Gatwick Airport Northern Runway Project

Consultation Report Appendices – Part B – Volume 16

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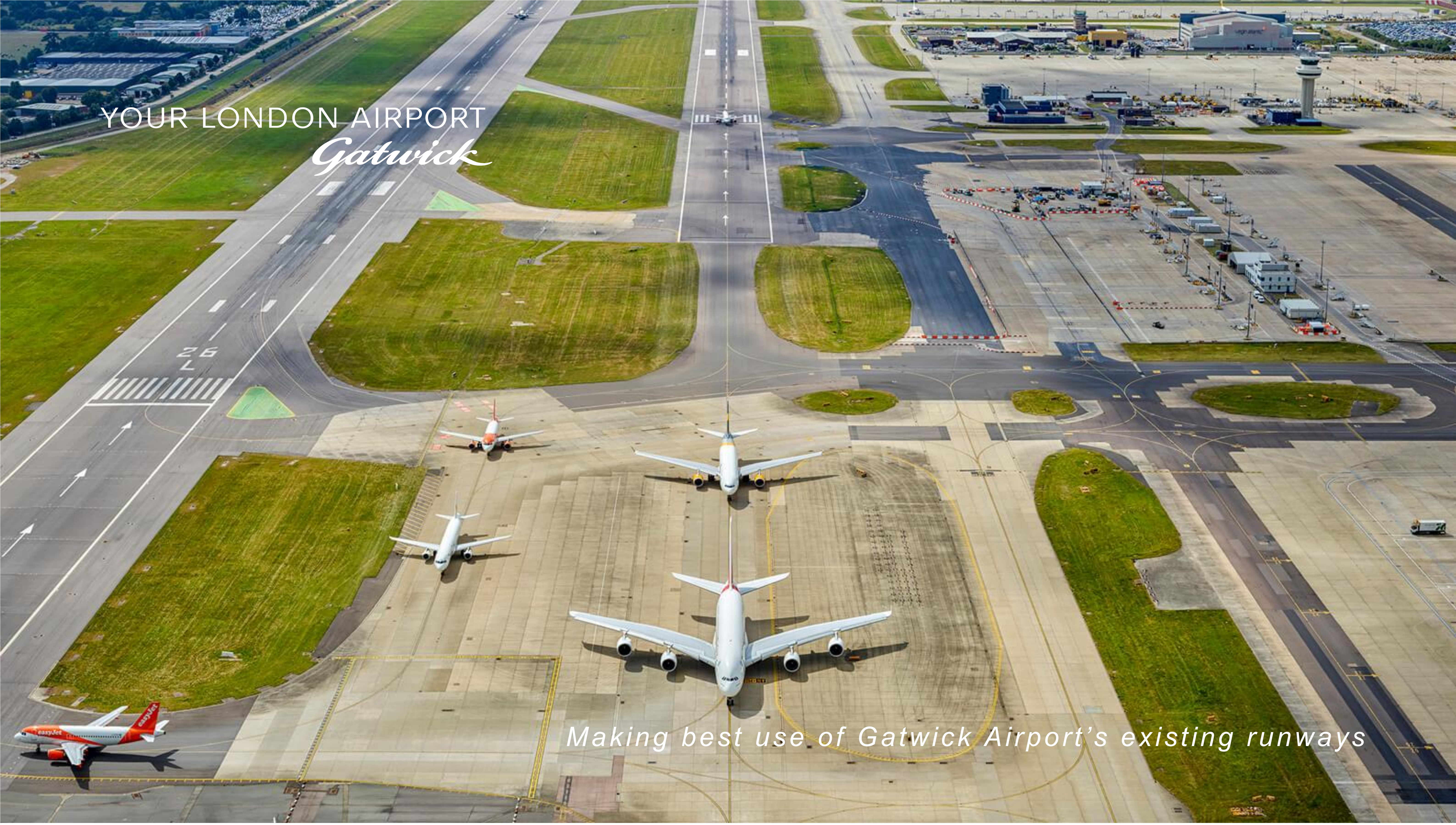
Contents – Part B – Volume 16



Preliminary Environmental Information Report
Appendix 12.9.1: Preliminary Transport Assessment Report (PTAR)

September 2021

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1 Introduction

1.1 General

1.1.1 This document forms Appendix 12.9.1 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process for the proposal to make best use of Gatwick Airport's existing runways (referred to within this report as 'the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in the Chapter 5: Project Description.

1.1.2 This document provides the Preliminary Transport Assessment Report (PTAR) for the Project.

1.2 Purpose of Assessment

1.2.1 In line with planning guidance, this PTAR sets out the transport network, its operation and performance and potential transport impacts of the proposed project. It includes an assessment of impacts, and how those impacts will be mitigated to promote sustainable development. A draft Airport Surface Access Strategy (ASAS) and Travel Plan will be included in the final Transport Assessment (TA). Draft actions and targets which could be considered to deliver an effective ASAS and Travel Plan are described in Section 7. Interventions that have been tested in the strategic transport modelling to support meeting these draft targets are also identified specifically in this section.

1.3 Overview of the Project

1.3.1 Gatwick Airport is currently served by a single main runway. The airport also has a further runway, which is located north of the main runway and is only available for use when the main runway is closed. This runway is known as the 'northern runway' or the 'standby runway'. A planning condition, together with a planning agreement, has historically prevented this runway from being used at the same time as the main runway. This agreement expired in August 2019 but the planning condition remains in place.

1.3.2 The Project proposes to make alterations to the northern runway, including repositioning its centreline to the north by 12 metres which, along with the lifting of the planning condition restricting its use, would enable dual runway operations in accordance with international standards.

1.3.3 It is anticipated that by 2047 these improvements could increase airport capacity up to 80.2 million passengers per annum (mppa), compared to a maximum potential capacity based on existing facilities of 67.2 mppa within the same timescale. This represents an increase of approximately 13 mppa.

1.3.4 Further details of the key components of the Project are provided in Section 2 of this report.

1.4 Scope of Assessment

1.4.1 A TA will be submitted as part of the Development Consent Order (DCO) application for the Project and will set out the potential transport impacts of development and how those impacts will be mitigated to promote sustainable development.

1.4.2 This document is the PTAR for the PEIR which will become the TA for the application for development consent as the modelling analysis and design proposals are further refined.

1.5 Document Structure

1.5.1 The structure of the documents is as follows:

- Section 2 describes the Project.
- Section 3 explains the policy context for the Project, whilst Section 4 sets out the assessment methodology required to test the effects of the Project in that policy context. The strategic transport modelling which underpins the assessment is described in Annex B.
- Existing conditions are described in Section 5 though more detail is provided in the sections pertaining to each mode of transport (Section 8 to Section 13).
- The demand forecasts for the Future Baseline and Project scenarios are presented in Section 6.
- The ASAS, mode share modelling and proposed highway mitigation are described in Section 7.
- The assessment of effects pertaining to each mode is described as follows:
  - Section 8 Rail.
  - Section 9 Bus and Coach.
  - Section 10 Strategic Highways: including proposed highway mitigation. A more detailed concept design report describing the highway mitigation is provided in Annex C.
  - Section 11 Local Highway and Road Network, including Terminal Forecourts.
  - Section 12 Walking and Cycling.
  - Section 13 Railway Station and Inter-Terminal Shuttle.
- The effects of construction of the Project are considered in Section 13.6.3.
- Freight, Cargo and Logistics movements are discussed in Section 15.
- Section 16 and Annex A include GIS mapping related to catchment areas and Quality of Life.
- Resilience and reliability of transport networks is be presented in Section 17, with impacts of future transport trends in Section 18.
- Conclusions are presented in the final section, Section 19.

2 The Project

2.1 Site Description

2.1.1 The airport is located between the towns of Horley to the north and Crawley to the south. The London to Brighton railway line, also knowns as the Brighton Main Line, and the A23 are adjacent to South Terminal, and the M23 motorway runs north to south further to the east of the Airport. Gatwick Airport's location is shown in Diagram 2.1.1.

2.1.2 A site overview is provided in Diagram 2.1.2. Gatwick Airport is served by a single runway. The airport also has a further runway, which is located north of the main runway and is only available for use when the main runway is unavailable, ie owing to planned maintenance or an unplanned closure.

2.1.3 Gatwick has two passenger terminals, North Terminal which opened in 1988, and South Terminal which opened in 1958. North Terminal currently accommodates more than half of Gatwick's annual passenger traffic, processing 24.5 mppa in 2017/18, while South Terminal processed 21.2 mppa.

2.1.4 The train station adjacent to South Terminal (owned by Network Rail) provides access to a wide range of rail services. These include the Gatwick Express service to London Victoria as well the Southern and Thameslink networks.

Diagram 2.1.1: Gatwick Airport – Location

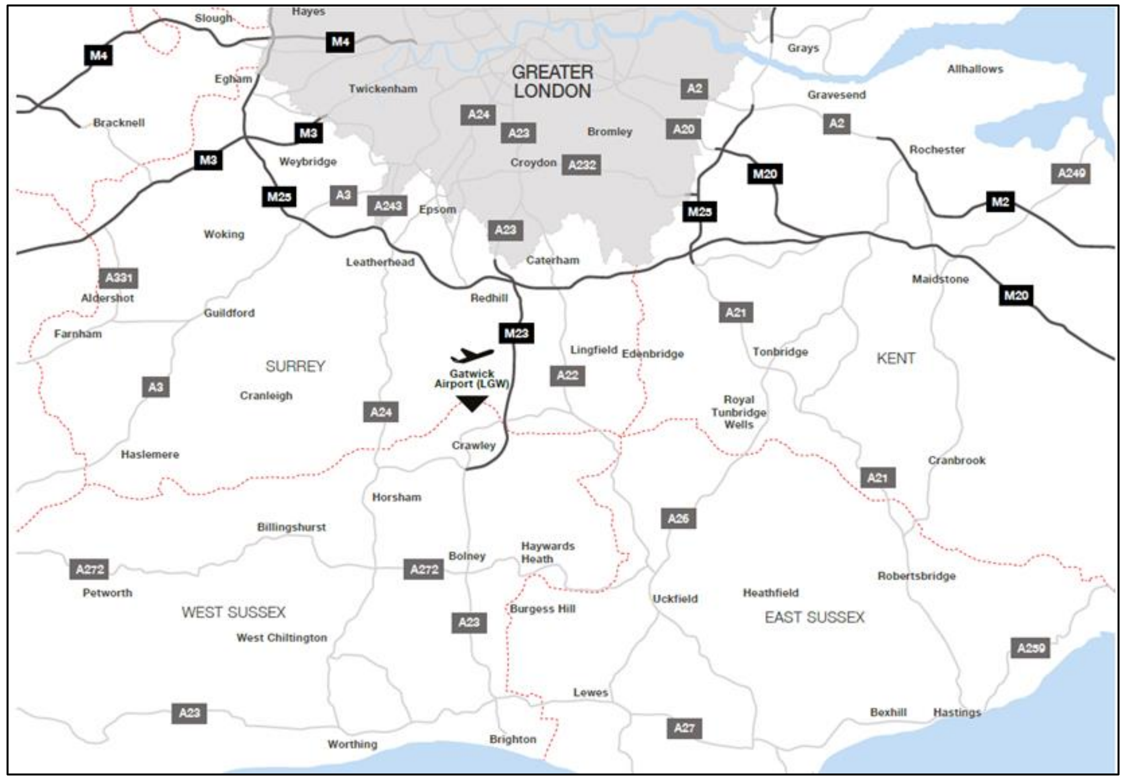


Diagram 2.1.2: Gatwick Airport – Site Overview

2.2 Site Access

2.2.1 Gatwick is an airport and a transport hub, where a range of transport modes connect. It acts as both a destination and an interchange for passengers.

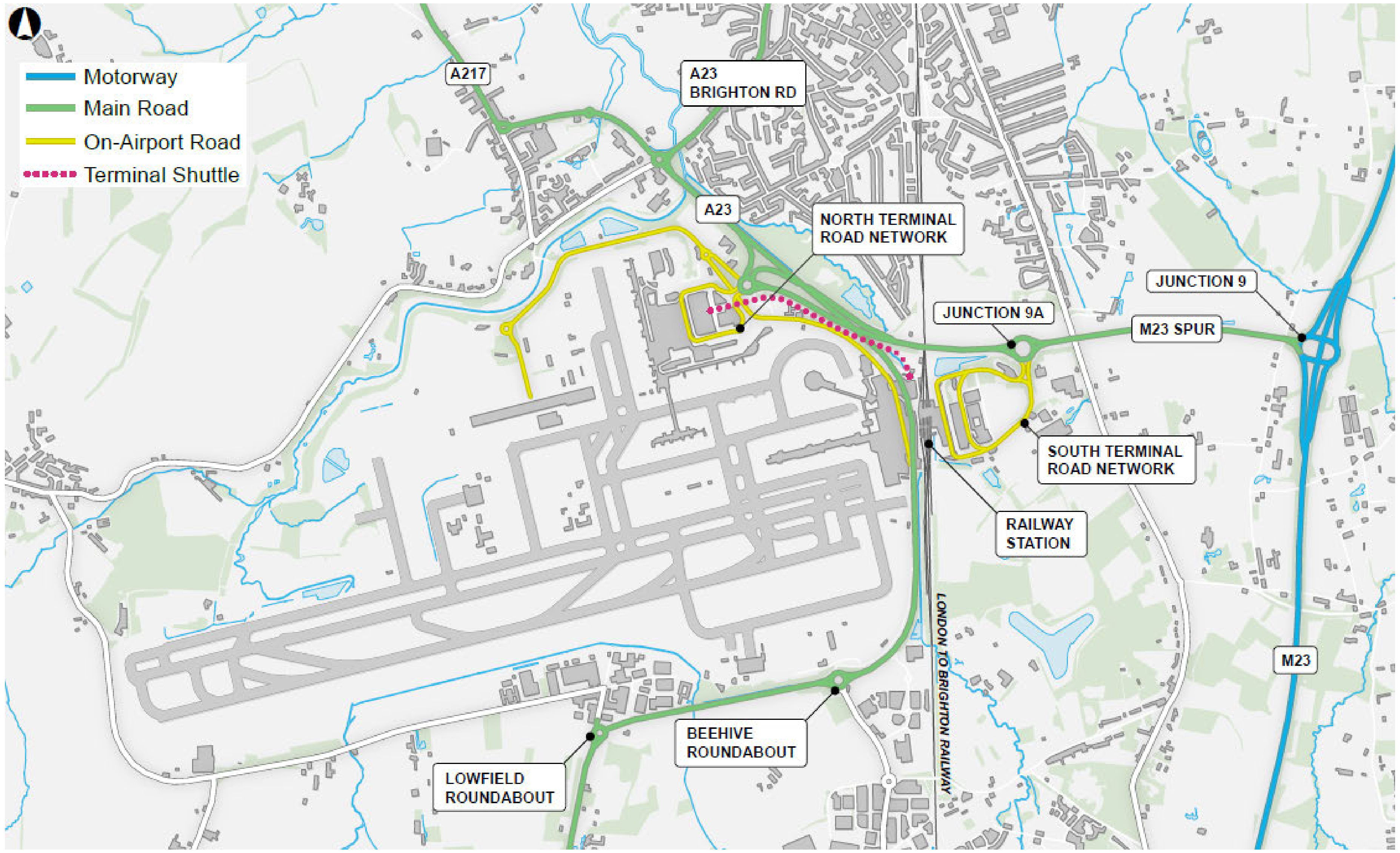
2.2.2 The Airport can be accessed by rail and road, as shown in Diagram 2.2.1:

- The Airport has a seven platform railway station adjacent to the South Terminal located on the Brighton Main Line, connecting London to Brighton.
- The Airport can be directly accessed from the national strategic road network 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 at the airport's South Terminal roundabout. The M23 connects to the M25 around London and the A23 towards Brighton and the South Coast.

2.2.3 North and South Terminals offer bus and coach access and are connected via an inter-terminal shuttle system.

2.2.4 Gatwick is the only London Airport to have 24 hour rail, bus and express coach access. The Airport is also accessible by walking and cycling, with routes into the Airport from Povey Cross, Horley and Crawley. National Cycle Network Route 21 (NCN21) provides a continuous route between Crawley, Gatwick, Horley, Reigate and London.

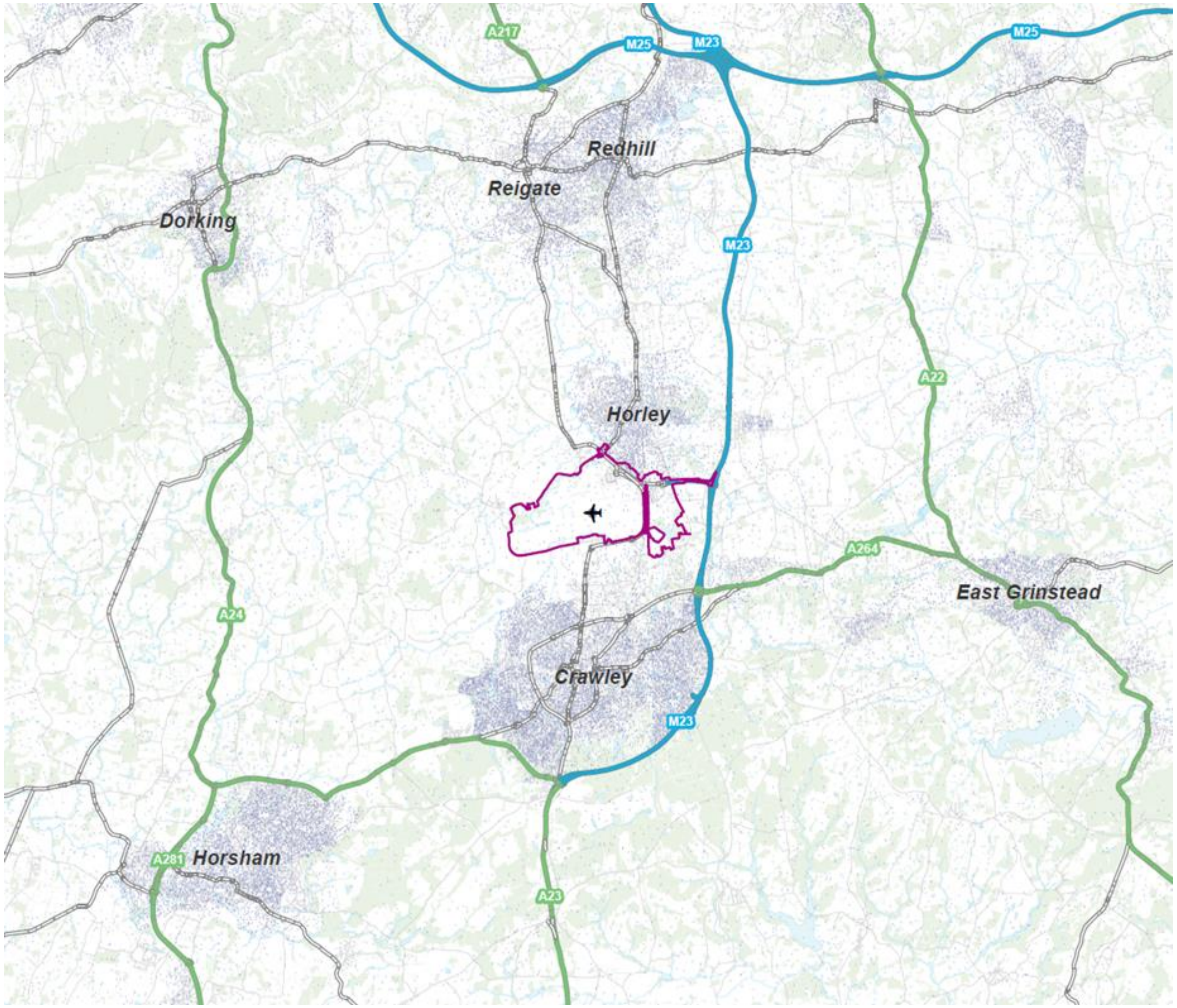
Diagram 2.2.1: Gatwick Airport – Transport Overview



2.3 Surrounding Communities

2.3.1 Gatwick Airport is located within the town of Crawley, West Sussex, along the border with the county of Surrey. The nearest towns are Crawley itself, with its town centre situated approximately 5 miles to the south of the airport, and the town of Horley, located immediately to the north. As shown in Diagram 2.3.1, Gatwick is also located near several other populous towns in West Sussex and Surrey, notably Horsham to the southwest, Dorking to the northwest, Redhill and Reigate to the north as well as East Grinstead to the east.

Diagram 2.3.1: Gatwick Airport -- Surrounding Communities



2.4 Project Description

2.4.1 The Project comprises alterations to the existing northern runway which, along with lifting the current restrictions on its routine use, will enable dual runway operations.

2.4.2 The Project includes the development of infrastructure and facilities to allow increased airport passenger and aircraft operations and to allow Gatwick Airport to make best use of its existing runways. There will be enhancements to the taxiway system and parking stands to accommodate an increase in aircraft movements. Other elements of the Project will enable the increased airfield capacity to be realised so that passengers can access the airport efficiently, with good levels of customer service, and so that environmental effects are mitigated.

2.4.3 In order to accommodate the proposed increase in passenger numbers, the following surface access improvements form part of the embedded mitigation of the Project, as shown in Diagram 2.4.1:

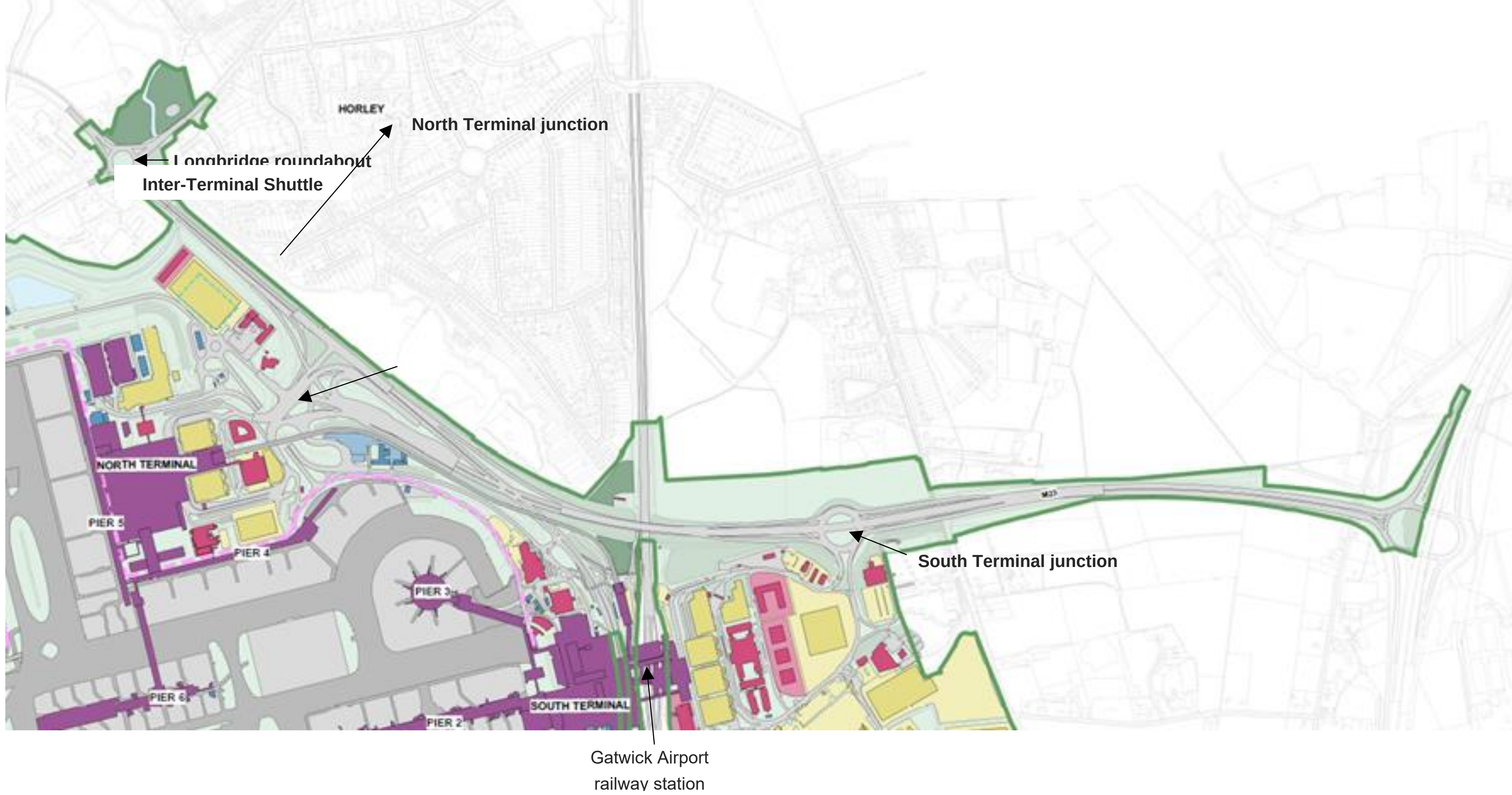
- South Terminal: new junction, providing full grade separation;
- North Terminal: new junction layout including some grade-separation, improving traffic flow and removing westbound traffic between Airport Way and the A23 from using the North Terminal roundabout;
- enhancement of the eastbound M23 Gatwick Spur as part of the South Terminal roundabout improvements, should these not be completed in advance of the airport expansion; and
- improvements to Longbridge roundabout where the A23 meets the A217.

2.4.4 Improvements to Gatwick Railway Station were the subject of a separate consenting process, with consent granted in March 2019 for a series of improvements to almost double the size of the station concourse, provide additional lifts and escalators and improve access to the platforms. The enhancement to the railway station will improve passenger experience and provide capacity for further growth in the numbers of rail passengers and overall public transport mode share. These improvements commenced in 2020 and will be in place prior to operation of the Project. Studies have been undertaken to explore the need for further improvement to the rail station, but taking into account the improvements that are planned, it is not currently envisaged that any further improvements will be required to the rail station platforms or concourse to accommodate the peak flows generated by the Project.

2.4.5 The Inter-Terminal Transit System (ITTS) provides a dedicated, elevated people mover system connecting North Terminal and South Terminal. Modelling has determined the scale of intervention necessary to adequately cater for demand, noting that some improvements can be made within the existing operation, eg increasing shuttle frequency.

2.4.6 It is anticipated that, by 2047, these improvements could increase Gatwick's passenger throughput to approximately 80.2 million passengers per annum (mppa), compared to a maximum potential passenger throughput based on existing facilities (with proposed/consented projects) of 67.2 mppa. This represents an anticipated increase in capacity of 13 mppa (see EIA Chapter 4: Existing Site and Operation for further details).

Diagram 2.4.1: Surface access works with the Project



3 Policy and Planning Context

3.1.1 The key legislation and policy documents relevant to traffic and transport and considered within the assessment process are described in this section.

3.2 National

3.2.1 The key national policy statements and frameworks considered are as follows[1]:

- **Airports NPS** (Department for Transport, 2018) - Primarily in relation to a new runway at Heathrow Airport but relevant for other applications for airport infrastructure in London and the south east of England, specifically "making best use of existing runways".
- **National Policy Statement (NPS) for National Networks[2]** (Department for Transport, 2015) - sets out the need for development of road, rail and strategic rail freight interchange projects on the national networks and the policy context against which decisions on major road and rail projects will be made.
- **National Planning Policy Framework (NPPF)** (Ministry of Housing, Communities and Local Government, 2021) - sets out the planning policies for England.

3.2.2 A summary of the key national policies is set out in Table 3.2.1.

[1] In July 2021, Government published its plan to decarbonise UK transport to net zero by 2050 with a number of strategic priorities discussed, including accelerating modal shift to public and active transport, decarbonisation of road transport through transition to zero emission road vehicles, decarbonising goods delivery, making the UK a hub for green transport technology, promoting place-based strategies for emissions reduction as well as reducing the UK's global impact on carbon through initiatives such as Jet Zero to decarbonise the aviation sector. These priorities align with the Government's Ten Point Plan for a Green Industrial Revolution. Given that the policy is under development, this section of the PTAR will be updated for the final ES and DCO submission. However, Gatwick is committed to low-carbon growth and its Decade of Change strategy sets ambitious carbon reduction targets. These inform headline mode share targets established when generating this assessment for PEIR and as documented in this PTAR.

[2] It is noted that the Transport Decarbonisation Plan announces the Department for Transport's (DfT's) intention to review the NPS in due course once demand patterns post-pandemic become clearer. It is understood DfT intend to commence the review by the end of 2021 and complete it by Spring 2023. In the interim and whilst the review is undertaken, DfT have confirmed the NPS for National Networks remains relevant government policy and has full force and effect for the purposes of the Planning Act 2008. To the extent that any emerging policy statement affects the assessment carried out in this PTAR, it will be updated as necessary in the environmental statement submitted with the DCO application.

Table 3.2.1: Summary of key national policies

Ref	Description
Airports NPS	
Para 5.9	The applicant must prepare an airport surface access strategy in conjunction with its Airport Transport Forum, in accordance with the guidance contained in the Aviation Policy Framework.
Para 5.10	The applicant should assess the implications of airport expansion on surface access network capacity using the WebTAG methodology stipulated in the Department for Transport guidance, or any successor to such methodology. The applicant should consult Highways England, Network Rail and highway and transport authorities, as appropriate, on the assessment and proposed mitigation measures. The assessment should distinguish between the construction and operational project stages for the development comprised in the application.
Para 5.11	The applicant should also consult to understand the target completion dates of any third party or external schemes included in existing rail, road or other transport investment plans.
Para 5.13	The applicant should have regard to Department for Transport (Department for Transport) Circular 02/2013, The Strategic Road Network and the delivery of sustainable development (or prevailing policy), and the National Networks NPS.
Para 5.14	Where appropriate, the applicant should seek to deliver improvements or mitigation measures that reduce community severance and improve accessibility.
Para 5.17	Any application for development consent and accompanying airport surface access strategy must include details of how the applicant will increase the proportion of journeys made to the airport by public transport, cycling and walking (with specific targets set for Heathrow in relation to its third runway proposal).
Para 5.18	The applicant should commit to annual public reporting on performance against these specific targets.
NPS for National Networks	
Para 3.14	The Government expects applicants to use reasonable endeavours to address the needs of cyclists and pedestrians in the design of new schemes.
Para 3.20	The Government expects applicants to improve access, wherever possible, on and around the national networks by designing and delivering schemes that take account of the accessibility requirements of all those who use, or are affected by, national networks infrastructure, including disabled users.
Para 3.22	Severance can be a problem in some locations. Where appropriate applicants should seek to deliver improvements that reduce community severance and improve accessibility.
Para 4.61 and 4.62	The applicant should undertake an objective assessment of the impact of the proposed development on safety including the impact of any mitigation measures. They should also put in place arrangements for undertaking the road safety audit process.
Para 5.201-5.212	This section discusses Impacts on Transport Networks and requires the applicant to give regard for policies in local plans, consulting with relevant authorities, support for other transport modes, assessing impacts and mitigation in EIA.
NPPF	
Para 10	At the heart of the Framework is a presumption in favour of sustainable development.
Para 104	Transport issues should be considered from the earliest stages of plan-making and development proposals, so that potential impacts can be address and opportunities are realised.
Para 110	In assessing applications for sites that may be allocated for development in plans, or specific applications for development,, it should be ensured that appropriate opportunities to promote sustainable transport modes can be taken up, safe and suitable access to the site can be achieved for all users, and any significant impacts from the development on the transport network can be cost effectively mitigated to an acceptable degree.
Para 111	Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

3.2.3 Other national guidance which has been considered in developing this PTAR includes:

- National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities and Local Government, 2019) - supports the NPPF and provides guidance across a range of topic areas, including 'Travel Plans, Transport Assessments and Statements'
- Road Investment Strategy 2: 2020-2025 (Department for Transport, 2020) – sets out the five year strategy for investment in and management of the strategic road network.
- The Strategic Road Network and the Delivery of Sustainable Development (Department for Transport, 2013)
- South East Route Control Period 6[3] Delivery Plan, Network Rail, March 2019 – This includes reference to support for a 45% rail mode share target for Gatwick Airport.
- Strategic Business Plan 2019 – 2024 (Network Rail, 2018); and
- Periodic Review 2018 (PR18) (Office of Rail and Road, 2018) – PR18 will establish outputs and funding for Control Period 6 (CP6) from 1 April 2019 to 31 March 2024.

3.3 Regional and Local

3.3.1 Gatwick Airport lies within the administrative area of Crawley Borough Council and adjacent to the boundaries of Mole Valley District Council to the north west, Reigate and Banstead Borough Council to the north east and Horsham District Council to the south west. The administrative area of Tandridge District Council is located approximately 1.9 km to the east of Gatwick Airport, while Mid Sussex District Council lies approximately 2 km to the south east. Other local authorities are . East Sussex (12km southeast) and Kent (15km east). Gatwick Airport is located in West Sussex and immediately adjacent to the bordering county of Surrey.

3.4 The relevant local planning policies applicable to Traffic and Transport based on the extent of the study area for this assessment are summarised in Table 3.5.1 and explained further in the paragraphs below.

3.5 Other Related Plans and Policies

3.5.1 Other plans and strategies have also been considered and these include:

- Draft West Sussex Transport Plan 2022 to 2036 (West Sussex County Council, 2021)
- West Sussex Transport Plan 2011-2026 (LTP3) (West Sussex County Council, 2011)
- West Sussex Walking and Cycling Strategy 2016-2026 (West Sussex County Council, 2016)
- West Sussex County Council Highway Infrastructure Policy and Strategy 2018 (West Sussex County Council, 2018)
- Mid Sussex Infrastructure Delivery Plan 2016 (Mid Sussex District Council, 2016)
- Draft Surrey Local Transport Plan 2022–2032 (LTP4) (Surrey County Council, 2021)
- Surrey Local Transport Plan 2011-2026 (LTP3) (Surrey County Council, 2018)
- East Sussex Local Transport Plan 2011-2026 (East Sussex County Council, 2011)
- Kent Local Transport Plan 2016-2031 (Kent County Council, 2017)

3.5.2 The following guidance has been considered:

- Design Manual for Roads and Bridges (DMRB) Standards for Highways
- WebTAG (Transport Analysis Guidance) (Department for Transport, 2019)
- Station Capacity Planning Guidance (Network Rail, 2016)
- Local highway authority standards, where relevant if these differ from DMRB

3.5.3 Additional studies and strategies which have also been reviewed as part of this PTAR report:

- West Sussex Infrastructure Studies (AECOM, 2016)
- West Sussex Guidance on Parking at New Developments (West Sussex County Council, 2020)
- West Sussex Transport Assessment Methodology (West Sussex Couny Council, 2007)
- West Sussex Cycling Design Guide (West Sussex County Council, 2019)
- Emerging Crawley's Local Cycling and Walking Infrastructure Plan, consultation draft (Crawley Borough Council, 2020)Horsham District Council, Draft Infrastructure Delivery Plan (Horsham District Council, 2020)
- The London Plan 2021 (Greater London Authority, 2021)
- The Mayor's Transport Strategy 2018 (Greater London Authority, 2018)
- South East Route - Sussex Area Route Study Final (Network Rail, 2015)
- Strategic Economic Plan (2018-2030) (Coast to Capital, 2018)
- Transport Strategy (being developed) (Transport for the South East, 2019)
- Manual for Streets (Department for Transport, 2007)
- Manual for Streets 2 (Chartered Institute of Highways and Transportation, 2010)

[3] Control Periods are 5 year periods used by Network Rail to specify planning and investment in railway infrastructure. Control Period 5 runs from 2014 to 2019, Control Period 6 from 2019 to 2024, and so on.

Table 3.5.1: Summary of key regional and local policies

Policy	Description
Crawley 2030: Crawley Borough Local Plan 2030	
IN3 Development and Requirements for Sustainable Transport	Supports guiding development toward existing sustainable travel networks and requires satisfactory mitigations for unacceptable cumulative impacts on the networks. For major projects, requires preparation of a Transport Assessment.
IN4 Car and Cycle Parking Standards	Calls for developments within the Borough to include sufficient car and cycle parking per relevant planning obligations and agreements. Standards for non-residential developments to be based on particular requirements of the development.
IN5 The Location and Provision of New Infrastructure	States support for infrastructure improvements where these are required to support development within the Borough. Major facilities should be located in locations with high levels of multi-modal accessibility.
IN6 Improving Rail Stations	Improvements to Gatwick Station should support its function as an airport related interchange as well as enhancing the broader functions as a multi-modal interchange for rail, coach, and bus users.
GAT1 Development of the Airport with a Single Runway	Support development that contributes safe and efficient operations within the existing airport boundary, provided satisfactory mitigations are in place for surface access and other environmental impacts. Currently, the Council supports development of the airport in its existing configuration as a two-terminal, single runway facility with growth up to 45 mppa.
GAT3 Gatwick Airport Related Parking	Policy calls for new or replacement airport parking to be based on demonstrated need and to be sited within the existing airport boundary. This policy is guided by a desire to limit spill over of parking facilities into local communities and need to maintain high mode-share targets for sustainable transport to the airport.
Draft Crawley Borough Local Plan 2021 – 2037 (January 2021) – Consultation closed at the end of June 2021.	
SD1 Presumption in Favour of Sustainable Development	When considering development proposals the council will take a positive approach to approving development which is sustainable. Strategic objectives are provided and development will be supported where it meets the objectives.
SD2 Enabling Healthy Lifestyles and Wellbeing	New development must be designed to achieve healthy, inclusive and safe places, which enable and support healthy lifestyles and address health and wellbeing needs in Crawley, as identified in the Crawley Joint Strategic Needs Assessment.
ST1 Development and Requirements for Sustainable Transport	Development should be located and designed so as to encourage travel via the walking and cycling network and public transport routes, while reducing dependency on travel by private motor vehicle. Developments should meet the access needs they generate and not cause an unacceptable impact in terms of increased traffic congestion or highway safety. Developments will be considered acceptable in highways terms unless there would be an unacceptable impact on highway safety, or the cumulative impact on the transport network is severe and cannot be satisfactorily mitigated. Developments that generate a significant amount of movements should be supported by a Transport Statement / Assessment.
ST2 Car and Cycle Parking Standards	Development will be permitted where the proposals provide the appropriate amount and type of car and cycle parking (including electric vehicle charging infrastructure) to meet its needs when it is assessed against the borough council's car and cycle parking standards.
ST3 Improving Rail Stations	Any improvements or developments at Gatwick Station should support its function as an airport-related interchange and provide opportunities for broadening the function of the station as an interchange for surface travellers using rail, coach, Fastway and other buses consistently with the safe and efficient operation of the airport.
ST4 Safeguarding of a Search Corridor for a Crawley Western Relief Road	The Local Plan Map identifies a Search Corridor for a Crawley Western Link Road linking the A264 with the A23. This Search Corridor will be safeguarded from development which would be incompatible with the future delivery of a full Crawley Western Link Road.
GAT1 Development of the Airport with a Single Runway	The council will support the development of facilities which contribute to the sustainable growth of Gatwick Airport as a single runway, two terminal airport provided that the proposed use is appropriate within the airport boundary and contributes to the safe, secure and efficient operation of the airport, the impacts of the operation of the airport on the environment are minimised, adequate supporting infrastructure (particularly for surface access) can be put in place, and benefits to Crawley's local economy and community are maximised.
GAT3 Gatwick Airport Related Parking	The provision of additional or replacement airport-related parking will only be permitted where i) it is located within the airport boundary; and ii) it is justified by a demonstrable need in the context of proposals for achieving a sustainable approach to surface transport access to the airport.

Policy	Description
Reigate and Banstead Local Plan: Core Strategy 2014 (Reigate and Banstead Borough Council, 2014)	
Policy CS17 Travel Options and Accessibility	States broad council commitment to working with relevant parties to manage travel demand, improve network efficiency for all road users, and facilitate sustainable transport choices.
Reigate and Banstead Borough Development Management Plan 2018-2027 (Reigate and Banstead Borough Council, 2019)	
TAP1 Access, Parking and Servicing,	Sets forth highway design, multi-modal access, and car and cycle parking requirements for proposals within the Borough, as well as stating preference for proposals to promote safe, sustainable travel and incorporate travel demand measures. Requires a Transport Assessment as appropriate.
TAP2 Airport Car Parking	Precludes permission for airport related parking, including additional or replacement parking, within the district.
HOR09 Horley Strategic Business Park	The site is allocated for a strategic business park of predominantly offices, with a complementary range of commercial, retail and leisure facilities and at least 5 ha of new high quality public open space. It should be demonstrated through a Transport Assessment that there will be no severe residual impact on the local and strategic road network. Development will be subject to requirements / considerations, including a new dedicated, direct access onto the strategic road network (M23 spur), a secondary access to the site from Balcombe Road for use by emergency services, public transport and other sustainable transport modes, measures and improvements to manage the impact of additional traffic on surrounding local roads, and improvements to pedestrian / cycle routes. In the Examination in Public, it was concluded that access to the business park would range from “a new access to the existing roundabout through to a grade-separated junction, depending on the level of development traffic”.
Mole Valley Core Strategy 2009 (Mole Valley District Council, 2009)	
CS18 Transport Options and Accessibility	States council preference for development with high levels of multi-modal accessibility on the existing network, and for schemes that include improvements for cyclists, pedestrians, and public transport users. Requires submission of Travel Plans to accompany major developments, to be implemented under an s106 agreement.
Mole Valley Local Plan 2000 (Mole Valley District Council, 2000)	
RUD28 Off Airport Car parking	Precludes permission for airport related parking, including additional or replacement parking, within the district.
MOV2 The Movement Implications of New Development	Proposals for development within the District should demonstrate compatibility with existing transport infrastructure and environmental character. As appropriate developers should provide for schemes and initiatives to provide adequate capacity for the development and provide provisions for all road users.
MOV5 Parking Standards	States that current car parking standards are applied as maximums for developments within the district and should be examined in regard to the site's accessibility by other modes and opportunities to contribute to improved public transport networks.
Draft Future Mole Valley 2018-2033	
INF1 Promoting Sustainable Transport and Parking	New development will be required to contribute to the delivery of an integrated, accessible and safe transport network, and maximise the use of sustainable transport modes; including walking, cycling and public transport. Where practical, taking account of the scale and nature of the development, the policy sets out requirements for proposals. New development will be required to provide and contribute towards suitable access, transport infrastructure and services that are necessary to make the development acceptable, including the mitigation of its otherwise adverse material impacts. Development of new off-airport car parking facilities or extensions to existing sites related to Gatwick Airport will not be supported unless a specific need can be demonstrated, and all realistic alternatives have been examined.
Horsham District Planning Framework (excluding South Downs National Park) 2015 (Horsham District Council, 2015)	
Policy 40 Sustainable Transport	Encourages and supports development proposals seeking to manage travel demand by promoting and improving sustainable transport options.
Policy 41 Parking	Calls for adequate parking, including for cars, bicycles, and motorcycles, to be provided within new developments generally. Precludes permission for airport-related parking within the district, unless no feasible alternative is available to meet a demonstrated need.

Policy	Description
Draft Horsham District Local Plan 2019-2036 (Horsham District Council, 2020)	
Strategic Policy 41 - Infrastructure Provision	The release of land for development will be dependent on there being sufficient capacity in the existing local infrastructure to meet the additional requirements arising from new development, or suitable necessary mitigation arrangement for the improvement of the infrastructure, services and community facilities caused by the development being provided. Where there is a need for extra capacity, this will need to be provided in time to serve the development or the relevant phase of the development, in order to ensure that the environment and amenities of existing or new local residents is not adversely affected. To ensure required standards are met, arrangements for new or improved infrastructure provision will be secured by Planning Obligations/Community Infrastructure Levy, or in some cases contributions attached to a planning permission, so that the appropriate improvement can be completed prior to occupation of the development, or the relevant phase of the development.
Strategic Policy 42 - Sustainable Transport	There is a commitment to developing an integrated community connected by a sustainable transport system. In order to manage the anticipated growth in demand for travel, development proposals which promote an improved and integrated transport network, with a re-balancing in favour of non-car modes as a means of access to jobs, homes, services and facilities, will be encouraged and supported.
Policy 43 - Parking	Adequate parking and facilities must be provided within developments to meet the needs of anticipated users. Consideration should be given to the needs of cycle parking, motorcycle parking, and vehicles for the mobility impaired. Adequate parking and plug-in charging facilities must be provided to cater for the anticipated increased use of electric, hybrid or other low emission vehicles. Planning permission will not be granted for off-airport parking facilities related to Gatwick Airport unless a need can be demonstrated and no other realistic alternatives is available.
Policy 44 - Gatwick Airport Safeguarded Land	Land identified on the Local Plan Policies Map will be safeguarded from development which would be incompatible with expansion of the airport to accommodate the construction of an additional wide spaced runway (if required by national policy) together with a commensurate increase in facilities that contribute to the safe and efficient operation of the expanded airport. Minor development within this area, such as changes of use and small scale building works, such as residential extensions, will normally be acceptable. Where appropriate, planning permission may be granted on a temporary basis. The airport operator will be consulted on all planning applications within the safeguarded area.
Tandridge District Core Strategy 2008 (Tandridge District Council, 2008)	
Policy CSP12 Managing Travel Demand	Developments to provide transport infrastructure improvements as appropriate, inclusive of all road users. Improvements to key corridors are supported, including the M23/A23 corridor.
Tandridge Local Plan Part 2: Detailed Policies 2014-2029 (Tandridge District Council, 2014)	
Policy DP5 Highway Safety and Design;	In addition to adherence to relevant highway design guidance, requires developments to avoid creating unnecessary traffic flow impediments or roadway hazards, ensure safe and suitable access to all road users, to maintain existing active travel networks, and to fund, as appropriate, mitigation measures for significant impacts. Calls for a Transport Assessment for developments generating significant amounts of traffic.
Emerging Our Local Plan 2033 (Regulation 22 Submission) 2019 (Tandridge District Council, 2019)	
Policies TLP50 Sustainable Transport and Travel	Calls for proposals to demonstrate broad conformity with the vision and objectives in the Surrey Local Transport plan, especially as regards active travel and air quality, and seeks to guide development to appropriate locations with a range of transport options. Requires preparation of a Transport Assessment and Travel Plan, as appropriate, to ensure appropriate mitigation measures for adverse impacts to traffic and the environment. Sets forth objectives to promote and enhance public transport, electric vehicle infrastructure, and active travel networks.
TLP51 Airport Related Parking	Precludes permission for airport related parking, including additional or replacement parking, within the district.
Mid Sussex District Plan 2014-2031 (Mid Sussex District Council, 2018)	
Policy DP21 Transport	Requires developments within the District to support West Sussex Transport Plan (2011-2026) objectives, which promote ensuring provision of high quality, resilient, safe and healthy, and sustainable transport network and outlines evaluation criteria for support. Transport Assessment along with Travel Plans are required as appropriate for developments generating significant amounts of movement.

Policy	Description
Saved policies from the Mid Sussex Local Plan 2004 (Mid Sussex District Council, 2004)	
T4 New Development	Calls for new development to adhere to sustainability requirements through siting in built up areas near existing public transport provision, seeking to limit new private car trips, and providing convenient and safe cycling and pedestrian infrastructure.
T5 Parking Standards	Proposals should adhere to latest parking standards for the district, and not provide parking in excess of guidance.

4 Assessment Methodology

4.1.1 This section describes the methodology, including modelling approach and assumptions used, to assess the impact or the effects of additional passengers, staff and cargo forecast for Gatwick Airport on the surface transport network.

4.1.2 The methodology and the inputs described have been discussed with key stakeholders in a series of meetings held through 2019-2021 and dialogue is ongoing.

4.1.3 In particular, strategic modelling has been developed with input from key stakeholders including DfT, Highways England and Local Authorities including West Sussex and Surrey County Councils through a series of technical workshops and reviewing of specific modelling technical notes when the base model was being developed (2019 to early 2020). These workshops are being restarted as of July 2021 to finalise the base and forecast year models to inform the application for development consent.

4.2 Stakeholder Consultations

4.2.1 Stakeholder engagement meetings and workshops are documented in Table 4.2.1.

Table 4.2.1: Ongoing Stakeholder Engagement

Consultee	Date	Details
Department for Transport	23 April 2019	Meeting held to discuss Master Plan scenarios and modelling approach to assess the potential effects on the transport network.
Highways England	Various, early 2019	Various meetings held in early 2019 to discuss Master Plan scenarios and Highways England expectations around both modelling and testing of effects and potential mitigation on the highway network.
	01 October 2019	Meeting to discuss modelling findings and potential mitigation. Highways England set out its expectations around process, engagement, considerations (including the need to model network impacts during highway construction) and how to interface the Gatwick and Highways England teams on design issues.
	26 November 2019	Meeting to discuss updates and evolution of proposed mitigation, including model assessment years, an alternative arrangement for North Terminal Roundabout, consideration of how to build highway works offline to reduce the traffic impacts of construction, as well as potential changes to posted speed limits.
	26 October 2020	Meeting with Highways England to confirm the recommencement of the Project after a pause because of the Covid pandemic. This included a recap on where the work had got to in Spring 2020 and next steps.
	02 February 2021	Given a change in personnel on the Highways England team considering GAL's DCO application, a briefing on all aspects of the project including proposed highway mitigation, VISSIM modelling demonstrating the appropriateness of the highway mitigation, strategic transport modelling including highway modelling and a proposed engagement schedule with Highways England.
	13 April 2021	Meeting to provide new team members at Highways England with an overview of the highway network serving GAL and the design development of highway mitigation to support growth at the Airport with NRP.
	17 May, 27 May, 15 June 2021	Meetings between GAL, Highways England and Arup on a programme of engagement through to DCO submission in summer 2022.
West Sussex County Council	15 April 2019	Meeting held with West Sussex surface access and modelling leads to discuss Master Plan scenarios, West Sussex's expectations, a potential modelling approach and study area, including access to the Crawley model network, which has since be provided to GAL.
Network Rail	13 February 2019	Meeting held with Network Rail to discuss Master Plan scenarios and potential impacts on the station, South Terminal and inter-terminal shuttle. Network Rail agreed to release the Legion model used for business case modelling of the station project for use by Gatwick in relation to the DCO.
	11 July 2019	Meeting to discuss and agree preliminary Legion modelling of the station, as presented in Section 12.
	04 December 2019	Meeting to discuss use of rail to transport project-related construction materials and spoil.
	10 December 2019	Meeting to discuss further Legion modelling of the station and to discuss route capacity enhancements.
Transport for London	16 April 2019	Meeting held with Transport for London to discuss Master Plan scenarios and the approach to modelling and testing effects, including access to the London Highway Assignment Model (LoHAM) network, which has since been provided to GAL.
	04 November 2019	Meeting to discuss expectations for assessment, potential modelling approach and study area, assumptions regarding rail access and onward travel across London.
	14 April 2021	Update on progress towards DCO submission, in particular the outline programme to consultation, progress and forthcoming outputs on surface transport modelling and transport assessment. Other subjects covered included the recently introduced Forecourt Charging at Gatwick and the Mayor's Financial Sustainability Plan with potential user charging concepts for London.
Local Authority Topic Working Group	21 August 2019	Meeting held with various Local Authorities (LAs) as the start of ongoing engagement with LAs, following the official announcement by GAL of its intention to submit a DCO application.
	04 February 2020	The assessment for the PEIR was presented and discussed including forecasting, the highway assessment, the public transport assessment including rail and station, construction, the highway mitigation options, the Airport Surface Access Strategy and initial mode share targets. Progress with the strategic transport modelling was also presented.
	27 July 2021	Meeting held with various Local Authorities (LAs) to provide an update on emerging findings from the assessment for PEIR including updated forecasts, draft actions and targets in the Airport Surface Access Strategy including mode share. the highway assessment and proposed highway mitigation, airfield and highway construction impacts, the public transport assessment including rail and railway station performance.
Highway Authorities	11 November 2019	Meeting held with Highways England, West Sussex and Surrey County Councils at Gatwick to discuss strategic modelling and the Model Specification Report (MSR). The meeting discussed components of the modelling including demand types, time periods, strategic model to VISSIM integration, committed highway schemes to be included in the modelling etc. This was the first of series of planned meetings with Highway Authorities on the transport modelling.

Consultee	Date	Details
	12 December 2019	Meeting held with Highways England, West Sussex and Surrey County Councils at Gatwick to discuss strategic modelling, including model validation, demand forecasting, future transport schemes and forecast scenarios.
	25 February 2020	Meeting held with Highways England, West Sussex and Surrey County Councils at Gatwick to discuss strategic modelling technical notes issued by Arup on behalf of GAL.
	06 July 2021	Meeting held with Highways England to discuss the status of strategic modelling and to set out the strategy for engagement through to DCO submission.
	07 July 2021	Meeting held with Surrey to discuss the status of strategic modelling and to set out the strategy for engagement through to DCO submission.
	14 July 2021	Meeting held with West Sussex to discuss the status of strategic modelling and to set out the strategy for engagement through to DCO submission.
Planning Inspectorate (PINS)	15 November 2019	Meeting held with PINS to respond to comments provided on the Environmental Impact Assessment Scoping Report, including in relation to cumulative development which impacts upon the strategic transport modelling.
	03 February 2021	Meeting held with PINS to restart DCO engagement on the Project after a short pause related to Covid. Discussion on NSIPs, Heathrow Runway 3 and in relation to cumulative development which will impact upon the next stage of strategic transport modelling.

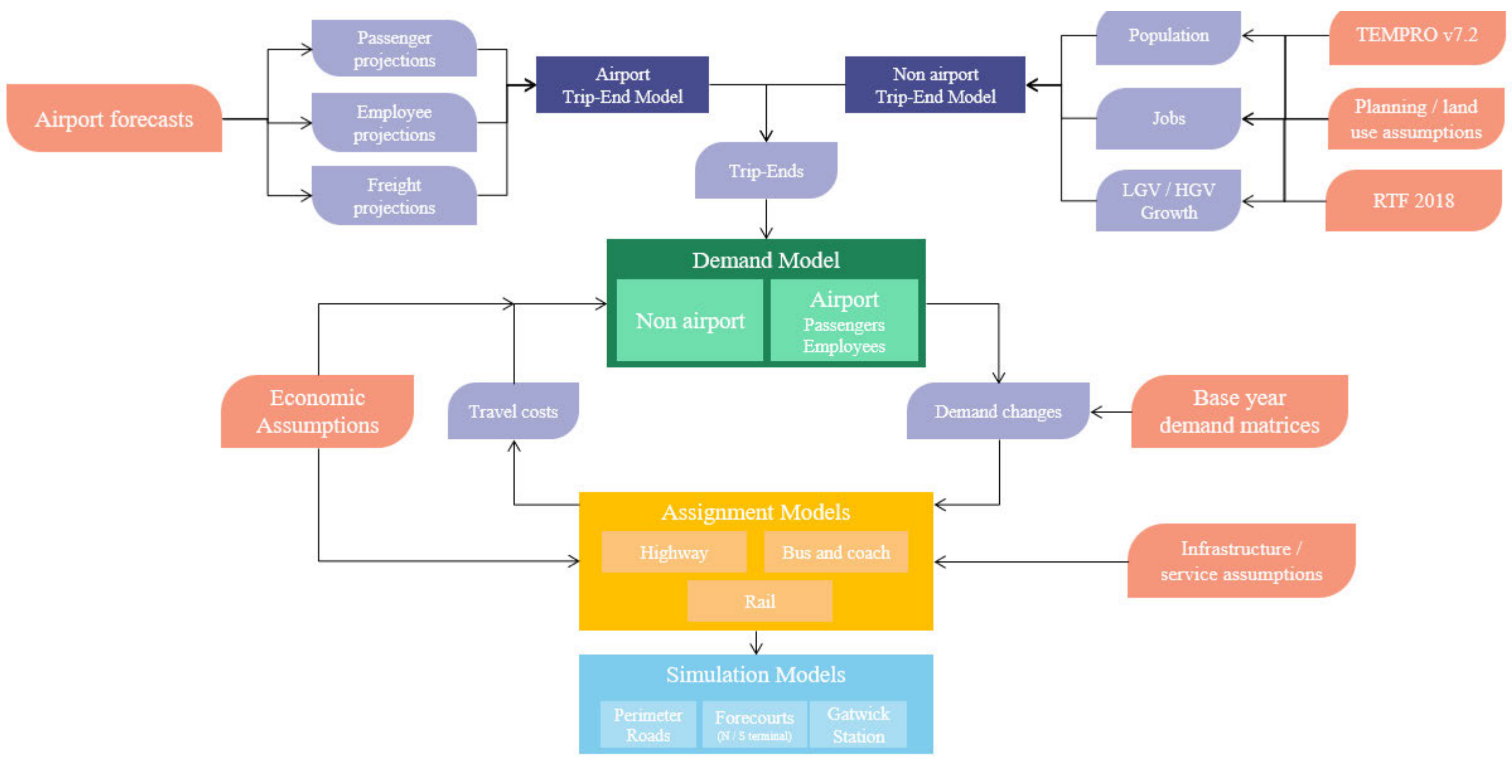
4.3 Modelling Approach

4.3.1 For the purpose of the assessment, GAL has developed a bespoke suite of inter-related strategic modelling tools. The development and structure of these modelling tools has been shared with Department for Transport, Highways England, Network Rail and the Local Authorities as statutory consultees prior to consultation.

4.3.2 An overall model architecture has been developed. Diagram 4.3.1 shows the proposed overall modelling structure that the Gatwick Strategic Model will follow. This aligns with the approach in WebTAG (Unit M1.1) (Department for Transport, 2014). It comprises three core model components.

- The demand model – capable of reflecting changes in the distribution and mode of non-airport demand and the mode of travel for airport demand (passengers, employees, freight and logistics movements).
- Assignment models – capable of establishing the likely routes taken by airport and non-airport demand and producing costs for the demand model.
- Simulation models – used for the detailed operational assessment of key pieces of infrastructure at and adjacent to the Airport, including the impacts of proposed mitigation.

Diagram 4.3.1: Proposed Model Architecture



Demand Model

4.3.3 A variable demand model has been developed to identify the background (non-Gatwick) trips. Alongside this sits a specific demand model for Gatwick Airport trips for two main reasons:

- more model detail is required – more modes (eg taxi), different segmentation (eg UK/overseas) and additional time periods customised to the specific circumstances of Gatwick Airport; and
- there are different choices and sensitivities – eg air passengers have no flexibility to change destination as they have to get to the airport. They also have different values with regard to journey time compared to general background trips.

4.3.4 Therefore, the development of the airport mode choice model has enabled the assessment of the relevant access/egress modes taken across the day for both passengers and employees. The mode choice model includes assumptions for the availability and performance of both the highway and public transport networks as the model is integrated with both the public transport (rail, bus and coach) and highway (car (kiss and fly, park and fly), taxi, Light Goods Vehicles (LGV) and Heavy Goods Vehicles (HGVs)) models.

Public Transport

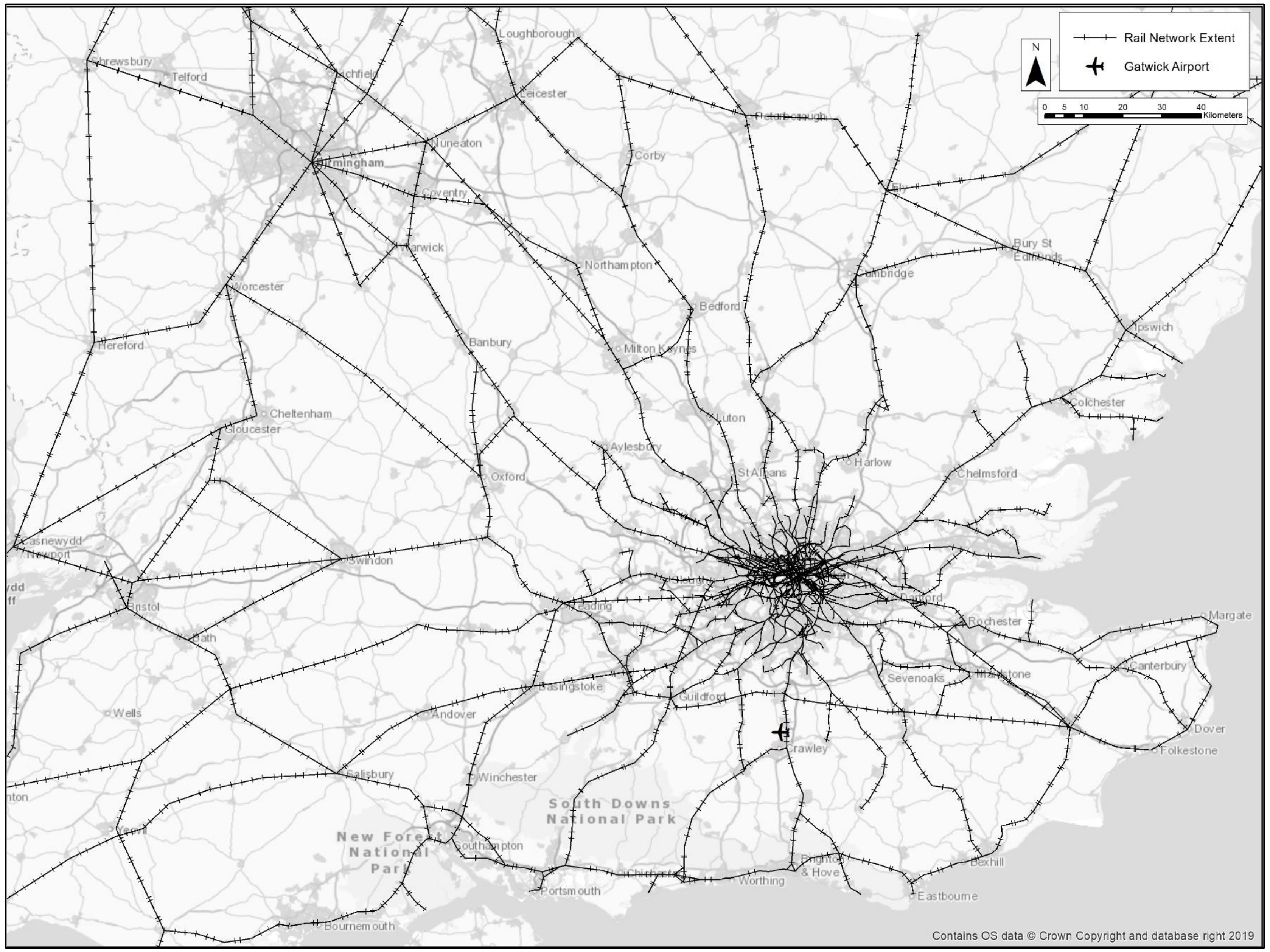
4.3.5 The public transport assignment model has used the PLANET South model as a basis for rail assignment and a new EMME model has been developed for bus/coach travel to create a bespoke Gatwick public transport model.

4.3.6 Department for Transport's strategic rail model is called PLANET. 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. It is an AM peak model covering the south of England. It is focussed on national rail (TOCs) but London Underground, DLR and Croydon Tramlink services are also included to provide London access and cross London connectivity for rail trips. The Department for Transport supports the use of PLANET South as the base model for development of the Gatwick model.

4.3.7 PLANET South was used for determining the study area for public transport and the assessment of rail effects such as capacity and crowding with and without the Project. The affected rail network in PLANET South showed that the minimum extent of rail network coverage should be from the Sussex coast to central London plus the North Downs Line between Gatwick and Reading (see Section 7). Moreover, given that travel to Gatwick for many passengers, requires cross-London travel, full coverage of PLANET South to locations north of London such as Stevenage, Peterborough and Cambridge have also been included. A plan showing the PLANET South model area is shown in Diagram 4.3.2.

4.3.8 Meanwhile, the bus/coach model includes all bus services that operate to, from or within the Crawley, Horley and Gatwick area. In addition to all the coach services operated by Megabus and National Express nationwide, plus other coach operators operating services at Gatwick Airport. The bus/coach model has been developed as a standard public transport frequency-based assignment tool using the inbuilt modules of the EMME software and applying a standard generalised journey time function with weight on the components of time as recommended in TAG.

Diagram 4.3.2: Proposed Rail and Public Transport Assignment Model



Highways (Strategic)

4.3.9 The Gatwick strategic highway model uses SATURN, which is the software used for strategic highway modelling by all the source highway models. Gatwick's model has been developed using Highways England's South East Regional Transport Model (SERTM). SERTM is the basis for generating a sub-regional highway assignment model that can be used to test strategic network effects specifically related to Gatwick Airport as well as providing input into any environmental analysis for noise and air quality.

4.3.10 SERTM was developed as one of five strategic models by Highways England and focuses on London and the South East. In terms of its coverage, it includes the entire south east of England, from The Wash and Oxford to Southampton. It includes detailed simulation of all motorways and 'A' roads, plus all 'B' roads and any 'C' roads that play a material role in allowing traffic to access the Strategic Road Network (SRN). The model includes in less detail the rest of UK (south west, Midlands, north, Wales and Scotland) and all motorways and 'A' roads, and all important 'B' roads that could affect the long distance routing of traffic in the South East.

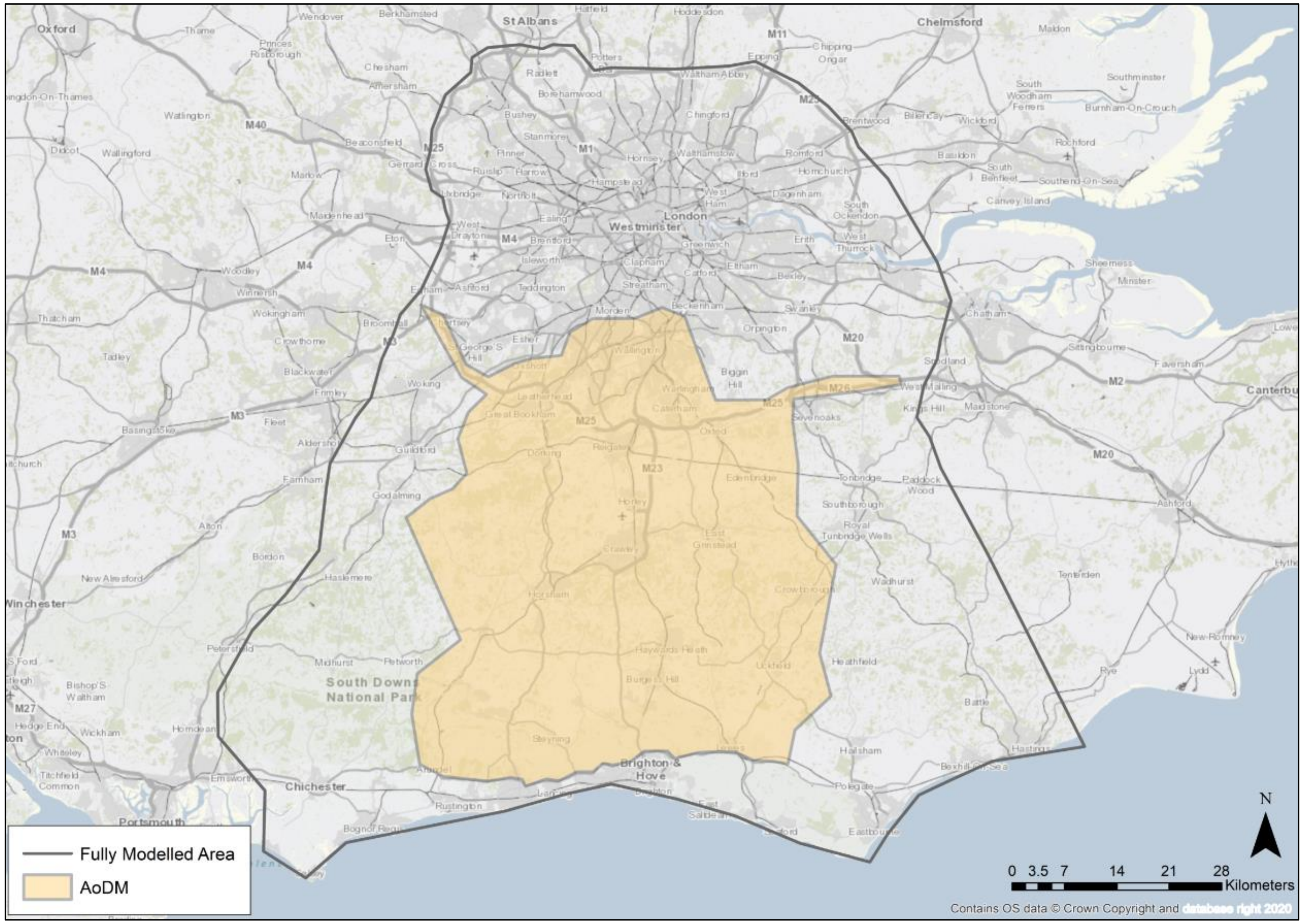
4.3.11 The Gatwick Highway Model has refined SERTM locally to add additional network detail and zoning. This update has made use of West Sussex's Crawley Local Transport Model (CLTM) and Transport for London's London Highway Assignment Model (LoHAM) for network coding in Crawley, Horley and the area of South London.

4.3.12 SERTM has been used for determining the study area for the highway network in addition to the extents being informed by previous experience and understanding of Gatwick's transport effects from modelling work to support various expansion proposals put forward by Gatwick Airport since 2013. Model coverage has been shared with key stakeholders.

4.3.13 The coverage of the highway assignment model is shown in Diagram 4.3.3 in which the more detailed simulation area is shown in yellow, with the fully modelled simulation area defined by a black outline. The simulation area includes the A27 between Chichester and Hastings which has been included in the modelling following discussions with West Sussex County Council. It should be noted that, while the whole of London is shown as simulation area, other than for an area in South London, the network is represented as fixed speeds which is the methodology adopted in SERTM. The area shown outside the fully modelled area is termed as "buffer network" which provides the key feeder links to the simulation area. Note this buffer area has been expanded when compared to SERTM to include links to Gatwick passenger origins and destinations.

4.3.14 The strategic highways model developed in SATURN is the primary highway assessment tool used for the PEIR, informing demand on links and through junctions as well as variation in speeds to be fed into more detailed junction modelling using VISSIM as well as into air quality and noise models.

Diagram 4.3.3: Highway Assignment Model Coverage



Highways (Local)

4.3.15 Local to Gatwick, Gatwick has developed three VISSIM traffic simulation models, comprising the detailed models of the North and South Terminal forecourts and a model of the wider network known as the Corridor Model.

4.3.16 The Corridor Model includes south Horley from the junction at Massetts Road and A23 Brighton Road, down through Longbridge Roundabout, east through North and South Terminal Roundabouts, along the M23 Spur to Junction 9 of the M23. The model also extends down the A23 London Road into North Crawley, including roads connecting to the Manor Royal estate.

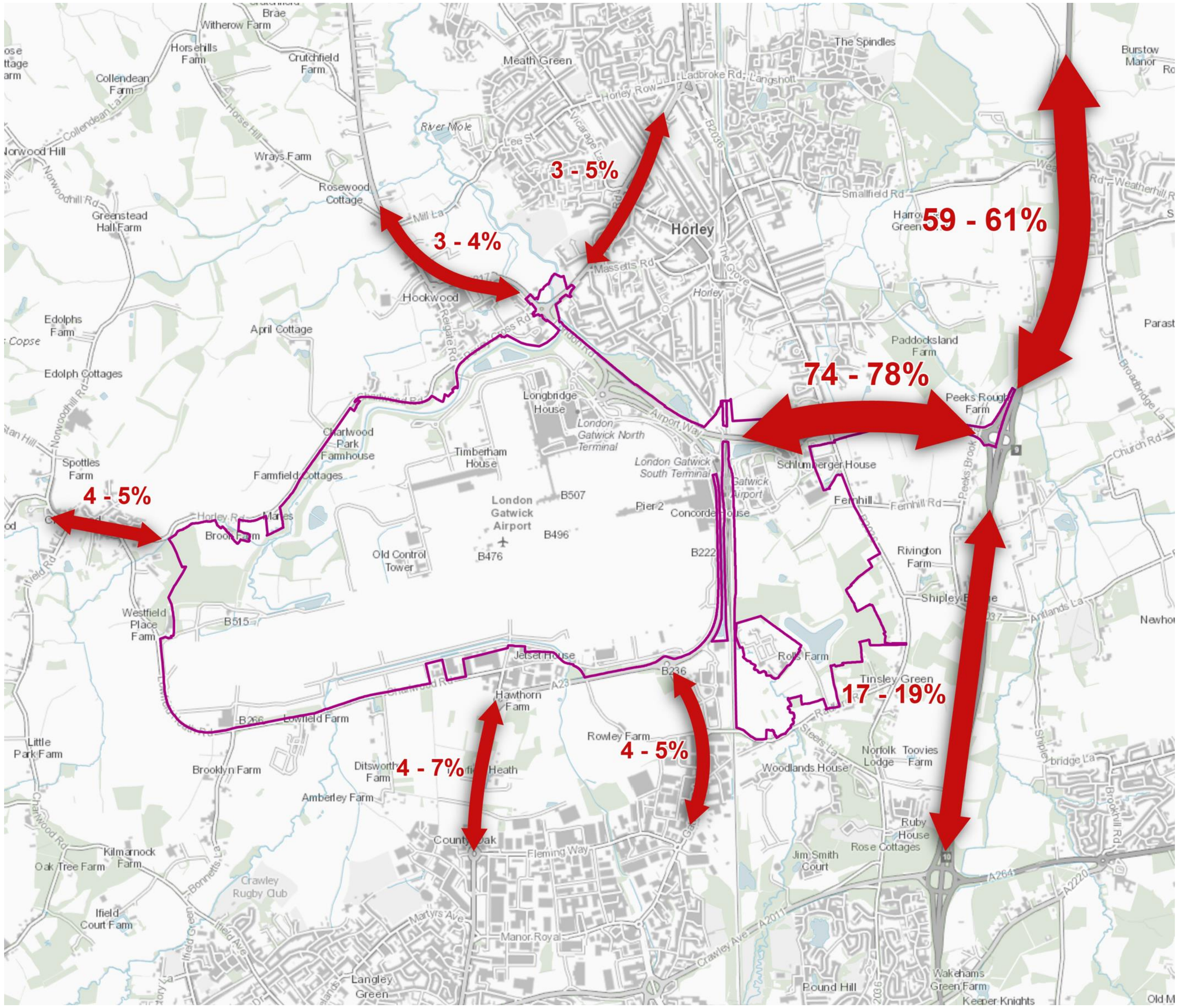
4.3.17 In 2016, the Corridor Model was recalibrated based on an extensive data collection exercise. Calibration of the 2016 Corridor Model shows that the model satisfies WebTAG requirements, with 90% calibration over the 24 hour simulation for turning counts and with 87% to 100% validation in terms of known journey times by route within one minute or a 15% variance.

4.3.18 Given this high degree of calibration and validation, the rebased 2016 Corridor Model is considered a robust base to test highway junction performance and congestion effects of growth at the Airport both in the baseline and with Project. VISSIM is a more appropriate tool for this detailed assessment than a strategic highway model, though demand in the VISSIM models is informed by the strategic highway model.

4.3.19 As per Diagram 4.3.4, model data shows that almost 80% of airport-related traffic is expected to use the M23 Spur in peak periods. Most of this traffic comes from the M23 to the north, ie most traffic comes from the M25 and London. Around 20% of road trips to Gatwick Airport are from the south, also via the M23. The remaining airport-related road trips are distributed in smaller proportions across the more local highway network to the north, west and south of the airport.

4.3.20 The VISSIM Corridor Model is therefore an appropriate tool for the assessment of traffic and congestion around the Airport as it includes the main east-west corridor, including the M23 Spur, A23 London Road and Airport Way, between and including M23 Junction 9 and Longbridge Roundabout.

Diagram 4.3.4: Proportion of Gatwick Traffic on the Highway Network, 2047



Station and Inter-Terminal Shuttle

4.3.21 In order to test the effects of future passenger growth on the railway station, South Terminal departures and the inter-terminal shuttle system, Gatwick is using the Legion model developed, validated and calibrated by Network Rail for the committed Station Project (see Section 13.1) to test the effects of future growth on passenger densities and crowding.

4.4 Assessment Scenarios

4.4.1 Modelling will consider the following assessment years to test and analyse the peak construction phase and the operation of the Airport without and with the Project

- The baseline year is 2016, which matches the base year of the modelling tools being used and reflects an extensive data collection exercise undertaken by GAL in that year, including mobile phone data capture, collected over a two month period and comprising upwards of 2.5 million devices and 170 million events per day for the busiest days giving a wealth of information to inform transport modelling. The 2016 dataset has been extrapolated to describe relevant 2018 conditions for the air quality and carbon assessments, where required. Given industrial action by Southern Rail as well as rail disruption associated with works at London Bridge from late 2016 to 2018, construction of M23 Smart Motorways from 2018 to 2020 and the Covid-19 pandemic, it has not been possible to update this base position with a more recent dataset. It should be noted that the Project is assessed against Future Baseline years, rather than against 2016 data.
- The baseline scenario is used to describe existing transport infrastructure and the performance of the transport network prior to expansion. In order to provide comparison with other environmental modelling workstreams a 2018 forecast was provided from the model to support these assessments. This is particularly pertinent to the Environmental Impact Assessment (EIA).
- 2029 First Full Year of Operation: The first year of operation after opening of the northern runway is anticipated to be 2029, accordingly this would be the first operational year modelled and tested.
- 2032 Interim Assessment Year: An interim assessment year, 2032, will be tested which is when all slots on the northern runway are likely to have been filled and the highway mitigation is expected to be in place. This horizon has been tested both without and with the Project.

- 2047 Ultimate Year: Reflecting a requirement under the Design Manual for Road and Bridges Vol. 5, Sec. 1 (TD37/93) (Highways England, 1995) to assess the effects of a project 15 years after it has been completed. Airport passenger and staff numbers are also higher in 2047 than 2032 and background traffic has increased on the network. This assessment year therefore provides a robust assessment and has been tested both without and with the Project.
- Construction Traffic Scenarios:
  - Understanding the impact of peak construction vehicle traffic on the highway network. An airfield construction scenario has been tested, with peak construction activity in 2026/27. The construction trips have been added to 2029 baseline traffic levels. This is conservative but reasonable as traffic flows in 2029 will be a few percent higher than in 2026/27, albeit within the daily variation in any given year.
  - Understanding the impact of constructing highway mitigation, including grade-separation, on the network and the potential reassignment of traffic this may cause as drivers seek alternative routes. This has been tested for 2029 and assuming the Project is operational. The test therefore includes increased operational airport traffic as a result of the northern runway.

4.4.2 The central case for the assessment is based on Heathrow's third runway not coming forward (as described in more detail in Section 5.10.4).

4.4.3 In terms of cumulative demand impacts, further discussion is provided in Section 6.5.

5 Current Transport Network, Operations and Performance

5.1 Existing Travel Demand

5.1.1 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.

5.1.2 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.

5.1.3 Gatwick carries out employee surveys and travel to work surveys for airport employees every five years. The most recent staff survey was carried out in 2016.

Passengers

5.1.4 The Covid-19 pandemic had a very severe impact on the global aviation industry in 2020. Gatwick, along with all other UK airports, experienced a significant reduction in passenger traffic levels as a result of both Government-imposed restrictions on air travel and reduced passenger demand driven by low consumer confidence.

5.1.5 Passenger numbers at Gatwick decreased from over 46 million passengers per annum (mppa) in FY2018/19 to 10.2 mppa in FY2019/20. It is expected that Government travel restrictions will continue to have an impact on passenger demand and traffic levels throughout 2021, but that by the end of 2021 traffic levels will be starting to recover.

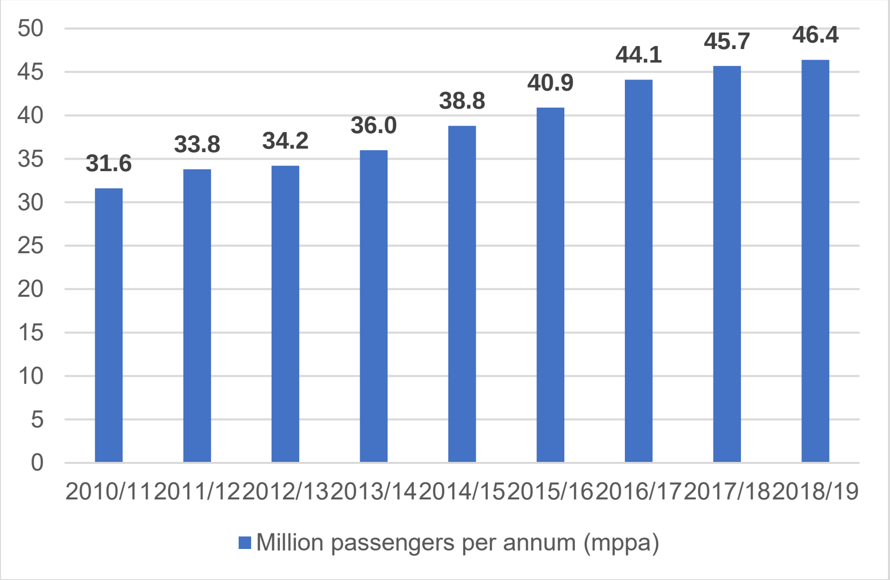
5.1.6 Prior to the Covid-19 pandemic, Gatwick Airport handled over 45 mppa in FY2017/18 and over 46 mppa in FY2018/19, as shown in Diagram 5.1.1. In FY2017/18, Gatwick was the seventh busiest airport in Europe, with the twelfth largest long-haul network, serving 200 destinations including over 60 long-haul routes. Mirroring this growth in long-haul passenger flights, cargo volumes were also growing.

5.1.7 Prior to the Covid-19 pandemic, Gatwick has been Europe's busiest point-to-point airport, with less than 10% of passengers transferring between flights. This high proportion of originating and terminating passengers places significant emphasis on surface access capacity.

5.1.8 In FY2017/18, 92% of all Gatwick passengers used the airport for an international flight, with 73% of passengers travelling on short haul international flights to European business centres.

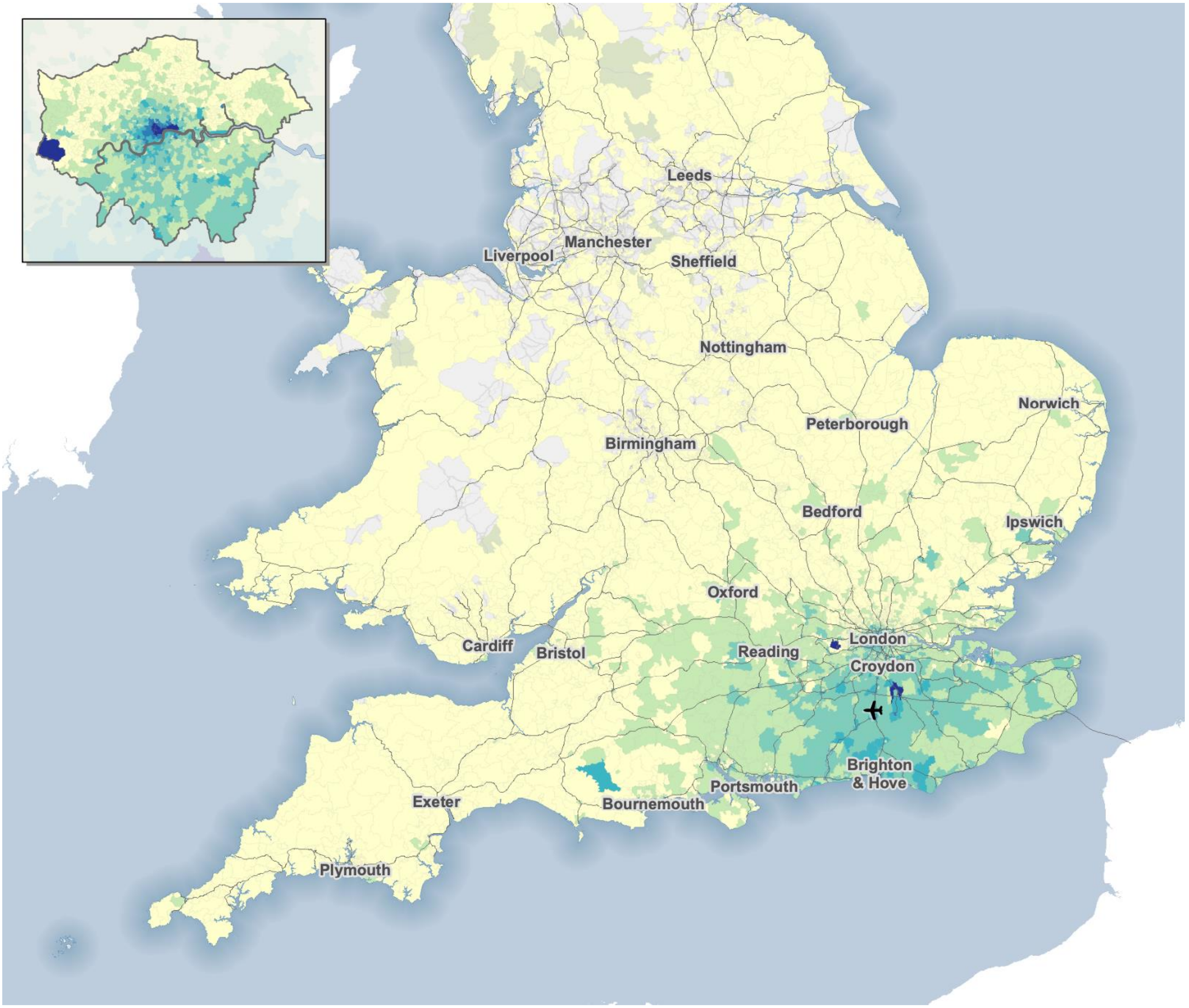
5.1.9 CAA passenger data has been analysed by mode for non-transfer passengers, which illustrates the distribution of passenger origins. Diagram 5.1.2 provides an illustration of the summary analysis, showing data for all surface access modes from the 2017 CAA passenger survey.

Diagram 5.1.1: Gatwick Passengers to FY2018/19 (million passengers per annum, or mppa)



5.1.10 Gatwick's proximity to London and extensive surface access links to the wider South East (and beyond) give it a wide catchment area. Recent CAA passenger survey data shows a total of 81% of Gatwick's originating and terminating passengers (i.e. excluding transfer passengers) travelling from/to destinations in London or the South East. Greater London is the largest source market (42%), but nearby counties Kent, Surrey and East and West Sussex account for a further 27%. Of the 19% of passengers travelling to/from destinations outside the South East, the majority travel to/from the East or the South of England.

Diagram 5.1.2: CAA Catchment Analysis for Gatwick Passengers (Average Day, June 2016)



Staff

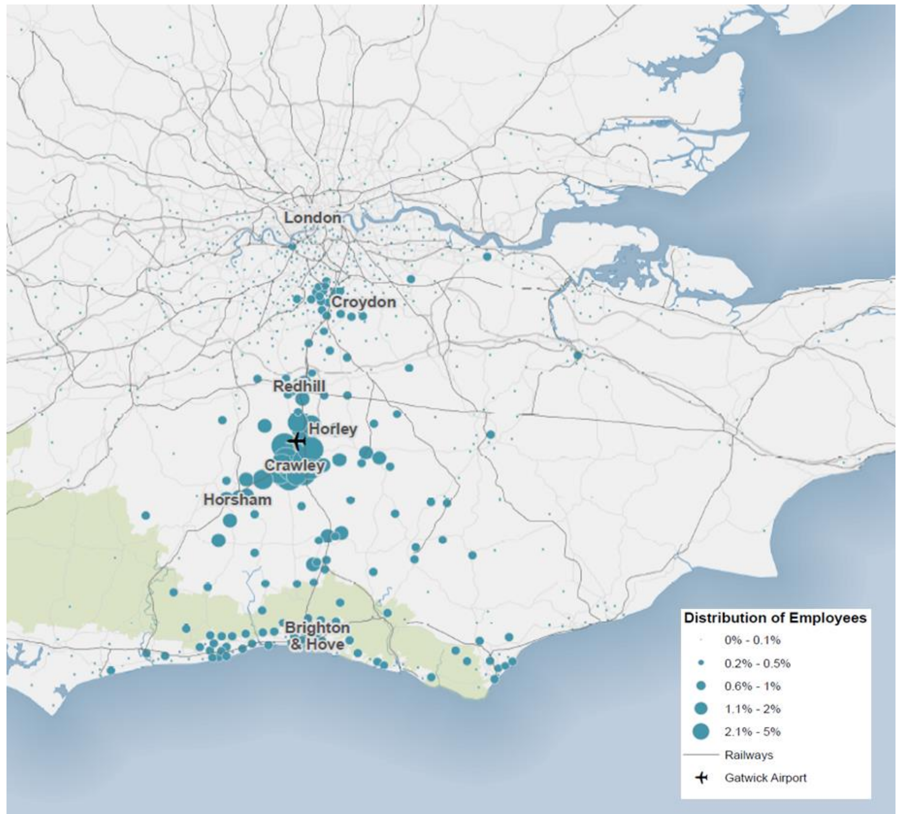
5.1.11 In 2016, nearly 24,000 people worked at Gatwick Airport. To better understand the commute patterns of airport staff, GAL routinely undertakes a travel-to-work survey, typically every 4 years. The most recent survey was taken in 2016 and received upwards of 5,300 responses (Gatwick Airport Ltd, 2016), building on the 2008 and 2012 surveys and showing a trend towards more sustainable modes, despite significant rail disruption at that time. It is unclear when the next staff survey will be undertaken owing to the impact of Covid-19. A more limited Staff Travel Survey was undertaken in 2019, providing information on attitudes to travel choices but without sufficient data to replace the mode share and distribution from 2016.

5.1.12 The 2016 survey showed that many of Gatwick's staff live within a short distance of the airport. Approximately 11% of staff travelled 3 miles or fewer to work and an additional 36% travelled between 4 and 10 miles. Overall, half of staff began their journey within 15 miles of the Airport.

5.1.13 Analysis of 2016 survey data shows that 63% of staff lived in East and West Sussex, about half of whom lived in Crawley, with significant numbers in the Horsham area also. An additional 19% of employees lived in Surrey, largely concentrated in Horley and Redhill. Significant clusters of employees also lived along the Brighton Mainline in Croydon and Brighton and Hove. The distribution of Gatwick employee home locations is shown in Diagram 5.1.3.

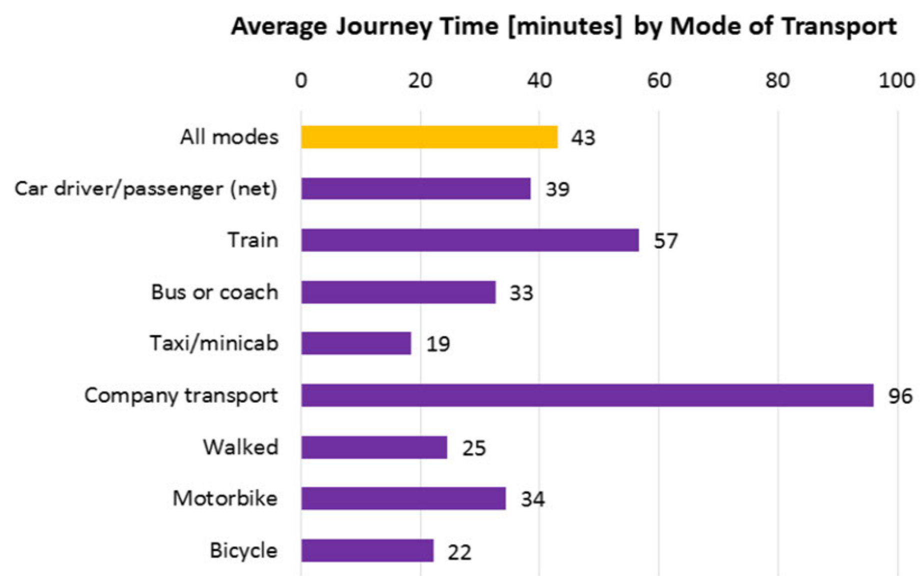
5.1.14 Staff journeys vary by mode of travel but the typical journey time is 43 minutes, as shown in Diagram 5.1.4. However, as noted above, many employees live in close proximity to the airport and thus tend to have much shorter journey times. Half of all employees' journey to work has been surveyed at 30 minutes or less; 24% have journey times between 11 and 20 minutes; and 9% have a journey of 10 or fewer minutes.

Diagram 5.1.3: Distribution of Home Location for Gatwick Employees



Source: Arup analysis of 2016 Gatwick Employer and Travel to Work Survey data

Diagram 5.1.4: Journey Time to Work for Gatwick Employees



Source: 2016 Gatwick Employer and Travel to Work Survey

5.2 Mode Share

Passengers

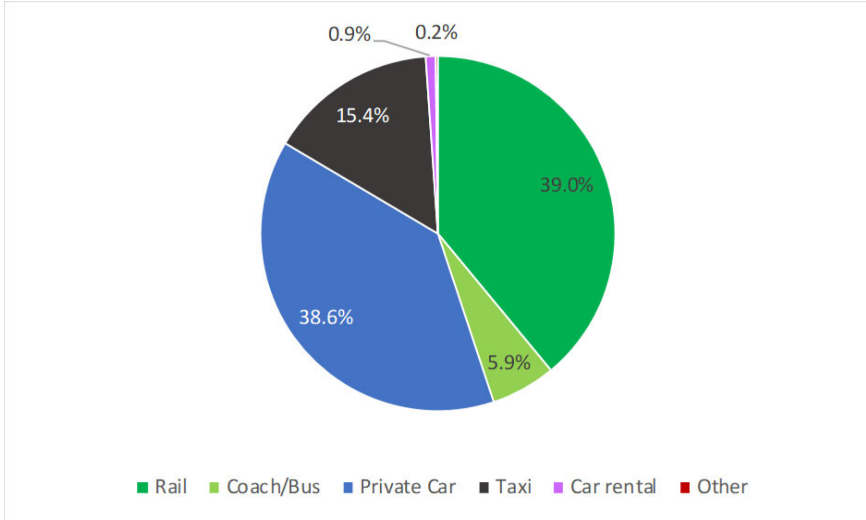
5.2.1 In 2012, Gatwick Airport set itself a target of achieving a 45% public transport mode share as the airport continued to grow beyond 40 million passengers per annum.

5.2.2 As set out in the Master Plan (Gatwick Airport Ltd, 2019), Gatwick achieved a public transport mode share for passengers of 45% in 2017, with 39% of passengers coming to the Airport by rail and almost 6% by bus and coach. Around 55% of passengers accessed the Airport by car-based modes, with almost 40% of passengers coming by private car, either as pick-up and drop-off trips to terminal forecourts or to park their car at the Airport. The 2017 passenger mode share at the Airport is shown in Diagram 5.2.1

5.2.3 Ongoing CAA surveys to first quarter 2020 show a continuing improvement in public transport mode share year-on-year, up to 47.4% in 2019 and 47.8% in the 12 months to March 2020, as per Diagram 5.2.12.

5.2.4 Diagram 5.2.23 shows quarter-by-quarter passenger mode share data, as provided by CAA, is an important consideration for the assessment and this PTAR. This shows that public transport mode share is highest in the autumn and winter, October through to March, owing to the passenger mix in those months. However, the assessment of the future impact with Project has been undertaken to test a busy summer day at the Airport which is when public transport mode share is at its lowest owing to the higher proportion of UK outbound leisure passengers. Accordingly, when considering outputs of any mode share modelling, it is important to understand that the average annual mode share will be higher than the summer mode share, as discussed further in Section 7.

Diagram 5.2.1: Mode Share data for Gatwick Passengers



Source: 2017 CAA Data

Diagram 5.2.2: Mode Share data for Gatwick Passengers to Q1 2020

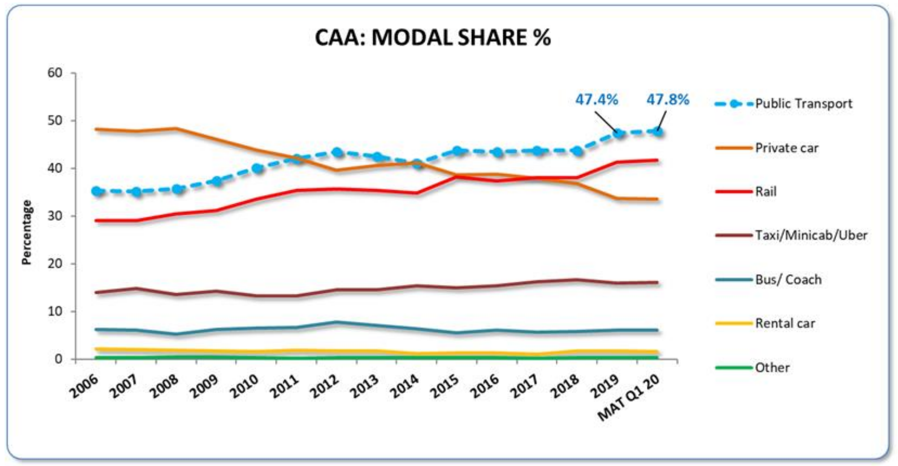
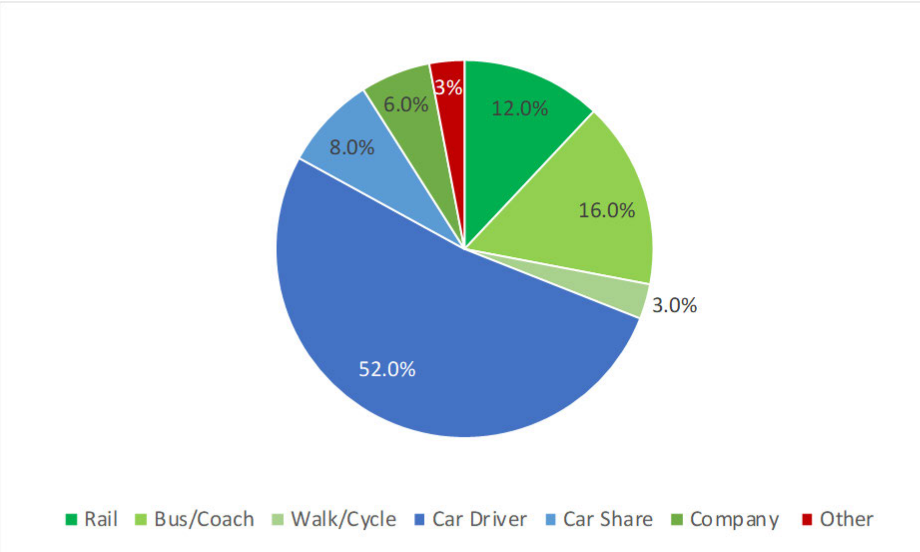


Diagram 5.2.3: Mode Share data for Gatwick Passengers by Quarter

Diagram 5.2.4: Mode Share data for Gatwick Employees



Source: 2016 Gatwick Employer and Travel to Work Survey

Staff

5.2.5 In the 2016, the staff travel survey showed that the sustainable mode share for employees was 31% excluding car share (39% with), as per Diagram 5.2.4.

5.2.6 Owing to changes in shift patterns, corresponding to a busier early morning schedule of flights, and a higher proportion of aircrew that rotate between more than one London airport, there have been challenges around how staff get to work by public transport. GAL has worked with the local operator Metrobus to make more bus services available 24 hours a day, serving the Crawley and Horley areas where a significant proportion of staff live. Staff receive discounts on both bus and rail journeys with local operators. Recent rail timetable changes will also support a higher rail mode share by staff.

5.3 Rail

5.3.1 Gatwick Airport station has regular, direct daily services from over 120 stations. Over 800 stations are accessible with one interchange.

5.3.2 There are four service brands provided by two train operators serving Gatwick:

- **Gatwick Express** provides a direct service to London Victoria, departing every 15 minutes in peak periods and taking around 30 minutes. Two trains per hour extend to Brighton at peak times.
- **Southern** provides services across London and the South-East, including London Victoria, London Bridge, Clapham Junction, Brighton, Southampton, Eastbourne and Portsmouth, as well as many local stations.
- **Thameslink** connects Gatwick to the south coast at Brighton, central London through London Bridge, St. Pancras International and Farringdon, and north to Bedford. Thameslink also provides a direct train to Luton Airport Parkway.
- **Great Western Railway** runs an hourly service between Gatwick Airport and Reading, via Redhill, Reigate and Guildford.

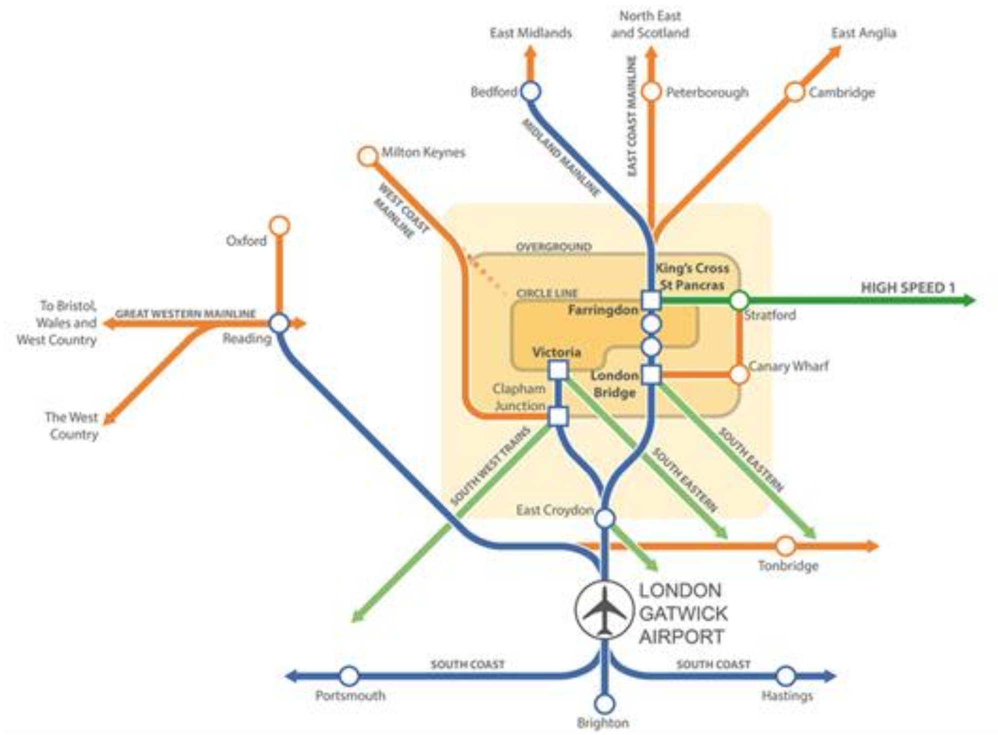
5.3.3 Peak rail frequencies are provided in Table 5.3.1

5.3.4 Gatwick is part of London's Oyster and contactless fare payment network. From Gatwick Airport station, it is possible to travel directly to the City of London via the Thameslink route (with interchange to Docklands from London Bridge station currently and at Farringdon on the Elizabeth Line from 2021) and to the West End via London's Victoria station. These services also directly connect the airport to key interchanges at Croydon, Clapham Junction and Brighton.

5.3.5 Gatwick Airport therefore enjoys a very high level of rail connectivity, with 20 trains to and from central London in the morning peak hour (10 to London Bridge and 10 to London Victoria, of which four are Gatwick Express services).

5.3.6 Train services can be busy in peak periods in the peak direction, into London in the morning and towards Brighton and the South Coast in the evening. However, with completion of the Thameslink Programme in 2019, train services between Gatwick and London now provide nearly 14,000 seats per direction per hour, with room for nearly 30,000 passengers (including standing passengers) per direction per hour overall.

Diagram 5.3.1: Current Rail Network to Gatwick



Source: Network Rail / GAL

Table 5.3.1: Rail frequencies via Gatwick

Operator/Service	Route	Peak Frequency
Gatwick Express	Gatwick Airport non-stop to London Victoria	4 trains per hour
Southern – Brighton Main Line	Gatwick Airport to Victoria via East Croydon and Clapham Junction	6 trains per hour
Southern – via London Bridge	Horsham and Gatwick Airport to London Bridge	1 trains per hour
Thameslink –via London Bridge	Brighton to Bedford via London Bridge	8 trains per hour
First Great Western – North Downs Line	Reading to Gatwick Airport via Redhill	1 train per hour

5.3.7 Opened in 1958, the current station is capacity constrained despite a number of upgrades, including a £53 million improvement programme in 2014, which provided an additional platform (Platform 7) and improved circulation for passengers. Accordingly, proposals exist to increase the size of the station concourse, improve vertical circulation and widen two of the seven platforms as per the Department for Transport upgrade announcement in July 2019. Construction of elements of the new station is currently underway, despite the Covid pandemic.

5.4 Bus and Coach

5.4.1 Gatwick is served by frequent bus and coach services at both North and South Terminals. The operators include Metrobus, National Express, Megabus, Oxford Bus Company, and Easybus. On average, prior to Covid, there were approximately 450 to 500 daily arrivals and departures respectively, offering services to destinations throughout the UK.

5.4.2 Bus and coach mode share for passengers was around 6% in 2017/18, whereas these modes account for 16% of staff travel.

5.5 Active Travel

5.5.1 There are very few passengers who walk or cycle to Gatwick Airport. However, based on the 2016 staff survey, around 3% of staff travel to Gatwick by walking or cycling. Given the extent of the catchment area for walking and cycling trips, the focus of active travel is on staff from nearby residential areas, including Horley and Crawley.

5.5.2 National Cycle Network Route 21 (NCN21) provides a continuous route between Crawley, Gatwick, Horley, Reigate and London, splitting towards Greenwich on Route 21 and Wandsworth on Route 20. To the south of Crawley, Route 20 continues south towards Brighton and Route 21 continues east towards Royal Tunbridge Well before heading south towards Eastbourne.

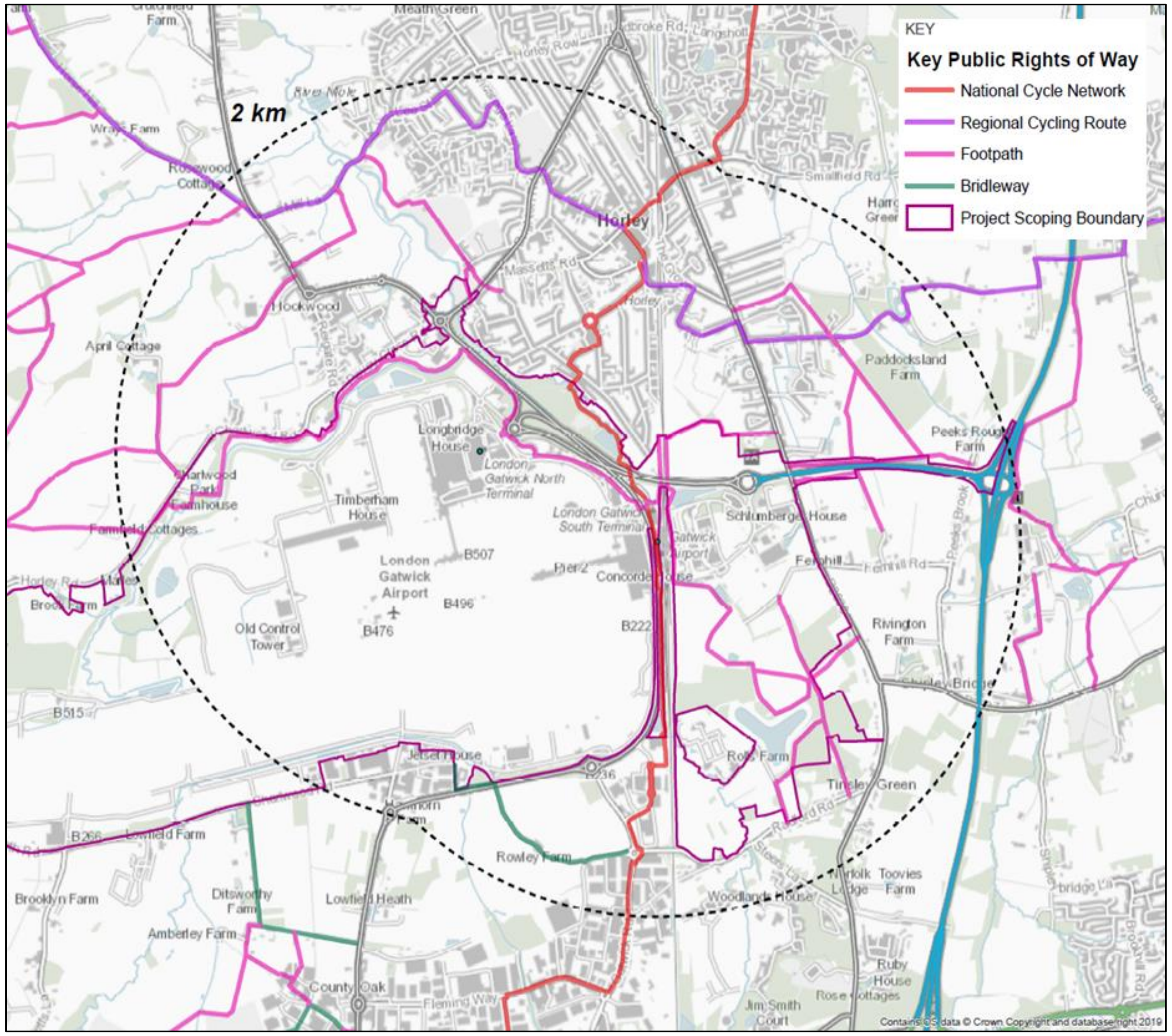
5.5.3 Within the vicinity of Gatwick, NCN21 crosses the A23 in the form of a subway, located to the north of the South Terminal. It crosses the railway lines along a ramped subway to the north of Horley station and along St Mary's Drive to the north of Three Bridges station.

5.5.4 On the wider highway network, there is a cycle track and shared pedestrian / cycle space on the A23 between the North Terminal and the Longbridge Roundabout. Signal controlled pedestrian crossings are located on all four arms of the Longbridge Roundabout. There are no other pedestrian or cycle facilities along the A23 or M23 to the east.

5.5.5 Gatwick provides pathways along internal access and forecourt roads, where pedestrian movements are considered to be appropriate. Zebra crossings are provided at appropriate locations and signage is also provided to direct passengers to the terminals.

5.5.6 Diagram 5.5.1 indicates the key designated pedestrian and cycle routes. Further details are included in Section 0.

Diagram 5.5.1: Key Active Travel Routes



Source: Analysis of West Sussex and Surrey online maps and OpenStreetMap Data

5.7 Highways

5.7.1 Gatwick Airport can be directly accessed from the national strategic road network 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 to Junction 9a at the airport's South Terminal roundabout.

5.7.2 The typical journey time from Gatwick Airport to the M25 via the M23 is less than 10 minutes. From the M25, there is access to the wider UK strategic road network.

5.7.3 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. It connects south London and Croydon, through Redhill then Horley and Gatwick Airport, through Crawley and providing a connection to the south through Pease Pottage to Brighton.

5.7.4 South of Gatwick, the M23/A23 continues as a strategic highway corridor from London to Brighton on the South Coast. Brighton is approximately 30 to 45 minutes from the airport by road in the off-peak and peak periods respectively. The A23 connects with the A272 and A27 east - west routes, placing the whole of the South Coast between Southampton and Folkestone within approximately 1 hour and 20 minutes of the airport.

5.7.5 Highways England's M23 Smart Motorway project opened in 2020 and adds additional running lane capacity to the strategic network serving Gatwick at peak times. In addition, GAL has allocated funding in its Capital Investment Programme to improve South and North Terminal roundabouts to cater for predicted growth over the next decade and beyond.

5.7.6 The M25 is busy and can be slow-moving and congested at peak times. Highways England is committed to improving conditions on the M25, through a variety of committed enhancements as well as the M25 South West Quadrant study, which is looking at ways to enhance capacity from Junctions 7 (for the M23) – 16 (for the M40) of M25.

5.8 Forecourts and Car Parks

5.8.1 Surface transport facilities within the airport boundary are made up of on-airport roads, forecourts and car parks, including facilities for coaches, taxis and car rental companies. In 2021, GAL introduced forecourt charging at both terminals and this is enforced by Automatic Number Plate Recognition. Free drop-off is provided in long-stay car parks for those who do not wish to pay. The forecourt charges are £5 for 10 minutes, and £1 for each additional minute, up to 20 minutes. The maximum charge is £25 and the maximum length of stay is 30 minutes. People picking up passengers are signed to do so from the short stay car parks as it often takes more time to collect passengers.

Diagram 5.8.1: Northway in Operation

5.8.3 There are currently approximately 46,700 car parking spaces 'on airport', including staff parking, and a further 21,196 authorised spaces 'off-airport'.

5.9 Freight and Cargo

5.9.1 In 2019 Gatwick handled 150,000 tonnes of cargo, an increase on the previous year, driven by additional long-haul services.

5.9.2 The Gatwick Cargo Centre comprises 12 self-contained units with landside and airside access, located west of North Terminal and accessed via Perimeter Road North and Cargo Road.

5.9.3 In the mid-2000s, Gatwick handled over 300,000 tonnes of cargo from the same facility. As such, there is spare capacity within the current facility for future growth.

5.10 Road Safety

5.10.1 DfT STATS19 road safety data (January 2021) has been examined for the latest available five years (2017 to 2019). The extent of the accident data reviewed is the study area identified as part of the EIA. Accidents which occur within 30m of the study area links are shown in Diagram 5.10.1, and a more detailed plan around the airport is shown in Diagram 5.10.2.

5.10.2 A summary of the average annual number of accidents by casualty severity is shown in Table 5.10.1. The accidents have also been considered in terms of local authorities.

Table 5.10.1: Accident Data

	Average Annual Number of Accidents, 2017 to 2019 (Highest Recorded Injury Severity)			
Location	**Fatal**	**Serious**	**Slight**	**Total**
Total accidents within 30m of a study area link	**0.6**	**24**	**140**	**164**
▪ Bromley	0.3	1	5	6
▪ Crawley	0.3	5	31	36
▪ Croydon	-	8	63	71
▪ Epsom and Ewell	-	2	2	4
▪ Mole Valley	-	-	2	2
▪ Reigate and Banstead	-	1	13	14
▪ Runnymede	-	4	20	24
▪ Sutton	-	-	1	1
▪ Tandridge	-	3	3	6

Diagram 5.10.1: 3-year accident data within 30m of a EIA study area link

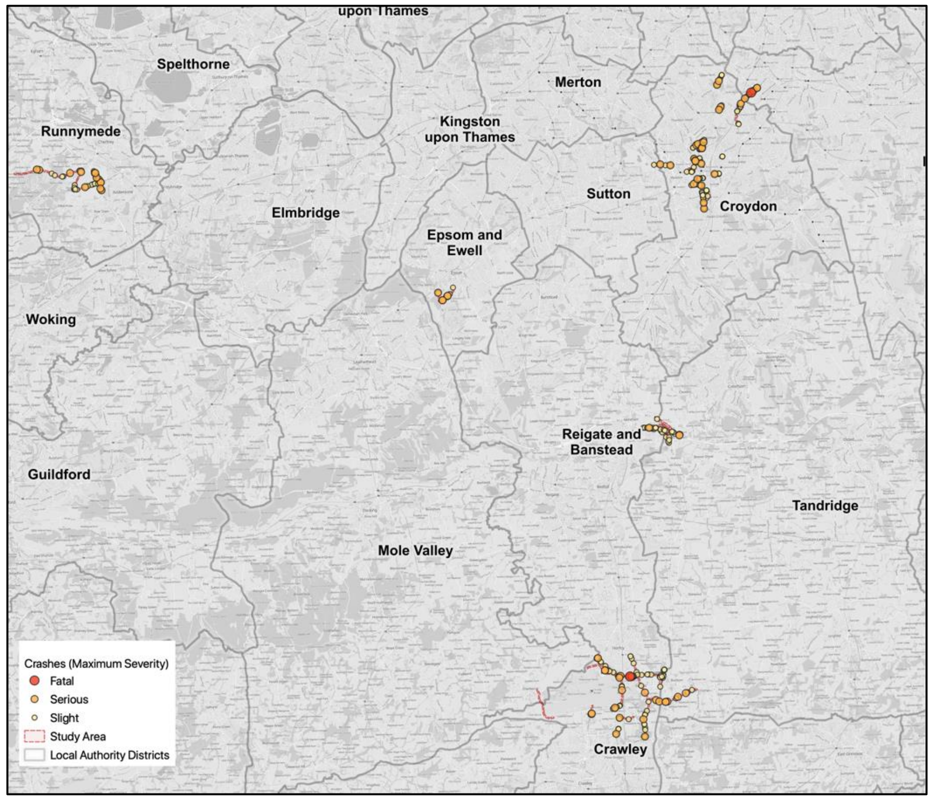
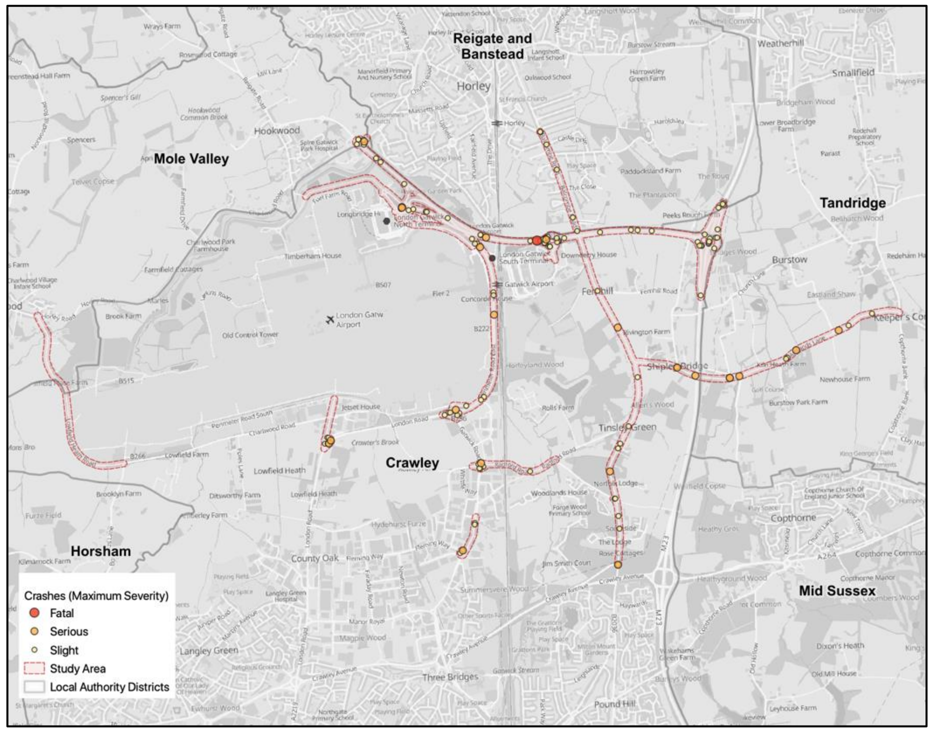


Diagram 5.10.2: 3-year accident data within proximity of the airport



5.10.3 The above shows that on average, 164 accidents per year occurred within the study area over the three year period. Of these, 140 accidents resulted in slight injuries (85%), 24 resulted in serious injuries (15%) and less than one accident, when average over three years, resulted in a fatality.

5.10.4 The location of the accidents suggest that junctions tend to have a higher risk of accidents because of potential conflicts and sensitivity to human error. Further assessments on the causation of accidents will be undertaken for the final Transport Assessment to support the development consent order.

6 Demand Forecasts – Future Baseline and Project Scenarios

6.1 Context

6.1.1 The Covid-19 pandemic had a very severe impact on the global aviation industry in 2020. Gatwick, along with all other UK airports, experienced a significant reduction in passenger traffic levels as a result of both Government-imposed restrictions on air travel and reduced passenger demand driven by low consumer confidence. Passenger numbers at Gatwick decreased from over 46 mppa in 2019 to 10.2 mppa in 2020. It is expected that Government travel restrictions will continue to have an impact on passenger demand and traffic levels throughout 2021, but that by the end of 2021 traffic levels will be starting to recover.

6.1.2 In the medium-term, through to the mid-2020s, it is expected that overall demand for air travel will recover to previous levels as consumer behaviours return, driven by factors such as global and UK economic growth, disposable income, consumer confidence and the relative cost of air travel. While the immediate outlook therefore remains challenging, there is confidence that passenger and airline demand will return to previous levels over the course of the next few years and then continue to grow thereafter.

6.1.3 In addition to recovery from Covid-19, another important factor that will affect the level of air traffic at Gatwick in the future is whether Runway 3 (R3) is brought forward at Heathrow.

6.1.4 Given various legal challenges as well as the Covid-19 pandemic, Heathrow Airport Holdings Ltd (HAHL) – the owner and operator of Heathrow Airport and the promotors of R3 – has stopped the work it had been doing to seek development consent for its R3 project. There is therefore significant uncertainty surrounding when, or indeed, if a third runway will now be developed at Heathrow Airport.

6.1.5 Given this uncertainty, the forecasts prepared by GAL for the baseline and with Project scenarios for this PTAR therefore adopt a 'No Heathrow R3' assumption. This approach provides a conservative assessment from a traffic and transport perspective. If Heathrow R3 was to come forward, traffic levels at Gatwick would likely decline in the period immediately following the opening of R3, meaning that the impacts of the Project, such as traffic and therefore associated noise and emissions would be lower in the 2032 assessment year. By not including Heathrow R3, the 2032 assessment is therefore more conservative. However, by 2047, there would be little difference between demand at Gatwick with or without Heathrow R3 and accordingly this scenario would be unchanged irrespective of developments at Heathrow.

6.1.6 GAL will, however, keep this under review as it progresses its work and prepares the TA in support of the application for development consent, particularly in view of any updated timelines put forward by Heathrow.

6.1.7 The central assessment cases for the Project are therefore as follows.

- Gatwick future baseline with no Heathrow R3.
- Gatwick Northern Runway or "with Project", which assumes the northern runway opens in 2029 and Heathrow R3 does not come forward.

Assessment Years

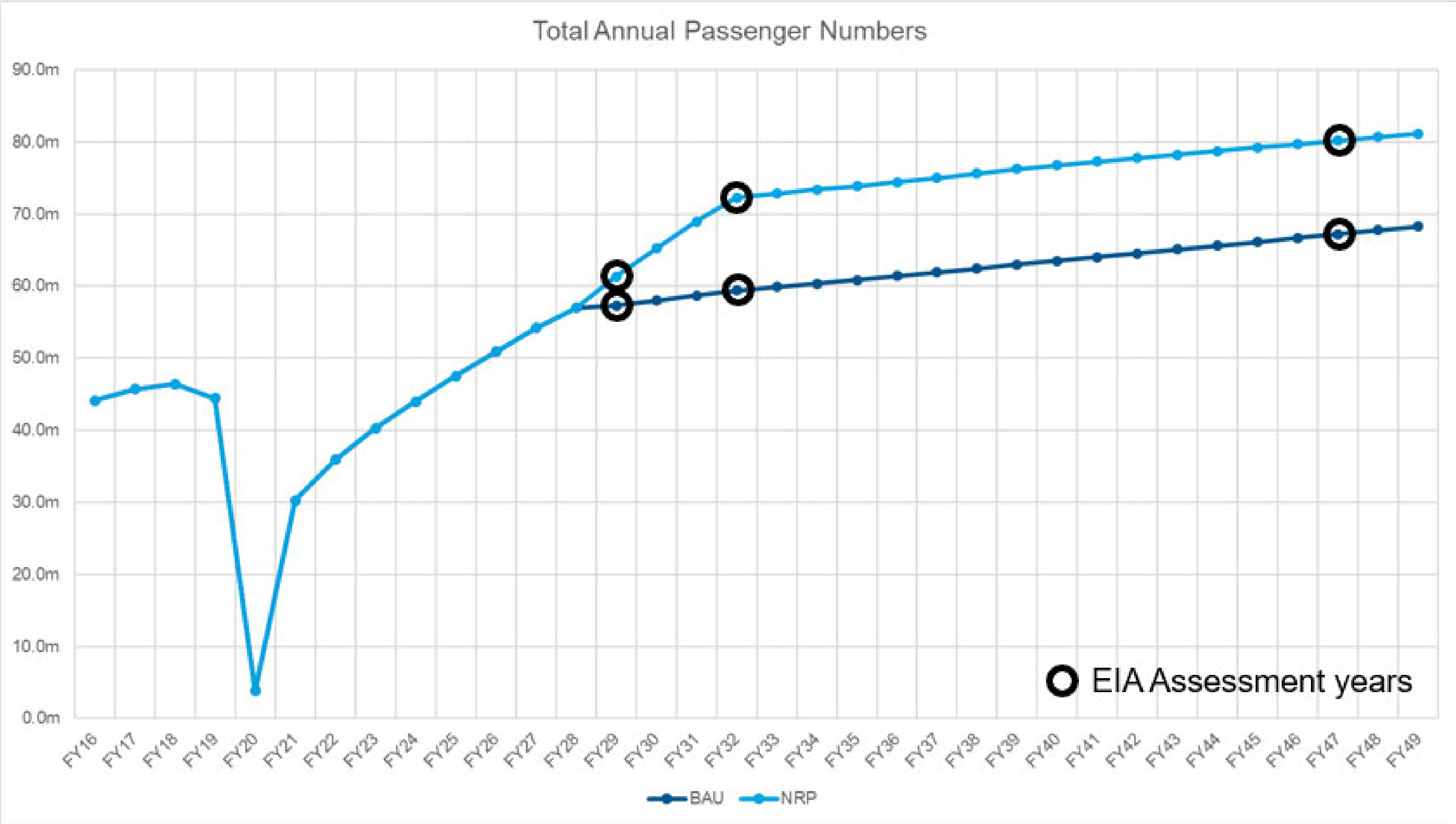
6.1.8 In respect of each of these two cases, forecasts have been prepared for three primary assessment years – 2029, 2032 and 2047:

- 2029: represents the first full year of opening of the Project (and therefore the first year when effects arising from its operation would occur).
- 2032: an interim assessment year, by which time highway mitigation is expected to have been completed, all peak slots on both runways are full and which therefore represents a year in which environmental effects are likely to be higher than 2029.
- 2047: reflects a requirement under the Design Manual for Road and Bridges Vol. 5, Sec. 1 (TD37/93) (Highways England, 1995) to assess the effects of a highway project 15 years after it has been completed. Airport passenger and staff numbers are also higher in 2047 than 2032 and background traffic has increased on the network. This assessment year therefore provides a robust assessment and has been tested both without and with the Project.

Annual Demand

6.1.9 Annual demand for these assessment years is shown in Diagram 6.1.1 and described more fully in the Forecast Databook in Appendix 4.3.1. Between 2024 and 2025, demand at the Airport is forecast to return to pre-Covid-19 levels and, by 2029, annual demand is estimated to be 57.3mppa in the future baseline. Opening of the Northern Runway generates additional traffic, with airlines taking advantage of the released slots, such that 2029 demand with the Project is 4 mppa higher than the future baseline at 61.3 mppa at the end of 2029. With the Project, there then follows a three year period of rapid growth to 2032, by which time demand at the Airport has grown to 72.3 mppa with the Northern Runway as compared to 59.4 mppa in the future baseline. Demand then levels off in line with future baseline and grows incrementally with all peak slots filled and with any growth coming from higher load factors or larger aircraft. It is anticipated that by 2047, the Project could increase airport capacity up to 80.2 mppa, compared to a maximum potential capacity based on existing facilities of 67.2 mppa within the same timescale. This represents an increase of approximately 13 mppa.

Diagram 6.1.1: Annual demand for Future Baseline and with Project Scenarios (No Heathrow R3)



Daily Demand

6.1.10 The daily profile of airside demand in terms of two-way passengers (arrivals and departures) is shown in Diagram 6.1.2

6.1.11 The future baseline growth scenario to 2032 is around 30% higher across the day when compared to 2016. By 2047 demand is around 40% higher than in 2016. Demand in the Project scenario is 70% higher across the day when compared to 2016.

6.1.12 To generate landside demand, modelling assumes a ‘lead’ time before departure - which is referenced to surveyed arrival at check-in profiles, with passengers arriving closer to departure time for short-haul flights and over a longer period for long-haul flights - as well as a ‘lag’ time after flight arrival - referenced to survey data of passengers exiting through terminal processes before taking landside modes.

6.1.13 When considering the landside profiles in Diagram 6.1.3, both scenarios create overlaps with background traffic peaks so the potential effect on congestion is greater at these times of the day, specifically 07:00 to 09:00 and 16:00 to 18:00. High inter-peak demand may also affect resilience and network recovery.

6.1.14 Accordingly GAL has developed a bespoke suite of inter-related strategic modelling tools to test the impact and the effects of this growth on the transport network as well as to inform environmental workstreams, as described in Section 4.3.

Diagram 6.1.2: Airside demand for 2018, Baseline and with Project

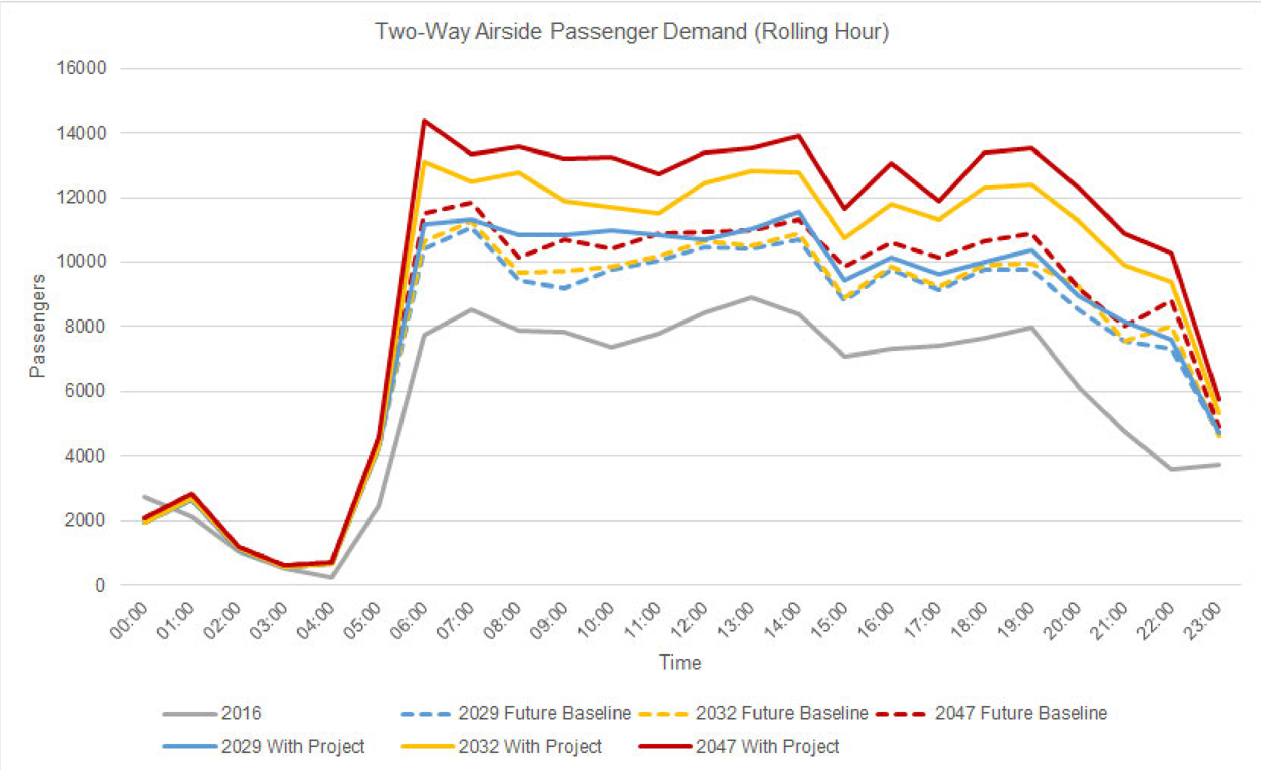
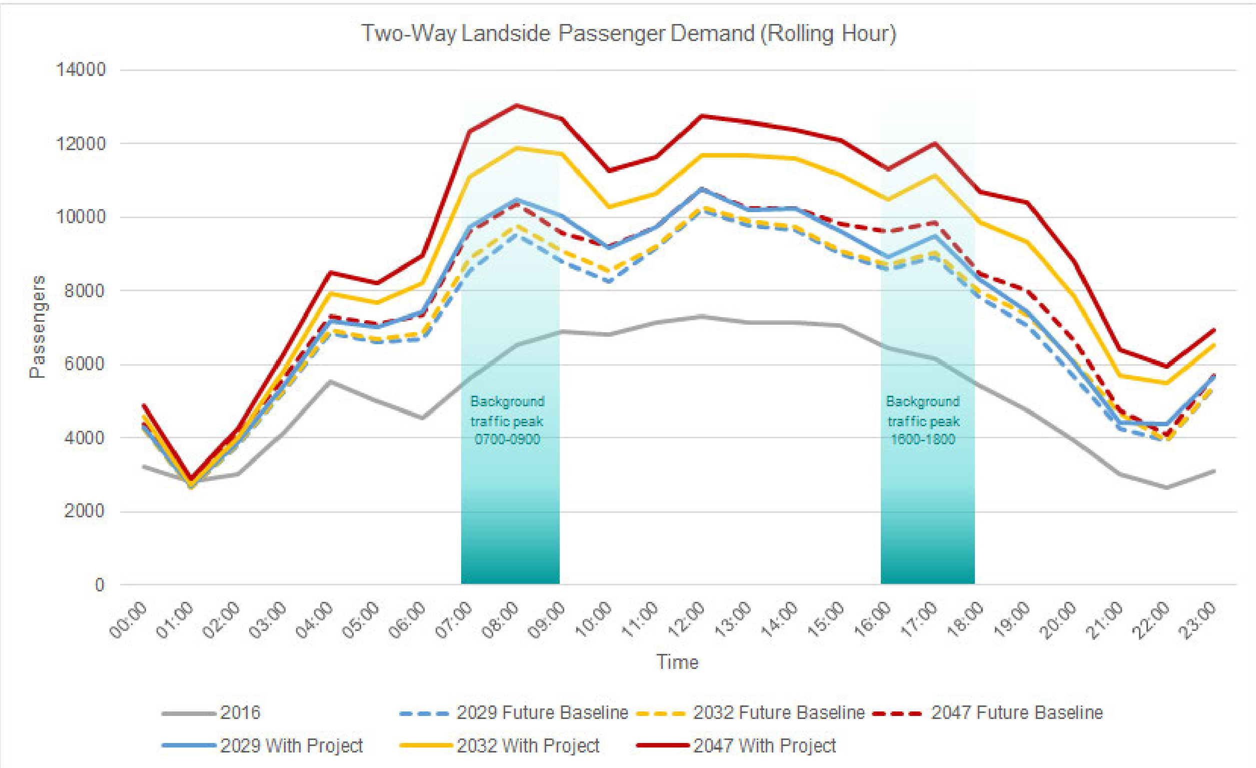


Diagram 6.1.3: Landside demand for 2018, Future Baseline and Project Scenarios



6.2 Employee Forecasts

6.2.1 Travel for staff working at the airport is an important consideration for this PTAR. The performance of transport networks will need to take account of forecast increases in the number of employees, their distribution and their working hours.

6.2.2 The Gatwick Airport Employment survey (Gatwick Airport Ltd, 2016) shows that approximately 23,800 people were employed on-airport.

6.2.3 Total on-airport employees is forecast to rise both in the Future Baseline and assuming the Project, as shown in Table 6.2.1.

Table 6.2.1: Gatwick employee forecasts (on-airport employee only)

	Future Baseline without Project	With Project
2016	23,807	-
2029	27,609	28,596
2032	28,074	31,247
2047	29,721	32,822

6.2.4 The forecasts indicate that on-airport employees will increase progressively and will reach approximately 29,700 by 2047 for the future baseline scenario and approximately 32,800 by 2047 for the Project scenario, a difference of 3,100 employees.

6.2.5 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.

6.2.6 Gatwick commissioned a study into employment growth and housing supply as per the Assessment of Population and Housing Effects in Appendix 16.6.2. This indicates that there will be sufficient housing in the local area into the future to accommodate Gatwick's growth as well as growth generated by other employers.

6.2.7 Accordingly, the transport modelling assumes that the distribution of new employment will be comparable to existing employment.

6.3 Cargo and Goods Traffic

6.3.1 In 2019, Gatwick handled 150,000 tonnes of cargo. Gatwick's cargo volumes are forecast to grow to just over 290,000 tonnes by 2047 in the future baseline and just under 350,000 tonnes in the Project scenario.

6.3.2 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.

6.3.3 It should be noted that Gatwick handled more than 300,000 tonnes of cargo in the mid-2000s and accordingly appropriate levels of handling capacity are already available at the Gatwick Cargo Centre.

6.3.4 Cargo and logistics movements are described further in Section 15. Cargo and logistics movements are included in the strategic transport model.

6.4 Background Demand

6.4.1 The level of background growth in the modelling undertaken for the PEIR has been estimated using TEMPRO, the Trip End Model Presentation Program, developed by the Department for Transport. TEMPRO v7.2 has been used to provide demand forecasts through to 2051 and is based on published Local Plan data where it exists and then extrapolated.

6.4.2 These forecasts are appropriate at district level but require adjustment to deal with local uncertainty or specific projects. This is covered further in the detailed strategic modelling appendix.

6.5 Cumulative Development

6.5.1 The estimates of rail and station crowding as reported in this PTAR (Sections 7 and 13) include for background traffic growth in line with Network Rail projections.

6.5.2 Highway modelling reported in Section 11 includes background traffic growth from TEMPRO through to 2047 and based on published Local Plan data.

6.5.3 This PTAR is based on strategic transport modelling which includes a comprehensive set of cumulative development assumptions related to specific developments that have been identified as of relevance to the Project.

6.5.4 A core set of assumptions have been developed for the strategic model scenarios through an uncertainty log which includes inputs from the local authorities regarding their development and infrastructure plans/proposals, as described in in the detailed strategic modelling appendix.

6.5.5 Modelling assumes growth at Heathrow with two runways from Heathrow's Future Baseline as published during its DCO consultation on its third runway or R3.

6.5.6 This approach provides a conservative assessment from a traffic and transport perspective. If Heathrow R3 was to come forward, traffic levels at Gatwick would likely decline in the period immediately following the opening of R3, meaning that the impacts of the Project, such as traffic and therefore associated noise and emissions would be lower in the 2032 assessment year. By not including Heathrow R3, the 2032 assessment is therefore more conservative. However, by 2047, there would be little difference between demand at Gatwick with or without Heathrow R3 and accordingly this scenario would be unchanged irrespective of developments at Heathrow.

6.5.7 The Heathrow R3 surface access narrative is predicated on "no more traffic", which is to say that total car traffic to the Airport is to be maintained at existing levels, albeit with variation in passenger and employee travel and therefore the distribution and timing of trips. Despite local variations, given the overall strategy of no more traffic at Heathrow, it is not envisaged that there would be a material impact on the performance of the highway network should both proposals come forward. In terms of public transport, the network and catchments serving the two airports are different and therefore the cumulative effects of Gatwick and Heathrow are unlikely to be significantly different to those described in this PTAR. GAL will, however, keep this under review and as it progresses its work and prepares its final documents, including the formal Environmental Statement in support of the development consent application.

7 Airport Surface Access Strategy, Mode Share and Mitigation

7.1.1 Gatwick is committed to low-carbon growth and its Decade of Change strategy (Gatwick Airport Limited, 2021) sets ambitious carbon reduction targets. These inform headline mode share targets established when generating this assessment for PEIR and as documented in this PTAR. These targets are common to both the baseline and the with Project ASAS.

