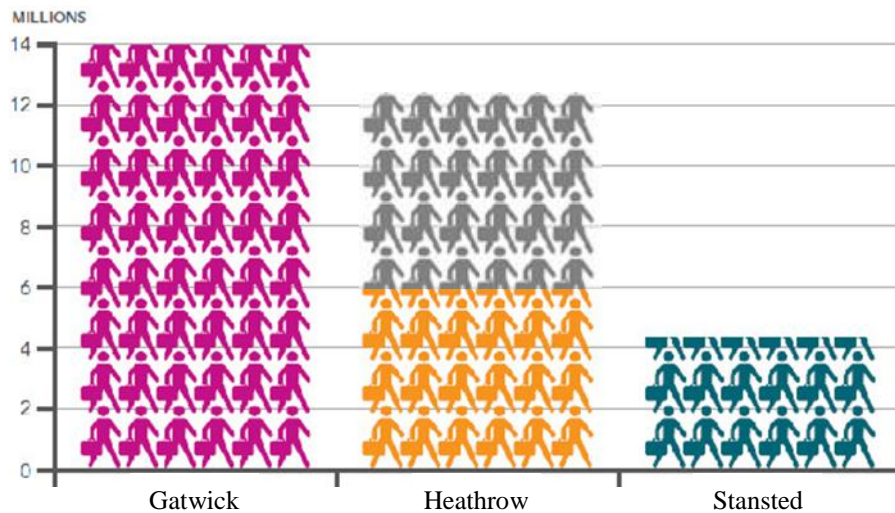
Gatwick has a target to achieve a 40% mode share when it achieves 40mppa passenger demand and it has already surpassed this. In 2012, the annual average mode share was 44%, meaning the 45% stretch target for mode share should be achieved in the next few years.

This trend will continue into the future given projected market segmentation at Gatwick with an increase in non-resident leisure and business travel resulting in higher use of public transport, lower car use and reduced parking demands.

Figure 4.2: Market Segmentation – Changes in Trip Purpose at Gatwick



Public transport is central to the R2 ASAS for Gatwick's growth and rail is the dominant mode of access with extensive coverage of direct services to Gatwick. **Figure 4.3** compares the size of Gatwick's rail access population, which shows almost 14 million annual rail passengers using Gatwick Airport railway station in 2012, with those of Heathrow and Stansted.

Figure 4.3: Comparison of rail trips to major South East airports *

* Heathrow demand also shows London Underground in grey

Airport Employees

Gatwick is a major economic driver for the South East region generating around 21,000 on airport jobs and a further 13,000 jobs off-airport through related activities.

In 2012, Gatwick completed the latest employer and employee travel surveys. Some key statistics include:

- 35% of airport employees live in the borough of Crawley, 7% in Horley, and around 6% in both Horsham and Brighton;
- 84% of staff work shifts, many of whom work a 4 day shift pattern;
- 46% of staff travel less than 10 miles to work whilst the average commute for staff is 25 miles; and
- 38.7% of staff estimate their commute takes 20 minutes or less and the average journey to work is 38 minutes.
- The English Indices of Deprivation measure relative levels of deprivation in small areas of England called Lower layer Super Output Areas (LSOAs). **Over 1 million people from the 20% most deprived areas live within a 25 mile radius of Gatwick.** As such, employment growth at Gatwick in the future can have a profound and positive impact on prosperity in the local area.

Table 4.2 summarises the current travel mode share for employees. **Gatwick has consistently achieved a lower car driver mode share** at 65% when compared to other airports such as Stansted (69%) and the regional average (75%). The employee travel information can also be broken down into areas and this is summarised for public transport users in **Table 4.3**.

In 2013, Gatwick introduced the Staff Travel Plan “Your Journey” – <http://www.gatwickairport.com/business-community/corporate-responsibility/sustainability-strategy/surface-access/>.

This sets out the level of staff discounts offered on both rail, National Express and Metrobus with the objective of increasing public transport mode share for employees. The Staff Travel Plan includes a range of initiatives and incentives for using sustainable modes and for increasing the proportion of car trips that are shared or made using low or zero emission vehicles (such as electric cars).

Table 4.2: Access mode share for employees working at Gatwick (2012 survey)

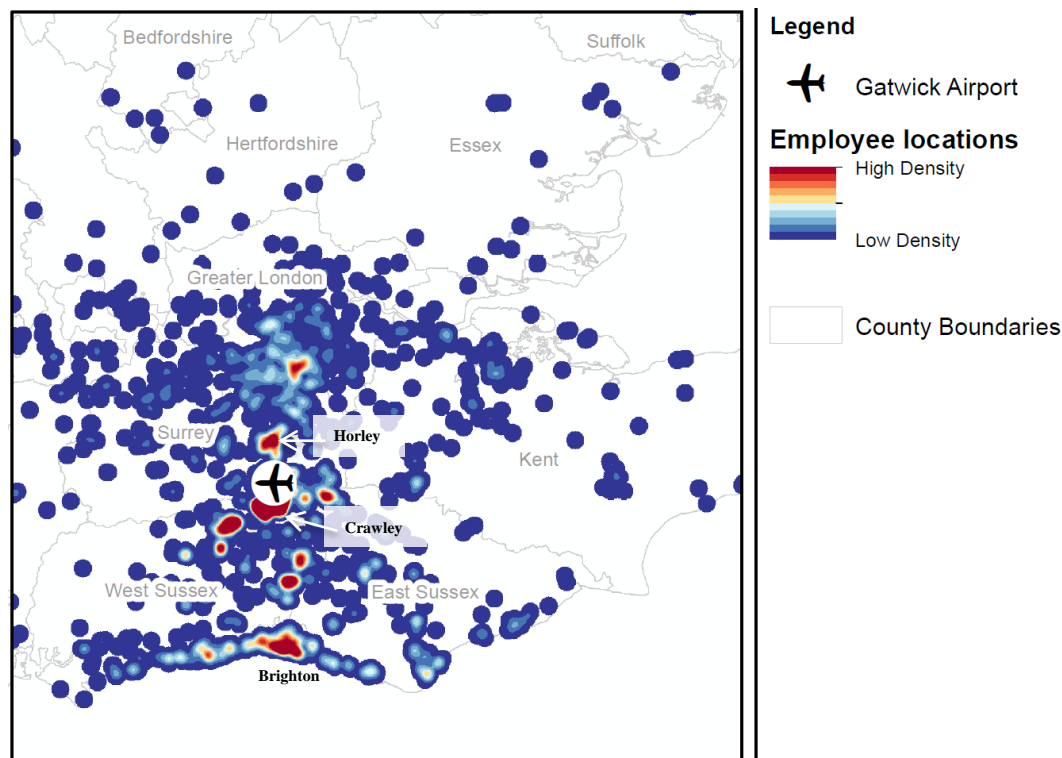
Mode	Employees mode share
Car Driver	65%
Car Passenger	4.5%
Rail	11.4%
Bus	11.8%
Walk/ Cycle	2.6%
Other	4.7%

Table 4.3: Employee public transport use by area

Transport Corridor	2012 Public Transport %
Crawley/Horley	34%
Croydon, Bromley and Merton	37%
Brighton and on Sussex coast	22%

The distribution of Gatwick employees in the South East region is shown in **Figure 4.4**. This shows high densities of existing employees from deprived areas in Brighton, Hailsham and Hastings as well as Croydon and South London, indicating the importance of Gatwick as a regional employer. This map is also provided for the whole of the UK in Appendix A.

Figure 4.4 demonstrates how currently existing public transport connectivity, primarily running north and south, brings people to Gatwick for work. This reaffirms that **greater planned public transport connectivity will deliver a whole new future for the Gatwick region and the South-East in terms of employment**, by drawing people north to the airport from deprived parts of the South Coast and south from deprived parts of London, including Croydon, Lambeth, Lewisham, Southwark and Hackney.

Figure 4.4: Geographical Distribution of Gatwick Employees (2012)

4.1.2 Employee travel

The employees at Gatwick account for an estimated 10 million journeys per year. Therefore, the development of a staff travel plan to support the R2 ASAS is essential. In 2012, the Gatwick Staff Travel Survey showed that over 32% of employees were using public transport and sustainable travel methods for their journey to work. Gatwick is targeting a 40% public transport mode share target for employees in its 2012 ASAS ‘Access Gatwick’ –

http://www.gatwickairport.com/PublicationFiles/business_and_community/all_publications/2012/lgw_asas_2012_web.pdf.

Over 80% of employees work a 4 day, 12 hour shift pattern, which means that they do not contribute to peak period travel throughout the traditional working week experienced by commuters. Over a third of staff live in Crawley and the towns nearest to the airport, resulting in estimated commuting time of 20 minutes or less. **Nearly half of staff travel less than 10 miles to work**, and the average commute distance is 25 miles, taking less than 40 minutes for the journey to work – this makes bus, car share and cycle all attractive to staff and employees. These statistics emphasise the need for continued good local access to the airport and the opportunities for public transport to provide sustainable and reliable alternatives to the private car.

Gatwick published its new Staff Travel Plan ‘Your Journey’ in 2013 and this is a daughter document to its 2012 ASAS – <http://www.gatwickairport.com/business-community/corporate-responsibility/sustainability-strategy/surface-access/>.

The aims of the Staff Travel Plan are to:

- Improve the choice of transport options and facilities available to all employees working at Gatwick;
- Reduce the local, national and global environmental impact of airport staff travel to and from work by raising awareness; and
- Promote more sustainable means of transport.

Gatwick also supports wider employee travel initiatives and is a member of the regional group Travel Green Easit Network and the National Liftshare scheme. Gatwick also supports Community Rail projects on the Arun Valley Line, the West London Line and the Tonbridge Line through its Public Transport Levy.

Gatwick Commuter is the airport's dedicated brand promoting sustainable travel to all on-airport staff. The main source of information is the website, which manages and monitors the airport's liftshare scheme. It also holds full information of all the modes of public transport and discounts available on rail, National Express and Metrobus, with links to the relevant websites for timetables, prices and purchasing discounted fares.

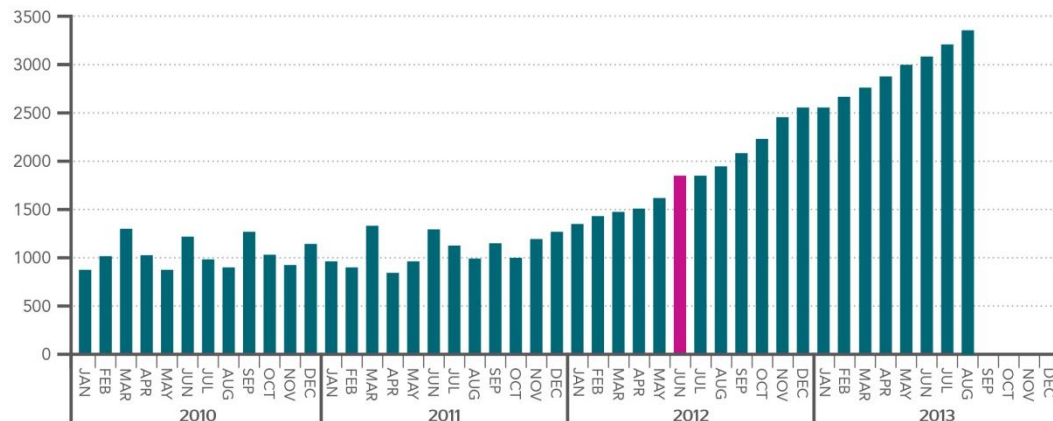
It is anticipated that progress towards achieving the 2012 ASAS target of 40% public transport mode share for staff will result from a series of initiatives both to discourage car use and to make public transport more attractive. These are consistent with current activities and initiatives led by Gatwick in partnership with transport providers and local business communities.

Public transport

In 2012, 12% of staff used local bus services to travel to work, principally from Crawley, Horley and Horsham. Continued investment by the local bus operator, Metrobus, with contributions by Gatwick to support infrastructure and service enhancement, particularly in the Fastway network, has resulted in new services, higher frequencies and better connections to fit work patterns.

Particular emphasis has been placed on improving early morning services to the airport every day of the week, in order to enable shift workers to be able to use the bus to get to work. In 1998, there were just four buses that arrived at Gatwick for staff that were on the early shifts, starting work between 04:00 and 06:00 each morning. Now there are 23 each day.

From June 2012, there has been a continuous increase in the number of Metrobus travel cards purchased by staff, coincident with a change to smart card technology, 'The Key'. Metrobus has also introduced mobile ticketing via smart phones and tablets, further improving accessibility, and free wifi on some of its services.

Figure 4.5: Metrobus Travel Card Update

Rail travel to work accounted for a further 11% of employee journeys to Gatwick. Staff receive discounted rail travel on most of the South East rail network and this can be used on Southern, First Great Western and First Capital Connect services. Gatwick has an extensive catchment of over 120 directly connected stations, with 24 hour rail access, allowing all shift patterns to be covered. Future enhancement of the Brighton Main Line and the introduction of a single operator franchise covering Thameslink, Southern and Great Northern services will reduce journey times to Gatwick and extend the network of directly connected stations, making rail even more attractive for commuters to Gatwick.

The impact of committed and planned improvements to enhance public transport mode share are described for rail, bus and coach in Chapters 6 and 7.

Private car travel

Whilst it is recognised that public transport is not an option for all staff, alternatives to single occupancy car use are successfully promoted. The percentage of staff driving to work has decreased by more than 10% in the last ten years. Car sharing has increased by over 60% since the current scheme was initiated in 2010 and there are now over 700 registered daily users, representing over 10% of the current staff parking demand. Gatwick's target is to increase this to over 20% by 2019.

The combination of Staff Travel Plan initiatives, improved local bus services and enhancements on the rail network mean Gatwick is confident of meeting its R2 ASAS target of 40% of staff journeys by sustainable modes.

Allowing for growth in airport employment, meeting this target would lead to more than a million fewer car journeys and 20 million less miles travelled per year to and from the airport.

4.2 Existing Transport Networks and Current Initiatives

Gatwick is a transport hub, where a range of transport modes connect. It acts as both a destination and an interchange for passengers. The hub is focused around the North and South Terminals, which both offer bus and coach access and are connected via an Automated People Mover (APM). On-going infrastructure

capacity and security constraints have influenced where current facilities have been located. **Gatwick is the only London Airport to have 24 hour rail, bus and express coach access.**

4.2.1 Gatwick Airport Railway Station

Gatwick Airport railway station is located at the South Terminal. It primarily caters for air passengers and employees working at the airport (14 million people per year), however over 1 million commuters also use the station to commute to London and to access employment located just outside the airport boundary – 15 million users in total. Air passengers' use of the station and services differs to commuters' due to the amount of luggage, average group size and familiarity with the station.

Having a railway station adjacent to the main terminal is a distinct asset. Improvements to concourse capacity and continuing to enhance service quality are priorities for Gatwick as passenger demand grows.

Figure 4.6: Gatwick Railway Station Upgrade



Station concourse

Gatwick Airport railway station is located adjacent to the South Terminal and the station concourse is accessed directly from the Terminal. Ticketing facilities are concentrated on the station concourse (also in the arrivals area in the South Terminal) along with information displays, customer service and retail facilities. In 2012, refurbishment of the station concourse was undertaken which included the relocation of tickets machines, new flooring, de-cluttering and decoration of the area.

On 4th December 2013, the Government announced its National Infrastructure Plan with £50 million of funding to kick-start the further development of Gatwick's rail station concourse and paving the way for creating the Gatwick Gateway – as reported in Chapter 11. Through this redevelopment process, Gatwick is committed to working with Network Rail and the train operating company (TOC) to achieve a high level of passenger experience and plan for future demand.

Platform capacity

Gatwick Airport railway station currently has 7 platforms. The seventh platform opened in February 2014 along with new access arrangements from the concourse. This is part of a £53 million enhancement project by Network Rail of which Gatwick has contributed £6.3m from the Passenger Transport Levy. The project includes concourse improvements, the additional platform, track and signalling upgrades and more lifts and escalators giving improved access to platforms. These works will improve railway track capacity, train reliability and passenger experience.

With Platform 7 now operational, Gatwick Express will presently be relocated to Platforms 5 and 6 with Platforms 1-4 and 7 accommodating all other services. The principle under the current franchise arrangements is to always have a Gatwick Express train on the platform acting as a ‘virtual waiting room’ to enhance the quality of service and travel experience.

4.2.2 Rail Connectivity

Gatwick is London’s and the UK’s best connected airport by rail with direct train services to over 120 stations and over 700 stations with just one interchange. Gatwick is also the only London airport to have 24 hour rail access and a train departing every 4 minutes in the peak. Gatwick and its airlines place great emphasis and importance on its rail connectivity.

Current connections to key stations are shown in **Table 4.4**.

Table 4.4: Direct connection from Gatwick to key stations

Station	Direct trains to key stations (Dec 2012 timetable)		
	Per day	Peak period (0700-1000)	High peak hour (0800-0900)
London Victoria	180	28	10
East Croydon	192	30	12
Clapham Junction	98	13	5
London Bridge	50	7	1
Farringdon	62	10	3
St Pancras	62	9	2
Redhill	95	18	5
Brighton	92	16	6
Reading	16	3	1

Source: Arup analysis of Network Rail December 2012 timetable

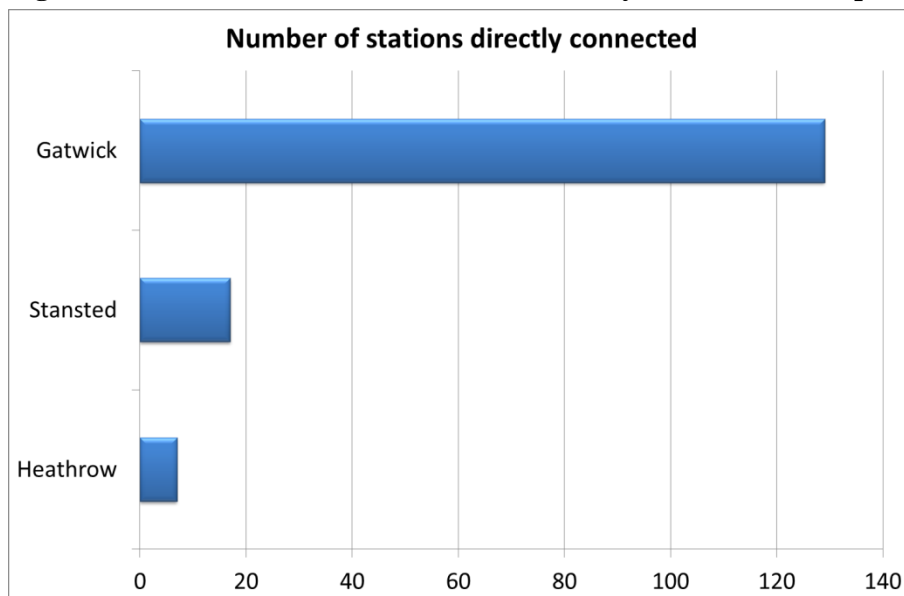
Figure 4.8 illustrates the current rail connectivity and journey times for access to Gatwick and **Figure 4.9** shows the journey times between Gatwick and terminal and interchange stations in London.

Further analysis has been undertaken to compare this connectivity with Heathrow and Stansted to show how well connected Gatwick is compared to other major South East airports. **Figure 4.7** shows the number of railway stations served by direct trains from each of the three major London airports, illustrating Gatwick’s superior connectivity.

In 2012, Gatwick developed its Rail Strategy to promote integration of the UK's busiest rail network in the South-East and its second largest airport, supporting both the UK's future international connectivity and the needs of the every-day commuter. It outlined that there is a clear rationale for delivering value and efficiency in future rail franchises and network planning. It built on the South East Airports Taskforce's recommendation that rail and airport operators work in partnership with Government to secure high quality surface access to and from airports. This was reiterated by The Commission's Interim Report in December 2013 and Network Rail's London and South East Market Study report in October 2013.

Engagement with Network Rail has been on-going and in developing both network impacts modelling and in development of future concourse concepts for the station.

Figure 4.7: Number of rail stations served directly from London airports



NB Based on December 2012 timetable, excludes London Underground

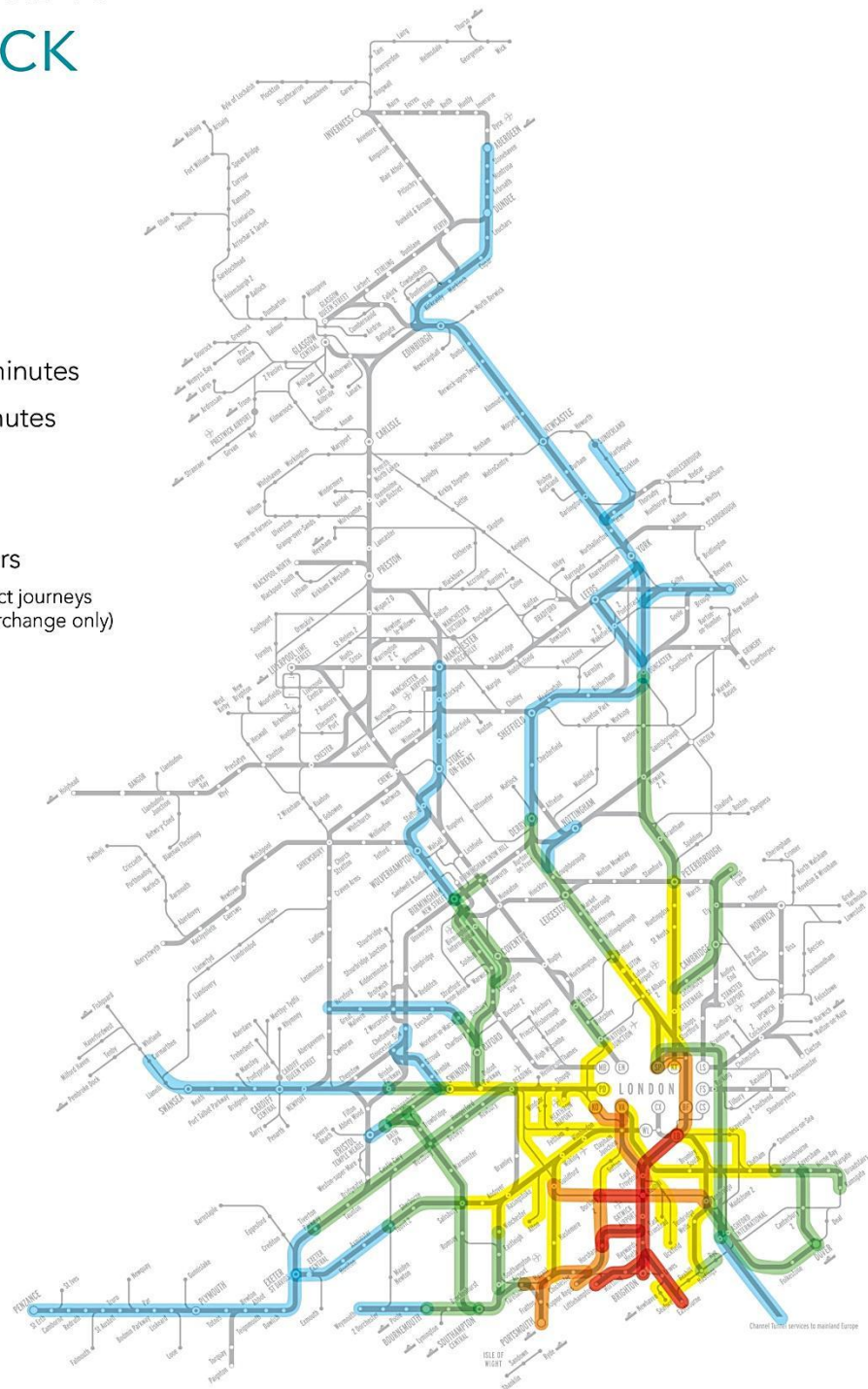
Rail accessibility to the airport is central to activities at Gatwick. Although links to London are the busiest, the wider connectivity by rail across the South East and to the South Coast is an enviable asset for local business and the regional economy. There are opportunities to expand on existing connections to achieve greater mode shift to rail for air passengers, commuters and airport employees.

As part of a regional study of using Smartcard technology to improve accessibility and ease of use of the railway network Gatwick will be included in a trial for London and the South East starting in 2014.

Figure 4.8: Rail connectivity and journey times for Gatwick

JOURNEY TIME TO GATWICK BY RAIL

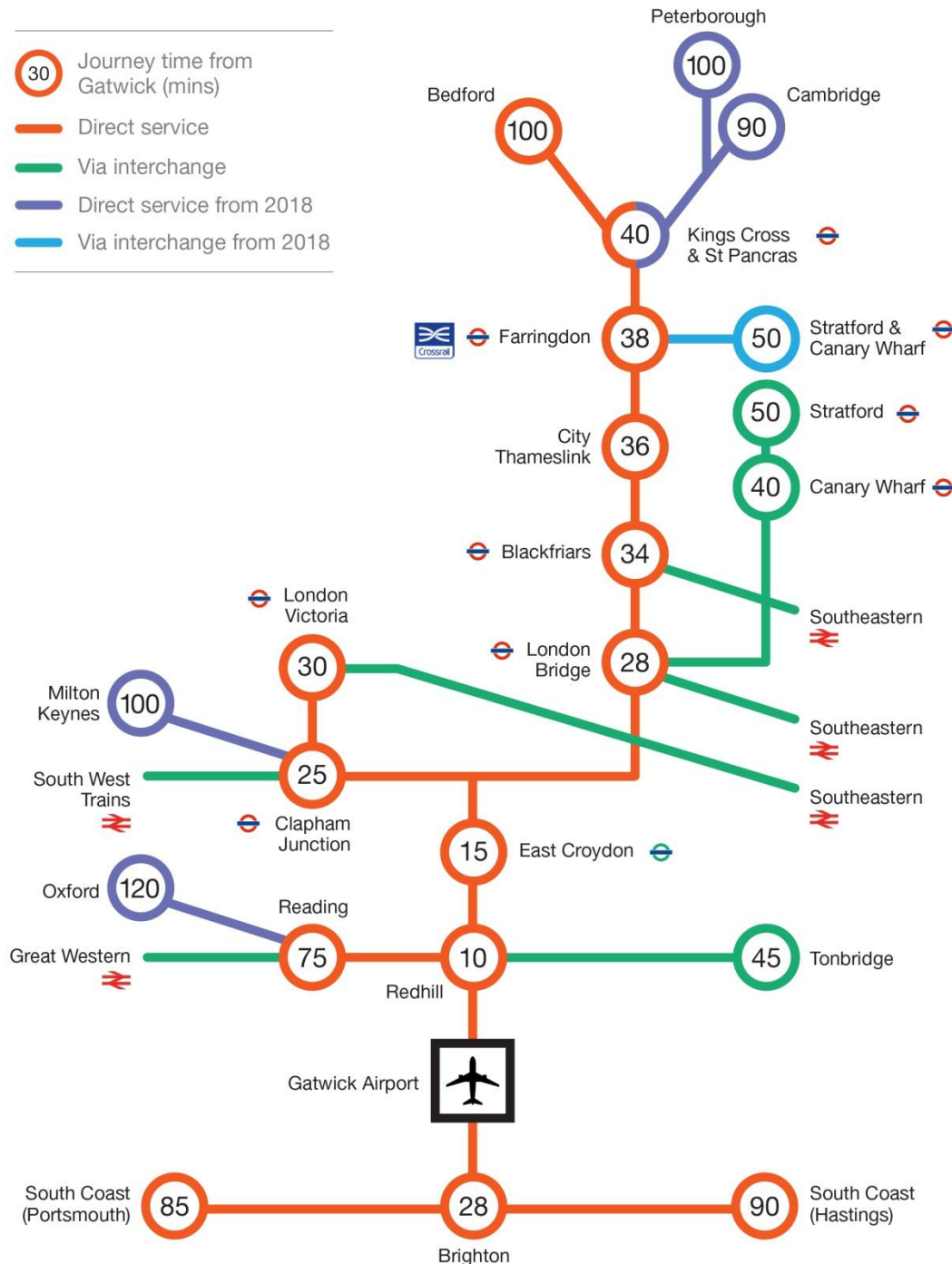
- Up to 30 minutes
 - 30 - 60 minutes
 - 1 - 2 hours
 - 2 - 3 hours
 - over 3 hours
- (Times for direct journeys or via one interchange only)



YOUR LONDON AIRPORT
Gatwick

Figure 4.9: Rail connection times between Gatwick and London

Future journey times from Gatwick Airport to London stations and key interchanges (2025)



4.2.3 Regional Connections

Aside from the Gatwick Express services extended from and to **Brighton** in the peaks (morning inbound to London and evening outbound from **London**), most other southbound services calling at Gatwick Airport station also continue to

locations on the South Coast throughout the day. This gives direct services to places as far as **Portsmouth Harbour** and **Southampton** via **Horsham** and **Littlehampton** via **Hove** and **Worthing**. Services between Gatwick and Kent services interchange at Redhill, only 10 minutes from the airport.

Thameslink services operate via London Bridge and St Pancras to Luton and Bedford. These are through trains from Brighton. Wider access via interchange at St Pancras International railway station includes East Midlands Trains services to South Yorkshire and the East Midlands. The completion of the Thameslink Programme Key Output 2 investment provides new infrastructure that will allow **direct connections from Gatwick to Peterborough and Cambridge** via Kings Cross/St Pancras in 2018. Indeed, depending on the operator, the new franchise may deliver additional services and connections. The Canal Tunnels, which link the Thameslink route to the East Coast Main Line north of Kings Cross, could provide up to eight trains per hour. It is anticipated that some of the services to these new destinations, currently served via Kings Cross, will operate to Brighton via Gatwick Airport. In the future, a second train to Reading via Redhill could potentially continue all the way to Oxford and the possibility exists for a direct service to Milton Keynes via Old Oak Common, which will be connected to Crossrail 2 and HS2.

The combination of services to the South Coast, Reading and two routes to London gives Gatwick unrivalled rail connectivity across the South East and excellent access from elsewhere in the UK, either directly or via a number of interchange stations. This will be enhanced following completion of the Thameslink Key Output 2 programme and further opportunities for additional longer distance direct services exist as a result of committed improvements to the South East network by Network Rail.

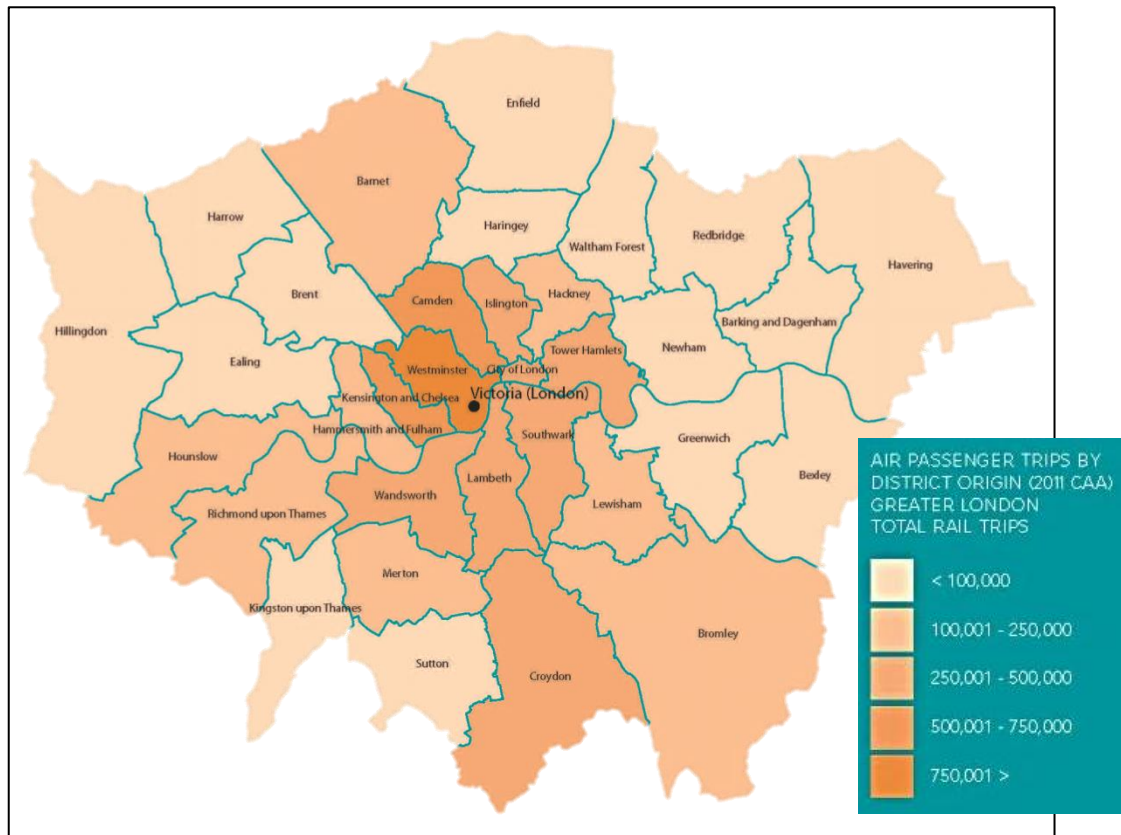
Gatwick's contribution to northbound (i.e. peak direction rail flows) is only 8% of total demand and, therefore, only represents contribution when compared to background commuter traffic on the Brighton Main Line.

4.2.4 Importance of Gatwick Express

Gatwick Express is a premium air-rail service that carries around 50% of all rail journeys to and from Gatwick and over 60% of all rail journeys between London and the airport (see **Figure 4.10**). Rail travel is up to 50% quicker in the peak than car, taxi or bus options to London. For rail trips to the City of London Business District, Gatwick Express accounts for around 71% of passengers. **Rail also carries 97% of all City of London business passengers** travelling to the airport.

Gatwick Express passengers contribute around 40% more revenue (via premium fares) than commuters. This equates to extra revenue in excess of £27 million per annum, which reduces the subsidy payments and directly contributes to the Government's objective to reduce rail's cost to the taxpayer. Its importance to Gatwick's future growth and the UK economy cannot be underestimated as rail connectivity is an important factor in an airline's decision to choose Gatwick.

In the future, it is imperative that a non-stop Gatwick Express service is maintained as it provides a 'virtual waiting room', with a train in the platform and seats available for air passengers, providing quality of service and a high passenger experience.

Figure 4.10: Rail passenger journeys to London

4.2.5 Coach Network

The airport is served by a range of coach services, which both complement and compete with the rail network. There are three main operators on airport which are easyBus, National Express and Oxford Airline. On average there are between over 500 daily arrivals and departures, offering services to destinations throughout the UK, either directly or via interchange at coach hubs including London Victoria and Birmingham. Many operators have invested in high-quality vehicles, customer service improvements and effective marketing which have contributed to more attractive coach services. Coach services account for the vast majority of the 8.5% mode share recorded for bus and coach in the 2012 CAA Passenger Survey data

National Express Coaches provides a wide range of direct services to and from Gatwick, including 10 destinations in south and central London, with London Victoria as the main terminus, further services to 10 destinations on the South Coast, South Wales and East Anglia. In total over 30 other towns and cities are served throughout England and Wales. In May 2011, National Express launched new route 206: Poole – Bournemouth – Gatwick South Terminal – Gatwick North Terminal and patronage on the route has been growing steadily.

Despite strong competition from rail, National Express operates high frequencies to London, including its 025 Route (London Victoria – Gatwick South Terminal – Brighton). In December 2011, National Express complemented this with a separate route A3: London Victoria – Gatwick South Terminal – Gatwick North

Terminal. London Victoria is National Express hub for their UK coach network and passengers find it an effective interchange point between coach services.

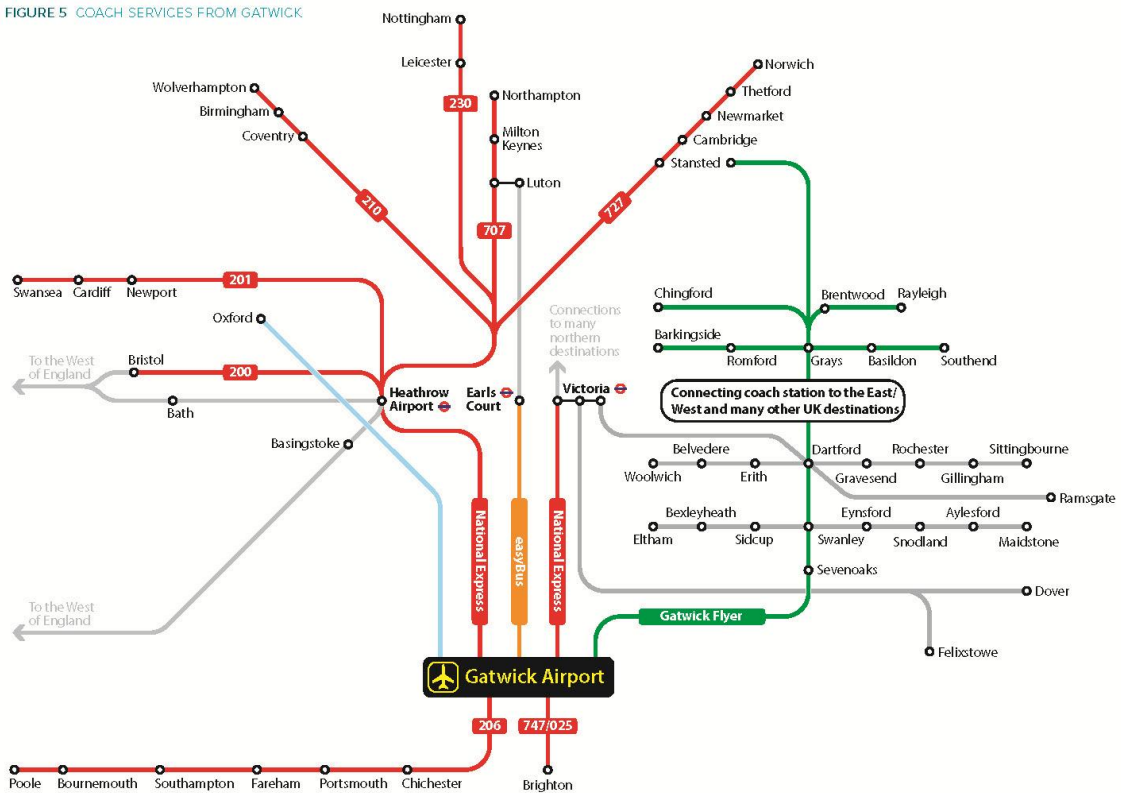
easyBus provides a non-stop shuttle service between Gatwick and London (Earls Court/West Brompton) aimed at providing a low-cost alternative to the Gatwick Express.

Oxford Bus Company provides the Airline service to Heathrow Airport and Oxford. Gatwick Flyer provides a midi coach service to Dartford, Thurrock and Stansted Airport.

There are two other shuttle type services which are the Witney Shuttle route 1(Stow-on-the-Wold – Witney – Gatwick North Terminal – Gatwick South Terminal) and the Gatwick Flyer services (Barkingside/ Chingford/ Southend/ South Woodham Ferrers/ Dartford/ Swanley –Gatwick South Terminal). **Figure 4.11** shows the coach network with direct services to Gatwick Airport.

Figure 4.11: Coach services from Gatwick Airport

FIGURE 5 COACH SERVICES FROM GATWICK



Source: Gatwick Airport Surface Access Strategy (2012)

4.2.6 Local Buses

The majority of local bus services are provided by Metrobus and are used by airport staff and air passengers, as well as rail passengers accessing Gatwick Airport station. All buses are low floor, wheelchair accessible vehicles. The main towns served are Crawley, Horley, Three Bridges, East Grinstead, Redhill, Caterham and Horsham.

Metrobus provides three 'Fastway' bus routes using new, wheelchair accessible buses, calling at stops with improved shelters and real-time information displays,

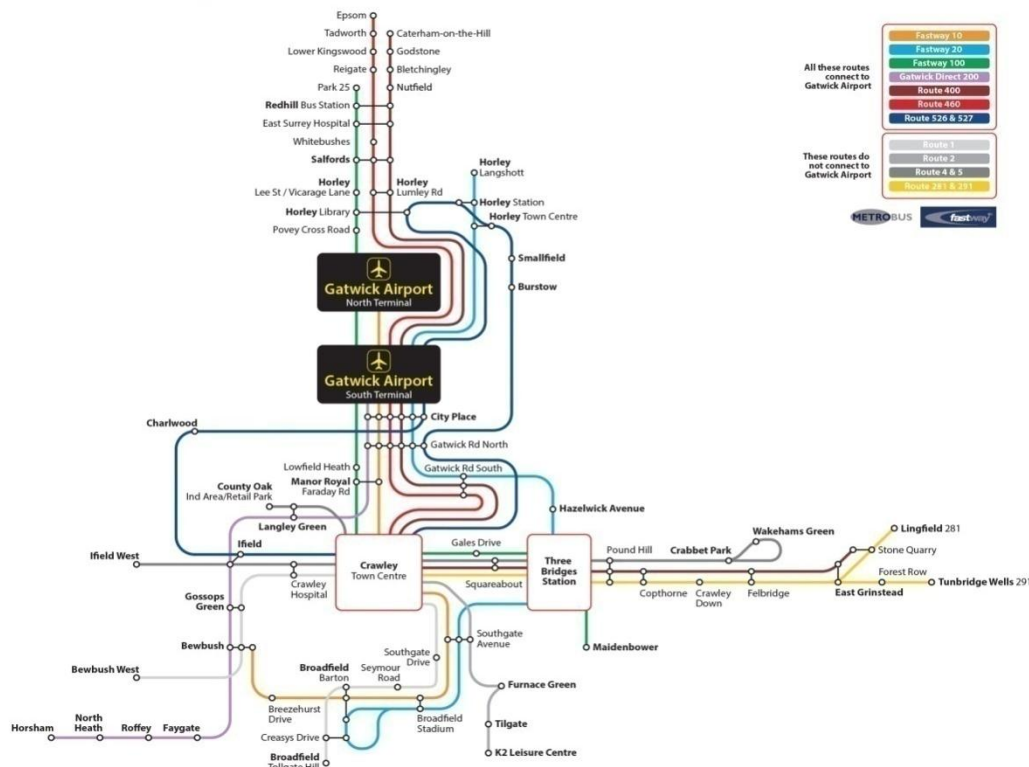
and using a combination of bus lanes and guided busways to achieve bus priority over general traffic:

- 10: Bewbush–Broadfield–Crawley–Gatwick Airport
- 20: Broadfield–Three Bridges–Gatwick Airport–Crawley
- 100: Maidenbower–Three Bridges–Crawley–Gatwick Airport–Horley–Redhill

Since 2000, Gatwick has invested over £6 million in local bus services and infrastructure via the Public Transport Levy. This includes revenue support for the route 200, and early morning services on the 400 service from East Grinstead.

Fastway is the airport's flagship bus service, running along 24km of route network with extensive bus priority, including stretches of innovative guideways that allow the buses to by-pass congestion hotspots. Fastway has grown successfully since its introduction in 2003 and now carries over 16,000 passengers a day, many of which are airport employees. Fastway 10 also operates 24 hours a day, 365 days a year.

Figure 4.12: Local bus routes serving Gatwick Airport



Source: Gatwick Airport Surface Access Strategy (2012)

Metrobus also provides three conventional routes, which are operated by wheelchair accessible buses:

- 200: Horsham – Gatwick South Terminal – (Gatwick North Terminal for selected journeys only)
- 300: Ifield West – Gatwick South Terminal – Gatwick North Terminal (peak hours only)
- 400: East Grinstead – Gatwick South Terminal – Redhill – Caterham

- 526/527 – Crawley- Charlwood – Gatwick South Terminal – Horley- Smallfield
- London General operates two local bus services, which are very infrequent:
- 727: Banstead – Gatwick South Terminal – Crawley provides one departure on Tuesdays and Fridays
- 772: Redhill – Gatwick South Terminal – Brighton

Particular emphasis has been placed on improving early morning services to the airport every day of the week, in order to enable shift workers, to be able to use the bus to get to work. In 1998, there were just four buses that arrived at Gatwick for staff that were on the early shifts, starting work between 04:00 and 06:00 each morning. Now there are 23 each day.

Metrobus has introduced a range of ticketing options through the use of smart ticketing in the form of a smart Key Card. For occasional bus travellers, part time worker or shift worker passengers multi trip tickets are available for the Crawley, Horsham and Redhill & Reigate areas. Recently, Metrobus has also introduced mobile ticketing with access via downloaded apps to a smart phone.

Airport staff are entitled to the Gatwick Travelcard key card which enables them to buy discounted bus travel that is not available to members of the public. Staff can top up their smartcard online or at local travel shops and since its introduction use has doubled.

Metrobus have introduced the PLUSBUS scheme which allows passengers to add bus travel to a train ticket, saving money and being more convenient than buying a separate ticket on the bus.

All local buses are fitted with GPS technology so users can find out how far away their bus is in real time, from any bus stop on the network using the internet or their smart phone. Many bus stops are also fitted with screens providing this information, as well as the exit from Gatwick Airport railway station. QR codes and NFC tags at bus stops, compatible with smart phone readers, make it even easier for users to get this information. Buses are also fitted with the 'Next Stop' screens which are very useful for first time travellers.

4.2.7 Other Bus and Coach Services

In common with other large airports, Gatwick also has a wide range of staff buses/coaches, licensed car park and car hire shuttle buses, hotel and guest house shuttle buses provided by operators including National Express, Southdown PSV and TGM.

There are ten hotel bus routes which operate on circular routes calling at both terminals in one direction. All routes operate seven days per week and include journeys in the early morning and late evening, in order to match demand from departing and arriving passengers.

There are nearly 30 guest houses or hotels that operate services on request. The vehicles used are cars or van-based buses.

For off airport car parks there are also large numbers of bus movements:

- Airparks route APS1 to Lowfield Heath 10 buses per hour from 04:00 to 01:00
- APH route to Snowhill 10 buses per hour from 04:00 to 01:00
- Cophall Farm route 20 buses per hour from 04:00 to 01:00

4.2.8 Charter Coaches

Currently there are over 17,000 charter coach movements a year and peaking at almost 200 arrivals a day at the airport, which are operated by a large number of companies from across the UK.

4.2.9 Bus and Coach Station / Interchange

Providing bus and coach interchange facilities has been the focus of major projects that Gatwick has undertaken in 2011 and 2012. The aim is to provide appropriate facilities to encourage people to choose public transport modes. The creation of the Gatwick Gateway – as reported in Section 9 – will be the next stage of this development.

From 2009 to 2012, £7 million was invested on new bus and coach interchange facilities along with significant changes to forecourt management to place bus and coach passengers in a position where they have higher priority. Over 2 million passengers per annum use the facilities.

Local bus facilities

Local buses drop off and pick up passengers on the A23 located beneath the South Terminal. These can be accessed by lifts from the International Arrivals area or via stairs near the railway station via the transit station concourse. Real time information screens are located at the exit to the railway station and in the bus stops. Passengers can also use Metrobus' mobile phone app to obtain real time information and tickets. In the North Terminal local buses use the facilities on Furlong Way.

South Terminal

In the South Terminal, licensed buses, coaches and courtesy vehicles now use a specially designed area in the lower forecourt (inner lane) for dropping off and picking up passengers. In addition, a new ticket office has been provided, which is manned by National Express, new timetable holders installed, smoking areas and way finding have been improved.

Changes have also been made to the vehicle operating area that has 10 bays for scheduled coach services, licensed hotel and guest house shuttle buses/vehicles and off airport car parks. Charter coaches operate from the outer lane of the forecourt.

North Terminal

The North Terminal forecourt and bus and coach waiting facilities have been redeveloped during 2012 and 14 bus stops are available for all types of services including Charter Coach.

4.2.10 Highway Network

As the UK's second busiest airport, Gatwick is well connected for road journeys from north, south, east and west via the strategic route network. Gatwick is directly connected to the M23 at Junction 9 and 9a, which in turn directly connects to the M25 at Junction 7 (7 to 8 minute drive time). 70% of the traffic accessing the airport uses these connections.

There are three main entry/exit points to the airport:

- The two roundabouts off the M23 Junction 9a that provide access to the South and North Terminals.
- The A23/Gatwick Road roundabout south of the airport.

4.2.11 Management of airport roads in 2012

There are many people who access the airport by car for whom there is no practical alternative. Airport roads are also important for bus and coach operation as well as logistics traffic – all of these users need an efficient road network. Therefore, a good quality road network that is both efficient and safe is essential.

Gatwick manages the 23 miles of road in the airport network over which it has Traffic Authority responsibility, as required by the 1976 Gatwick Traffic Act. The Airport has developed a Landside Roads Network Plan to strategically manage its roads; this recognises the best practice requirements of national guidance. The Plan sets out how Gatwick manages its roads from capacity modelling to planned maintenance.

Gatwick integrates environmental management into the local road network through the use of solar-powered signs and employing recycling technology to ensure that at least 85% of construction waste is recycled.

In recognising its role as a Traffic Authority, Gatwick has followed the Highway Agency best practice established in response to the Traffic Management Act, and has a long established 24-hour operational team for the landside areas of the Airport. Part of their responsibility is to look after the day-to-day running and resilience of the surface transport infrastructure at Gatwick.

The roads outside the immediate airport environment are managed by the Highways Agency (M23) and West Sussex County Council (A23 roundabout). The A23 Longbridge Roundabout to the north of the airport, managed by Surrey County Council, is also an important junction for local traffic to and from Redhill, Reigate and Horley.

For passengers there are already a number of tools, which can help drivers plan their journeys, and provide information in real time. The Highways Agency has put significant effort into developing communications systems for drivers to enable them to predict and know what their expected journey times will be.

Equally, Gatwick, the local authorities and the Highways Agency are continually developing the ways in which they work together to make sure impacts on journeys are minimised during periods of disruption.

4.2.12 Walking and Cycling

The airport can be accessed from the local area on foot or by bicycle and a series of rights of way foot paths and cycleways allow connections to be made to local business and the towns of Horley and Crawley.

The percentages of staff and passengers cycling and walking to the airport are small but important components of the R2 ASAS. They provide staff with the opportunity to make local journeys to destinations in and around the airport. The National Cycle Route 21 passes through the airport on a north–south axis and is the principal pedestrian and cycle access route to the airport. It links into the local networks in Crawley and Horley. There is also access to the airport via Povey Cross Bridge which is convenient for staff living around Charlwood and Hookwood, and from the Balcombe Road for residential areas to the east of the airport. In addition to local roads there are off-road rights of way in the vicinity of the airport that will be affected by the Masterplan proposals. **Figure 4.13** indicates the public rights of way and local cycle routes in the vicinity of Gatwick. These are considered in Chapter 10.

4.2.13 Travel information

Gatwick recognises the importance of good travel information for air passengers and staff using the airport and has refreshed all of its paper and online sources of travel options, making sure it is available when and where it is needed.

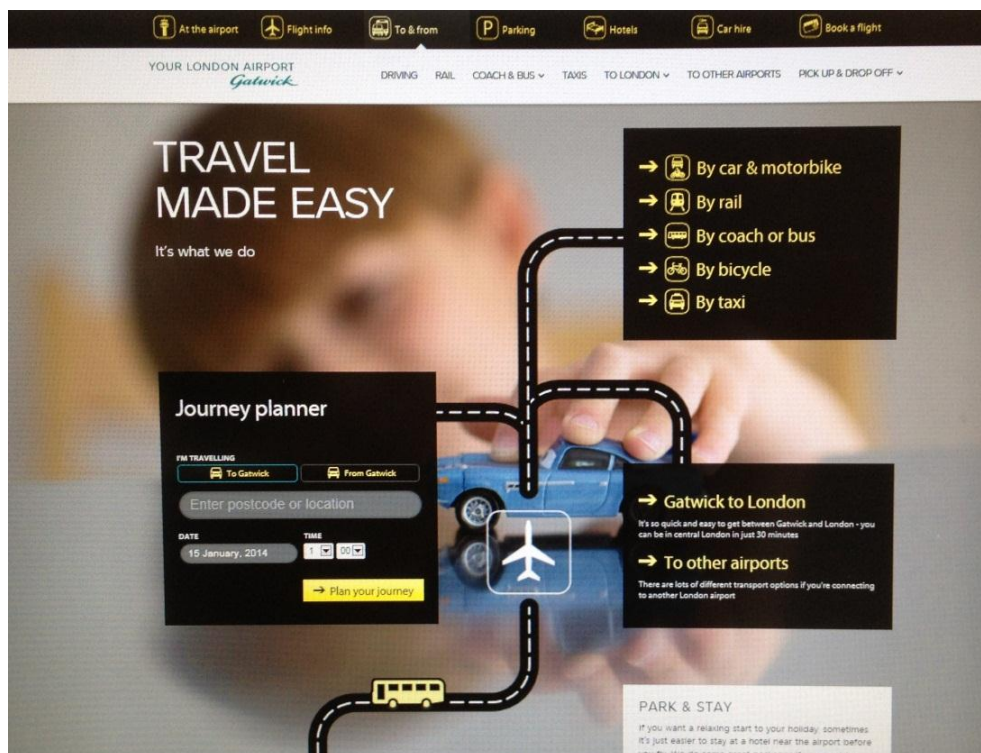
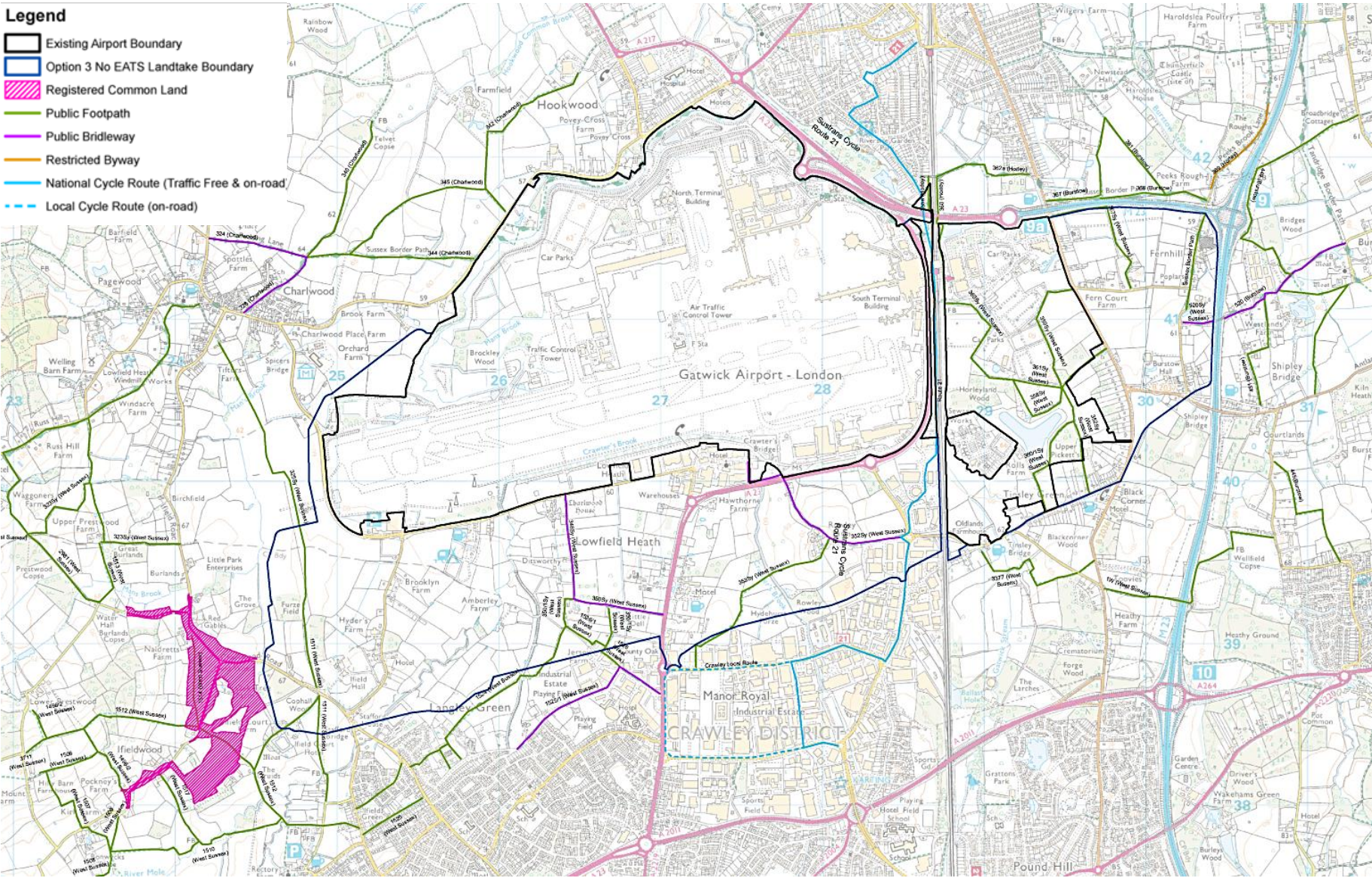


Figure 4.13: Public Rights of Way



5 Forecast of Gatwick Travel Demand

5.1 Introduction

The forecasts for air passengers and airport employees are described in the air traffic forecast report and summarised in this chapter. These are based on 2012 annual demand when Gatwick handled 34.2 million passengers. Since then demand has continued to grow, showing a strong recovery from 31.3 million in 2010. The forecasts indicate that the steady growth in the number of passengers travelling from Gatwick will continue and it is expected that passenger numbers will reach 44 mppa in 2025 without any increase in runway capacity. The assessment of surface access effects has been based on the difference between the passenger forecasts under the Masterplan options described in Section 1.4 and as shown in **Table 5.1**.

Table 5.1: Masterplan Options

Option	Description	Demand (MPPA)				
		2012	2025	2030	2040	2050
0	One Runway (planned growth)	35	44	46	47	-
3	Two Runways (wide spaced, independent)	-	53	65	83	95

5.2 Air Passenger Forecasts

The make-up of passengers using Gatwick has an important bearing on surface access. Firstly, only originating and terminating passengers (i.e. those not transferring between two flights) will require surface access. Secondly, the passenger purpose of travel has an impact as different modes of access are favoured by business and leisure travellers, and foreign visitors may not have the same level of access to private vehicles as UK residents. The analysis takes into account forecast changes in three characteristics:

- Long haul, short haul and domestic flights
- Business and leisure travellers
- UK and non-UK passengers

These are described in more detail in sections 5.2.3 to 5.2.5.

The impact of growth will also see a more even spread of trips throughout the year, as demand becomes less dominated by the UK holiday market with a traditional peak in the summer months. Increases in business trips and non-UK passengers travelling to London throughout the year will take some of the focus away from busy days in July and August and provide for more busy days during the year. For example, at 87 mppa in 2050, Option 3 generates 265,500 daily trips across the busy day and 47,430 in the AM peak period (peak three hours, arrivals and departures combined).

5.2.1 Passenger Forecasts – arriving and departing

Forecasts for the Masterplan option were developed based on a busy day schedule of hourly arriving and departing passengers. These were derived from a detailed forecast of long haul, short haul and domestic air traffic movements for 2040, shown in **Table 5.2**. The forecasts show a more even distribution throughout the day compared with the 2012 pattern of movements, as shown in **Figure 5.1** and **Figure 5.2**. Note that there is no increase in the number of night flights assumed with these forecasts.

5.2.2 Non-Transfer Passengers

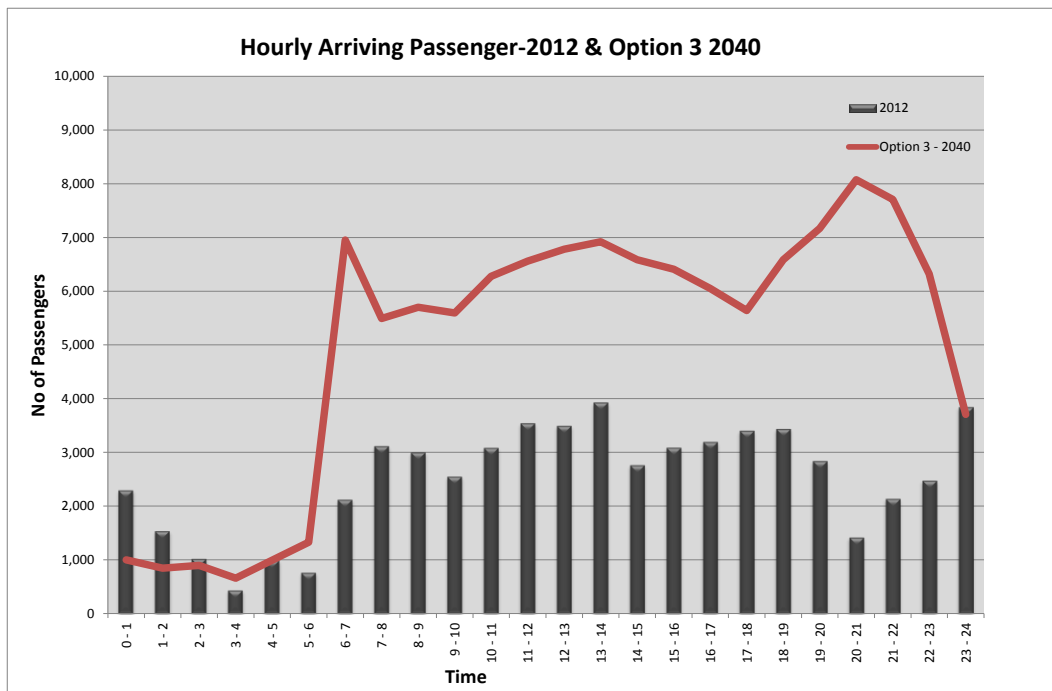
Gatwick served 34.2 million passengers in 2012, of which approximately 2.8 million passengers (8%) transferred between flights. The forecasts indicate that transfer passengers will remain at less than 10% of total air passengers using Gatwick over the long term. This shows that Gatwick will remain predominantly a point to point airport. This approach is consistent both with the current demand for air travel in the UK and also forecast growth. Any shift towards increased transfers and airline hubbing will reduce demand on the landside transport network, with fewer passengers leaving the airport and taking onward surface transport modes.

Table 5.2: Busy day forecast of air passengers (non-transfer passengers only, 2040)

Time	Option 0 2040		Option 3 2040	
	Arr Pax	Dep Pax	Arr Pax	Dep Pax
1:00 – 2:00	417	63	999	756
2:00 – 3:00	337	112	845	0
3:00 – 4:00	385	78	897	486
4:00 – 5:00	199	226	658	299
5:00 – 6:00	564	125	993	129
6:00 – 7:00	782	358	1,328	756
7:00 – 8:00	3,969	4,682	6,952	8,059
8:00 – 9:00	3,112	4,605	5,493	8,567
9:00 – 10:00	3,743	4,829	5,701	8,616
10:00 – 11:00	3,214	5,343	5,594	9,619
11:00 – 12:00	3,909	4,434	6,277	8,070
12:00 – 13:00	4,170	3,827	6,561	6,651
13:00 – 14:00	3,954	3,788	6,782	6,545
14:00 – 15:00	4,321	4,176	6,919	7,083
15:00 – 16:00	4,077	4,556	6,587	7,329
16:00 – 17:00	3,452	4,376	6,408	6,524
17:00 – 18:00	3,455	4,147	6,051	6,672
18:00 – 19:00	3,405	4,076	5,639	7,703
19:00 – 20:00	3,839	3,498	6,585	6,255
20:00 – 21:00	4,074	3,740	7,169	6,242
21:00 – 22:00	4,663	3,287	8,074	4,973
22:00 – 23:00	4,002	2,537	7,707	4,114
23:00 – 24:00	4,184	2,100	6,322	3,254
24:00 – 1:00	2,282	1,546	3,706	2,214

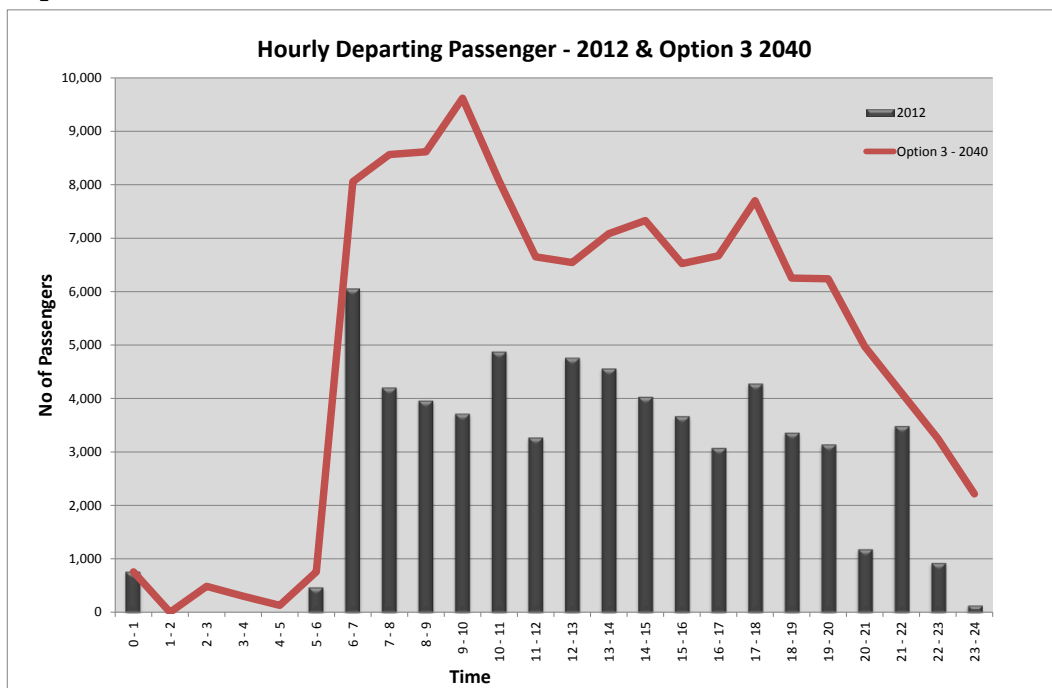
Source: Air traffic forecasts

Figure 5.1: Daily profile of arriving passengers - 2012 and 2040 Busy Day forecast (Option 3)



Source: Option 3 air traffic forecasts

Figure 5.2: Daily profile of departing passengers – 2012 and 2040 Busy Day forecast (Option 3)



Source: Option 3 air traffic forecasts

5.2.3 Flight Type

Table 5.3 shows estimated changes in market share to 2040.

Table 5.3: Changes in Market Share for Air Passengers

	Domestic	Short-Haul	Long-haul
2012	12%	71%	18%
2040	8%	59%	33%

Long haul

The mix of routes is expected to change at Gatwick as the airport attracts new long haul services. New Far Eastern airlines have recently commenced long haul services from Gatwick and low cost carriers are investing in new routes, including long haul transatlantic services. There is also the potential for long haul leisure markets to shift from Heathrow to Gatwick. This will create potential for more long haul services from Gatwick to the fastest growing economies. The forecasts assume that long haul as a percentage of originating and terminating passenger traffic (i.e. excluding transfers) will remain approximately one third and will increase overall when including transfer passengers.

Short haul

A high proportion of flights from Gatwick are short haul international flights which provide connectivity to key European destinations. This market will continue to expand to serve other European countries. The share of the short haul market is forecasted to remain above 50% for originating and terminating passengers, but is projected to decline slightly in respect of total passenger numbers as the proportion of long haul passengers increases.

Domestic

Gatwick currently provides domestic services to over a dozen destinations including Aberdeen, Belfast, Edinburgh, Glasgow, and Newcastle. In 2012, over 10% of all passengers travelled to destinations in the UK. Like the short haul market, the share of originating and terminating passengers for the domestic market at Gatwick is expected to remain at about this level in both options, but the proportion is likely to decline slightly relative to the total number of passengers.

5.2.4 Purpose

Table 5.4 shows estimated changes in business and leisure to 2040.

Table 5.4: Changes in Trip Purpose for Air Passengers

	Business	Leisure
2012	17%	83%
2040	23%	77%

Business

Over one sixth of passengers at Gatwick travel for business and this proportion has increased steadily in recent years. The airport is planning to grow its share of business passengers over time by providing attractive services and incentives, including new flights to short haul and long haul business markets. The Airport's plan to open new routes to destinations in Asia, America and Europe will generate

additional growth in business travellers. Low cost carriers (e.g. easyJet and, Norwegian) are also attracting business travellers which will lead to higher growth in business passengers. Based on this, overall business passenger numbers are expected to grow gradually over the predicted period and, by 2040, they are expected to account for up to 23% of passengers, almost one quarter of all passengers.

Leisure

Leisure traffic represents the majority of the air passengers from Gatwick and, at the end of the forecast period; this is assumed to remain the case. In 2012, around 83% of the passengers travelled for leisure purposes mainly to short haul destinations. Although the leisure demand for long haul destinations is predicted to grow in the medium to long term, the overall share of the leisure market is predicted to gradually decline in the same period.

5.2.5 Origin

Table 5.5 shows estimated changes in passenger origin to 2040.

Table 5.5: Changes in Origin of Air Passengers

	UK Resident	Non UK Resident
2012	74%	26%
2040	72%	35%

UK Passengers

In 2012, UK passengers accounted for 74% of total demand, of which 63% travelled for leisure and 11% travelled for business. The forecast shows that the overall proportion of UK based passengers will decline over the next three decades for both runway options. This is mainly expected for passengers travelling for leisure, as the number of UK based business passengers is predicted to increase. This change will be unevenly distributed throughout the year, as the summer “busy day” schedules will still be driven by UK-based leisure travellers, but growth in other times of the year will include higher proportions of foreign visitors for business and leisure.

Non-UK Passengers

In recent years the proportion of non-UK passengers has increased and the arrival of non-UK based airlines is assumed to drive growth in the proportion of foreign nationals arriving or departing at Gatwick. In addition, the introduction of new long haul destinations to Asia and the Americas will attract passengers from overseas. Over the forecast period, the proportion of non-UK passengers in the annual forecasts is expected to rise for both business and leisure passengers.

5.3 Employee Forecasts

Travel for staff working at the airport is an important part of the R2 ASAS. Future networks and services will take account of forecast increases in the number of employees, their distribution and their working hours.

5.3.1 Employee forecasts

The Gatwick Airport Employment survey (2012) shows that approximately 21,000 people are employed on-airport and 2,200 work off-airport. In addition, the airport is responsible for generating up to a further 13,000 jobs off-airport through related activities.

Over the past five years, there has been a slight reduction in the number of on-airport employees. This corresponds to the reduction in passenger numbers during the economic downturn, efficiencies across some employment types from the increase in online check in, self check-in and self-handling. The employment forecasts produced include the future efficiency gains tempered by Gatwick's commitment to improve service levels for passengers.

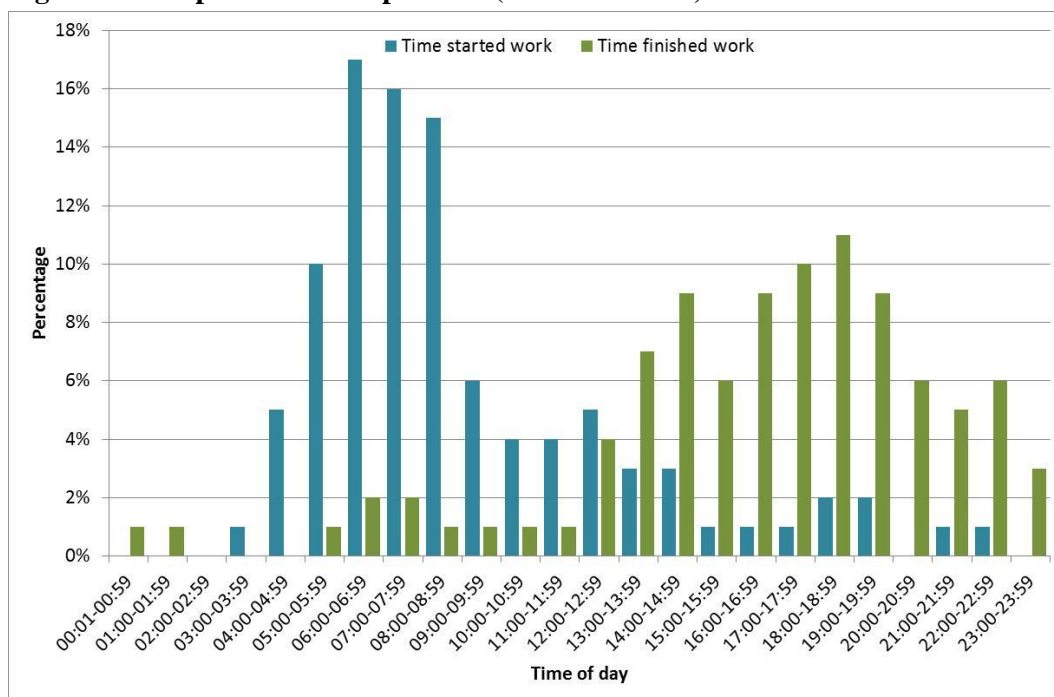
The forecast from the air traffic forecast report indicates direct on-airport employment is expected to increase to 24,000 in 2025/26 without any increase in airport runway capacity. The total on-airport employees required to operate a two runway airport are also forecast to rise, as shown in **Table 5.6**.

Table 5.6: Gatwick employee forecasts (on-airport employee only)

	Option 0	Option 3
2012	21,025	21,025
2025	24,026	26,460
2030	24,430	29,685
2040	25,063	35,210
2050	26,355	39,943

The forecasts indicate that the on-airport employees will increase progressively and will reach approximately 25,000 (+19%) in 2040 for the single runway scenario (Option 0). For Option 3 (wide spaced runway), on-airport employees are forecast to increase by approximately 61% by 2040.

The majority of airport staff work in 4-day shift patterns, with a range of start times from before 0500 to after 1000. As an employment site this spreads the impact of the journey to work beyond the traditional commuter peak more commonly associated with office, retail and some service sector employment. Therefore only a proportion of trips for additional employment at Gatwick will have an impact on peak traffic flows. **Figure 5.3** shows the current distribution of regular shift start and end times throughout the day for airport employees. This shows how **a high proportion of employees, nearly half, start their shift before 0800 when the traditional journey to work peak hour occurs**. The data also indicate that **the pattern for the end of a shift is spread over several hours, from 1400 to 2000, much longer than the normal commuter PM peak**.

Figure 5.3: Airport staff shift patterns (start and finish)

Source: Gatwick Staff Travel Survey (2012)

As well as air passenger and staff vehicle trips there are a number of other uses on the airport that generate traffic. These include:

- Air Cargo traffic movements to and from the Cargo Centre;
- Delivery movements to the airport, mainly to support the catering and retail businesses at the terminals;
- Gatwick maintenance traffic transferring between sites on the airport; and
- Emergency services.

5.4 Mode Share

For all of our modelling, we have taken the approach of **testing the most conservative or “highest impact” case for each mode in order to provide a robust understanding of capacity on future surface access networks.**

Demand for passengers and employees is as per the air traffic forecasts used in developing the overall Masterplan. The foundation of these forecasts is the **2012 busiest day of the year**. The **2040 busy day airport schedule data** has been incorporated into matrices corresponding to demand on transport networks for a **future 2040 busy day in September**.

Gatwick is committed to maintaining a public transport mode share of over 40% through its 2012 ASAS with a stretch target of 45%. Gatwick’s public transport mode share in 2012 was 43.6% and is rising.

In the future, by 2040, Gatwick aspires to a 60% public transport mode share for passengers, comprising 50% by rail, 10% by bus and coach, and the rest by other modes.

When modelling future capacity on the rail network (as described in Chapter 6), **this has been undertaken on a future target mode share of 50% for rail as part of the 60% public transport mode share and represents the most conservative case** when considering capacity and crowding on the rail network.

For the **strategic highway and local roads modelling** (as described in Chapters 8 and 9), modelling has been **undertaken on the current mode share as taken from 2012 CAA data – this equates to ~60% mode share by car**. The modelling of the road networks and testing of capacity considerations has therefore been undertaken on **the most conservative case for roads**. In order to understand the benefits of a 60% public transport mode share in terms of reduced flows and delays on the road network, sensitivity testing has been undertaken at the higher public mode share and has been reported for comparison purposes in both chapters.

In addition, **we have stress-tested surface access networks assuming another decade of growth to 2050** in order to demonstrate resilience in the networks for future growth.

5.5 Cargo and goods traffic

Gatwick handled 101,000 tonnes of air cargo in 2012. 95% of Gatwick's cargo traffic involves non-EU markets and nearly 70% of total cargo volumes are carried by passenger aircraft in the form of belly cargo. This is expected to continue into the future.

Gatwick's cargo volumes are forecast to grow to 1,070k tonnes by 2050 in Option 3. Forecast growth in cargo volumes is driven by an increasing proportion and volume of flights to long haul markets where cargo volumes are typically strong. To serve these markets the forecasts anticipate a greater proportion of wide-body aircraft with cargo capacities in line with or greater than today's fleet.

6 Assessment of Transport Effects: Rail

Executive Summary

- Gatwick is the UK's best connected airport by rail.
- Gatwick Airport station is situated above the Brighton Main Line and is integrated with the airport's South Terminal. It currently has direct services to 129 rail stations; trains calling 24 hours a day, seven days a week; and there are up to 15 trains an hour to a range of London destinations.
- Over 37% of air passengers use rail (14 million passengers each year) of which about half use the Gatwick Express. There are also more than 1 million non-airport rail passengers from the local community using the station, for a total of 15 million users.
- All rail users (including Gatwick's air passengers) will benefit from extensive committed and planned capacity improvements for the Brighton Main Line, delivered by Government and Network Rail before 2025. These programmes will deliver a step change in capacity along the Brighton Main Line thereby reducing crowding and enabling future growth in rail travel. This will enable the railway to accommodate both further growth in commuter demand and forecast peak period additional demand generated by the opening of the second runway at Gatwick. The number of seats available in the northbound direction from Gatwick Airport station in the morning peak hour will rise from 9,300 today to 20,600, an increase of 122% or 11,300 seats. This significant increase in capacity will be achieved through the following steps:
 - **The completion of the final stage of the Thameslink Programme in December 2018 delivering a step change in train capacity, frequency and the direct connections available from Gatwick.** The completion of this major £6 billion investment will unlock key bottlenecks and will facilitate more frequent and longer trains on the Brighton Main Line. This represents an additional 4,280 seats in the morning peak hour departing towards London from Gatwick Airport station benefitting air passengers and commuters alike. There will also be more direct connections to Gatwick including new destinations north of London such as Stevenage, Cambridge and Peterborough as well as interchange at Farringdon to Crossrail services to the Thames Valley and the East of London.
 - **Train lengthening** on certain services into London Victoria between now and 2019 providing an additional 900 peak hour seats.
 - **Further investment beyond 2018 to unlock further capacity constraints along the Brighton Main Line providing additional capacity and operational performance benefits.** A series of focussed enhancement projects are planned for the period from 2019 – 2025 and further projects are being developed for the second half of the 2020s. By the end of the decade, it is expected that an additional 6 trains an hour could be operated due to this investment. This equates to an additional 6,120 seats northbound from Gatwick in the peak hour. This will be supported by integrated control of the route from the new Route Operating Centre at Three Bridges. These investments will again benefit both commuters and air passengers. Capacity will be ahead of or in line with

demand growth. Crowding will be better than existing for most passengers on the Brighton Main Line.

- **The introduction of the European Rail Traffic Management System (ERTMS) on the Brighton Main Line will deliver further capacity during the 2040s.** ERTMS removes fixed lineside signalling of trains and enables trains to operate more closely together. It may also enable the introduction of new operating techniques such as convoys of trains in the peak direction.
- Therefore, by 2040, the railway will have been significantly transformed with an additional 122% increase in seated capacity, enabling the growth of Gatwick Airport and also commuting demand into London. With all of these enhancements, modelling shows that in 2050 demand can be accommodated by the available train capacity north of Gatwick Airport station even in the peak hour. This is before the impact of ERTMS on the Brighton Main Line's capacity is considered.

It is also important to note that the forecast pattern of air passenger arrivals at Gatwick means that, by 2050, a second runway at Gatwick will only generate an additional 2,800 northbound passengers in the morning peak 3 hours into London; an 8% increase in demand north of Gatwick. Gatwick demand growth associated with a second runway is therefore marginal compared with the dominant commuter growth, which is the main driver of capacity, crowding and future planning on the Brighton Main Line.

- As such, overall crowding on the Brighton Main Line with committed and planned schemes is lower than today even assuming a second runway at Gatwick by 2040. With the planned improvements over the next fifteen years, modelling shows that **air passengers will be able to get a seat in the morning peak hour from Gatwick in 2040 and 2050.**
- Once the committed Thameslink Programme is completed in 2018, **Gatwick will have direct services to 175 stations, over 1,000 railway and London Underground stations with just one change, and will be served by a train into London every 2.5 minutes in the peak.** This will support economic growth across London and the South East and provide improved employment opportunities to many deprived areas across the region.
- **A high quality Gatwick Express is essential for Gatwick's future growth.** The Department for Transport supports the new Thameslink Southern Great Northern (TSGN) franchise retaining the four trains per hour service, non-stop to London Victoria. Retaining Gatwick Express is important for overall capacity planning on the Brighton Main Line and to ensure the airport's growth can proceed in parallel to commuting growth in both the forthcoming and future franchises
- These schemes, allied with the extension of Oyster and smart ticketing, will help Gatwick **increase rail mode share to 50%** of a total public transport mode share of 60% by 2040. The remaining 10% will be delivered on bus and coach services.
- The impact of enhanced rail connectivity will be to bring a wider population within 60 and 90 minutes of Gatwick by train, increasing Gatwick's attractiveness as a potential centre of employment. Gatwick is therefore ideally placed to benefit from the significant additional capacity and

connectivity enabled by committed investment in rail on the Brighton Main Line and Thameslink corridors over the next decade.

- Gatwick growth makes a positive contribution by utilising relatively uncrowded off-peak and contra-peak services and supports the case for investing in more capacity by reducing the cost to the taxpayer.
- **Rail services will be brought into an integrated passenger transport interchange, the Gatwick Gateway, which will take advantage of Gatwick's excellent rail connectivity and wide range of local bus and expresses coach services.** The Gateway will be centred on the railway station at South Terminal, with a new single concourse to replace the current concourse and bridge links. This will cater for the needs of both airport passengers and staff, and also commuters and local users who can take advantage of a step-change in public transport connectivity. The Gateway is described in more detail in Chapter 11.
- In summary, Gatwick is the best connected airport by rail in the UK. It will benefit over the next decade from the completion of committed and planned investment in the railway which will significantly improve the airport's connectivity by rail across the UK and deliver a step change in on train capacity and train frequency. Analysis of forecast patterns of air passenger demand show that peak air passenger demand can be managed within the capacity delivered by these committed and planned improvements. In turn the committed improvements will enable Gatwick to increase rail mode share to 50% for passengers and 20% for staff by 2040.

The step change in capacity will be supported by rapid evolution of technology and the personalisation of information to those travelling by rail to Gatwick. This will aid day to day demand management and the ability of the railway to accommodate growth. Technological development is fast paced at the moment. During 2012, Gatwick took the lead in the UK airports sector in considering what user demands and technological change would mean for the surface access experience through a day's workshop (<http://www.driversofchange.com/facilitate/gatwick-the-future-of-surface-access>).

The workshop drew some important conclusions as to how air passengers would make their journey to the airport and the ways in which information would become more personalised and relevant to their particular needs. Technological change has been rapid over the last decade.

- Experts predict further significant change driven by the increased personalisation of information and the increasing ability to use big data for real time control and customer information. By 2040, each air passenger arriving at Gatwick by rail can expect a highly personalised experience with their train journey planned in advance for them, multi-modal "tickets" covering their rail and air journey stored on the mobile personal communication device and even information as to where they should stand on the platform to board their train provided. Demand will be much better spread across the Brighton Main Line and the wider rail network as a result.

6.1 Introduction

Gatwick is the UK's best connected airport by rail. It has regular, direct daily services from over 129 stations and at least 60 stations can be accessed in the peak period. A network of over 800 UK stations is already accessible with just one interchange and Gatwick is connected to High Speed One trains to Europe from St Pancras International. In addition to these stopping services, the Airport has a dedicated four trains per hour, Gatwick Express service to London Victoria, which provides wider economic value to the Gatwick region. The services operating in the current timetable to and from Gatwick are shown in **Table 6.1**.

Table 6.1: Rail services to Gatwick (Current Timetable)

Operator/Service	Route	Peak Frequency	Journey time
Gatwick Express	Gatwick Airport non-stop to London Victoria	4 trains per hour	30 minutes (to London Victoria)
Southern – Brighton Main Line / Coastway	Gatwick Airport to Victoria via East Croydon and Clapham Junction	4 trains per hour	30-53 minutes
First Capital Connect –via London Bridge	Brighton to Bedford via London Bridge	4 trains per hour	28 minutes (to London Bridge)
Southern – via London Bridge	Horsham and Gatwick Airport to London Bridge	2 trains per hour	50-54 minutes (to London Bridge)
First Great Western – North Downs Line	Reading to Gatwick Airport via Redhill	1 train per hour	76-91 minutes (to Reading)

Source: Arup analysis of Network Rail December 2013 timetable

Being situated on the main line between London and Brighton, with a dedicated station integrated with the South Terminal, is a huge asset and a competitive advantage over other South East airports.

Far from being an airport just serving London, Gatwick is accessible from across the South East. Gatwick has daily direct services to more than 120 stations throughout the region; across the South Coast from Southampton to Hastings, west to Reading and as far north as Bedford, and in the future Cambridge and Peterborough. This gives it a distinct advantage over other London airports in terms of catchment population within a certain journey time of the airport.

Currently, rail attracts approximately 36% of all air passengers (2012 CAA passenger data) and approximately 11% of all airport employees (2012 staff travel survey). In the two years from 2010 to 2012, the total number of air passengers accessing the airport by rail grew by around 18% according to CAA data. This is around twice the rate of overall air passenger growth and four times the rate of growth in private vehicle traffic accessing the airport.

Committed and continuing improvements in passenger facilities and customer service at Gatwick Airport station provide the foundation for an overall increase in public transport mode share over time. This will help Gatwick meet its own and the Government's sustainable transport objectives.

RAIL CONNECTIVITY

GATWICK TODAY

Legend:

- Red line: direct
- Yellow line: 1 change

Map details include station names, route numbers, and a scale bar.

National Rail Enquiries
08457 46 49 50
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YOUR LONDON AIRPORT
Gatwick

In the next sections, this chapter looks ahead to future demand growth at Gatwick and how it impacts on rail services in the future. It starts off with a summary of committed schemes, such as the Thameslink Programme, and describes the benefits that these provide for the users of the Brighton Main Line through Gatwick in terms of additional capacity to accommodate demand growth and reduced crowding.

It then goes on to describe the demand inputs used in capacity modelling of the rail network in the future, before using the resulting demand forecasts to demonstrate the significant contribution of the committed schemes in terms of providing additional capacity and reducing crowding when compared to current conditions.

The final section demonstrates the significant increase in connectivity to and from Gatwick delivered by the Thameslink Programme in conjunction with Crossrail and other schemes.

6.2 Rail Capacity Improvements

6.2.1 Current and Future Rail Services

Gatwick Airport is ideally placed on the rail network. It is served by a range of services including the Brighton Main Line and Thameslink networks.

Table 6.2: Rail services to Gatwick (Future Timetable)

Operator/Service	Route	Peak Frequency	Journey time
Gatwick Express	Gatwick Airport non-stop to London Victoria	4 trains per hour	30 minutes (to London Victoria)
Combined TSGN Franchise – Brighton Main Line / Coastway	Gatwick Airport to Victoria via East Croydon and Clapham Junction	6 trains per hour	30-53 minutes
Combined TSGN Franchise –via London Bridge	Bedford via London Bridge	4 trains per hour	28 minutes (to London Bridge)
	Peterborough via London Bridge	2 trains per hour	
	Kings Lynn via London Bridge	2 trains per hour	
Potential Additional Services in CP6	Route	Peak Frequency	Journey time
Combined TSGN Franchise – Brighton Main Line	Various stopping at Three Bridges, Gatwick, Croydon, Clapham and Victoria	2 trains per hour	Minimum of 30 minutes
Combined TSGN Franchise –via London Bridge	Various via London Bridge	2 trains per hour	28 minutes (to London Bridge)
Combined TSGN Franchise – North Downs Line	Reading to Gatwick Airport via Redhill, 1 service on to Oxford	2 trains per hour	76-91 minutes (to Reading)
Potential Additional Services in CP7	Route	Peak Frequency	Journey time
Combined TSGN Franchise – Brighton Main Line	Various stopping at Three Bridges, Gatwick, Croydon, Clapham and Victoria	2 trains per hour	Minimum of 30 minutes

This service pattern, which delivers 14 trains to and from Gatwick in the peak hour, will be subject to significant change over the next five years through the completion of the Thameslink Programme, designed to deliver significant extra capacity and increased north-south connectivity. This will provide 8 trains an

hour via Thameslink to and from Gatwick to Bedford, Cambridge and Peterborough (replacing the First Capital Connect service above) in addition to the services to and from London Victoria including Gatwick Express. In addition, the new integrated Thameslink Southern Great Northern franchise is expected to bring further benefits in terms of improved timetabling which in turn will benefit from the establishment of a Route Operations Centre at Three Bridges by Network Rail to integrate control of the Brighton Main Line and wider Sussex Route network.

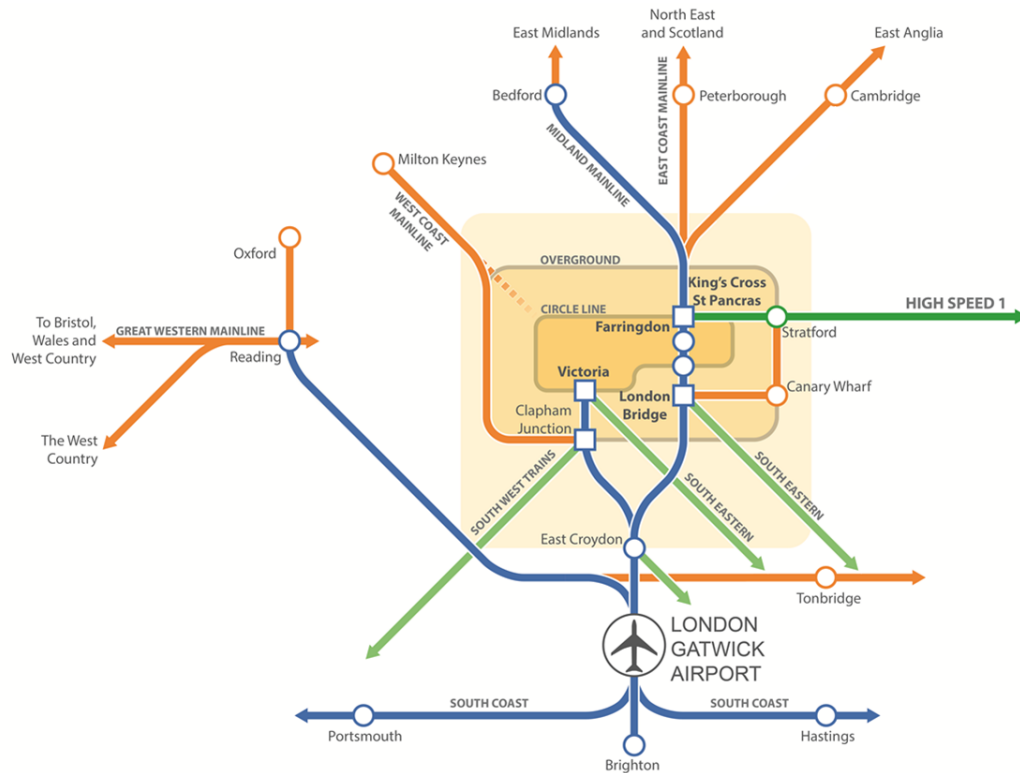
After completion of the Thameslink Programme, Network Rail plan further enhancements to the Brighton Main line unlocking a number of capacity constraints. By 2030 up to an additional 6 trains per hour could operate in the peak hour, four going to London Victoria and two to London Bridge.

Aside from the Thameslink investment, which is targeted at providing additional capacity for increasing commuter demand and to address crowding issues, a committed improvement at Redhill station will double the hourly frequency of train services to Gatwick from the North Downs Line, improving connections to Guildford, Reading and Oxford.

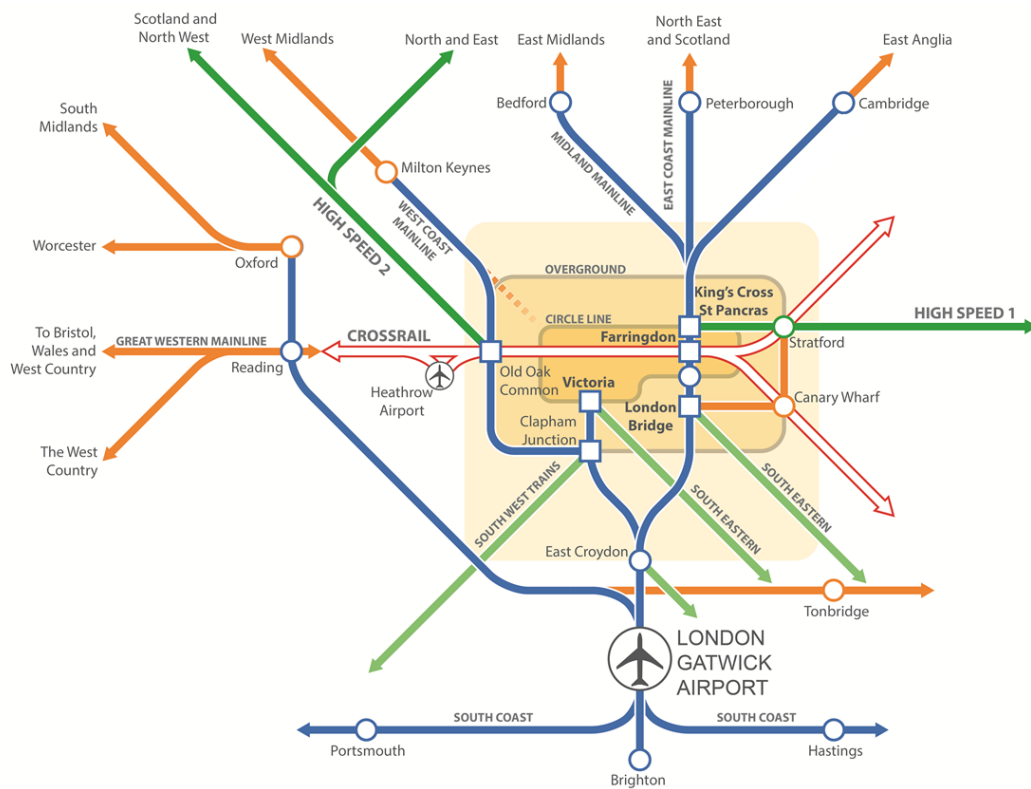
There is also scope to improve connections to Milton Keynes by extension of the current hourly Milton Keynes Central to South Croydon service to Gatwick (and possibly the South Coast), with the potential for a direct connection to the High Speed 2 station at Old Oak Common from 2026. This would provide a building block for the development of a major improvement scheme at Clapham Junction to deliver additional capacity and interchange opportunities, including future interchange with the Crossrail 2 route, if it is developed.

Gatwick understands the importance of Clapham Junction as an interchange and also as a destination. Gatwick is actively supporting Network Rail's work to provide capacity solutions at the station and also the work being undertaken on a regeneration masterplan for Clapham Junction, which is led by Network Rail. The fast and frequent rail connection between Gatwick Airport and Clapham Junction will help the regeneration case and will provide wider economic and employment benefits.

Gatwick Express is of critical importance to the airport and its users, beyond the service it provides to London. Airlines view surface access connectivity as a key issue and the quality of an airport's rail links demonstrate its attractiveness for international business, providing a direct link to the regional or national economy. Furthermore, Gatwick Express provides support and accessibility for local businesses in the Gatwick Diamond to compete with other areas in the South East.

Figure 6.2: Current Rail Network to Gatwick

Source: Network Rail and Farrelis

Figure 6.3: Future Rail network to Gatwick including the Thameslink Programme and Crossrail

Source: Network Rail and Farrelis

6.2.2 Long Term Planning Process

Network Rail has embarked on a new Long Term Planning Process (LTPP) to establish a link between investment, which is delivered on a rolling 5-year plan basis, and strategic long term objectives and priorities based on changes to rail demand. This process has led to stakeholder consultation on four Market Studies:

- London and the South East Market Study
- Long-Distance Market Study
- Freight Market Study
- Regional Urban Market Study

Arguably, the Brighton Main Line has a role to play in all four studies but, in practice, its main relevance is to the London and the South East study. In this latter study, Network Rail makes specific reference to the importance of international gateways (port and airport) and access by rail as an economic driver for the region. The report takes account of comments received from Gatwick Airport and others relating to the importance of capacity and quality of access for services used by airport passengers (and staff). These comments include recognition that **airport access can make a significant contribution to cross-regional and contra-peak movements that help to improve the value for money of rail services and encourage investment in capacity**. A specification for train services to airports catering for more than 30 million passengers per annum was included in the London and South East Market Study report. This identifies a minimum output of six trains per hour to/from London and four trains per hour for other key airport catchments in the region. This is based on direct services or minimal interchange as is conditional on a viable business case. Other aspects of a minimum service level aspiration are set out by Network Rail as follows:

- Sufficient capacity for the needs of passengers (including non-air passengers that use the airport as a transport hub);
- A minimum frequency of two trains per hour per route during airport peak operation;
- High levels of reliability and punctuality;
- Journey speed (including waiting time) of 50-60mph;
- Direct services (i.e. minimal interchange);
- A total journey time of less than 60 minutes to/from key airport catchments within London and the South East; and
- A total journey time of less than 100 minutes to/from key airport catchments within long distance airport catchments beyond London and the South East.

Gatwick is currently a major transport hub and has aspirations to grow as both an airport and transport interchange – as described in Chapter 11. Gatwick compares favourably with these minimum requirements with 14 services per hour in the peaks and current journey times of 30 minutes into London Victoria and London Bridge, 40 minutes to Farringdon and to London St. Pancras, with onward international connections. Existing rail journey time catchments are provided in Appendix A.

The Market Studies, which were all published at the end of 2013, are supported by Route Plans, of which the Sussex Route – Summary Route Plan is one, and will be followed by specific route based studies looking at individual corridors. The Sussex Route Study, and a further Network Rail study of Rail Access to Airports, will both be undertaken in 2014. As a key consultee, Gatwick's own analysis of rail demand associated with the airport, and its views on capacity, reliability and the economic importance of rail access, will be important inputs to these studies.

As part of their Long Term Planning Process, and consistent with the recommendations of the Airports Commission, Network Rail is developing a programme for enhancement of the Brighton Main Line over the next fifteen years. The first five years of scheme funding (2014-2019 or Control Period 5) has been approved by the Office of Rail Regulation.

6.2.3 Committed and Planned Enhancements

Control Period 5 (2014 – 2019)

Control Period (CP5) sees significant investment in the Brighton Main Line by 2019. This investment benefits air passengers from Gatwick and commuters alike reducing crowding on trains and providing capacity for demand growth.

The most significant output is the completion of Key Output 2 of the Thameslink Programme in December 2018 which will deliver a step change in train capacity, frequency and the direct connections available from Gatwick. The Thameslink Programme will deliver an additional 4,280 seats in the morning peak hour northbound from Gatwick Airport station.

In addition a number of smaller enhancements are planned to remove bottlenecks or capacity pinchpoints. These build on the committed improvements contained in the Sussex Route Plan and Network Rail Business Plan published in January 2013. They include:

- New platforms and track at Redhill to enhance capacity.
- Committed strengthening of certain services into London Victoria delivering an additional 900 peak hour seats northbound from Gatwick.
- A second train per hour Reading to Gatwick Airport on the North Downs Line utilising the additional capacity at Redhill, with potential for 1 train per hour continuing to Oxford. There are 2 trains per hour operating on the North Downs Line, one fast service and one slow service. The fast service stops only at Reading, Wokingham, Blackwater, North Camp, Guildford, Dorking Deepdene, Reigate, Redhill and Gatwick and takes about 40 minutes from Guildford to Gatwick. The slow service stops at nearly all stops and takes about 50 minutes from Guildford to Gatwick, with a change of trains at Redhill. Provision of Platform 0 at Redhill will deliver 2 trains per hour direct between Reading and Gatwick Airport, with the opportunity to accelerate services but with the primary benefit likely to be additional rail mode share.

There will also be more direct connections to Gatwick including new destinations north of London such as Stevenage, Cambridge and Peterborough as well as interchange at Farringdon to Crossrail services to the Thames Valley and the East of London.

The recent opening of Platform 7 at Gatwick Airport station has reduced the requirement for fast and slow line trains to cross over, providing a capacity benefit and enabling Gatwick Express services on Platforms 5 and 6 to once again operate as a 'virtual waiting room' to enhance the quality of service and passenger experience.

The National Infrastructure Plan (NIP) announcement by The Chancellor of the Exchequer in December 2013 included £50million for the Gatwick Gateway scheme to further develop Gatwick Airport railway station and provide an expanded concourse and improved passenger facilities. Under Secretary of State for Transport Robert Goodwill indicated that "the redevelopment of Gatwick Airport station... may be timed in parallel with the upgrading of the Brighton Main Line in 2018/19 to reduce costs and disruption" at a speech to the Airport Operators Association in March 2014.

Control Period 6 (2019 – 2024) and beyond

Beyond these committed improvements, Network Rail is seeking to develop a further set of planned improvements that will together provide extra resilience and reliability of the network, improving journey times and capacity that could deliver extra train paths into London Victoria. These extra train paths could then be used to further increase the number of services originating or calling at Gatwick, using more of the station capacity delivered by the current improvement scheme.

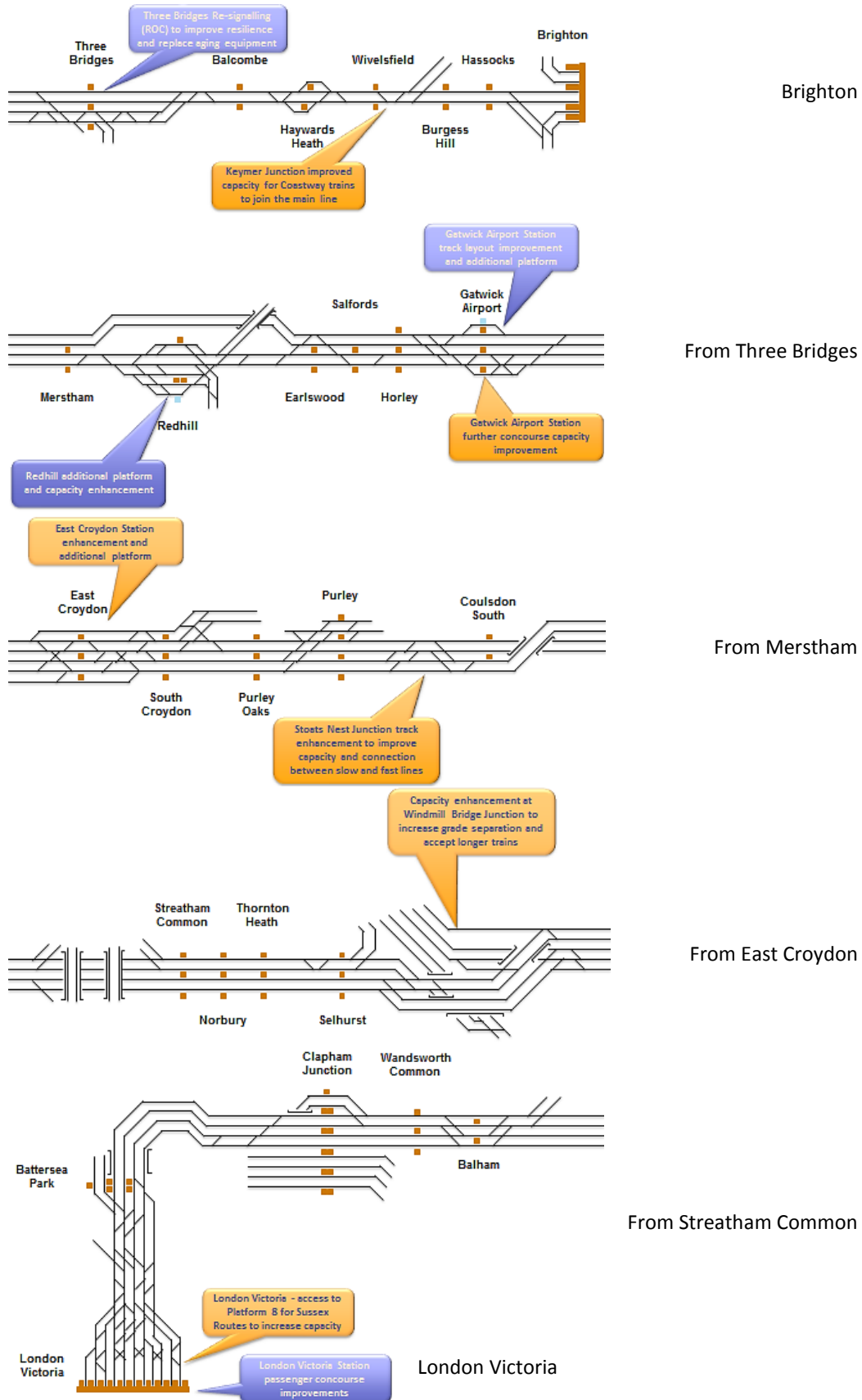
Additional potential measures being considered and worked up by Network Rail for implementation in the period from 2019-2024 - Control Period 6 (CP6) - include the following:

- Additional capacity at London Victoria station for Sussex Routes (Platform 8);
- Grade separation and capacity enhancement at Windmill Bridge Junction;
- Additional track and station enhancement at East Croydon;
- Grade separation at Stoats Nest Junction; and
- Capacity enhancement at Keymer Junction.

The changes proposed by Network Rail at East Croydon and Windmill Bridge Junction will provide a dedicated line for services and remove conflicts, opening up more space for stopping services. At Stoats Nest Junction, a grade separated junction will remove conflict and will also make better use of the improvements between East Croydon and Windmill Bridge Junction. A summary of committed and potential improvements are shown in **Figure 6.4** overleaf.

These schemes create the potential to operate additional trains from the Brighton Main Line. As further background commuter growth is forecast beyond 2025, it can be expected that Network Rail will continue to develop further proposals to enhance capacity and reliability. We understand schemes are already being examined at other pinchpoints, including at Clapham Junction. Based on discussions with Network Rail, modelling in 2040 has assumed an additional 4 trains per hour in CP6 and a further 2 trains per hour between 2025 – 2029 - Control Period 7 (CP7) - to reflect use of the enhanced capacity on the Brighton Main Line. This enhanced capacity equates to 6,120 seats northbound from Gatwick Airport in the peak hour.

Figure 6.4: Committed (CP5 - blue) and potential (CP6 - orange) enhancements



6.2.4 European Rail Traffic Management System (ERTMS)

ERTMS will revolutionise the operation of the British rail network as is progressively introduced across the country. Fixed lineside signals will be replaced by a computer in the driver's cab. This will control the speed and movement of the train, whilst taking account of other trains on the railway. Each train will run at an appropriate safe speed, allowing more trains onto the network.

Introduction of ERTMS on the Brighton Main Line is scheduled for 2040. When introduced, it will enable the next step change in capacity along the route, building on the 122% increase in seated capacity delivered by 2029. It will also facilitate the introduction of new operating techniques such as flighting or convoying of trains in the peak direction of travel.

6.2.5 Marketing and New Technology

There is also scope to further improve the marketing and promotion of rail as the mode of choice to Gatwick and supporting the use of emerging technology to enhance the surface access experience and meet Gatwick's vision for the quality of surface access by 2030.

During 2012 Gatwick took the lead in the UK airport's sector in considering what user demands and technological change would mean for the surface access experience in 2030 through a day's workshop.

(<http://www.driversofchange.com/facilitate/gatwick-the-future-of-surface-access>).

The workshop drew some important conclusions as to how air passengers would make their journey to the airport and the ways in which information would become more personalised and relevant to their particular needs. Technological change has been rapid over the last decade. Experts predict further significant change driven by the increased personalisation of information and the increasing ability to use big data for real time control and customer information. By 2040, each air passenger arriving at Gatwick by rail can expect a highly personalised experience with their train journey planned in advance for them, multi-modal "tickets" covering their rail and air journey stored on the mobile personal communication device and even information as to where they should stand on the platform to board their train provided. Demand will be much better spread across the Brighton Main Line and the wider rail network as a result.

It is also essential that all trains offer a high quality of experience for air passengers. Whilst Gatwick Express will form the premium service with wifi and high quality passenger information, the opportunity created by the new Thameslink rolling stock fleet and modern trains on services into Victoria need to be capitalised on. Whole journey information through apps or future equivalent personalised information technology will be an essential component of the future air passenger journey experience.

6.2.6 London Termini

In terms of the rail network, it is important to mention that capacity at the main London termini, notably London Victoria, London Bridge and Farringdon (for interchange) impact upon the whole passenger experience, as well as onward journeys by London Underground or by bus.

At the London termini, more complex movements and capacity interactions occur, with stations dealing with a number of different routes and services, requiring interchange with onward rail and underground services as well as pedestrian access and egress.

Improvements to the station concourse at London Victoria and to passenger facilities in the Underground station are also committed by Network Rail and Transport for London. London Bridge and Farringdon stations are both subject to significant changes as a result of the Thameslink upgrade and Crossrail respectively.

Farringdon will grow from an important interchange station to become London's newest and one of its busiest transport hubs, where Thameslink, Crossrail and Underground services all connect. From Farringdon, passengers will have access to rail services operating at up to 24 trains per hour in the peak in each direction, on Thameslink and Crossrail, as well as London Underground services on the Hammersmith and City, Metropolitan and Circle lines.

Gatwick demand forms only a small portion of overall background demand in the South-East. In addition, given Gatwick's high degree of connectivity, passengers are dispersed between a significant number of stations through London and the South-East. Therefore any demand increase generated by a potential second runway, whilst important, is unlikely to trigger capacity improvement requirements at London termini in its own right.

6.3 Contra-Peak Demand and Value for Money

Whilst there is a continued focus in delivering sufficient capacity for peak hour and peak period commuter flows the contribution of non-commuter demand, for example for access to airports, is increasing. This has not only been recognised in the Network Rail planning process but also in the specification of forthcoming franchise changes awarded by the DfT. The Invitation To Tender (ITT) documents to bidders for the new combined Thameslink, Southern, Great Northern Franchise (TSGN or New Thameslink Franchise) were instructed to consider both revenue and quality improvements in their submissions, highlighting the wider economic and quality benefits associated with delivering rail access to Gatwick.

Network Rail's commitments, illustrated by the Market Studies and Route Plans, provide a framework for future growth, estimating future demand and identifying how rail can support that growth. The Route Plan describes more specifically the rail services and network enhancements required to deliver the demand growth identified in the Market Study, and has two forecast years, 2023 and 2043.

These documents combine to highlight a process for developing capacity enhancements that promotes best use of existing capacity and incremental improvement as follows:

- use existing spare capacity during peak hours, as well as the capacity which will be delivered by existing commitments;
- deliver extra capacity through the reallocation of resources ('making best use');
- deliver additional capacity within the current capability of the network, by adding resources to deliver more and/or longer trains; and

- enabling the operation of new and/or longer services by investing in the capability of the network.
- Any approach for accommodating Gatwick air passenger demand on rail should demonstrate that it is consistent with this overall approach, in particular improving the utilisation of existing services and network capacity, as advocated in the McNulty Rail Value for Money study for DfT. These issues extend beyond the term of the next franchise and will become an issue for the next, longer franchise that will start between 2022 and 2024.

6.4 Modelling Approach

6.4.1 PLANET South

Gatwick has undertaken modelling analysis to develop a view on future capacity required to accommodate demand, including testing a single runway airport in Option 0 and a second runway in Option 3 with capacity to grow up to 2040. This incremental difference between the two options has been used to represent the impact of a second runway on the overall demand for rail and to examine whether or not there is a need for additional capacity on the rail network directly as a result of airport expansion. In addition, a sensitivity test to 2050 has been undertaken and is provided for information in subsequent sections.

The approach for assessing rail access demand and options for mitigation follows the overall method shown in **Figure 3.3** in Chapter 3.

For all of our modelling, **we have taken the approach of testing the most conservative or “highest impact” for each mode** in order to provide a robust understanding of capacity on future surface access networks.

2040 busy day airport schedule data has been incorporated into matrices corresponding to demand on transport networks for a **future busy day in September**. For rail, modelling has been undertaken on the ‘highest impact’ mode share, namely a 50% rail mode share for passengers and 20% rail mode share for staff in 2040.

To assess the effects of the additional air passenger and employee demand at Gatwick for rail access, strategic modelling was undertaken using the DfT’s strategic rail model, PLANET. This enabled the effects on the wider rail network to be estimated. PLANET is split into four geographic regions (North, Midlands, South and National) with the PLANET South Model covering London and the South East as well as the South West, East of England and the Midlands.

An alternative tool is RailPlan, which has been developed by Transport for London. RailPlan provides for the detailed assignment of both rail and London Underground networks and has a greater level of detail across the capital. This strength for London-oriented rail planning is good for suburban and urban demand optimisation in Zones 1 to 6. By contrast, PLANET South has better coverage across the South East and beyond.

PLANET South was chosen for the following reasons:

- PLANET South is generally used at a more strategic level than RailPlan, which offers greater detail in and around London.

- PLANET South is closely aligned with the Gatwick objective of modelling national rail services throughout the south east of England and beyond, rather than a specific focus on journeys to, from and within London.
- The PLANET South model has recently been updated to reflect committed schemes as established by Network Rail in 2011, including the new Thameslink franchise, as well as other relevant schemes such as HS2.
- PLANET South is disaggregated by trip purpose (business, leisure and commuting) which is useful when analysing trip distribution by purpose from existing matrices.
- There is a balanced coverage across the whole model area in PLANET South with no bias towards Central London.
- PLANET has recently been used to model HS2 and the model is capable of handling strategic level schemes.
- DfT support its use for this study (as part of the overall assessment methodology set out in Chapter 3).

6.4.2 Approach and Validation

The PLANET South model years 2026, 2041 and 2051 were used to approximate the 2025, 2040 and 2050 assessment years. As agreed with DfT, the model was used without further calibration or validation, and without incorporating any additional functionality or detail to the base model. The future networks are therefore based on the committed capacity as agreed for this version of the model, including maintaining the existing level of service for the Gatwick Express and delivering capacity from schemes committed for Control Period 5 (2014-2019).

The PLANET South model in recent years has been used primarily for the HS2 project and the networks have been continuously updated since 2009. The version of the future year networks used in this work was last updated in 2011 and includes significant new projects such as Thameslink and Crossrail, both train service enhancements and lengthening, as well as other major network upgrades and planned timetable changes.

Table 6.3 shows the overall demand in the PLANET South matrices from the base 2010 model through to the 2050 future year model and shows the percentage increase in demand over time. Growth in background commuter demand increases from 25% between 2010 and 2025 and 49% between 2010 and 2040/50.

Table 6.3: PLANET South background demand by year

	2010	2025	2040	2050
Total	1,686,632	2,101,705	2,518,952	2,518,952
Change from base (excluding Gatwick Airport specific growth)	-	25%	49%	49%

Source: DfT PLANET South model

In addition to the growth shown in **Table 6.3**, demand to and from Gatwick was updated with the ‘airport overlay matrices’ that were taken from future air passenger forecasts as discussed in Chapter 5 of the report.

Gatwick has undertaken a validation exercise with Network Rail in terms of future demand and rail schemes.

Network Rail has advised that historical growth of morning peak trips into Central London, across all routes has averaged 1.3% a year. Modelling by Network Rail for the London and South East Market Study suggests that overall future growth, with committed schemes, is likely to be consistent with this, about 1.2% a year, depending on future investment in further rail schemes. In order to compare Network Rail's growth of 1.2% to 1.3% demand growth per annum, the PLANET growth between 2010 and 2031 has been extracted. Growth over this period equates to 31%, or around 1.3% p.a. which aligns with Network Rail's view of future demand growth.

Discussions with Network Rail on the service improvements assumed for Control Periods 4 and 5 in the modelling work indicate a broad level of agreement on the specification of these schemes, notably changes to the East London and south London Lines, various train lengthening proposals and reductions in Southern high peak operation into London Bridge (CP4) and Redhill – London Victoria high-peak services lengthening to 12 car operation and the Thameslink Key Output timetable ¹(CP5).

6.5 Future Demand at Gatwick

6.5.1 Daily Demand Profile

The impact of airport related growth on the rail network has been assessed by modelling Option 0 (single runway) and Option 3 (two runways) in PLANET South.

The impacts have been estimated by quantifying the following:

- Change in passenger demand on the network; and
- Change in crowding on the network.

The forecasts for air passengers and airport employees at Gatwick in the future are described fully in Chapter 5 of this report. **2040 busy day airport schedule data** has been incorporated into matrices corresponding to demand on transport networks for a **future busy day in September**. For rail, modelling has been undertaken on the “**highest impact**” **mode share**, namely a 50% mode share for 2040, as part of an overall public transport mode share of 60% for passengers. Sensitivity testing to 2050 has also been undertaken.

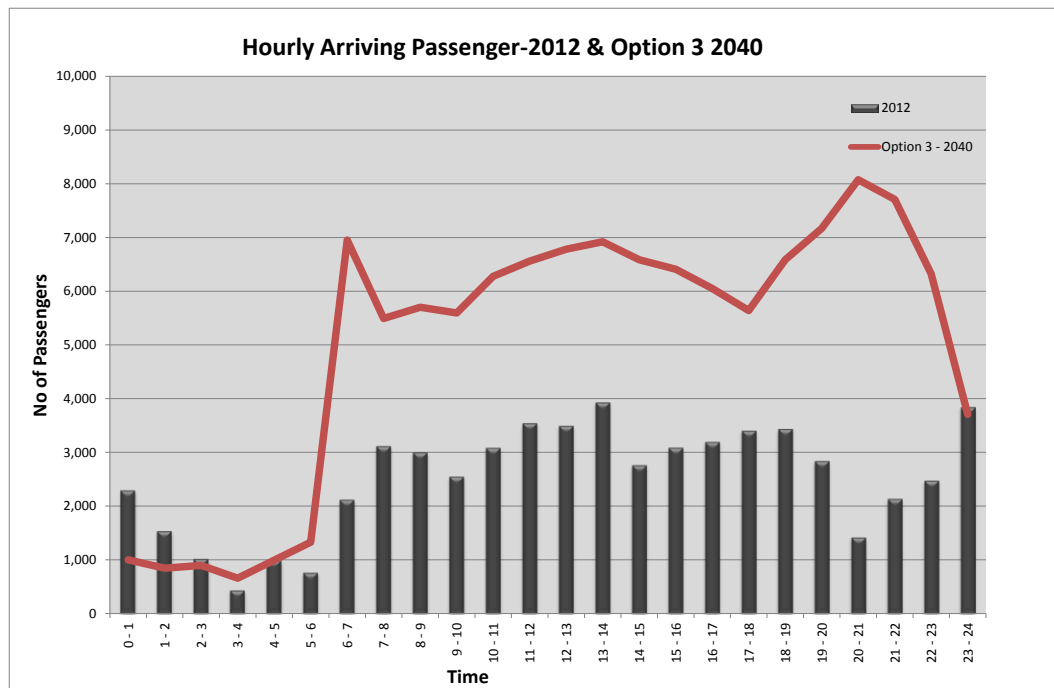
From the air traffic forecasts, the profile of air passenger growth throughout the day indicates that off peak rail demand will increase at a slightly higher rate than peak demand. This relates to the fact that there is still some spare capacity at the airport for more off peak flights to generate demand so the overall level of uplift is greater. This will help to better utilise available train capacity in the off peak periods of the day.

¹ 4 trains per hour Brighton – Bedford throughout the peak at 12-car via London Bridge. Horsham/East Grinstead/Three Bridges/Caterham/Tattenham <> London Bridge services all extended through Thameslink core.

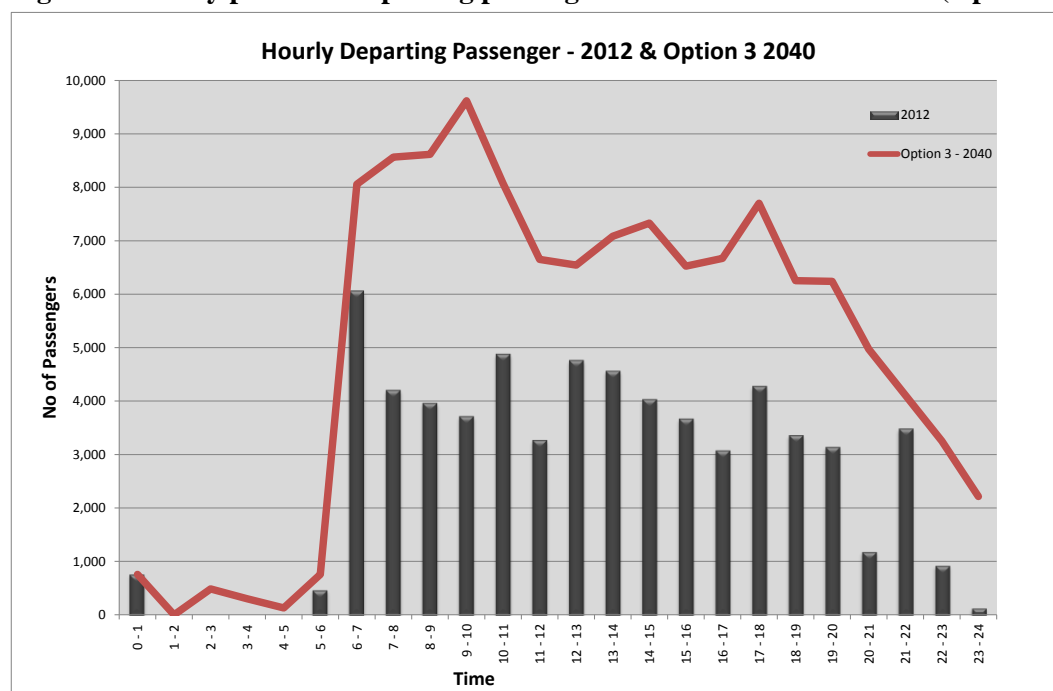
Figure 6.5 shows that with a second runway, the morning arrival peak at Gatwick will move to an earlier hour of 0600 on the airside. Assuming a one hour lag to account for processing in the terminals, this means the demand will reach landside transport modes from 0700 i.e. before the start of the commuter peak. This is a one hour time shift when compared to 2012 and is an important consideration when assessing how additional demand associated with a second runway relates to crowding on commuter services in the morning peak period.

For departures demand, as shown in **Figure 6.6**, a peak is shown from 0900 which assuming a two hour lead time means more passengers traveling from 0700. Whilst this overlaps with the commuter peak period, this demand is generally in the counter-peak direction i.e. from London to Gatwick.

Figure 6.5: Daily profile of arriving passengers - 2012 and 2040 forecast (Option 3)



Source: Air traffic forecasts

Figure 6.6: Daily profile of departing passengers – 2012 and 2040 forecast (Option 3)

Source: Air traffic forecasts

6.5.2 Rail Demand

The estimated growth in rail passengers is shown in for the different options considered in **Table 6.4**. This shows a 69% increase in all trips to Gatwick, combined across air passengers and airport employees across all modes, and 66% growth from Gatwick in 2040 when comparing Option 0 to Option 3.

Table 6.4: Rail passenger demand to/from Gatwick under different growth options (AM peak period, 7am to 10am)

Option	Year	Air Passengers		Employees	
		To Gatwick	From Gatwick	To Gatwick	From Gatwick
Existing	2012	3,240	2,366	863	99
Option 0 (single runway option for comparison purposes)	2025	6,144	4,523	1,549	178
	2040	5,841	4,902	1,616	185
Option 3 (Base Masterplan option)	2025	7,575	5,374	1,659	190
	2040	10,450	8,218	2,181	250
	2050	11,304	9,033	2,418	277

Source: Arup analysis from air traffic forecasts

6.5.3 Rail Passenger Demand from Gatwick

The impact of airport related growth on the passenger volumes immediately north and south of Gatwick is shown in **Table 6.5** and **Table 6.6** for each option. The demand to and from Gatwick for each option is shown along with the

corresponding total passenger volumes on the rail network, shown for the line immediately north and south of Gatwick.

In the morning peak direction (northbound), the percentage increase in total passenger volumes north of Gatwick as a result of the second runway is 8% in 2040 (Option 0 to Option 3).

There is significant demand for travel to Gatwick in the morning counter-peak direction. The percentage changes are higher owing to the lower overall level of demand in this direction. **A difference of 36% in southbound demand from London between Option 0 and Option 3 highlights the benefits of a second runway in terms of maximising use of rail services** and meeting the recommendations of the McNulty Rail Value for Money study.

The percentage increase in total passenger volumes south of Gatwick as a result of the second runway is less than the north of Gatwick volumes. The passenger volumes increase by 2% in the northbound and 6% in the southbound direction in 2040 (Option 0 to Option 3).

Table 6.5: Gatwick rail passenger demand (north of Gatwick) and impact on loading (7am to 10am)

7am-10am	Rail Trips From Gatwick	Rail Trips from Gatwick to London and North*	Link Volume North of Gatwick Northbound	% of Total Flow	Rail Trips To LGW	Rail Trips to Gatwick from London and North*	Link Volume North of Gatwick Southbound	% of Total Flow
Option 0 – 2012	2,465	2,145	27,824	8%	4,102	3,569	8,683	41%
Option 0 – 2025	4,701	4,090	29,543	14%	7,693	6,693	11,068	60%
Option 0 – 2040	5,087	4,426	33,236	13%	7,457	6,488	11,922	54%
Option 3 – 2025	5,564	4,841	30,266	16%	9,234	8,034	12,391	65%
Option 3 – 2040	8,468	7,367	35,999	20%	12,631	10,989	16,266	68%
Option 3 – 2050	9,310	8,100	36,691	22%	13,722	11,938	17,141	70%

Source: Arup analysis from PLANET South modelling and Air Passenger Forecasts, assuming a 50% rail mode share of a 60% public transport mode share

* 87% of the Gatwick trips are to/from the north.

Table 6.6: Gatwick rail passenger demand (south of Gatwick) and impact on loading (7am to 10am)

7am-10am	Rail Trips From Gatwick*	Rail Trips from Gatwick to South*	Link Volume South of Gatwick Southbound	% of Total Flow	Rail Trips To LGW*	Rail Trips to Gatwick from South*	Link Volume South of Gatwick Northbound	% of Total Flow
Option 0 – 2012	2,465	320	4,375	7%	4,102	533	24,942	2%
Option 0 – 2025	4,701	611	5,339	11%	7,693	1000	26,582	4%
Option 0 – 2040	5,087	661	6,420	10%	7,457	969	29,851	3%
Option 3 – 2025	5,564	723	5,431	13%	9,234	1200	26,752	4%
Option 3 – 2040	8,468	1,101	6,790	16%	12,631	1642	30,432	5%
Option 3 – 2050	9,310	1,210	6,889	18%	13,722	1784	30,594	6%

Source: Arup analysis from PLANET South modelling and Air Passenger Forecasts, assuming a 50% rail mode share of a 60% public transport mode share

*13% of the Gatwick trips are to/from the south.

Table 6.7 shows the estimated impacts of the demand from Gatwick under each option on overall rail demand at key network locations along the Brighton Main Line and Thameslink. The demand for air passenger travel from Gatwick is a very small percentage of total peak demand – 8% in Option 3 at 2040 for flows north of Gatwick. The impact wanes closer to London where commuting volumes become higher. As shown in the table, the percentage change in total passenger volume is 2% to 3% across the 3-hour morning peak, with the greatest impact occurring north of East Croydon in Option 3 in the later years of the analysis.

It is important to note the following points from **Table 6.7**, to understand the impact of second runway demand on overall capacity:

- Demand for a second runway adds only a further 8% growth in overall demand to services at a screenline immediately north of Gatwick in 2040 (Option 0 to Option 3). This is because the incremental growth from Gatwick moving from a single to a two runway airport is substantially less than the absolute increase in background commuter growth.
- Passenger loading on services into London Victoria in 2040 increase by between 55% and 68% between Gatwick Airport station and Clapham Junction, where overall demand is highest (resulting from the addition of commuter demand north of Gatwick).
- At Clapham Junction, which is the busiest point on the route, the impact of a second runway is to add just 2% of overall demand.
- Passenger loading on services into London Bridge in 2040 increase with the impact of second runway trips being an addition of just 4% on overall demand.

Table 6.7: Passenger volumes on key network locations (7am to 10am)

	North of Gatwick (Northbound)	Brighton Main Line			Thameslink via London Bridge	
		North of East Croydon (Northbound)	North of Clapham (Northbound)	South of London Victoria (Northbound)	North of East Croydon (Northbound)	South of London Bridge (Northbound)
Option 0 – 2012	27,824	33,435	53,287	51,293	27,785	3,467
Option 0 – 2025	29,543	30,579	49,166	47,778	34,582	32,460
Option 0 – 2040	33,236	33,936	55,826	53,902	38,885	36,447
Option 3 – 2025	30,266 ↓ +8%	30,910 ↓ +4%	49,456 ↓ +2%	48,031 ↓ +2%	34,865 ↓ +3%	32,689 ↓ +3%
Option 3 – 2040	35,999	35,135	56,709	54,751	39,958	37,366
Option 3 – 2050	36,691	35,436	56,915	54,946	40,232	37,586

Source: Arup analysis from PLANET South modelling, assuming a 50% rail mode share of a 60% public transport mode share

6.5.4 Crowding

In addition to looking at the impacts on network passenger volumes, changes in crowding have also been estimated. Crowding is an estimate of how much capacity is available for growth, or how much additional capacity is required to meet existing demand with an acceptable level of passenger comfort.

The Brighton Main Line is one of the busiest commuter lines in the country with peak crowding on a range of services. The planned investments in capacity already highlighted are intended to address the current gap and provide for growth.

These improvements include the completion of the Thameslink Key Output 2 in CP5 and retention of a non-stop Gatwick Express service at 4 trains per hour.

Network Rail is already developing a programme of measures to enhance the Brighton Main Line for implementation in CP6 and has advised that these improvements could result in up to 4 trains per hour.

In addition, potential reconfiguration of Clapham Junction in CP7, the largest remaining bottleneck on the route to London Victoria, could deliver yet more capacity, potentially up to a further 2 trains per hour.

Table 6.8 contains crowding indices at key network locations including growth at Gatwick assuming the capacity enhancements in CP5 up to 2025, and CP6 and CP7 for 2040 and beyond.

These have been estimated using Transport for London's Passenger Guidance Capacity (PGC) metric and based on PLANET South modelling. It is a peak hour measure of crowding illustrated by the following formulas:

when occupancy = $(2/3 * \text{seats} + 2/5 * \text{standing})$, PGC = 1.0

when occupancy = $(3/3 * \text{seats} + 3/5 * \text{standing})$, PGC = 1.5²





when occupancy = $(3/3 * \text{seats} + 5/5 * \text{standing})$, PGC = 2.0

The key observations are as follows:

- **Committed capacity schemes significantly reduce crowding by 2025.**
- With additional Gatwick demand for a second runway (Option 3), there is a small increase in crowding over Option 0 with crowding increasing towards central London.
- The analysis indicates that seats will be available in the peak period when trains arrive at Gatwick in 2040 and 2050 though updated station design and platform distribution will be required to support this.
- In all cases, **crowding with the second runway is lower than reported for 2012** showing that committed capacity enhancements on the corridor make an important contribution to accommodating the airport's growth. This shows that expanding Gatwick provides an opportunity to secure maximum benefits from planned investment and still have lower levels of crowding of services by 2040 and 2050 than exist today.

²PGC values at Gatwick are lower than 1.5 in the future indicating seats being available.

Table 6.8: Peak Crowding (PCG) at key locations (peak hour, northbound trains)

	North of Gatwick (Northbound)	Brighton Main Line			Thameslink via London Bridge	
		North of East Croydon (Northbound)	North of Clapham (Northbound)	South of London Victoria (Northbound)	North of East Croydon (Northbound)	South of London Bridge (Northbound)
Option 0 – 2012	1.50	2.13	2.26	2.13	2.26	2.99
			Impact of committed capacity improvements			
Option 0 – 2025	1.25	1.84	1.84	1.78	1.78	1.85
Option 0 – 2040	1.08	1.71	1.86	1.80	1.76	1.82
Option 3 – 2025	1.28	1.86	1.85	1.79	1.79	1.87
Option 3 – 2040	1.17	1.78	1.90	1.84	1.80	1.86
Option 3 – 2050	1.19	1.80	1.90	1.84	1.80	1.87

Source: Arup analysis from PLANET South modelling

Crowding at key locations between Gatwick and London

Figure 6.7 illustrates the 2012 crowding ratio (PGC) at key network locations along Brighton Main Line and Thameslink. The crowding ratios for Option 0 – 2025 and Option 3 – 2040 along these two lines are shown in **Figure 6.8** and **Figure 6.9** respectively.

The PGC results are for AM peak hour demand.

Figure 6.7 shows that crowding occurred between East Croydon and London Victoria in the morning peak in 2012, with all seats taken and standing capacity fully utilised over the high peak hour. At Clapham Junction and London Bridge the crowding was beyond generally acceptable limits and some of the passengers would have been left behind on platforms.

Figure 6.8 shows that Network Rail's committed improvements in CP5 reduce crowding by 2025.

In 2025 Option 0, there are seats available between Brighton and East Croydon and from there the rail passenger demand exceeds seated capacity in the last section approaching London. There is standing room available however, which is a step-change in improved capacity when compared to current conditions.

Figure 6.9 shows Option 3 at 2040 and indicates that there are seats available between Brighton and East Croydon but trains will become busy at Clapham Junction with all the seats and standing capacity utilised. The crowding then eases slightly between Clapham Junction and London Victoria with some standing capacity available.

On the Thameslink corridor, rail passenger demand exceeds seated capacity between East Croydon and London Bridge over the morning high peak three hour period. However, the journey time is below 20 minutes, which is the industry standard for maximum spent standing.

Figure 6.7: 2012 – PGC on Brighton Main Line and Thameslink, AM Peak Hour

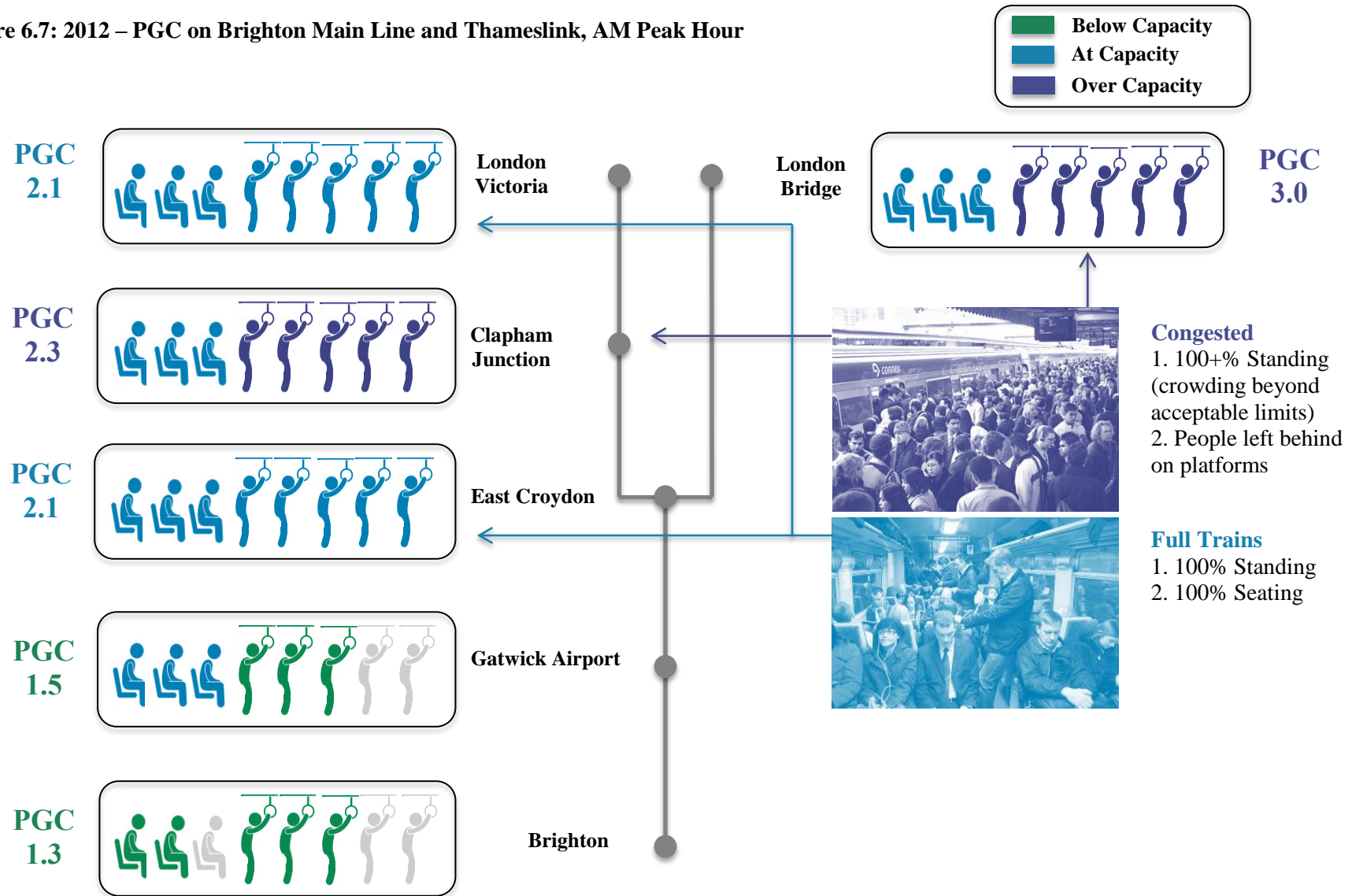


Figure 6.8: 2025 Option 0 – PGC on Brighton Main Line and Thameslink, AM Peak Hour

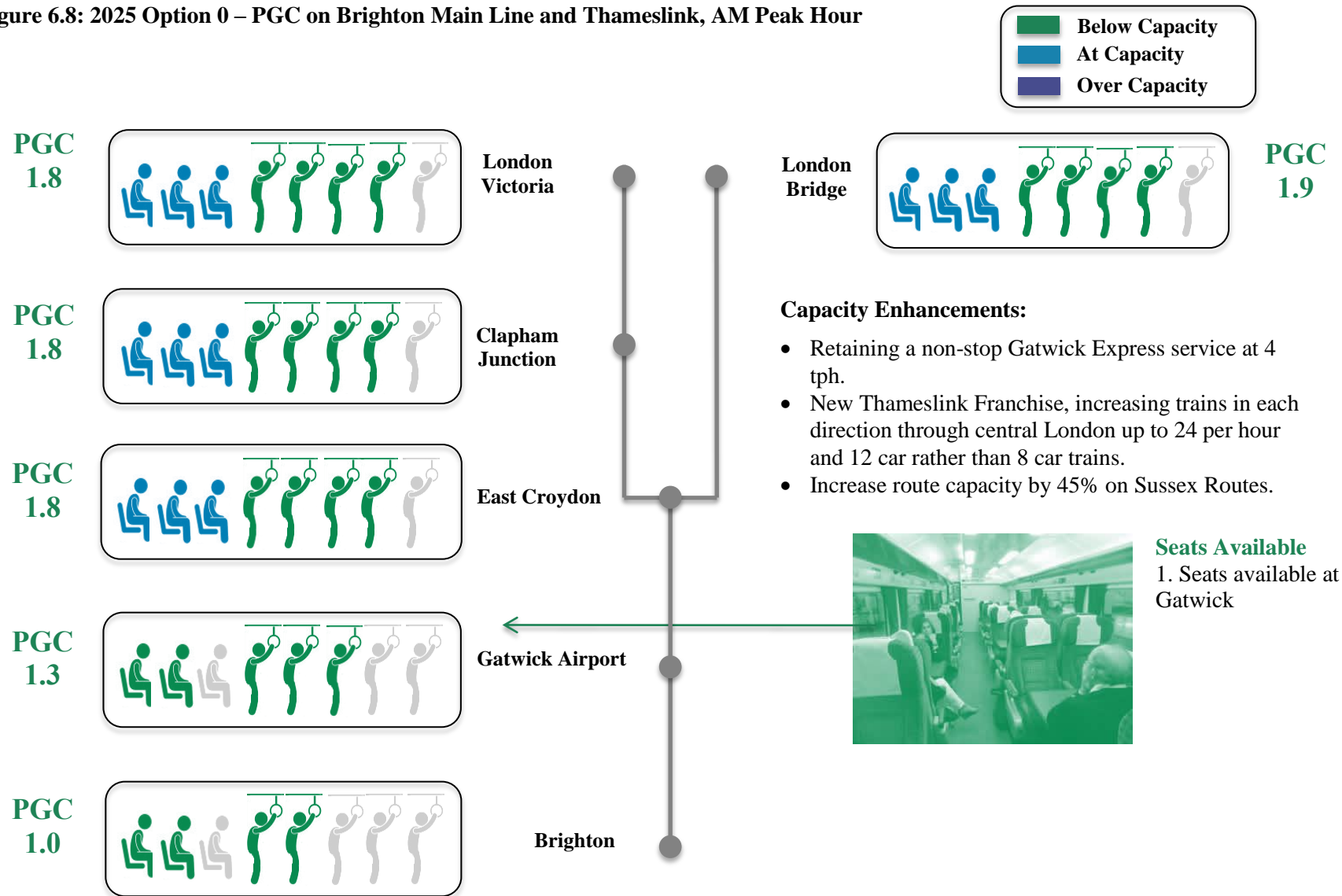
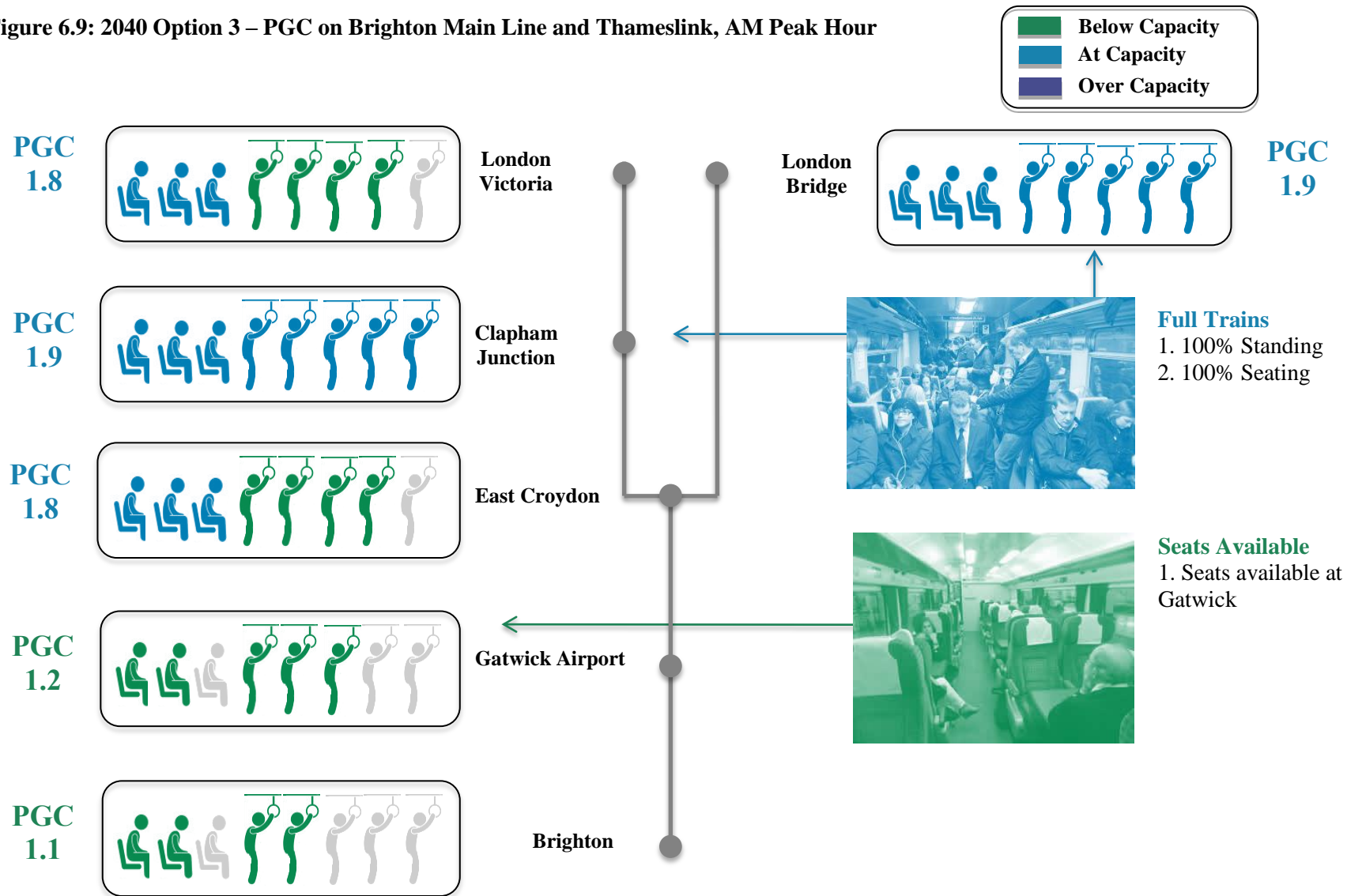


Figure 6.9: 2040 Option 3 – PGC on Brighton Main Line and Thameslink, AM Peak Hour



6.5.5 Rail Capacity and Demand

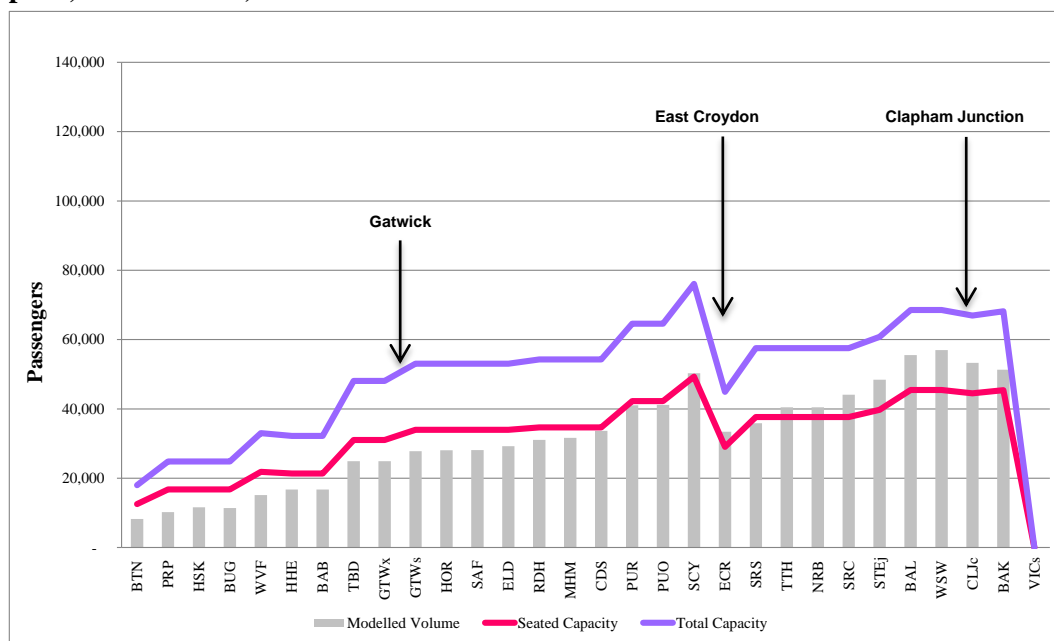
An alternative to looking at PGC values is to assess the overall number of seats and total train capacity against peak 3-hour and peak 1-hour demand.

Brighton Main Line

Figure 6.10 and **Figure 6.11** illustrate the build-up of 3-hour and 1-hour morning peak rail capacity and demand along the Brighton Main Line respectively in 2012 i.e. the situation today. The figures indicate the amount of capacity provided (both seated and total including standing capacity) along with the rail passenger occupancy based on the PLANET modelling. The 1-hour chart has been generated by taking 51% of peak 3-hour demand and 40% of peak 3-hour capacity in line with assumptions provided by Network Rail's planning team.

As can be seen in **Figure 6.10**, for 2012 operations, all the seats are occupied between South Croydon and London Victoria over the 3-hour morning commuter peak period. Seats are available at Gatwick during the 3-hour period, though a lack of platform distribution may mean that passengers cannot get to these seats.

Figure 6.10:2012 Rail capacity and demand on Brighton Main Line (3-hour morning peak, 7am to 10am)

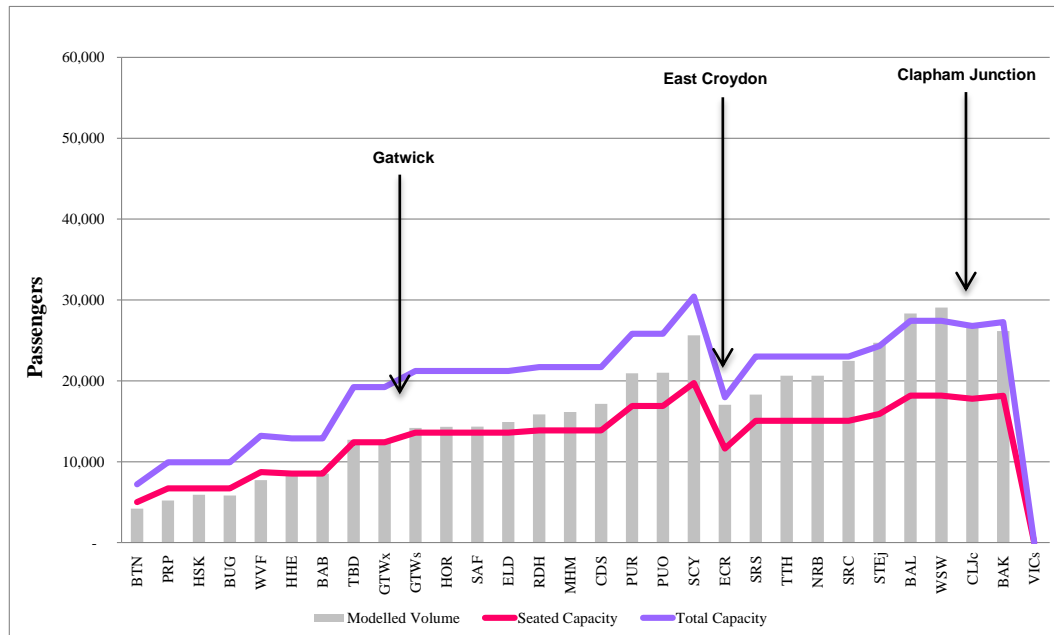


Source: Arup analysis from PLANET South modelling

Figure 6.11 shows the 1-hour morning peak in 2012. It represents approximately half of the peak period demand loading onto approximately one third of the available train capacity. During the 1-hour morning peak, all the seats are occupied before getting to Gatwick, at Haywards Heath (north of Brighton), and from Streatham Common to London Victoria, trains become full and standing capacity is fully utilised.

A comparison of the 1-hour against the 3-hour morning peak indicates that the crowding takes place across the 1-hour but diminishes across the 3-hour peak period.

Figure 6.11:2012 Rail capacity and demand on Brighton Main Line (1-hour morning peak)



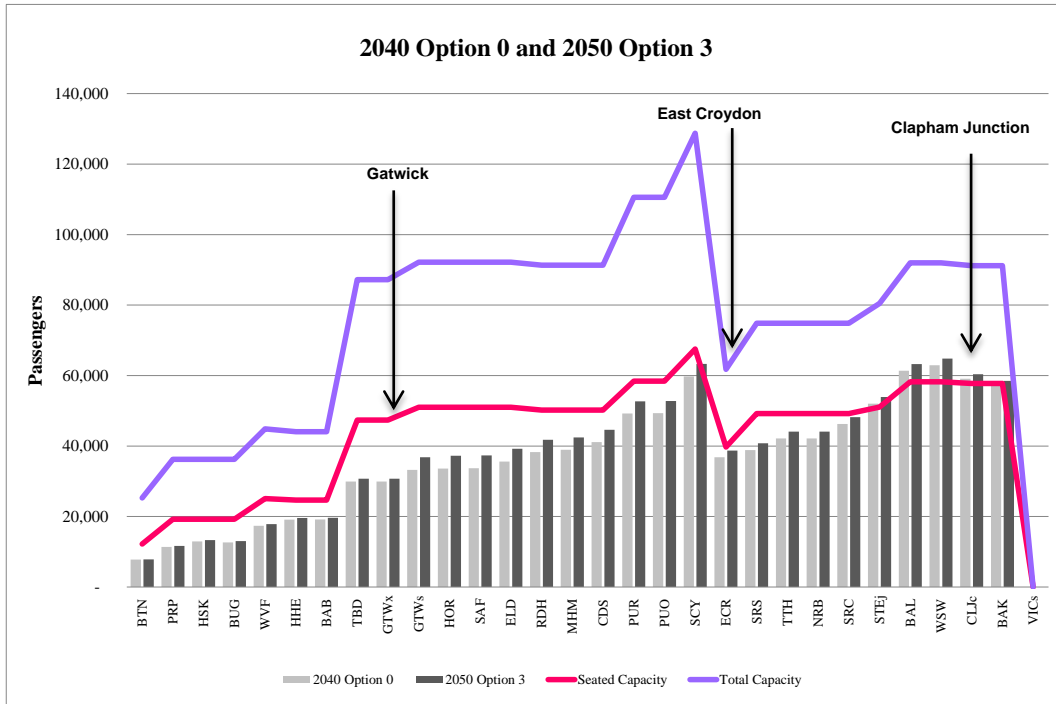
Source: Arup analysis from PLANET South modelling

In **Figure 6.12** and **Figure 6.13**, demand and capacity in 2040 is shown, incorporating the committed enhancements up to CP7, which help to manage the impact of demand growth on Brighton Main Line. Included in the chart is overall rail demand comparing 2040 – Option 0 Gatwick growth with 2050 – Option 3.