7.1.2 Mode share targets have been tested through the strategic modelling process to understand the impact of 'pull' and 'push' measures that are required to deliver these targets. 'Pull' measures include committed and planned transport improvements such as M23 Smart Motorways or planned upgrades on the Brighton-London main line. 'Push' measures tested include increasing forecourt and parking charges.

7.1.3 The final strategy in the application for development consent will be prepared in conjunction with Gatwick's Airport Transport Forum and in accordance with the Aviation Policy Framework guidance.

7.1.4 Gatwick intends to put forward a robust strategy which enhances Gatwick as a regional transport hub through improvements to rail, bus, and sustainable transport with challenging but achievable mode share targets established towards a lower carbon future.

7.1.5 In alignment with the ASAS, the Travel Plan will focus on specific interventions related to staff travel in particular. The Travel Plan will seek to promote sustainable and healthier modes of transport for staff and reduce travel to work by single occupancy car.

7.2 Targets

7.2.1 The Project ASAS and Travel Plan will be developed to deliver the growth associated with the northern runway safely and sustainably.

7.2.2 Headline targets proposed in this PTAR and common to both the future baseline and with Project ASAS are as follows.

- Achieve 60% sustainable travel (active travel and public transport) mode share for airport passengers by 2030 under the scrutiny of the Transport Forum Steering Group.
- Demonstrate clear progress towards reaching a rail mode share aspiration of 50% by 2030.
- Achieve 60% of staff journeys to work by sustainable modes (public transport, active travel modes and group travel provided by individual employers for their staff, referred to as 'company transport') and including other low emission travel initiatives for those travelling by car (car share and zero emission vehicles) by 2030.

- Achieve a year on year increase in bus use by staff and passengers, and demonstrate measurable value for money from Passenger Transport Levy funding.
- In proportion with the sustainable mode share targets set above, to deliver:
  - A reduction in air passenger "Kiss and Fly" car journeys.
  - A reduction in single occupancy car journeys by staff and an increase staff car journeys by registered car share users.
  - A reduction in staff car parking spaces in line with a shift to more sustainable modes.

7.2.3 At this stage, these ASAS targets have informed the actions (described in Section 7.3) and the modelled interventions (as set out in Section 7.4) used in the assessment. The assessment shows that mitigating the effects of the Project can be achieved by the interventions tested and are not reliant on the ASAS targets being met. However, Gatwick aspires to a high sustainable, low emission mode share so will continue to work towards these targets with stakeholders prior to the application for development consent and subject to model testing.

7.3 Actions

7.3.1 To achieve these targets, it is proposed that Gatwick Airport will:

- Support committed highway and rail schemes, due for delivery before 2025, which are necessary for background growth and provide sufficient capacity for airport growth.
- Support Network Rail in providing additional rail network capacity delivered through committed and planned schemes through CP6 and CP7, which provide for commuter growth in the South East, but which will also accommodate additional airport demand at the target mode share.
- Deliver the station improvement project to provide sufficient capacity.
- Work with coach and bus operators to provide an appropriate increase in service frequency as well as new route offers to accommodate future growth.

7.4 Modelled interventions

7.4.1 The above actions have been included as "pull" measures or interventions strategic modelling for the future baseline and with Project as per below. In line with TAG, only those interventions which are near certain or more than likely to occur have been included in the modelling. These interventions underpin the assessment results described in this PTAR.

- Road – all committed highway schemes including M23 Smart Motorways.
- Rail – rail assumptions to 2029 and beyond in future baseline and with Project include:
- Crossrail
- Thameslink frequency (24 tph)
- Extra peak Southern services enabled by improvements in East Croydon area (CARS)
- North Downs Line increase from 2 trains per hr (tph) to 3 tph (increase from 1 tph to 2 tph at Gatwick) with 1 tph extended from Reading to Oxford in 2047 only
- LUL Northern Line Extension
- LUL/DLR frequency and capacity improvements
- Gatwick Airport Station Project, doubling the size of the station concourse, adding five new lifts and eight escalators to improve passenger flow, and widening two platforms to reduce crowding
- Bus and coach – bus and coach assumptions to 2029 and beyond in future baseline and with Project include:
- Updates to coach frequencies in proportion to growth in air passengers.
- Further bus and coach enhancements with Project include:
- New bus route hourly Uckfield to Gatwick via East Grinstead.
- New coach route two-hourly Chatham – Maidstone – Sevenoaks – Gatwick
- Active travel – at this stage and to be conservative, no walking and cycling improvements have been included in any of the modelling and therefore these improvements would provide a benefit over and above the findings in this PTAR.

7.4.2 Iterative testing of these "pull" measures has indicated that there will still be a shortfall in the sustainable travel mode share being targeted and accordingly Gatwick is also considering:

- Increasing forecourt charging to reduce the proportion of "Kiss and Fly" trips (those incurring both drop off and pick up journeys). Note, free drop-off and pick-up will be provided in long-stay to ensure equitable access from those locations not well-served by public transport.
- Increasing parking charges to encourage use of more sustainable modes.

7.4.3 The above actions have been included as "push" measures in the strategic modelling for the future baseline and with Project as follows:

- Car 'Kiss and Fly' and parking – Car 'Kiss and Fly' and parking - in 2029 the forecourt charge is assumed to rise to £9.50 (in 2021 money) and to £11.50 in 2032 and 2047. Charges for use of both GAL managed and off-site car parks are assumed to rise by 30% in real terms from 2016 base to 2029 and by 40% to 2032 and 2047.

7.5 ASAS outcomes for PEIR

7.5.1 The measures described above and included in the strategic model lead to an increase in passenger public transport mode share from around 45% prior to the Covid-19 pandemic up to 54% and 56% between 2029 and 2047. Whilst not at the 60% target set for 2030, this increase in public transport mode share for air passengers is significant and notable given the growth in passenger numbers with the Project.

7.5.2 The annual average represents a public transport mode share of 48% to 50% on the busy summer day, owing to the seasonal variation described in Section 5.2, comprising 42% to 43% rail and 6% to 7% bus and coach.

7.5.3 Rail mode share on the busy summer day is shown by the model to be around 43% indicating that the annual average will be higher and likely to be closer to an annual average of 50% rail mode share in line with the ASAS target.

7.5.4 Additional routes and higher frequencies will be explored for bus and coach prior to the application for development consent.

7.5.5 In terms of employees, the strategic model shows that a sustainable transport mode share of 47% is achievable and this would indicate that further measures are required; in particular these could include incentives around EV uptake as well as restrictions on staff parking.

7.5.6 In response to Gatwick's Decade of Change (Gatwick Airport Limited, 2021), the Project will consider additional interventions to further improve sustainable mode share as per Section 7.7. However, this assessment shows that mitigating the effects of the Project are not reliant on these additional measures or conditional on the ASAS targets being met.

7.6 Trip Generation

7.6.1 Table 7.6.1 below shows airside passenger demand for the future baseline and with Project scenarios as compared to 2016. In the future baseline, passenger growth to 2032 is 30% higher across the day when compared to 2016. By 2047 passenger demand is around 40% higher than in 2016. Passenger demand in the Project scenario is 70% higher across the day when compared to 2016.

Passengers

Table 7.6.1: Airside passenger two-way demand

Time Period	Total Passengers - Future Baseline				Total Passengers - with Project			
	2016	2029 BAU	2032 BAU	2047 BAU	2016	2029 NRP	2032 NRP	2047 NRP
AM (0700-0900)	16,420	20,518	20,939	21,975	16,420	22,129	25,260	26,934
IP (0900-1600)	55,875	69,429	70,728	75,109	55,875	75,403	83,828	91,593
PM (1600-1800)	14,751	18,919	19,107	20,763	14,751	19,785	23,098	24,960
OP1 (1800-0000)	33,830	47,694	49,289	52,516	33,830	49,859	60,619	66,180
OP2 (0000-0400)	6,483	6,320	6,370	6,732	6,483	6,305	6,373	6,731
OP3 (0400-0700)	10,424	15,381	15,623	16,760	10,424	16,088	18,089	19,659
24hr	**137,782**	**178,262**	**182,056**	**193,855**	**137,782**	**189,569**	**217,265**	**236,056**

7.6.2 To generate landside demand, modelling assumes a 'lead' time before departure - which is referenced to surveyed arrival at check-in profiles, with passengers arriving closer to departure time for short-haul flights and over a longer period for long-haul flights - as well as a 'lag' time after flight arrival - referenced to survey data of passengers exiting through terminal processes before taking landside modes. Landside demand is shown in Table 7.6.2. Demand is lower than for the airside as transfer passengers are excluded from the landside table. Also, some passengers departing on flights between midnight and 01:00 arrive the day before the simulated day and some passengers arriving on flights between 23:00 and midnight reaching the landside after midnight on the simulated day and are therefore not modelled.

Table 7.6.2: Landside passenger two-way demand

Time Period	Total Passengers - Future Baseline				Total Passengers - with Project			
	2016	2029 BAU	2032 BAU	2047 BAU	2016	2029 NRP	2032 NRP	2047 NRP
AM (0700-0900)	12,160	18,081	18,651	19,967	12,160	20,220	22,972	25,389
IP (0900-1600)	49,548	64,812	65,823	69,532	49,548	69,763	78,748	85,377
PM (1600-1800)	12,611	17,506	17,737	19,498	12,611	18,385	21,620	23,302
OP1 (1800-0000)	22,917	34,081	35,424	37,731	22,917	36,224	44,782	49,142
OP2 (0000-0400)	13,215	15,950	16,118	16,889	13,215	16,269	17,187	18,333
OP3 (0400-0700)	15,098	20,172	20,481	21,755	15,098	21,644	23,859	25,717
24hr	125,549	170,602	174,233	185,372	125,549	182,505	209,169	227,260

7.6.3 These demands have been input into the model and have been assigned to different modes by the strategic transport model based on the "push" and "pull" measures described above as well as origin and destination, time and cost parameters which influence which modes are available to passengers and which modes passengers will choose to take.

7.6.4 By 2047, rail mode share on the busy summer day is shown by the model to increase to around 43% and bus and coach at 6% to 7%, as per Table 7.6.3 and Table 7.6.4. There is variation across the day with rail mode share up to 53% on average in the PM peak period on the busy summer day. As one would expect rail mode share is lower – 24% to 25% - late at night and early in the morning when there are limited services and connections are more difficult. Bus and coach mode share is more stable at between 6% and 7% across the day.

7.6.5 When taking data for the busy summer day, it is estimated from the modelling that the annual average will be a higher public transport mode share of around 54% and 56% between 2029 and 2047%, owing to the seasonal variation described in Section 5.2.

Table 7.6.3: Landside passenger two-way rail demand and mode share

Time Period	Rail Passengers - Future Baseline				Rail Passengers - with Project			
	2016	2029 BAU	2032 BAU	2047 BAU	2016	2029 NRP	2032 NRP	2047 NRP
AM (0700-0900)	3,564	7,033	7,484	8,213	3,564	7,871	9,111	10,310
IP (0900-1600)	18,819	30,249	31,311	32,792	18,819	32,464	37,358	40,151
PM (1600-1800)	5,505	9,113	9,388	10,339	5,505	9,530	11,395	12,332
OP1 (1800-0000)	9,061	16,439	17,386	18,366	9,061	17,392	21,991	23,954
OP2 (0000-0400)	2,858	4,045	4,174	4,280	2,858	4,085	4,375	4,566
OP3 (0400-0700)	2,674	4,849	5,052	5,219	2,674	5,211	5,856	6,151
24hr	**42,481**	**71,727**	**74,797**	**79,210**	**42,481**	**76,553**	**90,086**	**97,464**

Time Period	Rail Mode Share - Future Baseline				Rail Mode Share - with Project			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	29%	39%	40%	41%	29%	39%	40%	41%
IP (0900-1600)	38%	47%	48%	47%	38%	47%	47%	47%
PM (1600-1800)	44%	52%	53%	53%	44%	52%	53%	53%
OP1 (1800-0000)	40%	48%	49%	49%	40%	48%	49%	49%
OP2 (0000-0400)	22%	25%	26%	25%	22%	25%	25%	25%
OP3 (0400-0700)	18%	24%	25%	24%	18%	24%	25%	24%
24hr	**34%**	**42%**	**43%**	**43%**	**34%**	**42%**	**43%**	**43%**

Table 7.6.4: Landside passenger two-way bus/coach demand and mode share

Time Period	Bus/Coach Passengers - Future Baseline				Bus/Coach Passengers - with Project			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	701	1,164	1,253	1,375	701	1,427	1,718	1,923
IP (0900-1600)	2,695	3,846	4,035	4,326	2,695	4,458	5,391	5,857
PM (1600-1800)	671	984	1,023	1,134	671	1,112	1,386	1,487
OP1 (1800-0000)	1,173	1,861	1,986	2,128	1,173	2,102	2,766	3,022
OP2 (0000-0400)	702	1,013	1,062	1,125	702	1,108	1,270	1,351
OP3 (0400-0700)	831	1,287	1,358	1,445	831	1,471	1,745	1,859
24hr	**6,772**	**10,155**	**10,717**	**11,534**	**6,772**	**11,678**	**14,275**	**15,500**
Time Period	**Bus/Coach Mode Share - Future Baseline**				**Bus/Coach Mode Share - with Project**			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	6%	6%	7%	7%	6%	7%	7%	8%
IP (0900-1600)	5%	6%	6%	6%	5%	6%	7%	7%
PM (1600-1800)	5%	6%	6%	6%	5%	6%	6%	6%
OP1 (1800-0000)	5%	5%	6%	6%	5%	6%	6%	6%
OP2 (0000-0400)	5%	6%	7%	7%	5%	7%	7%	7%
OP3 (0400-0700)	6%	6%	7%	7%	6%	7%	7%	7%
24hr	**5%**	**6%**	**6%**	**6%**	**5%**	**6%**	**7%**	**7%**

7.6.6 By 2047, highway mode share (taxis, kiss and fly, car parking) on the busy summer day is shown by the model to reduce to around 50% of demand, as per Table 7.6.5, with higher mode share at times of the day when public transport options are more limited.

Table 7.6.5: Landside passenger two-way highway demand and mode share

Time Period	Highway Passengers - Future Baseline				Highway Passengers - with Project			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	7,895	9,884	9,914	10,379	7,895	10,922	12,143	13,156
IP (0900-1600)	28,035	30,718	30,476	32,415	28,035	32,841	35,999	39,369
PM (1600-1800)	6,435	7,408	7,325	8,024	6,435	7,743	8,839	9,483
OP1 (1800-0000)	12,684	15,781	16,052	17,237	12,684	16,730	20,026	22,166
OP2 (0000-0400)	9,654	10,892	10,881	11,483	9,654	11,076	11,542	12,415
OP3 (0400-0700)	11,593	14,036	14,070	15,090	11,593	14,962	16,259	17,707
24hr	**76,296**	**88,719**	**88,719**	**94,629**	**76,296**	**94,274**	**104,808**	**114,296**
Time Period	**Highway Mode Share - Future Baseline**				**Highway Mode Share - with Project**			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	65%	55%	53%	52%	65%	54%	53%	52%
IP (0900-1600)	57%	47%	46%	47%	57%	47%	46%	46%
PM (1600-1800)	51%	42%	41%	41%	51%	42%	41%	41%
OP1 (1800-0000)	55%	46%	45%	46%	55%	46%	45%	45%
OP2 (0000-0400)	73%	68%	68%	68%	73%	68%	67%	68%
OP3 (0400-0700)	77%	70%	69%	69%	77%	69%	68%	69%
24hr	**61%**	**52%**	**51%**	**51%**	**61%**	**52%**	**50%**	**50%**

Employees

7.6.7 Total employee trip generation is shown in Table 7.6.6. Note, these are two-way trips associated with those employees who are travelling to and from the Airport on any given day, not the total number of people employed at the Airport.

Table 7.6.6: Landside employee two-way demand

Time Period	Total Employees - Future Baseline				Total Employees - with Project			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	3,871	4,467	4,540	4,840	3,871	4,617	5,022	5,274
IP (0900-1600)	7,937	9,212	9,366	9,957	7,937	9,540	10,428	10,951
PM (1600-1800)	3,383	3,866	3,924	4,186	3,383	3,989	4,321	4,522
OP1 (1800-0000)	5,532	6,458	6,572	6,985	5,532	6,696	7,338	7,724

Time Period	Total Employees - Future Baseline				Total Employees - with Project			
	2016	2029 BAU	2032 BAU	2047 BAU	2016	2029 NRP	2032 NRP	2047 NRP
OP2 (0000-0400)	1,565	1,836	1,867	1,980	1,565	1,904	2,089	2,201
OP3 (0400-0700)	5,071	5,845	5,938	6,277	5,071	6,052	6,601	6,916
24hr	**27,359**	**31,683**	**32,207**	**34,226**	**27,359**	**32,798**	**35,798**	**37,588**

7.6.8 Modelling shows an employee mode share by sustainable modes of 36% by 2047 and up to 43% including car share, comprising 15% rail, 17% bus and coach and 4% active travel.

Table 7.6.7: Landside employee two-way rail demand and mode share

Time Period	Rail Employees - Future Baseline				Rail Employees - with Project			
	2016	2029 BAU	2032 BAU	2047 BAU	2016	2029 NRP	2032 NRP	2047 NRP
AM (0700-0900)	554	734	762	896	554	760	812	942
IP (0900-1600)	986	1,245	1,276	1,425	986	1,287	1,392	1,535
PM (1600-1800)	512	662	688	799	512	680	734	840
OP1 (1800-0000)	656	839	867	965	656	870	941	1,045
OP2 (0000-0400)	183	223	222	244	183	231	247	265
OP3 (0400-0700)	610	761	788	862	610	786	848	931
24hr	**3,501**	**4,464**	**4,604**	**5,191**	**3,501**	**4,612**	**4,973**	**5,558**
Time Period	**Rail Employee Mode Share - Future Baseline**				**Rail Employees Mode Share - with Project**			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	14%	16%	17%	19%	14%	16%	16%	18%
IP (0900-1600)	12%	14%	14%	14%	12%	13%	13%	14%
PM (1600-1800)	15%	17%	18%	19%	15%	17%	17%	19%
OP1 (1800-0000)	12%	13%	13%	14%	12%	13%	13%	14%
OP2 (0000-0400)	12%	12%	12%	12%	12%	12%	12%	12%
OP3 (0400-0700)	12%	13%	13%	14%	12%	13%	13%	13%
24hr	**13%**	**14%**	**14%**	**15%**	**13%**	**14%**	**14%**	**15%**

Table 7.6.8: Landside employee two-way bus/coach demand and mode share

Time Period	Bus/Coach Employees - Future Baseline				Bus/Coach Employees – with Project			
	2016	2029 BAU	2032 BAU	2047 BAU	2016	2029 NRP	2032 NRP	2047 NRP
AM (0700-0900)	575	706	702	794	575	740	771	832
IP (0900-1600)	1,259	1,532	1,553	1,702	1,259	1,597	1,743	1,874
PM (1600-1800)	487	590	591	659	487	610	653	700
OP1 (1800-0000)	895	1,090	1,101	1,211	895	1,141	1,233	1,325
OP2 (0000-0400)	255	315	319	353	255	330	361	392
OP3 (0400-0700)	816	990	999	1,091	816	1,031	1,119	1,198
24hr	**4,285**	**5,223**	**5,266**	**5,811**	**4,285**	**5,447**	**5,881**	**6,321**
Time Period	**Bus/Coach Employee Mode Share - Future Baseline**				**Bus/Coach Employees Mode Share - with Project**			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	15%	16%	15%	16%	15%	16%	15%	16%
IP (0900-1600)	16%	17%	17%	17%	16%	17%	17%	17%
PM (1600-1800)	14%	15%	15%	16%	14%	15%	15%	15%
OP1 (1800-0000)	16%	17%	17%	17%	16%	17%	17%	17%
OP2 (0000-0400)	16%	17%	17%	18%	16%	17%	17%	18%
OP3 (0400-0700)	16%	17%	17%	17%	16%	17%	17%	17%
24hr	**16%**	**16%**	**16%**	**17%**	**16%**	**17%**	**16%**	**17%**

Table 7.6.9: Landside employee two-way active travel demand and mode share

Time Period	Active Travel Employees - Future Baseline				Active Travel Employees - with Project			
	2016	2029 BAU	2032 BAU	2047 BAU	2016	2029 NRP	2032 NRP	2047 NRP
AM (0700-0900)	205	240	238	260	205	248	255	266
IP (0900-1600)	310	352	355	373	310	364	388	400
PM (1600-1800)	201	231	231	250	201	237	248	258
OP1 (1800-0000)	193	221	222	234	193	230	243	250
OP2 (0000-0400)	52	60	61	64	52	63	67	69
OP3 (0400-0700)	183	209	210	219	183	216	230	237
24hr	**1,144**	**1,312**	**1,315**	**1,399**	**1,144**	**1,358**	**1,431**	**1,481**
Time Period	**Active Employee Mode Share - Future Baseline**				**Active Employees Mode Share - with Project**			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	5%	5%	5%	5%	5%	5%	5%	5%
IP (0900-1600)	4%	4%	4%	4%	4%	4%	4%	4%
PM (1600-1800)	6%	6%	6%	6%	6%	6%	6%	6%
OP1 (1800-0000)	3%	3%	3%	3%	3%	3%	3%	3%
OP2 (0000-0400)	3%	3%	3%	3%	3%	3%	3%	3%
OP3 (0400-0700)	4%	4%	4%	3%	4%	4%	3%	3%
24hr	**4%**	**4%**	**4%**	**4%**	**4%**	**4%**	**4%**	**4%**

7.6.9 Modelling shows an employee mode share by highway modes of 64% by 2047. Note, this mode share comprises solo car drivers (which is the least sustainable), car sharing as well as company transport (eg airline minibuses). These modal splits will be separated out for the final TA.

Table 7.6.10: Landside employee two-way highway demand and mode share

Time Period	Highway Employees - Future Baseline				Highway Employees - with Project			
	2016	2029 BAU	2032 BAU	2047 BAU	2016	2029 NRP	2032 NRP	2047 NRP
AM (0700-0900)	2,538	2,787	2,838	2,890	2,538	2,870	3,184	3,233
IP (0900-1600)	5,382	6,083	6,182	6,457	5,382	6,293	6,904	7,141
PM (1600-1800)	2,183	2,382	2,413	2,478	2,183	2,462	2,685	2,724
OP1 (1800-0000)	3,789	4,309	4,382	4,575	3,789	4,456	4,921	5,104
OP2 (0000-0400)	1,075	1,238	1,265	1,320	1,075	1,280	1,414	1,475
OP3 (0400-0700)	3,463	3,886	3,941	4,106	3,463	4,018	4,404	4,550
24hr	**18,429**	**20,684**	**21,022**	**21,826**	**18,429**	**21,380**	**23,513**	**24,228**
Time Period	**Highway Employee Mode Share - Future Baseline**				**Highway Employees Mode Share - with Project**			
	2016	**2029 BAU**	**2032 BAU**	**2047 BAU**	**2016**	**2029 NRP**	**2032 NRP**	**2047 NRP**
AM (0700-0900)	66%	62%	63%	60%	66%	62%	63%	61%
IP (0900-1600)	68%	66%	66%	65%	68%	66%	66%	65%
PM (1600-1800)	65%	62%	62%	59%	65%	62%	62%	60%
OP1 (1800-0000)	68%	67%	67%	65%	68%	67%	67%	66%
OP2 (0000-0400)	69%	67%	68%	67%	69%	67%	68%	67%
OP3 (0400-0700)	68%	66%	66%	65%	68%	66%	67%	66%
24hr	**67%**	**65%**	**65%**	**64%**	**67%**	**65%**	**66%**	**64%**

7.7 Further actions and interventions to DCO

7.7.1 The assessment of the Project's impacts on the transport network have been undertaken on the basis of the above modelled interventions and the following further actions, which go beyond what is necessary to mitigate the Project's impact on the network, will be considered for DCO with the aim of improving the sustainable mode share further in line with ASAS targets:

- Upgrade the shuttle system to deliver appropriate capacity and passenger experience into the future.
- Support improved accessibility and connectivity for public transport, including rail, express coach, and local bus to make public transport the favoured choice for access for passengers and staff. This would include developing a Mobility-as-a-Service platform for the Airport.
- Further work with coach and bus operators to provide an appropriate increase in service frequency as well as new route offers to accommodate future growth.
- Support bus and rail operators to ensure early morning (04:00-07:00), late evening and weekend services are available to cater for staff shift patterns.

- Work with bus and rail operators to adopt the Gatwick Staff Travel Discount and to potentially create a Gatwick Staff Travel Card Area (combined across bus and rail) incorporating a specific catchment or series of post codes.
- Alongside the above to reduce car parking for staff, reflecting the same catchment area or postcodes.
- Complete a further review of options to manage forecourt access and passenger car parking, which could include increasing charges still further in real terms.
- Develop plans for a new Gatwick Cycle Hub in consultation with local stakeholders and partners.
- Develop a programme of monitoring against targets.

7.7.2 Car travel to Gatwick Airport will continue to be important and the ASAS and Travel Plan will need consider measures which improve car journeys to reduce emissions and the impact of congestion whilst also making these journeys more sustainable. These include:

- Provide a significant increase in capacity along the M23 Spur to ensure Airport traffic is accommodated on the strategic road network and to achieve speeds and delays at levels similar to today.
- Provide better travel conditions on through routes for non-airport users and, where possible, to separate airport traffic from non-airport traffic to add capacity and resilience as well as to improve safety.
- Develop a strategy to support more journeys to the Airport by Electric Vehicles or Zero Emission Vehicles, such as providing or supporting provision of EV charging on site or in the vicinity of the Airport.

7.8 Proposed Mitigation

7.8.1 Notwithstanding the increase in sustainable mode share demonstrated by the modelling, it has also shown that highway works are required as part of Project, to both the South Terminal and North Terminal roundabouts, and at Longbridge roundabout. These works are embedded mitigation with the Project, to improve capacity and mitigate against significant effects.

7.8.2 The final designs and details of the improvement works will be subject to further road traffic assessment and detailed engagement with highway authorities, including Highways England.

South Terminal Junction Improvements

7.8.3 The South Terminal roundabout (also known as the Welcome Roundabout) is the sole entry point into the South Terminal area and for local airport-related roads, including the terminal forecourt, long stay car parks and commercial premises. It is served by the M23 Gatwick Spur to the east (leading from the M23 Junction 9) and Airport Way from the west (leading from North Terminal roundabout). The majority of Gatwick traffic accesses the airport from the M23 and traffic for both the North Terminal and South Terminal passes through this roundabout.

7.8.4 The M23 Gatwick Spur has recently undergone an upgrade as part of the Highways England M23 Smart Motorway Project, completed in 2020. The hard shoulder of the westbound carriageway has become a permanent running lane, providing a total of three lanes approaching the airport. Further local improvements, involving signalisation and minor widening of entries/exits, are proposed in the absence of the Project.

7.8.5 In order to cater for additional road traffic demand associated with the Project, a significant improvement scheme will be required at the South Terminal roundabout. Details of the highway design are being developed and for the purpose of the PEIR, it is assumed that grade separation of the roundabout is required. The highway scheme being considered for the South Terminal roundabout for the PEIR involves the following.

- A new flyover taking through traffic from the M23 Gatwick Spur to Airport Way over the top of the existing roundabout to remove this traffic from the roundabout.
- The flyover will likely be around 8 metres above the existing ground level allowing for Highways England's safety and design standards.
- To deliver the grade separated solution, slip roads are required and these can be provided on public highway land to the north and GAL land to the south of the existing roundabout.
- Bridging structures are needed for the flyover at the roundabout. The existing structures either side of South Terminal roundabout (where the M23 Gatwick Spur crosses B2036 Balcombe Road, and where Airport Way crosses the Brighton-London main line railway) may require widening and strengthening or replacement.

North Terminal Junction Improvements

7.8.6 The North Terminal roundabout is the entry point to the North Terminal and local access roads, including the north and east perimeter roads. The existing layout consists of a circular five-arm at-grade roundabout to the north east of the North Terminal, to the south west of the A23. There is currently no direct entry to the roundabout southbound from Horley and no direct exit from the roundabout on to the A23 southbound towards Crawley.

7.8.7 Local improvements are proposed in the absence of the Project, including some widening and signalling to provide additional capacity in the future baseline.

7.8.8 In order to cater for additional road traffic demand associated with the Project, together with traffic growth that is expected to arise as a result of background growth and other developments, it is assumed that a significant improvement scheme will be required at North Terminal roundabout. As for the South Terminal junction improvements, any improvement scheme will be subject to detailed assessment work and discussion with Highways England and the local highway authorities.

7.8.9 For the purposes of the PEIR, the highway scheme being considered for the North Terminal roundabout involves the following.

- An elevated flyover to carry traffic between Airport Way (from South Terminal and the M23) and the A23 towards Horley. This removes through traffic from the roundabout.
- The elevated links are likely to be approximately 8 metres above the roundabout to provide the required clearances as stipulated by Highways England's safety and design standards.
- The grade separation solution would include additional slip roads, in particular to provide connections between Airport Way, the A23 London Road and access to the airport. Not all movements are currently catered for at North Terminal Roundabout (eg from the airport to the A23 southbound) and the aim is to include as many movements as practicable in order to improve the flow of traffic.
- The configuration of roads beneath the flyover will mean providing specific signal controlled routings which allow traffic to move directly between Airport Way, A23, Longbridge Way and the terminal forecourt.

Longbridge Roundabout

7.8.10 The existing Longbridge roundabout is where the A23 London Road meets Povey Cross Road, A217 and A23 Brighton Road. There is a dedicated left turn slip from Brighton Road to London Road. Signal controlled pedestrian crossings are provided on all four arms.

7.8.11 Preliminary modelling work shows that that the existing Longbridge roundabout would require works to improve capacity with the Project and to provide better integration with improvements at the North Terminal roundabout.

The proposed solution is to substantially improve the roundabout and provide full width running lanes throughout the junction, replacing the sub-standard narrow lanes that currently exist. These lanes create a capacity restriction due to goods vehicles needing to straddle two lanes for certain manoeuvres. The new roundabout would have a slightly larger inscribed diameter and would extend further west and north to accommodate wider circulating lanes, improved pedestrian crossing facilities and extra capacity on exit and entry lanes, particularly for the A23 arm to and from Horley.

8 Assessment of Transport Effects: Rail

8.1 Introduction

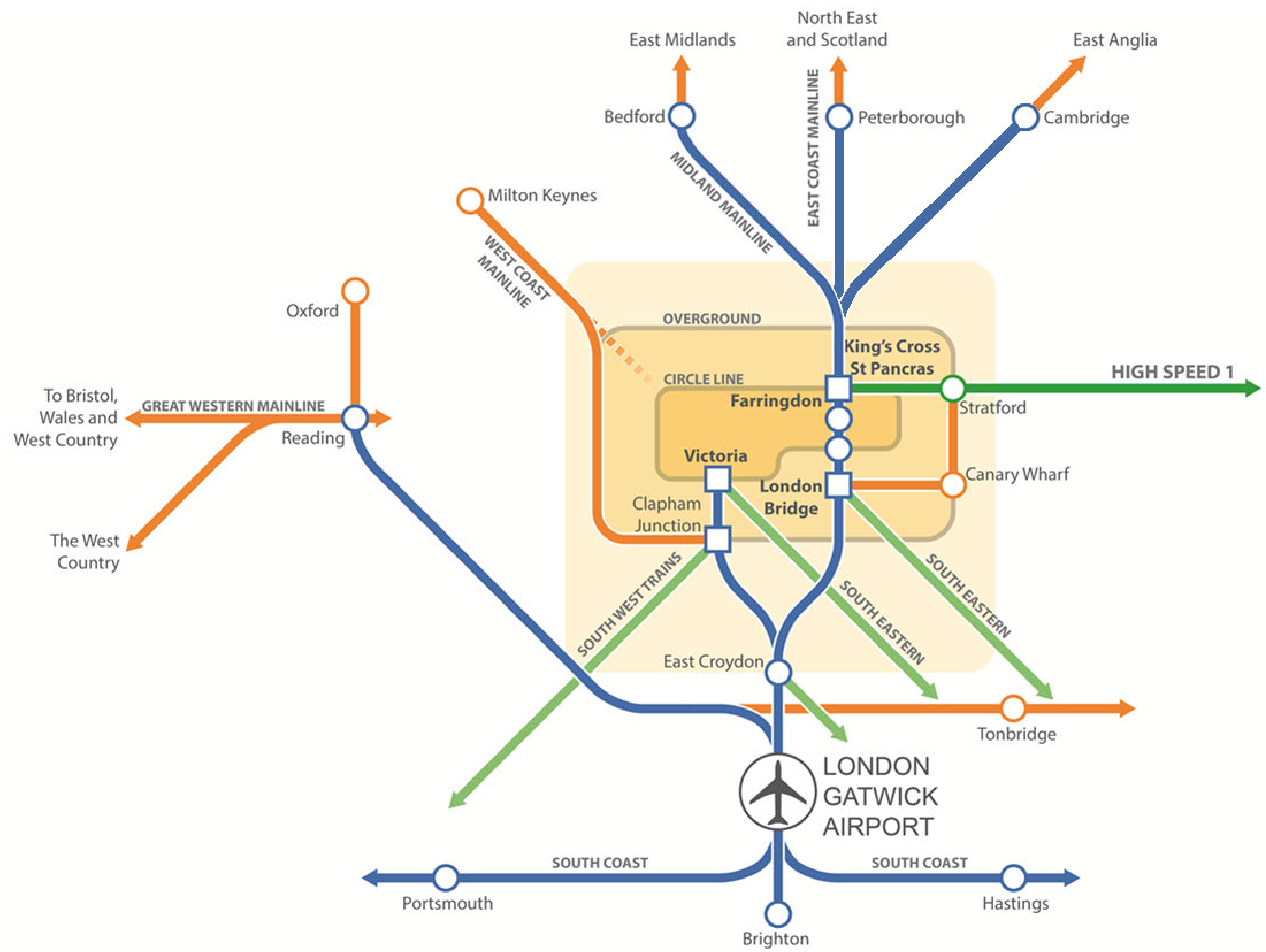
8.1.1 Gatwick is the UK's best connected airport by rail, as per Diagram 8.1.1. It has regular, direct daily services from over 120 stations, across the South Coast from Southampton to Hastings, west to Reading and as far north as Bedford, Cambridge and Peterborough, as shown by the blue lines.

8.1.2 A network of over 800 UK stations is accessible with just one interchange (as shown by the orange lines) and Gatwick is connected to High Speed 1 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.

8.1.3 Being situated on the Brighton-London main line, with a dedicated station integrated with the South Terminal, is an important asset and helps Gatwick Airport to achieve a high rail mode share for air passengers. Prior to the Covid-19 pandemic rail has attracted approximately 39% of all air passengers (2017 CAA passenger data) and approximately 12% of all airport employees (2016 staff travel survey)

8.1.4 As of May 2019, there were 8 tph via Thameslink to and from Gatwick to Bedford, Cambridge and Peterborough, a Southern service into London Bridge (1 tph), in addition to Southern services to and from London Victoria (8 tph) and Gatwick Express (4 tph). There is also a single direct service (1 tph) on the North Downs Line to Reading, for a total of 20 tph in each direction from Gatwick Airport in the peak.

Diagram 8.1.1: Current Rail Network to Gatwick



Source: GAL

8.2 Approach and Methodology

Committed and Planned Enhancements

Thameslink Programme

8.2.1 The Thameslink Programme has delivered additional rail capacity in Sussex and Kent, as well as improved cross London connectivity, particularly through direct rail services to Cambridge and Peterborough, as per Diagram 8.2.1. Most Thameslink services on the Brighton-London main line are operated using 12-car trains, which have provided additional capacity for people accessing the Airport. In addition, customers to Gatwick have enjoyed an increased frequency of connections with recent timetable changes.

8.2.2 The assessment presented in this section includes these capacity enhancements in Control Period 5 (CP)[4] for 2029 and beyond.

Digital Railway

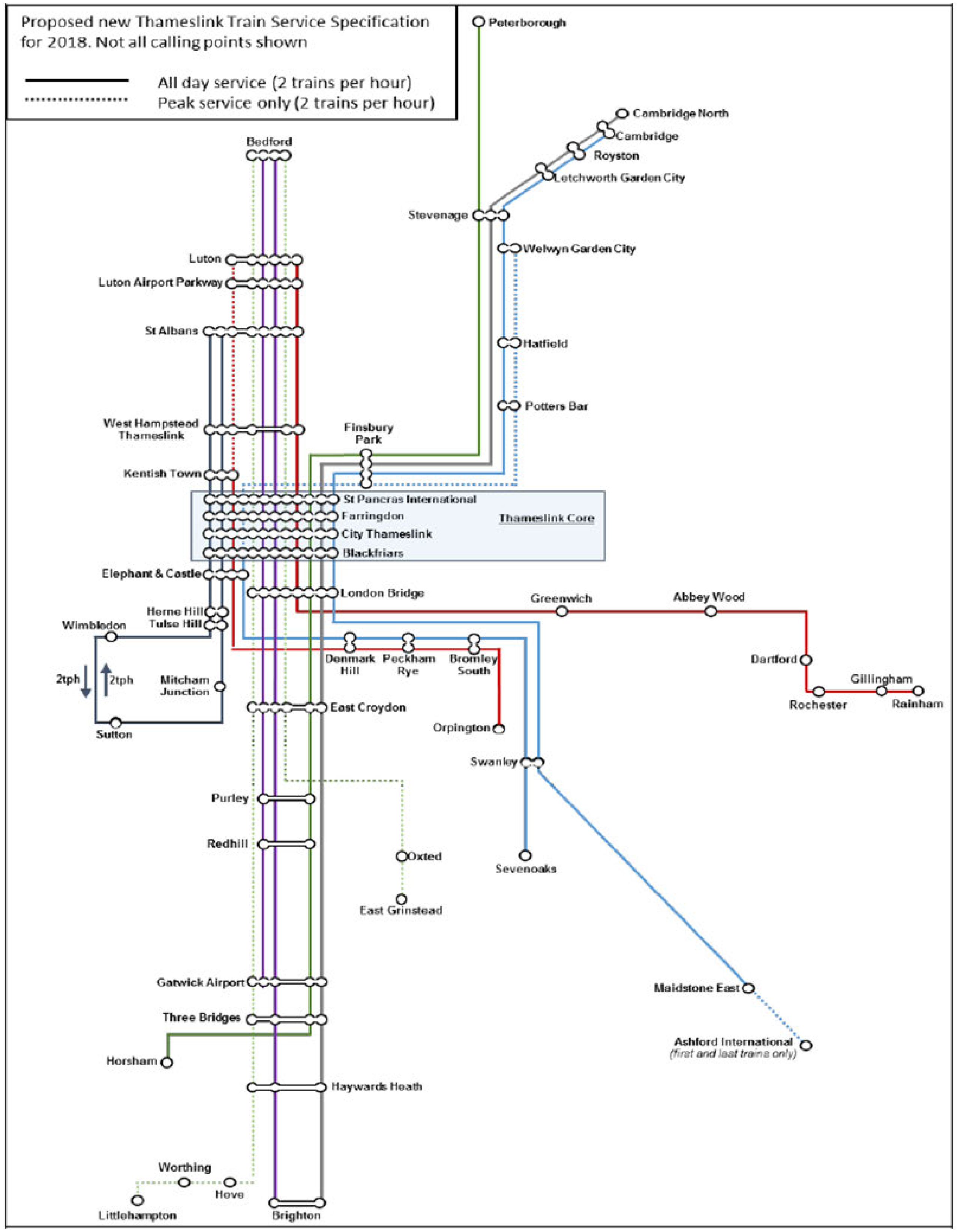
8.2.3 Network Rail's Digital Railway programme is delivering technological improvements to traffic management on the Brighton-London main line. A new Traffic Management System installed as part of the Thameslink Programme is able to:

- take full control of train regulation through the core cross London route via Blackfriars, Farringdon and St Pancras International (as described below);
- assist train regulation on the most intensively used parts of the Brighton-London main line, where the system can highlight issues of late train running and advise the signaller of a solution (which they can accept or reject); and
- assist regulation on other parts of the network, again suggesting solutions to the signaller but not being fully integrated with their control panel.

8.2.4 The system automates some traffic regulation and provides improved real-time information to signallers so they have time to take more oversight and strategic decisions across the network. It is understood that train drivers can also receive real-time advice to drive to a modified train service plan.

[4] Control Periods are 5 year periods used by Network Rail to specify planning and investment in railway infrastructure. Control Period 5 runs from 2014 to 2019, Control Period 6 from 2019 to 2024, and so on.

Diagram 8.2.1: Thameslink service patterns from 2018



Source: GTR 2018 Timetable Consultation, 15 September 2016

Diagram 8.2.2: Brighton Mainline Upgrade proposals

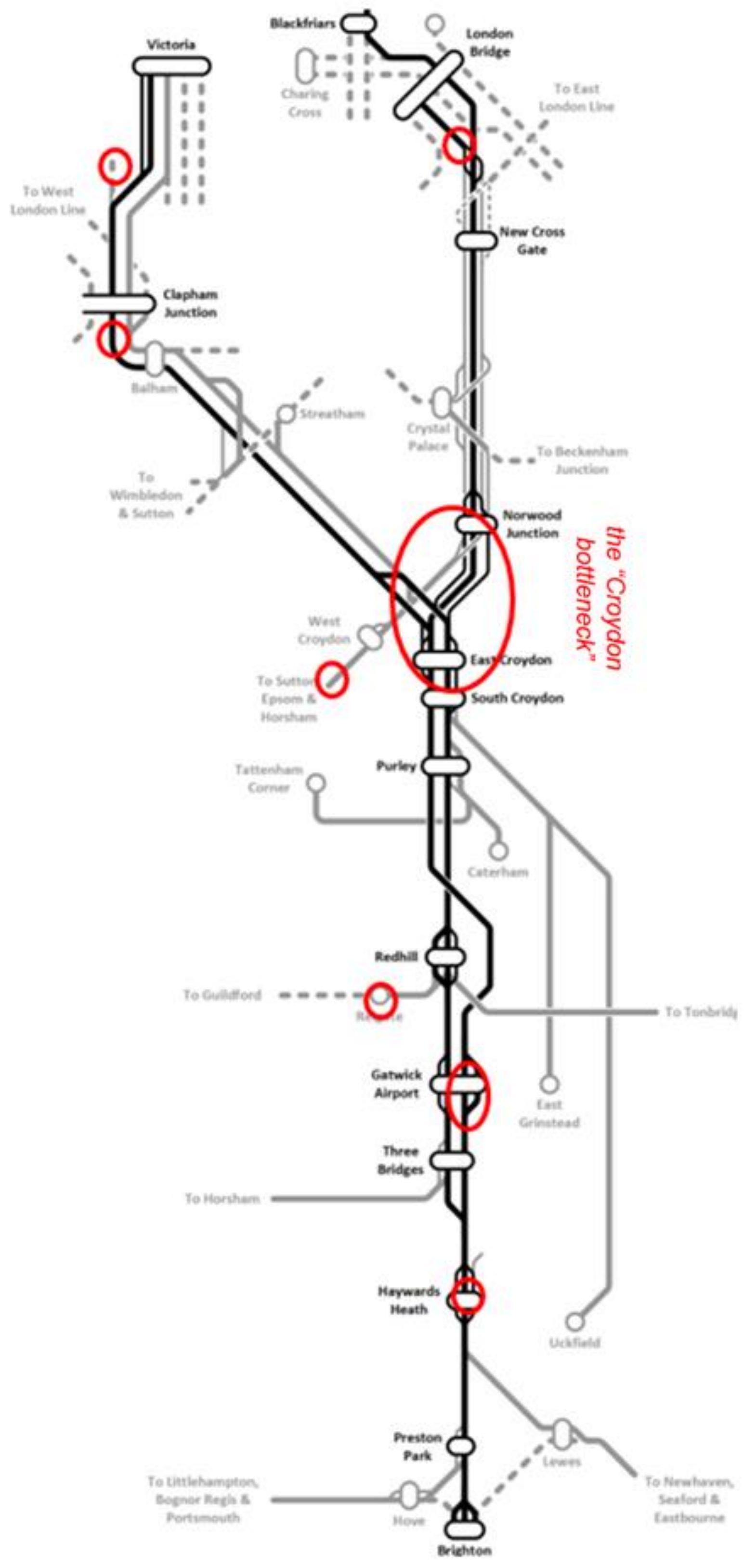
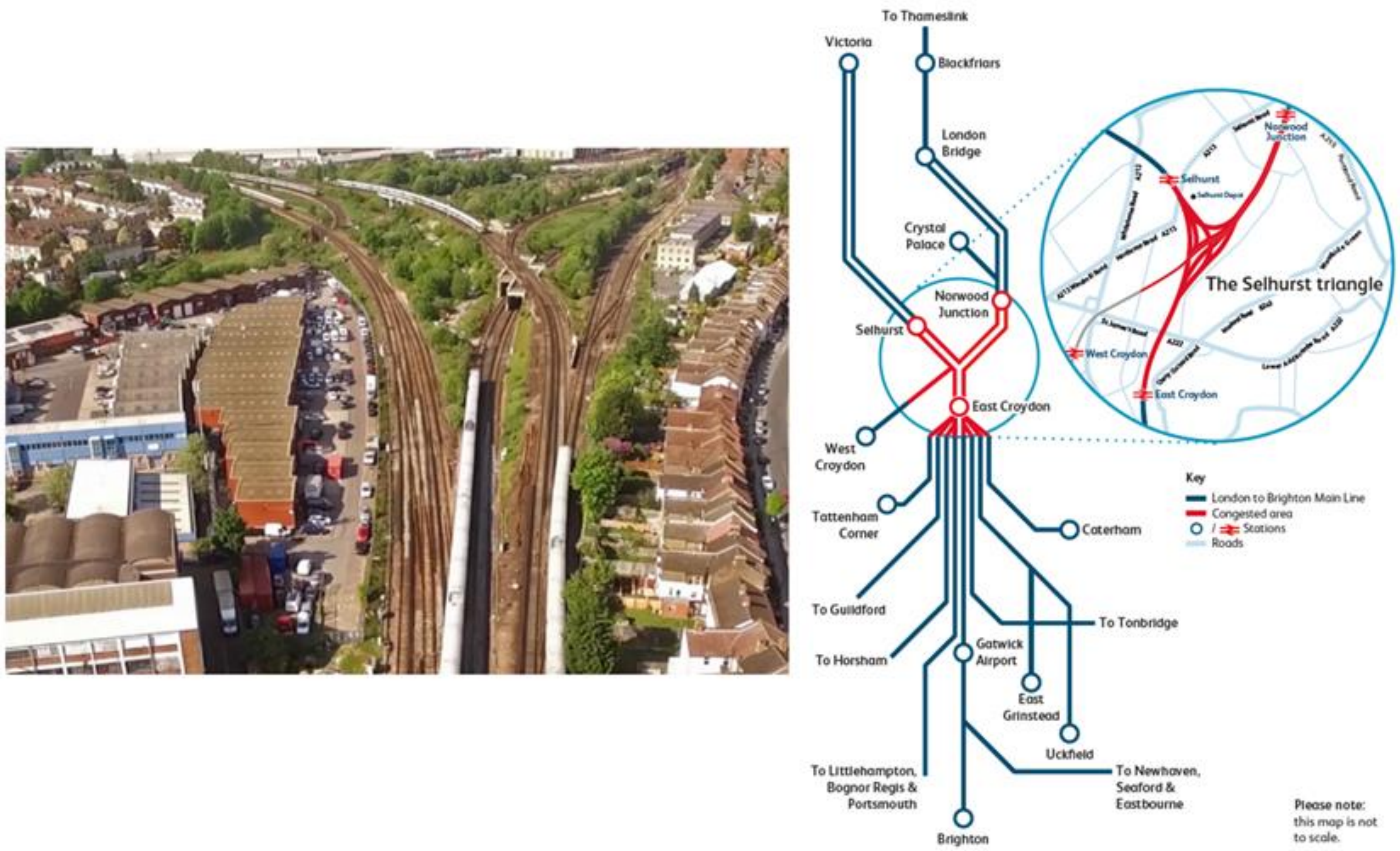


Diagram 8.2.3: Location of Croydon Area Remodelling Scheme (CARS)



8.2.5 The cross London Thameslink route via Farringdon has been fitted with an automatic train operation system whereby Traffic Management algorithms automatically update the signalling to regulate the service optimally. These Digital Railway improvements are vital to maintain and improve punctuality under a more intensive and complicated train service delivered by the Thameslink Programme.

Brighton-London Main Line Upgrade (Croydon / Windmill Bridge)

8.2.6 The Brighton-London 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 described above are intended to address the current gap and provide for growth. However, Network Rail is already developing a programme of measures to enhance the railway line for implementation in CP6 and CP7. These include the Croydon Area Remodelling Scheme (CARS), as per Diagram 8.2.2 and Diagram 8.2.3.

8.2.7 CARS is the most significant scheme to transform Brighton-London main line capacity and the largest and most complex part of Network Rail's long-term route upgrade proposals. It would remove the operationally most challenging bottleneck on Britain's railway at East Croydon station and the layout of the important Windmill Bridge Junction where the Thameslink route to London Bridge and the route to Victoria Station diverge.

8.2.8 Network Rail's analysis shows that removing this constraint could deliver four additional trains per hour in the peak direction via Gatwick as well as improving punctuality.

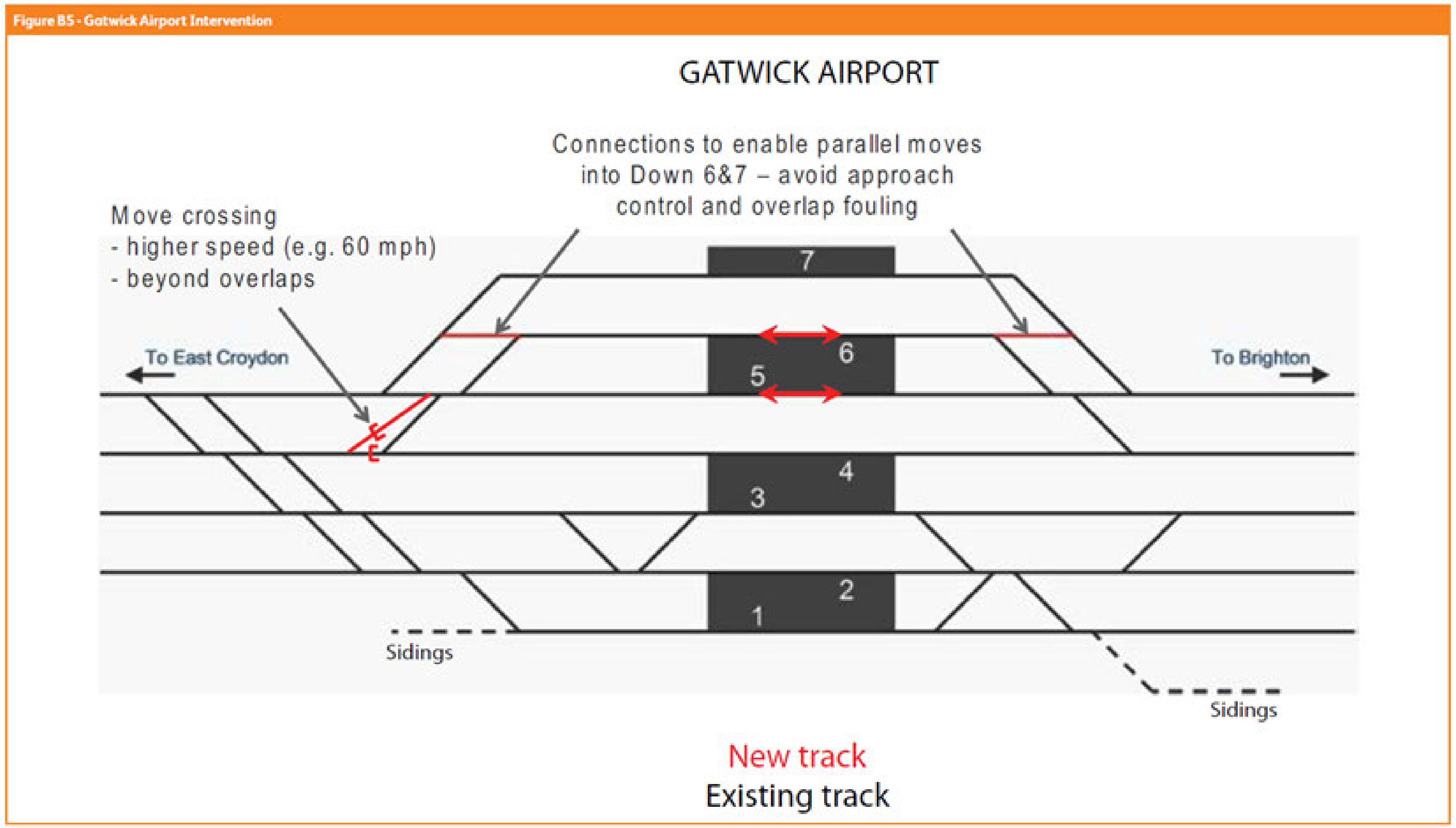
8.2.9 This additional capacity could remove the need to split and join trains from the South Coast, reducing journey times, and enable more trains to operate to Reigate; both are current connectivity gaps for the Airport. If this was supported by changes to the railway track layout at Gatwick Airport station, this could enable more trains to call at the Airport also.

8.2.10 CARS comprises major works at Norwood Junction, Selhurst triangle, two additional platforms at East Croydon station and between these locations and would include new grade-separation of track (fly-overs and dive-unders), more tracks and better signalling, resulting in improved reliability and enhanced capacity.

8.2.11 Network Rail is continuing design work and has carried out two consultations, the latest on its proposals in summer 2020, in line the Transport and Works Act process. The South East Route Control Period 6 Delivery Plan (Network Rail, 2019) identifies that the scheme will *"remove known bottle necks in the Croydon area in CP7 and increase capacity on the main line routes between London and Brighton",* ie the scheme is planned to come forward between 2024 and 2029. Accordingly the CARS is included in the future baseline for the strategic modelling.

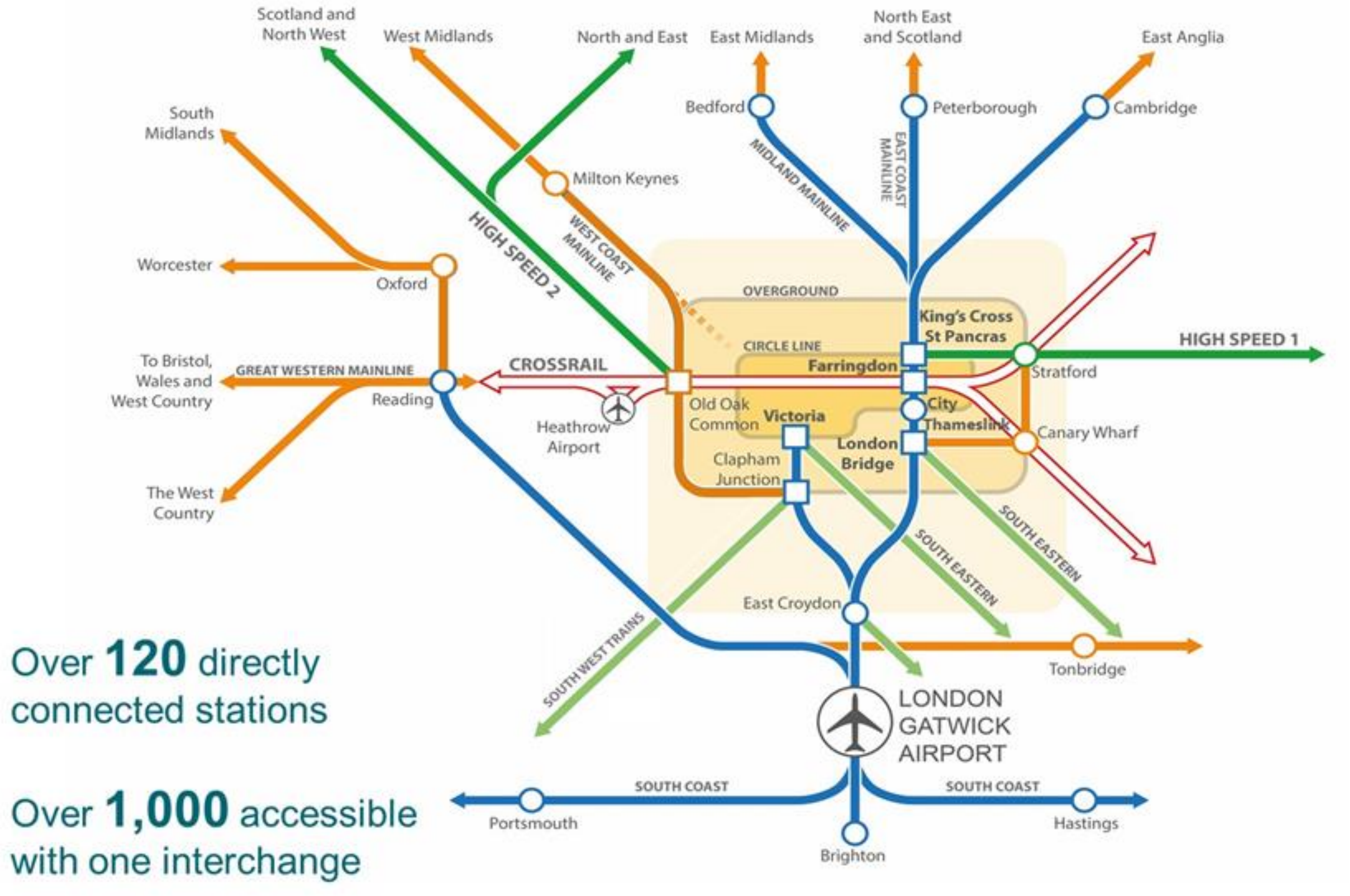
8.2.12 In addition to CARS, the accompanying changes to the track layout at Gatwick Airport are shown in Diagram 8.2.4 which support the delivery of this additional capacity.

Diagram 8.2.4: Proposed Gatwick Airport Station track layout enhancements



Source: Network Rail South East Area Route Study (September 2015)

Diagram 8.2.5: Future Rail network to Gatwick including the Thameslink Programme and Crossrail



Source: GAL

8.2.13 At this stage, it is envisaged that the full package of Brighton-London main line upgrades, most notably CARS, could deliver four tph in the peak direction and this assumption has been included in the initial assessment described in this section.

Redhill and the North Downs Line

8.2.14 The planned work to bring into use a new platform at Redhill will provide additional capacity to turn trains from the North Downs Line and run through to Gatwick. Great Western Railway (GWR) are planning to operate a second direct train per hour to Gatwick as a result, with potential for a third service extended to Oxford later in the assessment period. This will enable a connection to East West Rail in the future. GWR introduced a three tph service between Reading and Redhill in September 2020, in anticipation of extending the additional services to Gatwick Airport in the next phase. As such, service improvements on the North Downs Line have been included in the modelling.

Gatwick Airport Station

8.2.15 Gatwick Airport station currently acts as an 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, handled around 20 million airport passengers per annum prior to the Covid-19 pandemic.

8.2.16 The current station is congested at peak times and accordingly the Department for Transport announced £150 million investment in the Station Project in July 2019, which will include doubling the size of the station concourse, adding five new lifts and eight escalators to improve passenger flow, and widening two platforms to reduce crowding. This project is under construction.

8.2.17 These enhancements will make travelling to Gatwick Airport by rail more attractive into the future and should help grow the Airport's strong rail mode share. The performance of the station under the Project scenarios is described in Section 13.

Future Network Connectivity

8.2.18 In terms of wider connectivity, it will be possible to travel directly to the City of London via the Thameslink route with interchange to Docklands from London Bridge station now and at Farringdon on Crossrail from 2022. These services also directly connect the airport to Croydon. The connection to the East Coast Main Line provides direct services through Hertfordshire to Cambridge and Peterborough for air passengers. Cross-platform connections on to trains to Yorkshire, the North East and Scotland on the Virgin

Trains East Coast franchise are possible at both Stevenage and Peterborough.

8.2.19 Improvements to the connection from Gatwick to Reading (particularly the provision of more and faster direct trains) via Redhill, Reigate and Guildford is important for unlocking this corridor. The North Downs Line upgrade will also enable Gatwick to link with one or two connections to Oxford, the Midlands and, in the future, the East West Rail connection to Milton Keynes and Bedford.

8.2.20 In the future, Crossrail 2 may provide connectivity benefits between Surrey and Hertfordshire through Central London, in particular through Clapham Junction which provides connectivity to Gatwick Airport. In addition, Gatwick Airport will be connected to HS2 Phase 1 at Old Oak Common from the West London Line via interchange at Clapham Junction. However, these schemes have not been included in the modelling.

8.2.21 Future rail connectivity is shown in Diagram 8.2.5.

Earlier Train Services

8.2.22 Earlier morning trains on all routes to Gatwick Airport station would help match services to staff shift patterns at Gatwick. This intervention has been discussed with Network Rail though no specific service has been confirmed at this time and so this is not included in the modelling.

8.2.23 This intervention does not require additional capital expenditure but may require additional operational expenditure for additional traincrew. Subject to a detailed diagramming exercise, existing units could start operation earlier.

8.2.24 These earlier services provide better connectivity both for employees on early shifts as well as air passengers catching the first departing flights of the day. Track signalling upgrades could allow services to continue to run in parallel with overnight maintenance, which might otherwise restrict the ability to operate earlier services.

8.3 Comparison of Baseline and With Project Performance

Modellling approach

8.3.1 The EMME platform has been used for the public transport modelling for Gatwick. EMME is a well-established and reliable software for public transport assignment, including modelling impacts of in-vehicle crowding on passenger route choice. Both DfT and TfL have their primary rail models in EMME software (Railplan and Planet South respectively) and its strengths and limitations are well understood.

8.3.2 PLANET South has been used for the assessment of rail effects. The model extents include rail lines from the Sussex coast to central London, plus the North Downs Line between Gatwick and Reading. Moreover, given that travel to Gatwick for many passengers, requires cross-London travel, full coverage of PLANET South to locations north of London such as Stevenage, Peterborough and Cambridge have also been included. The Department for Transport supports the use of PLANET South for this study (as part of the overall assessment methodology set out in Section 1).

Study Area

8.3.3 As might be expected, Gatwick's primary effect on the rail network is on services which pass through Gatwick Airport railway station. The plots in Diagram 8.3.1 shows a comparison between flows in the 2047 AM and PM peak periods (0700-0900 and 1600-1800) in the future baseline and with the Project, with the change in bandwidth indicating the growth with Project. These plots show that the largest potential change in demand will be on the Brighton Main Line, in particular north of Gatwick, and then on into London Victoria and London Bridge, which is intuitive and confirmed by catchment analysis of CAA data for passengers and staff travel survey data for employees.

8.3.4 Diagram 8.3.2 shows rail catchments for air passengers to Gatwick. It can be seen that the largest number of trips to and from Gatwick by passengers by rail is along the Brighton-London main line, with catchments through Horsham, along the South Coast and also running west from Redhill/Reigate through to Reading on the North Downs Line.

8.3.5 A similar distribution is also shown for employees in Diagram 8.3.3 though specific catchments stand out as having higher concentrations of Gatwick employees, including Croydon, Redhill and Reigate, Crawley, Horsham, Haywards Heath, Brighton and towns along the South Coast.

8.3.6 The rail services which have been assessed are:

- North Downs Line (NDL)
- Gatwick Express (GX)
- Fast services to/from London Victoria
- Stopping services to/from London Victoria
- Fast services to/from London Bridge
- Stopping services to/from London Bridge

Modelled rail improvements to 2029

8.3.7 Modelled rail improvements to 2029 and beyond in future baseline and with Project include:

- Crossrail
- Thameslink frequency (24 tph)
- Extra peak Southern services enabled by improvements in East Croydon area (CARS)
- North Downs Line increase from 2 tph to 3 tph (increase from 1 tph to 2 tph at Gatwick) with 1 tph extended from Reading to Oxford in 2047 only
- LUL Northern Line Extension
- LUL/DLR frequency and capacity improvements
- Gatwick Airport Station Project, doubling the size of the station concourse, adding five new lifts and eight escalators to improve passenger flow, and widening two platforms to reduce crowding

8.3.8 These enhancements lead to an improvement in rail mode share to between 42% and 43% for air passengers and between 14% and 15% for employees in future years 2029, 2032 and 2047.

Assessment Criteria

8.3.9 Crowding is an important measure of rail effects. Line loading data, as well as information on seating and standing capacity by line, have been used to determine crowding. More passengers standing indicate a reduction in space and less comfortable journeys.

Diagram 8.3.1: 2047 net flow change between Future Baseline and With Project

Diagram 8.3.2: Gatwick Airport passenger catchments for rail

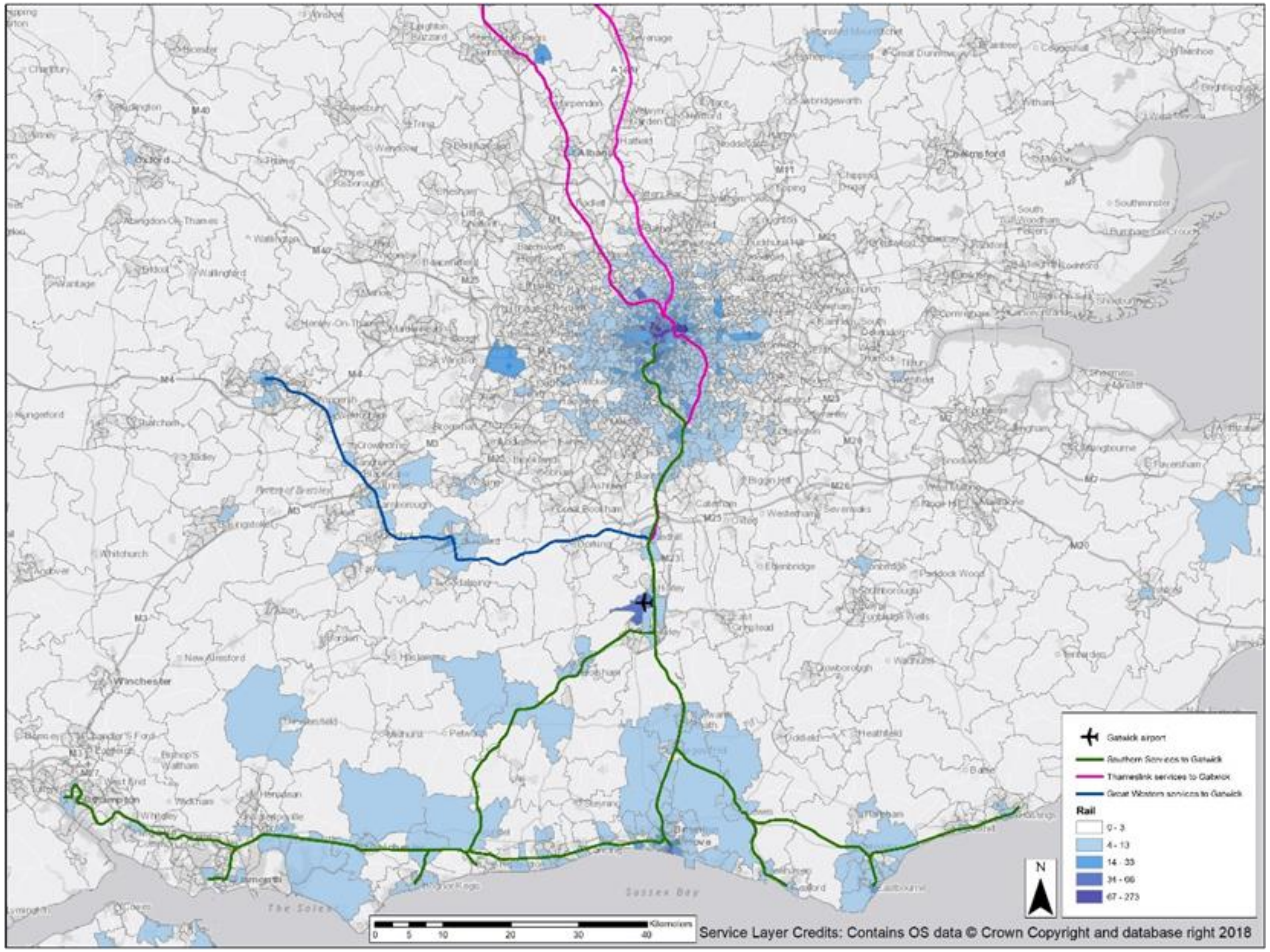
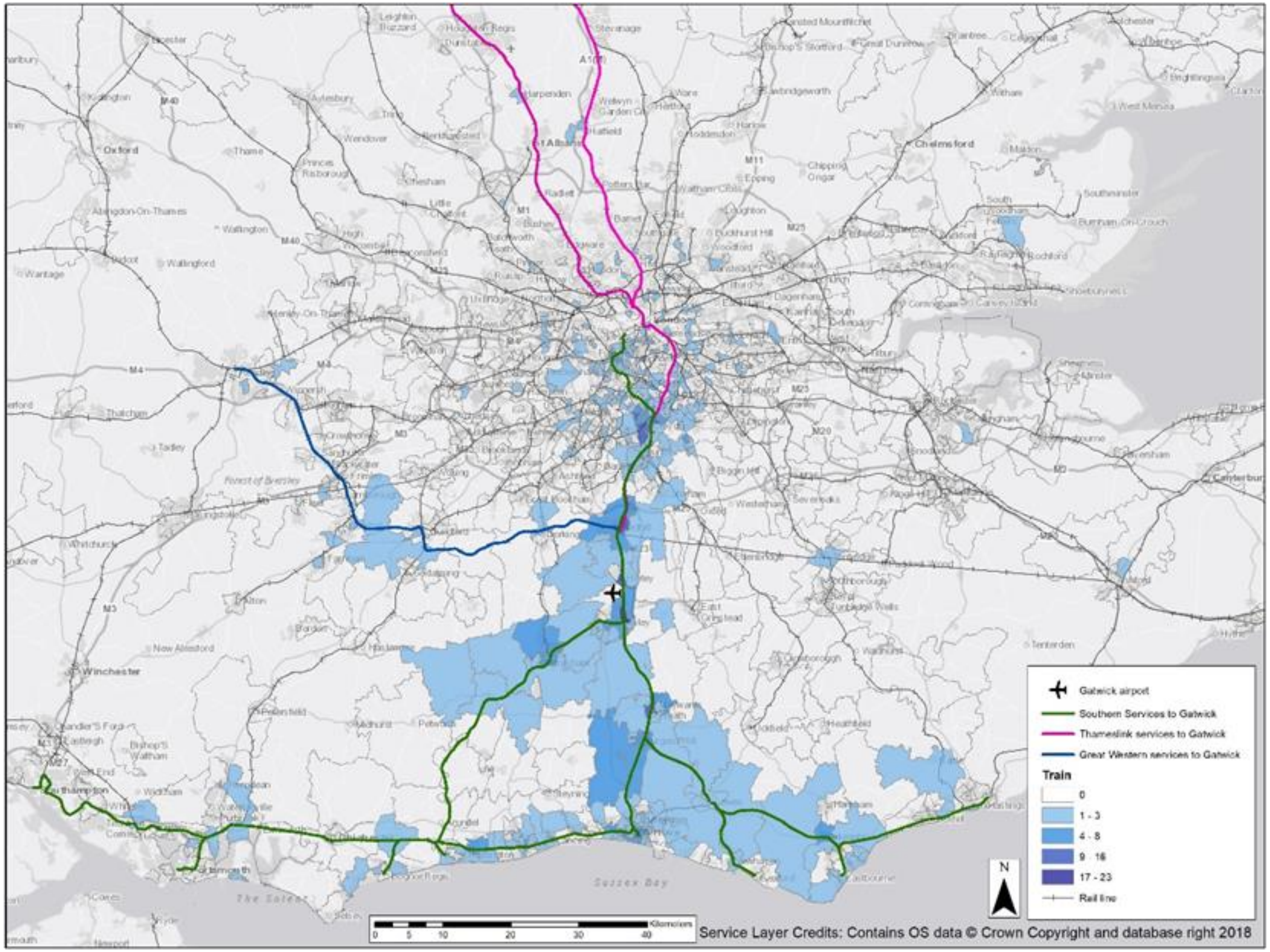


Diagram 8.3.3: Gatwick Airport employee catchments for rail



8.3.10 The scope of the rail crowding assessment includes the following:

- Line loading assessment
- Seated load factor assessment
- Standing capacity

Comparison of Future Baseline and with Project Scenarios

8.3.11 Table 8.3.1 shows airport rail passenger demand by year for the future baseline and with Project. By 2047, the Project accounts for over 2,000 more passengers using the rail network from Gatwick Airport railway station, from approximately 10,000 passengers to 12,000 passengers in the AM peak two hours (0700-0900) and from approximately 13,000 passengers to 15,000 in the PM peak two hours (1600-1800).

Table 8.3.1: Passenger Demand at Gatwick

Scenario	AM Peak (0700-0900)			
	Northbound		Southbound	
	Alighters	Boarders	Alighters	Boarders
2029 Future Baseline	858	3,413	3,764	416
2029 Project	938	3,603	4,288	445
2029 net increase	**80**	**190**	**524**	**30**
2032 Future Baseline	908	3,594	4,008	436
2032 Project	1,037	4,133	4,991	493
2032 net increase	**129**	**539**	**984**	**57**
2047 Future Baseline	1,020	4,117	4,536	471
2047 Project	1,187	4,751	5,763	534
2047 net increase	**168**	**635**	**1,227**	**63**
Scenario	**PM Peak (1600-1800)**			
	Northbound		**Southbound**	
	Alighters	**Boarders**	**Alighters**	**Boarders**
2029 Future Baseline	595	4,203	5,343	742
2029 Project	617	4,384	5,545	768
2029 net increase	**22**	**181**	**201**	**26**
2032 Future Baseline	610	4,383	5,560	764
2032 Project	716	5,175	6,589	870
2032 net increase	**107**	**792**	**1,030**	**105**
2047 Future Baseline	661	5,168	6,176	907
2047 Project	775	5,892	7,257	999
2047 net increase	**114**	**724**	**1,081**	**92**

AM Peak

Line Loading Assessment (AM Peak)

8.3.12 Crowding has been assessed based on line loading in both directions in the AM peak (0700-0900).

8.3.13 Table 8.3.2 shows the northbound line loading and Table 8.3.3: Passenger line loading on departure – AM Southbound (07:00 – 09:00) shows the southbound line loading, and the net change in line loading as the result of the Project is set out in Table 8.3.4.

8.3.14 In the AM peak, the highest increase in rail passengers is in the counter peak southbound direction, from London to Gatwick. This demonstrates that Gatwick growth means better use of contra-peak rail capacity.

8.3.15 The analysis shows that most passengers are expected on the fast train services from London Victoria and London Bridge and the changes in line loadings by assessment years are summarised below.

8.3.16 In 2029, the Project adds around 140 passengers to rail services in the northbound direction, which represents an overall increase of 2%. In the southbound off-peak direction, the Project adds up to a total of around 550 passengers. The increase in passengers represents an 8% increase in passengers on the fast services, and 9% on Gatwick Express.

8.3.17 In 2032, the Project adds around 420 passengers to rail services in the northbound direction, which represents an overall increase of 2%. In the southbound off-peak direction, the Project adds up to a total of around 950 passengers. This increase in passengers represents an 13% to 14% increase in passengers on the fast services, and 14% on Gatwick Express.

In 2047, the Project adds around 770 passengers to rail services in the northbound direction. The increase in passengers represents a 4% to 6% increase in passengers on the fast services owing to the high volume of commuters already travelling into London, and 17% on Gatwick Express which is to be expected as this is the dedicated Airport rail service. In the southbound off-peak direction, the Project adds up to a total of around 1,270 passengers. The increase in passengers represents an 13% to 15% increase in passengers on the fast services, and 16% on Gatwick Express.

Table 8.3.2: Passenger line loading on departure – AM Northbound (07:00 – 09:00)

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
2029 AM BAU	NDL	NB	4	1,040	1,276	2,316	0	192	192	192	192	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,728	2,960	7,688	3,169	3,975	3,975	3,975	3,975	3,975	3,975	3,975	3,975	3,975	3,975	3,975	0	0
	Fast VIC	NB	10	6,318	3,770	10,088	3,371	5,143	5,196	5,196	5,196	5,196	5,196	5,196	5,196	5,196	7,609	6,632	0	0
	Stoppers VIC	NB	4	2,672	1,596	4,268	0	96	64	72	381	1,032	1,207	1,842	2,857	2,857	3,182	2,873	0	0
	Fast LBG	NB	17	10,964	14,727	25,691	7,006	8,503	8,503	8,503	8,503	8,503	8,503	8,503	8,503	8,503	0	0	15,327	15,327
	Stoppers LBG	NB	10	6,710	10,924	17,634	1,000	422	502	551	1,045	2,286	2,706	4,263	5,545	5,498	0	0	8,603	9,711
	Total		**53**	**32,432**	**35,253**	**67,685**	**14,546**	**18,331**	**18,431**	**18,489**	**19,292**	**20,992**	**21,586**	**23,779**	**26,076**	**26,029**	**14,766**	**13,479**	**23,930**	**25,038**
2029 AM NRP	NDL	NB	4	1,040	1,276	2,316	0	198	198	198	198	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,728	2,960	7,688	3,172	3,998	3,998	3,998	3,998	3,998	3,998	3,998	3,998	3,998	3,998	3,998	0	0
	Fast VIC	NB	10	6,318	3,770	10,088	3,380	5,184	5,236	5,236	5,236	5,236	5,236	5,236	5,236	5,236	7,631	6,637	0	0
	Stoppers VIC	NB	4	2,672	1,596	4,268	0	97	64	73	384	1,037	1,211	1,846	2,861	2,861	3,185	2,872	0	0
	Fast LBG	NB	17	10,964	14,727	25,691	7,025	8,563	8,563	8,563	8,563	8,563	8,563	8,563	8,563	8,563	0	0	15,342	15,342
	Stoppers LBG	NB	10	6,710	10,924	17,634	1,008	432	512	560	1,058	2,293	2,712	4,268	5,550	5,503	0	0	8,616	9,725
	Total		**53**	**32,432**	**35,253**	**67,685**	**14,585**	**18,472**	**18,571**	**18,628**	**19,437**	**21,126**	**21,720**	**23,911**	**26,208**	**26,161**	**14,813**	**13,506**	**23,957**	**25,067**
2032 AM BAU	NDL	NB	4	1,040	1,276	2,316	0	204	204	204	204	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,728	2,960	7,688	3,276	4,110	4,110	4,110	4,110	4,110	4,110	4,110	4,110	4,110	4,110	4,110	0	0
	Fast VIC	NB	10	6,318	3,770	10,088	3,526	5,352	5,408	5,408	5,408	5,408	5,408	5,408	5,408	5,408	7,734	6,698	0	0
	Stoppers VIC	NB	4	2,672	1,596	4,268	0	98	64	73	374	1,049	1,229	1,893	2,938	2,938	3,236	2,911	0	0
	Fast LBG	NB	17	10,964	14,727	25,691	7,365	8,941	8,941	8,941	8,941	8,941	8,941	8,941	8,941	8,941	0	0	15,672	15,672
	Stoppers LBG	NB	10	6,710	10,924	17,634	1,043	450	535	586	1,108	2,383	2,817	4,445	5,763	5,714	0	0	8,792	9,932
	Total		**53**	**32,432**	**35,253**	**67,685**	**15,210**	**19,155**	**19,263**	**19,323**	**20,145**	**21,891**	**22,505**	**24,797**	**27,159**	**27,111**	**15,080**	**13,719**	**24,465**	**25,604**
2032 AM NRP	NDL	NB	4	1,040	1,276	2,316	0	218	218	218	218	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,728	2,960	7,688	3,260	4,176	4,176	4,176	4,176	4,176	4,176	4,176	4,176	4,176	4,176	4,176	0	0
	Fast VIC	NB	10	6,318	3,770	10,088	3,529	5,471	5,526	5,526	5,526	5,526	5,526	5,526	5,526	5,526	7,808	6,715	0	0
	Stoppers VIC	NB	4	2,672	1,596	4,268	0	99	65	74	382	1,059	1,238	1,903	2,947	2,947	3,246	2,910	0	0
	Fast LBG	NB	17	10,964	14,727	25,691	7,411	9,129	9,129	9,129	9,129	9,129	9,129	9,129	9,129	9,129	0	0	15,749	15,749
	Stoppers LBG	NB	10	6,710	10,924	17,634	1,034	477	561	611	1,132	2,397	2,829	4,455	5,772	5,722	0	0	8,802	9,945
	Total		**53**	**32,432**	**35,253**	**67,685**	**15,235**	**19,570**	**19,675**	**19,735**	**20,563**	**22,287**	**22,899**	**25,188**	**27,550**	**27,500**	**15,231**	**13,801**	**24,552**	**25,695**
2047 AM BAU	NDL	NB	4	1,040	1,276	2,316	0	255	255	255	255	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,728	2,960	7,688	3,747	4,468	4,468	4,468	4,468	4,468	4,468	4,468	4,468	4,468	4,468	4,468	0	0

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
	Fast VIC	NB	12	7,849	4,684	12,533	5,447	7,614	7,704	7,704	7,704	7,704	7,704	7,704	7,704	7,704	9,596	8,404	0	0
	Stoppers VIC	NB	5	3,319	1,983	5,302	0	121	83	97	600	1,558	1,802	2,651	3,838	3,838	4,032	3,688	0	0
	Fast LBG	NB	18	11,661	15,104	26,765	9,667	11,487	11,487	11,487	11,487	11,487	11,487	11,487	11,487	11,487	0	0	17,622	17,622
	Stoppers LBG	NB	10	6,710	10,924	17,634	1,416	629	739	799	1,353	2,740	3,217	4,893	6,092	6,031	0	0	9,367	10,533
	Total		**57**	**35,308**	**36,930**	**72,238**	**20,277**	**24,573**	**24,735**	**24,809**	**25,867**	**27,957**	**28,678**	**31,202**	**33,589**	**33,528**	**18,095**	**16,559**	**26,989**	**28,155**
2047 AM NRP	NDL	NB	4	1,040	1,276	2,316	0	272	272	272	272	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,728	2,960	7,688	3,741	4,538	4,538	4,538	4,538	4,538	4,538	4,538	4,538	4,538	4,538	4,538	0	0
	Fast VIC	NB	12	7,849	4,684	12,533	5,449	7,761	7,849	7,849	7,849	7,849	7,849	7,849	7,849	7,849	9,697	8,425	0	0
	Stoppers VIC	NB	5	3,319	1,983	5,302	0	122	84	99	613	1,574	1,818	2,667	3,854	3,854	4,045	3,695	0	0
	Fast LBG	NB	18	11,661	15,104	26,765	9,708	11,701	11,701	11,701	11,701	11,701	11,701	11,701	11,701	11,701	0	0	17,710	17,710
	Stoppers LBG	NB	10	6,710	10,924	17,634	1,426	673	784	844	1,408	2,781	3,256	4,930	6,129	6,066	0	0	9,389	10,559
	Total		**57**	**35,308**	**36,930**	**72,238**	**20,324**	**25,066**	**25,228**	**25,302**	**26,380**	**28,443**	**29,162**	**31,684**	**34,070**	**34,008**	**18,280**	**16,658**	**27,099**	**28,269**

Table 8.3.3: Passenger line loading on departure – AM Southbound (07:00 – 09:00)

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							London Victoria (VIC Branch)	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
2029 AM BAU	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	579	579	579	579	0
	GX	SB	8	4,276	2,676	6,952	602	602	0	0	602	602	602	602	602	602	602	602	602	376
	Fast VIC	SB	11	5,835	3,478	9,313	1,557	3,038	0	0	2,148	2,148	2,148	2,148	2,148	2,148	2,148	2,148	2,148	1,129
	Stoppers VIC	SB	2	1,144	638	1,782	0	0	0	0	0	0	0	0	0	37	226	248	331	0
	Fast LBG	SB	16	10,903	17,751	28,654	0	0	6,355	6,355	3,522	3,522	3,522	3,522	3,522	3,472	3,472	3,472	3,472	1,338
	Stoppers LBG	SB	8	5,032	8,193	13,225	0	0	2,526	2,728	1,130	1,130	923	807	799	306	541	567	849	370
	Total		**49**	**28,231**	**34,012**	**62,242**	**2,159**	**3,640**	**8,880**	**9,083**	**7,402**	**7,402**	**7,196**	**7,080**	**7,072**	**7,145**	**7,569**	**7,617**	**7,982**	**3,213**
2029 AM NRP	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	608	608	608	608	0
	GX	SB	8	4,276	2,676	6,952	655	655	0	0	655	655	655	655	655	655	655	655	655	380
	Fast VIC	SB	11	5,835	3,478	9,313	1,621	3,160	0	0	2,324	2,324	2,324	2,324	2,324	2,324	2,324	2,324	2,324	1,144

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							London Victoria (VIC Branch)	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
	Stoppers VIC	SB	2	1,144	638	1,782	0	0	0	0	0	0	0	0	0	39	221	243	326	0
	Fast LBG	SB	16	10,903	17,751	28,654	0	0	6,594	6,594	3,816	3,816	3,816	3,816	3,816	3,765	3,765	3,765	3,765	1,348
	Stoppers LBG	SB	8	5,032	8,193	13,225	0	0	2,539	2,749	1,135	1,135	927	812	805	313	549	575	857	373
	Total		**49**	**28,231**	**34,012**	**62,242**	**2,277**	**3,816**	**9,132**	**9,343**	**7,930**	**7,930**	**7,722**	**7,607**	**7,600**	**7,704**	**8,122**	**8,170**	**8,535**	**3,246**
2032 AM BAU	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	600	600	600	600	0
	GX	SB	8	4,276	2,676	6,952	649	649	0	0	649	649	649	649	649	649	649	649	649	410
	Fast VIC	SB	11	5,835	3,478	9,313	1,583	3,125	0	0	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	1,226
	Stoppers VIC	SB	2	1,144	638	1,782	0	0	0	0	0	0	0	0	0	38	221	244	330	0
	Fast LBG	SB	16	10,903	17,751	28,654	0	0	6,550	6,550	3,766	3,766	3,766	3,766	3,766	3,713	3,713	3,713	3,713	1,426
	Stoppers LBG	SB	8	5,032	8,193	13,225	0	0	2,555	2,743	1,158	1,158	947	830	820	317	564	591	882	384
	Total		**49**	**28,231**	**34,012**	**62,242**	**2,232**	**3,775**	**9,105**	**9,293**	**7,876**	**7,876**	**7,665**	**7,548**	**7,538**	**7,620**	**8,050**	**8,101**	**8,477**	**3,446**
2032 AM NRP	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	608	608	608	608	0
	GX	SB	8	4,276	2,676	6,952	738	738	0	0	738	738	738	738	738	738	738	738	738	420
	Fast VIC	SB	11	5,835	3,478	9,313	1,697	3,350	0	0	2,609	2,609	2,609	2,609	2,609	2,609	2,609	2,609	2,609	1,255
	Stoppers VIC	SB	2	1,144	638	1,782	0	0	0	0	0	0	0	0	0	40	218	241	327	0
	Fast LBG	SB	16	10,903	17,751	28,654	0	0	6,991	6,991	4,299	4,299	4,299	4,299	4,299	4,243	4,243	4,243	4,243	1,453
	Stoppers LBG	SB	8	5,032	8,193	13,225	0	0	2,599	2,785	1,175	1,175	962	846	836	326	571	598	889	391
	Total		**49**	**28,231**	**34,012**	**62,242**	**2,436**	**4,089**	**9,590**	**9,776**	**8,820**	**8,820**	**8,608**	**8,492**	**8,482**	**8,565**	**8,988**	**9,038**	**9,415**	**3,519**
2047 AM BAU	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	603	603	603	603	0
	GX	SB	8	4,276	2,676	6,952	795	795	0	0	795	795	795	795	795	795	795	795	795	679
	Fast VIC	SB	11	5,835	3,478	9,313	1,584	3,253	0	0	2,916	2,916	2,916	2,916	2,916	2,916	2,916	2,916	2,916	1,792
	Stoppers VIC	SB	2	1,144	638	1,782	0	0	0	0	0	0	0	0	0	54	175	202	296	0
	Fast LBG	SB	16	10,903	17,751	28,654	0	0	7,049	7,049	4,823	4,823	4,823	4,823	4,823	4,763	4,763	4,763	4,763	2,029
	Stoppers LBG	SB	8	5,032	8,193	13,225	0	0	2,654	2,910	1,253	1,253	1,030	912	892	410	630	662	981	476
	Total		**49**	**28,231**	**34,012**	**62,242**	**2,379**	**4,048**	**9,703**	**9,959**	**9,787**	**9,787**	**9,564**	**9,446**	**9,426**	**9,542**	**9,883**	**9,941**	**10,355**	**4,976**
2047 AM NRP	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	625	625	625	625	0
	GX	SB	8	4,276	2,676	6,952	924	924	0	0	924	924	924	924	924	924	924	924	924	702
	Fast VIC	SB	11	5,835	3,478	9,313	1,746	3,529	0	0	3,294	3,294	3,294	3,294	3,294	3,294	3,294	3,294	3,294	1,814

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							London Victoria (VIC Branch)	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
	Stoppers VIC	SB	2	1,144	638	1,782	0	0	0	0	0	0	0	0	0	58	164	191	285	0
	Fast LBG	SB	16	10,903	17,751	28,654	0	0	7,572	7,572	5,541	5,541	5,541	5,541	5,541	5,481	5,481	5,481	5,481	2,059
	Stoppers LBG	SB	8	5,032	8,193	13,225	0	0	2,713	2,959	1,271	1,271	1,046	929	910	428	642	674	992	486
	Total		**49**	**28,231**	**34,012**	**62,242**	**2,670**	**4,453**	**10,284**	**10,530**	**11,030**	**11,030**	**10,805**	**10,688**	**10,669**	**10,809**	**11,130**	**11,188**	**11,601**	**5,061**

Table 8.3.4: Change in line loading – AM peak (07:00 – 09:00)

Year of Assessment	Groups	Direction	Change in Line Loading (% change)													
			Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
2029	NDL	NB	-	6 (3%)	6 (3%)	6 (3%)	6 (3%)	-	-	-	-	-	-	-	-	-
	GX	NB	3 (0%)	23 (1%)	23 (1%)	23 (1%)	23 (1%)	23 (1%)	23 (1%)	23 (1%)	23 (1%)	23 (1%)	23 (1%)	23 (1%)	-	-
	Fast VIC	NB	9 (0%)	41 (1%)	40 (1%)	40 (1%)	40 (1%)	40 (1%)	40 (1%)	40 (1%)	40 (1%)	40 (1%)	22 (0%)	5 (0%)	-	-
	Stoppers VIC	NB	-	1 (1%)	1 (1%)	-	3 (1%)	4 (0%)	4 (0%)	4 (0%)	4 (0%)	4 (0%)	3 (0%)	-1 (0%)	-	-
	Fast LBG	NB	18 (0%)	60 (1%)	60 (1%)	60 (1%)	60 (1%)	60 (1%)	60 (1%)	60 (1%)	60 (1%)	60 (1%)	-	-	15 (0%)	15 (0%)
	Stoppers LBG	NB	8 (1%)	10 (2%)	10 (2%)	10 (2%)	13 (1%)	7 (0%)	6 (0%)	5 (0%)	5 (0%)	5 (0%)	-	-	13 (0%)	14 (0%)
	Total		**39 (0%)**	**141 (1%)**	**139 (1%)**	**139 (1%)**	**146 (1%)**	**134 (1%)**	**134 (1%)**	**133 (1%)**	**132 (1%)**	**132 (1%)**	**47 (0%)**	**27 (0%)**	**28 (0%)**	**29 (0%)**
2032	NDL	NB	-	14 (7%)	14 (7%)	14 (7%)	14 (7%)	-	-	-	-	-	-	-	-	-
	GX	NB	-15 (0%)	66 (2%)	66 (2%)	66 (2%)	66 (2%)	66 (2%)	66 (2%)	66 (2%)	66 (2%)	66 (2%)	66 (2%)	66 (2%)	-	-
	Fast VIC	NB	3 (0%)	119 (2%)	117 (2%)	117 (2%)	117 (2%)	117 (2%)	117 (2%)	117 (2%)	117 (2%)	117 (2%)	74 (1%)	17 (0%)	-	-
	Stoppers VIC	NB	-	1 (2%)	1 (1%)	1 (1%)	8 (2%)	10 (1%)	9 (1%)	10 (1%)	10 (0%)	10 (0%)	10 (0%)	-1 (0%)	-	-
	Fast LBG	NB	46 (1%)	188 (2%)	188 (2%)	188 (2%)	188 (2%)	188 (2%)	188 (2%)	188 (2%)	188 (2%)	188 (2%)	-	-	77 (0%)	77 (0%)
	Stoppers LBG	NB	-9 (-1%)	26 (6%)	25 (5%)	25 (4%)	24 (2%)	14 (1%)	12 (0%)	9 (0%)	9 (0%)	8 (0%)	-	-	10 (0%)	13 (0%)
	Total		**25 (0%)**	**415 (2%)**	**412 (2%)**	**412 (2%)**	**418 (2%)**	**396 (2%)**	**393 (2%)**	**391 (2%)**	**391 (1%)**	**390 (1%)**	**151 (1%)**	**82 (1%)**	**87 (0%)**	**90 (0%)**
2047	NDL	NB	-	17 (7%)	17 (7%)	17 (7%)	17 (7%)	-	-	-	-	-	-	-	-	-

Year of Assessment	Groups	Direction	Change in Line Loading (% change)													
			Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
	GX	NB	-6 (0%)	70 (2%)	70 (2%)	70 (2%)	70 (2%)	70 (2%)	70 (2%)	70 (2%)	70 (2%)	70 (2%)	70 (2%)	70 (2%)	-	-
	Fast VIC	NB	2 (0%)	147 (2%)	145 (2%)	145 (2%)	145 (2%)	145 (2%)	145 (2%)	145 (2%)	145 (2%)	145 (2%)	101 (1%)	21 (0%)	-	-
	Stoppers VIC	NB	-	1 (1%)	1 (2%)	2 (2%)	12 (2%)	16 (1%)	16 (1%)	16 (1%)	16 (0%)	16 (0%)	14 (0%)	7 (0%)	-	-
	Fast LBG	NB	40 (0%)	215 (2%)	215 (2%)	215 (2%)	215 (2%)	215 (2%)	215 (2%)	215 (2%)	215 (2%)	215 (2%)	-	-	88 (1%)	88 (1%)
	Stoppers LBG	NB	10 (1%)	44 (7%)	45 (6%)	45 (6%)	55 (4%)	40 (1%)	39 (1%)	37 (1%)	36 (1%)	35 (1%)	-	-	22 (0%)	26 (0%)
	Total		**47 (0%)**	**493 (2%)**	**493 (2%)**	**493 (2%)**	**514 (2%)**	**486 (2%)**	**484 (2%)**	**483 (2%)**	**481 (1%)**	**480 (1%)**	**185 (1%)**	**99 (1%)**	**110 (0%)**	**115 (0%)**

Year of Assessment	Groups	Direction	London Victoria (VIC Branch)	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
2029	NDL	SB	-	-	-	-	-	-	-	-	-	28 (5%)	28 (5%)	28 (5%)	28 (5%)	-
	GX	SB	53 (9%)	53 (9%)	-	-	53 (9%)	53 (9%)	53 (9%)	53 (9%)	53 (9%)	53 (9%)	53 (9%)	53 (9%)	53 (9%)	4 (1%)
	Fast VIC	SB	65 (4%)	123 (4%)	-	-	176 (8%)	176 (8%)	176 (8%)	176 (8%)	176 (8%)	176 (8%)	176 (8%)	176 (8%)	176 (8%)	15 (1%)
	Stoppers VIC	SB	-	-	-	-	-	-	-	-	-	2 (5%)	-5 (-2%)	-5 (-2%)	-5 (-1%)	-
	Fast LBG	SB	-	-	239 (4%)	239 (4%)	293 (8%)	293 (8%)	293 (8%)	293 (8%)	293 (8%)	293 (8%)	293 (8%)	293 (8%)	293 (8%)	10 (1%)
	Stoppers LBG	SB	-	-	13 (1%)	21 (1%)	5 (0%)	5 (0%)	5 (1%)	5 (1%)	5 (1%)	7 (2%)	8 (1%)	8 (1%)	8 (1%)	3 (1%)
	Total		**118 (5%)**	**176 (5%)**	**252 (3%)**	**260 (3%)**	**527 (7%)**	**527 (7%)**	**527 (7%)**	**527 (7%)**	**527 (7%)**	**559 (8%)**	**553 (7%)**	**553 (7%)**	**554 (7%)**	**33 (1%)**
2032	NDL	SB	-	-	-	-	-	-	-	-	-	8 (1%)	8 (1%)	8 (1%)	8 (1%)	-
	GX	SB	89 (14%)	89 (14%)	-	-	89 (14%)	89 (14%)	89 (14%)	89 (14%)	89 (14%)	89 (14%)	89 (14%)	89 (14%)	89 (14%)	10 (3%)
	Fast VIC	SB	114 (7%)	225 (7%)	-	-	306 (13%)	306 (13%)	306 (13%)	306 (13%)	306 (13%)	306 (13%)	306 (13%)	306 (13%)	306 (13%)	29 (2%)
	Stoppers VIC	SB	-	-	-	-	-	-	-	-	-	2 (5%)	-3 (-2%)	-3 (-1%)	-3 (-1%)	-
	Fast LBG	SB	-	-	441 (7%)	441 (7%)	533 (14%)	533 (14%)	533 (14%)	533 (14%)	533 (14%)	530 (14%)	530 (14%)	530 (14%)	530 (14%)	27 (2%)
	Stoppers LBG	SB	-	-	44 (2%)	42 (2%)	17 (1%)	17 (1%)	15 (2%)	15 (2%)	16 (2%)	10 (3%)	7 (1%)	7 (1%)	8 (1%)	8 (2%)
	Total		**203 (9%)**	**314 (8%)**	**485 (5%)**	**483 (5%)**	**945 (12%)**	**945 (12%)**	**943 (12%)**	**943 (12%)**	**944 (13%)**	**945 (12%)**	**937 (12%)**	**937 (12%)**	**938 (11%)**	**73 (2%)**
2047	NDL	SB	-	-	-	-	-	-	-	-	-	22 (4%)	22 (4%)	22 (4%)	22 (4%)	-
	GX	SB	129 (16%)	129 (16%)	-	-	129 (16%)	129 (16%)	129 (16%)	129 (16%)	129 (16%)	129 (16%)	129 (16%)	129 (16%)	129 (16%)	24 (3%)
	Fast VIC	SB	162 (10%)	276 (8%)	-	-	378 (13%)	378 (13%)	378 (13%)	378 (13%)	378 (13%)	378 (13%)	378 (13%)	378 (13%)	378 (13%)	22 (1%)
	Stoppers VIC	SB	-	-	-	-	-	-	-	-	-	3 (6%)	-11 (-6%)	-11 (-6%)	-11 (-4%)	-
	Fast LBG	SB	-	-	523 (7%)	523 (7%)	718 (15%)	718 (15%)	718 (15%)	718 (15%)	718 (15%)	717 (15%)	717 (15%)	717 (15%)	717 (15%)	30 (1%)

Year of Assessment	Groups	Direction	Change in Line Loading (% change)													
			Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
	Stoppers LBG	SB	-	-	59 (2%)	48 (2%)	18 (1%)	18 (1%)	16 (2%)	17 (2%)	17 (2%)	18 (4%)	12 (2%)	12 (2%)	11 (1%)	10 (2%)
	Total		**291 (12%)**	**405 (10%)**	**582 (6%)**	**571 (6%)**	**1243 (13%)**	**1243 (13%)**	**1241 (13%)**	**1242 (13%)**	**1243 (13%)**	**1268 (13%)**	**1247 (13%)**	**1247 (13%)**	**1246 (12%)**	**85 (2%)**

Seated Loading Factor Assessment (AM peak)

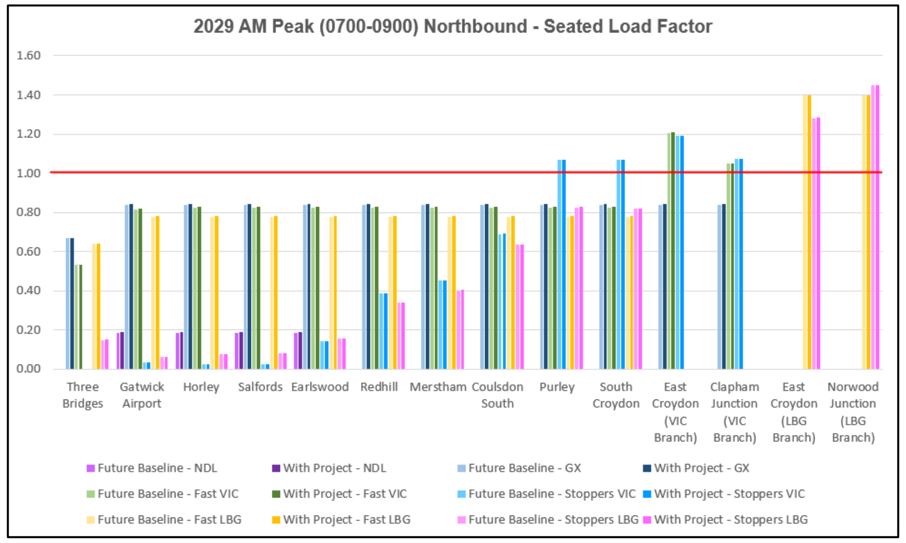
8.3.18 A seated load factor assessment for the AM peak has been undertaken for both the northbound and southbound direction services, as shown in Diagram 8.3.4.

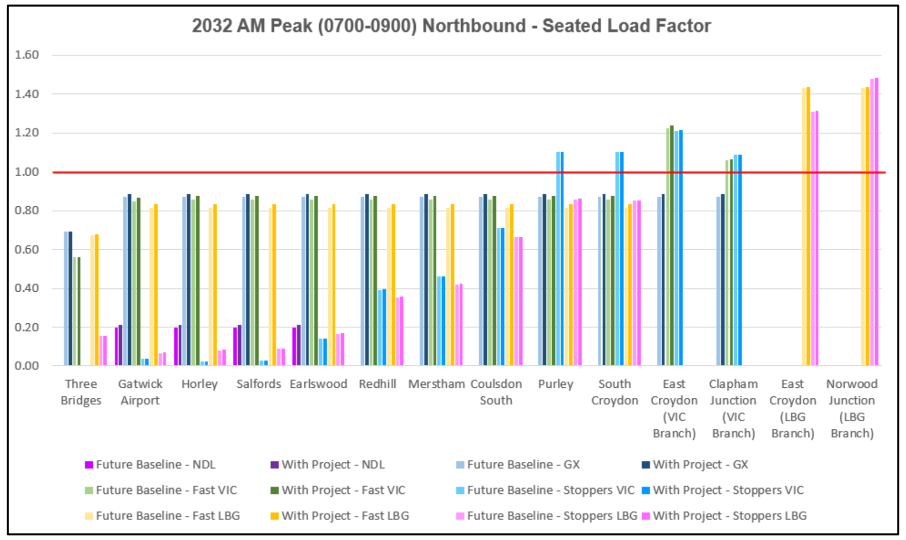
8.3.19 The highest increase in rail passengers is in the southbound direction, but there is still sufficient seating available for all passengers for all assessment years.

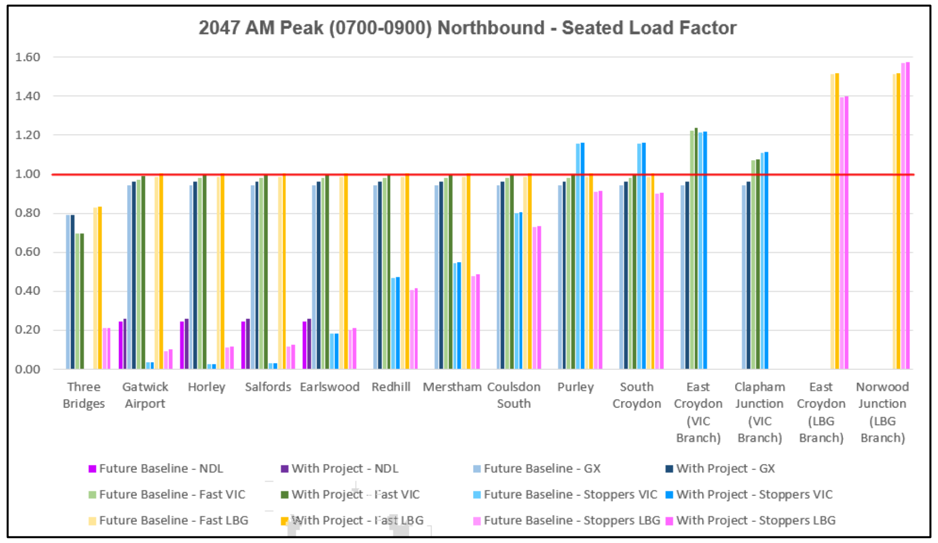
- 2029 - The highest seated load factor is around 0.6, which means that six out of ten seats are occupied and four will be available.
- 2032 and 2047 - The highest seated load factor is up to around 0.7, which means that seven seats out of ten seats are occupied and three will be available.

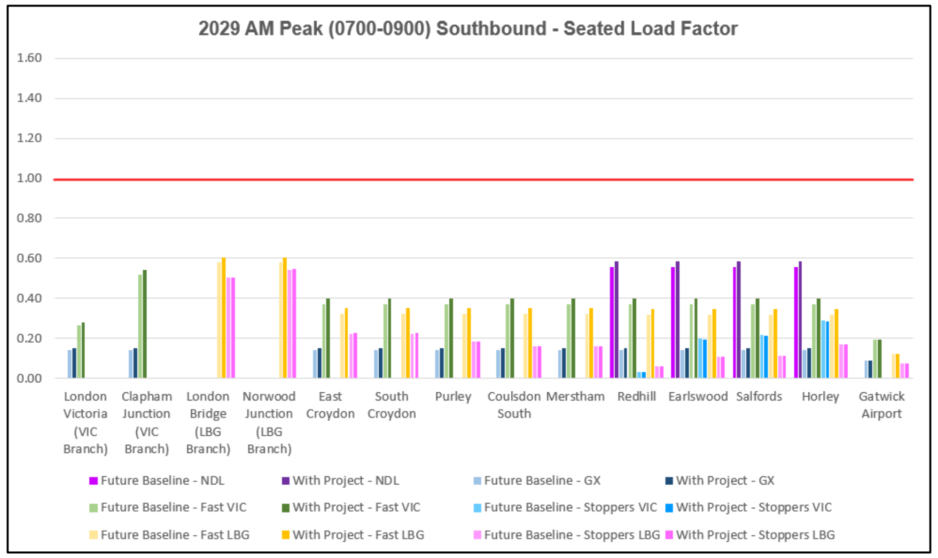
8.3.20 In the northbound direction, between Three Bridges and Coulsdon South, there is seating available for all passengers for all assessment years. However, north of Purley, there are some services where the seating capacity is exceeded owing to background commuter flows into London. For these stations, standing capacity has been assessed in the next section.

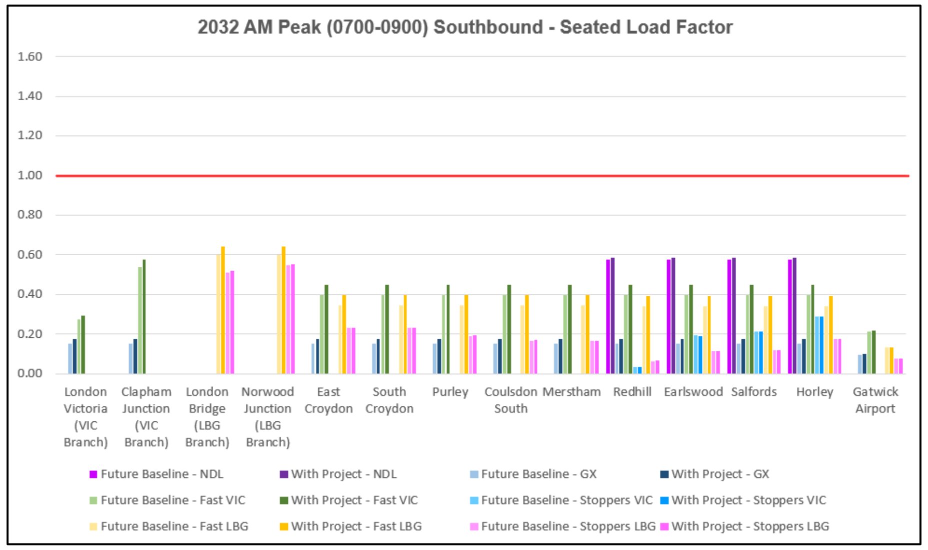
Diagram 8.3.4: Seated Load Factor – AM Peak

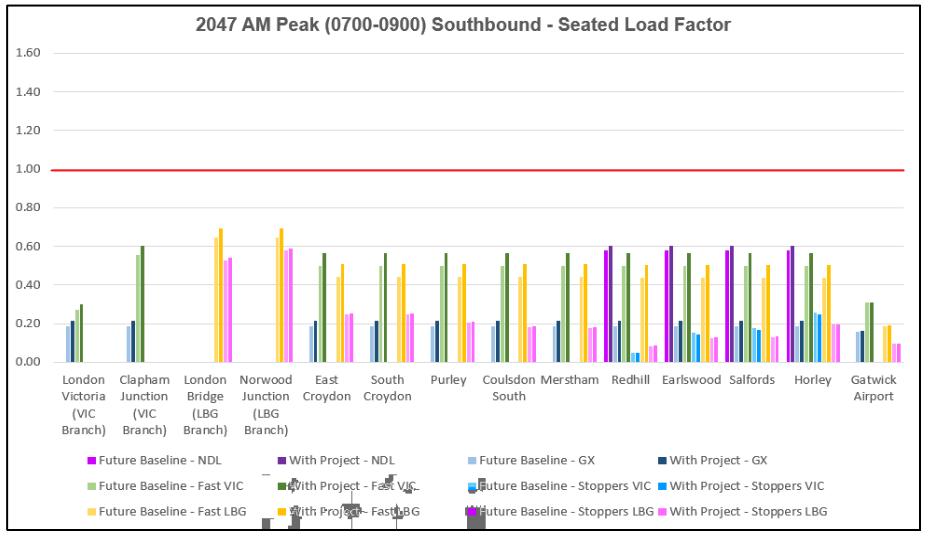












Standing Assessment (AM peak)

8.3.21 This assessment shows the percentage of standing capacity occupied for each service type. The AM peak assessment for the northbound services where the seating capacity is exceeded is shown in Table 8.3.5.

8.3.22 In 2029, 2032 and 2047, the highest percentage of standing capacity occupied is around 35% to 40%, which occurs north of East Croydon on both the London Victoria and London Bridge branches of the network, which is predominantly as a result of background commuter growth (1-2% maximum change in standing capacity occupied as a result of the Project). Whilst services north of East Croydon are therefore busy, the Project will not materially increase congestion, with the highest increase in standing capacity occupied by Gatwick passengers being 0.6% (2029) to 2.2% (2047) north of East Croydon on fast services into London Victoria.

8.3.23 Seating capacity is only exceeded on fast services to Victoria, stopping services to Victoria and fast services to London Bridge. The seating and standing capacities are illustrated in Diagram 8.3.5 below (after Table 8.3.5).

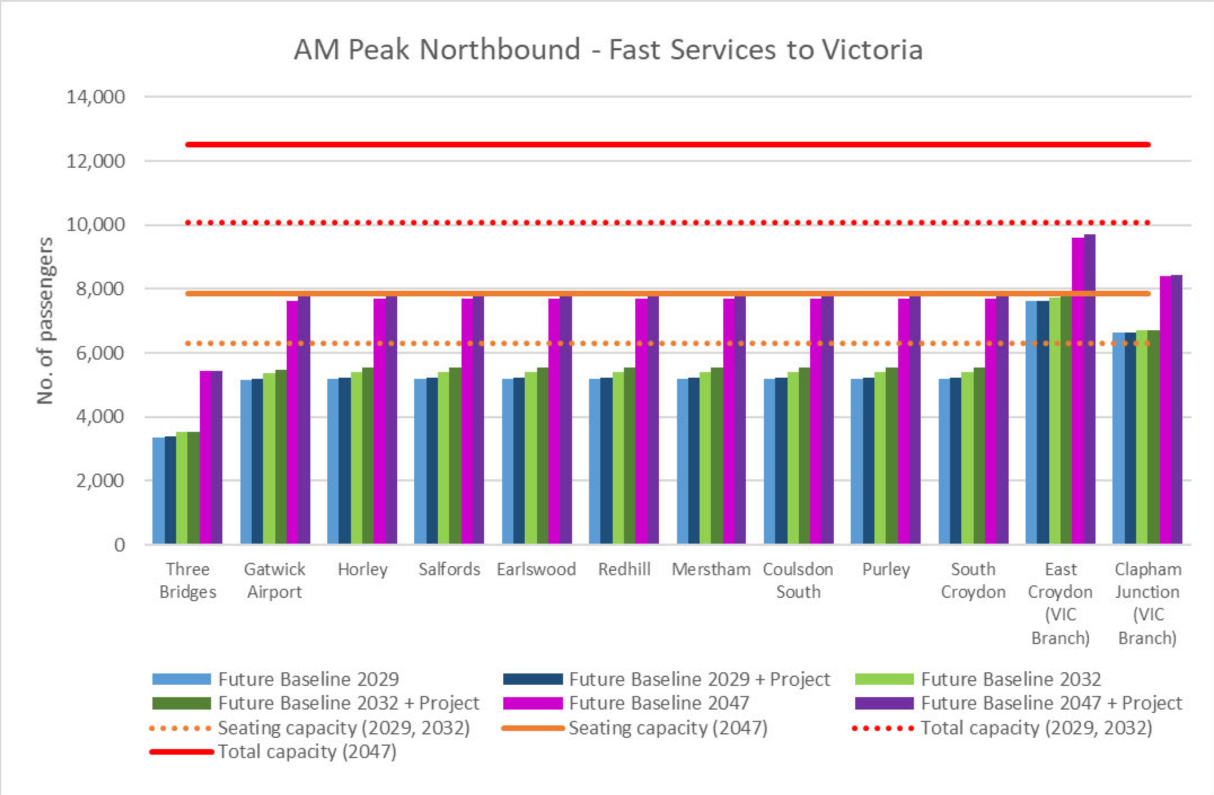
Table 8.3.5: Standing Assessment – Percentage of Standing Capacity Occupied – AM Peak (07:00 – 09:00) Northbound

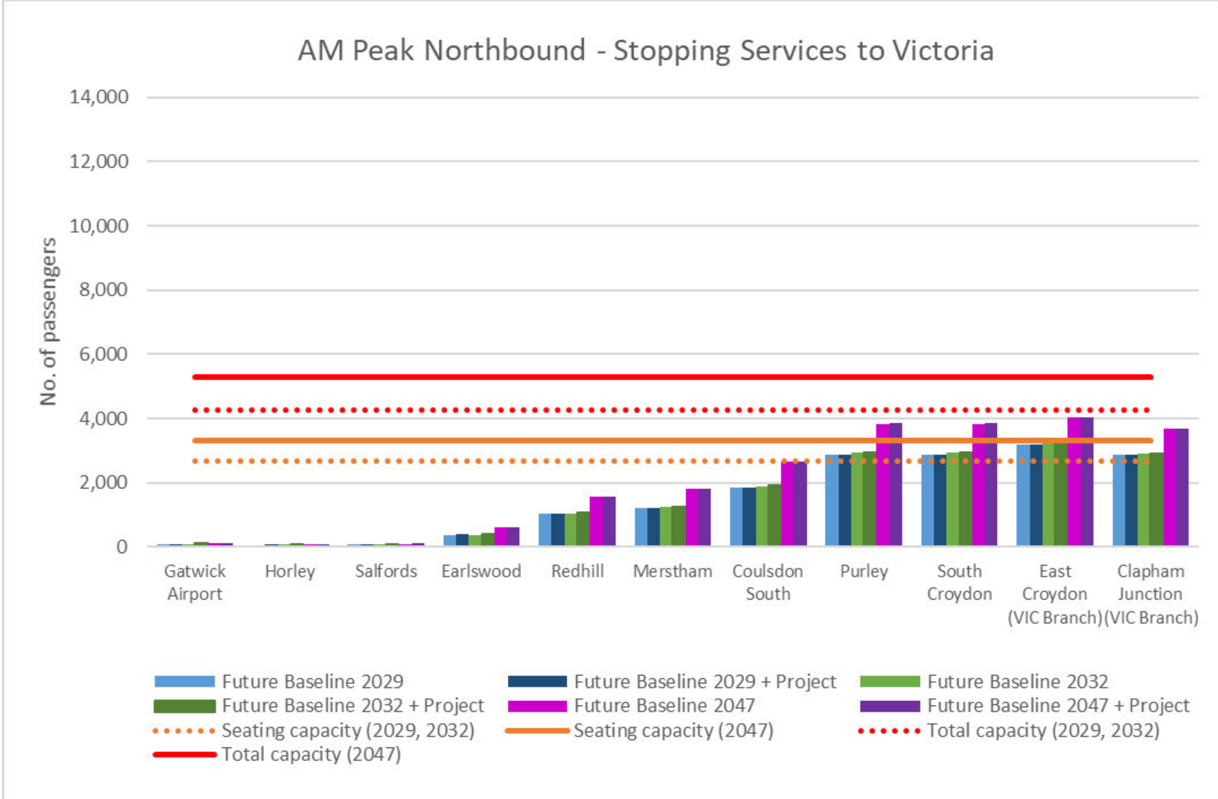
Assessment Year	Groups	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
2029 Future Baseline	NDL	-	-	-	-	-	-
	GX	0%	0%	0%	0%	-	-
	Fast VIC	0%	0%	34%	8%	-	-
	Stoppers VIC	12%	12%	32%	13%	-	-
	Fast LBG	0%	0%	-	-	30%	30%
	Stoppers LBG	0%	0%	-	-	17%	27%
	Total	**1%**	**1%**	**5%**	**1%**	**18%**	**21%**
2029 Project (% change)	NDL	-	-	-	-	-	-
	GX	0% (0%)	0% (0%)	0% (0%)	0% (0%)	-	-
	Fast VIC	0% (0%)	0% (0%)	35% (1%)	8% (0%)	-	-
	Stoppers VIC	12% (0%)	12% (0%)	32% (0%)	13% (0%)	-	-
	Fast LBG	0% (0%)	0% (0%)	-	-	30% (0%)	30% (0%)
	Stoppers LBG	0% (0%)	0% (0%)	-	-	17% (0%)	28% (0%)
	Total	**1% (0%)**	**1% (0%)**	**5% (0%)**	**1% (0%)**	**18% (0%)**	**21% (0%)**
2032 Future Baseline	NDL	-	-	-	-	-	-
	GX	0%	0%	0%	0%	-	-
	Fast VIC	0%	0%	38%	10%	-	-
	Stoppers VIC	17%	17%	35%	15%	-	-
	Fast LBG	0%	0%	-	-	32%	32%
	Stoppers LBG	0%	0%	-	-	19%	29%
	Total	**1%**	**1%**	**6%**	**2%**	**19%**	**22%**
2032 Project (% change)	NDL	-	-	-	-	-	-
	GX	0% (0%)	0% (0%)	0% (0%)	0% (0%)	-	-
	Fast VIC	0% (0%)	0% (0%)	40% (2%)	11% (0%)	-	-
	Stoppers VIC	17% (1%)	17% (1%)	36% (1%)	15% (0%)	-	-
	Fast LBG	0% (0%)	0% (0%)	-	-	32% (1%)	32% (1%)
	Stoppers LBG	0% (0%)	0% (0%)	-	-	19% (0%)	30% (0%)
	Total	**1% (0%)**	**1% (0%)**	**6% (0%)**	**2% (0%)**	**20% (0%)**	**23% (0%)**
2047 Future Baseline	NDL	-	-	-	-	-	-
	GX	0%	0%	0%	0%	-	-
	Fast VIC	0%	0%	37%	12%	-	-
	Stoppers VIC	26%	26%	36%	19%	-	-
	Fast LBG	0%	0%	-	-	39%	39%
	Stoppers LBG	0%	0%	-	-	24%	35%
	Total	**1%**	**1%**	**7%**	**2%**	**23%**	**26%**
2047 Project (% change)	NDL	-	-	-	-	-	-
	GX	0% (0%)	0% (0%)	0% (0%)	0% (0%)	-	-
	Fast VIC	0% (0%)	0% (0%)	39% (2%)	12% (0%)	-	-
	Stoppers VIC	27% (1%)	27% (1%)	37% (1%)	19% (0%)	-	-

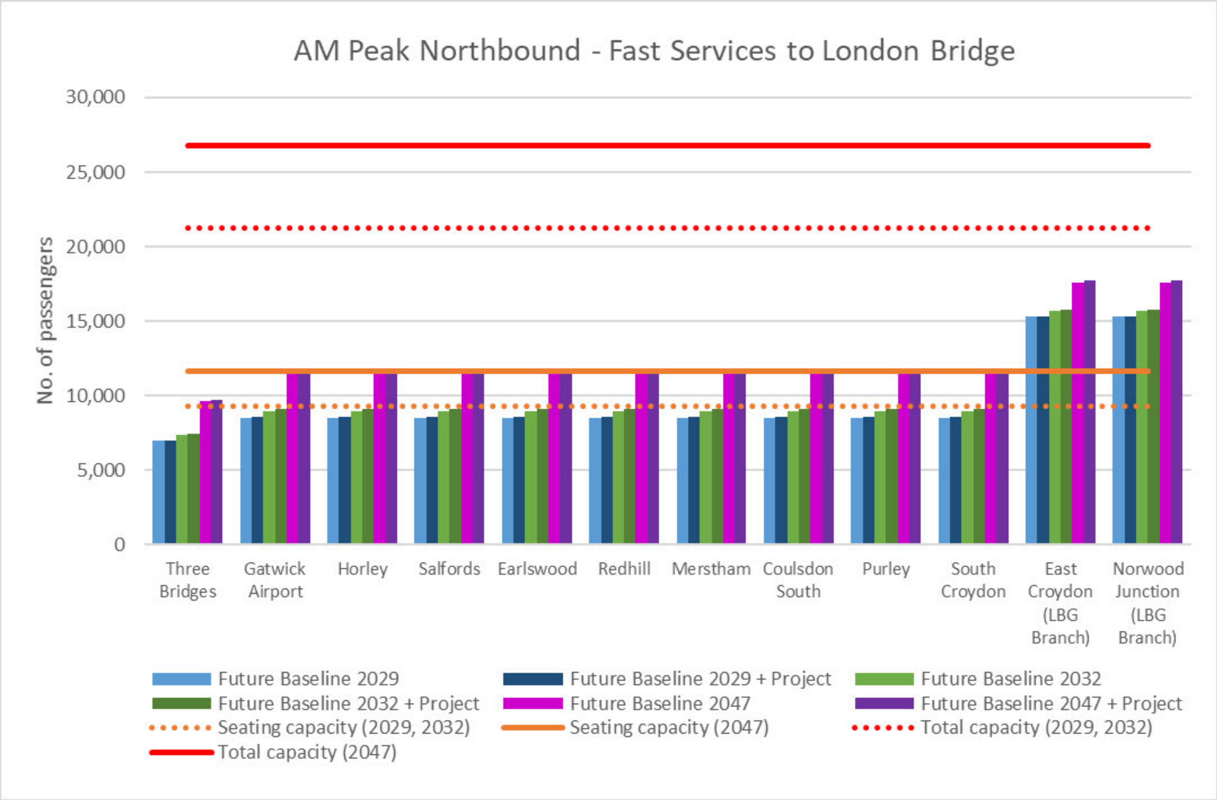
Assessment Year	Groups	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
	Fast LBG	0% (0%)	0% (0%)	-	-	40% (1%)	40% (1%)
	Stoppers LBG	0% (0%)	0% (0%)	-	-	25% (0%)	35% (0%)
	Total	**2% (0%)**	**2% (0%)**	**7% (0%)**	**3% (0%)**	**24% (0%)**	**27% (0%)**

Note: Fast LBG has 0.3% standing from Gatwick to South Croydon in 2047. This is minimal and not included in the above table.

Diagram 8.3.5: Occupied Seating and Standing Capacity – AM Peak (07:00 – 09:00) Northbound







PM Peak

Line Loading Assessment (PM Peak)

8.3.24 Crowding has been assessed based online loading in both directions in the PM peak (1600-1800). Table 8.3.6 shows the northbound line loading, Table 8.3.7 shows the southbound line loading, and the net change in line loading as the result of the Project is set out in Table 8.3.8.

8.3.25 The analysis shows that most passengers are expected on the fast train services from London Victoria and London Bridge and the changes in line loadings by assessment years are summarised below.

8.3.26 In 2029, the Project adds around 200 passengers to rail services in the northbound off-peak direction, which represents a 2% increase in passengers on the fast services, and 4% on Gatwick Express. In the southbound direction, the Project adds up to a total of around 190 passengers, which represents an overall increase of 1%.

8.3.27 In 2032, the Project adds around 840 passengers to rail services in the northbound off-peak direction. This increase in passengers represents a 9 to 10% increase in passengers on the fast services, and 16% on Gatwick Express. In the southbound direction, the Project adds up to a total of around 980 passengers. This represents an overall increase of 6%, with an 8% increase on the fast services from London Victoria.

8.3.28 In 2047, the Project adds around 770 passengers to rail services in the northbound off-peak direction. The increase in passengers represents a 4% to 6% increase in passengers on the fast services, and 17% on Gatwick Express which is dedicated airport service. In the southbound direction, the Project adds up to a total of around 1,030 passengers, which represents an overall increase of 5%.

Table 8.3.6: Passenger line loading on departure – PM Northbound (16:00 – 18:00)

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
2029 PM BAU	NDL	NB	4	1,040	1,276	2,316	0	242	242	242	242	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,952	3,104	8,056	572	579	579	579	579	579	579	579	579	579	579	579	0	0
	Fast VIC	NB	13	7,535	4,494	12,029	2,145	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	4,011	1,807	0	0
	Stoppers VIC	NB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fast LBG	NB	13	8,387	13,655	22,042	1,461	3,149	3,149	3,149	3,149	3,149	3,149	3,149	3,149	3,149	0	0	4,724	4,724
	Stoppers LBG	NB	15	9,466	15,422	24,888	758	1,373	1,045	1,022	1,028	1,051	1,042	1,144	1,418	1,418	0	0	4,222	3,757
	Total		**53**	**31,380**	**37,951**	**69,331**	**4,936**	**9,112**	**8,785**	**8,762**	**8,767**	**8,548**	**8,539**	**8,642**	**8,915**	**8,915**	**4,590**	**2,386**	**8,945**	**8,481**
2029 PM NRP	NDL	NB	4	1,040	1,276	2,316	0	247	247	247	247	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,952	3,104	8,056	576	600	600	600	600	600	600	600	600	600	600	600	0	0
	Fast VIC	NB	13	7,535	4,494	12,029	2,159	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	4,071	1,832	0	0
	Stoppers VIC	NB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fast LBG	NB	13	8,387	13,655	22,042	1,473	3,226	3,226	3,226	3,226	3,226	3,226	3,226	3,226	3,226	0	0	4,798	4,798
	Stoppers LBG	NB	15	9,466	15,422	24,888	764	1,387	1,059	1,036	1,041	1,059	1,050	1,152	1,426	1,426	0	0	4,242	3,780
	Total		**53**	**31,380**	**37,951**	**69,331**	**4,972**	**9,311**	**8,982**	**8,960**	**8,965**	**8,736**	**8,727**	**8,829**	**9,103**	**9,103**	**4,671**	**2,432**	**9,040**	**8,578**
2032 PM BAU	NDL	NB	4	1,040	1,276	2,316	0	261	261	261	261	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,952	3,104	8,056	639	609	609	609	609	609	609	609	609	609	609	609	0	0
	Fast VIC	NB	13	7,535	4,494	12,029	2,349	4,047	4,047	4,047	4,047	4,047	4,047	4,047	4,047	4,047	4,156	1,867	0	0
	Stoppers VIC	NB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fast LBG	NB	13	8,387	13,655	22,042	1,628	3,381	3,381	3,381	3,381	3,381	3,381	3,381	3,381	3,381	0	0	4,911	4,911
	Stoppers LBG	NB	15	9,466	15,422	24,888	811	1,484	1,148	1,125	1,132	1,097	1,090	1,192	1,469	1,469	0	0	4,336	3,883
	Total		**53**	**31,380**	**37,951**	**69,331**	**5,426**	**9,782**	**9,446**	**9,423**	**9,430**	**9,133**	**9,127**	**9,228**	**9,506**	**9,506**	**4,765**	**2,476**	**9,246**	**8,793**
2032 PM NRP	NDL	NB	4	1,040	1,276	2,316	0	278	278	278	278	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,952	3,104	8,056	656	705	705	705	705	705	705	705	705	705	705	705	0	0
	Fast VIC	NB	13	7,535	4,494	12,029	2,405	4,402	4,402	4,402	4,402	4,402	4,402	4,402	4,402	4,402	4,413	1,982	0	0
	Stoppers VIC	NB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fast LBG	NB	13	8,387	13,655	22,042	1,679	3,708	3,708	3,708	3,708	3,708	3,708	3,708	3,708	3,708	0	0	5,217	5,217

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
	Stoppers LBG	NB	15	9,466	15,422	24,888	829	1,520	1,182	1,165	1,171	1,120	1,112	1,214	1,493	1,493	0	0	4,420	3,965
	Total		**53**	**31,380**	**37,951**	**69,331**	**5,570**	**10,613**	**10,275**	**10,258**	**10,264**	**9,935**	**9,928**	**10,029**	**10,308**	**10,308**	**5,118**	**2,687**	**9,638**	**9,182**
2047 PM BAU	NDL	NB	4	1,040	1,276	2,316	0	416	416	416	416	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,952	3,104	8,056	1,167	779	779	779	779	779	779	779	779	779	779	779	0	0
	Fast VIC	NB	13	7,535	4,494	12,029	4,010	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	4,652	2,071	0	0
	Stoppers VIC	NB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fast LBG	NB	13	8,387	13,655	22,042	3,020	5,282	5,282	5,282	5,282	5,282	5,282	5,282	5,282	5,282	0	0	5,724	5,724
	Stoppers LBG	NB	15	9,466	15,422	24,888	1,179	2,362	1,975	1,960	1,980	1,290	1,294	1,395	1,687	1,687	0	0	4,791	4,260
	Total		**53**	**31,380**	**37,951**	**69,331**	**9,376**	**14,501**	**14,114**	**14,099**	**14,119**	**13,014**	**13,018**	**13,119**	**13,411**	**13,411**	**5,431**	**2,850**	**10,515**	**9,984**
2047 PM NRP	NDL	NB	4	1,040	1,276	2,316	0	426	426	426	426	0	0	0	0	0	0	0	0	0
	GX	NB	8	4,952	3,104	8,056	1,191	909	909	909	909	909	909	909	909	909	909	909	0	0
	Fast VIC	NB	13	7,535	4,494	12,029	4,082	5,887	5,887	5,887	5,887	5,887	5,887	5,887	5,887	5,887	4,867	2,161	0	0
	Stoppers VIC	NB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fast LBG	NB	13	8,387	13,655	22,042	3,069	5,611	5,611	5,611	5,611	5,611	5,611	5,611	5,611	5,611	0	0	5,954	5,954
	Stoppers LBG	NB	15	9,466	15,422	24,888	1,205	2,439	2,052	2,039	2,060	1,347	1,351	1,449	1,740	1,740	0	0	4,881	4,349
	Total		**53**	**31,380**	**37,951**	**69,331**	**9,546**	**15,271**	**14,884**	**14,872**	**14,893**	**13,753**	**13,757**	**13,856**	**14,147**	**14,147**	**5,776**	**3,070**	**10,835**	**10,303**

Table 8.3.7: Passenger line loading on departure – PM Southbound (16:00 – 18:00)

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							London Victoria (VIC Branch)	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
2029 PM BAU	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	431	431	431	431	0
	GX	SB	9	5,400	3,384	8,784	3,605	3,605	0	0	3,605	3,605	3,605	3,605	3,605	3,605	3,605	3,605	3,605	1,770
	Fast VIC	SB	10	6,077	3,623	9,700	5,029	6,473	0	0	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,446	2,534

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							London Victoria (VIC Branch)	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
	Stoppers VIC	SB	2	1,074	590	1,664	0	0	0	0	0	0	0	0	0	121	104	99	128	0
	Fast LBG	SB	15	10,072	14,894	24,966	0	0	9,984	10,317	6,557	6,557	6,557	6,557	6,557	6,557	6,557	6,557	6,557	5,435
	Stoppers LBG	SB	10	5,968	9,735	15,704	0	0	6,924	6,508	4,714	4,714	3,396	2,391	2,153	1,102	792	754	767	1,014
	Total		**50**	**29,631**	**33,502**	**63,134**	**8,634**	**10,078**	**16,908**	**16,824**	**19,317**	**19,317**	**17,999**	**16,994**	**16,756**	**16,258**	**15,930**	**15,887**	**15,935**	**10,754**
2029 PM NRP	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	438	438	438	438	0
	GX	SB	9	5,400	3,384	8,784	3,641	3,641	0	0	3,641	3,641	3,641	3,641	3,641	3,641	3,641	3,641	3,641	1,772
	Fast VIC	SB	10	6,077	3,623	9,700	5,050	6,506	0	0	4,513	4,513	4,513	4,513	4,513	4,513	4,513	4,513	4,519	2,535
	Stoppers VIC	SB	2	1,074	590	1,664	0	0	0	0	0	0	0	0	0	122	105	100	129	0
	Fast LBG	SB	15	10,072	14,894	24,966	0	0	10,007	10,342	6,626	6,626	6,626	6,626	6,626	6,626	6,626	6,626	6,626	5,441
	Stoppers LBG	SB	10	5,968	9,735	15,704	0	0	6,934	6,522	4,716	4,716	3,398	2,393	2,156	1,108	797	759	773	1,016
	Total		**50**	**29,631**	**33,502**	**63,134**	**8,691**	**10,148**	**16,940**	**16,863**	**19,497**	**19,497**	**18,179**	**17,174**	**16,937**	**16,449**	**16,121**	**16,078**	**16,127**	**10,764**
2032 PM BAU	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	465	465	465	465	0
	GX	SB	9	5,400	3,384	8,784	3,808	3,808	0	0	3,808	3,808	3,808	3,808	3,808	3,808	3,808	3,808	3,808	1,910
	Fast VIC	SB	10	6,077	3,623	9,700	5,074	6,560	0	0	4,637	4,637	4,637	4,637	4,637	4,637	4,637	4,637	4,642	2,693
	Stoppers VIC	SB	2	1,074	590	1,664	0	0	0	0	0	0	0	0	0	127	110	104	133	0
	Fast LBG	SB	15	10,072	14,894	24,966	0	0	10,123	10,503	6,864	6,864	6,864	6,864	6,864	6,864	6,864	6,864	6,864	5,667
	Stoppers LBG	SB	10	5,968	9,735	15,704	0	0	7,011	6,609	4,887	4,887	3,550	2,501	2,254	1,171	853	812	823	1,079
	Total		**50**	**29,631**	**33,502**	**63,134**	**8,882**	**10,368**	**17,135**	**17,112**	**20,196**	**20,196**	**18,860**	**17,811**	**17,563**	**17,072**	**16,736**	**16,690**	**16,735**	**11,350**
2032 PM NRP	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	495	495	495	495	0
	GX	SB	9	5,400	3,384	8,784	3,975	3,975	0	0	3,975	3,975	3,975	3,975	3,975	3,975	3,975	3,975	3,975	1,919
	Fast VIC	SB	10	6,077	3,623	9,700	5,189	6,712	0	0	4,999	4,999	4,999	4,999	4,999	4,999	4,999	4,999	5,004	2,675
	Stoppers VIC	SB	2	1,074	590	1,664	0	0	0	0	0	0	0	0	0	132	115	109	139	0
	Fast LBG	SB	15	10,072	14,894	24,966	0	0	10,245	10,643	7,234	7,234	7,234	7,234	7,234	7,234	7,234	7,234	7,234	5,714
	Stoppers LBG	SB	10	5,968	9,735	15,704	0	0	7,090	6,693	4,910	4,910	3,574	2,526	2,279	1,213	895	850	862	1,085
	Total		**50**	**29,631**	**33,502**	**63,134**	**9,163**	**10,687**	**17,334**	**17,336**	**21,118**	**21,118**	**19,782**	**18,733**	**18,487**	**18,047**	**17,712**	**17,661**	**17,709**	**11,394**
2047 PM BAU	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	686	686	686	686	0
	GX	SB	9	5,400	3,384	8,784	4,515	4,515	0	0	4,515	4,515	4,515	4,515	4,515	4,515	4,515	4,515	4,515	2,603
	Fast VIC	SB	13	7,646	4,558	12,204	6,199	7,945	0	0	6,864	6,864	6,864	6,864	6,864	6,864	6,864	6,864	6,869	4,743

Scenario	Groups	Direction	No of Services (2hr)	Seating Capacity	Standing Capacity	Total Capacity	Load on Departure (2hr)													
							London Victoria (VIC Branch)	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
	Stoppers VIC	SB	2	1,074	590	1,664	0	0	0	0	0	0	0	0	0	176	163	155	185	0
	Fast LBG	SB	15	10,448	15,118	25,567	0	0	10,535	11,325	8,635	8,635	8,635	8,635	8,635	8,635	8,635	8,635	8,635	7,516
	Stoppers LBG	SB	10	5,968	9,735	15,704	0	0	7,399	6,953	5,204	5,204	4,032	2,958	2,677	1,571	1,234	1,175	1,182	1,338
	Total		**53**	**31,576**	**34,662**	**66,238**	**10,714**	**12,459**	**17,934**	**18,278**	**25,218**	**25,218**	**24,047**	**22,972**	**22,691**	**22,448**	**22,098**	**22,031**	**22,073**	**16,199**
2047 PM NRP	NDL	SB	4	1,040	1,276	2,316	0	0	0	0	0	0	0	0	0	723	723	723	723	0
	GX	SB	9	5,400	3,384	8,784	4,639	4,639	0	0	4,639	4,639	4,639	4,639	4,639	4,639	4,639	4,639	4,639	2,598
	Fast VIC	SB	13	7,646	4,558	12,204	6,306	8,125	0	0	7,229	7,229	7,229	7,229	7,229	7,229	7,229	7,229	7,235	4,699
	Stoppers VIC	SB	2	1,074	590	1,664	0	0	0	0	0	0	0	0	0	183	170	161	193	0
	Fast LBG	SB	15	10,448	15,118	25,567	0	0	10,685	11,497	9,070	9,070	9,070	9,070	9,070	9,070	9,070	9,070	9,070	7,568
	Stoppers LBG	SB	10	5,968	9,735	15,704	0	0	7,489	7,045	5,235	5,235	4,066	2,994	2,714	1,633	1,295	1,234	1,241	1,356
	Total		**53**	**31,576**	**34,662**	**66,238**	**10,945**	**12,764**	**18,174**	**18,542**	**26,174**	**26,174**	**25,004**	**23,932**	**23,652**	**23,477**	**23,126**	**23,057**	**23,100**	**16,221**

Table 8.3.8: Change in line loading – PM peak (16:00 – 18:00)

Year of Assessment	Groups	Direction	Change in Line Loading (% change)													
			Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
2029	NDL	NB	-	5 (2%)	5 (2%)	5 (2%)	5 (2%)	-	-	-	-	-	-	-	-	-
	GX	NB	4 (1%)	21 (4%)	21 (4%)	21 (4%)	21 (4%)	21 (4%)	21 (4%)	21 (4%)	21 (4%)	21 (4%)	21 (4%)	21 (4%)	-	-
	Fast VIC	NB	15 (1%)	82 (2%)	82 (2%)	82 (2%)	82 (2%)	82 (2%)	82 (2%)	82 (2%)	82 (2%)	82 (2%)	61 (2%)	26 (1%)	-	-
	Stoppers VIC	NB	-	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-
	Fast LBG	NB	11 (1%)	77 (2%)	77 (2%)	77 (2%)	77 (2%)	77 (2%)	77 (2%)	77 (2%)	77 (2%)	77 (2%)	-	-	74 (2%)	74 (2%)
	Stoppers LBG	NB	6 (1%)	14 (1%)	13 (1%)	13 (1%)	13 (1%)	8 (1%)	8 (1%)	8 (1%)	8 (1%)	8 (1%)	-	-	21 (0%)	23 (1%)
	Total		**36 (1%)**	**199 (2%)**	**198 (2%)**	**198 (2%)**	**198 (2%)**	**188 (2%)**	**188 (2%)**	**188 (2%)**	**188 (2%)**	**188 (2%)**	**81 (2%)**	**46 (2%)**	**95 (1%)**	**97 (1%)**
2032	NDL	NB	-	16 (6%)	16 (6%)	16 (6%)	16 (6%)	-	-	-	-	-	-	-	-	-
	GX	NB	17 (3%)	96 (16%)	96 (16%)	96 (16%)	96 (16%)	96 (16%)	96 (16%)	96 (16%)	96 (16%)	96 (16%)	96 (16%)	96 (16%)	-	-
	Fast VIC	NB	57 (2%)	356 (9%)	356 (9%)	356 (9%)	356 (9%)	356 (9%)	356 (9%)	356 (9%)	356 (9%)	356 (9%)	257 (6%)	115 (6%)	-	-

Year of Assessment	Groups	Direction	Change in Line Loading (% change)													
			Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
	Stoppers VIC	NB	-	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-
	Fast LBG	NB	51 (3%)	327 (10%)	327 (10%)	327 (10%)	327 (10%)	327 (10%)	327 (10%)	327 (10%)	327 (10%)	327 (10%)	-	-	307 (6%)	307 (6%)
	Stoppers LBG	NB	19 (2%)	36 (2%)	35 (3%)	40 (4%)	39 (3%)	23 (2%)	22 (2%)	22 (2%)	24 (2%)	24 (2%)	-	-	85 (2%)	82 (2%)
	Total		**144 (3%)**	**831 (8%)**	**830 (9%)**	**835 (9%)**	**834 (9%)**	**802 (9%)**	**801 (9%)**	**801 (9%)**	**802 (8%)**	**802 (8%)**	**353 (7%)**	**211 (9%)**	**392 (4%)**	**389 (4%)**
2047	NDL	NB	-	11 (3%)	11 (3%)	11 (3%)	11 (3%)	-	-	-	-	-	-	-	-	-
	GX	NB	23 (2%)	130 (17%)	130 (17%)	130 (17%)	130 (17%)	130 (17%)	130 (17%)	130 (17%)	130 (17%)	130 (17%)	130 (17%)	130 (17%)	-	-
	Fast VIC	NB	72 (2%)	224 (4%)	224 (4%)	224 (4%)	224 (4%)	224 (4%)	224 (4%)	224 (4%)	224 (4%)	224 (4%)	216 (5%)	90 (4%)	-	-
	Stoppers VIC	NB	-	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-
	Fast LBG	NB	49 (2%)	329 (6%)	329 (6%)	329 (6%)	329 (6%)	329 (6%)	329 (6%)	329 (6%)	329 (6%)	329 (6%)	-	-	230 (4%)	230 (4%)
	Stoppers LBG	NB	26 (2%)	77 (3%)	77 (4%)	79 (4%)	80 (4%)	57 (4%)	56 (4%)	54 (4%)	53 (3%)	53 (3%)	-	-	90 (2%)	89 (2%)
	Total		170 (2%)	770 (5%)	770 (5%)	773 (5%)	774 (5%)	740 (6%)	739 (6%)	737 (6%)	736 (5%)	736 (5%)	345 (6%)	220 (8%)	320 (3%)	319 (3%)

Year of Assessment	Groups	Direction	London Victoria (VIC Branch)	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
2029	NDL	SB	-	-	-	-	-	-	-	-	-	6 (1%)	6 (1%)	6 (1%)	6 (1%)	-
	GX	SB	36 (1%)	36 (1%)	-	-	36 (1%)	36 (1%)	36 (1%)	36 (1%)	36 (1%)	36 (1%)	36 (1%)	36 (1%)	36 (1%)	2 (0%)
	Fast VIC	SB	21 (0%)	33 (1%)	-	-	73 (2%)	73 (2%)	73 (2%)	73 (2%)	73 (2%)	73 (2%)	73 (2%)	73 (2%)	73 (2%)	1 (0%)
	Stoppers VIC	SB	-	-	-	-	-	-	-	-	-	1 (1%)	1 (1%)	1 (1%)	1 (1%)	-
	Fast LBG	SB	-	-	22 (0%)	25 (0%)	69 (1%)	69 (1%)	69 (1%)	69 (1%)	69 (1%)	69 (1%)	69 (1%)	69 (1%)	69 (1%)	6 (0%)
	Stoppers LBG	SB	-	-	10 (0%)	14 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)	3 (0%)	6 (1%)	5 (1%)	5 (1%)	6 (1%)	2 (0%)
	Total		**57 (1%)**	**69 (1%)**	**32 (0%)**	**39 (0%)**	**180 (1%)**	**180 (1%)**	**180 (1%)**	**181 (1%)**	**181 (1%)**	**191 (1%)**	**191 (1%)**	**191 (1%)**	**192 (1%)**	**10 (0%)**
2032	NDL	SB	-	-	-	-	-	-	-	-	-	30 (7%)	30 (7%)	30 (7%)	30 (7%)	-
	GX	SB	167 (4%)	167 (4%)	-	-	167 (4%)	167 (4%)	167 (4%)	167 (4%)	167 (4%)	167 (4%)	167 (4%)	167 (4%)	167 (4%)	9 (0%)
	Fast VIC	SB	115 (2%)	152 (2%)	-	-	361 (8%)	361 (8%)	361 (8%)	361 (8%)	361 (8%)	361 (8%)	361 (8%)	361 (8%)	362 (8%)	-18 (-1%)
	Stoppers VIC	SB	-	-	-	-	-	-	-	-	-	5 (4%)	6 (5%)	5 (5%)	6 (4%)	-
	Fast LBG	SB	-	-	121 (1%)	140 (1%)	370 (5%)	370 (5%)	370 (5%)	370 (5%)	370 (5%)	370 (5%)	370 (5%)	370 (5%)	370 (5%)	47 (1%)
	Stoppers LBG	SB	-	-	78 (1%)	84 (1%)	23 (0%)	23 (0%)	24 (1%)	24 (1%)	26 (1%)	42 (4%)	42 (5%)	38 (5%)	39 (5%)	5 (0%)
	Total		**282 (3%)**	**319 (3%)**	**200 (1%)**	**224 (1%)**	**921 (5%)**	**921 (5%)**	**922 (5%)**	**922 (5%)**	**923 (5%)**	**976 (6%)**	**976 (6%)**	**971 (6%)**	**974 (6%)**	**44 (0%)**
2047	NDL	SB	-	-	-	-	-	-	-	-	-	37 (5%)	37 (5%)	37 (5%)	37 (5%)	-
	GX	SB	124 (3%)	124 (3%)	-	-	124 (3%)	124 (3%)	124 (3%)	124 (3%)	124 (3%)	124 (3%)	124 (3%)	124 (3%)	124 (3%)	-4 (0%)
	Fast VIC	SB	107 (2%)	181 (2%)	-	-	365 (5%)	365 (5%)	365 (5%)	365 (5%)	365 (5%)	365 (5%)	365 (5%)	365 (5%)	365 (5%)	-45 (-1%)
	Stoppers VIC	SB	-	-	-	-	-	-	-	-	-	7 (4%)	7 (4%)	7 (4%)	7 (4%)	-
	Fast LBG	SB	-	-	150 (1%)	172 (2%)	435 (5%)	435 (5%)	435 (5%)	435 (5%)	435 (5%)	435 (5%)	435 (5%)	435 (5%)	435 (5%)	52 (1%)

Year of Assessment	Groups	Direction	Change in Line Loading (% change)													
			Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC Branch)	Clapham Junction (VIC Branch)	East Croydon (LBG Branch)	Norwood Junction (LBG Branch)
	Stoppers LBG	SB	-	-	90 (1%)	93 (1%)	32 (1%)	32 (1%)	34 (1%)	36 (1%)	37 (1%)	62 (4%)	61 (5%)	59 (5%)	59 (5%)	19 (1%)
	Total		**231 (2%)**	**305 (2%)**	**240 (1%)**	**264 (1%)**	**956 (4%)**	**956 (4%)**	**958 (4%)**	**960 (4%)**	**961 (4%)**	**1029 (5%)**	**1028 (5%)**	**1026 (5%)**	**1027 (5%)**	**22 (0%)**

Seated Loading Factor Assessment (PM peak)

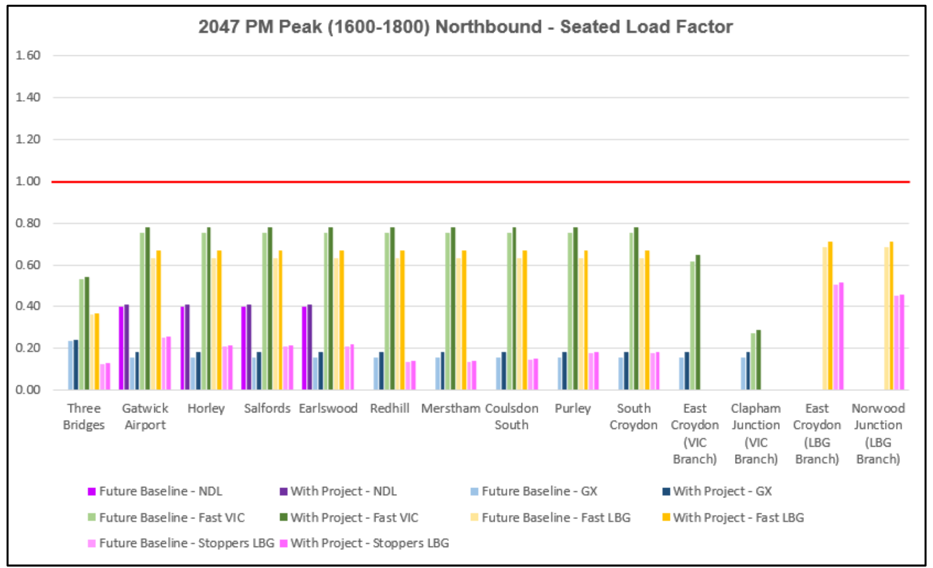
8.3.29 Seated load factor assessment for the PM peak has been undertaken for both the northbound and southbound direction services, as shown in Diagram 8.3.4.