The reason for showing Option 0 at 2040 and Option 3 at 2050 is to provide comparison between a future at Gatwick with a single runway or with two runways. This comparison shows that the impact of a second runway is small when compared to overall peak commuting growth owing to the forecast pattern of air passenger arrivals at Gatwick as described in section 6.5. From the grey columns which show 2040 Option 0 and 2050 Option 3, it can be seen that in terms of peak period demand there is very little difference between a single and two runway Gatwick in terms of demand on the rail network, given the high volume of background traffic.

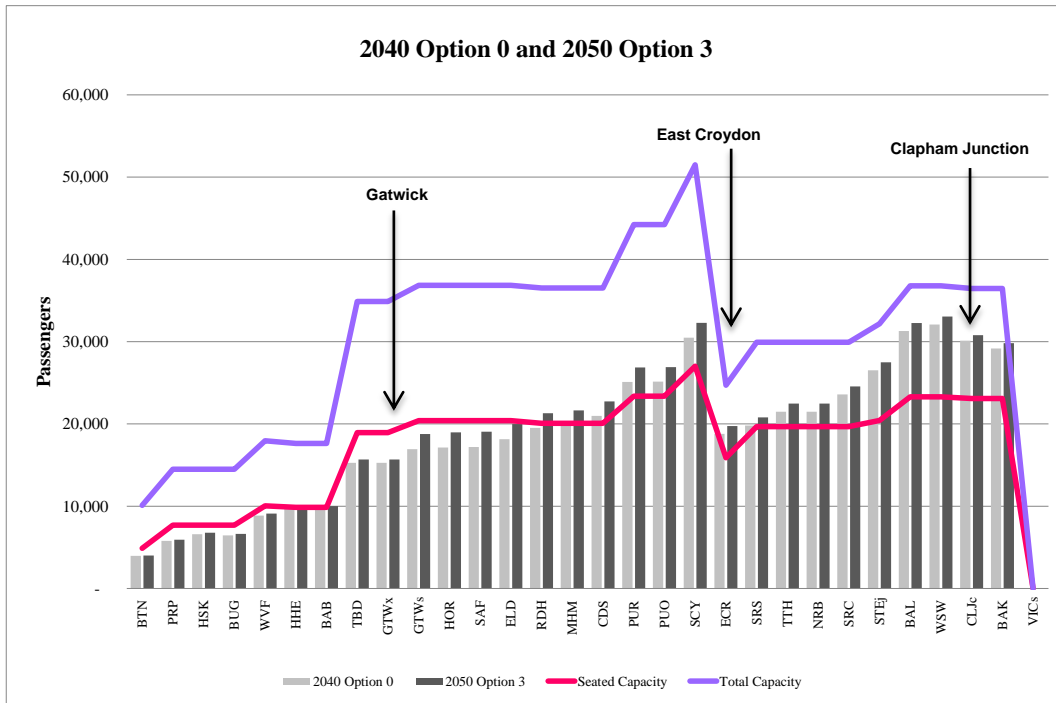
Figure 6.12 indicates the rail capacity and demand over the 3-hour morning peak period and **Figure 6.13** shows the 1-hour morning peak.

Figure 6.12: Rail capacity and demand on Brighton Main Line - 2040 Option 0 and 2050 Option 3 (3-hour morning peak, 7am to 10am)



Source: Arup analysis from PLANET South modelling

Figure 6.13: Rail capacity and demand on Brighton Main Line - 2040 Option 0 and 2050 Option 3 (1-hour morning peak)



Source: Arup analysis from PLANET South modelling

During the 3-hour morning peak, the rail passenger demand only exceeds seated capacity over the peak period in the section approaching London Victoria (north of Balham). This accords with the previous PGC analysis in section 6.5.4.

During the 1-hour morning peak, the demand exceeds seated capacity north of Redhill and from there up to London Victoria. However, demand no longer exceeds the capacity of train services when standing room is included. In addition, there are seats available at Gatwick indicating a significantly enhanced passenger experience even in the peak hour in 2050 as compared to current conditions.

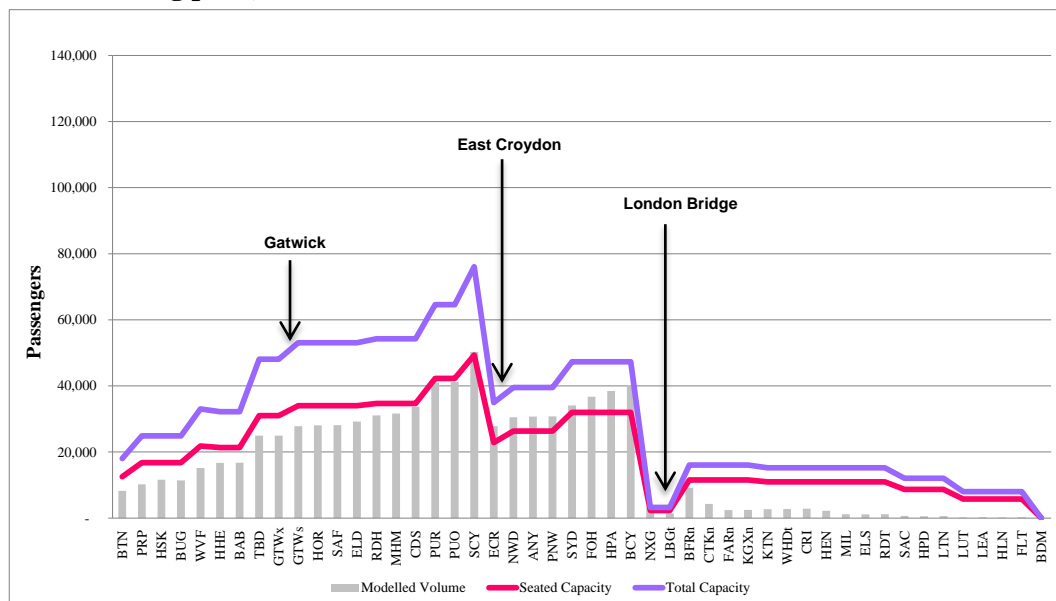
These figures show that the second runway only has a very marginal impact on overall demand towards London, which is dominated by the commuter peak flow.

Thameslink

The 3-hour and 1-hour morning peak rail capacity (seated and total capacity) and rail passenger demand along Thameslink via London Bridge are shown for 2012 in **Figure 6.14** and **Figure 6.15** respectively.

As can be seen in **Figure 6.14**, 2012 crowding on Thameslink occurs between South Croydon and New Cross Gate over the 3-hour morning peak, with all seats occupied over the commuter peak period.

Figure 6.14: 2012 Rail capacity and demand on Thameslink via London Bridge (3-hour morning peak, 7am to 10am)

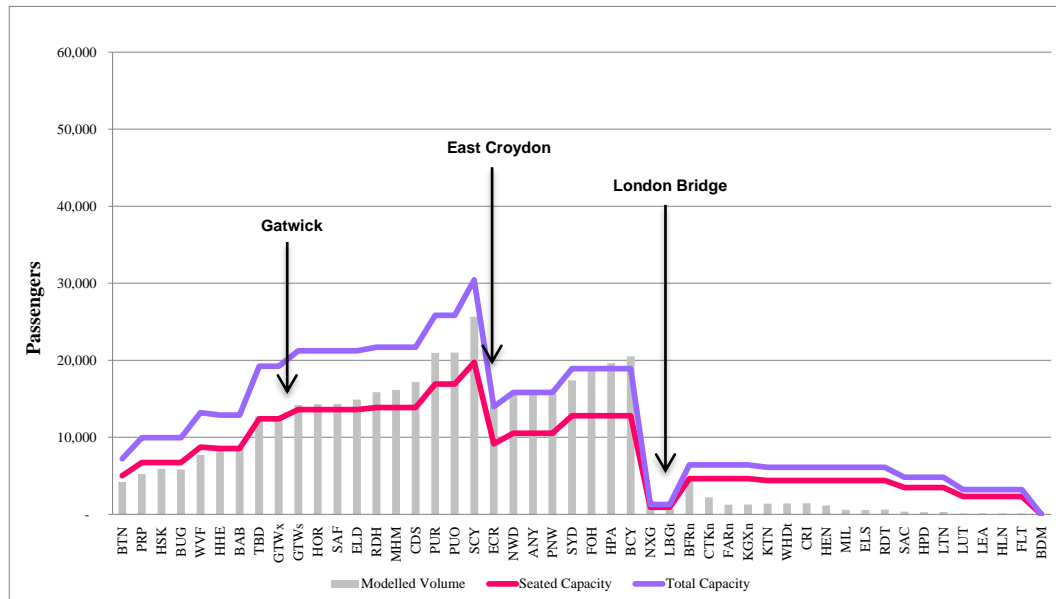


Source: Arup analysis from PLANET South modelling

Figure 6.15 which shows 1-hour morning peak indicates that during the peak hour, all the seats are occupied before getting to Gatwick, at Haywards Heath, and from East Croydon to London Bridge, standing capacity is fully utilised.

A comparison of the 1-hour against the 3-hour morning peak indicates that the crowding takes place across the 1-hour but diminishes across the 3-hour peak period.

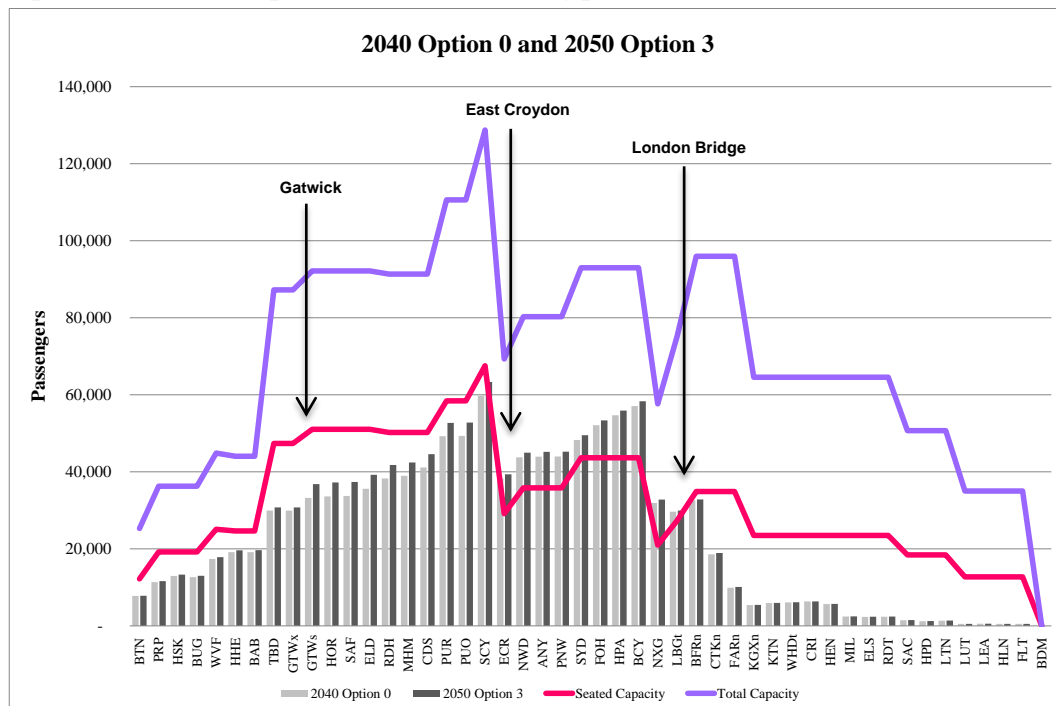
Figure 6.15: 2012 Rail capacity and demand on Thameslink via London Bridge (1-hour morning peak)



Source: Arup analysis from PLANET South modelling

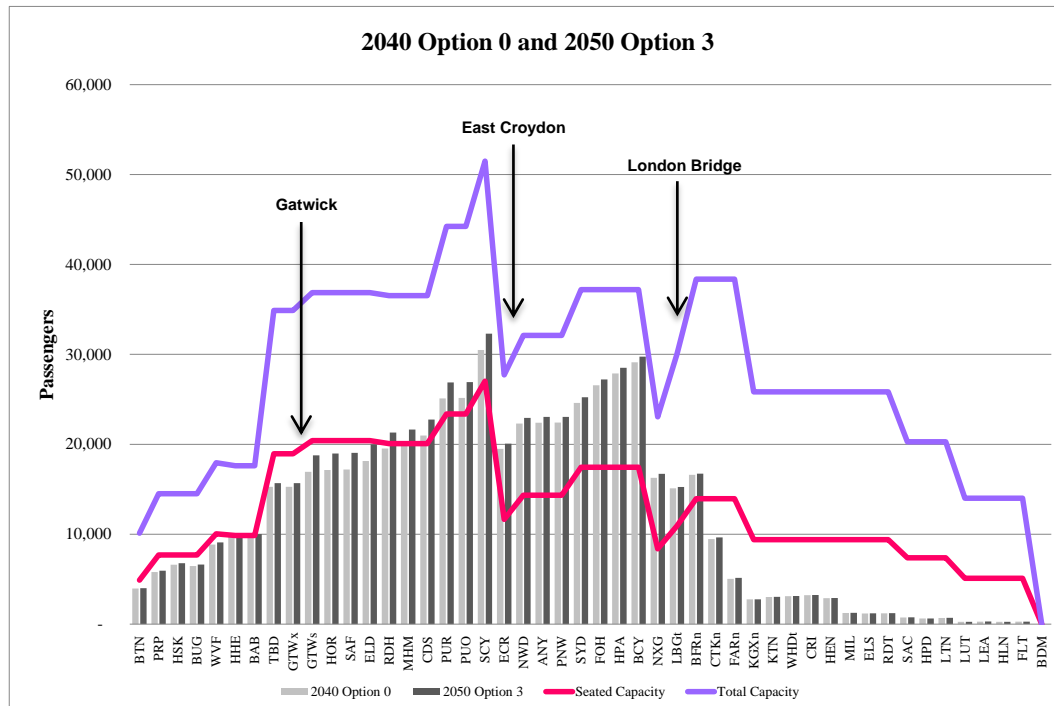
In **Figure 6.16** and **Figure 6.17**, additional capacity in 2040 is shown as delivered by changes up to and including CP7 and this shows a step change in capacity when compared to 2012. **Figure 6.16** indicates the rail capacity and demand over the 3-hour morning peak period and **Figure 6.17** shows the morning peak hour.

Figure 6.16: Rail capacity and demand on Thameslink via London Bridge – 2040 Option 0 and 2050 Option 3 (3-hour morning peak, 7am to 10am)



Source: Arup analysis from PLANET South modelling

Figure 6.17: Rail Capacity and demand on Thameslink via London Bridge – 2040 Option 0 and 2050 Option 3 (1-hour morning peak)



Source: Arup analysis from PLANET South modelling

During the 3-hour morning peak, the rail passenger demand only exceeds seated capacity over the peak period between East Croydon and London Bridge – again this reflects the PGC analysis described in section 6.5.4 of this chapter.

During the 1-hour morning peak, demand exceeds seated capacity from Redhill up to London Blackfriars. During this period, demand no longer exceeds the total capacity of rail services even in the 2050 peak hour, when standing room is included. In addition, there are seats available at Gatwick indicating a significantly enhanced passenger experience even in the peak hour in 2050 as compared to current conditions.

Figure 6.17 illustrates that the overall level of peak demand is accommodated over the 1-hour morning peak period and that Gatwick demand as a result of a second runway does not significantly impact on the level of crowding experienced under the model tests.

In accommodating growth from Gatwick the role of Gatwick Express is important. Despite operating just half of the number of trains to London Victoria, and less than a third of all trains to London termini, Gatwick Express carries over half of the passengers according to data from Southern and a significantly higher proportion of overall revenue. As a dedicated, premium service, non-stop between Gatwick Airport station and London Victoria, the relative passenger loading is directly linked to air passenger growth. Its retention as a premium, dedicated, non-stop service in the forthcoming and future Thameslink franchises is essential.

The increased demand and crowding would be likely to trigger further capacity enhancement by Network Rail. The mitigation that may be considered to manage this future estimate of crowding in the high peak hour would be most likely

associated with removing some of the bottlenecks and pinchpoints that constrain the number of train paths at key parts of the network. These are discussed further in **Section 6.6**.

6.6 Summary of Capacity Issues

Our analysis has resulted in the following overall conclusions for rail:

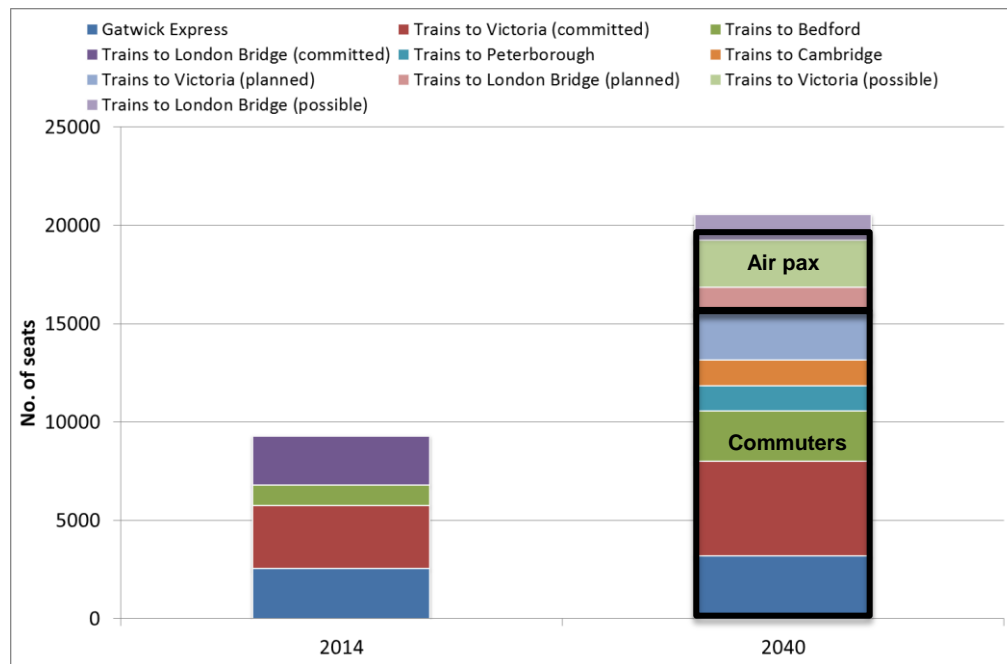
- Network Rail committed investment schemes for CP4 and CP5 are important for accommodating growth at Gatwick and background growth at the current mode share. This is a key strength of Gatwick – it benefits directly from schemes that have been or will be delivered in the period up to 2025, whilst also improving the business case in terms of contra-peak patronage. Thus most of the rail capacity is available for the airport's growth
- Committed enhancements significantly reduce peak period crowding in the short term (by 2025) but forecast commuter demand will lead to some peak hour crowding by 2040 if no further capacity is delivered.
- Gatwick demand growth associated with a second runway is marginal compared with the dominant commuter growth, which is the main driver of capacity and crowding. Gatwick demand has a small impact on passenger demand in the peak direction and has only a very small impact on crowding. This is due to the expected profile of air passenger arrivals at Gatwick.
- Retaining Gatwick Express is essential for overall capacity and to ensure Gatwick growth is not impeded by commuter growth in both the forthcoming and future franchises.
- Gatwick growth makes a positive contribution by utilising relatively uncrowded off-peak and contra-peak services and supports the case for investing in more capacity by reducing the cost to the taxpayer.
- The R2 ASAS target is to increase mode share for rail to Gatwick by working with Network Rail to develop further capacity enhancement and network resilience schemes in CP6 and CP7 that could deliver up to 6 more peak trains per hour, 4 in CP6 and 2 in CP7. Inevitably the final number of additional trains will be traded off with the benefits of using capacity to improve performance.
- When these enhancements are included, modelling shows that demand no longer exceeds the capacity of train services when standing room is included for services to Victoria and London Bridge. In addition, there are seats available at Gatwick indicating a significantly enhanced passenger experience even in the peak hour in 2050 as compared to current conditions.

The following three charts show seat capacity in 2012 and 2040, combined across all services through Gatwick and then separated out by services to London Bridge and services to Victoria.

In 2040, modelling indicates that trains arriving at Gatwick between 7:00 and 8:00 will have 15,500 passengers on them with a total available seat capacity of 20,600 seats. This is an increase of 11,300 (122%) seat capacity when compared to 2012. In the peak hour, 3,760 airport passengers will board the trains Northbound at Gatwick, up from today's 1,160 boarders. This will still leave 1,300 seats

vacant for users further up the lines.

Figure 6.18: Seat Capacity and Demand (All Rail Services)



The same principle holds true when considering the individual rail lines: Thameslink rail services into London Bridge and rail services into Victoria.

Figure 6.19: Seat Capacity and Demand (Rail Services via London Bridge)

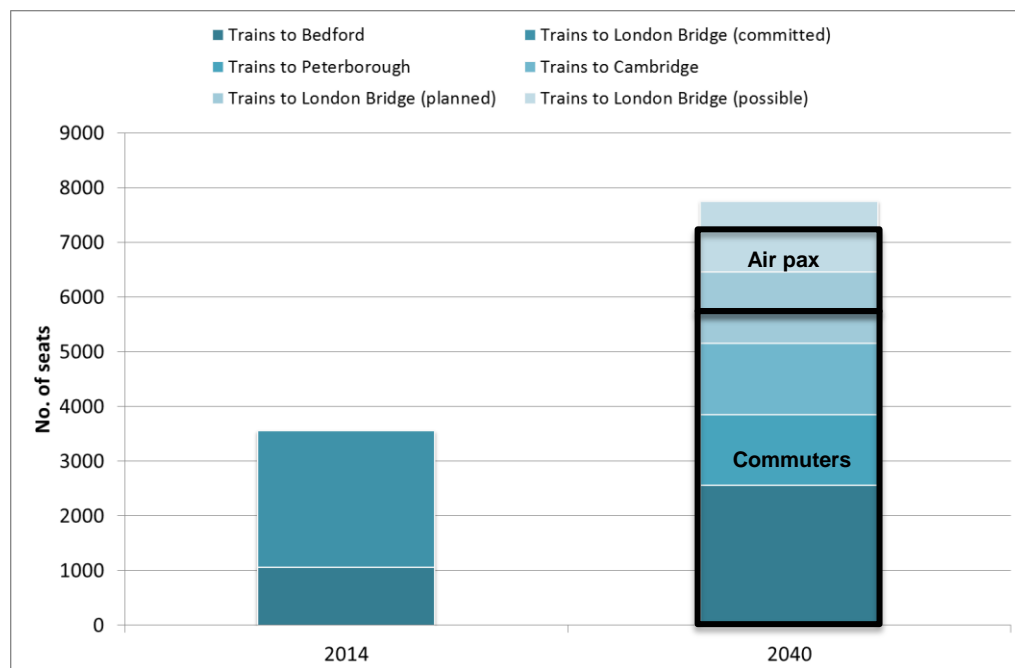


Figure 6.20: Seat Capacity and Demand (Rail Services to Victoria)

In addition to the improvements identified by Network Rail, potential further measures to add capacity to the routes have been considered and discussed as part of developing the R2 ASAS, namely:

- **A second Gatwick Airport to Reading service**, as a result of a new platform at Redhill. This would double the existing hourly service and, with retimetabling, could reduce journey times. Enhancement of Reading station, due for completion in 2015, creates the opportunity for one of these hourly services to extend north and operate from Oxford to Gatwick.
- **Gatwick Express every 10 minutes**: This is a potential consideration for CP6 but may not be achievable owing to constraints on the rail network and given that Express services need to be fitted around stopping services.

The rail industry priority will be to alleviate congestion at East Croydon and Clapham Junction in order to deliver wider benefits across the network. Such stopping services will also benefit Gatwick by increasing access to South London and improving access to the airport.

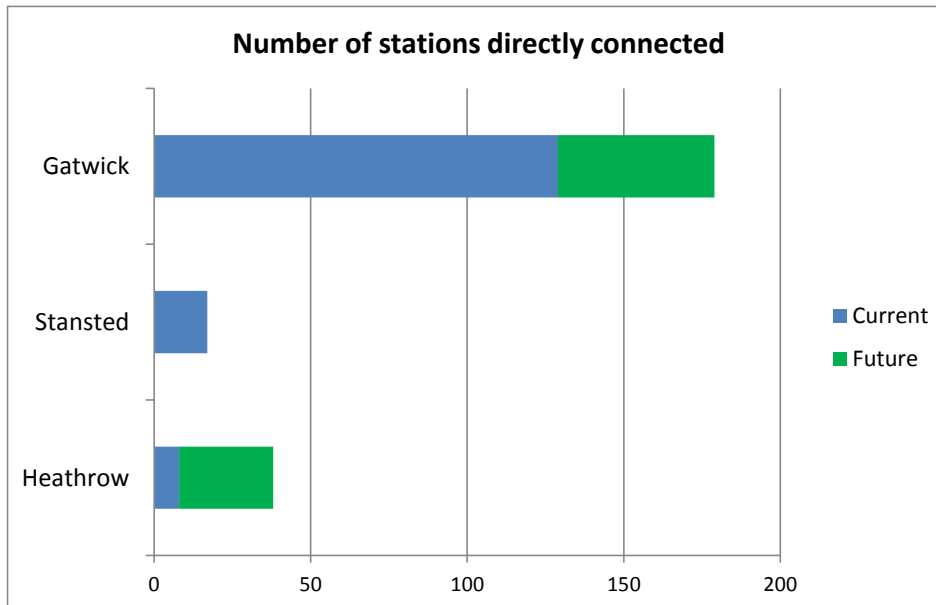
6.7 Improved Connectivity

The preceding sections have primarily been focussed on rail capacity, in both the peak and contra-peak direction. Another critical consideration is the development of rail connectivity as highlighted in the recent London and South East Market Study, part of Network Rail's Long Term Planning Process. Two major projects dominate the committed investment, with Crossrail and the Thameslink upgrade. At this stage, other major enhancements including Western Rail Access, HS2 and CrossRail 2 are being considered but have not been committed to by Government.

Figure 6.21 shows the number of rail stations currently served by direct trains from each of the three major London airports, illustrating Gatwick's superior

connectivity. Allowing for just a single interchange, the stations accessible from Gatwick rises to over 800, most of them with regular, hourly or better service patterns.

Figure 6.21: Number of direct rail connections from major London airports



The Thameslink upgrade will also significantly improve connections from Gatwick (and the South Coast) to areas north of London with new half - hourly services to Cambridge and Peterborough. The number of services to Central London via London Bridge will also double, allowing Gatwick to gain the following benefits:

- New rolling stock with more capacity and longer trains;
- Consistent peak and off peak service to a transformed London Bridge station;
- New connections, to cities such as Cambridge and Peterborough;
- Better interchange with Underground and Crossrail services at Farringdon; and
- More direct or “one change” access to destinations.

Once the committed Thameslink Programme is completed in 2018, Gatwick will have direct services to 175 stations, over 1,000 railway and London Underground stations with just one change, and will be served by a train into London every 2.5 minutes in the peak.

In addition, Crossrail will deliver up to 24 trains per hour across Central London in the peak, all calling at Farringdon, which will become a key interchange station with Thameslink services to Gatwick. Together these improvements provide a step change in capacity on the Brighton Main Line as well as improved connectivity to destinations north of Kings Cross towards Peterborough and Cambridge.

A number of opportunities exist, arising from changes associated with the New Thameslink Franchise, to be awarded in Spring 2014 and to run from 2015, or from other infrastructure improvements at strategic nodes on the national network during the next Control Period (CP6, 2019-2024) and beyond. The major station

improvements at Reading, due for completion in 2015, includes a grade separated crossing of the Great Western Main Line, which potentially could allow services from Birmingham, Oxford, Banbury or tourist destinations such as Stratford-upon-Avon to be directly connected by rail. Once again, these opportunities will require careful consideration to determine if a suitable business case exists for making these connections. In all cases the investment would deliver additional rail trips to and from Gatwick, meeting strategic objectives.

The importance of rail connectivity to Gatwick's R2 ASAS has led to strong lobbying for strategic investment in the Brighton Main Line and a balanced approach to valuing the needs of commuters and airport users. This includes consideration of the wider economic benefits associated with Gatwick Express as part of the wider network of services along the corridor.

Gatwick's strategy for rail has been discussed with Government, Network Rail and train operators. The need for short term measures to support longer term expansion has also been articulated in Gatwick's response to The Commission. Importantly, The Commission recommended future investment in Gatwick Express, Brighton Main Line and Gatwick Airport railway station as urgent priorities for infrastructure investment in the context of growing the UK economy and promoting international connectivity.

The National Infrastructure Plan (NIP) announcement by The Chancellor of the Exchequer in December 2013 reflects The Commission's recommendation, reiterating the need for a long term plan for capacity on the Brighton Main Line through a study led by Network Rail. Importantly, the NIP also included £50million for the Gatwick Gateway scheme to further develop Gatwick Airport railway station and provide an expanded concourse and improved passenger facilities. This is in direct recognition of its position as an international gateway and reflects the importance of rail for airport surface access.

Gatwick's vision for the Gatwick Gateway is for an integrated passenger transport interchange, which serves both the airport and local users. It will offer a high quality facility to support sustainable travel opportunities and access to jobs across the region. The Gateway will be centred on the railway station at South Terminal. It will be at the heart of increased rail and public transport connectivity from Gatwick to the rest of the UK and will be instrumental in achieving a higher public transport mode share.

Gatwick recognises that passengers that do not have a direct rail journey to Gatwick will interchange at one of a number of intermediate stations, such as Reading, Brighton, Redhill, Clapham Junction and London stations including Farringdon, Kings Cross St Pancras, London Bridge and London Victoria. Gatwick proposes to work with train operators to provide some form of customer assistance and wayfinding at these interchanges to ensure seamless connections to the final leg of the passenger journey.

Figure 6.22: Gatwick's connections to London

Future journey times from Gatwick Airport to London stations and key interchanges (2025)

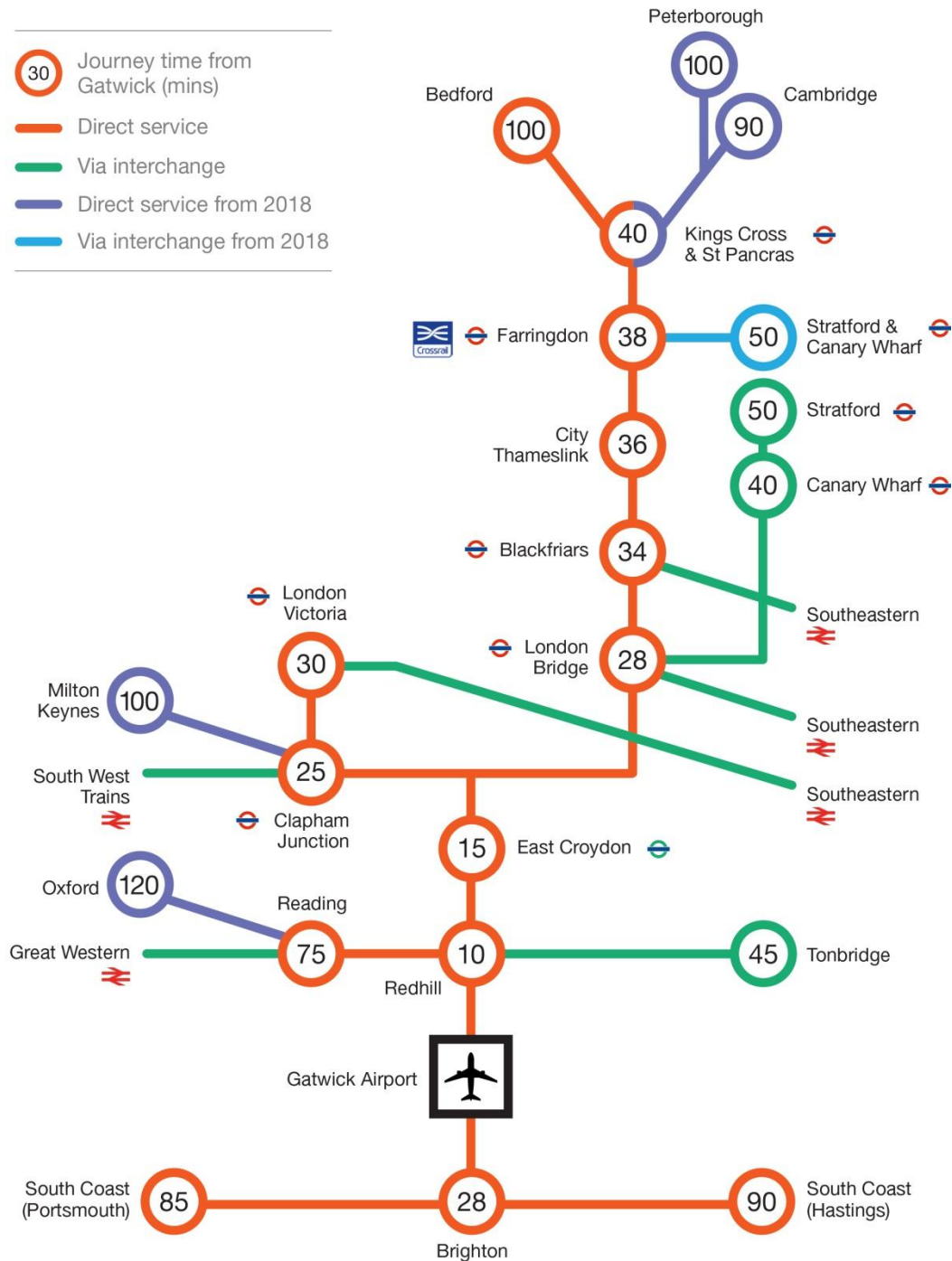
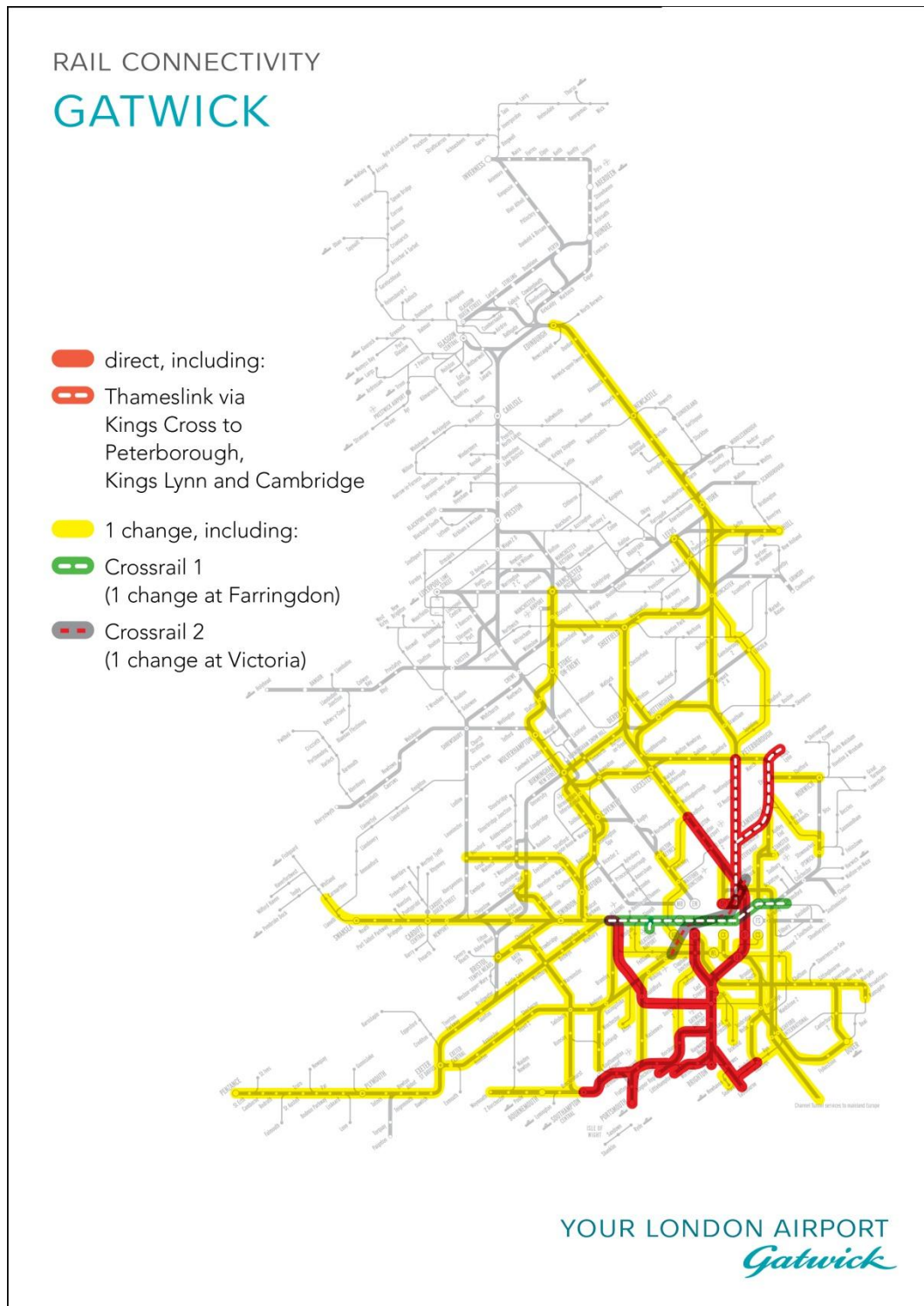


Figure 6.23: Future rail connectivity (post-Thameslink Key Output 2)

A summary of future rail connectivity and journeys between Gatwick and London is illustrated in **Figure 6.22**. This highlights the main connections with the respective journey times by rail. In addition, all of the main interchanges and terminal stations in London, including Stratford, Liverpool Street, Euston and Waterloo are, and will remain, just one interchange away from a direct service to Gatwick, at London Victoria, London Bridge, Clapham Junction or Farringdon. This means that even if a passenger does not use one of the 1000 stations

accessible from Gatwick with one interchange, simply getting a train to London allows swift access to the Airport.

Figure 6.23 illustrates the extent of the direct and single-interchange rail connectivity to and from Gatwick after 2018, when both the Thameslink Key Output 2 and Crossrail projects are complete and the new Thameslink franchise is awarded. The Thameslink Key Output 2 improvements will result in a step change in connectivity of considerable importance to Gatwick. Both the frequency and range of connections will be enhanced, creating direct connections from the South Coast, via Gatwick and London Bridge to Cambridge and Peterborough.

Gatwick wishes to continue working with schemes that will support further improvements in the airport's rail connectivity. They include:

- An improved Gatwick – Guildford – Reading service via Redhill using the committed enhancement at Redhill to be delivered during CP5. This could result in extending one of the two hourly services to start at Oxford and improving journey times.
- Extension of the current hourly Milton Keynes Central to South Croydon service to Gatwick and the South Coast, with the potential for a direct connection to the High Speed 2 station at Old Oak Common from 2026.
- Development of a major improvement scheme at Clapham Junction to deliver additional capacity and interchange opportunities, including future interchange with the Crossrail 2 route, if it is developed.
- Joint marketing and promotion of rail as the mode of choice to Gatwick and supporting the use of emerging technology to enhance the surface access experience and meet Gatwick's vision for the quality of surface access by 2030.

6.8 Stakeholder Engagement

As part of the process of engaging with relevant stakeholders, Arup and Gatwick have met with Network Rail, Transport for London (TfL) and the Department for Transport (DfT). Particularly, in the case of Network Rail, significant onward dialogue is anticipated to develop the potential outputs to be delivered by rail enhancements and the way these respond to increasing passenger demand. Development of a business case for each improvement will also be required in order to secure funding approval for Control Period 6 (2019-2024), which would ensure additional capacity is delivered before the implementation of a second runway at Gatwick. Gatwick is participating in the Sussex Route Study Regional Group, which has been set up by Network Rail to follow on from the Long Term Planning Process Market Studies. This group will support the evidence base for developing the business case for CP6 schemes and consider further enhancement to the Brighton Main Line and other routes up to 2043.

Rail is an important issue for other stakeholders, notably the Gatwick Diamond Enterprise Area and Coast to Capital LEP as well as the local authorities in the South East. Engagement with Kent, West Sussex, East Sussex and Surrey County Councils and with Brighton and Hove City Council have all raised rail connectivity with Gatwick as a benefit both now and in the future, recognising the economic importance of the airport as a gateway to the region. Gatwick also has

and continues to engage with the East Sussex Rail Alliance and the Passenger Advisory Group on rail and other transport matters, both in terms of providing for Gatwick's passengers but also for commuters and local users.

Arup, Gatwick and Network Rail have held collaborative workshops on Rail Network Modelling Assumptions at which the PLANET modelling for this analysis has been presented and discussed. Gatwick will continue to work closely with Network Rail and the DfT to establish appropriate sensitivity tests around new or enhanced rail services that widen Gatwick's rail catchment, including opening up new routes, increasing rail mode share; rolling stock; and creative use of capacity to maximise efficiency.

Gatwick and Arup have worked closely with Network Rail to establish an understanding of future rail improvements and services. This liaison has been very valuable and Gatwick is pleased to maintain this constructive, ongoing dialogue with Network Rail, reflecting the continuing work on the Sussex Route Study as part of the long term rail planning process. This close working has led to shared information, which has allowed Gatwick to present the case for a higher rail mode share in the context of the latest information available on future services and capacity.

Gatwick has identified the following points to reflect areas of common alignment with Network Rail's own analysis and planning:

- The overall conclusions from both sets of analysis are similar, acknowledging that there is some degree of uncertainty in any forecast, and variation between models. Network Rail has checked the assumptions underlying the analysis presented in this Technical Report and is satisfied with the overall approach followed. The base forecast growth included in the DfT's PLANET model used in this analysis is lower than the base demand used in the Network Rail Sussex Route Study, which will report later in 2014. These differences do not affect the conclusions regarding the proposed requirements for major rail infrastructure.
- Network Rail has applied a high commuter growth scenario for its Sussex Route Study work. Gatwick's analysis has used a high air passenger (busy day and busy hour) case with a 50% rail mode share but has different background growth assumptions. Network Rail's review of the initial outputs from combining the Network Rail high growth scenario plus Gatwick's forecast additional passengers with a second runway are considered to be a robust estimate for forecast capacity planning.
- Network Rail's Sussex Route Study work, including high commuter growth, already takes into account some growth in airport passengers using rail services. This is equivalent to approximately half of the second runway growth in 2043 (Network Rail's long term planning horizon) and 2050.
- Increased rail trips arising from a second runway contributes only a small proportion, less than 6%, of overall demand in the high peak hour on the most congested parts of the network.
- Additional air passengers travelling in the contra peak and off peak will contribute additional revenue to the franchise system.

- Work to date on Network Rail's Sussex Route Study has concluded that passenger numbers under a high growth scenario will require the extra train paths that are likely to be created by the proposed Brighton Main Line schemes planned for Control Period 6 (2019-2024). Managing the impact of further second runway demand not included in the Sussex Route Study work is dependent on how these new paths are used and where trains start from. Gatwick will support Network Rail in bringing forward the interventions proposed in the Sussex Route Study.
- The additional demand generated by a second runway does not justify additional major infrastructure requirements over and above those already committed or planned by Network Rail or included in Gatwick's submission to the Airports Commission. All of the schemes proposed by Network Rail would still be justified without a second runway. Local enhancement around Gatwick Airport station to optimise performance, which may be recommended following completion of the Sussex Route Study work, would be the subject of further analysis. To this point Network Rail has not identified any such improvements to be necessary.
- At the highest levels of growth, in 2043 - 2050 with a second runway, there could be some people standing in the high peak hour on some trains, over a longer distance than would be the case without a second runway in 2040. To reduce the incidence of this, options include reviewing where trains start their journey and how the stopping patterns are timetabled.
- It is important to note that additional Gatwick demand makes a significant contribution to more efficient loading of contra-peak and off-peak capacity, which has wider economic benefits that can be valued in any assessment.
- Gatwick has included in its cost plan measures to improve Gatwick Railway Station, including further optimisation to assist platform dwell times that enables more efficient loading of trains and delivers possible performance benefits. Gatwick is committed to continue working with Network Rail to ensure the planned enhancement at Gatwick Airport station helps to optimise performance and mitigates any potential impact of additional passengers boarding and alighting at Gatwick.
- In the future, other operational improvements, such as new signalling and train control systems, may also improve resilience but these are not yet factored into the analysis. Gatwick supports measures by Network Rail to improve resilience through sustained investment over coming control periods, which is necessary with or without a second runway at Gatwick.
- Gatwick is represented on the Regional Group for the Sussex Route Study and will continue to hold separate discussions with Network Rail to ensure proposals for expansion at Gatwick, and enhancement of the railway station and its approaches, fully reflect the latest information on future demand and capacity.

6.9 Overall Conclusions

Gatwick's station has excellent direct connectivity to many stations across the South East and with one change to many more across the country. This will improve further with the completion of the Thameslink Programme and Crossrail projects. The station is also ideally placed to benefit from committed and planned enhancements to train and network capacity on the Brighton Main Line and Thameslink route across London. The additional capacity created by these projects leads to a step change reduction in overcrowding on the route and creates spare capacity to accommodate Gatwick's growth and to enable the airport to achieve a higher mode share of 50% for air passengers arriving and departing by rail,

Our analysis can be used to draw the following overall conclusions with regard to capacity:

- Committed improvements accommodate growth at Gatwick, even assuming a 50% rail mode share, as part of a 60% overall public transport mode share. Improvements are required at Gatwick in the form of an enhanced station concourse and potential integration as part of a Public Transport Interchange or Gatwick Gateway – this is described further in Chapter 11 of this report.
- Significant committed investment (including Thameslink Key Output 2, Southern train lengthening and new platforms at Redhill and Gatwick Airport station) enables the peak direction growth to be accommodated with load factors lower than today.
- The rail demand generated by a second runway has a greater proportional impact on train loadings in the contra-peak direction than to commuter peak demand. As a result Gatwick growth allows more efficient loading and better use of contra-peak capacity, improving operational value for money. Optimum use of Gatwick Express capacity for airport rail passengers and wayfinding to make most efficient use of the dedicated, premium service is recommended to obtain best value from the improvements.
- Gatwick would support Network Rail's plans for potential investment in CP6 and CP7 as they could help deliver an increased mode share and improve network resilience. In turn, growth at Gatwick will help support the business case for investment in Brighton Main Line capacity.
- Optimal use of any additional train paths in CP6 and CP7 is likely to be in the form of stopping services serving both Gatwick and South London as opposed to being used for additional Gatwick Express services.
- Further investigation of the feasibility and economic business case for new rail connections to the east, west and north from Gatwick will determine the scope for higher public transport mode share targets, improving the attractiveness of Gatwick compared to other airports and supporting social inclusion and economic growth objectives.

In terms of delivering connectivity and securing improved accessibility and journey times to Gatwick the combination of committed, planned and potential investment will continue to deliver class-leading rail access.

The following improvements will have a positive impact on journey time, and therefore connectivity, to Gatwick:

- The completion of the Thameslink Programme will allow trains to run directly from the East of England (Peterborough, Kings Lynn, Cambridge, Welwyn Garden City) to Gatwick and the South Coast reducing journey time and removing an interchange.
- The Thameslink Programme will also deliver a higher frequency of service on routes via London Bridge and Kings Cross/St Pancras. Combined with Gatwick services to Victoria there will be a train from the airport to London every 3-4 minutes.
- An integrated Thameslink, Southern and Great Northern (TSGN) Rail Franchise will release reliability and some timetable benefits by reducing competition and inefficiency, as well as potentially providing additional peak hour services.
- Additional trains on the North Downs line to Reading, which doubles the frequency of direct services through Surrey. This is made possible by an increase in platform capacity at Redhill station. In the future, a second train to Reading via Redhill could potentially continue all the way to Oxford and the possibility exists for a direct service to Milton Keynes via Old Oak Common, which will be connected to Crossrail 2 and HS2.
- Crossrail will deliver improved journey times across London (east to west) with a key interchange provided at Farringdon, where at least eight trains per hour will connect to and from Gatwick. This will reduce connection times to Stratford, Canary Wharf and other parts of East London as well as offering alternative routes to parts of Central and West London.
- Once the committed Thameslink Programme is completed in 2018, Gatwick will have direct services to 175 stations, over 1,000 railway and London Underground stations with just one change, and will be served by a train into London every 2.5 minutes in the peak.

The impact of this accessibility is to place a wider population within 60 or 90 minutes of Gatwick by train, making it a suitable destination for employment. It is important to recognise the importance of providing public transport connections given the variability of highway journey times in the peak periods (when most journeys to and from work are made) and the priority for delivering sustainable transport solutions for access to Gatwick. Furthermore, changes in rolling stock and station enhancements will lead to improved quality that will promote the attractiveness of rail and support higher mode shares, which in turn meet strategic objectives. The areas that have the greatest opportunity to benefit most from these improvements include the following:

- East London – The primary beneficiary of Crossrail, with improved journey times to Central London, relief for crowding on existing tube lines, and new interchange opportunities.
- North East London – Connections via Kings Cross and Liverpool Street will be improved by the integration of the Thameslink franchise and by Crossrail connections.
- South and Central London – will have more frequent services and reduction in journey time from more direct services.

- South Coast – The South Coast should receive better connections with a wider range of destinations as a result of the new Thameslink franchise timetable, most of these services will call at Gatwick.

6.10 Summary Strategy

The above chapter describes the analysis which has gone into understanding the impacts and benefits of growth at Gatwick on the capacity of the rail network. Gatwick's focus is to ensure the rail network has sufficient capacity to improve. Gatwick is working closely with the rail industry to support the business case for future improvements and to secure the earliest possible delivery of benefits to the wider community.

Gatwick's vision for rail capacity and connectivity in the R2 ASAS focuses on working with its partners to bring forward and deliver the following:

- A series of stepped improvement that will increase seated capacity north of Gatwick Airport station on the Brighton Main Line by 122% by 2030:
 - The completion of the committed Thameslink Programme Key Output 2 in December 2018 with services to Bedford, Peterborough, Cambridge and King's Lynn and with better access to key London stations such as London Bridge for business passengers. This will deliver a step change in train capacity, frequency and direction connections available from Gatwick.
 - The completion of committed train lengthening of Southern services into London Victoria.
 - The long term development of capacity of the Brighton Main Line and improved connections to the South Coast. It is important the schemes planned for CP6 (2019 – 2024) are delivered and further schemes developed for delivery in CP7 (2024-2029). These will be supported by more effective service planning and delivery through an integrated Thameslink Southern Great Northern franchise operating all services to London on the route and integrated route control from the soon to open Route Operating Centre at Three Bridges.
- In the longer term the planned introduction of ERTMS will enable the delivery of further capacity on the route after its introduction in 2040.
- An improved Gatwick – Guildford – Reading service via Redhill using the committed enhancement at Redhill to be delivered during CP5. This could result in extending one of the two hourly services to start at Oxford and improving journey times.
- Extension of the current hourly Milton Keynes Central to South Croydon service to Gatwick and the South Coast, with the potential for a direct connection to the High Speed Rail station at Old Oak Common from 2026.
- Development of a major improvement scheme at Clapham Junction to deliver additional capacity and interchange opportunities, including future interchange with the Crossrail 2 route, if it is developed.
- Joint marketing and promotion of rail as the mode of choice to Gatwick and supporting the use of emerging technology to enhance the surface access experience and meet Gatwick's vision for the quality of surface access by 2030.

The improved catchment area for rail, more services and more capacity will increase rail mode share. Gatwick's target for rail mode share is shown in **Table 6.9**. As described in earlier chapters, **Gatwick has a very high mode share by rail currently and has set target of a 50% rail mode share for air passengers by 2050, to be delivered by committed schemes and improvements such as Gatwick Gateway. The target mode share is 20% for staff by 2050.**

Table 6.9: Rail mode share targets

	2012 Mode Share	2040 Mode Share	2050 "Stretch" Mode Share
Passengers	36%	40%	50%
Employees	11%	20%	20%

To support the enhancement in infrastructure and services, Gatwick will continue to engage with rail industry partners to deliver improvements in the overall customer experience, consistent with the R2 ASAS and Gatwick's wider commitments. This will be demonstrated by the transformation of the passenger experience at Gatwick Airport railway station by the Gatwick Gateway project, described in Chapter 11.

Gatwick markets rail services extensively, for both air passengers and staff, with dedicated travel leaflets for onward rail travel and staff travel discounts to encourage public transport use. Gatwick will also be included in a smart ticketing trial to commence in 2014 and is engaged in discussions with TfL in terms of the extension of Oyster.

The step change in capacity will be supported by rapid evolution of technology and the personalisation of information to those travelling by rail to Gatwick. This will aid day to day demand management and the ability of the railway to accommodate growth. Technological development is fast paced at the moment. During 2012, Gatwick took the lead in the UK airports sector in considering what user demands and technological change would mean for the surface access experience in 2030 through a day's workshop.

(<http://www.driversofchange.com/facilitate/gatwick-the-future-of-surface-access>).

The workshop drew some important conclusions as to how air passengers would make their journey to the airport and the ways in which information would become more personalised and relevant to their particular needs. Technological change has been rapid over the last decade. Experts predict further significant change driven by the increased personalisation of information and the increasing ability to use big data for real time control and customer information. By 2040, each air passenger arriving at Gatwick by rail can expect a highly personalised experience with their train journey planned in advance for them, multi-modal "tickets" covering their rail and air journey stored on the mobile personal communication device and even information as to where they should stand on the platform to board their train provided. Demand will be much better spread across the Brighton Main Line and the wider rail network as a result.

7 Assessment of Transport Effects: Bus and Coach

The assessment of bus and coach effects is closely linked to the development of passenger facilities, local infrastructure and services and to the delivery of the proposed local road and strategic highway mitigation strategy.

Bus and coach operators do not generally consider their long term route strategy beyond a three to five year period over which demand can be reasonably predicted. Gatwick has consulted Metrobus, the main local bus operator, and express coach operator National Express to understand their likely response to future Masterplan options for the airport.

Current mode shares for bus and coach are 8% for air passengers and 12% for airport staff. The aspiration is to increase these mode shares to 10% for passengers and 20% for airport staff by 2040.

Employees currently enjoy discounted travel on National Express and Metrobus, and smart card and mobile ticketing technology on local buses. Alongside operators and West Sussex County Council, Gatwick has invested through its Passenger Transport Levy, in infrastructure and service enhancements that support local bus access, including the successful Fastway priority network.

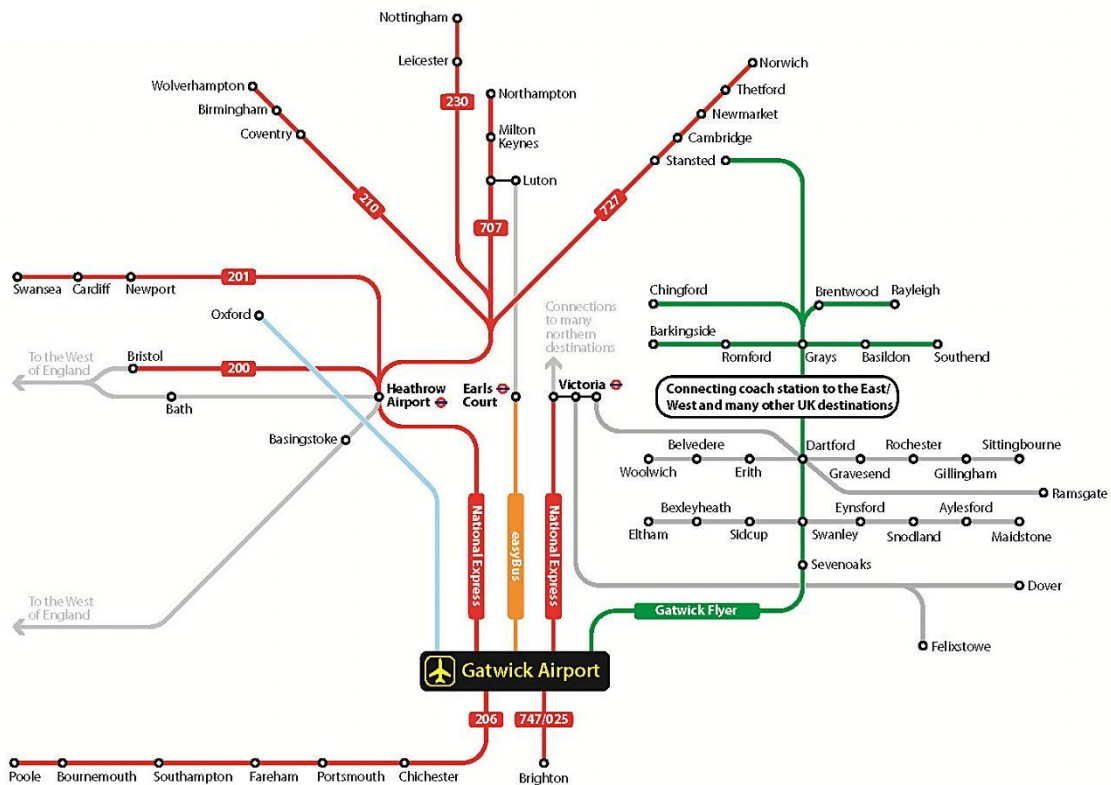
Both Metrobus and National Express have experienced strong growth in demand for services to and from the airport. For Metrobus, this is largely driven by accessibility for journeys to work at the airport and surrounding employment areas such as City Place and Manor Royal. For National Express, continued passenger growth on services between Gatwick and London has also been experienced on a new service to Poole and Bournemouth.

7.1 Express Coach Services

National Express and other coach operators are driving forward improvements to their services and to enhancing passenger experience and quality. Changes to access arrangements at both South Terminal and North Terminal have been completed in the last two years and operators have access to both terminal forecourts with priority stand allocation.

On average there are around 500 daily express coach departures, each direct from the terminal. The network reflects that some routes compete with Gatwick's rail services. **Figure 7.1** shows some of the busiest passenger services on the express coach network and **Table 7.1** illustrates the overall network of services showing the wide catchment of destinations served.

Coach access to the Airport is dependent on the reliability of the strategic road network. The proposed enhancement of the M23 resulting from the Highways Agency Route Based Study, as a committed improvement following the National Infrastructure Plan announcement in December 2013, will support journey times for express coach as part of the overall travel demand on the strategic road network.

Figure 7.1: Express Coach Network for Gatwick**Table 7.1: Selected Express Coach services for Gatwick**

Service	Route	Key Destinations	Hours of Operation	Daily Departures
National Express	025	Eastbourne – Brighton – Gatwick South – Coulsdon – Mitcham Junction – Streatham – Stockwell – Vauxhall – London Victoria	24 hours	16
National Express	A3	London Victoria – Vauxhall – Stockwell – Streatham – Mitcham – Sutton – Gatwick South	24 hours	22
National Express	747	Brighton – Gatwick South and North – Heathrow	24 hours	20
National Express	797	Cambridge – Stansted – Gatwick North and South	24 hours	10
National Express	206	Poole – Bournemouth – Gatwick South and North	24 hours	10

An assessment of the distribution of passenger trips indicates the majority of these trips are by long distance coach services. Based on the passenger demand forecasts set out in Section 5, this equates to an increase in trips from around 10,000 on the busiest day in 2012 to just over 21,000 in 2040 for Option 3 assuming an increase to a 10% (bus and) coach mode share for passengers. It is expected that this growth in trips will be met by increasing the frequency of the busiest services and introducing new routes.

7.1.1 Impact of Potential Measures on Express Coach Services

The main markets that would be affected are expected to be the following:

- Services to Central London.
- Services to East London.
- Services to the South Coast.
- Connections to Kent.
- Connections to UK areas via Interchange at coach hubs e.g. London Victoria.

In all cases network resilience on the strategic road network is an important feature for successful and reliable journeys to sustain attractive services.

Consultation with existing express coach operators indicates that they already have alternative routes that are used in the event that the preferred and scheduled route is congested or unavailable. Operators take decisions based on experience of how best to avoid the affected areas in order to maintain passenger experience and operational efficiency.

Based on discussions with National Express, it is understood that future options include:

- Kent (Margate - Ramsgate - Canterbury - Maidstone - Gatwick);
- Essex (Ipswich - Colchester - Chelmsford - Basildon); and
- Various routes into South and East London.

Other potential routes that are being looked at include Bath, Swindon, Reading, Slough, Cheltenham, Gloucester and Exeter.

The potential for enhancement to existing services has been identified for the following:

- South London stops on Central London express coach services, in close proximity to transport interchanges, such as Streatham and Balham.
- Sussex Coastal Towns express coach services.
- Increased frequency on the busiest or fastest growing routes.

The performance of the local highway network and requirements for infrastructure at the airport for long distance coach services are discussed in Chapter 9.

Bus and coach services will come together at new passenger transport interchange, the Gatwick Gateway, as described in Chapter 11.

7.2 Local Bus Services

Local bus routes provide links to many of the towns and villages that surround the Airport. They are reliant on the efficient operation of the local highway network particularly the A217, A264 and the A23 so it is essential that any mitigation to alleviate additional traffic flow on these routes considers carefully the impact on local bus routes both during construction and in the long term.

Local bus services primarily serve Gatwick employees rather than passengers, with around 12% of all employees using this form of transport.

Whilst 8% of air passengers currently travel to and from Gatwick by bus or coach an assessment of the distribution of these trips indicates the majority of these trips are by long distance coach services.

Current use of bus services is highest for trips to and from stops at North Terminal, South Terminal and Atlantic House. This is projected to continue with forecast growth in bus mode share and an increase in trips associated with employment forecasts. Gatwick is also used as an interchange between bus and rail services for people whose primary purpose is not as an air passenger or airport employee – for example, passengers use bus services from stops on the current A23 to access City Place from the station. People access Gatwick for commuting along the Brighton Main Line and to access the Manor Royal Business District and City Place for employment. These destinations are located to the south of the Airport.

Routes combine accessibility for the airport with connections to Crawley, Horley and Horsham, in order to provide the most efficient service catering for overall demand. Gatwick and Metrobus have collaborated to ensure areas with a high population of airport employees are well served by bus. This helps sustain and indeed improve the commercial revenue base for bus services and therefore benefits the local community as well as the airport. **Table 7.2** shows the range of bus routes serving Gatwick, noting the high number of connections to Crawley and Horley each day and **Figure 7.2** illustrates the high level of connectivity to local communities.

Table 7.2: Local bus routes serving Gatwick

Operator	Route No.	Route	Daily Departures
Metrobus Fastway	10	Gatwick North Terminal – Gatwick South Terminal – Crawley – Bewbush	134
Metrobus Fastway	20	Langshott – Horley – Gatwick South Terminal – Broadfield	91
Metrobus Fastway	100	Redhill – Gatwick North Terminal – Gatwick South Terminal – Crawley – Maidenbower	97
Metrobus	200	Gatwick North Terminal (selected journeys only) – Gatwick South Terminal – Bewbush – Horsham	40
Metrobus	300	Gatwick North Terminal – Gatwick South Terminal – Ifield West	2
Metrobus	400	Caterham – Redhill – Gatwick South Terminal – East Grinstead	25
Metrobus	460	Epsom – Reigate – Redhill – Gatwick South Terminal – Crawley	17
Metrobus	526/527	Crawley – Charlwood – Gatwick South Terminal – Horley – Smallfield	22

The map illustrates the extensive bus network serving Gatwick Airport. Routes are color-coded and labeled with numbers. Key locations include Epsom, Tadworth, Caterham-on-the-Hill, Lower Kingswood, Godstone, Reigate, Bletchingley, Park 25, Nutfield, Redhill Bus Station, East Surrey Hospital, Whitebushes, Salfords, Horley, Lee St / Vicarage Lane, Horley Library, Povey Cross Road, Horley Langshott, Horley Lumley Rd, Horley Station, Horley Town Centre, Smallfield, Burstow, City Place, Gatwick Rd North, Gatwick Rd South, Hazewick Avenue, Gales Drive, Gossops Green, Crawley Hospital, Crawley Town Centre, Three Bridges Station, Pounds Hill, Crabbet Park, Wakehams Green, Lingfield 281, Stone Quarry, Forest Row, East Grinstead, Tunbridge Wells 291, Maidenbower, Southgate Avenue, Furnace Green, Tilgate, K2 Leisure Centre, Broadfield Stadium, Broadfield Barton, Seymour Road, Broadfield Drive, Creasys Drive, Broadfield Tilgate Hill, Horsham, North Heath, Roffey, Faygate, Bewbush West, Bewbush, Gosspops Green, Ifield West, County Oak Ind Area/Retail Park, Langley Green, Manor Royal, Faraday Rd, Lowfield Heath, Charlwood, and Iffield.

Legend:

- Fastway 10** (Orange)
- Fastway 20** (Blue)
- Fastway 100** (Green)
- Gatwick Direct 250** (Yellow)
- Route 400** (Red)
- Route 460** (Dark Red)
- Route 526 & 527** (Dark Blue)
- Route 1** (Grey)
- Route 2** (Light Grey)
- Route 4 & 5** (Light Blue)
- Route 281 & 291** (Light Yellow)

Logos: METROBUS, first bus

Option 3 will require a review of the local bus routes to and from the airport. By introducing a strategy that creates strong links between the airport and local towns within the area, bus services can reduce private car trips and increase bus mode share, helping to meet Gatwick's objective for improving sustainable surface access at the airport.

The R2 ASAS reflects the potential to increase bus mode share and this will be reflected in local highway improvements, including an allocation of priorities for buses. The changes to the local road network discussed in Chapter 9 include the realignment of the A23, which will impact on all of the bus routes serving Gatwick, and Balcombe Road, which is only used by one service (the 526/527 route to Smallfield).

The R2 ASAS considers both on-airport and off-airport facilities supporting services and ensuring sustainable access by local bus. To remain competitive and

attractive as well as to improve commercial revenues, buses require measures that reduce delay and allow reliable journey times.

This could potentially include the following:

- Bus priority lanes on the A23 or other important bus routes;
- Bus only gates to access the terminals;
- Bus only connections through the Airport to minimise the time it takes to travel between terminals and avoid delays along the local road network; and
- Consideration of the benefits and operation of a larger bus station at a new passenger transport interchange and how this affects facilities for buses serving each terminal.

Analysis of alternative routing and bus stop and station provision will compare the following:

- Location and levels of priority for the A23 and access to the airport terminals to improve journey time reliability and support higher bus mode share
- Access to a single bus interchange point located adjacent to South Terminal within the Gatwick Gateway (as described in Chapter 11);
- Separate bus facilities serving each of the airport terminals with buses calling at some or all terminals in series; and
- Alternative routes between Crawley and each terminal that allow the New Terminal to be accessed separately to the South Terminal if required, in addition to the Gatwick Gateway.

The Gatwick Gateway, centred on the current railway station, offers potential for consolidating facilities to enhance passenger convenience as well as providing additional capacity and opportunity for interchange between modes. This is as important for non-airport trips as it is for air passengers and staff at Gatwick. The future of the Gateway is as a regional transport hub and local focus for interchange and access to transport networks, linking bus, coach, rail, cycling and walking as well as providing car rental, taxi, car parking and terminal forecourt activity.

The introduction of the Gatwick Gateway will provide enhanced passenger facilities and potentially increase bus mode share for both airport and non-airport trips. It is not intended that the Gateway will fully replace access for buses to the North Terminal forecourt or the New Terminal as this will provide choice as well as passenger and staff convenience.

In support of increasing the mode share for both staff and air passengers using local bus the opportunities for strengthening services, including extending the operating period to support shift working, will be developed in consultation with Metrobus as part of the R2 ASAS. Gatwick will continue to support other initiatives for air passengers and staff including information provision by a range of electronic and paper media, smart and discounted ticketing initiatives, support for staff choosing to travel by bus and data sharing with operators to jointly promote and plan effective services.

Possible future journeys by bus and coach are shown in the 2012 ASAS at this [hyperlink](#) –

http://www.gatwickairport.com/PublicationFiles/business_and_community/all_public_publications/2012/lgw_asas_2012_web.pdf.

The following options are also recommended in terms of on-going investment in local bus services:

- Developing commercial local bus services to new areas such as Dorking and Leatherhead.
- Development of existing services serving Gatwick with increased frequency and operating hours such as early morning journeys on Metrobus 200, and early morning, late evening and Sunday journeys on Metrobus 400.
- The Fastway 2 and 3 concepts funded with a contribution from the Airport's Passenger Transport Levy, which Gatwick has already used to help finance the existing Fastway network.

7.3 Overall Conclusions

The combination of physical infrastructure, enhanced services, new passenger facilities and ticketing and information initiatives will result in an increased mode share for bus and coach. This is also consistent with other measures in the R2 ASAS to manage and reduce the impact and number of trips by car to the airport. The aspiration for bus and coach mode share by 2040 and 2050 with a second runway are shown in **Table 7.3**. In conjunction with a 50% rail mode share, **a 10% mode share for bus and coach gives an overall target 60% mode share for public transport for passengers. The mode share targets for staff are 20% for rail and 20% for bus and coach for a total public transport mode share of 40%.**

Table 7.3: Bus and Coach mode share targets

	2012 Mode Share	2040 Mode Share	2050 "Stretch" Mode Share
Passengers	7%	10%	In excess of 10%
Employees	12%	20%	In excess of 20%

7.4 Summary Strategy

Gatwick's vision for bus and coach connectivity in the R2 ASAS includes working with its partners to bring forward and deliver the following:

- Support and promote new and existing services.
- Improve the passenger experience and facilities, enhance and expand infrastructure provision.
- Embrace innovation to support measures that improve the accessibility and quality of information, ticketing and passenger facilities.

Gatwick is committed to investing in local buses through the Passenger Transport Levy, the proceeds of which are used to support services and routes, and have already helped to fund the successful Fastway network.

The Airport will work with Metrobus to ensure that areas where most airport employees live are well served, with buses linking the airport with Crawley, Horley, Horsham and East Grinstead.

Staff receive discounts on National Express and Metrobus with smart card and mobile ticketing technology on local buses.

Gatwick and National Express have committed to work together on developing new routes for air passengers, including routes to serve Kent, the Sussex Coast, as well as more services and stops in South and East London. National Express has confirmed its support for the Gatwick Gateway and other initiatives contained in this strategy and will work closely with Gatwick to deliver best practice, develop new routes and support an increase in public transport mode share through the R2 ASAS.

Gatwick Airport is committed to making buses and coaches more attractive and accessible by supporting operators investing in passenger information, smart ticketing and other new technology.

Strategic priorities for bus and coach to increase mode share include:

- New and better bus and coach services to Kent, South and East London and the Sussex Coast (planned);
- ‘Fastway 2 or 3’ local services with bus priorities to achieve reliable journey times (planned);
- High quality interchange and 24/7 “Access All Hours” (planned);
- Gatwick Gateway facilities for bus and coach services (planned)
- Staff Travel Plan initiatives to get more people to work by bus (planned)
- Ticketing, fare payment and information innovations (planned)
- Integration with flight information and fares (planned)

The target is to deliver over 10% bus and coach mode share for air passengers and 20% bus and coach mode share for airport staff by 2040.

8 Assessment of Transport Effects: Strategic Highways

Executive Summary

- **Gatwick has excellent connectivity to the strategic highway network.** The airport terminals are located at Junction 9a of the M23, with onward journey times to the M25 of between 7 and 8 minutes. From the M25, there is access to the wider UK strategic road network to the north, south, east and west.
- The A23, which runs parallel to the M23, continues north beyond the M25 into London via Croydon and Brixton to the heart of the West End and the City.
- Capacity analysis has been undertaken to test the implications of different demand scenarios at Gatwick, assuming a single runway airport (Option 0) and the Masterplan option of a second runway (Option 3).
- **There is enough running lane capacity in 2040 on the M23 with committed schemes to accommodate both future growth at Gatwick and background commuter growth.** With the M23 Managed Motorway J8-10 (hard shoulder running), northbound and southbound capacity will be in the region of 8,000 vehicles per hour on the running lanes.
- By 2040, the number of background commuter trips northbound on the M23 towards the M25 increase by 25% to 5,200 per hour when compared to 2012. Airport users will add 1,600 vehicles at Junction 9 during the 2040 peak hour, generating a total of 6,800 vehicles. In the southbound direction, the number of airport-related vehicles in the peak is greater at 2,300 with additional background demand of 5,500 vehicles for a total of 7,800 vehicles.
- **Gatwick demand is only a percentage of overall traffic on the strategic highway network** – up to 28% of demand by 2040 on the M23 and up to 12% of demand on certain links on the M25. Demand on the M23 between Junction 9 and 9a is higher at up to 64%, or almost two thirds. This is intuitive given that this link is provided primarily for access to the airport itself.
- **Background growth on the M25 is a bigger contributor to future demand than a second runway at Gatwick**, comprising more than 88% of peak hour demand in 2040.
- A combination of **committed strategic highway improvements and local mitigation is capable of meeting 2040 demand and allows further growth at the airport to 2050.** Local mitigation around the airport includes upgrading M23 Junction 9, with plans to double its capacity through a new grade separated junction to handle the on/off traffic to the M23. Gatwick is meeting 100% of the cost of this. This upgrade is described in more detail in Chapter 9.
- By 2040 in Option 0 (i.e. with a single runway), the strategic highway network shows a number of junctions with capacity constraints. This is primarily driven by background traffic growth with Gatwick less than a third of total demand. This demonstrates **the need for improvements to the highway network irrespective of a second runway at Gatwick.**

- For local roads where Gatwick is a contributor to increased traffic, Gatwick is proposing a Local Roads Development Fund for local authorities to draw upon for improvements.
- The Government's proposed strategic highway improvements will secure wider corridor and network benefits and will help to deliver better medium and long term accessibility between London and the South Coast.
- Gatwick has engaged a number of stakeholders throughout development of its future surface access strategy, including the Highways Agency. As part of that process, the **Highways Agency has stated that it "is content that traffic modelling of the strategic highway network is currently fit for purpose"**.

8.1 Introduction

Gatwick benefits from direct access to the national strategic road network³ via the M23 motorway which runs north-south adjacent to the airport. Junction 9 of the M23 is the main access point with an onward link of motorway standard dual carriageway to Junction 9a, immediately adjacent to the entrance of South Terminal. Whilst Gatwick is committed to securing a higher surface access mode share by sustainable modes, highway access will remain critical for future access for passengers, staff, and freight, including those arriving by local bus and express coach, and is a central part of the R2 ASAS.

In 2012, 56% of all Gatwick passenger demand accessed the airport by car, either as a driver, passenger or by taxi. Car journeys are split between those that park at the airport (short stay or long stay, using on or off airport parking and also including "meet and greet" or valet parking) and those that are dropped off or picked up ("kiss and fly" and taxi journeys). This proportion is gradually decreasing in favour of higher public transport access mode share. Between 2010 and 2012, the total number of air passengers accessing the airport by road grew by around 5%, whilst the overall growth in demand at the airport was around 9% indicating that public transport is gaining mode share. This is consistent with Gatwick's sustainability objectives and the prioritisation of public transport and non-motorised modes.

This chapter covers modelling of the strategic highway network between London and Brighton including the M23 and M25. Proposed capacity enhancements to motorway access at Junction 9/9a and main roads in the vicinity of the airport, including realignment of the A23, are described in Chapter 9.

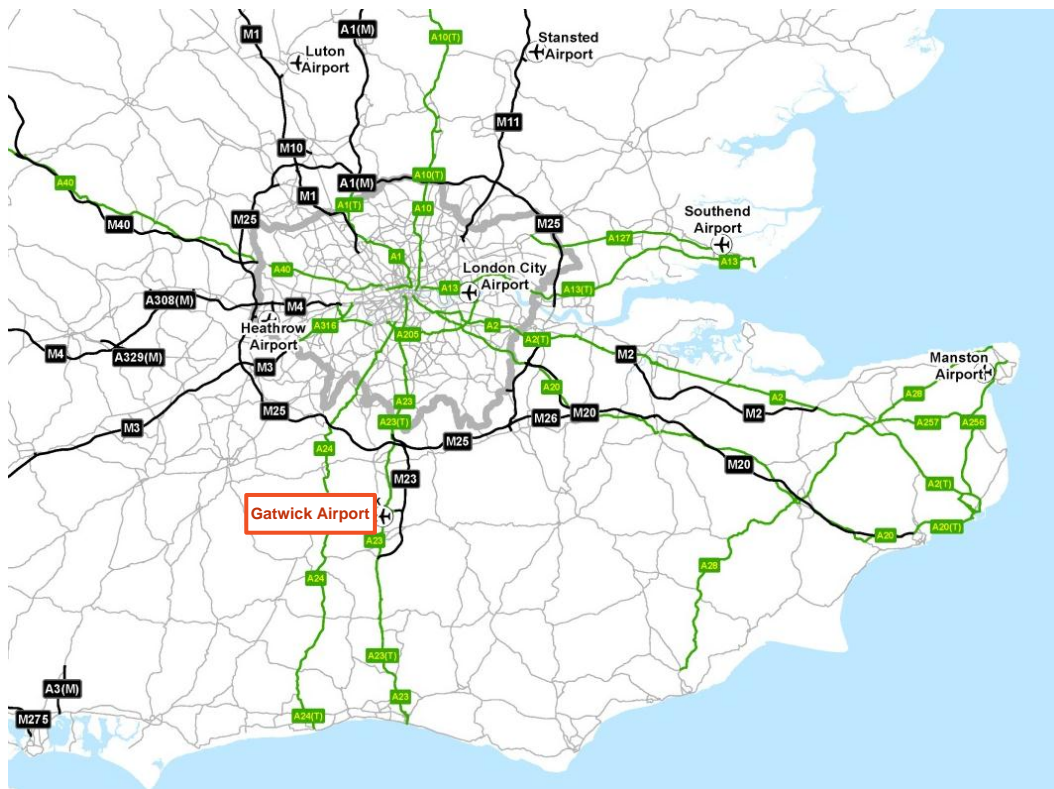
8.1.1 Strategic Road Network

Gatwick's terminals are located at Junction 9a of the M23, with direct access from both North Terminal and South Terminal. Journey time access to the M25 is between 7 and 8 minutes. From the M25, there is access to the wider UK strategic road network to the north, south, east and west. The A23, which runs parallel to the M23, continues north beyond the M25 into London via Croydon and Brixton to the heart of the West End and the City. The important centre of Croydon is 30 minutes from the airport by road.

³The principal UK highway routes managed by the Highways Agency.

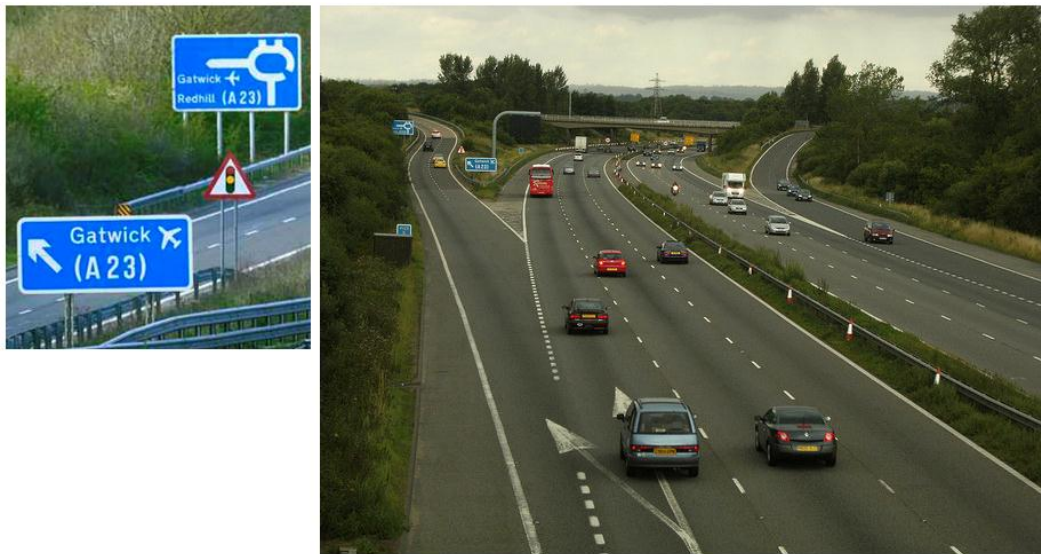
The proximity to the M25 and M23 motorways is an important strength for Gatwick as shown in **Figure 8.1** and **Figure 8.2**. Arriving air passengers leaving the airport by road have easy access to the motorway network without the stop-start of urban networks with multiple junctions. North of Gatwick, the M23 connects to the M25 Junction 7 (east of Merstham) without any intermediate junctions. North of the M25, the M23 becomes the A23 and connects to Purley and Croydon. The M25 provides access to the airport across the South East, anti-clockwise to Kent, Essex and East Anglia, and clockwise to routes to the South West, Thames Valley, Wales, Midlands and the North.

Figure 8.1: Strategic highway network serving South East airports



South of Gatwick, the M23/A23 continues as the main highway from London to the South Coast and connects with the A272 and A27 east west routes, placing the whole of the South Coast between Southampton and Folkestone within one hour and 20 minutes of the airport. This opens up a large area of potential employment and economic growth opportunity within a commuter catchment to Gatwick.

Local roads around Gatwick are connected via the A23, which bisects the airport and separates the South Terminal roundabout and highway access to the terminal forecourt from the rest of the operational airport. The A23 runs parallel to the Brighton Main Line railway and provides access to airport related businesses around the periphery of the airport as well as the City Place and Manor Royal employment zones.

Figure 8.2: Main strategic highway access to Gatwick – M23 Junction 9

This chapter summarises work undertaken to test the capacity of the M23 and M25 against future demand, in terms of both background commuter traffic and traffic generated by growth at Gatwick. Separate analysis has been undertaken of the network local to the airport, including the A23, and this is documented in Chapter 9.

The capacity analysis has tested the implications of different demand scenarios at Gatwick, assuming a single runway airport (Option 0) and the Masterplan option of a second runway (Option 3). Growth in background traffic is also an important consideration when analysing Gatwick's future. Demand generated by growth in South East drives a requirement for highway improvements, irrespective of a second runway at Gatwick Airport.

Important issues for highway access to and from Gatwick are maintaining the reliability of journey times and enhancing capacity. As will be seen, the capacity required around Gatwick in the future is delivered by committed schemes, such as M23 and M25 Smart Motorways. These provide capacity for growth in the South East and also offer opportunity for growth at Gatwick.

8.2 Model Forecasting Approach

8.2.1 Overview

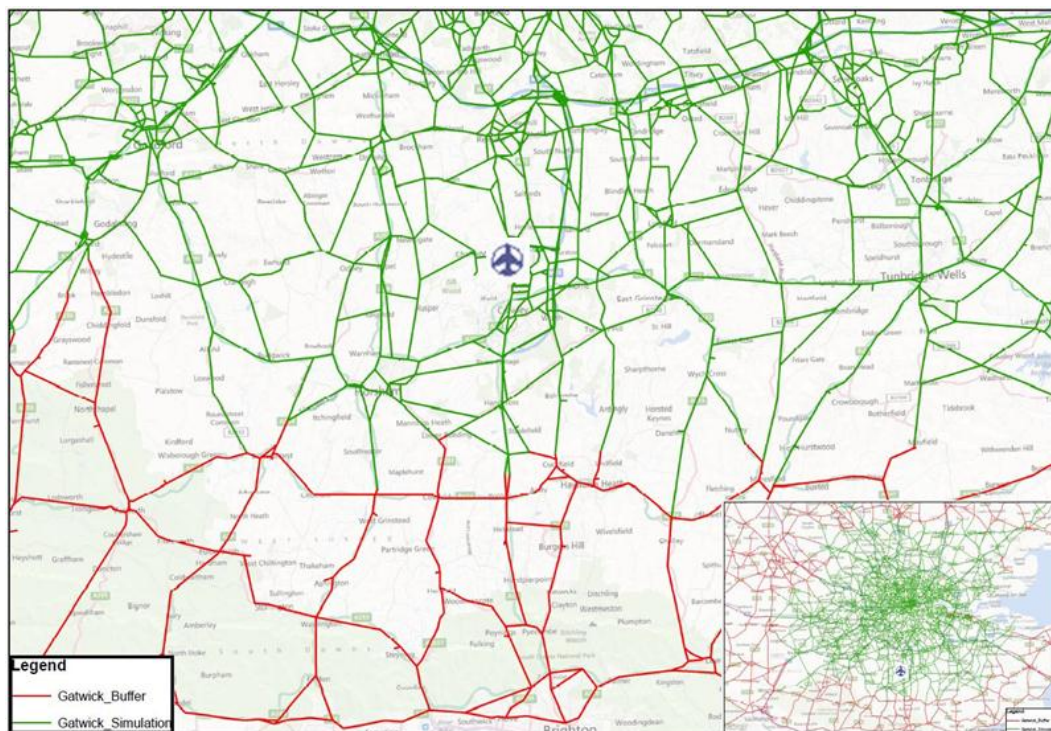
Traffic modelling has been undertaken using a validated version of the Highways Agency's (HA) M25 model. This is a SATURN highway assignment model covering the whole of the South East of England with particular emphasis on the highways connecting with the M25 and the London orbital route itself. The version employed for this study, recommended by the HA and endorsed by the DfT, was developed by HA's consultants and modified in 2012 to develop traffic forecasts for the Free Flow Charging scheme at the Dartford crossings (DFFC).

The model's coverage of the southern section of the M25 is excellent, reflecting the DFFC scheme it was designed to test. All motorways, A-roads and the main B-roads are included in the model. **Figure 8.3** illustrates the extent of the model

network coverage around Gatwick. Overall, the DFFC model was deemed suitable to be used for strategic highway modelling in this study.

The DFFC base year model is 2009. Forecast years have been developed for Gatwick for the years 2025 and 2040 (with a 2050 sensitivity test). Airport demand has been taken from the air passenger and employee forecasts, in accordance with all other modelling. The 2050 forecast year matrices have been derived by extrapolation from the 2040 model using the latest TEMPRO growth factors. This is discussed in more detail in Section 8.2.4.

Figure 8.3: Model network coverage



Future year networks have been updated in consultation with the HA to reflect the committed schemes for which funding has been secured (see Section 8.2.3).

Two Masterplan options have been modelled at Gatwick. These are shown in **Table 8.1** and the results are presented in Section 8.2.5 onwards.

Table 8.1: Modelled Options

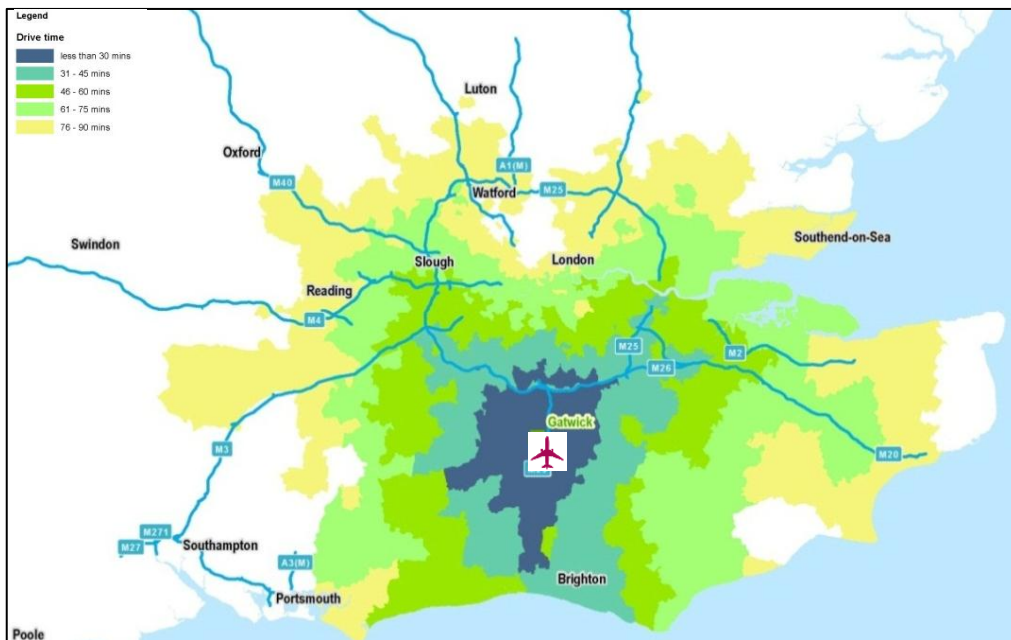
Name	Description
Option 0	One Runway (planned growth)
Option 3	Two Runways (wide spaced, independent)

8.2.2 Modelled Time Period

Figure 8.4 and **Figure 8.5** illustrate the relative journey times across the network for journeys to/from Gatwick. It can be seen that AM commuter peak journey times are longer than off-peak. For the purpose of this study, the approach has been to model the road network during the peak when conditions are likely to be most sensitive to additional traffic. In the absence of a PM model, which tends to

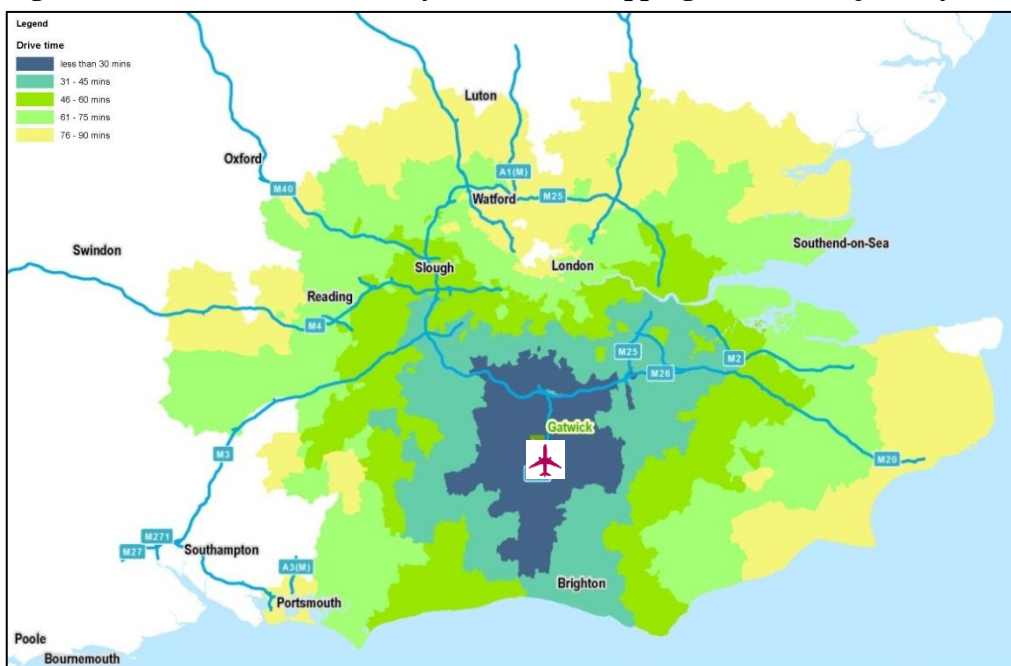
have a ‘flatter’ peak profile, the AM commuter peak model was deemed appropriate to be used and representative of peak travel times.

Figure 8.4: 2009 AM Peak Journey times (GIS mapping of modelled journeys)



Source: Arup analysis of Accession and the DFFC model for Gatwick Airport Limited

Figure 8.5: 2009 Off Peak Journey times (GIS mapping of modelled journeys)



Source: Arup analysis of Accession and the DFFC model for Gatwick Airport Limited

As part of the modelling process, analysis has been undertaken to establish the morning peak hour around Gatwick. Three different count types have been assessed:

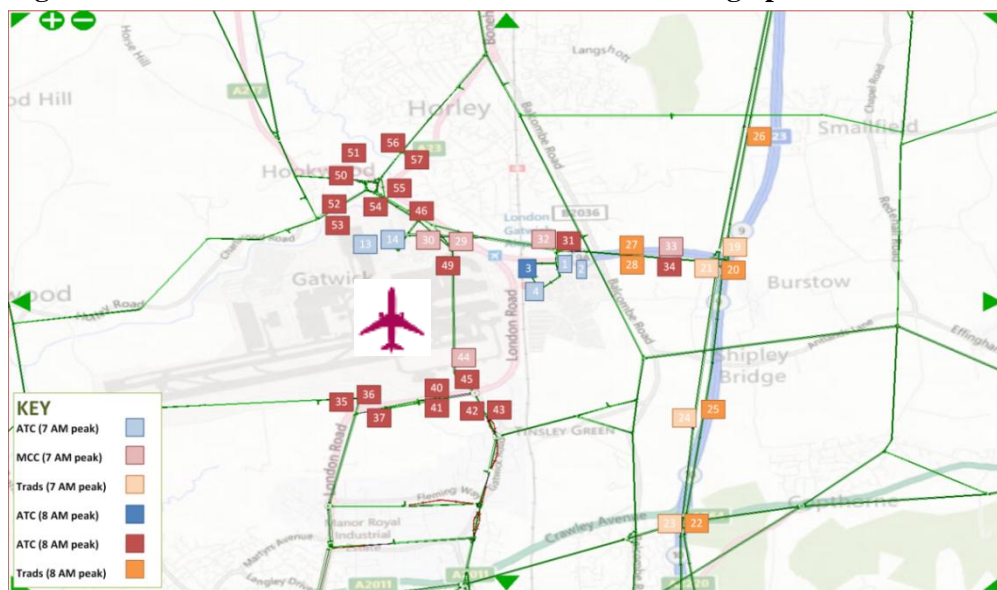
- 24-hour Manual Classified Count (MCC) data (collected on 18th September 2012),

- 1-week Automatic Traffic Count (ATC) data (collected during week beginning 19th September 2012); and
- 1-month HA Traffic Information Database (TRADS) data (dated September 2012).

In total, 41 count sites were analysed; six ATCs, 10 TRADS and 25 MCCs. The catchment area for trips to and from Gatwick is consistent with the isochrones and population data referred to in Section 4.

Figure 8.6 shows the model network (in green) and the count site locations, colour-coded based on data source and the peak hour in terms of traffic flow. This analysis has shown that the busiest morning peak hour around the airport, including background traffic, is 0800-0900.

Figure 8.6: Traffic count sites used to establish the AM high peak hour



Source: Traffic count sites around Gatwick, HA and GAL

Therefore capacity analysis has been undertaken using an 0800-0900 model. The model allows for traffic already on the network from the previous hour to be included so that the progressive build-up of the peak hour is reflected in results.

8.2.3 Committed Network Schemes and Mitigation

Committed Schemes

There are a number of strategic road network improvements included in the 2040 and 2050 models, corresponding to committed enhancements, which are planned or are currently under construction and expected to be completed in the next few years.

Table 8.2 lists and **Figure 8.7** shows the principal schemes committed on the M25, M23 north of Gatwick and the A23 south of Gatwick.

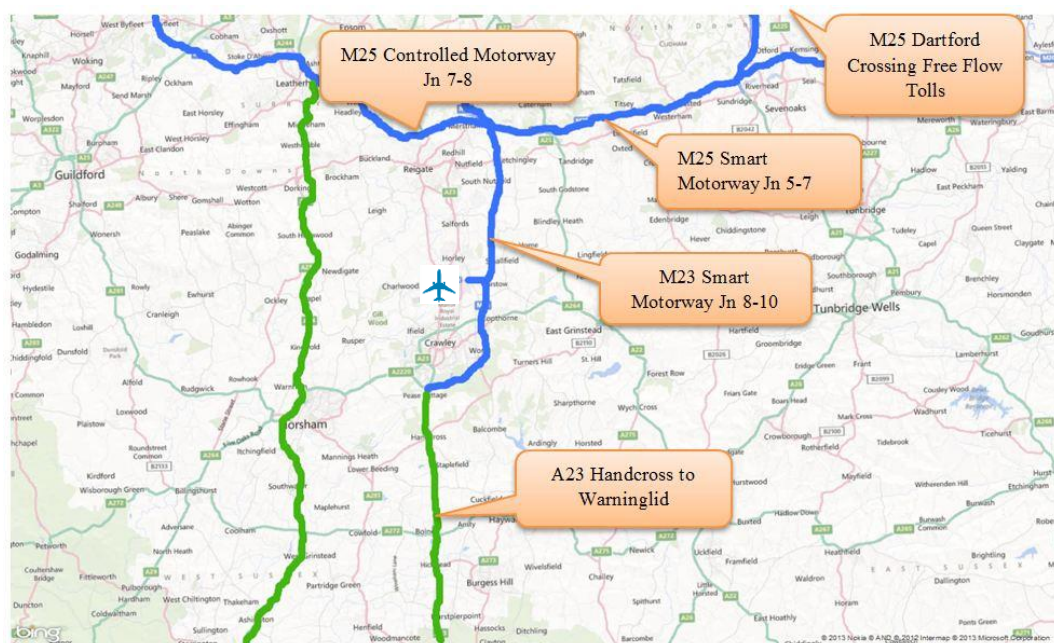
Table 8.2: Committed Schemes

Road	Improvement	Funding Secured	Complete by	Included in model years
M25	Dartford Free Flow crossing	£70-88m	2014	2025, 2040 and 2050
M25	Smart Motorways Jcn. 5-7	£129m	2014	2025, 2040 and 2050
M25	Jn7-8 controlled motorway	<£5m (est)	Pre 2025	2025, 2040 and 2050
M23	Smart Motorway Jcn. 8-10	£80-90m (est)	Pre 2025	2025, 2040 and 2050
A23	Handcross to Warminglid	£77m	2014	2025, 2040 and 2050
A24	Horsham to Capel	Not committed	N/A	None
A24	Ashington to Southwater	Not committed	N/A	None

NB M23 Smart Motorway Jn 8-10 estimate based on per mile costs for M25 Jn 5-7

M25 Jn 7-8 Controlled Motorway estimate based on per mile costs for M25 Jn 16-23 scheme

Each of the M25 schemes⁴ are designed to manage the flow of traffic better, providing additional incremental capacity to improve traffic flow and reduce delays on the M25. Smart Motorways projects ensure traffic is flowing as efficiently as possible as well as catering for growth. In addition, to the M25 proposals, M4 Junction 3 to 12 and M3 Junctions 9 to 14 are also included as potential schemes in the National Infrastructure Plan (NIP), as announced in December 2013. These schemes will provide enhanced connectivity from London to the west.

Figure 8.7: Committed improvements to the strategic road network

M23 Junctions 8 to 10 (Gatwick Junctions) are also committed in the NIP.

Indeed, the Commission also recommended a route strategy for the sections of the motorway network connecting to Gatwick, with a particular emphasis on the M23,

⁴ The Dartford Free Flow Crossing scheme, the Smart Motorways improvement between Junction 5 and 7 and the Controlled Motorway scheme between Junctions 7 and 8.

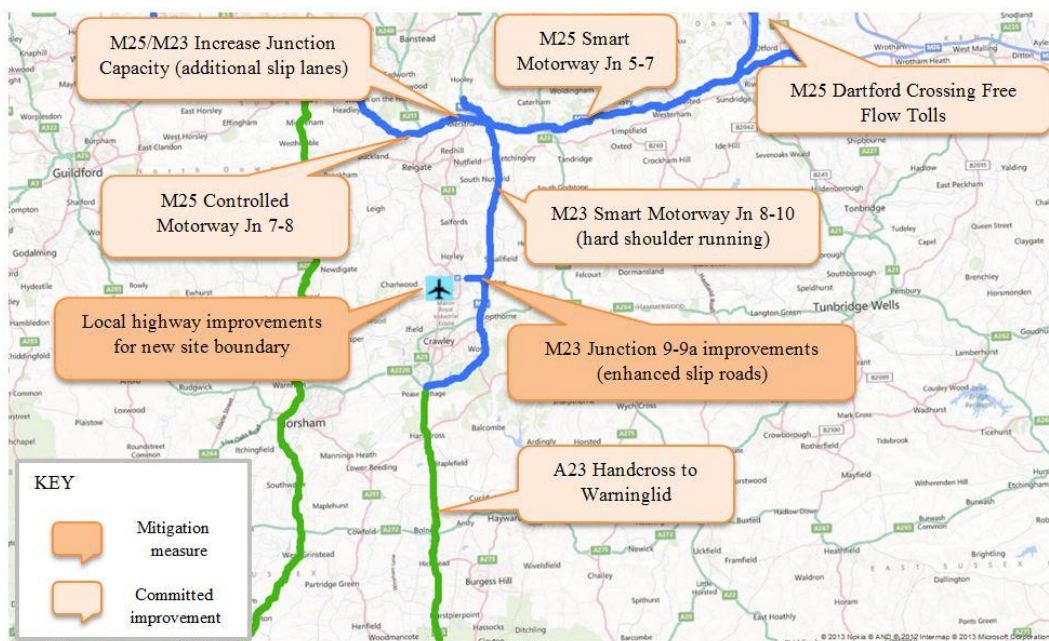
in a letter from Sir Howard Davies to the Chancellor of the Exchequer, dated 26th November 2013.

Mitigation Measures

The modelling has identified various locations on the road network requiring mitigation as a result of traffic growth in the future. This mitigation is required to alleviate congestion where airport traffic meets the strategic highway network. These mitigation measures include M23 Junction 9 slip road capacity improvements and local highway improvements around the airport, including realignment of the A23, as part of Option 3 Masterplan. Both of these measures are described in more detail in Chapter 9.

Figure 8.8 shows both mitigated and committed schemes incorporated into the future year modelling.

Figure 8.8: Mitigation measures and committed improvements



Mitigation measures around Gatwick have the following impacts on the strategic highway network:

- Mitigation at M23 Junction 9 allows better throughput of traffic to and from the airport and causes a decrease in traffic on the parallel A23.
- With mitigation, there is a general reduction in traffic taking alternative routes parallel to the M23 (to avoid congestion) as a result of increased capacity. This reduces the amount longer distance traffic re-routing from the A23 to the M23 and brings local traffic relief.

8.2.4 Gatwick Airport Demand

8.2.4.1 Modelling Approach

The M25 DFFC model includes the distribution of airport related traffic from 2012 CAA passenger data and Gatwick employee survey data overlaid on background trips in the model. Model flows have been validated against observed traffic counts. Checks on the M25 DFFC model around Gatwick with CAA and employee survey data incorporated shows an improved validation of modelled flow against observed traffic flow along the M23.

The model has been updated with airport passenger and employee forecasts to generate future year demand scenarios out to 2040 and 2050. No reassignment has been undertaken but demand to and from Gatwick has been uplifted to reflect future growth.

For all of our modelling, we have taken the approach of **testing the most conservative or “highest impact” case for each mode.**

2040 busy day airport schedule data has been incorporated into matrices corresponding to demand on transport networks for a **future 2040 busy day in September.**

Road network modelling around Gatwick has been undertaken on the “highest impact” mode share, namely the current mode share of 60% of passengers accessing the airport by car maintained to 2040. This does not reflect the enhancements in rail and public transport capacity and connectivity which form part of the R2 ASAS and will drive a much higher mode share for public transport.

In addition, **modelling has stress-tested surface access networks assuming another decade of growth to 2050** in order to demonstrate resilience in the networks for even more future growth. For background demand growth, the DfT’s standard TEMPRO factors have been used. Given that the TEMPRO data only forecasts to 2041, the matrices have been extrapolated to 2050 by applying TEMPRO growth factors for the previous decade (5.6% over ten years).

Accordingly there is **high degree of confidence in the modelling analysis and the network that has been developed.**

8.2.4.2 Traffic Growth

Additional growth with the introduction of a second runway at Gatwick on car traffic in the AM peak hour is shown in the **Table 8.3.** Traffic to Gatwick is two to three times higher than traffic from Gatwick in the AM peak.

Table 8.3: AM peak hour traffic movements for each growth option (0800-0900)

		Employees and Air Passengers	
		To Gatwick	From Gatwick
Existing	2012	2,928	1,172
Option 0	2025	3,396	1,469
	2040	3,645	1,539
	2050	-	-
Option 3	2025	3,971	1,686
	2040	6,213	2,080
	2050	6,728	2,325

8.2.4.3 Demand Zones

Gatwick demand has been divided into passenger and employee trips. These trips have been divided into four zones that represent Gatwick, namely:

- The North Terminal zone;
- The South Terminal zone;
- The New Terminal zone; and
- The South Perimeter zone.

These correspond to areas where changes in the number of trips (for example as a result of growth) are included in the model.

Table 8.4 to **Table 8.6** show the air traffic forecast demand by zone for 2025, 2040 and 2050 for Options 0 and 3.

Option 0 assumes North and South Terminals only. In Option 3, the New Terminal begins operating in 2025 and shows a marked increase in demand by 2040 reflecting full build out.

Demand in the South Perimeter zone is removed with a second runway – this zone is replaced by airport expansion – and trips are redistributed accordingly.

At this stage, no specific freight or cargo zone has been included in the model. The implications of cargo and freight on the road network are more pertinent to the local road modelling as reported in Chapters 9 and 14.

Table 8.4: 2025 Passenger and Employee Trips (08:00-09:00)

	North Terminal	South Terminal	South Perimeter	New Terminal	Total
Opt 0	2,164	2,164	536	0	4,865
Opt 3	2,192	2,966	0	498	5,657

Table 8.5: 2040 Passenger and Employee Trips (08:00-09:00)

	North Terminal	South Terminal	South Perimeter	New Terminal	Total
Opt 0	2,219	2,219	559	186	5,184
Opt 3	2,764	3,512	0	2,017	8,293

Table 8.6: 2050 Passenger and Employee Trips (08:00-09:00)

	North Terminal	South Terminal	South Perimeter	New Terminal	Total
Opt 0	-	-	-	-	-
Opt 3	3,083	3,688	0	2,282	9,052

8.2.5 Gatwick Traffic Analysis

Figure 8.9 and **Figure 8.10** show Gatwick related traffic as a proportion of total flow in 2025, 2040 and 2050 for Options 0 and 3. These figures illustrate the impact of a second runway on Gatwick's contribution to total traffic on the main routes around the airport. Except for the M23 between Junction 9 and Junction 9a, Gatwick traffic is less than 18% of total traffic in Option 0 at 2040. This increases to 28% in 2040 in Option 3, meaning Gatwick traffic is still less than a third of overall traffic.

The percentage change between Option 0 and Option 3 is greatest south of the airport. In all cases, except on the M23 south of Junction 9 and the A23 London Road, the increase in percentage contribution is less than 10% and in many cases less than 5%.

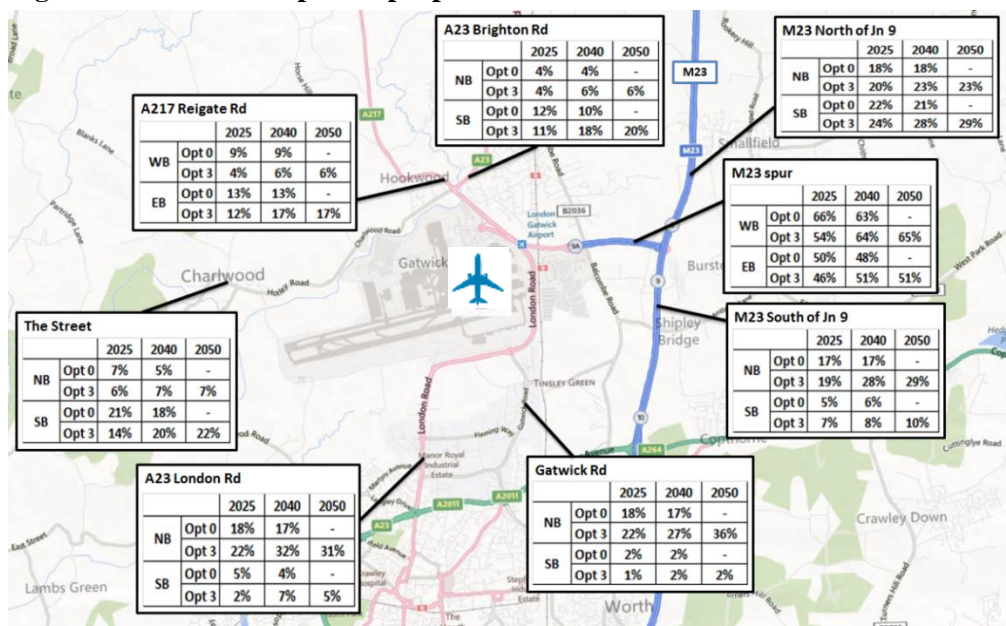
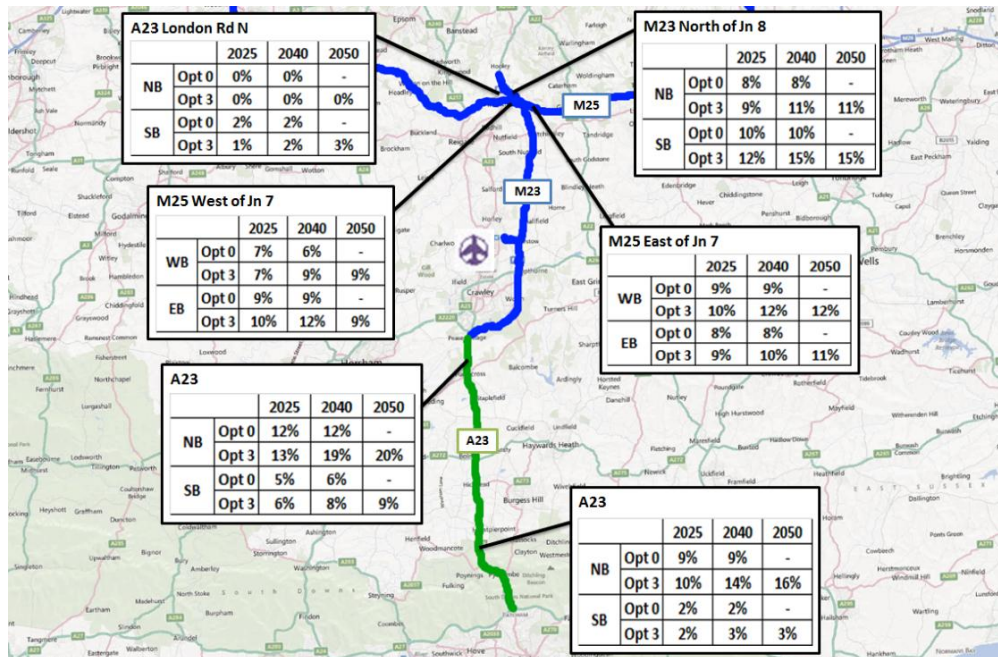
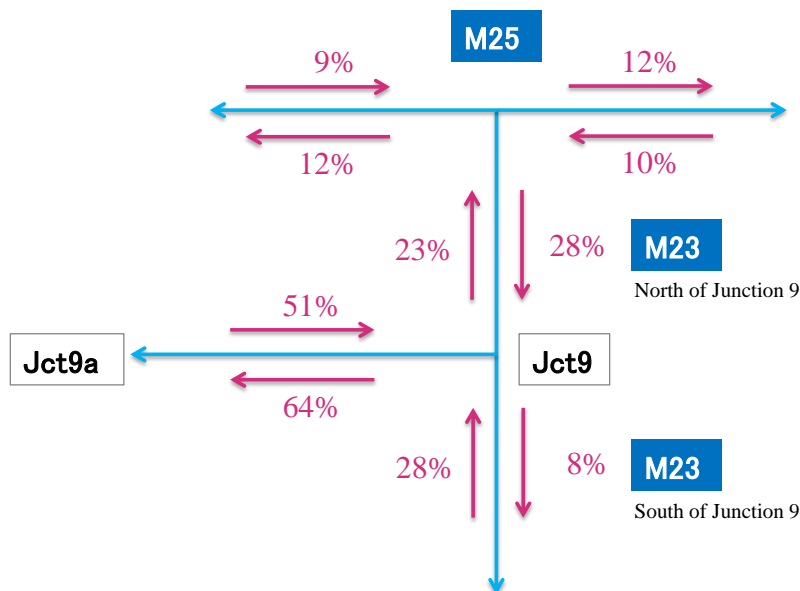
Figure 8.9: Gatwick trips as a proportion of total traffic on the local network

Figure 8.10 illustrates the proportion of Gatwick trips further afield, noting that the greatest proportion of traffic uses the M23 and the M25. At most, Gatwick trips account for 12% of all vehicle movements on specific links on the M25.

Figure 8.10: Gatwick trips as a proportion of total traffic on the strategic network

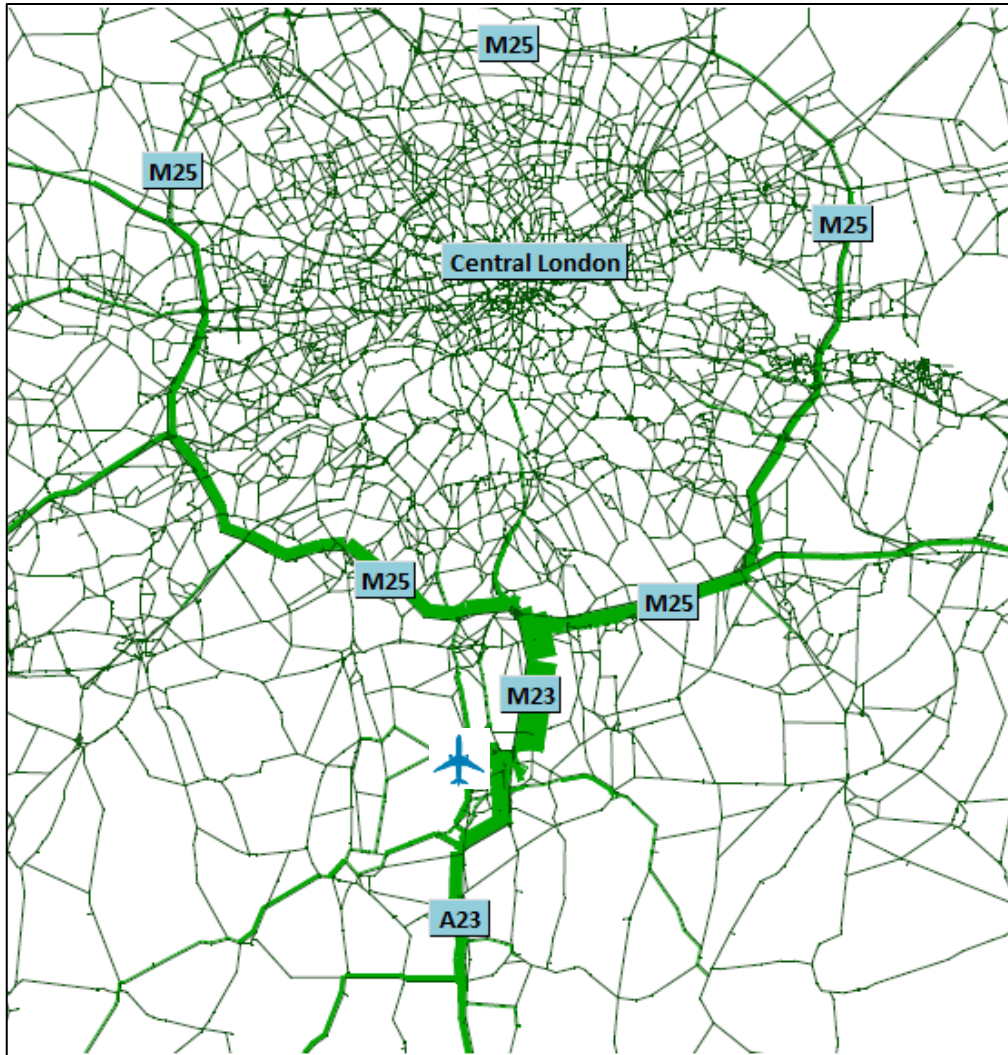
It can be seen from these maps that **Gatwick demand is only a percentage of overall traffic on the strategic highway network**. These percentages are summarised for 2040 in **Figure 8.11**.

Figure 8.11: Proportion of Gatwick Traffic on the Strategic Highway Network for Option 3 in 2040

It can be seen that up to 28% of demand by 2040 on the M23 and up to 12% of demand on certain links on the M25 is related to Gatwick. **Background growth on the M25 is a bigger contributor to future demand than a second runway at Gatwick**, comprising more than 88% of peak hour demand in 2040. By contrast, Heathrow is located between Junctions 12 and 16 of the M25, one of the busiest stretches of motorway in the country and one of the most congested.

Figure 8.12 illustrates the overall distribution of trips to Gatwick, noting that the greatest proportion of traffic uses the M23 before dispersing to the main radial corridors around London. A considerable proportion of trips use the M23/A23 south of Gatwick. This distribution of Gatwick trips does not change between options.

Figure 8.12: Distribution of trips towards Gatwick (2040 Option 0) CAA data

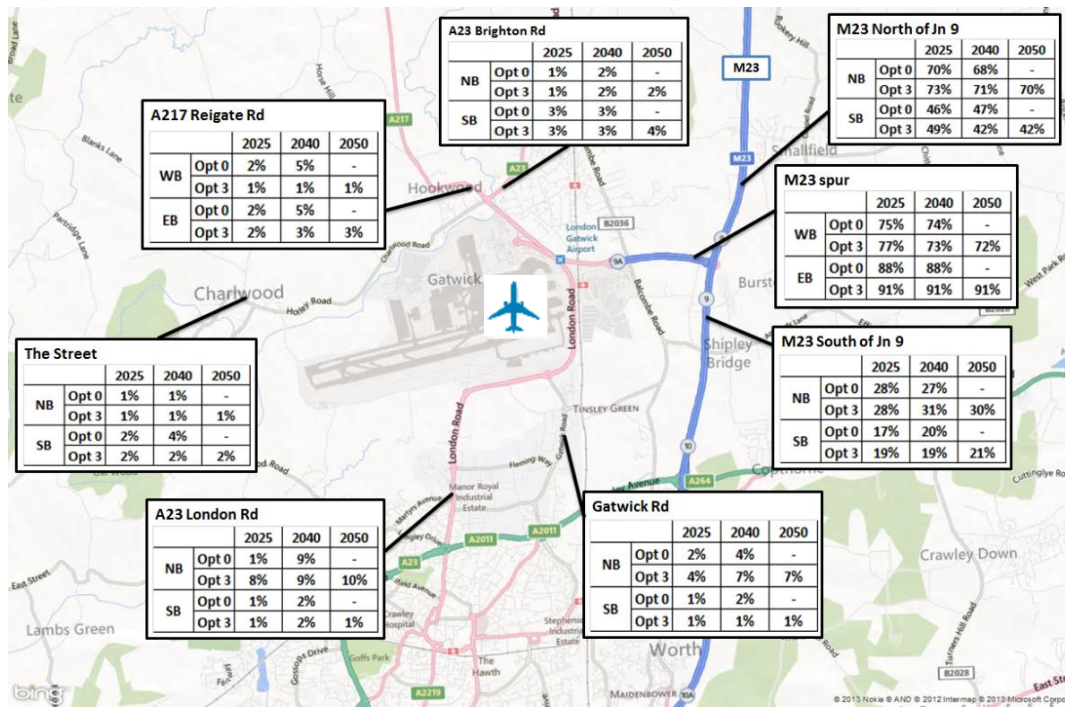


Analysis has been undertaken to identify the distribution of Gatwick related trips on roads such as the M23 and M25. This was performed for Options 0 and 3 for 2025, 2040 and 2050. The results are presented in **Figure 8.13**. The analysis shows how Gatwick related traffic is dispersed on the highway network as a percentage i.e. if there are 5,000 Gatwick trips in total and 4,000 trips use the M23 then 80% of Gatwick traffic can be said to be using the M23.

Figure 8.13 shows results for the distribution of Gatwick traffic on the network around the Airport. It shows that with a second runway the proportion of Gatwick traffic that uses the M23 and A23 (the two most important routes for airport trips) changes by only 4% with a second runway. This supports the conclusion that the increased capacity on the M23 removes traffic from other local roads that have less capacity (such as the A23 and A217).

The remainder of Gatwick related traffic not using the M23 to Junction 9a accesses the airport from alternative roads. The largest contribution from these roads is the A23 London Road and Gatwick Road accessing from the south of Gatwick. The percentage contribution to A23 traffic through Horley remains constant at 2% northbound and 3% southbound in Option 0 and Option 3.

Figure 8.13: Distribution of Gatwick traffic on the highway network near Gatwick



8.2.6 Junction Performance

Junction analysis has been undertaken performed to assess the impact of additional traffic generated by a second runway on junctions where demand on a route is approaching the capacity of that route and consequently where delays may occur. This analysis was based on demand volume over capacity (V/C), a criterion which is interrelated to delay and congestion.

Table 8.7: Criteria for junction performance assessment

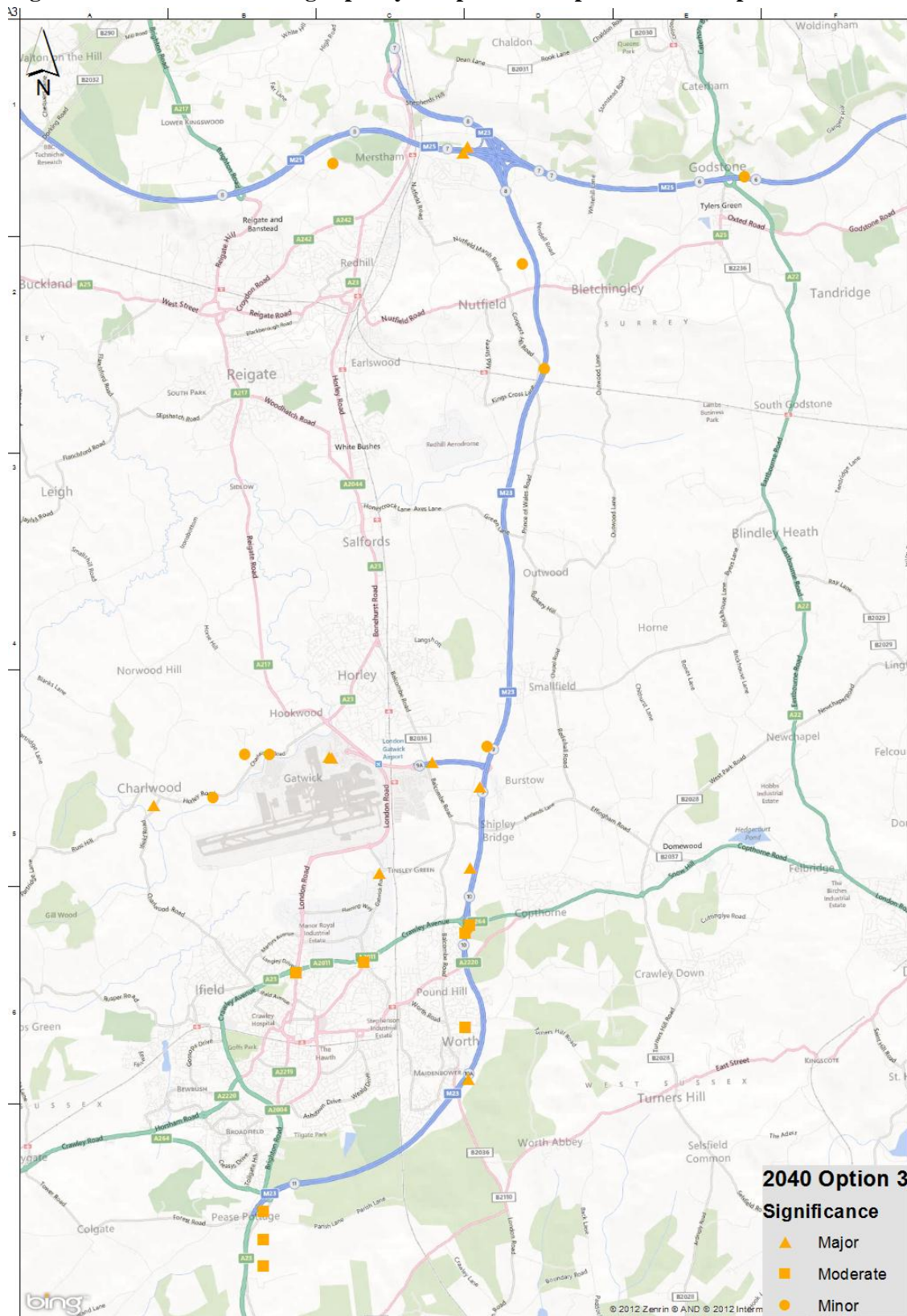
Criteria		Magnitude of impacts			
		Not significant	Minor	Moderate	Major
Congestion Indicator		<85%	85 - 92%	92 - 98%	98% or more
<2% change in Congestion Indicator	Very Low	Not significant	Not significant	Not significant	Not significant
2-5% change in Congestion Indicator	Low	Not significant	Minor	Minor	Moderate
Between 5-10% change in Congestion Indicator	Medium	Not significant	Minor	Moderate	Major
>10% change in Congestion Indicator	High	Not significant	Moderate	Major	Major

Table 8.7 shows how the impacts are categorised based on V/C. As V/C increases, so delay and congestion also increase. If the V/C is greater than 85% then the junction is considered to be approaching or functioning at capacity.

Analysis of 2012 demand against 2040 Option 0 identifies a number of junctions where increases in background traffic to 2040 generate junctions where the 85% threshold is exceeded, irrespective of a second runway at Gatwick. Gatwick is therefore engaging with stakeholders to develop improvements which will overcome local capacity issues and maximise the benefit of committed schemes. Where Gatwick is a contributor to increased traffic on local roads or at junctions, Gatwick is proposing a Local Roads Development Fund for local authorities to draw upon for improvements.

Figure 8.14 shows the junctions where the 85% threshold is exceeded when comparing 2040 Option 0 and Option 3 in 2040. This enables a comparison of the effects of a second runway on the strategic road network by location and severity. The highlighted junctions reflect the roads that are approaching capacity that will experience more traffic with the second runway.

Ten junctions are shown to have major impact with a number of these around Gatwick itself. These junctions have been effectively removed through development of the road network as described in Chapter 9.

Figure 8.14: Junctions nearing capacity in Option 3 compared to 2040 Option 0

8.2.7 Journey Times

Delays may be experienced along a route or corridor where interrelated junctions do not have sufficient capacity to cater for the traffic flow. This can occur where traffic is forced onto unsuitable roads, perhaps as a result of a deficiency elsewhere or because of a preferred alternative route in less congested periods of the day. One way to test this is to compare journey times between options, or between peak and off peak time periods, along typical routes between two points within the model, representative of typical or popular movements.

Ten 2-way routes were identified for comparing modelled journey times between different options in 2040 and assessing variability of travel times. Routes were selected to illustrate journey times on segments of the strategic road network around Gatwick including the M25, M23, M23 Junction 9a and the A23. **Table 8.8** describes the journey time start and end points for the ten routes.

Table 8.8: Journey Time Route Descriptions

Route	Directions	Start	End	Road
R1	NB/SB	Gatwick Airport	M25, Junction 6 (with the A22)	M23/M25
R2	NB/SB	A23 - A27 Junction	Gatwick Airport	A23
R3	NB/SB	Gatwick Airport	London Rd N - M25 crossroad	A23
R4	NB/SB	Gatwick Airport	M25, Junction 8 (with the A217)	A217
R5	NB/SB	Crawley Ave - Horsham Rd	Gatwick Airport	A23
R6	EB/WB	M25, Junction 6 (with the A22)	M25, Junction 8 (with the A217)	M25
R7	EB/WB	Snow Hill A264 - Snow Hill B2037	Gatwick Airport	A264/A23/A2011
R8	NB/SB	Gatwick Airport	M25, Junction 10 (with the A3)	M23/M25
R9	NB/SB	Gatwick Airport	Dartford Crossing	M23/M25
R10	NB/SB	Gatwick Airport	Croydon	M23/A23

Figure 8.15 shows these routes. All routes start or end at Gatwick apart from Route 6 which is entirely on the M25 and is used to reflect the differences in journey time across the M25 Junction 7 where Gatwick traffic joins or leaves the main M25 flow.

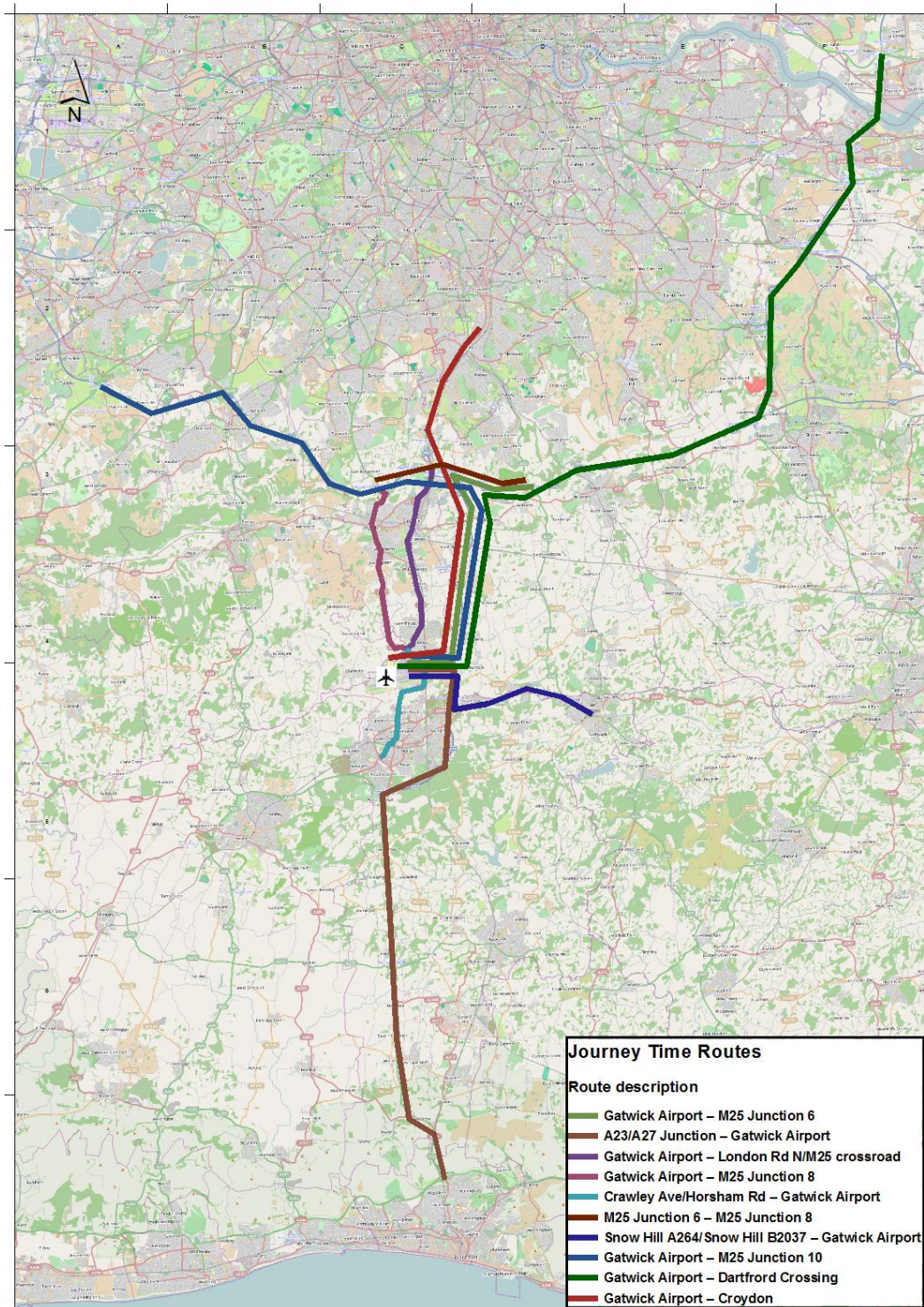
Figure 8.15: Journey Time Routes

Table 8.9 provides a summary of the journey time routes for all the options in 2040. Overall journey times are broadly similar for Option 0 and 3. The largest variations are as follows:

- Routes 1, 8, 9 and 10 southbound - journey speed decreases with traffic from a second runway. These routes all use the M23 southbound and the M23 to Junction 9a westbound. The overall reduction in speed is between 2kph and 10kph indicating that additional delays with a second runway are within an acceptable range for peak traffic.
- Route 3 (A217) southbound – The impact of committed schemes reduces delays and increases journey speed on the A217.
- Route 5 (A23 London Road) southbound – Journey speeds are slightly slower with a second runway (a reduction of 3kph) owing to an increase in traffic but delays are maintained at an acceptable level.

It should be noted that the network in Option 0 differs to that in Option 3 owing to network changes related to the New Terminal in Option 3. That is also why distances are slightly different.

Table 8.9: 2040 Journey time routes

Route	Start	End	Opt 0		Opt 3	
			Mins	Kph	Mins	Kph
R1 NB	Gatwick Airport	M25, Junction 6 (with the A22)	12.5	84	12.8	83
R1 SB			14.0	77	16.4	66
R2 NB	A23 - A27 Junction	Gatwick Airport	28.9	82	33.0	72
R2 SB			30.6	78	30.9	78
R3 NB	Gatwick Airport	London Rd N - M25 crossroad	28.6	27	28.2	28
R3 SB			22.2	35	19.9	39
R4 NB	Gatwick Airport	M25, Junction 8 (with the A217)	25.5	30	25.1	30
R4 SB			24.4	31	23.8	32
R5 NB	Crawley Ave - Horsham Rd	Gatwick Airport	18.0	31	18.7	31
R5 SB			11.9	47	13.3	44
R6 WB	M25, Junction 6 (with the A22)	M25, Junction 8 (with the A217)	7.0	59	7.0	59
R6 EB			7.1	73	8.0	65
R7 WB	Snow Hill A264 - Snow Hill B2037	Gatwick Airport	21.2	39	23.9	34
R7 EB			20.8	40	20.8	40
R8 NB	Gatwick Airport	M25, Junction 6 (with the A22)	30.6	77	30.6	78
R8 SB			31.6	79	34.5	69
R9 NB	A23 - A27 Junction	Gatwick Airport	55.3	65	55.6	65
R9 SB			57.2	65	61.3	60
R10 NB	Gatwick Airport	London Rd N - M25 crossroad	50.9	33	50.7	33
R10 SB			46.5	37	50.5	34

The journey time findings vary by route and journey length, and therefore speed is can be considered a good comparison measure. The summary average speeds for all routes for Option 0 and 3 are shown in **Table 8.10**. This table shows that the overall impacts on the strategic road network are similar and that **overall speeds are maintained even with the increased traffic associated with a second runway**.

Table 8.10: 2040 Journey time routes – average speed

	Option 0	Option 3
Average Speed	51 km/hr	50 km/hr

8.2.8 West Sussex County Transport Model (WSCTM) and the Surrey County Council (SINTRAM) model

As part of Gatwick’s commitment to consultation with stakeholders and in order to provide context and to further understand local impacts, a comparison of strategic modelling is currently being undertaken with local models, namely the West Sussex County Transport Model (WSCTM) and the Surrey County Council (SINTRAM) model. All three models were built for different purposes and therefore an ongoing process of engagement is envisaged between Gatwick, West Sussex and Surrey.

Model Comparison

The M25 DFFC model covers the south-east of England in detail. The extent of the network coverage enables the modelling of long distance trips, including those of strategic national interest e.g. trips relating to ports, airports and between major hubs. The trunk road network, including both the M25 and M23, is modelled in sufficient detail so that these strategic trips can be assigned across the network.

WSCTM is a multimodal strategic traffic model covering the county of West Sussex, including detailed coverage to the south of Gatwick. It was developed by combining the West Sussex County and Crawley models. WSCTM uses SATURN for highway modelling and CUBE for public transport. The WSCTM only contains trips that either enter, leave or route through West Sussex – therefore a trip from Horley to Epsom on the M23 and M25 would not be included in the model. The M23 Junction 9a is represented in the model, with the M25/M23 junction only represented at the edge of the detailed model in area known as model “buffer”.

SINTRAM is a strategic highway model for the county of Surrey. SINTRAM was developed in OmniTRANS and has been used for the County’s Local sustainable Transport Fund (LSTF) appraisal. The M23/M25 and the M23 Junction 9a are represented in the model as detailed junctions and can be used for comparison.

The models were compared in terms of flows in 2029, selected as a common year for comparison and assuming a single runway airport at Gatwick. For the WSCTM, we used the existing modelled 2029 forecast year whilst for the M25 DFFC and SINTRAM models we used interpolated flows based on existing forecast models of 2025 and 2030, and 2026 and 2031 respectively.

The analysis was performed on the AM peak hour (08:00-09:00) in M25 DFFC and WSCTM models and an average hour of the peak period (07:00-10:00) in SINTRAM.

Screenline Flows

Screenlines are a set of model links forming a boundary/line which typically run north to south or east to west. Screenlines are used to capture broader or wider trip patterns within a model and are useful for assessing where a model area has generally lower or high traffic volumes. Two screenlines, both capturing north-south trip patterns, were identified for model volume comparison. Screenlines are shown in **Figure 8.16**. These two north-south screenlines were chosen because the majority of trips to and from Gatwick are from the north and south.

Figure 8.16: Location of Screenline and Cordon for Modelled Flows

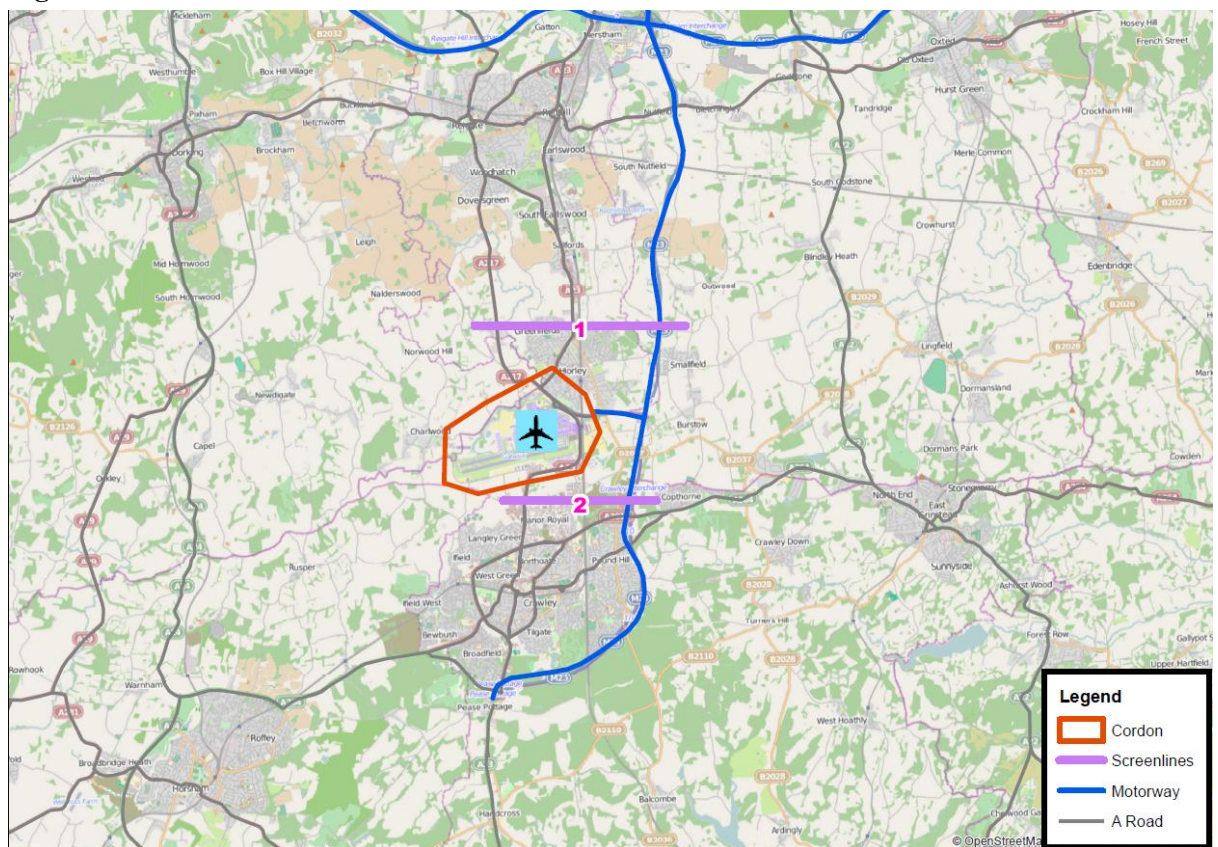


Table 8.11 presents the screenline flow for the three models, looking at year 2029 and with reference to background flows and a single runway operation at Gatwick.

Table 8.11: 2029 AM screenline flow

Screenline	Roads	Dir.	M25 DFFC Mitigated network	WSCTM	SINTRAM
1	A217 Reigate Rd A23 Brighton Rd M23	NB	8,193	6,181	7,778
		SB	9,553	6,846	6,859
2	A23 London Rd Gatwick Rd B2036 Balcombe Rd M23	NB	8,860	7,589	7,885
		SB	7,347	6,865	6,018

The WSCTM and the SINTRAM models have lower flow on both screenlines and in both directions when compared to the M25 DFFC mitigated network model, owing to the differences described above.

Airport cordon flows

A cordon was identified around Gatwick to capture the total inbound and outbound modelled volumes between the different models – this is shown in **Figure 8.16**. The cordon analysis shows the overall demand levels to and from the Airport. **Table 8.12** presents the cordon flow for the three models in the AM peak.

Table 8.12: 2029 AM Gatwick cordon flow

Screenline	M25 DFFC Mitigated network	WSCTM	SINTRAM
Outbound	6,920	6,255	6,894
Inbound	9,404	8,018	7,389

The WSCTM has lower flow on the Gatwick cordon in both the inbound and outbound direction. SINTRAM cordon flows are similar to the M25 DFFC model on the outbound but lower in the inbound direction.

Summary

A high level comparison of the West Sussex, Surrey and M25 models has been undertaken. The models differ in terms of model coverage, purpose of model development, underpinning growth assumptions, type of model (multi-model or highways only) and software used.

Demand is highest in the M25 DFFC model across screenlines and airport cordon flows meaning the modelling undertaken for Gatwick represents a prudent upper bound or conservative assessment of vehicle trips on the strategic highway network.

Gatwick is committed to on-going work with West Sussex and Surrey Councils in relation to the modelling. A potential longer term development may be to utilise model data from both the M25 DFFC and WSCTM models to enable a fuller assessment of Gatwick's impact on the northern part of West Sussex and in particular around Crawley.

8.3 Mode Share Sensitivity Test

The mode share assumption underpinning the SATURN modelling analysis and results assumes the current mode share maintained into the future. Gatwick's target is for 60% of passengers and 40% of staff to access the airport by public transport in the future, as set out in the R2 ASAS.

Whilst it is **prudent to test the performance of the strategic highway network against the highest impact case** (to be able to demonstrate resilience and capacity on the network), this section describes the benefits that the higher R2 ASAS public transport mode share will have - as modelling sensitivity test.

The modelling uses the same M25 DFFC model and, for consistency purposes, the trip distribution to and from the airport is the same between the current mode share model and the sensitivity test. The only change is in mode share.

8.3.1 Passenger and employee trips

The combined passenger and employee vehicle trips for Gatwick for both the current mode share model and sensitivity test are shown in **Table 8.13**. The impact of the revised mode share is around a 30% reduction of total trips between 08:00 and 09:00.

Table 8.13: 2040 Passenger and Employee Vehicle Trips (08:00-09:00)

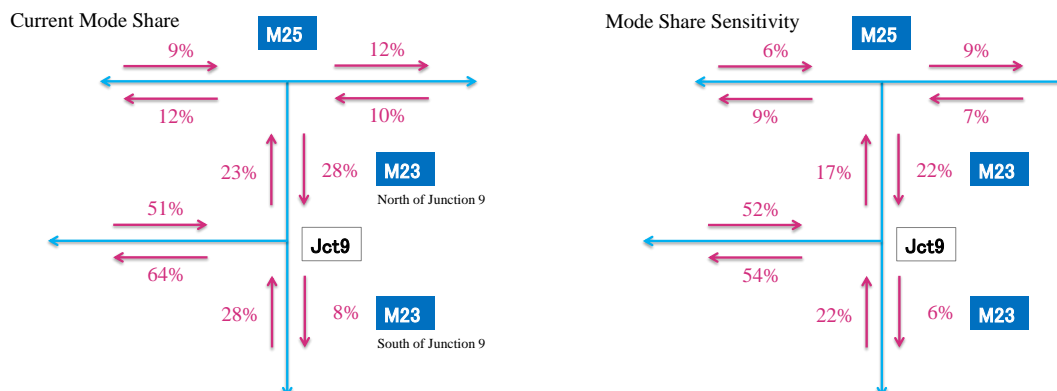
Mode share assumption	North Terminal	South Terminal	New Terminal	Total
Current Mode Share	2,764	3,512	2,017	8,293
R2 ASAS public transport mode share	1,970	2,618	1,322	5,911
% Difference	-29%	-25%	-34%	-29%

8.3.2 Gatwick traffic flows

An analysis of traffic to or from Gatwick as a percentage of total traffic on the network shows a decrease with increased public transport mode share, which is intuitive and expected.

Figure 8.17 shows the contribution of Gatwick traffic as a percentage of total traffic on the strategic highway network local to Gatwick and with reference to the M25 for the current mode share and the higher public transport mode share. It can be seen that Gatwick-related trips reduce to around one fifth of demand on the M23 and less than a tenth of demand on the M25.

Figure 8.17: Comparison of Gatwick related traffic as a percentage of total traffic at Current Mode Share and at R2 ASAS Mode Share



8.3.3 Triggered junctions

Table 8.14 shows the number and level of significance of triggered junctions with both mode share assumptions.

Table 8.14: Triggered junctions by level of significance

Level of significance	Current Mode Share	R2 ASAS public transport mode share
Major	10	4
Moderate	6	5
Minor	9	10
Total	25	19

Overall there is less traffic with a higher public transport mode share and therefore a reduction in the number of junctions nearing capacity. The number of ‘Major’ instances of volume over capacity at junctions is cut to less than half with a higher public transport mode share, indicating the benefits that this will have around Gatwick when the R2 ASAS target is achieved.

8.4 Stakeholder Engagement

As part of the process of engaging with relevant stakeholders, Gatwick has consulted regularly with local highway authorities, the Highways Agency, TfL and the DfT. Dialogue is ongoing to develop the optimum approach to a corridor enhancement strategy for the A23 and M23. Issues for programme and funding will be central to future discussions, as will developing the design and business case for intervention.

In terms of the SATURN modelling described in this chapter, **the Highways Agency has stated that it “is content that traffic modelling of the strategic highway network is currently fit for purpose”.**

The wider importance of highway capacity and congestion to local stakeholders, notably the Gatwick Diamond Enterprise Area and Coast to Capital LEP as well as the local authorities, is also being considered as part of this ongoing

engagement, ensuring relevant proposals take full account of the sub-regional economy. Key issues for Gatwick and other stakeholders include:

- assessment of strategic routes to important community facilities, such as healthcare, employment and education;
- accident and delay “hotspots” reflecting existing problems, particularly those where Gatwick-related traffic is a contributor; and
- the potential for future congestion (both from background traffic and Gatwick-related traffic) to push demand onto unsuitable routes, with consequent local community and environmental impacts.

8.5 Overall Conclusions

Gatwick has excellent access to the strategic road network and the analysis indicates that, with committed schemes, 2040 flows with a second runway can be accommodated on the main routes currently used by airport traffic. Furthermore, committed schemes to increase capacity on the M23 and at the M25 Junction 7 will reduce traffic on parallel routes that have less capacity (for example the A217, A23 and A24), which will bring benefits along these parallel routes.

The following investment, at an estimated construction value over £350 million, is committed to address existing issues in this part of the strategic road network before 2025:

- M25 Dartford Free Flow crossing
- M25 Smart Motorways Jcn. 5-7
- M25 Jn7-8 controlled motorway
- M23 Smart Motorway Jcn. 8-10
- A23 Handcross to Warninglid

The greatest contribution from Gatwick airport traffic is experienced on the M23 and M25. Gatwick supports the Government’s commitment and investment and is working with the HA, DfT, West Sussex County Council and Surrey County Council through the M23 Route Based Study and wider consultation.

In addition to enhancement of the strategic road network, further improvements in terms of junctions and access around the airport are proposed, as discussed in Chapter 9 of this report. These include doubling capacity of Junction 9 of the M23 and realignment of the A23. The overall highway mitigation strategy in the M25 DFFC model is consistent with these improvements.

The overall impact of committed schemes with some local mitigation around the Airport, including capacity enhancement at Junction 9 of the M23, is to accommodate traffic flows with a second runway at Gatwick, alongside background growth to 2040, without the need for major elements of new strategic highway infrastructure.

The following are key conclusions from the capacity analysis:

- Capacity analysis has been undertaken to test the implications of different demand scenarios at Gatwick, assuming a single runway airport (Option 0) and the Masterplan option of a second runway (Option 3).

- **There is enough running lane capacity in 2040 on the M23 with committed schemes to accommodate both future growth at Gatwick and background commuter growth.** With the M23 Managed Motorway J8-10 (hard shoulder running), northbound and southbound capacity will be in the region of 8,000 vehicles per hour on the running lanes.
- By 2040, the number of background commuter trips northbound on the M23 towards the M25 increase by 25% to 5,200 per hour when compared to 2012. Airport users will add 1,600 vehicles at Junction 9 during the 2040 peak hour, generating a total of 6,800 vehicles. In the southbound direction, the number of airport-related vehicles in the peak is greater at 2,300 with additional background demand of 5,500 vehicles for a total of 7,800 vehicles.
- **Gatwick demand is only a percentage of overall traffic on the strategic highway network** – up to 28% of demand by 2040 on the M23 and up to 12% of demand on certain links on the M25. Demand on the M23 between Junction 9 and 9a is higher at up to 64%, or almost two thirds. This is intuitive given that this link is provided primarily for access to the airport itself.
- **Background growth on the M25 is a bigger contributor to future demand than a second runway at Gatwick**, comprising more than 88% of peak hour demand in 2040.
- A combination of committed strategic highway improvements and local mitigation is capable of meeting 2040 demand and allows further growth at the airport to 2050. Local mitigation around the airport includes upgrading M23 Junction 9, with plans to double its capacity through a new grade separated junction to handle the on/off traffic to the M23. Gatwick is meeting 100% of the cost of this. This upgrade is described in more detail in Chapter 9.
- The impact on local roads has been analysed and further modelling is being undertaken with reference to the West Sussex County Council traffic model.
- By 2040 in Option 0 (i.e. with a single runway), the strategic highway network shows a number of junctions with capacity constraints. This is primarily driven by background traffic growth with Gatwick less than a third of total demand. This demonstrates **the need for improvements to the highway network irrespective of a second runway at Gatwick.**
- For local roads where Gatwick is a contributor to increased traffic, Gatwick is proposing a Local Roads Development Fund for local authorities to draw upon for improvements.
- The Government's proposed strategic highway improvements will secure wider corridor and network benefits and will help to deliver better medium and long term accessibility between London and the South Coast.
- Gatwick has engaged a number of stakeholders throughout development of its future surface access strategy, including the Highways Agency. As part of that process, the **Highways Agency has stated that it "is content that traffic modelling of the strategic highway network is currently fit for purpose"**.

8.6 Summary Strategy

The above chapter describes the analysis which has gone into understanding the implications of growth at Gatwick on the capacity of the rail network. Gatwick is

working closely with stakeholders to support the business case for future improvements and to secure the earliest possible delivery of benefits to the wider community.

Gatwick's vision for connectivity on the strategic highway network in the R2 ASAS includes supporting committed schemes being brought forward by others and bringing forward planned schemes. These include the following:

- M23 Smart Motorway with hard shoulder running (committed).
- Dartford Crossing Free Flow Tolling (committed and scheduled to open in October 2014).
- M25 Jn 5-7 Smart Motorway (committed).
- Supporting the Highways Agency Route Based Strategies for the M25, M23 and A27.
- Doubling capacity at M23 Junction 9 and better links to the A23 (as described in Chapter 9).
- Extra junction capacity at the airport terminals (as described in Chapter 9)
- Diverting the A23 to the east of the airport (as described in Chapter 9).
- Providing a Local Roads Development Fund for local authorities to draw upon for road improvements.

Gatwick's target is to deliver a 15% reduction in mode share for air passenger private car journeys and 10% mode share reduction in single occupancy car journeys by staff by 2040.

9 Assessment of Transport Effects: Local Roads and Access to Gatwick

Executive Summary

- The road network around the airport delivers connectivity between local communities as well as serving Gatwick. It comprises the M23 between Junction 9 and Junction 9a, the main north-south artery – the A23 – which also has a wider area function, as well as a number of local roads, most of which are of lower capacity.
- **The future road network has been designed to accommodate flows out to 2040 and even out to 2050 at a conservative mode share assumption. Modelling shows that delays on the future network will be better than today given capacity increases through grade separation and realignment.**
- When considering future growth at Gatwick, key features of the design of new road layout around the airport include:
 - Providing more capacity at M23 Junction 9 and better links to the A23.
 - Realigning the A23 to the east of the airport to separate out airport traffic from through traffic and thus safeguard journey times for both sets of users.
 - Providing separate junctions for the airport terminals off the A23 as well as providing access to the Gatwick Gateway (as described in Chapter 11).
 - Delivering safe, reliable and easy to follow routes.
 - Consolidating cargo and logistics deliveries in a single location to reduce transport impacts, minimising goods traffic travelling on the local road network in peak periods and giving direct access onto the A23 and M23.
 - Delivering better access and benefitting local communities, including realigning Balcombe Road as a local road with connection to Antlands Lane. This will also help safeguard journey times for local trips.
 - Preventing an increase in traffic through Charlwood by closing Lowfield Heath Road.
 - Developing a Local Highway Development Fund which Local authorities can use to help improve the local road network where Gatwick is one of a number of contributors to traffic.
 - Building in better pedestrian and cycling routes and facilities – these are described in more detail in Chapter 10.
- **Modelling of Option 0 shows that there is the need for mitigation and network enhancement even without a second runway at 2030, owing to background commuter traffic.** Improvements are required to remove capacity issues between M23 Junction 9 and 9a, at the North and South Terminal roundabouts and the Longbridge Roundabout. **The required improvements include increased capacity at M23 Junction 9 and realignment of the A23.**

- **With network improvements, analysis of Option 3 at 2040 shows travel times to the North Terminal and South Terminal to be generally equal to or better than existing.**
- The mode share assumption underpinning the local highway and access analysis assumes the current mode share maintained into the future. Gatwick's R2 ASAS target is for 60% of passengers and 40% of staff to access the airport by public transport in the future. **Therefore modelling has been undertaken on the “highest impact” case.**
- Even assuming the current mode share (~60% of passengers arriving at Gatwick by car), overall 2040 proposed road network performance will be broadly comparable with existing conditions. This includes average delays across the whole network.
- The road network has been developed based on future growth at the existing mode share. When Gatwick reaches its target of a 60% public transport mode share for passengers and 40% public transport mode share for staff⁵, the related reduction in vehicle volumes on the road mean that network performance will improve and become more resilient to change.
- For car parking, the Option 3 Masterplan has been designed to deliver the best possible passenger experience and increase value and efficiency while meeting sustainability objectives, including 'yield management' measures to maximise use of long stay and staff parking and reducing Kiss and Fly.