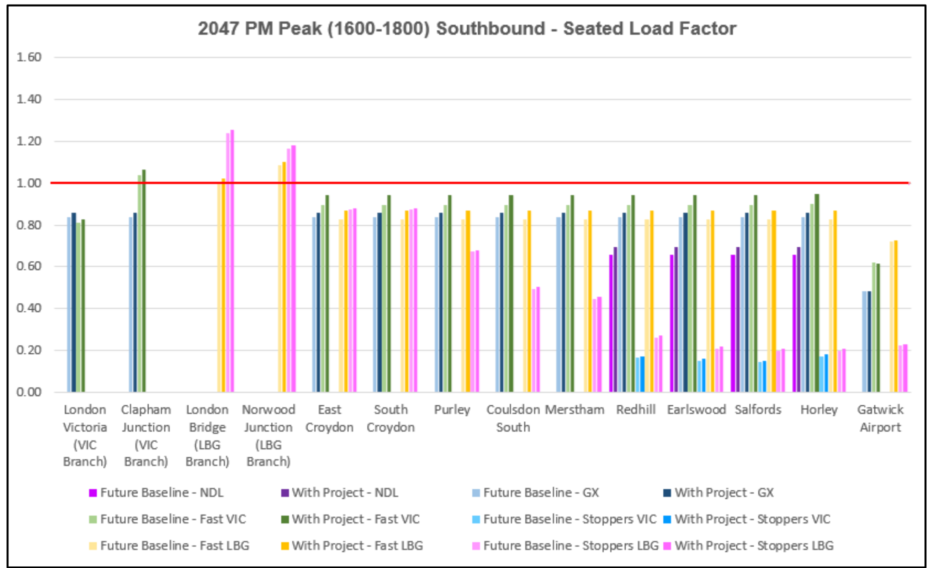
8.3.30 There is sufficient seating available for passengers for the assessment years in the northbound off-peak direction:

- 2029 and 2032 - The highest seated load factor is around 0.6, which means that six out of ten seats are occupied and four will be available .
- 2047 - The highest seated load factor is up to around 0.8, which means that eight out of ten seats are occupied and two will be available .

8.3.31 In the southbound direction, trains departing London in the PM peak are mostly full beyond their seated capacity. However, on arrival at Clapham Junction and East Croydon, sufficient passengers alight such that seats become available indicating spare capacity. For services into stations where seating capacity is exceeded, standing capacity has been assessed in the next section.

Diagram 8.3.6: Seated Load Factor – PM Peak





Standing Assessment (PM peak)

8.3.32 This assessment shows the percentage of standing capacity occupied for each service type. The PM peak assessment for the southbound services where the seating capacity is exceeded is shown in Table 8.3.9.

8.3.33 In 2029, 2032 and 2047, the highest percentage of standing capacity occupied is 12% to 18%, which indicates that rail services are busy out of London but suggests that there is some spare standing capacity available. The Project will not significantly materially increase congestion, with the highest increase in standing capacity occupied by Gatwick passengers being 1% (2029) to 4% (2047) on fast services departing London Victoria.

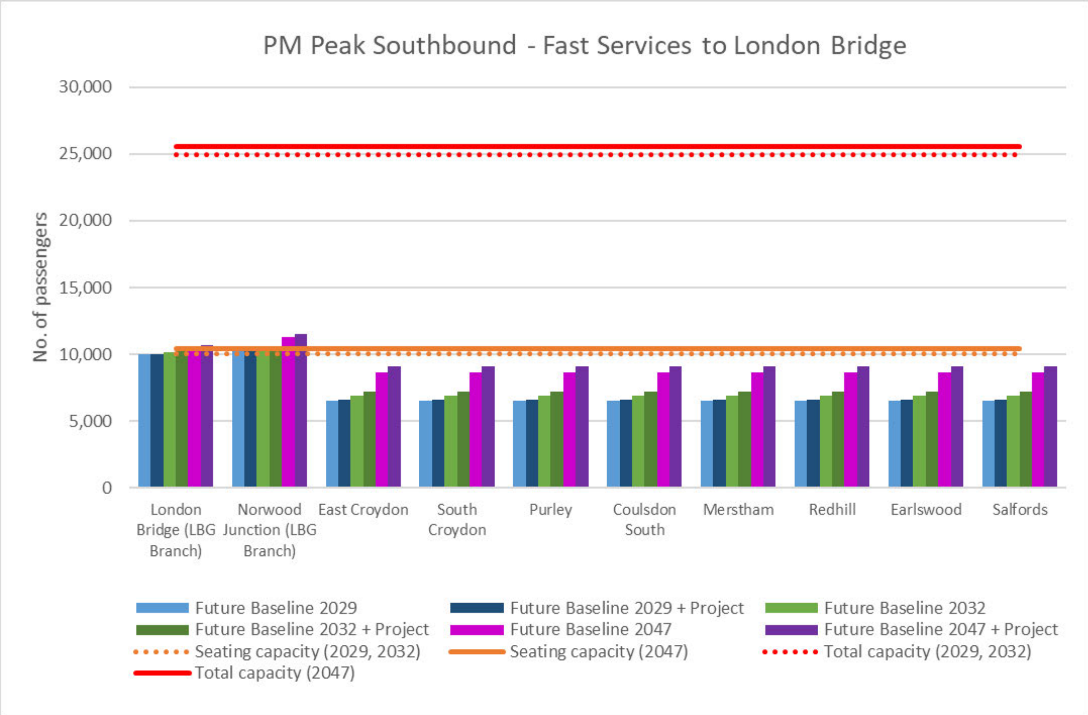
8.3.34 Seating capacity is only exceeded on fast services from Victoria, stopping services and fast services from London Bridge. The seating and standing capacities are illustrated in Diagram 8.3.7 below (after Table 8.3.9).

Table 8.3.9: Standing Assessment – Percentage of Standing Capacity Occupied – PM Peak (16:00 – 18:00) Southbound

Assessment Year	Groups	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)
2029 Future Baseline	NDL	-	-	-
	GX	0%	-	-
	Fast VIC	11%	-	-
	Stoppers VIC	-	-	-
	Fast LBG	-	0%	2%
	Stoppers LBG	-	10%	6%
	Total	**1%**	**3%**	**2%**
2029 Project (% change)	NDL	-	-	-
	GX	0% (0%)	-	-
	Fast VIC	12% (1%)	-	-
	Stoppers VIC	-	-	-
	Fast LBG	-	0% (0%)	2% (0%)
	Stoppers LBG	-	10% (0%)	6% (0%)
	Total	**1% (0%)**	**3% (0%)**	**2% (0%)**
2032 Future Baseline	NDL	-	-	-
	GX	0%	-	-
	Fast VIC	13%	-	-
	Stoppers VIC	-	-	-
	Fast LBG	-	0%	3%
	Stoppers LBG	-	11%	7%
	Total	**1%**	**3%**	**3%**
2032 Project (% change)	NDL	-	-	-
	GX	0% (0%)	-	-
	Fast VIC	18% (4%)	-	-
	Stoppers VIC	-	-	-
	Fast LBG	-	1% (1%)	4% (1%)
	Stoppers LBG	-	12% (1%)	7% (1%)
	Total	**2% (0%)**	**4% (1%)**	**4% (1%)**
2047 Future Baseline	NDL	-	-	-
	GX	0%	-	-
	Fast VIC	7%	-	-
	Stoppers VIC	-	-	-
	Fast LBG	-	1%	6%
	Stoppers LBG	-	15%	10%
	Total	**1%**	**4%**	**5%**
	NDL	-	-	-

Assessment Year	Groups	Clapham Junction (VIC Branch)	London Bridge (LBG Branch)	Norwood Junction (LBG Branch)
2047 Project (% change)	GX	0% (0%)	-	-
	Fast VIC	11% (4%)	-	-
	Stoppers VIC	0% (0%)	-	-
	Fast LBG	-	2% (1%)	7% (1%)
	Stoppers LBG	-	16% (1%)	11% (1%)
	Total	**1% (1%)**	**5% (1%)**	**6% (1%)**

Diagram 8.3.7: Occupied Seating and Standing Capacity – PM Peak (16:00 – 18:00) Southbound



Summary of Assessment

8.3.35 The Project will increase the number of rail passengers but based on the line loading, seated loading factor and standing capacity assessments, no significant crowding on rail services is expected as a result of the Northern Runway.

8.3.36 The highest increases in line loading as a result of the Project are in the contra-peak direction services during the AM and PM peak periods, where there is sufficient number of spare seats to accommodate the increase in the number of passengers.

8.3.37 The network peak directions are northbound in the AM peak and southbound in the PM peak. In the AM peak, there will be passengers standing on some services north of Purley. The highest percentage of standing capacity occupied with Project on train services is around 40%, indicating busy trains into London. However, the Project only accounts for a very small change in standing (around 2%), with the remainder being as a result of high commuter flows into London.

8.3.38 In the PM peak, there will be passengers standing on some services southbound out of London, with seats only becoming available at Clapham Junction and East Croydon. The highest percentage of standing capacity occupied on a service is 18%, with the Project accounting for 4% change in standing.

8.3.39 Whilst the Project will add extra passengers to peak direction services that have standing, the greater increases in demand as a result of the Project, are contra peak.

8.3.40 It should be noted that the Project does not assess committed improvements proposed by the rail industry as mitigation of its effects, instead these improvements are applied in the future baseline, against which the Project is being assessed. Moreover, the last Control period considered for improvements is CP7 (which is to 2029) so the modelling currently assumes no further improvements between 2029 and 2047, which is considered a conservative assumption.

8.3.41 Overall, the Project is not expected to significantly increase rail crowding, and the growth in passengers makes better use of contra-peak rail capacity and improves operational value for money.

8.4 Potential Mitigation

8.4.1 The rail crowding assessment indicates that no additional mitigation is required because of the Project, other than that already proposed by the rail industry.

9 Assessment of Transport Effects: Bus and Coach

9.1 Introduction

9.1.1 Prior to the Covid-19 pandemic, Gatwick was served by frequent bus and coach services at both North and South Terminals. These are all expected to resume as demand returns to the airport, and the following sections describe the full services that were previously operating. The operators included Metrobus, National Express, Megabus, Oxford Bus Company, and Easybus. On average there were approximately 450 to 500 daily arrivals and departures respectively, offering services to destinations throughout the UK.

9.1.2 Bus and coach mode share for passengers was around 6% pre-pandemic, whereas these modes accounted for 16% of staff travel.

Coach services

9.1.3 Prior to the Covid-19 pandemic, the airport has been served by a range of coach services, which both complement and compete with the rail network. These coach services are expected to resume as demand returns to the airport, with the following sections describing the full services that were previously operating. Many operators have invested in high-quality vehicles, customer service improvements and effective marketing which have contributed to more attractive coach services.

9.1.4 National Express provide a number of direct services to and from Gatwick and the most popular routes are summarised in Table 9.1.1.

Table 9.1.1: Popular National Express coach services to Gatwick

Routes	Service	Daily Services	Fastest Journey Time
London (Victoria, Vauxhall, Belmont, Banstead) to Gatwick	A3	37	30 mins
Heathrow to Gatwick	200, 201, 210, 230, 707, 727, 747	81	1 hr 5 mins
Bristol to Gatwick	200, 201	19	3 hrs 25 mins
Southampton to Gatwick	206	19	2 hrs 30 mins
Bournemouth to Gatwick	206	24	3 hrs 20 mins
Birmingham to Gatwick	210	23	4 hrs
Cardiff to Gatwick	201	22	4 hrs 35 mins
Brighton to Gatwick	025, 026, 028, 029, 201, 206, 747	23	45 mins
Newport to Gatwick	201	20	4 hrs 10 mins
Swansea to Gatwick	201	15	5 hrs 40 mins

9.1.5 Other coach services include:

- Megabus routes serve Gatwick Airport from London (EB1) and Bristol (M25).
- Oxford Bus Company operate the Airline service between Gatwick and Oxford.
- easy Bus provides a non-stop shuttle service between Gatwick and London (Fulham Road and Park Royal).

Local bus services

9.1.6 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.

9.1.7 Metrobus provides three 'Fastway' bus routes, calling at stops with 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 – Horley
- 100: Maidenbower – Three Bridges – Crawley – Gatwick Airport – Horley – Redhill

9.1.8 Metrobus also provides conventional routes:

- 3 Crawley - Three Bridges - Gatwick Airport
- 4 and 5: County Oak – Crawley – Wakeham Green
- 22: Holbury St Mary – Docking – Crawley
- 200: Horsham – Gatwick Airport
- 400: East Grinstead – Gatwick Airport – Redhill – Caterham
- 420/460: Sutton/Epsom – Redhill - Crawley

9.1.9 There is also the Southdown PSV service operating one route: 422 Reigate – Gatwick Airport – Crawley.

9.1.10 Particular emphasis has been placed on improving early morning services to the airport every day of the week in order to enable shift work staff to travel by bus.

9.1.11 Gatwick has worked with Metrobus to develop an extensive, 24 hour, local bus network.

9.1.12 Diagram 9.1.1 shows the Metrobus services frequencies and Diagram 9.1.2 provides a bandwidth plot of frequencies within the vicinity of Gatwick and which have been used to inform the modelling. Diagram 9.1.1 shows that South Terminal generally has more frequent Metrobuses, with up to 30 buses in the peak hour. There is good local bus coverage in the local areas of Crawley and Horley, and north towards Redhill, which is reflected in the staff mode shares in these areas.

9.1.13 All buses are low floor, wheelchair accessible vehicles. Metrobus has introduced a range of ticketing options through the use of smart ticketing in the form of a smart Key Card. 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, it has been very successful.

9.1.14 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.

Diagram 9.1.1: Metrobus services frequencies

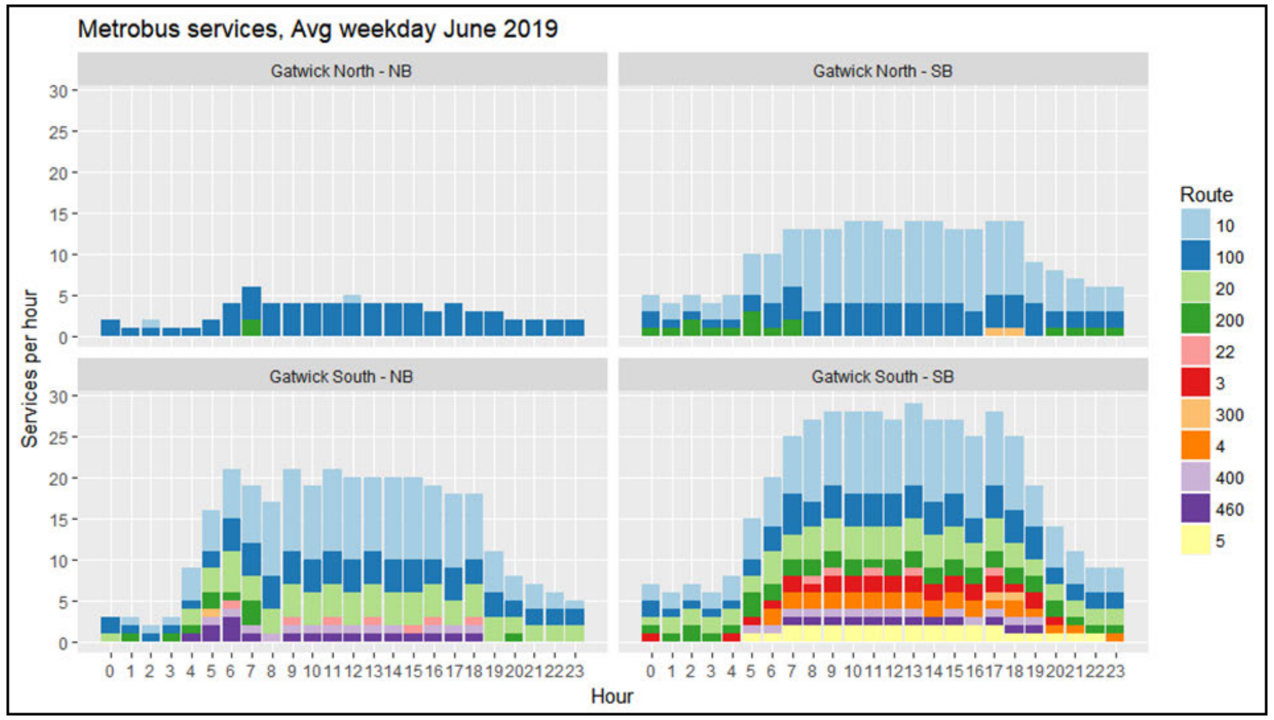


Diagram 9.1.2: Bandwidth plot of Metrobus frequencies

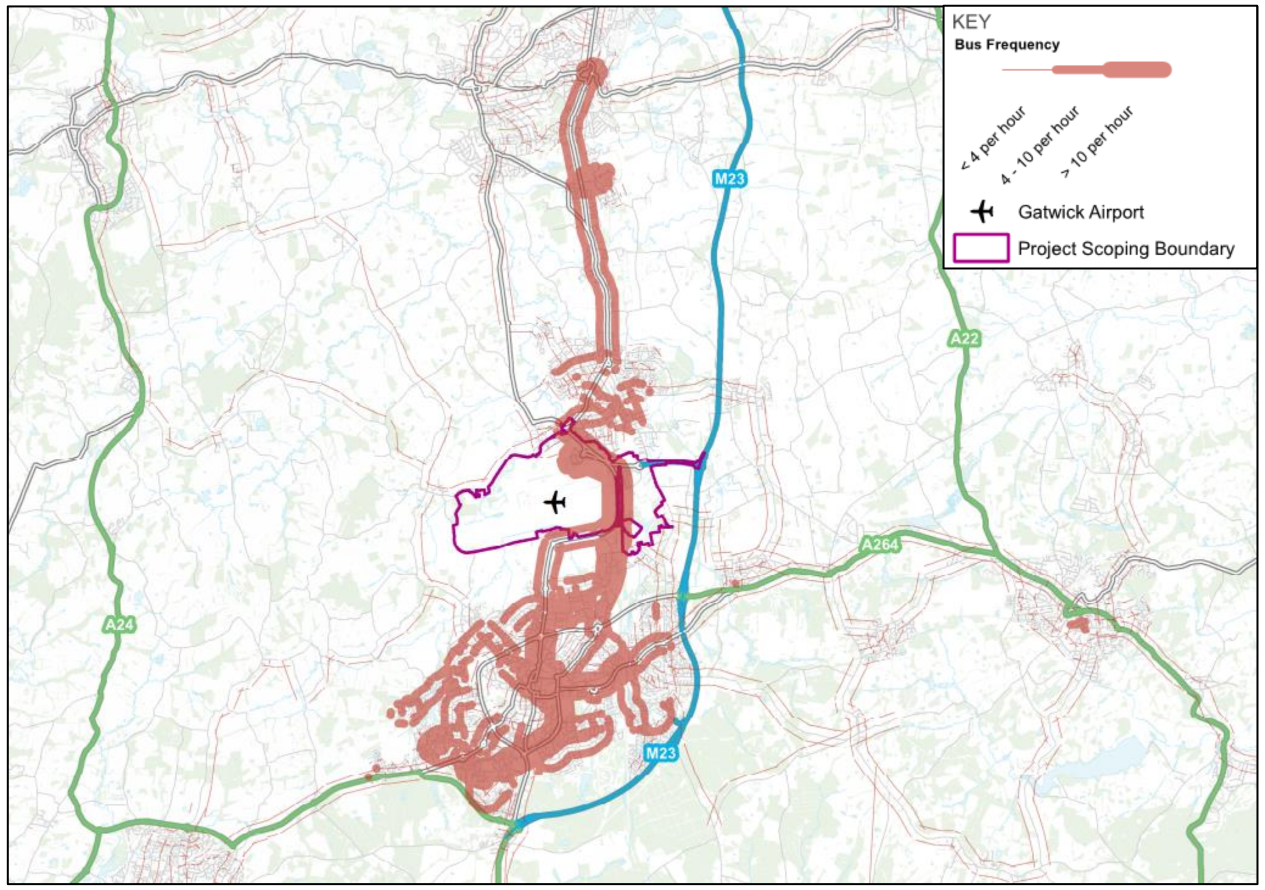
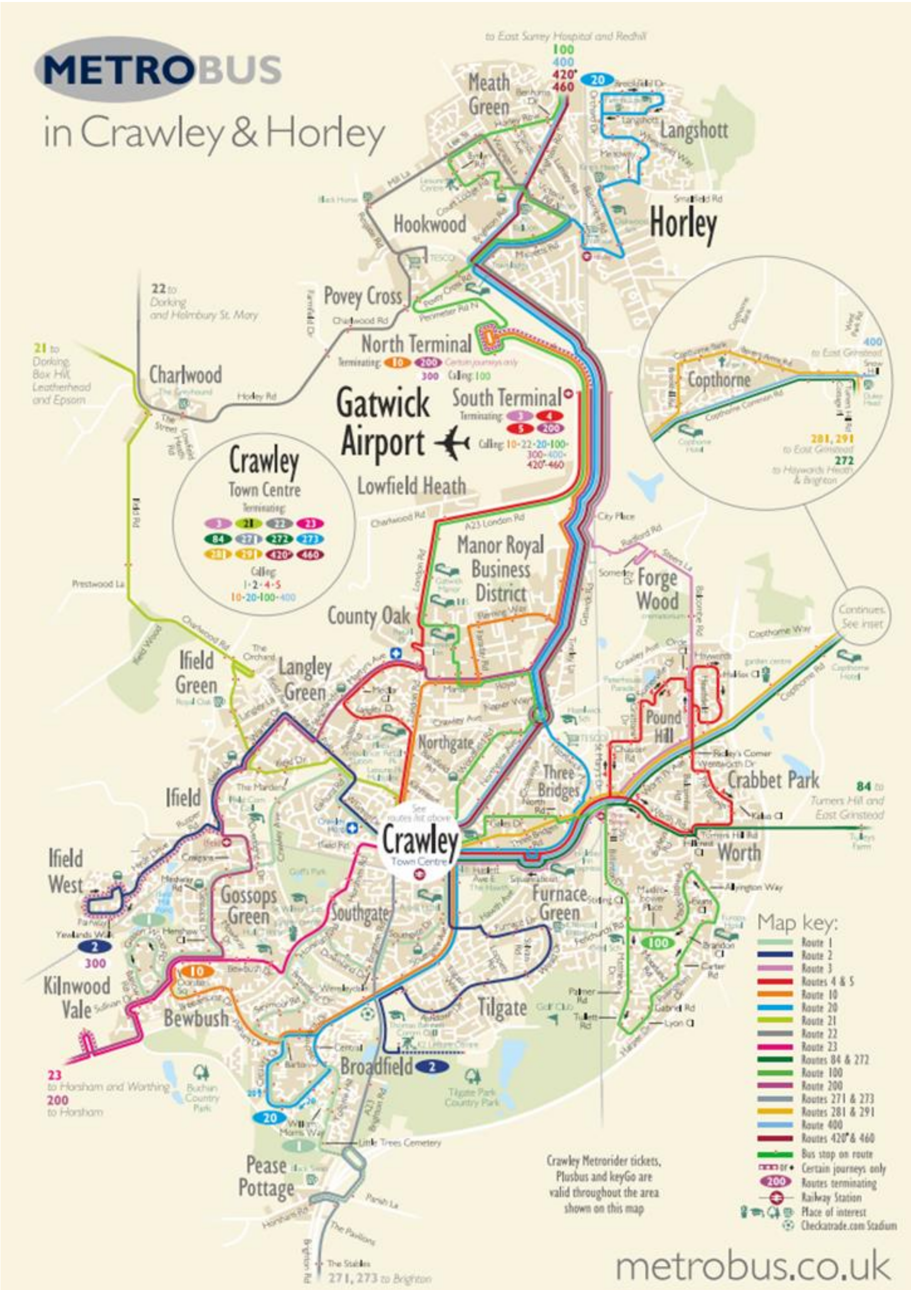


Diagram 9.1.3: Metrobus Local Service in Crawley and Horley (Summer 2019)



9.1.15 Gatwick has recently improved the customer experience for bus and coach services at the airport through provision of a new waiting area at the South Terminal for passengers. Gatwick is also developing a proposal to increase the capacity of bus and coach facilities on Furlong Way at the North Terminal and has improved pedestrian access between the South Terminal and local bus stops located on the A23.

Other Bus and Coach Services

9.1.16 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.

9.1.17 Prior to the Covid-19 pandemic, there were ten hotel bus routes which operated on circular routes calling at both terminals in one direction. All routes operated seven days per week and included journeys in the early morning and late evening, in order to match demand from departing and arriving passengers.

9.1.18 There were also nearly 30 guest houses or hotels that operated services on request. The vehicles used range from cars to van-based buses.

9.1.19 There are also large numbers of bus movements associated with off airport car parks.

9.1.20 Charter coach movements peaked at almost 200 arrivals a day at the airport and were operated by a large number of companies from across the UK.

9.1.21 All of the above are expected to resume as demand returns to the airport.

9.2 Comparison of Future Baseline and With Project Performance

Modelling approach

9.2.1 A bus and coach network model has been developed in EMME software and complements the rail modelling undertaken in PLANET South to create the overarching Gatwick public transport model.

9.2.2 The public transport model includes all bus and coach services used to access the airport by air passengers and employees. The information for bus/coach route coding has been obtained through discussions with operators, data from Gatwick and other publicly available data sources.

9.2.3 The bus/coach model has been developed as a standard public transport frequency-based assignment tool using the inbuilt modules of the EMME software and applying a standard generalised journey time function with weight on the components of time as recommended in TAG.

Study Area

Coaches

9.2.4 Coach services to/from Gatwick Airport are operated by National Express, Megabus, Oxford Airline and easyBus and include destinations such as Brighton, London, Heathrow Airport, South Wales, the South West, Hampshire and the West Midlands.

9.2.5 Coach is mostly relevant to air passengers though some local coach services (eg from Brighton and London) may fulfil a limited commuter role.

9.2.6 Analysis of CAA data shows significant airport passenger use of coach to access Gatwick from Brighton, Bournemouth, Southampton, Bristol, Oxford, London, Heathrow (transfers), as shown in Diagram 9.2.1.

Diagram 9.2.1: Gatwick Airport passenger catchments for coach (and bus)

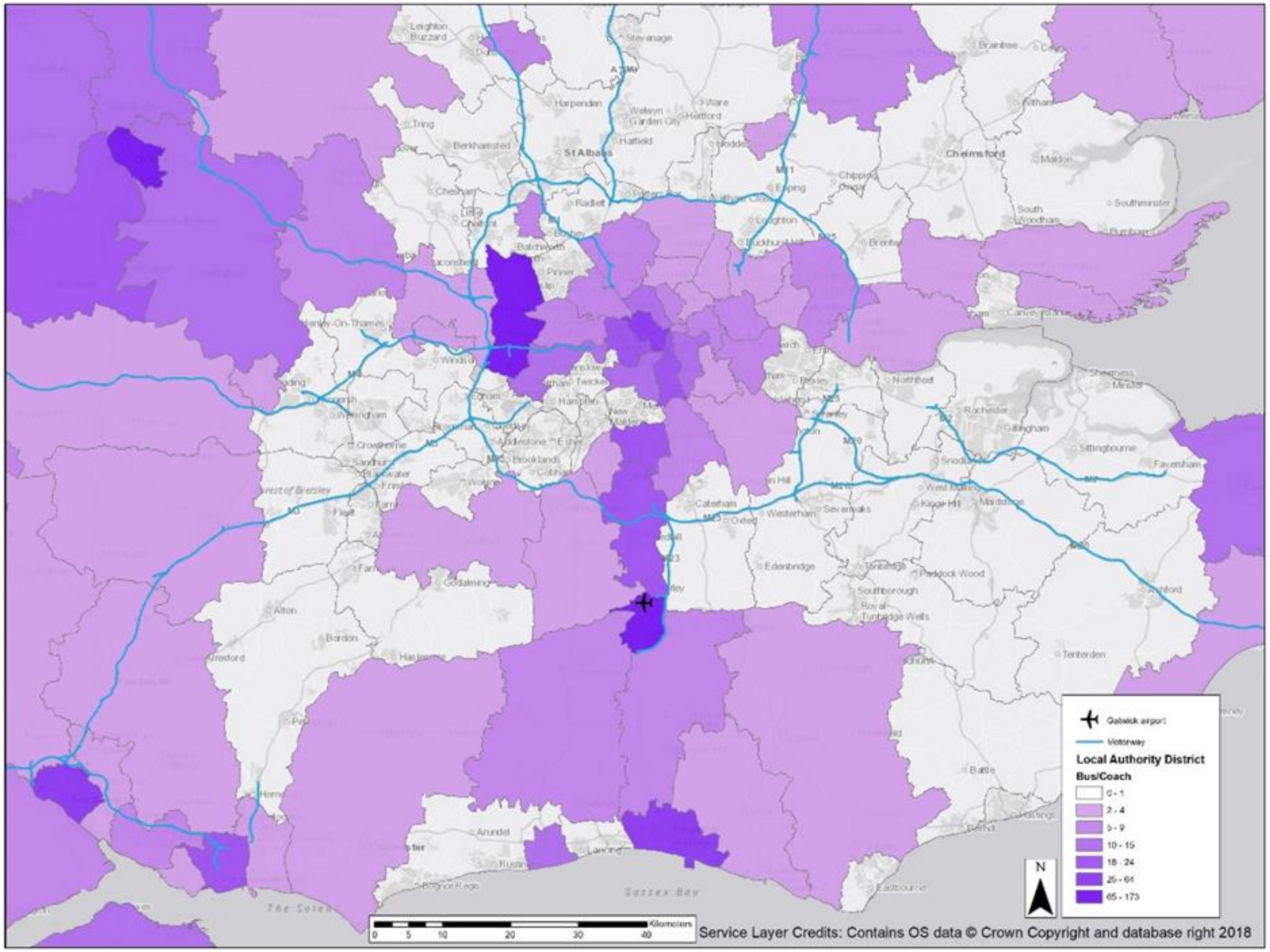
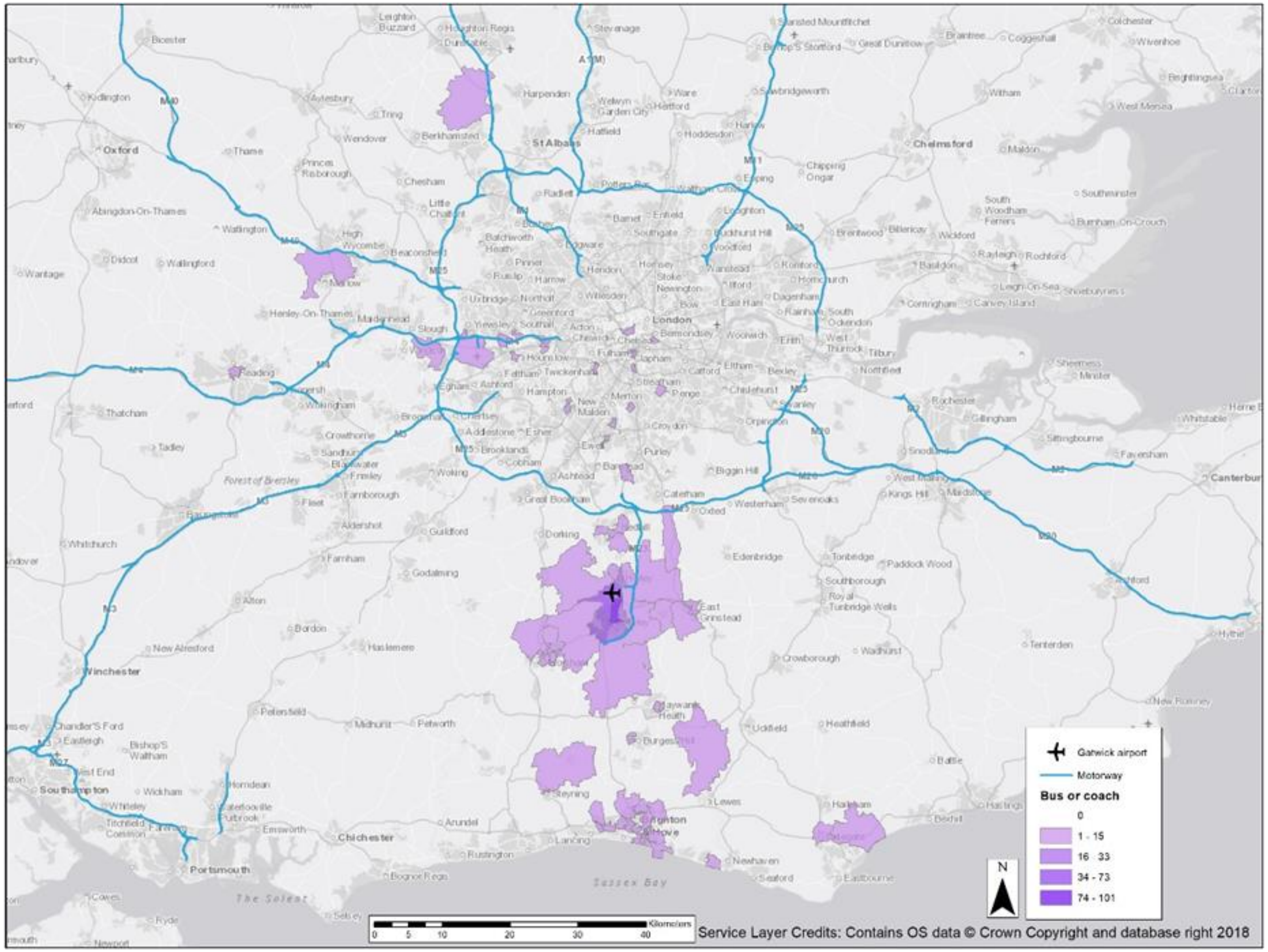


Diagram 9.2.2: Gatwick Airport employee catchments for bus (and coach)



9.2.7 Some Gatwick Airport passengers living in Horley and Crawley use local bus services to access the Airport.

9.2.8 The public transport model includes all airport coaches plus the England-wide National Express and Megabus networks. This ensures that there is a reasonable representation not just by direct coach to Gatwick but also those requiring an interchange, e.g. from Margate to Gatwick, requiring interchange in London.

Bus Services

9.2.9 Bus services are used predominantly by Gatwick Airport employees and those air passengers living locally. For airport employees, the existing catchment of bus users is shown in Diagram 9.2.2

9.2.10 Diagram 9.2.2 shows that most Gatwick employees who use bus/coach live in Crawley and Horley, with smaller clusters in surrounding towns and villages and the suburbs of Brighton.

9.2.11 The model includes all local bus routes that serve Gatwick Airport, Horley and Crawley, including journeys that require interchange at Crawley bus station.

Modelled bus and coach improvements

9.2.12 Modelled bus and coach improvements to 2029 and beyond in the future baseline and with Project include:

- Updates to coach frequencies in proportion to growth in air passengers.

9.2.13 Further bus and coach enhancements with Project include:

- New bus route hourly Uckfield to Gatwick via East Grinstead.
- New coach route two-hourly Chatham - Maidstone - Sevenoaks - Gatwick.

9.2.14 The new bus and coach routes were explored and put forward as part of Gatwick's Bus and Coach Strategy.

9.2.15 These enhancements lead to an improvement in bus and coach mode share to between 6% and 7% for air passengers and between 16% and 17% for employees in future years 2029, 2032 and 2047.

Assessment Criteria

9.2.16 Given the adaptability of bus and coach provision, crowding on bus and coach services has not been tested explicitly within the modelling framework as operators tend to respond to sustained increases in demand by increasing the number of services. As such, the assessment includes service frequency and quality as a measure of public transport amenity.

Comparison of Future Baseline and with Project Scenarios

9.2.17 With the improvements described above, demand on bus and coach services increases from approximately 4,500 passengers in 2018 across the busiest local areas to almost double at 8,700 daily passengers with the Project in 2047, as per Table 9.2.1.

9.2.18 Within this overall growth, there are significant increases in employee travel on local bus services in Crawley, an increase of almost 800 passengers on a high base of over 1,900 passengers, albeit with bus share remaining largely constant across Local Authority areas.

9.2.19 On coach services, London is by far the largest market for air passengers and demand on coach services to/from London increases by 1,500 daily passengers between 2018 and 2047 with Project, albeit with London's share of coach trips remaining at 5% throughout the assessment period, as per Table 9.2.2. Gains in share are shown by the model for Brighton and Hove and Hampshire, reflecting the strong existing catchments in these two locations, as per Diagram 9.2.1. Kent also shows strong growth in passenger numbers and share, reflecting the success of the new service from Chatham, Maidstone and Sevenoaks.

Table 9.2.1: Daily bus trips by Local Authority/Daily coach trips by region

		Bus/Coach trips						
		2018	**2029 Future Baseline**	**2029 With Project**	**2032 Future Baseline**	**2032 With Project**	**2047 Future Baseline**	**2047 With Project**
Local Bus	Crawley	1969	2329	2423	2372	2599	2536	2750
	Mole Valley	7	10	11	10	12	11	12
	Reigate and Banstead	174	215	226	221	247	236	263
	Tandridge	12	16	18	17	21	20	24
	Mid Sussex	46	58	62	60	69	64	74
	Horsham	72	86	91	88	99	93	104
Coach	Brighton and Hove	210	378	425	404	551	490	651
	Rest of West Sussex	37	63	70	67	91	77	104
	Rest of Surrey	16	25	27	26	33	28	35
	East Sussex	54	88	98	94	120	104	132
	Kent	73	124	376	131	442	139	470
	London	1089	1719	1894	1807	2331	1941	2527
	Hampshire	220	383	431	411	557	453	612
	Ox, Bucks, Berks	468	681	744	708	889	763	973
	TOTAL	**4446**	**6174**	**6896**	**6415**	**8063**	**6955**	**8732**

Table 9.2.2: Daily bus share by Local Authority/Daily coach share by region

		Bus/Coach share						
		2018	**2029 Future Baseline**	**2029 With Project**	**2032 Future Baseline**	**2032 With Project**	**2047 Future Baseline**	**2047 With Project**
Local Bus	Crawley	36%	36%	36%	36%	35%	36%	35%
	Mole Valley	1%	1%	1%	1%	1%	1%	1%
	Reigate and Banstead	8%	8%	8%	8%	8%	8%	8%
	Tandridge	2%	2%	2%	2%	2%	2%	2%
	Mid Sussex	2%	2%	2%	2%	2%	2%	2%
	Horsham	4%	4%	4%	4%	4%	4%	4%
Coach	Brighton and Hove	8%	11%	11%	11%	13%	13%	14%
	Rest of West Sussex	2%	2%	2%	2%	3%	3%	3%
	Rest of Surrey	0%	1%	1%	1%	1%	1%	1%
	East Sussex	2%	3%	3%	3%	3%	3%	3%
	Kent	1%	2%	5%	2%	5%	2%	5%
	London	4%	5%	5%	5%	5%	5%	5%
	Hampshire	5%	7%	7%	7%	8%	8%	9%
	Ox, Bucks, Berks	12%	15%	15%	15%	16%	15%	16%

9.3 Potential Mitigation

9.3.1 The bus and coach assessment indicates that additional peak period services, or network changes including consideration of new or revised routes, provides for increased patronage by both employees on local bus services and air passengers on coaches. Additional services would not be required or expected in all locations, with many experiencing very small changes in patronage. Increased service frequencies provide improved amenity for non-airport users also, benefitting both local communities and businesses by improving connectivity.

10 Assessment of Transport Effects: Strategic Highways

10.1 Introduction

10.1.1 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.

10.1.2 In FY2017/18, 55% of all Gatwick passenger demand accessed the airport by car, either as a driver, car 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.

10.1.3 This section covers modelling of the strategic highway network between London and Brighton including the M23 and M25. Proposed capacity enhancements and embedded mitigation with Project along the M23 Spur is described in Section 10.2 below.

10.2 Approach and Methodology

10.2.1 The strategic highway model has used SATURN software. It has been developed using Highways England's South East Regional Transport Model (SERTM) as the basis for generating a sub-regional highway assignment model that has been used to test strategic network effects as well as providing input into environmental analysis for noise and air quality.

10.2.2 SERTM has been used as the basis of the highway assignment model and refined locally to add additional network detail and zoning. The model uses network details from West Sussex's Crawley Local Transport Model (CLTM) and Transport for London's London Highway Assignment Model (LoHAM) for Crawley and the area of South London.

Current Network

10.2.3 Gatwick benefits from direct access to the national Strategic Road Network (SRN) 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. The off-peak journey time from Gatwick Airport to the M25 via the M23 is around 10 minutes. From the M25, there is access to the wider UK strategic road network.

10.2.4 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. Croydon is between 30 and 40 minutes from the airport by road in the off-peak and peak periods respectively.

10.2.5 South of Gatwick, the M23/A23 continues as a strategic highway corridor from London to Brighton on the South Coast. Brighton is between 30 and 45 minutes from the airport by road in the off-peak and peak periods respectively. The A23 connects with the A272 and A27 east - west routes, placing the whole of the South Coast between Southampton and Folkestone within 1 hour and 20 minutes of the airport.

10.2.6 The A23 runs north-south parallel to the M23 from South London (and Croydon), through Redhill then Horley and Gatwick Airport. It then bypasses Crawley and provides a connection to the south through Pease Pottage to Brighton.

10.2.7 The A264 connects Horsham to the south-west with Gatwick via a combination of potential routes including the A23, A2011 or M23 depending on the route chosen. To the east the A264 also connects Gatwick to East Grinstead via the A22.

10.2.8 Whilst Gatwick is committed to encouraging more employees to travel to work by modes other than sole occupancy private car, road access will remain an important consideration in planning the airport's growth in the future.

10.2.9 Gatwick Airport has recently benefitted from a number of road improvements, as listed in Table 10.2.1.

Future Network

10.2.10 There are a number of schemes currently under development within the study area. Highways England maintain a pipeline of schemes under their Road Investment Programme (RIP) which includes schemes identified for progression under the Department for Transport's Road Investment Strategy (RIS) 1 covering the period 2015 to 2020 and Road Investment Strategy 2 (RIS2) covering 2020 to 2025. In addition, a number of local schemes are also planned that deliver improvements to junction capacity / traffic flow supporting development or safety enhancements. Table 10.2.1 shows the major highway schemes which have been included in the SATURN model. The schemes have been cross-checked with Highways England, information provided by LA/consultancies and available public information. The major Road Investment Strategy (RIS) schemes are captured as well as other strategic schemes in the study area. A full list of highway schemes in the model can be found in Annex B.

Diagram 10.2.1: Highway network serving Gatwick Airport

Diagram 10.2.2: Main strategic highway access to Gatwick – M23 Junction 9 (before Smart Motorways)

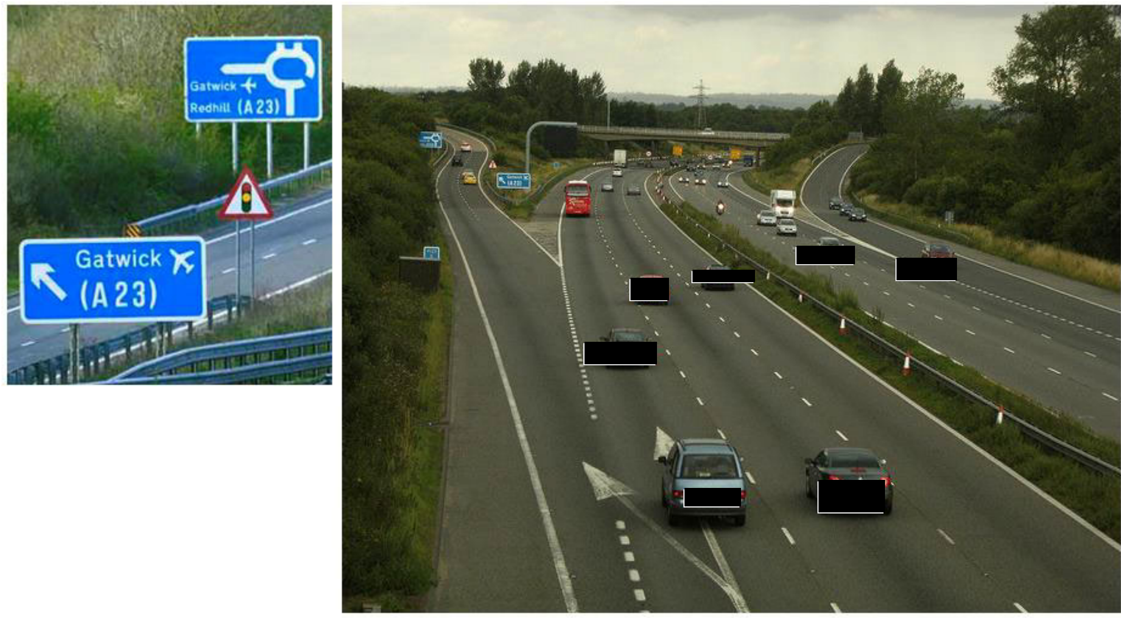


Diagram 10.2.3: Local highway and road network

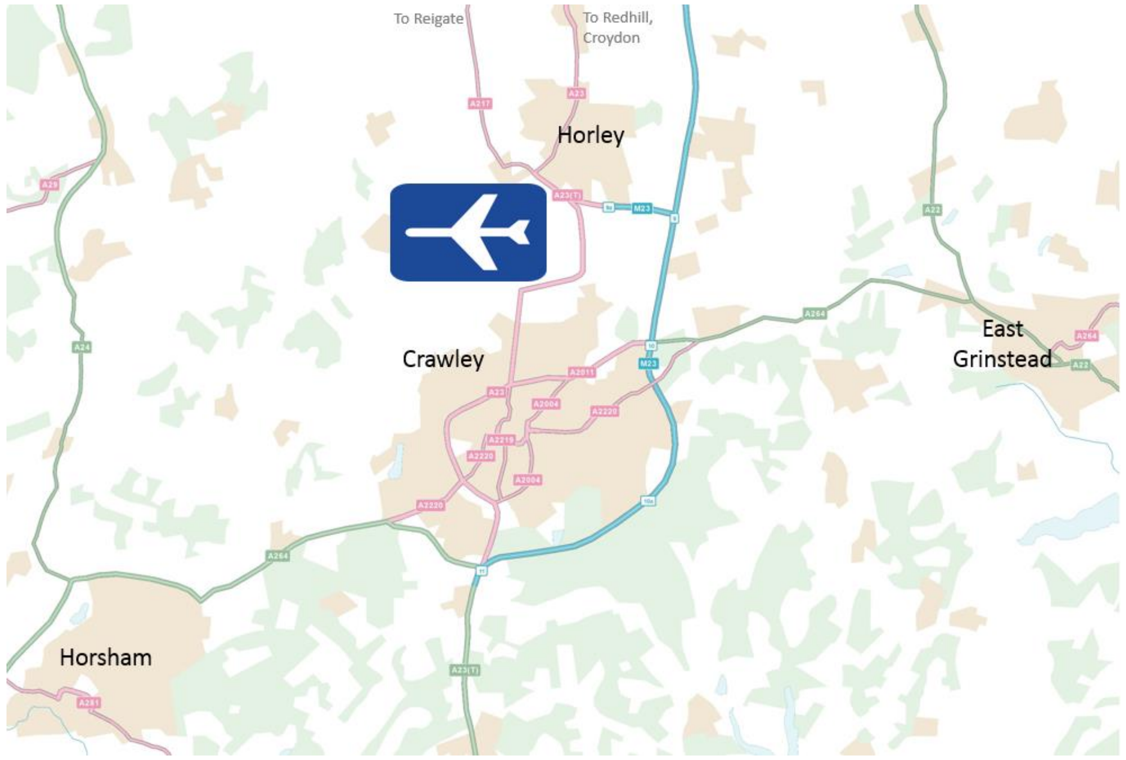


Table 10.2.1: Major highway schemes included in the model

Scheme Name	Scheme Promoter	Opening Year
M23 Junctions 8-10: Smart Motorways	Highways England	Spring 2020
M23 Junction 9, north bound slip road - Carriageway widening	Crawley	Before 2026 (assumed)
M23 Junction 10 - Junction improvements, Signal, carriageway widening	Crawley	Before 2026 (assumed)
M25 Junction 10-16 Smart Motorway	Highways England	2023
M25 J8 Improvement Scheme	Highways England	Dec-2020
M25 South West Quadrant	Highways England	2023
Lower Thames Crossing - new link	Highways England	Before 2029 (assumed)
A2 Bean & Ebbsfleet Junction Improvement Scheme	Highways England	2022-2023
A27 East of Lewes	Highways England	Jan-2022
A22 Corridor - M25 Junction 6 improvements	Tandridge	Before 2029 (assumed)
Burgess Hill Northern Arc Land - Highways (A2300), bridges	West Sussex	Before 2029 (assumed)
Radford Road approach to Gatwick Road	Crawley	Before 2026 (assumed)

Source: Schemes confirmed with Highways England and Local Authorities

Model Forecasting Approach

10.2.11 Traffic modelling has been undertaken using a SATURN highway assignment model developed for Gatwick Airport using SERTM, CLTM and LoHAM and known as the GHOST model (Gatwick's Holistic Overview of Strategic Transport).

10.2.12 As described in Section 5.10.4, the base year model is 2016. Forecast years have been developed for Gatwick for the years 2029, 2032 and 2047 for a Future Baseline (without Project) and with Project scenario. Airport demand has been taken from the air passenger and employee forecasts, in accordance with all other modelling. Background traffic is based on the latest TEMPRO (v.7.2) growth factors which have been adjusted to align with cumulative developments in the scheme area in line with TAG guidelines.

10.2.13 Future year networks have been updated in consultation with Highways England and Local Authorities to reflect the committed schemes for which funding has been secured.

10.2.14 The base model updates include overlaying passenger and employee demand for the Airport using the geographical distributions from CAA passenger data and Gatwick employee survey data, which has then overlaid onto background trips in the model. Model flows have then been validated against observed traffic counts including checks on the model around Gatwick Airport to show how modelled flow validates against observed traffic flow.

10.2.15 The forecast year model has been developed with airport passenger and employee forecasts to generate future year demand scenarios out to 2047.

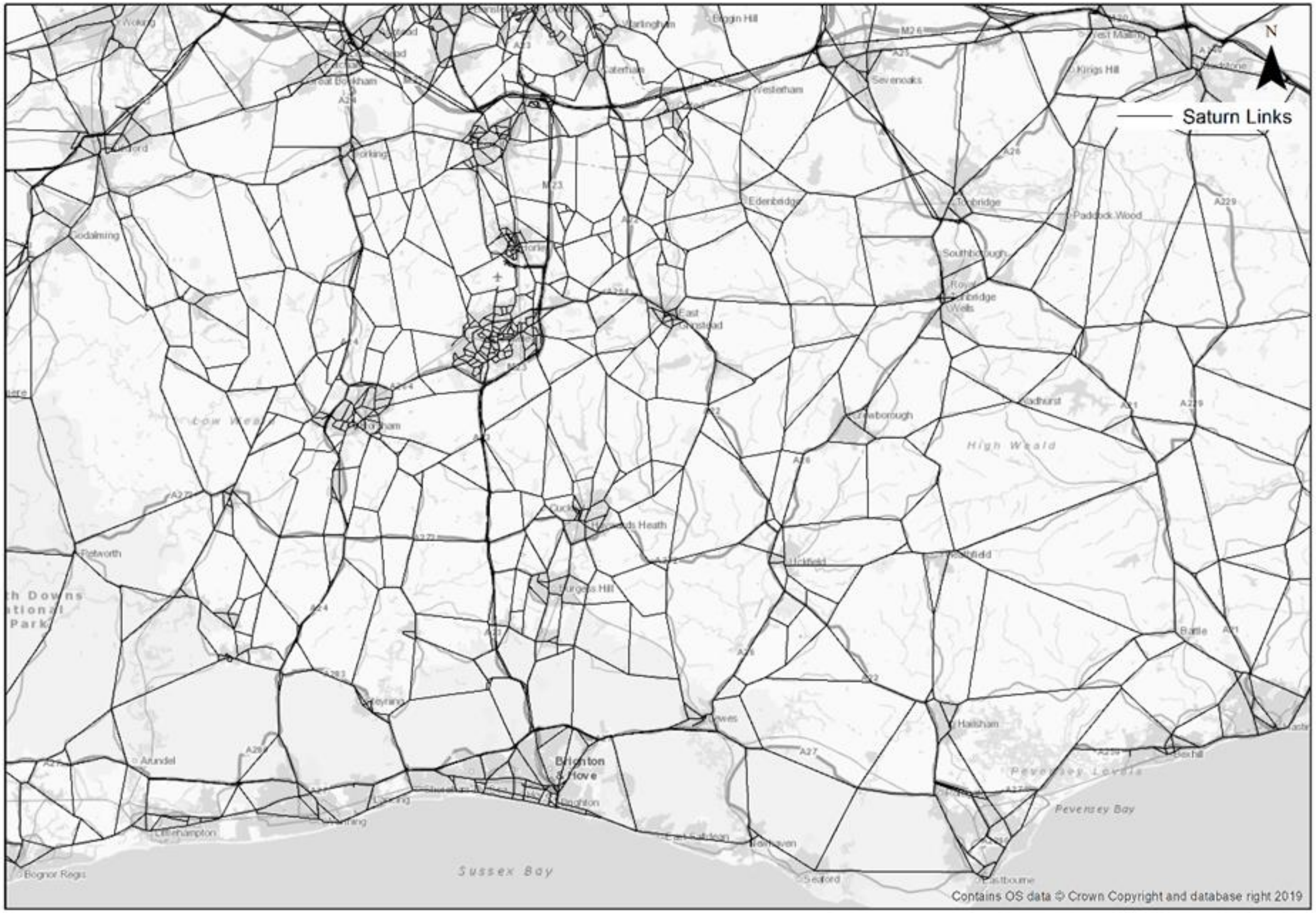
10.2.16 For the purpose of this study, the approach has been to model the road network during specific time periods when traffic levels and sensitivity to mode choice will vary.

10.2.17 The time periods modelled in the highway model are:

- AM Peak Hour 1 – representing the peak in flows on the SRN network between 07:00-08:00;
- AM Peak Hour 2 – representing the peak in flows on the SRN network between 08:00 - 09:00;
- IP Average Hour – representing an average hour flow between 09:00 - 16:00; and
- PM Average Hour – representing an average hour flow between 16:00 - 18:00.

10.2.18 The strategic transport modelling which underpins the assessment is described in detail in Annex B.

Diagram 10.2.4: Model network coverage in the vicinity of the Airport



10.3 Comparison of Future Baseline and Project Scenarios

Changes in Demand

10.3.1 Modelled traffic volumes extracted for the four modelled time periods are combined and expanded to represent Average Annual Daily Traffic (AADT) volumes. These averages represent (Monday-Sunday) traffic volumes at 24-hour levels.

10.3.2 Comparisons across the three assessment years considering the difference between the future baseline and with Project scenario have been carried for all modelled links. The purpose of this analysis is to demonstrate the characteristics of changes in traffic volume, henceforth denoted as AADT and distinguishes which corridors are affected, and the nature in which the highway model responds in the with Project scenario.

10.3.3 The assessment across all years shows a similar pattern and therefore the comparison between the 2047 baseline and with Project scenario is shown in Diagram 10.3.1.

10.3.4 The modelling shows that the key corridor affected by the development of the airport is the M23 in both directions with changes over 2,500 AADT.

10.3.5 Additionally the M25 east and west of junction 7 shows tidal changes on links approaching the airport between 1,000 and 2,500 AADT.

10.3.6 The diagram shows the other key corridors for access to the South-West via the A264 and A24 and across to East Grinstead on the A264 and A22.

10.3.7 When looking at the specific peak period distribution from SATURN in closer proximity to the Airport, as per Diagram 10.3.2, this shows that almost 80% of airport traffic comes via the M23 and then accesses the Airport via the M23 Spur between Junction 9 and 9a.

10.3.8 Previous analysis indicates minimal change in this distribution between expansion projects supporting the conclusion that increased capacity on the M23 in the future will remove traffic from other local roads that have less capacity (such as the A23 and A217).

10.3.9 Given the above concentration of flows on highways and junctions in close proximity to the Airport, an additional assessment of junction capacity has been undertaken in VISSIM as described in Section 11 of this PTAR.

Diagram 10.3.1: 2047 AADT – Change with Project as compared to Future Baseline

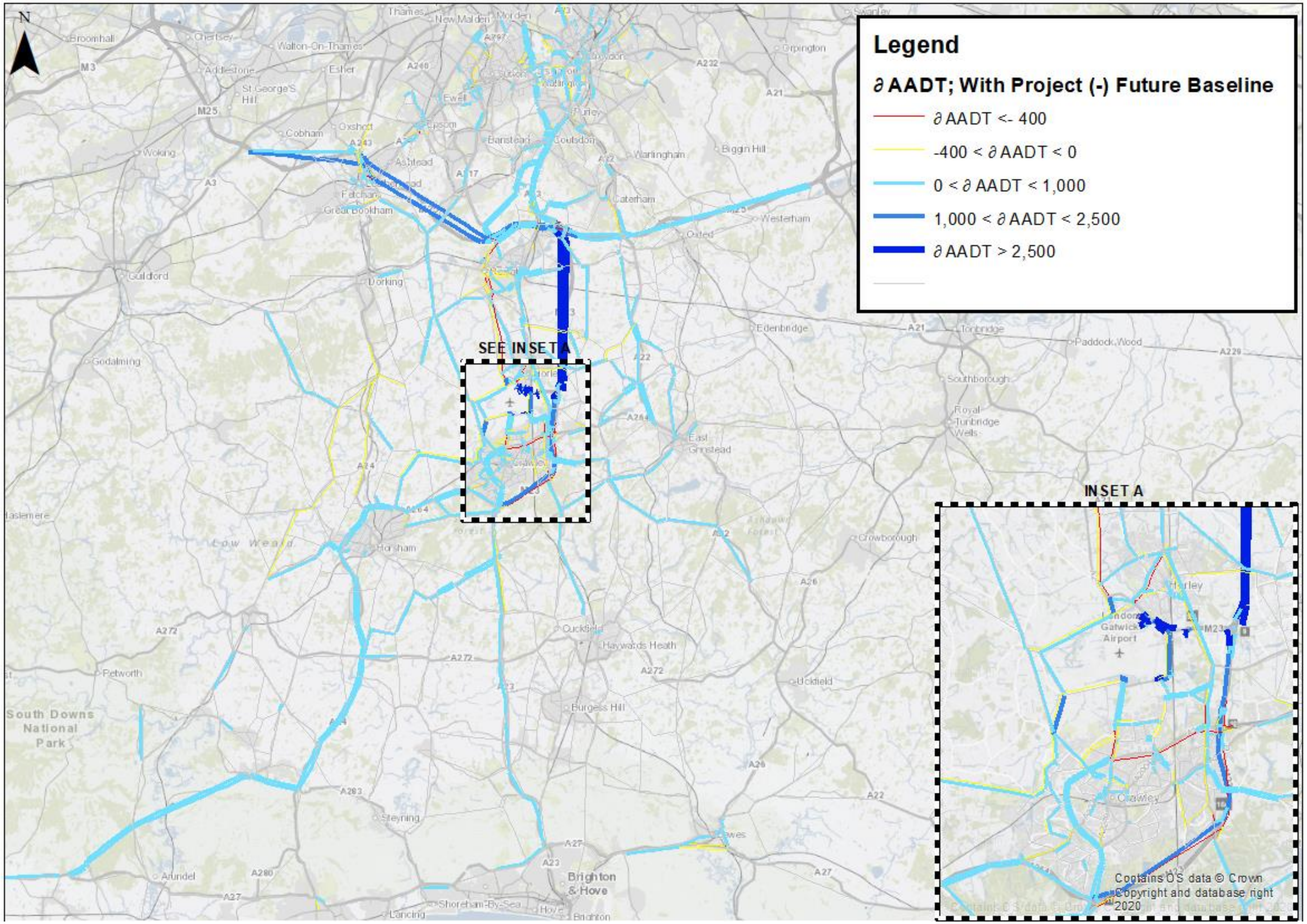
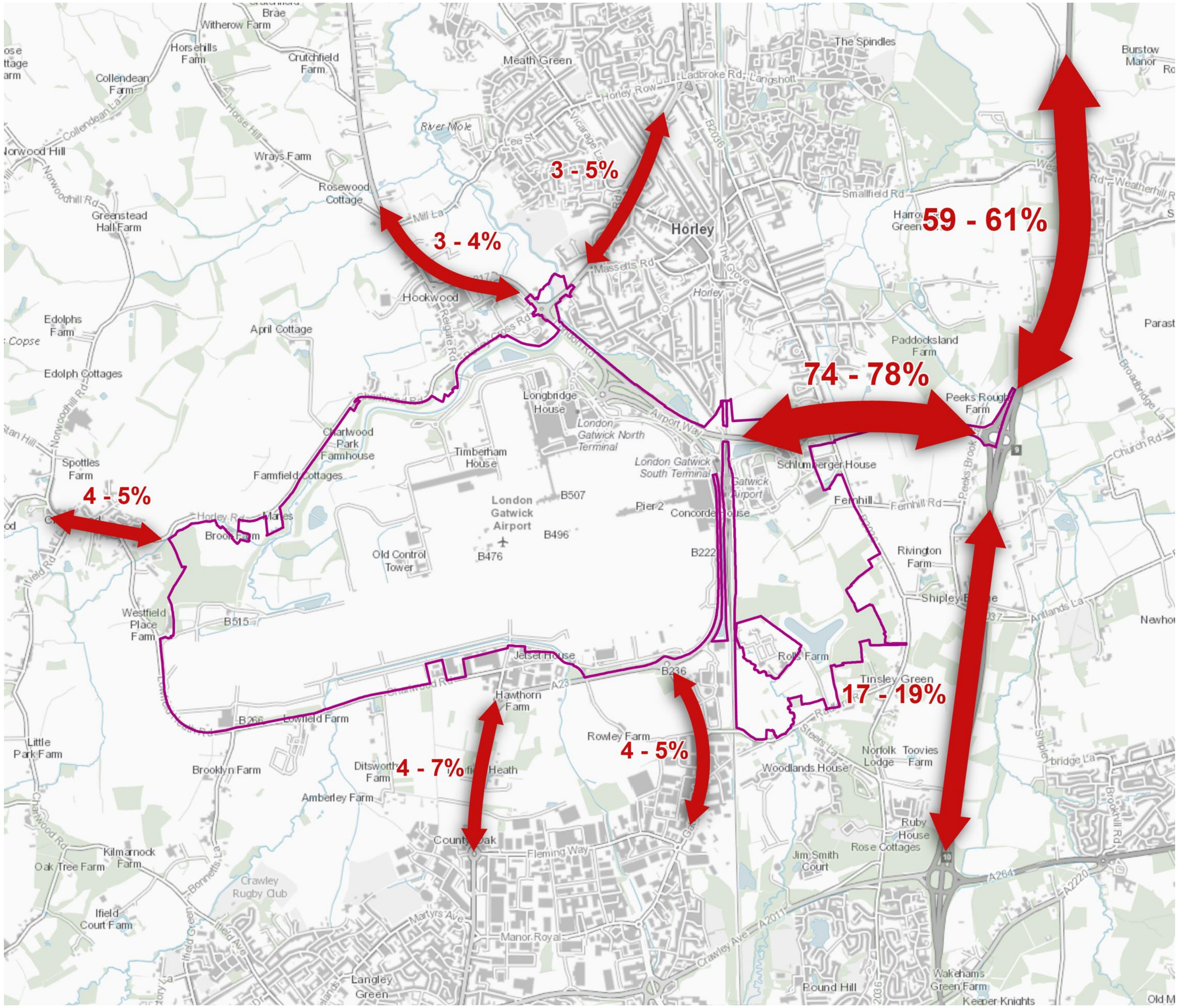


Diagram 10.3.2: Proportion of Gatwick Traffic on the Strategic Road Network, 2047



10.4 Effects of Project on Wider Area

10.4.1 The following section details the performance of the highway model in relation to the future baseline and with Project respectively. This covers the three assessment years of 2029, 2032 and 2047.

10.4.2 The performance of the highway model is assessed by considering the changes in network operation for each assessment year between the future baseline and with Project scenarios. The assessment considers five performance areas presented in Diagram 10.4.1 and consists of:

- Strategic Road Network (SRN): M25 (J5 to J10), M23, A23 & A27 (Lewes to Arundel);
- Performance Area A: Gatwick Airport, Crawley and Horley;
- Performance Area B: M25 to A272;
- Performance Area C: Inter-London; and
- Performance Area D: A272 – A27

10.4.3 The following network characteristics have been analysed:

- **Journey Times** – expressed as end-to-end travel times on key routes across the area of detailed modelling. These include the Strategic Route Network (SRN), routes in the vicinity of Gatwick Airport, the periphery of Crawley and other key distributor roads. The routes analysed capture trips to/from Gatwick Airport as well as other key strategic movements on the network. These are presented for SRN, Performance Areas A, B and D.
- ***Volume to Capacity (V/C)*** – ratios expressing the total traffic volume using a highway or road link with respect to its total available capacity. This is a common metric used to estimate the potential level of congestion. A volume to capacity or V/C ratio of 50% would mean low levels of busyness as demand is only 50% of the capacity of the junction. Conversely a V/C ratio of 105% would indicate demand being 105% of junction capacity and therefore over capacity, with congestion and queuing. Modelled values are presented to show the worst performing links (i.e. the maximum across all time periods). V/C is segmented in to three key operational categories presented in Table 10.4.1 and is considered for SRN & Performance Areas A-D.
- ***Magnitude of Impact (Links / Nodes)*** – changes between link and node V/C metrics between the future baseline and with Project scenarios are categorised into Low, Medium and High and presented for Performance Areas A-D. The categories are based on a combination of changes in V/C referred to as congestion indicators as well as the V/C standard in the with Project scenario. For example, an instance of V/C changing by greater than 10% with a corresponding V/C of less than 85% in the with Project scenario is deemed 'Not Significant' as the junction is below 85% of its capacity. However if the V/C is 92-99% in this context, a greater than 10% change would be classified as 'High' as the change takes the junction over capacity. An overview of the parameters considered as part of categorising this magnitude of impact is presented in Table 10.4.2.

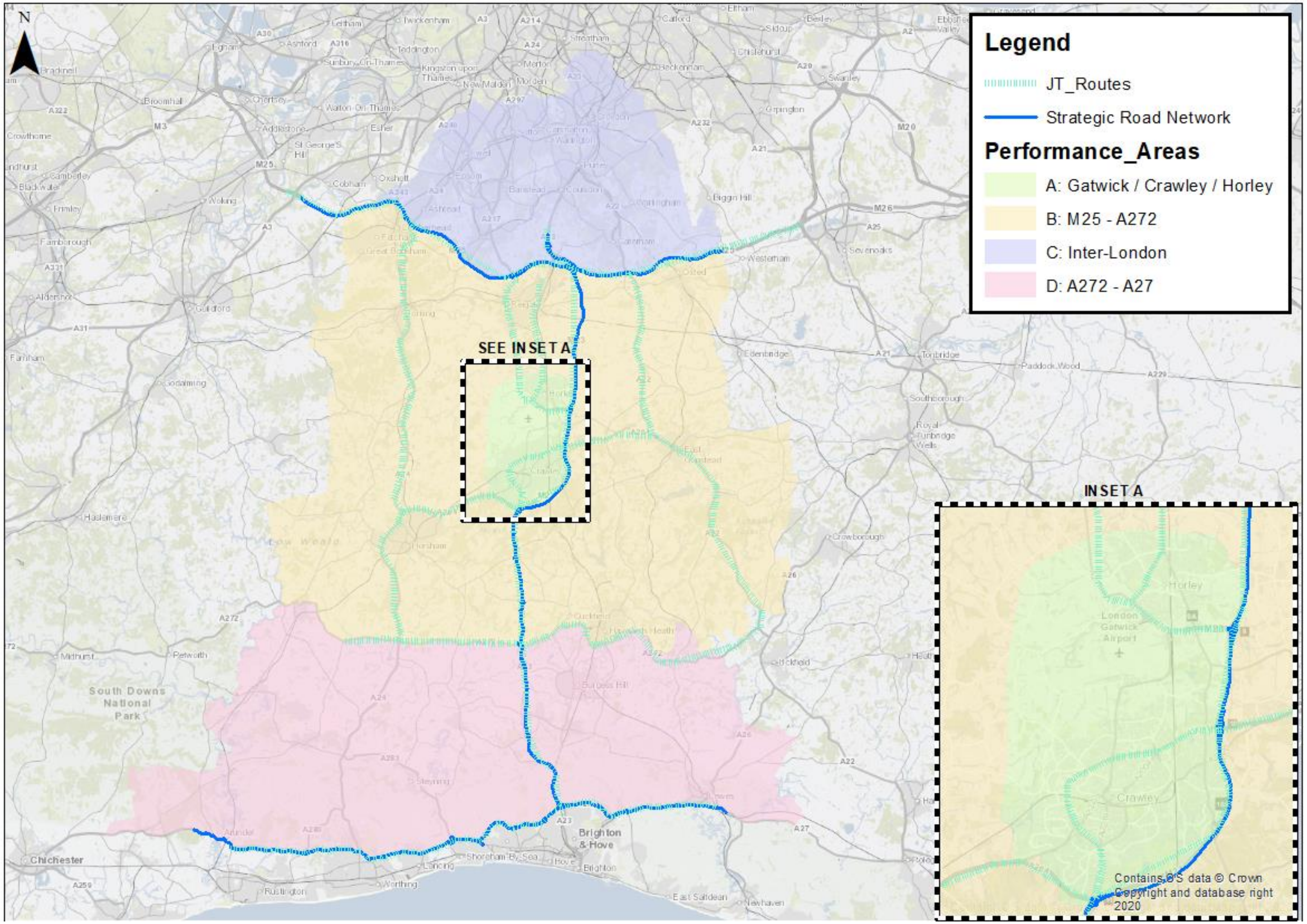
Table 10.4.1: Volume over Capacity Definition

Category	V/C Definition
-	V/C < 50%
Green	50% < V/C < 85%
Amber	85% < V/C < 99%
Red	V\C > 100%

Table 10.4.2: Magnitude of Impacts Grid

Criteria		Magnitude of impacts			
		Not significant	Minor	Moderate	Major
		<85%	85 - 92%	92 - 99%	99% 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	Low	Low	Medium
Between 5-10% change in Congestion Indicator	Medium	Not significant	Low	Medium	High
>10% change in Congestion Indicator	High	Not significant	Medium	High	High

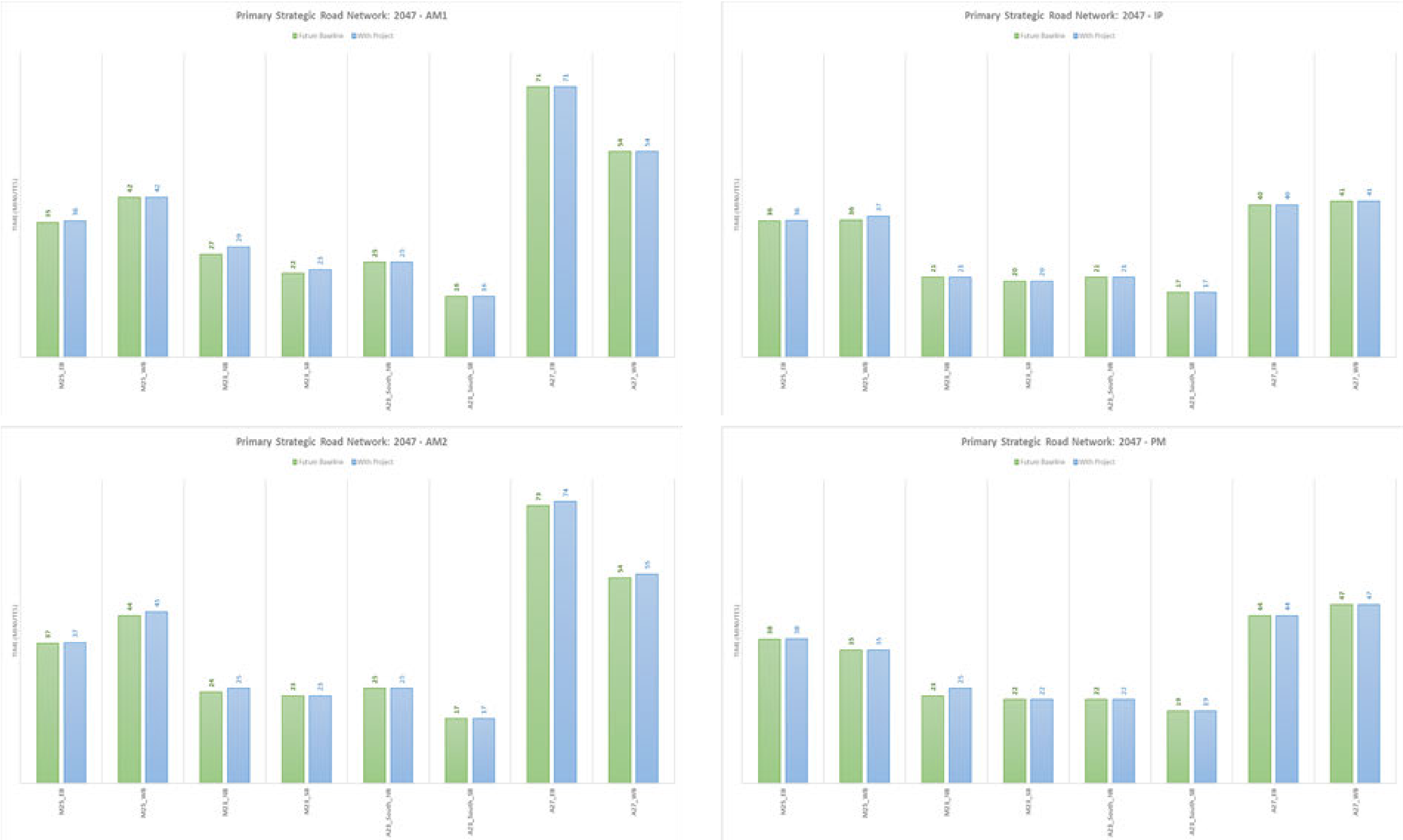
Diagram 10.4.1 : Highway Model Performance Area



Strategic Road Network

10.4.4 There are no notable changes in journey times with respect to the SRN between the future baseline and with Project scenarios, including the mitigation described in Section 10.2, with differences of circa 1 minute shown on the M25 and A27 eastbound and westbound in the AM1 time period for 2032 and 2047, as per Diagram 10.4.2.

Diagram 10.4.2 Highway Journey Times - Primary SRN, 2047



Additionally, the modelling suggests that there are no occurrences of SRN links that have had a change in magnitude of impact between the future baseline and with Project scenario across all assessment years.

Performance Area A

10.4.5 Within performance area A the following journey time routes covering the local road network were analysed:

- A23 from Longbridge Roundabout to A23 (south of M25, near Merstham), northbound and southbound; and
- A217 from M23 Spur via A217 to M25 J8, northbound and southbound.

10.4.6 In 2032 the A217 route showed a slight improvement in end to end journey time in the PM peak of circa 2 minutes while there were minimum other notable changes across the time periods.

10.4.7 In terms of operational performance there are some changes in the magnitude of impact between the future baseline and with Project scenario across all assessment years.

10.4.8 The magnitude of impact analysis for 2029 and 2047 is shown in Diagram 10.4.1 and Diagram 10.4.2 respectively. 2032 shows comparable or improved conditions when compared to 2029 owing to the provision of highway mitigation.

10.4.9 The only junction in 2029 which shows a medium impact relates to Gatwick Road roundabout for both the PM period. This change is predominantly driven by increase in the volume of trips heading to the Gatwick long-stay car park zone to the north and turning right from the south into the eastern arm of the roundabout.

10.4.10 Additionally, the low impact identified at South Terminal roundabout in 2029 is mitigated by 2032 when the embedded highway mitigation proposed with Project has been built.

10.4.11 In 2032, the M23 offslip at Junction 9 for access towards the airport changes from low to medium in terms of V/C. By 2047 this becomes a potential high impact classification at M23 Junction 9, related to the interaction between traffic from the southbound off-slip and traffic on the circulatory. The circulatory itself shows a medium impact. While the junction is operating at capacity, no blocking back on the slip-road occurs. These issues are analysed further using VISSIM modelling, as described in Section 11. VISSIM is more appropriate tool for assessing junction performance than a strategic highway model and allows for balancing of signal timings as potential mitigation.

10.4.12 A high impact occurrence is also shown in 2047 for Airport roads west of the North Terminal at Longbridge Way roundabout and this has also been assessed in the VISSIM model.

Diagram 10.4.1: Magnitude of Impacts: Performance Area A, 2029 Nodes

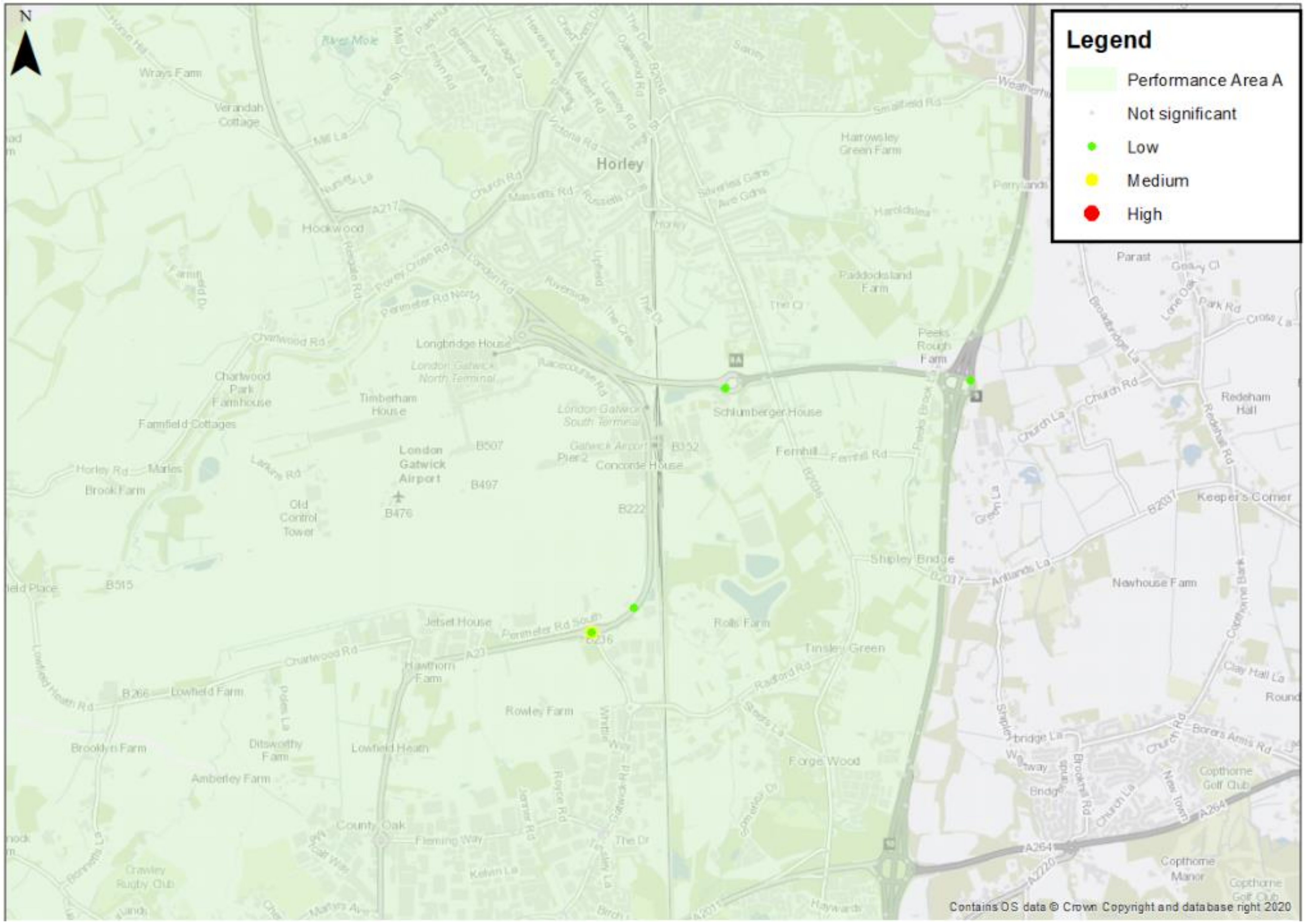
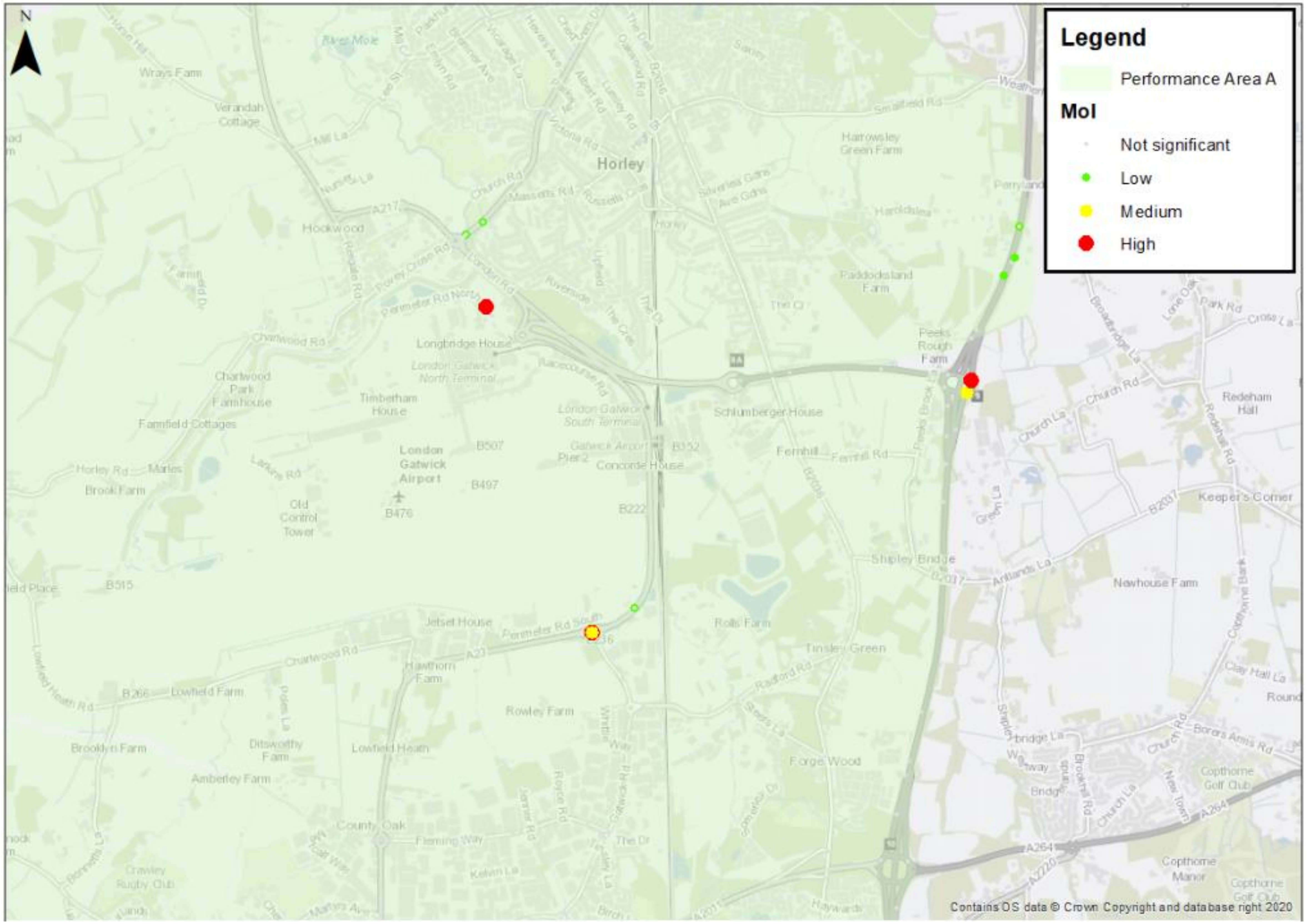


Diagram 10.4.2: Magnitude of Impacts: Performance Area A, 2047 Nodes



Performance Area B

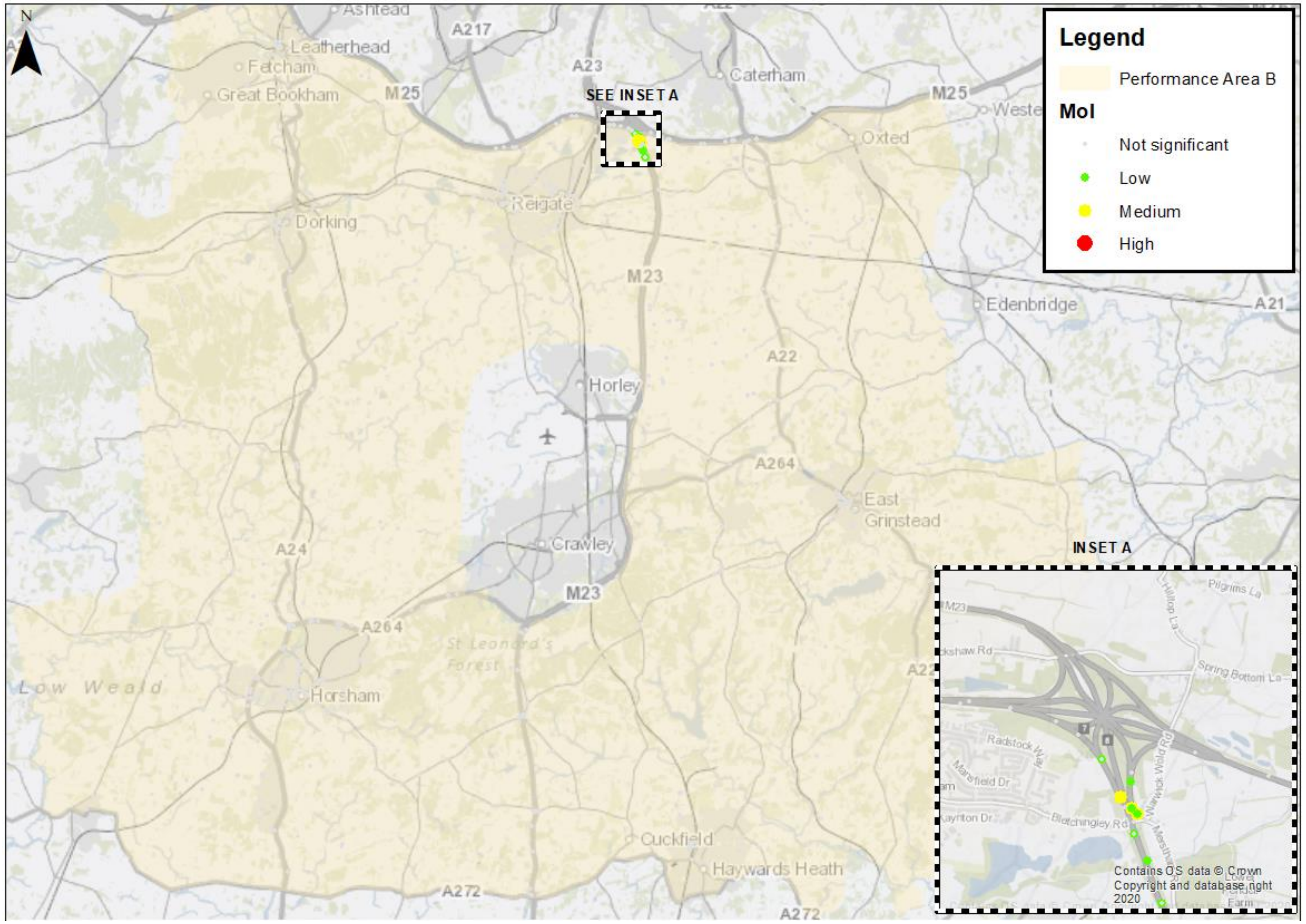
10.4.13 Modelled journey times extracted for the routes in performance area B are:

- A22 [1] from M25 J6 to East Grinstead, southbound and northbound;
- A22 [2] from East Grinstead to Maresfield, southbound and northbound;
- A2011 from M23 J11 to East Grinstead via Crawley, eastbound and westbound;
- A24 [1] from near M25 J9 (Leatherhead) to north Horsham, southbound and northbound;
- A24 [2] from north Horsham to A272/A24 near West Grinstead, southbound and westbound; and
- A264 from north Horsham to M23 J11, eastbound and westbound.

10.4.14 Journey time analysis demonstrates that no routes are notably impacted between the future baseline and with Project in 2029, 2032 and 2047. There are no instances of journey times exceeding changes greater than one minute. The modelled journey times suggest that, although these corridors carry more traffic with Project, there are no significant impacts in end-to-end journey times as a result of these additional vehicles.

10.4.15 In terms of impacts on congestion, the modelling shows that, in 2047, there are no high impact instances and a maximum of two medium impact instances across the modelled periods. These are shown in Diagram 10.4.3 and relate to the M25 westbound near M25 Junction 7 and the M25 southbound off-slip on to the M23 southbound for the AM1 and AM2 period. Here the V/C increases from 99% to 101% in the with Project scenario. The M25 southbound off-slip has a V/C of 87% which increases to 94% in the with Project scenario. Although flagged as a medium impact, overall the junction still operates at a similar level of V/C.

Diagram 10.4.3: Magnitude of Impacts: Performance Area B, 2047 Nodes



Performance Area C

10.4.16 Modelling undertaken to date has identified that this area of the network is particularly sensitive (as a result of high volumes of inner London traffic as well as areas of variable speed in the model, as opposed to with Project impacts) and the modelling assumptions (e.g. network definition / scale / coding of speeds) will be further reviewed during future workstreams in preparation for the DCO.

Performance Area D

10.4.17 Performance Area D shows no noticeable change in journey times on the A272 and no change in impact between the baseline and with Project scenarios.

10.4.18 No junctions within the area are classified as showing a low, medium or high change in impact in any of the assessed time periods or future years.

10.5 Potential Mitigation

10.5.1 Overall, strategic highway modelling shows that demand with Project and a northern runway can be accommodated on the main strategic highway routes currently used by airport traffic. Two high impact exceedances are shown closer to the Airport and these have been tested further using VISSIM modelling which is more appropriate tool for microsimulation of junction performance and are shown to perform within capacity (please see Section 11). The modelling is deemed appropriate for assessment for the PEIR and associated impacts of the development at Gatwick Airport. However, detailed model statistics are being reviewed by stakeholders and the highway model will go through a series of updates in terms calibration and validation to feed into the final DCO submission.

10.5.2 The M23 Smart Motorways scheme widens the motorway to effectively 4 lanes in each direction at peak times between Junctions 8 and 10, providing significant additional capacity.

10.5.3 This scheme also widens the M23 Junction 9 to 9a link in the westbound direction and Gatwick is proposing a third eastbound lane as part of embedded mitigation with the Project.

10.5.4 Ongoing journey time variability on the M25 Southwest Quadrant is an issue which has been recognised by Highways England in their Stage 3 report for the M25 South West Quadrant (SWQ). The M25 is of strategic importance to the country and Highways England is promoting a package of measures to resolve congestion issues.

10.5.5 In addition, a number of committed schemes have been identified on the A27 to improve reliability along the corridor.

10.5.6 Given the above, GAL is not proposing any additional mitigation for the SRN, with the exception of the embedded Project mitigation on the M23 Spur between Junction 9 and Longbridge Roundabout, and schemes already envisaged by the highway authorities, as described in Section 10.2.

11 Assessment of Transport Effects: Local Highway and Road Network

11.1 Introduction

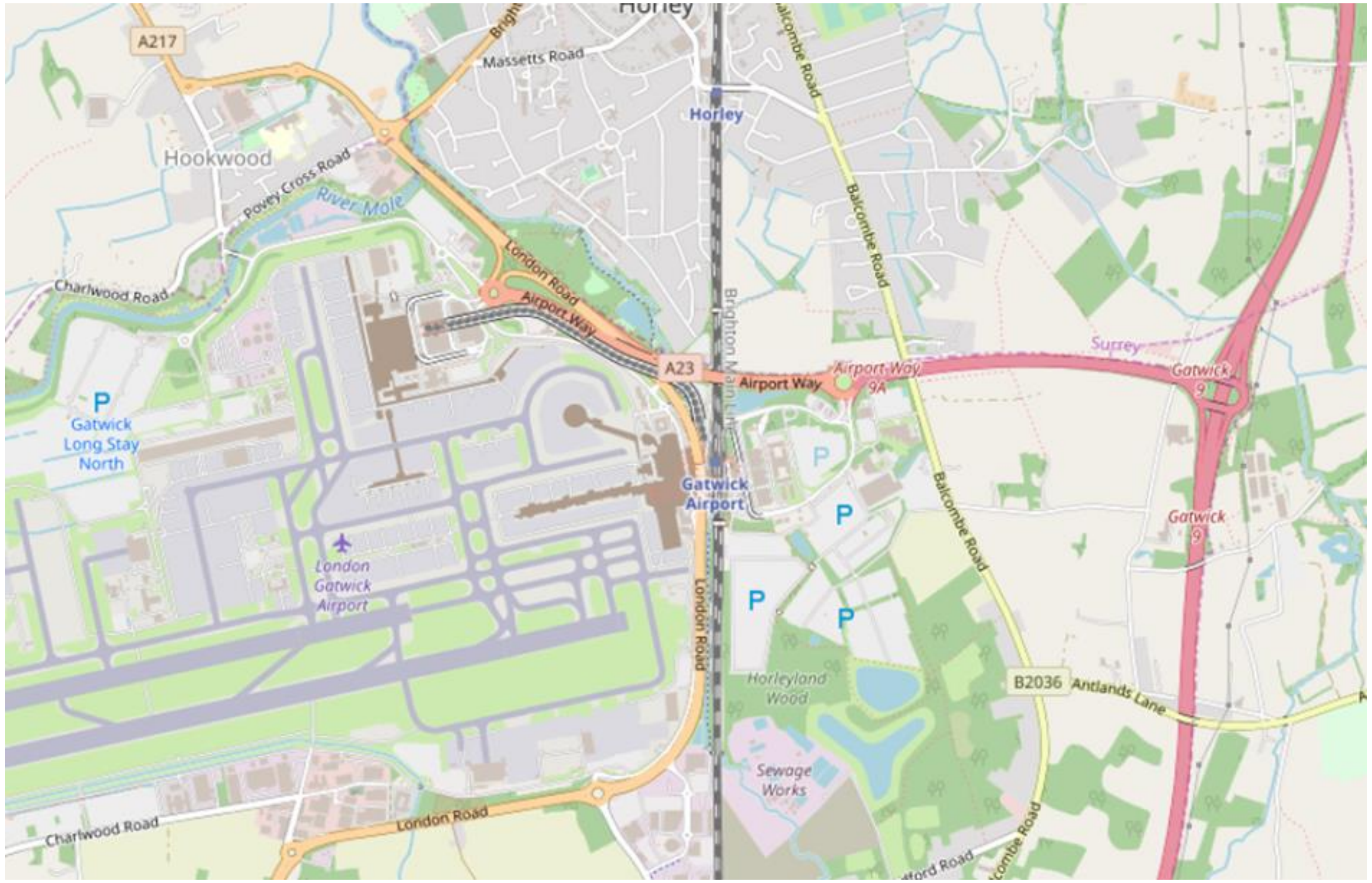
11.1.1 The signed route for access from the motorway to the Airport is via the M23 Spur between Junction 9 and 9a, with direct access to both South Terminal and North Terminal. This is the preferred ‘gateway’ for access to Gatwick by road and is consistent with the current wayfinding strategy. The corridor between M23 Junction 9 and Longbridge Roundabout, including South and North Terminal Roundabouts, is therefore fundamental to the successful operation of the Airport.

11.1.2 The A23 represents an important north-south strategic route as well as providing local access. 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 4 km south of Gatwick’s South Terminal.

11.1.3 Some traffic from south of the Airport can access the airport via Junction 10 of the M23 as an alternative route. Currently, this is not as attractive to passengers as this is a longer route in distance and time. However, some delivery and logistics movements related to the Airport may still access the Airport from the south.

11.1.4 Diagram 11.1.1 shows the road network in the area around Gatwick including connection to the M23 motorway.

Diagram 11.1.1: Highway network in the vicinity of the Airport including the M23 spur



Source: Open Street Map

11.2 Approach and Methodology

VISSIM Models

11.2.1 For the PEIR, the strategic highways model developed in SATURN is the primary highway assessment tool, informing demand on links and through junctions as well as variation in speeds to be fed into more detailed junction modelling using VISSIM.

11.2.2 Gatwick has three VISSIM traffic simulation models which can be used to test detailed highway junction performance. These comprise the following.

- A 24 hour Corridor model to test flows, congestion and mitigation on the highway network around Gatwick Airport.
- Two 24 hour Terminal Forecourt models, one for the South Terminal and one for the North Terminal, including detailed pick-up and drop-off behaviour and dwell, car parking etc. to test how the forecourts perform.

11.2.3 The Corridor model has been used to test highway junction performance and congestion effects of growth at the Airport both in the Baseline and with Project.

Corridor Model

11.2.4 The Corridor Model includes south Horley from the junction at Massetts Road and A23 Brighton Road, down through Longbridge Roundabout, east through North and South Terminal Roundabouts, along the M23 Spur to Junction 9 of the M23. The model also extends down the A23 London Road into North Crawley, including roads connecting to the Manor Royal estate, as per Diagram 11.2.1.

11.2.5 In 2016, the Corridor Model was recalibrated based on an extensive data collection exercise and is considered a robust base to take forward and uplift for future analysis of impacts related to future growth at Gatwick. For the purposes of the PEIR and for consultation, the Corridor Model is being used to test highway link and junction performance around the Airport to confirm the findings of the strategic highway modelling which is the primary highway assessment tool.

Highway Network

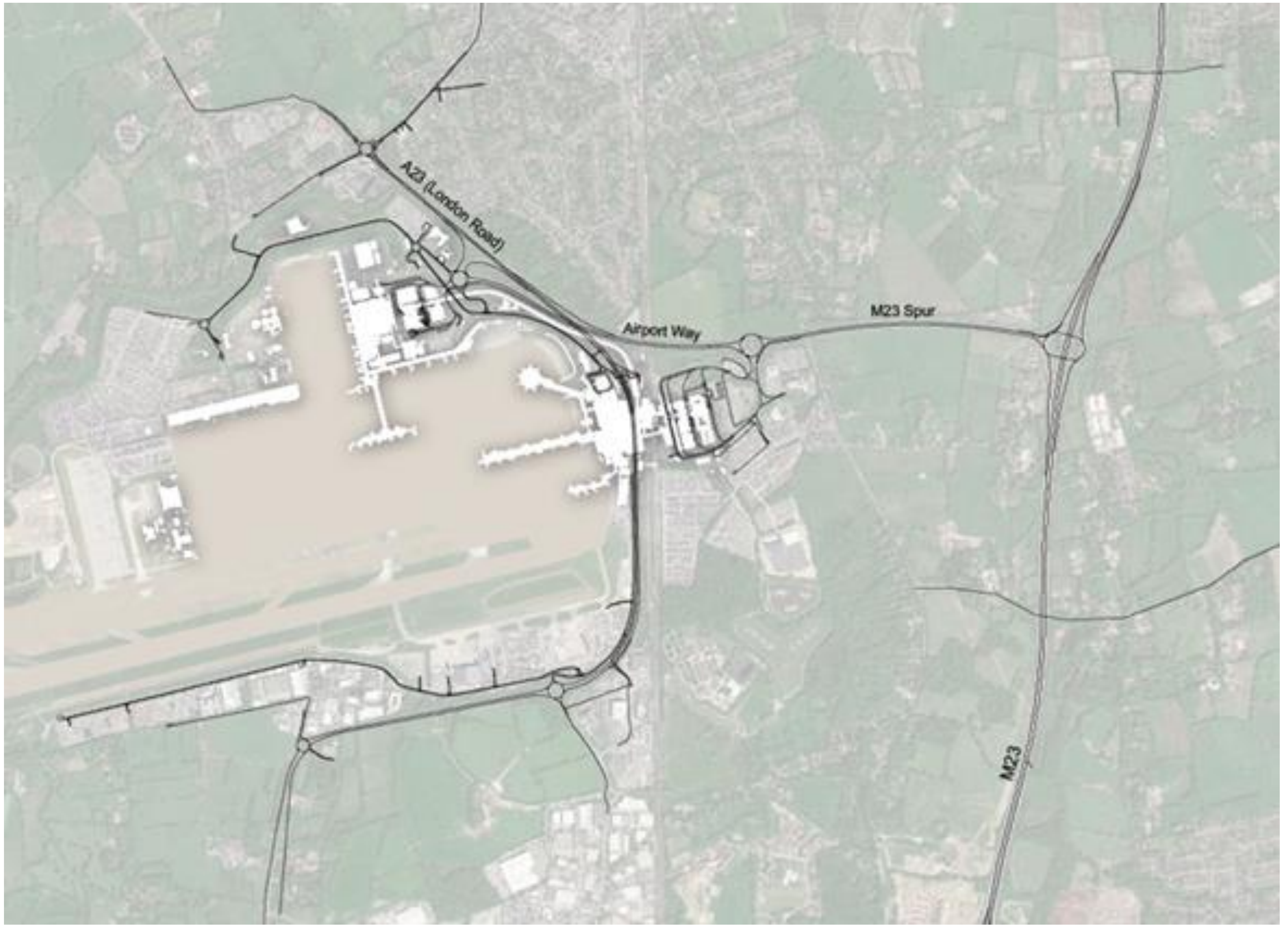
11.2.6 The following highway network improvements are included in the VISSIM model.

Highway England Smart Motorways

11.2.7 The Highways England Smart Motorways scheme forms part of its wider strategic highway investment programme.

11.2.8 The programme involves the delivery of £15bn of investment in England's motorways and major A roads. Key initiatives include conversion of the hard shoulder to be used for additional traffic capacity, along with technology enabled methods for monitoring congestion, changing speed limits, activating warning signs and closing lanes.

Diagram 11.2.1: VISSIM Corridor Model Extents



11.2.9 The 11 mile section along the M23, between Junctions 8 to 10, was completed in 2020 and includes the following features which are relevant and have been included in the future baseline VISSIM model.

- Conversion of the hard shoulder on the M23 to a permanent running lane, increasing it from three to four lanes in each direction.
- All on and off ramps, from the M23 to J9, being widened to allow two separate lanes connecting into the mainline. The current configuration has a single lane off and on the mainline widening to two lanes by Junction 9.
- The traffic signals on Junction 9, at the intersection with the M23 northbound off ramp, will be removed. A new bypass lane provides a free-flowing left turn movement towards Gatwick Airport.
- Additional capacity on the M23 spur by increasing it to three lanes in the westbound direction between Junction 9 and South Terminal Roundabout.

Capital Investment Plan (CIP) Improvements

11.2.10 Modelling of Capital Investment Plan (CIP) demand to between 53 and 55 million passengers per annum through the Airport shows the need for signalisation and local widening at both terminal roundabouts to cater for short-term increases in Airport and background demand. These works form the basis of a separate project currently being discussed between Gatwick Airport and Highways England which will be implemented in the mid-2020s.

11.2.11 Proposed highway improvements include local widening on the junction entry/exit lanes for both the North Terminal and South Terminal roundabouts, together with signalisation of the roundabouts and provision of enhanced signage as shown in Diagram 11.2.2 and Diagram 11.2.3.

11.2.12 These improvements are included in the VISSIM assessment from 2029 onwards.

11.2.13 In addition, the CIP modelling shows that without improvements to the South Terminal roundabout, this junction acts as a 'throttle' during busy periods, limiting eastbound traffic flows heading out to the M23.

11.2.14 The CIP improvements release additional traffic through the junction though two lanes eastbound towards Junction 9 still provide appropriate capacity to accommodate this demand. However, grade-separation with Project, releases this 'throttle' and accordingly three lanes in the eastbound direction between South Terminal Roundabout and Junction 9 are recommended, mirroring the Smart Motorways enhancements on the westbound carriageway. Three lanes eastbound along the Spur have therefore been included in the VISSIM model for all future testing with Project.

Diagram 11.2.2: CIP improvement works to South Terminal Roundabout

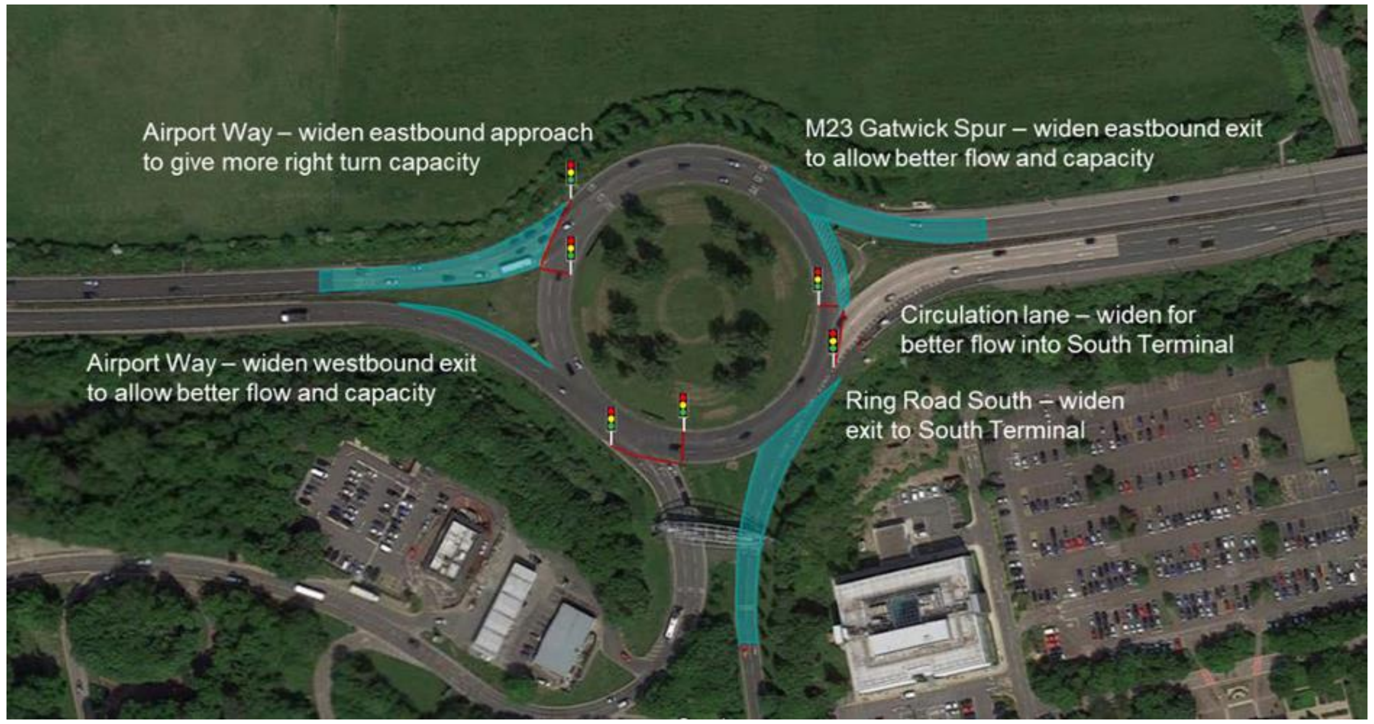
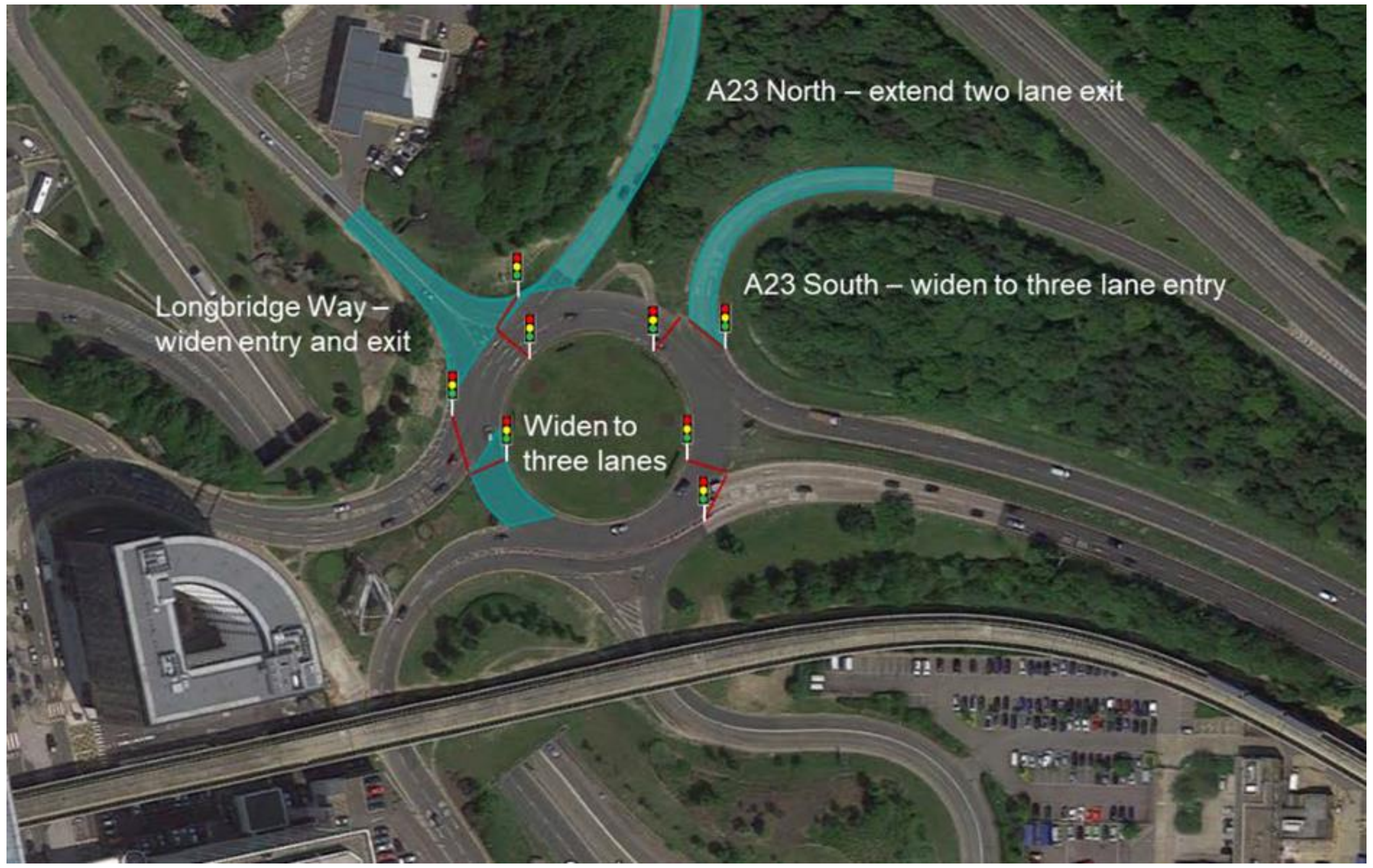


Diagram 11.2.3: CIP improvement works to North Terminal Roundabout



Car Parking Strategy

11.2.15 A number of new car parks are proposed for implementation in the Future Baseline. These include the following:

- New multi-storey car parking capacity (MSCP4 and MSCP7) with 4,250 spaces; and
- Use of robotics technology within existing long stay parking areas, resulting in an additional 2,000 to 2,500 spaces.

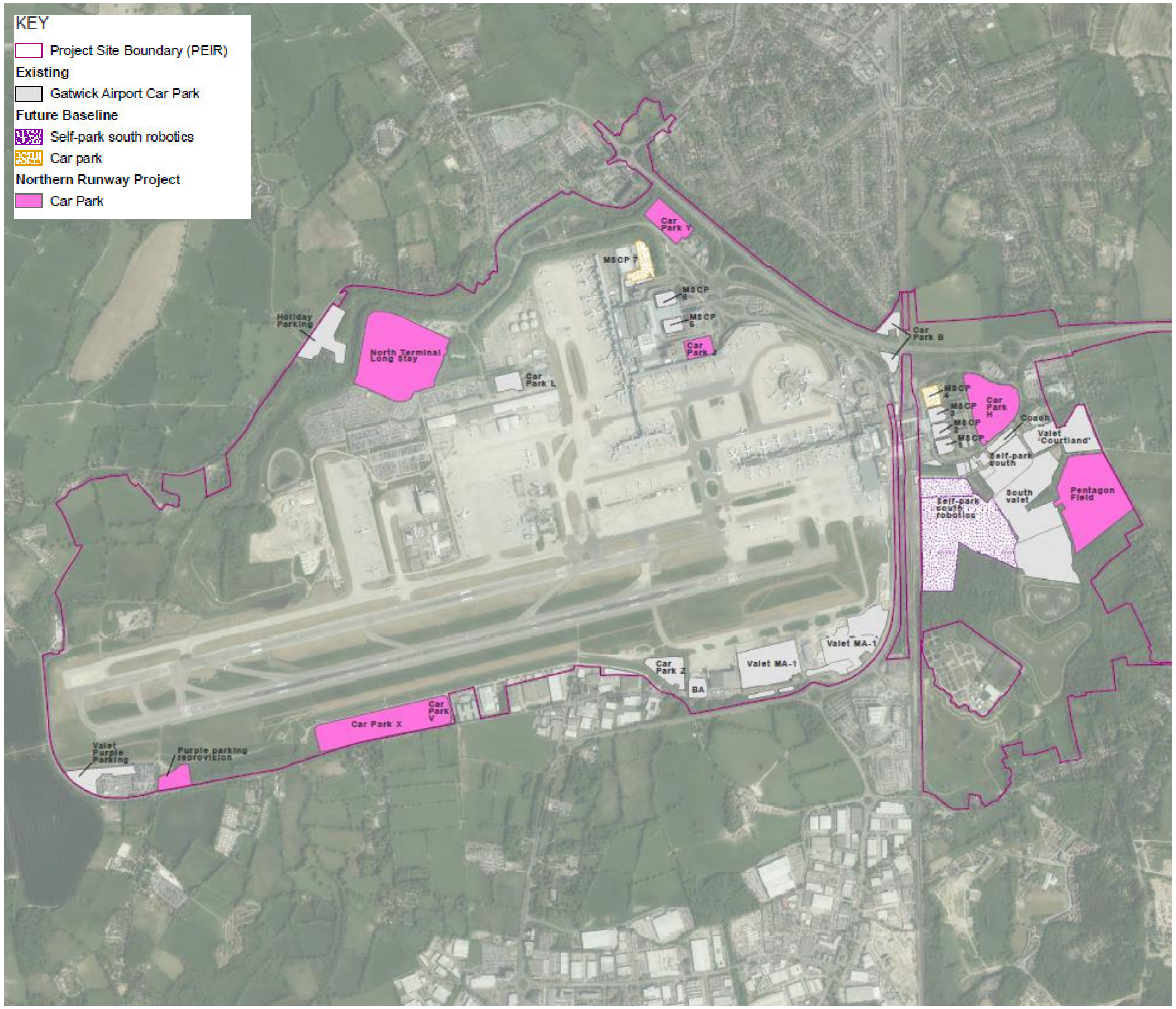
11.2.16 This will take future car parking provision on airport up to approximately 53,450 spaces in the absence of the Project.

11.2.17 New car parking will be required on site in order to meet additional parking demand generated by the proposed increase in passengers with Project, and to replace existing parking spaces that may be lost owing to development associated with the Project. Gatwick's plans also take into account an anticipated reduction in the number of spaces currently provided in unauthorised car parking sites away from the airport, in line with GAT3 requirements. 3,300 spaces are to reduce off airport parking from 6,300 to 3,000 spaces. The overall net increase in car parking spaces by 2047 with the Project could be approximately 18,500 spaces.

11.2.18 The location of car parks in the Future Baseline and Project scenarios are shown in Diagram 10.2.4. These car parks and the mix of passenger and staff parking in the GAL car parking strategy is included in the modelling.

11.2.19 It should be noted that the amount of car parking shown is the potential maximum to provide confidence that Gatwick has enough space to accommodate its parking needs. However, the aim of the Project ASAS will be to maximise sustainable modes and accordingly it may be that not all of this potential space for car parking is used.

Diagram 11.2.4: GAL Car Parking Strategy with Project



11.3 Comparison of Future Baseline and Project Scenarios

Highway Capacity

No Mitigation, 2032

11.3.1 Initial testing shows that Future Baseline can be accommodated on at-grade network assuming the CIP improvements to 2032. As per Diagram 11.3.1, the 2032 Future Baseline average speed plot shows that the majority of the network continues to operate well, with the exception of queueing on the approaches to Longbridge Roundabout.

11.3.2 The average speed plots show that the PM peak has very similar operation to the AM peak, as per Diagram 11.3.2 with some additional slow moving traffic at the merge eastbound from A23 London onto Airport Way.

11.3.3 Introducing changes in passenger growth with Project in 2032, the average speed plots show more congested conditions than in 2032 with demand related to the Northern Runway but without the mitigation proposed as part of the Project (Diagram 11.3.3 and Diagram 11.3.4). In particular long queues form at South Terminal roundabout, effecting egress from the terminal and which block back to adjacent junctions including M23 J9, which in turn effects slip road operation.

11.3.4 Given the congestion shown by the model with the 2032 Future Baseline network with Project demand, equivalent to 72.3 mppa, Gatwick has made the decision that mitigation will be required on the highway network to support additional growth with Project, out to 80.2 mppa by 2047, otherwise there will be potential for delays on the network.

11.3.5 Gatwick Airport has therefore explored the potential mitigation required to deliver appropriate capacity at both terminal roundabouts, including grade-separation, as well as Longbridge roundabout with this being provided prior to 2032. The scope and scale of the highway mitigation is described in Section 10.

Diagram 11.3.1: 2032 Future Baseline – Average Speeds, AM Peak

Diagram 11.3.2: 2032 Future Baseline – Average Speeds, PM Peak

Diagram 11.3.3: 2032 Future Baseline Network with Project Demand – Average Speeds, AM Peak

Diagram 11.3.4: 2032 Future Baseline Network with Project Demand – Average Speeds, PM Peak

With Mitigation, 2032 and 2047

11.3.6 This section provides VISSIM average speed plots for a mitigated network with Project growth. These plots show the current option for embedded highway improvements which involves a grade-separated South terminal roundabout; a signalised junction at the North Terminal beneath a flyover which takes through traffic over the junction; and an enhanced and enlarged roundabout at Longbridge.

11.3.7 The embedded highway mitigation measures in 2032 with Project reduce the congestion impacts of higher demand, as shown for the AM peak period in Diagram 11.3.5.

11.3.8 The model shows the network is accommodating the proposed growth, with no significant queuing in any location. High volumes of traffic in some areas result in the slowing of vehicles speeds in and around the North Terminal junction and Longbridge roundabout but this is predominantly as a result of vehicles waiting for the next green phase at traffic signals. The M23 southbound off-slip is busy but the modelling shows free flow traffic on the mainline.

11.3.9 The average speed plot for the PM peak is shown in Diagram 1.1.6 for 2032 with Project and show very similar operation to the morning peak period but with improved performance at M23 J9. The embedded highway mitigation measures as part of the Project mean that the network is shown by the modelling to be operating within capacity in 2032.

11.3.10 By 2047, the network would be busier in peak periods as a result of Project growth.

11.3.11 The average speed plot for the AM peak is shown in Diagram 1.1.7 for 2047 with Project. The embedded highway mitigation measures with Project aim to reduce congestion as much as possible. However, the increase in passenger demand with Project as well as increased background traffic to 2047 shows that vehicle speeds will reduce, with longer queues on the approaches to some junctions. However, the network continues to maintain an acceptable level of performance without queuing back into adjacent junctions.

11.3.12 In the PM peak, shown in Diagram 1.1.8, results are very similar to the AM peak but with improved performance at M23J9 due to the lower southbound off slip flows.

Conclusions

11.3.13 With Project and background traffic growth to 2047, VISSIM modelling shows some localised areas where the network is busy even with the proposed mitigation. However, some slower moving traffic and congestion is to be expected given that the modelling is to a 2047 horizon and indicates that the network has been sized appropriately. This operation is broadly in line with that predicted to occur in the 2032 Future Baseline, with improvements at the operation in some locations such as Longbridge Roundabout. As such the proposed mitigation is sufficient to provide for the expected growth but does not over-provide network capacity

11.3.14 As required and in conjunction with highway authorities, the highway designs will be adjusted in line with VISSIM modelling to provide further improvements by DCO submission.

Diagram 11.3.5: 2032 with Project – Average Speeds, AM Peak

Diagram 1.1.6: 2032 with Project – Average Speeds, PM Peak

Diagram 1.1.7: 2047 with Project – Average Speeds, AM Peak

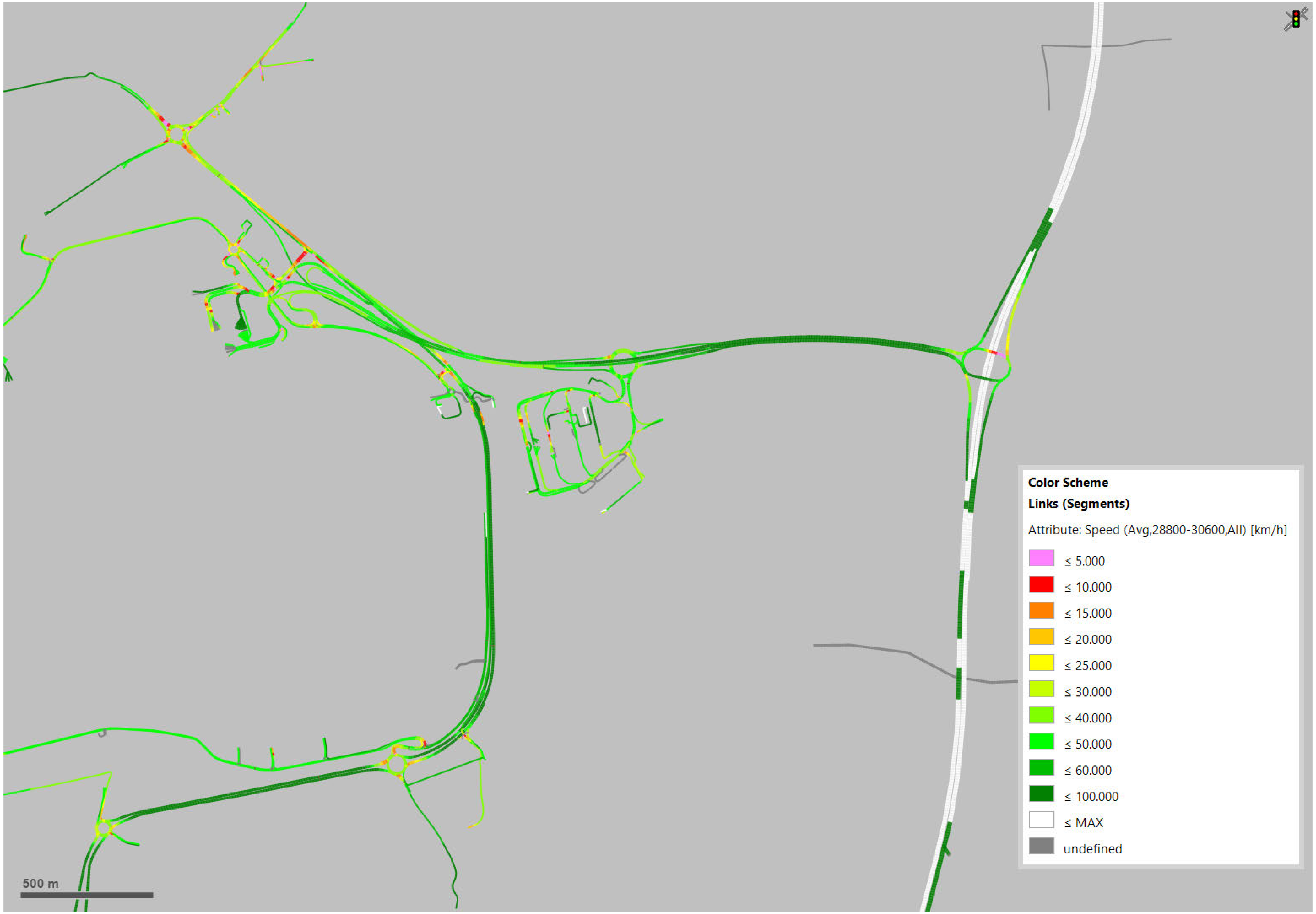
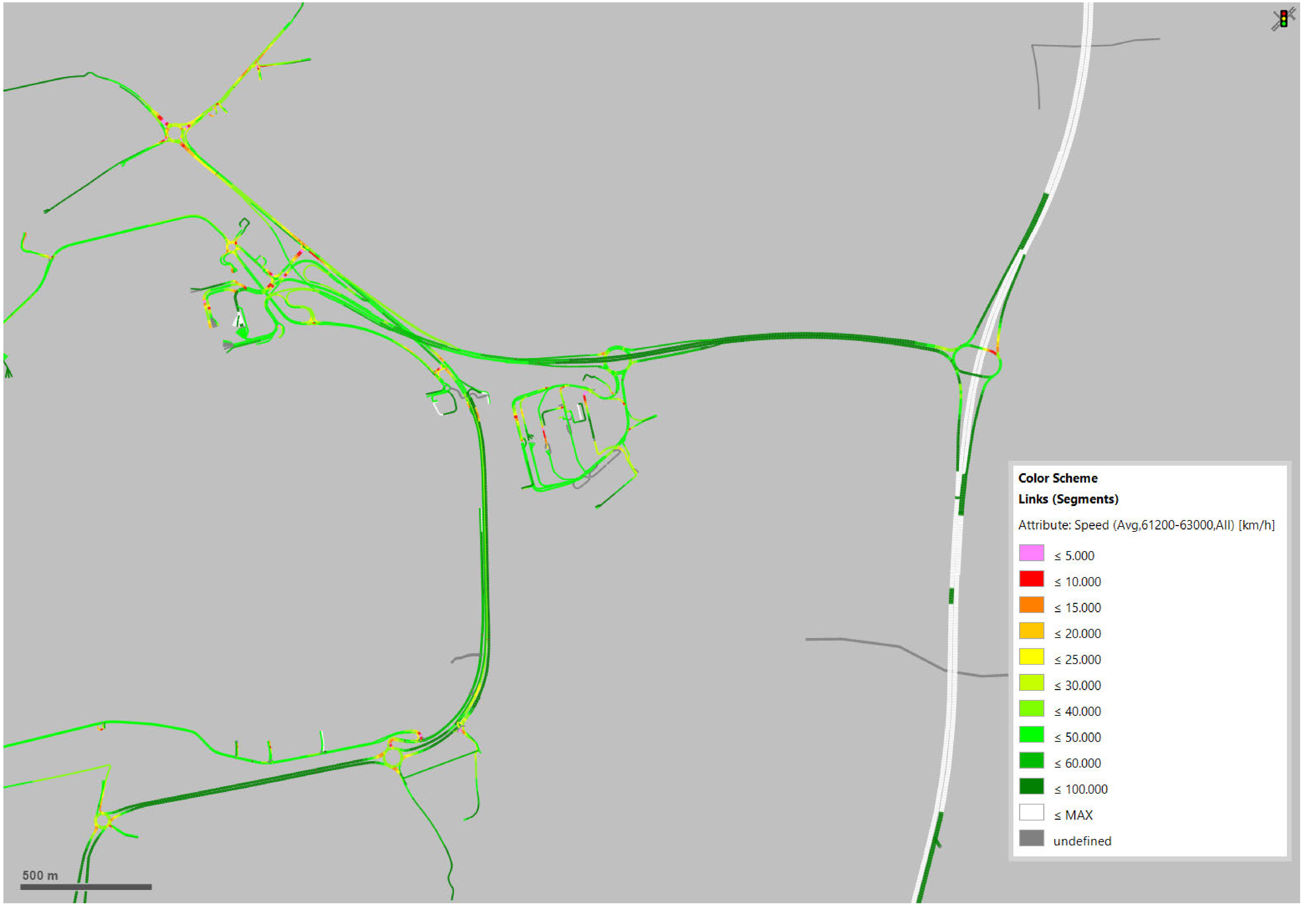


Diagram 1.1.8: 2047 with Project – Average Speeds, PM Peak



11.4 Forecourt Operations

11.4.1 Gatwick's Forecourt Design Technical Standard (2012) set out the user hierarchy that forecourts should aim to achieve, in order to be able to prioritise transport modes. This hierarchy is shown in Diagram 11.4.1 and reflects Gatwick's prioritisation of the most sustainable vehicle modes.