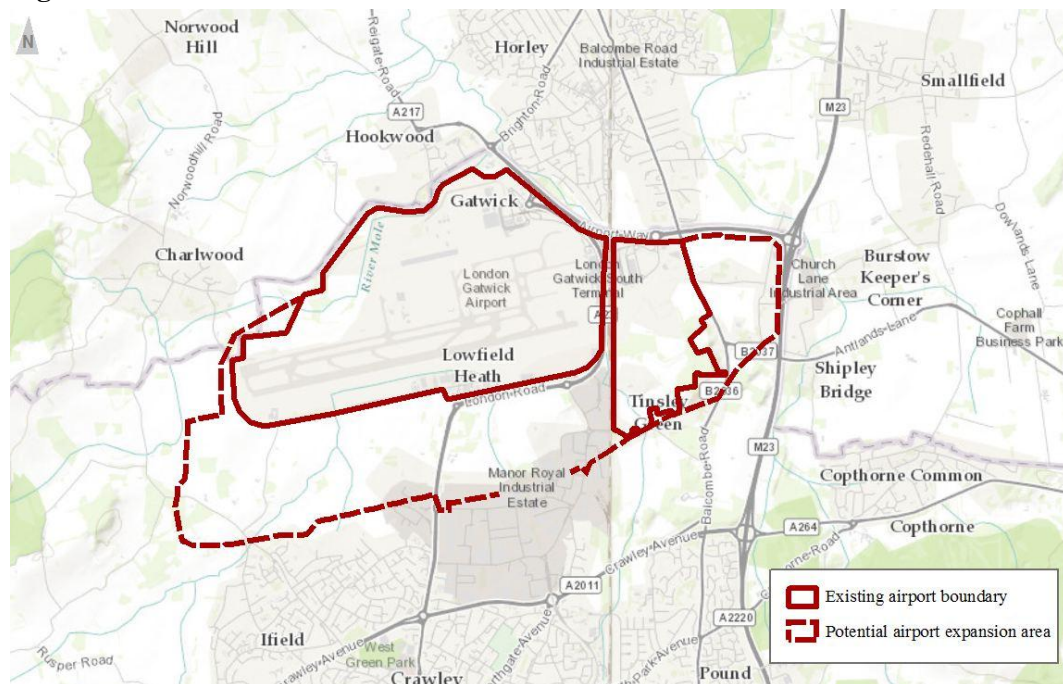
9.1 Introduction

Access and linkages from the M23 and A23, as well as from local roads in the vicinity of the airport, are an important element of Gatwick's R2 ASAS and associated connectivity strategy. These elements are discussed in this chapter of the surface access technical report.

The road network around the airport delivers connectivity between local communities as well as serving Gatwick. It comprises the M23 between Junction 9 and 9a, the main north-south artery – the A23 – which also has a wider area function, as well as a number of local roads, most of which are of lower capacity. These local roads provide connectivity for local towns, accessibility for local villages and a small number of through routes as part of a predominantly inter-urban or semi-rural network. The A23 provides connections into the strategic highway network, which support the wider airport access catchment.

Figure 9.1 shows the road network in the area around Gatwick including connection to the M23 motorway, showing both the existing airport boundary and potential expansion area as context for the analysis.

⁵ 50% total, generated by an additional 10% mode share reduction in single occupancy car journeys by staff by 2040.

Figure 9.1: Local road network around Gatwick

The distribution of traffic on these roads is determined by the surrounding land uses and access points to airport facilities. The A23 represents an important north-south strategic route as well as providing local access, and currently bisects the airport. It has an important local role connecting Crawley to the south to Horley to the north of Gatwick. Crawley is the largest nearby town and its centre lies approximately 4km south of Gatwick's South Terminal. North of Crawley but south of the airport is the Manor Royal Business District, supporting over 30,000 jobs in both airport-related and non-airport commercial and light industrial employment.

Immediately north of the airport is the smaller town of Horley, which has approximately a third of its working population employed at Gatwick, Manor Royal or Crawley. A further 7km north of Horley are Reigate and Redhill, including East Surrey Hospital, which has a catchment area for accident and emergency care, paediatric surgery and maternity units that covers Crawley and Horsham. Access to East Surrey Hospital via the A23 is an important consideration for connectivity and accessibility.

There are a number of local villages, including Charlwood to the west and Copthorne and Smallfield to the east, which are served by local roads but these routes are mainly of low capacity and rural in nature. The principal local routes are orientated in a north-south direction to connect the main towns.

The South Terminal of Gatwick sits adjacent to Junction 9a of the M23. Access to the Airport from the motorways is signed via Junction 9 only⁶. The road network is configured assuming this is the main route to access both the North Terminal and South Terminal. Direct access to the M23 at Junction 9a means that Gatwick South Terminal is just 7 to 8 minutes' drive from M25 Junction 7 via the M23.

⁶ Junction 10 is located further south and is principally used for access to and from Crawley.

In relation to road traffic flows and accessibility requirements, the existing local road network provides connectivity and capacity for current demand but there are a number of issues to be addressed in the future.

These include the following issues:

- The A23 between Crawley and Horley performs competing functions and combines access to and from Crawley, access to Manor Royal Business District and direct airport access for passengers and employees. These competing uses have implications both for capacity and resilience.
- Providing access to the airport from the A23 results in a number of indirect and circuitous movements that involve u-turns and extended mileage at the South Terminal and North Terminal roundabouts.
- Some local routes are congested in peak periods as a result of increasing demand and constraints on capacity within existing alignments.
- Local roads away from main routes are used as alternative routes to avoid congested parts of the network in peak periods and are unsuited for the volume and type of traffic using them (e.g. Balcombe Road and Antlands Lane).

This chapter analyses the local roads and access to Gatwick against demand generated by Option 3 as well as growth in background traffic around the Airport. It recognises the existing constraints highlighted above and also the impacts of increased traffic to and from the airport as a result of expansion.

9.2 Background

To assist in identifying future road network requirements, a series of broad design principles were developed to guide the road strategy around Gatwick. These principles demonstrate alignment with The Commission's evaluation criteria and are consistent with the R2 ASAS as follows:

- Enhance the airport customer experience;
- Where possible, maintain or improve on current journey times and delay;
- Separate where possible airport-related traffic from A23 through traffic to reduce interaction and potential delays as well as to improve access for airport passengers;
- Improve network resilience to incidents and unexpected situations;
- Improve safety for pedestrians, cyclists and all road users;
- Improve wayfinding for airport passengers;
- Maintain local community and business access;
- Provide for emergency vehicle routes; and
- Reduce conflicts between pedestrians and motor vehicles.

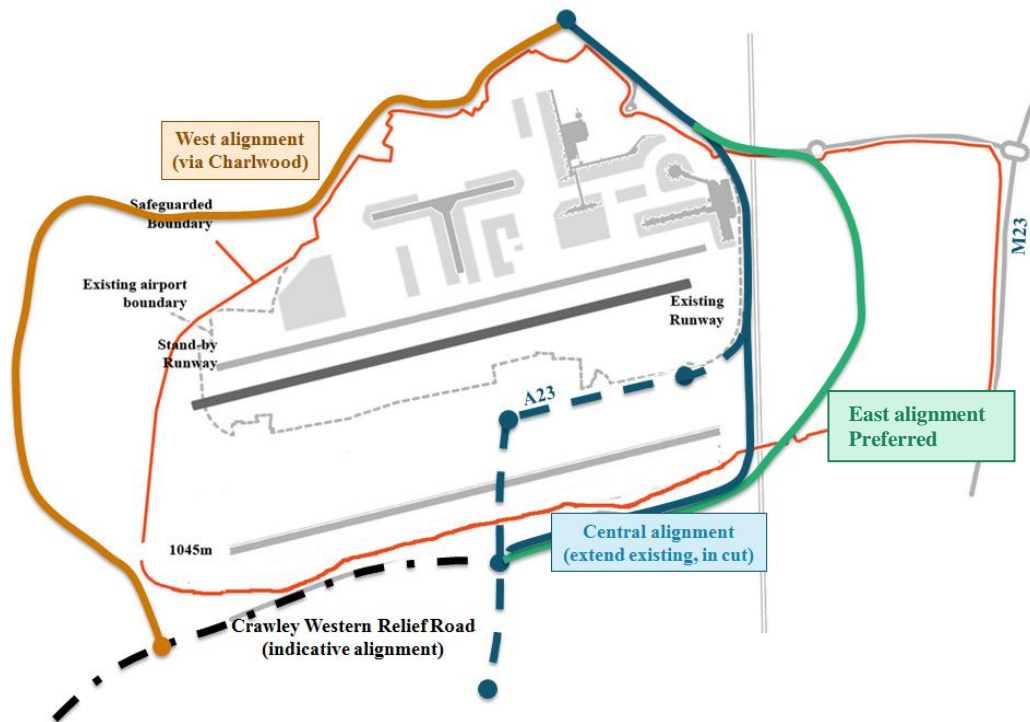
These principles have been used to guide development of a future network which responds to demand changes in the future at Gatwick.

9.2.1 A23 Alignment

Future demand growth with a second runway at Gatwick requires diversion of the A23. Three A23 alignment options have been considered as shown in **Figure 9.2**:

- East alignment: A23 diverted to the east side of the railway line;
- Central alignment: A23 extended further south in cutting; and
- West alignment: A23 diverted to the west side of the airport boundary.

Figure 9.2: A23 diversion alignment options



A high level assessment of each alignment option was undertaken and reviewed against the criteria set out in **Section 9.1**. Based on this appraisal, the eastern alignment was considered the preferred route as it provided the better solution in terms of connectivity, impact on non-airport traffic, network resilience and orientation to airport expansion. This is an important conclusion for the subsequent choice of airport access strategy and delivery of required capacity. This has been discussed with local authorities, West Sussex Police, bus operators and Gatwick Diamond.

9.2.2 Access to the M23

The signed route for access between the motorway and the airport is via the M23 at Junction 9 and 9a, with direct access to both South Terminal and North Terminal. This is the preferred “gateway” for access to Gatwick by road and is consistent with the current wayfinding strategy. It should be noted, however, that some traffic from the south could access the airport via Junction 10 as an alternative route. Currently, this is not as attractive and is a longer route in distance and time. As the orientation of the airport expands to the south it will be

important that the main airport access remains attractive and that the potential for trips to be drawn towards Junction 10 is addressed.

Acknowledging these two access routes from the M23 via Junction 9 or 10 is important in the context of available capacity, wayfinding and signage, competing demands on each route and future network development. The main access junction at M23 Junction 9 is the most direct and straightforward route to the airport and caters for over 80% of traffic accessing the airport, with most travelling to or from the north. It also allows for consistent wayfinding for each terminal, between terminals and to access airport facilities (such as car parking). The following is also relevant when considering routes from the M23 to the airport:

- Junction 9 principally serves Gatwick and Horley (plus surrounding villages) with no fourth arm to the junction and therefore no additional access from the east of the motorway.
- Manor Royal and other employment sites to the east of Crawley are reliant on Junction 10 for access.
- Crawley has two routes for access from the M23 to the Town Centre – Junction 10, a four arm junction to the east, including the A264 from East Grinstead and Junction 11, a three arm junction to the south with one minor access at Pease Pottage, which is also the main access for Horsham.

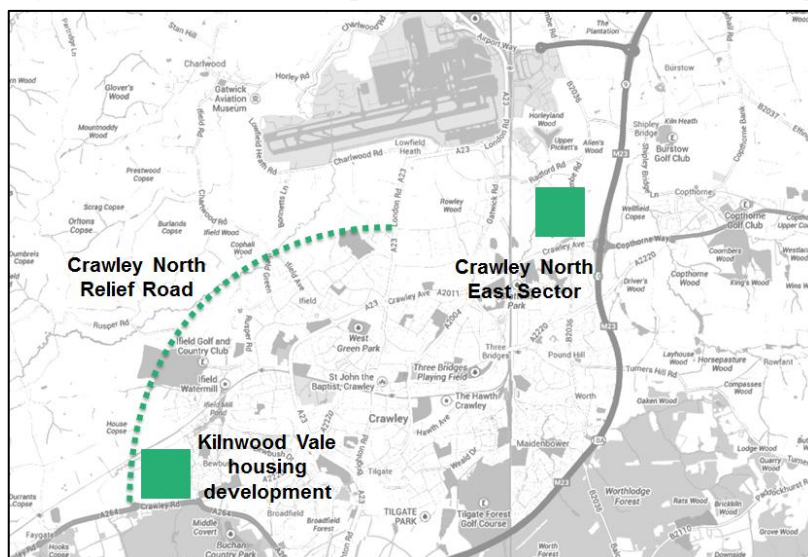
In considering access from the M23, a number of options were considered, these included a new junction between Junction 8 and 9 on the M23, expanding the capacity at Junction 9 on the M23, and an additional access between Junction 9 and 10 on the motorway. Following a high level appraisal and discussions with the Highways Agency, it was agreed that expanding capacity at M23 Junction 9 was the preferred option.

Therefore, the analysis focuses on determining the optimum solution for M23 Junction 9 given estimated future demand. The relevance of M23 Junction 10 for other local traffic, including new development, indicates that this should not be a signed or priority route to Gatwick except to provide access in the event that an incident affects other access routes.

9.2.3 Local development around Gatwick

At a local level, there are three further developments with associated highway improvements, worthy of note and shown in **Figure 9.3**.

Crawley North East Sector – The development is proposed to comprise 1,900 homes, 5,000 square metres of office and industrial floor space, 2,500 square metres of retail activity, open space, a new primary school and a community hall. This will be located along Balcombe Road, north of Crawley Avenue and south of Radford Road. The development plan assumes new junctions on Balcombe Road and some localised speed management to reflect the new development. The site lies to the south east of the safeguarded area for Gatwick development. Outline planning permission was approved in February 2011. The development will be completed in four phases with the first homes planned for construction in 2014 with full development expected to be completed by approximately 2025. A series of local junction and access improvements are proposed to serve the development and accommodate increased local traffic.

Figure 9.3: Potential development in the vicinity of Gatwick Airport.

Associated with the Crawley North East Sector development are a number of local highway improvements that are the subject of planning conditions for the approval of the development plan. These improvements include:

- A2011 Crawley Avenue and associated junctions;
- Changes to Balcombe Road; and
- Provision of cycle and pedestrian routes.

These proposals will not change the overall capacity of the A2011 between M23 Junction 10 and the A23 at Tushmore Roundabout, or Balcombe Road. However, they will improve the operation of key junctions and provide additional off-road cycle facilities.

Kilnwood Vale housing development – up to 2,500 homes are to be built near Bewbush, to the north of Horsham Road on the western edge of Crawley. The site works involve new junctions on the A264 Horsham Road (currently under construction). Kilnwood Vale will be directly connected to Gatwick Airport via existing Fastway bus services but will not be affected by proposals for expansion at Gatwick. The development began construction in late 2012.

Crawley North West Relief Road (preliminary plans only) – West Sussex County Council has developed preliminary plans for a new highway link to relieve traffic congestion on the A23/A2220/A264 route through Crawley towards Horsham. The link, which currently has no planning status, would create an outer relief road to the north west of the town from the A264, west of the new Kilnwood Vale development to meet the A23 close to Fleming Way. The road alignment would pass close to the southern boundary of the safeguarded area for Gatwick expansion.

9.3 Assessment approach

The following section summarises the adopted approach to assessing the effect of future demand (both airport and non-airport) on the current network and proposed mitigation and improvements to the network. Capacity modelling has been

undertaken on the network and the main access routes to the airport in the morning and afternoon peak periods, for background commuter and airport traffic, to understand the following:

- the existing and future traffic conditions around Gatwick assuming no change to the existing network;
- constraints and opportunities for additional capacity; and
- the suitability and capacity of proposed highway enhancements tested in terms of journey time and delay.

For all of our modelling, we have taken the approach of **testing the most conservative or “highest impact” case for each mode.**

2040 busy day airport schedule data has been incorporated into matrices corresponding to demand on transport networks for a **future 2040 busy day in September.**

As per the strategic highways modelling reported in Chapter 8, the **road network modelling around Gatwick has been undertaken on the “highest impact” mode share, namely the current mode share of 60% of passengers accessing the airport by car maintained to 2040.** This does not reflect the enhancements in rail and public transport capacity and connectivity which form part of the R2 ASAS and will drive a much higher mode share for public transport.

In addition, **modelling has stress-tested surface access networks assuming another decade of growth to 2050** in order to demonstrate resilience in the networks for even more future growth.

Accordingly there is **high degree of confidence in the modelling analysis and the network that has been developed.**

9.3.1 Demand

The assessment uses the forecast growth in airport demand as described in Chapter 5.

As for the rail and strategic highways modelling reported in Chapters 6 and 8, a lead time for departing passengers and a lag time for arriving passengers has been incorporated into the method for estimating surface access trips on the road network in the AM and PM peak periods.

For airport staff car trips, both the number of employees and their shift patterns, recorded for the 2012 Gatwick Staff Travel Survey, have been taken into account to estimate the daily number of vehicles. **Table 9.1** summarises the total number of vehicles on the highway network corresponding to air passenger and employee trips for each option in 2040 as compared with 2012.

Table 9.1: Total employee and air passenger vehicle traffic volumes for each option.

Option	Year	AM Peak Hour		PM Peak Hour	
		To Gatwick	From Gatwick	To Gatwick	From Gatwick
<i>Existing</i>	<i>2012</i>	<i>2,150</i>	<i>1,500</i>	<i>1,600</i>	<i>2,250</i>
<i>Option 0</i>	<i>2030</i>	<i>2,600</i>	<i>1,600</i>	<i>1,850</i>	<i>2,300</i>
Option 0	2040	2,650	1,600	1,900	2,400
Option 3	2040	4,200	2,800	2,900	3,850

All future air passenger and staff movements using highway modes have been converted to vehicle trips by using observed vehicle occupancy rates for current air passengers and employees – which is conservative as it assumes no change into the future. The assessment of capacity is based on meeting vehicle demand assuming the same levels of occupancy.

Figure 9.4 and **Figure 9.5** show how the expected traffic growth for airport related trips (including air passengers, employees and goods) for Option 3 in 2040 compared with 2012 in terms of its contribution to overall traffic flow during the AM and PM peak hours. It can be seen that the majority of trips on the network comprise background traffic as opposed to airport-related demand.

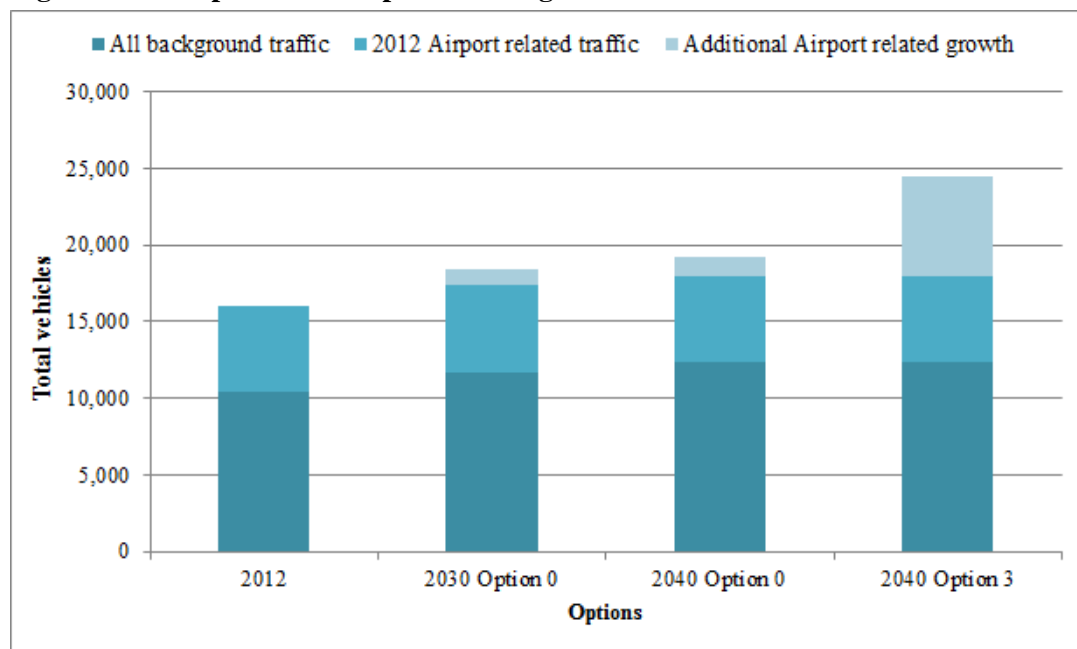
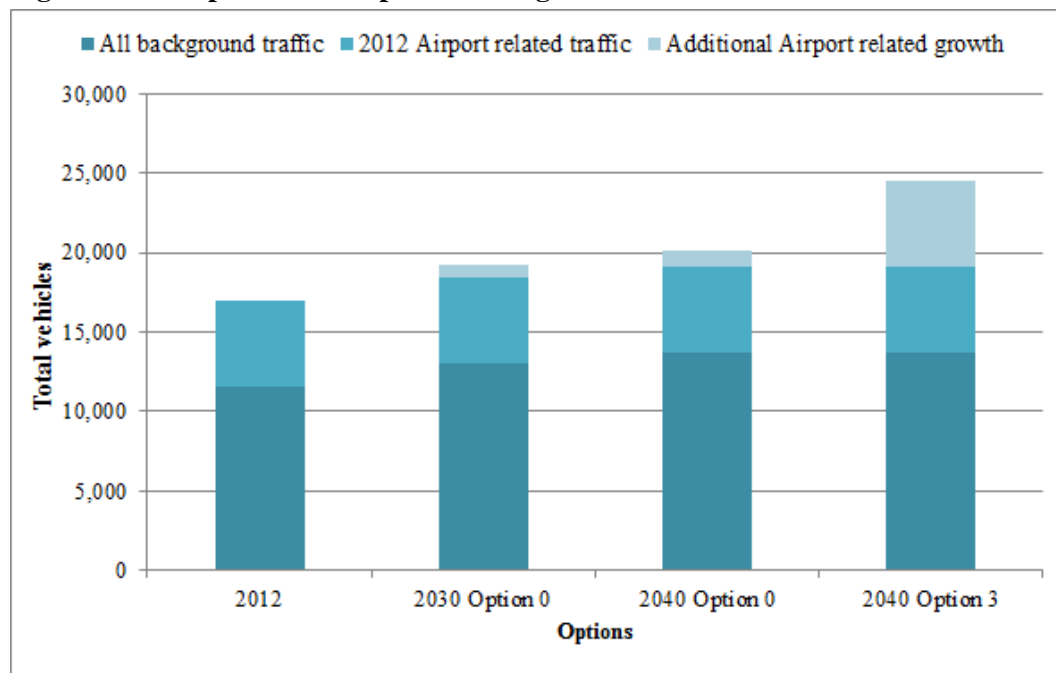
Figure 9.4: AM peak hour airport related growth

Figure 9.5: PM peak hour airport related growth

Overall vehicle demand combines airport-related demand, generated using this approach, and background growth in non-airport traffic, defined using approved assumptions for annual growth

The level of background growth has been estimated using TEMPRO, the Trip End Model Presentation Program, developed by the DfT. TEMPRO predicts approximately 25% growth in background traffic between 2012 and 2050.

The assessment therefore considers how the network will manage the assignment of all vehicles, and what extra capacity may be needed to accommodate the predicted growth.

9.3.2 Local Traffic Assessment Model - Extents

The area included in the assessment of highway operational conditions is shown in **Figure 9.6**. This covers the network from Junction 9 of the M23 west to the A217/Povey Cross Road roundabout and along the A23 London Road from the A217 southwards as far as Old Brighton Road South. It includes both the North terminal and South Terminal access junctions.

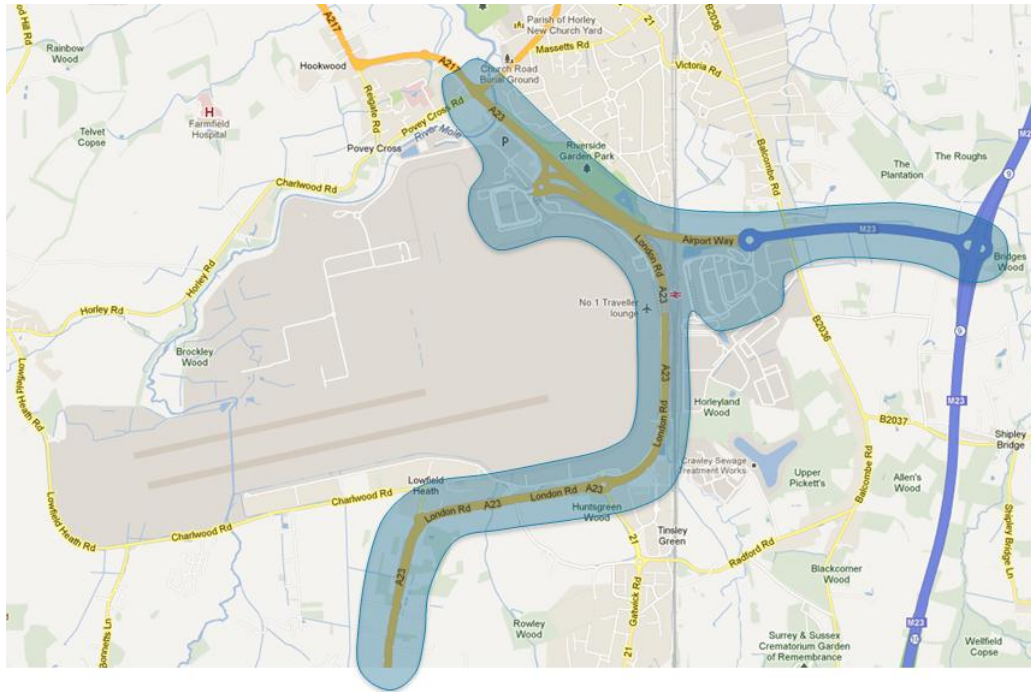
To estimate the impact of additional traffic on the road network, a local traffic assessment model has been created that represents all relevant highway links, lanes and junctions, using an industry standard tool for modelling road networks in the UK. The local highway assessment modelling was validated to represent 2012 conditions based on a comprehensive set of traffic counts. Estimates of future conditions are based on a similar distribution of traffic with a series of assumptions to correspond to expected trip behaviour.

The road vehicle traffic on this network includes the following:

- Air passenger, employee and goods traffic accessing to and from the airport from the northwest (A23/A217), northeast (M23) and south (A23);

- Through traffic on the A23 and traffic between either Crawley or Horley and the M23 at Junction 9; and
- Short distance trips, mostly associated with the airport, that use the A23 locally.

Figure 9.6: Extent of the Gatwick Airport Local Traffic Assessment Model



The approach and main assumptions used are summarised as follows:

- The model uses a matrix of trips with many distinct origins and destinations (points on or around the network where traffic enters or exits the model) to ensure that demands for different movements within the network are adequately represented.
- The model allows traffic flows to be assigned dynamically to the network to represent the effects of re-routing if congestion occurs.
- Option 0 and 3 were run for the AM peak period (0700-1000) and PM peak period (1600-1900) allowing traffic to build-up before the peak hour, identified as 0745-0845 and 1700-1800 for the AM and PM peak hours respectively.
- The model includes different trip types, representing airport and non-airport related traffic with different journey purposes or characteristics (e.g. private cars and commercial vehicles are identified separately).
- **Vehicle occupancy (passengers per vehicle) and overall transport mode share for background traffic in future years is assumed to remain as at present i.e. is very conservative.**

9.4 Existing road network assessment

Initial analysis was undertaken on the existing road network for Option 0 assuming a single runway at 2030 and background traffic growth on the road network around Gatwick. This approach enabled an evaluation of how the

existing network would perform against estimated demand growth irrespective of a second runway.

The key results of the analysis were as follows:

- 2012 conditions – Currently the existing network operates adequately with approximately 42 seconds of average delay per vehicle across the network.
- 2030 Option 0 – Delay in excess of three minutes is expected by 2030 assuming the existing road network with no changes, indicating that highway improvements will be required before 2030.

The existing road network does not provide appropriate capacity for potential future flows at various locations as follows:

- Congestion occurs at the South Terminal roundabout as a result of insufficient capacity especially on the eastern approach from the M23. Queues extend back to Junction 9 impacting traffic on the M23.
- At the North Terminal roundabout, vehicles find it increasingly difficult to exit the North Terminal on Northway owing to the large amount of traffic turning right from Airport Way to the A23.
- Delays at Longbridge Roundabout increase owing to the increase in background traffic and the number of u-turning vehicles leaving North Terminal wishing to travel south on the A23.

These results indicate that the existing local road network is unable to accommodate forecast levels of airport and non-airport traffic in 2030 with the existing single runway.

9.5 Highway Improvement for Option 3

Given the constraints identified for the existing network, a number of alternative highway concepts were developed and analysed using modelling in order to generate a preferred highway network concept that could meet demand growth in Option 3, both at 2040 and out to 2050.

9.5.1 Design principles

The design principles which informed the development of the preferred highway network concept include:

- Providing at least two lanes in each direction for the A23 (i.e. maintaining existing capacity);
- Aiming to provide no more junctions on the A23 traffic than exist at present, to minimise the potential for additional delay;
- Seeking to reduce the number of locations where traffic needs to ‘weave’ between entry and exit slip roads, by providing earlier decision points as traffic enters and exits the airport area and by “streaming” traffic;
- Providing free-flow routes within junctions and interchanges where possible, and thus reducing the complexity of the network for all users;
- Enhancing cycling and walking routes – as described in Chapter 10.

The highway network proposals are at an appropriate level of design i.e. Masterplan concept stage, sufficient to demonstrate feasibility and suitable for comparison with the existing network in terms of delay and journey time but excluding engineering design assessments. This level of detail still enables the order of magnitude of the improvements required to accommodate airport growth to be identified. As the R2 process develops, more detailed design will be undertaken in conjunction with the Highways Agency.

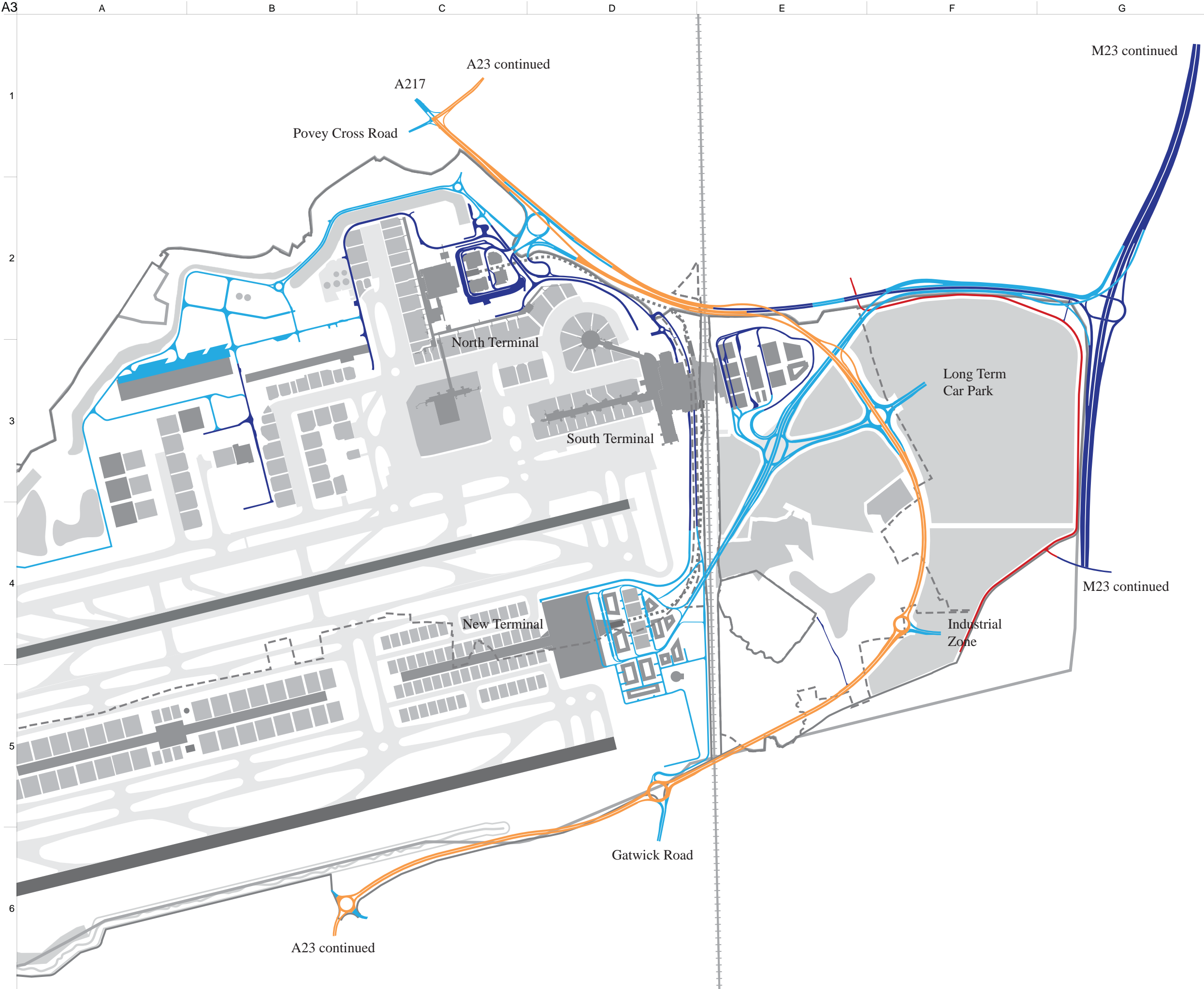
The highway network concept has been developed in accordance with the standards contained in the Design Manual for Roads and Bridges (DMRB). The general design assumptions and principles include:

- Horizontal road design and speed limits to urban road standards;
- Merge and diverge arrangements;
- The minimum distance between merges and diverges;
- The desirable maximum road gradient; and
- A minimum headroom clearance to any new structure.

These assumptions are considered suitable for the development of a concept arrangement to meet the required capacity. The design assumptions are being discussed and agreed with the local Highway Authority and with the Highways Agency.

9.5.2 Highway improvements

An highway network concept has been developed for Option 3 which includes necessary mitigation and improvements to achieve appropriate journey times, as shown in **Figure 9.7**. The network has been developed to meet 2040 requirements but also to provide appropriate capacity up to 2050 demand.



Legend

- A23 Diversion
- Balcombe Road Diversion
- Existing Roads (retained)
- New Upgraded Roads

1.1	04/11/13	MP	PFR	EW
Issue	Date	By	Chkd	Appd

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Client
Gatwick Airport Ltd.

Job Title
Gatwick Airport R2
Development Options

Figure 9.7
Road Network for Option 3

Scale at A3 1:25,000

Discipline Aviation

Job No Drawing Status
Confidential

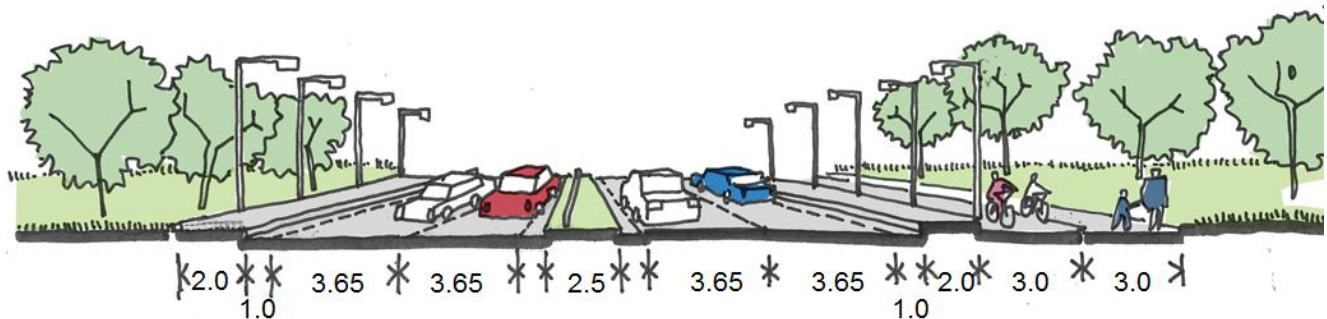
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Issue
1.1

Highway improvements include:

- Doubling the capacity of the M23 Junction 9 including slip road widening and a new grade separated flyover;
- The M23 between Junction 9 and 9a increased from two lanes in each direction to four lanes and five lanes in the eastbound and westbound directions respectively;
- Airport Way increased from two lanes in each direction to four (including constructing a new bridge over the railway lines);
- The A23 realigned to the east of the airport and provided as a dual carriageway with two lanes in each direction;

Figure 9.8: Cross-Section through the A23



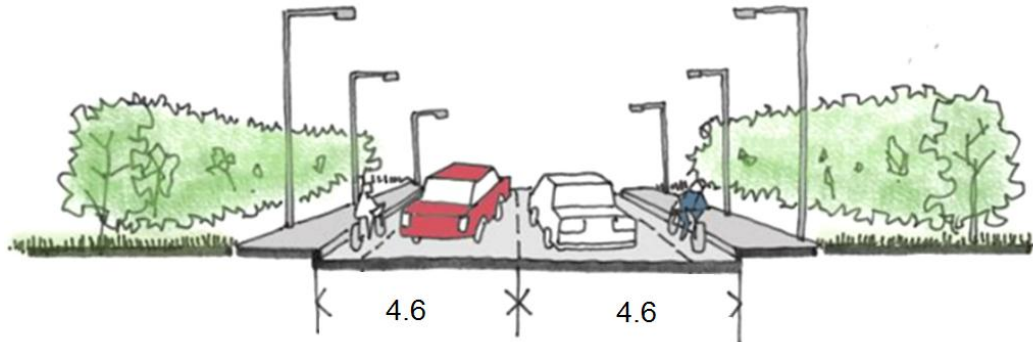
- A new high capacity interchange for the A23 with direct access to and from airport parking facilities;
- A new A23 junction for access to/from the industrial site east of the A23;
- Capacity improvements at the existing North Terminal roundabout to provide a new junction with greater capacity;
- Grade separation at some locations to achieve free-flowing interchanges.
- Dual carriageway for traffic accessing the New Terminal including a new road bridge over the railway line; and
- New high capacity interchange for the South Terminal with direct access to and from the A23 in both directions.

As well as improvements for airport traffic and background growth, Option 3 will affect other local roads that will require re-provision or mitigation:

- A short diversion of Ifield Road, close to Ifield Court, is required to accommodate the new runway;
- The roundabout at the junction of A23 / A217 / Povey Cross Road, often called Longbridge Roundabout, will also require improvements to increase capacity;
- A new junction from Gatwick Road to the new A23;
- Balcombe Road and its connection with Antlands Lane will be re-provided to connect local communities. It is proposed that the new alignment lies to the east, closer to the M23 at the new boundary of the airport site. There will be

no connection from Balcombe Road to the A23 or the terminals to prevent “rat-running” and to reduce congestion;

Figure 9.9: Cross-Section through Balcombe Road



These proposals will provide benefits for the local communities as well as improving access to the airport to meet future needs. The changes to the A23 and Balcombe Road will have a direct impact on accessibility and the mitigation strategy ensures that connections will be re-provided to allow these routes to maintain their function to distribute local traffic.

This road network achieves the stated objectives and delivers a similar level of service to current conditions despite the additional background and airport growth. Whilst this is not necessarily the final design, it is indicative of the level of additional capacity required to achieve this level of service. The direct beneficiaries of these improvements will be the following:

- Passengers and staff at the airport;
- Communities and businesses of Crawley and Horley served by the A23;
- Local bus services travelling between Crawley, Gatwick Airport and Horley; and
- All traffic using M23 Junction 9.

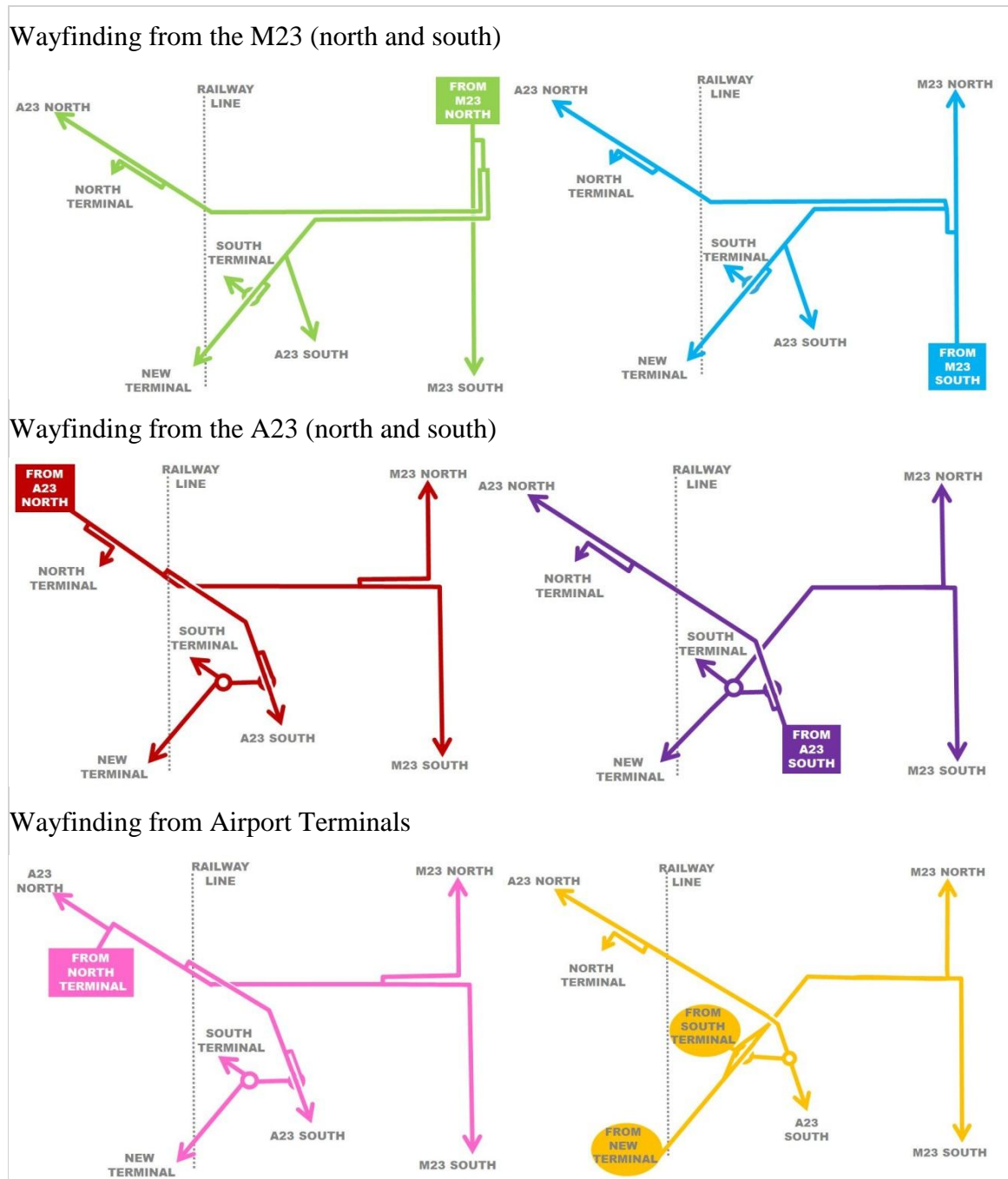
The design of the road network caters for airport growth up to 2050 and accommodates background growth. The investment in local highway improvements is considered a significant economic benefit for the local area.

We have consulted with local planning and highway authorities and understand the relevance of traffic associated with the airport over a wider area within local authority control. Some redistribution of traffic is expected as a result of airport and background traffic growth. This will be the subject of further detailed modelling to agree a wider mitigation strategy that balances the needs of the local community with accessibility for the airport. The intention is that a programme of prioritised schemes will be developed in consultation and Gatwick will assign a sum of money for local authorities to draw on, subject to agreement and programming. This will be called the Local Highways Development Fund.

9.5.3 Traffic routes and wayfinding

Figure 9.10 represents the traffic routes and wayfinding on the mitigated network for the principle movements to and from the airport and along the A23. The wayfinding strategy ensures that the routes defined for the main traffic movements, both to the airport and for non-airport traffic, are intuitive and could be adequately signed.

Figure 9.10: Key movements and wayfinding with indicative mitigation



In the existing network the following movements cannot be made directly and are therefore improved with the mitigated road network:

- A23 south to South Terminal;
- A23 north to North Terminal; and
- M23 Junction 9 to A23 north and A23 south, which currently passes via North Terminal roundabout.

9.5.4 Analysis of Proposed Mitigation

The performance of road network has been assessed in terms of:

- Network performance using the metric of average vehicle delay; and
- Travel time results.

As noted earlier in this chapter, all of our modelling has been based on **testing the most conservative or “highest impact” case for each mode.**

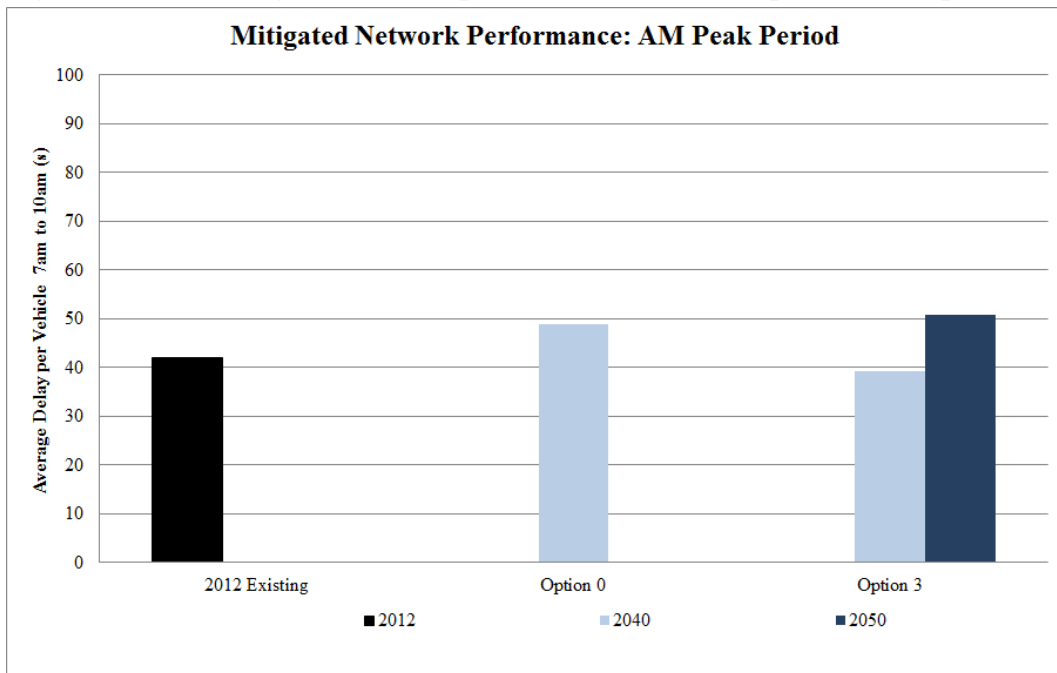
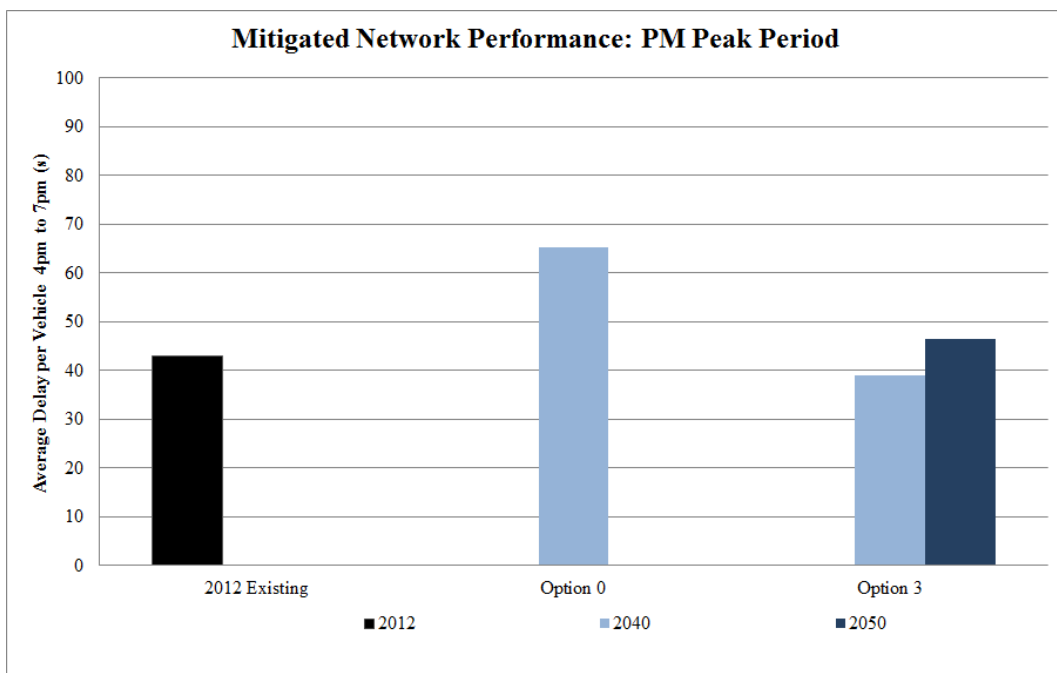
2040 busy day airport schedule data has been incorporated into matrices corresponding to demand on transport networks for a **future 2040 busy day in September.**

Road network modelling around Gatwick has been undertaken on the “highest impact” mode share, namely the current mode share of 60% of passengers accessing the airport by car maintained to 2040. This does not reflect the enhancements in rail and public transport capacity and connectivity which form part of the R2 ASAS and will drive a much higher mode share for public transport.

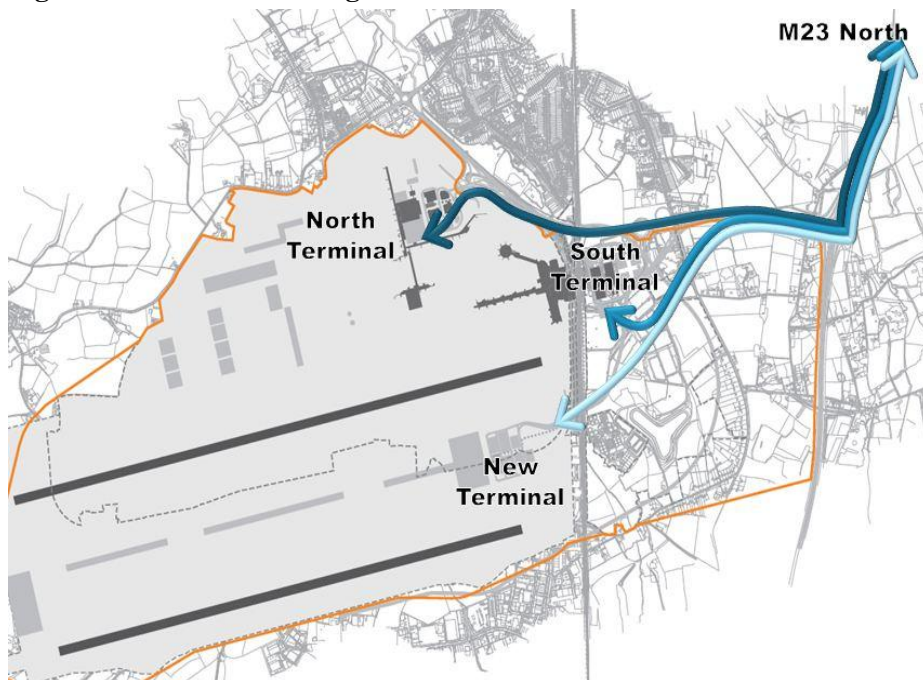
Figure 9.11 and Figure 9.13 show the overall average network performance in terms of delay in the AM and PM peak period for Option 0 and 3. The road network used for Option 0 included capacity improvements as described in **Section 9.4.2.** This is the average delay experienced by all vehicles modelled across the local network.

The results of the analysis are as follows:

- For the 2040 and 2050 AM and PM peak periods, the proposed highway network concept is estimated to have comparable delays to those experienced in 2012 on the existing network. The proposed concept therefore mitigates the potential delays inherent in the 2012 network.
- **The proposed highway network can satisfactorily accommodate forecast demands for Option 3 and background growth in the 2040 and 2050 AM and PM peak periods,** operating with relatively low average delays per vehicle ranging between approximately 38 seconds and 51 seconds.
- **The proposed network enhances connectivity.**
- As discussed in section 9.6, **this level of delay reduces still further when modelling the R2 ASAS mode share target of 60% of passengers and 40% of staff by public transport.**

Figure 9.11: AM mitigated network performance for 2012, Option 0 and Option 3**Figure 9.12: PM mitigated network performance for 2012, Option 0 and Option 3**

In addition to delay data, travel time segments between the M23 North (north of Junction 9) and the three airport terminals have been assessed as shown in **Figure 9.14**.

Figure 9.13: Travel time segments

The results for Option 3 (with the greatest increase in traffic) are summarised in **Figure 9.14** for the AM peak hour and **Figure 9.15** for the PM peak hour. The colours used for each route match those shown in **Figure 9.13** for ease of reference. Travel times have been measured on routes which are 3.3km, 4.1km and 4.0km long between the M23 north of Junction 9 and the South Terminal, North Terminal and New Terminal respectively.

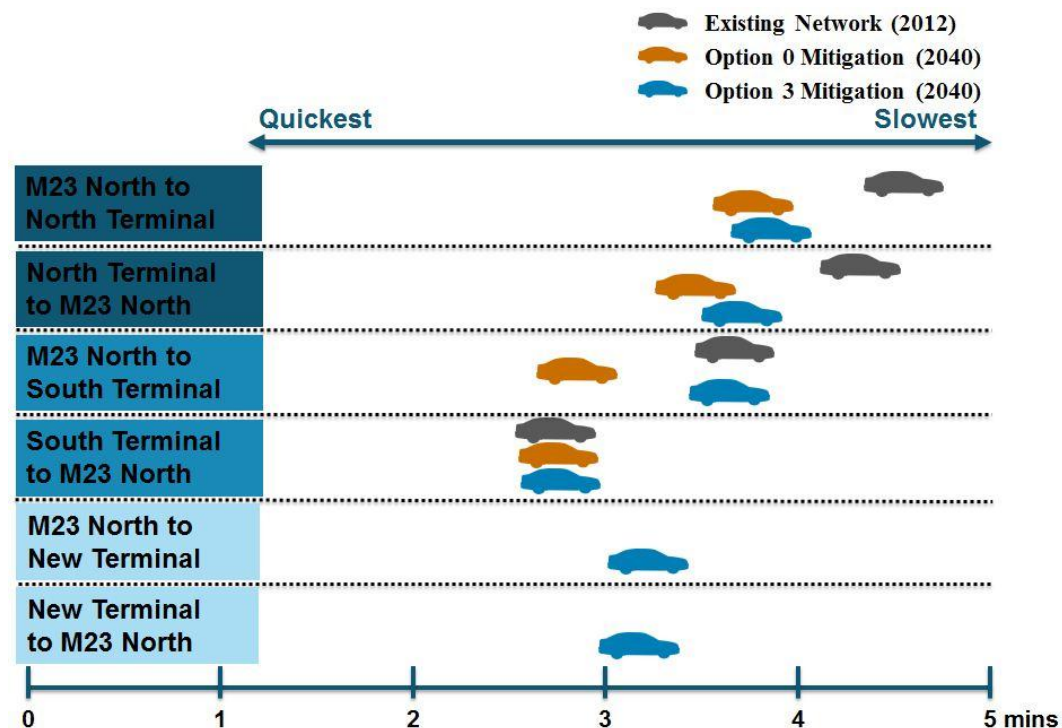
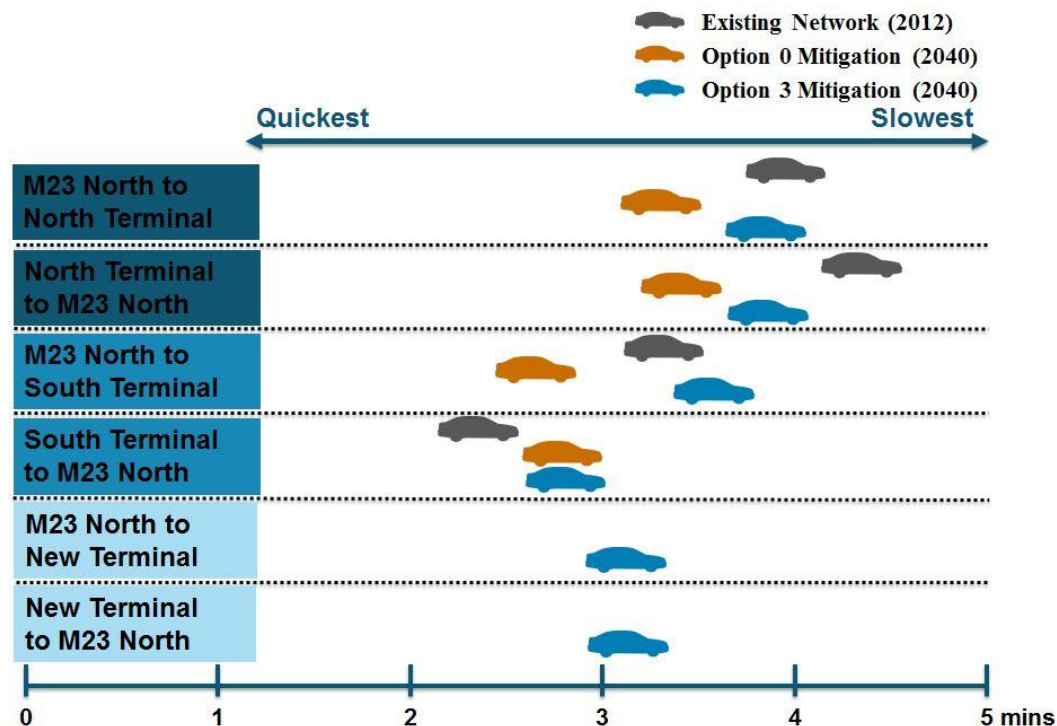
Figure 9.14: AM peak hour travel time results for Option 3

Figure 9.15: PM peak hour travel time results for Option 3

The key travel time results are as follows:

- M23 North to / from North Terminal:** With the revised network, travel times for Option 3 in 2040 are improved when compared to existing conditions for both the AM and PM peaks.
- M23 North to / from South Terminal:** The total travel distance to access the South Terminal is slightly longer in the revised road network but owing to network improvements motorists experience less delay. The total travel times are expected to be similar in the AM peak between 2012 and 2040 Option 3. Journey times are approximately 20 seconds longer in the PM peak hour for 2040 Option 3 when compared to 2012 owing to higher background traffic. Further enhancements including signal timing optimisation would eliminate this.
- M23 North to / from New Terminal:** In the revised road layout, traffic conditions are free flow from the M23 to the New Terminal with no delays at junctions. Therefore, despite being further away from the M23 when compared to the other terminals, travel times to the New Terminal are less than travel times to the other terminals.

In addition to the M23, modelling has also analysed journey times on the A23 in Option 3. The realignment of the A23 generates an additional distance of approximately 1.7km. This will affect the overall journey time for movements between Horley and Crawley, although average speeds remain similar to 2012 observed speeds.

At an average speed of 40mph the extra distance would add approximately 90 seconds to the journey. However, the realignment of the road provides improved resilience, better connectivity and greater reliability for journey times by separating out airport and non-airport traffic. This has benefits for trips to each terminal as well as through trips not associated with the airport.

9.6 Mode Share Sensitivity Test

Gatwick's R2 ASAS target is for 60% of passengers and 40% of staff to access the airport by public transport in the future. Whilst it is **prudent to test the performance of the road network against the highest impact case** (to be able to demonstrate resilience and capacity on the network), this section describes the benefits that the target of the higher R2 ASAS public transport mode share will deliver.

9.6.1 Network Performance

Table 9.2 shows the potential reduction in trips with a 60% and 40% public transport mode share respectively for passengers and staff. Traffic volumes reduce by approximately 1,000 vehicles for movements both to and from Gatwick.

Table 9.2: Total employee and air passenger vehicle traffic volumes for the existing and target mode share

Option	Year		AM Peak Hour		PM Peak Hour	
			To Gatwick	From Gatwick	To Gatwick	From Gatwick
<i>Existing</i>	<i>2012</i>	<i>Existing Mode Share</i>	<i>2,150</i>	<i>1,500</i>	<i>1,600</i>	<i>2,250</i>
Option 3	2040	Existing Mode Share	4,200	2,800	2,900	3,871
Option 3	2040	Target Mode Share	2,900	1,850	1,950	2,700

Note: traffic volumes rounded to nearest 50 vehicles

Figure 9.16 and **Figure 9.17** show the average network delay per vehicle in the AM and PM peak periods for the target mode share compared to the existing mode share for Option 3. This is the average delay experienced by all vehicles modelled across the local network.

Figure 9.16: AM peak period network performance for Option 3 - existing and target mode share

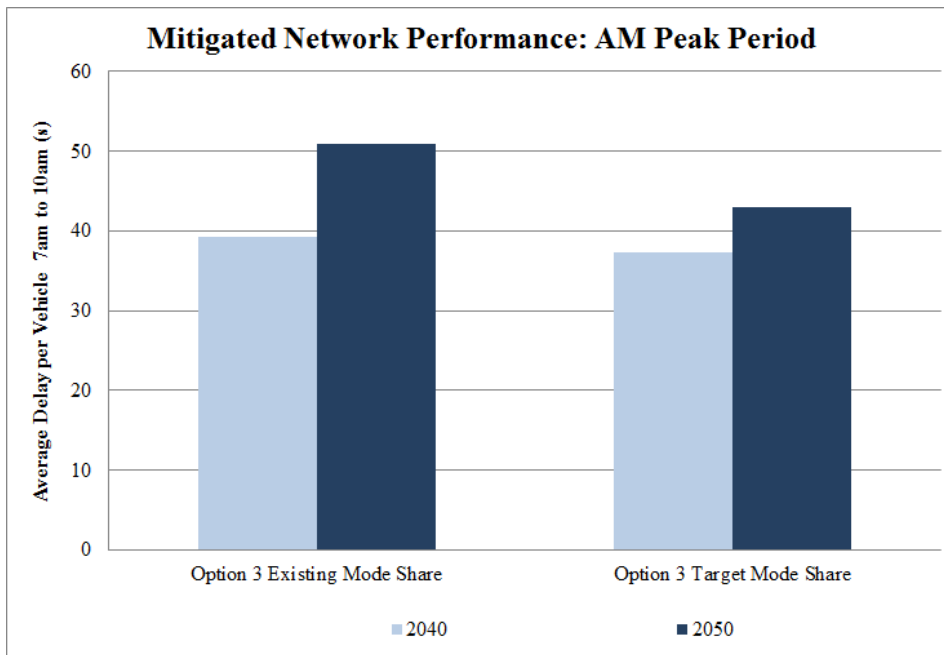
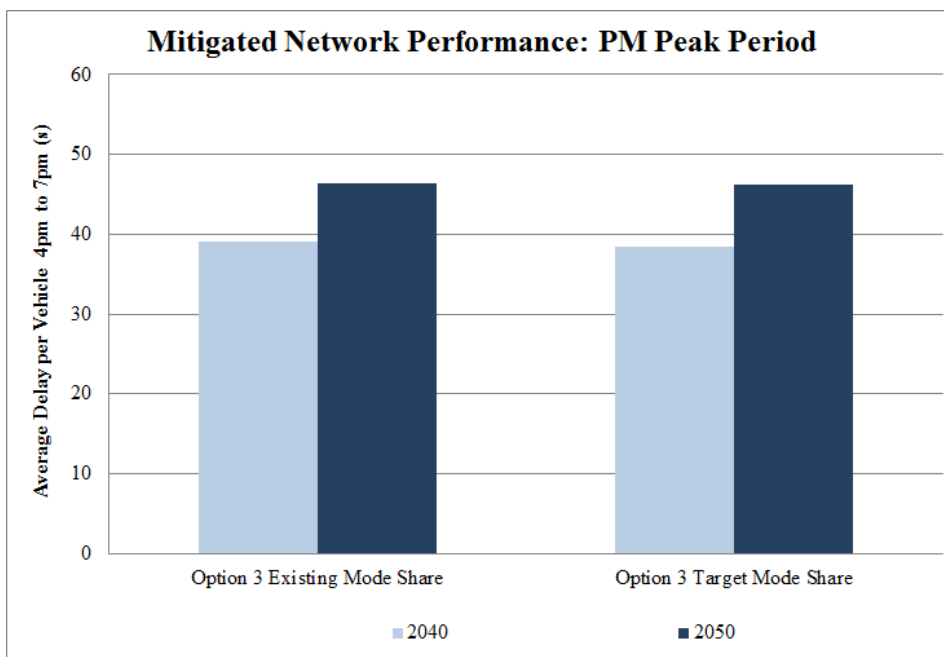


Figure 9.17: PM peak period network performance for Option 3 - existing and target mode share



9.6.2 Summary

The highway network has been designed to accommodate Option 3 and background traffic growth in 2040 and 2050 assuming the existing mode share (~60% access by car).

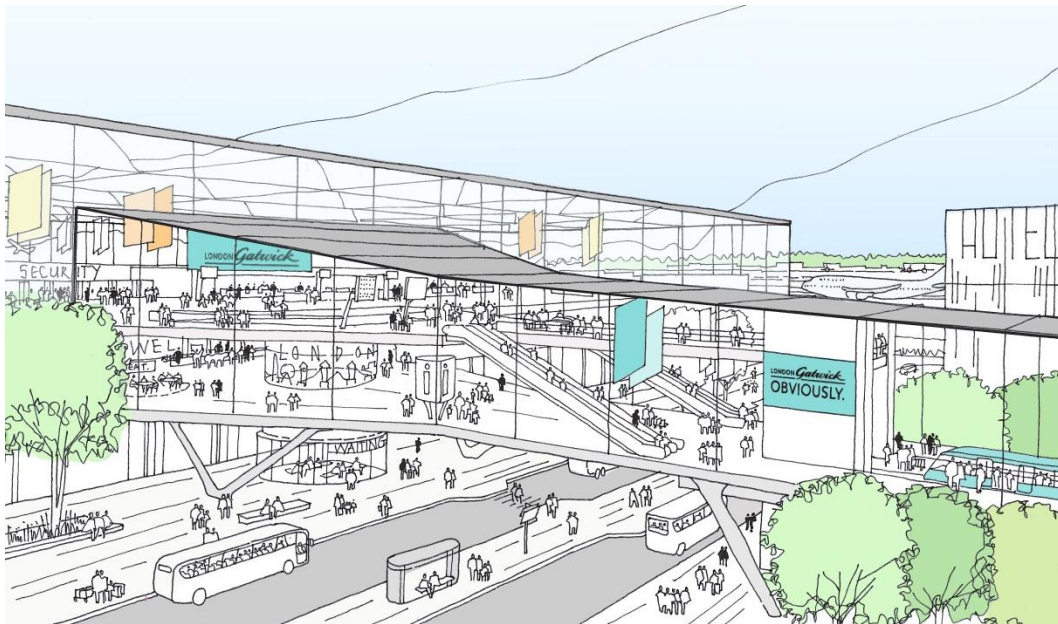
When modelling the target public transport mode as per the R2 ASAS, there is a related reduction in car trips by passengers and employees which results in:

- A reduction in average delay per vehicle, especially in the AM peak periods;
- Further resilience in the highway network for variations in demand or movement patterns; and
- Environmental benefits associated with a reduction in trips, such as a reduction in traffic noise levels or improved air quality.

9.7 New Terminal - Kerbs and Forecourt

The New Terminal forecourt kerb-space has been planned to accommodate the future demands of a variety of modes of transport.

Figure 9.18: New Terminal Forecourt Concept



Mode split data, vehicle occupancy and set-down durations have been analysed and applied to the expected volume of arriving and departing passengers at the New Terminal. Analysis of kerb and forecourt requirements at the New Terminal indicates that **all the necessary capacity can be provided at-grade** and therefore there is **no requirement for an elevated kerb**.

The forecourt design is based on a hierarchy which prioritises public transport in order to meet Gatwick's sustainable surface transport targets along with targeting a reduction in the number of kiss-and-fly trips to the airport.

The two roads adjacent to the terminal building will provide kerb-space intended to accommodate the modes listed below, with pedestrian crossings provided at appropriate intervals along the length of the kerb:

- Local buses;
- On airport taxi operator;
- "On airport" long-stay parking shuttles;
- Valet parking; and
- Group travel.

A dedicated ‘hotel road’ will be provided to reduce the number of vehicles using priority space adjacent to the terminal frontage with space for private vehicle drop-off provided to the east of the short-stay multi-storey car parks, with private pick-up in the car parks themselves.

Appropriate wayfinding and signage will direct vehicles from the primary access road to the forecourt and into the one-way system.

Figure 9.19 shows the road layout in the vicinity of the terminal with an overview of the vehicle types that will use the roads.

Figure 9.19: New Terminal – Hierarchy of Forecourt Roads



9.8 Car Parking

The provision of parking products and services is an important aspect of the R2 ASAS for those people for whom public transport is not their choice of mode. The strategy aims to provide an appropriate level of parking supply at Gatwick with a targeted approach to parking products and management for staff, passenger and visitor spaces. The R2 ASAS will continue to promote a shift to more sustainable modes of transport whilst ensuring excellent access by private vehicle for those that require it.

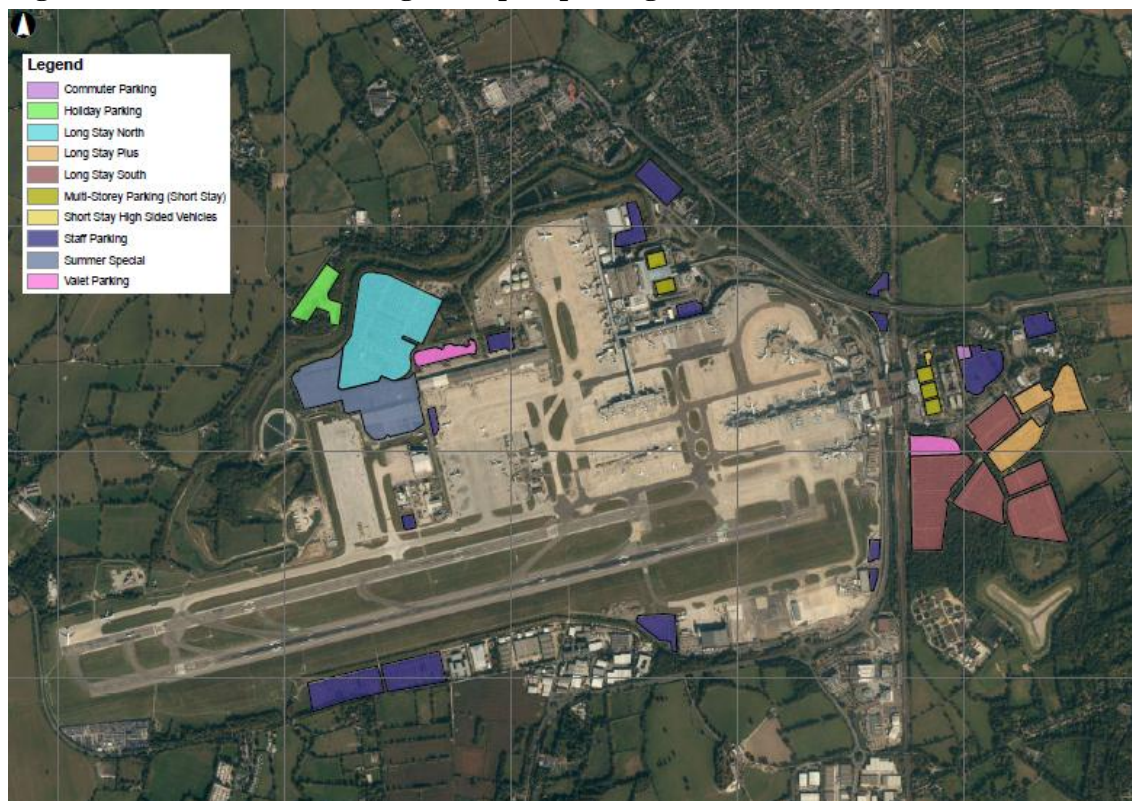
The anticipated increase in passenger demand associated with the introduction of an additional runway at Gatwick will require car parking provision to increase to accommodate the demand. This, in addition to the loss of space for existing parking to the northwest and south of the airport due to the expansion, will require the majority of the parking to be situated within the eastern zone. Some of the long-stay parking, primarily within areas close to the South Terminal, may require decking. Additional short-stay Multi-Storey Car Parks (MSCPs) for the North, South and New Terminals will be required to accommodate the expected increase in parking demand.

9.8.1 Existing Parking Conditions

Currently private car trips to and from the airport account for approximately 50% of passenger trips and 70% of staff employed at the airport of which 21% and 65% respectively park their car. There is a total capacity for approximately 44,000 parking spaces on-airport taking into account short stay, valet and long stay on-airport parking and staff parking. There are a further 17,450 authorised, off-airport parking spaces as well as a number of unauthorised spaces, which are the subject of a long-standing policy by Crawley Borough Council for them to be closed down.

Figure 9.20 shows the distribution of parking facilities available on-airport. Long-stay and short stay parking is provided separately for both the North and South Terminals. Staff parking is spread across the airport footprint. Those areas located in more remote parts are served by shuttle buses for staff to continue their journeys to the workplace.

Figure 9.20: Location of existing on-airport parking facilities at Gatwick



The 2012 ASAS specified a number of strategic objectives for Gatwick taking into account passenger growth at a single runway airport. The objectives for car parking are:

- To accommodate all additional airport-related car parking on-airport;
- To make more efficient use of the combined on-airport car park supply;
- To optimise car parking locations relative to South and North Terminal demand;
- To continue 'yield management' measures to maximise the use of long stay car parking and reduce the need for 'kiss and fly';

- To apply technology to enhance the passenger experience; and
- To introduce a preferred traders scheme for authorised off airport car parks.

The car parking proposals outlined in this section take into account the 2012 ASAS strategic objectives for parking and recognise the continued relevance they have for Gatwick with a second runway.

9.8.2 Car Parking objectives for the R2 ASAS

During the development of Option 0 and Option 3, a series of objectives were set in relation to parking. These have been developed in order to deliver the best possible passenger experience, to increase value and efficiency whilst also meeting sustainability objectives. Objectives include the following:

- accommodating all additional airport-related car parking on-airport;
- providing all short-stay parking close to terminals and relocating all other car parking to the zone east of the South Terminal, with associated benefits of consolidation;
- making the most efficient use of the combined on-airport car park supply, including the impact on land take and impact of parking traffic;
- optimising car parking locations in relation to demand for terminal access continuing 'yield management' measures to maximise use of long stay parking and reducing 'Kiss and Fly';
- applying technology to enhance the passenger experience; and
- managing demand and delivery for employee parking with a reduction in the proportion of staff driving to the airport consistent with the Staff Travel Plan.

The aim is to emphasise the importance of sustainable modes of transport to promote a mode shift away from private car. This focuses on providing attractive alternatives in conjunction with modifications to car parking provision and operation.

9.8.3 Future Demand

The projected car parking demand for Gatwick is based on the air passenger and employee forecasts provided in Chapter 5 of this report. Continued mode shift towards public transport follows recent trends, 2012 ASAS initiatives and future committed rail improvements. This will reduce the additional parking demand required in the future.

The following assumptions were made for the calculations of forecast parking requirements in 2040:

- Growth calculations include an assumption that parking mode share will decrease slightly over time as public transport mode share increases.
- The forecast increase in foreign resident air passengers will reduce the overall level of parking required as they are less likely to have access to private vehicles in the UK and are assumed to travel to/from the airport via other modes – this reduces the level of additional parking required by 6%.

Parking requirements have been estimated based on different mode share assumptions, corresponding with a current mode share up to a 60% public transport mode share. Gatwick's target is 60%, based on R2 ASAS initiatives for sustainable surface access and improvements to bus and rail connectivity and service provision, as discussed in Chapters 6 and 7.

Table 9.3 and **Table 9.4** show the estimated number of passenger (short and long stay) and staff car parking supply current mode share and 60% public transport mode share scenarios compared to the existing provision. The tables include both on-airport and off-airport parking.

Table 9.3: Forecast parking spaces (2040, current mode share)

Scenario	Year	MPPA	No of Staff	Number of parking spaces		
				Short-stay	Long-stay	Staff
<i>Existing</i>	2012	35	21,000	5,000	46,300	10,000
Option 0	2025	45	24,000	6,500	59,700	11,400
Option 3	2040	79	33,700	10,300	96,250	14,700

Table 9.4: Forecast parking spaces (2040, 60% PT mode share)

Scenario	Year	MPPA	No of Staff	Number of parking spaces		
				Short-stay	Long-stay	Staff
<i>Existing</i>	2012	35	21,000	5,000	46,300	10,000
Option 0	2025	45	24,000	5,700	52,700	10,100
Option 3	2040	79	33,700	8,500	78,700	12,100

The target for achieving a 60% public transport mode share will reduce the car parking requirement by the following amount for Option 3 in 2040, compared with maintaining the current mode share for public transport:

- Additional 1800 short-stay spaces;
- Additional 17,550 long-stay spaces; and
- Additional 2,600 staff spaces.