Diagram 11.4.1: User hierarchy in Gatwick's Forecourt Design Technical Standard (2012)

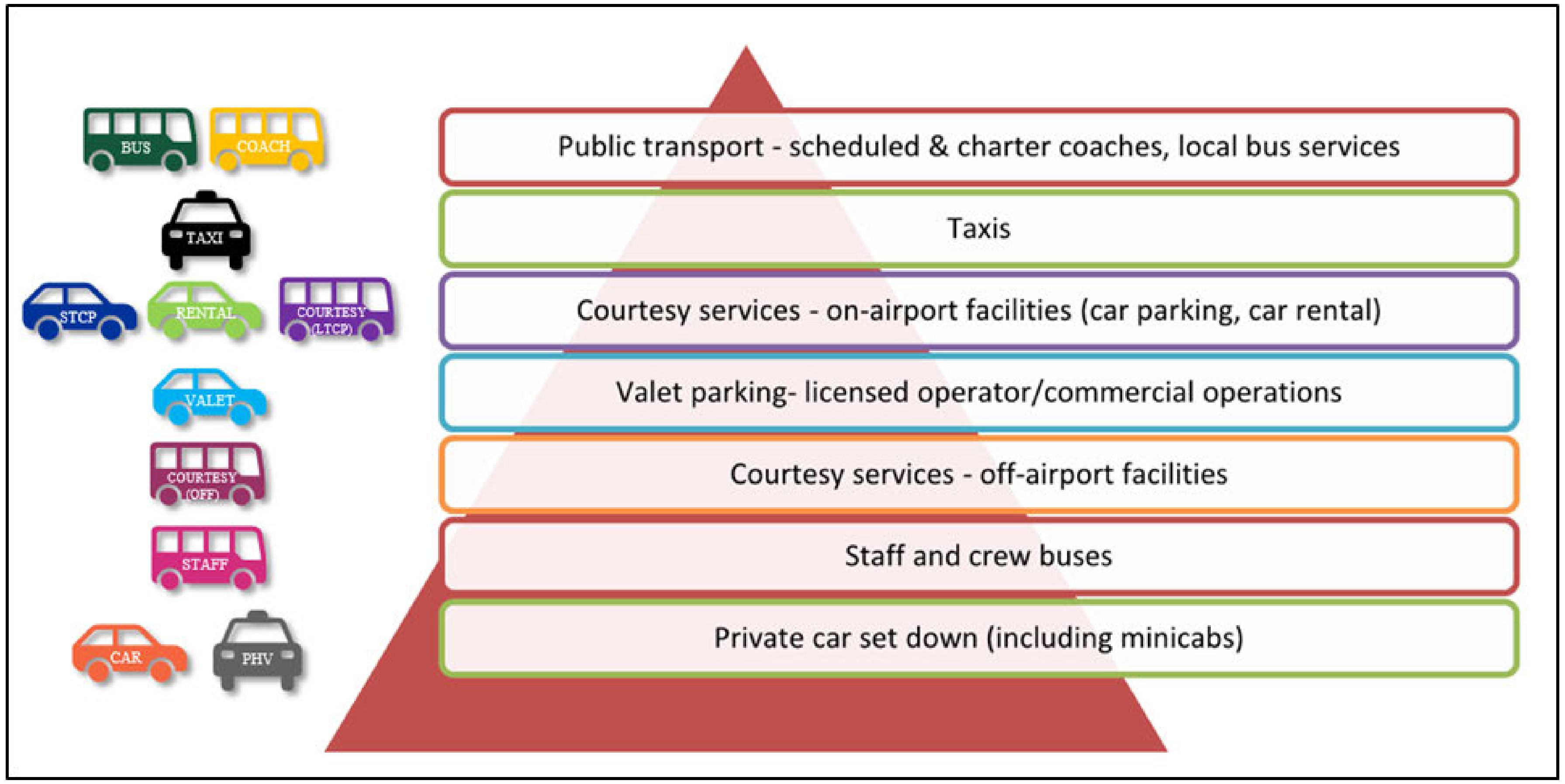
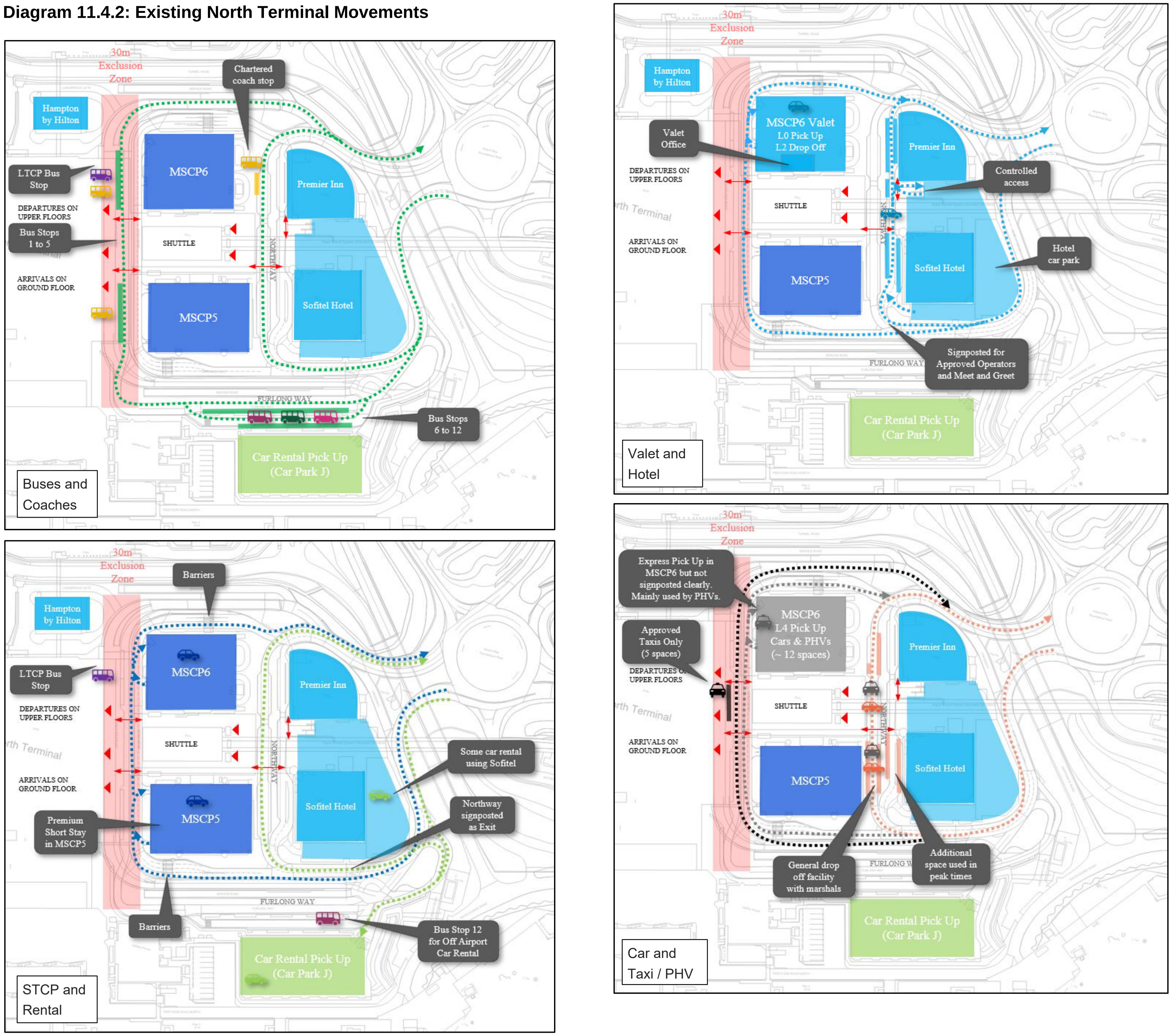


Diagram 11.4.2: Existing North Terminal Movements



Current Forecourt Operation

North Terminal

11.4.2 The North Terminal forecourt is accessed off the Airport Way / London Road roundabout. The extent of the forecourt includes two multi-storey car parks (MSCP5 and MSCP6), three hotels and an area for car rental. There is a bus station on Furlong Way to the south and there are additional bus stops by the terminal entrance. Drop-off activity currently takes place on Northway, located between the car parks and hotels. Northway is also used by the hotels.

11.4.3 In March 2021, Gatwick introduced forecourt charging at North Terminal and this is enforced by Automatic Number Plate Recognition along Northway. Car rental vehicles have been whitelisted and can use Northway without being charged. Free drop-off is provided in North Terminal long-stay for those who do not wish to pay.

11.4.4 The forecourt charges are:

- £5 for 10 minutes, and £1 for each additional minute, up to 20 minutes.
- The maximum charge is £25 and the maximum length of stay is 30 minutes.

11.4.5 People picking up passengers are signed to do so from the short stay car parks as it often takes more time to collect passengers.

11.4.6 Prior to Covid-19, Northway was heavily used, and it was observed that vehicles sometimes do not pull up parallel to the kerb or double park, which holds up traffic or creates unsafe overtaking movements. Vehicles tend to use the southern end more than the northern end of the Forecourt, potentially owing to visibility issues and uncertainty of getting a parking space beyond the shuttle bridge structure.

11.4.7 The upper Forecourt has restricted access for VIP drop off only.

11.4.8 Diagram 11.4.2 illustrates the existing vehicle movements in the North Terminal forecourt.

South Terminal

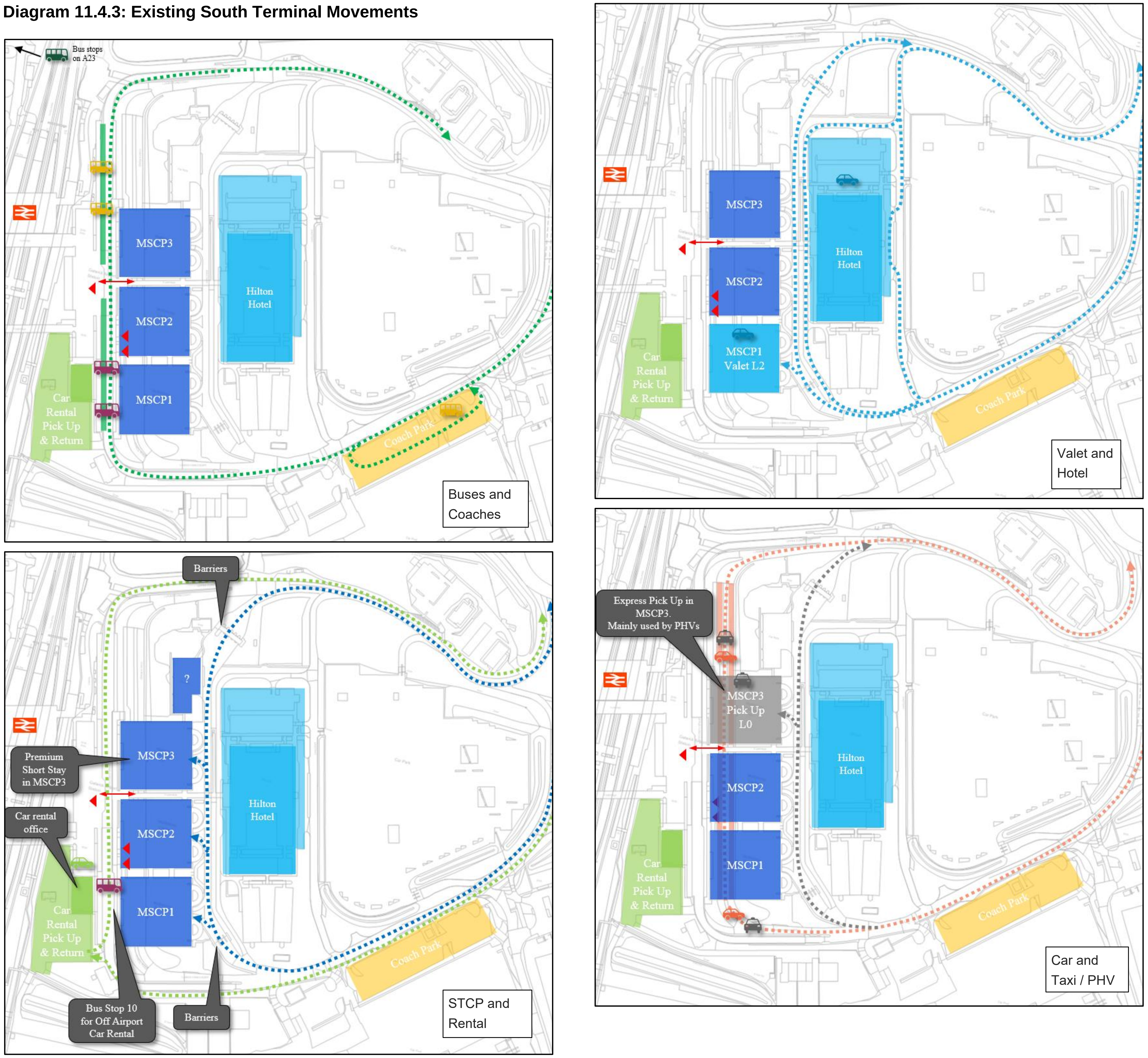
11.4.9 The South Terminal forecourt is accessed off the M23 / Airport Way roundabout. The extent of the forecourt includes three multi-storey car parks MSCP1 – 3), Hilton hotel and an area for car rental. There is a separate coach park on the approach to the forecourt. Bus stops are located by the terminal entrance, drop-off activity takes place on Coach Road. Access to the multi-storey car parks is from Westway.

11.4.10 Forecourt charging was introduced at South Terminal in April 2021, with the same charges as at North Terminal. Prior to the Covid-19 pandemic, it was observed that queuing occurs at the primary drop-off kerb during busier times, with vehicles prioritising spaces near to the forecourt entry point. The secondary drop-off area is often underutilised which is a feature of drivers having to make a decision about which lane to be in before being able to see the kerbside occupancy. Steps have been taken to improve signage as part of the forecourt charging works. Free drop-off is provided in South Terminal long-stay for those who do not wish to pay.

11.4.11 The upper Forecourt has restricted access for long stay car park buses, approved taxis, premium valet and electric car rental only.

11.4.12 Diagram 11.4.3 illustrates the existing vehicles movements in the South Terminal forecourt.

Diagram 11.4.3: Existing South Terminal Movements



Estimated Future Forecourt Requirements

11.4.13 Initial estimates have been undertaken for drop off / pick up demand using landside passenger forecasts and existing departure mode shares with some amendments to reflect rail targets.

11.4.14 Whilst the North Terminal handles more than half of Gatwick Airport demand now and into the future, the terminal forecourt itself is around half the size of the South Terminal and accordingly static analysis indicates the potential for capacity constraints into the future both for the future baseline and the Project scenarios.

11.4.15 Analysis for the South Terminal indicates that the forecourt is sufficiently sized to accommodate future growth, subject to appropriate utilisation of the full capacity of the forecourt. This will require signage and operational management strategies to make full use of the available space.

11.4.16 The demand for the North Terminal forecourt with the northern runway in operation under the Project scenarios for 2032 and 2047 is shown in Table 11.4.1 below.

Table 11.4.1: North Terminal Forecast drop off / pick up (2032 and 2047 with Project)

	Drop Off / Pick Up Activity	Peak hourly pick up + drop off demand	No. of Spaces Required	
			2 minute dwell time	5 minute dwell time
2032 with Project	**Overall Peak**	**1,424**	**47 (315m)**	**119 (797m)**
	- Arrivals	405	13	34
	- Departures	996	33	83
	Peak Departures	1,086	36	91
2047 with Project	**Overall Peak**	**1,575**	**53 (355m)**	**131 (878m)**
	- Arrivals	464	15	39
	- Departures	1,026	34	86
	Peak Departures	1,157	39	96

Proposed Future Forecourt Strategy

North Terminal

11.4.17 The existing drop off facility on Northway is not expected to be able to accommodate the forecast level of passenger growth for drop-off and pick-up.

11.4.18 The strategy envisages moving drop-off from Northway into the short-stay Multi-Storey Car Parks (MSCPs) which is where pick-up is currently handled.

11.4.19 Accordingly, there is an opportunity to reconfigure the North Terminal forecourt to provide more capacity for drop off and also to increase priority for buses.

11.4.20 The proposed strategy at North Terminal also opens up the potential option for Northway to be repurposed as the primary bus station, which would be more visible and have more direct pedestrian access from the terminal building than Furlong Way.

11.4.21 Car rental is proposed to be relocated and consolidated to the South Terminal and a new multi-storey car park is proposed to the south of Furlong Way.

11.4.22 Diagram 11.4.4 below illustrates the proposed vehicle movements in the North Terminal forecourt.

South Terminal

11.4.23 The South Terminal forecourt generally has more capacity than the North Terminal and it is not expected that significant changes are required. Additional highway infrastructure is proposed to create the same charging regime as at North Terminal. The use of MSCP3 for pick up / drop off could also be expanded.

11.4.24 Diagram 11.4.5 below illustrates the proposed vehicles movements in the South Terminal forecourt.

11.4.25 The demand for the South Terminal forecourt with the northern runway in operation under the Project scenarios for 2032 and 2047 is shown in Table 11.4.2.

Table 11.4.2: South Terminal Forecast drop off / pick up (2032 and 2047 with Project)

	Drop Off / Pick Up Activity	Peak hourly pick up + drop off demand	No. of Spaces Required	
			2 minute dwell time	5 minute dwell time
2032 with Project	**Overall Peak**	**1,424**	**47 (315m)**	**119 (797m)**
	- Arrivals	405	13	34
	- Departures	996	33	83
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2047 with Project	**Overall Peak**	**1,575**	**53 (355m)**	**131 (878m)**
	- Arrivals	464	15	39
	- Departures	1,026	34	86
	Peak Departures	1,157	39	96

Diagram 11.4.4: Proposed North Terminal Movements

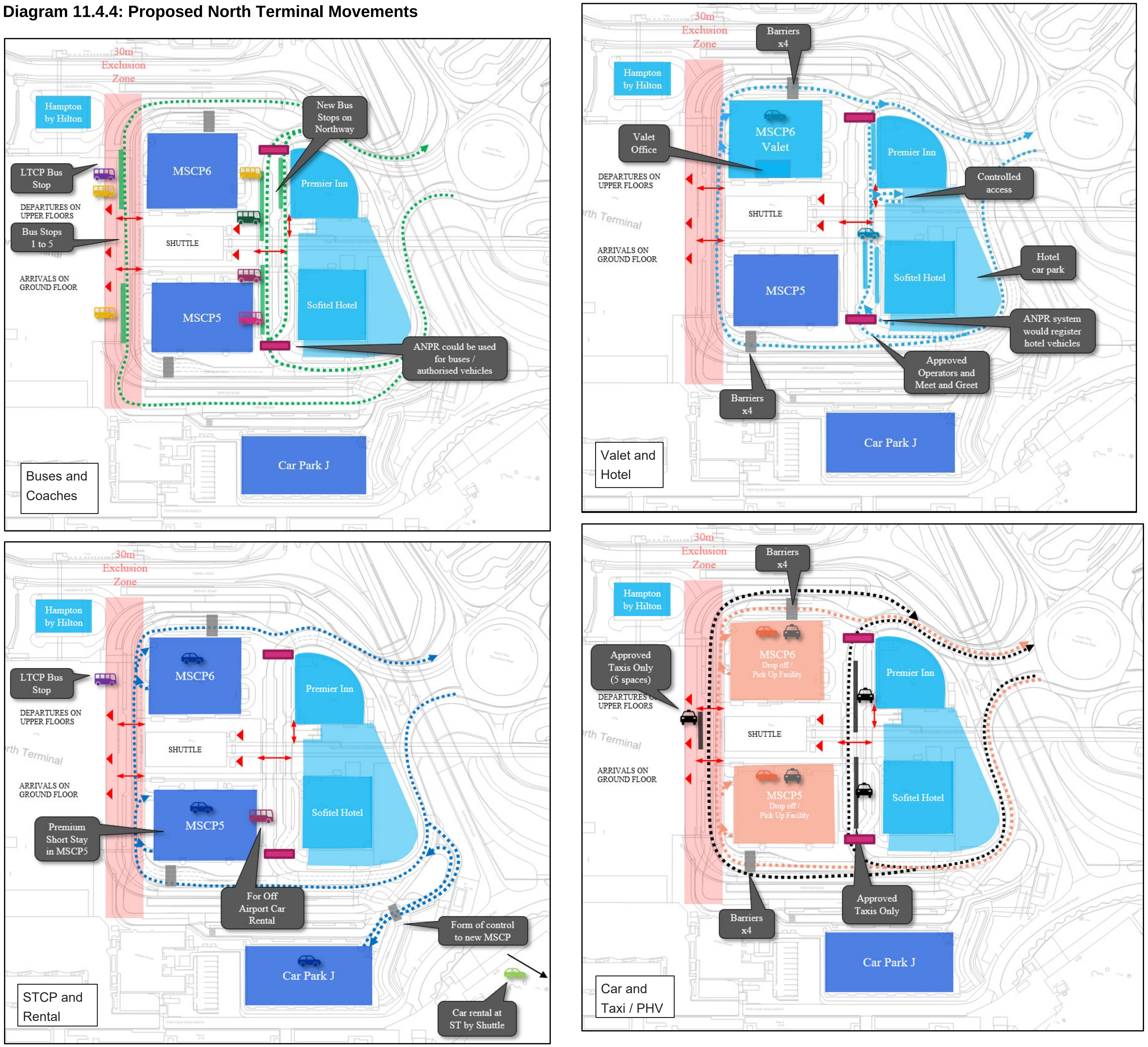
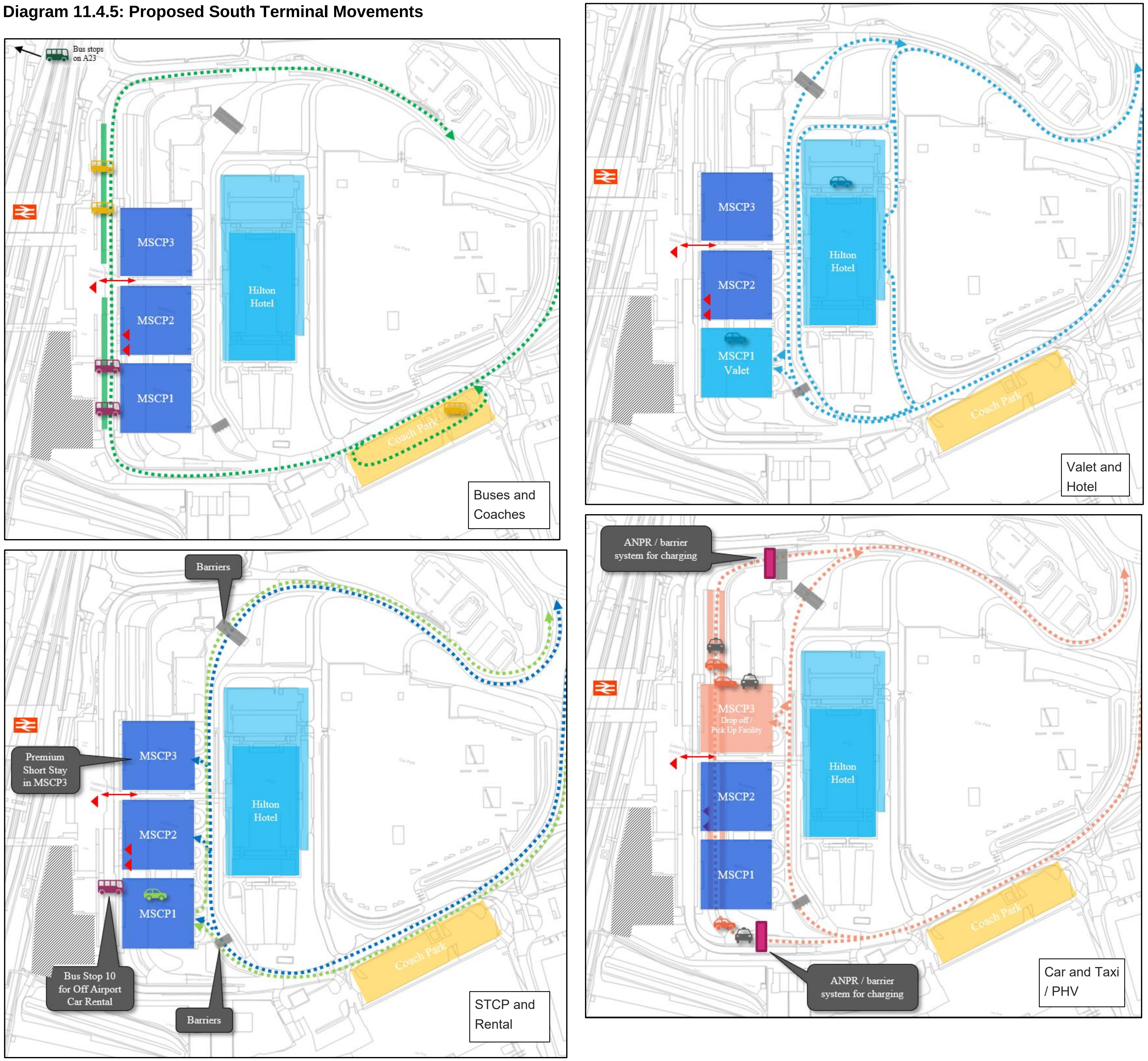


Diagram 11.4.5: Proposed South Terminal Movements



12 Active Travel: Walking and Cycling

12.1 Introduction

12.1.1 Although less than 0.5% of air passengers travel to the airport on foot or by bicycle, these modes are important for employee travel. 3% of staff at the airport regularly walk or cycle to work. These are supported under the 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.

12.2 Approach and Methodology

12.2.1 The attractiveness of walking and cycling to work is influenced by several factors, including distance, safety, the quality of available routes, and the level of amenities and incentives provided on-site (such as showers and lockers).

12.2.2 The latest available employee survey data from GAL has been analysed to map trip-end patterns to better understand the home locations of employees currently using active travel. GIS methods provide the basis for understanding the catchment area for walking and cycling. A qualitative assessment of routes has been undertaken to assess opportunities for increasing walking and cycling mode shares and improving the active travel experience for employees, based on site visits and visual inspection.

12.3 Current Active Travel Patterns at Gatwick

12.3.1 As of the latest GAL survey, approximately 3% of employees walk or cycle to work (about 1% and 2% respectively) on an average day. It is estimated that the average travel time for walk-to-work trips is approximately 25 minutes, or about a 2.5 km walk at an average walking speed. The average travel time for cycling is 22 minutes, which at an average speed of 19 km/hr (or 12 mph) indicates a primary catchment of approximately 6km to 8km. This implies that walking trips are primarily generated from the immediate vicinity surrounding the airport, while cycling trips occur from locations slightly further afield.

12.3.2 Geographic analysis of the employee survey data supports these insights. Data mapped in Diagram 12.3.1 and Diagram 12.3.2 shows walking and cycling trips into Gatwick by staff, assuming 13,000 staff on site on a typical work day.

12.3.3 Approximately 115 employees walk to work at Gatwick, the vast majority of whom – over 70% – live in Horley. While some employees walk from areas in Crawley and towns in Mole Valley to the west of Gatwick, such as Charlwood, most residential areas fall outside the catchment area for walking, especially considering the limited number of entry points into the airport and the busyness of highways around the Airport.

12.3.4 Cycling has a wider catchment area. Of the 216 employees cycling to work, just under half come from Horley and surrounding communities. An additional 32% come in from Crawley, which reflects the fact that while most people find the walk from Crawley too far, it is within a 30-minute cycle of the airport. Small numbers of employees at Gatwick cycle from further areas, such as Horsham, communities in Mid-Sussex and from the north.

12.3.5 Although the overall mode shares for active travel are low when considering all airport employees, they are substantial in the areas immediately surrounding the airport and present a significant opportunity. In central Horley, more than one third of employees walk or cycle to work; in Greenfields to the northwest, this figure is over 20%, and in north-east Horley, it is 15%. In sections of Mole Valley including Hookwood and Charlwood lying just west of airport, walking and cycling mode share is almost 15%, and in areas of Crawley immediately south of Gatwick, over 8% walk and cycle.

Diagram 12.3.1: Home locations of employees walking to work

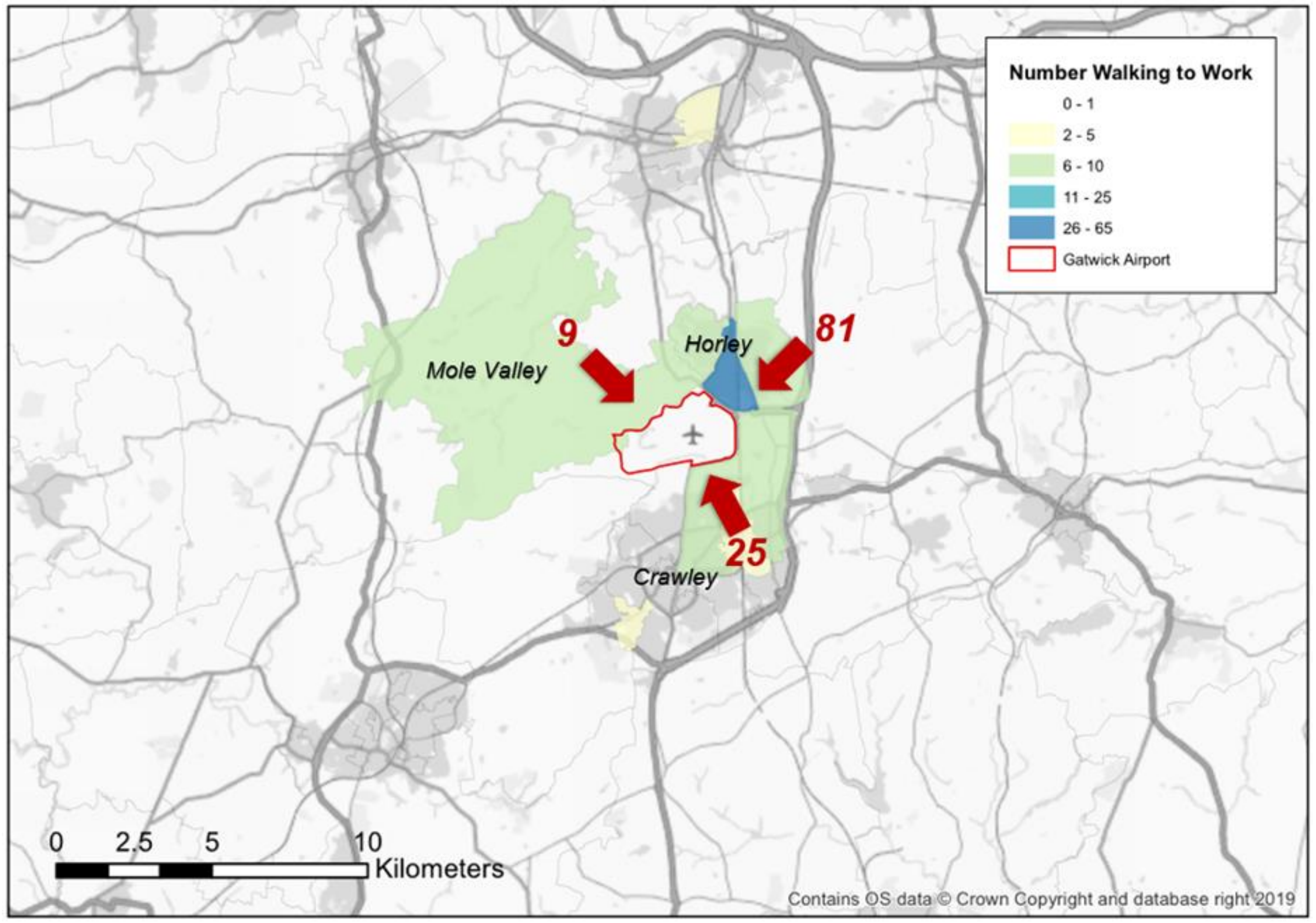
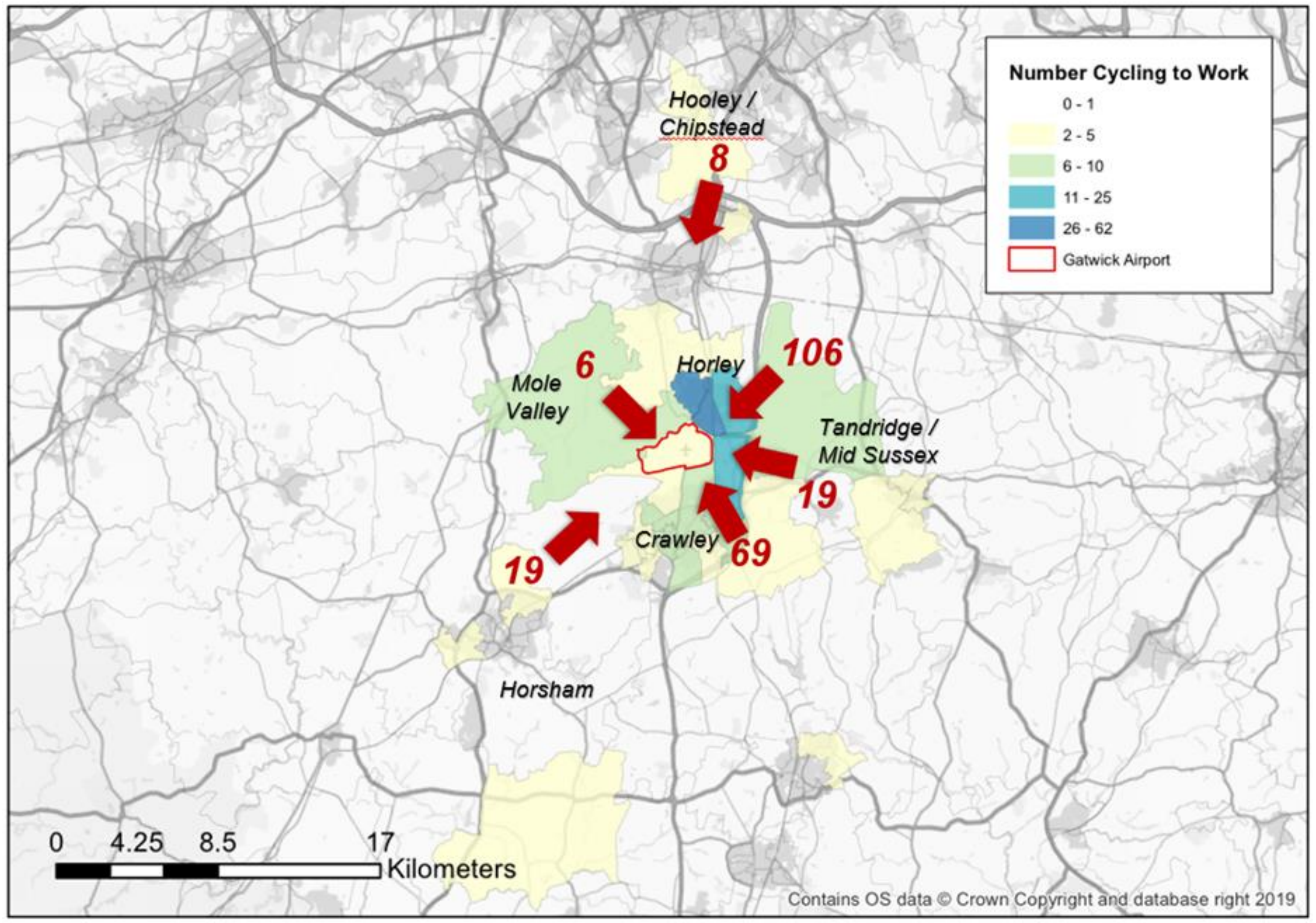


Diagram 12.3.2: Home locations of employees cycling to work



12.4 Active travel infrastructure

Key Routes

12.4.1 Gatwick is connected with its surrounding communities by a network of local streets and highways, as well as National Cycle Network Route 21 (NCN21) which runs north and south to the west of the railway line. Additionally, the areas around the airport are connected by a variety of public footpaths and bridleways, including the Sussex Border Path, mostly providing connectivity through wooded areas and farmland. The network of key links for pedestrians and cyclists is shown in Diagram 12.4.1.

12.4.2 NCN21 provides the key active travel link into the airport, with a mixture of on-road and off-road cycle facilities that result in a disjointed north/south link. A signage strategy has been implemented to direct cyclists and pedestrians along underpasses and overbridges. While some sections of the route provide adequate lighting and priority off-road space, other sections are less well signed and require users to switch to on-road facilities.

12.4.3 Diagram 12.4.2 shows a wider view of cycling routes within 5 km of the airport. This illustrates the connection to Gatwick via local routes into the centre of Crawley. It also shows the Surrey Cycleway through Horley. These routes are primarily on-street but provide connections with the north-south NCN21.

Diagram 12.4.1: Active travel network around Gatwick Airport

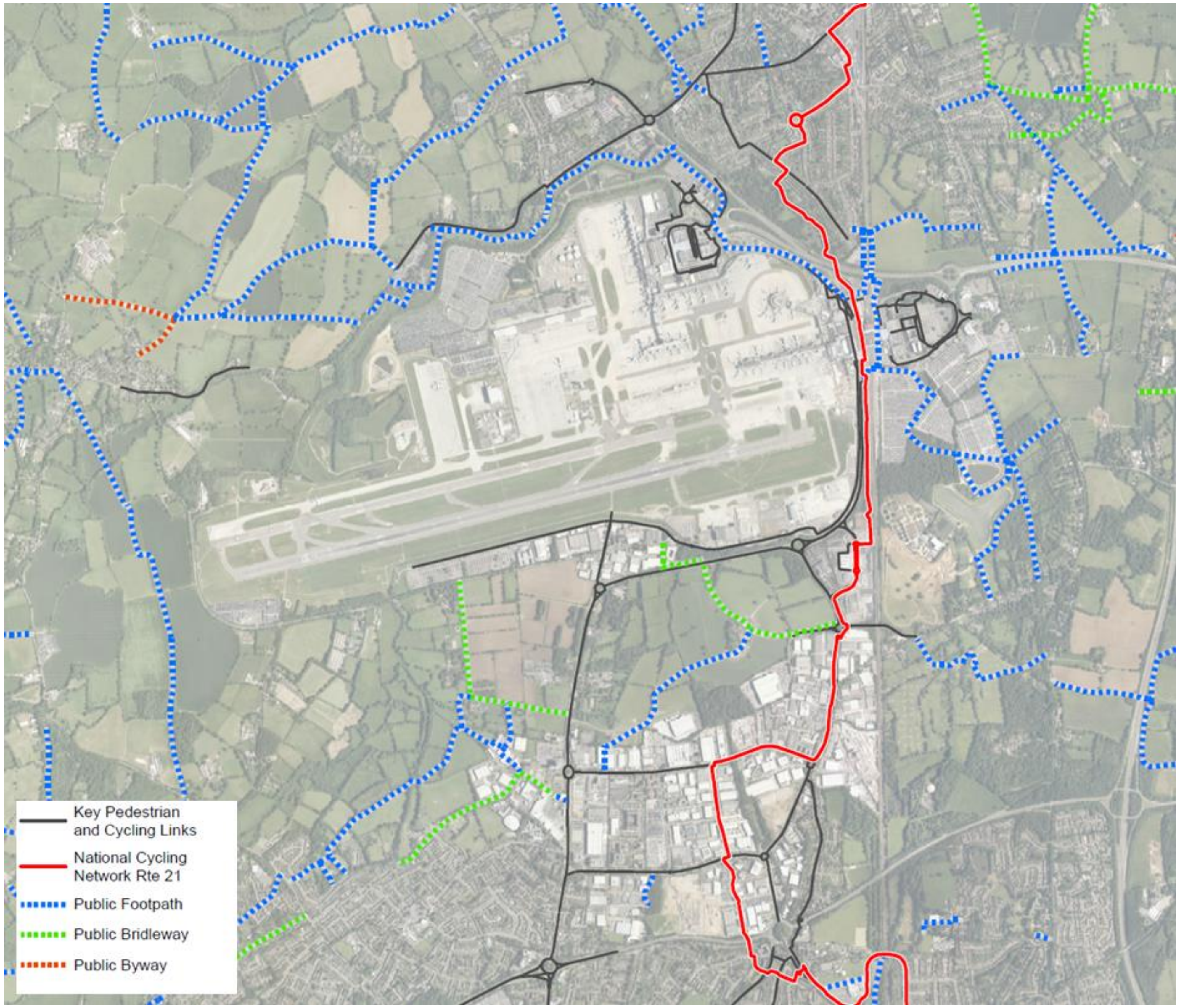
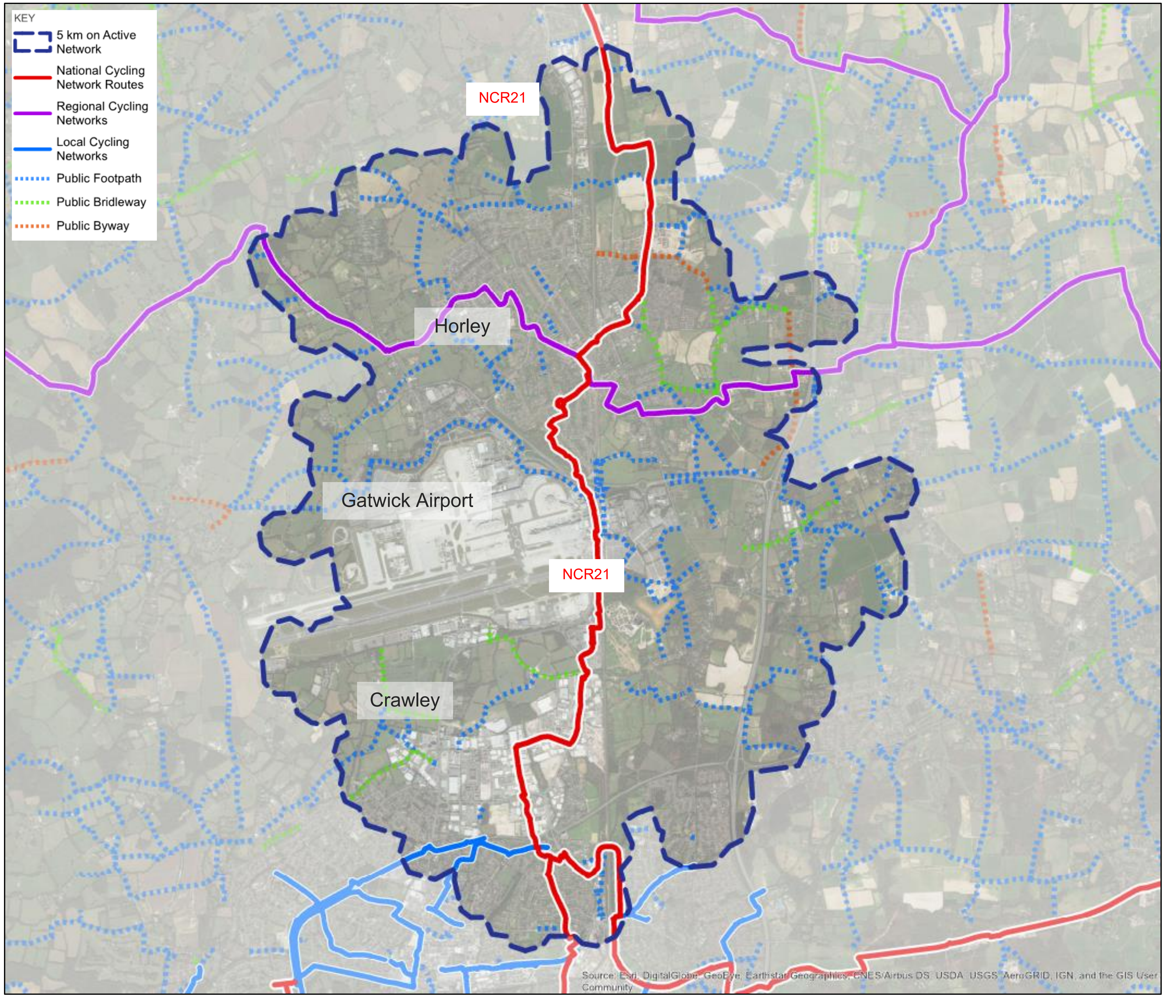


Diagram 12.4.2: Wider cycling network within 5km Gatwick Airport



Source: Open Street Map Data

Airport Access for Walking and Cycling

12.4.4 When considering the walking catchment of Horley, and the cycling catchments of Horley and Crawley, the primary access point to the airport is via the underpass beneath Airport Way by South Terminal. The routes available into this underpass are shown in Diagram 12.4.3.

12.4.5 To the north, there are two options to travel beneath Airport Way towards Horley. The route through Riverside Garden Park is paved and lit and connects directly onto Riverside Road in Horley. It is considered that this route should be promoted as the main walking and cycling route to Horley. To the south, the route directs cyclists onto NCN21 towards Crawley.

12.4.6 From Longbridge Roundabout, there is a public footpath from Povey Cross Road and runs along the A23 London Road towards the North Terminal.

12.4.7 Once on the Airport, the primary route for circulation is via the footpath along Perimeter Road North, which connects the two terminals. There are footways, dropped kerbs, dedicated crossing points within the forecourts.

Diagram 12.4.3: Access Route from NCN 21 and North to South Terminal Area

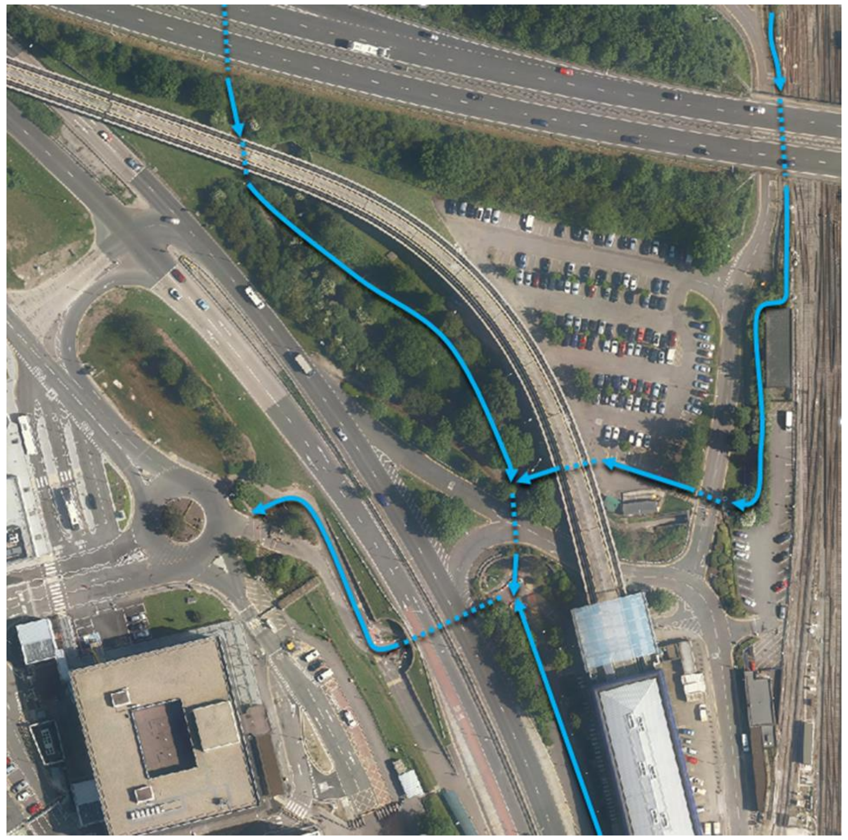
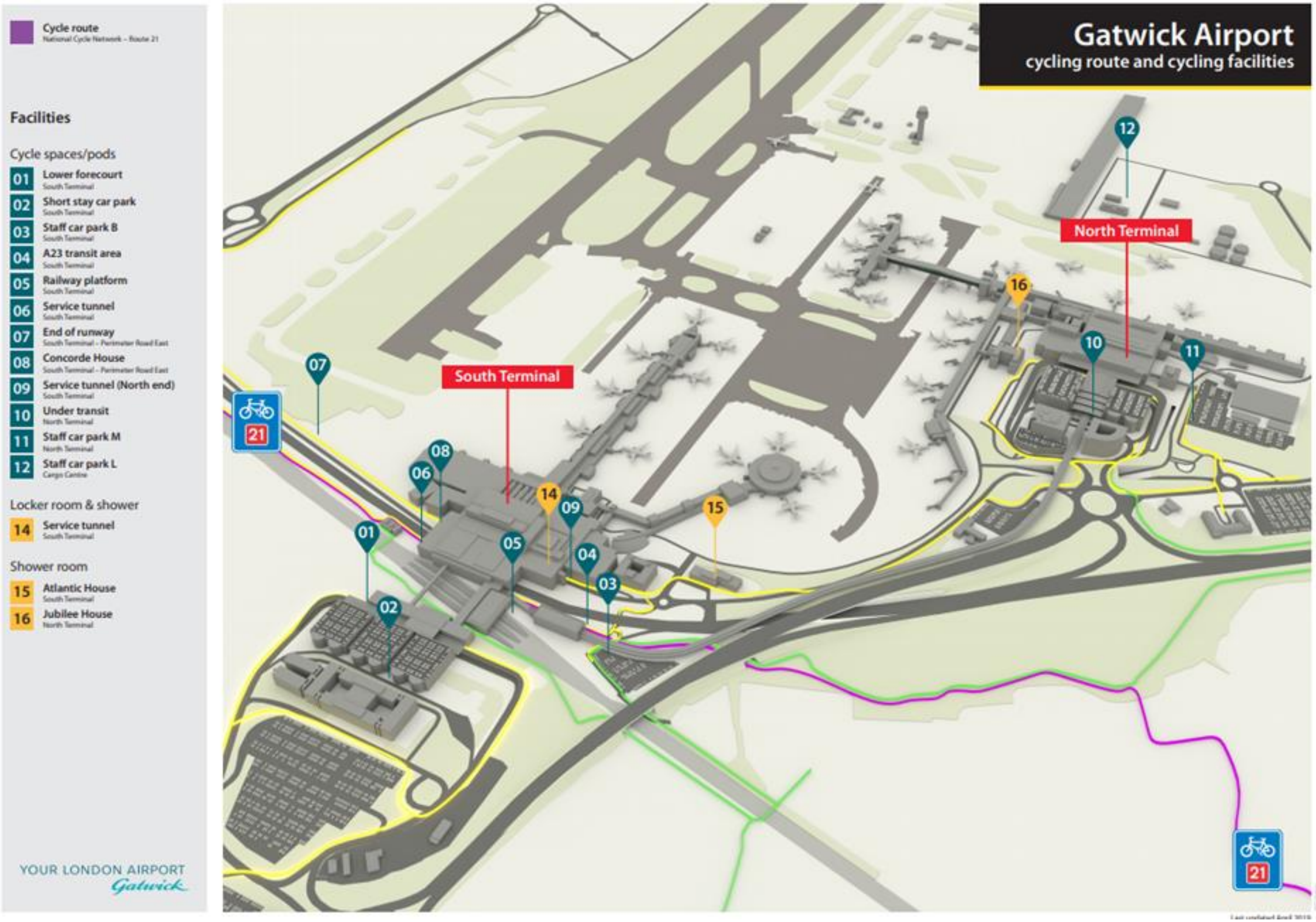


Diagram 12.4.4: Gatwick cycling facilities



Source: https://www.gatwickairport.com/globalassets/to-and-from/airport-cycle-routes-and-facilities.pdf

Bicycle Parking and Amenities

12.4.8 Currently, Gatwick provides upwards of 300 cycle parking spaces for airport staff and the general public. Cycle parking is available in several of the staff car parks, including car parks B, M and L. Much of the parking is clustered in the vicinity of the NCN 21 cycle route.

12.4.9 A locker and shower room is available to staff at the South Terminal, with another shower room at Atlantic House. Jubilee House provides the shower facility at the North Terminal.

Improvements to Walking and Cycling

12.4.10 GAL is exploring options to improve walking and cycling and have submitted proposals to improve linkages alongside the CIP improvements proposed for highways (see Section 11.2.10). The proposals include:

- new footways and pedestrian and cycle bridge over the River Mole to provide a more direct link between Longbridge Roundabout and the North Terminal;
- Provision of signal-controlled pedestrian crossings at the North Terminal roundabout;
- Shared cycle footway along Perimeter Road North; and
- Improved connection to NCN21 at the South Terminal.

12.4.11 The proposals are shown in Diagram 12.4.5 to Diagram 12.4.7.

12.4.12 There is a network of walking and cycling routes to Gatwick and it is proposed that the key routes shown in Diagram 12.4.8 should be promoted as the main access to the airport. These routes are considered to be more direct and of higher quality, suitable for staff and local residents, compared to the alternative public rights of way routes which may be more suitable for leisure users and ramblers, such as the Sussex Border Path.

12.4.13 At this stage and to be conservative, no walking and cycling improvements have been included in any of the modelling and therefore these improvements would provide a benefit over and above the findings in this PTAR.

Diagram 12.4.5: Proposed Longbridge walking and cycling improvements

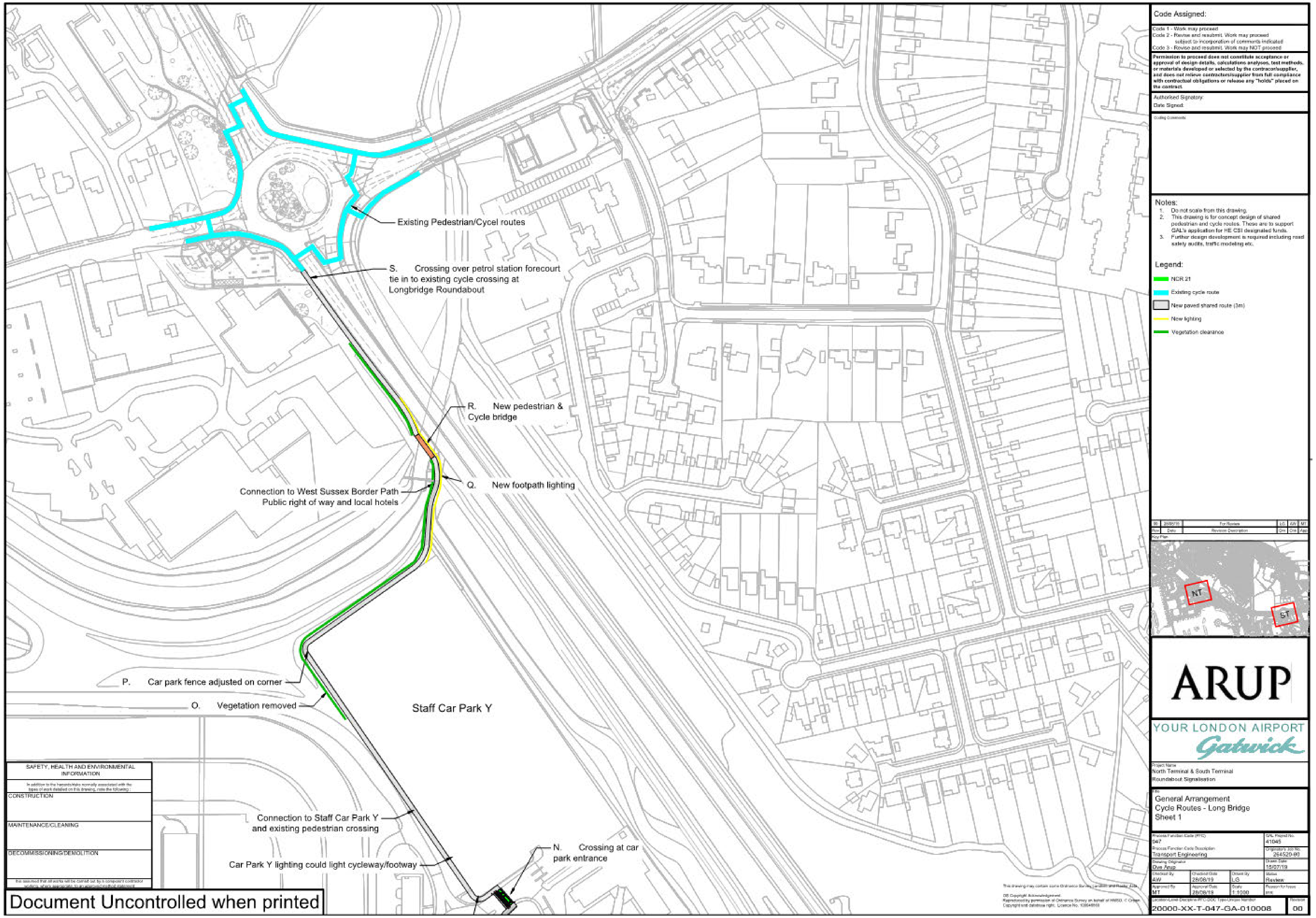


Diagram 12.4.6: Proposed North Terminal walking and cycling improvements

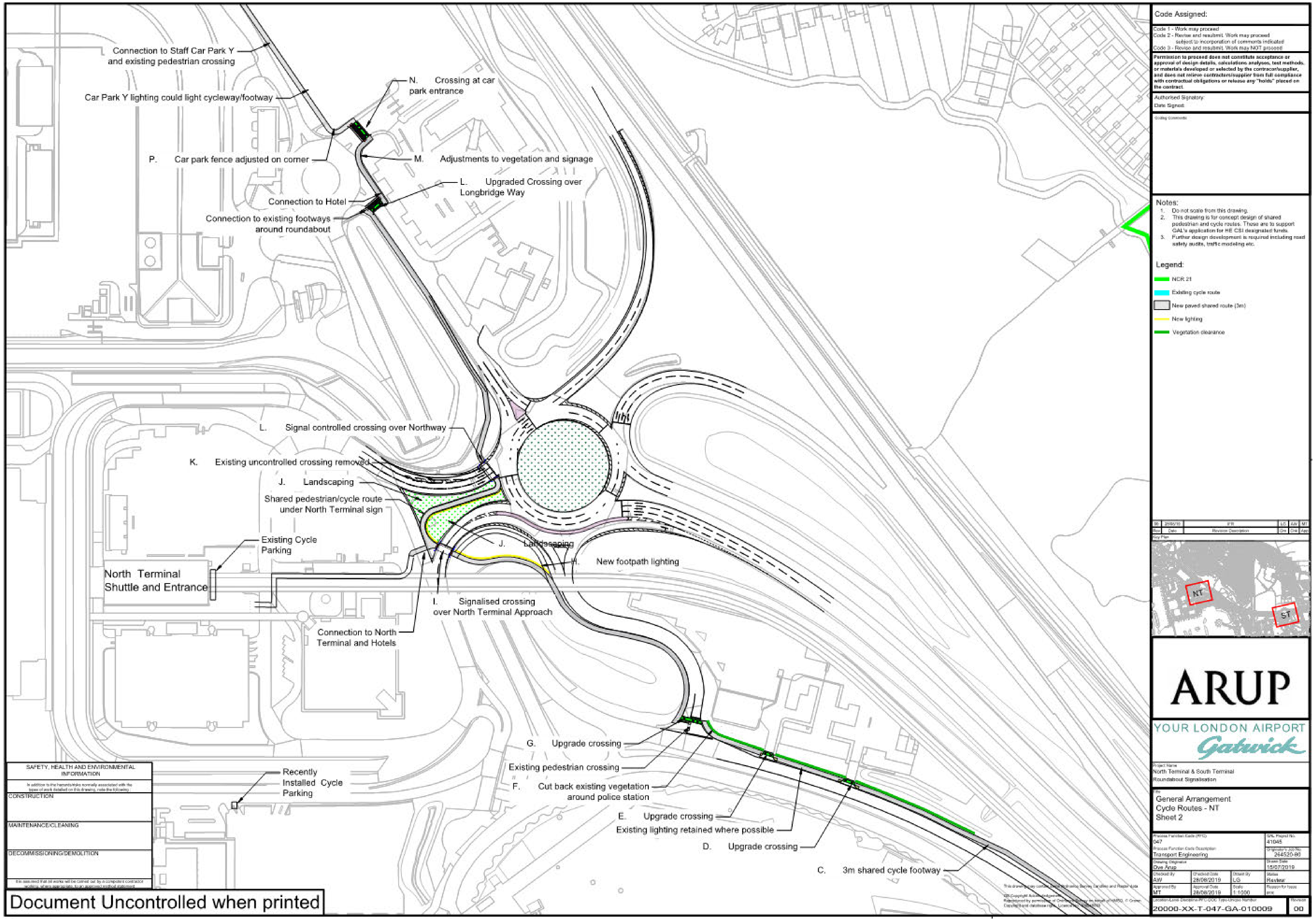


Diagram 12.4.7: Proposed South Terminal walking and cycling improvements

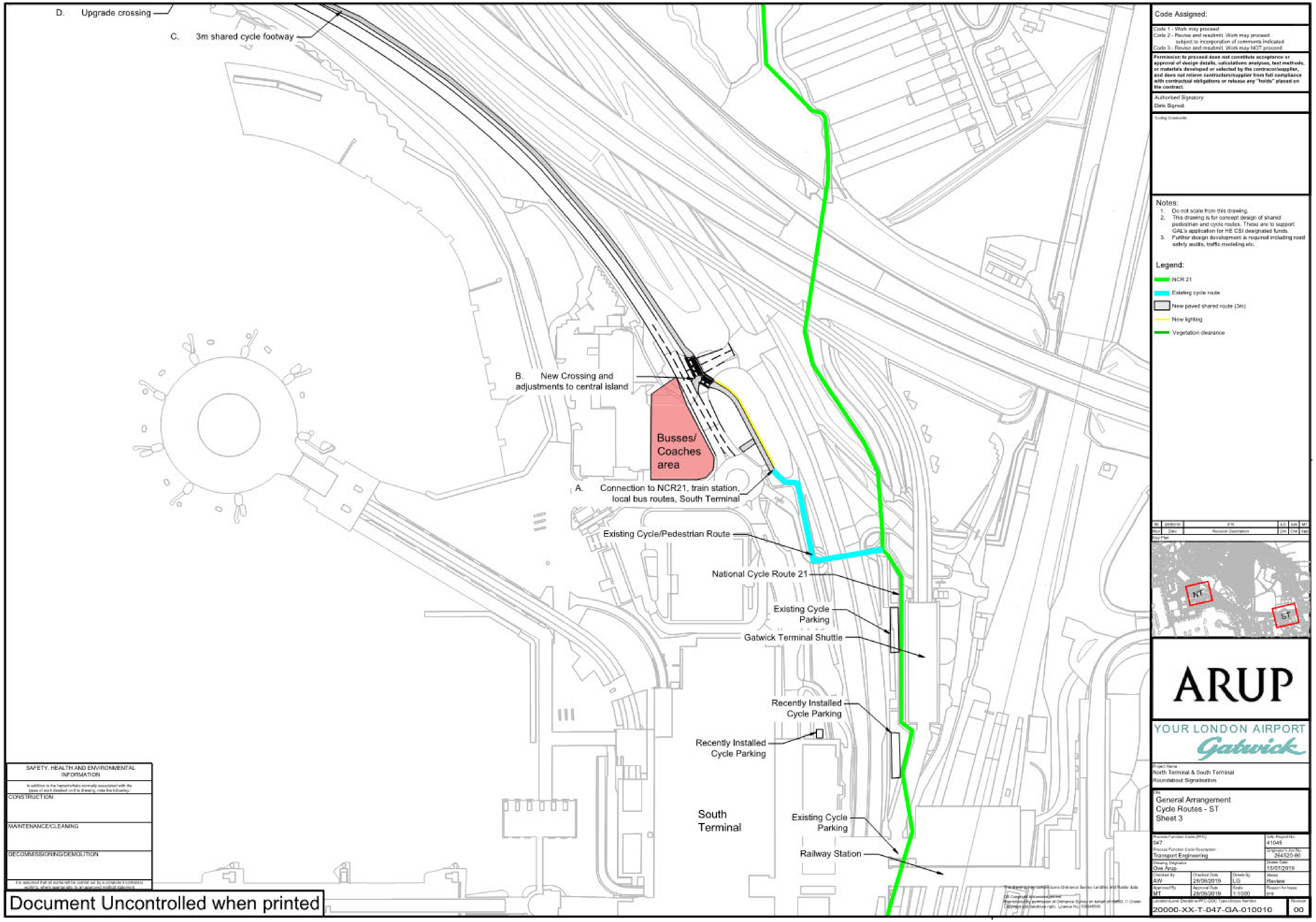
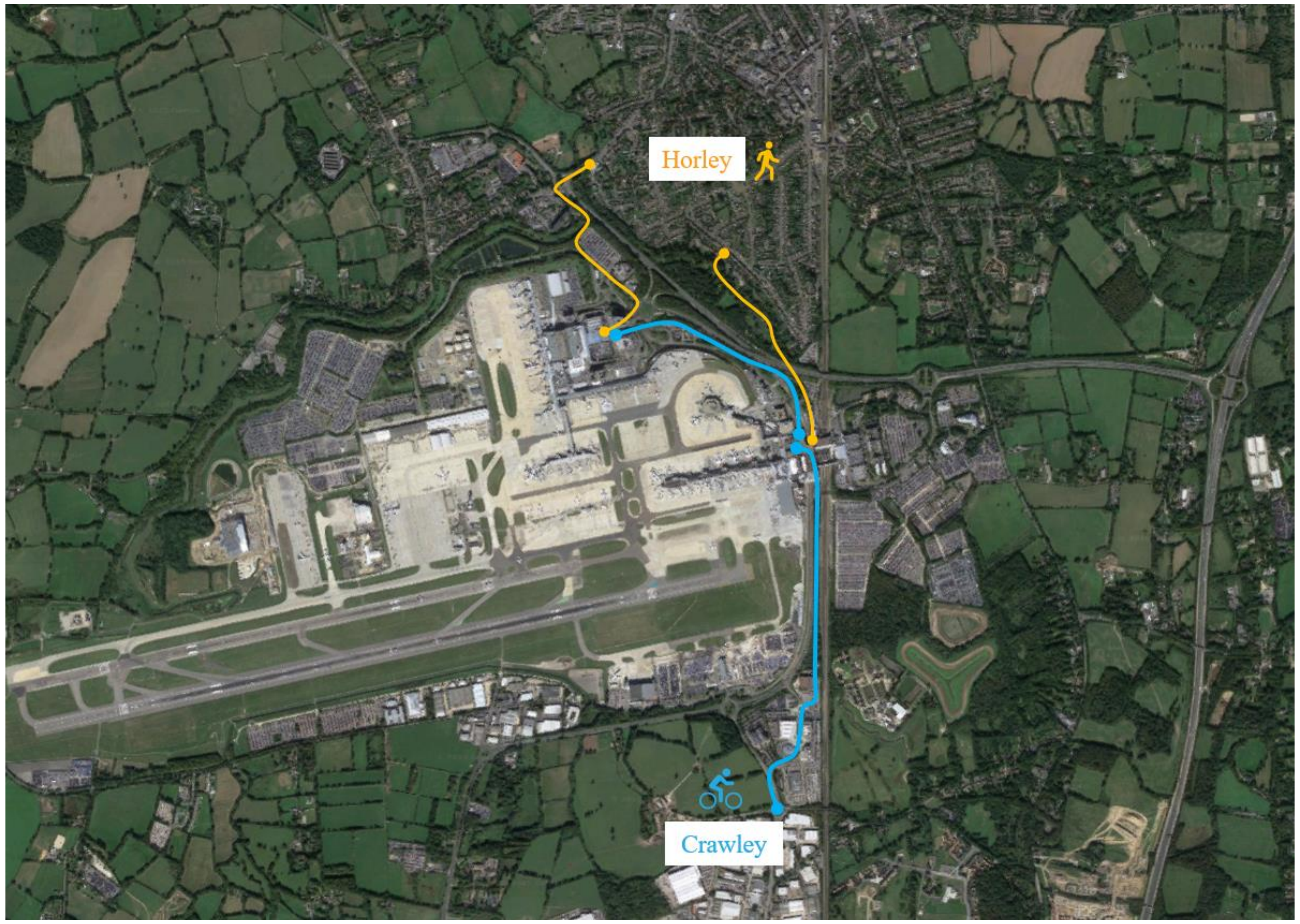


Diagram 12.4.8: Proposed promoted walking and cycling routes



12.5 Opportunities to Increase Active Travel

12.5.1 In 2016, 11% of Gatwick employees travelled 3 miles or fewer to work by car. Many of these employees who drive are within a comfortable distance to walk or cycle instead. Analysis of previous survey data for 2012 shows that 1 in 10 staff could have chosen to walk or cycle rather than drive.

12.5.2 The ASAS accompanying the DCO application will further develop Gatwick's strategic plan for walking and cycling. Strategies that will be explored and will include the following.

- **Increased and improved amenities:** Gatwick already provides locker and shower facilities to employees choosing to walk or cycle to work as well as cycle parking. Increasing the quantity or improving the quality of these facilities, as well as optimising their location, will further incentivise active travel amongst employees.
- **Improved routes on the airport:** Identifying and improving 'gaps' in infrastructure provision which may include provision of additional cycleways, footways, and improved crossings, as described above and as shown in Diagram 12.4.5 to Diagram 12.4.7. As appropriate, these routes should be separated from vehicular traffic.
- **Improved connections:** Some employees may find travelling to and from NCN21 or other key parts of the existing active travel network difficult or unsafe. Strategic investment in the wider network in Horley and Crawley could improve employee access and willingness to walk or cycle and Gatwick will work with Local Authorities to identify measures to improve these journeys.
- **Improved permeability:** As discussed above, the primary access point into the airport is the underpass under the A23 and into South Terminal. Additional, secure entrances and routes may need to be considered, such as the proposed route from Horley via Longbridge Roundabout, around car park Y and into the North Terminal and then along Perimeter Road to the South Terminal.
- **Improved wayfinding:** In some areas on the airport, it may be possible to enhance the sense of connectivity for users by improving or introducing new wayfinding signage. Gatwick has already begun this process along Perimeter Road North.

13 Railway Station and Inter-Terminal Shuttle Assessment

13.1 Gatwick Airport Railway Station

13.1.1 Opened in 1958, the current station is located adjacent to South Terminal with direct access from the terminal to the station concourse. Diagram 13.1.1 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, as an integrated transport hub.

13.1.2 In 2014, the station underwent a £53 million improvement programme, with opening of an additional platform (Platform 7) and improved circulation for passengers. However, despite this improvement, the current station is constrained with issues identified during the assessment work for the Airports Commission identifying the following issues.

- 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 1.6 metres.
- On the platforms, 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. With 12-car trains operating through the station, 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.

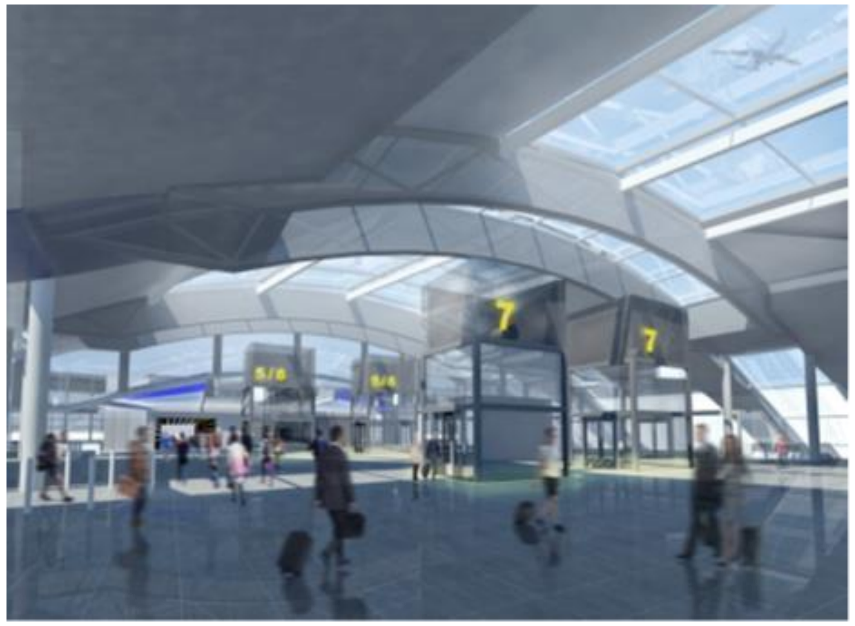
Diagram 13.1.1: Gatwick Station in 1958

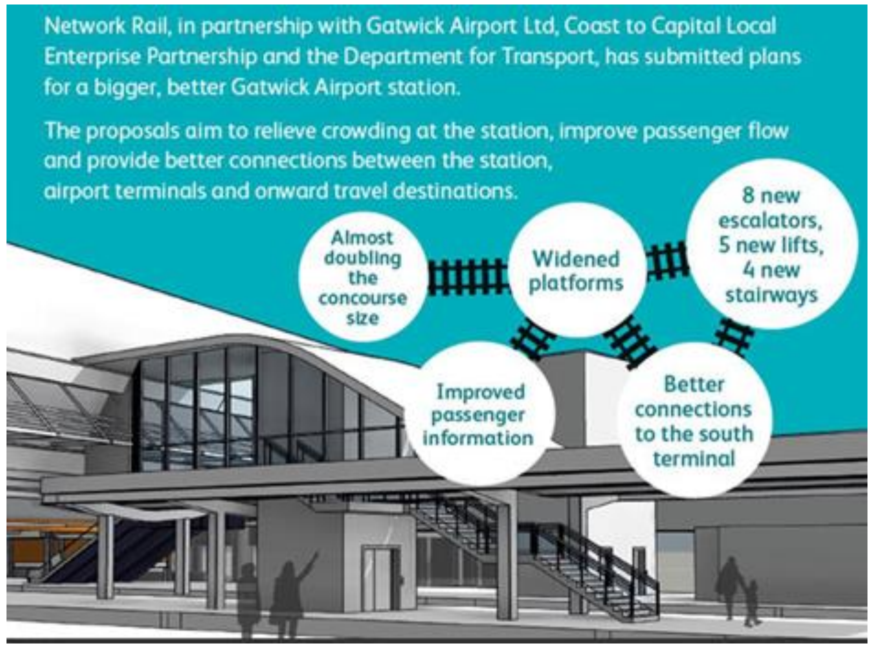
13.1.3 These constraints have been reaffirmed by consultation responses on Gatwick's 2018 Master Plan, which include 13 stakeholder comments on the need to improve the railway station, eg the Sussex Community Rail Partnership Limited which stated that *'upgrading work to improve the station is essential to reduce current ticket hall and platform congestion'*.

13.1.4 As such, Gatwick has been working with the Department for Transport, Network Rail and other stakeholders to develop an appropriate design to improve passenger experience in the station, as part of the Station Project.

13.1.5 In July 2019, the Department for Transport announced £150 million investment in the Station Project, which will include doubling the size of the station concourse, adding five new lifts and eight escalators to improve passenger flow, and widening two platforms to reduce crowding.

Diagram 13.1.2: Station Project Enhancements





13.1.6 The Station Project is currently under construction, despite the Covid pandemic, and should be complete by 2022. It is therefore the reference design for all future assessment work on the station.

13.2 Inter-Terminal Shuttle

13.2.1 Located in close proximity to the railway station is the Inter-Terminal Shuttle which takes passengers arriving by rail to or from the North Terminal. The shuttle operates as two trains of three Innovia APM 100 cars as manufactured by Bombardier. These two trains each operate on their own track, with a peak headway of 6 minutes, which means that passengers never wait more than 3 minutes for a train at peak times.

Diagram 13.2.1: Gatwick Inter-Terminal Shuttle System

13.2.2 There is a shuttle station at each end of the system, with a single central boarding platform between the two tracks and two alighting platforms, on the outside of each track. This means that boarding and alighting flows can be kept separate which reduces congestion and dwell times.

13.2.3 The system was upgraded in 2010 and has an average design life of 25 years, meaning another upgrade is likely to be required prior to the end of the assessment period. Modelling reported here has assumed the current shuttle configuration and service frequency, though future improvements have been identified (see Section 13.5.21).

13.3 Legion Model

Model History

13.3.1 Network Rail provided GAL with the 2036 Legion model developed as part of the Gatwick Station Project and used to demonstrate the performance of the station under AM and PM peak demand conditions. The model was provided on 19 March 2019.

Model Extents

13.3.2 The model of station as provided by Network Rail includes the existing concourse, the new concourse and all seven platforms, as shown in Diagram 13.3.1.

13.3.3 The model provided by Network Rail has been built on the following assumptions.

- An ungated station solution, ie with no gateline, which is the preferred operation at Gatwick Airport into the future (though the station project design does allow for the inclusion of ticket gates).
- The existing concourse is primarily the entry concourse to the station from the airport, with the main Customer Information Screens and ticket retail accommodated in the reconfigured concourse.
- The concourse provides the main exit route from all platforms to both the Airport and the South Terminal forecourt area and interchange with bus and coach services. It also provides a new entry route to the station from the South Terminal forecourt, which is new and which will benefit commuters who park at Gatwick Airport and use the station for journeys into London and elsewhere on the rail network. Customer Information Screens will also be provided on this concourse.
- The station will continue to operate broadly as per current passenger flows, with boarding passengers encouraged to wait on the platforms as far as possible (to safeguard train dwell times).
- The passenger composition (the number of passengers with luggage and restricted mobility) passing through the station is based on NR's passenger survey carried out at the station in May 2014.

13.3.4 Arup has taken Network Rail's validated and calibrated Legion model and extended it to include the inter-terminal shuttle operation. Diagram 13.3.2 shows the South Terminal station but the model now also includes the North Terminal station which is configured in the same way, with a central boarding platform and alighting platforms on the outside.

13.3.5 The shuttle operation has been calibrated to video and CCTV footage, in particular for loading of boarding platforms and maximum loading of the shuttle itself

Diagram 13.3.1: Legion Model of Gatwick Airport Rail Station

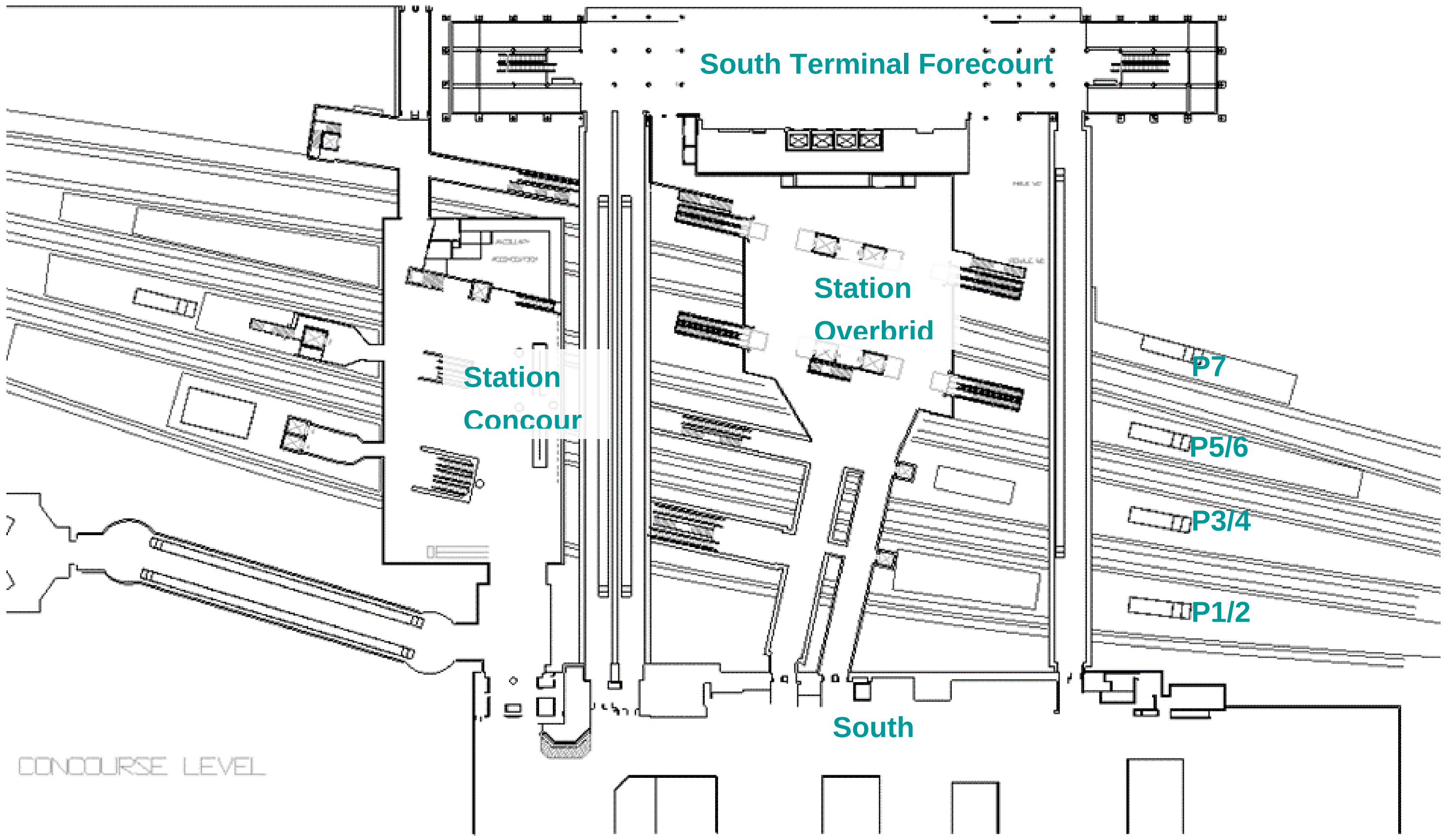
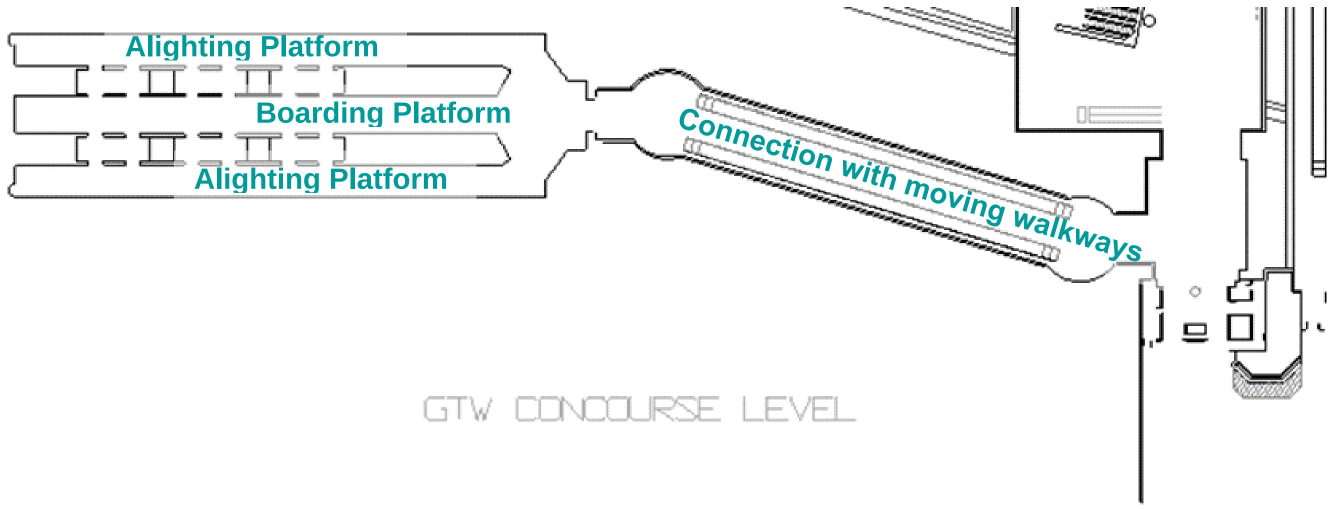


Diagram 13.3.2: Legion Model of Inter-Terminal Shuttle Extension (South Terminal)



Demand

13.3.6 Testing of Gatwick Airport Station and the shuttle has been undertaken for four future demand scenarios; future baseline 2032 and 2047, as well as for 2032 and 2047 with the Project. Both the AM and PM 2-hour peak have been modelled.

13.3.7 Demand into and out of the station taken from the strategic rail model for the specific peak hours modelled.

13.3.8 Entity groups include passengers arriving at or departing from Gatwick Airport and using rail, passengers using the South Terminal Forecourt and commuters using Gatwick Airport railway station. Interchange movements are also included and have been calculated as 7.3% of the total station entry and exit journeys, based on the 2015/16 Office of Road and Rail (ORR) Station Footfall figures. Table 13.3.1 shows the total modelled demand across a 2-hour AM and PM peak in line with the strategic modelling, as compared to demand in the 2036 Network Rail model. These demand numbers include rail passengers as well as people using South Terminal forecourt and parts of the South Terminal.

13.3.9 Demand in the 2032 and 2047 models as compared to the 2036 Network Rail model is provided in Table 13.3.1 It can be seen that demand in the 2032 and 2047 models with Project is higher than the previous 2036 demand test used for the Station Project, even by 2032. The PM peak has therefore been assessed in the EIA and PTAR.

Passenger Types and Luggage

13.3.10 The passenger composition is based on Network Rail's passenger survey carried out in May 2014, and divides passengers across three types: no luggage, medium luggage and large luggage.

Train Timetable

13.3.11 Diagram 13.3.3 and Diagram 13.3.4 show the frequency of train services per platform in the AM and PM peak period. Platforms 4 and 7 have the most train arrivals and departures.

Station Operation

13.3.12 Vertical circulation in Gatwick Airport railway station and replicated in the 2036 Legion model provided by Network Rail is shown in Diagram 13.3.5. There are nine up and eight down escalators, eight bi-directional stairs and one one-way stair to/from the platforms.

Table 13.3.1: Demand modelled across 2-hour AM and PM peak

Total Demand	Future Baseline 2032	Project 2032	NR 2036	Future Baseline 2047	Project 2047
AM 2 hours (0700-0900)	15,851	18,891	21,937	17,673	21,557
PM 2 hours (1600-1800)	19,539	23,296	22,353	22,025	25,728

Table 13.3.2: Passenger types used in model

Type	No Luggage	Medium Luggage	Large Luggage
Alighters	54%	36%	10%
Boarders	51%	36%	13%
Meeters	100%	0%	0%
Interchange	90%	10%	0%
Staff	100%	0%	0%

Diagram 13.3.3: AM train departures per platform

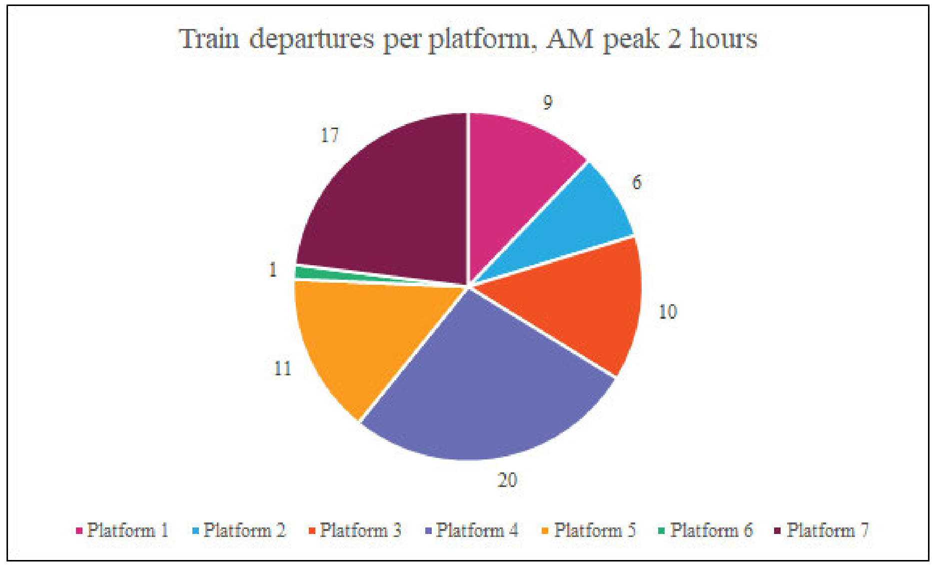


Diagram 13.3.4: PM train departures per platform

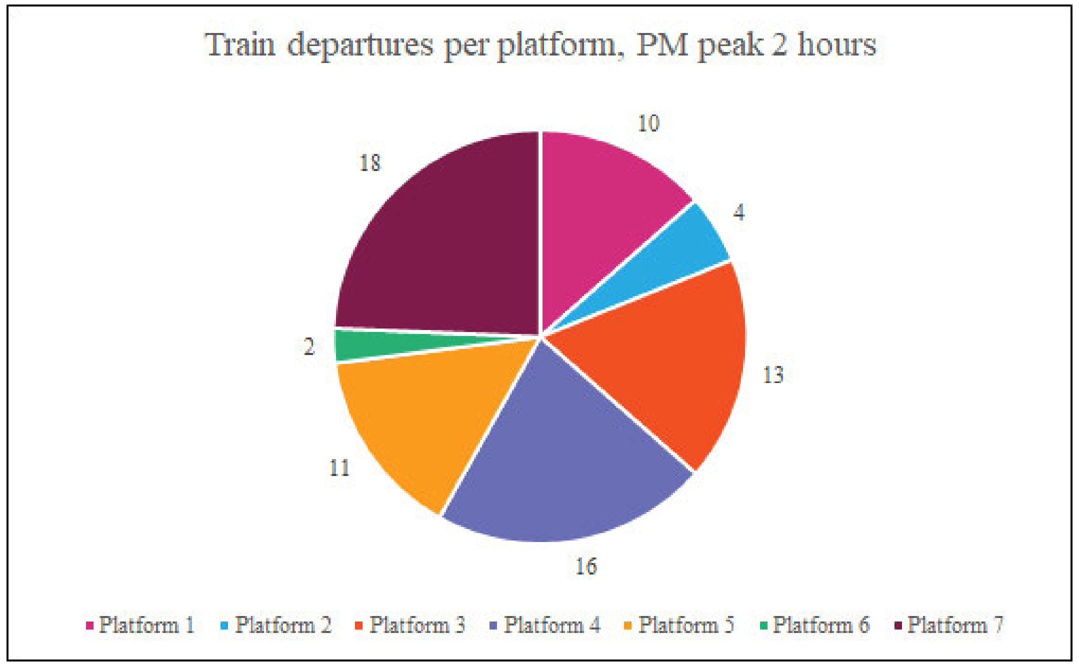


Diagram 13.3.5: Platform Vertical Circulation

13.3.13 Assumptions related to vertical circulation elements include the following.

- Escalator capacity flow rate at 54 passengers per minute.
- Lift capacity at 35% of the plated capacity.
- Lift cycle times of 110 seconds per cycle.

13.3.14 The above flow rates were confirmed during a site survey on 31 July 2019. Train arrivals on all platforms between 16:00 and

17:30 were observed and escalator flow rates recorded. For escalators with a continuous demand over 1 minute, flow rates observed were between 52 and 57 people per minute.

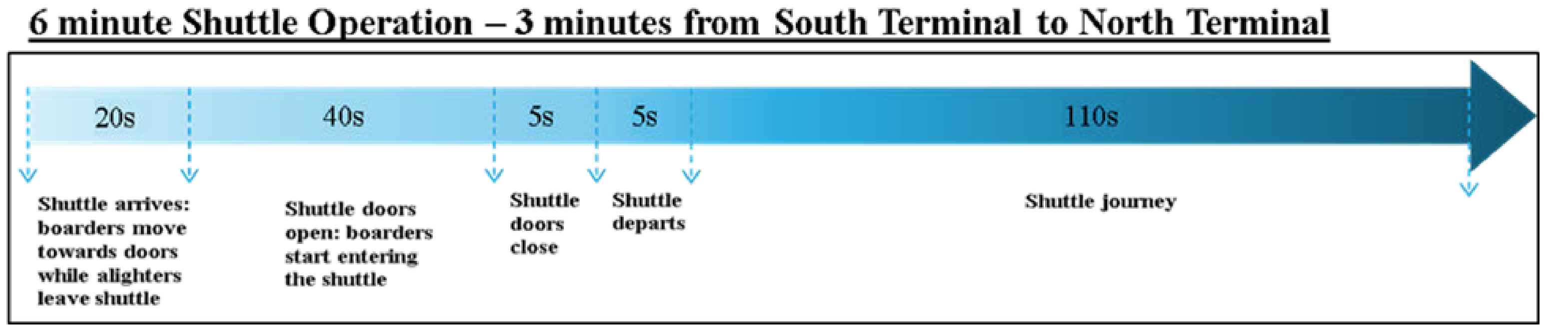
13.3.15 The following maximum flow rates for stairs have been used from Network Rail's Station Capacity Planning Guidance (Network Rail, 2016).

- Stairs (one-way): 35 passengers/minute/metre.
- Stairway (two-way): 28 passengers/minute/metre.

Shuttle Operation

13.3.16 The shuttle connections between the North and South Terminals have been added to the Network Rail model. Diagram 13.3.6 shows the pattern of service to achieve a 6-minute shuttle headway. Timings are based on data received from GAL and a site survey.

Diagram 13.3.6: 6-minute shuttle operation times



13.4 Assessment Criteria

Levels of Service

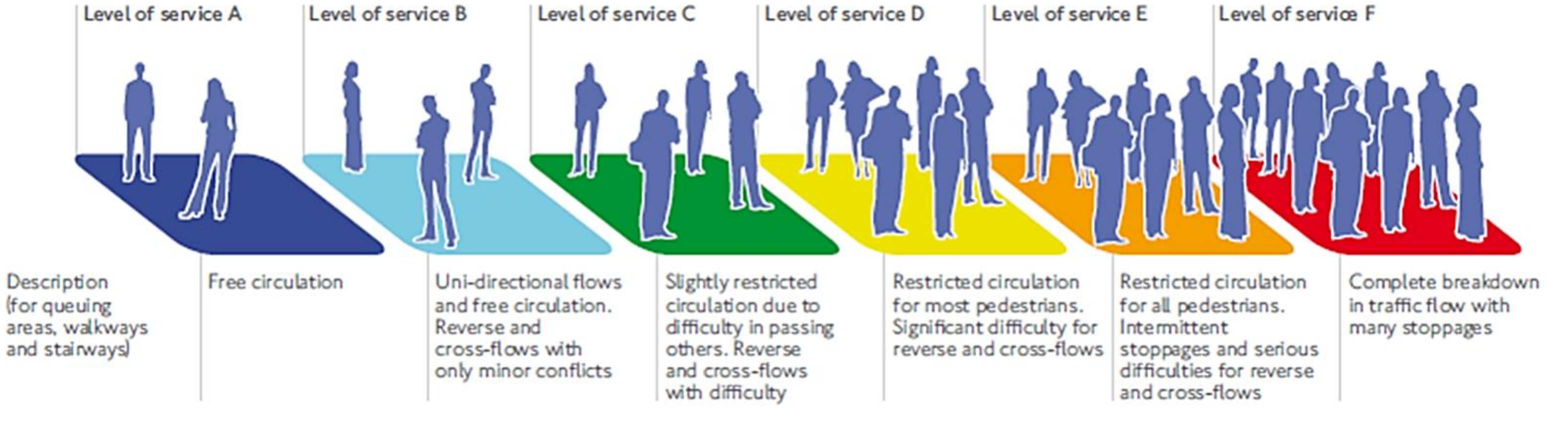
13.4.1 The analysis has been undertaken against Network Rail's Station Capacity Planning Guidance (November 2016). The assessment of crowding is based on Fruin Level of Service (LoS) criteria.

13.4.2 In the 1970s and 1980s, John Fruin pioneered pedestrian planning analysis and the development of LoS criteria for pedestrians – previously Level of Service metrics had only been used to describe vehicular traffic flow by highways agencies (Fruin, 1987).

13.4.3 LoS is used to describe pedestrian movement, relating density of pedestrians and flow rates for walkways and circulation areas, stairs and in queues, with LoS A representing free flow and LoS F a complete breakdown in circulation.

13.4.4 LoS C is typically used for designing transport interchanges as it provides a balance between congestion, design and operations. Network Rail therefore typically recommends LoS C or better for the design of new stations and station enhancements.

Diagram 13.4.1: Levels of Service ranges



13.4.5 It is important to note that Fruin differentiates between LoS for walkways – areas where a pedestrian would expect free movement – and queues/waiting areas – where pedestrians tolerate higher densities and still consider their environment comfortable. The difference between flow rates and area requirements for walkways and queues at each LoS range are very different, as shown in Table 13.4.1.

13.4.6 Platforms are considered as a queuing/waiting environment and Network Rail guidance states that these should perform at LoS B/C or 0.93 m^2 per person. Similarly, concourse waiting areas should perform at LoS B for queuing/waiting behaviour at 1.0 m^2 per person.

13.4.7 This is an important consideration when reviewing any Legion outputs shown in this report. The typical approach is to show a Fruin walkways map such that the overall station performance can be considered. This mapping is likely showing areas of queuing as LoS D or E for walkways – ie less than 1.0 m^2 per person. However, if these locations are where a queue should occur, such as at the top or bottom of an escalator, at gatelines or for boarding on a platform, the queuing density is more appropriate.

Table 13.4.1: Fruin Level of Service criteria for Walkways and Queues

Level of Service	Fruin Walkways		Fruin Queues
	Flow (people per m of circulation width)	Area per Person (m2)	Area per Person (m2)
A	23 or less	3.3 or more	1.2 or more
B	23 to 33	2.3 to 3.3	0.9 to 1.2
C	33 to 49	1.4 to 2.3	0.7 to 0.9
D	49 to 66	0.9 to 1.4	0.3 to 0.7
E	66 to 82	0.5 to 0.9	0.2 to 0.3
F	82 and over	0.5 or less	0.2 or less

13.5 Comparison of Baseline and Project

2032 Future Baseline

13.5.1 Diagram 13.5.1 and Diagram 13.5.2 show LoS for the peak 15 minutes in the 2032 future baseline for the concourse and for the platform level in terms of Fruin Walkways.

13.5.2 From Diagram 13.5.1, it can be seen that the station concourse level performs at an appropriate Level of Service in the 2032 future baseline, with predominantly LoS A to LoS C shown by modelling. Higher densities are shown on escalator elements which reflects people bunching on escalator treads which is typical and expected.

13.5.3 From Diagram 13.5.2, it can be seen that platforms performs at an appropriate Level of Service in the 2032 future baseline, with predominantly LoS C or better shown by the modelling. Higher densities are shown on some narrower sections of platform as well as at the base of escalator elements, in particular on Platforms 3 and 7, which reflects that these are waiting or queuing environments. As described in section 13.4, these higher densities are typical and expected at such locations.

Diagram 13.5.1: Concourse LoS, Fruin Walkways – 2032 Future Baseline PM Peak (17:45 – 18:00)

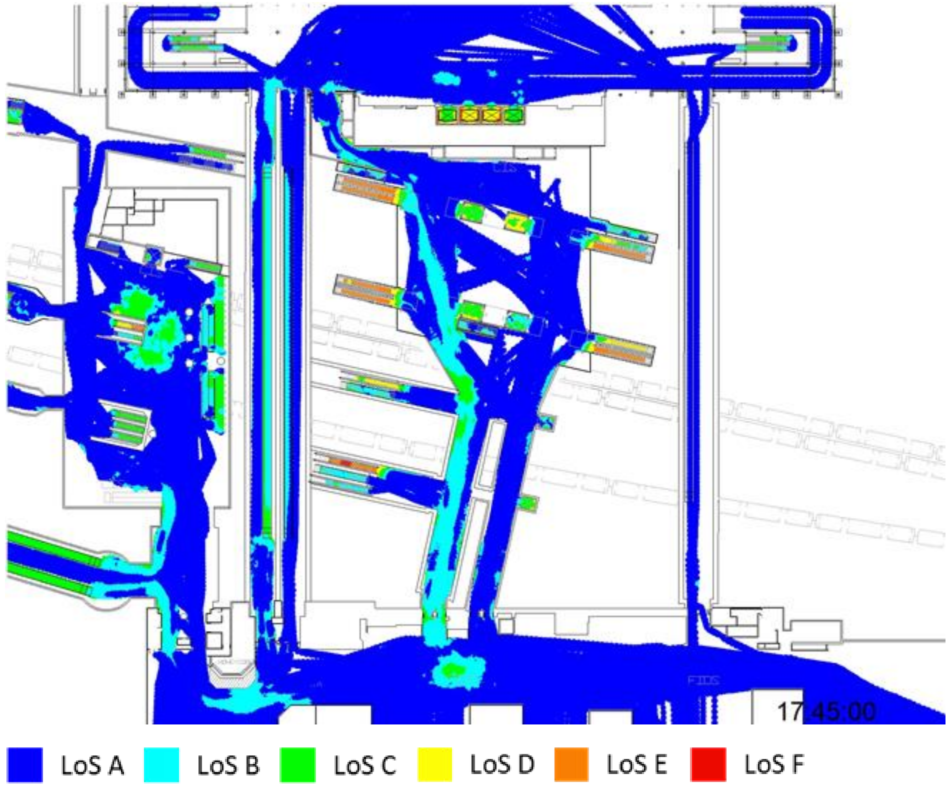
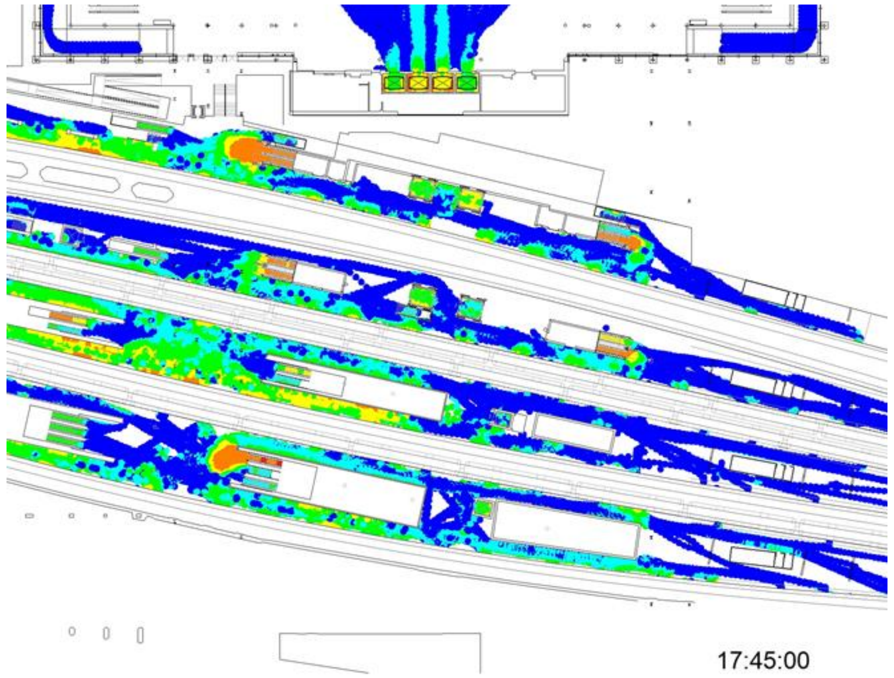


Diagram 13.5.2: Platform LoS, Fruin Walkways – 2032 Future Baseline PM Peak (17:45 – 18:00)



2047 Future Baseline

13.5.4 Diagram 13.5.3 and Diagram 13.5.4 show LoS for the peak 15 minutes in the 2047 future baseline for the concourse and for the platform level in terms of Fruin Walkways.

13.5.5 From Diagram 13.5.3, it can be seen that the station concourse level performs at a comparable Level of Service to the 2032 future baseline, with predominantly LoS A to LoS C shown by modelling.

13.5.6 From Diagram 13.5.4, it can be seen that platforms also perform at a comparable Level of Service to the 2032 Future Baseline, with predominantly LoS C or better shown by the modelling. However, higher densities are shown on some narrower sections of platform, most notably on Platforms 3 and 7, as well as at the base of escalator elements, in particular on Platforms 2 and 7. However, these are queuing or platform waiting environments, where people expect higher densities as described in 13.4.

Diagram 13.5.3: Concourse LoS, Fruin Walkways – 2047 Future Baseline PM Peak (17:45 – 18:00)

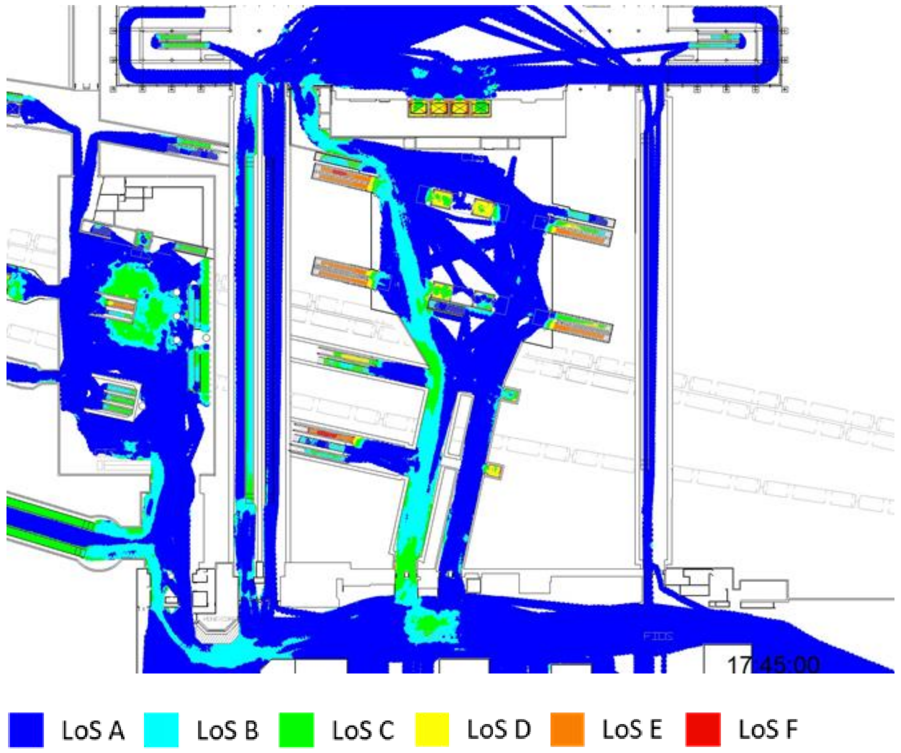
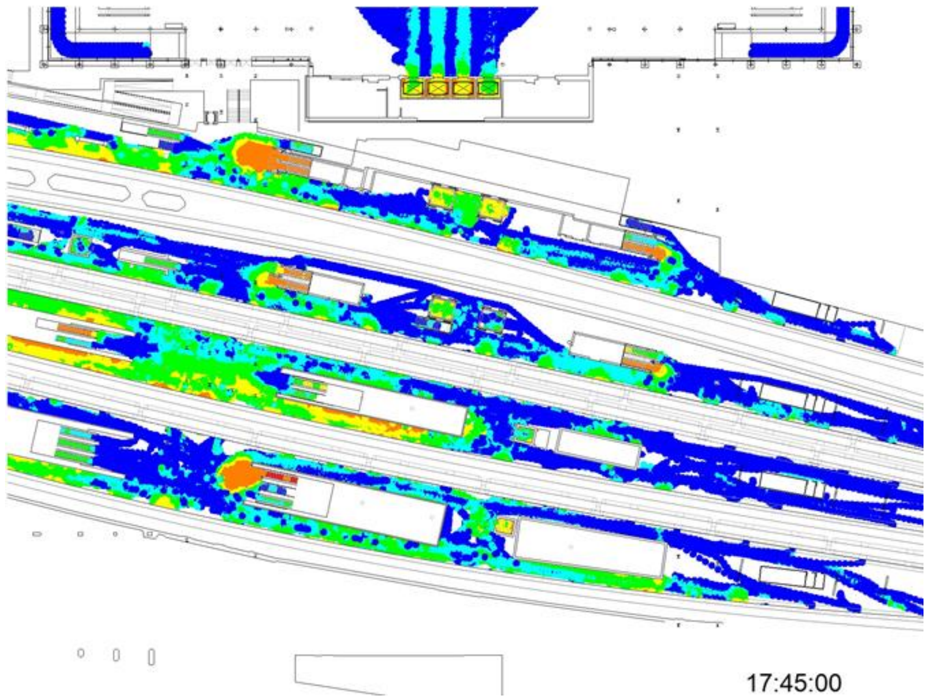


Diagram 13.5.4: Platform LoS, Fruin Walkways – 2047 Future Baseline PM Peak (17:45 – 18:00)



2032 with Project

13.5.7 Diagram 13.5.5 and Diagram 13.5.6 show LoS for the peak 15 minutes in 2032 with Project for the concourse and for the platform level in terms of Fruin Walkways.

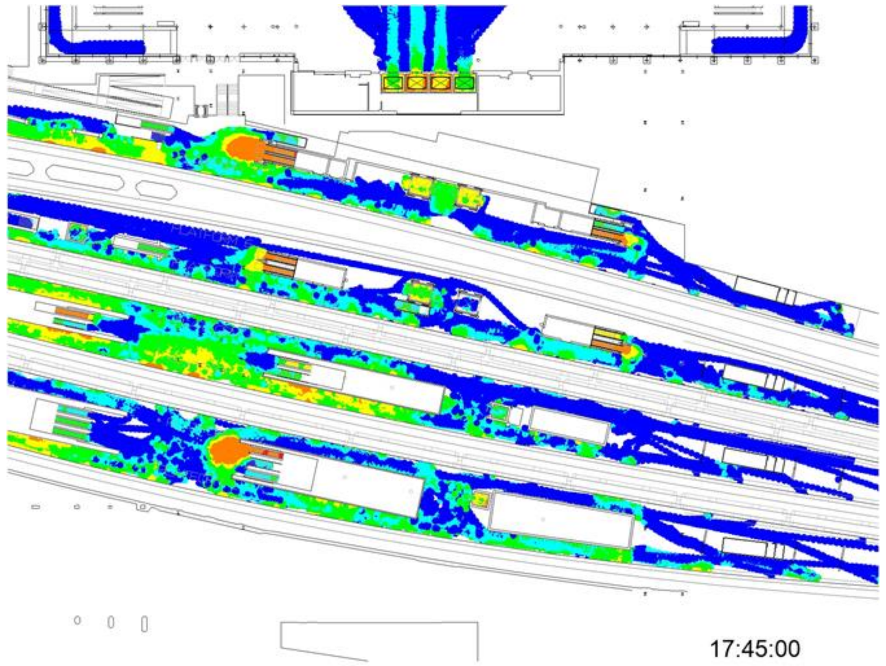
13.5.8 From Diagram 13.5.5, it can be seen that the station concourse level performs at a comparable Level of Service to the 2032 future baseline, with predominantly LoS A to LoS C shown by modelling.

13.5.9 From Diagram 13.5.6, it can be seen that platforms also perform at a comparable Level of Service to the 2032 future baseline, with predominantly LoS C or better shown by the modelling. However, higher densities are shown on some narrower sections of platform, most notably on Platforms 1, 3 and 7, as well as at the base of escalator elements, in particular on Platforms 2 and 7. However, these are queuing or platform waiting environments, where people tolerate higher densities as described in section 13.4.

13.5.10 Level of Service for platforms based on Fruin Queuing are presented in paragraph 13.5.20 onwards.

Diagram 13.5.5: Concourse LoS, Fruin Walkways – 2032 with Project PM Peak (17:45 – 18:00)

Diagram 13.5.6: Platform LoS, Fruin Walkways – 2032 with Project PM Peak (17:45 – 18:00)



2047 with Project

13.5.11 Diagram 13.5.7 and Diagram 13.5.8 show LoS for the peak 15 minutes in 2047 with the Project for the concourse and for the platform level in terms of Fruin Walkways.

13.5.12 When compared to Diagram 13.5.3, it can be seen that the station concourse level performs at a comparable Level of Service to the 2047 future baseline, with predominantly LoS A to LoS C shown by modelling.

13.5.13 When compared to Diagram 13.5.4, it can be seen that platforms also perform at a comparable Level of Service to the 2047 future baseline, with predominantly LoS C or better shown by the modelling. However, higher densities are shown on some narrower sections of platform, most notably on Platforms 1, 3 and 7, as well as at the base of escalator elements, in particular on Platforms 2 and 7. However, these are queuing or platform waiting environments, where people tolerate higher densities as described in 13.4.

13.5.14 Level of Service for platforms based on Fruin Queuing are presented in paragraph 13.5.20 onwards.

Diagram 13.5.7: Concourse LoS, Fruin Walkways – 2047 with Project PM Peak (17:45 – 18:00)

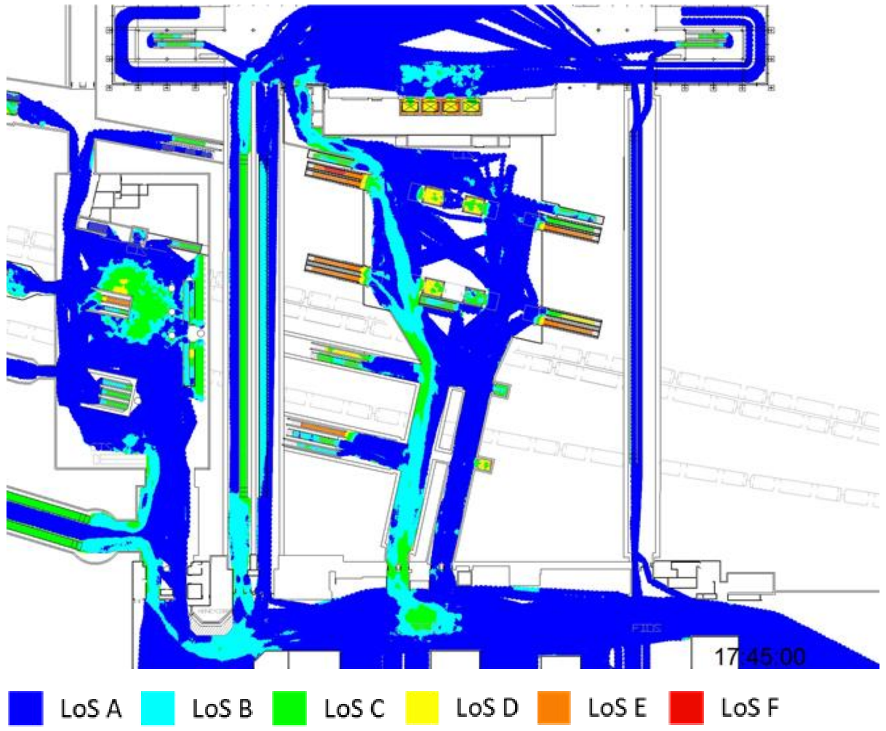
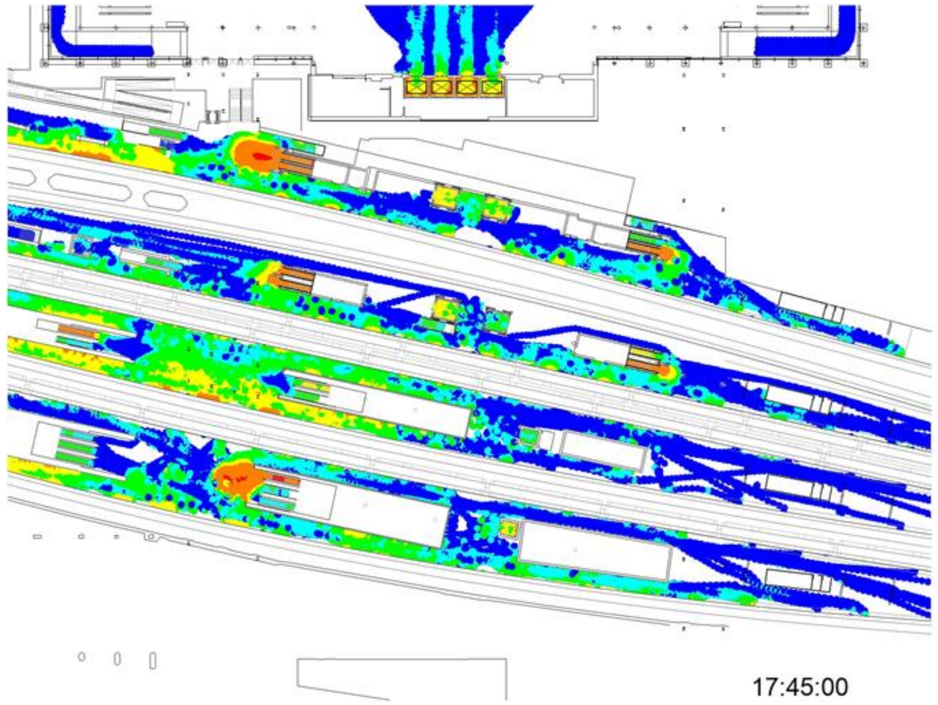


Diagram 13.5.8: Platform LoS, Fruin Walkways – 2047 with Project PM Peak (17:45 – 18:00)



Summary of Performance

Level of Service

13.5.15 The Level of Service performance across all scenarios for the existing and new concourses is shown in Diagram 13.5.9 and Table 12.5.1, excluding escalator elements.

13.5.16 The percentage of passengers experiencing different Level of Service ranges varies between scenarios however all future years show station performance at concourse level being predominantly LoS C or better (95% to 97% of passengers experience LoS C or better depending on scenario). This indicates that there is no material difference in performance between the baseline and with Project scenarios and that performance is acceptable and appropriate.

13.5.17 The Level of Service performance across all scenarios for the station platforms is shown in Diagram 13.5.10 and Table 12.5.2, excluding escalator queuing areas and escalator elements, using a Walkways comparison i.e. as if the platforms were circulation environments.

13.5.18 All future years show station performance at platform level at predominantly LoS C or better (70% to 81% of passengers experience LoS C or better depending on scenario). However, the proportion of passengers experiencing more congested conditions at LoS D also increases into the future and with Project, with 30% of passengers experiencing higher densities by 2047.

13.5.19 However, it should be noted that platforms are considered more of a queuing environment than a typical walking environment as platforms typically have a mix of passengers waiting and standing still (essentially queuing) or walking at slower speeds to either move along or exit from the platform. To reflect this type of environment, Network Rail recommends using Fruin Queuing Level of Service for platforms, which represents a lower overall space requirement per passenger. The guidance states that platforms should perform at Queueing LoS B/C or 0.93 m^2 per person or better.

13.5.20 The Level of Service performance across all scenarios for the station platforms is shown in Diagram 13.5.11 and Table 13.5.3 using Fruin Queuing Level of Service criteria, excluding escalator-related elements. This shows performance at predominantly LoS B or better in terms of Fruin Queuing (90% to 94% of passengers depending on scenario), so acceptable conditions.

Diagram 13.5.9: Concourse LoS, Fruin Walkways – All Scenarios, PM Peak (17:45 – 18:00)

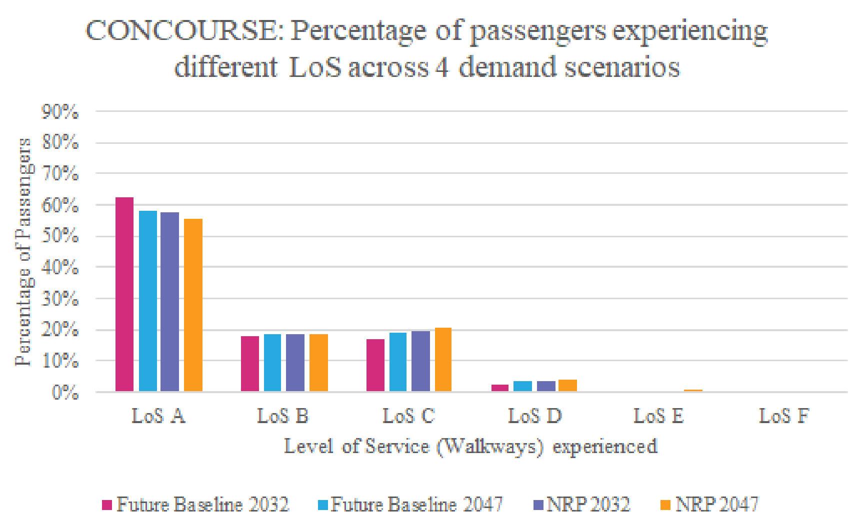


Diagram 13.5.10: Platforms LoS, Fruin Walkways – All Scenarios, PM Peak (17:45 – 18:00)

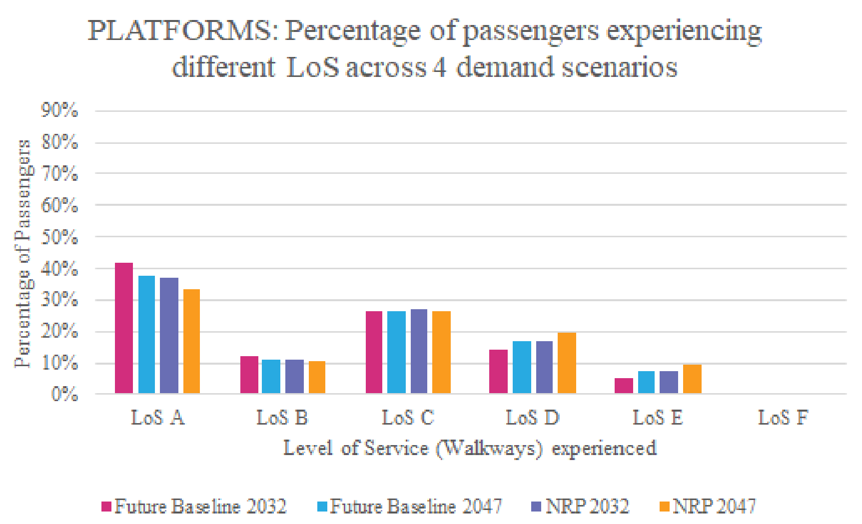


Table 13.5.1: Concourse LoS, Fruin Walkways – All Scenarios, PM Peak (17:45 – 18:00)

	PM Level of Service Walkways			
	Future Baseline 2032	FUTURE Baseline 2047	Project 2032	Project 2047
LoS A	62%	58%	58%	55%
LoS B	18%	19%	19%	19%
LoS C	17%	19%	19%	21%
LoS D	3%	3%	4%	4%
LoS E	0%	0%	1%	1%
LoS F	0%	0%	0%	0%

Table 13.5.2: Platform LoS, Fruin Walkways – All Scenarios, PM Peak (17:45 – 18:00)

	PM Level of Service Walkways			
	Future Baseline 2032	Future Baseline 2047	Project 2032	Project 2047
LoS A	42%	37%	37%	33%
LoS B	12%	11%	11%	11%
LoS C	26%	26%	27%	26%
LoS D	14%	17%	17%	19%
LoS E	5%	7%	7%	10%
LoS F	0%	0%	0%	1%

Diagram 13.5.11: Platforms LoS, Fruin Queuing – All Scenarios, PM Peak (17:45 – 18:00)

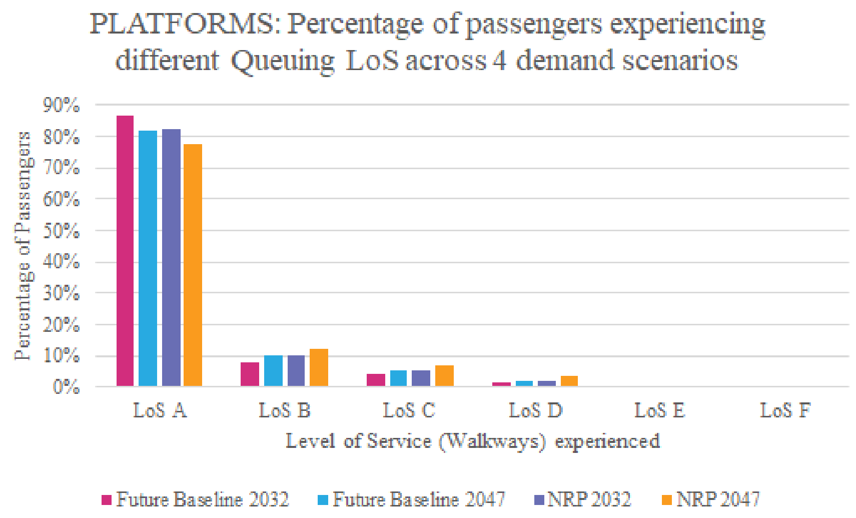


Table 13.5.3: Platform LoS, Fruin Queuing – All Scenarios, PM Peak (17:45 – 18:00)

	PM Level of Service Queuing			
	Future Baseline 2032	Future Baseline 2047	Project 2032	Project 2047
LoS A	87%	82%	82%	77%
LoS B	8%	10%	10%	12%
LoS C	4%	6%	5%	7%
LoS D	2%	2%	2%	3%
LoS E	0%	0%	0%	0%
LoS F	0%	0%	0%	0%

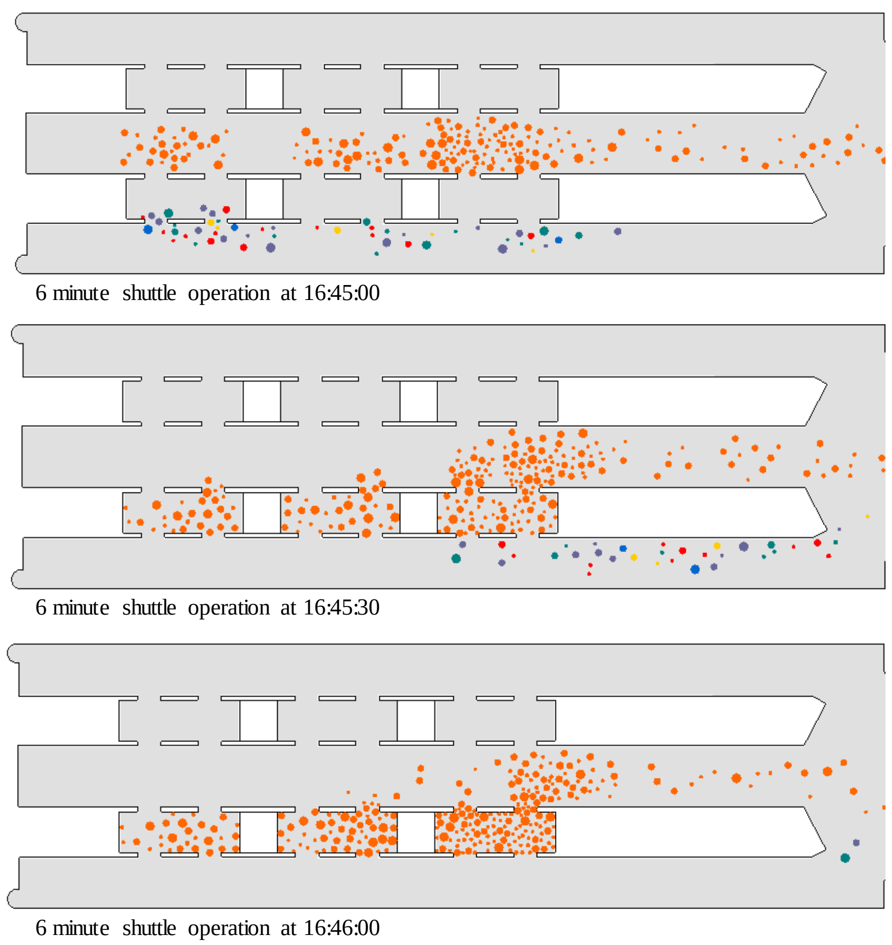
Shuttle Station

2047 with Project

13.5.21 Modelling to 2047 with the Project shows that the boarding platform of the shuttle stations, particularly at the South Terminal, can become congested at peak times and that congestion blocks the platform and prevents full use of shuttle capacity.

13.5.22 Diagram 13.5.12 shows platform loading in 2047 assuming a 6 minute shuttle headway, which is the current peak frequency (which with two trains each operating on their own track, means that passengers never wait more than 3 minutes for a train at peak times).

Diagram 13.5.12: Shuttle platform loading, PM Peak (16:45 – 16:46), 6 minute headway



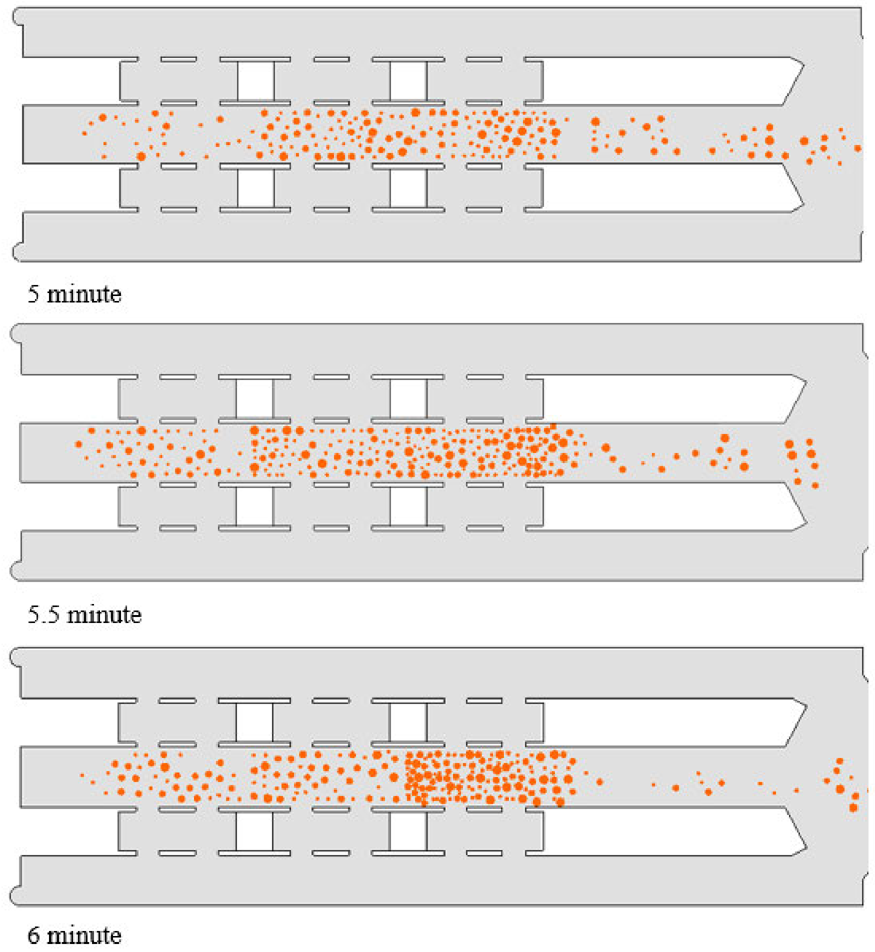
13.5.23 The first image shows peak passenger queuing on the boarding platform just before the shuttle doors open. The second image shows passengers moving to the shuttle car closest to them and boarding. The final image shows the spare capacity in the northern car with the remaining passengers left on the platform at the southern end. These are predominantly passengers who have just arrived on the boarding platform at the southern end of the South Terminal shuttle station.

2047 with Project and Potential Mitigation

Changing Shuttle Headway

13.5.24 The shuttle operation has therefore been assessed to see what the impact of 5, 5.5 and 6-minute shuttle headways will have on crowding levels at the shuttle boarding platforms.

Diagram 13.5.13: Shuttle platform loading, PM Peak (16:45 – 16:46), various headways



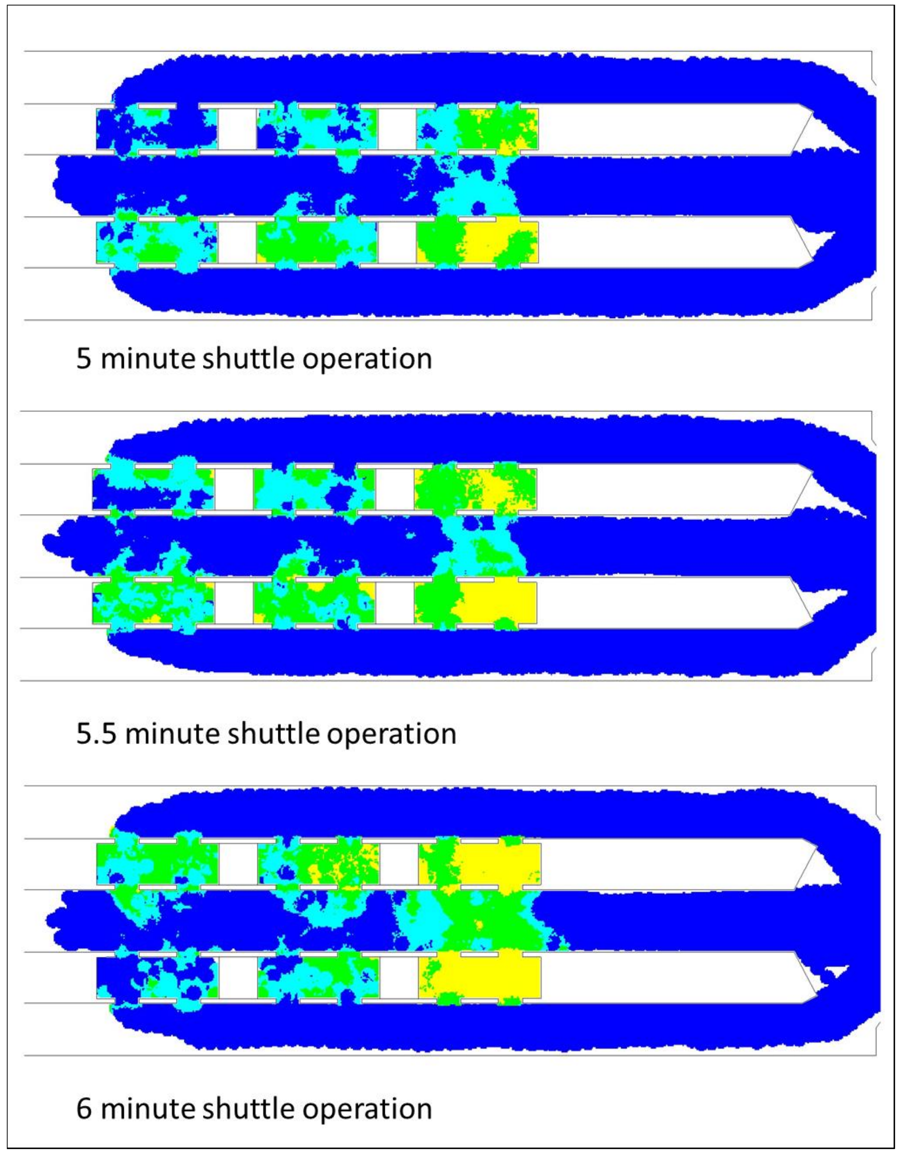
13.5.25 As can be seen from Diagram 13.5.14, the busyness at the southern end of the platform and in the southern shuttle car is reduced with a shorter headway. This is reaffirmed by the Level of Service analysis which shows reduced congestion and improvement to LoS B on the boarding platform with a 5 minute headway.

13.5.26 Analysis shows that this reduction in congestion leads to a more efficient loading of the shuttle.

Four car shuttle operation

13.5.27 Additionally, a test model considers the impact of the shuttle comprising four cars rather than the current configuration of three cars, ie a potential 33% uplift in capacity, to understand what this enhancement might provide. This analysis shows that adding an additional shuttle car reduces density and number of passengers left on the platform during the peak period. However, no discernible improvement occurs outside of the peak period and indeed the peak impacts are nominal, owing to congestion on the boarding platform full and even utilisation of the fourth car.

Diagram 13.5.14: Shuttle platform Level of Service, Fruin Queuing, PM Peak (16:45 – 16:46), various headways



13.6 Conclusions

13.6.1 Improvements to Gatwick Station are the subject of a separate consenting process, with a planning application submitted by Network Rail to Crawley Borough Council in April 2018. Consent has been granted and these improvements are currently under construction, despite the Covid pandemic, and will be complete by the time the Project is operational.

13.6.2 Analysis and modelling with the Project shows that no further improvements will be required to the railway station platforms or concourse.

13.6.3 Modelling to 2047 with the Project shows that the boarding platform of the shuttle stations, particularly at the South Terminal, can become congested at peak times and that congestion blocks the platform and prevents full use of shuttle capacity. Analysis indicates that reducing the headway of the system from 6 minutes down to 5 minutes has the greatest benefit. Adding a fourth car to the system does not provide an additional 33% capacity as the boarding platform remains congested unless the shuttle headway is changed. GAL therefore proposes to reduce the shuttle headway to achieve appropriate additional capacity in peak periods by 2047.

14 Impacts of Construction

14.1 Introduction

14.1.1 This section describes the impacts of construction on the transport network for the PEIR. For the final Transport Assessment, this section will additionally reference Gatwick Airport's Construction Traffic Management Plan for the Project and the associated Appendices related to construction vehicle traffic management and construction workforce travel planning which are currently in development.

14.1.2 The section describes impacts related to two construction scenarios, namely:

- Understanding the impact of peak construction vehicle traffic on the highway network.
- Understanding the impact of constructing highway mitigation, including grade-separation, on the network and the potential reassignment of traffic this may cause as drivers seek alternative routes.

14.2 Construction Inputs

Indicative Construction Programme

14.2.1 Gatwick has developed a programme of works covering all of the construction activities related to the project and when these will occur. The programme will likely evolve and change however the initial timings are presented in Chapter 5: Project Description of the PEIR.

Construction Workforce

14.2.2 This construction programme generates a peak of construction activity over winter 2026/27, with over 1,300 construction workers on site.

Construction Sites

14.2.3 Various construction compounds have been identified as follows:

- Main contractor compound (MA1) – the main site and compound for airfield works.
- Airfield satellite contractor compound – this compound will support most of the core airfield works to the North West of the airfield.
- Surface access satellite contractor compounds – up to three off airport locations to be used for construction activities related to highway works at South Terminal, North Terminal and Longbridge roundabout works.

14.2.4 There will be construction-related and construction workforce-related trips to these locations at various project stages. However, the location for construction workforce car parking will be MA1 and therefore the highest number of overall trips will be made to this location.