9.8.4 Masterplan proposals – impact on car parking

The Masterplan requires the relocation of existing long-stay car parking that serves the North Terminal (including valet parking and 'Summer Special' parking). To the south, the introduction of the second runway and expansion of the southern operational boundary and airside fence will result in the removal of the existing staff parking facilities that currently occupy this space. These will be re-provided.

As a result of these changes and the need to provide additional parking provision to accommodate forecast increases in passenger numbers the proposals for car parking are to:

- Relocate staff car parking from the south of the airport to the expansion zone to the east of the railway;

- Premium long-stay parking to be provided adjacent to the railway and close to the South Terminal, with the potential for decking subject to height limitations within the Public Safety Zone of the existing runway;
- North Terminal long-stay parking is to be relocated to the eastern expansion zone with shuttle bus access to terminals;
- Potential for decking of long stay car parks to be considered in line with the wider Masterplan and land use strategy; and
- Additional short-stay multi-storey car parks provided near the New, North and South Terminals.

Consistent with the R2 ASAS objectives for sustainable travel, the increase in parking provision is not proportionate to the increase in passenger numbers. A reduction in the number of spaces provided per million passengers per annum, and per thousand employees, will be delivered through a combination of R2 ASAS initiatives and parking management, supported by a continued increase in public transport mode share.

9.9 Stakeholder Engagement

Gatwick has developed potential solutions for local road and airport access requirements to meet future demand as well as to meet the needs of the surrounding communities. Gatwick holds regular dialogue with stakeholders, including through the Gatwick Airport Transport Forum Steering Group, on all aspects of surface access and has done since the initial decision to pursue a second runway proposal as part of the Commission's process. Gatwick is currently engaging with the following stakeholders:

- Local Authorities (planning and highways)
- Metrobus
- Sustrans
- Commission for Passenger Transport (CPT)
- Transport for London (TfL)
- Highways Agency (HA)
- Network Rail
- National Express
- Gatwick Diamond

9.10 Summary Strategy

The above chapter describes the analysis which has gone into understanding the implications and network enhancements associated with growth at Gatwick on the road network around the airport.

Gatwick's vision for the road network around the airport in the R2 ASAS includes working with its partners to support committed schemes and deliver the following:

- M23 Smart Motorway with hard shoulder running (committed and discussed in Chapter 8).
- Dartford Crossing Free Flow Tolling (committed and scheduled to open in October 2014).
- M25 Jn 5-7 Smart Motorway (committed and discussed in Chapter 8).
- Doubling capacity at M23 Junction 9 and providing better links to the A23.
- Extra junction capacity at the airport terminals.
- Diverting the A23 to the east of the airport and separating out airport users from background traffic for the benefit of both sets of travellers.
- Closing Lowfield Heath Road and prevent an increase in traffic through Charlwood (planned).
- Diverting Balcombe Road as a local road with connection to Antlands Lane/Shipleigh Bridge (planned).
- Support TfL's Roads Task Force Strategy for the A23 into London (planned).

Gatwick's target is to deliver a 15% reduction in mode share for air passenger private car journeys and 10% mode share reduction in single occupancy car journeys by staff by 2040.

The R2 ASAS and future surface transport enhancements aim to reduce private car usage through the following:

- Promoting public transport.
- Re-design of terminal forecourts including changes to private car drop-off to discourage kiss and fly trips.
- Enhanced on-airport and off-airport walking and cycling infrastructure.
- Consolidation of long-term and staff car-parking.

Although future private vehicle usage will remain important for both passengers and staff travelling to the airport, a number of additional methods will be considered to further promote sustainable modes of surface transport such as:

- Car park pricing and location strategies;
- Progressive removal of unauthorised off-airport parking by local authorities; and
- Promotion of car share schemes and other initiatives for staff.

10 Walking and Cycling

Although less than 0.5% of air passengers travel to the airport on foot or by bicycle, these modes are important for employee travel. Over 2% of staff at the airport regularly cycle to work. These are supported under the Staff Travel Plan with a number of initiatives for staff to consider sustainable modes as well as supporting infrastructure including cycle parking at a number of locations.

The principles driving the development of the **proposed walking and cycling enhancements in Option 3 are based on achieving the R2 ASAS objectives** for accessibility and passenger experience, as well as reflecting the needs of the local communities around Gatwick. **These proposals include 9km of new cycle paths and pedestrian rights of way.**

The principles behind development of the Option 3 proposals are as follows:

- Where appropriate, retain and upgrade existing links and infrastructure – some of the existing infrastructure is in a poor state or provides circuitous routing;
- Minimise grade-separated infrastructure to enhance walking and cycling connectivity within the vicinity of the airport;
- Enhance the user experience and where possible provide continuous off-road cycle facilities to key airport buildings and nearby commercial zones;
- Promote local connectivity between Horley and Crawley; and
- Promote connectivity through the eastern zone for walking and cycling that takes into account the re-aligned A23 to Antlands Lane.

10.1 Existing walking and cycling facilities

The South Terminal at Gatwick is currently served by the National Cycle Route 21 (NCR21) running north/south adjacent to the railway line. Though the route provides good connections to both Horley and Crawley there is scope to improve the existing infrastructure and enhance the user experience. NCR 21 suffers from a poor mixture of on-road and off-road cycle facilities that result in a disjointed north/south link. Cyclists and pedestrians currently have to navigate a number of underpasses and overbridges and while some sections of the route provide adequate lighting and priority off-road space, other sections are poorly signed and require users to switch to on-road facilities. The existing bridleways and public footpaths that lie in the vicinity of the airport include some links that may be removed due to a change in land-use to the south and east of the existing airport boundary owing to an enlarged airport boundary. Where these provide an identified recreational or access function, these routes will be re-provided.

As well as re-providing access routes for pedestrians and cyclists, Option 3 allows for both the quality and quantity of facilities to be significantly enhanced. This could include providing permanent facilities to replace temporary facilities and a consistent approach to wayfinding, signage and road markings.

Figure 10.1 shows existing cycle parking and parts of the route adjacent to the railway.

Figure 10.1: Example of existing cycle parking facilities at Gatwick

10.2 Walking and Cycling – Proposals

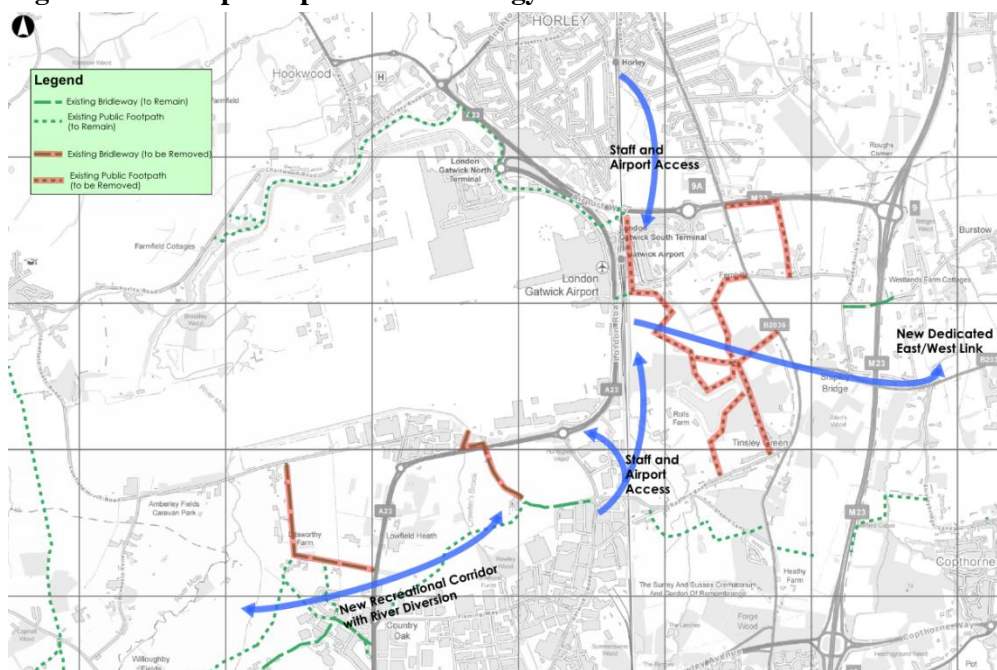
Where possible, the aim has been to retain existing walk and cycle routes within the vicinity of the airport in addition to providing improved facilities and an enhanced user experience.

10.2.1 Walking

These opportunities for new pedestrian rights of way are shown in blue in Figure 10.2 below, with current paths and rights of way shown in red.

Figure 10.2 shows the existing and proposed walking routes around the airport with the proposed new connections. Owing to proposed changes in land use within the area to the east of the railway, a number of existing walking routes will need to be re-routed or replaced. This provides a unique opportunity to offer a step change pedestrian connectivity, both north-south and east-west.

These opportunities for new pedestrian rights of way are shown in blue in Figure 10.2 below, with current paths and rights of way shown in red.

Figure 10.2: Proposed pedestrian strategy

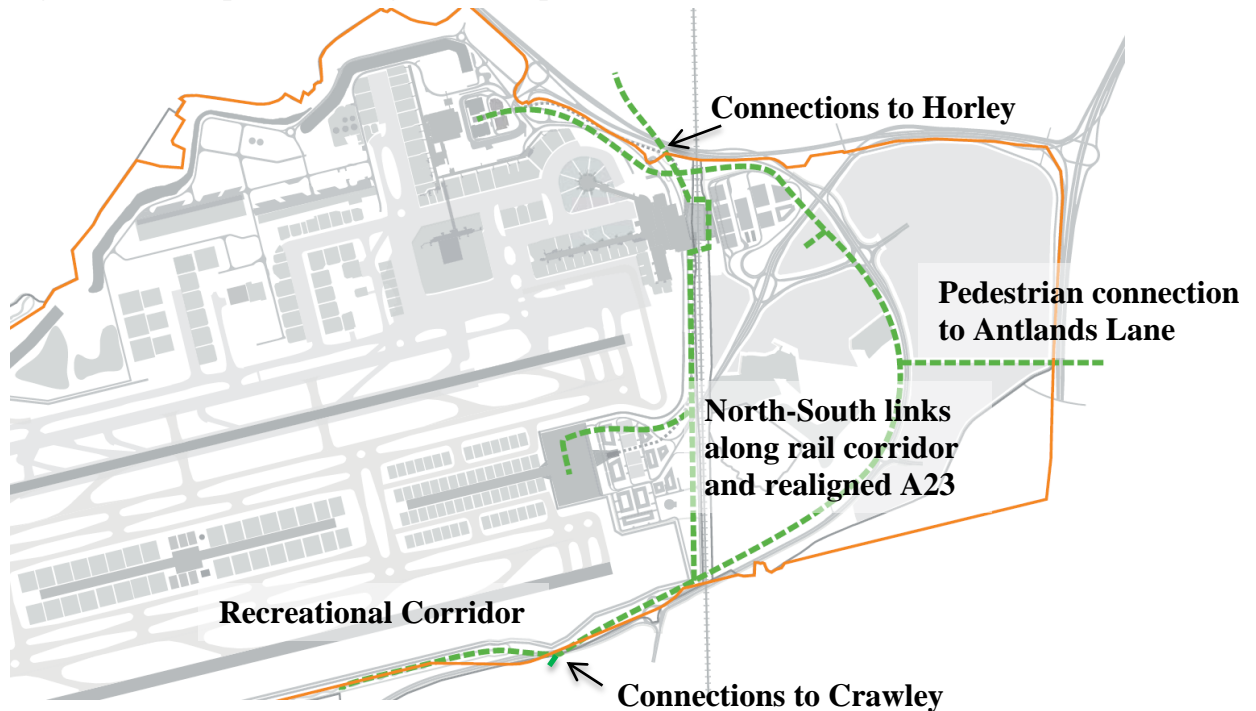
Pedestrian permeability across the zone east of the railway is required for local community access and will be retained with a number of individual and circuitous paths, which no longer lead anywhere, replaced by a co-ordinated network of routes.

The introduction of long-stay parking to the eastern zone will be designed with pedestrians in mind with safe, convenient routes through the parking areas. Accordingly it is proposed that a dedicated east/west route for pedestrians be introduced to maintain and improve connectivity from the airport to the area to the east of the M23.

It is proposed that a recreational corridor be introduced to the south of the airport to coincide with the proposed river diversion from Crawter's Brook to the River Mole. The river corridor would link to the NCR 21 and would provide a walking route immediately to the south of the airport boundary.

The outcome in terms of the Option 3 layout is shown in **Figure 10.3**.

Figure 10.3: Proposed walking routes – Option 3



10.2.2 Cycling Proposals

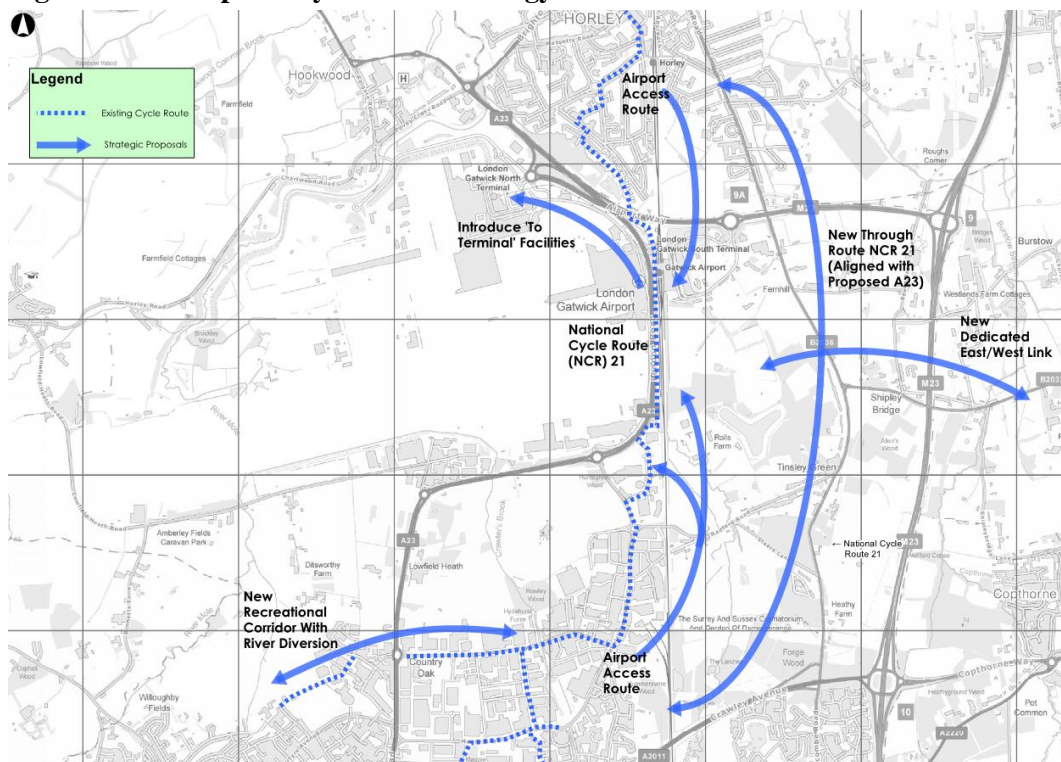
These opportunities for new cycle routes are shown in blue in Figure 10.4 below, with current cycle routes shown as dotted lines.

Figure 10.4 shows the strategic cycle routes within the vicinity of the airport. The main proposals of the cycle route strategy are to:

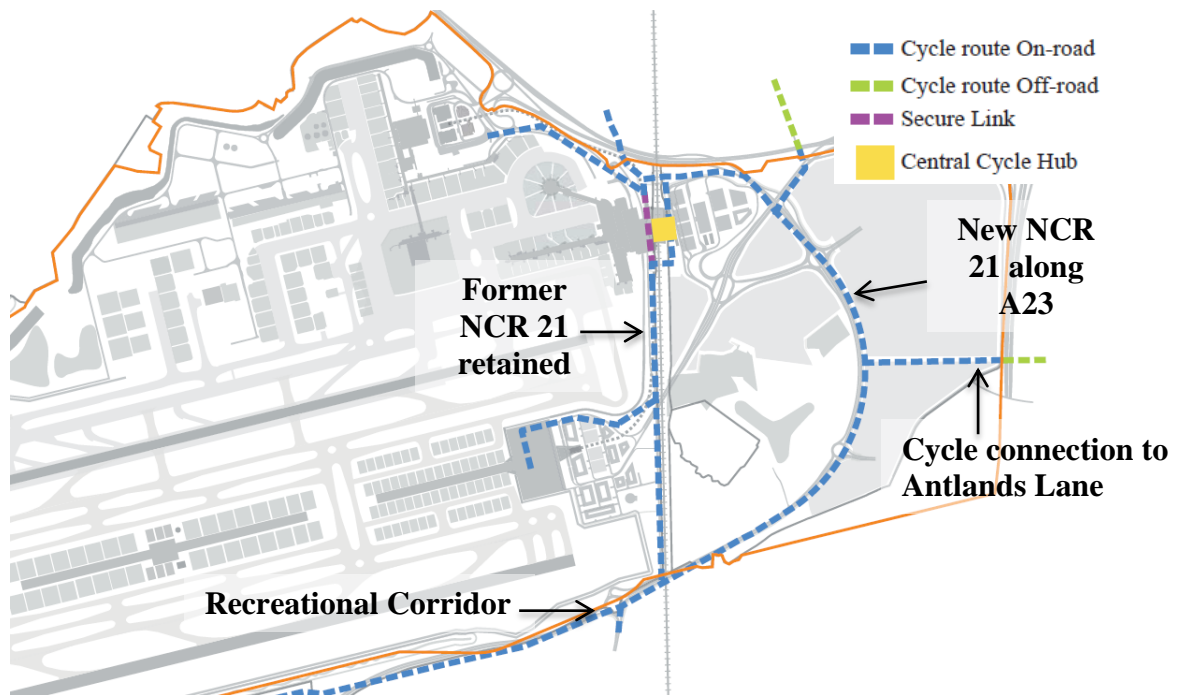
- Retain and enhance the existing north/south cycle link for access to the airport to promote cycling for staff travelling from Horley and Crawley;
- Where appropriate, introduce dedicated off-road cycle facilities to the terminal buildings;
- Introduce a new east/west cycle and pedestrian link across the eastern zone to improve connectivity to the area to the east of the M23; and
- Provide a new through route to become NCR 21, a new cycle super highway that will follow the proposed realignment of the A23.

These opportunities for new cycle routes are shown in blue in Figure 10.4 below, with current cycle routes shown as dotted lines.

Figure 10.4 : Proposed cycle access strategy



The outcome in terms of the Option 3 layout is shown in Figure 10.5.

Figure 10.5: Proposed cycle routes – Option 3

One of the key element of the proposals for Option 3 focuses on re-routing the National Cycle Route (NCR) 21 to follow the new alignment of the A23, creating a cycle super highway. This new route is proposed to be a dedicated, off-road cycle facility linking Horley to the north and Crawley to the south to primarily target recreational users. In order to mitigate the need for multiple underpass connections across the A23, it is proposed that NCR 21 will run along the eastern side of the A23 from the proposed South Terminal junction (to the north) to the connection with Gatwick Road (to the south).

It is proposed to retain the existing walk and cycle route (currently designated as NCR 21) to provide a direct route to the airport for staff. This link provides accessibility for the relatively high percentage of the Gatwick workforce living within Crawley (35%) and Horley (7%). Increasing the proportion of employees cycling to Gatwick will contribute to the R2 ASAS target of increasing mode share for sustainable travel to work.

In addition, it is proposed to strengthen links to the east of the airport by introducing a dedicated cycle and pedestrian route through the eastern zone to connect with Antlands Lane.

10.2.3 Summary Strategy

A summary of cycle and walking inputs to the R2 ASAS is as follows:

- Re-routed NCR 21 to follow the new alignment of the A23 to create a cycle super highway;
- The proposed section of the NCR 21 from the South Terminal junction to the connection with Gatwick Road to be a continuous, dedicated cycle route;
- Retain and enhance existing NCR 21 cycle facilities providing a north/south link adjacent to the railway from a proposed underpass linking the route from

Gatwick Road to the South and North terminals. Local residents can still access South Terminal and the railway station via this route;

- Introduce a secure link underneath the South Terminal for approved users only (with a focus on staff cycle users);
- Provision of a new cycle link to the North Terminal from the Gatwick Gateway to be provided as either an on-road or off-road facility;
- A dedicated cycle and pedestrian east/west link through the eastern zone connecting with Antlands Lane;
- Introduction of a dedicated link from Balcombe Road (north of the M23) to the proposed alignment of NCR21 and new developments within the vicinity of the airport;
- On-road facilities and wayfinding on the new Balcombe Road alignment within the eastern zone;
- Cycle hub facilities and user assistance at the Gatwick Gateway;
- Cycle parking facilities located to the north and south of the Gateway and at terminal and main office buildings; and
- Development of information using a range of media supporting passenger and staff sustainable travel choices and opportunities for cycling, including employee journey to work initiatives.

Overall, Option 3 includes 9km of new cycle paths and pedestrian rights of way demonstrating Gatwick's commitment to walking and cycling.

Following public consultation in Spring 2014, a comprehensive walking and cycling strategy will be developed taking on board comments that have been received through that process.

11 Transport Interchange

11.1 Introduction

Gatwick currently acts a transport interchange, primarily for passengers connecting to air services via the terminals but also for staff, commuters and local residents. The railway station, located adjacent to South Terminal, handles over 14 million airport passengers per annum – over one third of all passengers through the airport. In addition, over 1 million people use the station for commuter journeys into London or to transfer between rail services to access employment locally around Gatwick, for a total of 15 million users.

Coach facilities are at ground level in the South Terminal forecourt adjacent to the railway station, with additional local bus access along the A23. Bus and coach facilities are replicated at North Terminal to provide convenient access for passengers.

In the context of a second runway, and in particular in a three terminal configuration, the opportunity exists to enhance interchange at South Terminal whilst also providing greater capacity. This opportunity has been recognised in Gatwick's vision for a brand new interchange called the Gatwick Gateway, primarily aimed at the airport's public transport modes.

11.2 Gatwick Gateway

A well-planned transport interchange enables seamless connectivity between different transport modes – for example, from bus to rail and, in the case of Gatwick, also from rail or bus to air. Interchange should be intuitive, quick and easy, with minimal level changes such that the passenger does not consider switching between modes to be an inconvenience.

Gatwick's vision is for an integrated passenger transport interchange, the Gatwick Gateway, which serves both the airport and local users, offering a high quality facility to support sustainable travel opportunities and access to jobs across the region. This takes advantage of Gatwick's excellent rail connectivity and wide range of local bus and expresses coach services. The Gateway will be centred around the railway station at South Terminal with a new single concourse to replace the current concourse and bridge links. This will create an iconic space and a feeling of arrival at a key destination as well as integrating the railway station more with the airport and terminal environment.

The railway station concourse is currently congested at peak times and the distribution of passengers to the platforms can lead to crowding at platform level. Through reconfiguration of the railway station concourse, there is an opportunity to both overcome these issues as well as to extend the range of interchange opportunities at a central point around the railway station.

It is envisaged that a passenger concourse and waiting area for long-distance coach and local bus services will be also provided, as an extension to the railway station concourse. This facility will provide high quality, enclosed waiting areas, allowing passengers to wait for services at an upper level before walking down to board bus and coaches departing from ground level. All long distance coach and

local bus services will stop at the Gatwick Gateway (though some local services may also continue to drop-off and pick up from the terminals).

A cycle parking hub and pedestrian access will also be key components of the Gatwick Gateway.

An important element of the Gatwick Gateway will be fast connections (no more than 2 minutes) to other terminals using the Automated People-Mover (APM). The Gateway and onward APM connections will be the beginning of many passengers' experience of Gatwick and will be designed to facilitate a seamless and informed transition from passenger access mode to airport terminal and eventually onto a flight. The APM will be integrated with the railway station concourse and bus and coach facility to provide the best possible passenger connectivity as a fundamental design consideration.

The Gatwick Gateway concept is illustrated in **Figure 11.1**.

Figure 11.1: Gatwick Gateway concept



Modes envisaged for the Gatwick Gateway include:

- Rail – the Gateway will be built around the expanded station concourse, which is required to alleviate existing congestion issues, and to create an iconic arrival point at the airport.
- Bus and Coach – for a range of services this will be the main interchange point, though bus pick-up and drop-off at specific terminals for staff or passengers may continue for certain services.
- Park and Ride – approximately 10% of rail demand to and from Gatwick currently is commuter demand with people making use of the rail connectivity between Gatwick and London to either park and ride, or interchange between rail services or bus and rail. The Gateway will be designed to encourage this interchange.
- Car Rental – a new consolidated facility at the Gateway will bring all of the customer facilities together with office, preparation, fuelling and maintenance space. This new facility will bring together the customer facing and operations aspects into a single space, providing efficiency and an improved customer experience. This central location will also allow passengers to pick-

up and drop-off cars before using the APM to access terminals. This enhances passenger experience and eliminates the need for inconvenient bus transfer to car rental locations such as that provided at other airports including Heathrow.

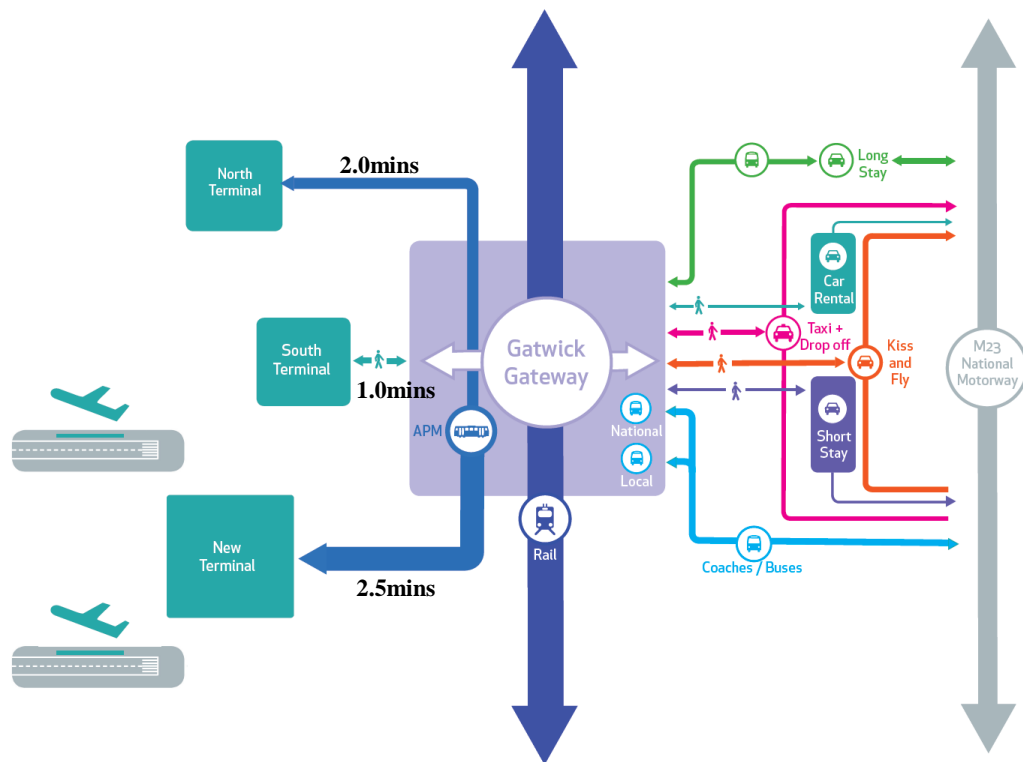
- Taxi – for the approved airport taxi operator, there will be taxi access at the South Terminal forecourt adjacent to the Gatwick Gateway as well as access for authorised airport operators at both North Terminal and New Terminal.
- Cycling – a cycle parking hub will be created at the Gateway with potential cycle routes to north and south for staff use and public access via the diverted National Cycle Route 21, in effect a new cycle super highway, which will follow along the edge of the A23.
- Walking – easy interchange between all modes, to and from South Terminal, forecourt zones and the APM as well as pedestrian access from local communities along signed routes.
- APM – this will provide frequent and rapid landside connectivity from the Gateway to the North Terminal and New Terminals, for both passengers and staff.

These improvements mean that the Gateway will provide for a step-change in connectivity between rail, coach and bus services not just for air passengers, but also for employees, commuters (to London and other cities) and local users. Local residents and local businesses will be able to take advantage of 24/7 accessibility to connect to or from the Gatwick region across the South East and to the rest of the UK via the Gatwick Gateway. Moreover greater demand generated by airport users will potentially make local bus and regional coach services more commercially viable over shorter time periods.

The National Infrastructure Plan has already earmarked £50m for initial funding of a major station improvement, which was endorsed by The Commission in its short and medium term priority schemes. The scheme will build on rail's strength and enable the station to accommodate growth from improved services after the completion of the Thameslink Programme and from Gatwick's expansion. The wider benefits of this station investment will be maximised through enhanced accessibility by bus and coach, cycling and walking. Gatwick is committed to this enhanced interchange and work with local partners to deliver an exemplar facility.

Figure 11.2 shows the Gatwick Gateway concept, essentially a focal point for journeys into and out of the airport. In the figure, the relative thickness of the lines for each mode relates to the level of demand for each of these, with the importance of rail shown by the wide blue line running north-south and the importance of the APM for onward connections, in particular to the New Terminal, also shown. The line to the New Terminal is around twice the width of the line to the North Terminal reflecting that twice as many passengers will be travelling to or from the North given the respective terminal sizes. As can be seen, planning work has concentrated airport access around this new interchange, including cycling and walking routes, car rental consolidation centre, taxis and forecourt access to South Terminal with APM access to other terminals.

This chapter describes planning to date on the Gatwick Gateway, specifically the expanded railway station, integration of bus and coach as well as walking and cycling. APM connectivity is explored later in this chapter. Specific infrastructure or design solutions have not yet been fully developed.

Figure 11.2: Gatwick Gateway concept – A Focal Point for Interchange

11.2.1 Stakeholder Engagement

To develop the Gatwick Gateway concept, Gatwick has worked and will continue to work with key stakeholders including Network Rail, Metrobus, National Express, the Department for Transport, the airport's own Passenger Advisory Group and the Gatwick Transport Forum.

11.3 Railway Station

11.3.1 Introduction

The heart of the Gatwick Gateway is the railway station. This will be the iconic centrepiece of the Gateway taking advantage of current direct connectivity to 129 stations and, post 2018, the expanded network that Thameslink will offer directly, and that Crossrail will deliver through interchange at Farringdon. Once the committed Thameslink Programme is completed in 2018, **Gatwick will have direct services to 175 stations, over 1,000 railway and London Underground stations with just one change, and will be served by a train into London every 2.5 minutes in the peak.**

In order to understand future station requirements with the above enhancement in services, analysis has been undertaken to test existing station infrastructure against future demand, as reported in Section 11.3.3. This analysis identified capacity constraints with the existing station concourse and prompted an assessment of potential alternatives for the station, with particular focus on location, as documented in Section 11.3.4. Having confirmed the current station

location as the preferred position in conjunction with Network Rail, analysis was undertaken to estimate future station concourse requirements and this is documented in Sections 11.3.5 to 11.3.7.

11.3.2 Current Conditions

Opened in 1958, the current station is located adjacent to South Terminal with direct access from the terminal to the station concourse. **Figure 11.3** shows the original 1958 design, with the railway station integrated with the terminal and in close proximity to the forecourt area for private vehicle, taxi and bus access from the A23. In essence, this is the original Gatwick Gateway and accordingly current planning is building on this history of integrated transport planning.

Figure 11.3: Gatwick Station in 1958



The station has undergone a £53 million improvement programme, which now provides an additional platform (Platform 7) and improved circulation for passengers.

Other recent changes have seen the introduction of ticket barriers, both at Gatwick Airport station and for the Gatwick Express dedicated platforms at London Victoria, with a corresponding removal of on-train revenue collection staff. The introduction of ticket barriers has resulted in peak period queuing at the ticket machines and staffed ticket windows at Gatwick Airport station. The station is straining under increased throughput and observed issues in terms of station operation include the following:

Concourse Level

- The current concourse is constrained in size as well as shape leading to a shortfall of capacity at peak times and associated congestion. Crowding

occurs in front of ticket barriers with passengers waiting in this area to view information screens. Queuing also occurs at ticket machines and windows.

- The station has ticket barriers installed in late 2011. Barriers are not evenly used, particularly on the overbridge where a secondary set of barriers is less frequently used by passengers and is located in a separate corridor.
- There is insufficient safeguarded space, also known as run-off, at the top of escalator and stair elements.
- Some stairs do not meet the minimum Network Rail width requirement, having less than an obstacle-free width of 1.6m.

Platform Level

- Passengers often congregate at the base of stairs and escalators. This leads to inefficient use of platforms and capacity issues when boarding and alighting trains. The Thameslink Programme when completed in 2018 will have metro levels of frequency across London (24 trains per hour) so it is important that passengers are spread along the full length of the train to ease boarding and alighting, both at Gatwick and the London stations.
- There are structural, mechanical and staff accommodation facilities located on platforms which reduce platform area and visibility.

A number of the issues above are identified through photographs taken at the station in August 2013, shown in **Figure 11.4**.

Figure 11.4: Existing Station – Constraints (2013)



Lack of orientation space on entry to South Terminal departures hall



Gatelines in station cause queuing



Orientation space on arrivals side



Congestion on concourse

11.3.3 Capacity Analysis

Analysis was undertaken to assess the performance of the existing station in 2040 using the forecasts discussed in Chapter 1. This analysis reaffirms observed

congestion issues and demonstrates that the station concourse requires expansion prior to 2025 i.e. even without second runway demand.

In addition to the concourse constraints, analysis shows that more vertical circulation is required. This will have an impact both at concourse and platform level.

Railway Station Concourse

Analysis shows that the current concourse is constrained in size, with an estimated effective area of only 120m².

Concourse requirements have been estimated using different methodologies. These are Network Rail guidance based on Fruin Level of Service requirements and International Air Transport Association (IATA) Level of Service Standards.

In the 1970s, John Fruin pioneered the development of Level of Service criteria for describing pedestrian movement, related to density of pedestrians and flow rates for walkways and circulation areas, stairs and in queues. Fruin described Level of Service C as being free flow, assuming a normal walking speed with some opportunity to overtake. Level of Service C is typically used for designing stations and transport interchanges providing a balance between congestion and infrastructure provision.

IATA standards are an adaptation of Fruin standards and are most appropriate for air passengers as they factor in luggage and trolley usage. These standards are typically used inside airport terminals but there is a strong argument for using these standards when designing facilities such as airport transport interchanges given that the majority of passengers using them have the same requirements.

The analysis documented here was undertaken using methodology from Network Rail's *Station Capacity - Assessment Guidance* (May 2011) and based on Fruin at 1.0m². IATA requirements are between 1.8m² and 2.3m² per passenger.

The two key requirements in the Network Rail guidance document are as follows:

- **Customer Information Screens** - Where customer information screens are provided, sufficient space needs to be provided in front of the screens for passengers to digest the information and determine their next course of action. These areas should be designed to be large enough to accommodate 10% of the peak 15 minute station entry and exit demand at a density of 1.0m² per person.
- **Concourse Accumulation** - Where customers wait for trains in the concourse (typically at termini stations), accumulation areas should be provided. These should be designed to be large enough to accommodate [up to] 100% of the peak 15 minute total⁷.

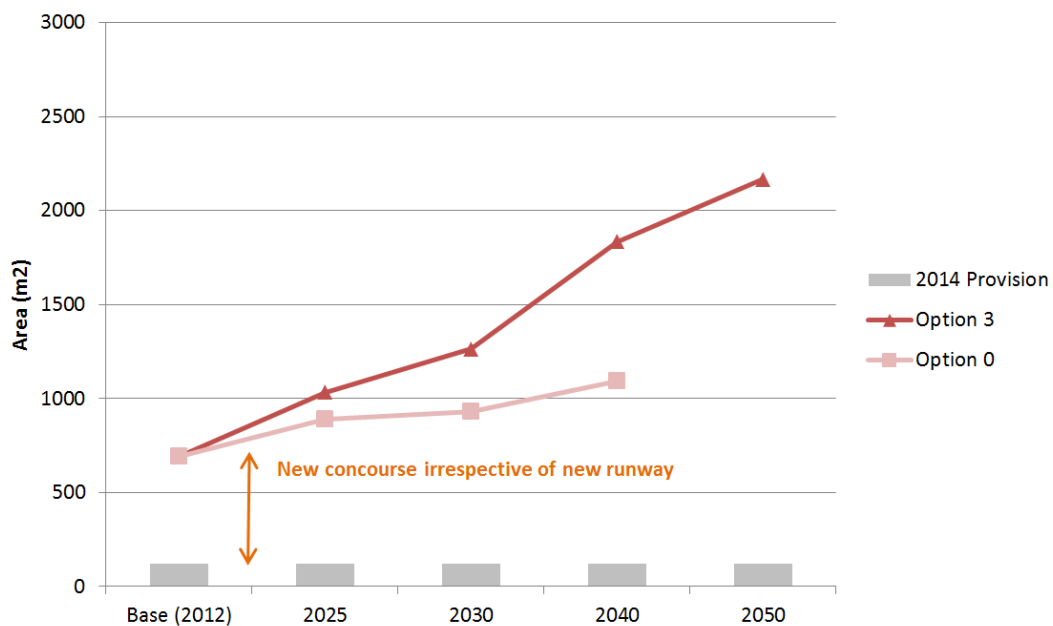
Unlike other airport railway stations Gatwick Airport station is not a terminus. However, a significant number of travellers are unfamiliar users and given the large choice of destinations available including two routes into London

⁷ This percentage depends on the station being considered with London Cannon Street referenced as being a commuter station and therefore not requiring as big an accumulation area as say King's Cross or Victoria Station.

(terminating at Victoria and via London Bridge/Farringdon), passengers will wait on the concourse in front of information screens. An assumed percentage of 10% of the peak 15 minute station entry and exit demand has been used for this analysis but the exact proportion will need to be determined through surveys as part of design development on the station in 2014.

Taking these requirements against current demand through the station, analysis indicates a requirement for approximately 700m² for the railway station concourse area in 2012 when compared to the actual provision of 120m². This reaffirms that the concourse is not adequately sized for current year demand and will continue to experience deterioration in level of service into the future, even without additional demand from a second runway. Application of IATA standards serves to further highlight this shortfall in capacity.

Figure 11.5: Existing Station Concourse – Area Required for the Unpaid Concourse



When projecting into the future, without and with a second runway, it can be seen from **Figure 11.5** that the unpaid concourse area (i.e. where passengers wait and circulate before going through ticket barriers) will need to be a minimum of between 700m² and 2200m².

Given that space for circulation routes, ticket barriers and vertical circulation will also need to be factored in, actual total requirements will be greater and these are reported in Section 11.3.7. It should also be noted that retail space, mechanical and electrical services and structure are not included within this assessment.

Vertical Circulation

Vertical circulation is a term used to describe stairs, escalators and lifts. The latter is important for both passengers with bags and also for passengers with reduced mobility.

With lifts and stairs included as primary vertical circulation, future escalator requirements match current station provision assuming a 2 minute platform clearance time. However, it should be noted that some stairs are less than the

minimum obstacle-free width of 1.6m as stated in Network Rail guidance and certain escalator run-offs, a clear zone to allow passenger orientation and to prevent congestion, are also less than minimum standards.

When considering vertical circulation requirements at Gatwick Airport station analysis is based on escalators only i.e. assuming stairs and lifts are not used for primary vertical circulation.

Analysis findings are as follows:

- Platforms 1&2: Provision of 5 escalators is more than is required to 2050. The 5 escalators here relate to the fact that Gatwick Express was located here until February 2014.
- Platforms 3&4 appear to have insufficient escalator provision, with only 2 escalators currently but a requirement for 3 to 5 escalators in the future.
- Platform 5&6 become the Gatwick Express platforms in February 2014. These platforms have insufficient escalator provision with 3 escalators currently but a requirement for 3 to 6 escalators in the future.
- Platform 7 has only 1 escalator but requires a minimum of 1 up and 1 down.

Platforms

The analysis does not capture passenger distribution on the platforms. Future platform distribution will be important to achieve the benefits of the proposed rail enhancements, such as train lengthening on Thameslink services. Effective platform distribution is required to minimise the impact of luggage and crowding on the platforms and on the train (described in more detail in Section 6).

Platform distribution can be properly analysed through computer simulation, given interaction between the location of vertical circulation, train doors, platform furniture and obstacles such as vending machines etc. and this will form part of the next stage of station design. Vertical circulation requirements during an emergency evacuation will also need to be considered at this next stage.

11.3.4 Station Location

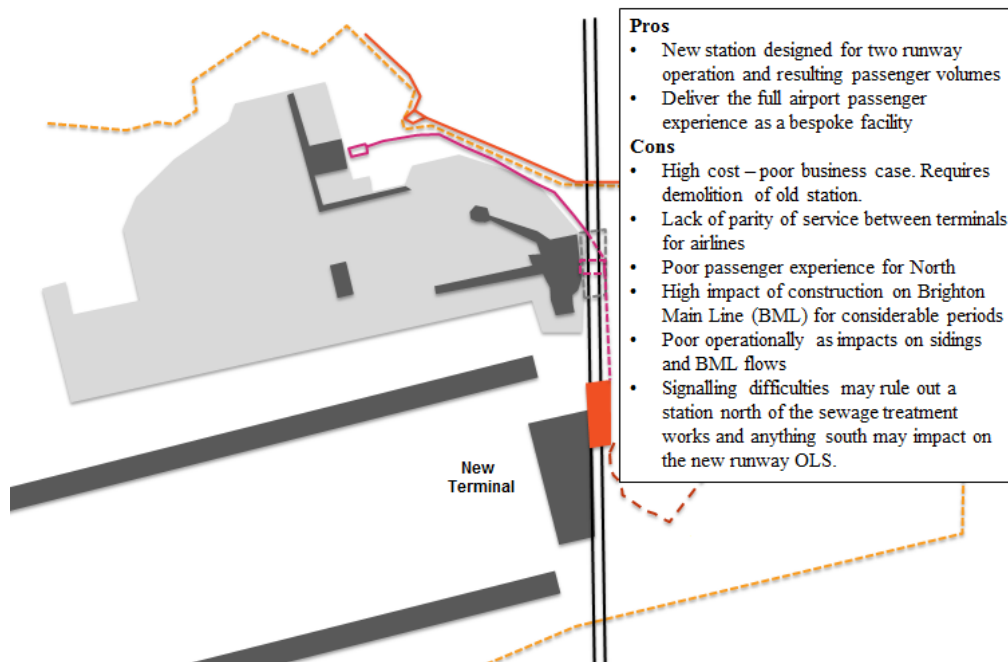
Given constraints with the existing station, in particular the concourse, and in the context of potential passenger growth with another runway, a number of alternative station location options have been considered. These are:

- A new station located at the New Terminal and configured to accommodate demand to 2050 at an appropriate level of service, with closure of the existing station.
- A new station located at the New Terminal, but with the existing station retained and used by passengers for North and South Terminals.
- Continued use of the existing station at or adjacent to its current location, making use of the existing platforms. This option would require upgrade and enhancement to the concourse.

Option A: New Station and Closure of Existing Station

A new station located at the New Terminal and configured to accommodate demand to 2050 at an appropriate level of service, with closure of the existing station. This is illustrated in **Figure 11.6**.

Figure 11.6: Option A - Station Location at New Terminal



Pros

The advantage of building a brand new station at the New Terminal is that it can be built for the passenger demand associated with a two runway operation, with a concourse and platforms configured for airport users and therefore delivering the full passenger experience.

Cons

The cost of building a new station would be high – in the region of £0.5 to £1 billion. In addition, this option would need an extension to the Automated People-Mover (APM) system to connect to South and North Terminals. This would mean additional track and cost.

There would be a lack of parity in service for airlines located in the New Terminal with direct rail access and those in the North Terminal whose passengers would need to travel two stops and double the travel time by APM to access the terminal.

From a rail perspective, a new station would require a number of possessions of the Brighton Mainline, with potential line closures required for construction of the new station, commissioning of the new station, closure of the old station and demolition of the old station. Operationally, a number of negative impacts such as loss of sidings and crossovers⁸ would reduce operational flexibility on the Brighton Mainline and impact on its capacity.

⁸Crossovers are short track sections that allow a train to switch from one main track to another.

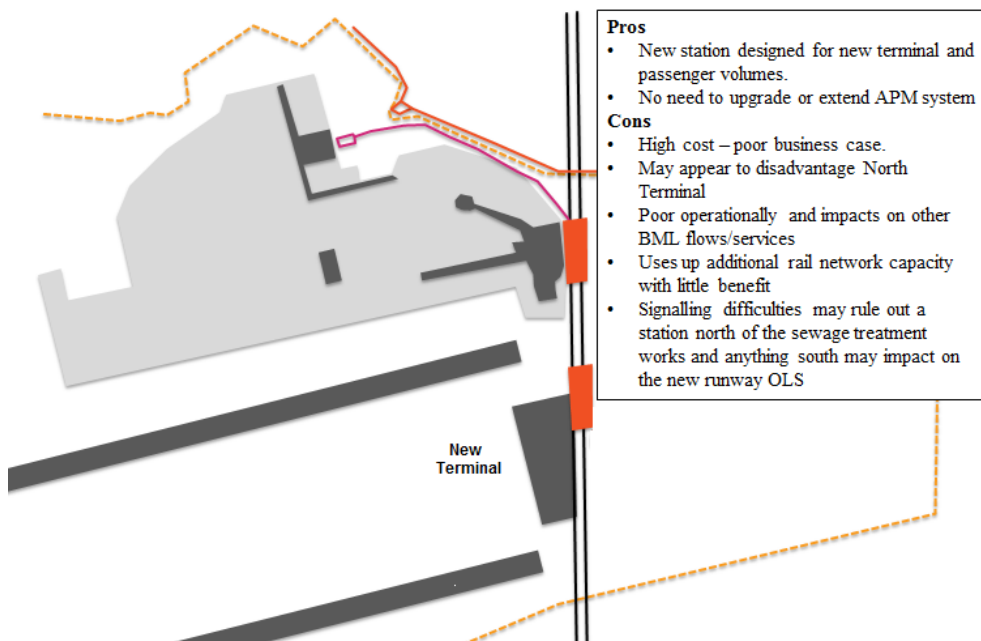
Conclusion

Given these disadvantages, this option was not taken forward for further development.

Option B: New Station and Retention of Existing Station

A new station located at the New Terminal but with the existing station retained and used by passengers for North and South Terminals. This is illustrated in **Figure 11.7**.

Figure 11.7: Option B - New Station Location and Existing Station Retained



Pros

The advantage of building a new station at the New Terminal, whilst retaining the existing station, is that the new station can be built for the passenger demand associated with a two runway operation and can therefore deliver the full passenger experience.

Retaining the existing station maintains this asset and provides connectivity to North and South Terminals whilst reducing the size of the new station. The existing APM to North Terminal can be retained which is a further cost saving when compared to a new station with demolition of the old station.

Cons

The cost of building a new station, even if it is reduced in size, would be high at a minimum of £0.5billion subject to the number of platforms provided. In addition, the existing station would still need to be refurbished and enhanced given current constraints, meaning an additional cost.

There would be a lack of parity for airlines in the New Terminal and the South Terminal, both with direct rail access, and those in the North Terminal whose

passengers would need to travel by APM to access the terminal. This scenario would be unacceptable to airlines located in North Terminal.

A new station would require a number of possessions of the Brighton Mainline with potential line closures required for construction of the new station and commissioning. This option has a number of negative impacts such as loss of sidings and crossovers which would reduce operational flexibility on the Brighton Mainline. The two stations would be too close together for efficient operation.

These issues were confirmed and agreed with Network Rail.

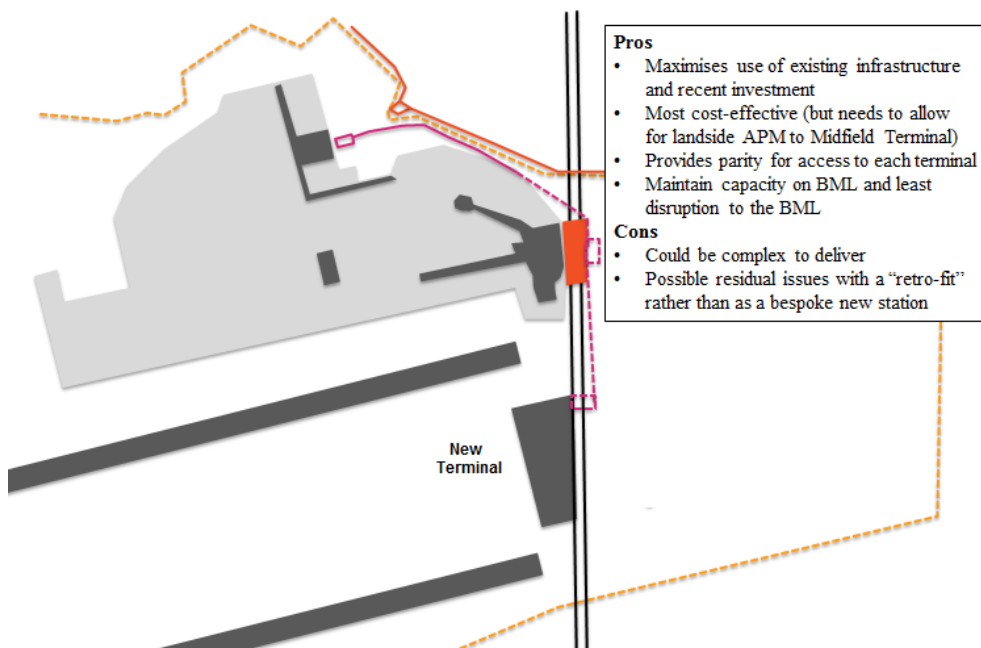
Conclusion

Given these disadvantages, the option of having two stations was not taken forward for further development.

Option C: Existing Station Upgrade at or nearby Current Location

Enhancement of the existing station at its current location relative to the South Terminal and used by passengers for all Terminals. This is illustrated in **Figure 11.8**.

Figure 11.8: Option C - Upgrade of Existing Station



Pros

The existing station is considered to be in the best location, with good proximity to the South Terminal and being broadly equidistant from the North and New Terminals. Design considerations will need to remove residual issues related to retro-fitting the existing station configuration. A new concourse will solve issues at the upper level, and future design will need to consider good distribution of passengers along platforms.

Whilst there will need to be possessions of the rail line during construction, this option offers the least disruption.

Cons

This option could potentially be complex to deliver, but it is likely that the tracks will be decked over in a single phase to construct the new concourse.

Conclusion

Option C, the existing station location, was taken forward for further development as the preferred solution for delivering future rail capacity.

The existing station is considered to be in the best location, with good proximity to South Terminal and being broadly equidistant from the North and New Terminals.

Keeping the station where it is makes use of existing infrastructure and recent investment such as the Platform 7 works and is likely to be the most cost-effective approach when compared to the other options.

11.3.5 Station Design Principles

Gatwick and Network Rail have agreed the following design principles and considerations for the railway station as part of the Gatwick Gateway, which are consistent with The Commission's criteria for supporting rail access to airports as well as Gatwick Sustainability and R2 ASAS objectives:

- Gatwick is an airport station - therefore the station needs to be integrated with the South terminal.
- The station needs to serve a commuter market. Commuters represent ~10% of current rail passengers (with 90% being airport users).
- The South Terminal could still operate as a passenger terminal in the future, but there is potential to use part of it for an enhanced station or public transport interchange.
- The passenger check-in process will be characterised by more self-service, common user check-in and bag-drop
- The station location and configuration should support surrounding development opportunities.
- The station should support economic drivers for commercial development.
- When considering commercial opportunities, vertical constraints from the existing runway clearances (Obstacle Limitation Surfaces or OLS) need to be taken into account and planned around.
- The station should be integrated with other modes to create a full public transport interchange.
- Design considerations should include:
 - Seamless passenger experience and quality
 - Designing with future-proofing in mind
 - Clarity, legibility, wayfinding

- Technology proof and configure to protect rail revenue capture
- Based on these considerations, the best design option will address:
 - Passenger distribution at both concourse and platform level.
 - Vertical circulation between platform and concourse, to achieve appropriate capacity and effective distribution.
 - Location and interaction with Automated People-Mover (APM) which is particularly critical in a three terminal context.
 - A layout that works well both for free movement and if barriers are required. This is a fundamental design issue which will impact the concourse and its usage. A concourse designed for free movement is the best solution in terms of achieving seamless passenger interchange.
 - A layout that reflects Department for Transport (DfT) regulations on security clearance from private vehicle traffic.

11.3.6 Demand

Demand for rail access to and from Gatwick has been estimated from passenger and employee forecasts.

The station concourse will need to accommodate peak hour demand and therefore work undertaken to estimate the size of the station has been based on a one hour extract for the period, 08:00 to 09:00, taken from the three hour peak period dataset used in rail modelling. Accordingly, this analysis is consistent with other work undertaken on future rail operations and as documented in Section 6 of this report.

Table 11.1: Rail passenger demand to/from Gatwick under different growth options at 60% public transport mode share, 50% by rail (AM peak hour, 8am to 9am)

Option	Year	Air Passengers		Employees	
		To Gatwick	From Gatwick	To Gatwick	From Gatwick
Existing	2012	1045	591	359	17
Option 0 (no second runway)	2025	1967	1406	599	29
	2040	2350	1736	626	31
Option 3 (two runways, wide spaced, independent)	2025	2455	1580	642	31
	2040	4231	3041	843	41
	2050	4506	3288	935	45

Source: Arup analysis from Air Passenger Forecasts

The analysis has also tested PM peak demand because this period shows higher demand into Gatwick (arriving air passengers) which leads to more onerous use of the concourse in terms of passengers waiting for specific rail services or waiting at information screens.

11.3.7 Future Concourse Sizing

Using the demand shown above, an assessment has been undertaken of future station concourse requirements. In addition to rail passenger demand, the concourse itself is also the centrepiece of the Gatwick Gateway and will therefore need to provide linkages for pedestrians from other modes between the South Terminal and South Terminal forecourt. Flows will include:

- Rail flows to and from South Terminal and via the APM to other terminals.
- Bus and coach flows to and from South Terminal and via the APM to other terminals.
- Car rental flows to and from South Terminal and via the APM to other terminals.
- Taxi, kiss and fly, short and long-stay car parking flows for the South Terminal.

These flows have also been factored into the requirements.

Concourse Area Provided

It is envisaged that a future Gatwick Gateway concourse will be located between and including the current pedestrian links connecting South Terminal and the Forecourt. This area is approximately 100metres long by 90 metres across the rail corridor and therefore provides for 9,000m² of space for the primary concourse in the Gateway.

Figure 11.9: Area Available between Pedestrian Connectors at South Terminal



At this stage, the current station concourse has not been included in any area requirement estimates. Including this area would provide another 4,000m² if required for the Gateway.

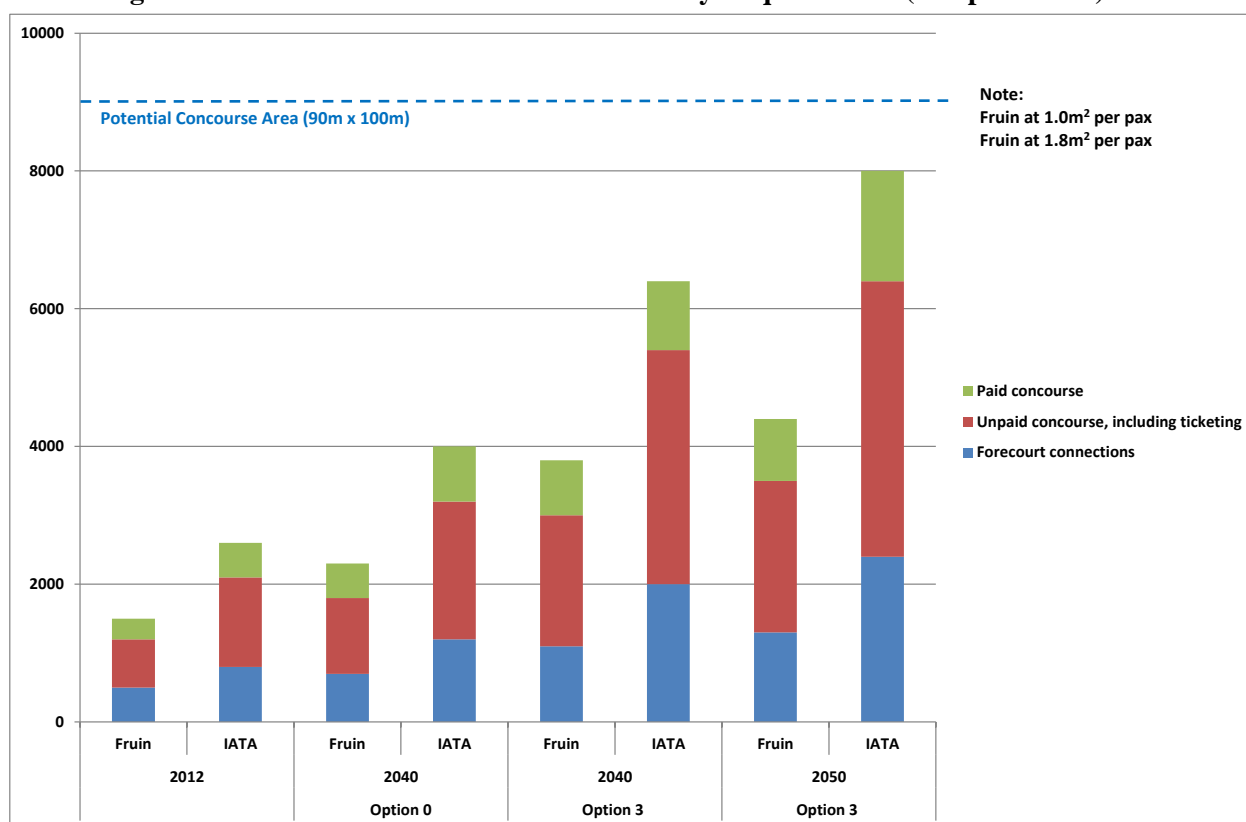
Minimum Concourse Requirements

Analysis has been undertaken to estimate area requirements assuming Fruin and IATA Level of Service standards for:

- 2012 (i.e. current requirements);
- Option 0 at 2040; and
- Option 3 at 2040 and 2050.

These are minimum area requirements and do not account for structural, mechanical and electrical or other back-of-house uses which may require additional space.

Figure 11.10: Indicative Station Size and Facility Requirements (PM peak hour)



Area Requirements (m²)

	2012		Option 0		Option 3		Option 3	
			2040		2040		2050	
	Fruin (1.0m ²)	IATA (1.8m ²)	Fruin (1.0m ²)	IATA (1.8m ²)	Fruin (1.0m ²)	IATA (1.8m ²)	Fruin (1.0m ²)	IATA (1.8m ²)
Forecourt connections	500	800	700	1200	1100	2000	1300	2400
Unpaid concourse, including ticketing facilities	700	1300	1100	2000	1900	3400	2200	4000
Paid concourse	300	500	500	800	800	1000	900	1600

Network Rail's *Station Capacity - Assessment Guidance*, dated May 2011, provides for 1.0m² per passenger at Level of Service B, which is based on Fruin. IATA recommends greater space per passenger of between 1.8m² and 2.3m² depending on the amount of luggage and trolleys. The above IATA area requirements assume luggage but no trolleys at 1.8m² per passenger.

For 2050 Option 3, assuming Network Rail standards, just under half of the available concourse area for the Gatwick Gateway is required for station flows and for through movements between the Terminal and Forecourt, meaning there is additional space for commercial and retail considerations. Assuming IATA Level of Service, 8,000m² is required for passenger flows through the Gateway, equivalent to almost 90% of the available area.

Greater area may also be required to achieve an appropriate distribution of vertical circulation between concourse and platform level.

The existing station concourse provides an additional 4000m² and this additional area could also be used if needed to provide more space or connections to other modes.

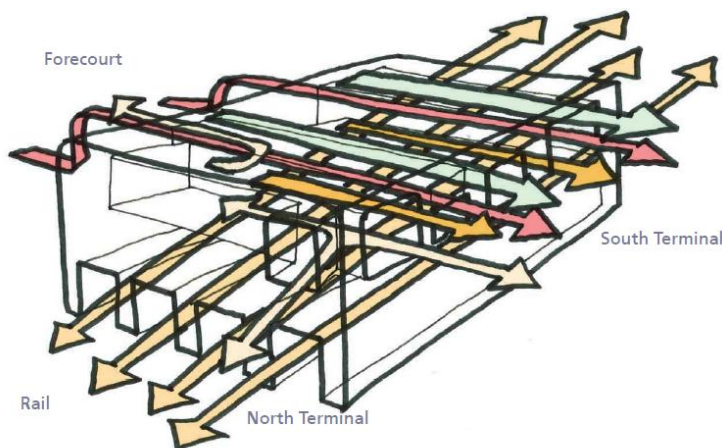
Pedestrian Flows

Current pedestrian flows through the station concourse, station overbridge and pedestrian link bridges convoluted, with counter-intuitive wayfinding in some locations and cross-flows and congestion at various locations.

- Flows between South Terminal and the Forecourt are via two pedestrian bridge links with moving walkways, with station concourse areas located between them and to the North.
- Flows into South Terminal from the rail station are signed via the overbridge.
- Flows from South Terminal are signed via the main railway station concourse.
- Flows to and from North Terminal are also signed via the main concourse meaning arrivals and departure cross-flows in this already congested area.

Figure 11.11 which is taken from a previous study shows the complexity of current flows through the station.

Figure 11.11: Current Complexity of Pedestrian Flows



Future design concourse design should therefore look to rationalise and direct movement across the concourse and preliminary conceptual design has tried to do this, though it is recognised that this needs further refinement through GRIP3 and GRIP 4 design study. It is envisaged that the deck will be built in a single construction phase, though components of the Gateway could be delivered as part of a phased fitout. Phasing is described later in Section 11.8 of this chapter.

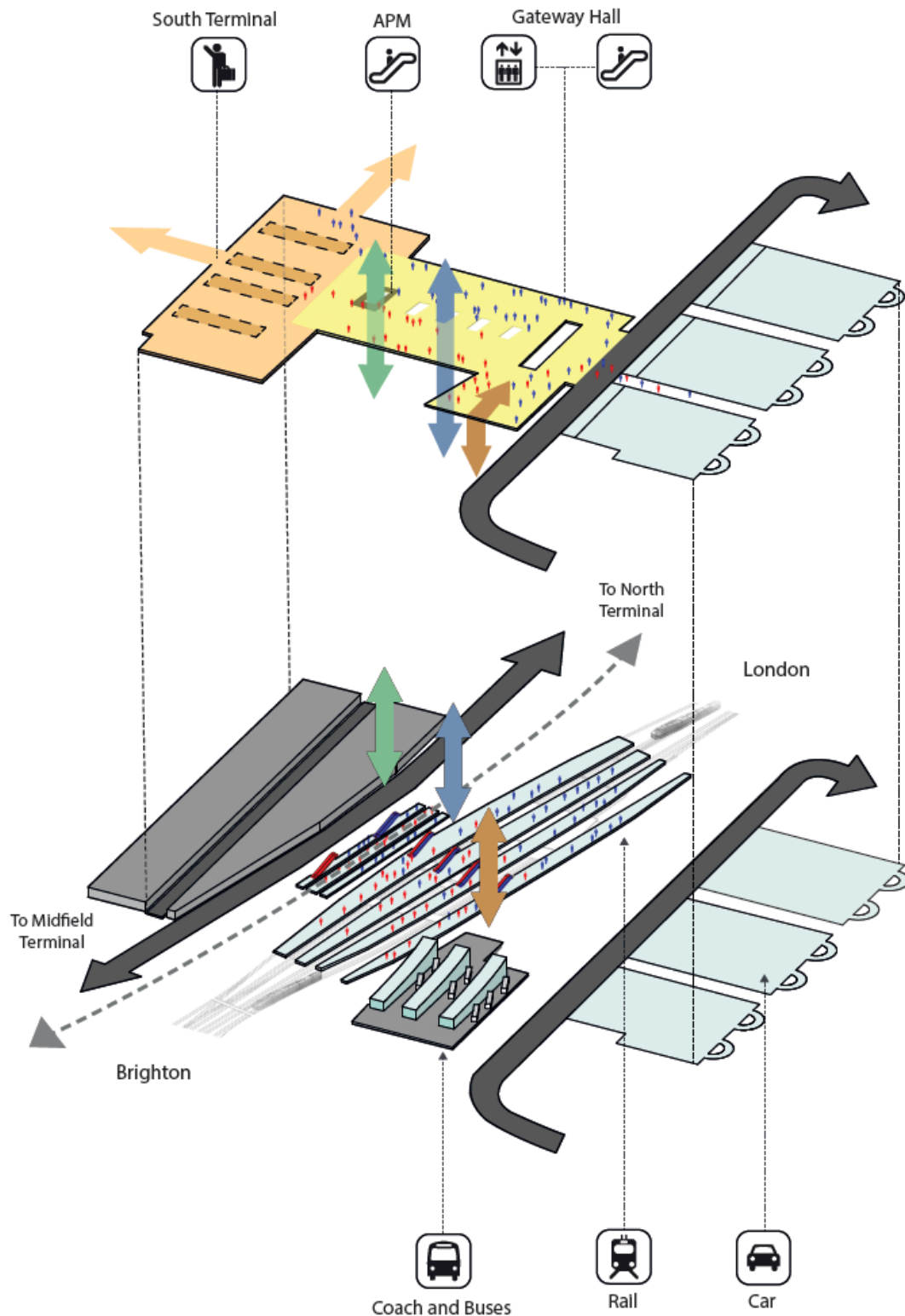
Figure 11.12: Potential Gateway Configuration

Figure 11.12 shows the two main levels of the Gateway, essentially concourse level and platform level. The concourse connects to South Terminal and across to the Forecourt. Rail flows between the platforms and concourse are indicated by the blue vertical arrow. Onward journeys to the North and New Terminals occur via the APM system indicated by the green vertical arrows, with passengers for

South terminal entering directly into the departure area. The brown arrow indicates vertical movement between waiting areas for bus and coach at concourse level and islands at ground level where buses will pull up and passengers will board and alight.

Optioneering demonstrates that a number of future configurations exist and these will influence pedestrian movement through the Gateway. The exact nature of flows will depend on the final location of the APM station, ticketing and waiting areas for other modes, entrances into the terminal and onto the forecourt, whether the rail station has ticket barriers or not.

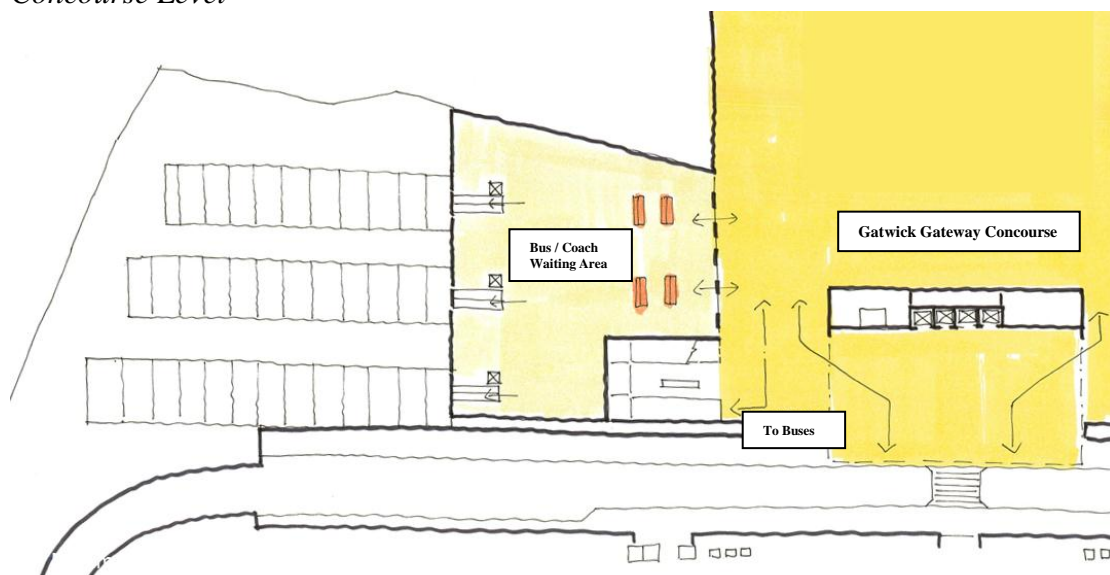
Development of the station concourse to achieve optimum movement patterns is intrinsically linked with Gatwick Gateway and integration of other modes.

It is envisaged that greater clarity about development of the concourse, pedestrian flows and integration with other modes will emerge through 2014 as design development moves from Masterplan concepts to actual design in light of the National Infrastructure plan funding.

11.4 Buses and Coaches

Infrastructure requirements for buses and coaches in the Gatwick Gateway will be developed in consultation with operators and local authorities. A potential bus and coach facility, integrated with the railway station concourse, is shown in **Figure 11.13**. At concourse level, passenger waiting areas will be provided in a high-quality, sheltered and climate controlled environment. Passengers will wait here until their coach or bus service arrives before walking down escalators to one of three islands or the existing kerb to board services.

Figure 11.13: Potential Configuration of Bus and Coach Facility
Concourse Level



“Platform” Level

Metrobus has indicated an interest in how best to offer continued access to both the airport and local commercial development following changes to local roads and Gatwick will continue to liaise with them to deliver the maximum benefits of a central interchange at South Terminal with high quality facilities and waiting areas. Gatwick is also consulting with coach operators, including National Express.

Consideration is being given to how local bus services that might serve Gatwick Gateway will also provide access to local workplaces and other terminals, where possible avoiding additional interchange, as well as the facilities required for these services. At this stage, initial options have considered expansion of the existing South Terminal forecourt for all bus and coach services in order to maximise use of existing infrastructure and integration with the east side of the Gatwick Gateway. The APM can and will provide rapid connections to each terminal and this will form part of the discussion with operators on service provision.

The introduction of a passenger transport interchange will provide enhanced facilities and increase bus mode share for both airport and non-airport trips. It is not intended that the Gatwick Gateway will fully replace access for buses and coaches to the North Terminal forecourt or, for Option 3, the New Terminal as this will provide choice and passenger convenience. To attract operators and remain competitive, attractive bus priorities may be required to ensure reliable journey times. This is an approach already adopted for the Fastway services and will ensure that the Gateway and other bus facilities at the airport are convenient for passengers and operators. These measures could include:

- Bus priority lanes along the A23 or other important bus routes, as appropriate and agreed with stakeholders;
- Bus only gates to access the terminals; and
- Bus only connections through the airport to minimise the time it takes to travel between terminals.

A new passenger transport interchange at the Gateway offers potential for consolidating facilities to enhance passenger convenience as well as providing additional capacity and opportunity for interchange to and from bus and coach.

11.5 Cycling

Combined use of cycles and public transport are an effective alternative to travel by private car, typically with public transport providing the long distance travel component and the bicycle offering door-to-door flexibility at each end of the journey.

Planning around the cycle network is developing options or providing a new route for National Cycle Network Route 21 alongside a diverted A23 to the east of the South Terminal. This would provide an enhanced, off highway route with linkages to Gatwick Gateway. Along the former Route 21 alignment, cycling will be possible but restricted to accessing either the north side or south side of the South Terminal with no through route.

A new cycle hub (and fitness suite for employees) will be provided in the Gatwick Gateway. The cycle hub will allow for safe and secure parking of bicycles and ticket barrier arrangements in the Gateway, if any, will allow for bicycle access.

These local access elements are explained in more detail in Chapter 9.

11.6 Walking

The Gatwick Gateway will be accessible from both the west and east side of the railway, and from multiple levels. Public footpaths will connect the Gateway to the rest of the airport site as described in Section 9.

Important for pedestrian access, connectivity and amenity through the Gateway will be whether the rail station needs to have barriers and therefore be “closed” or whether it can be “open”, with revenue protection limited to inspectors on Gatwick Express services, use of smart technology to validate tickets and at barriers at other stations on the network.

Typically in airport environments, passengers will have luggage so minimising the use of barriers and reducing level changes is an important consideration.

11.7 Automated People-Mover (APM)

A key consideration for the success of the Gatwick Gateway will be terminal access via an Automated People-Mover (APM). This is particularly important for a three terminal scenario. The landside APM will be the main access system for passengers to the North and New Terminals and thus will be fundamental to the operation of the airport. The APM will be designed to provide a seamless connection with a high level of availability for ease of use by passengers and staff, with sufficient redundancy to provide a minimum level of service during system disruption.

11.7.1 Existing System

The current APM system covers a 1.2 kilometre track length between the South and North Terminals. The system is a dual track double shuttle, with a central guideway and is driverless. Currently the system operates with a 2 minute travel time, at an average speed of 36 kilometres per hour.

The system comprises two train sets, each with three cars, totalling 6 cars. Although baggage trolleys are permitted, very few passengers take trolleys on board the APM. A design capacity of 48 passengers per car allows an appropriate level of passenger comfort, and accommodates trolley usage comparable to current levels.

With a 60 second dwell time at each station, the current nominal capacity of the system is 1,800 peak hour passengers as compared to current year demand of 1,100 peak hour passengers in each direction. The existing APM system is therefore considered to be suitably sized for existing demand loads, with capacity for demand growth.

Although the existing system operates with 3-car trains, both platforms were future-proofed for expansion to 4-car trains. This allows for the capacity of the existing system to be increased without significant cost implications or service disruption.

11.7.2 APM Assumptions

An assessment of future demand likely to use the APM system has considered both passengers and staff. The demand forecasts used are consistent with the basis of design for the Gatwick surface access strategy.

In terms of users of the APM system, the following assumptions have been made:

- All passengers by rail travelling to the North Terminal and any potential New Terminal will use the APM to or from the Gatwick Gateway.
- Car rental is assumed to be centrally located at the Gatwick Gateway and therefore the APM carries those car rental passengers wishing to travel to or from North Terminal or any potential New Terminal.
- All bus and coach is assumed to be located at Gatwick Gateway and therefore the APM again carries those bus and coach passengers wishing to access the North or New Terminals.
- Passengers by all other modes are assumed to access terminals directly or via bussing (e.g. taxi, kiss&fly, short and long-stay parking).
- The majority of future transfer movements are assumed to be airside, and therefore these flows are not carried by the landside APM system.
- A 10% uplift has been applied to represent meeter-greeters and well-wishers using the APM.

As noted above, the current public transport mode share is approximately 40% of passengers. Gatwick's target is to increase this mode share to 60% and it is intended that the Gatwick Gateway will deliver this step-change in mode share. As per the station concourse, the APM system has therefore been tested at these levels of demand.

11.7.3 APM Capacity

APM capacity has been tested at different horizons out to 2050 with a second runway. This analysis has concluded that:

- A 3-car system will suffice for the opening phase of any future New Terminal.

- By 2050, the system will require increased capacity, which may either be achieved through operating more frequent services, or by extending to a 4-car system.
- The APM system should therefore be built for 3-cars trains, with passive provision for expansion to 4-car trains (as per current design).

This flexible approach will allow the system to respond to the emerging growth and demand patterns, meeting the future needs of Gatwick and continuing to offer a high level of amenity for both passengers and staff.

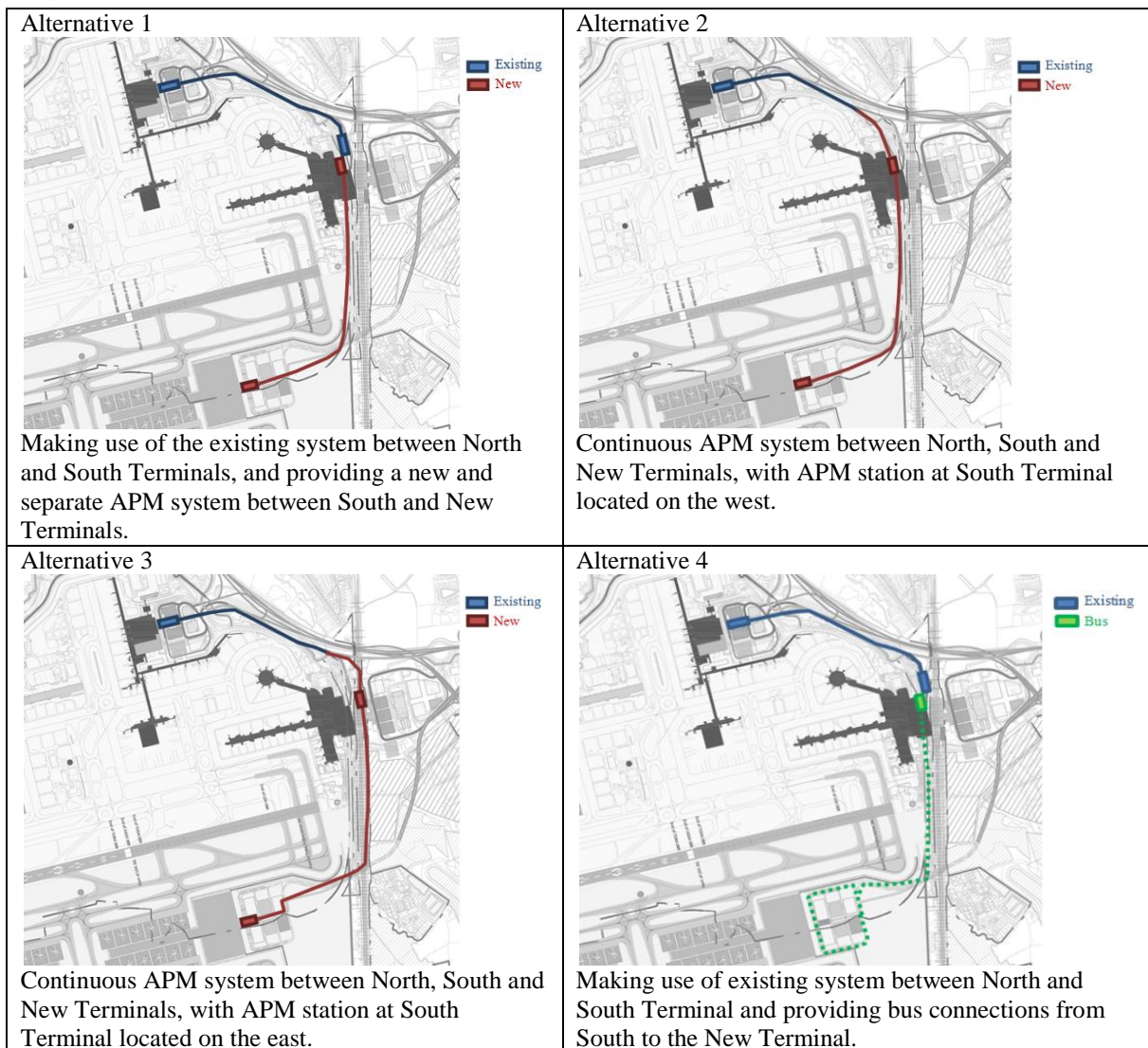
11.7.4 Future System Alternatives

For a future three terminal configuration, a new link will need to be provided between the South Terminal and any potential New Terminal and considerations include:

- The alignment of the new APM link – to the west or east of the railway tracks.
- Whether to have separate systems between North and South Terminals and South and New Terminals or a continuous APM system between all three terminals; and
- The location of the future APM station or stations at the Gatwick Gateway to provide the highest level of connectivity and ease of passenger routing.

For a three terminal configuration, analysis has been undertaken to assess the advantages and disadvantages of four potential future APM system alternatives as shown in **Figure 11.14** and described below.

- Alternative 1 – two separate APM systems, with the existing alignment connecting North and South Terminals and a new and separate link connecting the South and New Terminals. This alternative requires a new station at South Terminal which would be located on the west of side of the railway station, at grade on the former alignment of the A23. As described in previous sections, it is envisaged that the A23 will be relocated in the future.
- Alternative 2 – a single and continuous APM system with new APM stations at South and New Terminals. The existing APM station at South Terminal is closed. The new station at South Terminal would be located on the west of side of the railway station, at grade on the former alignment of the A23.
- Alternative 3 – this alternative also proposes a continuous system but with the station at South Terminal located on the east of side of the Brighton Main Line, elevated above the existing South Terminal forecourt.
- Alternative 4 – making use of the existing APM between North and South Terminals and using buses to the New Terminal from South Terminal. This is a lower capital cost alternative which could be achieved by two to three buses operating in place of one 4 car APM or a guided bus way.

Figure 11.14: Potential APM Alternatives – Indicative Only

11.7.4.1 Western Alignment

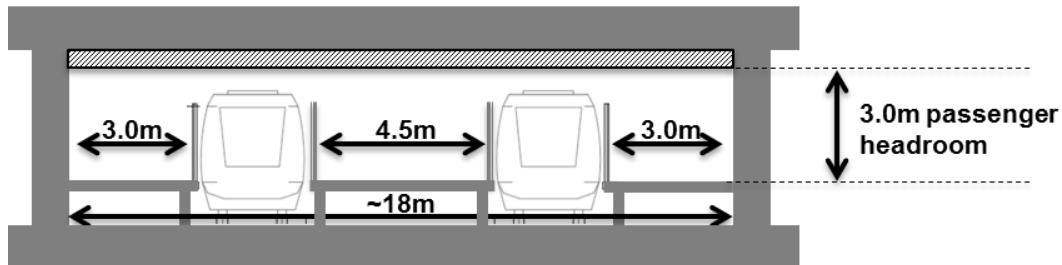
For Alternatives 1 and 2, the APM system would need to run along the west side of the Brighton Main Line, along the former alignment of the A23, passing beneath South Terminal at grade.

Engineering analysis has been undertaken to test the western alignment in terms of track design, structural support requirements and horizontal and vertical curve gradients. The alignment meets best practice requirements.

The APM station at South Terminal could be located directly underneath the terminal building, or could be positioned to the north side alongside the current APM station. Both options would be at grade. Both options would provide a direct connection to the Gatwick Gateway, allowing for fast interchange from public transport modes to the various terminals. The second station option might allow quicker APM to APM transfer when considering separate systems as per Alternative 1.

The following diagram indicates the proposed platform arrangement within the station, with two side platforms and one central island platform. The headroom shown is indicative of levels under the existing South Terminal. A three platform solution allows for segregation of boarding and alighting passengers, offering a more comfortable experience for passengers.

Figure 11.15: APM Platform Cross-Section, Western Alignment on A23



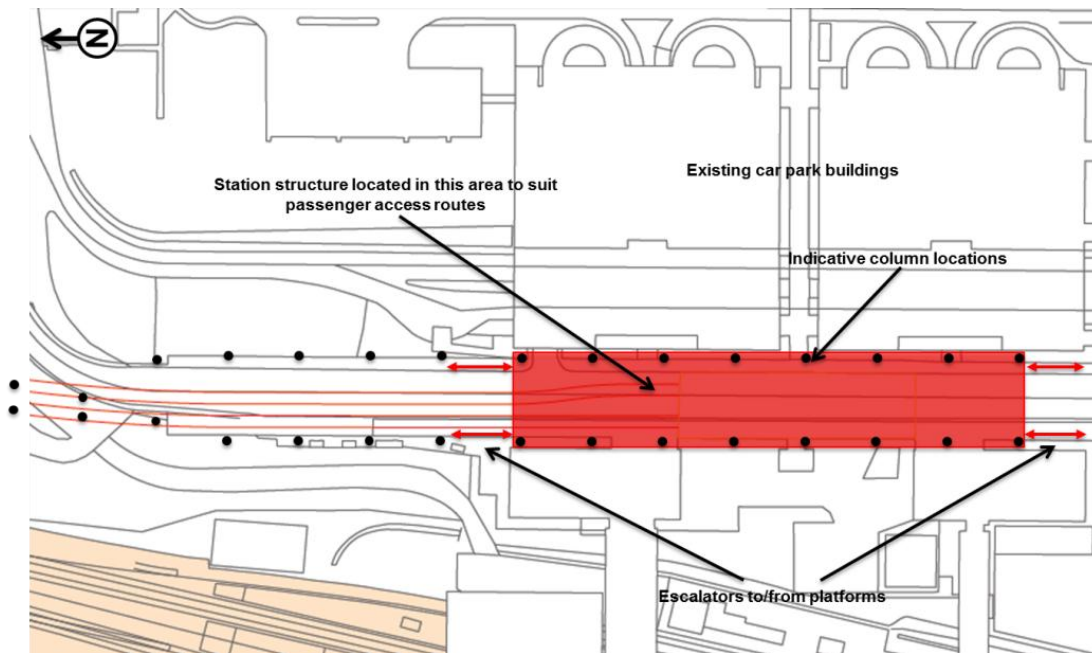
To connect South Terminal to the New Terminal, the APM alignment follows the current A23, rising gradually up to the west towards the New Terminal and arriving at mezzanine level in the New Terminal forecourt. This allows the track to remain at grade for most of the alignment.

11.7.4.2 Eastern Alignment

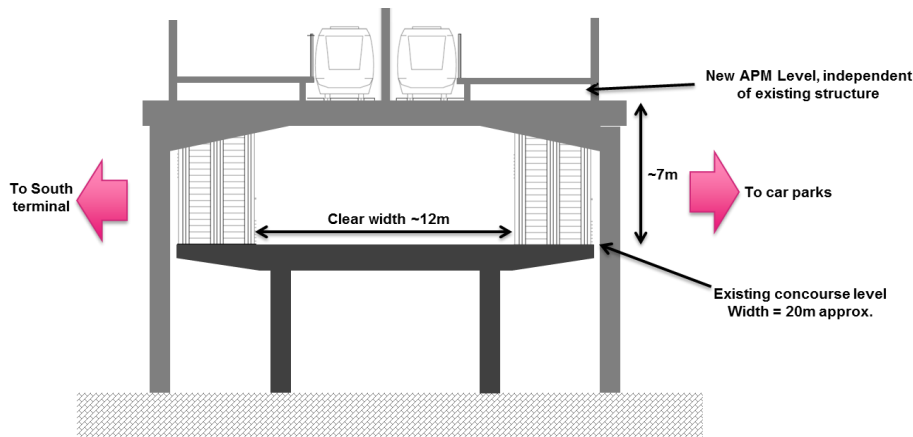
For Alternative 3, the APM system would need to run up and over to the east side of the Brighton Main Line, spanning the railway tracks, and turning to connect with Gatwick Gateway above the existing South Terminal forecourt.

Although a vertical and horizontal alignment can be achieved that complies with design guidelines, the horizontal gradients are sharper than the western alignment option and this option is therefore less attractive from a passenger comfort perspective.

The proposed station would be situated above the existing forecourt level, making use of the straight section between the South Terminal short-stay car park and the railway tracks. Supporting columns would need to be located around existing structure, adding to the complexity of this option.

Figure 11.16: APM Platform Plan View, Eastern Alignment on Forecourt

In order to provide vertical circulation to the platforms on either side, the width of the station box is constrained to 12 metres width, meaning only a two platform solution can be provided, without segregation of boarding and alighting passengers. This option is therefore less attractive from a passenger comfort perspective and may impact on APM operations given longer dwell times.

Figure 11.17: APM Platform Cross-Section, Eastern Alignment on Forecourt

To connect South Terminal to the New Terminal, the APM continues on an elevated track towards the New Terminal, lowering beneath the approach path of the existing runway and then rising to cross back over the railway and arriving at a mezzanine level at the New Terminal. The horizontal alignment in this section would need to avoid a number of constraints including a sewage treatment works, the existing railway and terminal access roads.

11.7.5 Preferred APM Configuration

For a two terminal configuration based around the current North and South Terminals, the existing alignment and stations can deliver future capacity.

For a three terminal configuration, the assessment of the two alignments, west or east of the Brighton Main Line, has identified that the western alignment is the most advantageous and is therefore preferred.

- The western alignment offers a better passenger experience on-board, with shallow gradients meeting best practice design criteria, whilst enabling a higher average speed that reduces journey times for APM passengers.
- The western alignment allows for dedicated boarding and alighting platforms at a new South Terminal APM station which prevents passengers heading in different directions from mixing on the platforms. This means greater passenger comfort and reduced dwell times for APM services which helps safeguard journey times.
- The western alignment avoids construction of bridges across the railway tracks. This has constructability and deliverability benefits.

The above assessment has therefore discounted Alternative 3.

Alternative 4 with buses is considered to be less attractive than transfer to rapid APM connection and may not allow Gatwick to realise its target for a 60% public transport mode share. Buses were considered in terms of providing a short-term solution for an initial build-out of the New Terminal but this has since been rejected by Gatwick as providing an unsuitable passenger experience.

Alternatives 1 and 2, respectively separate and continuous systems, running along the west side of the Brighton Main Line are comparable in terms of alignment. A continuous system is considered to provide the best inter-terminal connectivity for passengers and staff and at this stage is the preferred option, though construction and systems commissioning factors need to be considered and these will also influence the final design decision when it is made.

Journey times between terminals with a continuous APM system will be as follows:

- North Terminal to South Terminal = travel time of 2 minutes.
- New Terminal to South Terminal = travel time of 2.5 minutes.
- New Terminal to North Terminal = travel time of 4 minutes.

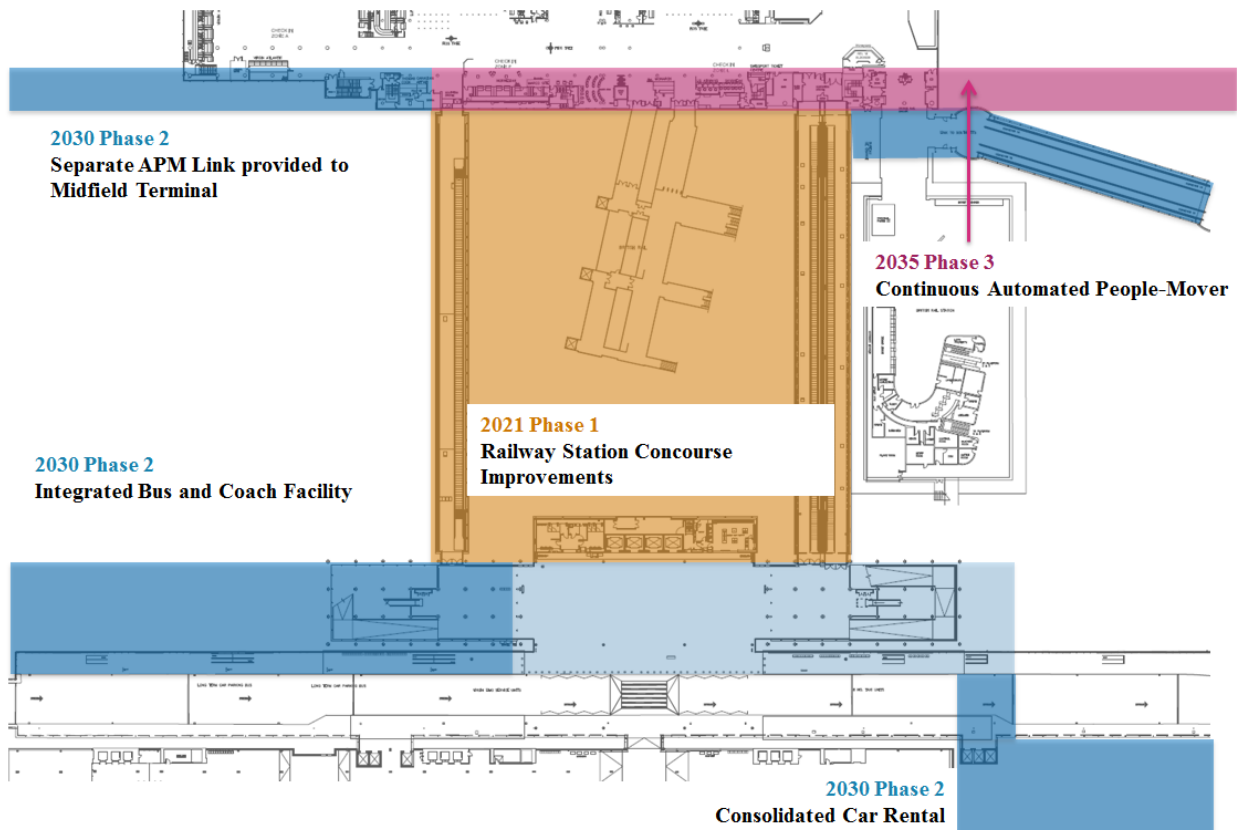
11.8 Summary Strategy

Bringing together enhanced rail connectivity, as delivered by the Thameslink Programme and Crossrail, as well as expanded bus and coach networks, the Gatwick Gateway will be the iconic arrival point at the airport for the majority of passengers by 2040. Centred on the existing railway station, with an expanded concourse and improved circulation, the Gateway will provide simple and seamless interchange between a myriad of transport modes including rail, bus, coach, taxi, car rental, walking and cycling.

The above work informs Gatwick's vision in the R2 ASAS which includes working with its partners to bring forward and deliver the Gateway in appropriate phases.

The first phase will involve working with DfT and Network Rail to bring forward improvements to the railway station concourse at an estimated cost of £200million, one quarter funded by Government and the rest by Gatwick and partners – as shown in orange in **Figure 11.18**.

Figure 11.18: Indicative Phasing of the Gatwick Gateway



Gatwick will then fund two additional phases. The second phase – shown in blue – will entail extension of the Gateway around the railway station concourse, including provision of the integrated bus and coach facility and consolidated car rental facility. This stage will also see a new APM link being provided to the New Terminal as a separate system from the current APM to North Terminal. The intention in the third phase will involve linking the two APMs into one continuous system.

It is envisaged that the Gateway will provide benefits not only for air passengers and airport staff but also local residents and employees who will be able to take advantage of 24/7 public transport connectivity from the Gatwick region to the rest of the UK.

The Gatwick Gateway is integral to the Masterplan for a two runway Gatwick. It will make connections between modes of transport easier and create new journey opportunities. It will deliver quality passenger facilities as an interchange available to the whole region.

12 Catchment, Connectivity and Quality of Life

The Commission emphasises the importance of connectivity and catchment throughout the Appraisal Framework (issued on 2nd April 2014). The framework identifies an important consideration to be “how each proposal can facilitate the delivery of national and regional connectivity”, primarily in terms of air transport.

Gatwick believes strongly that surface access connectivity is important in terms of widening and spreading the benefits of air traffic growth across the South-East and the rest of the UK. This chapter sets out key elements of the Strategic Argument as to why the Gatwick proposal is well placed to address the UK’s surface transport connectivity needs, and how it will support the socio-economic development of local areas, regions and the UK as a whole.

In addition, the Appraisal Framework highlights the importance of enhancing the ability of “businesses to interact with the global marketplace” and how “for local communities, airports can have positive impacts in terms of transport connectivity and employment”. This chapter also highlights important initiatives, such as the Gatwick Gateway, which will provide a step-change in surface access connectivity and catchment both for local residents but also local employees and employers.

This chapter is supported by GIS mapping, provided in Appendix A, which reflects the journey times and accessibility of transport services from parts of the UK as well as proximity and ease of access to Gatwick. In particular, it provides specific evidence as requested in Section 11.13 of The Commission’s Appraisal Framework on p.97 in terms of:

- **The geographical proximity of Gatwick in 5 mile, 10 mile, 25 mile and under 50 mile catchments; and**
- **The surface access journey time proximity to Gatwick at less than 30 minutes, less than one hour, less than two hours and less than four hours.**

Mapping for these quality of life metrics is provided in Appendix A.

12.1 Catchment

In terms of catchment and based on the current geographical location of population, the number of people living in 5 mile, 10 mile, 25 mile and 50 mile catchments from Gatwick is as follows:

- 162,200 people between 0 and 5 miles;
- 237,000 people between 5 and 10 miles, equivalent to 399,200 between 0 and 10 miles of the airport;
- 5.417 million people within 10 and 25 miles, equivalent to 5.816 million between 0 and 25 miles of the airport; and
- 10.394 million people within 25 and 50 miles, equivalent to 16.210 million people within 0 and 50 miles of the airport.

12.2 Connectivity

Gatwick already has excellent existing public transport access, in particular by rail. Gatwick is the UK's best connected airport by rail and Gatwick Airport station is situated above the Brighton Main Line and is integrated with the airport's South Terminal. Gatwick currently has direct services to 129 rail stations; trains calling 24 hours a day, seven days a week; and there are up to 15 trains an hour to a range of London destinations.

In the future, Thameslink means that the whole of Central London will be within 60 minutes travel time from Gatwick and cities such as Cambridge will be about 90 minutes away with no change of train.

As described in Chapter 6, other rail upgrades mean direct trains to Oxford, Milton Keynes and Peterborough within the next 5 years. The improved train services mean that Gatwick is within 1 change of all the main UK rail lines. This includes Great Western (Bristol, Wales and the South West), West Coast Mainline (Birmingham, Manchester, Glasgow), Midland Mainline (Sheffield, Nottingham, Derby), East Coast Mainline (Leeds, Newcastle, Edinburgh) and SouthEastern services for the continent.

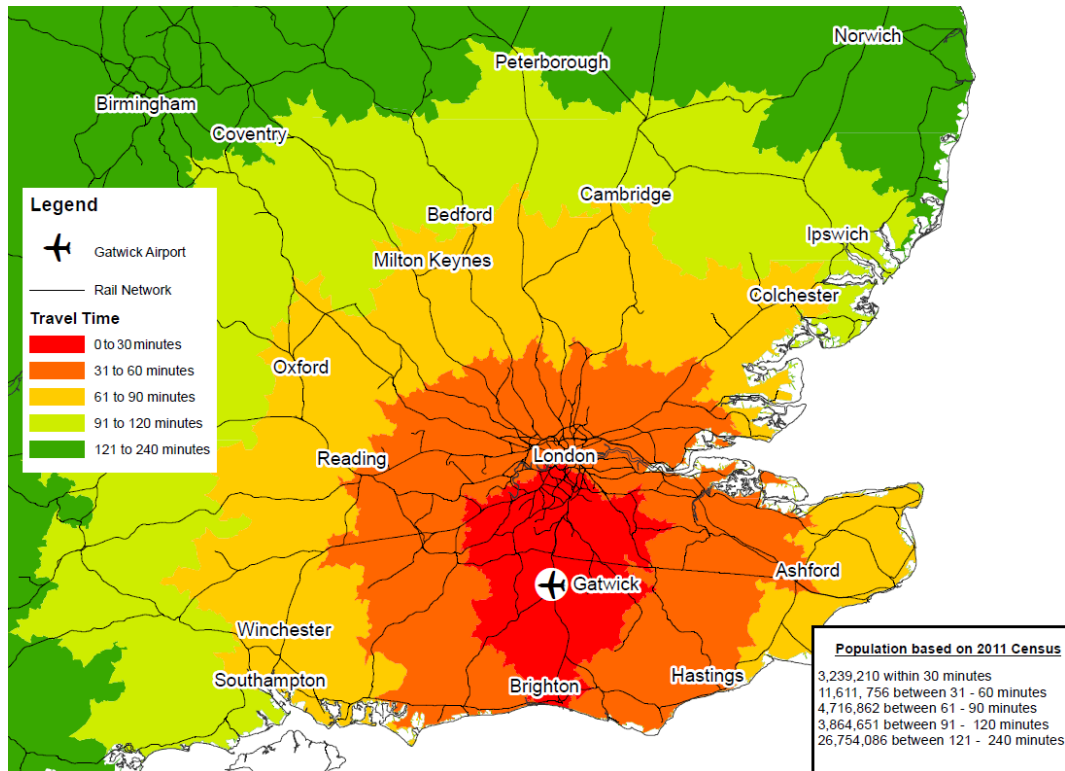
Once the committed Thameslink Programme is completed in 2018, **Gatwick will have direct services to 175 stations, over 1,000 railway and London Underground stations with just one change, and will be served by a train into London every 2.5 minutes in the peak.** This will support economic growth across London and the South-East and provide improved employment opportunities to many deprived areas across the region.

These schemes, allied with the extension of Oyster and smart ticketing, will help Gatwick **increase rail mode share to 50%** of a total public transport mode share of 60% by 2040. The other 10% will be delivered on bus and coach services.

The impact of enhanced rail connectivity will be to bring a wider population within 60 minutes of Gatwick by train, increasing Gatwick's attractiveness as a potential centre of employment. Gatwick is therefore ideally placed to benefit from the significant additional capacity and connectivity enabled by committed investment in rail on the Brighton Main Line and Thameslink corridors over the next decade.

In terms of future journey times across all modes, the number of people between 0 and 4 hours from Gatwick is as follows:

- 3.24 million people between 0 and 30 minutes;
- 11.61 million people between 31 and 60 minutes, equivalent to a total of 14.85 million between 0 and 60 minutes from the airport;
- 4.72 million people between 61 and 90 minutes, equivalent to a total of 19.57 million between 0 and 90 minutes from the airport;
- 3.86 million people between 91 and 120 minutes, equivalent to a total of 23.43 million between 0 and 120 minutes from the airport; and
- 26.75 million people between 121 and 240 minutes, equivalent to a total of 50.18 million between 0 and 240 minutes from the airport.

Figure 12.1: Journey time Isochrones by Road, Rail and Public Transport

As shown in **Figure 12.1**, the current catchment within 1 hour's travel time of Gatwick is 14.85 million people (3.24 million 0 to 30 minutes, plus 11.61 million 31 to 60 minutes).

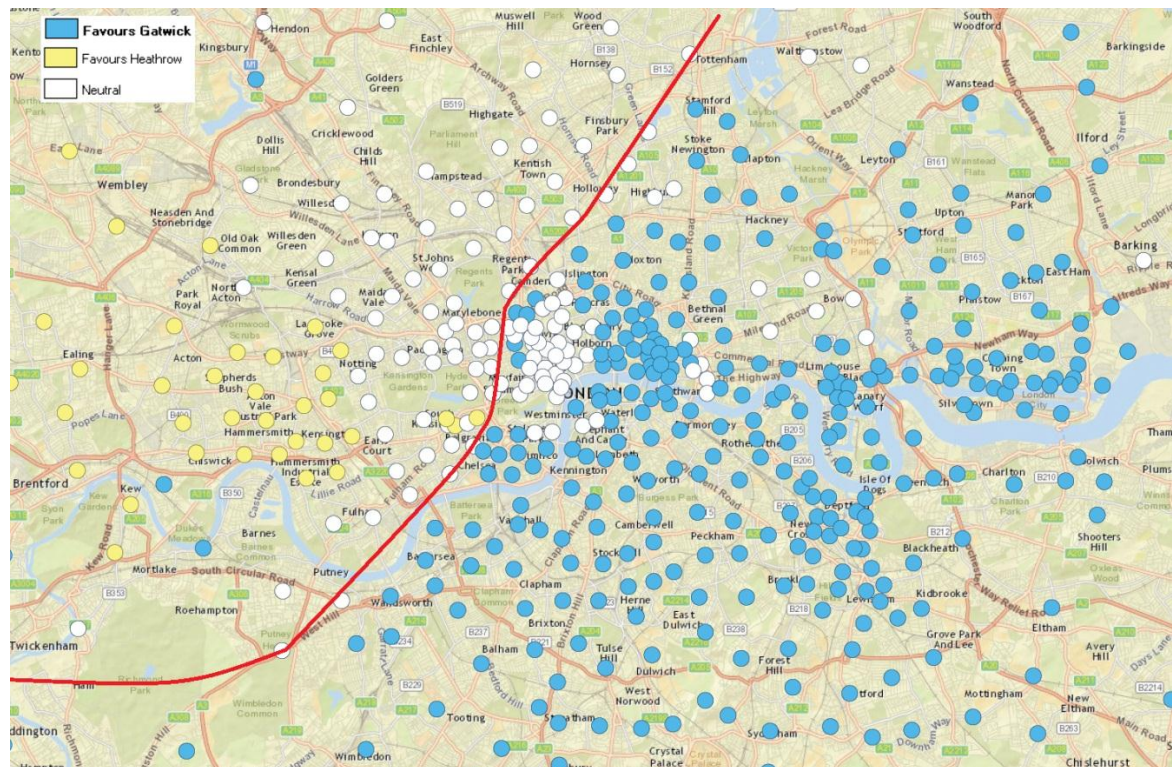
A scenario of two runways at both Gatwick and Heathrow generates the best connectivity and shortest journey times for Londoners, whilst providing choice and competition. This level of competition will safeguard the shortest travel to an airport for any particular journey and at the same time spread total customer load over a more extensive public transport network. Gatwick with a second runway is therefore advantageous in terms of spreading demand

Gatwick also has a greater catchment of London and is therefore the best choice for passengers from London using sustainable modes. The map in **Figure 12.2** has been generated from PLANET South, including future committed rail and London Underground schemes such as Thameslink, Crossrail and the Piccadilly Line upgrade, and reflecting generalised journey time⁹.

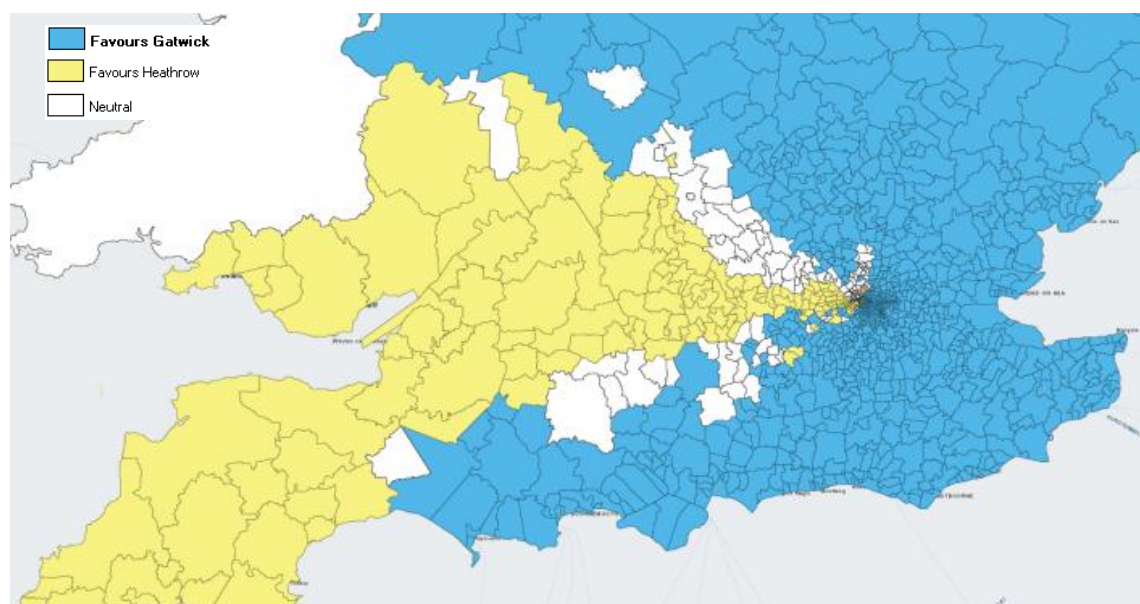
Generalised journey time is a composite of a number of things including access time to the origin station, time waiting for a service, boarding penalty, interchange time (and additional wait time associated with interchanging), in-vehicle time on trains/tube and egress time at the end of the journey. Non-in vehicle time units are also weighted using industry standard weightings.

For all areas with a blue circle or shaded blue it is 'quicker' to travel to Gatwick than Heathrow. For all areas shaded yellow it is 'quicker' to travel to Heathrow than Gatwick. White denotes areas where there is little difference in choice between Gatwick and Heathrow (+ or – 10 minutes).

⁹ HS2 is not included as it is not committed.

Figure 12.2: Line of Time Indifference between Gatwick and Heathrow (London)

It can be seen that Gatwick is more readily accessible for all parts of London east of Chelsea, Fitzrovia and Regent's Park, including both the City and Canary Wharf. In addition, most of the key London termini (except Paddington) are more accessible from Gatwick. Moreover these termini stations have or are undergoing capacity upgrades e.g. London Victoria, London Bridge, Blackfriars, Farringdon, King's Cross and St Pancras meaning they are well placed to accept the increased volume of airport users given improvements in both capacity and service quality.

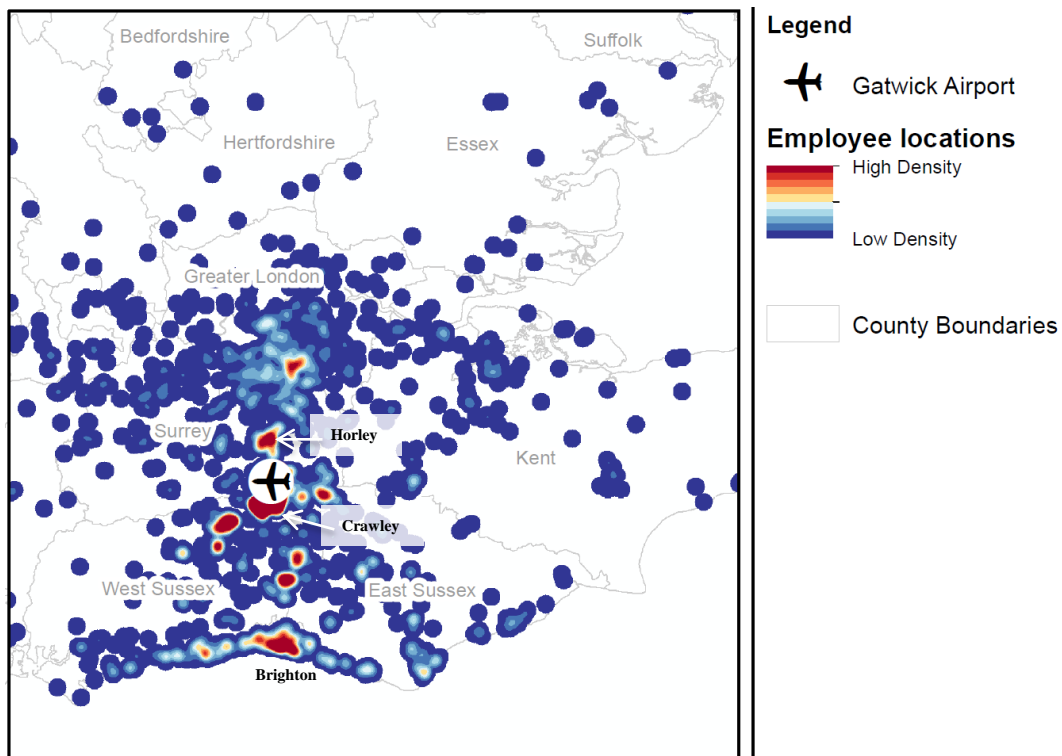
Figure 12.3: Line of Time Indifference between Gatwick and Heathrow (UK)

Customers prize most highly a local “front door” to access public transport, together with as few interchanges as necessary, to complete their journey to the airport. In that sense Gatwick’s superior rail connectivity will give it distinctive edge in attracting users to public transport. Gatwick will work with the Train Operating Companies and bus companies to boost its mode share through these “front doors”.

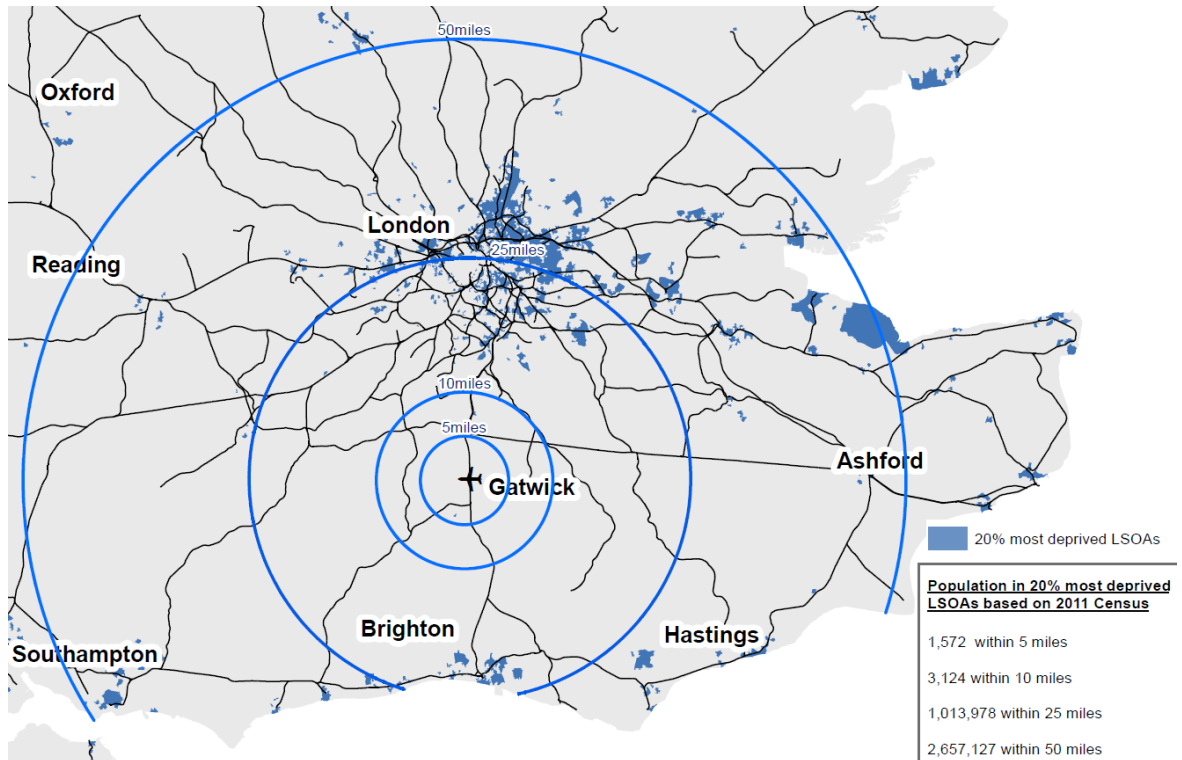
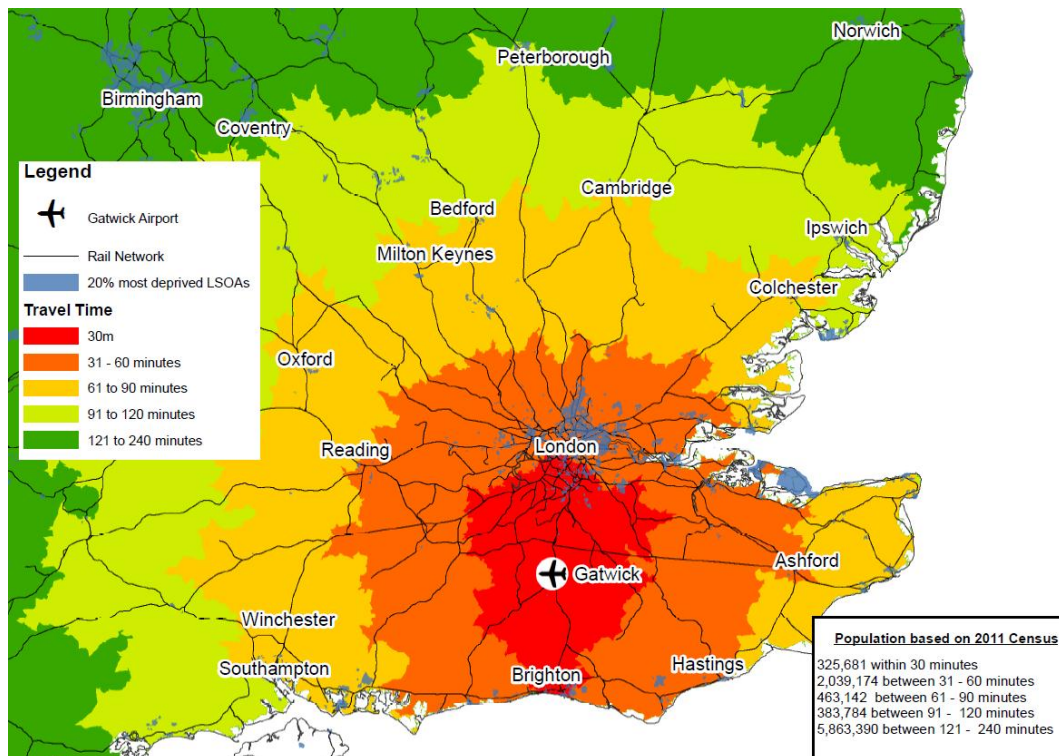
12.3 Economic Impacts

In terms of current employees, **Figure 12.4** shows how currently existing public transport connectivity, primarily running north and south, brings people to Gatwick for work and reaffirms that **greater planned public transport connectivity will deliver a whole new future for the Gatwick region and the South-East and along the south coast in terms of employment.**

Figure 12.4: Geographical Distribution of Gatwick Employees (2012)



The English Indices of Deprivation measure relative levels of deprivation in small areas of England called Lower layer Super Output Areas (LSOAs), essentially small local areas. **Over 1 million people from the 20% most deprived local areas live within a 25 mile radius of Gatwick** – as shown in **Figure 12.5**. As such, employment growth at Gatwick in the future can have a profound and positive impact on prosperity in the local area.

Figure 12.5: Catchment of Deprived Areas around Gatwick Airport**Figure 12.6: Journey time Isochrones by Road, Rail and Public Transport to 20% Most Deprived LSOAs**

When considering journey times, 2 million people from the most deprived areas for England live less than 60 minutes from the airport, most within a typical commute time of 30 to 45 minutes.

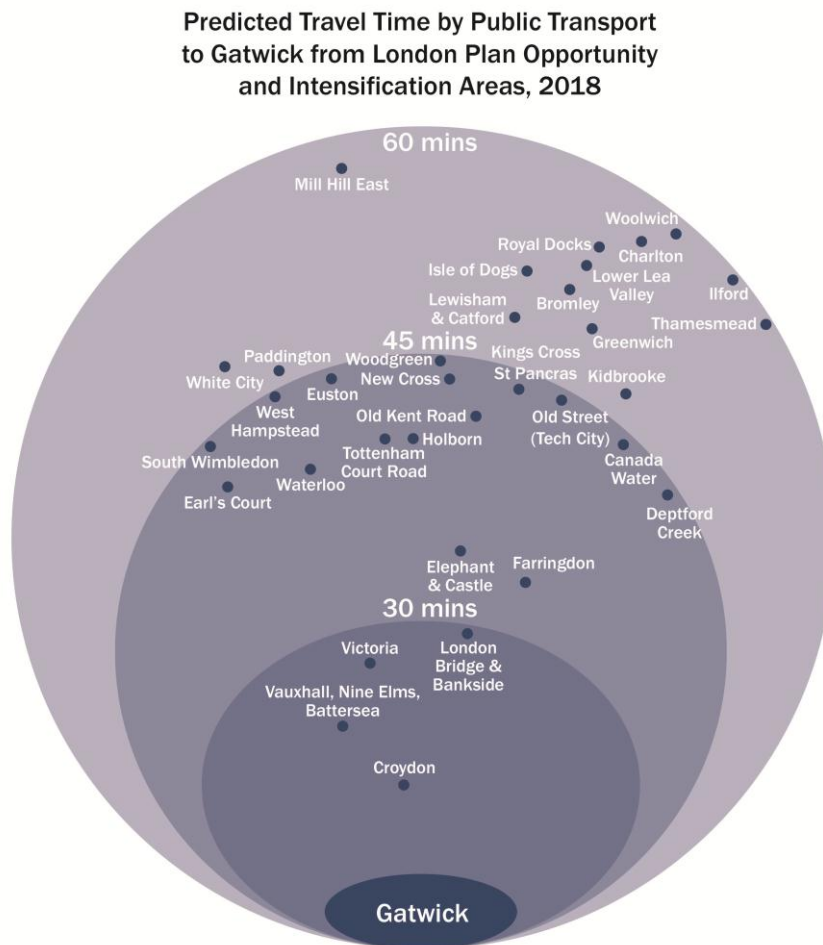
Indeed, there are nine London Boroughs identified as being in the “Top 20” most deprived authorities in the South East, six of which equally or more accessible to Gatwick by rail than Heathrow – these are London Boroughs of Greenwich, Hackney, Islington, Kensington and Chelsea, Newham and Tower Hamlets.

Gatwick therefore offers an opportunity to drive forward growth in London’s key Regeneration and Opportunity areas, including Croydon, as well as in poorer areas in Crawley and along the South Coast including parts of Brighton and Hailsham.

The proposal to expand Gatwick with a second runway seeks to focus on a **North South axis helping to rebalance the economy** away from the East West emphasis which has naturally occurred with the 2012 Olympics and future plans for the introduction of Crossrail.

Economic and physical flows to key Opportunity and Regeneration Areas will be fast, frequent and reliable thus maximising regeneration benefits. Areas such as Clapham Junction, London Bridge and Victoria are all within a 30 minute train journey and key inner London areas earmarked for growth such as Victoria, Vauxhall, Nine Elms and Battersea, London Bridge and Bankside all fall within Gatwick’s catchment when considering the line of time indifference in **Figure 12.2** and when considering employment as shown on the map in **Figure 12.7**.

Figure 12.7: Geographical Distribution of Employment Centres by Journey time



This North South axis will also boost the economy and support growth in parts of North London, including Tottenham and Finsbury Park, which are both experiencing significant investment and regeneration, given their connections to many parts of the capital and the airports of both Stansted and Gatwick.

Croydon, Sutton and the Wandle Valley all have ambitious plans to deliver on jobs and growth as well as to reduce deprivation. The expansion of Gatwick will accelerate their development as destinations and as a source of the workforce for an expanded airport.

At a more local level, with Gatwick Airport at its core, the informal boundary of the 'Gatwick Diamond' stretches from the southern edge of London to the northern boundaries of Brighton and Hove. Proximity to the Airport, good surface access and connectivity has helped create the conditions that have enabled the Diamond to grow as a national and international business location. This transport led growth will also be felt by communities along the South Coast: jobs created by Gatwick during the build and operate phases will provide significant opportunity for many of these communities.

12.4 Quality of Life

Gatwick's proposals for surface access have been developed with a view to improving the quality of life for local communities and the local economy.

The local community also uses Gatwick to connect their journeys by all modes of transport to access jobs and leisure activities across the South East. Gatwick's proposals are highly supportive of this, with the main considerations for local residents and employers as follows:

- Gatwick rail station is already used by 1 million local passengers a year.
- Once the committed Thameslink Programme is completed in 2018, Gatwick will have direct services to 175 stations, over 1,000 railway and London Underground stations with just one change, and will be served by a train into London every 2.5 minutes in the peak. This will support economic growth across London and the South East and provide improved employment opportunities to many deprived areas across the region.
- It is envisaged that the Gatwick Gateway will provide benefits not only for air passengers and airport staff but also local residents, employees and employers who will be able to take advantage of 24/7 public transport connectivity from the Gatwick region to the rest of the UK. We believe this strongly supports improving the quality of life for local residents.
- Gatwick will increase the Passenger Transport Levy that it uses to support local bus services, providing pump-priming and ensuring early morning, late evening and weekend services run for staff shift patterns. Indeed, Gatwick positively contributes to the viability of public transport schemes for local residents and employers by helping increase patronage of contra-peak services out of London in the AM peak and into London in the PM peak.
- Gatwick is proposing to deliver new bus priorities and dedicated routes for local buses to access the airport, supporting sustainable travel for all.

- The proposed road network has been designed to deliver better access and to benefit local communities, including realignment of Balcombe Road as a local road with connection to Antlands Lane. This will also help safeguard journey times for local trips.
- Where congestion occurs on the road network around the airport, Gatwick is proposing to set up a Local Highway Development Fund to support road improvements by Local Authorities where Gatwick traffic is one of a number of contributors to junction capacity issues.
- The Option 3 Masterplan proposes 9km of new cycle paths and pedestrian rights of way. The Masterplan includes provision of a new through route to become NCR 21, a new cycle super highway that will follow the proposed realignment of the A23. Separate pedestrian rights of way will also be provided along the A23. This provision exceeds the length of local footpaths lost due to expansion and enhances connectivity when compared to current conditions (i.e. various circuitous and disconnected pedestrian rights of way around the airport).

Ultimately the most significant positive impact will be jobs during construction and operation, both direct and indirect. The strength of Gatwick's public transport reach means that these opportunities will be open not only to people living in close proximity to the airport, but also to many of the most deprived communities along the south coast and those on up north through London: Croyden, Lambeth, Lewisham, Southwark and Hackney.

In essence the new airport will:

- create a north/south corridor of opportunity;
- help achieve the London Plan;
- rebalance the South-East and London; and
- provide opportunity for the 1 million people in deprived local communities within 25 miles of Gatwick.

13 Resilience and Reliability

The Airports Commission has identified “reliability and resilience of surface transport links” as an important element of an airport’s R2 ASAS.

13.1 Current Situation

Gatwick currently has a 24/7 surface transport operational response team to enable it to react and respond to incidents or accidents at the airport, as well as on transport networks approaching the airport.

Gatwick is the only UK airport to still have this type of team with other airports, including Heathrow, have disbanded their teams and passed responsibility to other agencies.

The role of the operational response team is to make sure everything runs smoothly. This includes managing and inspecting the road network and using established safety techniques to monitor, analyse and prevent accidents. In addition, Gatwick’s team is also equipped with a snow fleet to clear roads in winter conditions as well as flooding kits in order to be able to respond to extreme wet weather events.

Gatwick has implemented joined-up rail contingency planning with Network Rail, relevant Train Operating Companies and TfL. This aligned thinking and coordinated response has been clearly demonstrated during planned closures over Christmas 2013 (as described in the section below). Clearly the new Thameslink Southern Great Northern (TSGN) franchise means that this relationship will need to be revisited and new protocols developed. However, all of the Thameslink bidders have committed to enhancing the operational relationship with Gatwick.

The safety response to accidents and incidents on the road network is governed principally by Highways Regulations. Gatwick’s approach is to have a comprehensive strategy to manage these risks, based on leadership and behaviours, effective management systems, assurance systems and performance management. In addition, protocols are in place with key stakeholders and agencies, including West Sussex Police, in order to deliver a rapid and coordinated response.

13.2 Rail Infrastructure

As part of understanding rail resilience, Gatwick has met with current rail operators, including Southern Rail, in order to establish existing responses to disruption.

13.3 Network Rail

Published in January 2013, the Network Rail Sussex Route Plan identifies the long-term strategy for the Sussex Route and is focused on enhancing capacity to meet forecast traffic growth, whilst undertaking a renewal programme to address sustainability, resilience and asset performance. The Plan recognises that there is a balance required between increasing capacity and improving reliability through planned upgrades.

In terms of asset resilience, Network Rail is engaged in a continuous process of upgrading physical infrastructure such as signals and tracks. The strategy for signal assets has been “to focus on cable renewals, relay renewals, conversions from analogue equipment to digital, gauge at points and remote condition monitoring”.

The Route Plan also identifies that the Thameslink Key Output 2 improvements will deliver a step-change in capacity, noting short-term construction issues related to delivering major infrastructure changes, such as at London Bridge Station.

Once fully operational in 2018, the Thameslink Programme will provide improved resilience reducing the current dependency of Gatwick services on the London Victoria route (28 peak period services to/from Victoria currently as compared to 7 for London Bridge). The Thameslink Programme means a robust second connection to central London providing an alternative if there are delays or disruption on the Victoria route. There are also turnback facilities at London Bridge and Blackfriars for Thameslink services.

The main control centre for whole Thameslink franchise will be located less than a mile from Gatwick at Three Bridges. This will include a new signalling facility which will eventually control most of the railway across Sussex and Surrey, as one of 12 similar facilities planned to operate the entire rail network across the UK. From this centre, Network Rail can work with operators on emergency response planning and keep the maximum capacity available for as much time as possible. The proximity to the airport will facilitate a close operational relationship between Gatwick, the Thameslink operator and Network Rail.

The management approach based on the new ROC extends to the way in which communication systems help a more effective response to different factors affecting the railway, including:

- Power supply interruptions
- Critical and seasonal weather
- Network maintenance plans
- Renewals and replacement programmes

Closer to Gatwick, there are a number of alternatives when disruption occurs given the availability of two routes north of Gatwick – namely the Quarry Line and the Redhill line with two routings again providing resilience by allowing for re-routing of services as appropriate.

There is also scope to turn trains back at Three Bridges helped by one of the new Thameslink depots being there e.g. if the Ouse Viaduct or Arun Valley line is experiencing disruption, frequency through Gatwick can still be maintained.

13.4 Thameslink Network

The future Thameslink network around Gatwick is currently operated by Southern and First Capital Connect.

Southern operates 765,000 trains per annum (the second highest number of trains in the country) and carries 22.5 million passenger miles per annum. The franchise

is profitable, and on average DfT earns 6p per passenger mile from the franchise (this is the third best return in the country behind First Capital Connect – also to become part of the combined TSGN franchise - and South West Trains).

Southern works very closely with Network Rail, and a joint Regional Operations Centre at Three Bridges now controls all trains on the network with staff working alongside each other and taking joint operational decisions.

Network Rail has reported that service reliability has improved dramatically in 2013 with the benefit of resilience works that have already taken place, and Southern ran 93% of all services during the recent weather disruption rather than 70% in 2010.

The Brighton Main Line already carries more passengers than any other main line in the country, and therefore network performance is important to the whole of the south of England. The Brighton Main Line is not a single corridor - it has a number of built-in diversionary routes, which increase resilience.

North of Gatwick there are two independent routes as far as Purley. Beyond East Croydon there are three independent routes to London termini, again able to be used to divert services when necessary. From South Croydon, there are five tracks to provide additional 'tidal flow' capability. A completely independent route to London is also available via Horsham and Epsom. In times of operational disruption, all trains from Gatwick can use any route to London.

The resilience of the services at Gatwick is best illustrated by the planned closure at Christmas 2013, with Gatwick, Network Rail and Southern collaborating and coming to a joint decision to remove 13 – 14 individual weekend rail closures and combine them into one closure over the Christmas period of 8 days (of which 2 days were annual closures). Combined with the collaborative communication package and the shortened disruption period, this resulted in a far better customer experience during a difficult but necessary enhancement programme. Even with the Oxted landslip, which then closed a section of the planned alternative route, a new route was opened within a day allowing the planned closure to proceed successfully.

Overall communications between Gatwick and the rail operator are strong, with joint ownership of issues and contingency response, such that both parties work to resolve incidents jointly using consistent passenger communications.

In summary, for rail:

- The very busyness of the Brighton Main Line provides the service resilience required to accommodate airport expansion.
- Significant investment is going into the Brighton Main Line to increase reliability, and once these works are complete by 2018, reliability will increase to above the South-East average.
- Gatwick has one of the widest ranges of through train destinations of any station in the south of England, which makes it an ideal transport hub with a number of alternative routes, including two to London in terms of Victoria and London Bridge.

- Gatwick works closely with Train Operating Companies, including Southern, and indeed the working relationship with Southern has been identified as being best practice and has been nominated for the Air Rail Awards 2014.

13.5 Road Resilience

13.5.1 Context

Gatwick has a strong working relationship with West Sussex and Surrey County Councils, the Highway Agency and West Sussex Police, working with these organisations when planning diversionary routes.

This coordinated approach is best illustrated by an incident in January 2012 when there was an accident on the main terminal access road to South Terminal. Within minutes, Gatwick had implemented a diversion for South Terminal traffic to North Terminal to keep passengers moving and, with the help of emergency services, was able to reinstate access back to South Terminal within 2 hours.

Looking ahead, it is recognised that Option 3 will require an update to contingency planning, given that the network will be significantly reconfigured to reflect the future terminal configuration. This update to contingency planning will be required both for construction phases and for full build-out of Option 3. However, the network has been planned with resilience in mind, as described in the next section.

13.5.2 Alternative Routes

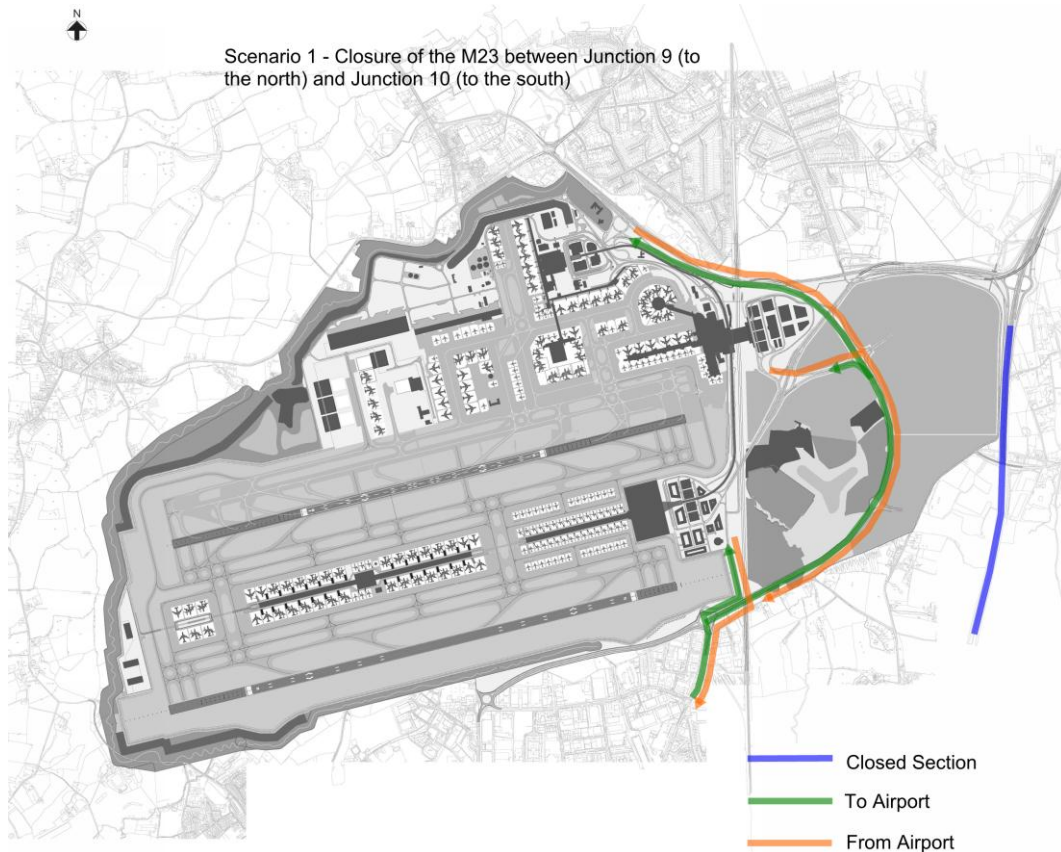
The future road network at Gatwick as set out in Chapter 9 and has been designed to include for resilience. The following section identifies alternative highway routes to and from Gatwick for a number of theoretical scenarios assuming closure of sections of road in the vicinity of Gatwick. A description of the potential alternative routes for airport related traffic to and from the terminals is provided to give an indication of the resilience inherent in the network.

The following scenarios are considered:

1. Closure of the M23 between Junction 9 (to the north) and Junction 10 (to the south).
2. Closure of the southbound slip from the M23 to Gatwick Airport M23 between Junction 9 and 9a.
3. Closure of the northbound slip from the M23 to Gatwick Airport M23 between Junction 9 and 9a.
4. Closure of Junction 9 on the M23 (slip road operation maintained).
5. Closure of the realigned A23 junction with Ring Road South and Ring Road North.
6. Closure of the realigned A23 to the east of the junction with Gatwick Road.

7. Closure of the realigned A23 to the west of the junction with Gatwick Road.
8. Closure of the A23 to the south-east of the junction with Povey Cross Road and Brighton Road.

1. Closure of the M23 between Junction 9 (to the north) and Junction 10 (to the south)



To Gatwick Airport

The routing for vehicles travelling southbound on the M23 (to the airport) would be unaffected by this closure and would continue to access the M23 Junction 9a via the slip roads at Junction 9. However, journey times on this route may be impacted due to non-airport related traffic diverting onto other roads (such as the A23) in order to continue their journey beyond the closed section and then re-join the M23 further south. It is likely that southbound traffic would be diverted via the A23, Gatwick Road and Crawley Road back onto the M23 at Junction 10.

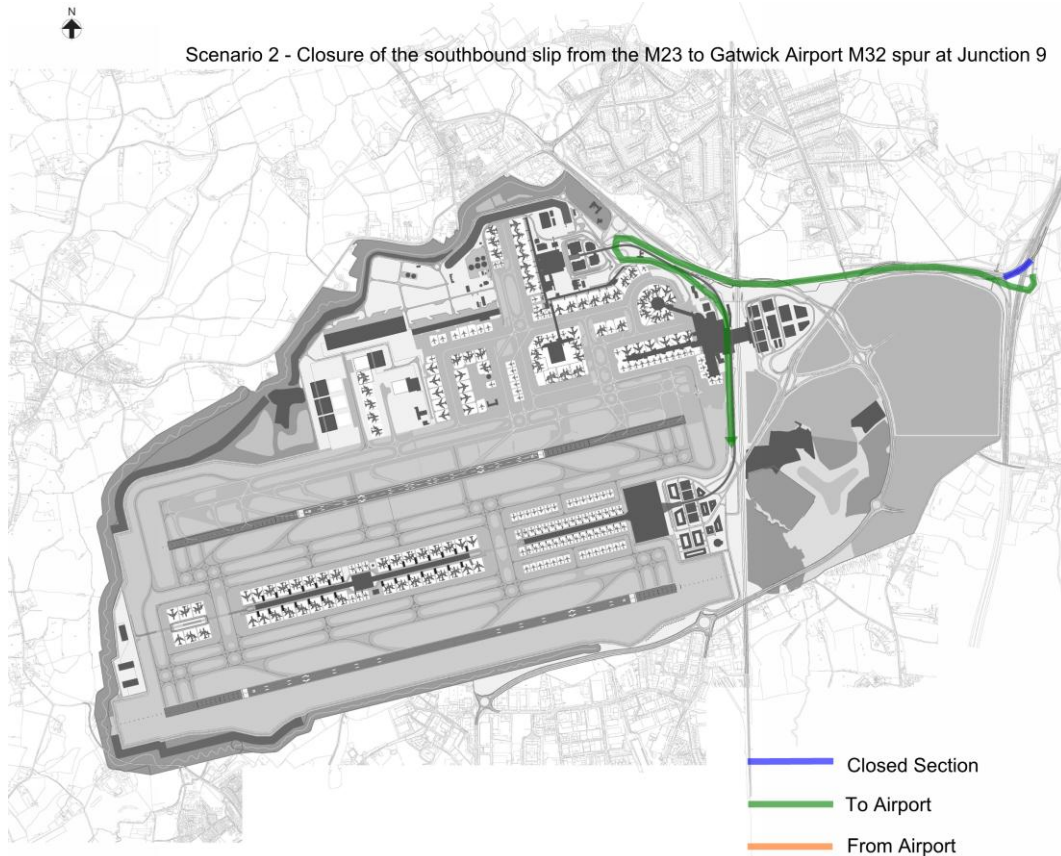
For northbound vehicles travelling to the airport the shortest available route would be to exit the M23 at Junction 10 and continue via Crawley Avenue, Gatwick Road and the A23. Alternatively the secure link to the New Terminal located to the north of the Gatwick Road junction and the A23 could be opened to ease pressure on the A23 and provide multiple, to terminal routes.

From Gatwick Airport

For vehicles travelling from the airport in the northbound direction they would be largely unaffected by this closure (other than potential increased traffic congestion that may occur). For those vehicles wishing to travel southbound, the A23 would

provide an alternative route that connects to the North, South and New Terminals. Via the A23, Gatwick Road and Crawley Road vehicles could travel southbound and connect to the M23 at Junction 10 to avoid the closure. Alternatively the secure link from the Gatwick Road junction with the A23 could be used to divert traffic from the terminals.

2. Closure of the southbound slip from the M23 between Junction 9 and 9a



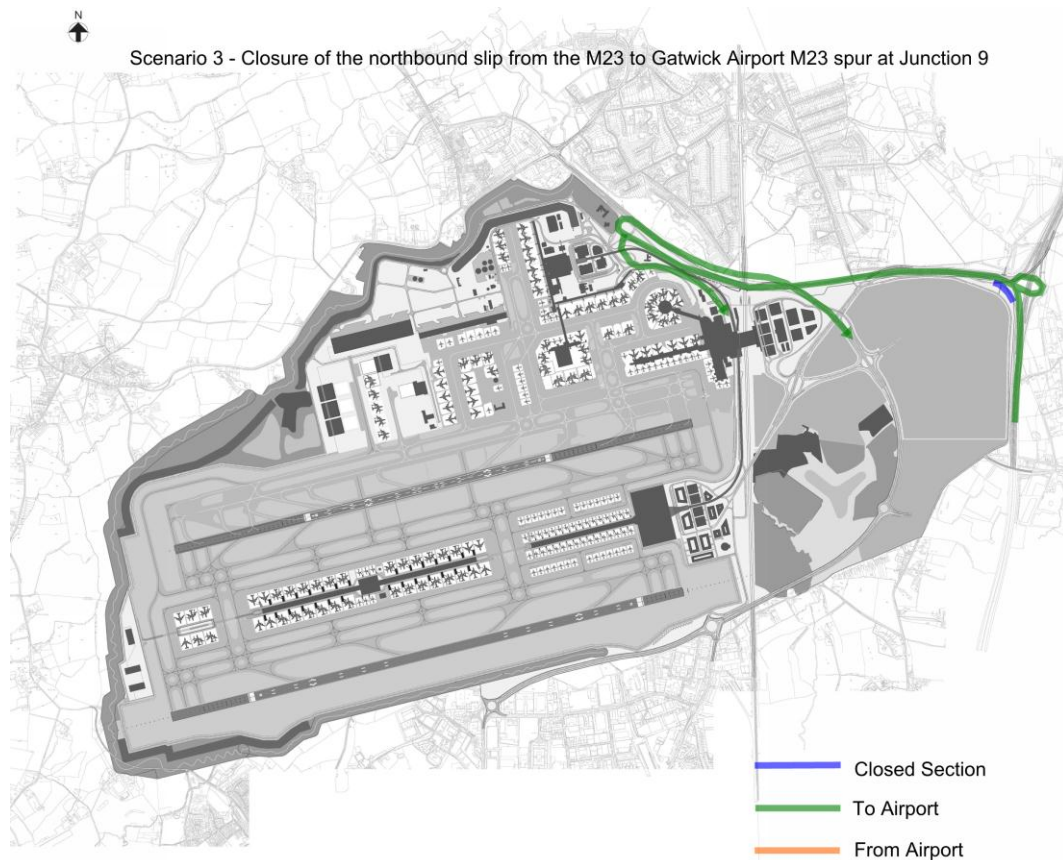
To Gatwick Airport

The closure of this link would primarily impact upon those vehicles travelling to the South and New Terminal buildings. An alternative route via Junction 9 on the M23 would allow vehicles to travel via the A23 towards the North Terminal. From there, the local Gatwick Airport road system could be used by vehicles to continue their journey or alternatively they could 'u-turn' via the North Terminal roundabout and travel southbound on the A23, connecting to the South and New Terminals.

From Gatwick Airport

For vehicles travelling from the north, south or New Terminals their routes will be unaffected by the closure of the southbound M23 slip. However, it should be noted that the use of alternate routes may increase traffic on the network in the vicinity of the airport and may therefore impact upon journey times for vehicles wishing to depart from the terminals to the strategic highway network.

3. Closure of the northbound slip from the M23 between Junction 9 and 9a



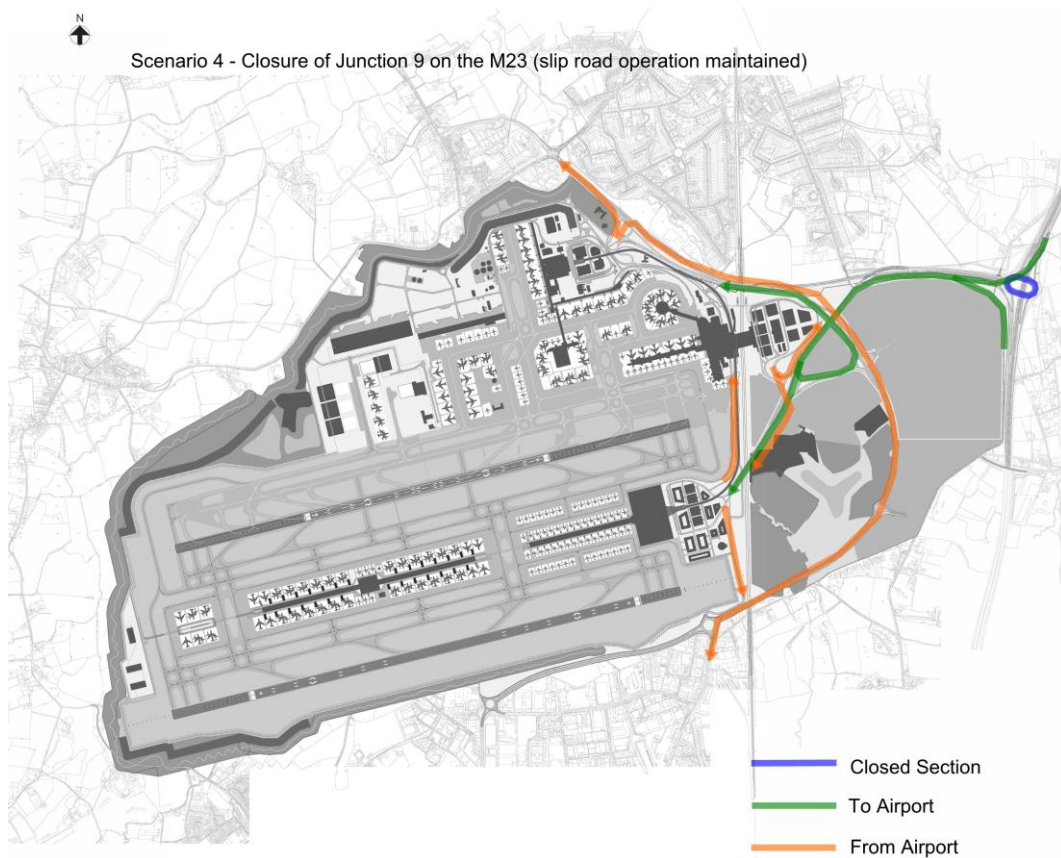
To Gatwick Airport

The closure of the northbound slip would primarily impact upon vehicle routing to the south and New Terminals. The closure of this link would require vehicles to use Junction 9 on the M23 to travel towards the North Terminal. At the North Terminal roundabout vehicles may then either u-turn and use the facility at the A23 to access south and New Terminals or use the local road network from the North Terminal. It is likely that the alternate routing would increase traffic on the A23 and the roads and junctions in the vicinity of the North Terminal.

From Gatwick Airport

The closure of the northbound slip will not affect vehicles wishing to access routes from the airport. It may however impact upon congestion in the vicinity of the airport due to alternative routes used by vehicles travelling to the terminals.

4. Closure of Junction 9 on the M23 (slip road operation maintained)



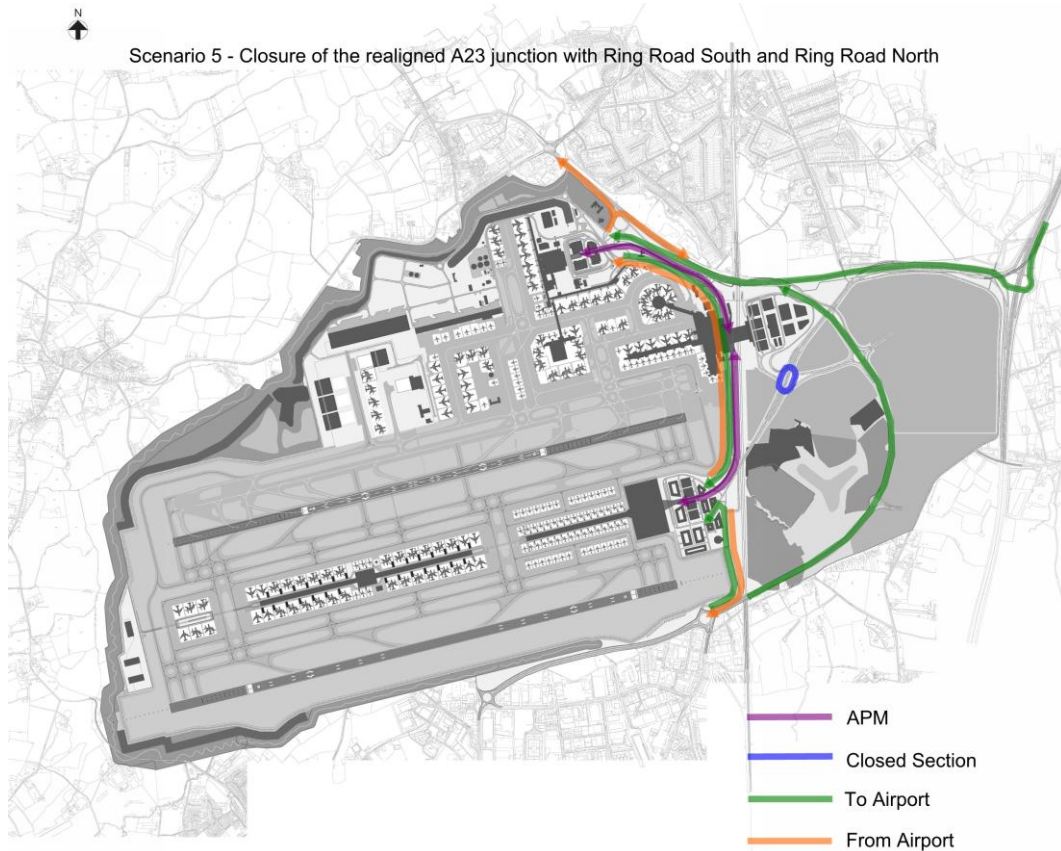
To Gatwick Airport

The closure of Junction 9 would affect the routing of airport related traffic travelling to and from the North Terminal. Vehicles wishing to travel to the North terminal may be required to use the southbound or northbound slip roads at the junction that would take them toward the South and New Terminals. From there, the internal Gatwick road system could be used to facilitate routing of traffic to the North Terminal forecourt. Alternatively, at the South Terminal roundabout vehicles may u-turn to the A23 and from there continue toward the North Terminal. It should be noted that there may be potential journey time impacts incurred from non-airport related traffic diversions causing congestion on alternative routes

From Gatwick Airport

The closure of Junction 9 would largely affect those vehicles wishing to travel northbound on the M23. All traffic from the north, south and New Terminals would be required to use the A23 (northbound) or to travel to Junction 10 on the M23. Alternatively, vehicles from the terminals could use the local roads to join the A23 southbound and from there, via Gatwick Road and Crawley Avenue join the M23. This additional traffic that is likely to re-route to Junction 10 on the M23 may increase congestion and impact upon journey times.

5. Closure of the realigned A23 junction with Ring Road South and Ring Road North



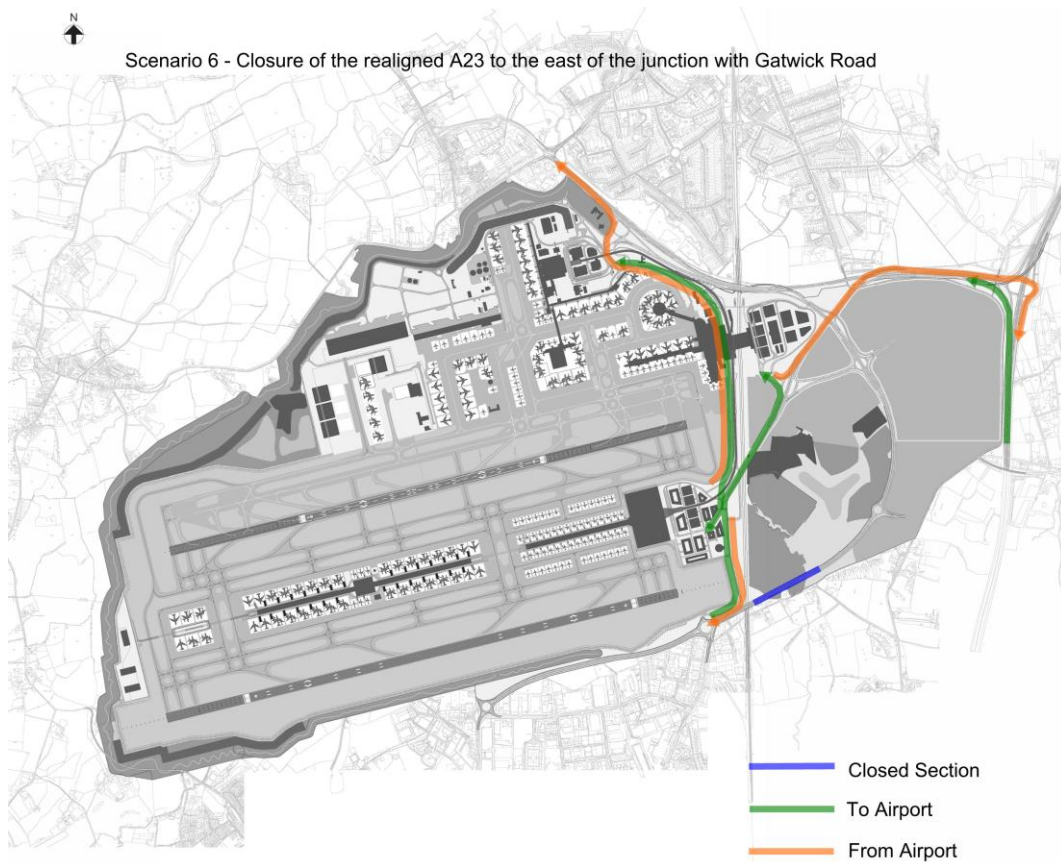
To Gatwick Airport

The closure of this junction would impact upon vehicles wishing to gain access to the South Terminal forecourt. Alternative routing would require vehicles to drop passengers at either the north or New Terminals. Passengers would then be required to use the APM to continue their journey to the South Terminal. In addition, typical routing to the New Terminal would be affected, vehicles would be required to travel to the North Terminal and use the north/south link (adjacent to the railway) to connect to the New Terminal. Another option would be to access New Terminal via the southern junction with the A23 and Gatwick Road. It is likely that the closure of the realigned A23 junction with Ring Road South and Ring Road North would have a significant impact on congestion within the vicinity of the airport.