Diagram 14.2.1: Peak Construction Workforce

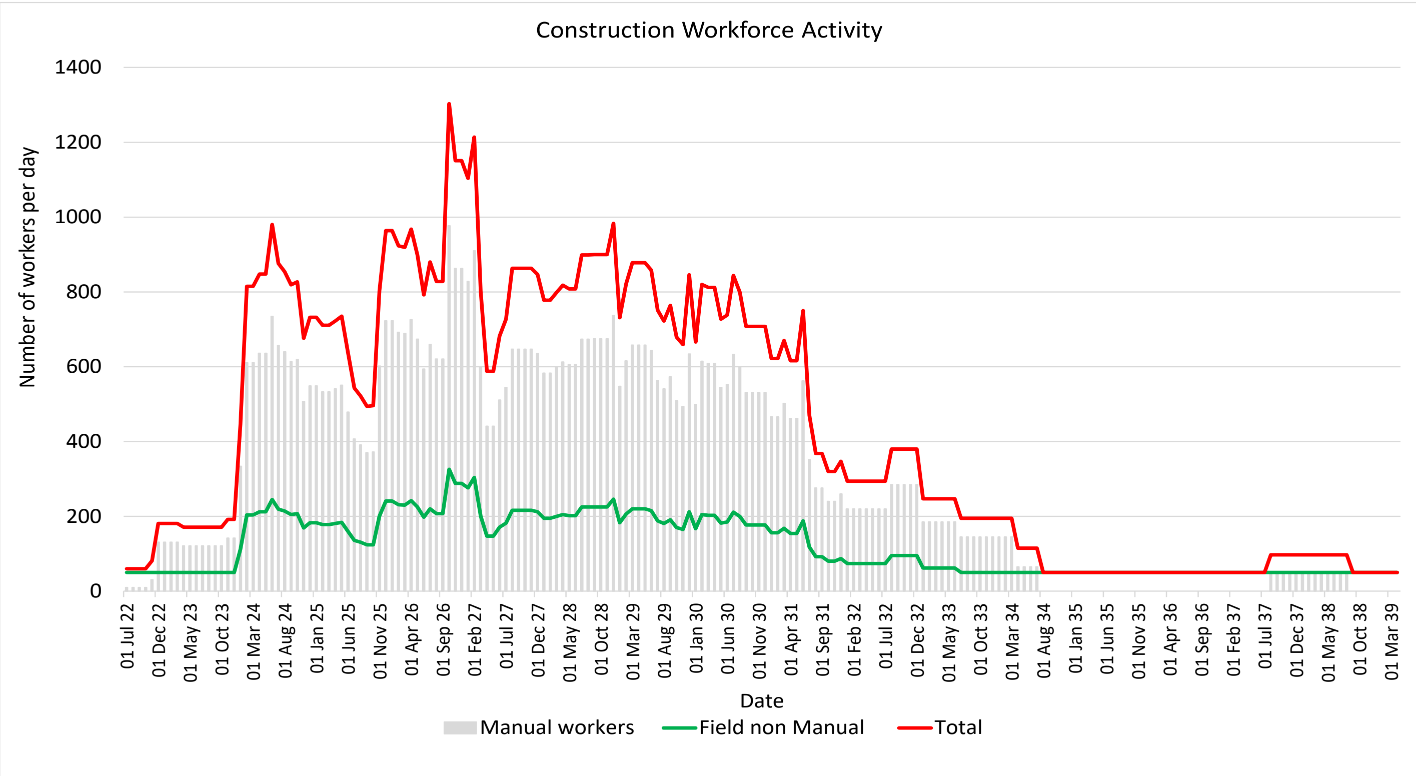
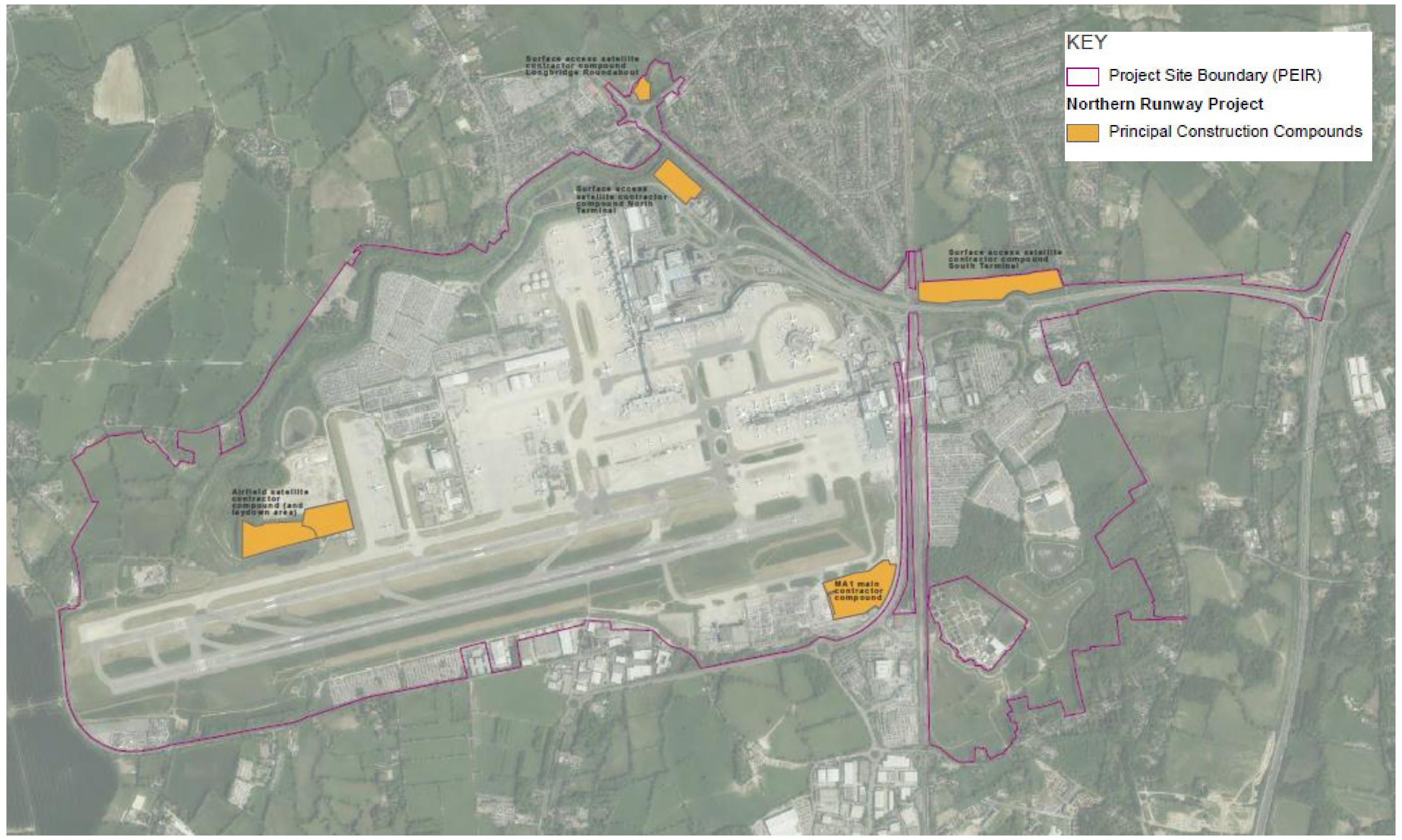


Diagram 14.2.2: Proposed Construction Compounds



14.3 Impacts of Airfield Construction Trips

14.3.1 This section relates to vehicles carrying materials to and waste from the Airport, typically Heavy Goods Vehicles (HGVs over 7.5 tons), Light Goods Vehicles (LGVs between 3.5 tons and 7.5 tons) and small delivery vans.

14.3.2 The objective of the Construction Traffic Management Plan will be to reduce the impact of construction traffic including:

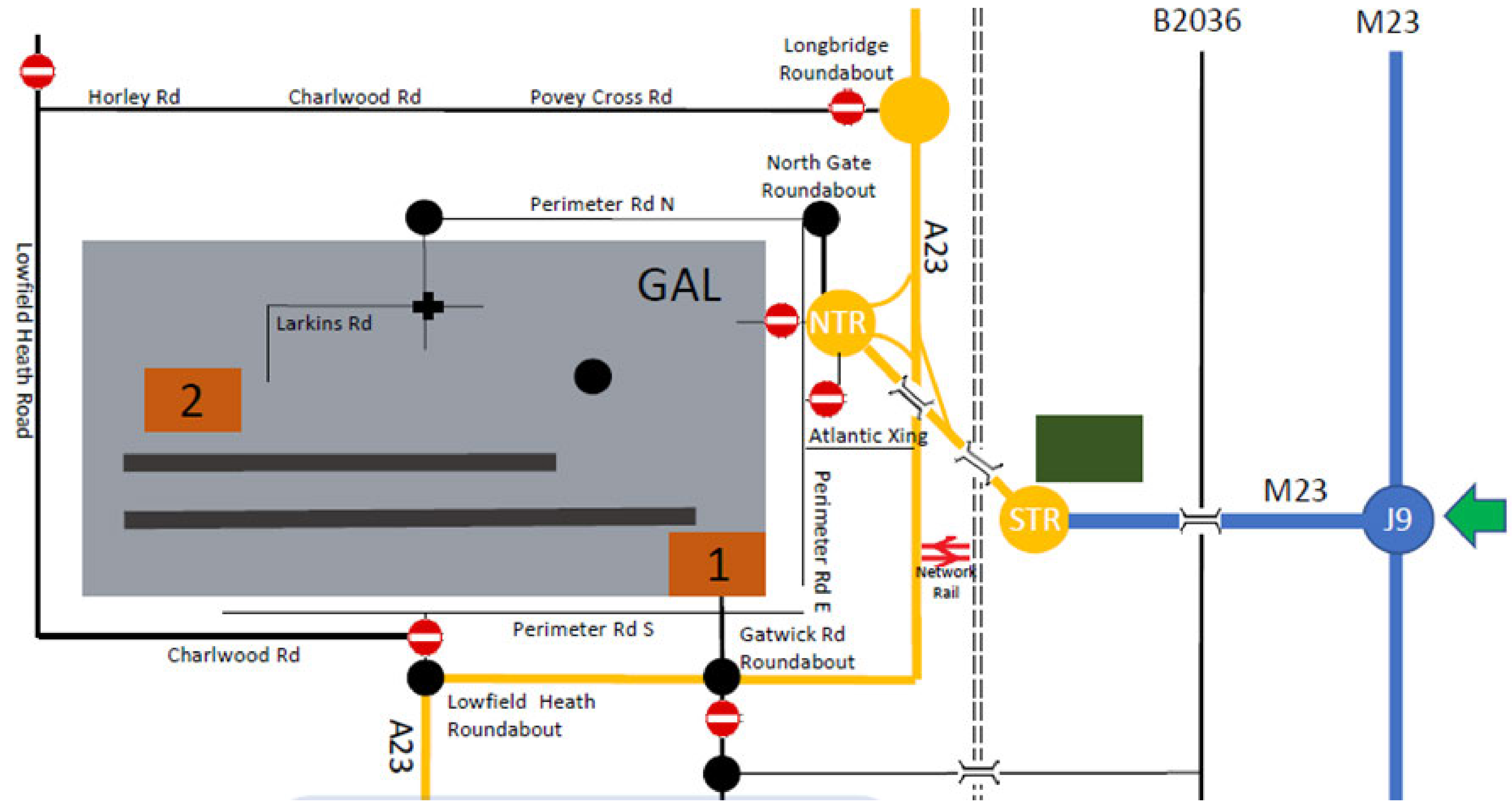
- reducing potential congestion impacts, caused by additional vehicles on the network over and above typical traffic levels;
- reducing safety risks related to construction vehicle movements;
- minimising emission levels;
- limiting noise impacts; and
- minimising other impacts such as wear and tear of the road network and dust from construction traffic.

14.3.3 In order to achieve this, Gatwick Airport has prescribed a single route into the Airport, with all construction traffic coming via Junction 9 of the M23, as shown in Diagram 14.3.1. Access will be via M23 Junction 9 through South Terminal roundabout (STR), onto North Terminal roundabout (NTR) and around Longbridge Roundabout. Construction vehicles then take the A23 south to Gatwick Road roundabout and from there into the MA1 site.

14.3.4 An option had been discussed which allowed construction vehicles to access the Airport via Junction 9 and Junction 10. However, whilst this approach distributes the impact of construction traffic and therefore potentially reduces its intensity, it also has the effect of spreading the impact of construction traffic across a wider area, specifically into north Crawley and is therefore not preferred and has not been taken forward for assessment.

14.3.5 At this stage further analysis is required to confirm the need for and location of a Construction Logistics Consolidation Centre. This could be on an existing site or one that is permitted for such use already. As the details are yet to be confirmed, it is assumed that such a facility is not provided for the purposes of this assessment. This is a conservative assumption as the consolidation centre should reduce trips to and from the construction sites on Airport. Should a consolidation centre be provided, this could be explored as further mitigation as part of the final ES if necessary.

Diagram 14.3.1: Prescribed Routes for Construction Traffic



14.4 Impacts of Airfield Construction Staff Trips

14.4.1 An outline Construction Workforce Travel Plan (CWTP) is being developed for the Project. It will focus on how the construction workforce will travel to and from the Airport, including measures that encourage alternatives to the use of private car in particular single-occupancy car journeys. The intent of the Travel Plan is to put forward a range of travel options for the construction workforce which encourage and deliver a high sustainable mode share and, through this, reduce any potential capacity and environmental impacts of the Project.

14.4.2 It should be noted that each contractor appointed by Gatwick to deliver the Project will be responsible for developing their own detailed CWTP and will be monitored against it to ensure compliance. The outline CWTP is therefore a guidance document to inform appropriate strategies from contractors, which will then become enshrined in contracts and obligations as the Project moves forward.

Aims of Construction Workforce Travel Plan

14.4.3 The aims of the outline Construction Workforce Travel Plan are to:

- Increase the workforce awareness of more sustainable and healthier travel choices.
- Through this, to achieve the highest possible mode share by public transport, walking and cycling as sustainable transport modes.
- Reduce travel by private car, particularly single occupancy car journeys.
- But where car travel is the only viable mode, to encourage multi-occupancy car use to reduce the number of trips.

14.4.4 Through this, the outcomes of the CWTP are to:

- Reduce congestion on key routes / junctions, especially during traditional morning and evening peak travel times. This will benefit Airport passengers, staff and the local community.
- Identify appropriate bus and shuttle services for the construction workforce to augment existing rail, bus and coach connectivity.
- Maintain safety and comfort by minimising increases in traffic levels on local routes; and
- Minimise noise and air quality impacts throughout the Project.

Total Construction Workforce

14.4.5 The construction workforce is estimated to reach a peak of approximately 1,300 workers over the winter of 2026/27 and then reduce to approximately 800 - 900 workers to summer 2030, with workforce numbers reducing after that point to less than 400 by mid-2031.

Rail

14.4.6 Gatwick is the UK's best connected airport by rail. It has regular, direct daily services from over 120 stations, across the South Coast from Southampton to Hastings, west to Reading and as far north as Bedford, Cambridge and Peterborough.

14.4.7 Prior to Covid, rail already accounted for a reasonable proportion of staff travel, 12%, and this was increasing. 2019 timetable changes with earlier and more frequent services as well as potential future measures, such as increasing the Staff Travel Discount, will likely help to drive rail mode share amongst employees even higher.

14.4.8 Accordingly, rail could be a viable mode for some of the construction workforce, particularly those that live in towns and cities along the Brighton Main Line or the Arun Valley Line. Discounted travel could be used to incentivise rail usage.

Local Bus Services

14.4.9 Most Gatwick employees who use bus/coach live in Crawley and Horley, with smaller clusters in surrounding towns and villages including Horsham, Redhill, Reigate and East Grinstead. The 2016 employee mode share by bus/coach was 16% of all staff.

14.4.10 Construction workers living in these locations could make use of existing bus/coach connectivity to access the Airport and, depending on the Metrobus route used, some of the construction workforce may be able to be dropped at bus-stops directly adjacent to construction sites (e.g. Metrobus routes 4 and 5 from Crawley/County Oak will pass construction compound MA1).

Specific Construction-Related Bus Services

14.4.11 Rail services are accessed via the station at South Terminal, and bus routes pick up and drop off at both the South and North Terminals. As such, the workforce arriving at those locations will require a method of travelling the final leg of their journey to site. A construction workforce shuttle bus would provide this service. This will require bus service planning, procurement of a supplier and identification of locations for pick-up, drop-off and layover.

14.4.12 The possibility of developing one or more 'Park and Ride' hub stations outside of the Airport and creating a dedicated workforce bus connection from these locations directly to site is being considered. This would reduce any potential impact of construction workers using the rail and local bus services.

14.4.13 At a minimum, lower emission Euro 6 engines would be expected in all construction-related vehicles, including buses, accessing the Airport. This would reduce the air quality impacts of emissions related to construction traffic.

14.4.14 Further development of a system for dedicated worker buses is underway and will be further defined within the CWTP.

Active Travel

14.4.15 The following initiatives are being considered to support walking and cycling for the construction workforce.

- A 'cycle to work bundle' including discounts on bike and equipment purchases and free bike servicing.
- Safe routes - design consideration is being given to access routes for walking and cycling (as described in Section 11).
- Cycle stands - secure cycle parking to be provided in a convenient location relative to the desired arrival route and site location.
- Showering and locker facilities - provided in the welfare facilities specifically for cyclists.
- Workforce recruitment - a drive to recruit a significant proportion of the workforce from the local area.

Car Parking and Car Sharing

14.4.16 Some of the workforce will continue to drive to work, particularly those working non-standard hours or those carrying equipment and tools. Parking will be provided only at the MA1 compound located near the A23 in the south east corner of the Airport. An internal shuttle bus service will then transport the workforce to their site locations.

14.4.17 The CWTP will develop the parking strategy further based on refined modelling of the workforce profile. However, at this stage, it is envisaged that around 500 car parking spaces may be provided, which can accommodate the total peak project workforce (even assuming some overlap of parking demand at shift changeover – please also see 14.5.8).

14.4.18 This means that 10% of the workforce will need to come by other modes such as public transport and active travel, which is conservative when considering the mode share of current Airport staff. Gatwick will also encourage car sharing by providing incentives for workers to travel to work together (priority parking spots, meal vouchers etc). The current assumption is 1.5 construction workers per vehicle and car parking provision reflects this.

14.5 Impacts of Airfield Construction Trips on Highway Network

14.5.1 A peak airfield construction scenario has been tested with construction trips added on to 2029 baseline traffic levels. This is conservative but reasonable as traffic flows in 2029 will be a few percent higher than in 2026/27, albeit within the daily variation in any given year.

14.5.2 Construction vehicle data has been generated on a monthly basis by GAL's construction team in relation to core and non-core construction activities to deliver the Northern Runway Project. The data is based on project activity, with vehicle numbers for core works generated from quantities for earthworks, pavement works, drainage, aeronautical ground lighting, navaids etc and non-core works based on an intensity factor and costs of the various projects at design status of RIBA 0-1.

14.5.3 The busiest month for construction vehicle activity is December 2026 with 38,450 construction vehicles for the busiest shift across the month. This comprises16,360 construction workforce or Person Owned Vehicles (POVs) and 22,090 other construction vehicles as a mix of HGVs, LGVs and Liveried Vans with two shifts per day.

14.5.4 However, December is a lower month for traffic on the highway network around the Airport and therefore the assessment has also considered other months during the peak months of construction activity in 2026 and 2027. Typically, the summer months, with high Airport activity and background traffic, are the busiest on the network.

14.5.5 Accordingly, the modelling and assessment considers the highest summer month which occurs in August 2027 with 21,834 vehicles for the busiest shift across that month, comprising 7,326 POVs and 14,508 other construction vehicles and with three shifts per day (two x 10 hour shifts and an 8 hour night shift).

14.5.6 Monthly data has been used to generate daily and peak period traffic volumes by:

- Considering shift patterns.

- Dividing monthly vehicle numbers by 22 working days per month.
- Assuming 1.5 construction workers per vehicle, which is considered to be conservative. GAL's construction team have data which suggests that a reasonable proportion of the recent workforce on airside projects at the Airport came to site in minivans with up to 6 people per van. As such, 1.5 construction workers per vehicle is considered a conservative case.
- Assuming 10% construction workforce public transport mode share. Again, this is a low percentage given the excellent connectivity provided by Gatwick Airport railway station, as well as local bus and long-distance coach services.

14.5.7 The three shifts in August 2027 mean that, for the busiest daytime peak, the monthly total POVs is 7,326 vehicles, equivalent to 3,663 POVs in one direction. When divided by 22 working days and factored by 90% to reflect 10% of construction workers on public transport, this gives 150 construction worker vehicles travelling into the MA1 site in the AM peak period (07:00-08:00) and out of the site after the PM peak period (18:00-19:00) in August 2027.

14.5.8 Note that the peak construction worker vehicle activity is higher in the autumn and winter months, with between 330 and 440 POVs for a single shift ie 180 to 290 vehicles more than the August peak. However, traffic into Gatwick Airport is lower in these months - for example, traffic heading into South Terminal roundabout is estimated to be more than 400 vehicles lower in December 2026 than August 2027. Accordingly, there is greater capacity on the network to accommodate these additional vehicles.

14.5.9 The 150 construction worker vehicles travel into the MA1 site in the AM peak period (07:00-08:00) and out of the site after the PM peak period (18:00-19:00) in August 2027.

14.5.10 In order to provide a reasonable distribution of potential locations from which construction workers will travel to/from, the modelling assumes that construction workers are drawn from Croydon, the Gatwick Diamond area and Brighton and Hove. Whilst some construction workers will be drawn from a wider catchment, the length of the Northern Runway construction works over several years, is likely to result in construction workers staying in the area temporarily while working at the Airport and this is the assumption used for modelling. The distribution of construction workers by Local Authority reflects the proportion of construction workers living in those areas from 2019 Office of National Statistics data. The trips are distributed evenly between zones in these Local Authority areas. Given that it will be very difficult to mandate and then monitor routes for construction workers, it is assumed that these vehicles will arrive at MA1 via the most appropriate highway route from or to each zone.

14.5.11 For HGVs and LGVs, the shift patterns in August 2027 mean that, for the busiest daytime shift, the monthly total construction vehicles are 14,508 vehicles, equivalent to 7,254 in one direction. When divided by 22 working days and spread over a 10 hour shift, the estimated vehicle trip generation is 33 vehicles (HGVs and LGVs) in and out every hour along the M23 Spur. At this stage, material-carrying construction vehicles, i.e. LGVs and HGVs, have not been excluded from peak hours on the highway network to test the impact of extra construction traffic in the peak.

14.5.12 The modelling has tested the summer peak level of construction activity in August 2027 on 2029 baseline airport and background traffic levels to provide a robust assessment of potential construction impacts. The difference in traffic flows between 2027 and 2029 will be small (up to 5% higher) and accordingly within the daily variation in any given year.

14.5.13 Traffic flows have been provided to environmental modelling workstreams, specifically air quality and noise, for modelling and input to the draft EIA. Those flows have been provided as 24 hour AADT.

Comparison of Baseline and Project

14.5.14 The proposal is for all construction vehicles to travel to and from the airport from via M23 Junction 9, and no restrictions are proposed for construction worker vehicles. Construction traffic would be monitored to ensure compliance with proposed routes, unless disruption causes these to be unavailable and signed diversionary routes provided.

14.5.15 The estimated vehicle trip generation is 33 vehicles (HGVs and LGVs) in and out an hour along the M23 Spur, and 150 construction worker vehicles in the AM peak hour.

14.5.16 In line with IEMA guidance, the assessment considers highway links where traffic flows will increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%); or links through any other specifically sensitive areas where traffic flows have increased by 10% or more.

14.5.17 Strategic modelling shows that no link within the study area exceeds an increase in traffic of over 30%, which is expected given the volume of airfield construction traffic generated by the Project.

14.5.18 Flows on Old Brighton Road South, Lowfield Heath Roundabout-Perimeter Road South are 20% higher in the AM peak and 25% higher in the afternoon inter-peak owing to the location of the MA1 site off this junction.

14.5.19 The modelling shows that HGV flows increase by more than 30% on some roads into the Airport in the AM and PM peaks, which is expected given the requirement for construction HGVs related to the Project to use the Strategic Road Network. The roads impacted are as follows:

- M23 Spur, J9-South Terminal roundabout
- A23 Airport Way
- A23 London road, North Terminal-Longbridge Roundabout
- A23 London Road, Beehive Ring Road-South Terminal
- A23 London Road, Beehive Ring Road-A23 London Road

14.5.20 No other roads into the Airport show HGV increases of 30% or more in the AM and PM peaks. Moreover, with the 150 construction worker vehicles coming from nine Local Authority areas, the most vehicles from one Local Authority area is between 20 and 30 vehicles in an hour. This is only a small increase in traffic when considered against other demand on highways and roads around the Airport.

14.5.21 The above effects are shown in Diagram 14.5.1 for the AM peak hour, with a 30 to 100 vehicle two-way flow change shown predominantly on the M23, M23 Spur and A23. There are also minor vehicle increases on Charlwood Road south of the Airport and a number of smaller roads in North Crawley. 30 vehicles per hour two-way is equivalent 15 vehicles per hour in each direction, or one every 4 minutes.

14.5.22 Given the limited impact of construction traffic, it is not anticipated that there would be overlap between construction traffic when considering Heathrow R3 construction on a cumulative basis. However, this will be reviewed for the application for development consent.

Diagram 14.5.1: Roads impacted during the Airfield Construction Scenario (AM Peak)

Mitigation of Construction Traffic Impacts

14.5.23 Based on the levels of construction traffic described above, it is not considered that peak airfield construction will have a significant impact on the performance of the highway network around the Airport.

14.5.24 Further work will be undertaken for the Environmental Statement to explore measures to mitigate the potential impacts from construction traffic during peak periods and reduce the overall construction traffic loading created by the Project.

14.5.25 Whilst the modelling indicates that there is available capacity in peak hours on the network, a conservative assumption is to aim for minimal additional construction traffic at these times to make sure construction works related to the Project do not negatively impact on network capacity and safety.

14.5.26 Potential traffic mitigation measures could include the following and would need to be modelled and assessed to confirm effectiveness prior to being taken forward.

- Developing a Travel Plan for deliveries including HGVs: A Travel Plan which puts in place a series of sustainable measures to address the delivery or removal of materials to or from site. This may include the use of low or zero emission delivery vehicles and the leveraging of the rail network that supports Gatwick including the potential for setting up local rail hub(s) for the delivery of bulk materials. It will also include measures to consolidate deliveries to site. This measure has the potential to reduce the number of vehicle movements during peak and off-peak periods.
- Restrict material deliveries and waste away to outside of peak hours: This measure is not intended to reduce vehicle movements overall but rather to flatten the vehicle loading across the day and remove any vehicle movements that are not time-critical during the morning and evening traffic peak hours. This measure may require more capacity in holding and layover areas to maintain reliable arrival times on site.
- Restricting car parking spaces for the construction workforce: This is a base measure which is already included in the mitigation, limiting car parking to 45% of the peak workforce.
- Travel Plan for staff and workforce: A Travel Plan which puts in place a series of sustainable measures to address the impacts of workers travelling to and from site and which promotes sustainable travel. Measures might include staff travel discounts to maximise the use of public transport (including rail), incentives for car sharing, and the provision of ‘cycle to work’ schemes. The elements of the plan would build on Gatwick’s existing staff travel plan, which includes discount schemes for public transport use.
- Provide ‘Park and Ride’ services for construction workers: Provision of ‘Park and Ride’ hubs in towns and cities around the airport where Project construction workers will be drawn from. Providing ‘Park and Ride’ bus operations will address vehicle impacts on roads leading to the airport by consolidating the vehicles, however the location of the car parks will govern the extent of the benefit and may result in additional, unwanted congestion at or near the sites themselves.
- Use of bus lanes for construction workforce buses: This option is intended to speed up the transport of workers from car parks (including ‘Park and Ride’ sites etc.), the railway station and off-site bussing to the compounds. This option would not reduce the number of vehicle movements directly but would speed up the transit time of buses to and from site and as such may indirectly reduce the vehicle movements by making bus travel more attractive. However, this option may also result in slowing down existing public bus services so its advantages and disadvantages need to be further assessed.
- Reduce the amount of ‘business as usual’ construction work: Reduce the volume of ‘business as usual’ construction work to a minimum during the peak Project construction period(s). It is intended that this measure would reduce some of the existing traffic thereby releasing some capacity for Project construction vehicles.
- Increase non-day shift working: Undertaking more work on a back shift (from late afternoon until midnight) or night shift, especially in the summer when daylight hours are longer. This measure is not intended to reduce overall vehicle movements but to flatten or remove construction vehicle activity from the morning and evening peak hours. This measure could not be applied to all project activities but could be applied to selected works.
- Stagger shift patterns: This measure could be used to flatten or remove construction vehicle activity from the morning and evening peak hours. This measure may not need to be applied to all project activities and may only be applied to selected areas of work. This is an approach commonly taken for large development projects near congested networks and has been adopted by several DCO projects.
- Move selected construction activities to the winter months: Moving selected construction activities to the winter months would reduce the impact on the roads during spring and summer months when the roads can be busier. The extent of the impact would be dependent on the activities to be moved. This may also impact the overall completion date for the works. At this stage, it is envisaged that peak airfield construction will occur during the winter months of 2026/27.

14.6 Sequencing and Impacts of Highway Construction

14.6.1 Understanding the impact of constructing highway mitigation, including potential grade-separation, has been assessed for a conservative construction phase which envisages works at both South and North Terminal junctions at the same time. Further scenarios will need to be considered in conjunction with Highways England and local highway authorities prior to DCO submission.

Overview of Highway Works

14.6.2 All highways construction activities tend to follow a broadly similar construction sequence, with the duration and detail dependent upon the scale and complexity of the scheme in question, as follows:

- Activities normally start with delineation of the boundary to the work, site clearance where required for the work and protection or diversion of utilities affected by the scheme.
- Prior to site clearance, any trees or vegetation to be retained are identified and safe paths maintained through or around the works for pedestrians, cyclists and other non-motorised users of the network who may be affected by the construction activities.
- Once the site is cleared, topsoil and possibly also subsoil will be removed where roads are widened, or new roads are to be built. Soils are placed in stockpiles for re-use.
- Structure foundations are then built, and earth or other materials removed to sufficient depth to prepare the ground for new road embankments or road pavement layers. Various ancillary items can be constructed at this stage including access chambers, sign and gantry foundations, draw pits, drainage pipes and ducts for highway communications systems or traffic signals.
- The next stage comprises above ground structures such as bridge piers or abutments and bridge decks, as well as the laying and compaction of road pavement sub-base materials.
- Kerbs are then installed and new road pavements constructed.

- Finishing works include verges, re-soiling of earthworks' side-slopes and the installation and commissioning of vehicle restraint systems, street furniture, traffic lights, road lighting, wayfinding and the like. Final tasks include road markings, diversion of traffic onto the new road layout, removal and making good of redundant sections of road, soft landscaping and the removal and restoration of any temporary contractor's compounds or other facilities.

South Terminal Roundabout and M23 Spur

14.6.3 The Project involves providing grade separation of the traffic movements at the existing South Terminal roundabout, together with conversion of the existing eastbound hard shoulder on the M23 Spur to a permanent running lane up to M23 Junction 9.

14.6.4 The roundabout itself will remain in its current position and be connected to the new flyover by four new slip roads. Space to construct the slip roads is restricted in some places and, where this is the case, retaining structures will be needed to support them clear of the surface features that need to be avoided, such as, for example, the water storage pond to the south of Airport Way and east of the Brighton-London main line. The need to incorporate slip roads to/from the M23 Spur motorway also means that the existing bridge over B2036 Balcombe Road will have to be extended and may have to be replaced altogether.

14.6.5 After site clearance and diversion or protection of utilities, the proposed construction sequence envisages the retaining structures and portions of the new Balcombe Road overbridge being built. This will be followed by earthworks and roadworks necessary to enable the traffic to be diverted off Airport Way and M23 Spur onto the slip roads, connecting to the South Terminal roundabout. It is likely that each slip road will need to temporarily support two lanes of traffic.

14.6.6 The flyover structure across the roundabout will then be completed, along with the associated retaining walls, earthworks and road pavements leading up to it.

14.6.7 Once any works to the existing in-line B2036 Balcombe Road overbridge are completed, through traffic can then be diverted from the slip roads onto the flyover. This should reduce the traffic flows on the slip roads, enabling them to be reconfigured into their final layout.

14.6.8 The M23 Spur eastbound carriageway will be widened slightly to enable it to carry three permanent lanes of traffic. The construction sequence and activities will be very similar to those carried out in 2018/2019 on the westbound carriageway for Highways England. The road will remain within the existing highway boundary and two lanes of traffic will be maintained for the construction duration, unless short-term temporary lane closures are needed.

14.6.9 All construction activities will take into account the need to maintain safe working zones, with appropriate temporary speed limits, clearances and safety barriers between construction areas and trafficked lanes. Where necessary, short-duration temporary lane closures will be needed to allow construction activities to proceed safely. Occasional temporary full closures of carriageways or roads may be needed for certain critical activities and these will be timed to avoid the busiest times of the day or night, with appropriate alternate routes in place and signposted. Access along Balcombe Road will be maintained except for occasional short-term closures to enable certain bridge deck construction activities to take place safely. Access into the Gatwick Airport South Terminal area will be maintained at all times.

North Terminal Roundabout

14.6.10 This scheme involves providing grade separation of the traffic movements at the North Terminal roundabout.

14.6.11 Overall, the objective will be to maintain safe working zones, with appropriate temporary speed limits, clearances and safety barriers between construction areas and lanes that are open to traffic. Where necessary, short to medium-duration temporary lane closures will be needed to allow construction activities to proceed safely. Occasional temporary full closures of carriageways or roads may be needed for certain critical activities and these will be timed to avoid the busiest times of the day or night, with appropriate alternate routes in place and signposted. Some night-working will be required.

14.6.12 The overall sequence will be to first clear the site and divert or protect utilities and other services to be retained. Work can then begin on the reconfiguration of the road layout, which starts with foundations and substructures for the new flyover. The new link roads can each be built in turn, to ensure that traffic can continue to flow through the junction whilst construction is underway. As each new link is completed and can be opened to traffic, sections of the existing junction or link roads can be closed, enabling construction to take place at those locations.

14.6.13 As well as the flyover, other key stages will involve creating the signalised junction which will accommodate traffic moves into and out of North Terminal, replacing the current roundabout.

Longbridge Roundabout

14.6.14 The capacity of Longbridge roundabout will be increased by providing full width running lanes throughout the junction and signalising certain arms. The new roundabout will have a slightly larger circulatory and will extend further west and north to accommodate wider circulating lanes, additional pedestrian crossing facilities and improved capacity on exit and entry lanes, particularly for the A23 arm to and from Horley.

14.6.15 All works will take place at the same levels or very slightly higher than the existing road network.

14.6.16 Construction methods will be typical of this type of construction activity and are not expected to include the use of unusual or exceptional plant or equipment. One item of work will be to widen the road bridge over the River Mole. Whilst this is done, safe routes for pedestrians and cyclists will be maintained.

14.6.17 All construction activities will take into account the need to maintain safe working zones, with appropriate clearances and safety barriers between construction areas and trafficked lanes. Where necessary, short-duration temporary lane closures may be needed to allow construction activities to proceed safely, however it is not expected that the roundabout will need to be fully closed to traffic.

Terminal Access Roads and Forecourts

14.6.18 Works to the terminal access roads and forecourt areas will be required to ensure they can safely and efficiently accommodate the predicted increase in demand. The highway-related aspects to this work include selective widening of the roads that enter and leave the terminal areas, improved or refreshed road markings and signage to aid and inform road users and improved footpaths and road crossings for users other than vehicles and their occupants.

14.6.19 The work will be timed to minimise disruption to existing users and to ensure airport operations can continue as efficiently as possible whilst maintaining safe working zones to construction activities.

14.6.20 All works will take place at the same levels as the existing road network.

14.6.21 Construction methods will be typical of this type of construction activity and are not expected to include the use of unusual or exceptional plant or equipment.

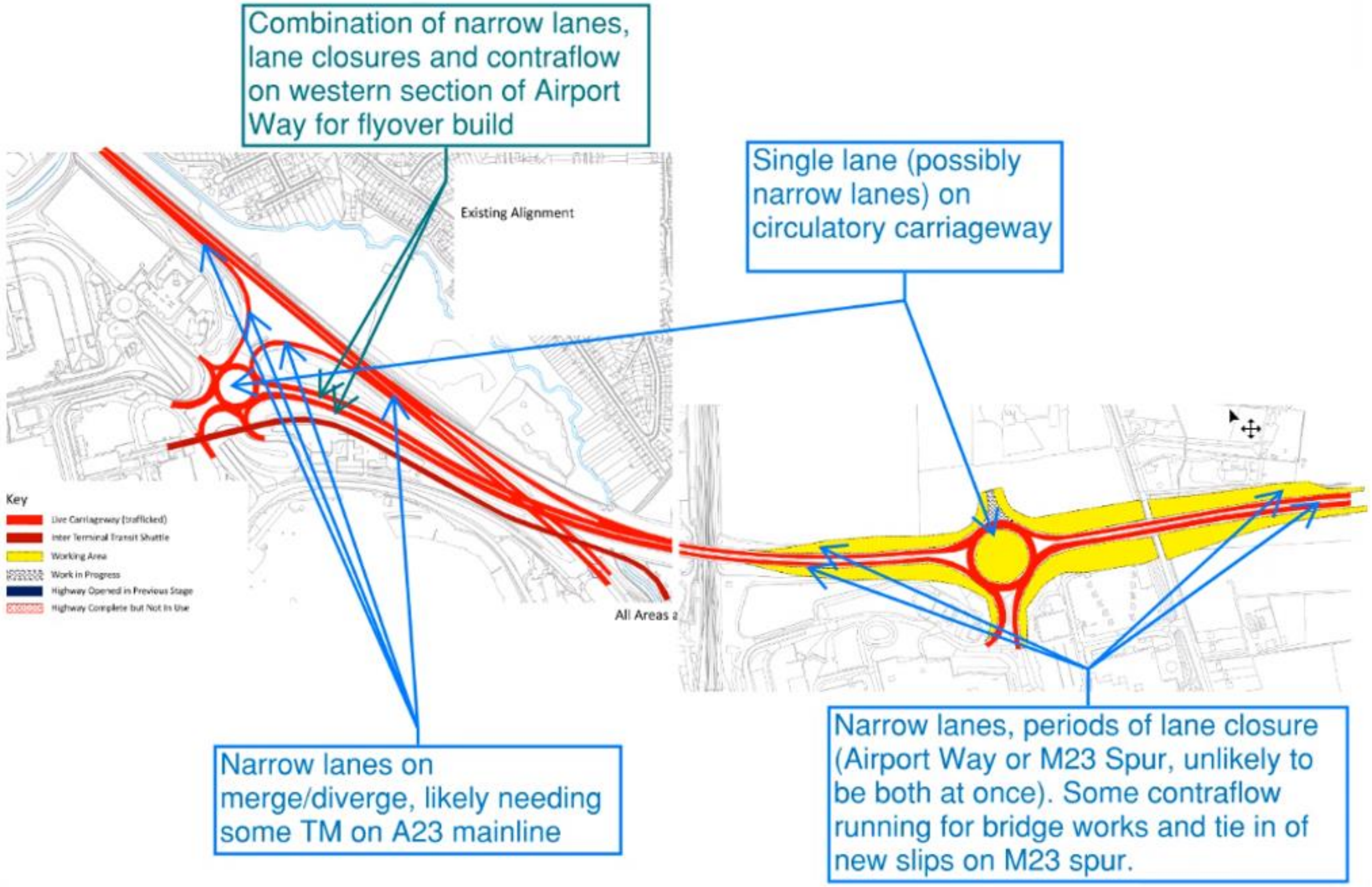
14.6.22 Access into the Gatwick Airport terminal areas will be maintained at all times and during busy periods the number of lanes open to traffic will not be reduced.

14.6.23 Access to side roads and facilities alongside the primary roads to be widened will be maintained at all times. If temporary road, access or lanes closures are required to maintain safe working zones whilst completing the works, signed alternative access arrangements will be put in place.

Assessment of Impacts

14.6.24 The most complex highway construction phase as currently envisaged would involve a combination of construction works at both the South and North Terminal roundabouts, as shown in Diagram 14.6.1. The construction methods are typical for the works envisaged but the sequencing of these to avoid unnecessary disruption creates complexity.

Diagram 14.6.1: Potential Highway Construction Phase



14.6.25 The highway construction works could last for a period of up to four months and would include:

South Terminal roundabout

- Narrow lane running or periods of temporary lane closure on the M23 Spur and/or Airport Way, with some contraflow running for bridge works and tying in the new slips back to the M23 Spur.
- No right turn into the Airport, owing to the reduced capacity of the roundabout, with traffic being sent to Junction 9 to u-turn.

Both roundabouts

- Single of narrow lanes on the circulatory of both roundabouts.

North Terminal roundabout

- Narrow lanes on merges and diverges, likely requiring some traffic management on the A23.
- A combination of narrow lanes and/or lane closures and contraflow running on the western section of Airport Way to allow the flyover to be built.

14.6.26 It is envisaged that these works would take place November through to February.

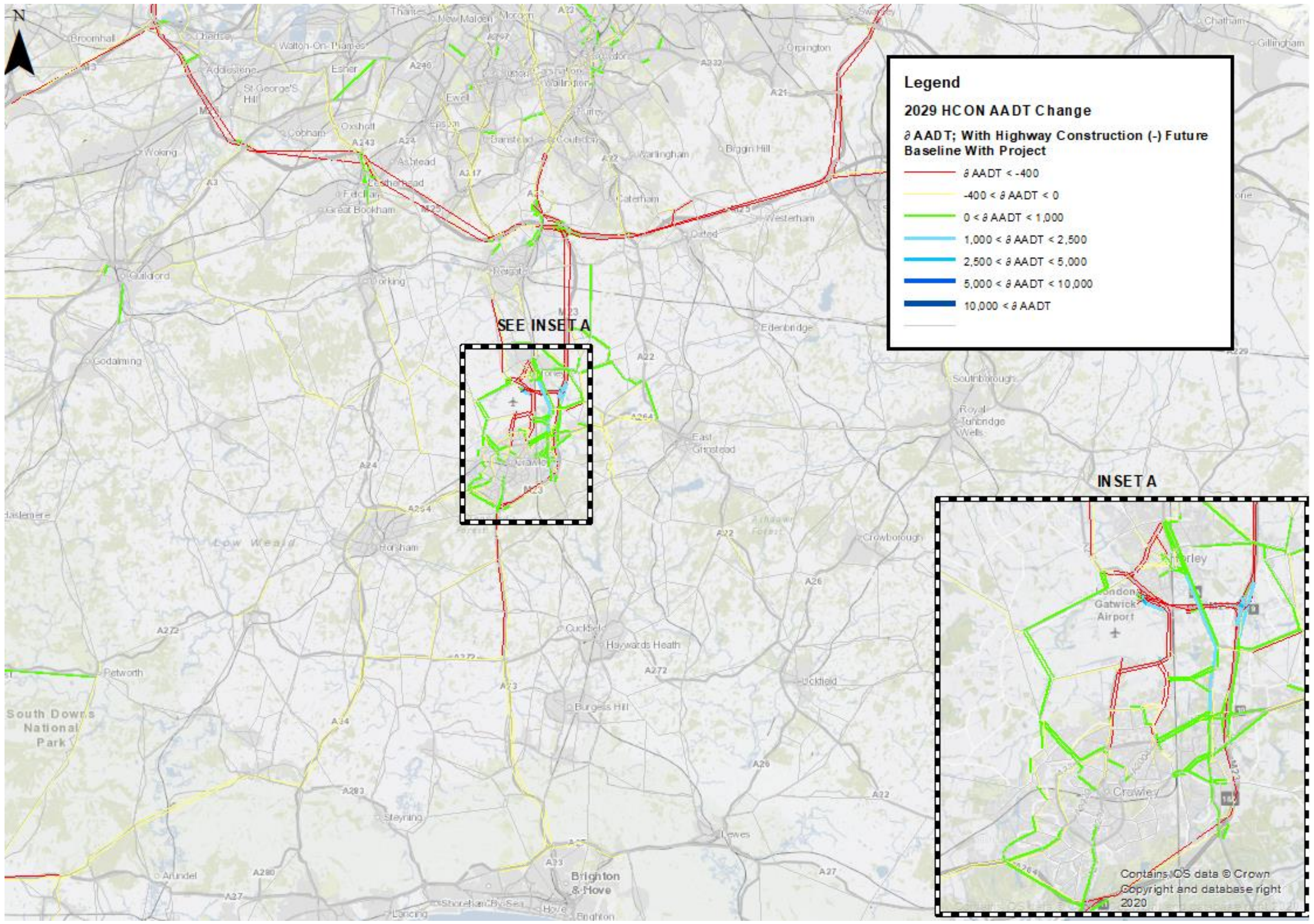
14.6.27 Accordingly, strategic modelling has tested the most conservative construction phase against winter Airport traffic assuming 2029 with Project demand, ie assuming the Northern Runway is open, to provide a robust assessment of potential construction impacts with additional demand generated by increased runway capacity.

14.6.28 Traffic flows on a peak Friday in winter are 72% of those of a peak summer day, reflecting that this is a quieter period at the Airport and therefore when it would make the most sense to sequence the more complex phases of highway construction at this time.

14.6.29 Modelling of this scenario shows reassignment of traffic owing to the temporary highway works on the M23 Spur, as per Diagram 14.6.2. The links shown in red indicate a reduction in traffic. It can be seen that traffic reduces on the M23 Spur, this being background traffic not needing to access the Airport, seeking alternative routes. The works also impact on traffic levels on the M23 itself with reductions also shown by the model on the motorway. M23 Junction 9 shows an increase in traffic flows related to right-turning into the Airport being forbidden during this construction phase and therefore traffic from the west heading to South Terminal having to u-turn at Junction 9.

14.6.30 The modelling shows increases on highway or road links shown in green and blue. Notable changes include north-south traffic between Horley and Crawley rerouting via Balcombe Road as well as some traffic taking a route on the west side of the Airport from Ifield Avenue in Crawley via Bonnets Lane, Lowfield Heath Road, Horley Road and Charlwood Road and into Horley via Povey Cross.

Diagram 14.6.2: Reassignment of Traffic during Highway Construction



14.6.31 It should be noted that flows are shown as Annual Average Daily Traffic, equivalent to average 24 hour flows. As such, where red is shown, traffic flow has reduced by 400 AADT or more, which is equivalent to a reduction of 17 vehicles or more per hour on average on those roads. Green shows increases of between 0 and 1000 AADT, which is equivalent to between 42 more vehicles per hour on average on those roads. These changes are therefore relatively small, less than one vehicle per minute, which is reflected in changes in junction performance.

14.6.32 In general, temporary capacity issues at junctions are only observed on the SRN where works are taking place or at junctions on Airport. Minor changes in capacity are shown in Redhill and Copthorne owing to some local traffic reassignment in the model.

Diagram 0.1: Junction Analysis during Highway Construction

14.6.33 At this stage, the effects associated with highway networks, such as potential congestion and traffic reassignment, are preliminary as construction sequencing has not been fully developed or agreed with Highways England.

15 Freight, Cargo and Logistics

15.1 Definition of Freight Movements

15.1.1 At Gatwick, there are four types of goods vehicle movements, as described below.

- Air cargo: movements related to shipments that have been brought in or will be taken away by air, typically in the belly of passenger aircraft.
- Logistics: 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.
- Airline servicing: movements related to inflight catering, including movements to the consolidation centre near Perimeter Road South, as well as those between the consolidation centre and the aircraft.
- Airport servicing: movements related to construction and maintenance on the airport estate.

15.1.2 Each of these movements occurs in a different area of the airport.

- Air cargo and logistics are handled in the cargo area north of the airfield and west of North Terminal.
- Waste consolidation occurs south of the cargo area along Larkins Road.
- Airline servicing is based south of the airfield in the Gatwick Gate Industrial Estate.
- Airport servicing originates from both north and south of the airfield, depending on the type of activity.

15.1.3 This section describes these different types of traffic, their activity within each freight zone and impact on the road network. For the purposes of the assessment, freight traffic comprises Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs).

15.2 Air Cargo

Current demand and future growth

15.2.1 In 2019, Gatwick handled over 150,000 tonnes of cargo driven by additional long-haul services. A high proportion of Gatwick's cargo traffic involves non-EU markets and most of this cargo is carried by passenger aircraft in the form of belly cargo. This is expected to continue into the future.

15.2.2 Gatwick's cargo volumes are forecast to grow to over 229,000 tonnes by 2047 in the baseline and to over 303,000 tonnes with the Project.

15.2.3 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.

Cargo Handling Area

15.2.4 The Cargo facility covers an area of 10 hectares. This is made up of 23,000 m² of cargo sheds, plus office accommodation, areas for HGV loading, unloading and parking, and open equipment parking areas.

15.2.5 The cargo sheds are owned by a third party with a long-term ground lease. Gatwick has no direct commercial involvement with the cargo operation, although GAL manages the Border Inspection Post located there. The inspection post is used for temporary storage, inspection and clearance of live animals and foodstuffs.

15.2.6 The Gatwick Direct logistics operation run by DHL, consolidates deliveries and some of the waste collection operation, is also located in part of the cargo building (see Section 15.3).

15.2.7 In the mid-2000s, the cargo area handled 300,000 tonnes of air freight annually. Therefore, it is envisaged the return to these historic air cargo levels by 2047 can be accommodated within the existing air cargo area.

15.2.8 The cargo area is shown in Diagram 15.2.1. Access is via the North Terminal roundabout. The Project envisages reconfiguring this junction to provide additional capacity. Longbridge roundabout will also be upgraded as part of the Project. These enhancements and their performance are discussed in more detail in Sections 9 and 11.

Current Cargo Traffic

15.2.9 When considering cargo growth into the future, the following can be inferred from current operations.

- Landside vehicle movements related to air cargo tend to be outside typical commuter peak periods.
- 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. Cargo handlers typically expect a maximum of between 50 and 60 LGVs and HGVs per day.

15.2.10 Data from August 2019 shows an average two vehicles per hour (55 across the day) into Dnata's area of the cargo centre. Whilst there is no current data for Royal Mail, WFS movements and other cargo movements, it is estimated that a maximum of five vehicles of varying size arrive at the cargo centre in any given hour currently. When compared to traffic on the highway network around the Airport, this is a very low level of vehicle activity.

Diagram 15.2.1: Location and scale of cargo and freight facilities

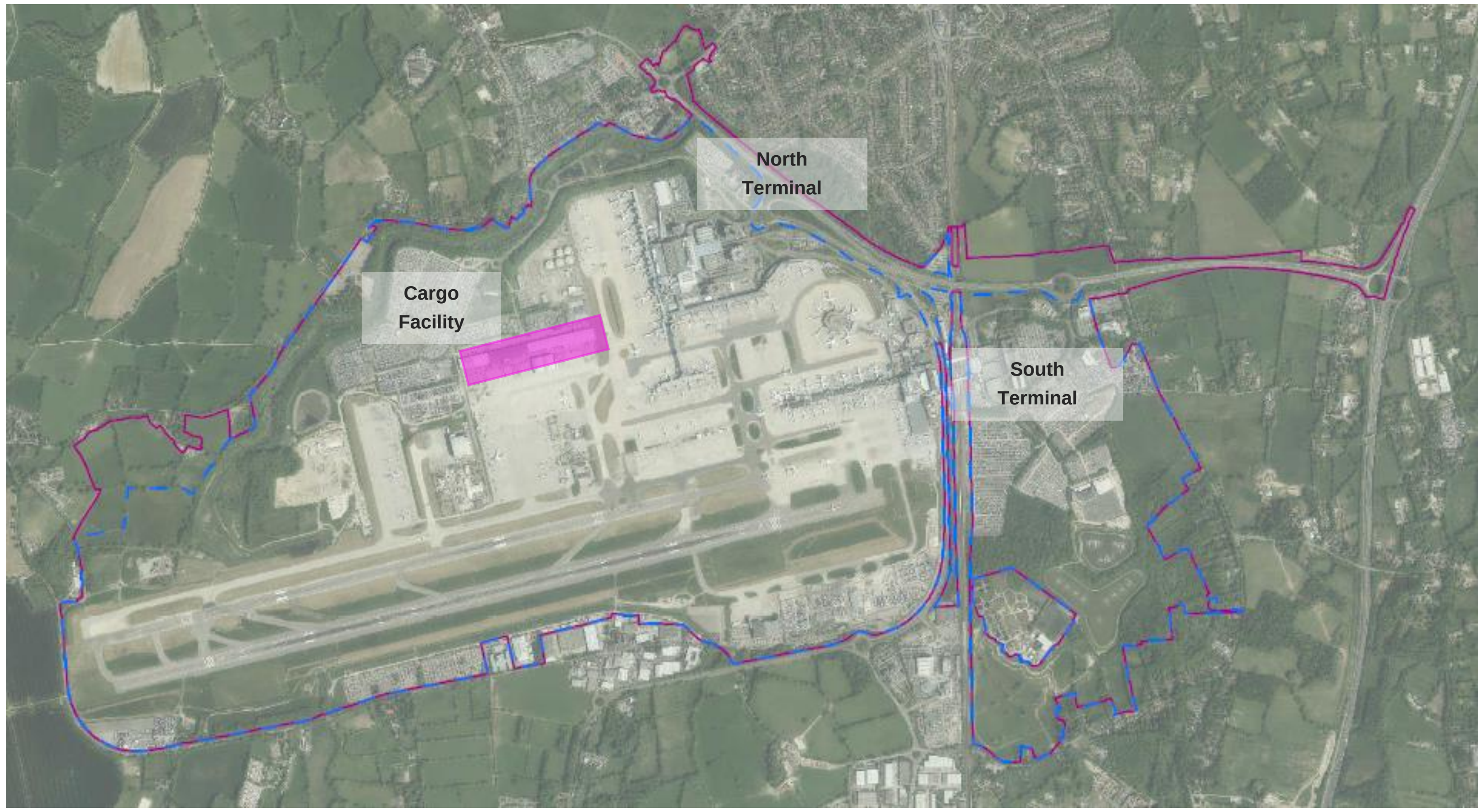


Diagram 15.2.2: Cargo Facility during Commuter Peak Period – Low Activity

15.3 Logistics

Gatwick Direct

15.3.1 Gatwick Direct is a 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.

15.3.2 The Gatwick Direct facility is located at the eastern end of the cargo facility. There is an airside / landside boundary that runs through the Gatwick Direct warehouse, with screening being conducted through a security fence from one side of the building to the other.

15.3.3 All vehicles arriving at Gatwick Direct must have an online, system-generated valid booking reference with a specific timed delivery. This allows DHL to manage incoming flows to suit operations and / or peak traffic hours on road networks. Vehicles are directed to specific loading bays by the booking reference.

15.3.4 When goods arrive, they are unloaded against the booking-in information and marshalled prior to being screened through the control point (CP) fence. Gatwick has introduced paying for screening, the cost of which is invoiced to Gatwick Direct users.

15.3.5 The major benefits to concessionaires are in time-saving and potentially stockroom savings, 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.

15.3.6 The service has reduced airside vehicle traffic, and through managed deliveries and increased volumes should help to reduce landside vehicles and spread the deliveries over non-peak hours. Both will be of benefit for the access strategy for Gatwick.

15.3.7 Gatwick Direct therefore brings advantages in terms of efficiency and security, but importantly for the road network, also in terms of potential consolidation and a reduction in vehicle movements.

15.3.8 Data from August 2019 shows an average four vehicles per hour (84 across the day) from 350 different suppliers into the Gatwick Direct area managed by DHL. 50% of vehicles entered between 05:00-12:00, peaking at 05:00-06:00 and 10:00-11:00, with peak hour arrivals up to 7 vehicles. 46% of all vehicles booked in by DHL were LGVs, with most arrivals through the morning and middle of the day. On average, two HGVs arrived per hour across the day. Again, these numbers are not significant compared to flows on the wider network.

Waste

15.3.9 There are three groups of waste movements: Gatwick airside, Gatwick landside and third party. Data from October 2019 shows an average one vehicle per hour (16 across the day) into the waste centre.

15.4 Airline Servicing

15.4.1 Airline servicing includes provision of fuel, catering and other services.

15.4.2 At this stage, data on tanker trips to / from the fuel farm from outside the airport are still being analysed. This is also true of supplier trips to / from the catering consolidation centre from outside the airport.

15.4.3 This data will be included in the strategic modelling when available.

15.5 Airport Servicing

15.5.1 Airport servicing includes movements by construction, facilities maintenance, air traffic control and other services.

15.5.2 Data exists for business-as-usual construction traffic and this data will be used to inform baseline construction and maintenance and activity in terms of number of vehicles as compared to capital expenditure of works.

15.6 Conclusions

15.6.1 Strategic highway modelling of future highway network around the Airport, including air cargo and logistics activities, is described in Section 10, with more localised capacity modelling of junctions around the Airport described in Section 11. These models include the main access points to the Gatwick Airport site from the wider road network for cargo and logistics vehicles.

16 Catchment Areas

16.1.1 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 section sets out the extent of Gatwick Airport's catchment.

16.1.2 This section is supported by GIS mapping, provided in Annex 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 "quality of life" analysis 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.

16.2 Current Catchment

16.2.1 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:

- 170,000 people between 0 and 5 miles.
- 248,000 people between 5 and 10 miles, equivalent to 418,000 between 0 and 10 miles of the airport.
- 5.662 million people within 10 and 25 miles, equivalent to 5.910 million between 0 and 25 miles of the airport.
- 11.193 million people within 25 and 50 miles, equivalent to 16.855 million people within 0 and 50 miles of the airport.

16.3 Current Journey Times (All Modes)

16.3.1 In terms of current journey times across all modes, the number of people between 0 and 4 hours from Gatwick is as follows:

- 494,000 people between 0 and 30 minutes.
- 4.259 million people between 30 and 60 minutes, equivalent to 4.75 million within 0 to 60 minutes from the airport.
- 8.831 million people between 60 and 90 minutes, equivalent to 13.584 million people within 0 and 90 minutes from the airport.
- 7.574 people within 90 and 120 minutes, equivalent to 21.158 million persons within 0 and 120 minutes of the airport.
- 25.538 million people within 120 and 240 minutes, equivalent to 46.696 million people within 0 to 120 minutes from the airport.

17 Resiliency and Reliability of Transportation Networks

17.1.1 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.

17.1.2 Gatwick is the only UK airport to still have this type of team with other airports having disbanded their teams and passed responsibility to other agencies.

17.1.3 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.

17.1.4 Gatwick has implemented joined-up rail contingency planning with Network Rail, relevant Train Operating Companies and Transport for London. This aligned thinking and coordinated response has been clearly demonstrated during planned closures, as described in Section 17.2.

17.1.5 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, to deliver a rapid and coordinated response.

17.2 Resilience and Reliability of the Rail Network

Configuration of the Network

17.2.1 The Brighton-London main line is one of the busiest railway lines in the country, and therefore the performance and resilience of this part of the network is important to the whole of the south of England.

17.2.2 It is important to note that the Brighton-London main line is not a single corridor, it has a number of built-in diversionary routes, which increase its resilience.

- North of Gatwick there are two independent routes as far as Purley, known as the Quarry Line and the Redhill line.
- 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.
- There is also scope to turn trains back at Three Bridges helped by one of the Thameslink depots being there.

Investment in capacity and asset resilience

17.2.3 The Network Rail Sussex Area Route Study, published in 2015, identifies the long-term strategy for the Sussex Route, particularly in terms of enhancing capacity to meet forecast traffic growth through projects such as the Thameslink Programme, whilst also considering the need for a renewal programme to address sustainability, resilience and asset performance along the Brighton-London main line. The Plan recognises that there is a balance required between increasing capacity and improving reliability through planned upgrades.

17.2.4 Data collected by Network Rail shows that passenger numbers on the line have more than doubled since the year 2000, with around 300,000 people using the route each day. This means busier services and more crowded trains in peak periods, particularly north of Croydon.

17.2.5 As described in Section 7, a major infrastructure proposal exists to eliminate bottlenecks in the Croydon and Windmill Bridge area to release more train paths that can be used to run additional train services to reduce crowding and support future growth.

17.2.6 In addition, removing the bottlenecks on the line will provide greater resilience. At the moment, these bottlenecks *'magnify the impact of even the most minor incident or delay along the line, making it much harder to get trains back on time when things go wrong'.* (Network Rail, 2018)

17.2.7 Accordingly, passengers on the Brighton-London main line are more likely to experience 60% more knock-on delay when an incident occurs when compared to the South West Main Line. The South West Main Line is a useful comparator as it has similar passenger numbers and train service frequencies as the Brighton-London main line.

17.2.8 In addition to major investment, Network Rail has also been carrying out a progressive series of renewals and repairs to improve reliability and performance on the Brighton-London main line, including a major 9-day closure in February 2019 and an additional series of weekend closures around it.

17.2.9 The focus of these improvements has been towards the southern end of the line between Three Bridges and Brighton / Lewes, with engineering work to repair bridges and tunnels, improve drainage, as well as replace or upgrade power supply, points, signals and track. The works have included the railway itself as well as the Victorian-era tunnels at Balcombe, Clayton, Haywards Heath and Patcham.

17.2.10 The main works undertaken during the 9-day closure related to renewal of the Balcombe Tunnel Junction along with upgrades to lineside signalling and power systems between Haywards Heath and Preston Park. The Brighton-London main line was closed south of Gatwick Airport and the airport played its part in supporting this coordinated operation, providing pre-booked car parking for those who wished to park and ride on train services north of the Airport. Direct trains to London Victoria continued to operate every 30 minutes from Gatwick Airport but on a diversionary route via Horsham.

17.2.11 In total, more than 36,000 hours of work were carried out which Network Rail estimated as being the equivalent of 79 separate weekend closures.

17.2.12 Separate weekend closures were also carried out, with works including ballast cleaning, signal upgrades, improved track formation (Preston Park Station), rerailing through Keymer level crossing and deep cleaning of track and other infrastructure (Wivelsfield Station).

17.2.13 The works described above represent £67 million in upgrades to the Brighton-London main line corridor which will improve reliability along the line. In addition, north of London, engineering works on the East Coast Main Line will significantly improve reliability for all operators, including Great Northern and Thameslink.

Service reliability

17.2.14 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. In particular, the improvement works related to the Thameslink

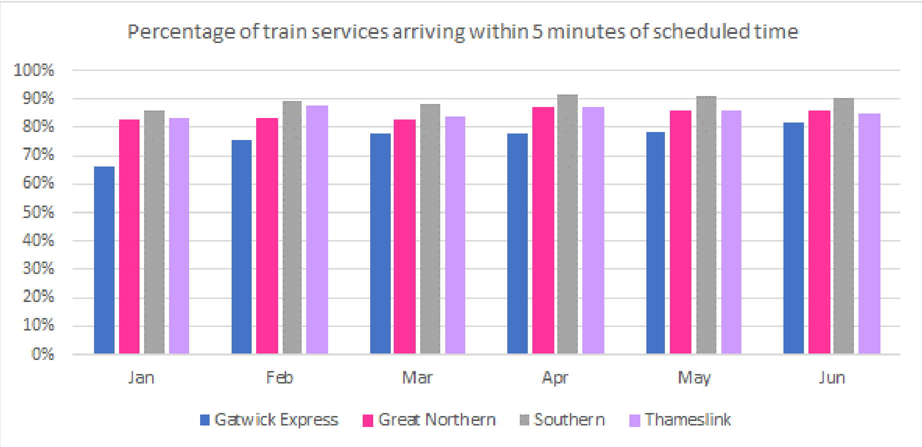
Programme, including redevelopment of London Bridge station, means reduced dependency of Gatwick services on the London Victoria route and a robust second connection to central London via Thameslink. There are also turnback facilities at London Bridge and Blackfriars for Thameslink services.

17.2.15 As such, the very busyness of the Brighton-London main line provides the service resilience required to accommodate airport expansion.

17.2.16 In 2015, Network Rail noted the *'exceptional level of connectivity'* from Gatwick Airport, leading *'the Route Study to conclude that on the Brighton Main Line there is no specific connectivity gap to/from London at Gatwick Airport'* (Network Rail, 2015).

17.2.17 Diagram 17.2.1 shows the percentage of trains arriving at destination within five minutes of scheduled time for the first 6 months of 2019 for the four train services. Punctuality in June 2019 was 80% or above on all services. Punctuality information from 2020/21 has not been reported here owing to the passenger impact of Covid.

Diagram 17.2.1: Percentage of train services arriving within 5 minutes of scheduled time (January to June 2019)



Relationship with the Train Operating Companies

17.2.18 Overall communications between Gatwick and the Train Operating Companies (TOCs) are strong, with joint ownership of issues and contingency response, such that both parties work to resolve incidents jointly using consistent passenger communications.

17.2.19 Govia Thameslink Railway (GTR) works very closely with Network Rail and operates a joint Regional Operations Centre at Three Bridges, which now controls all trains on the network, with staff working alongside each other and taking joint operational decisions.

17.2.20 The Regional Operations Centre (ROC), essentially the main control centre, for the whole Thameslink franchise is located less than a mile from Gatwick at Three Bridges. This includes 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 facilitates a close operational relationship between Gatwick, GTR and Network Rail.

17.2.21 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; and
- renewals and replacement programmes.

Summary

17.2.22 The following provides a summary for rail.

- 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.
- Significant investment is going into the Brighton-London main line to increase capacity and reliability.
- The very busyness of the Brighton-London main line provides the service resilience required to accommodate airport expansion.
- Gatwick works closely with TOCs to provide a coordinated response to incidents, supported by the Thameslink ROC, essentially the main control centre, for the whole franchise being located less than a mile from Gatwick at Three Bridges.

17.3 Resilience and Reliability of the Highways Network

Configuration of the Network

17.3.1 Gatwick is well connected to the strategic highway network with direct access from the M23. Junction 9 of the M23 is the main access point with an onward link of dual carriageway motorway standard road to Junction 9a at the airport's South Terminal roundabout. The M23 provides strategic access to the M25 (Junction 7).

17.3.2 There are a number of parallel routes between Gatwick and the M25 that can provide alternatives to the M23 in the event of a major incident and absorb a large volume of traffic. The A23 provides an alternative highway access and links the airport with Crawley and other nearby towns.

17.3.3 In addition, whilst not the preferred routing, access to the Airport can also occur via Junction 10 of the M23.

Investment in Capacity and Asset Resilience

17.3.4 Highways England recognises that the M23 is a crucial part of the UK strategic road network connecting Crawley and Gatwick Airport to the M25 motorway, routes into London and the rest of the UK. This stretch of the M23 is heavily used by traffic travelling to and from Gatwick Airport and between Brighton and London, especially in peak hours as well as during UK holiday periods. As a result, safety, congestion and journey times are all key issues that need to be considered.

17.3.5 Highways England's M23 Smart Motorway project therefore aims to:

- reduce congestion by smoothing the flow of traffic to improve journey times and make them more reliable;
- facilitate economic growth within the region, by providing much-needed capacity on the motorway; and
- maximise motorway capacity while maintaining safety.

17.3.6 The Smart Motorways scheme has enabled proactive management of the M23 carriageway, including the link roads from/to the M25 at Junction 8, Junction 9 and the Spur to Gatwick Airport, as well as Junction 10. The scheme includes:

- converting the hard shoulder to create a permanent fourth lane between Junctions 8 and 10;
- converting the westbound hard shoulder along the Spur to Gatwick Airport (towards Junction 9a) to create three permanent lanes;
- redefined junction layouts to accommodate the fourth lane - in particular a dedicated northbound slip road before Junction 9 to minimise congestion as traffic leaves the motorway and heads towards Gatwick Airport;

- new gantries with variable message signs, providing drivers with better information;
- installing new electronic information signs, signals and CCTV cameras - these will be used to vary speed limits and manage traffic flow and incidents;
- installing 12 emergency areas to use in place of the hard shoulder which include emergency roadside telephones and CCTV cameras to improve emergency service response times;
- improving the central reserve and adding a reinforced barrier to improve safety;
- adding new noise barriers in built up areas; and
- creating a new emergency turn-around facility at Coopers Hill Road to minimise response times to incidents.

17.3.7 The project was completed in 2020, and the additional running lane in each direction adds capacity and resilience to the strategic network serving Gatwick Airport at peak times. Dynamic signage should improve reliability and improve information provision and management of incidents.

17.3.8 Highways England is committed to improving conditions on the M25, through a variety of committed enhancements as well as the M25 South West Quadrant study, which is looking at ways to enhance capacity from Junctions 7 (for the M23) to 16 (for the M40).

17.3.9 Highways England's "M25 South West Quadrant Strategic Study, Stage 3 Report" (Highways England, 2017) recognised that this is the busiest section of road in the country. The evidence gathered to date suggests that directly adding capacity to the M25 (beyond what is already committed in the first Road Investment Strategy) is technically challenging and would have significant effects on surrounding communities.

17.3.10 The study recommends that the focus of future work should not be on widening the existing road. Instead, attention should be given to how to reduce pressures and provide parallel capacity to relieve the motorway network. This should work first to find alternatives to travel, or to move traffic to more sustainable modes. The volume of travel would mean that road enhancements are also likely to be needed.

Service Reliability

17.3.11 Highways England published the "London Orbital and M23 to Gatwick Route Strategy" in March 2017 (Highways England, 2017). Route Strategies provide a high-level view of the current performance of the strategic road network as well as issues perceived by our stakeholders that affect the network.

17.3.12 The report recognises that an essential facet of a resilient road network is the ability to effectively divert traffic away from closed carriageways in the event of an unplanned incident. Within proximity of Gatwick Airport, the A23 south, together with the A2011 and A265 east, is identified as being part of the diversionary route network.

17.3.13 There are a number of alternative A standard routes that run parallel along the M23 corridor including the A23, A217, A264 / A22 and A24 which can act as diversionary routes.

Relationship with the Highway Authorities

17.3.14 Gatwick has a strong working relationship with West Sussex and Surrey County Councils, Highways England and West Sussex Police. Incidents are resolved as quickly as possible using protocols in place with key stakeholders and agencies to deliver a rapid and coordinated response.

18 Impacts of Future Transport Trends

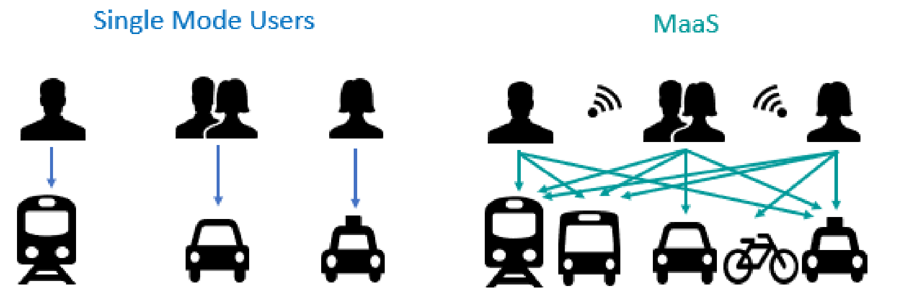
18.1 Mobility-as-a-Service

18.1.1 Mobility-as-a-Service, sometimes referenced as MaaS, reflects a move towards buying transport as a service and therefore travellers having access to up-to-date information to enable them to choose from a range of transport providers and modes for any specific journey. It implies a change in the way people buy mobility with more shared services and a move away from car ownership.

18.1.2 To support these changes, Gatwick is considering ways to develop an integrated travel planning tool, either hosted on or directed via the Airport's website and accessible on a mobile device through an app.

18.1.3 Using this app, passengers, customers and employees will be able to choose across a range of surface transport modes weighing up next available service, frequency of service and cost in one integrated platform.

Diagram 18.1.1: Single mode or Mobility-as-a-Service



18.1.4 The benefit to passengers is that they are able to assess the most appropriate mode for their journey, augmented by real-time information on fares, journey time, delays and incidents.

18.1.5 The benefit for transport operators is that it creates a transparent platform enabling more sustainable mode choices driven by greater awareness and certainty of available public transport options.

18.1.6 Challenges to Mobility-as-a-Service include the need to integrate data from multiple stakeholders in single user friendly platform. Also, as demonstrated by the success of private hire services such as Uber and Lyft, MaaS may simply shift some car users into a different type of car rather than onto public transport. However, some operators, such as BlueCity, which operated from Gatwick before Covid-19, are 100% electric and thus provide improved sustainability.

18.1.7 The effectiveness of Mobility-as-a-Service for Gatwick in the context of the Project needs further exploration as part of developing the DCO and is not included in the PEIR assessment.

18.2 Electric Vehicles (EVs) and Zero Emission Vehicles (ZEVs)

18.2.1 Alternative fuel platforms, such as electric vehicles (EVs), offer a potential pathway for reducing additional carbon and air pollutant emissions associated with increased airport traffic. The strong growth anticipated in the EV market also could also result in additional demand for EV charging at the airport more generally, which will need to be considered as part of the airport's overall parking and sustainability strategy.

Electric Vehicles in the UK

18.2.2 At the end of 2018, there were just over 184,000 EVs in the UK. While this represents a small fraction of the vehicle fleet in the UK (around 0.5%), market growth is strong.

18.2.3 The primary types of electric vehicles operating in the UK are plug-in hybrid (PHEVs) and pure, battery electric vehicles (BEVs). Historically, most EVs sold in the UK have been PHEVs, which make up nearly two thirds of the EV fleet while BEVs comprised around a third. The small remainder of the market is comprised of range extended and hydrogen fuel cell vehicles.

18.2.4 Although PHEV vehicles have been a prominent feature of the early technology cycle for EVs, they are widely seen as a steppingstone in a transition to fully electric vehicles. Recently, PHEVs were excluded from government grants programs for low-emission vehicles, which resulted in 34% drop in sales (Autocar, 2019). At the same time, improvements to battery technology resulting in improved vehicle range, wider availability of charging infrastructure, and development of rapid charging networks are also increasing consumer acceptance of 100% battery electric vehicles.

18.2.5 EV batteries are charged by plugging the vehicle into a charge point. A spectrum of alternating and direct current (AC and DC) charging infrastructure exists, which may be characterised as slow to rapid charging. Power is measured in kW and the greater the power supplied by charge point, the faster the battery will charge. While larger batteries usually supply greater range – the same way a larger petrol tank would – they also take longer to reach a full state of charge.

18.2.6 Depending on the vehicle and type of charging infrastructure used, current vehicles may take up to 8 hours to reach a full state of charge from empty. However, fast and rapid charging infrastructure is increasingly available. A 50kw DC rapid-charge point can recharge 80% of a typical vehicle's capacity in less than 1 hour. The following table provides an overview of charging equipment. The total time required to charge an EV varies both by battery capacity and the on-board charging equipment – which receives and manages the supplied load.

Table 18.2.1: Electric Vehicle Charging Infrastructure Levels

Type	Power Supplied	Charge Time	Typical Application
Slow	3 kW AC	6 - 12 hours	Overnight home charging
Fast	7 kW -22 kW AC	3 - 4 hours	Workplace charging; public charging
Rapid	> 50 kW DC	80% charge in 30 - 60 minutes	Fuel stations; public charging; taxi ranks

Source: www.zap-map.com

18.2.7 Industry continues to invest in improving charging infrastructure to provide consumers with an experience in line with traditional petrol stations. Ultra-rapid chargers, with power levels between 150 and 350 kW could provide compatible vehicles with well over 200 miles of range in about 10 minutes (Current News, 2019).

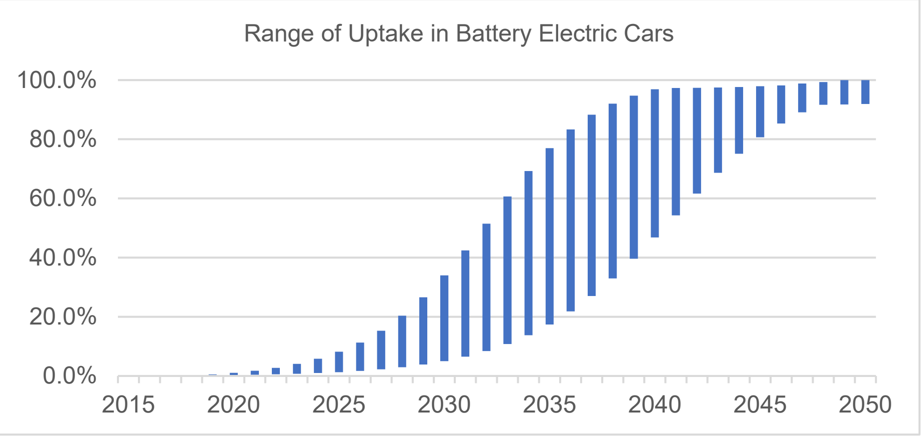
EV market forecasts

18.2.8 National Grid's annual Future Energy Scenarios publication provides scenario-based forecasts of EV uptake throughout the UK (National Grid, 2019). These forecasts provide a reasonable estimate of the potential growth in the EV market out to 2050. They are based on varied assumptions regarding government policy and technological advancement, including Net Zero by 2050.

18.2.9 In all scenarios, it is anticipated that most vehicles sold in the future will be fully battery electric, with the speed of transition varying between scenarios. By 2050, it is envisaged that battery electric cars and vans will comprise 80 to 90% of all vehicles on UK roads.

18.2.10 Those passengers and staff who continue to drive to Gatwick in the future will transition to electric vehicles faster than most other vehicle types. The chart below presents the range (low to high) of BEV uptake amongst cars only. The ranges begin to converge in late 2040s indicating relative confidence in long term market for EVs, with a much greater bandwidth in the 2020s and 2030s.

Diagram 18.2.1: National Grid, Battery Electric Car Scenarios (2015-2050)



Source: FES 2019

18.2.11 While the ranges above are large, the direction is clear that, within the next 10 years, several thousand cars parked at Gatwick Airport at any given time are likely to be EVs.

General planning considerations

18.2.12 In the context of tens of thousands of EVs at the Airport in the next 20 years, developing a sensible and appropriate strategy to accommodate this increased in EV activity is important for the DCO and for the Project ASAS.

18.2.13 That said, it is unlikely that most EVs will require on-airport charging. Overnight, home-based charging is likely to remain the most prevalent behaviour short-term and the growth and spread of EV infrastructure in local areas surrounding the Airport will play a part in reducing the need for lots of charging activity on Airport.

18.2.14 Increasing vehicle range is also an important factor in determining the overall charging demand for airport users. Ranges of up to 200 to 500 km (125 to 315 miles) are typical of the current generation of EVs, with premium vehicles such as the Tesla Model S reaching ranges of up to 500 km (315 miles).[5] Even as driving range improves, the current ranges are high enough to support a return journey from home to the Airport for all staff and a large proportion of Gatwick passengers.

[5] Analysis of popular vehicles on ev-database.co.uk. Ranges vary by driving conditions and weather and is highest in urban areas and in mild temperatures.

18.2.15 For those users who do require a charge or top-off while at the airport, several models of infrastructure delivery could be deployed. Each has advantages and disadvantages and a comprehensive strategy is likely to rely on elements of each. These include:

- Distributed slow charging – a large, distributed network of low-power charge points deployed across parking facilities, typically serving only one parking space. This model is employed at Oslo airport, which features over 700 chargers in two passenger parking facilities. Whilst comparatively easy to provide, this method can be relatively inefficient with low-utilisation per space, eg an air passenger taking a two week trip may only require the use of the charger for a small portion of their overall parking duration but remain parked at that space for the entirety of their trip.
- Valet model – Under a valet model, a parking attendant would be able to move multiple vehicles each day and charge them on the same charge points. Passengers or staff would leave their car with the attendant, who would fuel the vehicle at a charging hub prior to parking it at a designated location (or prior to collection). Chargers could be fast to rapid. An alternative to this model could employ mobile charging units, which have been developed by several companies. This model, which is actively managed, requires less infrastructure to charge the same number of vehicles and could be offered as a premium parking product. The process could also be automated using robot technology.
- Rapid charging hub –Charging hubs would feature clusters of rapid and ultrarapid chargers, likely en-route from parking locations to the airport exit, or within the airport's immediate surrounds. These locations would be comparable to a conventional petrol station, providing an opportunity for EV drivers to "fuel" before leaving the airport. This model establishes confidence among EV owners that their vehicle can be charged as needed. 50 kW rapid charge points could replete the bulk of an EVs battery capacity in about 30 minutes. Use could be time limited to manage demand and queuing and to encourage turnover, maximising the use available infrastructure.

Considerations for specific airport users

18.2.16 Gatwick will be able to influence different airport users to varying degrees, as follows:

- Airport passengers – the largest user group but the one that Gatwick Airport has least direct influence over in terms of uptake of EVs. The average consumers' decision to purchase an EV rather than a conventional vehicle depends on government incentives, lifestyle factors, and the availability of convenient charging infrastructure to serve their daily needs. Nonetheless, Gatwick could support those passengers that do own EVs by providing sufficient, flexible charging options for those drivers that require it.
- Airport staff – Gatwick has much more influence over airport staff choices. A variety of incentive programs could be developed for those choosing to drive electric cars. However, any incentives should avoid encouraging driving EVs rather than using other sustainable modes.
- Taxis and private hire vehicles – Gatwick's official taxi operator already uses an electric fleet (see below). Gatwick does not have direct influence over other taxi operators or private-hire vehicle companies. However, Gatwick can support operators and government initiatives to transition to electric fleet.
- Buses and coaches – Gatwick can influence certain bus operations directly, such as long-stay car park buses, and has some influence over third party providers in terms of a transition to electric buses and coaches. The only existing electric buses operating at the Airport today are hydrogen powered and are fuelled off Airport (see below).
- Freight – Gatwick has a high level of influence over its own supply chains, but less so for the delivery of goods to other on Airport businesses. Businesses operating on Airport can be incentivised to choose sustainable suppliers and Gatwick itself could facilitate identification of suppliers for airport businesses.

Current EV infrastructure and Initiatives at Gatwick

18.2.17 Gatwick currently has several initiatives to promote the use of EVs at the Airport.

Charging Network

18.2.18 For passenger convenience, Gatwick has installed two EV chargers at short stay car parks at both North and South Terminals (four in total). These 22 kW AC fast chargers each feature two connections and are operated as part of the national PodPoint charging network. While previously free to use, the airport now charges an energy tariff of £0.22 per kWh – a cost of under £10 to fully charge a typical electric vehicle with a 40 kWh battery. Charge time will vary by vehicle capability at these locations, ranging from about two to six hours for a full charge. While PodPoint does not require a membership to use its network of chargers, users must download their smartphone app to use the equipment.

18.2.19 In addition to PodPoint chargers, Gatwick has installed an additional 28 vehicles chargers. These primarily serve airport vehicles and are located at the fleet vehicle campus and public short stay car parks (Advance, 2019).

BlueCity Electric Car Club

18.2.20 Gatwick partnered with BlueCity to expand its London-based car club to the airport. The company used three-door, four-seater electric vehicles manufactured by Bollore with a range of about 200 km (125 miles). Space for 10 vehicles were dedicated on the upper forecourt of South Terminal, directly in front of the short stay car parks with dedicated charge points. These vehicles were available for trips to and from London. Access to vehicles requires membership in the car club (£5 per month). Vehicles were rented at a fee of £0.19 per minute, fully inclusive, with a £8.50 surcharge for trips to and from Gatwick.

Electric Taxis

18.2.21 Beginning in 2016, Gatwick partnered with its official taxi operator to transition their fleet to electric and hybrid vehicles. All vehicles will transition to electric platforms from 2020 and will operate in emissions free mode within 10 km from the airport (Gatwick Airport Ltd, 2019).

Hydrogen Buses

18.2.22 Gatwick has partnered with MetroBus to support innovative trials for hydrogen fuel cell (HFC) electric buses on its network. In 2018, MetroBus introduced the region's first HFC bus on the Fastway 100 route. The company has plans to procure a total of 20 fuel cell buses with the intention of operating these on its network serving the Airport. Gatwick's support has included funding for upgrades at the Manor Royal bus depot that will support the zero-emission fleet.

Electric Forecourt

18.2.23 In collaboration with Gridserve Gatwick is currently investigating the feasibility of an electric forecourt, equivalent to a petrol station, on Airport, with charging points for 36 EVs. Initial plans include provision of fast and rapid charging infrastructure, with co-located retail and amenities, and additional solar electricity generation.

Future Electric Vehicle Infrastructure Strategy

18.2.24 Into the future, Gatwick is committed to minimising its carbon emissions and is therefore actively considering the following.

- Encouraging greater use of EVs by airport passengers and staff through provision of flexible charging options in line with observed growth in EV demand, investing progressively in new charging technology and upgrading power supply as part of major planning and design projects to accommodate future charging needs. For passengers, this could include provision of a mix of charging options such as distributed charging valet charging, and rapid or ultra-rapid charging hub such as an electric forecourt(s).
- Potential provision of a rapid or ultra-rapid charging hub(s) for taxi and private hire vehicle operators as they require the fastest charging options available, along with provision of amenities and welfare. The location of this hub will need to be carefully considered to prevent non-airport related taxi use which will create unnecessary trips on Airport.
- Transition of Gatwick vehicle fleets supporting airport operations, including its own vehicles (such as long-stay buses), third-party authorised operators, airside vehicles, and ground service equipment to EVs.

18.3 Autonomous Vehicles (AVs)

Understanding Autonomous Vehicles

18.3.1 The advent of Autonomous Vehicles (AVs) promises an array of benefits to transport users and systems, making driving more efficient, productive, safer, and more sustainable. The timescales and scope of impacts, depends on several factors including manufacturers' ability to introduce high levels of automation at scale, government and indeed public acceptance as well as consumers' preferred models for meeting their mobility needs.

18.3.2 The transition to an AV future will occur in stages, with driving functions progressively shifting from driver to vehicle.

18.3.3 The Society of Automotive Engineers (SAE) framework describes six levels of autonomy, ranging from no autonomy (Level 0) to full autonomous operation (Level 5) (SAE, 2019). Many vehicles on the market today have features that correspond to Levels 0 and 1, with some having Level 2 features.

Table 18.3.1: SAE Levels of Autonomy

Driver Support	Level 0	Limited assistance features, such as blind spot or lane departure warnings, automated emergency braking, etc.
	Level 1	*Either* steering *or* acceleration/braking support. Typical features are lane centring and adaptive cruise control.
	Level 2	*Both* steering *and* acceleration/braking support. Level 2 vehicles have both lane centring and adaptive cruise control.
Automated Driving	Level 3	Vehicle can drive itself under specific conditions but human driver must take control when system requests. Examples include traffic jam chauffeur features.
	Level 4	Vehicle can drive itself under specific conditions without human intervention. Examples include local, driverless taxis. Steering wheels or pedals may be absent.
	Level 5	Vehicle can drive itself under any conditions without human intervention.

18.3.4 Although vehicles with Level 3 or better advanced levels of autonomy are being tested across the globe in various transport markets segments, such as public transport and in the taxi sector, such vehicles are not yet in widespread production or operation. Several pilot projects exist in the UK , including Bristol, London, Milton Keynes, Oxford, Cambridge, and the West Midlands.

18.3.5 Radical changes to the mobility landscape will be required with introduction of Level 4 and 5 vehicles which have true self-driving technology. The key difference between these technologies is that Level 5 autonomous driving functions must be advanced enough to perform under all conditions, while Level 4 vehicles are expected to be limited to specific geographic areas and driving conditions (known as the "operational design domain").

Market Timescales

18.3.6 Timescales for deployment of advanced AV technologies remain uncertain, with predictions of Level 4 and 5 vehicles becoming more widespread in the 2030s. Highways England has stated that they expect the Strategic Road Network to be fully autonomous by 2050 (Highways England, 2017).

18.3.7 Based on these ranges, it appears likely that significant growth in self-driving vehicles in the UK is likely to begin toward the end the of the next decade and continue into the 2040s. However, markets such as taxis/private hire vehicles, buses, and freight may begin transitioning to automated technologies more quickly.

AVs Impacts on Airports

18.3.8 In long term, the primary impact of AVs on airports is likely to be a reduction in the overall parking requirements and the potential need to shift parking to more remote locations. However, the magnitude of the impact is dependent on whether vehicles are primarily shared or privately owned.

18.3.9 Private AVs could conduct pick-up and drop-off near terminals, subsequently parking in more remote locations – or even returning home – while their owner's travel. If AVs are primarily a shared mobility service, fewer vehicles may need to park for long periods on-site. Instead vehicles will likely circulate to the arrivals area to pick up new passengers and leave the airport.

18.3.10 In either scenario, more intensive pick-up and drop-off activity near the terminal is likely, requiring more space in the forecourts which could be through repurposing of short-stay parking. New technological and physical design solutions may be needed to facilitate passenger-vehicle meet up locations. In addition, new user charging mechanisms may need to be considered to manage traffic levels. In particular, lower operating costs for shared AV trips may make AV trips more attractive than public transport which will in turn impact on highway capacity.

18.3.11 By reducing or shifting parking demand to new locations, valuable space nearby the terminals dedicated to short-term parking could be repurposed to serve other landside transport needs, to provide additional passenger amenities, or be given over to other airport operating functions.

18.3.12 AVs will change how parking is provided and indeed Gatwick is already exploring optimising long-term parking through its robotic valet pilot, which uses small tows capable of lifting a vehicle by the wheels and moving it to secure storage area. This system has the potential to store 50% more vehicles within a given area than traditional, self-parking arrangements (Airport Technology, 2019).

18.3.13 AV buses could serve a wide variety of landside transportation functions. Driverless shuttles could be operated higher on frequencies, providing convenient circulators to move staff and passengers between terminals, remote parking facilities, rental car centres, and worksites across the airport. This type of operation is likely to be easier to introduce on the airside where vehicle types are more controlled.

18.3.14 In conclusion, AVs will introduce changes to the operation of the Airport into the future, potentially from the end of the assessment period onwards. Given that this technology is in its infancy, Gatwick will respond to AVs and their introduction as the technology begins to emerge and be relevant to airports of comparable size and scale. Gatwick will therefore evolve and adapt its AV strategy over time but at this stage AVs have not been included in this PTAR.

18.3.15 There are many opportunities which Gatwick is keen to take advantage of, including connecting AVs with the Airport's infrastructure through communications technology to actively manage the location and quantity of vehicles across the Airport throughout the day to help balance capacity and demand.

19 Conclusions

19.1 Summary of Identified Impacts and Mitigation

19.1.1 The following impacts and mitigation have been identified through transport modelling and analysis to date.

Rail

19.1.2 Modelling indicates no additional mitigation other than that already proposed by the rail industry and as included in the future baseline.

Bus and coach

19.1.3 Potential mitigation may include additional peak period services or network changes including consideration of new or revised routes, such as a new bus route hourly Uckfield to Gatwick via East Grinstead and a new coach route two-hourly Chatham - Maidstone - Sevenoaks – Gatwick, in line with GAL's bus and coach strategy. With these enhancements, modelling indicates no adverse effects with Project on bus and coach operations.

Highway network

19.1.4 2047 flows with the Project can be accommodated on the main strategic highway routes currently used by airport traffic.

19.1.5 The M23 Smart Motorways scheme widens the motorway to effectively 4 lanes in each direction at peak times between Junctions 8 and 10, providing significant additional capacity. Furthermore, committed schemes improve reliability along the corridor.

19.1.6 Given the above, GAL is not proposing any additional mitigation for the SRN over and above that already envisaged by the highway authorities, with the exception of the M23 Spur between Junction 9 and Longbridge Roundabout.

19.1.7 Modelling undertaken to date has identified the Croydon area of the network as being particularly sensitive (as a result of high volumes of inner London traffic as well as areas of variable speed in the model, as opposed to with Project impacts) and the modelling assumptions (e.g. network definition / scale / coding of speeds) will be further reviewed during future workstreams in preparation for the DCO.

19.1.8 Modelling shows that the future baseline to 2029 can be accommodated on the M23 Spur with local widening and signalisation works that will be delivered prior to 2029.

19.1.9 Given the congestion shown by the model for 2032 future baseline, Gatwick has made the decision that more significant improvements will be required on the highway network to support additional growth with the Project, otherwise there will be potential for delays on the network.

19.1.10 With Project and background traffic growth to 2047, modelling shows some localised areas where congestion would still be expected, even with highway improvements. However, congestion levels are manageable and at expected levels for 15 years after opening, indicating that the improvements are appropriate and proportionate - ie it is sufficient to provide for expected growth but does not over-provide network capacity.

19.1.11 Through to DCO submission, the highway designs will be adjusted in line with VISSIM modelling to provide further improvements.

Walking and Cycling

19.1.12 Gatwick is exploring options to improve walking and cycling and have submitted proposals to improve linkages alongside the CIP improvements proposed for highways (see Section 11.2.10).

19.1.13 The final ASAS accompanying the application for development consent will further develop Gatwick's strategic plan for walking and cycling. Strategies that will be explored will include increased and improved amenities, upgraded routes on and, where appropriate, off airport, improved wayfinding and a programme of maintenance for existing routes.

Station and Shuttle

19.1.14 Analysis and modelling with Project show that no further improvements will be required to the railway station platforms or concourse.

19.1.15 Modelling to 2047 with the Project shows that the boarding platform of the shuttle stations, particularly at the South Terminal, can become congested at peak times and that congestion blocks the platform and prevents full use of shuttle capacity. Analysis indicates that reducing the headway of the system from 6 minutes down to 5 minutes would have the greatest benefit in increasing capacity.

Construction

19.1.16 In terms of airfield construction, preferred option is to have all material-carrying construction traffic (HGVs and LGVs) use Junction 9 and the M23 Spur which form part of the SRN. The SRN is designed to handle higher volumes of traffic. Construction workforce traffic has been modelled as coming via the shortest route.

19.1.17 Based on the levels of construction traffic estimated for the Project, it is not considered that peak airfield construction will have a significant effect on the performance of the highway network around the Airport. Further work will be undertaken for the Environmental Statement to explore measures to mitigate the potential impacts from construction traffic during peak periods (such as excluding LGVs and HGVs from peak hours on the highway network) and reduce the overall construction traffic loading created by the Project.

19.1.18 Modelling of highway construction shows reassignment of traffic owing to the temporary highway works on the M23 Spur, with traffic volumes reducing on the M23 Spur as background traffic not needing to access the Airport seeks alternative routes. The works also impact on traffic levels on the M23 itself with reductions also shown by the model on the motorway. M23 Junction 9 shows an increase in traffic flows related to right-turning into the Airport being forbidden during this construction phase and therefore traffic from the west heading to South Terminal having to u-turn at Junction 9.

19.1.19 The modelling shows increases in north-south traffic between Horley and Crawley rerouting via Balcombe Road as well as some traffic taking a route on the west side of the Airport from Ifield Avenue in Crawley via Bonnets Lane, Lowfield Heath Road, Horley Road and Charlwood Road and into Horley via Povey Cross.

19.1.20 These temporary changes are relatively small in traffic terms, less than one vehicle per minute. As such, capacity issues at junctions are only observed on the SRN where works are taking place or at junctions on Airport.

19.2 Airport Surface Access Strategy and Travel Plan for Gatwick

19.2.1 Draft actions and targets for the Airport Surface Access Strategy are included for consultation in this PTAR. The final strategy in the application for development consent will be prepared in conjunction with Gatwick's Airport Transport Forum and in accordance with the Aviation Policy Framework guidance.

19.2.2 Gatwick intends to put forward a robust strategy which enhances Gatwick as a regional transport hub through improvements to rail, bus, and sustainable transport with challenging but achievable mode share targets established towards a lower carbon future.

19.2.3 In alignment with the ASAS, the Travel Plan will focus on specific interventions related to staff travel in particular. The Travel Plan will seek to promote sustainable and healthier modes of transport for staff and reduce travel to work by single occupancy car.

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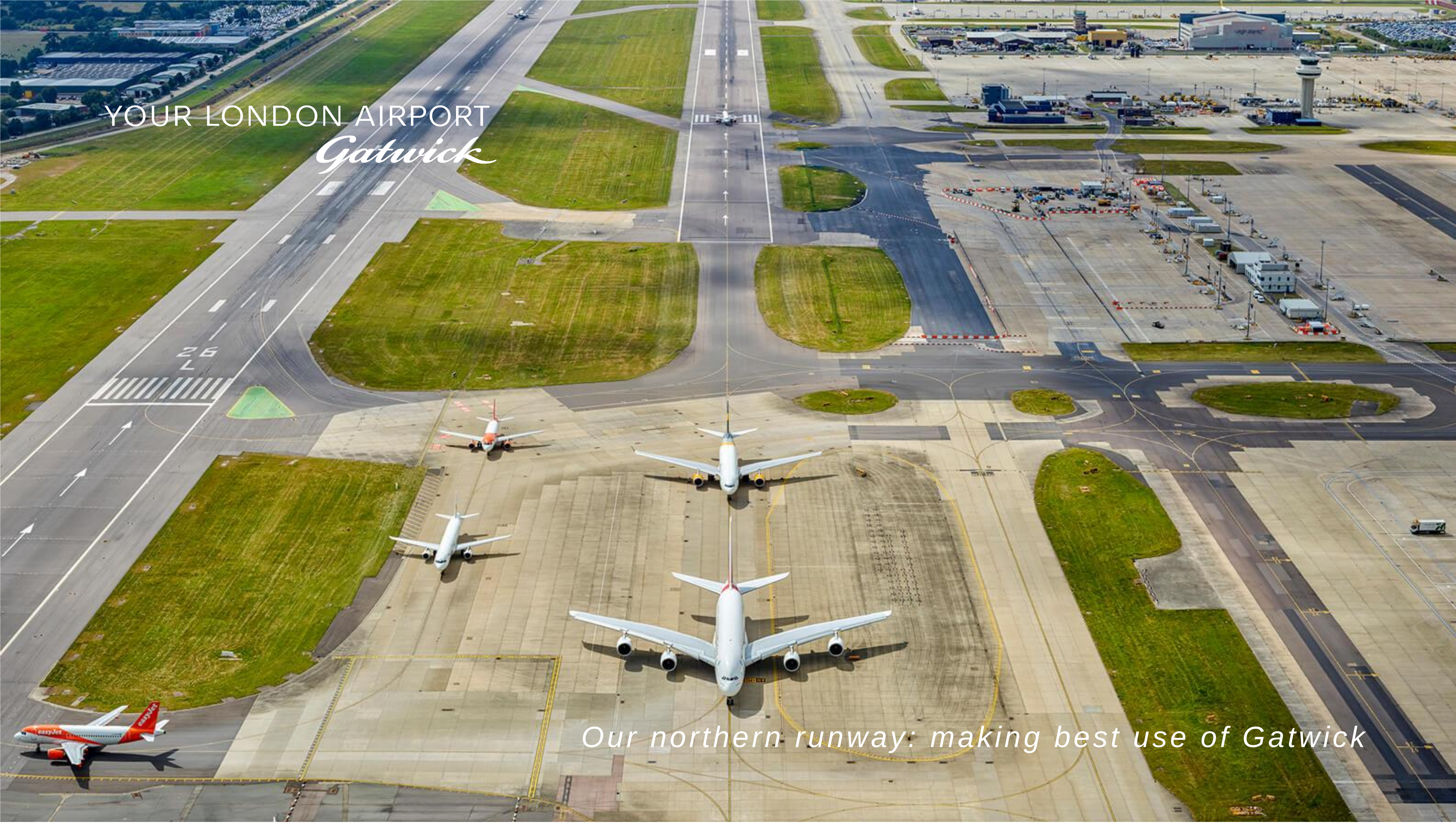
21 Glossary

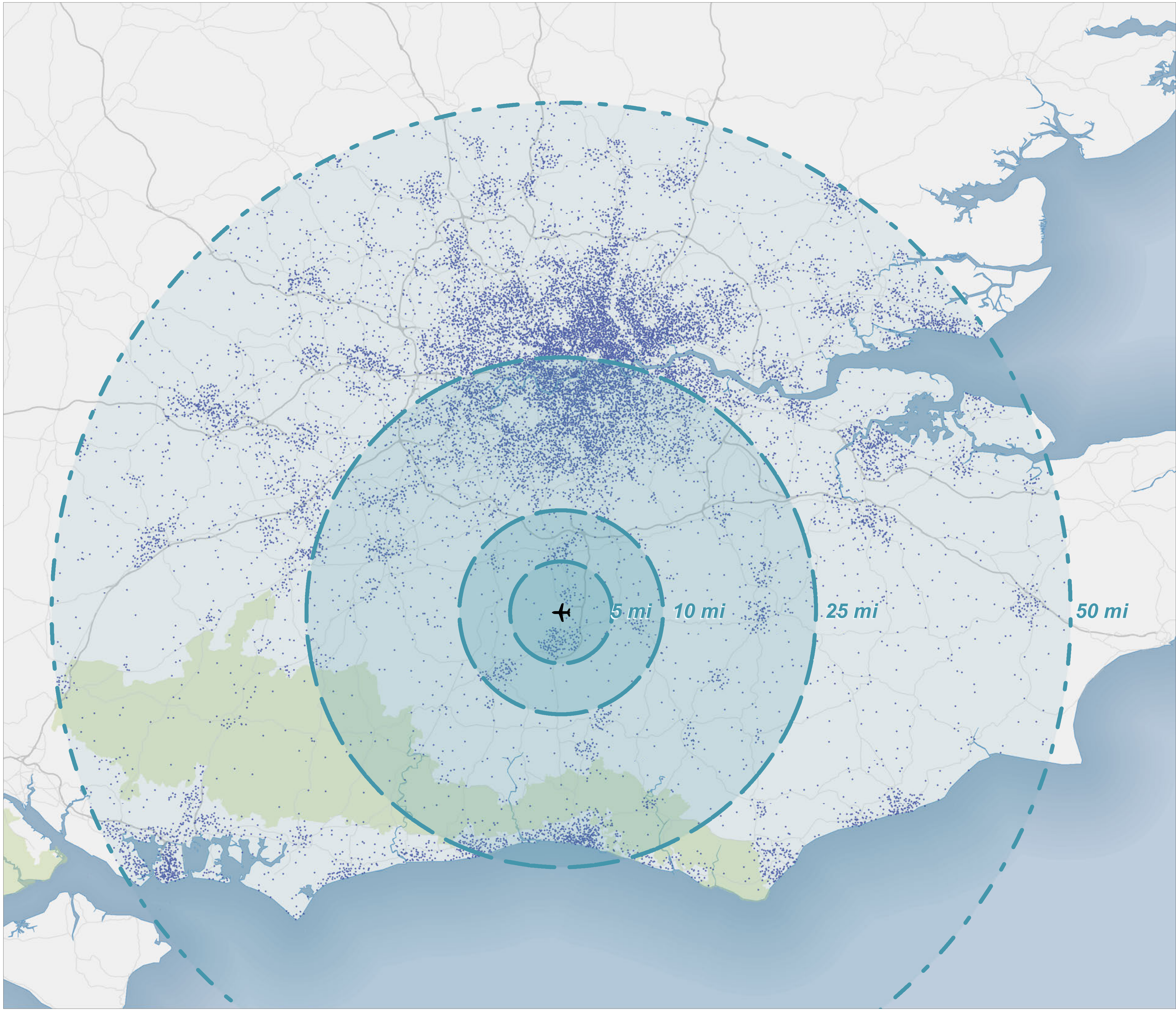
Term	Description
AADT	Annual Average Daily Traffic
ANPR	Automatic Number Plate Recognition
AQMA	Air Quality Management Area
ASAS	Airport Surface Access Strategy
AV	Autonomous Vehicle
CAA	Civil Aviation Authority
CARS	Croydon Area Remodelling Scheme
CIF	Common interface file
CP5	Control Period 5
CP6	Control Period 6 (2019-2024)
CP7	Control Period 7 (2024-2029)
DCO	Development Consent Order
DfT	Department for Transport
DLR	Docklands Light Railway
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
ES	Environmental Statement
EV	Electric Vehicle
GAL	Gatwick Airport Limited
HGV	Heavy Goods Vehicle
LGV	Light Goods Vehicle
LoS	Level of Service
LTP	Local Transport Plan
MCC	Manual Classified Counts
mppa	Millions of passengers per annum
NCN	National Cycling Network
NCR	National Cycle Route
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
ORR	Office of Rail and Road
PEIR	Preliminary Environmental Information Report
PGC	Passenger Guidance Capacity
PHEV	Plug-in Hybrid Electric Vehicle
PHV	Private Hire Vehicle
PINS	Planning Inspectorate
PR	Periodic Review
PTAR	Preliminary Transport Assessment Report
RIS	Road Investment Strategy
SERTM	South East Regional Transport Model
SRN	Strategic Road Network
TA	Transport Assessment
TEMPRO	Trip End Model Presentation Program
TfL	Transport for London

Term	Description
tph	Trains per hour
vehs	Vehicles
ZEV	Zero Emissions Vehicle



Preliminary Environmental Information Report
Appendix 12.9.1: PTAR Annex A: Figures

September 2021



YOUR LONDON AIRPORT
Gatwick

KEY

Gatwick Airport

Population Density

1 Dot = 1,000 persons

Distance from Gatwick

Distance from Gatwick

Miles from Gatwick	Population by Distance Band	Cumulative Population
5	170,208	-
10	248,504	418,712
25	5,632,927	5,881,431
50	11,233,645	16,866,572

DOCUMENT
Preliminary Environmental Information Report

DRAWING TITLE
GATWICK AIRPORT CATCHMENT AREA

DATE
SEPTEMBER 2021

ORIENTATION
N

DRAWING NO.
FIGURE 12A.1

REVISION
For PEIR Issue

DRAWN BY
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PM / CHECKED BY
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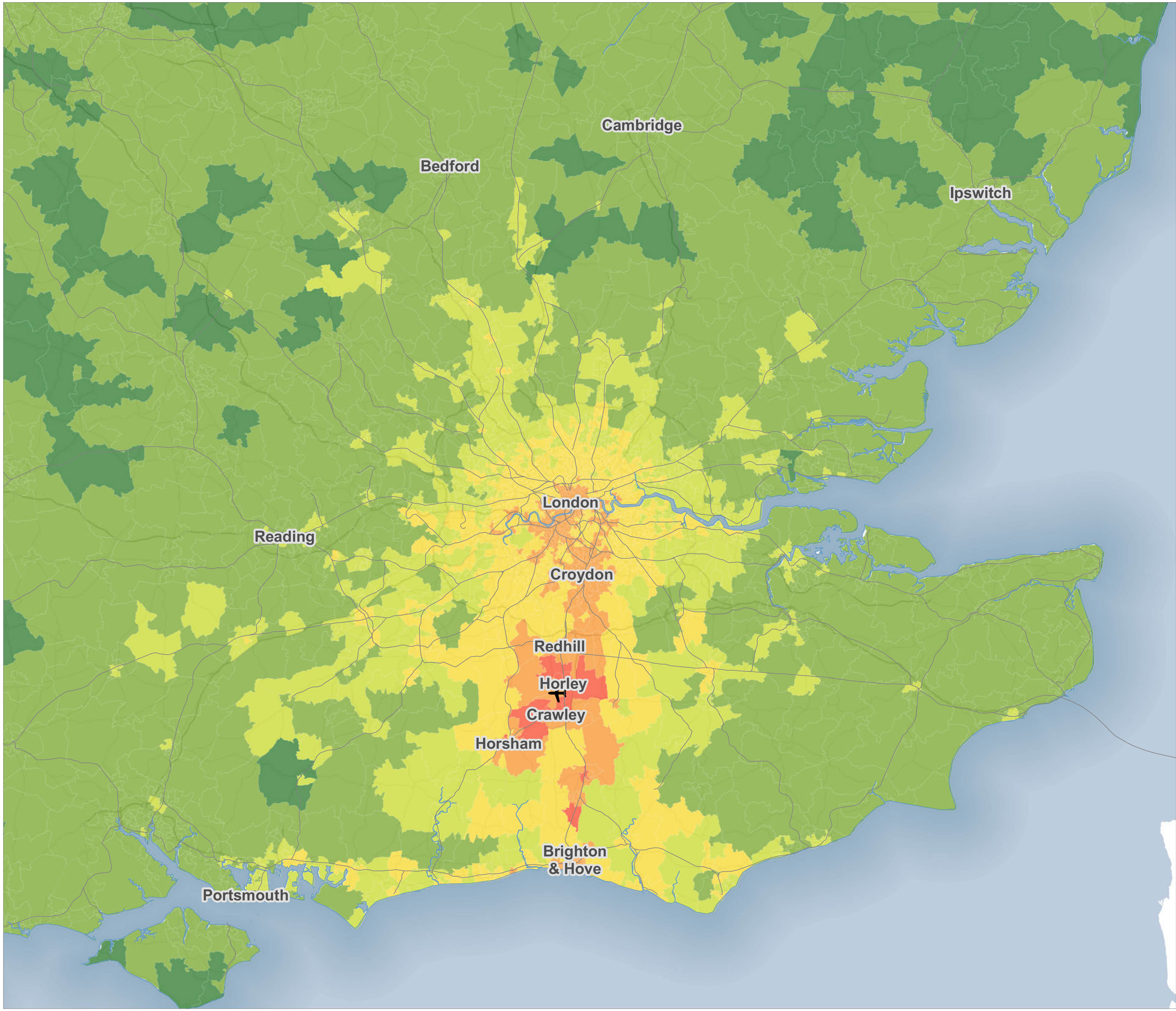

YOUR LONDON AIRPORT
Gatwick

KEY

Public Transport Travel Time

- < 0.5 hrs
- 0.5 - 1.0 hrs
- 1.0 - 1.5 hrs
- 1.5 - 2.0 hrs
- 2.0 - 4.0 hrs
- > 4.0 hrs
- Railways
- Gatwick Airport

DOCUMENT

Preliminary Environmental Information Report

DRAWING TITLE

JOURNEY TIMES TO GATWICK AIRPORT VIA PUBLIC TRANSPORT

DATE

SEPTEMBER 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 12A.2	For PEIR Issue
	DRAWN BY	PM / CHECKED BY
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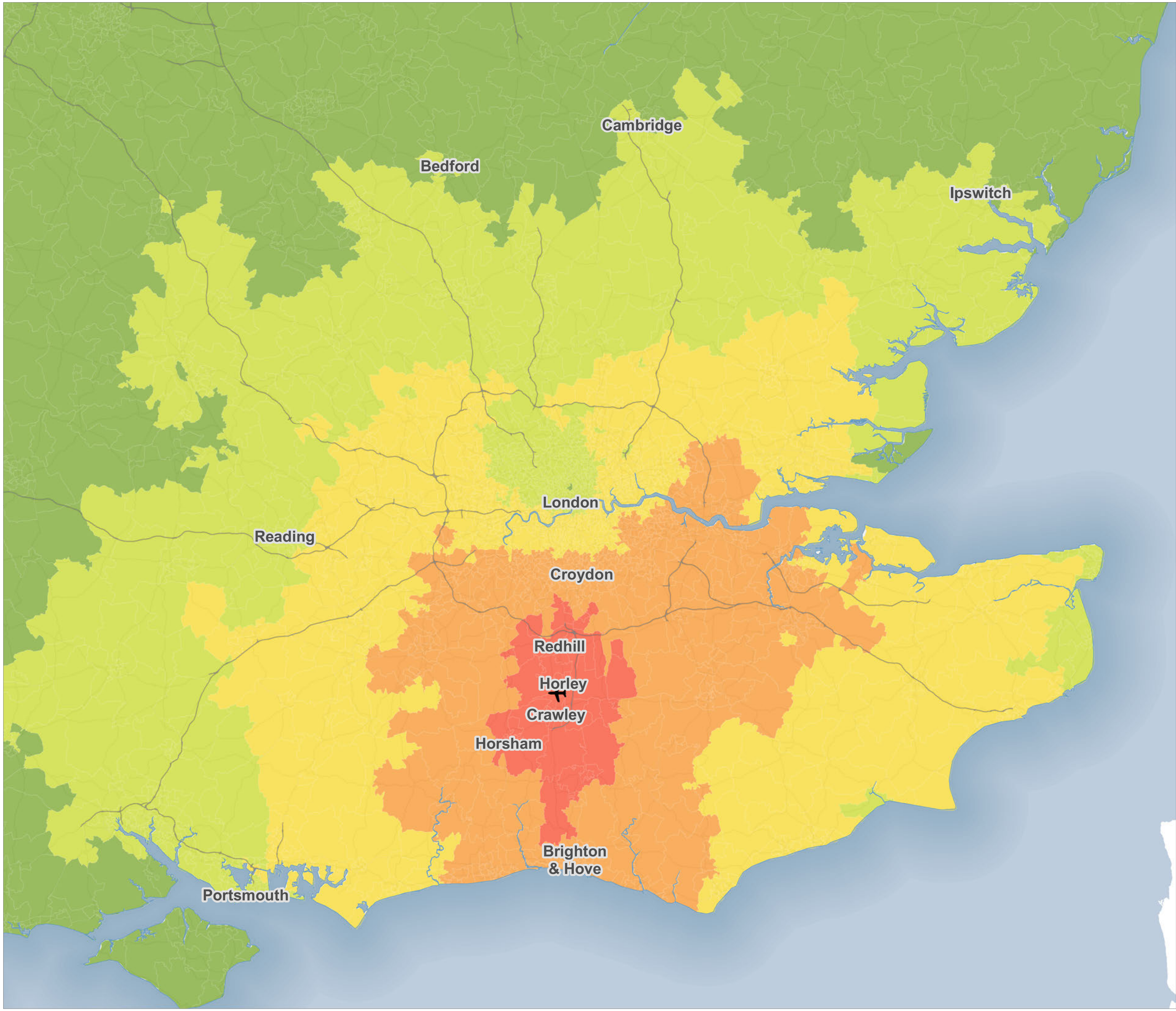

YOUR LONDON AIRPORT
Gatwick

KEY

Drive Time

- < 0.5 hrs
- 0.5 - 1.0 hrs
- 1.0 - 1.5 hrs
- 1.5 - 2.0 hrs
- 2.0 - 4.0 hrs
- > 4.0 hrs
- Motorway
- Gatwick Airport

DOCUMENT

Preliminary Environmental Information Report

DRAWING TITLE

JOURNEY TIMES TO GATWICK AIRPORT BY DRIVING (CONGESTED CONDITIONS)

DATE

SEPTEMBER 2021

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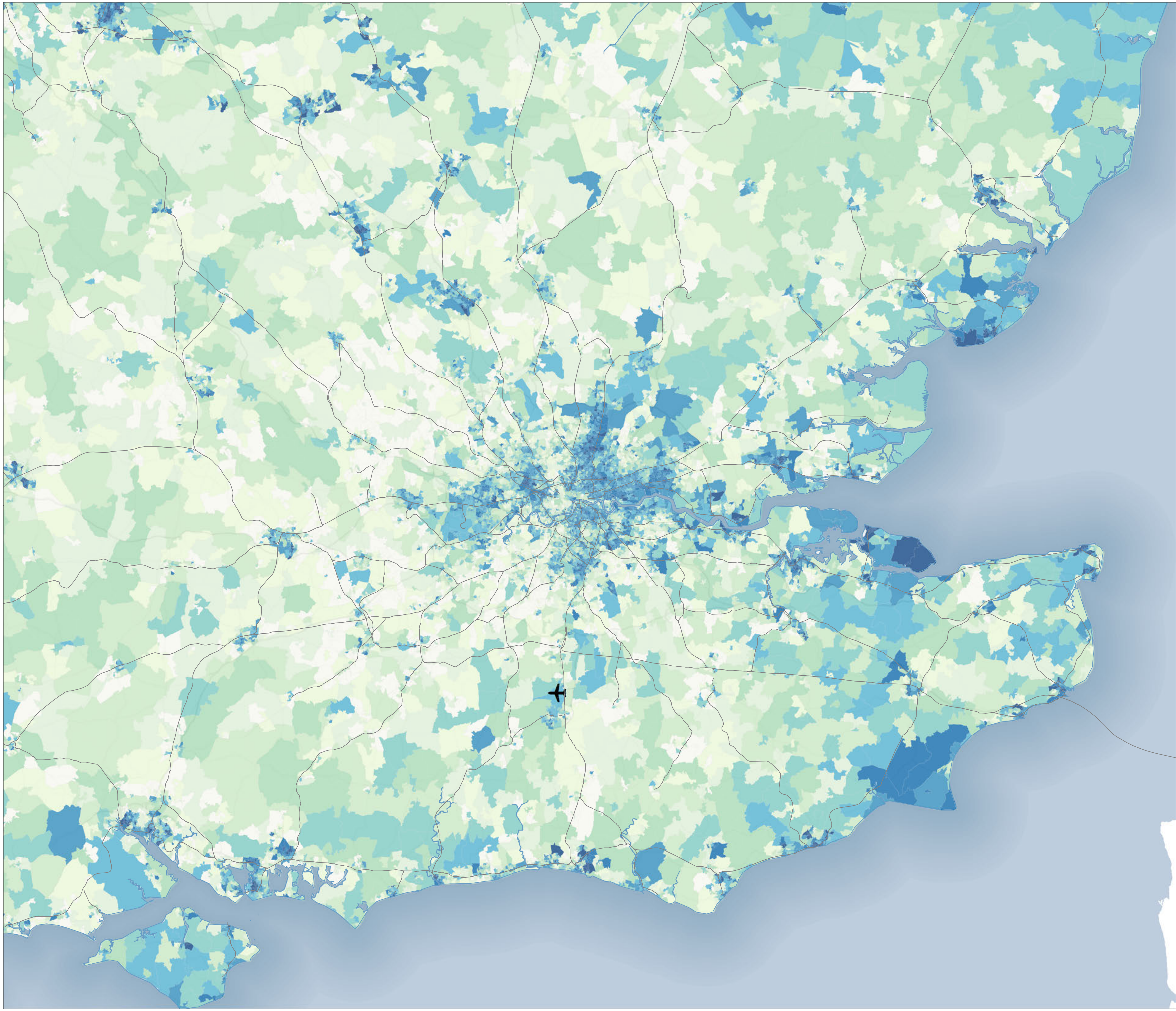

YOUR LONDON AIRPORT
Gatwick

KEY

Index of Multiple Deprivation Decile

- 1 - Most Deprived
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 - Least Deprived
- Railways
- Gatwick Airport

DOCUMENT

Preliminary Environmental Information Report

DRAWING TITLE

INDEX OF MULTIPLE DEPRIVATION

DATE

SEPTEMBER 2021

ORIENTATION	DRAWING NO.	REVISION
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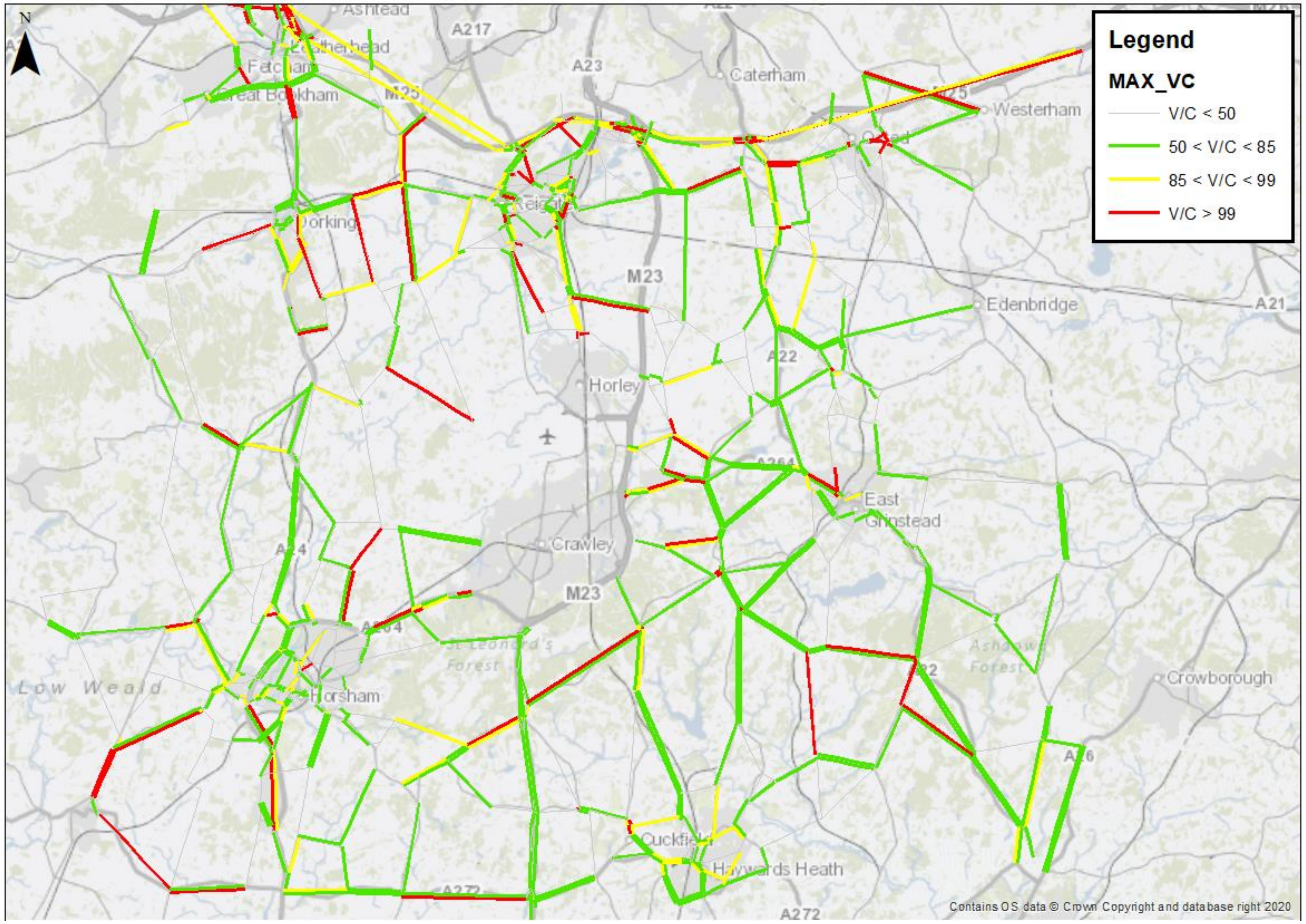
Figure 74: Maximum V/C - 2047, With Project - Performance Area B



10.7 Performance Area C

Operational Performance - Volume / Capacity ratios

10.7.1 Modelled Volume / Capacity ratios were extracted for each of the four modelled time periods. The maximum value across all time periods was selected to identify the highest value modelled and this is presented Figure 78 to Figure 83.

10.7.2 Performance Area C refers to Inter-London north of the M25 to the extents illustrated in Figure 26. Modelling undertaken to date has identified that this area of the network is particularly sensitive and the modelling assumptions (e.g. network definition / scale) will be further reviewed during future workstreams in preparation for the DCO. The primary focus for impacts are considered using the Magnitude of Impact criteria specified.

Magnitude of Impact

10.7.3 An overview of 'Low', 'Medium' and 'High' impacts is presented in Figure 75 to Figure 77. The graphics consider data for all periods.

10.7.4 There are some issues that have been noted within the Croydon area of the model which will be investigated further at the next stage. These issues relate to a mix of zone loading, and some convergence issues in the model where there are instances of route choices changes through the congested network. Croydon is just beyond the area of urban fixed speed modelling which results in some trips through the area being sensitive to small cost changes using the less congested fixed speed coding rather than the full simulation network. This results in instances of flow changes, and hence delay and V/C changes which are not related to the Project.

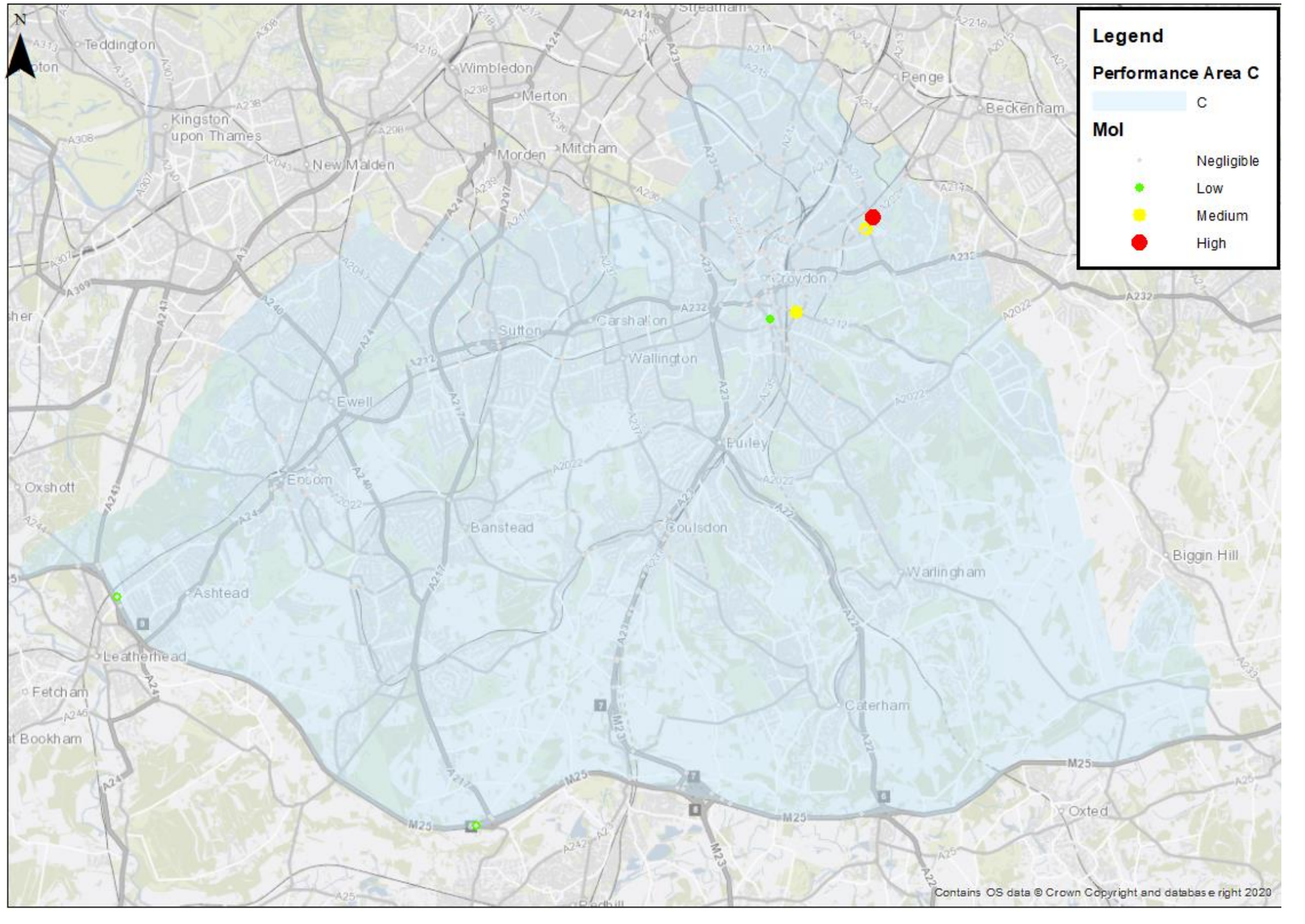
2029

10.7.5 When considering 2029, there is a maximum of one 'Medium' and one 'High' magnitude impact instance across all modelled periods as summarised in Table 10.7.1. These instances are located within Croydon. This 'High' impact occurs at a junction which is already stressed in the Future Baseline scenario and is made worse by a small increase in arrival flow. This is not considered to be a direct impact of the Project. A review of the coding in this area and the zone loading will be undertaken to ascertain where this can be improved.

Table 10.7.1: Magnitude of Impacts: Performance Area C, 2029 Nodes

2029	Performance Area C - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	266	101	154	166
Low	1	2	0	1
Medium	1	0	0	1
High	1	0	0	0

Figure 75: Magnitude of Impacts: Performance Area C, 2029 Nodes



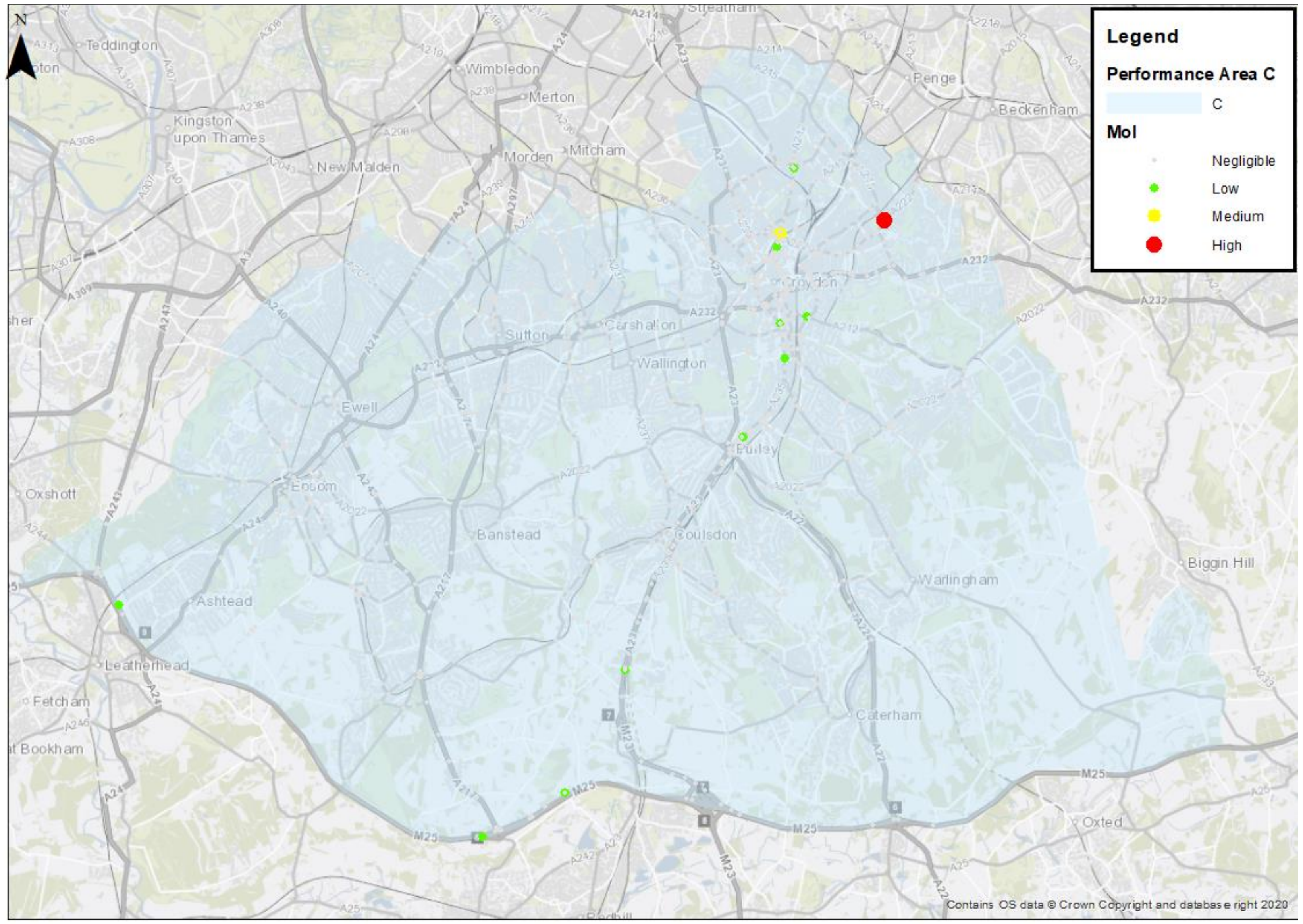
2032

10.7.6 The 2032 assessment year impacts are summarised in Table 10.7.2. The table outlines that there is a maximum of one 'High' impact and one 'Medium' across all modelled periods. Figure 76 outlines all occurrences across all peaks. These instances are located within Croydon. The 'High' impact is in the same location as for 2029, and the 'Medium' is due to re-routing within central Croydon unrelated to the Project.

Table 10.7.2: Magnitude of Impacts: Performance Area C, 2032 Nodes

2032	Performance Area C - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	611	429	448	485
Low	4	6	0	5
Medium	0	1	0	0
High	1	0	0	0

Figure 76: Magnitude of Impacts: Performance Area C, 2032 Nodes



2047

10.7.7 The 2047 assessment year impacts are summarised in Table 10.7.3. The table outlines that there is a maximum of one 'High' impact and two 'Medium' instances across all modelled periods. Figure 77 outlines all occurrences across all peaks. These instances are located within Croydon. The 'High' impacts in AM2 and PM are related to traffic switching between zone loading points at a junction which is under significant stress in the Future Baseline scenario and as such is sensitive to very small changes in traffic flows. These will be reviewed in the next stage of modelling.

Table 10.7.3: Magnitude of Impacts: Performance Area C, 2047 Nodes

2047	Performance Area C - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	487	492	331	493
Low	2	2	0	1
Medium	2	2	0	0
High	0	1	0	1

Figure 77: Magnitude of Impacts: Performance Area C, 2047 Nodes

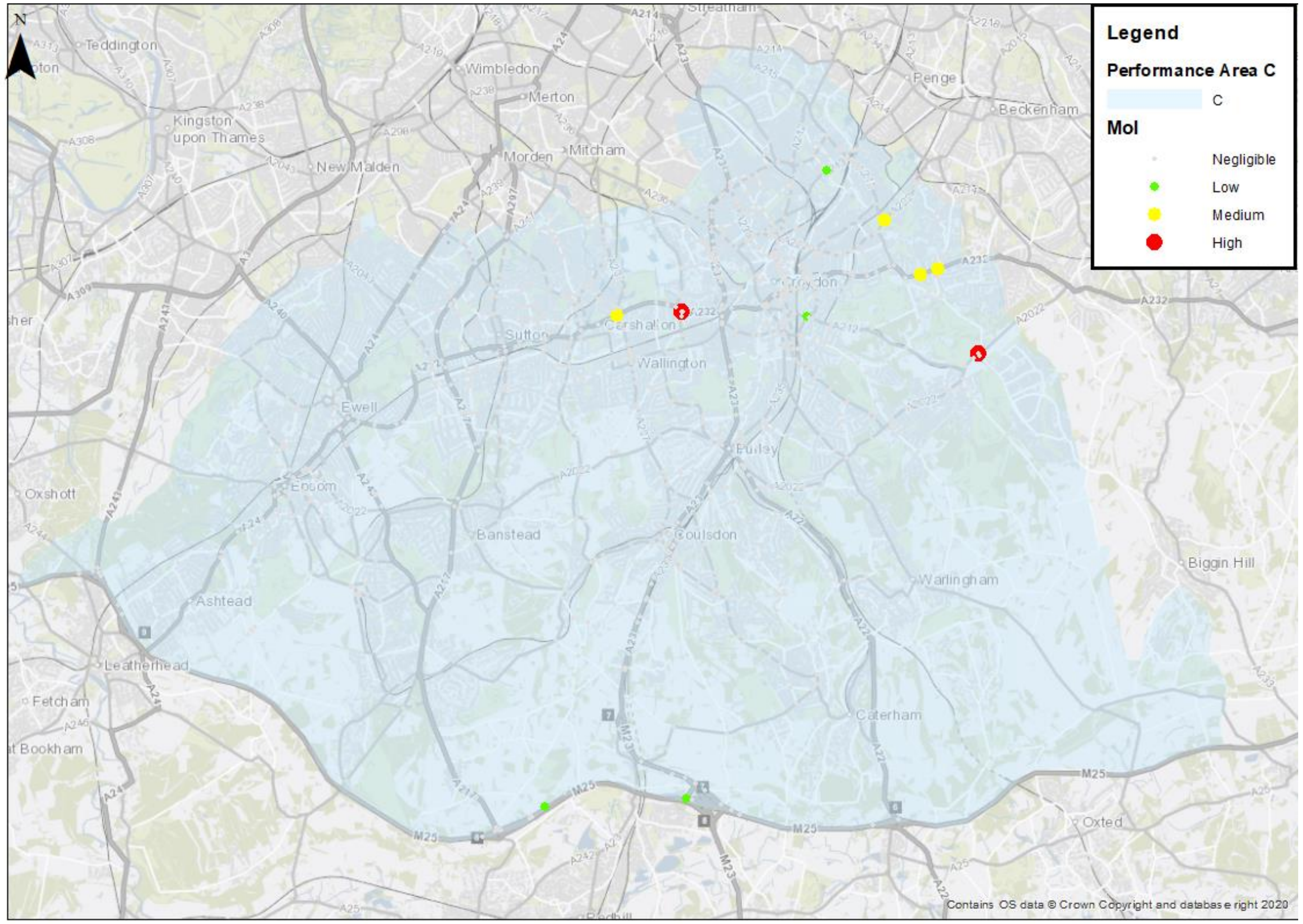


Figure 78: Maximum V/C - 2029, Future Baseline – Performance Area C

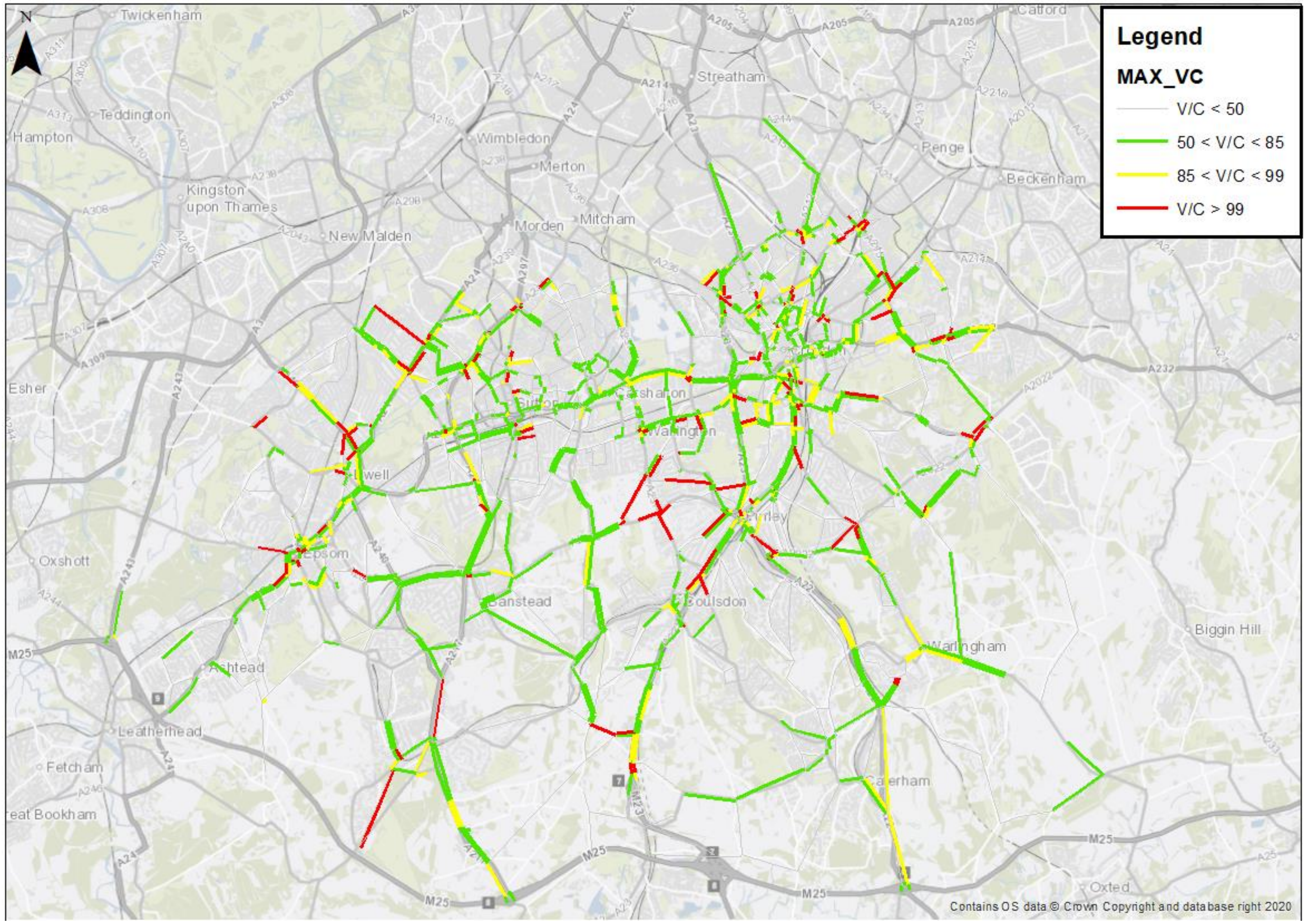


Figure 79: Maximum V/C - 2029, With Project – Performance Area C

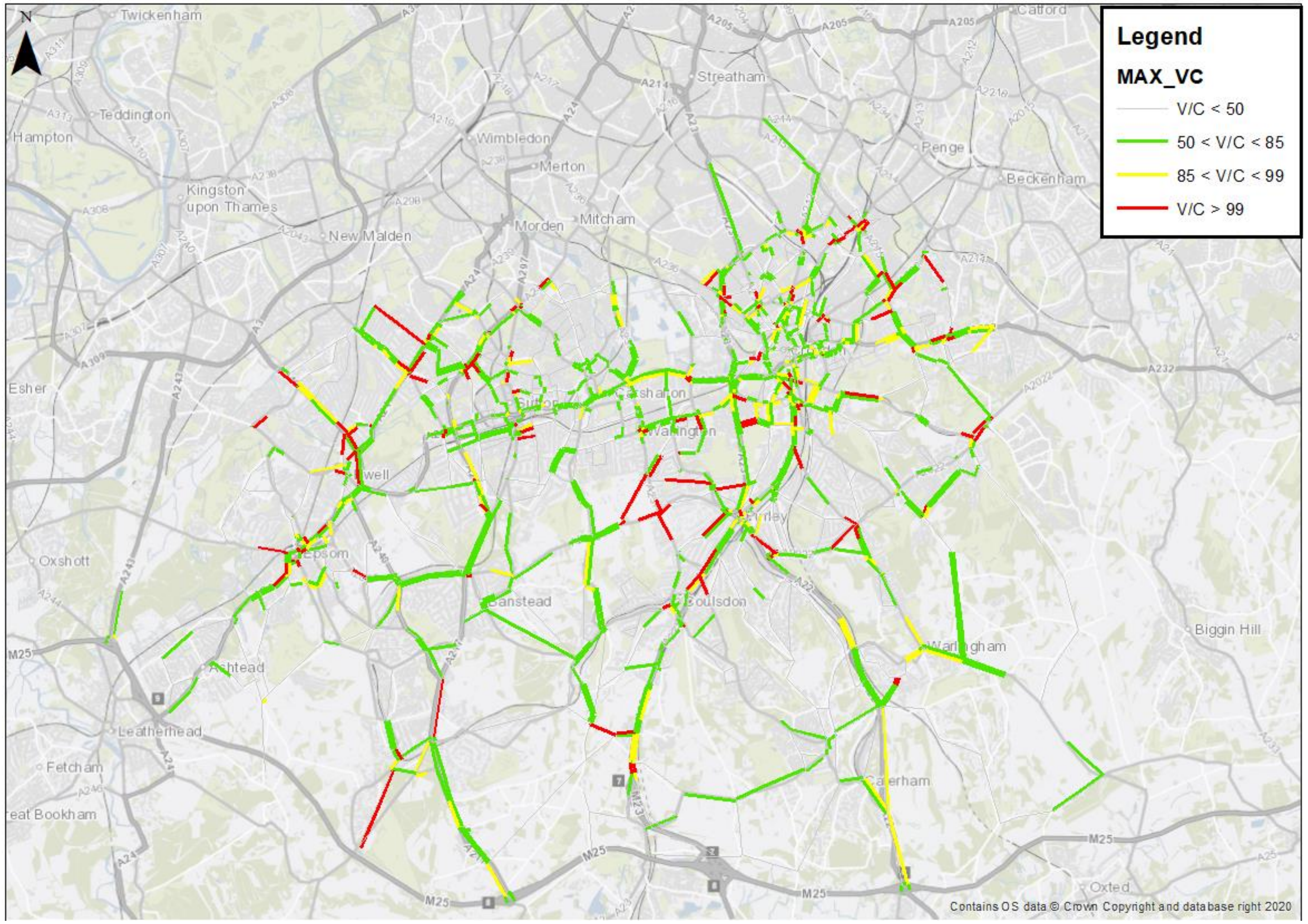


Figure 80: Maximum V/C - 2032, Future Baseline - Performance Area C

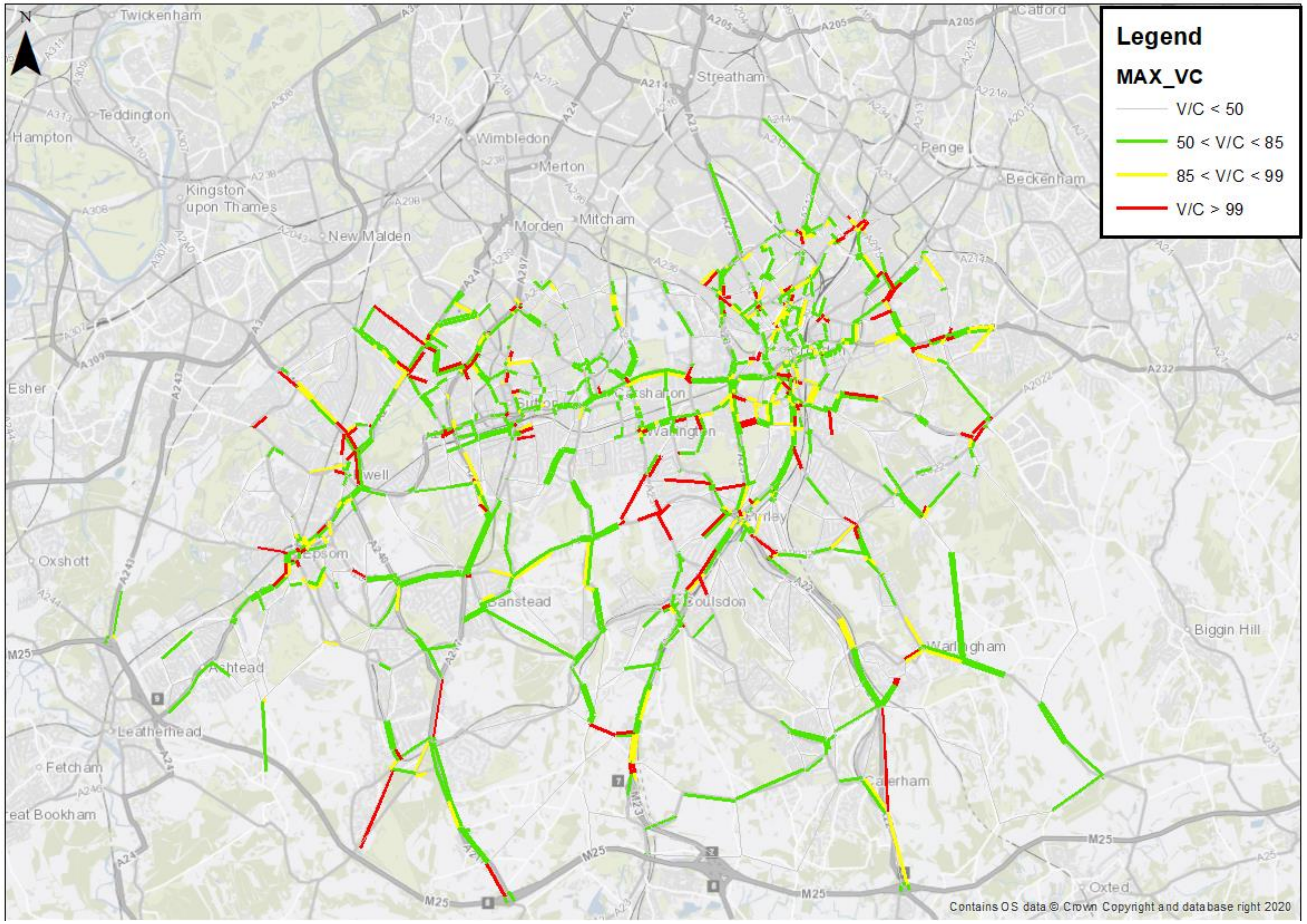


Figure 81: Maximum V/C - 2032, With Project - Performance Area C

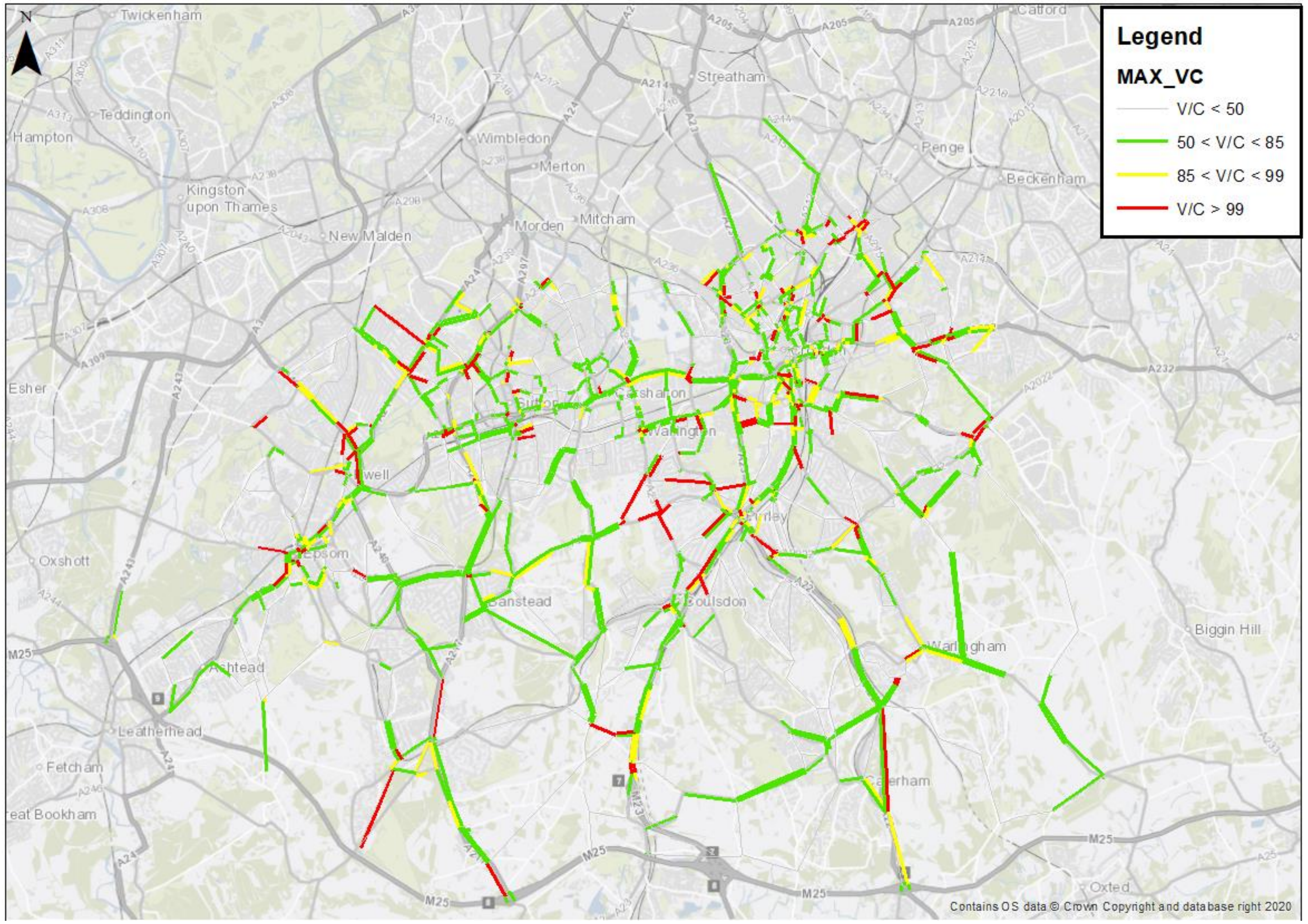


Figure 82: Maximum V/C - 2047, Future Baseline - Performance Area C

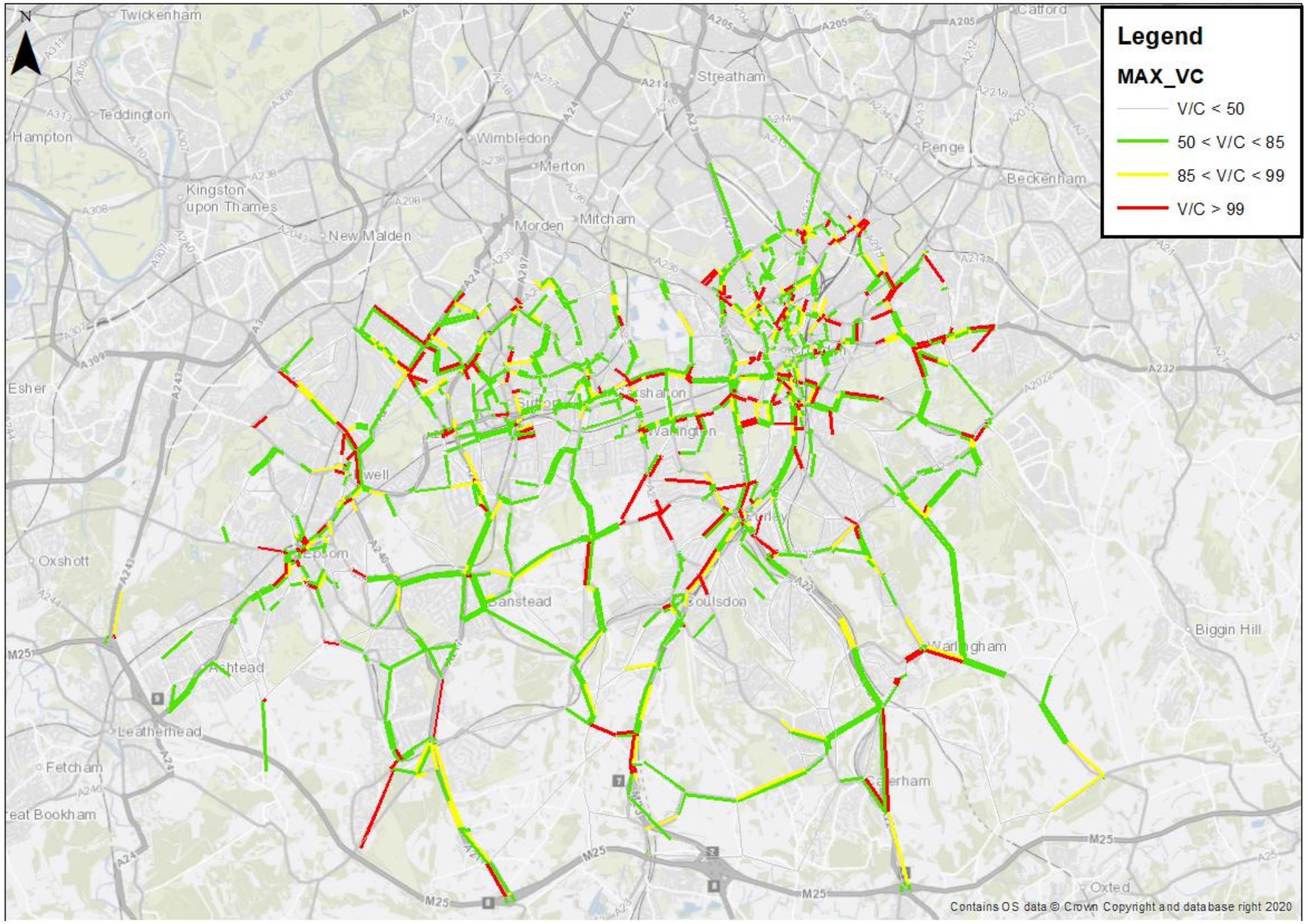
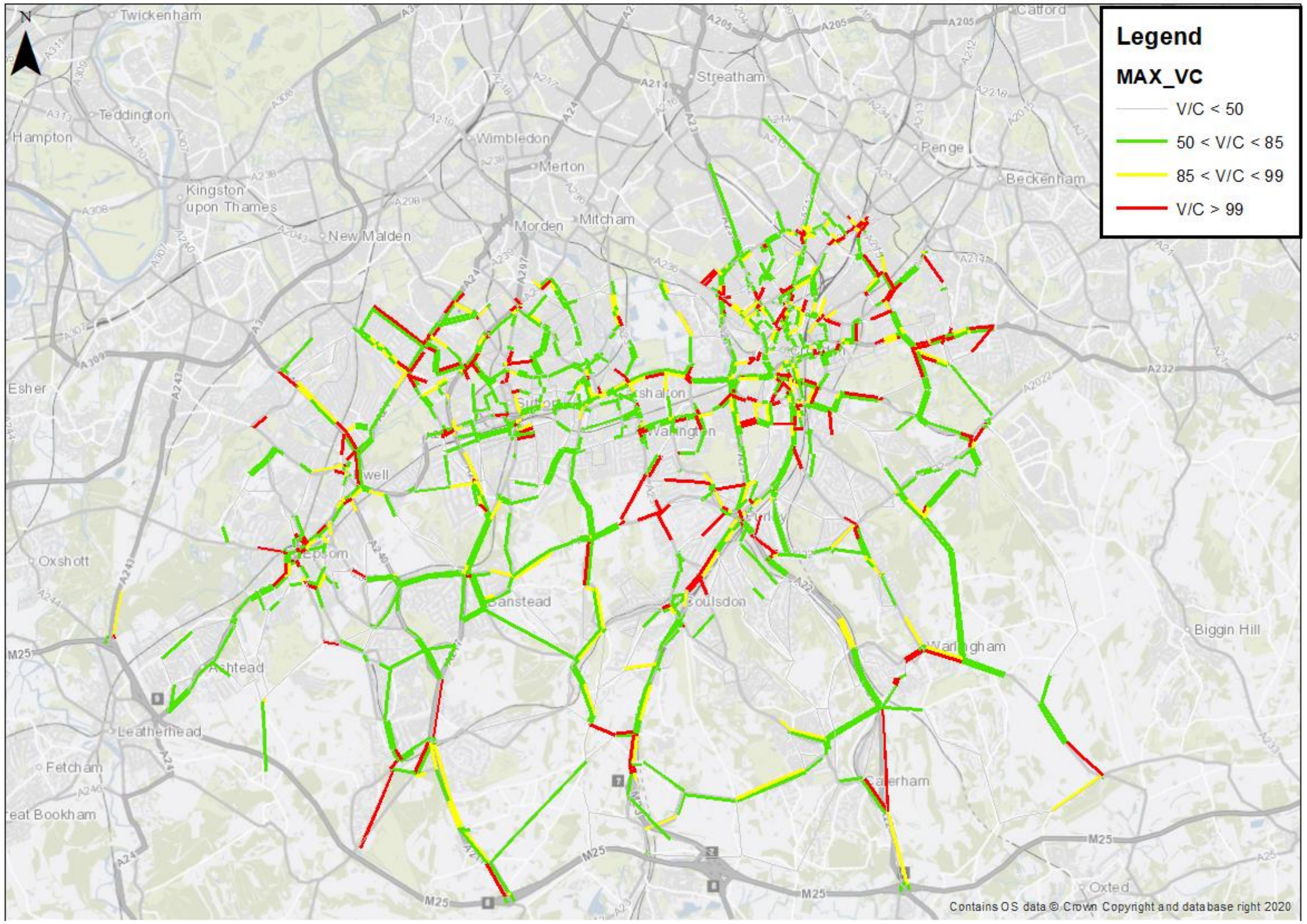


Figure 83: Maximum V/C - 2047, With Project - Performance Area C



10.8 Performance Area D

Journey Times

10.8.1 Journey times routes with respect to Performance Area D includes the following route:

- A272 from Coolham to near Uckfield, eastbound and westbound.

10.8.2 Modelled journey times extracted for these routes demonstrate that no routes are notably impacted between the Future Baseline and With Project Scenario across all assessment years and is summarised in Figure 84 to Figure 86. On balance, there are no notable changes in journey times between the Future Baseline and With Project scenario.

Figure 84: Highway Journey Times – Performance Area D, 2029

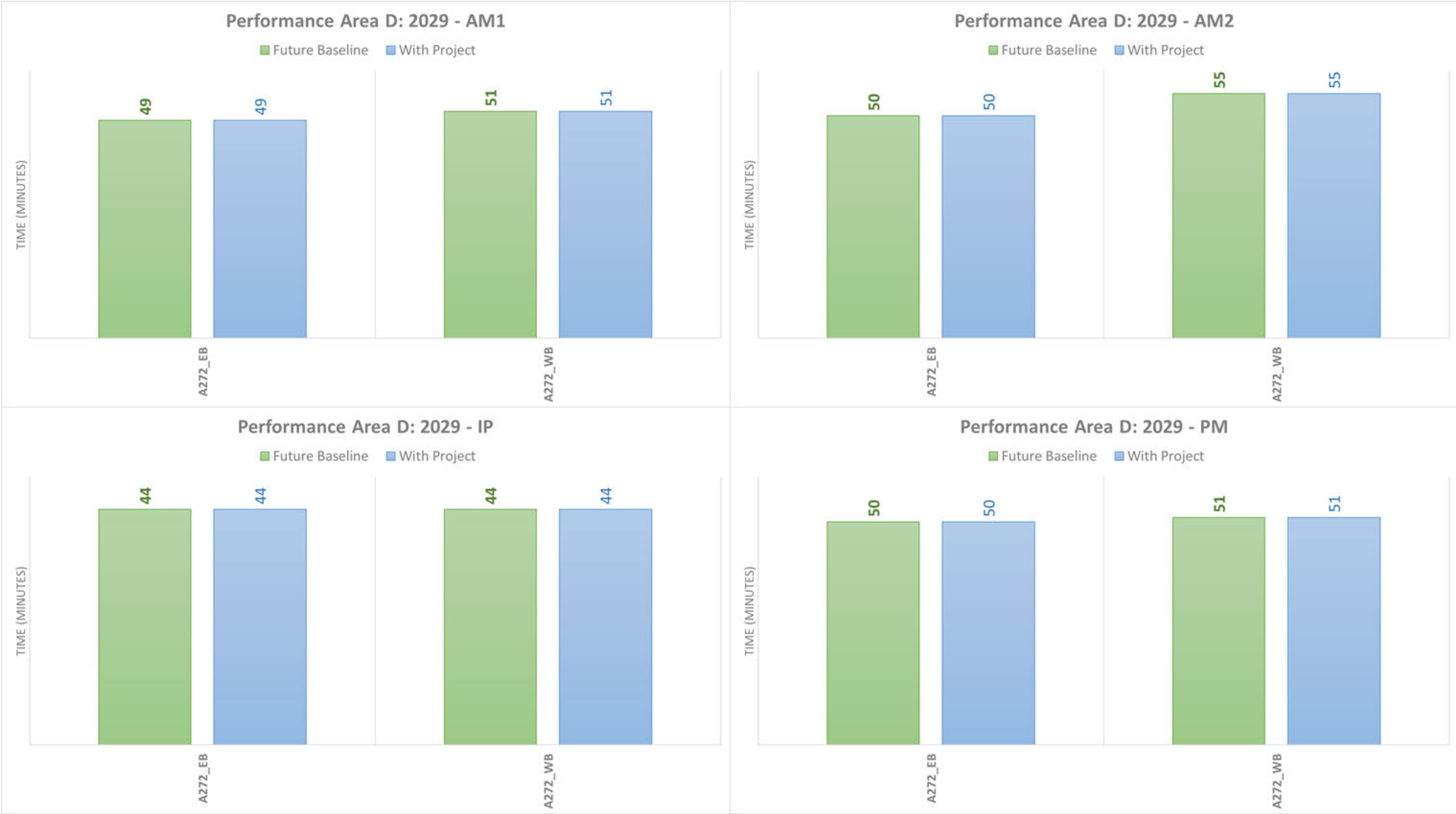


Figure 85: Highway Journey Times - Performance Area D, 2032

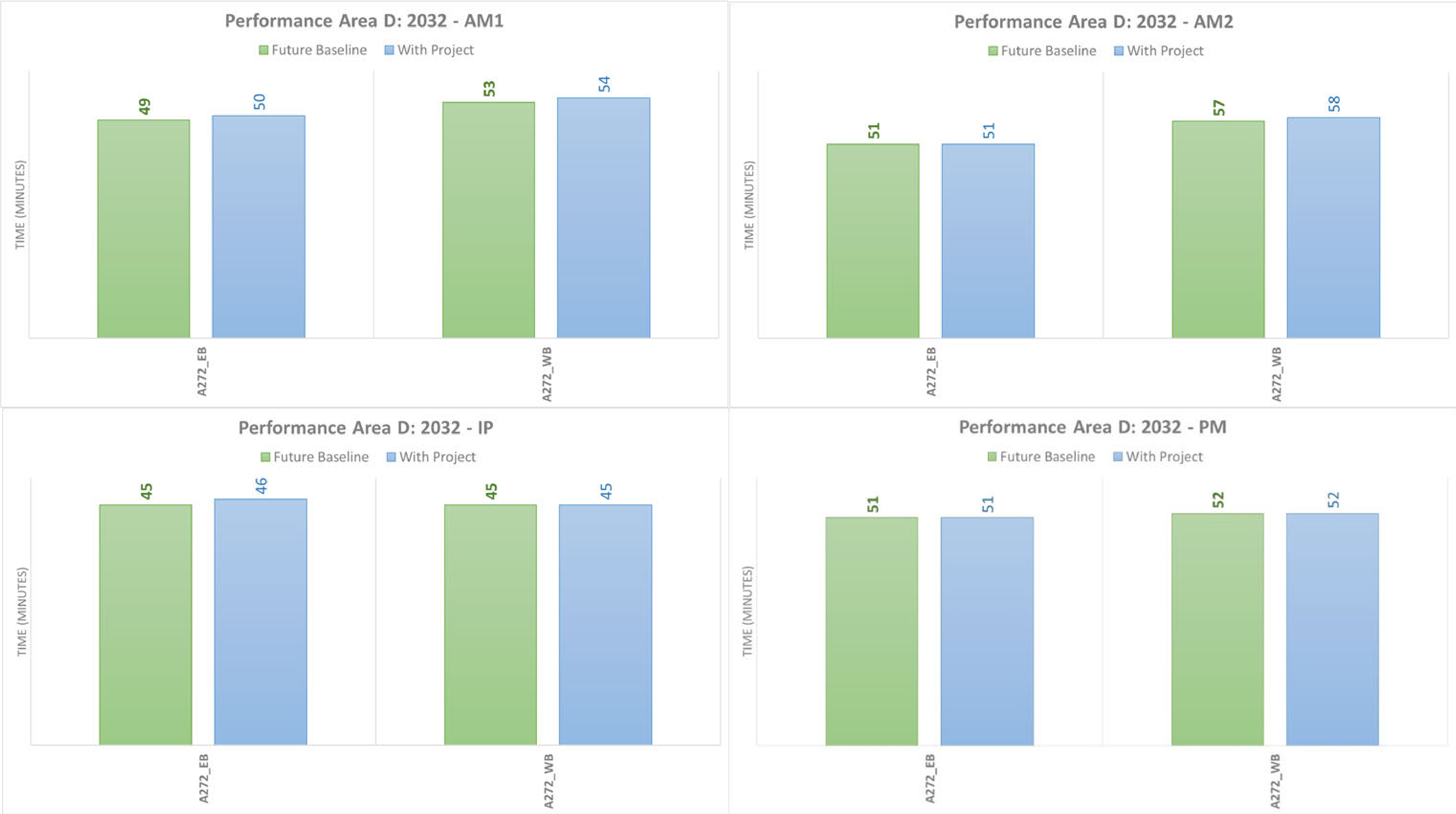
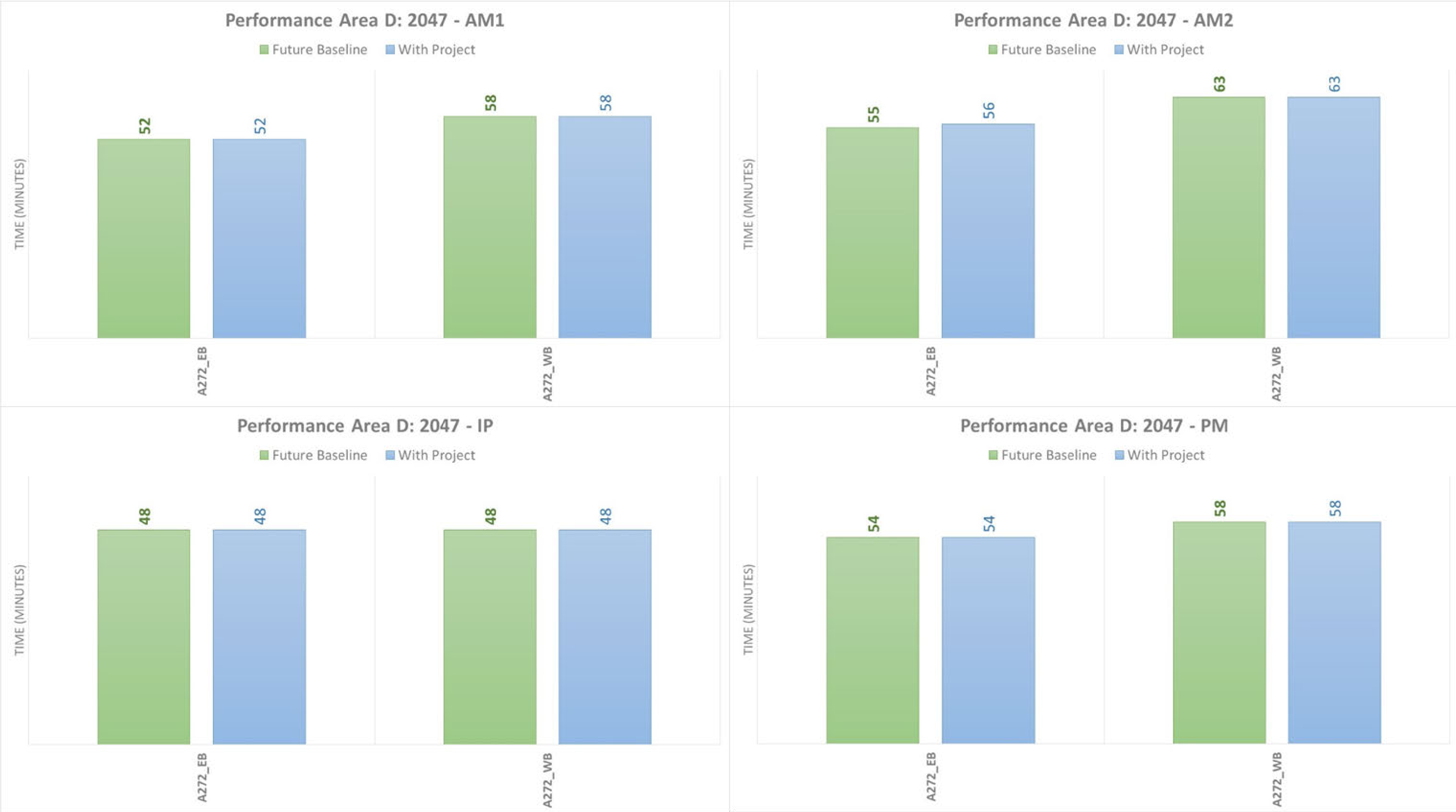


Figure 86: Highway Journey Times – Performance Area D, 2047



Operational Performance - Volume / Capacity ratios

10.8.3 Modelled Volume / Capacity ratios were extracted for each of the four modelled time periods. The maximum value across all time periods was selected to identify the highest value modelled and this is presented in Figure 88 to Figure 93. The evidence suggests that there are no instances of categories changing between the Future Baseline and With Project scenario across all assessment years.

10.8.4 All classifications in terms of Magnitude of Impacts for 2029, 2032 and 2047 show no 'Medium' or 'High' instances between the Future Baseline and With Project scenarios and is evidenced in Table 10.8.1 to Table 10.8.3 and illustrated in Figure 87.

Table 10.8.1: Magnitude of Impacts: Performance Area D, 2029 Nodes

2029	Performance Area D - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	33	25	12	17
Low	0	0	0	0
Medium	0	0	0	0
High	0	0	0	0

Table 10.8.2: Magnitude of Impacts: Performance Area D, 2032 Nodes

2032	Performance Area D - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	70	84	57	74
Low	0	0	0	0
Medium	0	0	0	0
High	0	0	0	0

Table 10.8.3: Magnitude of Impacts: Performance Area D, 2047 Nodes

2047	Performance Area D - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	70	42	68	80
Low	0	0	0	0
Medium	0	0	0	0
High	0	0	0	0

Figure 87: Magnitude of Impacts: Performance Area D, 2029; 2032 & 2047 Nodes

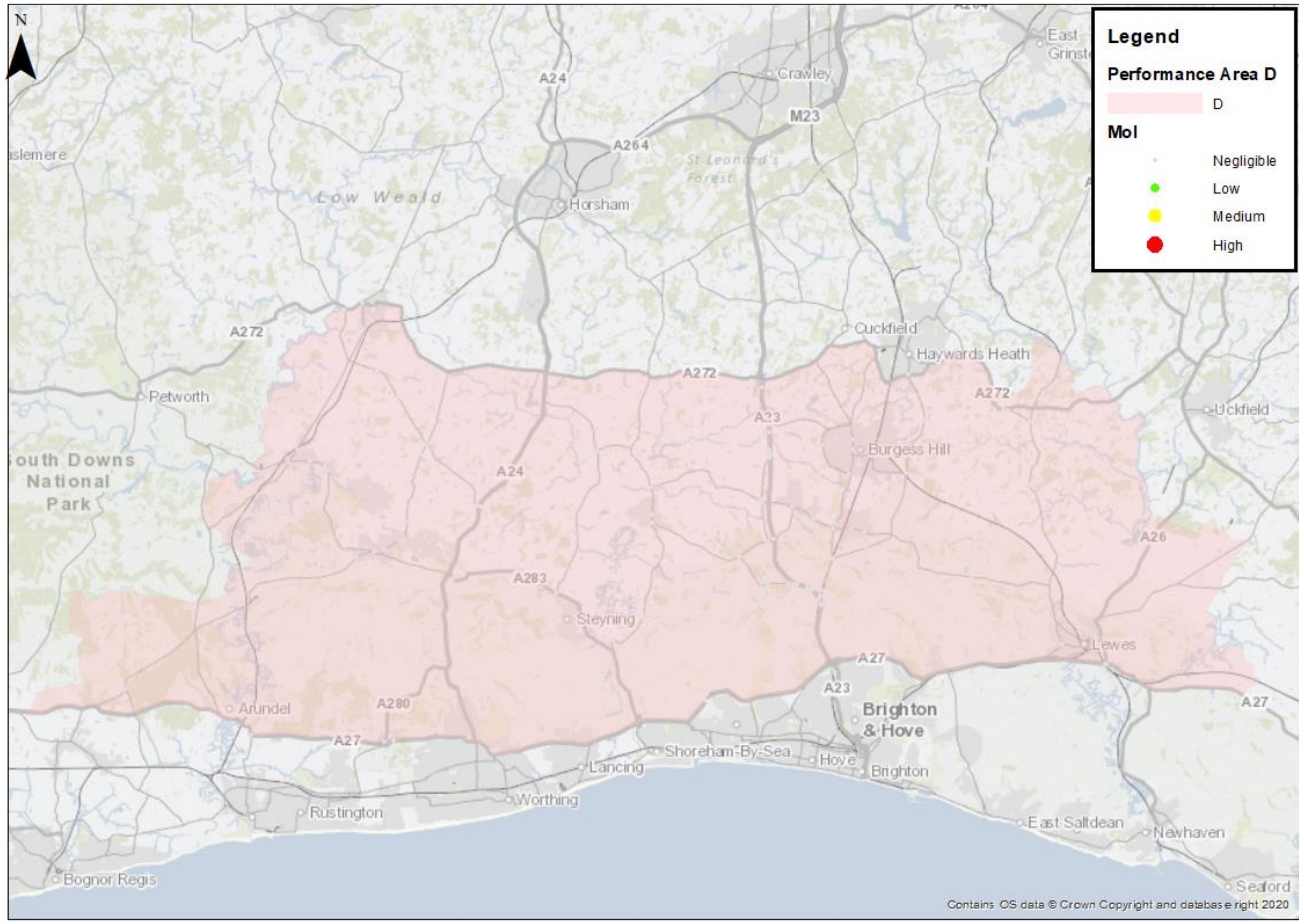


Figure 88: Maximum V/C - 2029, Future Baseline – Performance Area D

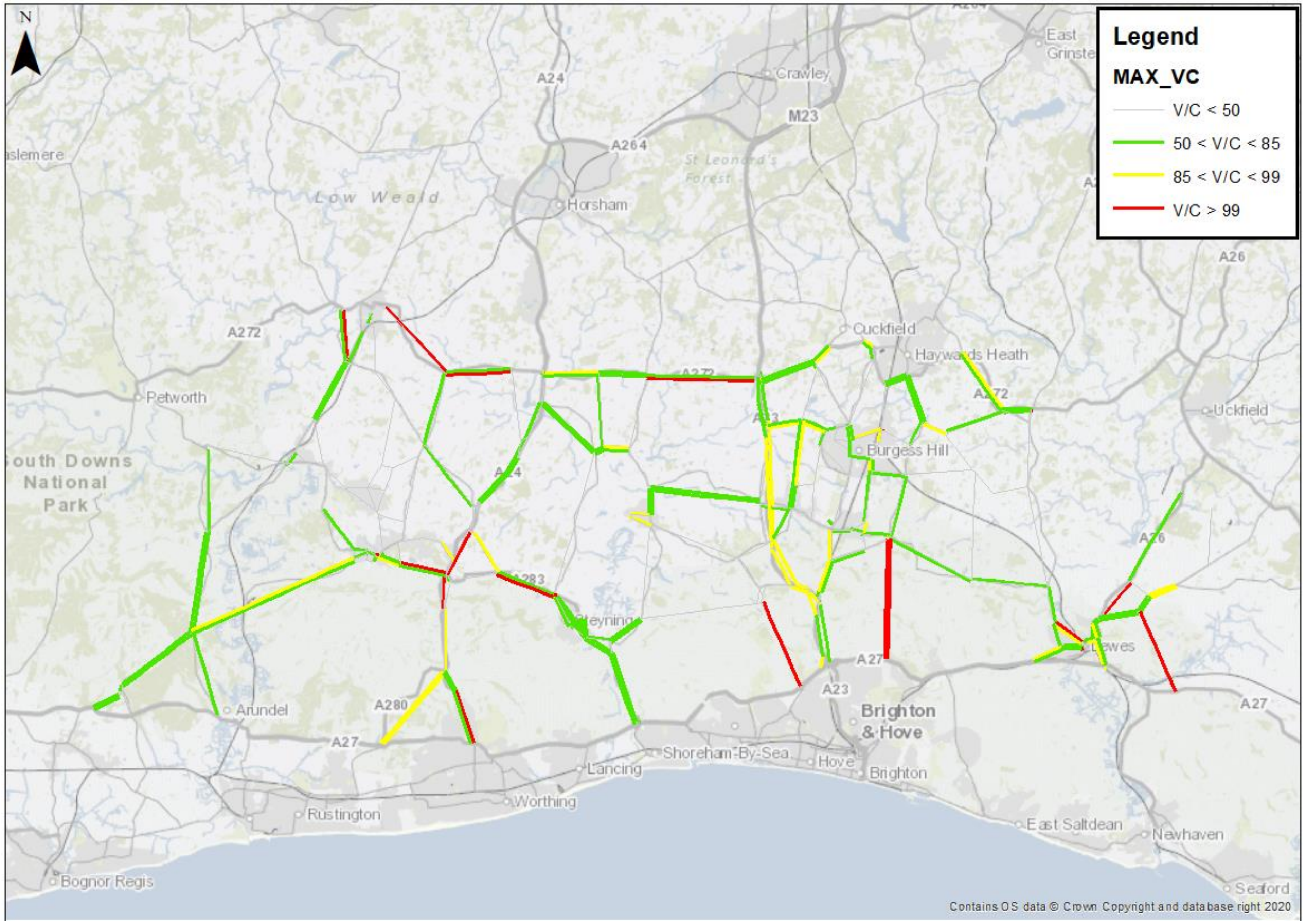


Figure 89: Maximum V/C - 2029, With Project – Performance Area D

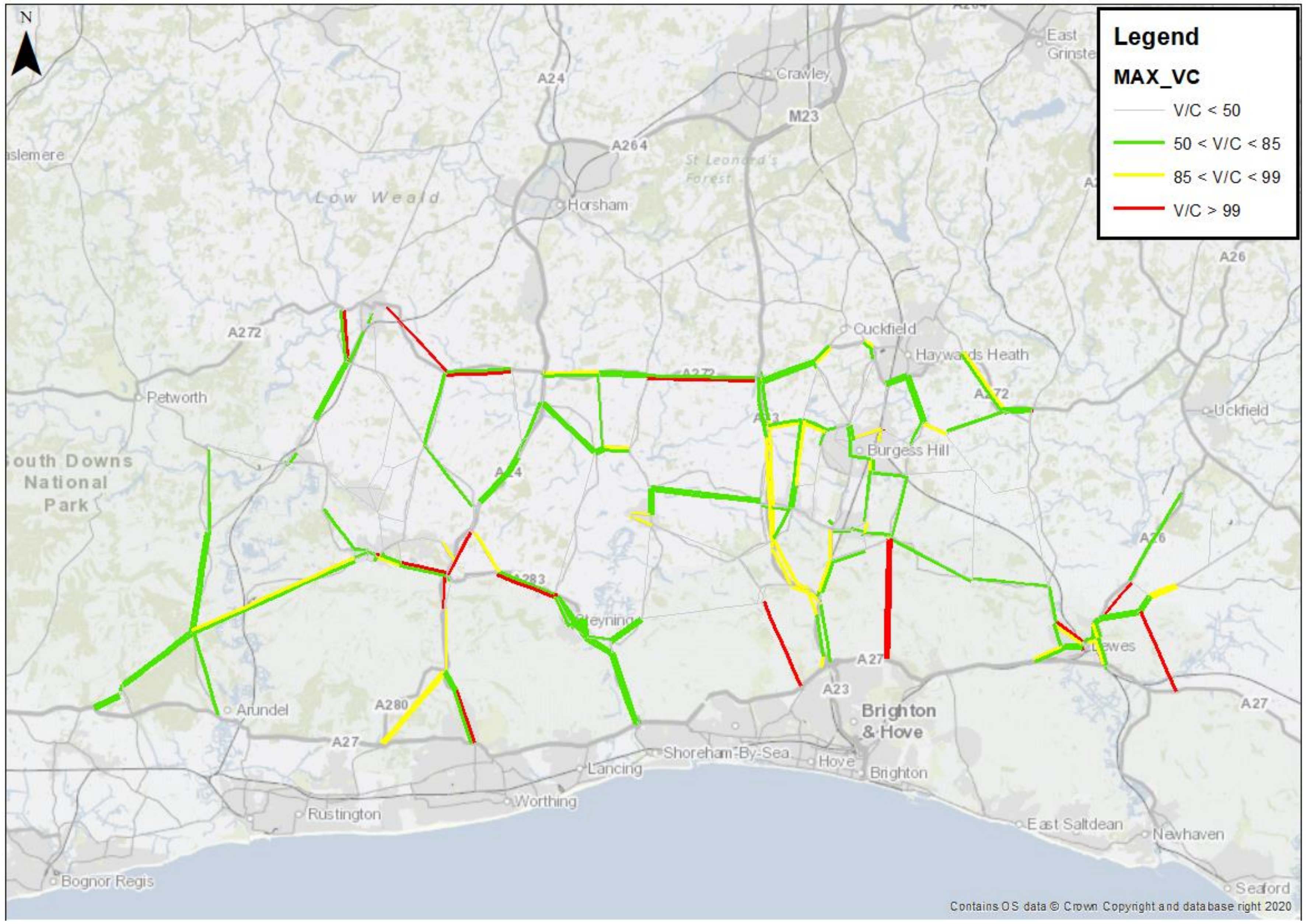


Figure 90: Maximum V/C - 2032, Future Baseline - Performance Area D

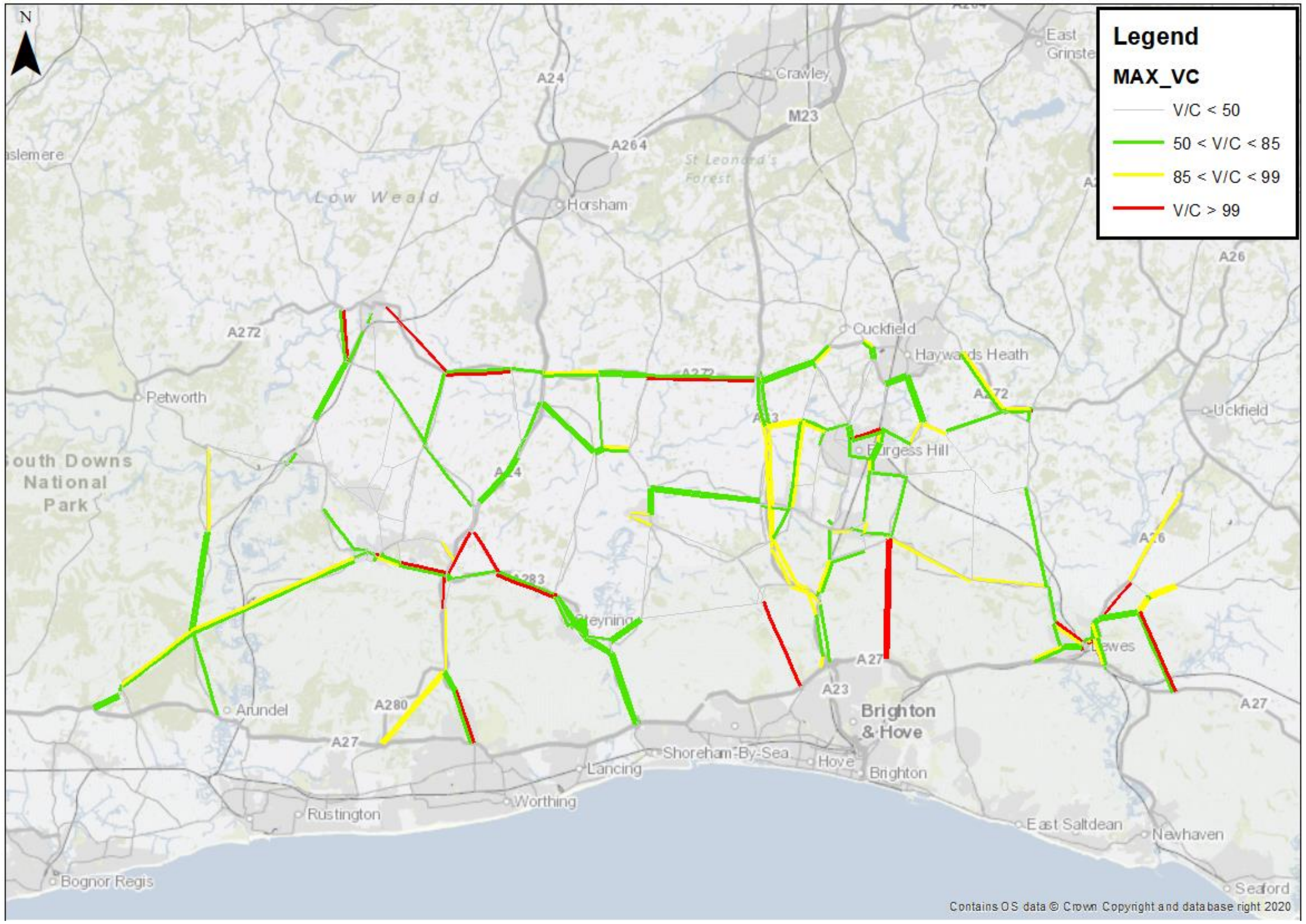


Figure 91: Maximum V/C - 2032, With Project - Performance Area D

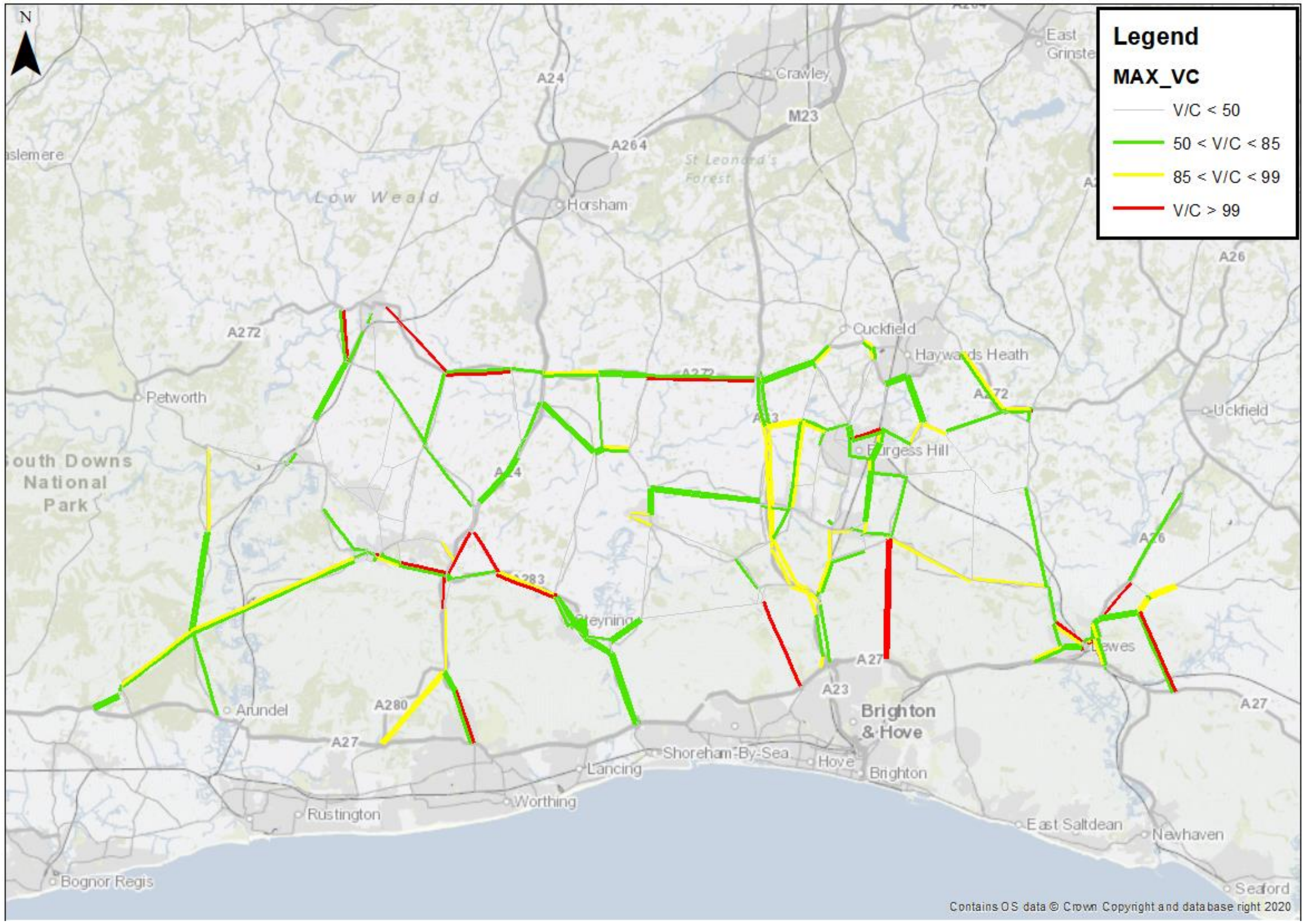


Figure 92: Maximum V/C - 2047, Future Baseline - Performance Area D

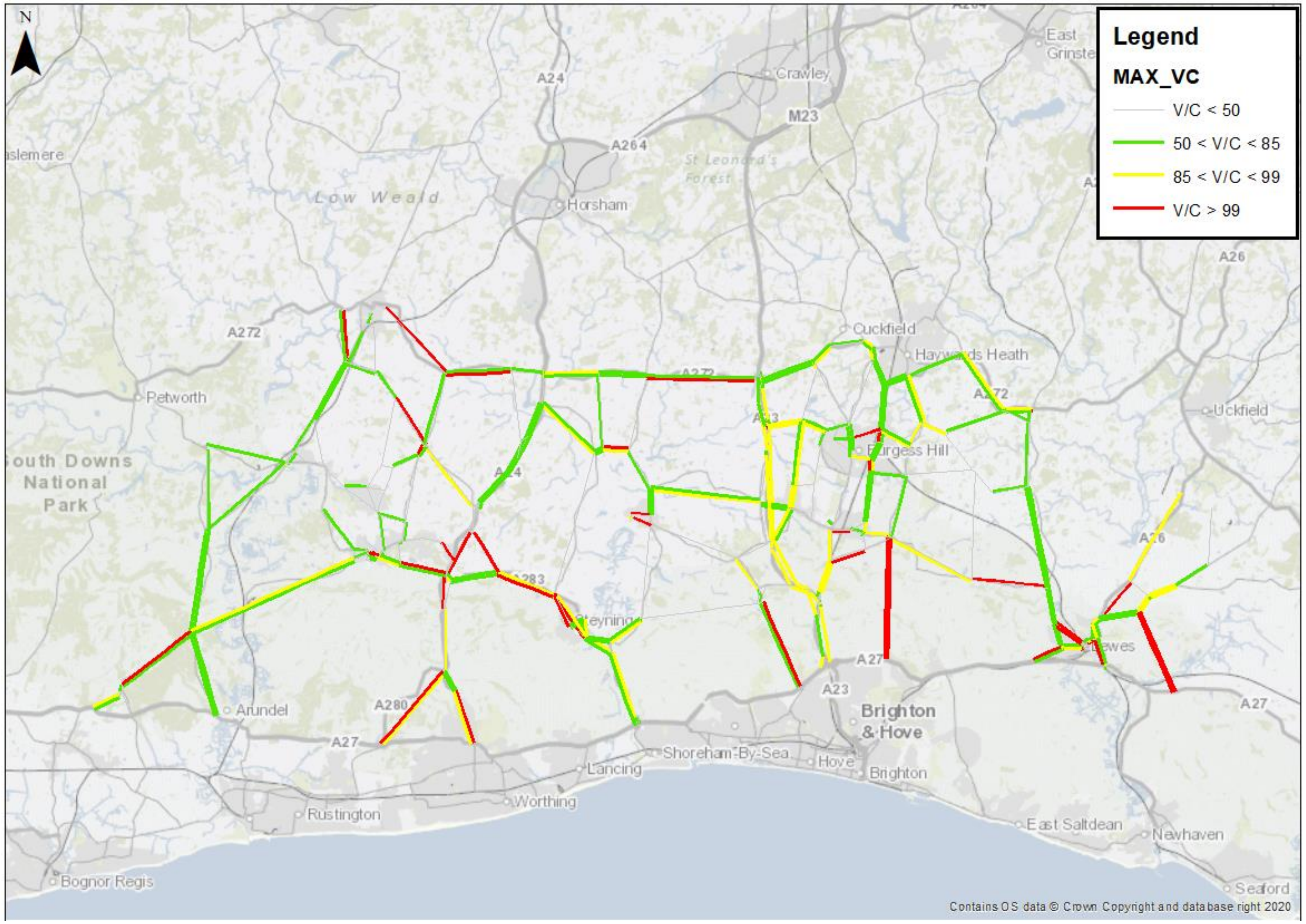
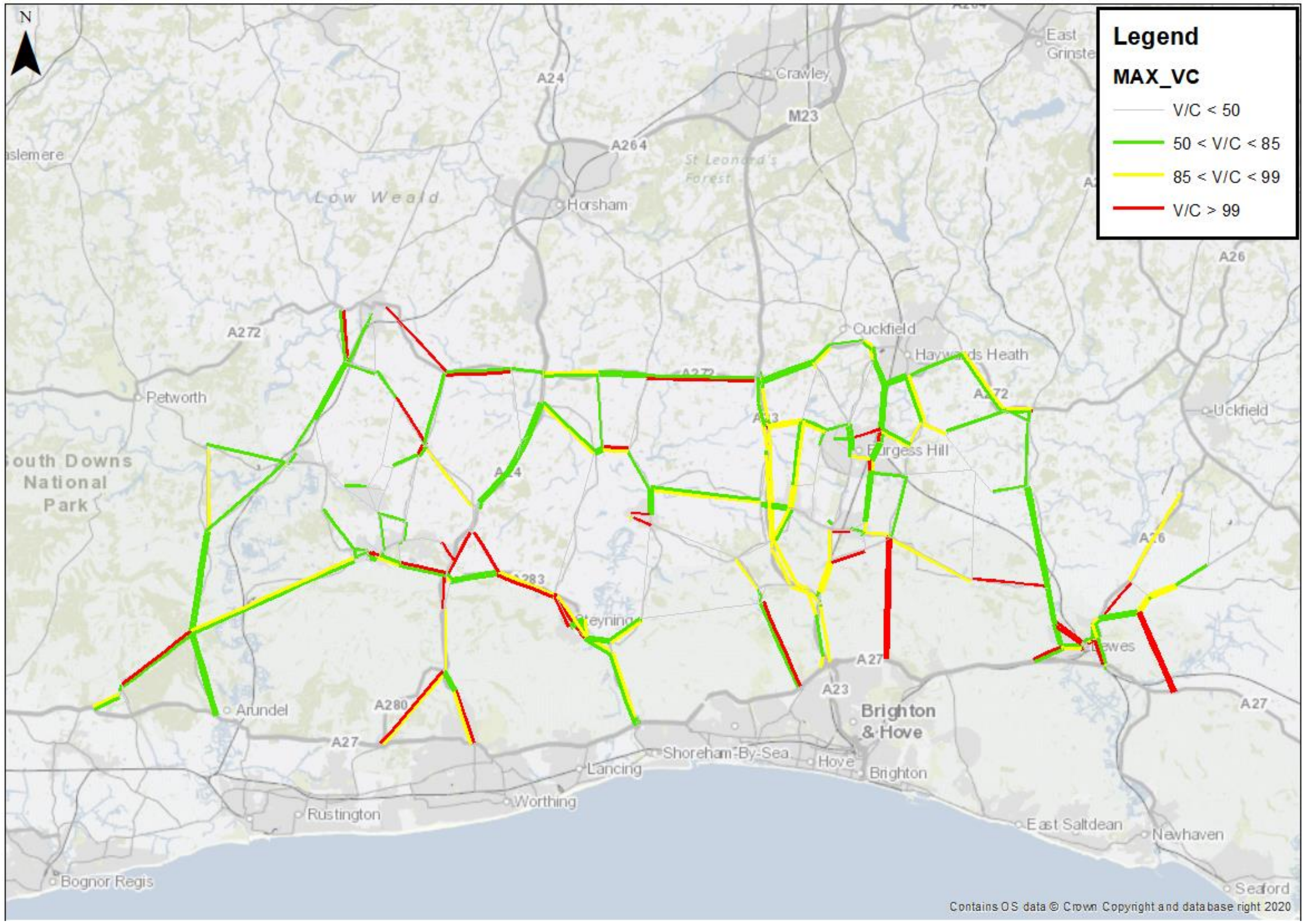


Figure 93: Maximum V/C - 2047, With Project - Performance Area D



11 Public Transport Network Performance

11.1 Introduction

11.1.1 Growth in demand and changes in capacity, impact on passenger experience through changes in crowding. It is important to assess rail crowding because, for timescale and cost reasons, it is not often practical for the rail operator to respond to crowding by expanding capacity. For bus/coach on the other hand, operators can adjust capacity to manage loadings more readily– through adjustment of frequencies and possibly vehicle size. For this reason, we focus on rail crowding in this Section.

11.1.2 The Brighton Main Line (BML), on which Gatwick Airport is located, has heavy peak commuter flows to London in AM peak and from London in PM peak. At these times, demand can exceed the number of seats available and people may have to stand. In future years these conditions may worsen if demand grows faster than capacity. We examine the crowding conditions in Future Baseline and Future Baseline with Project below.

11.2 Rail network performance

11.2.1 In the peak rail assignments, passengers are assigned to services taking account of the regular components of generalised cost (access, wait, in-vehicle time, interchange, egress) and also the crowding levels. Crowding is included in the generalised cost as crowding penalties. This is a feature of the PS model. This distributes the passengers among the available services in a realistic way taking account of capacity as well as journey times. The peak rail assignments are iterative, alternating between (a) loading passengers onto train services and (b) recalculating the crowding penalties; with iteration continuing until route choices are stable and equilibrium is reached.

11.2.2 The BML is a mix of fast and stopping services. Most passengers travelling to/from Gatwick Airport will favour the fast services (Gatwick Express and limited stop Southern and Thameslink services) and these will arrive at / depart from Gatwick Airport with high loads in the peaks. Stopping services (mainly Thameslink) also call at Gatwick but for most passengers these will not be attractive due to the extended journey times and will arrive at / depart from Gatwick Airport with relatively low loadings – these tend to fill up in the section north of Purley. For this reason, train crowding needs to be considered separately for each service group:

- Gatwick Express non-stop to Victoria
- Southern fasts (calling at East Croydon and Clapham Junction) to Victoria
- Thameslink fasts (calling at East Croydon) to London Bridge
- Thameslink stoppers to London Bridge
- North Downs Line, between Gatwick and Reading

Entries and exits at Gatwick

11.2.3 First, we examine the overall change in station entries and exits at Gatwick Airport station. This is shown for AM and PM peaks in Figure 93 and Figure 95. Between 2019 and 2047 station entries/exits are forecast to grow by around 60% in the Future baseline and around 90% in the Future baseline with Project. A simulation model of pedestrian movements through the station is being developed to test the capacity of the station to serve these expanded volumes, which is reported in the PTAR section 12.

Figure 94: Gatwick Airport Station Entries and Exits – AM Peak (07:00-09:00)

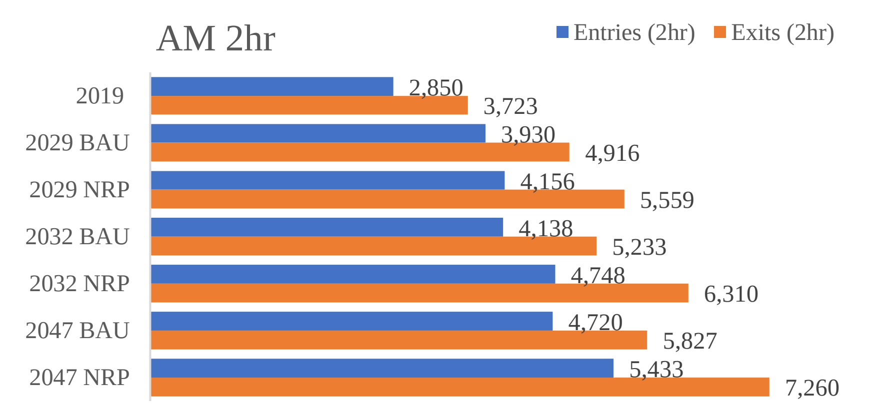
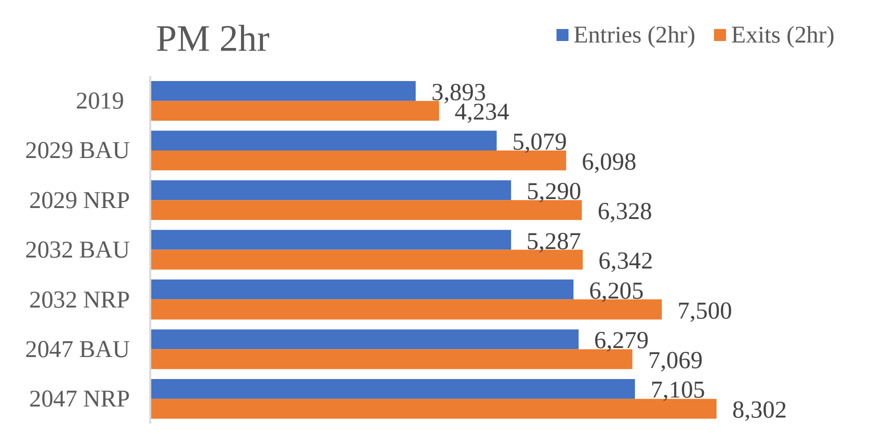


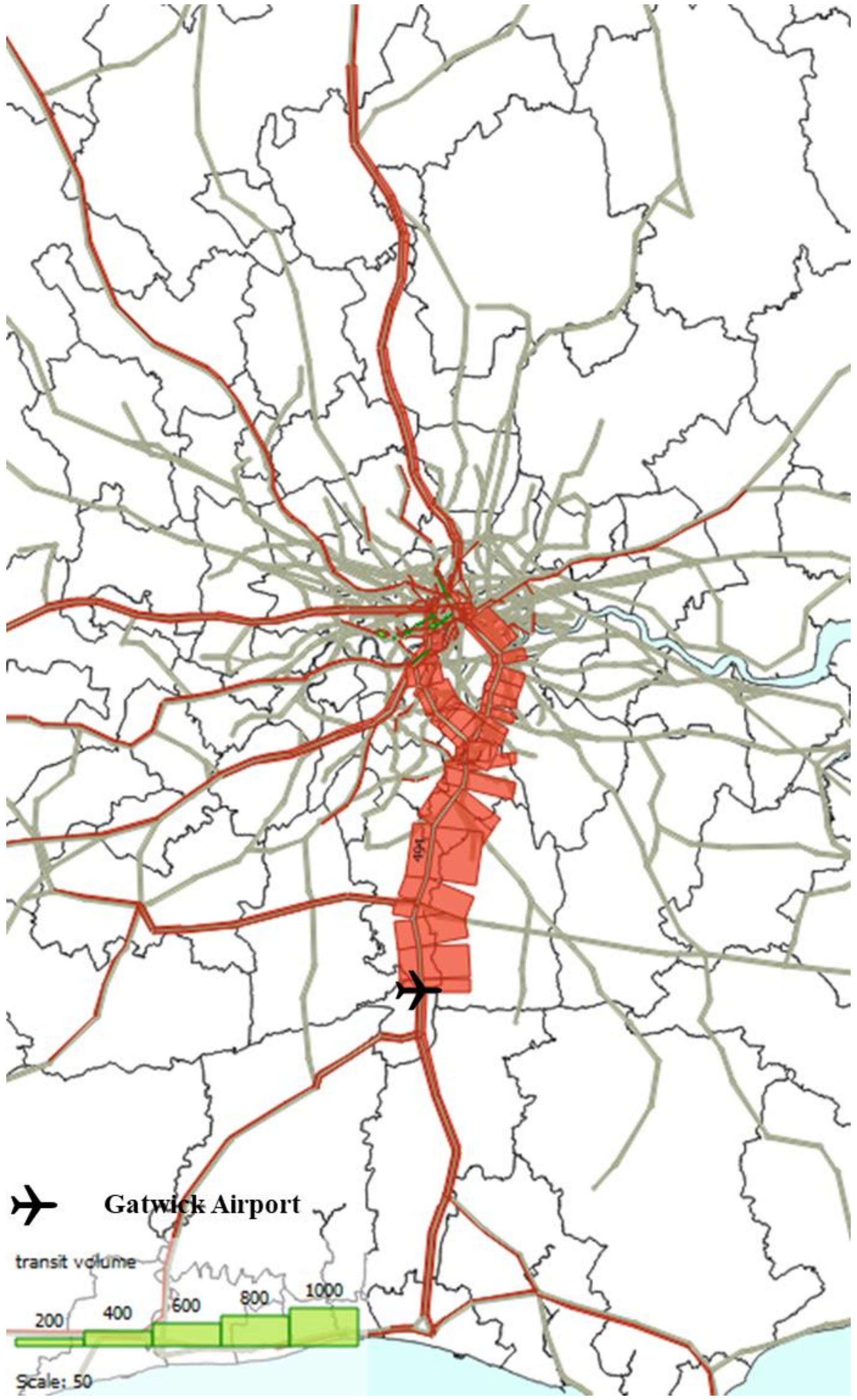
Figure 95: Gatwick Airport Station Demand – PM Peak (16:00-18:00)



Change in volumes on trains

11.2.4 Figure 96 provides an overview of where the additional passengers in the Future Baseline with Project appear on the rail networks. This is a demand difference plot between the Future Baseline with Project and Future Baseline scenario in 2047 AM period. Changes below 10 persons per hour are not shown. The dominance of London for rail demand is quite clear with a roughly 50:50 split between Victoria and London Bridge. In the AM peak, additional Gatwick passengers are predominantly travelling southbound, which is the counter-peak direction at this time of day.

Figure 96: Additional Gatwick passengers in the With Project scenario, 2047 AM (07:00-09:00)



11.2.5 Overall, the Project adds around 18,600 (+4.2%) passengers over 24 hours in 2047 of which:

- 1,350 (+1.2%) are Brighton Main (Brighton)
- 600 (+1.3%) are Arun Valley
- 550 (+3.0%) are North Downs Line (Reading)
- 100 (+2.4%) are Tonbridge Line
- 16,000 (+6.3%) are Brighton Main (London)

Crowding on train services: AM

11.2.6 Table 11.2.1 shows forecast load factors on northbound services in the AM peak for each modelled scenario. It includes all stations that Gatwick services call between Three Bridges and Victoria or London Bridge. These are seated load factors, calculated by dividing 2hr passengers by 2hr seats.

11.2.7 The yellow shading means 80-100% of seats taken; orange means 100-120% of seats taken (some standing) and red means over 120% of seats taken (more dense standing). In 2019, all seats on all service groups other than Gatwick Express are filled by Purley or East Croydon. DfT differentiates between standing for less 20 minutes (generally accepted) and those standing for more than 20 minutes (to be avoided if possible). For example, the DfT PIXC measure (Passengers In eXcess of Capacity) ignores standing under 20 minutes (unless standing capacity is exceeded) but standers above 20 minutes are counted. The 20-minute journey time threshold (from London termini) is in the south Croydon area.

11.2.8 In 2019 there was no significant crowding issues at a 2hr level reported. Although Purley is over 20 minutes from London, some Purley passengers go to East Croydon so it's unlikely that anyone is standing for more than 20 minutes. It is important to note that this is a strategic model that calculates average loads, not loads on individual trains. In reality there will be variation between individual trains and there is likely to be standing for over 20 minutes on some trains. However, the general point is that there are sufficient seats offered over the period, and people from locations south of Purley wanting a seat should be able to get one so long as they avoid the peak of the peak.

11.2.9 In later years, 2029, 2032 and 2047 there are increases in both seating capacity (due to extra services) and in demand.

11.2.10 In 2029 both Future Baseline and Future Baseline with Project scenarios, a similar level of crowding occurs to 2019 because although demand is increased, so is capacity, as the full Thameslink (24 tph) frequencies come into effect as well as extra peak services enabled by the Croydon Area Remodelling Scheme.

11.2.11 In 2032, capacity is unchanged from 2029, but demand growth continues, leading to slightly raised load factors in both scenarios but Purley remains the southern limit for standing.

11.2.12 By 2047, the fast services are approaching seated capacity with Gatwick Express seats being 94% occupied (in the Future Baseline) and 96% (in Future Baseline with Project); Fast Victoria 98% and 100% and Fast London Bridge 99% and 100% (Future Baseline and Future Baseline with Project respectively).

11.2.13 In summary, baseline growth, which is made up mainly of London commuters, determines the underlying seated load factor which approaches 100% on the fast services by the final analysis year, 2047. The Future Baseline with Project scenario adds a further 1-2% to the fast services. Stopping services are forecast to depart from Gatwick largely empty – these serve a different market and fill up to 100% by Purley or East Croydon.

11.2.14 NDL in the tables below refers to North Downs Line. The frequencies on this line increase from 1 tph to 2 tph after 2019 and this provides adequate capacity for all scenarios.

Table 11.2.1: Forecast load factors, AM peak (07:00-09:00) NB

Scenario	Groups	Direction	Seating Capacity	Seated Load Factor (2hr)													
				Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC)	Clapham Jcn (VIC)	East Croydon (LBG)	Norwood Jcn (LBG)
2019 AM	NDL	NB	520	0.00	0.17	0.17	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GX	NB	4,728	0.65	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.00	0.00
	Fast VIC	NB	6,318	0.52	0.77	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	1.14	1.00	0.00	0.00
	Stoppers VIC	NB	2,672	0.00	0.04	0.03	0.04	0.17	0.41	0.48	0.72	1.10	1.10	1.17	1.05	0.00	0.00
	Fast LBG	NB	9,279	0.58	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.00	0.00	1.32	1.32
	Stoppers LBG	NB	5,312	0.17	0.06	0.07	0.08	0.15	0.33	0.40	0.64	0.84	0.83	0.00	0.00	1.28	1.41
	Total		28,829	0.45	0.54	0.54	0.55	0.57	0.63	0.65	0.72	0.79	0.79	1.02	0.94	1.30	1.35
2029 AM BAU	NDL	NB	1,040	0.00	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GX	NB	4,728	0.67	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.00	0.00
	Fast VIC	NB	6,318	0.53	0.81	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.20	1.05	0.00	0.00
	Stoppers VIC	NB	2,672	0.00	0.04	0.02	0.03	0.14	0.39	0.45	0.69	1.07	1.07	1.19	1.08	0.00	0.00
	Fast LBG	NB	10,964	0.64	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.00	0.00	1.40	1.40
	Stoppers LBG	NB	6,710	0.15	0.06	0.07	0.08	0.16	0.34	0.40	0.64	0.83	0.82	0.00	0.00	1.28	1.45
	Total		32,432	0.46	0.58	0.58	0.58	0.61	0.67	0.69	0.76	0.83	0.83	1.08	0.98	1.35	1.42
2029 AM Project	NDL	NB	1,040	0.00	0.19	0.19	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GX	NB	4,728	0.67	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.00	0.00
	Fast VIC	NB	6,318	0.53	0.82	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	1.21	1.05	0.00	0.00
	Stoppers VIC	NB	2,672	0.00	0.04	0.02	0.03	0.14	0.39	0.45	0.69	1.07	1.07	1.19	1.07	0.00	0.00
	Fast LBG	NB	10,964	0.64	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.00	0.00	1.40	1.40
	Stoppers LBG	NB	6,710	0.15	0.06	0.08	0.08	0.16	0.34	0.40	0.64	0.83	0.82	0.00	0.00	1.28	1.45
	Total		32,432	0.46	0.58	0.59	0.59	0.61	0.67	0.69	0.76	0.83	0.83	1.08	0.98	1.36	1.42
2032 AM BAU	NDL	NB	1,040	0.00	0.20	0.20	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GX	NB	4,728	0.69	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.00	0.00
	Fast VIC	NB	6,318	0.56	0.85	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	1.22	1.06	0.00	0.00
	Stoppers VIC	NB	2,672	0.00	0.04	0.02	0.03	0.14	0.39	0.46	0.71	1.10	1.10	1.21	1.09	0.00	0.00
	Fast LBG	NB	10,964	0.67	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	0.00	1.43	1.43
	Stoppers LBG	NB	6,710	0.16	0.07	0.08	0.09	0.17	0.36	0.42	0.66	0.86	0.85	0.00	0.00	1.31	1.48
	Total		32,432	0.48	0.60	0.61	0.61	0.64	0.70	0.72	0.79	0.87	0.86	1.10	1.00	1.38	1.45
2032 AM Project	NDL	NB	1,040	0.00	0.21	0.21	0.21	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GX	NB	4,728	0.69	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.00	0.00
	Fast VIC	NB	6,318	0.56	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	1.24	1.06	0.00	0.00
	Stoppers VIC	NB	2,672	0.00	0.04	0.02	0.03	0.14	0.40	0.46	0.71	1.10	1.10	1.21	1.09	0.00	0.00

Scenario	Groups	Direction	Seating Capacity	Seated Load Factor (2hr)													
				Three Bridges	Gatwick Airport	Horley	Salfords	Earlswood	Redhill	Merstham	Coulsdon South	Purley	South Croydon	East Croydon (VIC)	Clapham Jcn (VIC)	East Croydon (LBG)	Norwood Jcn (LBG)
	Fast LBG	NB	10,964	0.68	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.00	0.00	1.44	1.44
	Stoppers LBG	NB	6,710	0.15	0.07	0.08	0.09	0.17	0.36	0.42	0.66	0.86	0.85	0.00	0.00	1.31	1.48
	Total		32,432	0.49	0.62	0.62	0.62	0.65	0.71	0.73	0.80	0.88	0.88	1.11	1.01	1.39	1.45
2047 AM BAU	NDL	NB	1,040	0.00	0.24	0.24	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GX	NB	4,728	0.79	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.00	0.00
	Fast VIC	NB	7,849	0.69	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	1.22	1.07	0.00	0.00
	Stoppers VIC	NB	3,319	0.00	0.04	0.02	0.03	0.18	0.47	0.54	0.80	1.16	1.16	1.21	1.11	0.00	0.00
	Fast LBG	NB	11,661	0.83	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.00	0.00	1.51	1.51
	Stoppers LBG	NB	6,710	0.21	0.09	0.11	0.12	0.20	0.41	0.48	0.73	0.91	0.90	0.00	0.00	1.40	1.57
	Total		35,308	0.59	0.71	0.71	0.72	0.75	0.82	0.84	0.91	0.98	0.98	1.14	1.04	1.47	1.53
2047 AM Project	NDL	NB	1,040	0.00	0.26	0.26	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GX	NB	4,728	0.79	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.00	0.00
	Fast VIC	NB	7,849	0.69	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.24	1.07	0.00	0.00
	Stoppers VIC	NB	3,319	0.00	0.04	0.03	0.03	0.18	0.47	0.55	0.80	1.16	1.16	1.22	1.11	0.00	0.00
	Fast LBG	NB	11,661	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.52	1.52
	Stoppers LBG	NB	6,710	0.21	0.10	0.12	0.13	0.21	0.41	0.49	0.73	0.91	0.90	0.00	0.00	1.40	1.57
	Total		35,308	0.59	0.72	0.73	0.73	0.76	0.83	0.85	0.92	0.99	0.99	1.15	1.05	1.48	1.54

11.2.15 In the counter-peak direction (AM southbound) there are no crowding issues: the load factors in all scenarios and service groups are 60% or below at all locations.

Crowding on train services: PM

11.2.16 Table 11.2.2 shows forecast load factors on southbound services in the PM peak for each modelled scenario.

11.2.17 The peak volumes are lower in PM than in AM. This is because London's PM peak is more spread (of longer duration) than the AM peak. The patterns mirror the AM peak insofar as the standing passengers (loadings above 100%) in the PM peak are in the section London to East Croydon.

11.2.18 The forecast 2hr load factors in the section south of East Croydon do not exceed 95% in any scenario. In 2047 Future Baseline with Project the fast services have 85-95% of seats occupied on arrival at Gatwick.

11.2.19 In the counter-peak direction (PM northbound) there are no crowding issues: the load factors in all scenarios and service groups are below 80% at all locations.

Table 11.2.2: Forecast load factors, PM peak SB (16:00-18:00)

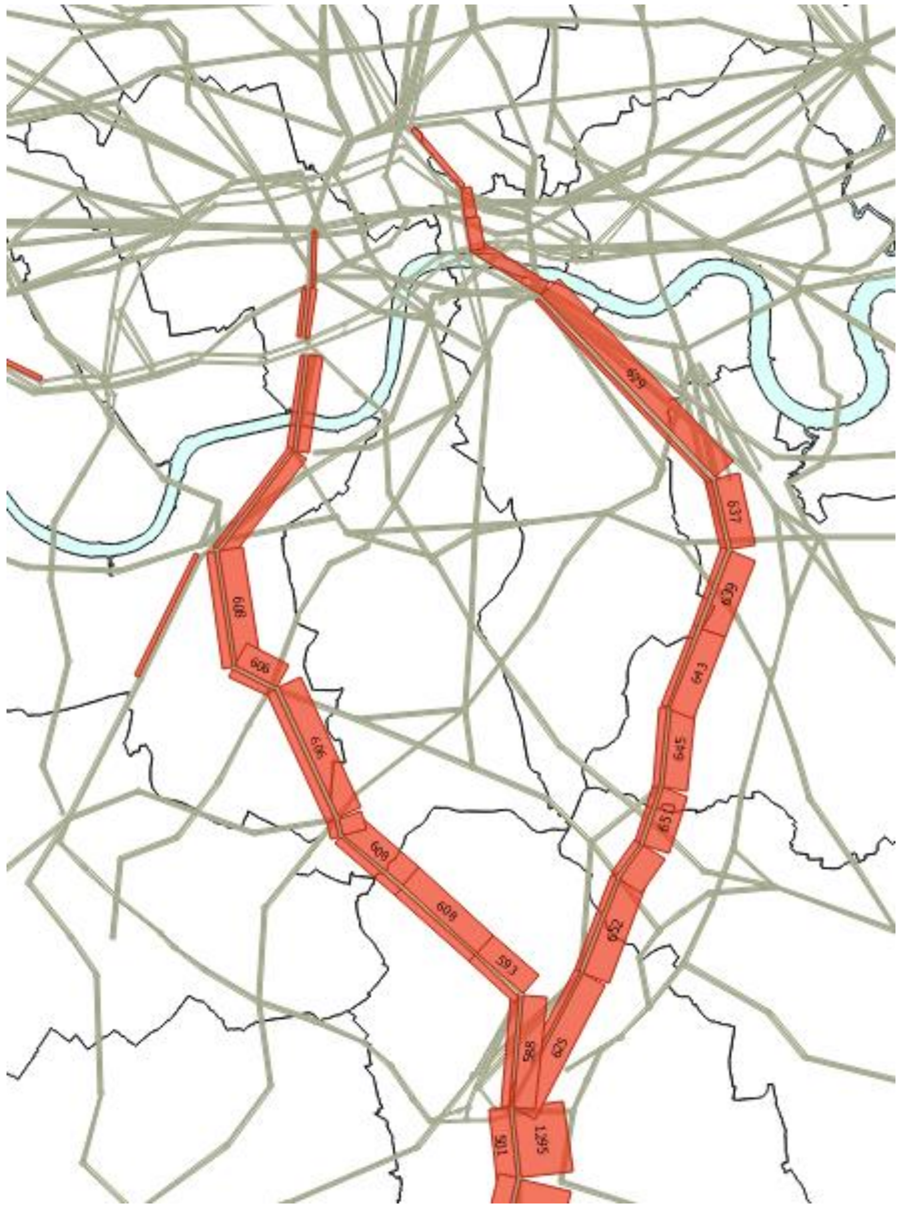
Scenario	Groups	Direction	Seating Capacity	Seated Load Factor (2hr)													
				London Victoria	Clapham Jcn (VIC)	London Bridge	Norwood Jcn (LBG)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
	NDL	SB	520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33	0.33	0.00
	GX	SB	5,400	0.57	0.57	0.00	0.00	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.31
	Fast VIC	SB	6,077	0.80	1.01	0.00	0.00	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.39
2019 AM	Stoppers VIC	SB	1,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.11	0.10	0.12	0.00
	Fast LBG	SB	8,098	0.00	0.00	0.88	0.93	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.55
	Stoppers LBG	SB	4,601	0.00	0.00	1.15	1.08	0.84	0.84	0.60	0.43	0.38	0.20	0.15	0.14	0.14	0.14
	Total		25,770	0.63	0.74	0.98	0.98	0.61	0.61	0.57	0.54	0.53	0.50	0.49	0.49	0.49	0.36
	NDL	SB	1,040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.41	0.41	0.00
	GX	SB	5,400	0.67	0.67	0.00	0.00	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.33
	Fast VIC	SB	6,077	0.83	1.07	0.00	0.00	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.42
2029 PM BAU	Stoppers VIC	SB	1,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.10	0.09	0.12	0.00
	Fast LBG	SB	10,072	0.00	0.00	0.99	1.02	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.54
	Stoppers LBG	SB	5,968	0.00	0.00	1.16	1.09	0.79	0.79	0.57	0.40	0.36	0.18	0.13	0.13	0.13	0.17
	Total		29,631	0.69	0.80	1.05	1.05	0.68	0.68	0.63	0.59	0.59	0.55	0.54	0.54	0.54	0.38
	NDL	SB	1,040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.42	0.42	0.00
	GX	SB	5,400	0.67	0.67	0.00	0.00	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.33
	Fast VIC	SB	6,077	0.83	1.07	0.00	0.00	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.42
2029 PM Project	Stoppers VIC	SB	1,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.10	0.09	0.12	0.00
	Fast LBG	SB	10,072	0.00	0.00	0.99	1.03	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.54
	Stoppers LBG	SB	5,968	0.00	0.00	1.16	1.09	0.79	0.79	0.57	0.40	0.36	0.19	0.13	0.13	0.13	0.17
	Total		29,631	0.69	0.81	1.06	1.05	0.68	0.68	0.64	0.60	0.59	0.56	0.55	0.55	0.55	0.38
	NDL	SB	1,040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.45	0.45	0.45	0.00
	GX	SB	5,400	0.71	0.71	0.00	0.00	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.35
	Fast VIC	SB	6,077	0.83	1.08	0.00	0.00	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.44
2032 PM BAU	Stoppers VIC	SB	1,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.10	0.10	0.12	0.00
	Fast LBG	SB	10,072	0.00	0.00	1.01	1.04	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.56
	Stoppers LBG	SB	5,968	0.00	0.00	1.17	1.11	0.82	0.82	0.59	0.42	0.38	0.20	0.14	0.14	0.14	0.18
	Total		29,631	0.71	0.83	1.07	1.07	0.71	0.71	0.66	0.62	0.61	0.58	0.57	0.57	0.57	0.40
	NDL	SB	1,040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.48	0.48	0.48	0.00
	GX	SB	5,400	0.74	0.74	0.00	0.00	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.36
2032 PM Project	Fast VIC	SB	6,077	0.85	1.10	0.00	0.00	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.44
	Stoppers VIC	SB	1,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.11	0.10	0.13	0.00
	Fast LBG	SB	10,072	0.00	0.00	1.02	1.06	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.57

Scenario	Groups	Direction	Seating Capacity	Seated Load Factor (2hr)													
				London Victoria	Clapham Jcn (VIC)	London Bridge	Norwood Jcn (LBG)	East Croydon	South Croydon	Purley	Coulsdon South	Merstham	Redhill	Earlswood	Salfords	Horley	Gatwick Airport
	Stoppers LBG	SB	5,968	0.00	0.00	1.19	1.12	0.82	0.82	0.60	0.42	0.38	0.20	0.15	0.14	0.14	0.18
	Total		29,631	0.73	0.85	1.08	1.08	0.74	0.74	0.69	0.66	0.65	0.61	0.60	0.60	0.60	0.40
2047 PM BAU	NDL	SB	1,040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.66	0.66	0.66	0.00
	GX	SB	5,400	0.84	0.84	0.00	0.00	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.48
	Fast VIC	SB	7,646	0.81	1.04	0.00	0.00	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.62
	Stoppers VIC	SB	1,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.15	0.14	0.17	0.00
	Fast LBG	SB	10,448	0.00	0.00	1.01	1.08	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.72
	Stoppers LBG	SB	5,968	0.00	0.00	1.24	1.16	0.87	0.87	0.68	0.50	0.45	0.26	0.21	0.20	0.20	0.22
	Total		31,576	0.76	0.88	1.09	1.11	0.83	0.83	0.79	0.75	0.74	0.71	0.70	0.70	0.70	0.53
2047 PM Project	NDL	SB	1,040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.70	0.70	0.00
	GX	SB	5,400	0.86	0.86	0.00	0.00	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.48
	Fast VIC	SB	7,646	0.82	1.06	0.00	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.61
	Stoppers VIC	SB	1,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.16	0.15	0.18	0.00
	Fast LBG	SB	10,448	0.00	0.00	1.02	1.10	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.72
	Stoppers LBG	SB	5,968	0.00	0.00	1.25	1.18	0.88	0.88	0.68	0.50	0.45	0.27	0.22	0.21	0.21	0.23
	Total		31,576	0.78	0.90	1.11	1.13	0.86	0.86	0.82	0.78	0.77	0.75	0.73	0.73	0.73	0.53

Impact at Victoria and London Bridge

11.2.20 Figure 97 shows the demand routing in London (volume changes less than 50 person per hour not shown) of the additional passenger demand (calculated as the difference between the Future Baseline with Project and Future Baseline scenarios).

Figure 97: Additional with Project Gatwick passengers, 2047 AM (07:00-09:00) (London detail)



11.2.21 The only links beyond Victoria and London Bridge that exceed an additional 50 persons per hour are on the Victoria Line as far north as Oxford Circus and on the Thameslink core as far north as St Pancras.

11.2.22 Table 11.2.3 shows the forecast volumes on London Underground at Victoria and London Bridge. In the rightmost three columns, the changes from between the two scenarios are given. The changes are small in comparison to the overall volumes forecast on these links, with a maximum forecast change being 141 for the two hours from Green Park on the Victoria Line. Changes of this magnitude will be unnoticeable.

Table 11.2.3: Change in volumes on London Underground, 2047 AM (07:00-09:00)

	Dir	Link	2019	2029 BAU	2029 Project	2032 BAU	2032 Project	2047 BAU	2047 Project	2029 Project - 2029 BAU	2032 Project - 2032 BAU	2047 Project - 2047 BAU
London Victoria	Victoria Line NB	Pimlico - Victoria	38,456	40,699	40,700	41,300	41,291	44,288	44,292	1	-9	4
		Victoria - Green Park	52,652	55,328	55,348	56,477	56,524	63,111	63,212	20	47	101
	Victoria Line SB	Green Park - Victoria	38,436	40,221	40,289	41,030	41,151	43,217	43,358	68	121	141
		Victoria - Pimlico	20,478	21,051	21,053	21,378	21,380	22,874	22,875	2	2	1
	District Line EB	Sloane Square - Victoria	40,697	45,755	45,777	46,311	46,350	48,483	48,555	22	39	72
		Victoria - St James's Park	43,241	49,034	49,022	49,531	49,476	52,068	51,996	-12	-55	-72
	District Line WB	St James's Park - Victoria	22,597	25,039	25,046	25,344	25,338	25,400	25,427	7	-6	27
		Victoria - Sloane Square	29,178	31,260	31,260	31,562	31,585	31,922	31,965	0	23	43
London Bridge	Jubilee Line EB	Southwark - London Bridge	27,333	30,120	30,123	30,976	30,997	34,743	34,774	3	21	31
		London Bridge - Bermondsey	26,128	27,316	27,302	28,167	28,166	33,451	33,455	-14	-1	4
	Jubilee Line WB	Bermondsey - London Bridge	32,893	39,031	39,046	40,128	40,174	41,990	42,040	15	46	50
		London Bridge - Southwark	37,246	42,790	42,783	43,705	43,722	45,822	45,840	-7	17	18
	Northern Line NB	Borough - London Bridge	22,573	24,250	24,251	24,585	24,590	25,931	25,944	1	5	13
		London Bridge - Bank	27,872	29,948	29,944	30,414	30,405	32,841	32,864	-4	-9	23
	Northern Line SB	Bank - London Bridge	12,068	13,603	13,617	13,970	13,993	14,619	14,652	14	23	33
		London Bridge - Borough	10,328	12,132	12,131	12,374	12,373	13,133	13,137	-1	-1	4

11.3 Bus and coach access to Gatwick

11.3.1 The purpose of this section is to provide a summary of changes in airport related demand on bus and coach services. As noted above, for bus and coach services the assumption is that operators can adjust capacity to manage loadings more readily than rail services, through adjustment of frequencies as Gatwick demand grows. Coach and bus loadings are therefore not assessed against a fixed capacity plan.

Future Year Network Assumptions

11.3.2 For the purpose of the calculating time and costs for the choice models, it was assumed that coach frequencies will rise proportionally with Gatwick demand.

- 2029 BAU: +33% (e.g. if there are 6 buses/day on a particular route in the base this is assumed to rise to around 8 in 2029 BAU)
- 2029 Project: +42%
- 2032 BAU: +37%
- 2032 Project: +67%
- 2047 BAU: +56%
- 2047 Project: +86%

11.3.3 It was also assumed that for the Future Baseline with Project scenario, a new coach service every two hours will be introduced serving Chatham – Maidstone – Sevenoaks – Gatwick Airport as recommended by a previous study for Gatwick and a new hourly bus service serving Uckfield to Gatwick via East Grinstead which fills an existing gap in the bus network.

[11] Future Baseline
[12] Future Baseline with Project

Future bus/coach demand

11.3.4 Table 11.3.1 shows the forecast bus/coach demand by local authority for each scenario. The local bus served areas mostly serve the airport employees, while the coach serves the air passengers principally. Given that air passengers grow at a significantly faster rate than airport employees it is not a surprise to see this reflected in the table. The growth rates 2019 to 2047 Project are around 40% for local bus and around 140% for coach. This would ensure healthy loadings in and out of Gatwick and possibly require more coaches than input to the model. This will be reviewed in more detail at a later stage.

11.3.5 The combined impact of the Future Baseline with Project scenario and the proposed Chatham coach, raises Kent coach patronage by around 330 per day, which suggests the proposition could be viable and deserves further study (if there are 12 services in each direction this implies around 14 persons per coach).

Table 11.3.1: Bus/coach demand, 24 hr

		Airport-related bus/coach trips (24 hr)						
		2019	**2029 BAU**	**2029 Project**	**2032 BAU**	**2032 Project**	**2047 BAU**	**2047 Project**
Local Bus	Crawley	1969	2329	2423	2372	2599	2536	2750
	Mole Valley	7	10	11	10	12	11	12
	Reigate and Banstead	174	215	226	221	247	236	263
	Tandridge	12	16	18	17	21	20	24
	Mid Sussex	46	58	62	60	69	64	74
	Horsham	72	86	91	88	99	93	104
Coach	Brighton and Hove	210	378	425	404	551	490	651
	Rest of West Sussex	37	63	70	67	91	77	104
	Rest of Surrey	16	25	27	26	33	28	35
	East Sussex	54	88	98	94	120	104	132
	Kent	73	124	376	131	442	139	470
	London	1089	1719	1894	1807	2331	1941	2527
	Hampshire	220	383	431	411	557	453	612
	Ox, Bucks, Berks	468	681	744	708	889	763	973
	REST OF UK	1013	1507	1658	1599	2006	1714	2168
	TOTAL	**5459**	**7681**	**8554**	**8014**	**10069**	**8668**	**10900**

12 Construction Scenarios

12.1.1 As outlined in section 2.4 two construction scenarios have been modelled to assess the impact of construction at two different phases of the development being delivered. These scenarios reflect:

- the airfield and airport works; and
- the effect of the highway construction.

12.2 Airfield construction

12.2.1 A peak airfield construction scenario has been tested with construction trips added on to 2029 baseline traffic levels.

12.2.2 Construction vehicle data has been generated on a monthly basis by GAL's construction team in relation to core and non-core construction activities to deliver the Northern Runway Project.

12.2.3 The busiest month for construction vehicle activity is December 2026 with 38,450 construction vehicles for the busiest shift across that month, comprising 16,360 construction workforce or Person Owned Vehicles (POVs) and 22,090 other construction vehicles as a mix of HGVs, LGVs and Liveried Vans and a two shift day.

12.2.4 However, December is a lower month for traffic on the highway network around the Airport and therefore the assessment has also considered other months during the peak months of construction activity in 2026 and 2027. Typically, the summer months, with high Airport activity and background traffic, are the busiest on the network.

12.2.5 Accordingly, the modelling and assessment considers the highest summer month which occurs in August 2027 with 21,834 vehicles for the busiest shift across that month, comprising 7,326 POVs and 14,508 other construction vehicles and two, 10 hour shifts and an 8-hour night shift.

12.2.6 This monthly data has been used to generate daily and peak period traffic volumes by:

- Considering shift patterns.
- Dividing monthly vehicle numbers by 22 working days per month.
- Assuming 1.5 construction workers per vehicle, which is considered to be conservative. GAL's construction team have data which suggests that a reasonable proportion of the recent workforce on airside projects at the Airport came to site in minivans with up to 6 people per van. As such, 1.5 construction workers per vehicle is considered a conservative case.
- Assuming 10% construction workforce public transport mode share. Again, this is a low percentage given the excellent connectivity provided by Gatwick Airport railway station, as well as local bus and long-distance coach services.

12.2.7 The three shifts in August 2027 mean that, for the busiest daytime peak, the monthly total POVs is 7,326 vehicles, equivalent to 3,663 POVs in one direction. When divided by 22 working days and factored by 90% to reflect 10% of construction workers on public transport, this gives 150 construction worker vehicles travelling into the MA1 site in the AM peak period (07:00-08:00) and out of the site after the PM peak period (18:00-19:00) in August 2027.

12.2.8 The 150 construction worker vehicles travel into the MA1 site in the AM peak period (07:00-08:00) and out of the site after the PM peak period (18:00-19:00) in August 2027.

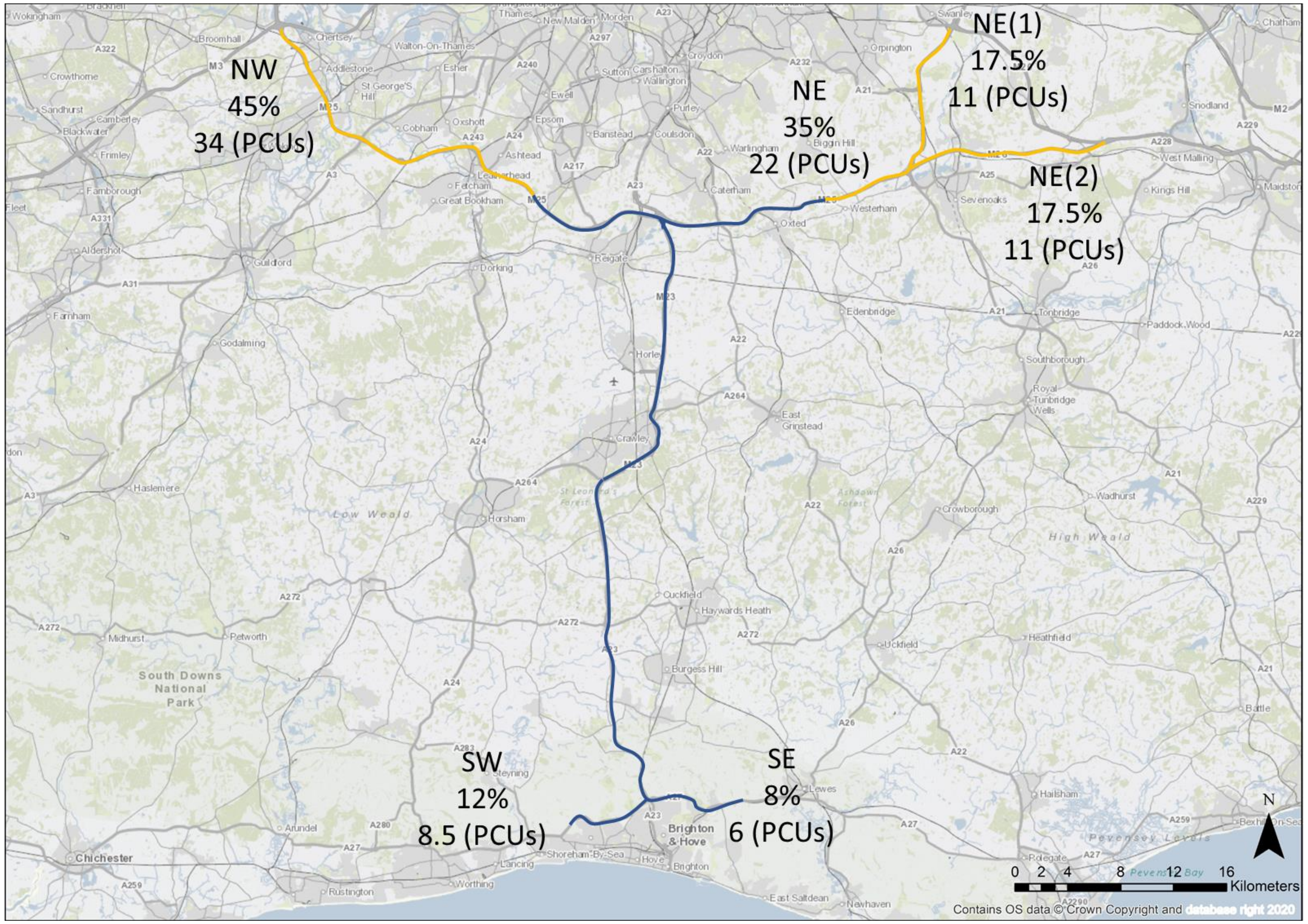
12.2.9 In order to provide a reasonable distribution of potential locations from which construction workers will travel to/from, the modelling assumes that construction workers are drawn from Croydon, the Gatwick Diamond area and Brighton and Hove. The trips are distributed between zones in nine Local Authority areas, including Croydon, Brighton and Hove, Crawley, Epsom and Ewell, Horsham, Mid Sussex, Mole Valley, Reigate and Banstead and Tandridge. The distribution of construction workers by Local Authority reflects the proportion of construction workers living in those areas from 2019 Office of National Statistics data. Given that it will be very difficult to mandate and then monitor routes for construction workers, it is assumed that these vehicles will arrive at MA1 via the most appropriate highway route from or to each zone.

12.2.10 For HGVs and LGVs, the shift patterns in August 2027 mean that, for the busiest daytime shift, the monthly total construction vehicles are 14,508 vehicles, equivalent to 7,254 in one direction. When divided by 22 working days and spread over a 10-hour shift, the estimated vehicle trip generation is 33 vehicles (HGVs and LGVs) in and out every hour along the M23 Spur. At this stage, material-carrying construction vehicles, i.e. LGVs and HGVs, have not been excluded from peak hours on the highway network to test the impact of extra construction traffic in the peak.

12.2.11 The proposal is for all construction vehicles to travel to and from the airport from via M23 Junction 9, and no restrictions are proposed for construction worker vehicles. Construction traffic would be monitored to ensure compliance with proposed routes, unless disruption causes these to be unavailable and signed diversionary routes provided.

12.2.12 The estimated vehicle trip generation is 33 vehicles (HGVs and LGVs) in and out an hour along the M23 Spur, and 150 construction worker vehicles in the AM peak hour. As described above the construction workers have been distributed out over the local authorities while the construction vehicles have been defined in the HAM as fixed routes and the distribution of these vehicles is shown in Figure 98.

Figure 98: Distribution of construction vehicles in PCUs – AM Peak Hour (07:00-08:00) and PM Peak Hour (18:00-19:00)



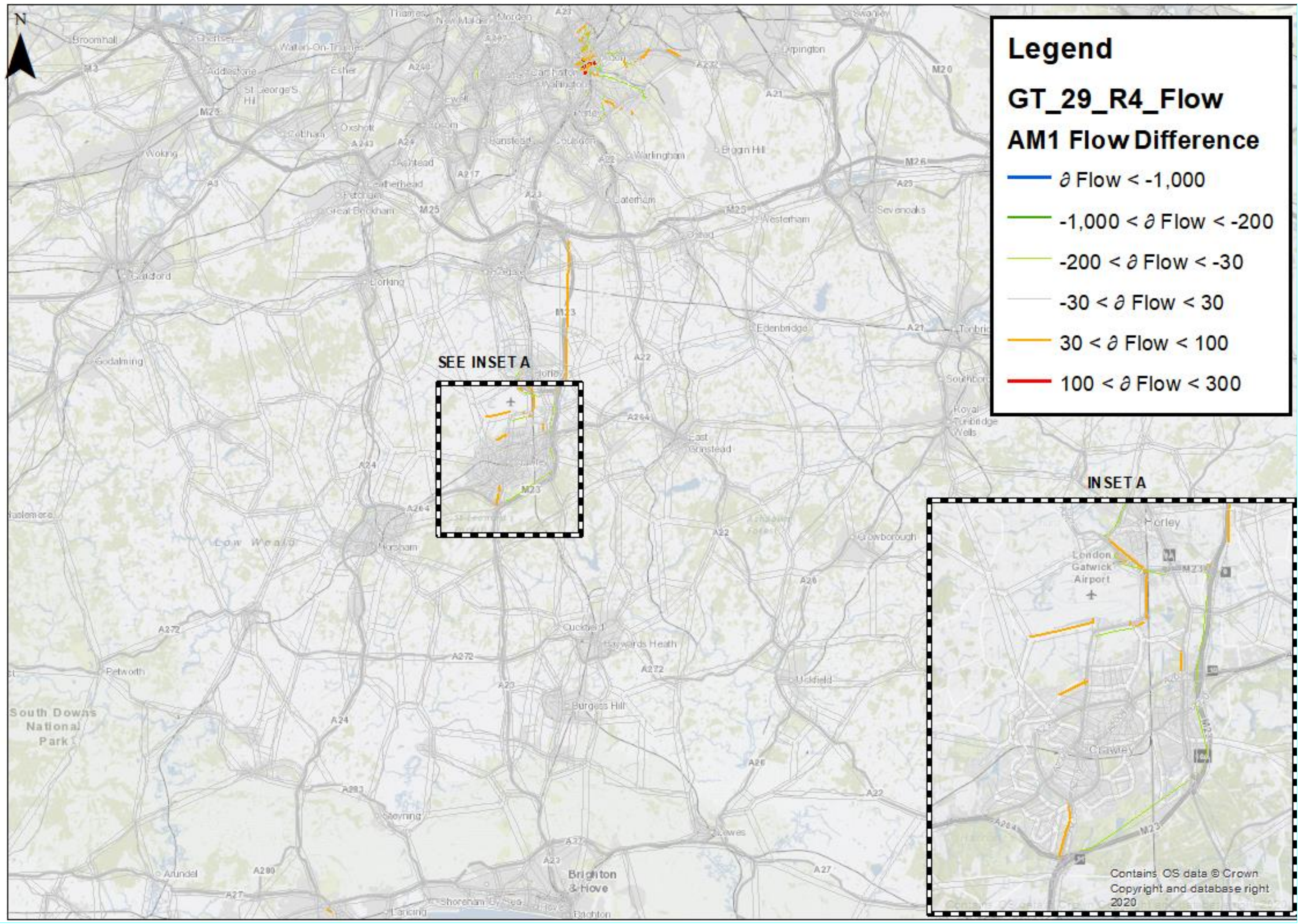
12.2.13 The modelling has tested the summer peak level of construction activity in August 2027 on 2029 baseline airport and background traffic levels to provide a robust assessment of potential construction impacts. The difference in traffic flows between 2027 and 2029 will be small (up to 5% higher) and accordingly within the daily variation in any given year.

Highway Network Performance

12.2.14 The modelling shows that there are negligible changes in traffic flows when including the airfield construction traffic, which is expected given the limited volume of airfield construction traffic generated by the Project.

12.2.15 The differences are shown in Figure 99 for the AM peak hour, with a 30 to 100 vehicle two-way flow change shown predominantly on the M23, M23 Spur and A23. There are also minor vehicle increases on Charlwood Road south of the Airport and a number of smaller roads in North Crawley.

Figure 99: Flow difference Airfield Construction minus. AM Peak Hour (07:00-08:00)



12.2.16 The magnitude of impact assessment described in 10.1 has been undertaken for the airfield construction scenario comparing against the 2029 future baseline, shown in Figure 100. This shows that the airfield construction vehicles have minimal effect on the operation of the highway network, with only one junction flagging as low near the airport, the junction between the A23, Gatwick Road and Perimeter Road East.

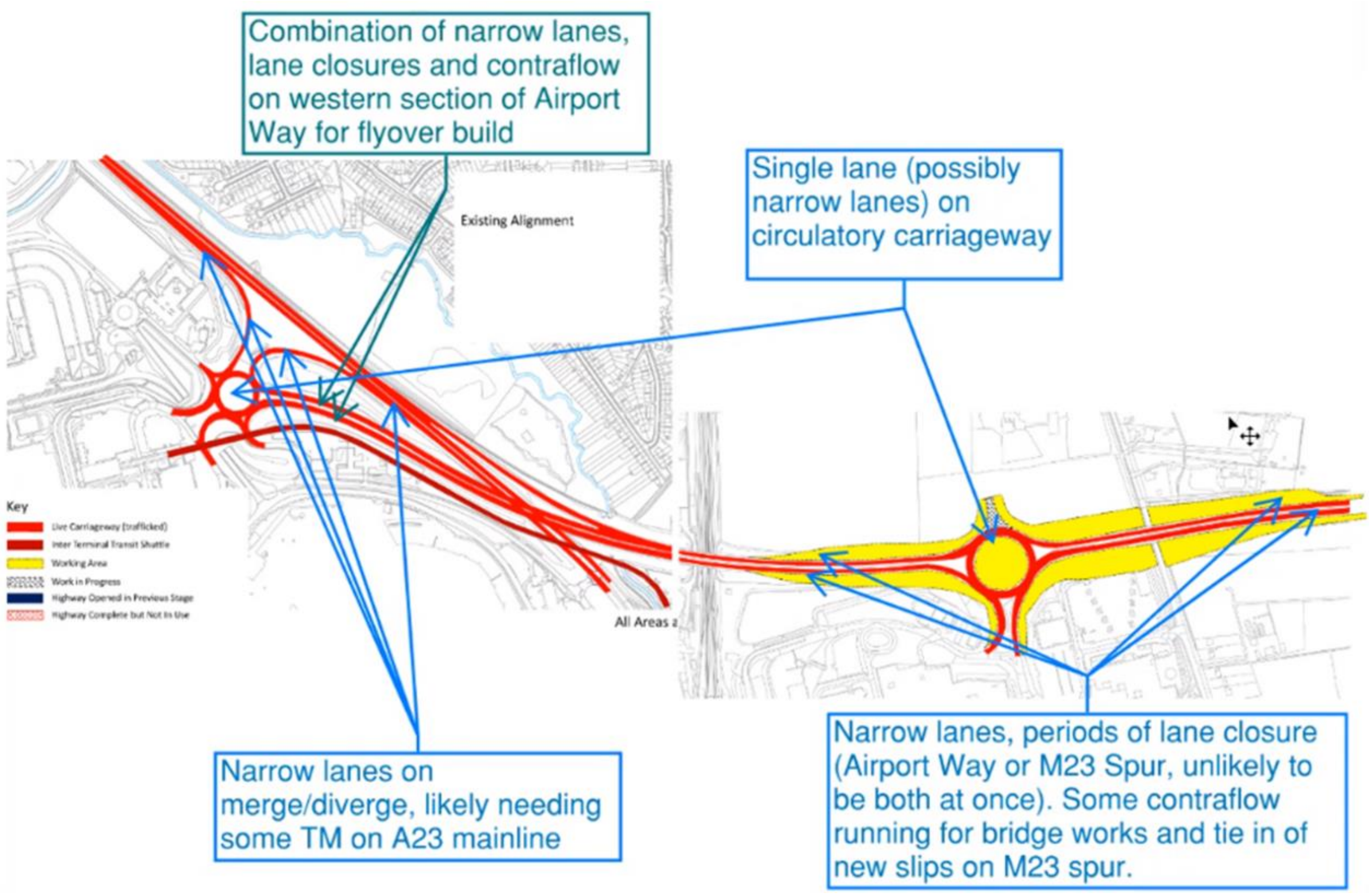
12.2.17 As described in section 10.7 the effects shown in Croydon are not as a result of the airport construction traffic but associated model noise in Croydon due to the area being highly congested and this will be investigated further in the next Phase for DCO submission.

Figure 100: Magnitude of Impact Assessment for Airfield Construction Scenario

12.3 Highway Construction

12.3.1 The most complex highway construction phase as currently envisaged would involve a combination of construction works at both the South and North Terminal roundabouts, as shown in Figure 101. The construction methods are typical for the works envisaged but the sequencing of these to avoid unnecessary disruption creates complexity.

Figure 101: Potential Highway Construction Phase



12.3.2 The works could last for a period of up to four months and would include:

- South Terminal roundabout
  - Narrow lane running or periods of temporary lane closure on the M23 Spur and/or Airport Way, with some contraflow running for bridge works and tying in the new slips back to the M23 Spur.
- Both roundabouts
  - Single of narrow lanes on the circulatory of both roundabouts.
- North Terminal roundabout
  - Narrow lanes on merges and diverges, likely requiring some traffic management on the A23.
  - A combination of narrow lanes and/or lane closures and contraflow running on the western section of Airport Way to allow the flyover to be built.

12.3.3 It is envisaged that these works would take place November through to February. Therefore, the modelling has tested the most conservative highway construction activity phase, against winter Airport traffic. This assumes 2029 with Project demand, i.e. assuming the Northern Runway is open, to provide a robust assessment of potential construction impacts with additional demand generated by increased runway capacity.

12.3.4 Airport passenger demand on a peak Friday in winter (Nov-Feb) is circa. 72% of a peak summer day, reflecting that this is a quieter period at the Airport and therefore when it would make the most sense to sequence the more complex phases of highway construction.

12.3.5 The AADT flow difference presented in Figure 102 demonstrate the effects of the highway construction on the transport network. This shows that the construction constraint on the highway network at both south terminal and north terminal roundabouts leads to slightly lower numbers of trips using the key routes in/out of the airport via the M25 and M23 corridors across the day.

12.3.6 The links shown in red indicate a reduction in traffic with the effect on the M23 Spur being that background traffic not needing to access the Airport is shown by the modelling to seek alternative routes. This also effects traffic levels on the M23 itself, though Junction 9 sees an increase in traffic flows. This increase is related to right-turning into the Airport being rerouted during this construction phase and therefore traffic from the west for South Terminal u-turns at Junction 9.

12.3.7 Additionally, there are increases in AADT through Crawley, between 0 and 1,000 vehicles AADT on Lowfield Heath Road, Bonnetts Lane and the B2036 Balcombe Road. These are vehicles that would normally use the Spur temporarily using alternate routes to avoid the constraints on the Spur and terminal roundabouts. The magnitude of impact assessment assesses the junction performance of the highway construction scenario against the 2029 Future Baseline with Project scenario, shown in Figure 103.

12.3.8 Discounting the impacts shown in Croydon due to the model noise issues discussed previously in this report. The modelling shows some localised and temporary impacts on highway network performance at South terminal Roundabout and on the A23 with the highway construction scenario.

12.3.9 This impact is not unexpected as the highway network is constrained in this area with narrow lane running and lane closures affecting capacity of the network.

12.3.10 Additionally, the roundabout between Copthorne Way, Copthorne Road and Copthorne Common Road to the East of M23 Junction 10 shows a low impact on junction performance due to the increases in traffic using the A2220 of between 0 and 1,000 AADT using two arms of this roundabout.

Figure 102: AADT Flow Difference of Highway Construction minus 2029 With Project

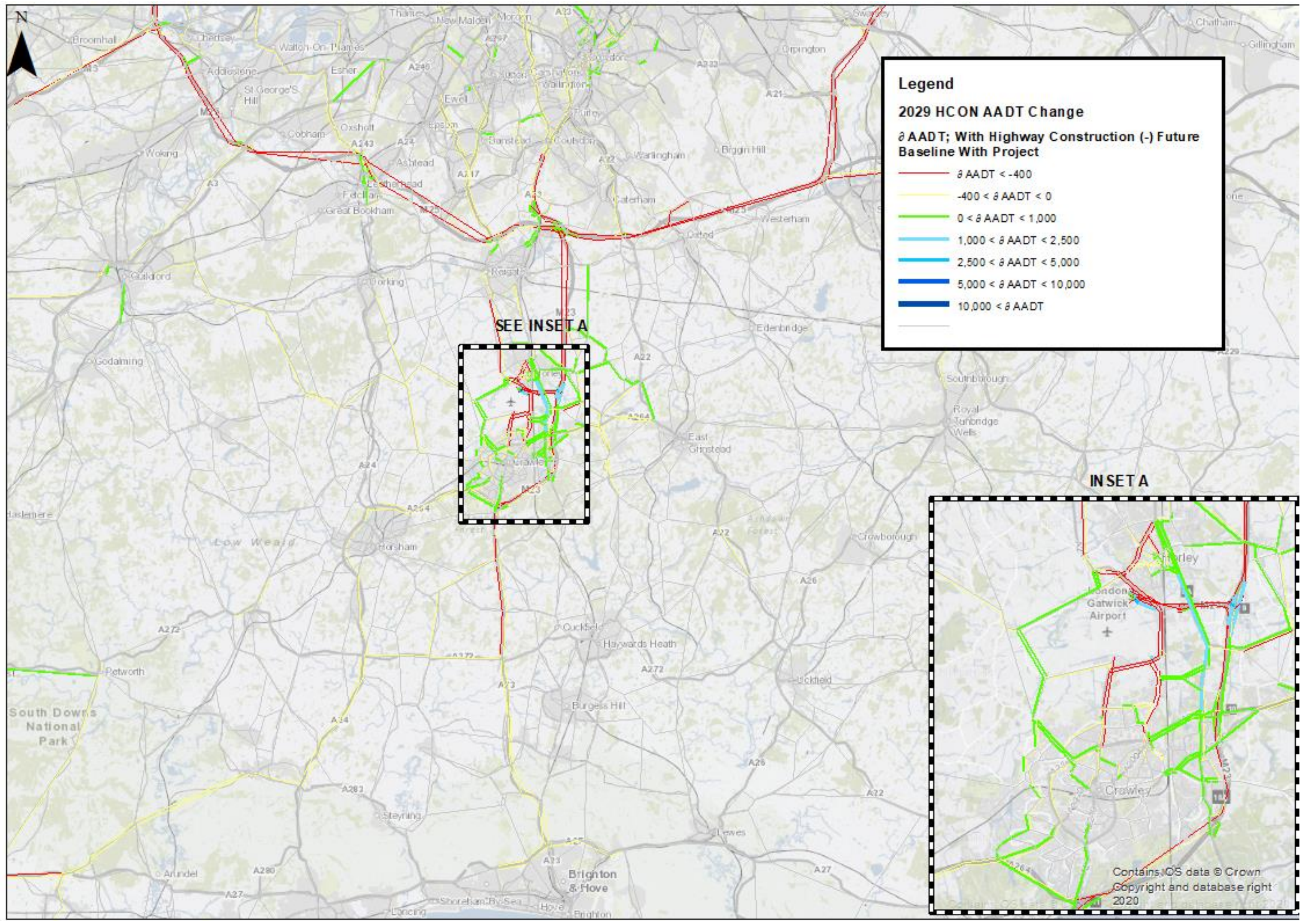
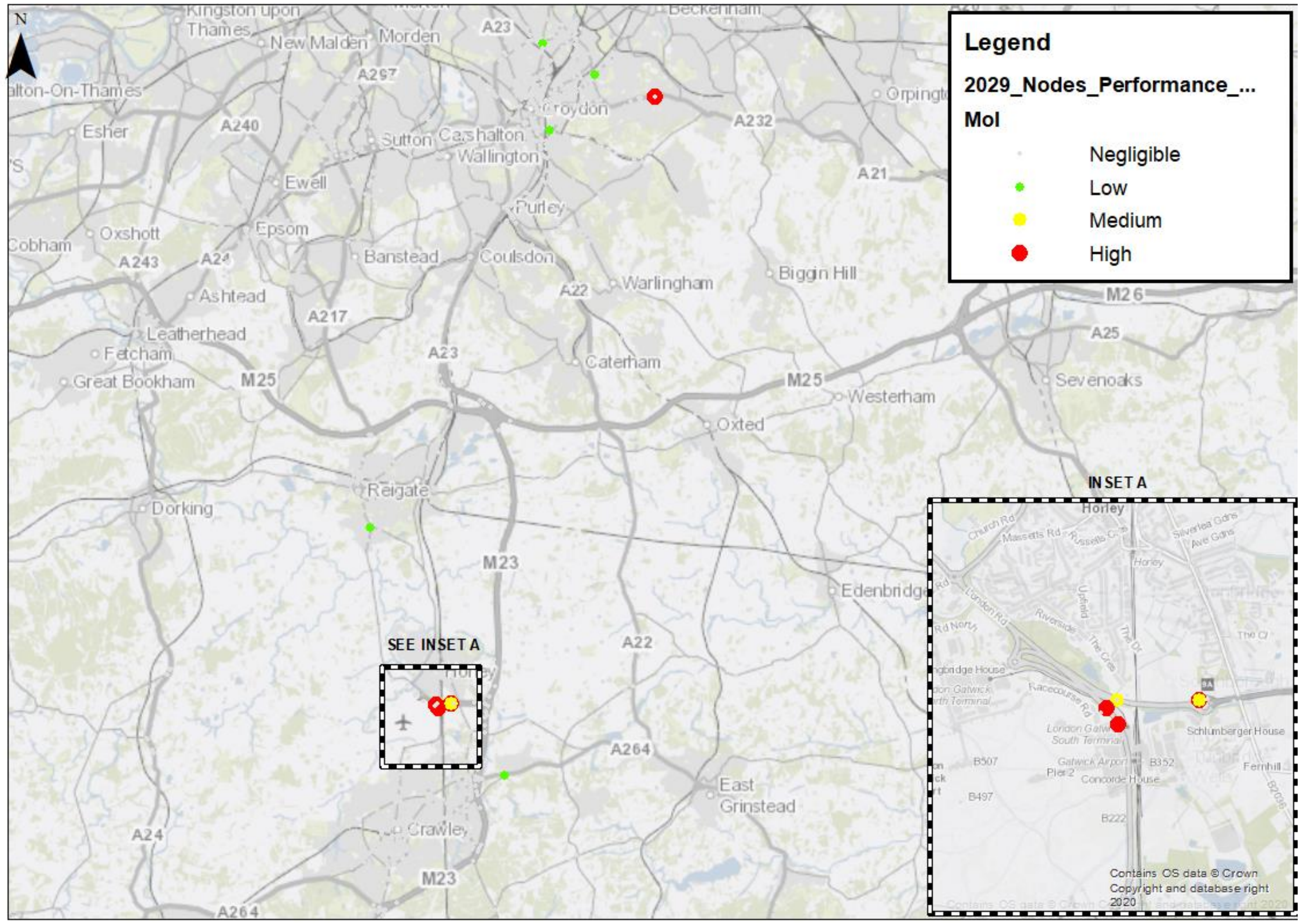


Figure 103: Magnitude of Impact Assessment of Highway Construction Scenario



13 Environmental Outputs

13.1.1 In order to generate the relevant outputs from the transport models to support environmental analysis, a series of factors were developed to support this. The key outputs required for environmental analysis included:

- Annual average daily traffic at a 24 hour and 18-hour level
- Annual average weekday traffic at a 24 hour and 18-hour level.

13.1.2 The aim of these factors were to help convert the time period level outputs from the highway model, expressed as a June weekday traffic flow, to the appropriate annual average traffic flow.

13.1.3 The first step of this was to combine time periods to create an 11-hour traffic volume. This was undertaken as:

- AM1+AM2+(6xIP)+(2xPM)

13.1.4 This was done for each section of road modelled. These were subsequently factored by a series of factors derived for airport and non-airport demand as set out in Table 12.3.1 and Table 12.3.2. These were derived from available traffic count data within the AoDM as well as airport seasonality data. The same factors for the airport passenger and employee demand were applied.

Table 12.3.1: Annual Average Daily Traffic Factors

AADT	Non-Airport	Airport
Average (24Hr)	1.72369	2.33603
Average (18Hr)	1.65527	1.93136

Table 12.3.2: Annual Average Weekday Traffic Factors

AAWT	Non-Airport	Airport
Average (24Hr)	1.35370	1.74919
Average (18Hr)	1.29998	1.44618

14 Conclusion

14.1 Introduction

14.1.1 This report, the PEIR Strategic Modelling Report, provides the detail around the suite of transport models that have been developed to both help develop a sustainable surface access strategy for the future of the airport and help assess the impacts of the proposed development on the surface transport network. The report provides a summary of the rationale for the development of the transport models with full technical details of the model development being provided at the DCO stage.

14.1.2 The strategic model includes measures within the Airport Surface Access Strategy, and wider network changes that may affect demand and mode share, most notably increases in forecourt and parking charges. These lead to an increase in passenger public transport mode share from around 45% prior to the Covid-19 pandemic up to 54% and 56% between 2029 and 2047. Whilst not at the 60% draft target set by GAL for 2030, this increase in public transport mode share for air passengers is significant and notable given the growth in passenger numbers with the Project.

14.1.3 In terms of employees, the strategic model shows that a sustainable transport mode share of 47% is achievable and this would indicate that further measures are required, in particular these could include incentives around EV uptake as well as restrictions on staff parking.

14.1.4 Even with increases in sustainable mode share, the modelling also then assumes proposed highway mitigation is in place in the ‘with Project’ scenarios in 2032 and 2047. Highway works are proposed as part of Project, to both the South Terminal and North Terminal roundabouts, to improve capacity and mitigate against significant effects, with additional improvement works also proposed at the Longbridge Roundabout.

14.1.5 The following impacts and mitigation have been identified through transport modelling and analysis to date.

14.2 Rail and Bus

14.2.1 In terms of rail, the Project will increase the number of rail passengers but based on the line loading, seated loading factor and standing capacity assessments, no significant crowding on rail services is expected as a result of the Northern Runway.

14.2.2 Given the adaptability of bus and coach provision, it is not considered necessary to model crowding on bus and coach services explicitly within the modelling framework. However, the assessment includes service frequency and quality as a measure of public transport amenity. The bus and coach assessment indicates that additional peak period services or network changes including consideration of new or revised routes, provides for increased patronage by both employees on local bus services and air passengers on coaches. Increased service frequencies provide improved amenity for non-airport users also, benefitting both local communities and businesses by improving connectivity.

14.3 Highway

14.3.1 The M23 Smart Motorways scheme widens the motorway to effectively 4 lanes in each direction at peak times between Junctions 8 and 10, providing significant additional capacity. Furthermore, committed schemes improve reliability along the corridor.

14.3.2 From a highway perspective, the ASAS measures proposed, and the highway mitigation measures included as part of the Project result in journey times which are not notably affected between the Future Baseline and with Project scenarios, with changes across all years limited to no greater than a 1-minute increase for end-to-end journey times.

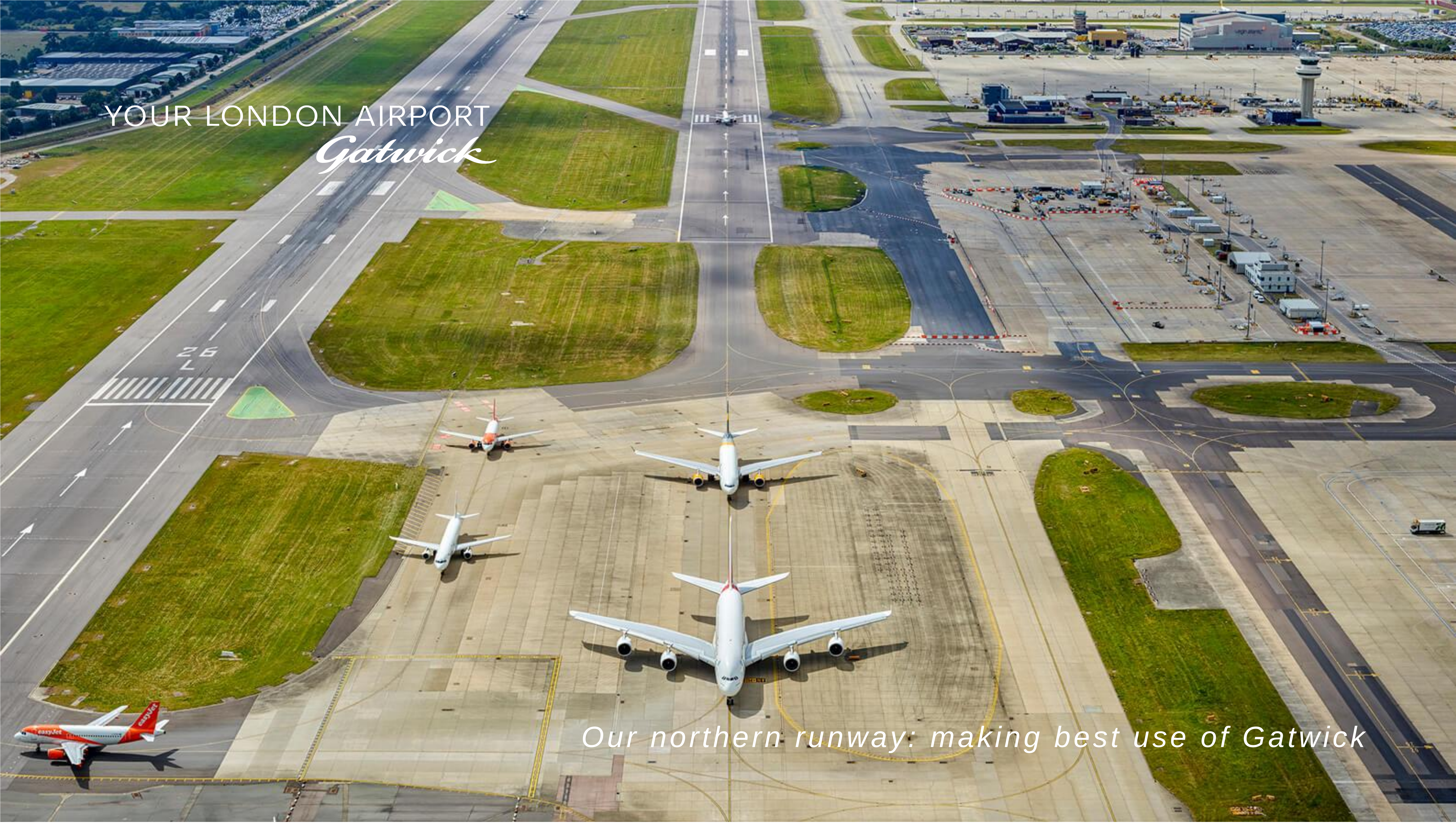
14.3.3 Modelling shows that the Future Baseline to 2029 can be accommodated on the M23 Spur with local widening and signalisation works that will be delivered prior to 2029.

14.3.4 Given the congestion shown by the model for 2032 Future Baseline, Gatwick has made the decision that more significant improvements will be required on the highway network to support additional growth with the Project, otherwise there will be potential for delays on the network. This comprises grade-separation at the South Terminal and North Terminal roundabouts to improve capacity as well as enlarging Longbridge Roundabout.

14.3.5 With Project and background traffic growth to 2047, modelling shows some localised areas where congestion would still be expected with highway improvements. However, congestion levels are manageable and indicate that the improvements are appropriate and proportionate. All of these local impact areas are examined in further detail in local VISSIM microsimulation modelling, which is reported in the PTAR.

14.3.6 The airfield construction scenario adds a small number of construction vehicles and construction worker vehicles during peak hours. These changes, reflected in the highway model, give rise to no material impacts.

14.3.7 Highway construction has been modelled to represent the four-month period when construction work will be carried out around north and south terminal roundabouts. The modelling shows that the constraint on the highway network at both North and South Terminal roundabouts leads to slightly lower numbers of trips using the key routes in/out of the airport and some increases in AADT through Crawley. However, the main affects being seen are immediately adjacent to the airport and temporary in nature.



Preliminary Environmental Information Report
Appendix 12.9.1: PTAR Annex C: Scheme Development Report - Highway Mitigation

September 2021

Table of Contents

1 Introduction

1.1 Gatwick Airport Northern Runway Project -Project Overview

1.1.1 Arup has been appointed by Gatwick Airport Limited (GAL) to act as consultant in the development of the concept design of highway mitigations associated with the Gatwick Northern Runway Project. The proposed increase in capacity of the Airport is expected to lead to an increase in traffic volumes in the vicinity of the airport. The purpose of the design proposals is to improve the existing highway layout to mitigate the effects associated with the anticipated increase in traffic volumes.

1.1.2 Gatwick Airport is currently served by a single runway. The Airport also has a further runway, which is located north of the main runway and is only available for use when the main runway is closed.

1.1.3 The Gatwick Airport Northern Runway Project (referred to within this report as 'the Project') proposes to make alterations to the northern runway, including repositioning its centreline to the north by 12 metres which, along with the lifting of the planning condition restricting its use, would enable dual runway operations in accordance with international standards.

1.1.4 The Project includes the development of a range of infrastructure and facilities which, together with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. These works include the proposed highway mitigations that are the subject of this report. The scope of the works under consideration includes modifications to the North Terminal junction, South Terminal junction (including the M23 spur motorway), Longbridge junction and the connecting link roads.

1.1.5 It is anticipated that by 2047 these improvements could increase airport capacity up to 80.2 million passengers per annum (mppa), compared to a maximum potential capacity based on existing facilities of 67.2 mppa within the same timescale. This represents an increase of approximately 13 mppa.

1.1.6 The Preliminary Transport Assessment Report (PTAR) for the Project sets out the transport network, its operation and performance and potential transport impacts of the Project. It includes an assessment of impacts, and provides a high-level overview of how those impacts will be mitigated to promote sustainable development. This report provides more detail on the proposed highway mitigations for the Project and also includes a description of the alternative design options for the highway mitigation that were considered but are not being taken forward to the next design stage.

1.2 Existing Highway Network

1.2.1 An overview of the existing transport network in the vicinity of Gatwick Airport is provided in Figure 1. Gatwick Airport is located in West Sussex adjacent to the county border with Surrey. The Airport can be directly accessed from the national strategic road network 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 providing connectivity to the airport's South Terminal roundabout (Junction 9a). This link is known as the M23 spur. The M23 connects to the M25 around London and the A23 towards Brighton and the South Coast.

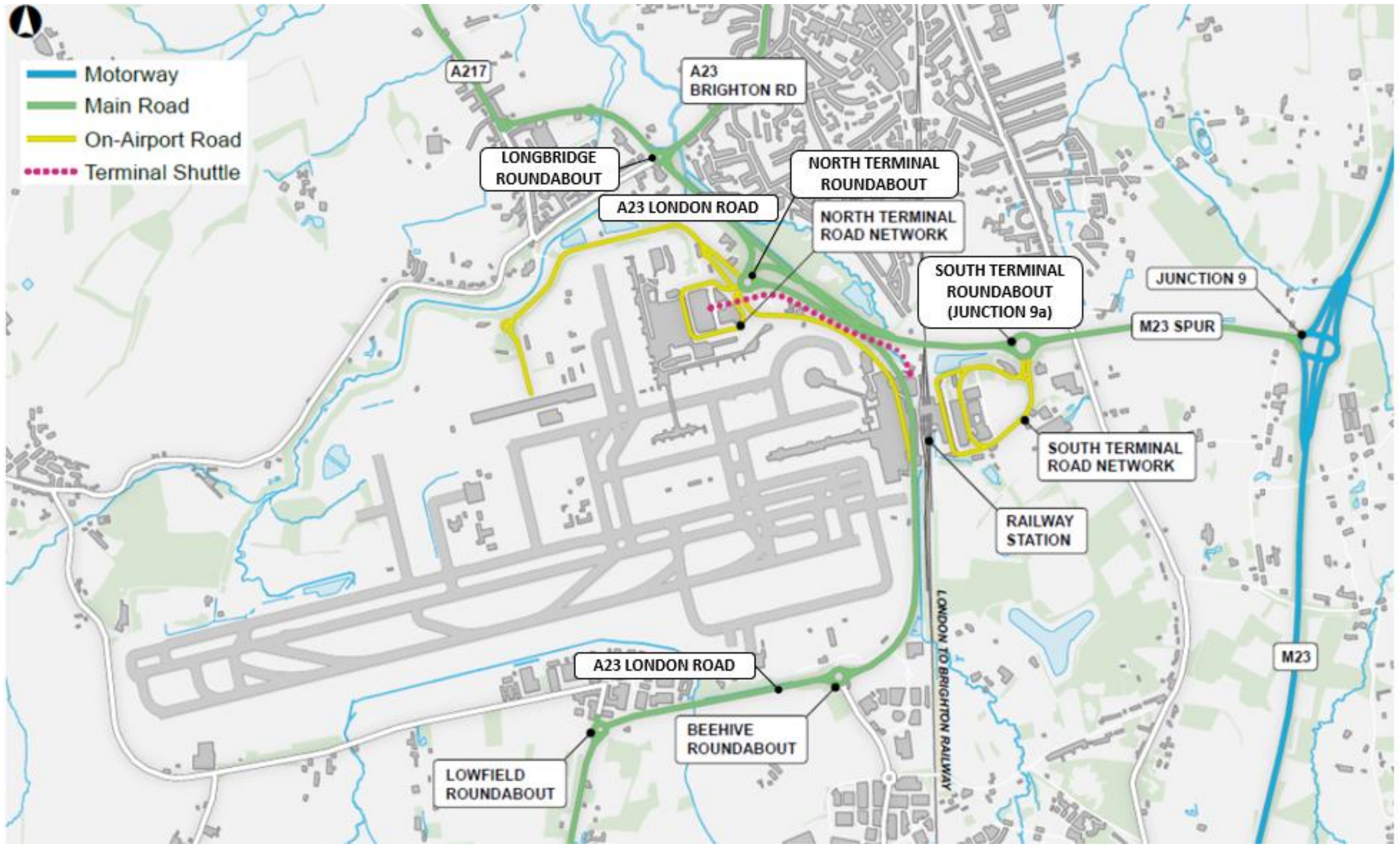


Figure 1: Gatwick Airport – Transport Overview

1.2.2 At-grade roundabouts at the North Terminal and South Terminal provide access to the Airport's road network. The A23 London Road provides connectivity to and from the local road network north and south of the Airport. Longbridge junction to the north of the Airport provides access to local routes and to the neighbouring town of Horley.

1.3 Required Highway Mitigation

1.3.1 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. The Gatwick strategic highways traffic model developed in SATURN is the primary highway assessment tool used for the Preliminary Environmental Information Report. (PEIR). It was used to inform demand on links and through junctions as well as variation in speeds to be fed into more detailed junction modelling using VISSIM as well as into air quality and noise models.

1.3.2 An assessment of the modelled traffic flows produced for the design year of 2047 indicated that the existing highway network in the vicinity of the Airport did not have suitable capacity to support the forecasted traffic volumes. Therefore, in order to accommodate the proposed increase in passenger numbers and taking into account other known and planned developments in the area, highway works are proposed as part of the Project, to both the South Terminal and North Terminal roundabouts, and at Longbridge roundabout. These highway modifications works are embedded mitigations as part of the Project. Their purpose is to provide additional capacity to mitigate the significant effects associated with the anticipated increase in traffic volumes.

1.3.3 Summaries of the proposed highway modifications for each of the three junctions are provided in Section 5 of this document. The final designs will be subject to further road traffic assessment and detailed engagement with highway authorities, including Highways England.

1.4 Purpose of the Report

1.4.1 This document sets out the highway development strategy for the Project. It contains the following key information.

- An overview of the full surface access strategy for the Project and a summary of key development constraints.
- A high-level summary of the traffic modelling work undertaken to date.
- A summary of the proposed highway modifications and associated design features such as structures and drainage design proposals.
- A description of the alternative design options that were considered but are not being taken forward to the next design stage.

2 Surface Access Strategy

2.1 Existing Highway Network

2.1.1 The existing South Terminal junction comprises a three arm at-grade roundabout with a three lane circulatory carriageway (reducing to one wide lane between the M23 spur roundabout exit and entry) as depicted in Figure 2. Airport Way and the M23 Spur, located to the west and east of the roundabout respectively, are dual carriageways with a posted speed limit of 50 mph. Access to Gatwick Airport South Terminal is provided by the southern arm of the junction with a posted speed limit of 30 mph.