From Gatwick Airport

The closure of the realigned A23 junction with Ring Road South and Ring Road North would prevent vehicles from departing from the South Terminal local road system. Passengers would be able to utilise the Gatwick Gateway to continue their journey from the airport or connect with the North and New Terminals via the APM. The closure of this junction would require traffic from the New Terminal to use the north/south route (adjacent to the railway) to exit the airport highway system.

6. Closure of the realigned A23 to the east of the junction with Gatwick Road



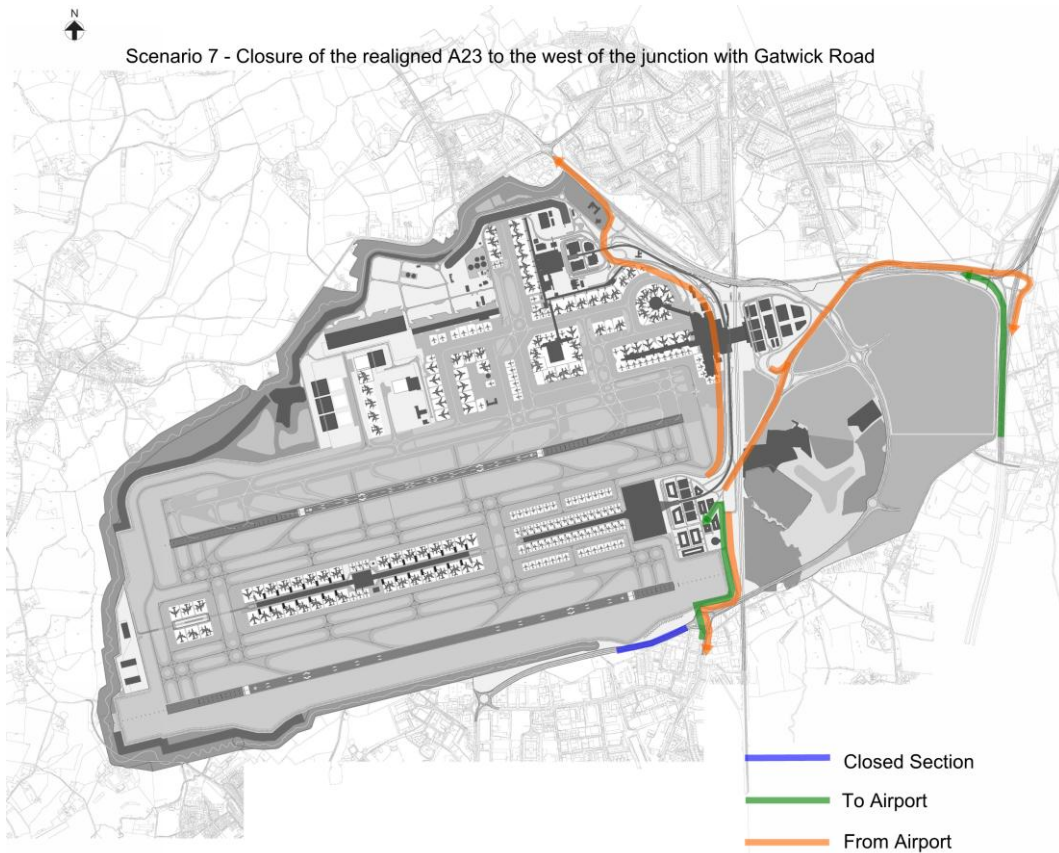
To Gatwick Airport

For those vehicles wishing to travel to the airport (northbound) via the A23, the closure of this section of the A23 would require vehicles to either utilise the A23 roundabout with Gatwick Road to gain access to the north and New Terminals or for the South Terminal, to use the M23 and use the slips roads at Junction 9 to continue their journey to the South Terminal local road system.

From Gatwick Airport

For those vehicles that would wish to use the A23 southbound, alternative routes would be via the M23 (at Junction) or from the North Terminal, the local road system connecting to the New Terminal and the link at the A23 junction with Gatwick Road. It is likely that the closure of this section of highway would result in significant traffic congestion in the vicinity of the airport due to re-routing of traffic.

7. Closure of the realigned A23 to the west of the junction with Gatwick Road



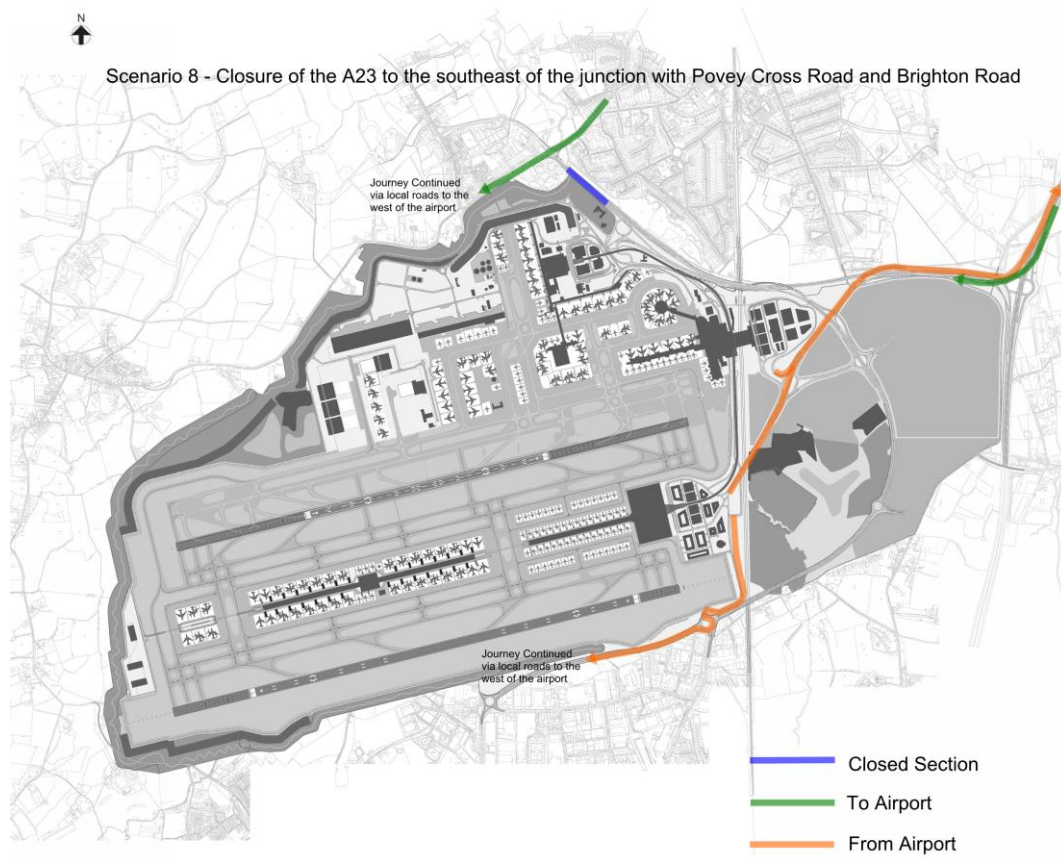
To Gatwick Airport

A localised closure to the west of this junction would require the re-routing of northbound traffic on this link to either the M23 (to exit at Junction 9 for access to terminals) or via a number of local roads to the west of the airport. This scenario is likely to significantly impact upon traffic congestion within the vicinity of the airport.

From Gatwick Airport

The closure would require vehicles to access the A23 (southbound) by travelling to the M23 (at Junction 9) and continuing their journey southbound. Alternatively vehicles could re-route to the west of the airport and connect back to the A23 via Charlwood Road or Ifield Avenue.

8. Closure of the A23 to the southeast of the junction with Povey Cross Road and Brighton Road



To Gatwick Airport

The closure of this link would impact upon those vehicles utilising the A23 southbound toward the Povey Cross Road junction with London Road to travel to the airport. The primary alternate route would require vehicles to be re-routed onto the M23 at Junction 8. Access can be made via the system of local roads to the west of the airport linking to the Gatwick Road junction with the A23 to the south. From here vehicles have multiple routes to choose from to continue their journey to the terminals.

From Gatwick Airport

The closure of this link is likely to primarily impact upon vehicles travelling from the North Terminal. Alternative routes would be to use the M23 (via Junction 9) and continue north to link with the A23 at Junction 8. For vehicles travelling west, alternative local roads may be used in conjunction with the A23 (southbound) to continue westward.

13.6 Terminal Connections

Access to terminals will be provided by a continuous landside Automated People-Mover (APM) APM system. This means that should the forecourt or access roads to specific terminals be disrupted, it will be possible for Gatwick to bring traffic into another terminal and distribute people on the APM system back to the affected terminal.

Should there be a breakdown on the APM system, it is envisaged that sections of the track can be isolated and potentially a half capacity service offered on one side of the future APM loop. In addition, the Masterplan includes for an airport-only landside road running parallel to the APM system up from the New Terminal underneath South Terminal and on to North Terminal. This road will allow for temporary bussing of passengers between terminals should there be problems with the APM.

13.7 Summary

The transport networks for all modes, both strategic in the South-East and local to Gatwick, have been designed to provide resilience should there be any disruption. Gatwick's strategy for resilience is to work with stakeholders to provide a coordinated and coherent response when incidents occur.

When considering resilience and reliability on the rail network:

- Gatwick works closely with Train Operating Companies and indeed its current working relationship with Southern has been identified as being best practice and has been nominated for the Air Rail Awards 2014.
- Significant investment is going into the Brighton Main Line to increase reliability, and once these works are complete by 2018, reliability will increase to above the South-East average.
- Gatwick Airport has one of the widest ranges of through train destinations of any station in the south of England, which makes it an ideal transport hub and provides resilience through the existence of alternative routes.
- The main control centre for whole Thameslink franchise will be located less than a mile from Gatwick at Three Bridges. This proximity will facilitate a close operational relationship between Gatwick and the Thameslink operator.

The resilience of terminal access by road has been considered as follows:

- The road network for Option 3 has been designed to include for resilience as described in 8 hypothetical incidents in section 13.5. It is recognised that these potential alternative routes will need to be discussed with other agencies and organisations as a formal update to contingency planning at an appropriate juncture.
- Access to terminals will be provided by a continuous landside APM system. This means that should the forecourt or access roads to specific terminals be disrupted, it will be possible for Gatwick to bring traffic into another terminal and distribute people on the APM system back to the affected terminal.

14 Cargo and Logistics

14.1 Definition

At Gatwick, there are two types of freight movements on the road network. Essentially, these can be broken down into:

- **Air cargo** i.e. traffic movements related to shipments that have been brought in or will be taken away by air, typically in the belly of passenger aircraft.
- **Logistics** i.e. movements that relate to goods delivered to businesses that operate on airport, including retailers, food and beverage outlets and catering. The reverse flow of waste away is also included in logistics movements.

This chapter deals separately with these different types of traffic and describes their combined impact on the road network in the conclusions in Section 14.4.

14.2 Air Cargo

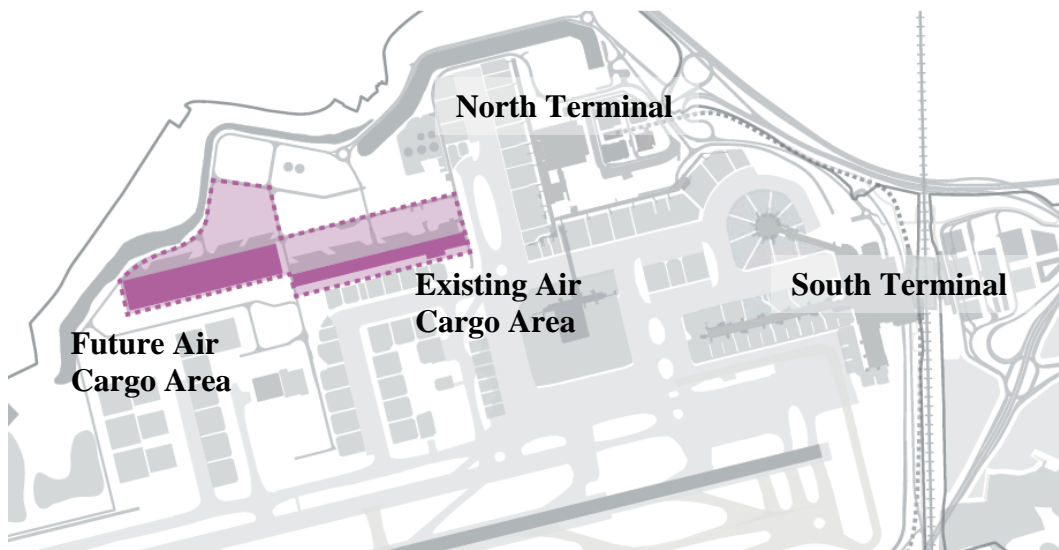
14.2.1 Current demand and future growth

Gatwick handled 101,000 tonnes of air cargo in 2012. 95% of Gatwick's cargo traffic involves non-EU markets and nearly 70% of total cargo volumes are carried by passenger aircraft in the form of belly cargo. This is expected to continue into the future.

Gatwick's cargo volumes are forecast to grow to over 950k tonnes by 2050 in Option 3. Forecast growth in cargo volumes is driven by an increasing proportion and volume of flights to long haul markets where cargo volumes are typically strong. To serve these markets the forecasts anticipate a greater proportion of wide-body aircraft with cargo capacities in line with or greater than today's fleet.

14.2.2 Option 3 Cargo Handling Area

In order to accommodate the growth in air cargo by 2040 and out to 2050, the existing air cargo area will be expanded with new hangars and apron provided, as shown in **Figure 14.1**. Access will be via the North Terminal roundabout which has been reconfigured to provide capacity both for passenger and staff vehicle movements, cargo and background traffic. Longbridge Roundabout will also be upgraded. These enhancements are discussed in more detail in Chapter 9.

Figure 14.1: Location and scale of cargo and freight facilities in 2040

14.2.3 Road Network Impacts

2012 air cargo tonnage has been measured at 101,000 tonnes, including mail. With a second runway in Option 3, air cargo is anticipated to reach ~740,000 tonnes by 2040 and ~950,000 tonnes by 2050.

These forecasts have been used to calculate a range of potential cargo-related vehicle numbers per hour at Gatwick, based on a combination of inbound and outbound tonnage, and assuming that cargo facilities will operate 12 months a year, and for 22 days per calendar month in line with current operations.

Estimates have been made assuming a degree of consolidation and a range of the tonnage that vehicles can carry – from 7.5 tonnes to a full HGV at 30 tonnes.

This approach indicates a potential **peak hour of 30 to 40 vehicles in 2040** and potentially **up to 50 vehicles in the peak hour in 2050** related to air cargo, being a mix of van, Light Goods Vehicles (LGV) and Heavy Goods Vehicles (HGV).

These numbers are not significant in terms of overall vehicle numbers on the external network and can easily be accommodated by proposed road network changes, even when included in the AM commuter peak hour.

14.2.4 Cargo handlers at Gatwick

Qualitative data has been obtained through interviews with three separate cargo handling agents at Gatwick, namely dnata, Servisair and Word Freight Services (WFS) in relation to air cargo. In general, these interviews identified a number of pertinent themes when considering cargo growth into the future.

- **Landside vehicle movements related to air cargo tend to be outside typical commuter peak periods.** For example, Servisair's cargo operations occur mostly off peak, with its cargo facility receiving shipments for export between 03:00 and 08:00 and import cargo arriving between 12:00 and 18:00 for onward shipment. WFS operations are from 23:00 through to 12:00 the following day.

- The **last decade has witnessed an increase in consolidation** with fewer but larger shipments on heavier vehicles, such as typical 30 tonne HGVs.
- The **number of cargo vehicles is typically low** when compared against other vehicle movements to and from Gatwick. As an example, WFS handle a maximum of between 30 and 40 HGVs per day.

Figure 14.2: Cargo Facility during Commuter Peak Period – Low Activity



Current vehicle movements for cargo equate to approximately 4 per hour on average (1 from dnata, 1 from Servisair and 2 from WFS), mainly in non-peak hours. When projecting this level of demand to 2040 and even out to 2050, this results in up to 32 HGVs per hour. This is in line with the derived vehicle peaks described in Section 14.2.1 though the derived vehicle peaks are slightly higher owing to additional assumed traffic in vans and Light Goods Vehicles (LGVs). This amount of additional vehicles is not anticipated to have a major impact on the network.

Table 14.1: Air Cargo – Cargo and Freight Vehicle Movements

	2012	Option 0 2040	Option 0 2050	Option 3 2040	Option 3 2050
Tonnes per year	100,698	430,410	517,575	736,773	961,357
Tonnes per day	381	1630	1961	2791	3642
Tonnes per hour (assumes a 13hr day)	29	125	151	215	280
Vehicle 7.5	4	17	20	29	37
Types 15	2	8	10	14	19
(tonnes) 22	1	6	7	10	13
30	1	4	5	7	9
Average Vehicles / Hr	3	9	11	15	20
Peak Vehicles / Hr	5	15	18	24	32

14.3 Logistics

14.3.1 Gatwick Direct

Gatwick Direct is a new consolidation centre, which opened in November 2013, for the handling of consumer goods that are sold by retail concessionaires in the terminal buildings. This is a fully secure operation, controlled by Gatwick security and with CCTV throughout, but operated by DHL.

The Gatwick Direct facility is located on the eastern end of the cargo area. There is an airside / landside boundary that runs through the Gatwick Direct warehouse; this is thought to be the only example where a third party operator has such a facility, with screening being conducted through a security fence from one side of the building to the other.

All vehicles arriving at Gatwick Direct have to have an online, system-generated valid booking reference with a specific timed delivery. This allows DHL to manage external flows to suit operations and / or peak traffic hours on road networks. Vehicles are directed to specific loading bays by the booking reference.

When goods arrive, they are unloaded against the booking in information and marshalled prior to being screened through the CP fence. Gatwick has introduced paying for screening, the cost of which is invoiced to Gatwick Direct users. Once goods have been screened, they are assembled (consolidated) by DHL in as few delivery media and vehicles as possible to meet service level agreements.

The major benefit to concessionaires is in time-saving as well as potentially stockroom savings and therefore cost reduction. Moreover, there is no need to have airside passes/training for staff. The benefit to Gatwick is that fewer vehicles are allowed, or need to pass, airside.

The new consolidation centre has also driven external consolidation in terms of number and size of vehicles, as suppliers know they will get serviced on time, and can therefore group deliveries to suit. An example of this is the company TRG which has reduced deliveries from three 18ft trucks to one 40ft articulated lorry.

Growth in volume of goods sold, linked to the growth in passenger numbers, will allow further 'natural consolidation' by retailers / suppliers: as the volumes increase, the tipping points between van to LGV to HGV are passed, driving a reduction in overall number of vehicles being sent to Gatwick as the size of loads increase.

The service will undoubtedly reduce airside vehicle traffic, and through managed deliveries and increased volumes will reduce landside vehicles and spread the deliveries over non-peak hours. Both will be of benefit for the access strategy for Gatwick.

Gatwick Direct therefore brings advantages in terms of efficiency and security, but importantly for the road network, also in terms of consolidation and a reduction in vehicle movements.

14.4 Conclusions

As Gatwick grows as a gateway, future volumes of air cargo are forecast to increase. To accommodate this, the Option 3 Masterplan has been planned with appropriate levels of cargo handling and storage to accommodate future demand. Similarly the road network, as described in Chapter 9 of this document, has been designed to accommodate future flows

Analysis indicates that air cargo and freight activities will have minimal impact on external road network volumes, equating to between 30 and 50 movements in the peak hour out to 2050.

In terms of logistics traffic, deliveries, catering movements, maintenance trips and waste away vehicle movements will still grow as the airport grows even with consolidation. However, Gatwick has developed its logistics strategy around delivering efficiency, reducing carbon and meeting sustainability objectives through Gatwick Direct. Gatwick Direct will drive changes of behaviour in terms of the consolidation of logistics and reduced onward transportation impacts, in particular managing peak period goods traffic on the local network.

The road network has been designed to accommodate demand out to 2050 at the “highest impact” mode share. When Gatwick achieves its R2 ASAS objectives of a higher public transport mode share by 2040, overall vehicle numbers on the network will reduce, improving traffic conditions and providing resilience. In addition, any changes in cargo or logistics movement patterns will therefore be accommodated without substantive changes to the network being required.

14.5 Construction of Runway 2 by Rail and Road

This section supports the Construction Delivery Report.

14.5.1 Introduction

Gatwick is committed to delivering as much of the construction of a second runway and associated works as is practicable by sustainable modes and is exploring options for making use of the close proximity of the Brighton Main Line for this. This aligns with Network Rail policy as described in the document Long Term Planning Process: Freight Market issued in October 2013. This describes Network Rail’s approach to handling freight and includes “for the construction materials sector growth of approximately one per cent per annum to 2043 in tonne kilometres” based on an “improvement in the competitiveness of rail”.

As such, a high-level assessment has been undertaken of the suitability of the Crawley New Yard site to act as a railhead for the movement of construction materials into the Gatwick Airport second runway construction site.

This assessment is based on Option 3 requirements for volumes of aggregates, spoil, and construction materials (cement, rebar and sections).

14.5.2 Crawley New Yard – Site Description

Crawley New Yard is actually the goods yard of the former Tinsley Green station. It lies to the east of the Brighton Main Line, roughly one mile north of Three Bridges station and two miles south of Gatwick Airport station.

The site is currently in use as an aggregates depot and blacktop plant, with most of the inwards aggregates fed by rail.

The site comprises approximately 6.5 hectares, and measures a maximum of 800 metres long (north to south) and 220 metres wide. It is roughly triangular, fanning out from an apex at the south end. The site is connected to the public road network at a junction with Gatwick Road.

The surrounding land is mainly in commercial and industrial use.

Figure 14.3: Location of the Crawley New Yard Site



14.5.3 Site Ownership

The freehold of the site lies with Network Rail. The site is leased to DB Schenker. Under industry procedures they are the lessees unless and until another Freight Operating Company (FOC) becomes the majority operator for traffic into the site, in which case the lease would be transferred to them. The land was originally leased to Foster Yeoman, a Somerset based quarry company, who have since been acquired by Cemex.

14.5.4 Planning Context

Given that the site is on railway operational land, it potentially benefits from Permitted Development rights.

In the future, the consents strategy for the second runway project will need to have regard to all of the works that are proposed and the entire project will need to be assessed. It might be that all the works, including any temporary construction facilities, need to be approved by a Development Consent Order (DCO).

The exact planning process will be defined once the scope of future works is fully understood but a review of planning policy indicates that there are various options for delivering construction of the future runway and new terminal by rail.

14.5.5 Rail Operations

Current Operation

Crawley New Yard is connected to the Slow Lines of the Brighton Main Line. The connections are controlled remotely by Three Bridges Signal Control Centre.

The connection consists of a south facing crossover onto the Slow Lines only. Trains to and from London either reverse in to the Reception Siding or reverse out. Direct freight train access is only possible from Portsmouth/Southampton via Horsham or Hove. Aggregates quarries are located on the Isle of Grain, Leicestershire or Somerset. Access from the south is possible from any of these locations.

There are two unloading tracks. Unloading is either by grab/front loader or underfloor hopper and conveyor. Currently there are long term train paths for 2 train arrivals per day.

There are corresponding departures of empty services at 03:37, 11:14 and 20:02. In practice, these are only the long term paths used, and under standard industry short term planning procedures additional trains will be booked to run to respond to market demands, usually using the same paths but on other days of the week.

Figure 14.4: Crawley New Yard from the Rail and Road



Trains are on site for around 3 ½ hours, and it is normal for a 2,000 tonne train to be unloaded within this timescale.

Figure 14.5: Track Layout at Crawley New Yard

Both daytime and night-time paths into and out of the terminal are therefore available, the only restriction being that paths during peak hours are not possible. The Brighton Main Line is open continuously apart from Saturday night and Sunday mornings.

The current train service pattern delivers around 300,000 tonnes of aggregate per annum.

Potential Future Operation

It would be feasible for the site to be able to handle at least 3 trains per day, and probably 4 trains per day at maximum, the principal constraint being storage capacity within the terminal. At present there is approximately 30,000 m² of storage space available, which will permit about 100,000 tonnes of material to be stored on site, depending on the mix of materials. This should provide sufficient capacity to support construction of the runway and terminal facilities.

It is believed that the current average stored tonnage is around 30,000 tonnes. There therefore appears to be capacity to increase the amount of materials (both aggregates and other products) stored on site.

Only aggregates (including sand) are currently handled, but it would be possible to provide storage and handling equipment for other construction products (such as cement, rebar and sectional steel) using mobile plant.

Materials could be stored on the Gatwick construction site to maximise available aggregate or, given that the construction site will be less than 500 metres from the Crawley New Yard site, conveyors could be used to transport materials into the construction area.

14.5.6 Construction Workforce Travel

Gatwick will introduce a Construction Workforce Travel Plan. The construction workforce will be able to take advantage of the excellent public transport links already available to current airport employees, and which will be enhanced in the short-term through committed schemes such as the Thameslink Programme.

Rail will be the primary mode of transport, connecting to disadvantaged areas (as described in Chapters 4 and 12) and providing opportunity for people living in areas of low employment. **Over 1 million people from the 20% most deprived areas in England live within a 25 mile radius of Gatwick.** As such, the construction phase provides an opportunity to generate a significant number of jobs and to improve prosperity in the local area.

Buses will be provided to ferry workers to the construction site using low emission bus vehicles. In addition, for those living locally, **cycle routes, mobile ablutions and secure cycle parking will be provided to encourage sustainable travel.** Indeed, **the construction workforce will have full access to permanent staff travel benefits** including discounted travel – as described in section 4.1 of Chapter 4.

In terms of the impact on transport network, **the construction workforce will be on site before the commuter peak and will leave after the commuter peak** so no capacity impacts are envisaged.

Gatwick does not want the construction workforce to commute to the site by car and accordingly no car parks will be provided for this purpose. Gatwick will work with local authorities to develop a strategy for controlled parking on local streets.

14.5.7 Construction Logistics - Conclusions

In terms of delivering construction of the second runway and new terminal, Gatwick has a significant advantage with a railhead and batching plant located within 500 metres of the potential construction site.

Crawley New Yard appears well placed in terms of rail connections to act as a construction logistics site for the second runway works. There is some spare capacity within the site (and potentially more can be made available) to store new material. If additional storage is available within the construction site, this can be used for more storage capacity, or material can be moved by conveyor as required.

Handling other materials, including sections, rebar and cement, is possible, and although this would concentrate activity within the site and place some demand on available space, it could be expected that the site operators would be amenable to such a proposal.

The use of the Crawley New Yard site for construction supplies is compatible with existing site uses. Cemex could be expected to be ready to cooperate in developing such a proposal, as it complements their current business. Indeed it is probable that Cemex already expects to benefit from its site ownership and intends to play an active part in supplying material.

Should the Crawley New Yard not be available for whatever reason, an alternative might be to build a railhead on airport land and to create a common batching plant adjacent to it taking advantage of Gatwick's proximity to rail.

Gatwick is committed to delivering as much of the construction of a second runway and associated works as is practicable by sustainable modes.

15 Summary and Link to R2 ASAS

The information and analysis contained in this report reflects a rigorous and robust approach to assessing the surface access demand from a second runway at Gatwick and one which has been developed in consultation with Network Rail, the Highways Agency, local authorities and other key stakeholders.

Network Rail and the Highways Agency have checked the approach, assumptions and outputs and are satisfied that they provide a sound basis for estimating the impacts of a second runway at Gatwick and in the case of Network Rail that the conclusions are consistent with their own, independent analysis. This audit validates the approach and findings of the analysis and reinforces the suitability of Gatwick's R2 ASAS in meeting the Airports Commission objectives.

The Gatwick R2 ASAS is deliverable, adds value for money to existing public transport services and future investment and supports a high access mode share for sustainable modes.

The impacts and benefits of the second runway have been tested robustly using high forecasts representative of both background and airport traffic in the **busy hour of a busy day**. As **further stress tests**, the transport network capacity has been subject to **2050 demand** analysis and the **road network capacity tested assuming no further increase in public transport mode share**, as a theoretical "worst case".

Under all tests, the transport networks accommodate the additional peak demand from a second runway and achieve suitable levels of service and journey time reliability. The analysis indicates that the second runway contributes only a small amount of additional demand to peak hour background traffic and that this increment does not trigger the need for additional infrastructure capacity in the strategic road and rail networks over that which is already committed or planned. The Highways Agency and Network Rail both concur with this conclusion.

The local road network improvements, to be fully funded by Gatwick as part of the R2 ASAS and delivered in partnership with the Highways Agency and local authorities, provide significant additional capacity and reduce conflict and congestion by separating airport and non-airport traffic, particularly on the A23 corridor.

Gatwick will also fund a near doubling of capacity at M23 Junction 9 as part of the roads strategy, to be integrated with the Smart Motorway scheme being delivered by the Highways Agency. Gatwick will continue to support the development of a long term strategy for the M25, which is being led by the Highways Agency, as a significant future network solution for the whole of London's orbital motorway.

Rail network improvements committed and planned by Network Rail will deliver a step change in capacity across routes into London over the next decade, as well as more direct connections from Gatwick to other destinations in the South East and East of England. Rail journey times will reduce for a large proportion of the travelling population as a result of the following combination:

- Higher frequencies;
- New direct services to places such as Cambridge and Peterborough;
- Infrastructure to remove bottlenecks and improve performance;
- Operational improvements; and
- Reduced number of interchanges resulting from a wider network of directly connected stations.

In order to present the analysis in the context of the benefits and impacts of a second runway, the proposed Option 3 Masterplan is compared with a single runway airport in 2040. This comparative assessment includes assumptions around background growth. The main findings of the analysis undertaken are relevant to the conclusions regarding surface access for a second runway:

- Background traffic generated before 2025, and independent of a second runway, will require additional highway capacity for the M23 and M25.
- Improvements committed and planned by Network Rail for completion before 2024 will provide up to 85% more capacity for journeys to and from Gatwick in the peak hour.
- A current shortfall in capacity at the airport railway station requires immediate mitigation, particularly in the form of new concourse development.
- Committed and planned rail schemes and extending bus and coach networks in partnership with operators support the proposed higher public transport mode share targets of 60% for air passengers by 2040 and 50% of staff travelling to work by sustainable modes (public transport plus car sharing, cycling and walking) by 2040.
- Mitigation of second runway impacts on local roads and access to Gatwick is required and this capacity can be provided through additional road building, widening and grade separation.

The following presents a summary of the conclusions of the analysis and the recommended R2 ASAS that has been developed as a result:

- Gatwick supports committed highway and rail schemes, due for delivery before 2025, which are necessary for background growth and provide sufficient capacity in the strategic networks to cater for second runway demand.
- The additional rail network capacity delivered through committed and planned schemes, along with future incremental improvements delivered by Network Rail and the train operating companies are sufficient to accommodate additional R2 demand, at the target mode share, without major additional infrastructure requirement.
- Significant increase in capacity on the A23, M23 and at Junction 9 of the M23 will ensure traffic is accommodated on the routes that are designed for higher flows and will discourage use of alternative routes on less suitable roads.
- Improvement to public transport interchange and services will help to drive a higher mode share and this will be achieved with a new facility,

Gatwick Gateway, as a major transport hub for the region, centred around the expanded railway station.

- A study for the design of additional capacity at Gatwick Airport railway station is underway and the scheme development will be configured to also accommodate second runway demand as well as optimising operational efficiency.
- Diverting the A23 to the east of the Brighton Main Line will allow better access to the airport and a reliable through route for local background traffic.

The R2 ASAS meets the Airports Commission objectives in the following ways.

Objective: To maximise the number of passengers and workforce accessing the airport via sustainable modes of transport

- Improved accessibility and connectivity for public transport, including rail, express coach, and local bus to make public transport the favoured choice for access and achieve a mode share target of 60% for air passengers accessing the airport by 2040 and for 50% of staff travelling to work by sustainable modes;
- Promote new direct rail connections to Peterborough, Cambridge, Oxford and Milton Keynes, and provide staffed passenger help points at major interchanges to assist them transferring onto direct services;
- Extend the network of express coaches serving the airport through agreed partnership commitments to develop new routes with National Express;
- Deliver new bus priorities and dedicated routes for local buses to access the airport, supporting sustainable travel for staff – funded with an extra £1million extra per year via the Passenger Transport Levy;
- Invest in Gatwick Gateway, a new passenger transport interchange that will improve the passenger experience, increase capacity and provide better access to national transport networks accessible to the whole region;
- Provide world class interchange and arrival experience around the railway station with capacity for R2 demand and fast, direct access to all terminals in under 5 minutes;
- As part of the Gatwick Gateway build a new bus and coach interchange with high quality, passenger facilities, increase capacity and direct interchange between bus, coach and rail; and
- Invest in passenger information systems and smart ticketing in support of initiatives being delivered over the next few years, including Oyster arriving at Gatwick in 2014.

Objective: To accommodate the needs of other users of transport networks, such as commuters, intercity travellers and freight

- Delivery of the Gatwick Gateway integrated transport interchange, providing an enhanced experience for airport users and local communities to access sustainable transport;
- Complete a comprehensive local road improvement programme that provides extra capacity and better travel conditions for local traffic as well

as easier access to the airport, with built in resilience and speeds and delays at levels no worse than today;

- Set up a Local Highway Development Fund to support further road improvements by local authorities where Gatwick traffic is one of a number of contributors to congestion;
- Re-align the A23 to provide better travel conditions on the through route for non-airport users and to separate airport traffic from non-airport traffic to add capacity and resilience;
- Gatwick will increase its support for local bus services, expanding the network and providing greater financial contributions to ensure early morning, late evening and weekend services are available to cater for staff shift patterns; and
- The Gatwick Gateway proposal will create a world class multi-modal interchange accessible for the wider community and positioning Gatwick as a regional transport hub providing access to the national rail and express coach networks.

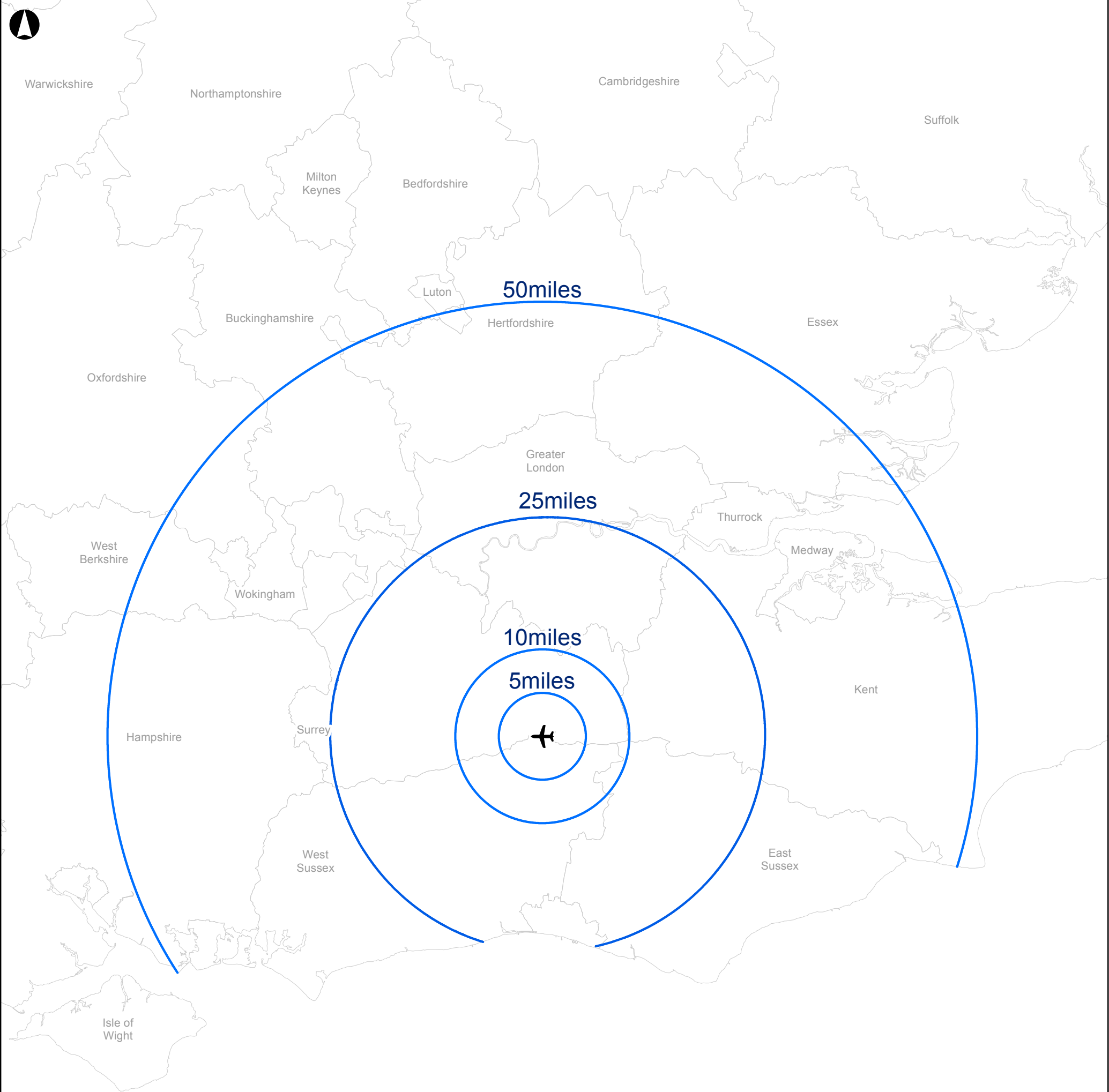
Objective: To enable access to the airport from a wide catchment area

- Expanding rail connectivity will reach more people, more quickly without interchange from 2018 and Gatwick will work with Network Rail and other partners to deliver even greater accessibility through long term service development;
- Gatwick and National Express have agreed a commitment to develop new coach routes that complement other public transport services and ensure that Gatwick is well connected to all areas by sustainable modes;
- Extend the reach of local bus routes for employees offering discounted travel with more frequent and new services continuing the approach for 24/7 access by public transport;
- Gatwick will provide hosted Gatwick “contact points” at main interchange points to help passengers transferring between trains and coaches, review flight connection information, print out luggage tags and make their journey as seamless as possible;
- Develop the Gatwick Gateway as a major interchange node on the regional network for non-airport users; and
- Gatwick’s increased catchment area by public transport brings a greater population within an easy commute of Gatwick, a catchment of 3.2 million people in 30 minutes journey time and 14.8 million in 60 minutes journey time - by rail, public transport and by road. This demonstrates Gatwick’s superior accessibility.

Appendix A

Catchment, Connectivity and
Quality of Life

GIS Mapping



Population Based on 2011 Census




162,205 within 5 miles

237,007 within 5 - 10 miles

5,417,030 within 10 - 25 miles

10,393,740 within 25 - 50 miles

Legend

-  Gatwick Airport
-  Gatwick Catchment Areas (miles)
-  County Boundaries

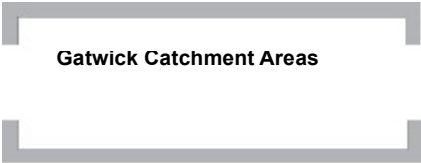
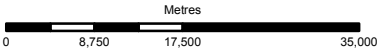
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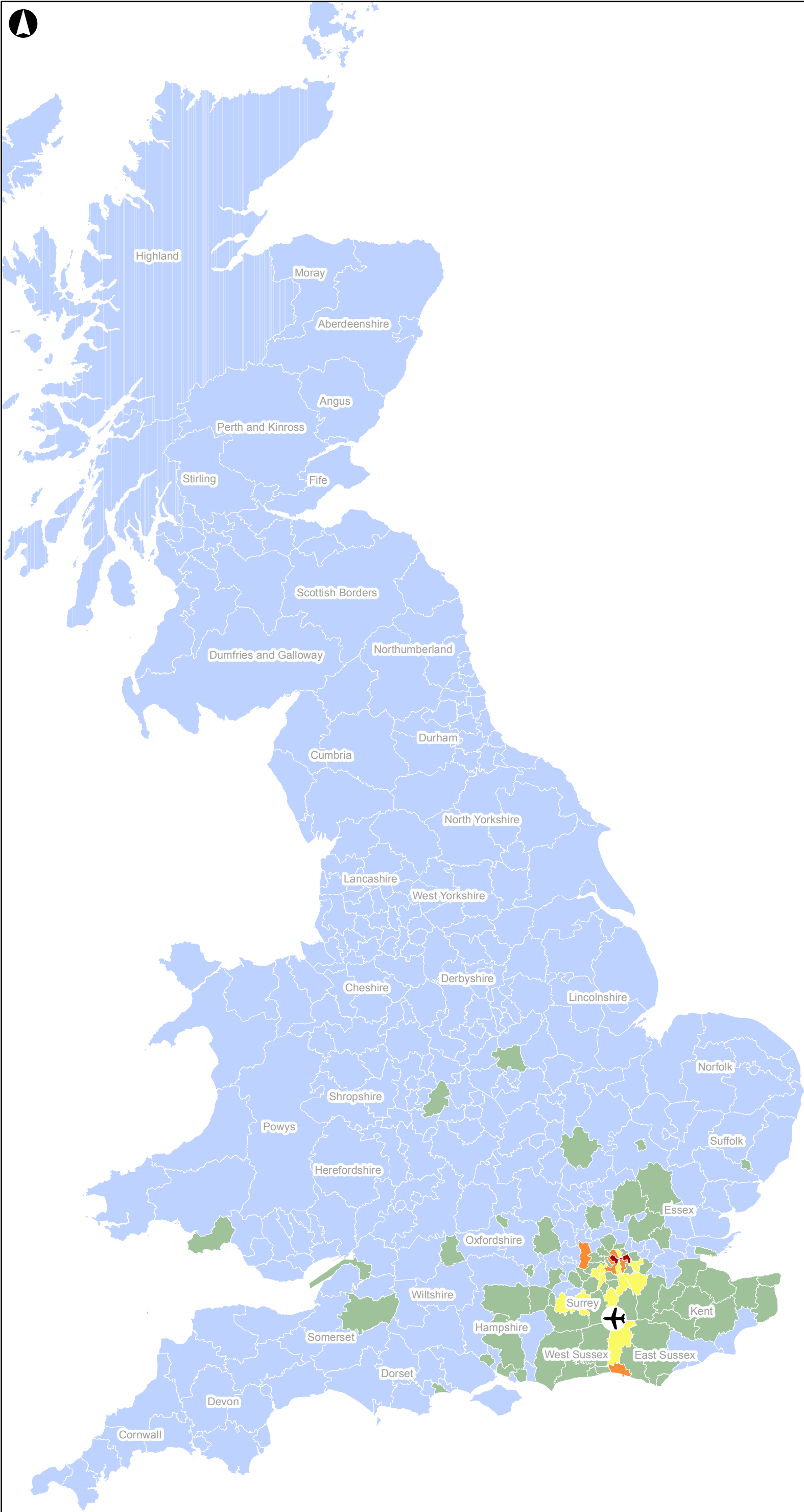
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Job Title
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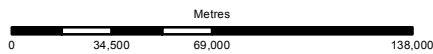


Number of
Business Passengers 2012

- 0 - 10,000
- 10,001 - 50,000
- 50,001 - 100,000
- 100,001 - 200,000
- 200,001 - 590,546

F5	2014-03-18	KC	DM	FJ
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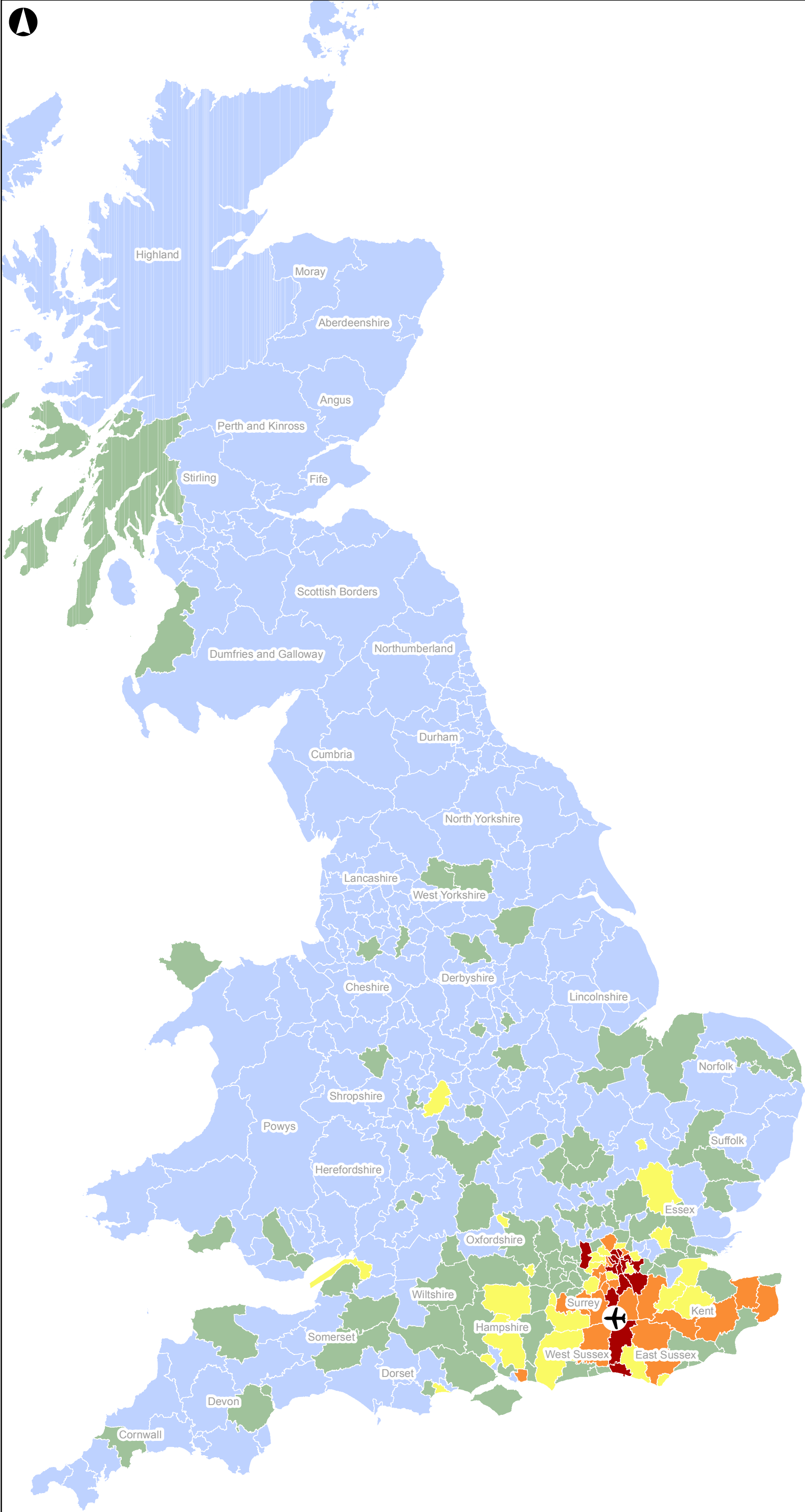
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Geographical Distribution of
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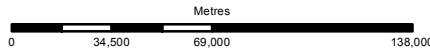


Number of
Business Passengers 2040

- 0 - 10,000
- 10,001 - 50,000
- 50,001 - 100,000
- 100,001 - 200,000
- 200,001 - 2,062,662

F3	2014-03-18	KC	DM	FJ
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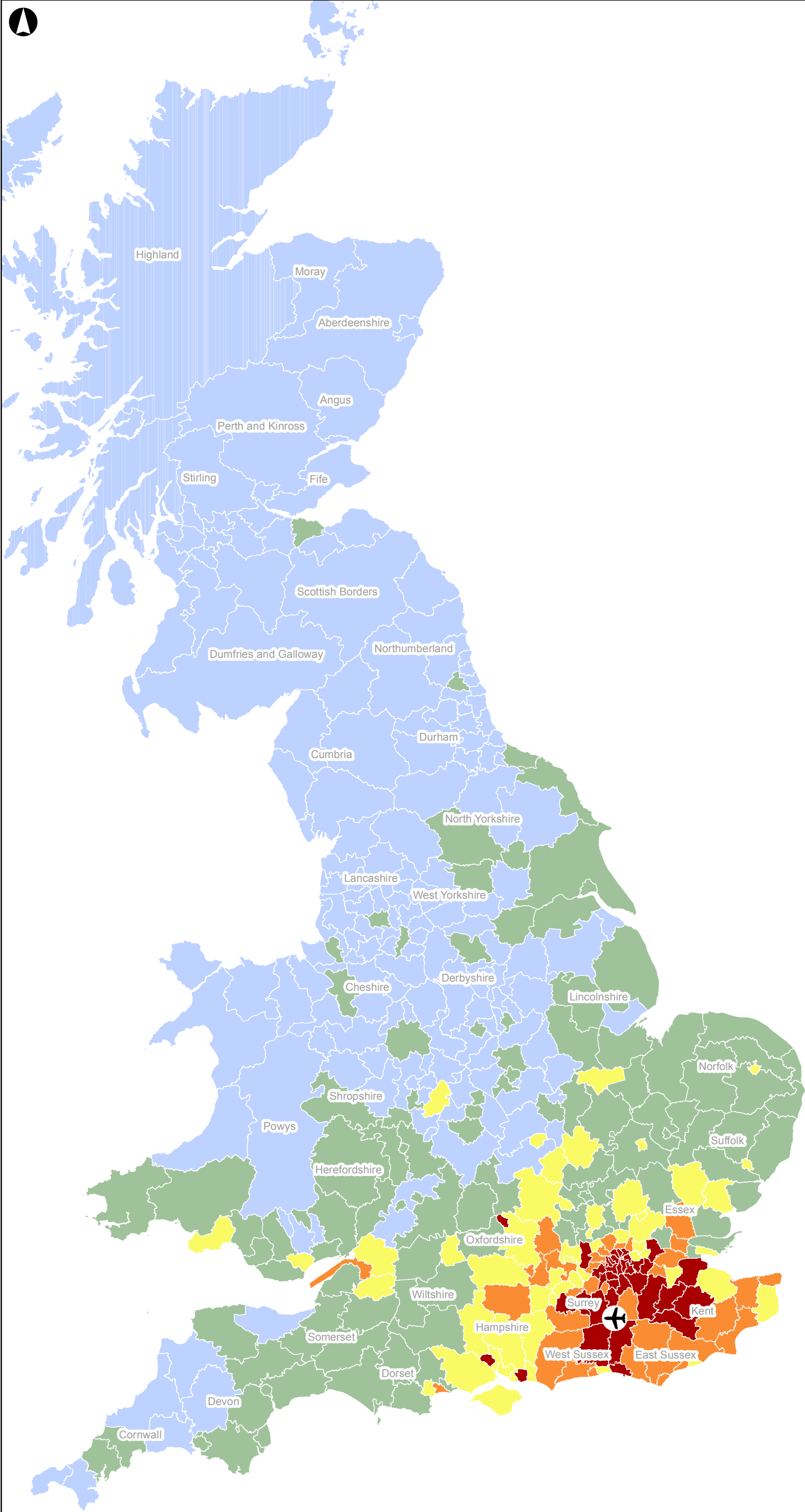
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Job Title
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Geographical Distribution of
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(2040)

Scale at A3
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Drawing No 003	Issue F3

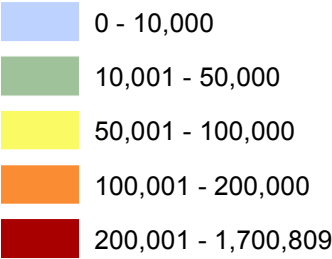


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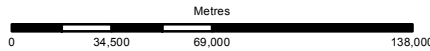


Number of

Leisure Passengers 2012



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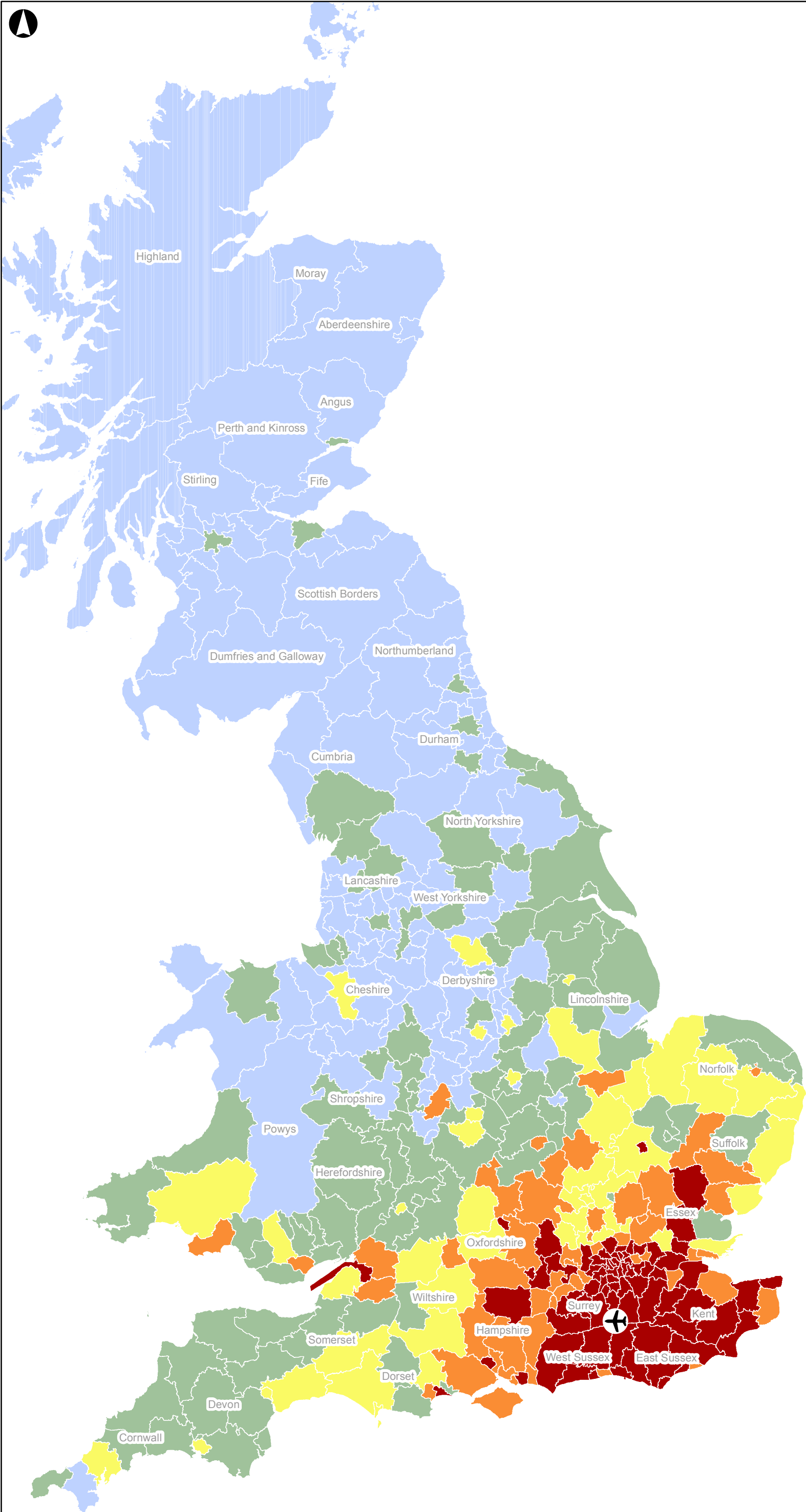
Client
Gatwick Airport Limited

Job Title
Gatwick Airport R2 Surface Access

Geographical Distribution of
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(2012)

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Job No 225680-50	Drawing Status For Issue	Issue F5
Drawing No 004		








Legend

 Gatwick Airport

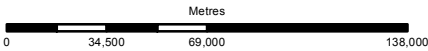
Number of

Leisure Passengers 2040

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-  10,001 - 50,000
-  50,001 - 100,000
-  100,001 - 200,000
-  200,001 - 3,571,690

F2	2014-03-18	KC	DM	FJ
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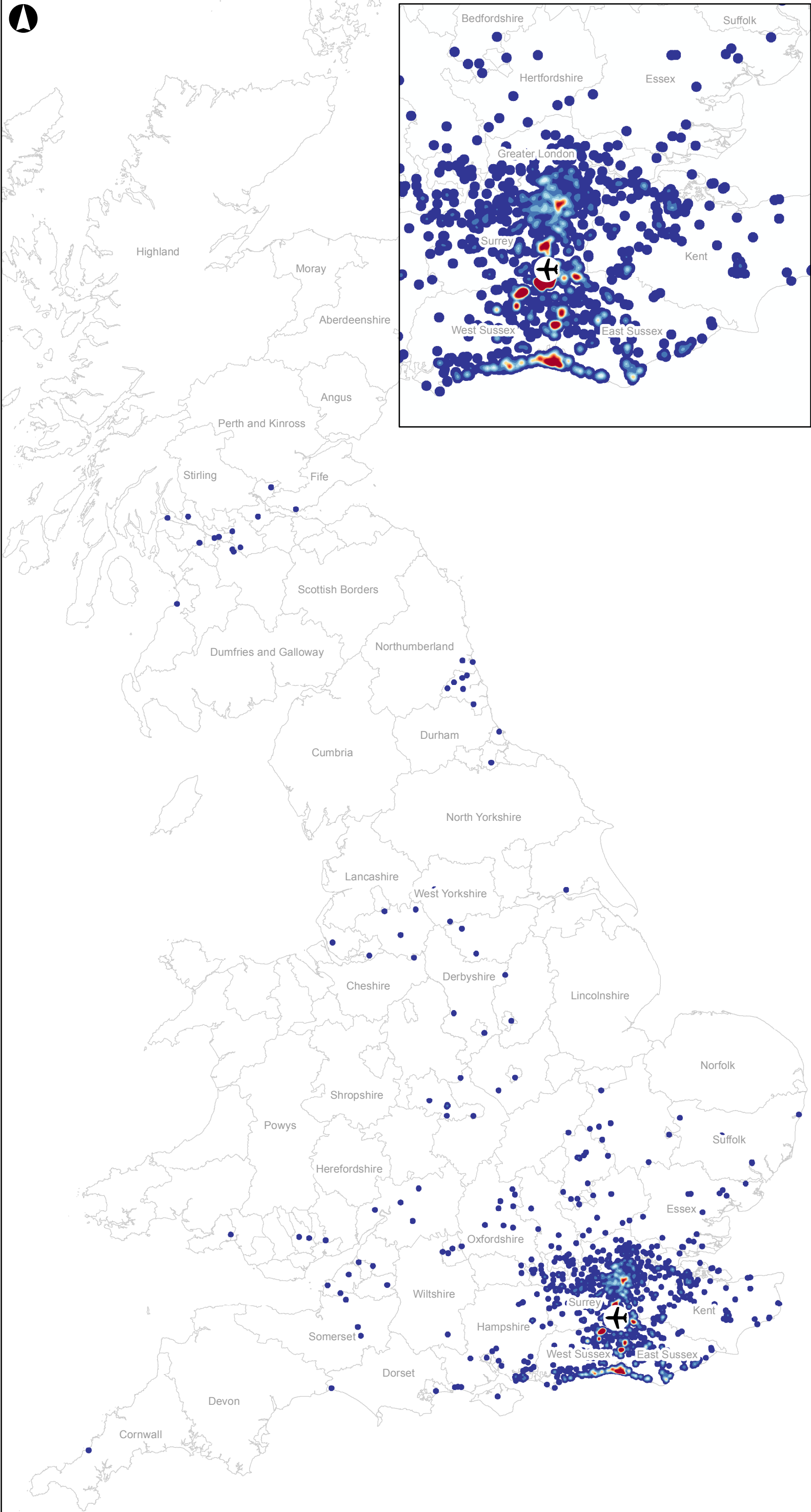
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Geographical Distribution of
Gatwick Leisure Passengers
(2040)

Scale at A3
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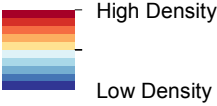
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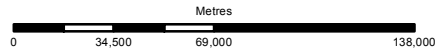
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Employee locations



 County Boundaries

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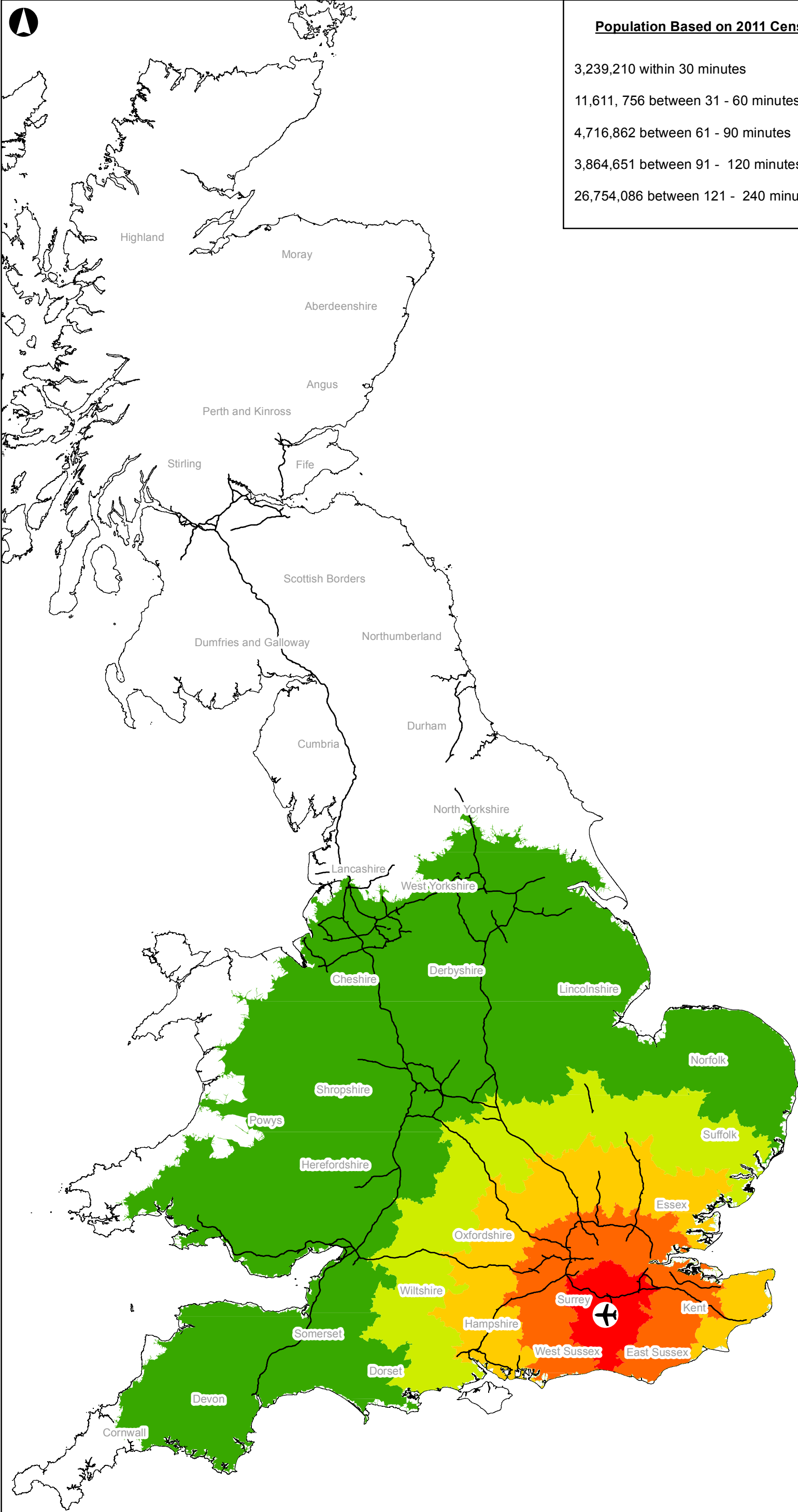
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Job Title
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**Geographical Distribution of
Gatwick Employee (2012)**

Scale at A3
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Job No 225680-50	Drawing Status For Issue	Issue F5
Drawing No 006		



Population Based on 2011 Census	
3,239,210	within 30 minutes
11,611,756	between 31 - 60 minutes
4,716,862	between 61 - 90 minutes
3,864,651	between 91 - 120 minutes
26,754,086	between 121 - 240 minutes

Legend

Gatwick

Motorway Network

Travel Time

Up to 30 minutes

31 - 60 minutes

61 to 90 minutes

91 to 120 minutes

121 to 240 minutes

P1	06-05-14	SK	DMc	JP
Issue	Date	By	Chkd	Appd

Metres

0

34,000

68,000

136,000

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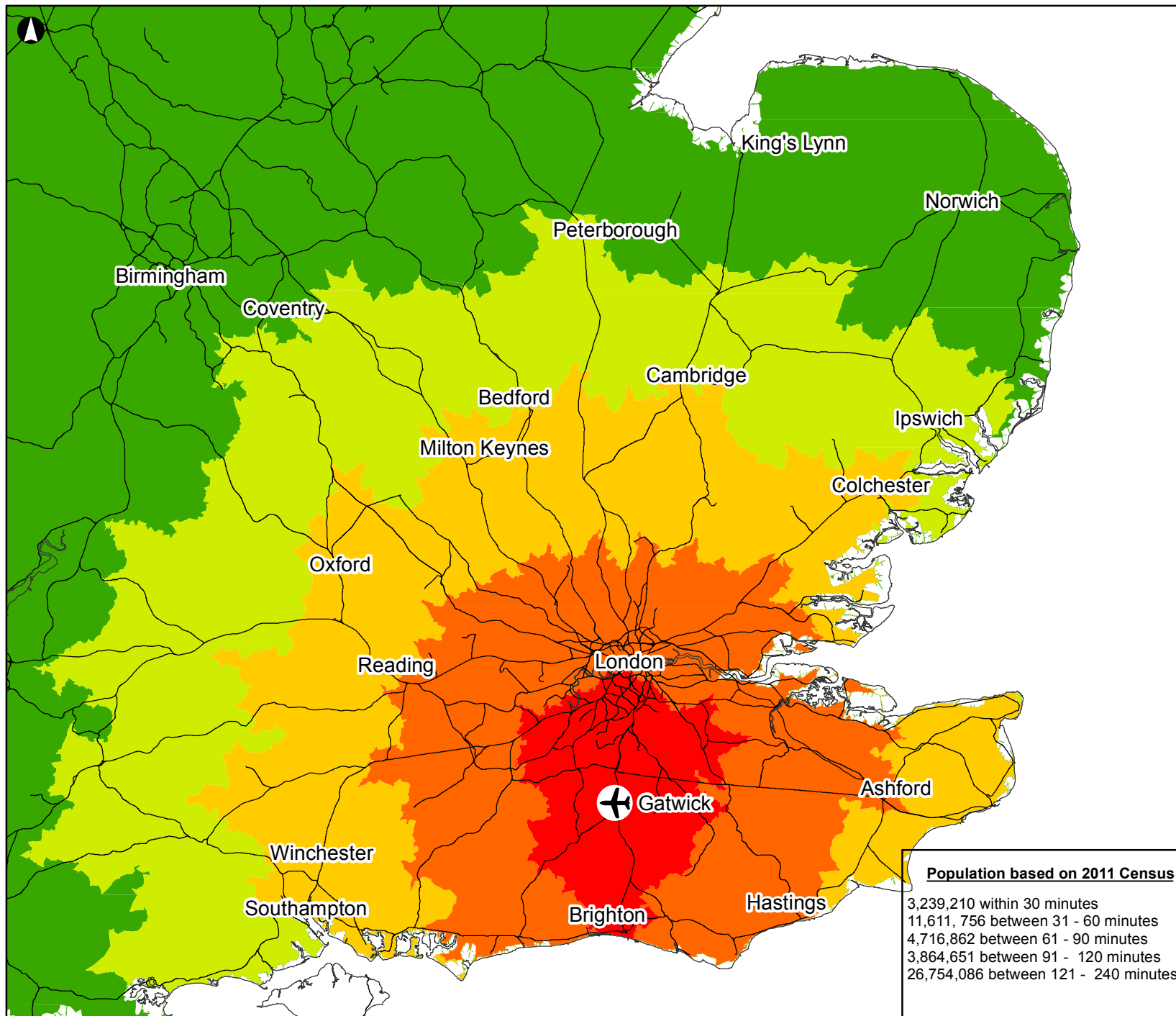
Gatwick Airport R2 Surface Access

Combined Driving and Public Transport Accessibility to Gatwick Airport

Scale at A3

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Legend



Gatwick Airport

Rail Network

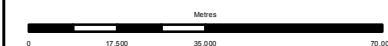
Travel Time

- 30m
- 31 - 60 minutes
- 61 to 90 minutes
- 91 to 120 minutes
- 121 to 240 minutes

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Job Title

Gatwick Airport R2 Surface Access

Combined Driving and Public
Transport Accessibility to
Gatwick Airport - Wider South East

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225680-50

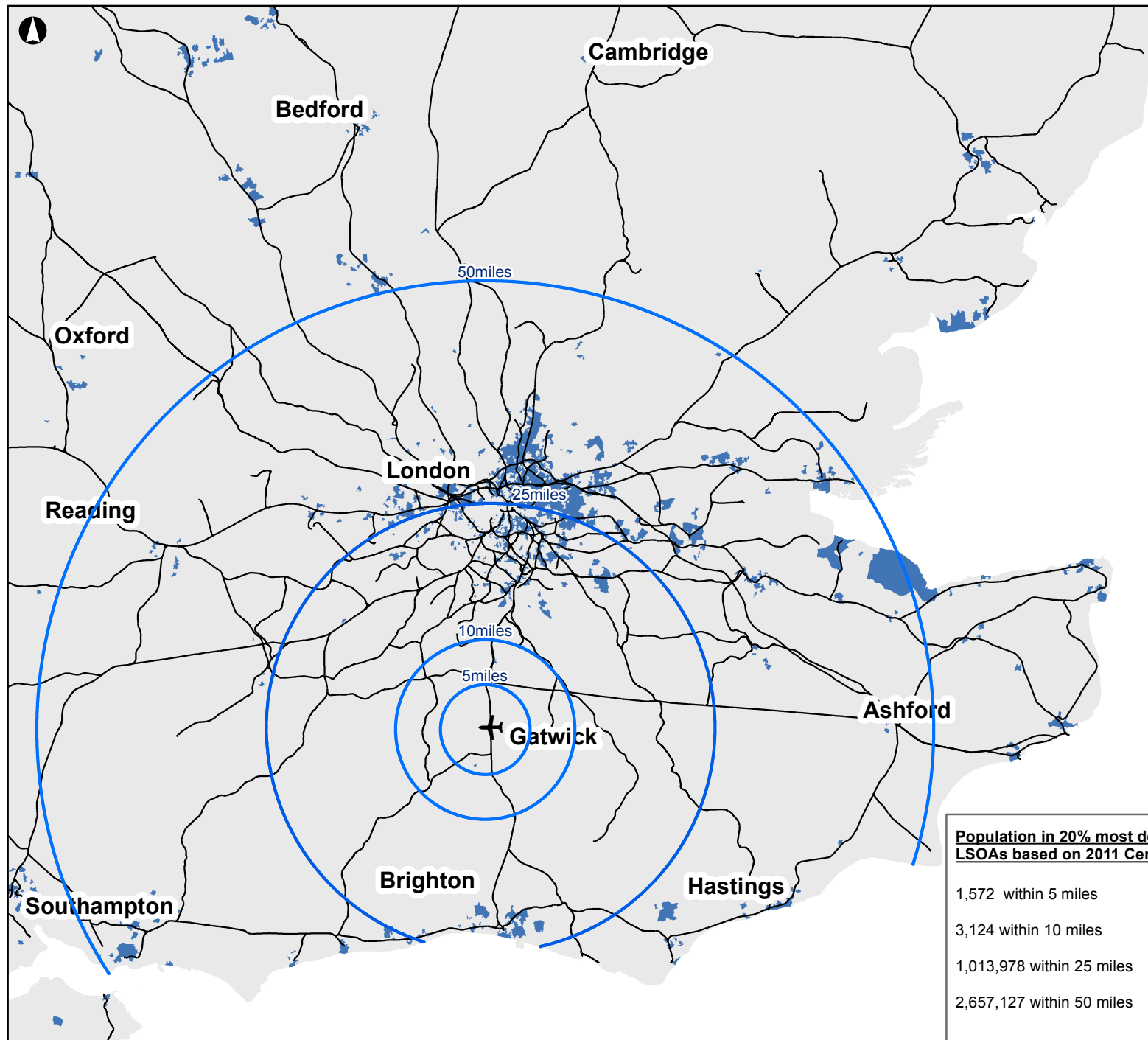
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Population based on 2011 Census

3,239,210 within 30 minutes
11,611,756 between 31 - 60 minutes
4,716,862 between 61 - 90 minutes
3,864,651 between 91 - 120 minutes
26,754,086 between 121 - 240 minutes



Legend

Gatwick Catchment Areas (miles)

— Existing Rail Network

Percentiles

20% most deprived LSOAs

P0	10-04-14	HC	KC	FJ
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Job Title

Gatwick Airport R2 Surface Access

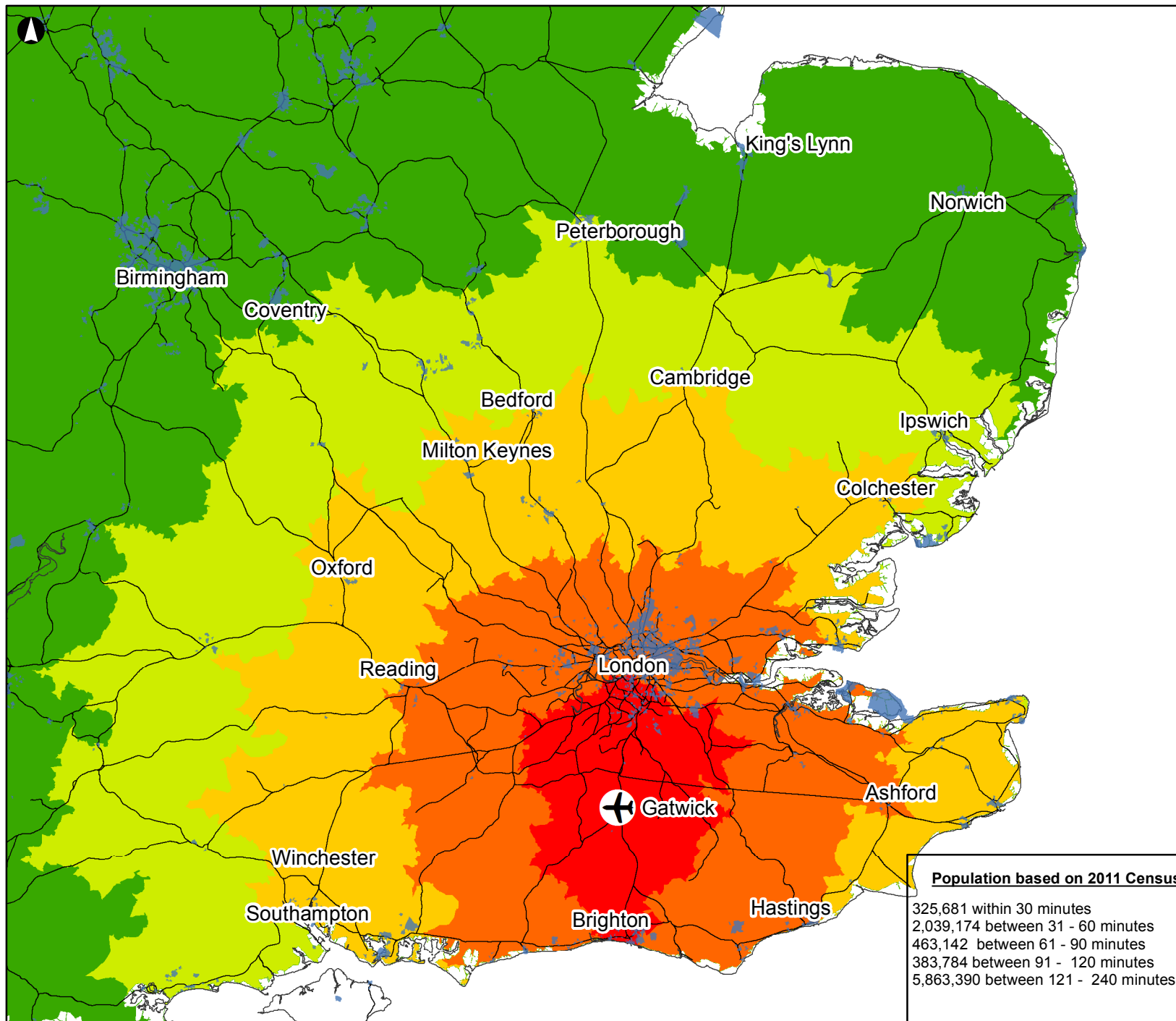


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Legend



Gatwick Airport

Rail Network

20% most deprived LSOAs

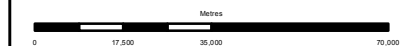
Travel Time

- 30m
- 31 - 60 minutes
- 61 to 90 minutes
- 91 to 120 minutes
- 121 to 240 minutes

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Job Title

Gatwick Airport R2 Surface Access

**Combined Driving and Public
Transport Accessibility to Gatwick
Airport from 20% most deprived LSOAs**

Scale at A4

1:1,500,000

Job No	Drawing Status
225680-50	Preliminary

Drawing No	Issue
007	P1