Figure 2: South Terminal Roundabout Existing Layout

2.1.2 The M23 Spur has recently been upgraded under the scope of the M23 Junctions 8-10 Smart Motorway Project, completed in 2020. As part of these works the westbound hard shoulder was converted into a permanent running lane, resulting in the provision of three traffic lanes westbound between M23 Junction 9 and the South Terminal. Upgrades also included the introduction of a ‘Place of Relative Safety’ for westbound traffic located to the east of the South Terminal Roundabout. In the eastbound direction the existing two running lanes and hard shoulder provision were retained.

2.1.3 Key existing structures in the vicinity of the South Terminal Junction and M23 spur include:

- M23 Spur Balcombe Road overbridge - Overbridge located approximately 190 metres to the east of South Terminal Roundabout, carrying the M23 Spur over Balcombe Road
- Airport Way London to Brighton railway overbridge – Overbridge located approximately 400 metres to the west of South Terminal Roundabout, carrying Airport Way over the London to Brighton railway.

2.2 North Terminal Junction

2.2.1 The existing North Terminal junction is located to the north east of Gatwick’s North Terminal. As illustrated in Figure 3, the junction consists of a five arm at-grade roundabout with a two lane circulatory carriageway. The Longbridge Way and Gatwick Way arms provide access to car parks, hotels and other airport infrastructure. The south western arm provides the primary access to and from the airport terminal via Northway and North Terminal Approach. The eastern approach to the junction is provided by Airport Way, a dual carriageway with two lanes in each direction connecting the North Terminal to the M23 Spur via the South Terminal roundabout.

2.2.2 Connectivity to neighbouring towns of Crawley and Horley is facilitated by the A23 London Road, a dual carriageway with two lanes in each direction travelling north-south underneath the existing Inter Terminal Transit System (ITTS) and Airport Way. The A23 London Road connects the North Terminal to Longbridge roundabout to the north, The North Terminal junction is connected to the A23 London Road northbound via at-grade diverge and merge slip roads. However, the existing highway layout does not permit vehicle movements between the North Terminal and the A23 London Road southbound. Traffic seeking to travel southbound on A23 London Road from North Terminal must currently travel via Longbridge roundabout. Southbound traffic on A23 London Road seeking to access North Terminal must currently travel via South Terminal roundabout and Airport Way. The speed limit for Airport Way, the A23 London Road and North Terminal Roundabout is 50mph, whilst the speed limit for the airport access roads is 30mph.

Figure 3: North Terminal Roundabout Existing Layout

2.2.3 The key existing structures in the vicinity of North Terminal roundabout can be summarised as follows.

- A skewed concrete bridge carries Airport Way over the A23 London Road.
- An underpass is located beneath the Northway and North Terminal Approach Road allowing Northgate Road and Tunnel Road/Fuel Farm Road to pass beneath.
- A viaduct carries the ITTS over North Terminal Approach and Gatwick Way before running parallel to Airport Way towards the South Terminal Shuttle Station.

2.3 Longbridge Roundabout

2.3.1 Longbridge roundabout is an existing at-grade partially signal-controlled roundabout located north of Gatwick Airport in Horley. It is a four arm roundabout with a two lane circulatory carriageway which widens to three lanes adjacent to the Povey Cross Road arm. Figure 4 illustrates the existing junction layout. Connectivity to the North and South Terminals of Gatwick Airport is provided via the A23 London Road dual carriageway which approaches the Longbridge junction from the south. Local access to the surrounding town of Horley is provided by the A23 Brighton Road, A217 and Povey Cross Road. Each arm of the roundabout includes a provision of signal-controlled toucan crossings and shared-use paths for use by pedestrians and cyclists.

2.3.2 The A23 London Road has a speed limit of 50mph. The A217 speed limit is 40mph, whilst the speed limit for the A23 Brighton Road and Povey Cross Road is 30mph.

2.3.3 There is an existing segregated left turn lane provision for southbound traffic between the A23 Brighton Road and A23 London Road. This is supported by an existing stilt structure which spans an area of flood plain associated with the River Mole to the east of the junction. Additional structures in the vicinity of the junction include the River Mole overbridges located on the A23 Brighton Road and A23 London Road.

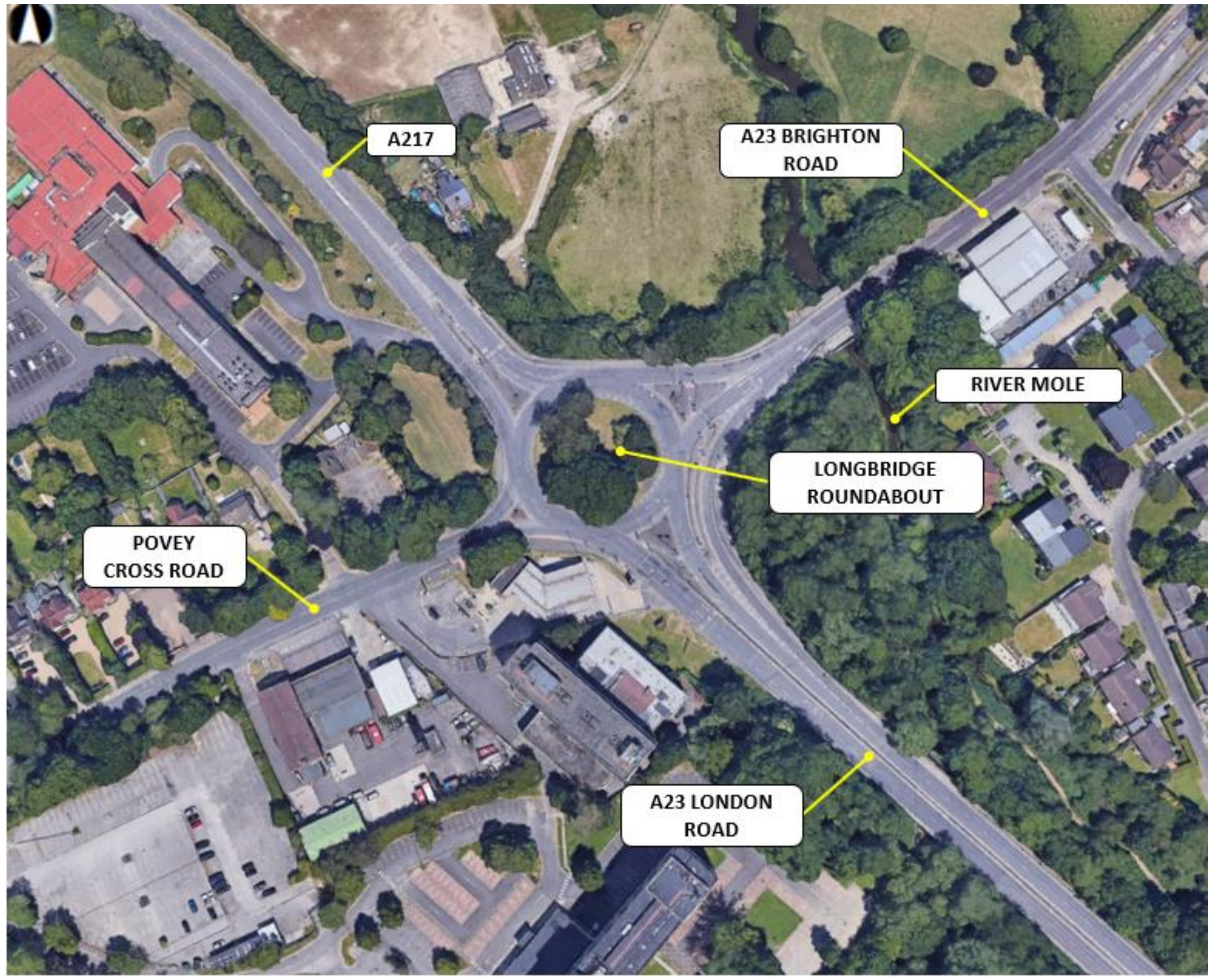


Figure 4: Longbridge Roundabout Existing Layout

2.4 Highway Development Strategy

2.4.1 The key aims of the proposed highway mitigation are as follows.

- Provide increased highway capacity to mitigate the forecasted airport traffic growth.
- Provide better travel conditions on through routes at the North and South Terminal junctions for non-airport users and, where possible, to separate airport traffic from non-airport traffic to add capacity and resilience as well as to improve safety.
- Minimise disruption to road users during construction.
- Minimise the impact to key areas of ecological, landscape or recreational value in the vicinity of the works.

2.5 Forecourt and Car Parking Strategy

2.5.1 At the North Terminal forecourt, the existing drop off facility on Northway is not expected to be able to accommodate the forecast level of passenger growth for drop-off and pick-up. Accordingly, there is an opportunity to reconfigure the North Terminal forecourt to provide more capacity for drop off and also to increase priority for buses. This strategy envisages moving drop-off from Northway into the short-stay Multi-Storey Car Parks (MSCPs) which is where pick-up is currently handled . Additionally, GAL has recently introduced forecourt charges at both terminal drop off zones in an initiative to reduce the proportion of “Kiss and Fly” trips.

2.5.2 The South Terminal forecourt generally has more capacity than the North Terminal and it is not expected that significant changes are required.

2.5.3 New car parking will be required on site in order to meet additional parking demand generated by the proposed increase in passengers with Project, and to replace existing parking spaces that may be lost owing to development associated with the Project. The overall net increase in car parking spaces by 2047 with the Project is approximately 18,500 spaces.

2.5.4 Further details on the proposed future forecourt strategy and car parking strategy can be found in Appendix 12.9.1 of the PEIR.

2.6 Public Transport Strategy

2.6.1 Gatwick is the only London Airport to have 24 hour rail, bus and express coach access. The seven platform train station adjacent to South Terminal (owned by Network Rail) provides access to a wide range of rail services. These include the Gatwick Express service to London Victoria as well the Southern and Thameslink networks. North and South Terminals offer bus and coach access and are connected via an inter-terminal shuttle system.

2.6.2 Draft actions and targets for the Airport Surface Access Strategy are included for consultation in Appendix 12.9.1 of the PEIR. The final strategy in the application for development consent will be prepared in conjunction with Gatwick’s Airport Transport Forum and in accordance with the Aviation Policy Framework guidance.

2.6.3 Gatwick intends to put forward a robust strategy which enhances Gatwick as a regional transport hub through improvements to rail, bus, and sustainable transport with challenging but achievable mode share targets established towards a lower carbon future.

The travel plan will focus on specific interventions related to staff travel in particular. The travel plan will seek to promote sustainable and healthier modes of transport for staff and reduce travel to work by single occupancy car.

2.7 Walking and Cycling Strategy

2.7.1 Gatwick is exploring options to improve walking and cycling and have submitted proposals to improve linkages alongside the Capital Investment Plan improvements proposed for highways (see Appendix 12.9.1 of the PEIR for further details).

2.7.2 The final Airport Surface Access Strategy accompanying the application for development consent will further develop Gatwick's strategic plan for walking and cycling. Strategies that will be explored will include increased and improved amenities, upgraded routes on and, where appropriate, off airport, improved wayfinding and a programme of maintenance for existing routes. The strategy will also take into account inclusive design considerations.

3 Development Constraints

3.1 Scheme Boundary

3.1.1 To better understand the impact of the proposed development a number of boundaries are relevant to the application. The identified boundaries include the following:

- Local Authority and Local Highway Authority boundaries;
- Surrey County Council (SCC);
- West Sussex County Council (WSCC);
- Extent of GAL ownership;
- Existing airport operation;
- Highways England boundary;
- Areas of ecological or landscape value;
- Riverside Garden Park;
- Private land holdings and buildings; and
- Proposed developments.

3.1.2 Impacts to land within the extents of the above boundaries caused by the proposed highway developments are to be considered during the development of the highways design. In addition, consultation with the relevant stakeholders and third parties will be conducted.

3.2 Local Authorities Highway Network

3.2.1 The GAL site is located on the border of two Local Highway Authority boundaries, SCC and WSCC. A list of the key highways impacted by the scheme within the bounds of each local authority is provided below.

West Sussex County Council:

- A23 London Road

Surrey County Council:

- A217
- A23 Brighton Road
- Povey Cross Road
- Longbridge roundabout circulatory carriageway

3.2.2 Design proposals impacting the local authority highway networks are subject to the approval of the relevant local highway authority.

3.3 Highway England’s Network

3.3.1 A list of the key highways impacted by the Project within the bounds of Highways England’s network is provided below.

Highways England Network:

- M23 Spur
- M23 Junction 9
- South Terminal roundabout circulatory carriageway
- Airport Way
- A23 London Road northbound diverge and merge at North Terminal roundabout
- A23 London Road southbound diverge onto Airport Way
- North Terminal roundabout circulatory carriageway

3.3.2 Design proposals impacting the Highways England network are subject to the approval of Highways England.

3.4 GAL highway network

3.4.1 In addition to the local highway and Highways England network, GAL’s highway network would be impacted by the proposed highway mitigation. The impacted roads include those listed below.

- GAL Highway Network:
- Gatwick Way
- Northway
- North Terminal Approach

- Northgate Road
- Longbridge Way
- Perimeter Road North
- Ring Road North
- Ring Road South

3.5 Structures

3.5.1 It is proposed to minimise the scope of any works where possible to the following existing structures in the vicinity of the scheme.

- Inter-Terminal Shuttle viaduct
- The underpass carrying Tunnel Road/Fuel Farm Road beneath Northway and North Terminal Road
- A23 London Road overbridge on Airport Way
- River Mole overbridge on the A23 London Road
- Network Rail London to Brighton Railway overbridge on Airport Way
- Peaks Brook Lane Overbridge on the M23 Spur
- M23 overbridges at Junction 9

3.5.2 Additional structures impacted by the Project are outlined in Section 6 of this report. The final scope of the impact to existing structures in the vicinity of the Project is subject to change as part of ongoing design development.

3.6 Environment, Landscape and Water

3.6.1 Key areas of ecological, landscape or recreational value in the vicinity of the Project include:

- Riverside Garden Park
- Church Meadows Park

3.6.2 Key existing watercourses in the vicinity of the Project include:

- River Mole
- Gatwick Stream
- Tributaries of Burstow Stream

3.6.3 Further details on the environmental considerations including landscaping and mitigation planting proposals; ecology and habitats; water; air quality and archaeology can be found the PEIR.

4 Traffic Modelling

4.1 Overview of Traffic Modelling

4.1.1 The Gatwick strategic highways traffic model developed in SATURN is the primary highway assessment tool used for the PEIR. It was used to inform demand on links and through junctions as well as variation in speeds to be fed into more detailed junction modelling using VISSIM as well as into air quality and noise models.

4.1.2 Full details on the traffic modelling work undertaken to date are provided in the PTAR, Appendix 12.9.1 of the PEIR. A summary of the key conclusions of this assessment work is provided below.

- Modelling shows that the future baseline to 2029 can be accommodated on the M23 Spur with local widening and signalisation works that will be delivered prior to 2029.
- Given the congestion shown by the model for 2032 future baseline, Gatwick has made the decision that more significant mitigation will be required on the highway network to support additional growth with the Project, otherwise there will be potential for delays on the network.
- With Project and background traffic growth to 2047, modelling shows some localised areas where congestion would still be expected, even with mitigation. However, congestion levels are manageable and at expected levels for 15 years after opening, indicating that the mitigation is appropriate and proportionate - ie it is sufficient to provide for expected growth but does not over-provide network capacity.

4.1.3 Through to DCO submission, the highway design will be adjusted in line with VISSIM modelling to address changes in capacity requirements.

5 Proposed Highway Mitigation

5.1 Design Process Overview

5.1.1 Table 1 provides a summary of the key potential design options examined for each of the proposed junction upgrades as part of the development of the proposed concept design. A preferred design option to be taken forward for further design development was selected for each junction. The selection of a preferred design has taken into account considerations such as environmental impact, safety, buildability, cost and viability from an engineering perspective.

5.1.2 The preferred design options will be subject to further development in consultation with Highways England and the local highway authorities.

Table 1: Highway Mitigation Option Summaries

Option Number	Option Name	Option Summary	Preferred Option
South Terminal			
Option 1a	Grade separated junction - M23 Spur/Airport Way Flyover (40mph)	At-grade roundabout to be retained and flyover through route to be introduced for the M23 Spur/Airport Way via a viaduct. M23 Spur/Airport Way mainline to be designed to be suitable for a 40mph speed limit.	
Option 1b	Grade separated junction - M23 Spur/Airport Way Flyover (50mph)	At-grade roundabout to be retained and flyover through route to be introduced for the M23 Spur/Airport Way via a viaduct. M23 Spur/Airport Way mainline to be designed to be suitable for a 50mph speed limit.	**Yes**
Option 1c	Grade separated junction (including northern access arm) - M23 Spur/Airport Way Flyover (50mph)	At-grade roundabout to be retained with a new northern arm to accommodate future potential developments to the North. Flyover through route to be introduced for the M23 Spur/Airport Way via a viaduct. M23 Spur/Airport Way mainline to be designed to be suitable for a 50mph speed limit.	
Option 2	Grade separated junction – Elevated Roundabout	Roundabout circulatory carriageway to be elevated and new at-grade through route for the M23 Spur/Airport Way to be provided.	
Option 3	Grade separated junction – Off-line	At-grade roundabout located off-line to the north of the existing South Terminal junction. The M23 Spur/Airport Way to be realigned off-line to develop a flyover through route at the proposed roundabout location. This option was discounted at an early stage for reasons including increased disruption to road users during construction and increased environmental impact due to the increased footprint of works	
North Terminal			
Option 1a	Grade separated junction – Constrained (40mph)	Provision of an at-grade elongated gyratory junction with a through route for the A23 London Road via a flyover. Junction layout constrained by the Riverside Garden Park to the North and existing Gatwick estate to the South. Mainline A23 London Road speed limit of 40mph.	
Option 1b	Grade separated junction – Constrained (50mph)	Provision of an at-grade elongated gyratory junction with a through route for the A23 London Road via a flyover. Junction layout constrained by the Riverside Garden Park to the North and existing Gatwick estate to the South. Mainline A23 London Road speed limit of 50mph.	

Option Number	Option Name	Option Summary	Preferred Option
Option 2b	Grade Separated junction – Unconstrained (50mph)	Provision of an at-grade elongated gyratory junction with a through route for the A23 London Road via a flyover. Junction layout constrained by the existing Gatwick estate to the South but unconstrained by the Riverside Garden Park to the North. Mainline A23 London Road speed limit of 50mph	
Option 3b	Grade separated junction – Unconstrained (50mph)	Provision of an at-grade elongated gyratory junction with a through route for the A23 London Road via a flyover. Junction layout constrained by the Riverside Garden Park to the North but unconstrained by the existing Gatwick estate to the South. Mainline A23 London Road speed limit of 50mph.	
Option A2 (4b)	At-grade free flow and signal-controlled junction with Airport Way westbound flyover	Existing roundabout junction to be replaced with an at-grade signal controlled junction providing free flow links between the A23 London Road, Airport Way and the North Terminal . A through route for the Airport Way Westbound connection onto the A23 London Road Northbound to be provided via a flyover.	**Yes**
Option 5	At-grade offline signal-controlled junction	Modifications to the existing North Terminal roundabout with the provision of a new offline roundabout in Staff Car Park Y. Improvements to Longbridge Way and Longbridge Way roundabout to facilitate changes in traffic flow.	
Longbridge Junction			
Option 1	Signal-controlled Junction	Existing roundabout junction to be replaced with a signal-controlled junction	
Option 2	Signal-controlled Roundabout	Local improvements to the existing Longbridge roundabout whilst retaining the existing junction footprint	
Option 3	Enlarged Signal-controlled Roundabout	Improvements to the existing roundabout to increase the junction size to facilitate increased junction capacity	**Yes**

5.1.3 The preferred options to undergo further design development are described in more detail below. Further details on the alternative design options that weren't taken forward can be found in Appendix A of this report.

5.2 South Terminal Junction (including M23 Spur)

Grade Separated Junction - M23 Spur/Airport Way Flyover (50mph) Option 1b

5.2.1 This solution proposes that an at-grade roundabout is retained and a through route for the M23 Spur/Airport Way is developed via a flyover. New slip roads would be provided to link the roundabout to the elevated mainline. The existing southern roundabout arm layout would be retained. An overview of the design is illustrated in Figure 5.

5.2.2 The M23 Spur Motorway and flyover would be designed to be suitable for a 50mph speed limit. It is proposed that the speed limit would transition to 40mph on Airport Way. The location of the speed threshold will be finalised at a later design stage.

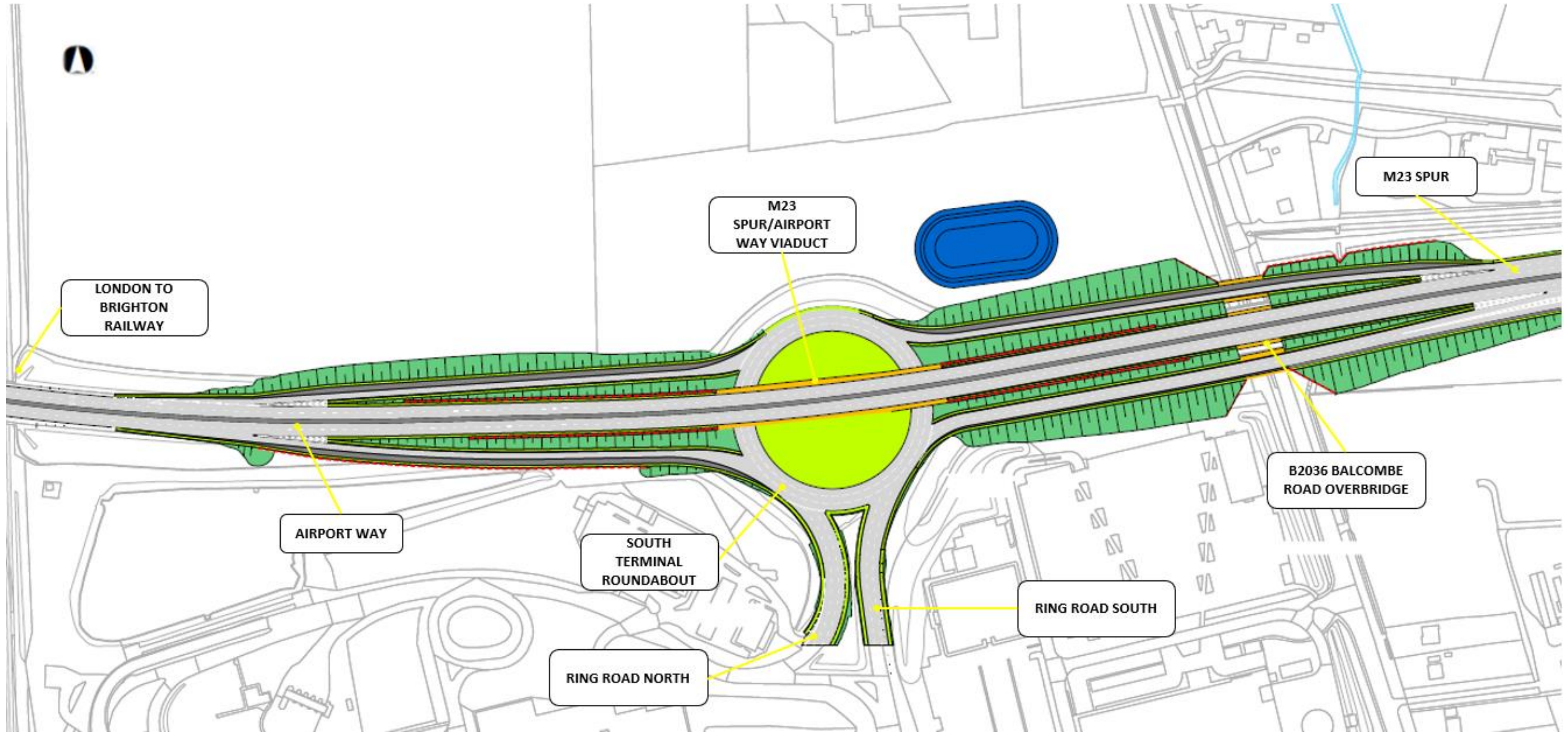


Figure 5: M23 Spur/Airport Way Flyover (50mph) Option 1b Concept Layout

5.2.3 To develop the flyover the M23 Spur/Airport Way alignment would be raised above the existing surface level via a viaduct. Construction of the viaduct would require earthworks and retaining structures to support the approaches to the flyover. The earthworks associated with constructing the viaduct and slip roads would require increased land-take beyond the existing highway boundary and would impact existing buildings to the south of the mainline.

5.2.4 To minimise the impact of raising the M23 Spur/Airport Way mainline, it is proposed that the alignment would tie in with the existing carriageway to the east of the Network Rail London to Brighton Railway overbridge on Airport Way. This would avoid or minimise requirements to strengthen or widen the existing structure. However, the tie into the existing carriageway east of the junction would likely be beyond the existing B2036 Balcombe Road overbridge. As a result, it is assumed that three new bridge structures would be required to support the realigned M23 Spur and the new slip roads.

5.2.5 The hard shoulder of the eastbound carriageway of the M23 Spur, between the South Terminal roundabout and M23 Junction 9, is proposed to be converted to a permanent running lane to provide three lanes of traffic. This is consistent with the changes recently made to the M23 Spur westbound carriageway as part of the M23 Junction 8-10 Smart Motorway Project, completed in 2020.

5.2.6 In summary, this design option proposes to mitigate the forecasted increase in traffic volume through introducing a through route on the M23 Spur/Airport Way. This provides the opportunity for non-airport traffic to bypass the South Terminal junction allowing the capacity of the existing roundabout to be maximised.

5.2.7 The key benefits of this option include the following.

- The provision of a flyover would create a free flow movement between the M23 Spur Motorway and Airport Way, removing non-airport traffic from the junction to maximise the capacity of the existing junction and accommodate the forecasted increase in traffic volume.
- The provision of the M23 Spur flyover would reduce the number of conflict points for through traffic compared to an at-grade junction, leading to a number of safety benefits for road users.
- Retaining an at-grade roundabout would minimise construction works and the associated disruption to the existing network during construction in comparison to proposals to elevate the circulatory carriageway. This is a result of being able to retain the southern arm of the junction, reducing the impact to the infrastructure associated with the South Terminal.
- The reduced footprint compared to an elevated roundabout design would lead to reduced environmental impacts compared to other options examined.
- The geometry design provides flexibility in positioning the proposed Airport Way 40mph speed limit transition.
- The proposed design does not preclude future amendments to the roundabout to accommodate potential developments in the vicinity of the junction.

5.2.8 The key disbenefit of this option is:

- The existing M23 Spur overbridge at B2036 Balcombe Road would need to be replaced.

5.2.9 The benefits of this proposal were considered to outweigh the disbenefits and the outcomes resulting from the proposed grade separated junction layout were tested using VISSIM modelling and considered to be preferable in comparison to the other options considered. As a result, Option 1b has been put forward as the preferred highway mitigation solution for South Terminal junction.

5.3 North Terminal Junction

Option A2 – At-Grade Part Free Flow and Signal-Controlled Junction with Airport Way/A23 London Road Flyover

5.3.1 This proposal would replace the existing roundabout with an at-grade signal-controlled junction, providing a number of free flow links between the A23 London Road, Airport Way and the Gatwick Way and North Terminal Approach connector roads to the North Terminal facilities. An at-grade solution resolves access problems and mitigates the forecasted increase traffic volumes at the junction whilst minimising the extent of construction works, environmental impact and disruption to the existing network through the reduced junction footprint. In addition, a through route is proposed via a flyover connecting Airport Way westbound to the A23 London Road northbound. The concept layout for the at-grade free flow junction is provided in Figure 6.

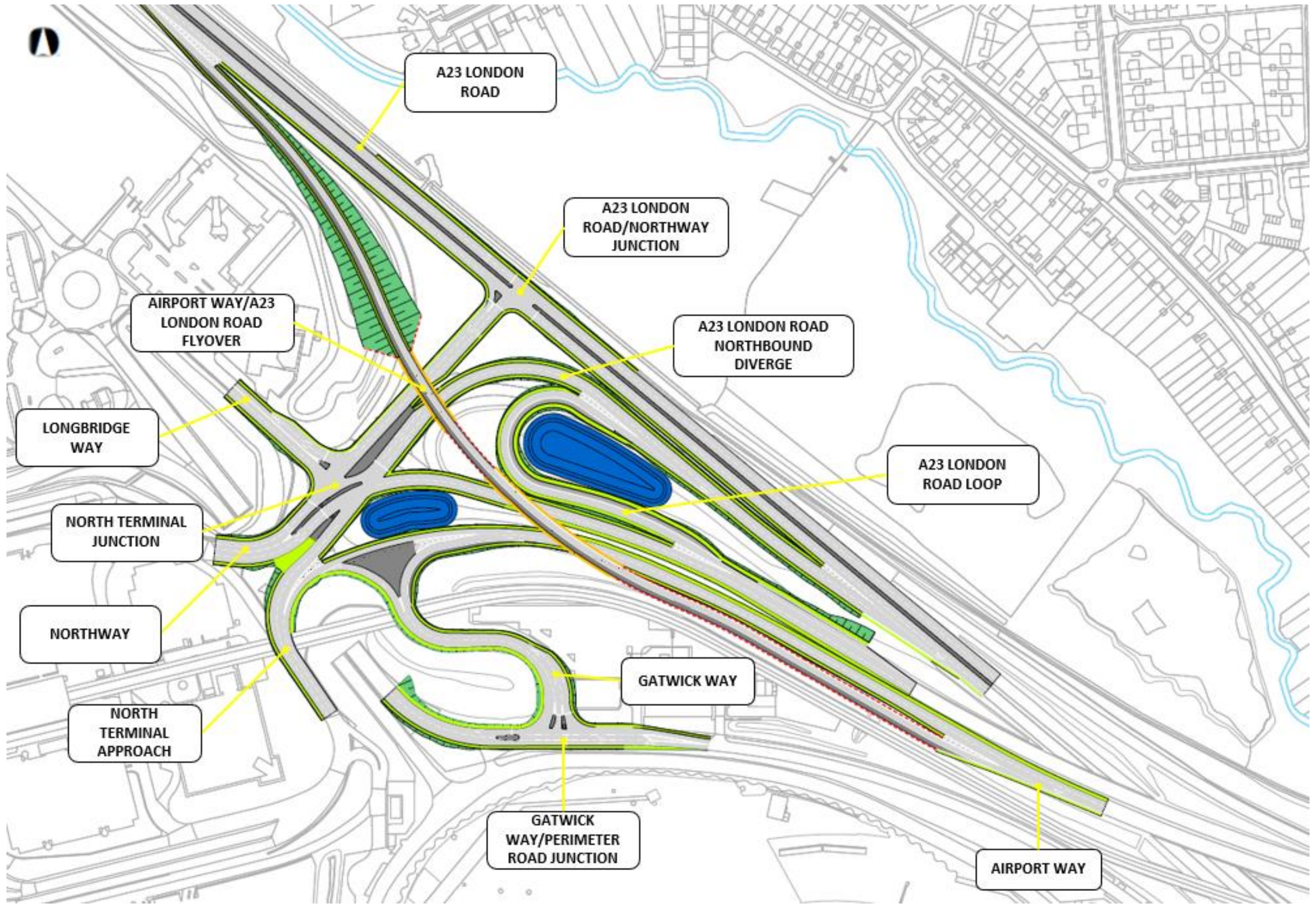


Figure 6: North Terminal At-grade Free Flow and Signal-Controlled Junction

5.3.2 The principle features of the concept design are detailed below.

5.3.3 The proposed free flow links A23 London Road Northbound Diverge, A23 London Road Loop and Airport Way Westbound to allow the following movements.

- Airport Way Westbound to North Terminal Approach
- Airport Way Westbound to Gatwick Way
- Airport Way Westbound to A23 London Road Northbound
- A23 London Road Northbound to Airport Way Eastbound

5.3.4 Three signal-controlled junctions, A23 London Road/Northway Junction, North Terminal Junction (Junction of Northway, A23 London Road Northbound Diverge to North Terminal Approach, Airport Way Eastbound and Longbridge Way) and Gatwick Way/Perimeter Road North Junction will allow the following movements.

- A23 London Road Northbound to North Terminal Approach
- A23 London Road Northbound to Longbridge Way
- Northway to A23 London Road Northbound/Southbound
- Northway to Airport Way Eastbound
- Longbridge Way to A23 London Road Northbound/Southbound
- Gatwick Way to Northgate/Perimeter Road North

5.3.5 Principally this proposal aims to minimise construction works and the impact to the existing network. Therefore, the proposed vertical alignments are as close to the existing ground levels as possible to reduce the extent of earthworks required in construction.

5.3.6 An at-grade signal-controlled junction would connect the existing highway network of the North Terminal with the A23 London Road and Airport Way. All connector roads within the junction would retain posted speeds of 30mph as per existing. Access to the North Terminal would be principally be provided via the North Terminal Approach. The exit from the North Terminal estate would be via an upgraded four lane Northway. Two lanes would accommodate right turn movements through the signalised junction towards Airport Way Eastbound, a central lane would provide access northwards to the A23 London Road Northbound/Southbound and a dedicated left turn lane would be provided for traffic heading onto Longbridge Way. As per the existing junction, Gatwick Way would only be accessible via Airport Way Westbound.

5.3.7 A through route is proposed via a flyover to accommodate non-airport traffic travelling on Airport Way Westbound to the A23 London Road Northbound, reducing traffic volumes heading through the signal-controlled junction. The flyover would be developed from a combination of retaining walls, viaduct and earthworks. To minimise the impact and disruption to the existing North Terminal operation, the horizontal alignment of the flyover would be developed to ensure the existing ITTS structure can be retained.

5.3.8 To the southeast of North Terminal Junction, the existing A23 London Road signal-controlled junction with Perimeter Road North would be upgraded to provide increased capacity and allow for additional traffic movements within the junction.

5.3.9 The key benefits of this option include the following.

- The proposed Airport Way Westbound flyover and the proposed free flow links between the local highway network and the North Terminal will enable undisrupted traffic movements on key routes through the junction and provide an increase in junction capacity.
- The provision of the Airport Way westbound flyover would enable non-airport traffic to bypass the junction and would reduce the number of conflict points for through traffic compared to an at-grade junction, leading to a number of safety benefits for road users.
- The at-grade option is proposed to remain largely within the existing highway footprint, minimising the impact to the Riverside Garden Park and other existing infrastructure in the vicinity of the junction in comparison to other options examined. This would reduce the environmental impact of the Project compared to other options examined.
- The proposed at-grade solution minimises the required construction works due to the reduced earthwork requirements which will result in reduced disruption to road users during the construction phase.

5.3.10 The key dis-benefits of this option include the following.

- The tight site spatial constraints may require relaxations and/or departures from standard as part of the highways geometry design. These will be examined in more detail as part of ongoing design development with appropriate mitigations put in place where required.
- The proposed layout restricts direct access to Longbridge Way from Airport Way. Alternative access routes would be via Gatwick Way/Northgate Road.

5.3.11 The benefits of this proposal were considered to outweigh the disbenefits and the outcomes resulting from the proposed free flow links and minimised earthworks footprint were considered to be preferable in comparison to the other options considered. In addition VISSIM modelling showed journey time improvements with this option as compared to other grade-separated proposals at North terminal. As a result, Option A2 has been put forward as the preferred highway mitigation solution for North Terminal junction.

5.4 Longbridge Junction

Option 3 Enlarged Signal Controlled Roundabout

5.4.1 This option would address future capacity issues associated with the existing partially signalised roundabout at Longbridge junction. The roundabout footprint would be increased and the circulatory carriageway would be widened. The concept proposal for the enlarged signal controlled roundabout is presented in Figure 7.

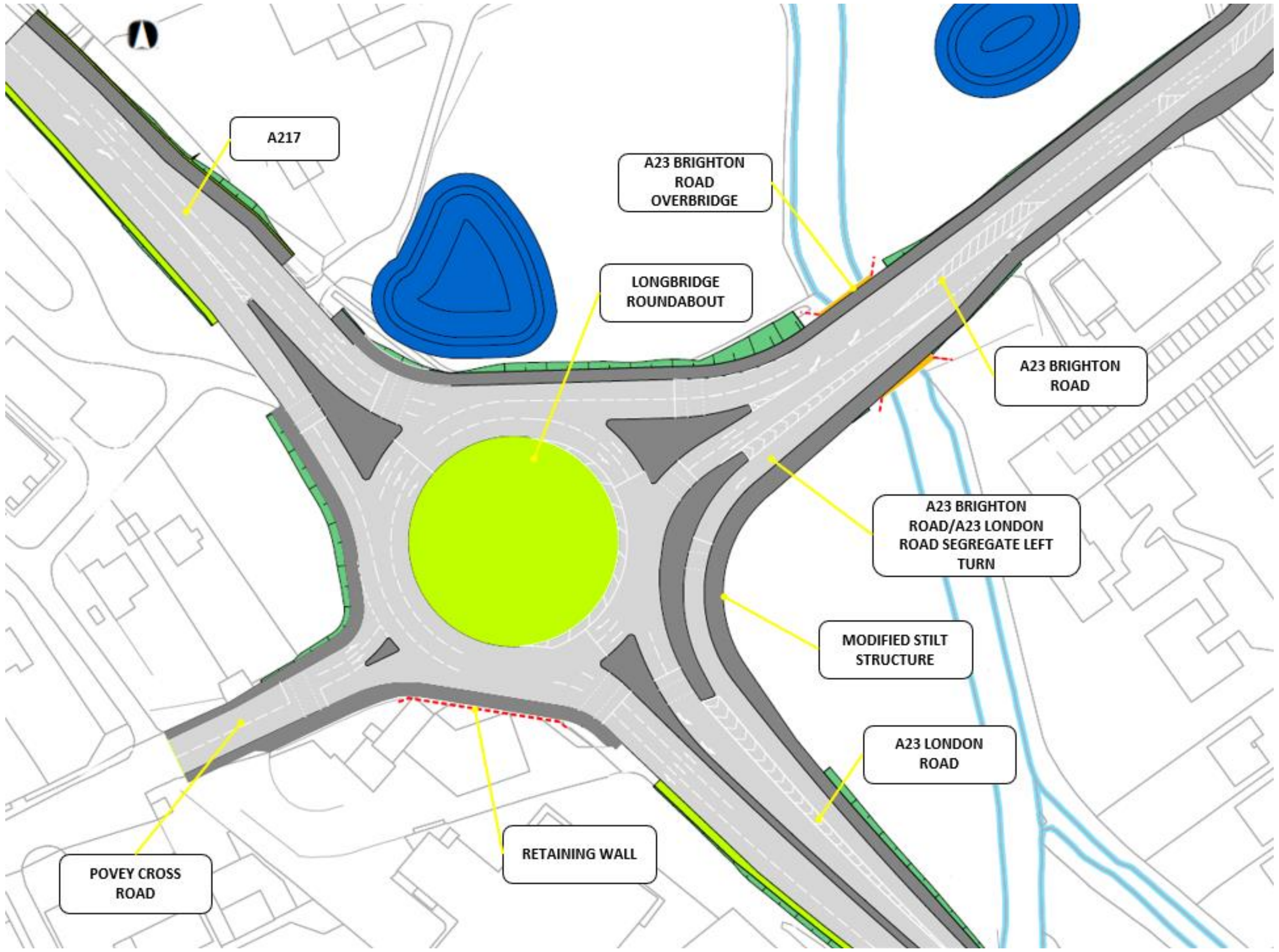


Figure 7: Enlarged Signal Controlled Longbridge Roundabout Concept Layout

5.4.2 Widening the circulatory carriageway would better accommodate turning movements of Heavy Goods Vehicles (HGV's). The design will also increase stacking capacity at the junction to support the greater forecasted traffic volumes.

5.4.3 Modifications proposed to the roundabout and circulatory carriageway layouts would impact the approach arms of the junction. Minor amendments to the horizontal geometry of the A23 London Road and Povey Cross Road would be required to align with the widened roundabout junction. The dedicated left turn lane on the A217 for traffic turning left onto the A23 Brighton Road would be extended.

5.4.4 Highway geometry changes on the A23 Brighton Road including an increased length of the segregated left turn lane (SLTL) diverge would result in carriageway widening over the existing River Mole bridge. These changes would require the existing structure to be modified or replaced. The increased junction footprint and modifications to the SLTL between the A23 Brighton Road and the A23 London Road would require the supporting stilt structure to be widened or replaced. New retaining walls may also be required to minimise the impact of the increased junction footprint on surrounding land parcels.

5.4.5 It is proposed to replace existing walking and cycling infrastructure impacted by the proposed junction layout changes on a like-for-like basis. The proposed design will ensure that existing walking and cycling connectivity between each arm of the roundabout will be retained with replacement toucan crossings and shared-use paths to be provided on each arm of the roundabout.

5.4.6 The key benefits of this option include the following.

- Retaining a roundabout junction layout is considered more favourable than proposals to replace the existing junction with a signal-controlled intersection. This will provide capacity benefits for road users and will lead to reduced disruption during construction.
- The increased circulatory carriageway width will provide safety and capacity benefits, in particular by making the junction more suitable for HGV turning movements.
- The provision of additional queuing capacity in combination with the proposed geometry changes will provide additional junction capacity to facilitate the anticipated traffic volume increases.

5.4.7 The key dis-benefits of this option include the following.

- The existing A23 Brighton Road overbridge crossing the River Mole would need to be widened or replaced leading to increased costs and construction works.
- The existing stilt structure supporting the segregated left turn lane from A23 Brighton Road onto A23 London Road would need to be widened or replaced leading to increased costs and construction works. Works taking place within the River Mole floodplain would lead to the loss existing vegetation.

5.4.8 The benefits of this proposal were considered to outweigh the disbenefits and the outcomes resulting from the proposed enlarged roundabout with improved geometry were considered to be preferable, in particular from a road safety perspective, and were also confirmed by VISSIM modelling. As a result, Option 3 has been put forward as the preferred highway mitigation solution for Longbridge roundabout.

6 Structures Proposals

6.1 Overview of Structures Proposals

6.1.1 A high-level summary of the key proposed highway structures identified at this design stage for each junction is provided below. The design of these structures and any additional structural works will be progressed further as part of ongoing design development in advance of the application for development consent.

6.2 South Terminal Junction

6.2.1 The preferred highway layout for the South Terminal Junction, as detailed in Section 5.2, proposes a grade separated junction layout with a flyover to be provided carrying the M23 spur/Airport Way over the proposed south terminal roundabout. The flyover would take the form of a viaduct structure. Retaining walls will be used to retain embankments on the approach/departure from the flyover.

6.2.2 The existing Balcombe Road overbridge would be replaced by three new overbridge structures carrying the M23 spur, M23 spur westbound diverge and M23 spur eastbound merge respectively over Balcombe Road.

6.2.3 Additional retaining walls on the southern side of the Airport Way westbound merge and the northern side of the M23 Spur eastbound merge will be required to minimise the impact on adjacent land parcels.

6.3 North Terminal Junction

6.3.1 The preferred highway layout for the North Terminal Junction, as detailed in Section 5.3, proposes an at-grade traffic signal intersection with an elevated through route between Airport Way Westbound and A23 London Road Northbound. To facilitate the through route a viaduct will be required to carry the carriageway above the North Terminal Junction. Reinforced soil and retaining walls will be used to retain embankments on the approach/departure from the flyover.

6.4 Longbridge Junction

6.4.1 The preferred highway solution for the Longbridge Junction detailed in Section 5.4 would result in an enlarged junction footprint. As a result, the existing elevated stilt structure that supports the junctions segregated left turn lane between A23 Brighton Road and A23 London Road will need to be modified or replaced. The A23 Brighton Road overbridge that passes over the River Mole will also need to be modified or replaced to accommodate changes to the highway footprint on the A23 Brighton Road. The design of these structures and any additional retaining wall requirements at this junction will be progressed at a later design stage.

7 Drainage Proposals

7.1 South Terminal Junction

7.1.1 The South Terminal Junction of Gatwick Airport is located within the bounds of West Sussex County Council, who have been assigned as the Lead Local Flood Authority (LLFA). The Local Authorities requirements and Surface Water Management (SWM) policies have been adopted to form the basis of the drainage design for the proposed highway layout detailed in Section 5.2.

7.1.2 Assessments of the existing drainage conditions indicate that the highway to the east of the B2036 Balcombe Road overbridge outfalls to a tributary of the Burstow Stream via an existing attenuation pond whereas to the west the drainage outfall is to the Gatwick Stream. At this stage, drainage proposals for the South Terminal are assumed to outfall to the same watercourse as the existing highway.

7.1.3 Applying the requirements of the LLFA, the preferred drainage solution for the proposed highway layout is based on the recommended SWM to discharge all storm water for the proposed works to greenfield sites.

7.1.4 The proposed drainage solution assumes that the existing catchment areas for the South Terminal junction are retained, east and west of the Balcombe Road overbridge. To the east the outfall to the existing attenuation pond would be retained. Further assessment will be undertaken to determine if this existing pond will need to be modified. To the west the existing outfall to Gatwick Stream would be retained. In addition, surface water is proposed to discharge into a ditch north of the junction which will direct the runoff into a new attenuation pond adjacent to Balcombe Road. The introduction of a new attenuation pond would require additional land to the North of the roundabout.

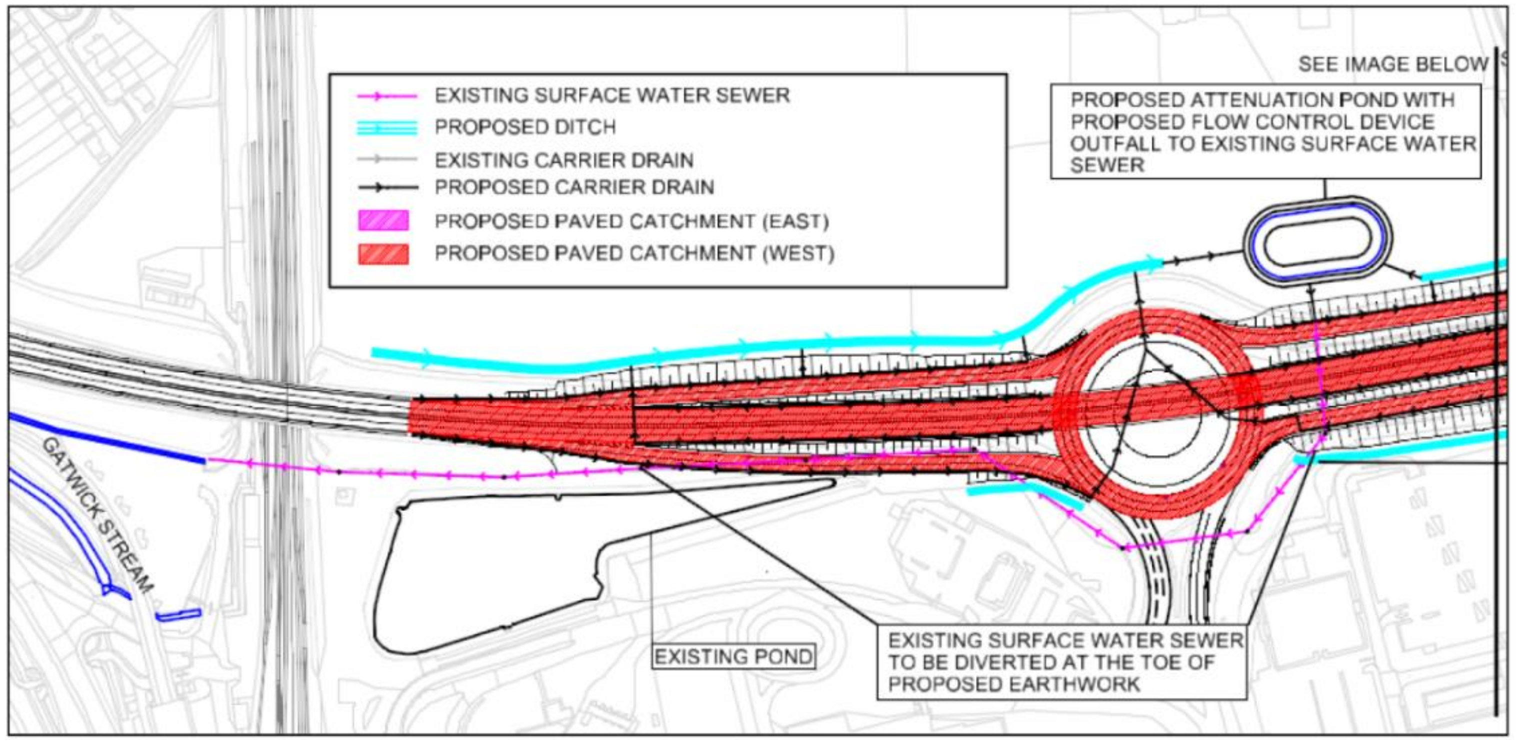


Figure 8: Proposed Drainage Layout - South Terminal

7.2 North Terminal Junction

7.2.1 Gatwick's North Terminal is located within West Sussex County Council which has been assumed as the LLFA. The Local policies for SWM have been adopted to form the basis of the proposed drainage solution for the at-grade free-flow signalised junction described in Section 5.3.

7.2.2 The North Terminal site is bounded by the Gatwick stream to the North and to the West by the River Mole. An assessment of the existing highway drainage appears to outfall to existing ditches which fall towards the River Mole (in some sections through the Gatwick Stream). The proposed drainage is suggested to fall to the same watercourse as existing.

7.2.3 Applying the requirements of the LLFA, the preferred drainage solution for the proposed highway layout is based on the recommended SWM to discharge all storm water for the proposed works to greenfield sites.

7.2.4 The concept drainage layout has been developed comprising of a combination of two attenuation ponds, geocellular storage and box culverts to store surface water collected from the proposed highway layout. The box culvert and attenuation pond would be located within the proposed highway network, connecting to the existing drainage network at the junction. Finally, the geocellular storage is proposed to the west of the scheme, assumed to be located within the Gatwick estate beneath an existing car park.

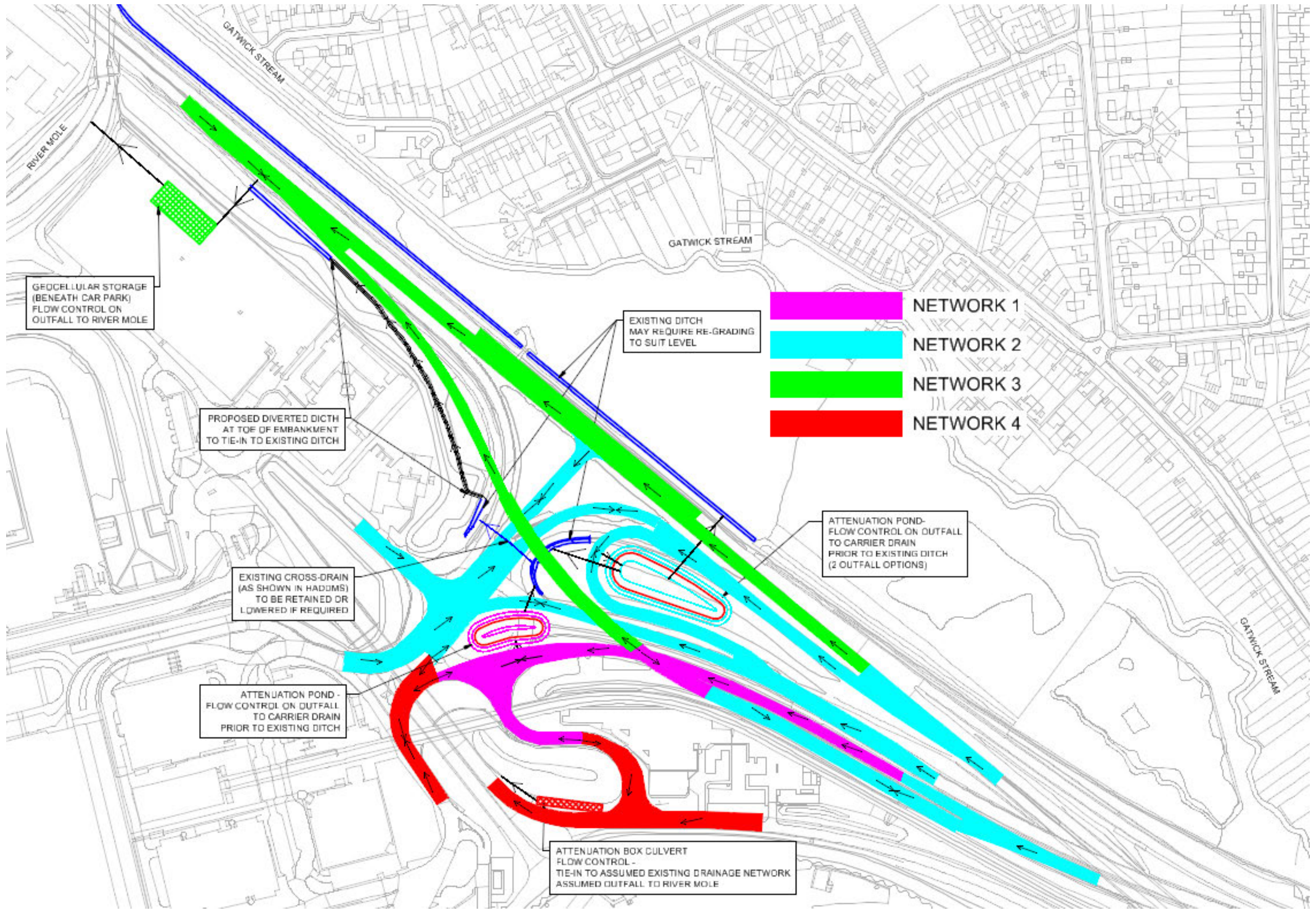


Figure 9: Proposed Drainage Layout - North Terminal

7.3 Longbridge Junction

7.3.1 The Longbridge Junction is located on the border between West Sussex County Council and Surrey County Council therefore both Councils have been assigned as the LLFA. Local SWM policies from these Local Authorities have formed the basis of the drainage design proposals. The existing drainage arrangement has been assumed to outfall into the River Mole.

7.3.2 Applying the requirements of the LLFA, the preferred drainage solution for the proposed highway modifications detailed in Section 5.4 is based on the recommended SWM, discharging all storm water for the proposed works to greenfield sites.

7.3.3 A drainage layout has been developed to facilitate the recommended SWM described above, storing surface water via a combination of attenuation ponds, box culverts and existing ditches. Box culverts are proposed to be located within the highway verge however additional land take would be required to install attenuation ponds adjacent to the junction. Principally the proposed drainage solution assumes that surface water drainage cannot be carried across the Brighton Road overbridge therefore it is proposed that two attenuation ponds are provided for water outfall South and North of the Brighton Road overbridge. The requirement to provide two attenuation ponds would result in increased footprint of the highway infrastructure.

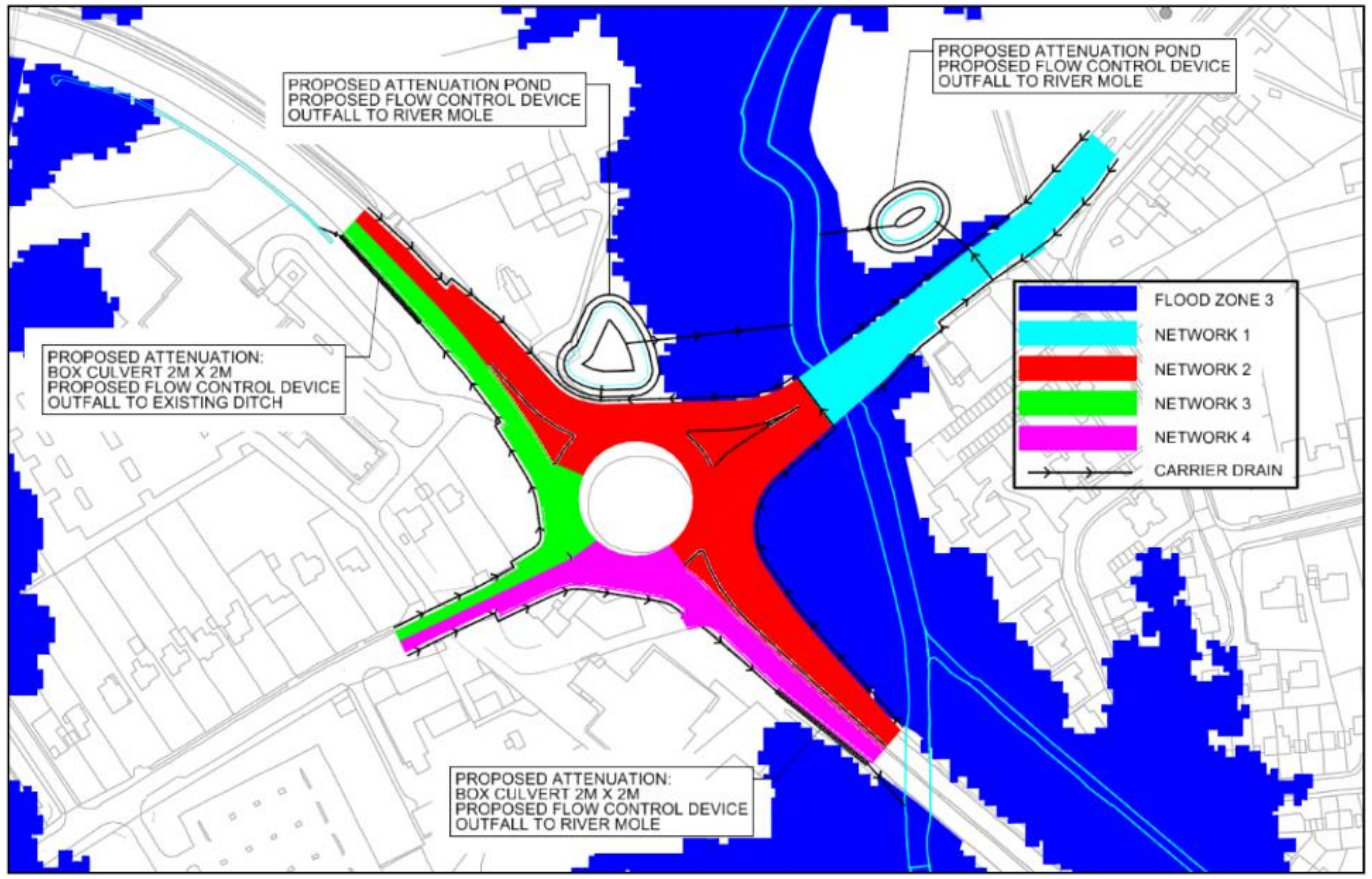


Figure 10: Proposed Drainage Layout - Longbridge Roundabout

8 Additional Design Considerations

8.1 Geology and Geotechnical Considerations

Geological Setting

8.1.1 Artificial Deposits or Made Ground forms the existing embankments from just west of Junction 9 of the M23 to the North Terminal Roundabout. Land northwest of the North Terminal Roundabout, south of London Road is also constructed on Made Ground. Made Ground is also found at Longbridge Roundabout, land south of Longbridge roundabout and west of the North Terminal Roundabout. Within the proposed study area infilled ground can also be identified at the North Terminal Roundabout, an infilled balancing pond and former channels of the River Mole and the Gatwick Stream, land between the London to Brighton railway line and the South Terminal Roundabout is shown as worked ground and landscaped ground.

8.1.2 Superficial deposits consisting of Alluvium and River Terrace Deposits criss cross the proposed study area. Alluvium is shown crossing the route at four different locations. These coincide with the former Mole River channels and the former channel of the Gatwick Stream. Alluvium may consist of clay, silt, sand and gravel. River Terrace Deposits are shown to outcrop from the Junction 9 of the M23 Motorway to the South Terminal Roundabout and south of Airport Way from the South Terminal Roundabout to the London to Brighton Railway Line. The River Terrace Deposits are indicated to consist of sand and gravel.

8.1.3 The Weald Clay Formation, which is the solid geology or bedrock, underlies the entire length of the proposed study area beneath the superficial and artificial deposits. The Weald Clay Formation forms part of the Wealden Group. It consists of dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone (eg the Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones and ironstone nodules. The Weald Clay Formation is expected to be between 180m – 210m thick and is known to dip approximately 2 degrees from south to north.

Preliminary Engineering Assessment

8.1.4 The proposed works may require modification to a limited number of existing cuttings in order to accommodate changes, for example the alignment of the A23 London Road and the provision of the Airport Way Westbound flyover. Where regrading of existing cuttings is proposed, further ground investigation is required to understand the ground conditions in these areas. This will further inform stability of the regraded cuttings.

8.1.5 To inform the design of new embankments, further examination of the proposed construction soils and any proposed borrow pits from which the materials will be sourced will be undertaken. In addition, further investigation of the foundation soils beneath current and proposed embankments will also be undertaken. Soft compressible soils such as un-engineered Made Ground and Alluvium may need to be removed prior to construction of new embankments.

8.1.6 The Project includes the provision of a number of new structures as well as modifications to a number of existing structures. Further ground investigation and examination of existing foundations will be undertaken to inform the design of these structures.

8.1.7 There are limited proposed excavations/cuts on the Project to generate fill material so much of the material for the proposed embankments will be sourced from suitable quarries and borrow pits.

8.2 Signage Strategy

8.2.1 At this stage the proposed signage for the highway network is assumed to be verge mounted including the M23 Spur east of the South Terminal Junction in line with the signage associated with the recent Smart Motorway upgrade.

8.2.2 To facilitate the proposed modifications to the highway network, Advanced Direction Signs would be provided at all junctions between all-purpose trunk roads and routes classified as 'B' and above. These direction signs would include map type sign faces where possible.

8.2.3 The preferred junction layout for Longbridge Roundabout currently proposes no changes to the number of lanes on each of the approaches to the roundabout. Similarly, the junction arrangement does not affect the lane required to traverse the roundabout to reach the required destination. Therefore, at this stage it is assumed that the existing signage at the Longbridge Junction can be retained or relocated as necessary.

8.3 Street Lighting

8.3.1 At this stage concept street lighting proposals have been developed and will be refined at a later design stage. Future design development will account for site specific lighting requirements including traffic flows, accident data, safety audits and road speeds. These factors will contribute to the selection of lighting levels. A survey will also be conducted to understand current existing lighting and electrical arrangements which should be undertaken prior to detailed design with an aim to providing a seamless tie-in between proposed and existing equipment. Sensitive receptors such as residential properties adjacent to the highway works will be subject to a lighting impact assessment in accordance with ILP GN01.

8.4 Technology and Traffic Signals

8.4.1 A number of existing highway technology assets such as CCTV cameras and traffic counter loops will be impacted by the proposed scheme. The design and layout of the scheme's technology assets will be developed at a later design stage.

8.4.2 Longbridge junction will remain signal-controlled following the junction capacity improvements and a number of new signal-controlled junctions will be introduced at North Terminal. The design and layout of the scheme's signal controlled junctions is subject to change as part of design development.

8.5 Noise

8.5.1 An assessment of the noise impacts associated with the proposed scheme has been undertaken and can be found in Chapter 14: Noise and Vibration of the PEIR.

8.6 Pavement

8.6.1 The pavement design is still under development and will be finalised at a later design stage.

8.7 Utilities

8.7.1 There are a number of significant utility diversions that will be required under the scope of the works. These will be designed in consultation with the relevant statutory undertakers at a later design stage.

9 Construction

9.1 Construction Programme

9.1.1 The programme of works that has been developed covers all of the construction activities related to the Project and when these will occur. The programme will likely evolve and change however the initial timings are presented in Chapter 5: Project Description of the PEIR .

9.2 Construction compounds

9.2.1 Potentially up to three off airport locations are to be used as satellite contractor compounds for construction activities related to highway works at South Terminal, North Terminal and Longbridge roundabout. Separate construction compounds will be used for the airside construction works. Indicative construction compound locations are illustrated in Figure 11.

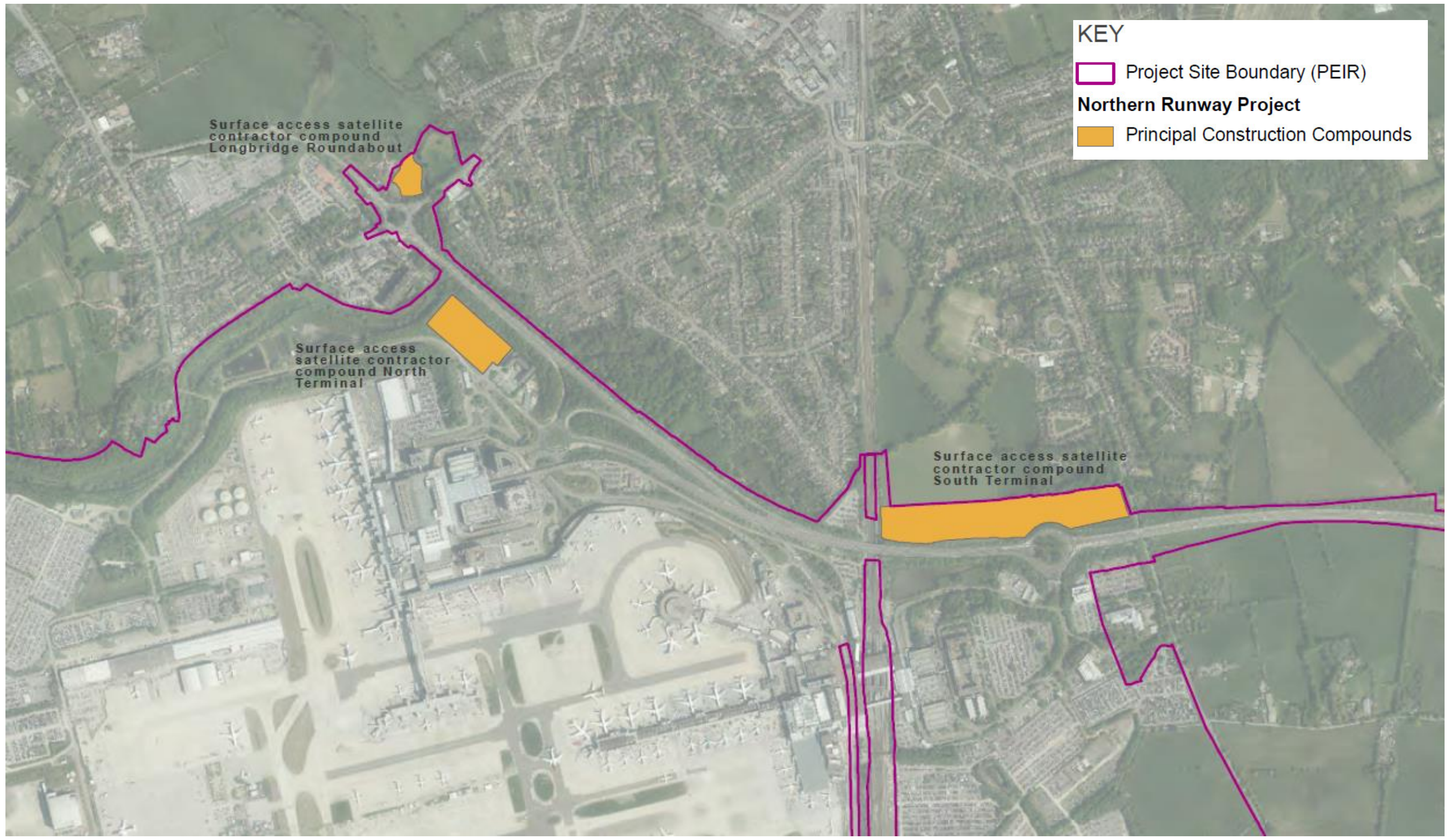


Figure 11: Proposed Construction Compounds

9.3 Sequencing and Impacts of Highway Construction

- All highways construction activities tend to follow a broadly similar construction sequence, with the duration and detail dependent upon the scale and complexity of the scheme in question, as follows.
- Activities normally start with delineation of the boundary to the work, site clearance where required for the work and protection or diversion of utilities affected by the scheme.
- Prior to site clearance, any trees or vegetation to be retained is identified and safe paths maintained through or around the works for pedestrians, cyclists and other non-motorised users of the network who may be affected by the construction activities.
- Once the site is cleared, topsoil and possibly also subsoil will be removed where roads are widened, or new roads are to be built. Soils are placed in stockpiles for re-use.
- Structure foundations are then built and earth or other materials removed to sufficient depth to prepare the ground for new road embankments or road pavement layers. Various ancillary items can be constructed at this stage including access chambers, sign and gantry foundations, draw pits, drainage pipes and ducts for highway communications systems or traffic signals.
- The next stage comprises above ground structures such as bridge piers or abutments and bridge decks, as well as the laying and compaction of road pavement sub-base materials.
- Kerbs are then installed and new road pavements constructed.
- Finishing works include verges, re-soiling of earthworks side-slopes and the installation and commissioning of vehicle restraint systems, street furniture, traffic lights, road lighting, wayfinding and the like. Final tasks include road markings, diversion of traffic onto the new road layout, removal and making good of redundant sections of road, soft landscaping and the removal and restoration of any temporary contractor's compounds or other facilities.

9.4 Traffic Impacts

9.4.1 The traffic impacts of constructing highway mitigation have been assessed for a conservative construction phase which envisages works at both South and North Terminal junctions at the same time. Details of this assessment can be found in the PTAR, Appendix 12.9.1 of the PEIR. Further scenarios will need to be considered in conjunction with Highways England and local highway authorities prior to DCO submission.

9.4.2 Gatwick Airport's Construction Traffic Management Plan will accompany the application for development consent and will provide further details on traffic management arrangements for the Project.

10 Glossary

10.1 Glossary of terms

Term	Description
DCO	Development Consent Order
GAL	Gatwick Airport Limited
HGVs	Heavy Good's Vehicles
ITTS	Inter-Terminal Transit System
LLFA	Lead Local Flood Authority
Mppa	Million Passenger Per Annum
MSCPs	Multi-Storey Car Parks
PEIR	Preliminary Environmental Report
PINS	Planning Inspectorate
PTAR	Preliminary Transport Assessment Report
SATURN	Simulation and Assignment of Traffic to Urban Road Networks
SCC	Surrey County Council
SLTL	Segregated Left Turn Lane
SWM	Surface Water Management
WSCC	West Sussex County Council

11 Appendix A – Alternative Junction Design Options

11.1 A1.1: Alternative South Terminal Junction Design Options

Option 1a - Grade Separated Junction - M23 Spur/Airport Way Flyover (40mph)

11.1.1 Option 1a is similar to the preferred Option 1b for South Terminal. The key design features can be summarised as follows:

- An at-grade roundabout would be retained.
- A new flyover would carry the M23 Spur/Airport Way over the proposed roundabout. The flyover would have a reduced speed limit of 40mph, compared to Option 1b, which has been designed to be suitable for a 50mph speed limit.
- Access to the South Terminal would be maintained as existing and slip roads would be provided to link the existing roundabout circulatory carriageway to the elevated M23 Spur/Airport Way.
- The hard shoulder of the eastbound carriageway of the M23 Spur, between the South Terminal roundabout and M23 Junction 9, would be converted to a permanent running lane to provide three lanes of traffic.
- Similar retaining wall provision to Option 1b would be required to reduce the footprint of the design proposals.

11.1.2 One of the key aims of Option 1a was to examine whether it would be feasible to retain the existing M23 spur overbridge at B2036 Balcombe Road. This would require the vertical alignment of the eastern end of the proposed M23 flyover to tie in to the existing carriageway surface levels in advance of or in close proximity to the existing bridge structure. For this reason, the M23 spur flyover was designed using a reduced design speed suitable for a speed limit of 40mph. However, it was determined that it would not be possible for the carriageway to tie-in in advance of the structure. The surface level difference and corresponding increase in loading at the bridge structure would be too great to retain the existing structure in its current form. The bridge would likely need to be replaced. Key factors influencing the vertical alignment of the flyover included the headroom clearance requirements for the proposed viaduct over the South Terminal roundabout.

11.1.3 Key benefits of this option include:

- The provision of a flyover would create a free flow movement between the M23 Spur Motorway and Airport Way, removing non-airport traffic from the junction to maximise the capacity of the existing junction and accommodate the forecasted increase in traffic volume.
- The provision of the M23 Spur flyover would reduce the number of conflict points for through traffic compared to an at-grade junction, leading to a number of safety benefits for road users.
- Retaining an at-grade roundabout would minimise construction works and the associated disruption to the existing network during construction in comparison to proposals to elevate the circulatory carriageway. This is a result of being able to retain the southern arm of the junction, reducing the impact to the infrastructure associated with the South Terminal.
- The reduced footprint compared to an elevated roundabout design would lead to reduced environmental impacts compared to other options examined.
- The geometry design provides flexibility in positioning the proposed Airport Way 40mph speed limit transition.
- The proposed design does not preclude future amendments to the roundabout to accommodate potential future developments to the north of the junction.

11.1.4 Key disbenefits of this option include:

- The existing M23 Spur overbridge at B2036 Balcombe Road would likely need to be replaced.
- The geometry design reduces flexibility in positioning the proposed Airport Way 40mph speed limit transition.

11.1.5 Option 1a and Option 1b are comprised of similar design proposals. Option 1b was considered preferable on the basis of the additional design flexibility that it allows for the next design stage in terms of positioning the mainline speed limit transition. For this reason Option 1a was not put forward as the preferred design option.

Option 1c - Grade Separated Junction (including northern access arm) - M23 Spur/Airport Way Flyover (50mph)

11.1.6 This option was developed using South Terminal Option 1b as a baseline therefore the two options share similar horizontal alignment, vertical alignment and cross sections for the main line and slip roads. The purpose of this option was to accommodate an additional northern access arm accounting for potential future developments to the north of the South Terminal. The key differences to the Option 1b design can be summarised as follows:

- The design would include a new northern arm on the at-grade roundabout to access such potential future developments. The access provision would include the provision of two new segregated left turn lanes to facilitate traffic entering and exiting the northern arm.
- The capacity of the M23 Spur eastbound merge slip road would be increased through the provision of a second lane and an increase in the proposed length of the slip road. The slip road lanes would merge into a single lane in advance of the merge with the M23 Spur eastbound traffic.
- A new segregated left turn lane would be provided for traffic turning left from the M23 Spur westbound diverge onto Ring Road South.

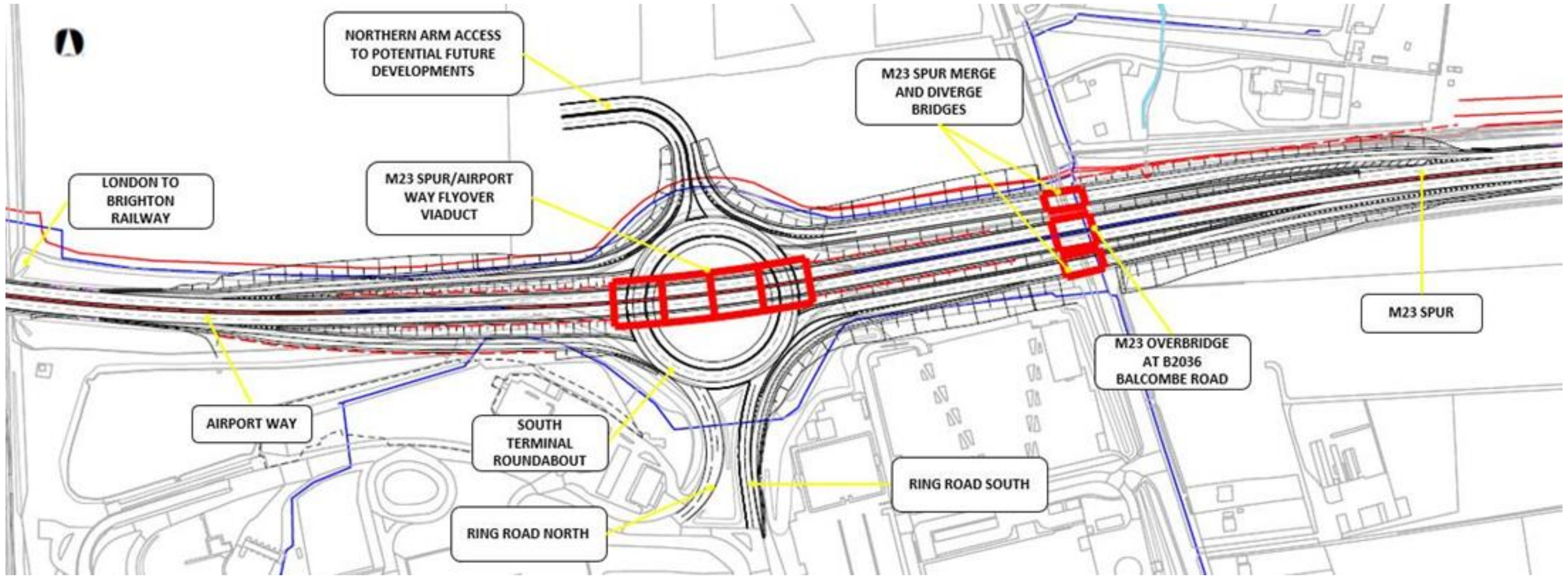


Figure 12: Option 1c M23 Spur/Airport Way Flyover including a Northern Arm Access to Potential Future Developments

11.1.7 The key benefits of this option include:

- The provision of a flyover would create a free flow movement between the M23 Spur Motorway and Airport Way, removing non-airport traffic from the junction to maximise the capacity of the existing junction and accommodate the forecasted increase in traffic volume.
- The provision of the M23 Spur flyover would reduce the number of conflict points for through traffic compared to an at-grade junction, leading to a number of safety benefits for road users.
- Retaining an at-grade roundabout would lead to a reduced scope of construction works and the associated disruption to the existing network compared to proposals to elevate the circulatory carriageway.
- The geometry design provides flexibility in positioning the proposed Airport Way 40mph speed limit transition.
- The proposed design would facilitate potential future developments to the north of the junction.

11.1.8 The key disbenefits of this option include:

- The existing M23 Spur overbridge at B2036 Balcombe Road would need to be replaced.
- The increased earthworks footprint of the proposed design would require additional permanent land from adjacent land parcels and would lead to the loss of a greater area of existing vegetation compared to Options 1a and 1b.
- The increased scope of construction works compared to Options 1a and 1b would lead to slightly greater disruption to road users, for example due to the works associated with the construction of the new segregated left turn lane for traffic turning left from the M23 Spur westbound diverge onto Ring Road South.

11.1.9 As the requirement for future potential developments to the north of the junction has not been confirmed at this design stage, this option was not put forward as the preferred design option. The preferred design option doesn't preclude future development to the north.

Option 2 - Grade Separation - Elevated Roundabout Option

11.1.10 Under this option, the circulatory carriageway of the South Terminal roundabout would be elevated introducing an at-grade through route for the M23 Spur/Airport Way. Access to the South Terminal, car parking and hotels/offices would be maintained to the south and slip roads would be provided to link the roundabout circulatory carriageway back to the existing M23 Spur/Airport Way. The proposed design speed for the through alignment and slip roads would be suitable for a 40mph speed limit under the assumption that the same speed limits would be applied to key routes at the North Terminal.

11.1.11 Where possible the through route would follow the existing ground level to minimise construction works and the impact to the existing highway network. Four new bridge structures would be required, two at the roundabout over the M23 Spur through route and two new bridge structures over B2036 Balcombe Road to facilitate the M23 Spur eastbound merge and westbound diverge slip roads. Substantial earthworks and retaining wall provision would be required to facilitate the elevated roundabout design as well as the associated slip roads.

11.1.12 Ring Road North and South would need to be realigned and raised to retain the existing access to Gatwick's South Terminal and connect to the elevated roundabout. Retaining walls would be required to minimise the footprint of these works and reduce the impact on surrounding infrastructure and buildings.

11.1.13 To minimise the scope of construction works, the alignment of the Airport Way westbound merge and eastbound diverge slip roads would tie in with the existing carriageway to the east of the Network Rail London to Brighton Railway overbridge on Airport Way. Whilst the M23 Spur through route would remain at grade, modifications to the cross section of the existing M23 Spur overbridge at B2036 Balcombe Road would be required to accommodate the provision of the M23 Spur Eastbound merge and M23 Spur eastbound diverge slip roads.

11.1.14 The hard shoulder of the eastbound carriageway of the M23 Spur, between the South Terminal roundabout and M23 Junction 9, would be converted to a permanent running lane to provide three lanes of traffic.

11.1.15 The key benefits of this option include:

- The provision of a through route between the M23 Spur/Airport Way would mitigate the forecasted increase in traffic volume at the junction by enabling eastbound/westbound traffic to flow freely, maximising the capacity of the roundabout junction for airport traffic.
- The provision of the M23 Spur through route would reduce the number of conflict points for through traffic compared to an at-grade junction, leading to a number of safety benefits for road users.
- The existing M23 Spur overbridge at B2036 Balcombe Road could be partially retained as a result of the M23 Spur being retained as an at-grade route.

11.1.16 The key disbenefits of this option include:

- To achieve the elevated roundabout necessary to accommodate the through route it is anticipated that substantial earthworks and retaining structures would be required. It is also likely that the construction works associated with the slip roads to the north of the junction would result in requirements for additional permanent land outside of the existing highway boundary
- Modifications to the M23 Spur overbridge at B2036 Balcombe Road would be required to accommodate the provision of the M23 Spur slip roads.
- Construction sequencing would be more complex in comparison to alternative solutions to provide an at-grade roundabout with M23 Spur/Airport Way Flyover leading to increased disruption to road users.
- Minimising the requirement for additional permanent land for this option would require the provision of substantial additional retaining wall provision. For example, substantial retaining wall provision would be required at the realigned Ring Road North and Ring Road South to minimise the impact on surrounding airport infrastructure and adjacent buildings. Even with such retaining wall provision, there is a risk that this option would lead to the partial loss of the forecourt housing McDonalds and the BP Station.
- The increased junction footprint would lead to an increased loss of existing vegetation in the vicinity of the junction.

11.1.17 In comparison to other options considered, Option 2 would introduce numerous additional disbenefits including increased scope of structures works and increased disruption to road users during construction. Considering the combined benefits and disbenefits, Option 1b was considered to be preferable so Option 2 was not put forward as the preferred design option for this junction.

11.2 A1.2 Alternative North Terminal Junction Design Options

Option 1a - Grade Separated Junction (Constrained) – 40mph

11.2.1 The Option 1a design would lead to the existing Northern Terminal roundabout being replaced with an elongated Gyratory junction with connections to adjacent roads being modified accordingly. The concept layout consists of a largely at-grade gyratory roundabout with a 2-lane circulatory carriageway. A similar layout to existing would be retained for the southwestern segment of the roundabout and therefore access to/from the North Terminal estate via Northway and North Terminal Approach will remain unchanged with only local improvements necessary. Additionally, the existing Northgate Road underpass would be unchanged.

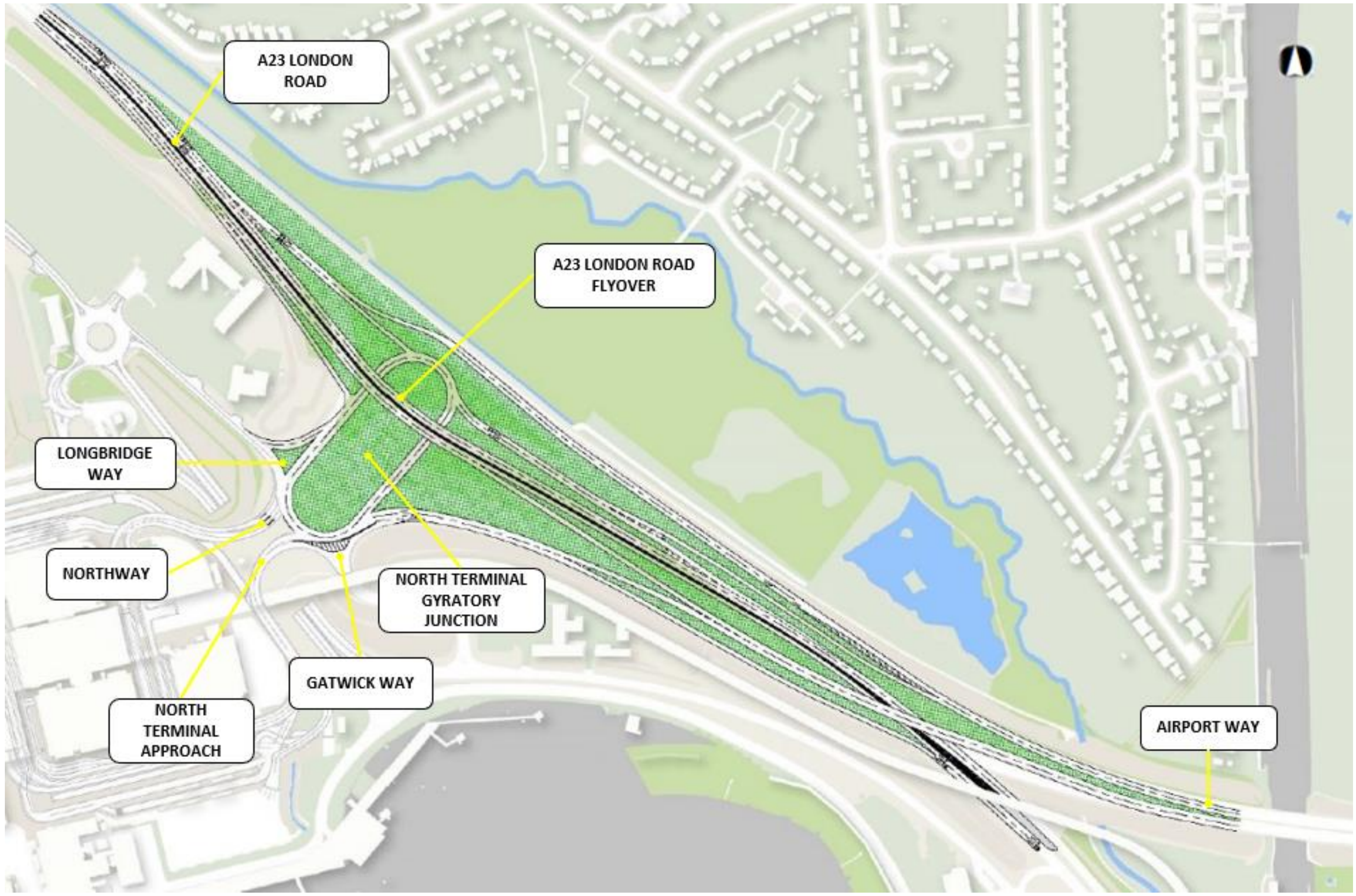


Figure 13: Option 1a North Terminal Grade Separated Junction Concept Layout.

11.2.2 A grade-separated junction arrangement would introduce a through route for the A23 London Road, raising the carriageway over the Gyratory junction via a four-span viaduct. Tie ins to the existing alignment are proposed to the west of the existing underbridge at Airport Way and east of the Longbridge junction respectively. The through route for the A23 London Road would enable non-airport traffic to bypass the North Terminal junction to mitigate the increasing traffic flow and maximise capacity of the junction. Retaining walls would be required at locations where insufficient space is available to accommodate 1V:2.5H earthworks side slopes.

11.2.3 Proposed changes to Airport Way include introducing substantial separation between the eastbound and westbound carriageways. The westbound alignment would largely follow the current Airport Way alignment and retain the existing bridge over the A23 London Road. However, the eastbound carriageway would no longer tie directly into the roundabout junction, instead it would coincide with the existing A23 London Road southbound adjacent to Riverside Garden Park. Airport Way eastbound would return to the existing alignment west of the London to Brighton Road Railway bridge.

11.2.4 Single lane slip roads are proposed to connect the Gyratory junction to Airport Way and the A23 London Road.

11.2.5 Whilst Options 1b, 2b and 3b are comprised of similar layouts, the distinguishing feature of Option 1a is the application of a design speed suitable for a reduced speed limit of 40mph with the intention of limiting the impact of the scheme within the existing highway and GAL estate. Additionally, the proposed design speed for the through alignment and slip roads would be designed to accommodate a 40mph speed limit and access to the terminal would be maintained with a 30mph speed limit.

11.2.6 Access to the North Terminal forecourt would be achieved primarily at the main roundabout but also at the secondary junction located south of Airport Way on the A23 London Road, via Perimeter Road North. This junction would be upgraded to provide additional junction capacity and allow for additional turning movements.

11.2.7 The key benefits of this option include:

- The alignment of the link and connector roads associated with the new gyratory junction close to the A23 London Road mainline would ensure that the new junction layout would largely remain within the existing highway boundary. Constraining the proposed highway improvements within highway land would minimise the impact to the Riverside Garden Park located north of the existing junction.
- To further reduce the impact to the existing infrastructure associated with Gatwick, this option proposes that the A23 London Road mainline is realigned to the North. These amendments would reduce the impact to the Premier Inn site.
- The provision of the A23 London Road flyover would enable non-airport traffic to bypass the junction and would reduce the number of conflict points for through traffic compared to an at-grade junction, leading to a number of safety benefits for road users.

11.2.8 The key disbenefits of this option include:

- Tight spatial constraints would lead to substantial retaining wall requirements and potentially lead to requirements for departures from standard for highway geometry.
- In this design option the proposed slip road approaching the junction from the A23 London Road Northbound cannot be accommodated between the existing Airport Way bridge and the ITTS. Therefore, it is likely that modifications would be required to the ITTS viaduct structure.
- Complex construction sequencing would lead to substantial disruption to road users during construction.
- Extensive structures works and complex construction sequencing would lead to higher costs than at-grade layouts.

11.2.9 The combined benefits and disbenefits of this option were considered in comparison to the other design options examined. Considering issues such as disruption to road users during construction and impact to the ITTS structure, this option was not considered preferable and has therefore not been taken forward as the recommended solution for the next design stage.

Option 1b - Grade Separated Junction (Constrained) – 50mph

11.2.10 Option 1b is largely similar to Option 1a, constraining the junction layout within the existing highway boundary and therefore minimise the impact to the Riverside Garden Park. However, an increased design speed suitable for a speed limit of 50mph has been adopted for the A23 London Road mainline.

11.2.11 As a result, the length of the proposed A23 London Road flyover alignment has been increased and the tie ins to the existing carriageway have moved slightly north and south. This would result in an increase in earthworks volumes and retaining wall provision to construct the approaches to the viaduct structure. Changes to the vertical geometry of the mainline impact the connecting slip roads and link roads which would be modified to align with the new A23 mainline geometry.

11.2.12 The key benefits of this option include:

- As per Option 1a but the increased speed limit on the A23 London Road would accommodate the same speed limit as per the existing layout which may be favoured by the local highway authority.

11.2.13 The key disbenefits of this option include:

- As per Option 1a but the increased length of the A23 London Road flyover and associated retaining walls and approach embankment earthworks would lead to higher costs.

11.2.14 Similarly to Option 1a, the disbenefits associated with the constrained at-grade junction resulted in the decision to not take this option forward as the preferred design solution.

Option 2b - Grade Separated Junction (Unconstrained)– 50mph

11.2.15 Option 2b was developed as a variant of the Option 1b proposal without the constraint of keeping the footprint of works within existing highway land. The design assumes that the junction improvement works could encroach into Riverside Garden Park. The design speeds applied for Option 1b were retained.

11.2.16 Primarily this option would realign the A23 mainline to the northeast to enable more flexibility for the links to the south of the junction which connect the A23 London Road and Airport Way to the Gatwick Estate. Reducing the constraints of the links to the Gyratory Junction would allow improvements to the highway geometry and increase the distance between successive slip roads. Additionally, relocating the A23 northwards would provide more space to locate the slip road between the Gyratory junction and the A23 London Road northbound. As a result, the impact of the proposed junction improvements on the Premier Inn Hotel would be minimised.

11.2.17 However, to accommodate the northern realignment of the A23 London Road mainline, slip roads connecting the North Terminal Junction to the southbound carriageway of the A23 and Airport Way eastbound would encroach into the Riverside Garden Park. Further, the at-grade gyratory carriageway would also extend north into the park in order to tie in with the connecting roads whilst remaining coincident with the southwestern quadrant of the existing roundabout.

11.2.18 In addition, changes proposed to the A23 London Road connector road, linking the northbound carriageway to the North Terminal junction, would likely result in an increased impact to the ITTS structure. To ensure suitable visibility and area to develop the slip road to the gyratory junction it is likely that the four existing spans would be affected and require replacing with two longer spans.

11.2.19 Access to the North Terminal forecourt would be achieved primarily at the main roundabout but also at the secondary junction located south of Airport Way on the A23 London Road, via Perimeter Road North. This junction would be upgraded to provide additional junction capacity and allow for additional turning movements.

11.2.20 The key benefits of this option include:

- The provision of the A23 London Road flyover would enable non-airport traffic to bypass the junction and would reduce the number of conflict points for through traffic compared to an at-grade junction, leading to a number of safety benefits for road users.
- Extending the junction footprint into the park would benefit the scheme in comparison to Options 1a and 1b in terms of improving highway geometry; reducing the complexity of construction phasing; and reducing disruption to road users during construction. However, substantial disruption for road users would remain.
- Impacts to the Premier Inn site would be minimised.

11.2.21 The key disbenefits of this option include:

- The increased footprint of works including permanent land requirements within the extents of Riverside Garden Park would lead to negative environmental impacts including an increased loss of existing vegetation compared to Options 1a and 1b.
- Substantial modifications to the existing ITTS viaduct would be required leading to increased costs and disruption to airport passengers and operations.

- Whilst retaining wall requirements would be slightly less than for Option 1b substantial retaining wall provision would still be required.

11.2.22 The combined benefits and disbenefits of this option were considered in comparison to the other design options examined. Considering issues such as the negative environmental impacts associated with permanent land requirements within Riverside Garden Park and impacts to the ITTS structure, this option was not considered preferable and has therefore not been taken forward as the recommended solution for the next design stage.

Option 3b - Grade Separated Junction (Unconstrained) – 50mph

11.2.23 Option 3b was developed as a further variant of Option 1b. As per Option 2b this proposal was developed without the constraint of keeping the footprint of works within existing highway land. However, this design assumes that the works can impact additional land within Gatwick and the associated infrastructure south of the junction. Infrastructure to the South of the junction includes the Premier Inn Hotel, the Police Station, ITTS and Perimeter Road. Little or no impact to the Riverside Garden Park is anticipated with this proposal.

11.2.24 Removing the constraints to the south provides additional land to develop links to the gyratory junction from the A23 London Road and Airport Way, allowing for improved road geometry on the approach to the junction. Additionally, the unconstrained nature of the proposal may reduce network disruption and improve construction phasing. Similarly, to Option 1b, design speeds suitable for 50mph and 40mph speed limits on the A23 London Road mainline and slip roads respectively were adopted for this option.

11.2.25 The A23 London Road mainline would be realigned southwards compared to Option 1b, allowing increased flexibility for the positioning of the links north of the mainline which connect the A23 London Road southbound, Airport Way and the gyratory junction. The additional land would enable improved geometry for these links. The southward shift of the mainline would also ensure that the junction footprint does not encroach on the Riverside Garden Park.

11.2.26 Further, extending the junction footprint south would result in a diversion to the existing ITTS viaduct, proposed to follow the line of the existing Perimeter Road. This would also impact Perimeter Road which would be realigned to accommodate the diverted ITTS, encroaching onto the airside boundary

11.2.27 In contrast to the previous options, Option 3b proposes to close the existing A23 London Road / Perimeter Road North junction to the south of the North Terminal and create an alternative access at the existing Queen's Gate roundabout approximately 70m further South.

11.2.28 The key benefits of this option include:

- The provision of the A23 London Road flyover would enable non-airport traffic to bypass the junction and would reduce the number of conflict points for through traffic compared to an at-grade junction, leading to a number of safety benefits for road users.
- The use of additional land to the south would enable improved geometry for the proposed links compared to Options 1a and 1b.
- The use of additional land to the south would lead to improved buildability of the highway works compared to Options 1a and 1b with corresponding reductions in disruption to road users.
- The southward shift of the mainline would also ensure that the junction footprint does not encroach on the Riverside Garden Park.

11.2.29 The key disbenefits of this option include:

- Realigning the A23 mainline would result in the North Terminal junction slip road connecting to A23 London Road northbound moving south impacting the existing Shell Filling Station at this location.
- This option would significantly impact the Premier Inn Hotel site.
- A diversion of the ITTS viaduct would be required leading to increased costs and disruption to airport passengers and operations.
- Whilst retaining wall requirements would be less than for Options 1b and 2b, substantial retaining wall provision would still be required.

11.2.30 The combined benefits and disbenefits of this option were considered in comparison to the other design options examined. Considering issues such as impacts to commercial sites and impacts to the ITTS structure, this option was not considered preferable and has therefore not been taken forward as the recommended solution for the next design stage.

Option 5 - At-Grade Offline (South) Signal-Controlled Roundabout

11.2.31 This option proposes an at-grade solution, modifying the existing North Terminal roundabout junction and introducing a new offline roundabout at the existing GAL Staff Car Park Y.

11.2.32 The existing North Terminal roundabout would be enlarged slightly to improve the geometry of the approach links to the junction and to provide greater separation between arms. To achieve this, it is proposed that the A23 London Road links to the existing roundabout would be removed and connected to a new offline roundabout. This would allow the Airport Way, Longbridge Way and Gatwick Way connections to be realigned onto an enlarged circulatory carriageway.

11.2.33 A new offline roundabout would be positioned at Gatwick Airport Staff Car Park Y, located to the northwest of the North Terminal, adjacent to the existing A23 London Road carriageway. The primary function of this roundabout would be to provide a connection between the A23 London Road northbound and southbound to the GAL estate. Additionally, a segregated through route would be considered to remove southbound traffic from the roundabout. Connection to the GAL estate would be facilitated by a realigned Perimeter Road North, linking the new roundabout to the existing roundabout on Longbridge Way. The existing Longbridge Way roundabout would require improvements to accommodate the anticipated increase in traffic flows resulting from A23 London Road user accessing the North Terminal through this route.

11.2.34 The reconfigured Airport Way would retain a two-lane dual-carriageway approach to the North Terminal Roundabout to accommodate the anticipated approach traffic flows. Gatwick Way would stay as a single carriageway two-way road, and North Way and North Terminal Approach would each have a similar carriageway layout to existing. However, improvements to the Longbridge Way roundabout and the increased traffic flow would require the Longbridge Way carriageway to be increased to three lanes northbound and two lanes southbound, creating a short section of urban dual carriageway.

11.2.35 The purpose of this option was to examine whether removing the direct connection between A23 London Road and North Terminal roundabout would lead to improved traffic flows by redirecting A23 London Road north terminal traffic to the new roundabout, and then into the GAL internal road network. This however introduces issues within the GAL internal road network, which would require a significant upgrade to cope with the increased traffic using Perimeter Road North and Longbridge Way on approach to the North Terminal Roundabout. The new roundabout shifts the flow of traffic but redirects it to the existing North Terminal Roundabout, albeit from a different approach. It is anticipated that this approach would demonstrate issues with queuing on Perimeter Road North and Longbridge Way and could block the exit from North Terminal. Additionally, the close proximity of the new offline roundabout to the Longbridge Way roundabout may cause issues with queuing and would provide little opportunity for lane changing to get to a required destination. There is also potential for queuing traffic to back up the GAL internal highway network and the surrounding road network.

11.2.36 With a significant through flow from Airport Way to A23 London Road it is expected this at-grade solution at North Terminal roundabout would struggle to cope with the volume of traffic.

11.2.37 The key benefits of this option include:

- Traffic volumes using the North Terminal roundabout would be reduced slightly by redirecting A23 London Road north terminal traffic to the new roundabout, and then into the upgraded GAL internal road network.
- The at-grade solution would minimise the scope of structures works leading to reduced construction duration and costs.
- The junction works footprint would not encroach on Riverside Garden Park.

11.2.38 The key disbenefits of this option include:

- It is expected that this solution would cause numerous issues with congestion at the proposed roundabouts and on the GAL internal road network, impacting both airport and non-airport traffic.
- Most of GAL Staff Car Park Y would be lost due to the construction of the new roundabout. These spaces would need to be replaced elsewhere.
- The proposed changes to Longbridge Way roundabout, Perimeter Road North and Longbridge Way would likely impact surrounding airport infrastructure and the Premier Inn hotel land.
- With minimal separation of airport and non-airport traffic, this option wouldn't achieve the safety benefits associated with grade separated solutions that minimise conflict points for through traffic.

11.2.39 The disbenefits of this option were considered to outweigh the benefits. Therefore, this option was not put forward as the recommended design option for this junction.

11.3 A1.3 Alternative Longbridge Junction Design Options

Option 1 - Signal-controlled Junction

11.3.1 To accommodate the forecasted increase in traffic flow at the Longbridge junction and mitigate congestion during peak times, a proposal to upgrade the existing junction to a signal-controlled intersection was developed. To achieve this, upgrades would be required to each of the four arms of the junction. The concept layout of the signal-controlled junction is presented in Figure 14.

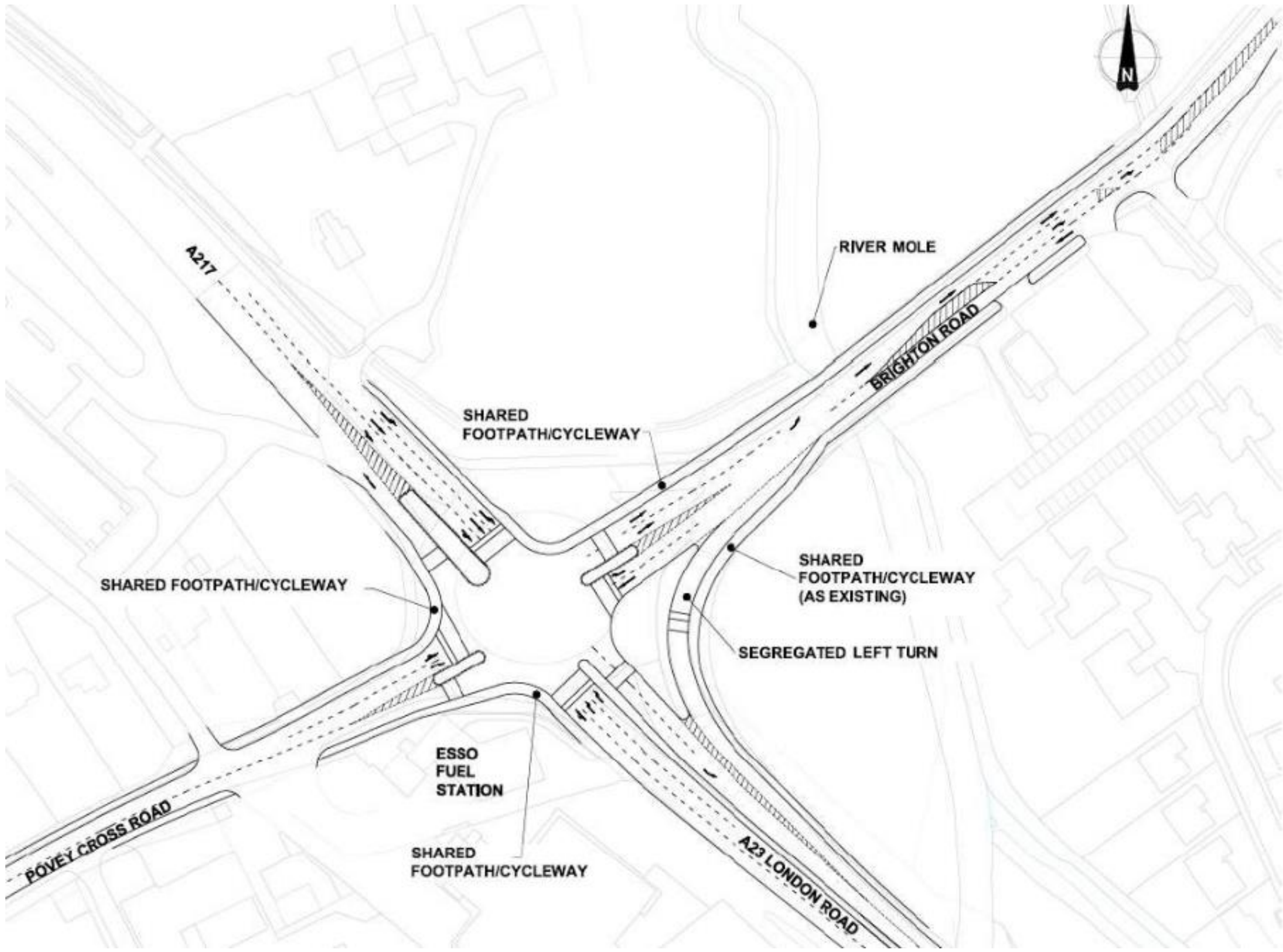


Figure 14: Longbridge Signal-controlled Junction Concept Layout

11.3.2 The A23 London Road northbound approach to the intersection would consist of three lanes, two of which provide a dedicated right turn leading to the A23 Brighton Road facilitating the primary traffic demand. The nearside lane would allow a straight through movement to the A217 and a left turn to Povey Cross Road.

11.3.3 Povey Cross Road and the A217 would largely remain as per the existing layout with minor amendments to align with the amended junction layout and provide additional queuing capacity on the junction approach.

11.3.4 A23 Brighton Road would also have a similar layout to existing, comprised of a single westbound lane widening to two lanes on the junction approach, two eastbound lanes at the junction exit merging to one lane in advance of the bridge at the River Mole, and a modified segregated left turn lane leading to the A23 London Road. Changes are proposed to the east of the river mole where a ghost island would be used to develop a right turn lane to provide access to the service station and Woodroyd Avenue. Widening of Brighton Road and the bridge at the River Mole would be required to support these changes to provide improved traffic flow.

11.3.5 Pedestrian and cyclist facilities would be retained at each arm of the junction via staggered signal-controlled crossings.

11.3.6 The key benefits of this option include:

- The changes to the junction layout would provide safety benefits compared to the existing layout, in particular by making the junction more suitable for HGV turning movements.
- The existing stilt structure supporting the segregated left turn lane from A23 Brighton Road onto A23 London Road would likely be retained minimising construction costs and impacts to existing vegetation in the vicinity of the junction.

11.3.7 The key dis-benefits of this option include:

- Based on the anticipated traffic volumes, this layout would not provide sufficient junction capacity for the design year traffic flows.
- The existing A23 Brighton Road overbridge crossing the River Mole would need to be widened or replaced leading to increased costs and construction works.
- The substantial changes to the junction layout by changing from a roundabout to a signal-controlled intersection would lead to relatively complex construction sequencing and substantial disruption to road users during construction.

11.3.8 As this option would not provide adequate mitigation for the Project, this option was not put forward as the recommended design option for this junction.

Option 2 – Signal-controlled Roundabout

11.3.9 Proposals to increase the capacity of the existing Longbridge junction with minimal design interventions were considered to determine if they could accommodate the forecasted increase in traffic volume. The aim of this design option was to increase stacking capacity on the A217 southbound, Povey Cross Road and the circulatory carriageway in addition to traffic signals improvements to mitigate the increased traffic volume.

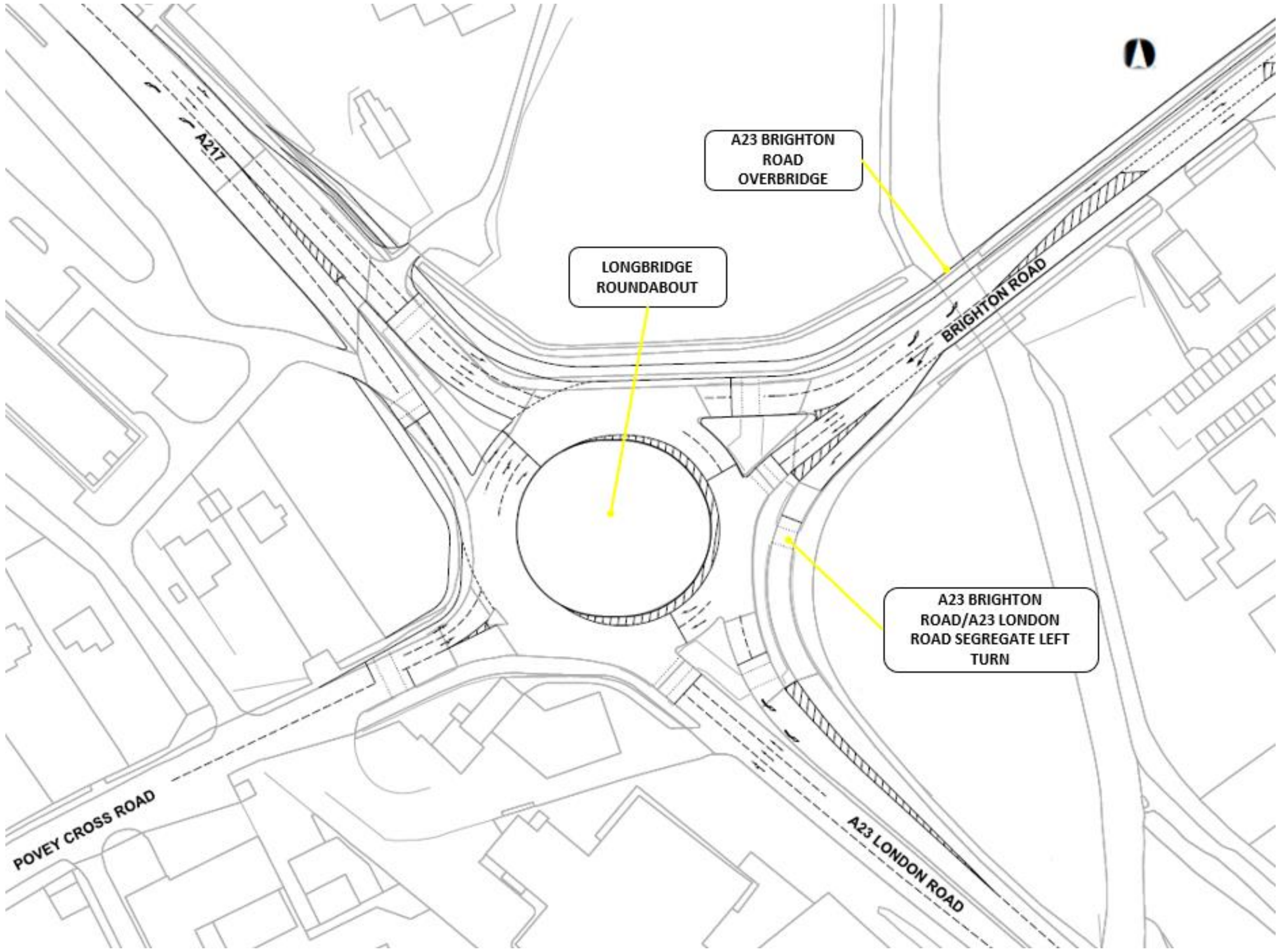


Figure 15: Longbridge Junction Signal-Controlled Roundabout Concept Layout

11.3.10 Under this option the existing roundabout central island was to be retained, avoiding design changes that would result in requiring additional land. This design aims to minimise the impact to adjacent residential and commercial properties and avoid impacting the existing segregated left turn lane and the associated stilt structure. However, changes to the circulatory carriageway are proposed, increasing the carriageway width adjacent to the A217 arm to introduce a third lane and increase storage capacity. Additionally, new traffic signals are proposed at this location. As a result, the eastern and northern kerb line of the roundabout would be widened to accommodate the increased circulatory carriageway width.

11.3.11 Changes to the circulatory carriageway would result in widening of the A217 splitter island to provide suitable stacking space.

11.3.12 The existing stilt structure supporting the A23 Brighton Road to A23 London Road segregated left turn lane would be retained however localised widening to the Brighton Road northbound kerb line would be required to ensure compliant highway geometry for the exit from the roundabout.

11.3.13 No substantial changes are proposed to the A23 London Road for this option.

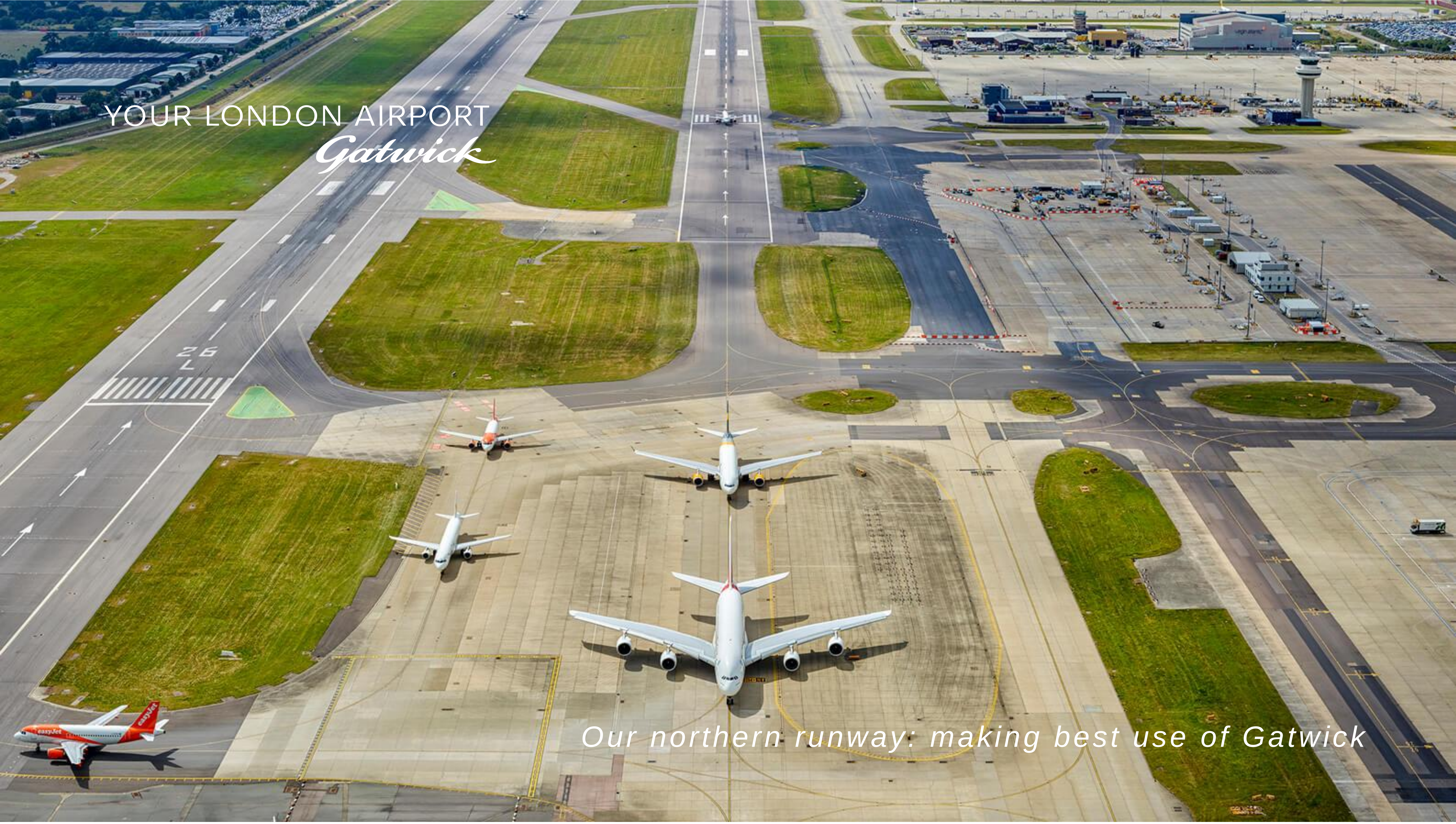
11.3.14 The key benefits of this option include:

- The limited scope of design changes associated with this option would minimise construction costs and disruption to road users during construction.
- The existing stilt structure supporting the segregated left turn lane from A23 Brighton Road onto A23 London Road would likely be retained minimising construction costs and impacts to existing vegetation in the vicinity of the junction.

11.3.15 The key disbenefits of this option include:

- This option wouldn't address safety issues present in the existing layout related to insufficient circulatory carriageway width. Based on vehicle tracking exercises and site observations of damage to roundabout kerbs, the existing layout is not considered to provide adequate space for HGV turning movements.
- As a result of insufficient circulatory carriageway width, this option would likely not provide sufficient capacity to accommodate the anticipated increase in traffic volumes.
- The existing A23 Brighton Road overbridge crossing the River Mole would need to be widened or replaced leading to increased costs and construction works.

11.3.16 As this option would not provide appropriate lane widths on the circulatory, this option was not put forward as the recommended design option for this junction.



Preliminary Environmental Information Report
Appendix 12.9.1:PTAR Annex B: Strategic Modelling Report

September 2021

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1 Executive Summary

1.1 Executive Summary

1.1.1 This document, the PEIR Strategic Modelling Report is Annex B of the Preliminary Transport Assessment Report (PTAR), which is Appendix 12.9.1 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The Project proposes alteration to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations.

1.1.2 This report provides the detail around the suite of transport models that have been used to develop a sustainable surface access strategy for the future of the airport and help assess the impacts of the proposed development on the surface transport network. The report provides a summary of the rationale for the development of the transport models with full technical details of the model development being provided at the DCO stage.

1.1.3 The Gatwick Strategic Model, which is known as GHOST, (Gatwick's Holistic Overview of Strategic Transport) was developed in order for GAL to assess the impact of any potential future airport growth scenarios on the transport network.

1.1.4 There are three core model components to the GHOST model which align to the modelling structure outlined in TAG (Unit M1.1).

- The demand model – capable of reflecting changes in the distribution and mode of non-airport demand and the mode of travel for airport demand (employees and passengers).
- Assignment models – capable of establishing the likely routes taken by airport and non-airport demand and producing costs for the demand model.
- Simulation models – used for the detailed operational assessment of key pieces of infrastructure at and adjacent to the airport.

1.1.5 GHOST is made up of:

- A highway assignment model in SATURN;
- A separate rail and bus/coach model in Emme;
- A variable demand model in Emme; and
- A Gatwick Mode Choice model, known as GSAM.

1.1.6 GHOST has been developed using available model data including:

- the South East Regional Traffic Model (SERTM);
- PLANET South;
- Crawley Local Transport Model (CLTM); and
- London Highway Assignment Model (LoHAM).
- a wealth of existing data sources including but not limited to traffic count data from local authorities and WebTRIS, surveyed traffic count data, journey time data, distribution data Green Book data, timetable data, Gatwick employee survey data and CAA data.

1.1.7 All the elements of the strategic transport model have been through development, calibration and validation using the appropriate TAG guidance. The model is deemed appropriate for assessment for the PEIR and associated impacts of the development at Gatwick Airport. However, detailed model statistics are being reviewed by stakeholders and the model will be go through a series of updates in terms calibration and validation to feed into the final DCO submission.

1.1.8 The model has been developed to a June 2016 base year and considers the following year assessment years to analyse the peak construction and the operation of the airport:

- 2018 – Forecast to support environmental modelling workstreams
- 2029 – First Full Year of Operation
- 2032 – Interim Assessment Year
- 2047 – Ultimate Year

1.1.9 In term of background growth assumptions in accordance with TAG Unit M4, an uncertainty log was developed for both demand (e.g., developments) and supply (e.g. new transport infrastructure). The demand uncertainty log was used as the basis for reviewing assumptions at a fine level of spatial detail in the Area of Detailed Modelling AoDM. National Trip End Model NTEM assumptions were updated accordingly, and the most current local plan assumptions were used as the basis for the growth trajectory in each local authority district. These were further extrapolated beyond the relevant local plan period adopting the assumptions in the NTEM.

1.1.10 The forecasts prepared by GAL for the Northern Runway and Baseline Cases adopt a 'No Heathrow R3' assumption, as providing a robust assessment of local conditions. GAL will, however, keep this under review as work continues on the project.

1.1.11 Therefore, the central assessment cases for the Project are as follows:

- Gatwick future baseline with no Heathrow R3.
- Gatwick Northern Runway or with "Project", which assumes Project opens in 2029 and Heathrow R3 does not come forward.

1.1.12 Growth in passengers, employees and cargo for both cases and all assessment years has been developed by ICF and used in the modelled scenarios. Additional growth is servicing vehicles to/from the airport has been assumed alongside indirect and catalytic job growth due to the Northern Runway Project, which was provided by a third-party consultant on behalf of GAL.

1.1.13 The strategic model includes measures around the Airport Surface Access Strategy, most notably increases in forecourt and parking charges. These lead to an increase in passenger public transport mode share from around 45% prior to the Covid-19 pandemic up to 54% and 56% between 2029 and 2047. Whilst not at the 60% draft target GAL has set itself for 2030, this increase in public transport mode share for air passengers is significant and notable given the growth in passenger numbers with the Project.

1.1.14 In terms of employees, the strategic model shows that a sustainable transport mode share of 47% is achievable and this would indicate that further measures are required, in particular these could include incentives around EV uptake as well as restrictions on staff parking.

1.1.15 Even with increases in sustainable mode share, the modelling also then assumes proposed highway mitigation is in place in the 'with Project' scenarios in 2032 and 2047. Highway works are proposed as part of Project to both the South Terminal and North Terminal roundabouts, to improve capacity and mitigate against significant effects, with additional improvement works also proposed at the Longbridge Roundabout. The final designs and details of the improvement works will be subject to further road traffic assessment and detailed engagement with highway authorities, including Highways England.

Highway Network Performance Summary

1.1.16 Similar levels of growth are displayed in all four time periods for car business, commute and other trips. Between 2016 and 2047 there are 26% additional business trips, 21% additional commuting trips, and 33% additional other trips.

1.1.17 Between 2016 and 2047 airport passenger car trips are forecast to grow by 24% (an additional 1,672 daily car trips) in the Future Baseline and 50% (3,454) in the Future Baseline with Project. Employee car trips are expected to increase by 18% (300) Future Baseline and 31% (518) with Project.

1.1.18 The impact of the Project compared to the Future Baseline on the highway network across five performance areas has been assessed by considering the AADT, journey times, Volume to Capacity Ratios, and a Magnitude of Impact metric.

1.1.19 In 2029 there are increases of 2,500 vehicles a day with Project for access to Perimeter Road, associated with the relocation of trips from Gatwick South Terminal in the opening year as part of changes related to the car parking strategy.

1.1.20 In 2032 the more significant increases in demand are expected with the Project, including on the M23 north of the airport and on the M23 spur in each direction. Journey times are not notably affected between the Future Baseline and with Project scenarios, with changes across all years limited to no greater than a 1-minute increase for end-to-end journey times.

1.1.21 A few areas around the airport are flagging as having a V/C > 99 with Project which are London Road between Lowfield Heath and Gatwick Road roundabouts in 2029 and 2032 ; Airport Way westbound in 2032 and 2047; Gatwick Road northbound approach to Gatwick Road roundabout in 2032 and 2047 which have been investigated further in the VISSIM modelling. There are additionally some increases in busyness at M23 Junction 9.

1.1.22 The key areas where there are notable Magnitude of Impacts are predominantly at access/egress points to the network for airport traffic, in particular at Gatwick Road roundabout and from North Terminal Long Stay. Staff parking spaces increase change with Project to the south, with access to the network via either Gatwick Road roundabout or Lowfield Heath roundabout.

1.1.23 The increase in traffic with Project, also results in some notable changes on the M23 Junction 9 southbound offslip, particularly in AM1 and AM2, and at the M23 Junction 8 northbound offslips and southbound onslips.

1.1.24 All of these local impact areas are examined in further detail in local VISSIM microsimulation modelling, which is reported in the PTAR.

Public Transport Network Performance Summary

Rail

1.1.25 Between 2019 and 2047 station entries/exits at Gatwick Rail Station are forecast to grow by around 60% in the Future baseline and around 90% in the Future baseline with Project. A Legion simulation model of pedestrian movements through the station has been developed to test the capacity of the station to serve these expanded volumes and is reported in the PTAR.

1.1.26 Overall, the Project adds around 18,600 (+4.2%) passengers over 24 hours in 2047 of which:

- 1,350 (+1.2%) are Brighton Main (Brighton)
- 600 (+1.3%) are Arun Valley
- 550 (+3.0%) are North Downs Line (Reading)
- 100 (+2.4%) are Tonbridge Line
- 16,000 (+6.3%) are Brighton Main (London)

1.1.27 In 2029, 2032 and 2047 there are increases in both seating capacity (due to extra services) and in demand. In 2029 both Future Baseline and with Project scenarios, a similar level of crowding occurs to 2019. Although demand has increased, so has capacity, as the full Thameslink (24 tph) frequencies come into effect as well as extra peak services enabled by the Croydon Area Remodelling Scheme.

1.1.28 In 2032, capacity is unchanged from 2029, but demand growth continues, leading to slightly raised load factors in both scenarios but Purley remains the southern limit for standing into London in the AM peak.

1.1.29 By 2047, the fast services are approaching seated capacity with Gatwick Express seats being 94% occupied (in the Future Baseline) and 96% (in Future Baseline with Project); Fast Victoria 98% and 100% and Fast London Bridge 99% and 100% (Future Baseline and Future Baseline with Project respectively).

1.1.30 The volume changes on the London Underground are small in comparison to the overall volumes forecast on these links, with a maximum forecast change being 141 from Green Park on the Victoria Line. Changes of this magnitude will be unnoticeable when compared to background activity on the London Underground network.

Bus/Coach

1.1.31 This report provides a summary of changes in airport related demand on bus and coach services. The growth rates 2019 to 2047 Project are around 40% for local bus and around 140% for coach. For bus and coach services the assumption is that operators can adjust capacity to manage loadings more readily than rail services, through adjustment of frequencies as Gatwick demand grows. Coach and bus loadings are therefore not assessed against a fixed capacity plan.

Construction Scenarios

1.1.32 Two scenarios have been modelled to assess the impact of construction at two different phases of the development being delivered. These scenarios reflect:

- the airfield and airport works; and
- the effect of the highway construction.

1.1.33 The airfield construction scenario adds 33 vehicles (HGVs and LGVs) in and out an hour along the M23 Spur, and 150 construction worker vehicles in the morning peak hour. These changes are small and no significant impacts are shown by the model.

1.1.34 Highway construction has been modelled to represent the four-month period when construction work will be carried out around South and North Terminal roundabouts. This includes narrowing of lanes and lane closures in the vicinity of the terminal roundabouts. The modelling showed that the constraint on the highway network at both South and North Terminal roundabouts leads to slightly lower numbers of trips using the key routes in/out of the airport via the M25 and M23 corridors across the day.

1.1.35 Additionally, there are increases in AADT through Crawley where vehicles that would normally use the Spur use alternate routes to avoid the constraints on the Spur and terminal roundabouts which are causing congestion/delays. However, the temporary impact on junction operation is limited with the main affects being seen immediately adjacent to the airport.

Conclusion

1.1.36 In summary:

- the Project result in journey times which are not notably affected between the Future Baseline and with Project scenarios, with changes across all years limited to no greater than a 1-minute.
- There are some areas of notable Magnitude of Impacts predominantly at access/egress points to the network for airport traffic, or in close proximity to the airport which are being examined in further detail with the VISSIM model and reported in the PTAR.
- The airfield construction give rise to no significant highway impacts.
- Highway construction shows that the constraint on the highway network at both South and North Terminal roundabouts leads to slightly lower numbers of trips using the key routes in/out of the airport via the M25 and M23 corridors across the day.
- The Project will increase the number of rail passengers but based on the line loading, seated loading factor and standing capacity assessments, no significant crowding on rail services is expected as a result of the Project.
- Given the adaptability of bus and coach provision, it is not considered necessary to model crowding on bus and coach services, the assessment includes service frequency and quality as a measure of public transport amenity. Increased service frequencies provide improved amenity for non-airport users also, benefitting both local communities and businesses by improving connectivity.

2 Introduction

2.1 General

2.1.1 This document, the PEIR Strategic Modelling Report is Annex B of the Preliminary Transport Assessment Report (PTAR), which is Appendix 12.9.1 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process for the proposal to make best use of Gatwick Airport's existing runways (referred to within this report as 'the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in the Chapter 5: Project Description of the PEIR.

2.2 Purpose of this report

2.2.1 Gatwick Airport Limited (GAL) have developed a suite of transport models to help develop a sustainable surface access strategy for the future of the airport. The models enable different travel policies at the airport to be assessed to help reduce the impact of increased Air Traffic Movements (ATMs) on the surface transport network.

2.2.2 The models were developed and refined to support GAL's Northern Runway Proposals and enable the assessment of environmental effects in line with national guidance set out in the IEMA EIA guidance and in the DfT's Transport Analysis Guidance (TAG).

2.2.3 This PEIR Strategic Modelling Report sets out the rationale for the development of the transport models, key sources of data, key assumptions and provides an assessment of the potential effects of the scenarios set out above.

2.2.4 Full technical details of the models developed, in a format akin to TAG's recommendations for a Traffic Data Collection Report, Model Validation Report and Traffic Forecasting Reports will be provided at the DCO stage and aspects of these are being discussed with the relevant stakeholders, including the DfT, Surrey County Council (SCC), West Sussex County Council (WSCC) and Highways England. It is expected that this process will continue during and after the PEIR Consultation and during which, model assumptions will be updated and further refined to reflect feedback from stakeholders.

2.3 Northern Runway Proposals

2.3.1 Gatwick Airport is served by a single runway. The airport also has a further runway, which is located north of the main runway and is only available for use when the main runway is closed. This runway is known as the 'northern runway' or the 'standby runway'. A planning condition, together with a planning agreement, has historically prevented this runway from being used at the same time as the main runway. This agreement expired in August 2019 but the planning condition remains in place.

2.3.2 The Project proposes to make alterations to the northern runway, including repositioning its centreline to the north by 12 metres which, along with the lifting of the planning condition restricting its use, would enable dual runway operations in accordance with international standards.

2.3.3 It is anticipated that by 2047 these improvements could increase airport capacity up to 80.2 million passengers per annum (mppa), compared to a maximum potential capacity based on existing facilities of 67.2 mppa within the same timescale. This represents an increase of approximately 13 mppa. Further details of the proposals are presented in the PTAR[1] Section 2.

2.4 Scenarios for assessment

2.4.1 Modelling considers the following assessment years to test and analyse the peak construction phase and the operation of the Airport without and with the Project, details regarding these scenarios are provided in section 8.

2016 Baseline Year

- The baseline year is 2016. This matches the base year of the modelling tools being used and reflects an extensive data collection exercise undertaken by GAL in that year. This includes mobile phone data capture, collected over a two-month period and comprising upwards of 2.5 million devices and 170 million events per day for the busiest days giving a wealth of information to inform transport modelling. Given construction of M23 Smart Motorways from 2018 to 2020, rail disruption in 2016 through to 2018, and now the Covid pandemic, this remains the most recent dataset.
- The baseline scenario is used to describe existing transport infrastructure and the performance of the transport network prior to expansion. In order to provide comparison with other environmental modelling workstreams a 2018 forecast was provided from the model to support these assessments.

2029 First Full Year of Operation

2.4.2 The first year of operation after opening of the Project is anticipated to be 2029, accordingly this would be the first operational year modelled and tested.

2032 Interim Assessment Year

2.4.3 An interim assessment year, by which time it is expected that all slots on the northern runway are likely to have been filled and the highway mitigation is expected to be in place. This horizon year was tested both without and with the Project.

2047 Ultimate Year

2.4.4 Reflecting a requirement under the Design Manual for Road and Bridges[2] to assess the effects of a highway project (the Northern Runway highway mitigation scheme in this context) 15 years after it has been completed. This assessment year has been tested both without and with the Project.

Construction Traffic Scenarios

2.4.5 Two construction traffic scenarios have been considered.

2.4.6 This first provides an understanding the impact of peak construction vehicle traffic on the highway network. It considers construction traffic reflecting the significant airfield and airport works, which would be completed in the mid-2020s, modelled using the 2029 baseline scenario for airport and background traffic.

[1] Appendix 12.9.1 PTAR

[2] DMRB Vol. 5, Sec. 1 (TD37/93)

2.4.7 The second scenario provides an understanding of the impact of constructing the highway mitigation. This construction scenario uses the 2029 with Project airport traffic and considers the effects associated with highway construction, such as potential traffic redistribution using strategic modelling.

Habitats Regulations Assessment (HRA)

2.4.8 Guidance produced by Natural England[3] identifies the following considerations for the assessment of air pollution impacts at ecological sites reported in an HRA: To support this assessment, an additional scenario for 2032 was required to create an alternate future baseline scenario, full details are provided in section 7.3.

2.5 Stakeholder Engagement

2.5.1 The model has been developed with input from key stakeholders such as DfT, Highways England and Local Authorities including West Sussex and Surrey councils. This was undertaken through a series of technical workshops and reviewing of specific modelling technical notes when the base model was being developed. Stakeholder engagement meetings are recorded in Table 4.2.1 of the PTAR. These workshops have been restarted in Summer 2021 to finalise the base and forecast year models for DCO submission with initial meetings held with:

- DfT;
- Highways England;
- Surrey; and
- West Sussex.

2.6 Structure of report

2.6.1 This report is set out as follows:

- Section 3 provides an outline of the **modelling framework**, the range of interventions to be tested and the requirements for the models developed.
- Section 4 sets out the **key features of the models**, this covers the general architecture of the models developed, the coverage, time periods and segmentation.
- Section 5 lists out the types of **data** that were collected and collated on behalf of developing the models.
- Section 6 describes the **model development** approach.
- Section 7 describes the range of **background forecasting assumptions** used to construct the future baseline.
- Section 8 sets out the specific **Northern Runway Proposals** in the context of strategic model assumptions.
- Section 9 provides the **future demand by mode** at the airport. These are outputs of the model forecasts for the Future Baseline and Future Baseline with Project scenarios – showing the airport passenger and employment demand at the airport using different surface transport modes of access.
- Section 10 describes the potential **highway network performance** when considering each of the assessment scenarios. This sets out the impact at different geographical scales.
- Section 11 describes the **public transport network performance** for each of the assessment scenarios covering both rail and the bus / coach networks.
- Section 12 evaluates the **construction scenarios** including airfield construction activity and the construction of highway mitigation.
- Section 13 sets out the assumptions for generating outputs from the model to support environmental assessment.
- Section 14 provides an overall summary and conclusion of the assessment.

[3] Natural England (2018), Approach to advising competent authorities on road traffic emissions and HRAs

3 Modelling framework and assessment requirements

3.1 Model uses

3.1.1 The Gatwick Strategic Model, which is known as GHOST, (Gatwick's Holistic Overview of Strategic Transport) was developed in order for GAL to assess the impact of any potential future airport growth scenarios on the transport network. It allows GAL to understand the impacts of changes in transport system capacity or performance on airport accessibility and the modes of transport used by passengers and employees.

3.1.2 The GHOST model was designed to specifically test proposals that include:

- growth in passenger numbers;
- change in flight schedules (such as the mixture of long haul and short haul flights, change in arrival and departure profiles and aircraft size) affecting passenger numbers and demographics;
- growth in staff numbers;
- changes to surface transport access and behaviour;
- responses to changes in travel cost over time; and
- surface access designs.

3.1.3 Additionally, the model is capable of including the potential impacts of:

- Committed proposals for upgrades to the wider transport system (e.g., highway junction improvements, rail service upgrades, bus frequency changes).
- Committed development proposals with the local area covering housing, employment or mixed-use development sites.
- The model is capable of providing traffic forecasts and network speed impacts that are required for environmental assessments covering noise and air quality.

3.2 Interventions to be tested

3.2.1 The previous work undertaken for the Gatwick Second Runway Airport Surface Access Strategy (R2 ASAS), in response to the Airports Commission, identified a range of potential transport schemes that could be required to support growth at Gatwick Airport. The strategic model was developed in order to be able to assess the impact of these interventions. These included:

- highway widening;
- junction improvements, including grade separation;
- signal timings / controller change;
- changes to rail and bus/coach services;
- public transport service frequency changes and speed changes;
- parking regime changes; and
- pricing / fare changes (including access charges and car parking).

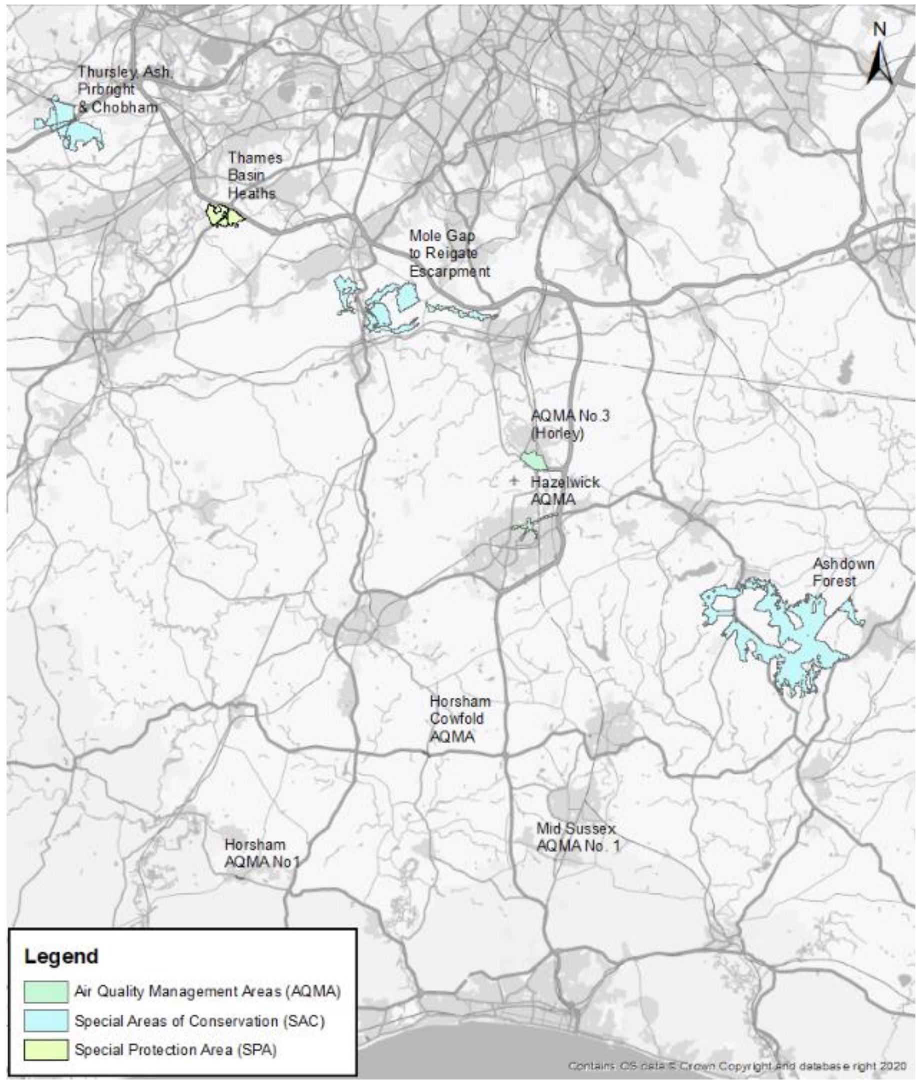
3.3 Key requirements

3.3.1 The core requirements of the GHOST model are a capability to assess the transport network affected by Gatwick Airport in order to assess the impact of future changes at the airport.

3.3.2 Considering the specifics of potential changes at the airport and the transport system serving it, the following requirements were used as the basis for developing the model:

- multi-modal capability with highway, public transport (rail and bus/coach) modes represented;
- time periods that take account of peaks at Gatwick airport and peaks on the surrounding road and rail networks, which in some cases may differ;
- separate segmentation for airport passengers and employees in order to be able to update passengers and employee numbers, their distribution, and represent the different perceptions of mode choice for each group;
- inclusion of goods traffic movements consistent with airport operations, services and airborne cargo demand;
- the highway model includes detailed junction modelling covering a suitable area, and takes account of flow metering and blocking back effects to accurately reflect delays and potential upstream effects;
- demand modelling functionality to represent the potential behavioural responses to changes in travel costs, such as changes in trip distribution and mode, for non-airport users;
- sufficient detail at the airport is included to be able to provide inputs into local more detailed simulations models that model the detailed operation of key pieces of infrastructure (e.g., capable of assessing detailed highway junction performance, or the operation of Gatwick Airport station); and
- inclusion of sufficient spatial detail and accuracy to facilitate environmental assessments for noise and air quality. Figure 1 shows the environmentally sensitive areas in the local area highlighting the potential relevance of model detail in these areas.

Figure 1: Environmentally sensitive areas near to Gatwick Airport



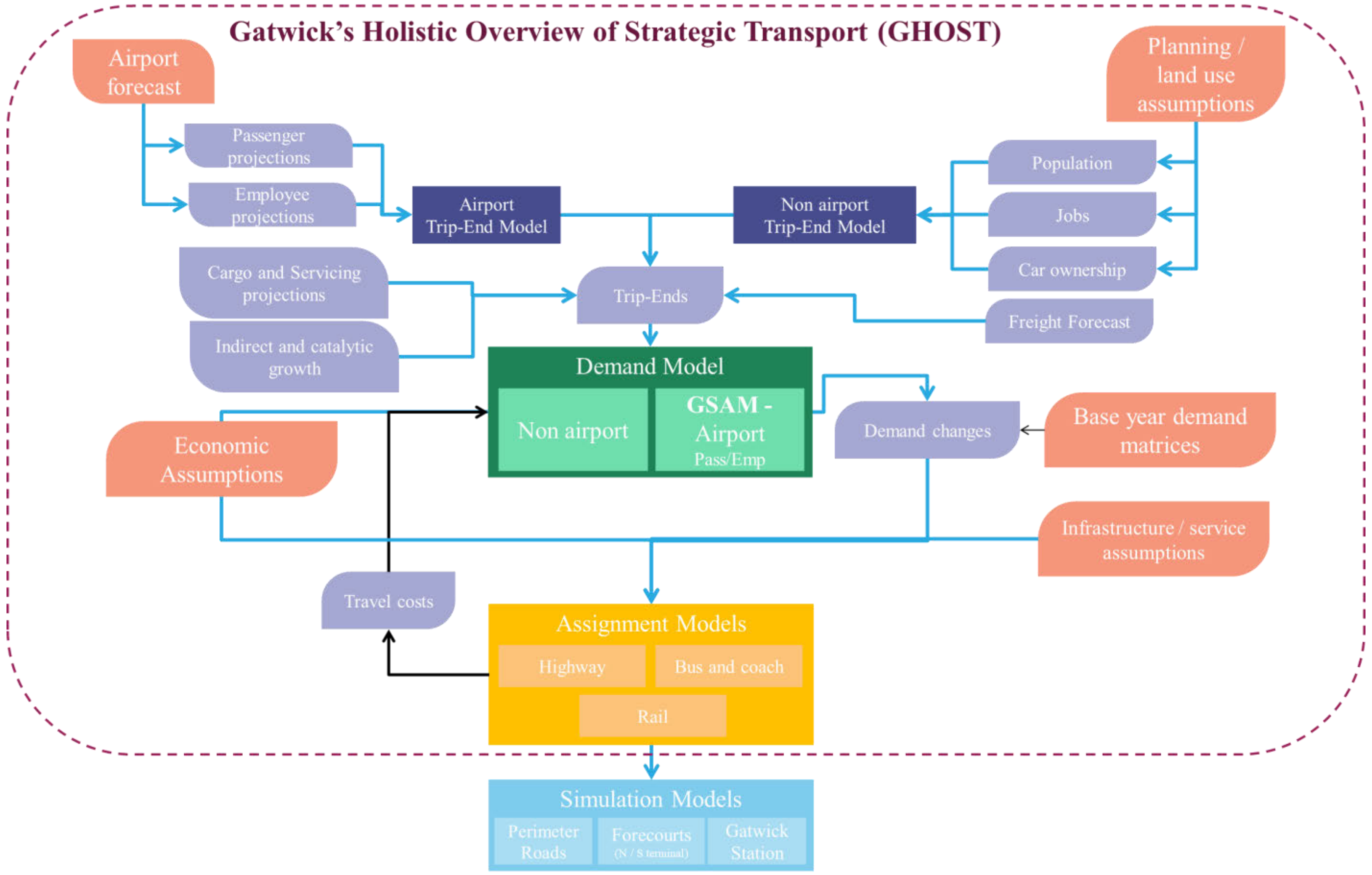
4 Key features of models

4.1 Overall modelling architecture

4.1.1 Figure 2 outlines the overall modelling structure that the GHOST Model follows. This aligns with the approach in TAG (Unit M1.1). It outlines three core model components:

- **The demand model** – capable of reflecting changes in the distribution and mode of non-airport demand and the mode of travel for airport demand (employees and passengers).
- **Assignment models** – capable of establishing the likely routes taken by airport and non-airport demand and producing costs for the demand model.
- **Simulation models** – used for the detailed operational assessment of key pieces of infrastructure at and adjacent to the airport.

Figure 2: Model Architecture



4.2 Source model overview

Use of existing models

4.2.1 The main objective of the model development is to create a suite of models that covers the requirements listed in Section 3.

4.2.2 A number of pre-existing models have provided useful source data to support the development of the GHOST model. The approach was therefore to make best use of existing model components, along with the incorporation of relevant data, to ensure the approach aligns with guidance within the DfT's TAG. The key source models are summarised below.

South East Regional Traffic Model (SERTM)

4.2.3 Highways England commissioned the development of five regional transport models in 2015, one of which covers the South East region. The South East model covers the South East England region which includes Gatwick Airport and the surrounding area with a modelled base year of March 2015.

4.2.4 These regional models were developed in order to assist in the assessment of Road Investment Strategy (RIS) schemes. The nature of the regional model means that there is no single geographic area of focus, and therefore to use the model for a local study, local area updates and recalibration/validation was required.

PLANET South (PS)

4.2.5 PLANET South (PS) is an AM peak rail model covering the south of England with a base year of 2011. PS is a member of the PLANET group of models, owned by the Department for Transport (DfT). It is focussed on national rail (TOCs); but London Underground, DLR and Croydon Tramlink services are also included to provide London access and cross London connectivity for rail trips.

Crawley Local Transport Model (CLTM)

4.2.6 The Crawley Local Transport Model (CLTM) is owned by West Sussex County Council (WSCC). The model focuses its area of detailed modelling on the town of Crawley with some extension of the simulation network coding to the north to account for trips between Crawley and both Gatwick Airport and Horley. The model version that we considered had a base year of November 2015.

4.2.7 The SATURN highway assignment model is supported by a spreadsheet-based trip-end and mode choice model in order to assess mode share in terms of public transport and active modes. This methodology means that other demand responses such as time period choice are not considered.

London Highway Assignment Model (LoHAM)

4.2.8 The London Highway Assignment Model (LoHAM) is owned by Transport for London (TfL). London is the area of focus with detailed simulation network inside the M25. At the time of developing the GHOST model TfL were creating an updated model with a base year of November 2016 which wasn't yet complete, with only the initial networks available for use during the development stage.

4.2.9 The HAM model is fed by TfL's demand model LTS with a separate public transport model, Railplan, used to assess the public transport network.

4.3 Model Platform

4.3.1 This section outlines the different software components that have been adopted to make best use of the available models in the development of the GHOST model.

Highway Assignment Model (HAM)

4.3.2 The South East region and the area around Gatwick in particular experience congestion during the peak periods. This, along with the network detail needed to assess widening and junction improvements requires a model platform that can assess these types of interventions.

4.3.3 The HAM was developed in the SATURN software, which is the most appropriate software for strategic highway modelling and is the software used by all of the source highway models. SATURN allows flow metering and blocking back to be modelled as well as achieving good convergence over large areas where detailed simulation is required for all junction types.

Public Transport Assignment Model

4.3.4 Emme was used for the public transport models. Emme is a well-established and reliable software for public transport assignment, including modelling impacts of in-vehicle crowding on passenger route choice. Both TfL and DfT have their principal rail models in Emme software (Railplan and PS respectively) and its strengths and limitations are well understood.

Variable Demand Model (for Non-Airport movements)

4.3.5 The highway and PT parts of the model are linked through a TAG aligned Variable Demand Model (VDM). Two options were considered: adapting the SERTM VDM which is coded in DfT software DIADEM; or developing an equivalent VDM in Emme scripting software for a more bespoke application.

4.3.6 Following a review, it was determined that an Emme option was preferred to allow for an improved interface between all component model parts, allowing for greater control over methodology and quality control.

Airport Demand Models

4.3.7 For consistency with other parts of the model and for efficiency (fast matrix calculations) the airport demand models were implemented in the Emme software.

4.3.8 The Gatwick Surface Access Models (GSAM) are mode choice models for travel to/from Gatwick Airport. GSAM is a key component of the strategic model; its role is to forecast how the mode choices of air passengers and airport employees change as transport supply times and costs change. It is comprised of two parts:

- an Air passenger model called GapSAM (Gatwick air passenger Surface Access Model); and
- an employee access model called GemSAM (Gatwick employee Surface Access Model).

4.4 Model Coverage and Network Structure

Highway Model Coverage

4.4.1 SERTM was used as a basis for assessing the extent of the modelled area which is shown in Figure 3. The Area of Detailed Modelling (AoDM) extends to the A27 in the south and Croydon in the North. The extent of the AoDM was determined through analysis of scale of the potential Affected Road Network (ARN) using SERTM by uplifting airport demand and reassigning to the base network to identify the ARN following the quantification method outlined in DMRB.

4.4.2 The fully modelled area includes the entire M25 and road network in London, however it should be noted that outside of the AoDM London is coded as a fixed speed network. Outside the fully modelled area the network consists of buffer links coded with fixed speeds. The buffer network covers the rest of Great Britain and provides realistic routing and journey times for trips to and from external zones. In both the fully modelled and external areas the model is not validated.

Figure 3: Highway Assignment Model Extent

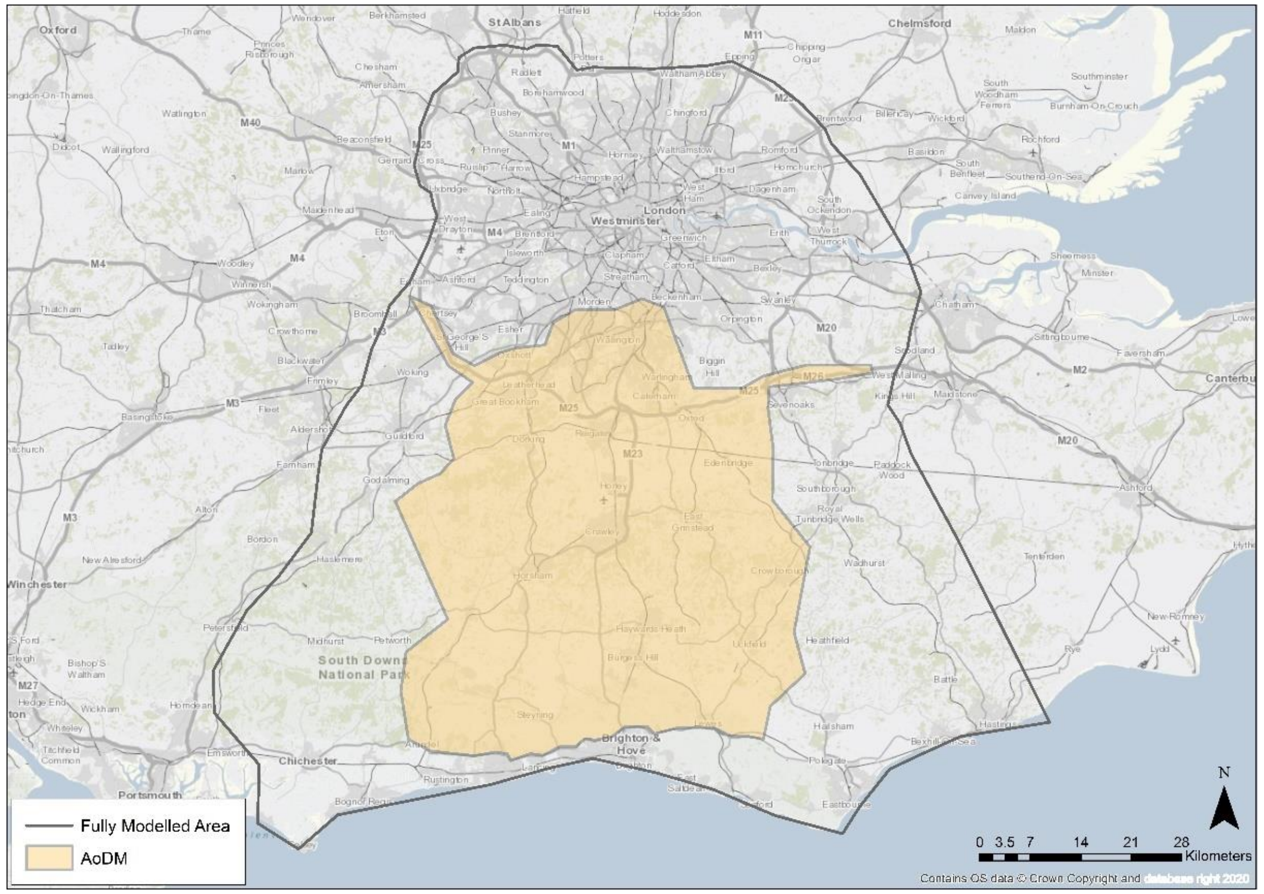


Figure 4: Rail network extent

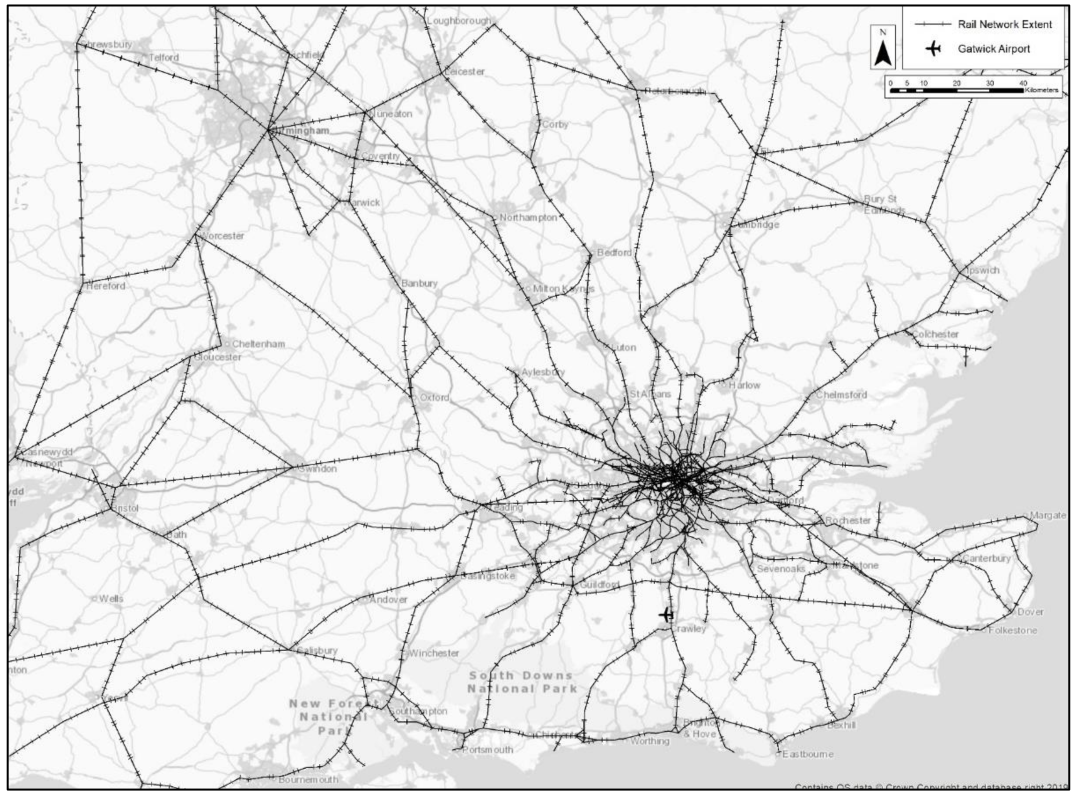
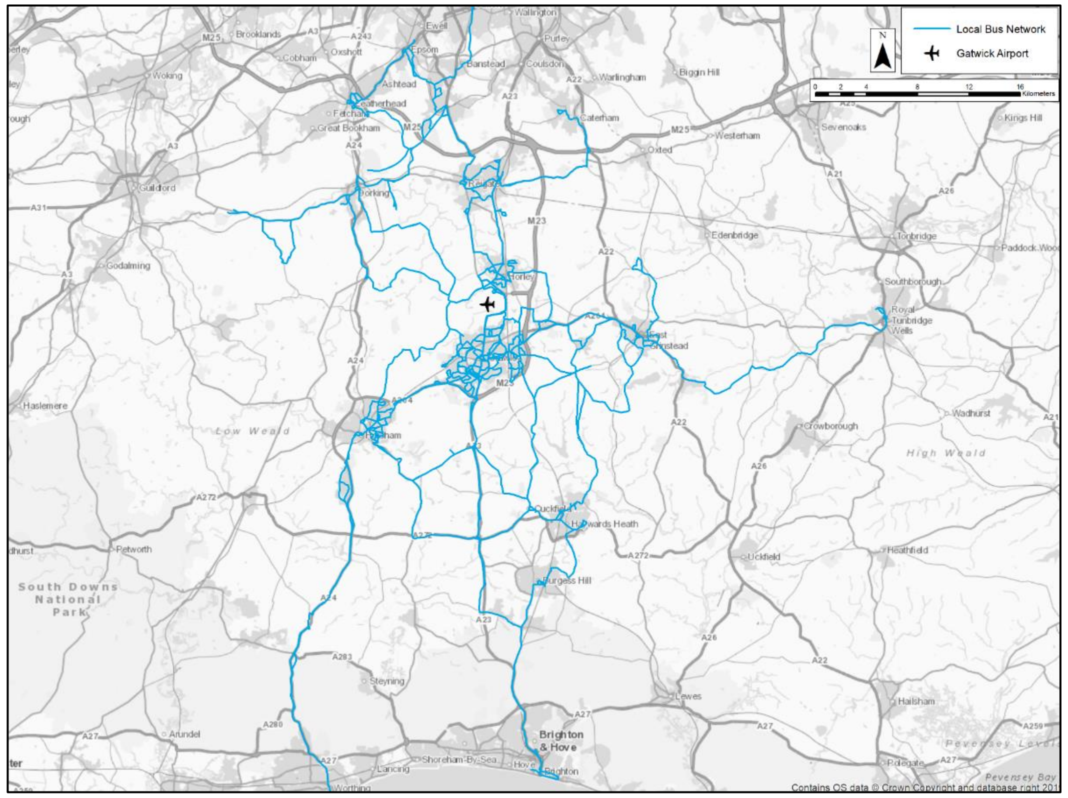


Figure 5: Local Bus Network



Public Transport Model Coverage

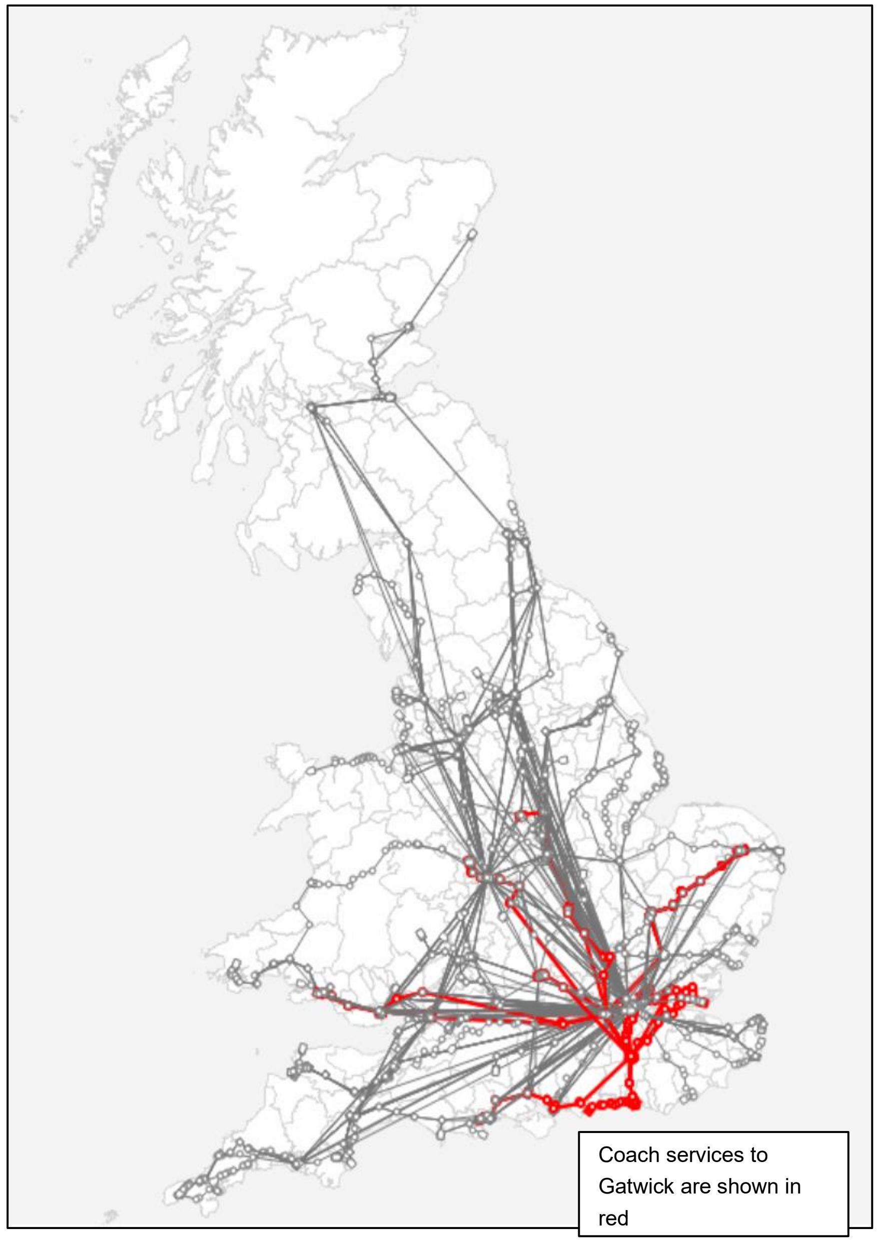
4.4.3 The extent of the public transport models for both rail and local bus and coach are shown in Figure 4 and Figure 5 and Figure 6 respectively. The rail model covers all national rail demand, stations and services in southeast England, while the bus/coach model covers demand for travel to and from Gatwick Airport only.

4.4.4 It was deemed advantageous that the rail model should include rail demand for all London corridors given that travel to Gatwick for many movements requires cross-London travel. Therefore, full coverage of PS has been included. This covers a far wider area, including origins that have recently become directly linked to Gatwick by Thameslink, such as Stevenage, Peterborough and Cambridge.

4.4.5 The bus/coach model includes all bus services that operate to, from or within the Crawley, Horley and Gatwick area. These are operated mainly by Metrobus plus a few by Southdown. The services include those that do not serve Gatwick Airport such Route 11 (Maidenbower) and 23 (Worthing) from which a transfer at Crawley bus station would be required to reach Gatwick.

4.4.6 The bus/coach model also includes all coach services operated by Megabus and National Express nationwide, plus other coach operators operating services at Gatwick Airport.

Figure 6: Coach network (interpeak)



4.5 Model Base Year

4.5.1 The model base year is 2016. This matches the base year of the modelling tools being used and reflects an extensive data collection exercise undertaken by GAL in that year including traffic count data, mobile phone data, and an employee travel survey.

4.5.2 It corresponds with normal road conditions prior to the M23 Smart Motorway programme, which started in 2018 and completed in September 2020, and the subsequent Covid pandemic. The M23 Smart Motorway programme resulted in roadworks and associated speed limit restrictions on the major strategic route to the airport.

4.5.3 From 2016 through to 2018 there was disruption (reduced services, cancellations, short formed services) on the Southern rail network including Brighton Main Line due to reconstruction of London Bridge station and Thameslink Programme. Analysis of growth rates showed that during this period there was lower than normal growth (or even contraction) and unreliable counts. Following discussion with train operator GTR it was determined that 2016 demand in the absence of disruption would be estimated by interpolating between counts taken before and after the disruption. The resulting underlying growth rates were checked against other areas, that were not affected, and found to be similar.

4.5.4 Taking all the above into account, 2016 was determined to be the most appropriate base year for the strategic model as it would replicate more normal conditions alongside the appropriate count datasets.

4.6 Time periods and seasonality

4.6.1 Airport seasonality analysis and traffic flow analysis on both the strategic and local road network was undertaken and showed that June was considered an appropriate month for the purpose of the assessment. June is representative of a neutral month for background traffic being outside of the school holidays, while the airport flows are 18% higher than the annual average, with the airport operating its summer flight schedule.

4.6.2 In addition to analysing the seasonality profiles, counts sites on both the strategic and local road network were analysed to understand the peak flows on the highway network. The analysis concluded that in the morning peak period there were distinct peak hours on the SRN and Local Road networks, in order to assess the peak impact upon the network two separate hours therefore needed to be modelled. In the evening peak period, SRN and local road network profiles are similar and therefore an average hour is most representative of typical conditions.

4.6.3 Therefore the time period definitions for the highway model are:

- AM Peak Hour 1 – representing the peak in flows on the SRN network between 07:00 – 08:00;
- AM Peak Hour 2 – representing the distinct peak in vehicles on the network between 08:00 – 09:00;
- IP Average Hour – representing an average hour flow between 09:00 – 16:00;
- PM Average Hour – representing an average hour flow between 16:00 – 18:00; and
- Off Peak Average Hour – representing an average hour flow between 18:00 – 07:00.

4.6.4 The Variable Demand Model has the same periods as the highway model except that periods AM1 and AM2 were combined into a single AM Peak period.

4.6.5 The PT models and the Airport Demand model have the following time periods:

- AM Peak – representing the period 07:00-09:00;
- Interpeak – representing the period 09:00-16:00;
- PM Peak– representing the period 16:00-18:00;
- Off Peak 1 – representing the period 18:00-24:00;
- Off Peak 2 – representing the period 00:00-04:00;
- Off Peak 3 – representing the period 04:00-07:00;

4.6.6 Three off peak periods have been selected to reflect the three very different levels of service to/from Gatwick in the off-peak: during OP1 (evening) there is good level of service and high PT mode share; in OP2 (night) there is little demand and most rail and bus lines have no service; and OP3 (early morning) when a reduced service operates and there is low PT mode share but significant airport demand .

4.7 Segmentation

4.7.1 The following level of segmentation has been applied in the highway assignment model:

- Car – Employers' Business;
- Car – Commute;
- Car – Other;
- Car – Gatwick Airport Employees;
- Car – Gatwick Airport Passengers;
- Light Goods Vehicles (LGVs); and
- Heavy Goods Vehicles.

4.7.2 In the VDM the segments are:

- Home-based work (commute)
- Home-based employers business
- Non-home-based employers business

- Home-based other
- Non-home-based other
- LGV (fixed)
- HGV (fixed)

4.7.3 The rail assignment has been segmented by purpose as in the existing PS model: business, commute and leisure; and the bus/coach assignment will only include assignment of airport users.

4.7.4 The airport passenger and employee mode choice models have adopted a segmentation that is appropriate to airport passengers and employees. For air passengers the segmentation has the same categories used in several existing SE England airport choice models: UK-resident Business, UK-resident Leisure, UK-non-resident Business, UK-non-resident Leisure.

4.8 Assignment Methodology

Highway Assignment

4.8.1 The assignment procedure used for the highway model is an interaction between an equilibrium assignment and a junction delay calculation, distributing demand according to Wardrop's first principle of traffic equilibrium:

4.8.2 "Under equilibrium conditions traffic arranges itself in congested networks in such a way that no individual trip makers can reduce his path costs by switching routes"

4.8.3 The state of equilibrium is reached by iterating between inner and outer assignment loops. Within the inner assignment loop, alternative routes for an origin-destination pair are brought into a state of equilibrium by shifting traffic from one route to the other until the travel time is the same. The outer loop then checks whether other routes with shorter travel times can be found as a result of the current assignment. This is repeated until no routes with an equal or shorter travel time can be found.

Public Transport Assignment

4.8.4 The public transport assignment is undertaken using the assignment algorithm of the Emme software and in the case of rail, the crowding functions of PS. Separate assignments are undertaken for rail (national rail, London Underground, DLR and Croydon Tramlink) and bus (local bus and scheduled coach). Trips that use both (e.g., local bus then rail) are treated as rail trips.

4.8.5 Routing through the network depends on the items included in the generalised cost function, which are as follows:

- Access time to bus stop / rail station
- waiting time at the bus stop / rail station
- in-vehicle time
- boarding / transfer penalty
- interchange walking time
- crowding penalties (peak periods only; rail only)
- egress time from final bus stop / rail station to destination

4.8.6 This is a standard approach for modelling public transport except in the one respect that we include modelling of crowding in the peak rail assignments using the methodology inherited from the PS model. This is appropriate to modelling rail route choice and generalised costs in peak times in the London area.

4.8.7 Fares do not influence the assignment routing but are included in generalised costs for the variable demand and airport mode choice models.

4.9 Generalised Cost Formulation and Parameter Values

4.9.1 The generalised costs here relate to the highway assignment model where it refers to both the monetary (i.e., fuel cost, vehicle operating cost) and non-monetary (i.e. travelling time) costs of a journey. Parameters are input for individual user classes. Monetary values are input to SATURN as pence per kilometre and non-monetary are input as pence per minute.

4.9.2 These costs interact to affect route choice. If time is highly valued and distance is not valued at all, the quickest journey will be chosen, no matter how long the distance. Similarly, if distance is highly valued and time not at all, the shortest distance will be chosen.

4.9.3 Generalised cost values were calculated based on the latest vehicle operating costs, values of time and user class splits as outlined within TAG Unit A1.3 and based on the prevailing TAG databook. TAG databook version 1.14, released July 2020, was used as the basis for the modelling described in this report.

5 Data

5.1.1 This section focuses on the availability of data that was used to develop the components of the GHOST model. A combination of primary and secondary data sources was included in the development of the model with specific data required for each model component.

5.2 Highway related data

5.2.1 To support the development of the highway model, data was required to capture the configuration of junctions and their characteristics (e.g., signal timings), the observed journey times and delays on the network, as well as traffic volumes and the classes of vehicles using the network. All data received was reviewed and processed to develop a consistent dataset to represent June 2016 conditions. A series of seasonality adjustments were used to ensure any secondary data not occurring during June 2016 was adjusted accordingly.

Traffic count data

5.2.2 For the development of the Gatwick Highway Assignment Model (HAM) an extensive primary data collection exercise was undertaken in 2016 to aid the development a model in the local area and assist in the calibration and validation exercise. Additional count data was collected in summer 2019. A variety of secondary data sources were identified from local highway authorities, including Surrey County Council, West Sussex County Council, East Sussex County Council and Transport for London. The data collected was used to provide information on either traffic volumes or journey times. Volumetric data was also obtained from the DfT for minor and major roads.

5.2.3 In total 545 counts are used for the calibration and validation of the model and associated with screenlines/cordons or ad hoc locations used to inform specific roads. The sources are outlined in Table 5.2.1.

Table 5.2.1: Sources of count data used in calibration/validation

Source	Number of Counts
WebTRIS	127
Surrey	29
East Sussex	39
Surveyed Sites	87
West Sussex	81
TfL	191

5.2.4 Additionally, manual classified counts providing estimates of vehicle proportions at specific locations were used, these were largely sourced from DfT sites.

Volumetric Data

5.2.5 Highways England have an extensive set of permanent monitoring sites across the Strategic Road Network (SRN). These measure the volume of traffic on the network and provide continuous output. This was used to support the derivation of robust seasonality profiles and average hourly volumes at specific sites covering the A27, A23, M25 and M23. Volumetric data available via DfT for minor and major roads were also considered for this purpose.

Journey Time Data

5.2.6 Historic journey time data was sourced from INRIX, a company providing observed data from a fleet of vehicles moving across the network. This data provides an estimated road speed at different times of day based on real time GPS feeds from vehicle navigation systems and in vehicle security systems. These feeds are processed to form estimates of vehicle speeds on individual stretches of road. Data was obtained for the period 1st April 2016 to 30th June 2016.

Trip Distribution Data

5.2.7 Citi Logik (CL) were commissioned in 2016 to provide travel demand data for an area within the south east of England. In the context of GAL, a broad specification to the data was included to ensure that temporal and geographic characteristics of travel through the area could be identified.

5.2.8 The Department for Transport's National Travel Survey dataset has been obtained at End User Licence (EUL) level via the UK Data Service (dataset Study Number 5340). The dataset, obtained for the period of 2002 – 2017, provides records from a series of household surveys designed to provide regular, up-to-date data on personal travel and monitor changes in travel behaviour over time.[4] The dataset has been used to provide validation checks throughout the matrix building process, namely providing trip length distribution information.

5.2.9 In addition, Transport for London provided data from their own research on movements within and from / to greater London. This was also derived from Mobile Network Data and was used as the basis for checking the amount of demand within London and between the M23 corridor and London.

Highway Models

5.2.10 Existing HAMs were used to inform the development of the highway component of the GHOST model. These sources included:

- South East Regional Traffic Model (SERTM), owned by Highways England;
- London Highway Assignment Model (LoHAM), owned by TfL; and
- Crawley Local Transport model (CLTM), owned by West Sussex.

5.2.11 Other models such as Surrey's transport model were considered but on review were not considered appropriate for developing a model of the Gatwick area due to incompatibility of software.

5.3 Public Transport Data

5.3.1 The Rail model and bus/coach model component of the GHOST model utilises a variety of data sources and is summarised in Table 5.3.1.

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[4] [redacted]

Table 5.3.1: PT Data Sources

PT Mode	Data Source	Type	Year, Coverage
Rail	Planet South model	-	2012, AM only
Rail	DfT Rail Statistics – Rai0201 / Rai0203	Services / Seats	2016 (24h), London Termini
Rail	ORR Estimates of station Usage	Demand	2012 & 2016, National Rail stations
Rail	DfT Green Book – Total Load	Total Load	2016, (All TOCs excluding GTR, by service), London Termini
Rail	DfT Green Book – Seats + total capacity / Services	Seats / Services	2016, (All TOCs excluding GTR, by service), London Termini
Rail	GTR Data – Total Load	Total Load	2012, 2019 (All GTR services), London Termini
Rail	GTR Data – Seats + total capacity / Services	Seats / Services	2016, (All GTR services), London Termini
Rail	Google Directions API	Journey Times	2019, (routes to/through London/Gatwick)
Rail	Rail Delivery Group, CIF Timetable	Services / Journey Times	2016, May
Rail	TfL Working Timetable	Services / Journey Times	2016 - 2019
Rail	Highways England South East Regional Transport Model	Demand	2015
Rail	TEMPRO	Demand	-
Rail	National Rail Travel Survey 2009	Demand	2009
Rail / Bus	Gatwick Airport Limited Employee Survey	Demand	2016
Rail	CAA Gatwick Departing Air Passenger Survey	Demand	2014 - 2018
Rail / Bus	Gatwick Airport Terminal Counts	Demand	2016
Bus/Coach	GTFS / OSM	Services / Journey Times	2019
Bus/Coach	Online timetables	Services / Journey Times	2019

Rail Data

DfT

5.3.2 Data publicly available through DfT’s online rail statistics portal provides information on the number of services, seats and standing capacity in/out of London termini for 2016. This information was used to validate the rail model at a 24-hour level.

5.3.3 DfT provided access to Green Book data for use on the study. This is very detailed data providing information on train formations/capacities and average loadings crossing a cordon formed by the TfL Zone 1 boundary. This data was used to code individual service capacities and to size the matrices. The following was received:

- All TOCs except Govia Thameslink Railway (GTR) – passenger flows, services and formations for all services originating/terminating/through London termini, autumn 2016;
- GTR – passenger flows, 2012 & 2019; and
- GTR – services, seats and total capacities, 2016.

Google Directions API data

5.3.4 Journey time analysis via Google Directions API was explored. The data captured through this process provides information relating to in-vehicle travel time, transfers/interchanges, walk-time and wait time. A selection of origin-destination pairs relating to Gatwick Airport and various key London locations were analysed. The data collected through this method corresponded to July 2019. This is not aligned with the base year of the model, 2016, therefore it was necessary to assess the impact of changes in the intervening period and impacts these changes may have on travel routes and times, particularly relating to Thameslink/London Bridge disruptions in 2016.

Office of Rail and Road Statistics

5.3.5 The Office of Rail and Road provide statistics through its online portal relating to entries and exists across all national rail stations in each year. The following two sources were utilised:

- estimates-of-station-usage-2010-11; and
- estimates-of-station-usage-2016-17

RDG CIF Timetable

5.3.6 Rail Delivery Group timetable information forms the foundation for inputs relating to all National Rail services for the rail model. The extracted data pertains to the May-Dec 2016 timetable. Data comprising train origin and destination termini, departure/arrival times and stop-stop times were processed for use in the rail model for all TOCs in London and the south east.

Bus and Coach Data

5.3.7 The foundation of the bus/coach network uses a combination of GTFS[5] data and Open Street Map (OSM) for 2019.

5.3.8 To assist in the validation of the bus/coach model, online resources were used to assess the validity of modelled services and journey times. These were obtained from operator websites including Megabus, Oxford Bus Company, National Express and easyBus.

5.4 Air passenger data

5.4.1 Civil Aviation Authority (CAA) data from Gatwick air passenger surveys 2014-2018 was used to provide the database of air passenger details such as home location, mode of travel, travel purpose, parking location.

5.4.2 Gatwick Airport Limited provided counts of passengers arriving at, and departing from, Gatwick North and South terminals in 15-minute time slices. These were used in the development of weights to expand the air passenger surveys

5.5 Employee survey data

5.5.1 For the employee model, behavioural survey data was obtained from the Gatwick Employee and Employment survey that GAL undertakes periodically of all employees who work within the airport. The last one, used in this study, was taken in Spring 2016. The data captured includes job type, work start and end times (for up to three shifts), home location and travel mode.

5.5.2 There were 5,323 usable responses from a total workforce of around 23,000. GAL also provided a survey report describing findings[6].

5.5.3 Oxera provided the full breakdown of employee job categories for all employees in 2015/16 to allow for expansion of the data to the workforce total of 23,807 employees

5.6 Parking data

5.6.1 Parking locations for employees are based on those stated in the employee survey, which have been matched to model zones.

5.6.2 For passengers parking on the airport the CAA profiler data provided information on locations where passengers park. Parking locations for May to July 2016 by terminal were allocated to the North Terminal; South Terminal; and North Terminal long stay parking and weighted by airport trips to provide the proportion of passengers using North and South terminals parking in each location.

5.6.3 Passengers parking off site or using the offsite valet provision have been allocated to car parks based on the relative capacities of the off-site car parks, using information provided by GAL.

5.7 Fares

Rail

5.7.1 UK-wide rail fares to/from Gatwick (for use in GSAM) and for all movements across the UK (for use in the VDM) were obtained from RDG for 2017 with some for 2019 that were deflated to 2017 to match. These were adjusted to 2016 base year using a fare index, and then discounted to a 2010 price base using the TAG GDP Deflator.

5.7.2 The employee rail fares included the 25% discount offered by the Gatwick Travel Pass if the origin zone is within the employee discount zone. This pass offers a 25% discount for employees on Thameslink, Gatwick Express, Southern and First Great Western as far as Wokingham[7]. This scheme existed in 2016 and remains in place as of the time of writing.

[5] General Transit Feed Specification – an electronic timetable format describing the schedule of different public transport services

[6] 2016 Travel to Work Survey Report

[7] [redacted]

Bus / Coach

5.7.3 Fares on local bus services (Metrobus, Southdown PSV) and coach services (easybus, Megabus, National Express, and Oxford Airline) in 2019 were obtained from the operator websites along with the approximate distance by road, to create a relationship between fare and distance.

5.7.4 The fares for local bus services were obtained from operator websites (Metrobus operates almost all services at Gatwick) which provide the fare zones; representative stops within these zones were used to determine fares. Employees are able to buy travelcards allowing unlimited travel on the Metrobus and Southdown PSV services within the wider network that serves Gatwick Airport

Taxi

5.7.5 Taxi fares in 2019 from a sample of locations to Gatwick Airport were extracted for Uber and minicabs [redacted]. It is our understanding that very few people hail a black cab for a trip to the airport therefore these fares were not used in the taxi fare calculations.

Parking costs

5.7.6 For the air passengers, on-airport parking costs for durations of 1 to 9 days were obtained from the Gatwick website for long stay, valet and short stay parking at north and south terminals. Data was collected for November, early December, February, April and June to examine seasonal variation.

6 Strategic transport model development

6.1 Highway Model

6.1.1 The highway model represents vehicle movements to and from Gatwick Airport as well as other strategic and local trips on the road network.

6.1.2 Prior to the assessment of future baseline scenarios, the highway model was built to represent current traffic conditions and is referred to as the 'base model' and is representative of average weekday traffic conditions consistent with June 2016.

6.1.3 The base model is built in consideration of guidance specified within DfT's TAG Unit M3.1, May 2020[8] and is built within the software suite SATURN. The wider role of the highway model and its interaction with the demand model is to supply generalised costs for the base model and future year scenarios.

Network Development

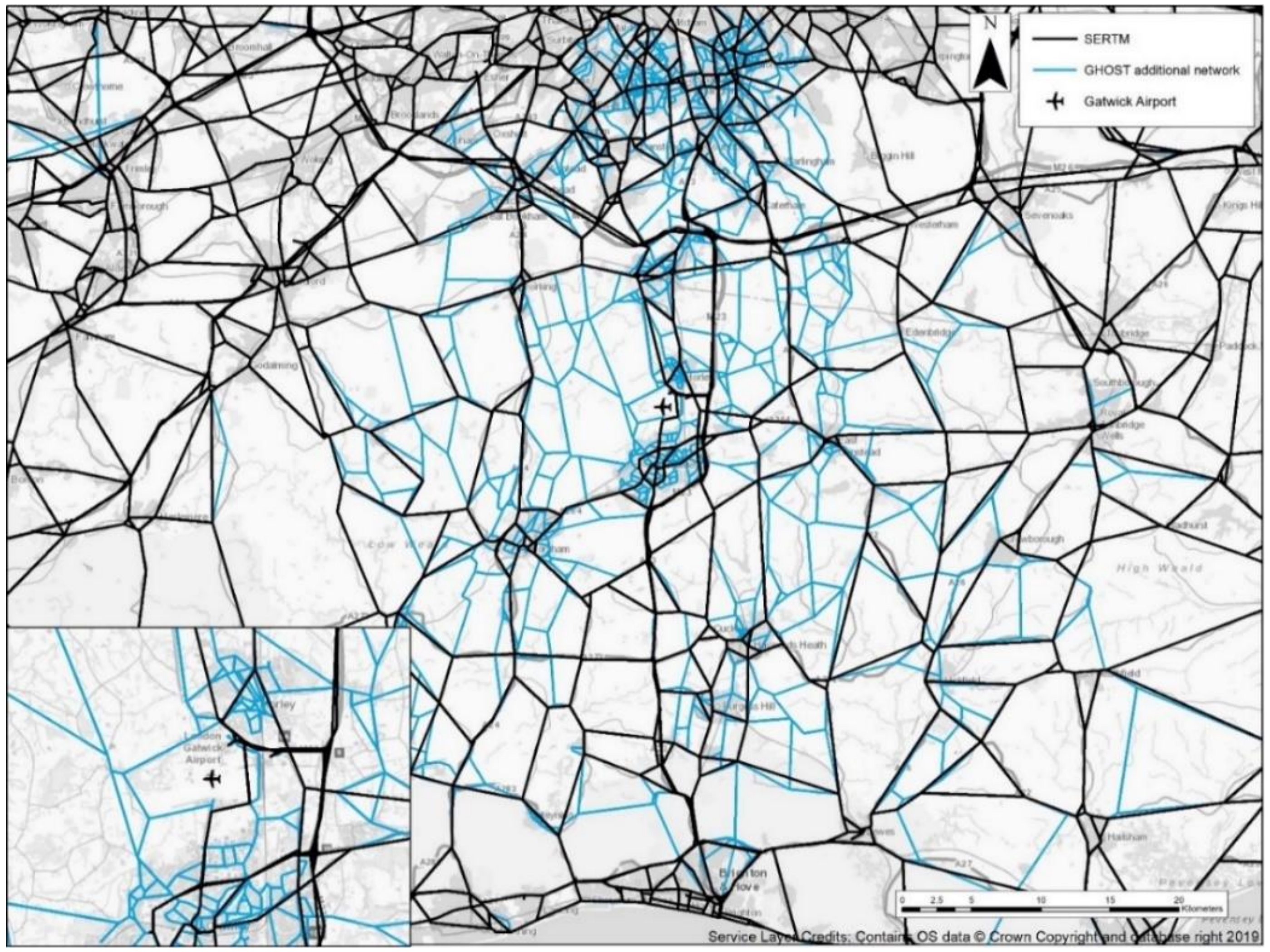
6.1.4 The highway model, known as Gatwick's Holistic Overview of Strategic Transport (GHOST) model, is principally built using the South East Regional Traffic Model (SERTM) developed by Highways England. Further network detail was incorporated through utilising the following additional models:

- Crawley Local Transport Model (CLTM); and
- The London Highway Assignment Model (LoHAM).

6.1.5 Inherited assumptions with respect to treatment of signalised junctions, detailed coding decorum and representation of tolls and network were considered in the model development process and addressed accordingly. The additional network included within the HAM model is shown in Figure 7.

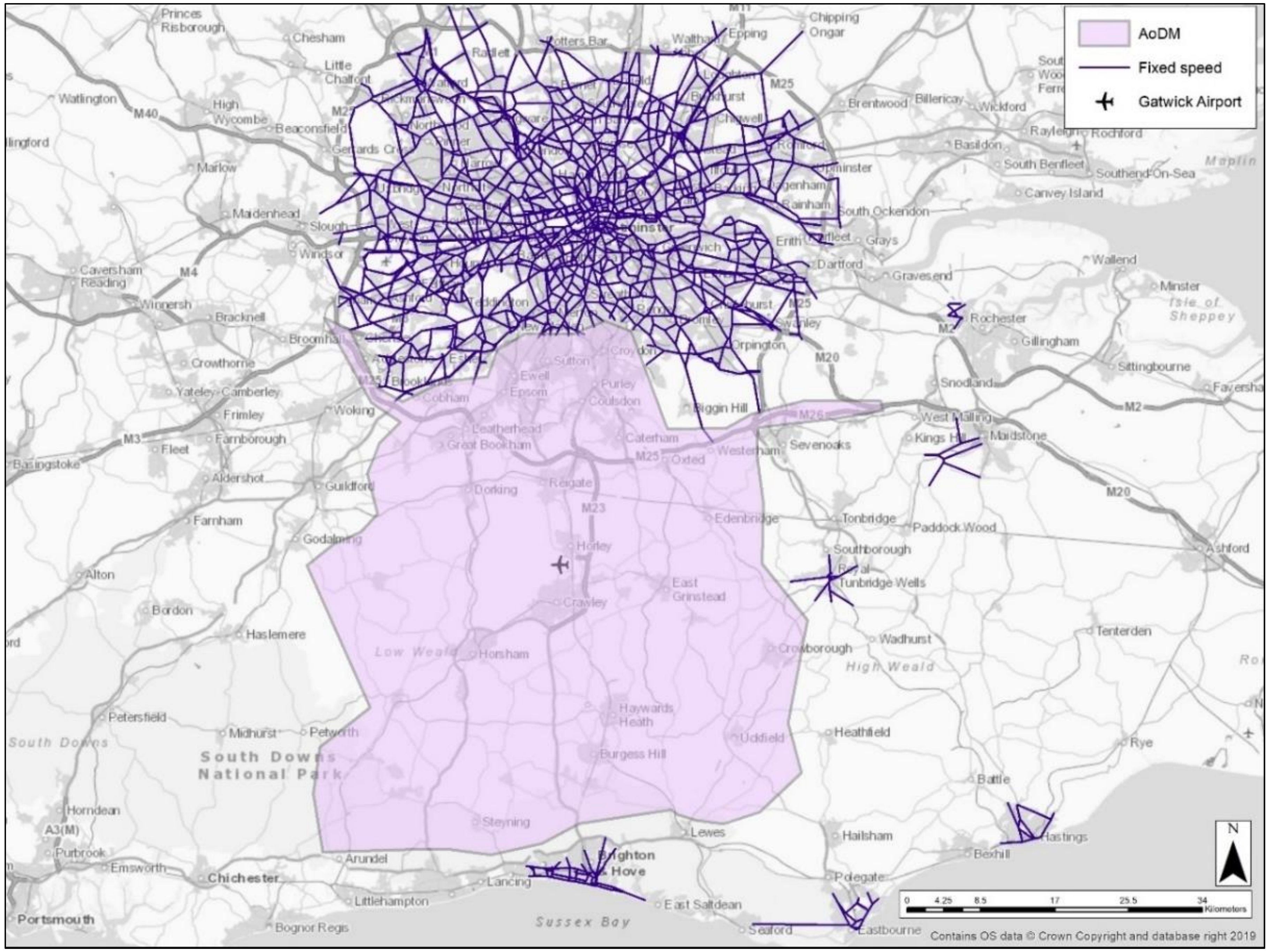
6.1.6 It should be noted due to the size of the regional models, SERTM was developed with fixed speed assumptions within urban areas to reduce the sources of model instability. To address this issue within the GHOST model, we have added in network detail into the main towns and cities that fall within our AoDM. This includes Crawley, Horsham and an area in South London. However, within the rest of the "fully modelled area" the fixed speed coding has been retained. Other areas of fixed speed coding in the fully modelled area e.g., on the south coast will retain the SERTM coding and forecast methodology. The fixed speed areas in the GHOST model are shown in Figure 8.

Figure 7: GHOST additional network



[8] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938864/tag-m3-1-highway-assignment-modelling.pdf

Figure 8: Fixed Speed Coding in GHOST



Matrix Development

6.1.7 The development of the highway model trip matrices considered the travel demand with respect to the following three regions:

- **Gatwick airport** – covering the terminals and all associated airport activity directly associated with the GAL operations;
- **local area** – the local area around the airport covering Crawley, Horley and local adjacent built-up areas; and
- **rest of model** – the remaining wider area covered by the highway model.

6.1.8 An estimate of June 2016 average weekday demand was built up progressively using the available sources of data and evaluating the strengths of each data source over each of the three geographies in order to generate prior matrices.

6.1.9 This tiered approach was required to reflect the need for increasing confidence in the quality of the travel demand estimated in the model within each region and the relative weight of analytical effort needed to build the model. Following the review of each of the sources of data, the development of base year matrices consisted of the following key steps:

- Rezoning of demand sources to common zone system
- Review of demand sources against NTS data and CAA/GAL Employee survey to check the appropriateness of the different sources. This considered trip length, purpose and time of day comparisons.
- Non airport demand was taken predominately from SERTM, with some updates derived using the CitiLogik source data where clear patterns emerged. Updates were controlled against NTS data.
- TfL distribution data was used to update the demand within London that was present in the SERTM source data.
- All airport demand (employees and passengers) was taken from the GAL employee survey data or passenger data.

Highway Performance Metrics

6.1.10 A calibration / validation process was undertaken with the aim of adjusting the model to improve the fit with observed data – including both traffic volumes and journey times. This was done in stages.

6.1.11 Network calibration was undertaken which picked up on the following reviews:

- modelled capacities verses observed traffic flows;
- investigation of large delays and very slow speeds;
- initial volume/capacity; and
- modelled shortest path routes against google maps.

6.1.12 As set out in TAG, calibration and validation screenlines and cordons were developed using the traffic count data. Following a detailed network calibration, review of routing, and adjustments to the prior matrices to improve the fit of the prior matrices, a matrix calibration process was undertaken.

6.1.13 In order to determine the success of the matrix estimation process, the modelled flows were compared to the counts. Calibration sites were reviewed on the same basis as validation sites, with the following measures used for comparison:

- the absolute differences between modelled flows and counts; and
- the GEH statistic.

6.1.14 Modelled link flows have been assessed across the calibration/validation screenlines. Table 6.1.1 show the calibration results at the screenline level while Table 6.1.2 show the performance at a link level for all vehicles combined.

Table 6.1.1: Screenline Performance

Classification	No.	AM1		AM2		IP		PM	
Criteria		5%	10%	5%	10%	5%	10%	5%	10%
Calibration	30	60%	93%	63%	90%	73%	100%	83%	97%
Validation	8	13%	75%	50%	88%	25%	75%	63%	75%

Table 6.1.2: Screenline Link Flow Validation Performance (All Vehicles)

Classification	AM1	AM2	IP	PM
Calibration	91%	92%	96%	92%
Validation	77%	80%	80%	73%

6.1.15 The summary of routes meeting the TAG guidance of modelled routes being within 15% of the observed times, for each time period, is shown in Table 6.1.3. The 33 sub-routes are considered in each direction, giving a total of 66 routes.

Table 6.1.3: Journey Time Validation Summary

Time Period	Number of Routes Passing	Percentage of Routes Passing
AM1	56	85%
AM2	48	73%
IP	63	95%
PM	56	85%

6.1.16 The model was deemed appropriate for assessment for the PEIR and associated impacts of the development at Gatwick Airport. However, detailed model statistics are being reviewed by stakeholders and the highway model will be go through a series of updates in terms calibration and validation to feed into the final DCO submission.

6.2 Rail Model

6.2.1 The role of the rail model is to produce zone-to-zone travel times and costs for the variable demand and airport mode choice models; and to assign rail trips onto services so that rail volumes may be reviewed and interpreted. In this section the development of the rail model is briefly described.

Source model

6.2.2 The DfT PS model formed the starting point for the rail assignment model. This covers national rail services across SE England and London Underground, Croydon Tramlink and Dockland Light Railway.

6.2.3 PS has a 2011 base year and represents only the AM peak. This therefore needed updating to 2016, and to reflect rail services across the day in the airport mode choice models, as a significant amount of airport access is outside the traditional peaks.

Network Development

6.2.4 PS provided the base network of nodes and links and the zoning system. The nodes and links were updated from 2011 to 2016, adding new links and stations such as Oxford Parkway, adding some existing stations that were not previously coded, and editing or completely replacing network elements requiring extra detail for the Gatwick analysis e.g., Croydon Tramlink. The single PS zone representing Crawley was split into north and south parts.

6.2.5 The 0700-1000 AM rail services coded in PS were deleted. Service coding was developed for six modelling periods (AM peak 0700-0900, Interpeak 0900-1600, PM peak 1600-1800, evening 1800-0000, night 0000-0400 and early morning 0400-0700). The services, calling points and journey times came from Network Rail CIF input for the May-Dec 2016 timetable. The train capacities (seats and standing spaces) came from DfT Green Book data for Spring 2016.

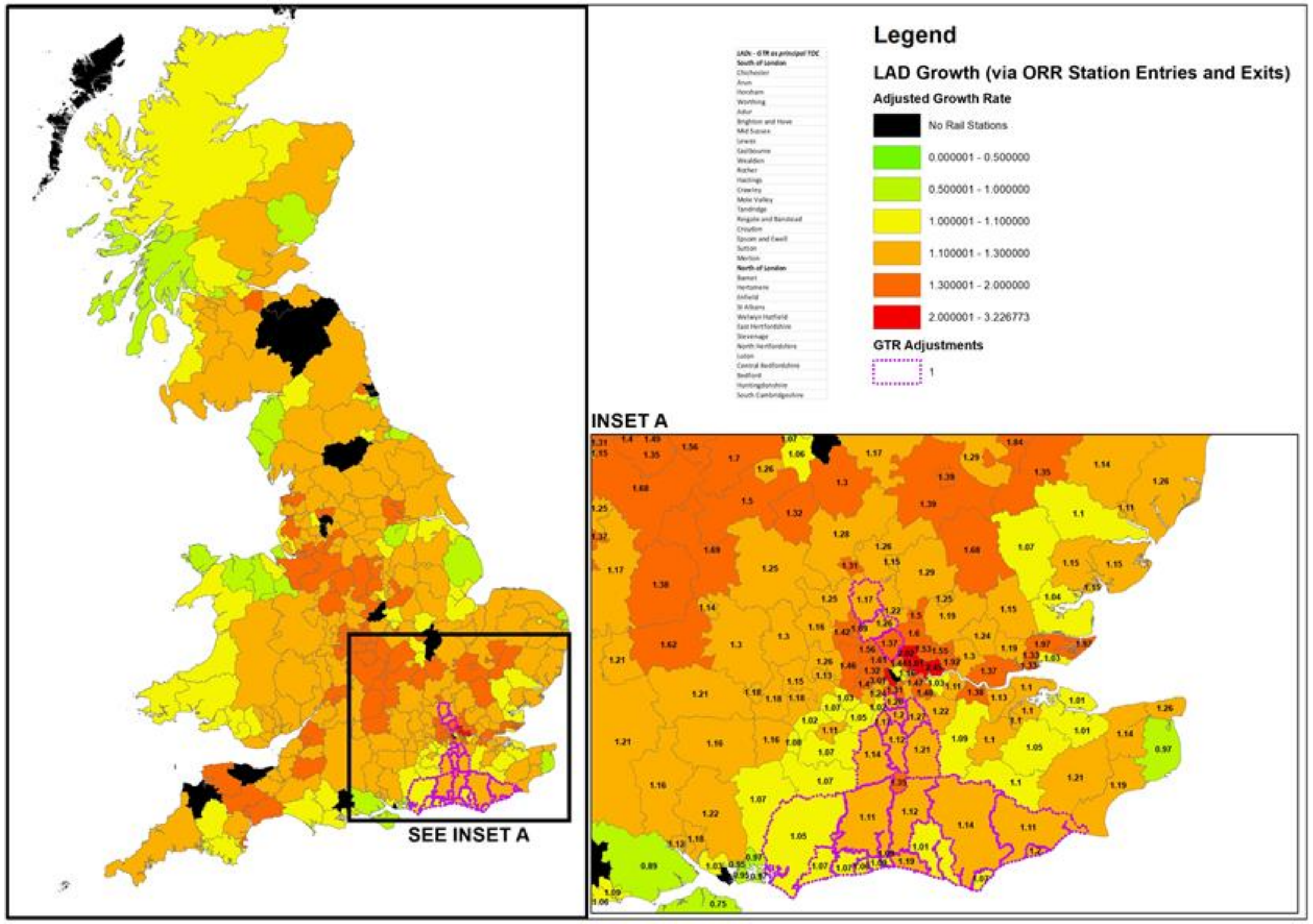
Matrix Development

6.2.6 The starting point was the PS AM Peak 2011 matrix. To expand to all periods and update from 2011 to 2016, the following steps were taken:

- Create a 2011 24hr Production-Attraction (PA) matrix by expanding the 2011 AM PA matrix using National Rail Travel Survey (NRTS) outward/return PA profiles (as used in DfT MOIRA2.2 model). These vary by purpose, time band, and flow type (e.g., to/from London).
- Apply growth to the 24hr 2011 PA matrix to create a 2016 version using growth rates derived from ORR (Office of Rail and Road) station entries and exits data for 2011 and 2016 and similar TfL data.
- In areas adversely affected by Thameslink Programme disruptions in 2016 (including the Brighton Main Line), the growth rates were obtained from an interpolation between 2012 and 2019.
- Create 2016 OD matrices for each of the six model periods by multiplying outward and return factors from the National Rail Travel Survey (NRTS) to the 24hr PAs.
- Assign to the networks.
- Refine volumes at 24-hour level and time period level using observed data at the London cordon and adjusting outward/return factors and overall 24hr volumes.

6.2.7 The demand growth from 2011 to 2016 at local authority level is shown in Figure 9. The pink outlined zones are those affected by Thameslink Programme disruption – growth for these zones was determined by interpolation between pre- and post-disruption counts.

Figure 9: 2010/11 to 2016/17 LAD Growth



Rail Performance Metrics

6.2.8 The performance of the rail model was assessed by undertaking service, journey time and line loading comparisons in line with the guidance set out in TAG Unit M3.2. Specifically, the following metrics were adopted:

- Number of National Rail services across the London cordon (TfL Zone 1 boundary);
- Number of seats on national rail services across the London cordon;
- Journey Times between selected locations;
- Passenger volumes across the London cordon;
- Passenger volumes entering/exiting at Gatwick Airport;
- Passenger volumes arriving at and departing from Gatwick Airport.

Summary of Performance

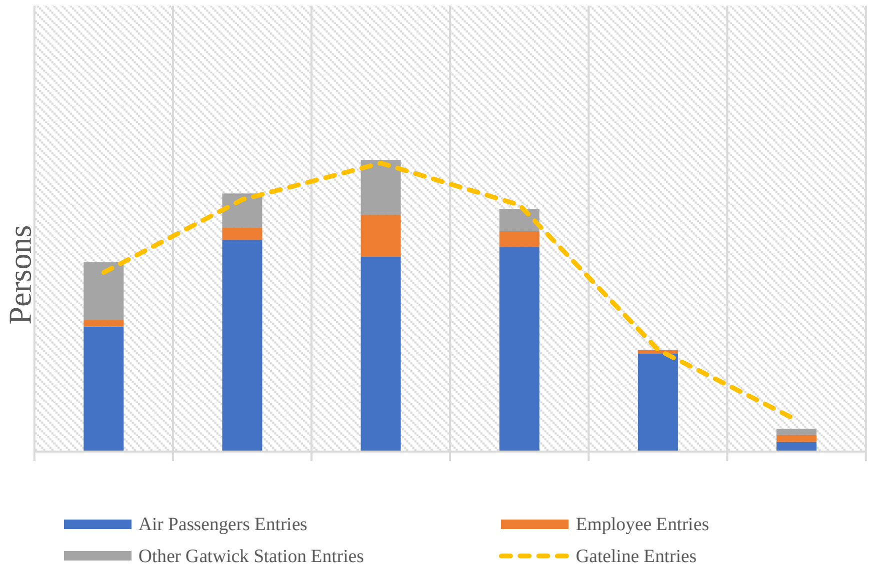
6.2.9 Validation was undertaken in sequential steps: ensuring the modelled supply (train services and capacities) and demand were realistic at 24-hour level at the London cordon, then repeating for each of the five periods (we do not include night time OP2) and then focusing attention on volumes at Gatwick Airport.

6.2.10 At 24hr level the 2-dir modelled passenger volumes are 1% above the counts for the Southern network (i.e., for GTR services crossing the London cordon at Victoria, Blackfriars and London Bridge).

6.2.11 In the individual periods, the 2-dir volumes differ from the counts by +1% (AM), 0% (IP), +4% (PM), -2% (OP1) and +6% (OP3). The coded train capacities were also checked and confirmed to be a close match to observed data.

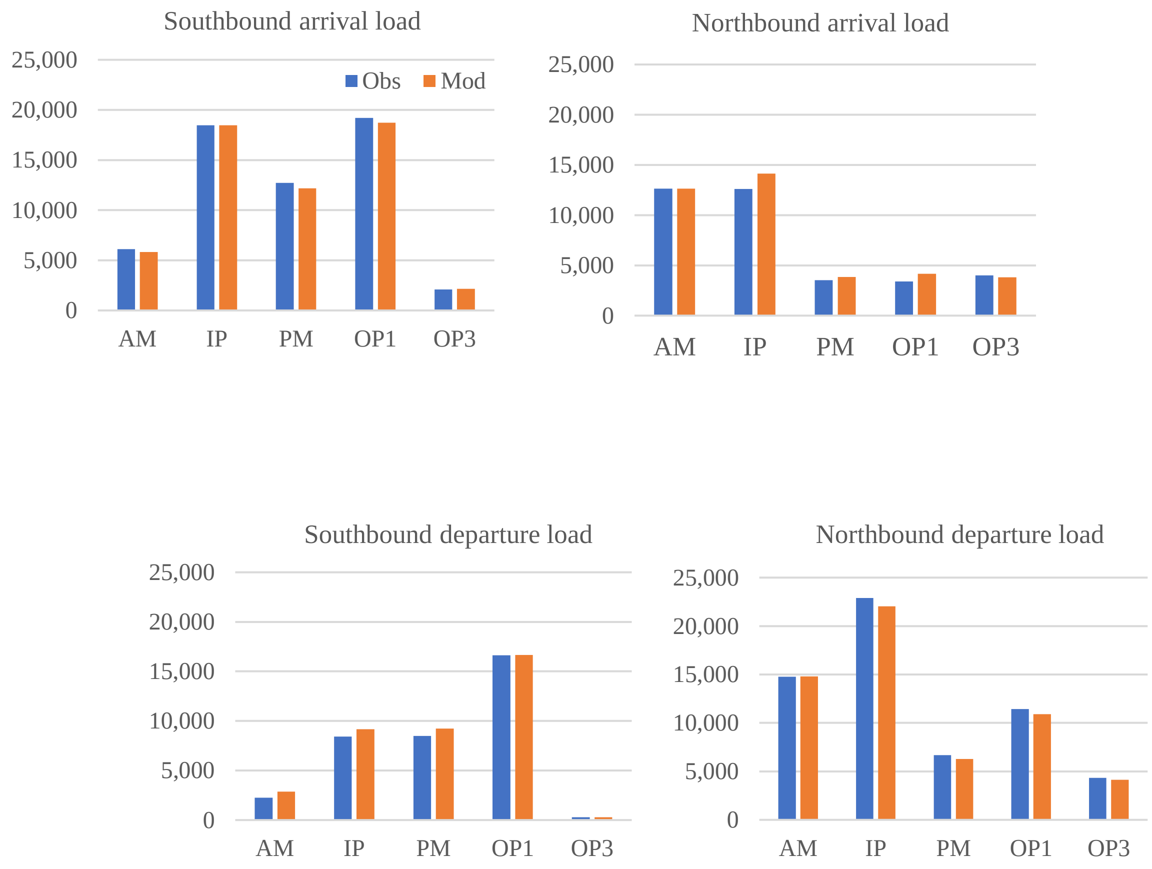
6.2.12 At Gatwick airport the modelled entries were compared against gateline data as shown in Figure 10. The numbers on the y-axis have been omitted for confidentiality reasons, but it can be seen that the match is close. The gateline data is independent, i.e., it was not used in development of the demand matrices, so this is a strong validation.

Figure 10: Gatwick airport station entries, 2016



6.2.13 The passenger volumes on arrival at and on departure from Gatwick Airport station are also a reasonably close match as shown in Figure 11.

Figure 11: Loads on arrival at / departure from Gatwick Airport Station



These summary performance statistics indicate that the model estimates passenger volumes that are a good match to count data and that capacity and crowding conditions are a reasonable reflection of reality.

6.3 Bus/Coach Model

6.3.1 In the absence of any suitable source model that could be built upon, a bus/coach model was developed from scratch with the same base year and time periods as for rail. Coach services are mostly used by Gatwick air passengers and bus services by Gatwick employees.

6.3.2 The role of the bus/coach model is to produce zone-to-zone times and costs for the airport mode choice models; and to assign bus/coach trips onto services so that volumes may be reviewed and interpreted. In this section the development of the bus/coach model is briefly described.

Network development

Coach Network

6.3.3 There is a limited coach network serving Gatwick. Some locations such as London Victoria and Oxford have excellent coach links to Gatwick throughout the day, but most towns and cities are either not directly connected to Gatwick or there is a low frequency service. From these places coach passengers going to/from Gatwick may need to change coaches at Victoria coach station or Heathrow Airport.

6.3.4 To ensure that the bus/coach model identifies realistic routes and generalised costs for those with direct and indirect access to Gatwick Airport, the complete (GB-wide) coach networks operated by National Express and Megabus were coded. In addition, any other coach operators that serve Gatwick Airport, eg, Oxford Bus Company. The data source was GTFS.

Bus Network

6.3.5 The local bus network serving Gatwick is provided by Metrobus, supplemented by a few services from other operators e.g., Southdown. All bus services that call at Gatwick or within the built-up areas of Horley and Crawley have been included in the model. This ensures that all local areas are connected to Gatwick by bus either directly or with interchange, generally at Crawley bus station.

6.3.6 GTFS data for the bus services were obtained to build a bus network at stop-to-stop level which was then overlaid onto the road networks to obtain the network shown in Figure 5.

Matrix development

6.3.7 Bus and coach demand matrices have been developed for airport passengers and airport employees using data from the expanded CAA passenger survey and GAL employment surveys respectively.

6.3.8 Operators were approached for patronage data but for reasons of commercial confidentiality this was not possible, and it was not possible to undertake a survey. Therefore, the bus/coach matrices are partial. This limits our ability to comment on capacity, however it is reasonable to assume that if/when demand exceeds capacity then operators would respond with higher frequencies or larger vehicles.

Bus/Coach Performance Metrics

6.3.9 The following metrics were adopted for validation for bus/coach:

- Number of coach services at Gatwick;
- Number of local bus services
- Journey times
- Passengers boarding local bus services at Gatwick Airport

6.3.10 The validation indicated that modelled bus and coach routes, frequencies and journey times are in close accordance with observed data.

6.3.11 As the demand matrices are partial (they exclude non-airport demand) the full validation of demand was not possible.

6.3.12 Bus boarding counts provided by Metrobus at North Terminal (where the vast majority of bus passengers should be air passengers or airport employees) showed a good match in each time period. At South Terminal there are a lot of non-airport bus passengers interchanging between rail and bus; the model includes only the airport trips, the boarding counts suggest that airport trips make up about half of all bus passengers boarding at ST.

6.4 Variable Demand Model

Development approach

6.4.1 The Variable Demand Model (VDM) was developed to forecast demand and find equilibrium between the demand and supply. The VDM was developed in EMME v4.4.2 with highway assignment undertaken in SATURN.

6.4.2 The model hierarchy follows the relevant guidance in TAG with choices applied incrementally, as opposed to absolutely. This incremental nature accounts for cost changes between the base and the forecast scenarios using a pivot point approach that is similar to the VDMs in the Highways England RTM e.g., SERTM.

6.4.3 In accordance with TAG guidance, the model hierarchy is as follows:

- Mode choice – car and rail (lowest sensitivity).
- Destination choice
- Route choice - undertaken for the highway model in SATURN (highest sensitivity).

6.4.4 TAG also refers to macro time period choice as the lowest sensitivity response (lower than mode choice). In our experience inclusion of this stage makes little difference to results but does extend run times. For this reason, it was excluded.

6.4.5 Destination choice is singly constrained for Business and Other trips, and doubly constrained for Commute trips. The destination choice logit parameters are as shown in Table 6.4.1. These are the median values from TAG Unit M2 Table 5.1.

Table 6.4.1: Destination choice parameters

Segment	Car	Rail	Constraint
HBEB	0.067	0.036	Production
HBW	0.065	0.033	Production and Attraction
HBO	0.090	0.036	Production
NHBEB	0.081	0.042	Origin
NHBO	0.077	0.033	Origin

6.4.6 The mode choice logit parameters are shown in Table 6.4.2. These are the median values from TAG Unit M2 Table 5.2.

Table 6.4.2: Mode choice parameters

Segment	Theta
HBEB	0.45
HBW	0.68
HBO	0.53
NHBEB	0.73
NHBO	0.81

6.4.7 The generalised costs used in the model were taken from TAG Data Book (July 2020 v1.14 -sensitivity test). The values of time (VoT) and vehicle operating costs (VOC) are shown in Table 6.4.3.

Table 6.4.3: Generalised Costs

	2016	2018	2029	2032	2047
Car Business VoT (pence per hour)	1,839.41	1,876.83	2,067.88	2,156,86	2,650.64
Car Commute VoT (pence per hour)	1,222.18	1,247.04	1,373.98	1,433.10	1,761.19
Car Other VoT (pence per hour)	876.04	893.86	984.84	1,027.22	1,262.39
Car Business VOC (pence per km)	12.27	12.68	10.91	10.13	8.39
Car Commute VOC (pence per km)	5.77	6.29	5.23	4.75	3.55
Car Other VOC (pence per km)	5.77	6.29	5.23	4.75	3.55
Rail Business VoT (pence per hour)	2,640.64	2,694.36	2,968.63	3,096.36	3,805.23
Rail Business VoT (pence per hour)	1,071.91	1,093.72	1,205.05	1,256.90	1,544.65
Rail Business VoT (pence per hour)	489.25	499.20	550.02	573.69	705.03

6.4.8 The base demand was assigned on an origin/destination basis and, for highway, calibrated in SATURN using matrix estimation. The VDM considers home based demand and non-home-based demand separately, the former modelled as productions and attractions and the latter modelled as origins and destinations. Conversion of the home-based trips from PAs to ODs results in discrepancies between the validated base demand and the VDM base reference demand. To overcome this, as is standard practice, a set of factors referred to as fitting on factors (FOFs) were calculated. These FOFs are applied on each iteration before assigning the demand to correct the differences.

6.4.9 Outbound and return factors define the proportion of home-based trips going out and returning in each time period. This is necessary to assign the demand and find equilibrium between demand and supply. These factors were calculated from the mobile phone data.

6.4.10 There are differences between the time period definitions in the highway, rail and variable demand models. This is shown in Table 6.4.4. Distribution and mode choice calculations are undertaken at the VDM time period level, and subsequently split where necessary for assignment using the ratio of demand in each sub time period in the base model.

Table 6.4.4: VDM time periods

Time period	Highway	Rail	VDM
AM	AM1: 07:00 – 08:00 AM2: 08:00 – 09:00	AM: 07:00 - 09:00	AM: 07:00 – 09:00
IP	IP: 09:00 – 16:00	IP: 09:00 – 16:00	IP: 09:00 – 16:00
PM	PM: 16:00 – 18:00	PM: 16:00 – 18:00	PM: 16:00 – 18:00
OP	OP: 18:00 – 07:00	OP1: 18:00 - 00:00 OP2: 00:00 - 04:00 OP3: 04:00 - 07:00	OP: 18:00 – 07:00

6.4.11 The VDM calculates demand for persons. The highway model assigns Passenger Car Units (PCUs); therefore occupancy factors are required to convert between persons and PCUs. For Business and Commute trips, these are imported from Highways England’s SERTM and are listed in Table 6.4.5.

Table 6.4.5: Car occupancy factors

Segment	Occupancy factor
HBEB	1.11
HBW	1.1
NHBEB	1.18

6.4.12 The occupancy factors for Other trips are calculated based on trip distance. The parameters are dependent on the location of the origin zone. The parameters are shown in Table 6.4.6.

Table 6.4.6: Other occupancy factor parameters

Segment parameter	Urban	Rural	London
HBO a	0.00113	0.00113	0.00113
HBO b	0.524	0.482	0.549
NHBO a	0.00108	0.00108	0.00108
NHBO b	0.418	0.418	0.497

6.4.13 The rail assignment model is not iterated in VDM. Forecast time and fare skims are read in for each scenario and are assumed to stay fixed. The rail time and fare skims have been rezoned from PS zoning to GHOST zoning, splitting based on population and jobs.

6.4.14 Choices predicted by multinomial logit models depend on the difference in generalised costs between two alternatives. This can result in overly sensitive to cost changes for longer distance trips. As recommended in TAG Unit M2.1, cost damping is applied in the model as a function of distance. The cost damping parameters were imported from SERTM, shown in Table 6.4.7.

Table 6.4.7: Cost damping parameters

	k	α	d_c	d_0	η
Car Business	30	0.5	10	99.5	0.387
Car Commute	30	0.5	10	30.5	0.248
Car Other	30	0.5	10	31.2	0.315
Rail Business	30	0.5	10	165.5	0.435
Rail Commute	30	0.5	10	30.5	0.248
Rail Other	30	0.5	10	31.2	0.315

6.4.15 LGV and HGV and segments are fixed, they are not subject to destination choice or mode choice.

6.4.16 Gatwick Airport employee and passenger demand is modelled by the Gatwick Mode Choice Model (GSAM). This is integrated into the VDM and run on each iteration of the VDM. The Gatwick Airport employee and passenger demand is assigned to the highway model on each iteration of the VDM. GSAM is discussed in further detail in section 6.5.

Realism testing

6.4.17 Three realism tests were undertaken for the base model:

- A fuel cost realism test by increasing the highway fuel costs by 20% in both the variable demand model and the highway assignment model;
- a public transport fare realism test by increasing PT fares by 20% in the variable demand model; and
- a car journey time realism test by increasing journey time skims by 20% in the variable demand model.

6.4.18 The model meets the TAG criteria set out in Unit M4 section 6.4 and Unit M2 for all three realism tests as shown in Table 6.4.8. The responses are sensible and the model is considered suitability for forecasting.

Table 6.4.8: Realism Test Summary

Test	TAG Criteria	Model
Car Fuel Cost	-0.25 to -0.35	-0.35 ✓
Public Transport Fare	-0.2 to -0.9	-0.28 ✓
Car Journey Time	No greater than -2.0	-1.13 ✓

6.5 Gatwick Mode Choice Model

Development approach

6.5.1 The Gatwick Mode Choice Model (GSAM) was developed to calculate the changes in mode choice for airport passengers and employees. GSAM was applied as an incremental logit model, in a similar manner to the main VDM.

6.5.2 The process followed for specifying, estimating, and validating GSAM is summarised as follows.

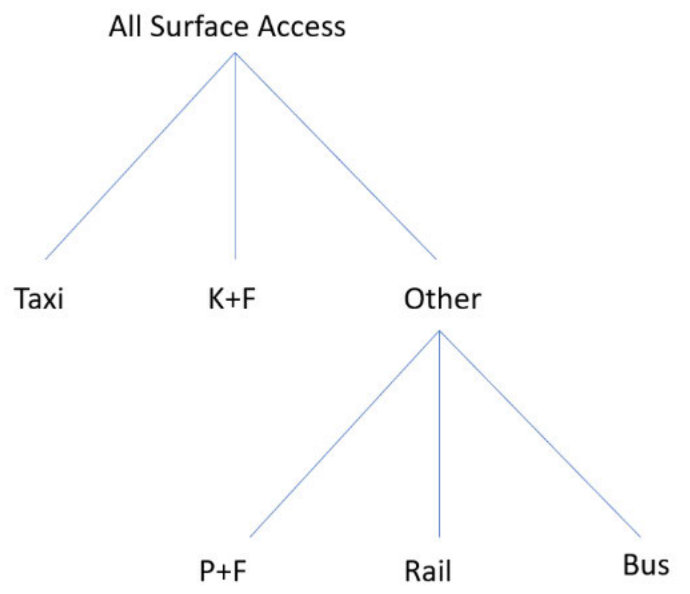
- Behavioural data for the period around / including the model base year 2016 was developed – databases were provided by GAL from the CAA rolling survey of departing airport passengers, and from the most recent periodic employee travel survey (Spring 2016).
- a database of transport times and costs from the highway, rail and bus models and other sources such as rail fares databases, taxi rates etc was developed and joined to the behavioural data.
- scripts to estimate models using Biogeme (v3.2.6) were developed.
- utility functions defined.
- model parameters estimated for a multinomial logit model.
- A range of models were tested, each assessed, to consider the overall fit; significance; magnitudes and signs of the parameters; key ratios e.g., the value of time; and other sensibility and reasonableness tests.
- utility functions were varied and relevant corrections / transformations applied to inputs. This process was repeated to estimate different models, testing a range of alternative utility functions.
- When no further improvements were found, alternative hierarchies (nesting structures) for improved model fit and plausibility were tested.
- the final models were run on the survey database to check that observed mode shares could be replicated with reasonable accuracy.
- the final models were then implemented in the GSAM application and base realism tests were undertaken to check sensitivities (elasticities).
- elasticities were compared against benchmarks from other models and DfT guidance.
- an expert reviewer was engaged to advise on the suitability of the approach and assist in the finalisation

6.5.3 To best align with the other model components, data inputs for the estimations have been undertaken at a time period level (AM, IP, PM, OP1, OP2, OP3), representing a single trip. For the employee model, GemSAM, this is the average of the two directions and for the passenger model, GapSAM, this is half the round-trip cost.

Model Hierarchy

6.5.4 A two-level model hierarchy produced the most statistically significant structure for air passengers, as shown in Figure 12, with the nesting parameters (theta values). The structure implies more sensitivity to switching within the lower nest (Park and Fly, Bus, Rail).

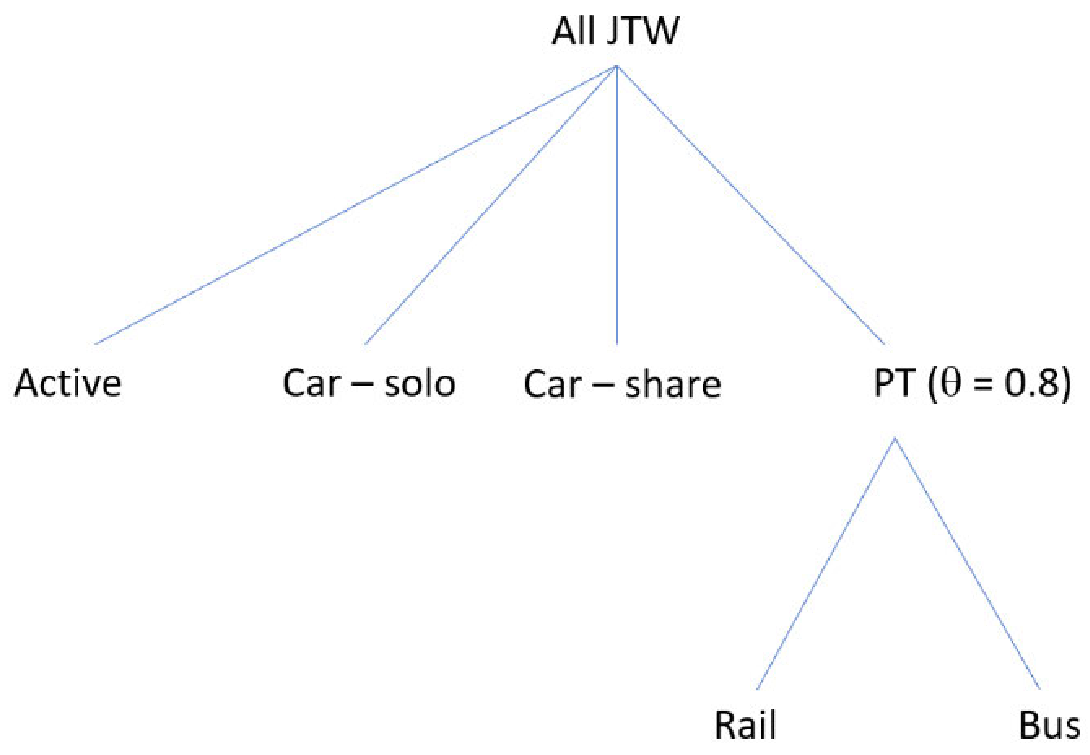
Figure 12: GapSAM (Air Passenger) model nesting



	Run	Theta
UKB	V1	0.62
NUKB	T2	0.57
UKL	T3	0.69
NUKL	T4	0.68

6.5.5 For airport employees, the best model fit was nesting of the public transport modes as shown in Figure 13.

Figure 13: GemSAM (Airport employee) model hierarchy



6.5.6 For UK Leisure, the model fit was significantly improved when out of pocket costs for car and taxi (fuel cost, taxi fare, parking fee) were shared among the vehicle occupants; for the other segments the fit was not improved. Therefore, sharing of fuel cost, taxi fare and parking fee has been accepted for UKL and rejected for other segments. There is no information in the survey data of whether costs are in fact shared or not. We have assumed that fuel costs are shared for the car share option for airport employees.

6.5.7 For employees, the costs for the 'car share' option are split among the car occupants.

Realism testing

6.5.8 A wide range of base realism tests were undertaken to test the sensitivity of the model and to benchmark elasticities against existing models of airport access choice (notably LASAM). The elasticities were found to be in reasonably ranges. The estimation of the models and elasticities were submitted for external expert review.

7 Background Forecasting assumptions

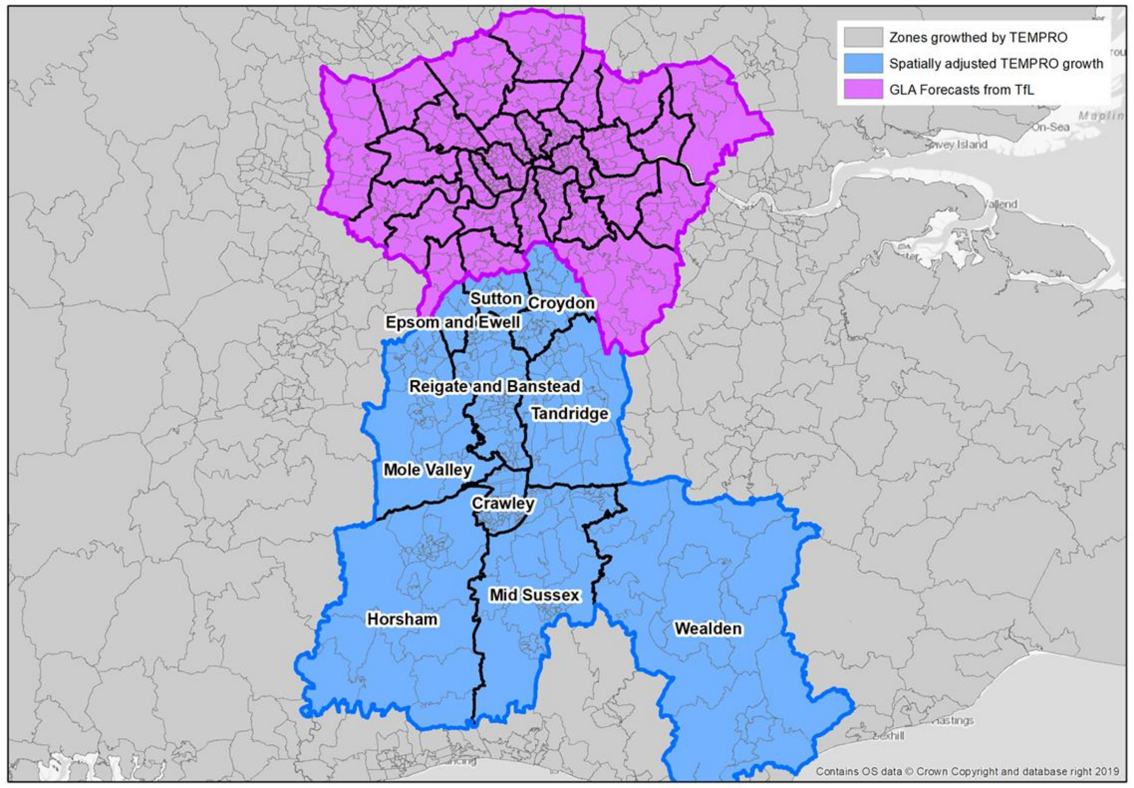
7.1 Uncertainty log

Background

7.1.1 In accordance with TAG Unit M4, an uncertainty log was developed for both demand (e.g., new developments) and supply (e.g. new transport infrastructure) that could impact the future performance of the transport system. The objective of this, is to review the likelihood of specific proposals coming forward based on their current planning / funding status and use this as the basis for selecting a set of assumptions for the Future Baseline.

7.1.2 The approach undertaken has been to review the assumptions for authorities that sit within the AoDM alongside national bodies such as Network Rail (and Train Operating Companies), Highways England, and relevant bus / coach operators. Specific Local Authority districts were contacted for specific information around committed and planned development as shown in blue in Figure 14. In addition, Transport for London's assumptions for population and employment growth in Greater London were also reviewed, such that growth in the Greater London Area align with TfL's LTS 7.1 model and GLAs projections from 2015/6 (see the purple area). Note specific detailed assumptions were made for the London Boroughs of Sutton, Croydon and Epsom and Ewell as these formed part of the area of detailed modelling.

Figure 14: Coverage area of uncertainty log



7.1.3 For ease of cross reference, Table 7.1.1 provides an extract from TAG Unit M4 in relation to the classification of uncertainty. This is the framework applied in the subsequent sections.

Table 7.1.1: Classification of future inputs (taken from TAG Unit M4)

Probability of the Input	Status	Core Scenario Assumption
Near certain: The outcome will happen or there is a high probability that it will happen.	Intent announced by proponent to regulatory agencies. Approved development proposals. Projects under construction.	This should form part of the core scenario
More than likely: The outcome is likely to happen but there is some uncertainty.	Submission of planning or consent application imminent. Development application within the consent process.	This could form part of the core scenario
Reasonably foreseeable: The outcome may happen, but there is significant uncertainty	Identified within a development plan. Not directly associated with the transport strategy/scheme but may occur if the strategy/scheme is implemented. Development conditional upon the transport strategy/scheme proceeding. Or, a committed policy goal, subject to tests (e.g., of deliverability) whose outcomes are subject to significant uncertainty	These should be excluded from the core scenario but may form part of the alternative scenarios
Hypothetical: There is considerable uncertainty whether the outcome will ever happen.	Conjecture based upon currently available information. Discussed on a conceptual basis. One of a number of possible inputs in an initial consultation process. Or a policy aspiration	These should be excluded from the core scenario but may form part of the alternative scenarios

Demand uncertainty - development data

7.1.4 The demand uncertainty log was populated using information from multiple planning documents in conjunction with council planning portals, mainly:

- Local Plan Development
- Strategic Housing Land Availability Assessment
- Annual Monitoring Report
- Housing/Employment Land Trajectory

7.1.5 Table 7.1.2 outlines the local plan assumptions used as the basis for the assessment.

Table 7.1.2: Local Plans

Local Authority	Source	Plan Period
Mid Sussex	District Plan 2014 - 2031	2014 - 2031
Reigate and Banstead	Reigate and Banstead Local Plan: Core Strategy	2012 - 2027
Wealden	Adopted Core Strategy	2013 - 2027
Mole Valley	Core Strategy	2009 - 2026
Epsom and Ewell	Core Strategy 2007	2006 - 2026
Crawley	Local Plan	2015 - 2030
Tandridge	Local Plan 2033 Proposed Version (under examination	2013 - 2033
Horsham	Horsham District Planning Framework 2015 - 2031 (excluding South Downs National Park)	2015 - 2031
Sevenoaks	New Local Plan	2015-2035
Wealden	Adopted Core Strategy	2013-2027
Brighton & Hove	City Plan Part One 2016	2010-2030

7.1.6 The data for each district was summarised and checked with data held by each LA to help verify the assumptions. Larger scale development, where specific new access requirements were likely were identified through the application of a specific set of criteria as shown in Table 7.1.3. Developments identified using this approach were modelled in detail through new zoning and specific access arrangements updated.

Table 7.1.3: Inclusion Criteria

Land use	Criteria
C3 - Dwellings	100
B1 - Office development (m^2)	1,200
B2 - Industrial Estate (m^2)	1,500
B8 - Warehousing (m^2)	5,000
Other	Major Developments

7.1.7 The uncertainty log identifies the likelihood of each development taking place as near certain, more than likely, reasonably foreseeable, hypothetical.

7.1.8 Assumptions of alternating commercial land-use size to number of full-time employees and build out rates across the future years were inferred based on planning documents and existing information of similar sites if no such data was available.

7.1.9 Major developments with the greatest number of housing units or employment opportunities collated in the uncertainty log are listed in Table 7.1.4. The full list of developments scoped in are included in Appendix A.

Table 7.1.4: Major Developments Identified in Uncertainty Log

Index	Location	Local Authority	Fully Built Year
37-41	Burgess Hill Northern Arc Land North and North West of Burgess Hill Between Bedelands Nature Reserve in The East and Goddard's Green Waste Water Treatment Works In The West	Mid Sussex	2035
156-160	Land West of Bewbush (Kilnwood Vale)	Horsham	2029
171-177	Land North of Horsham, Strategic Site, Holbrook Park and Chennells Brook, North Horsham	Horsham	2035
195-200	Horley North West Sector 'Land at Meath Green', Horley	Reigate and Banstead	2023
432-436	Whitgift Shopping Centre and Surrounding Land Croydon	Croydon	2028
289	Land west of Uckfield - Site SD1	Wealden	2029
375-377	1-5 Lansdowne Road and Voyager House, 30-32 Wellesley Road	Croydon	2025
19-21	Thales, Gatwick Road	Crawley	2029 (parcel 1&2) parcel 3 under construction
9	Land at London Road and Fleming Way (Elekta)	Crawley	2021
185	Nowhurst Business Park Guildford Road Broadbridge Heath, Slinfold	Horsham	2023
380-384	Land Adjoining East Croydon Station, bounded by George Street (Including 1-5 Station Approach), Dingwall Road, (Including The Warehouse Theatre), Lansdowne Road and Including Land to The North of Lansdowne Road, Croydon	Croydon	2025
485-487	Land Bounded by George St, Park Lane, Barclay Road, And Main London To Brighton Railway Line	Croydon	2026
485-487, 509	Forge Wood Neighbourhood	Crawley	2030
163-165	Land west of Horsham	Horsham	2026
503	Northwood Park, Gatwick Road, Northgate, Crawley	Crawley	2023

Supply uncertainty - transport scheme data

7.1.10 The supply side uncertainty log was completed for each relevant mode of transport used within the model.

7.1.11 For highway schemes, data was collated from the following sources:

- SERTM Future Year transport schemes from Highways England
- Crawley Local Transport Model uncertainty log of infrastructure schemes
- Highway network improvements provided by WSCC
- Development-related transport mitigation identified through review of planning applications
- Local Plan Schemes
- Infrastructure Delivery Plans

7.1.12 The schemes were cross checked against the Highways England road schemes website, information provided by LA/consultancies and available public information. The major Road Investment Strategy (RIS) schemes were captured as well as other strategic schemes in the study area. Table 7.1.5 lists the major highway schemes and full list can be found in the Addendum.

Table 7.1.5: Major Highway schemes

Index	Scheme Name	Scheme Promoter	Opening Year
13	M23 Junctions 8-10: Smart Motorways	Highways England	Spring 2020
86	M23 Junction 9, north bound slip road - Carriageway widening	Crawley	Before 2026 (assumed)
87	M23 Junction 10 - Junction improvements, Signal, carriageway widening	Crawley	Before 2026 (assumed)
24	M25 Junction 10-16 Smart Motorway	Highways England	2023
32	M25 J8 Improvement Scheme	Highways England	Dec-2020
153	M25 South West Quadrant	Highways England	2023
31	Lower Thames Crossing - new link	Highways England	Before 2029 (assumed)
5	A2 Bean & Ebbsfleet Junction Improvement Scheme	Highways England	2022-2023
22	A27 East of Lewes	Highways England	Jan-2022
62	A22 Corridor - M25 Junction 6 improvements	Tandridge	Before 2029 (assumed)
97	Burgess Hill Northern Arc Land - Highways (A2300), bridges	West Sussex	Before 2029 (assumed)
90	Radford Road approach to Gatwick Road	Crawley	Before 2026 (assumed)

7.1.13 The future year rail schemes included in all future years (unless otherwise stated) are:

- Crossrail
- Network Rail schemes
  - North Downs Line increase from 2 trains per hr (tph) to 3 tph (increase from 1 tph to 2 tph at Gatwick) with 1 tph extended from Reading to Oxford in 2047 only
  - Thameslink ultimate frequency 24 trains/hr
  - Croydon Area Remodelling Scheme enabling extra peak train paths
- London Underground schemes
  - Northern Line extension to Battersea Power Station
  - Jubilee Line enhancements
  - Victoria Line upgrade
  - Piccadilly Line upgrade
  - Subsurface full upgrade
  - LUL new vehicles
  - London Overground schemes
  - East London Line upgrades
  - Gospel Oak – Barking upgrades
- Dockland Light Railway and Croydon Tram schemes
  - DLR Rolling Stock Replacement Programme
  - Croydon Tram timetable change

7.1.14 HS2 was not coded as this would not have a significant impact on access to Gatwick as it and is outside the modelled area (first stop Birmingham).

7.1.15 Similar to the demand side uncertainty log, design stages and details given in the planning documents for development-related schemes were used to inform the uncertainty categories.

7.1.16 Those schemes meeting the near certain or more than likely criteria were coded into the relevant future model networks.

7.2 Demand forecasting approach

7.2.1 The methodology set out in TAG Unit M4 was used to produce demand forecasts for each of the model years.

7.2.2 The DfT's TEMPRO programme (V7.2) was used to source the National Trip End Model assumptions (NTEM). This sets out national travel demand growth for each local authority area based on a set of planning assumptions covering employment and housing projections. The demand uncertainty log was used as the basis for reviewing these assumptions at a fine level of spatial detail in the AoDM. NTEM assumptions were updated accordingly, and the most current local plan assumptions were used as the basis for the growth trajectory in each local authority district. These were further extrapolated beyond the relevant local plan period adopting the assumptions in the NTEM.

7.2.3 The growth in travel demand was calculated for each modelled demand segment, mode and car availability combination based on this update of population and employment projects by factoring the standard TEMPRO forecasts, accordingly, as recommended in the guidance.

7.2.4 In London, data from TfL was adopted to modify the assumptions in London for growth in travel demand. This involved the updated of population and employment forecasts for the London Boroughs outside of the AoDM.

7.2.5 Goods vehicle growth rates were taken from Road Traffic Forecast 2018 (RTF18) Scenario 1. The traffic growth factors (in vehicle miles) at regional level were applied to the 2016 base goods vehicle demand. Goods vehicle forecasting at Gatwick airport was undertaken using passenger and cargo forecasts. This is detailed in Section 8.4.

7.2.6 For each of the major development sites identified above in Table 7.1.4, specific trip generation assumptions were developed based on data sourced from transport assessments. These were adjusted where necessary to cover the full series of time periods modelled. These developments were removed from the growth adjustment process set out above. Specific trip distribution assumptions were made for each development zone based on the likely characteristics of the development and considering adjacent zones of similar characteristics.

7.2.7 The distribution of Heathrow Airport demand was taken from SERTM – this was based on data from the DfT on an R2 only scenario, with demand projections based on 2014 DfT forecasts. This demand was updated using the latest available public demand forecasts for Heathrow which assumed by 2047, a total of 92 mppa. Specific time period assumptions were derived by comparing base Heathrow assumptions with observed counts on the M4 Spur, and T5 slip roads on the M25.

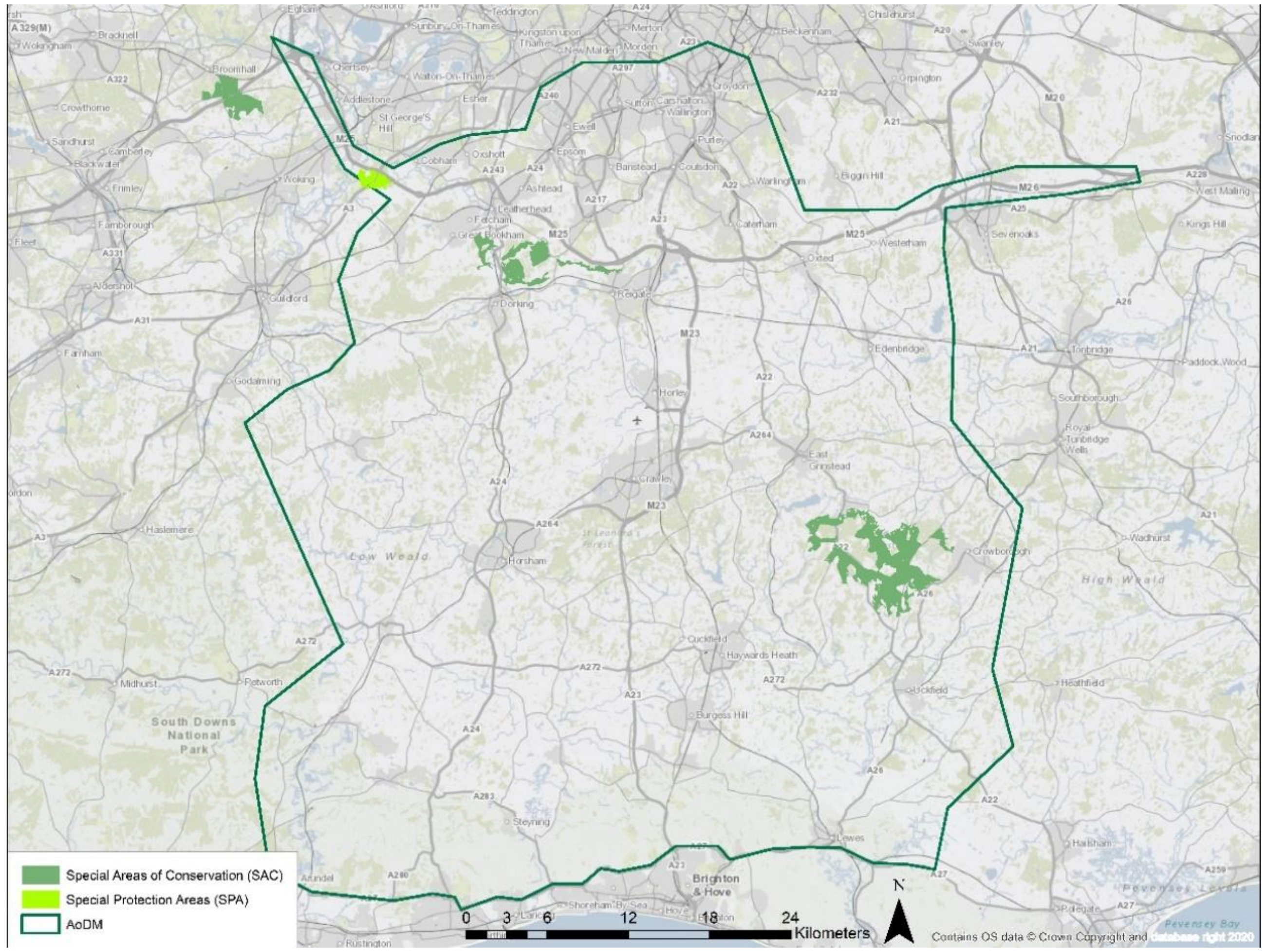
7.3 HRA

7.3.1 Habitats Regulations Assessment (HRA) was carried out for the 2032 forecast year. This assessment covers the following sites:

- Ashdown Forest Special Are of Conservation (SAC) and Special Protection Areas (SPA).
- Mole Gap to Reigate Escarpment SAC.
- Thames Basin Heaths SPA.
- Thursley, Ash, Pirbright & Chobham SAC.

7.3.2 These are shown in Figure 15. These sites were chosen based on the distance from the highway network, emissions, and presence and location of qualifying features.

Figure 15: SACs and SPA



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7.3.3 The HRA needs to include an assessment of air pollution changes from the Project alone, but also the project acting in combination with other projects/plans in the area. The assessment scenarios for the HRA were carried out for 2032 and are as follows:

- Future baseline scenario without any committed developments/plans;
- Future baseline scenario with growth to account for committed developments and plans (which is the scenario known as Future Baseline); and
- With Project scenario, which includes future growth from committed developments/plans and the contribution of the Project (the scenario known as With Project).

7.3.4 A comparison between scenarios C and B will provide the impact of the Project alone, while a comparison between scenarios C and A will provide the impact of the Project in combination with other committed developments/plans in the area.

7.3.5 To support this assessment, an additional scenario for 2032 was required to create an alternate future baseline scenario without any committed development plans which has been called HRA.

7.3.6 Based on the Natural England Guidance[9] the following approach was used:

- Apply growth to the 2016 base demand up until 2021
- Apply business as usual growth (i.e., without the Project) at the airport up until 2032.
- Exclude all committed developments, plans and other projects for local authorities within 10km of each ecological site.

[9] Natural England (2018), Approach to advising competent authorities on road traffic emissions and HRAs

7.3.7 The local authorities within 10km of each site are shown in Table 7.3.1.

Table 7.3.1: Local authorities within 10km of sites

Ashdown Forest SAC/SPA	Mole Gap to Reigate Escarpment SAC	Thames Basin Heaths SPA	Thursley, Ash, Pirbright & Chobham SAC
Lewes	Elmbridge	Windsor and Maidenhead	Windsor and Maidenhead
Wealden	Epsom and Ewell	Bracknell Forest	Bracknell Forest
Sevenoaks	Guildford	Elmbridge	Elmbridge
Tunbridge Wells	Mole Valley	Epsom and Ewell	Guildford
Tandridge	Reigate and Banstead	Guildford	Runnymede
Crawley	Tandridge	Mole Valley	Spelthorne
Mid Sussex	Woking	Runnymede	Surrey Heath
	Crawley	Spelthorne	Woking
	Kingston upon Thames	Surrey Heath	
	Sutton	Woking	
		Kingston upon Thames	

7.4 Indirect and catalytic employment growth

7.4.1 Indirect and catalytic employment numbers have been generated by a third-party consultant on behalf of GAL and are included in the 'Economic Impact Report'. The output of this work has been included in the strategic model in the With Project scenarios as shown in Table 7.4.1.

Table 7.4.1: Indirect and Catalytic Employment Growth included in With Project Scenarios

Employment Growth	Area	2029	2032	2047
Indirect	Diamond	400	1,300	1,300
	C to C LEP	600	2,100	2,100
	5 Authorities	1,300	3,900	3,900
	UK Total	1,800	5,600	5,600
Catalytic	Diamond	2,400	7,300	6,200
	C to C LEP	4,100	12,500	10,700
	5 Authorities	4,200	12,500	10,700

7.5 Background highway demand forecasts

7.5.1 The resulting highway demand for the AM1, AM2, IP and PM periods for the future baseline scenario is shown in Table 7.5.1, Table 7.5.2, Table 7.5.3 and Table 7.5.4 respectively.

Table 7.5.1: AM1 background highway demand (future baseline)

	Demand (PCUs)				Growth		
	2016	2029	2032	2047	2029	2032	2047
Business	528,982	589,323	599,781	662,108	1.11	1.13	1.25
Commute	2,214,469	2,427,253	2,463,116	2,674,164	1.10	1.11	1.21
Other	2,186,537	2,537,708	2,604,865	2,914869	1.16	1.19	1.33
LGV	891,376	1,059,730	1,100,783	1,301,686	1.19	1.23	1.46
HGV	379,048	383,702	387,354	410,096	1.01	1.02	1.08
Employees	1,134	1,305	1,326	1,413	1.15	1.17	1.25
Passengers	3,552	5,290	5,478	5,934	1.49	1.54	1.67
Total	**6,205,097**	**7,004,310**	**7,162,702**	**7,970,270**	**1.13**	**1.15**	**1.28**

Table 7.5.2: AM2 background highway demand (future baseline)

	Demand (PCUs)				Growth		
	2016	2029	2032	2047	2029	2032	2047
Business	578,955	645,250	656,732	725,010	1.11	1.13	1.25
Commute	2,431,620	2,665,996	2,705,454	2,937,347	1.10	1.11	1.21
Other	2,397,485	2,784,047	2,857,827	3,197,920	1.16	1.19	1.33
LGV	681,378	810,185	841,573	995,146	1.19	1.24	1.46
HGV	383,900	388,628	392,330	415,376	1.01	1.02	1.08
Employees	1,102	1,258	1,279	1,364	1.14	1.16	1.24
Passengers	3,521	5,119	5,249	5,535	1.45	1.49	1.57
Total	**6,477,961**	**7,300,483**	**7,460,444**	**8,277,698**	**1.13**	**1.15**	**1.28**

Table 7.5.3: IP background highway demand (future baseline)

	Demand (PCUs)				Growth		
	2016	2029	2032	2047	2029	2032	2047
Business	470,283	522,932	532,187	586,449	1.11	1.13	1.25
Commute	953,445	1,046,188	1,061,937	1,154,408	1.10	1.11	1.21
Other	2,924,688	3,390,014	3,478,632	3,890,563	1.16	1.19	1.33
LGV	897,917	1,067,365	1,108,702	1,311,041	1.19	1.23	1.46
HGV	519,646	525,467	530,332	560,842	1.01	1.02	1.08
Employees	685	788	801	851	1.15	1.17	1.24
Passengers	3,727	4,817	4,886	5,150	1.29	1.31	1.38
Total	**5,770,391**	**6,557,570**	**6,717,477**	**7,509,303**	**1.14**	**1.16**	**1.30**

Table 7.5.4: PM background highway demand (future baseline)

	Demand (PCUs)				Growth		
	2016	2029	2032	2047	2029	2032	2047
Business	573,659	640,085	651,653	720,062	1.12	1.14	1.26
Commute	2,129,734	2,335,505	2,370,702	2,578,556	1.10	1.11	1.21
Other	3,131,681	3,635,897	3,732,227	4,177,546	1.16	1.19	1.33
LGV	877,947	1,043,560	1,083,967	1,281,761	1.19	1.23	1.46
HGV	357,542	361,517	364,875	385,900	1.01	1.02	1.08
Employees	952	1,098	1,115	1,189	1.15	1.17	1.25
Passengers	3,332	4,452	4,500	4,931	1.34	1.35	1.48
Total	7,074,846	8,022,115	8,209,039	9,149,944	1.13	1.16	1.29

7.5.2 All four time periods display similar levels of growth in car business, commute and other trips. Between 2016 and 2047 there are 26% additional business trips, 21% additional commuting trips, and 33% extra other trips.

7.5.3 The background growth for LGV and HGV trips is consistent across all time periods. LGV trips grow by 46% between 2016 and 2047, while HGV trips grow by 8% over the same period.

7.5.4 The IP period has slightly higher background growth overall compared the other periods, experiencing an increase of 30% between 2016 and 2047 compared to 28% for AM1 and AM2, and 29% for the PM period.

7.5.5 There is significant growth in Gatwick employee numbers, particularly in the AM1 and AM2 periods where it exceeds 50% in 2047. Highway passenger trips grow by approximately 25% by 2047, and this is consistent across the model time periods.

7.6 Impact of the Covid Pandemic on travel demand

7.6.1 At the time of writing, there is a lot of speculation relating to the impact of the Covid-19 pandemic on long term trends associated with mobility. This includes discussions around the extent of changes in flexible working conditions offered in certain employment sectors, and the sustained impact on commuting and business-related travel. Due to this level of uncertainty, no specific account has been made in the forecasting of background travel demand to reflect any specific long-term trends. We would in general consider these impacts to result in a downside to travel demand making the assessments undertaken in this report conservative. These assumptions will be revisited in the run up to DCO submission as more information and advice is published around how to approach this.

8 Northern Runway Proposals

8.1 Context

8.1.1 As explained in the PTAR there are two major outside influences that will affect the predicted growth in demand at Gatwick Airport these are:

- the Covid-19 pandemic; and
- development of Runway 3 at Heathrow.

8.1.2 The influence of these are explained further in the PTAR, however in summary while the Covid-19 has had a severe impact on the global aviation industry it is expected that through the mid-2020s overall demand for air travel will recover to previous levels and then continue to grow.

8.1.3 Similarly, the development of Runway 3 at Heathrow remains in doubt due to both legal challenges and Heathrow themselves currently stopping work on the development proposal. Even if HAHL do restart the consenting process, it is considered unlikely that R3 could be operational much before the early/mid-2030s. Given the continuing uncertainty surrounding Heathrow R3, careful consideration has been given to the most robust assumption to be made in the traffic forecasts and environmental studies for Gatwick about Heathrow R3. It has been decided that the most robust assumption to adopt, at least for the purpose of preparing the PEIR, is to assume that a third runway does not come forward at Heathrow.

8.1.4 This approach provides a conservative assessment of environmental impacts of the Project. This is because if Heathrow R3 was to come forward, traffic levels at Gatwick would likely decline in the period immediately following the opening of R3, meaning that the environmental impacts of the Project, such as noise, traffic and emissions, would be lower in the 2032 assessment year. By not including Heathrow R3, the 2032 assessment is therefore more conservative. It should be noted that, by 2047, there would be little difference between demand at Gatwick with or without Heathrow R3 and accordingly this scenario would be unchanged irrespective of developments at Heathrow.

8.1.5 The forecasts prepared by GAL for the Northern Runway and Baseline Cases therefore adopt a 'No Heathrow R3' assumption. GAL will, however, keep this under review as work continues on the Project.

8.1.6 The central assessment cases for the Project are therefore as follows:

- Gatwick future baseline with no Heathrow R3.
- Gatwick Northern Runway or "with Project", which assumes Project opens in 2029 and Heathrow R3 does not come forward.

Assessment Years

8.1.7 In respect of each of these two cases, forecasts have been prepared for three primary assessment years – 2029, 2032 and 2047:

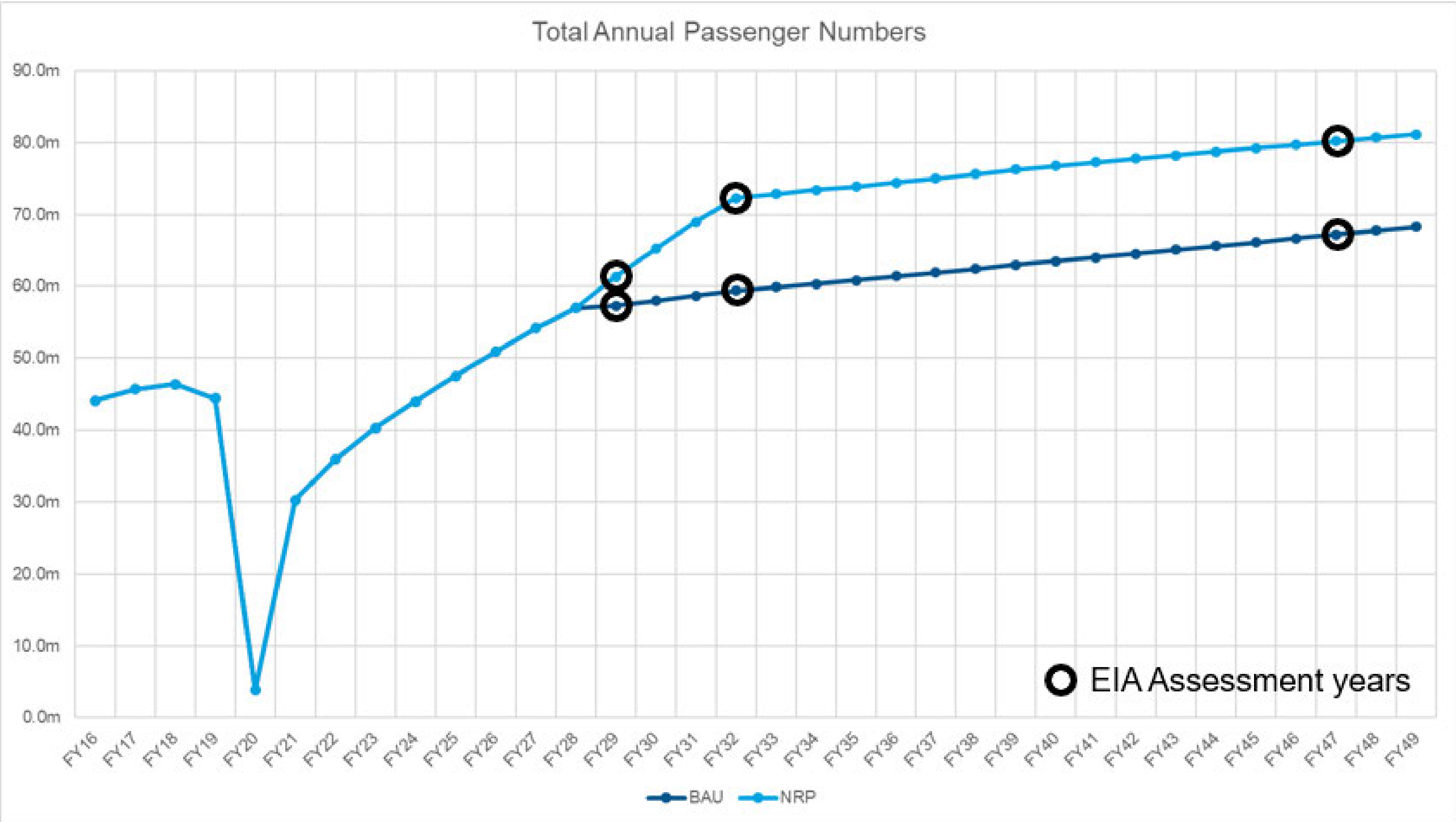
- 2029: represents the first full year of opening of the proposed Northern Runway Project.
- 2032: an interim assessment year, by which time highway mitigation is expected to have been completed and which represents a year in which environmental effects are likely to be higher than 2029.
- 2047: reflects a design year to assess the effects of a project 15 years after it has been completed.

8.2 Passenger growth

8.2.1 Annual demand for the assessment years are shown in Figure 16. Between 2024 and 2025, demand at the Airport is forecast to return to pre-Covid levels and, by 2029, annual demand is estimated to be 57.3mppa in the future baseline. Opening of the Northern Runway generates additional traffic, with airlines taking advantage of the released slots, such that 2029 demand with the Project is 4 mppa higher than the future baseline, at 61.3mppa.

8.2.2 With the Project, there then follows a three-year period of rapid growth to 2032, by which time demand at the Airport has grown to 72.3mppa with the Northern Runway as compared to 59.4mppa in the future baseline. Demand then levels off in line with future baseline and grows incrementally with all slots filled and any additional growth coming from higher load factors or larger aircraft. It is anticipated that by 2047, the Project could increase airport capacity up to 80.2 mppa, compared to a maximum potential capacity based on existing facilities of 67.2 mppa within the same timescale. This represents an increase of approximately 13 mppa.

Figure 16: Airside demand for Future Baseline and with Project Scenarios (No Heathrow R3)



8.2.3 These ICF forecasts provide a breakdown of hourly passenger arrivals and departures by terminal, residency, purpose and haul for each of the scenarios. For the purposes of this assessment the Busy Day forecasts have been used, these represent the third Friday in August.

8.2.4 The demand growth is the growth from a June 2016 weekday, to the forecast year third Friday in August. The third Friday in August 2016 had 14% higher passenger demand than the average June weekday, as such this approach to the forecast growth represents a robust scenario with higher airport demand levels than might otherwise be expected.

8.2.5 Table 8.2.1 shows the number of days and weekdays in each of 2016, 2017, 2018 and averaged that had higher volumes of passengers compared to the third Friday in August for that year. In 2016 19 weekdays had higher volumes than the third Friday in August; 2017 and 2018 had significantly fewer days where this was the case.

Table 8.2.1: Total number of days with higher passenger demand than the third Friday in August

	2016	2017	2018	Average
All days	33	3	2	7
Weekdays	19	1	0	2

8.2.6 The demand inputs are built in the same way as the base model with the hourly scheduled departures and the arrivals profiled out into exit times. The processed demand is then compared with the base demand inputs to provide growth factors by residency and purpose (UK Business, UK Leisure, Non-UK Business, Non-UK Leisure) for North and South terminals.

8.2.7 The ICF forecast additionally provides the proportion of expected transfers for each scenario, these are adjusted in each scenario to account for the volume of passengers with a surface access trip at Gatwick.

8.2.8 The demand inputs along with the forecast return factors and AM1 / AM2 highway demand split are inputs to GSAM.

8.2.9 The growth in passengers in terms of airside and landside demand across the day is shown in Figure 17 and Figure 18 respectively. In order to calculate landside demand, a 'lead' time before departure and a 'lag' time after flight arrival is assumed. These were based on survey data of passengers checking in and leaving the airport with variation in lead times based on short or long-haul flights.

8.2.10 The future baseline growth scenario to 2032 is around 15% higher across the day when compared to 2018. By 2047 demand is around 25% higher than in 2018. Demand in the Project scenario is 40% to 50% higher across the day when compared to 2018.

8.2.11 The landside profiles (Figure 18) show the overlaps with background traffic peaks so the potential impact on congestion is greater at these times of the day, specifically 06:00 to 09:00 and 16:00 to 19:00. High inter-peak demand may also affect resilience and network recovery.

Figure 17: Airside demand for 2018, Baseline and with Project

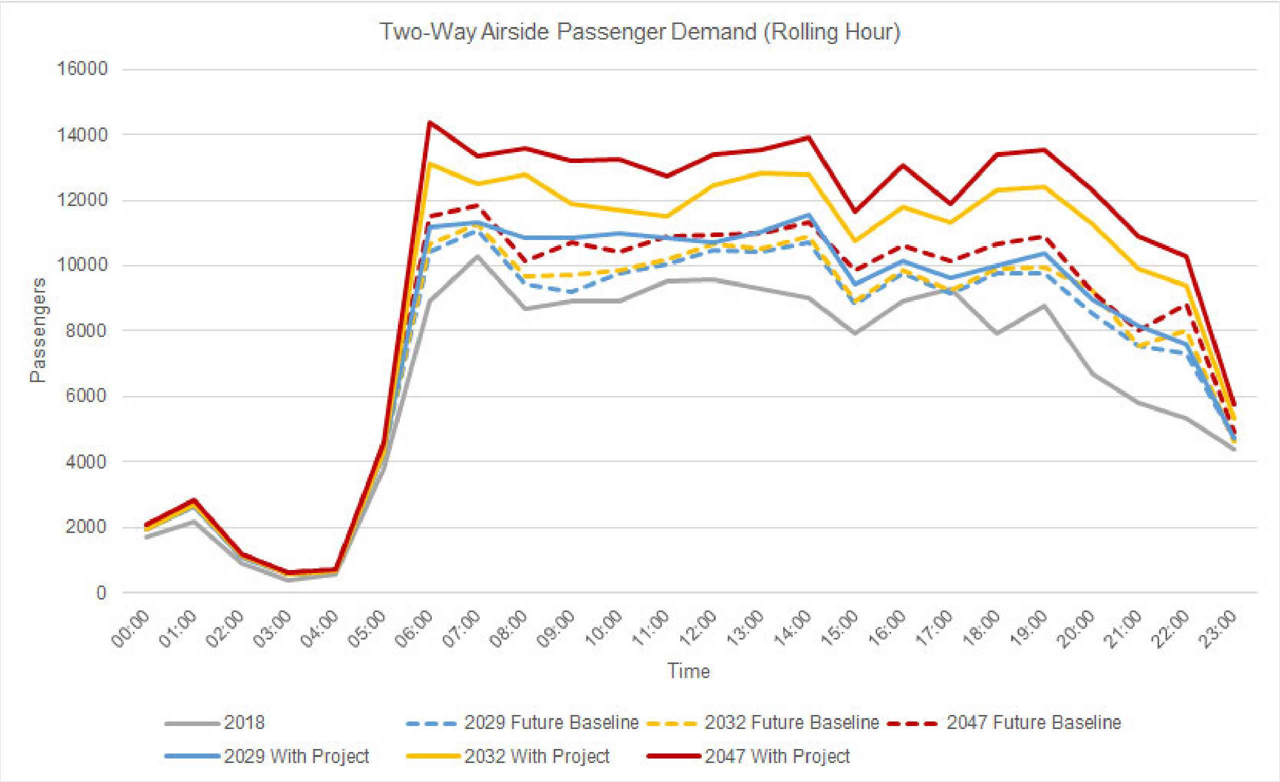
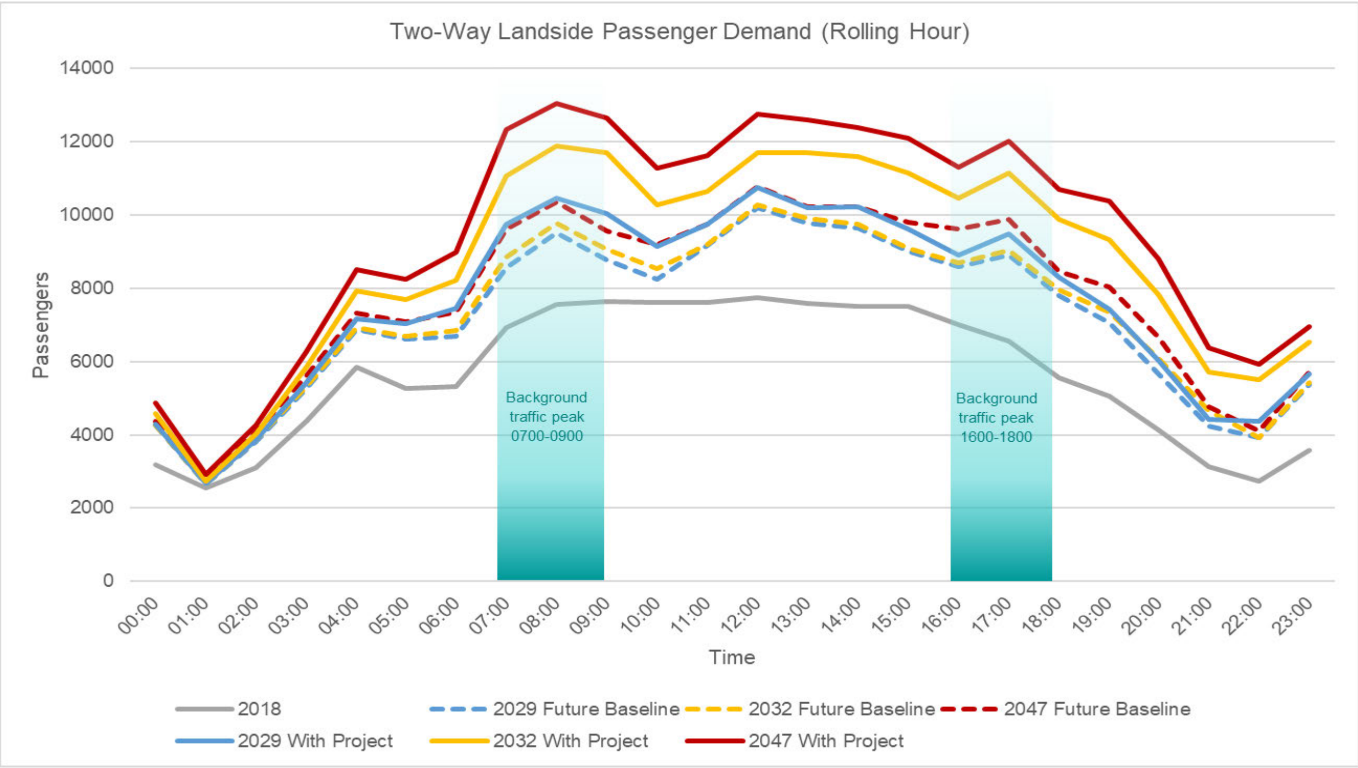


Figure 18: Landside demand for 2018, Future Baseline and Project Scenarios



8.3 Employment growth

8.3.1 The ICF Employment model provides employee numbers by job role for each scenario and forecast year for both the Future Baseline and Project scenarios without a third runway at Heathrow. The total employees for each year are shown in Table 8.3.1. The forecasts indicate that on-airport employees will increase progressively and will reach approximately 29,700 by 2047 for the future baseline scenario and approximately 32,800 by 2047 for the Project scenario, a difference of 3,100 employees.

Table 8.3.1: Gatwick employee forecasts (on-airport employee only)

Year	Future Baseline	With Project
2016	23,807	
2029	27,609	28,596
2032	28,074	31,247
2047	29,721	32,822

8.3.2 These totals are compared to the Oxera employee numbers to create growth factors by role. **Table 8.4.1** presents the growth factors from 2016 for the Future Baseline and with Project scenarios for 2029, 2032 and 2047.

8.3.3 Growth factors are applied during the data expansion process to create demand for each scenario and year. This processed demand is then compared to the base demand to produce growth factors by shift and non-shift workers and feed into GSAM.

8.3.4 Outbound and return factors for shift and non-shift workers are also fed into GSAM from this process.

8.3.5 Splits for AM1 and AM2 to and from the airport are calculated based on the hourly trip profiles in the demand build process and also fed into GSAM for producing assignable demand at the end of each loop of the demand model.

8.4 Cargo and Goods Vehicles

8.4.1 In 2017/18, Gatwick handled just over 102,000 tonnes of cargo. Gatwick's cargo volumes are forecast to grow to just over 290,000 tonnes by 2047 in the future baseline and just under 350,000 tonnes in the With Project scenario.

8.4.2 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. The forecast growth in cargo numbers is shown in Table 8.4.2.

Table 8.4.1: Growth factors from 2016

	2029 Project	2032 Project	2047 Project	2029 Future Baseline	2032 Future Baseline	2047 Future Baseline
Air Cabin Crew	1.27	1.42	1.52	1.22	1.25	1.35
Management Professional – Airport / Airline	1.16	1.24	1.30	1.13	1.14	1.20
Apron Ramp Cargo Baggage etc.	1.07	1.13	1.13	1.05	1.05	1.06
Catering Cleaning and Housekeeping	1.34	1.52	1.64	1.27	1.30	1.43
Customs Immigration Police and Fire Staff	1.36	1.55	1.68	1.29	1.33	1.45
Management/Professional – Other and IT	1.10	1.16	1.19	1.08	1.09	1.13
Maintenance Trades Staff and Other Skilled	1.22	1.33	1.40	1.17	1.19	1.27
Passenger Services Sales and Clerical Staff	1.08	1.12	1.15	1.06	1.07	1.10
Pilots/ATC/Flight operations	1.11	1.20	1.21	1.07	1.08	1.10
Security Passenger Search Security Access	1.25	1.38	1.47	1.20	1.23	1.32

Table 8.4.2: Cargo Growth Forecast (tonnes)

Year	Baseline	With Project
2016	76,800	
2018	157,475	
2029	227,705	250,816
2032	234,969	304,626
2047	290,499	348,430

8.4.3 Goods vehicles for cargo are not the only ones accessing/exiting the airport as both light and heavy goods vehicles are required to service the airport and aeroplanes themselves. Therefore, there were two assumptions applied to goods vehicles at the airport in order to increase the numbers to/from the airport. These were:

- **Cargo** – trips accessing the zone in the highway model representing the cargo terminal were increased by a growth factor between 2016 and the scenario being modelled. For example, the growth factor used for 2047 with Project was 4.54. representing an increase from 76,800 tonnes to 348,430 tonnes.
- **Servicing** – for any other goods vehicle trips using the Gatwick zones not related to the cargo terminal, these have been increased in line with the passenger per annum increase for each of the scenarios. The growth factors used for these vehicles is shown in Table 8.4.3.

Table 8.4.3: Growth in Gatwick goods vehicles servicing the airport

Year	Baseline	With Project
2029	1.4	1.5
2032	1.46	1.77
2047	1.65	1.97

8.5 Surface Access strategy

8.5.1 Draft actions and targets for the Airport Surface Access Strategy have been included within the PTAR. The final strategy in the application for development consent will be prepared in conjunction with Gatwick's Airport Transport Forum and in accordance with the Aviation Policy Framework guidance.

8.5.2 Gatwick intends to put forward a robust strategy which enhances Gatwick as a regional transport hub through improvements to rail, bus, and sustainable transport with challenging but achievable mode share targets established towards a lower carbon future.

8.5.3 In alignment with the ASAS, the Travel Plan will focus on specific interventions related to staff travel in particular. The Travel Plan will seek to promote sustainable and healthier modes of transport for staff and reduce travel to work by single occupancy car.

Targets

8.5.4 The Project ASAS and Travel Plan will be developed to deliver the growth associated with the northern runway safely and sustainably.

8.5.5 Headline targets proposed in this PTAR are as follows.

- Achieve 60% sustainable transport mode share, including active travel and public transport, for airport passengers by 2030 under the scrutiny of the Transport Forum Steering Group.
- Demonstrate clear progress towards reaching a rail mode share aspiration of 50% by 2030.
- Achieve 60% of staff journeys to work by sustainable modes (public transport, active travel modes and group travel provided by individual employers for their staff, referred to as 'company transport') and including other sustainable travel initiatives such as low emission travel initiatives for those who choose to travel by car by 2040.
- Achieve a year-on-year increase in bus use by staff and passengers and demonstrate measurable value for money from Passenger Transport Levy funding.
- In proportion with the public transport mode share targets set above, to deliver:
  - A reduction in air passenger "Kiss and Fly" car journeys;
  - A reduction in single occupancy car journeys by staff and an increase staff car journeys by registered car share users.
  - A reduction in staff car parking spaces in line with a shift to more sustainable modes.

8.5.6 The measures included in the strategic model lead to an increase in passenger public transport mode share from around 45% prior to the Covid-19 pandemic up to 54% and 56% between 2029 and 2047. Whilst not at the 60% target set for 2030, this increase in public transport mode share for air passengers is significant and notable given the growth in passenger numbers with the Project.

8.5.7 The annual average represents a public transport mode share of 48% to 50% on the peak summer day, owing to the seasonal variation, comprising 42% to 43% rail and 6% to 7% bus and coach.

8.5.8 Accordingly, it is considered likely that Gatwick can achieve a 45% rail mode share by 2030 in line with its ASAS target. Additional routes and higher frequencies will be explored for bus and coach prior to the application for development consent.

8.5.9 In terms of employees, the strategic model shows that a sustainable transport mode share of 47% is achievable and this would indicate that further measures are required, in particular these could include incentives around EV uptake as well as restrictions on staff parking

8.5.10 Further actions which could lead to an increase in sustainable mode share across passengers and employees and are set out in the PTAR.

Parking and forecourt charges

8.5.11 A forecourt access minimum charge of £5 was introduced in 2021 to reduce emissions as part of GAL's Decade of Change and Sustainability targets. It is assumed that this will rise in future years as demand grows to manage the forecourt efficiently. In 2029 the forecourt charge is assumed to rise to £9.50 (in 2021 money) and to £11.50 in 2032 and 2047.

8.5.12 Charges for use of both GAL managed and off-site car parks are assumed to rise by 30% in real terms from 2016 Base to 2029 and by 40% to 2032 and 2047.

8.5.13 In the Base, the off-airport car parks are estimated to be 80% on the modelled day. In future years no new capacity is assumed and an upper limit on off-airport car park occupancy is set at 95%. Excess demand above this limit is switched to on-airport car parks.

8.5.14 Onsite forecast parking assumptions are based on the Gatwick with Project Car Parking in Chapter 5: Project Description of the PEIR for Quarter 2. This provides the location and type of car parks in each of the forecast years, for the model these have been allocated to model zones. Car rental provision on and offsite is assumed to have the same level of provision and that operations can change in order to accommodate growth. It is assumed that the car rental location remains the same as for the 2016 base model.

8.5.15 Staff car parking provision in Car Park M is expected to become a new multi-story car park for passengers, with parking provision for staff moving across to Car Park H in the Future Baseline scenarios, and Car Parks X&V in the With Project scenario with the additional closure of Car Park Y to staff.

8.5.16 In the Future Baseline scenarios, passenger onsite parking provision is expected to increase through the opening of the multi-story car park where Car Park M currently is, along with additional spaces provided by the Robotics parking in the Self-Park South. In addition to these, with the Project in 2029 additional spaces at the north terminal self-parking and short stay in Car Park J will be completed along with an additional 5,800 spaces in the Pentagon. Additional spaces in the North Terminal self-parking will be available in 2032 and some in Car Park Y with the remaining spaces in Car Park Y available by 2047. Table 8.5.1 summarises the total onsite parking provision for staff and park and fly in each of the scenarios.

Table 8.5.1: On-site parking provision

	Staff spaces	Park and Fly	Valet
2019	6,090	26,804	13,807
2029 Future Baseline	6,090	33,554	13,807
2032 Future Baseline	6,090	33,554	13,807
2047 Future Baseline	6,090	33,554	13,807
2029 Project	6,041	42,514	13,807
2032 Project	6,041	49,103	13,807
2047 Project	6,041	52,103	13,807

8.5.17 Parking location changes between the Future Baseline and Project scenarios for each year are shown in Figure 19 to Figure 21, these show the difference compared to the Future Baseline rather than the incremental change year on year.

Figure 19: Changes in parking assumptions from Future Baseline to With Project, 2029

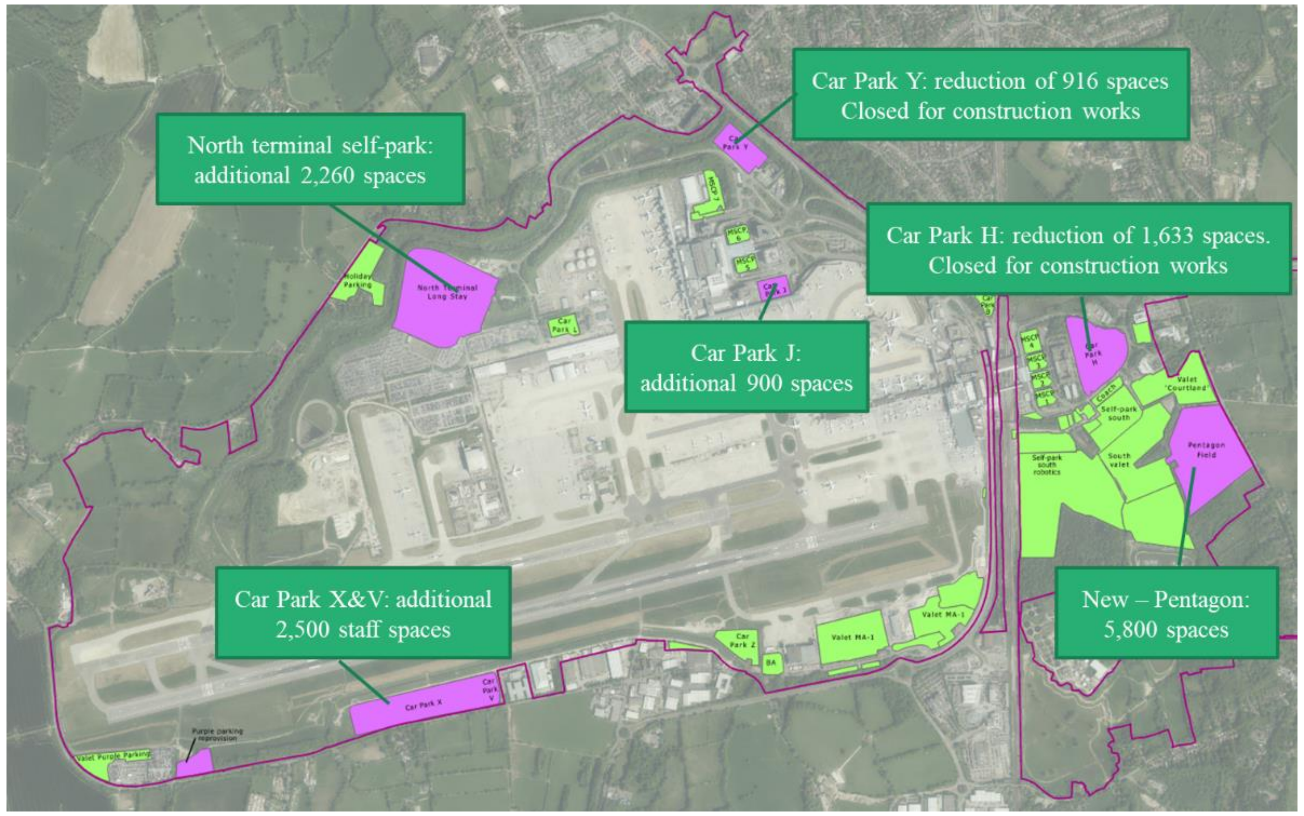


Figure 20: Changes in parking assumptions from Future Baseline to With Project , 2032

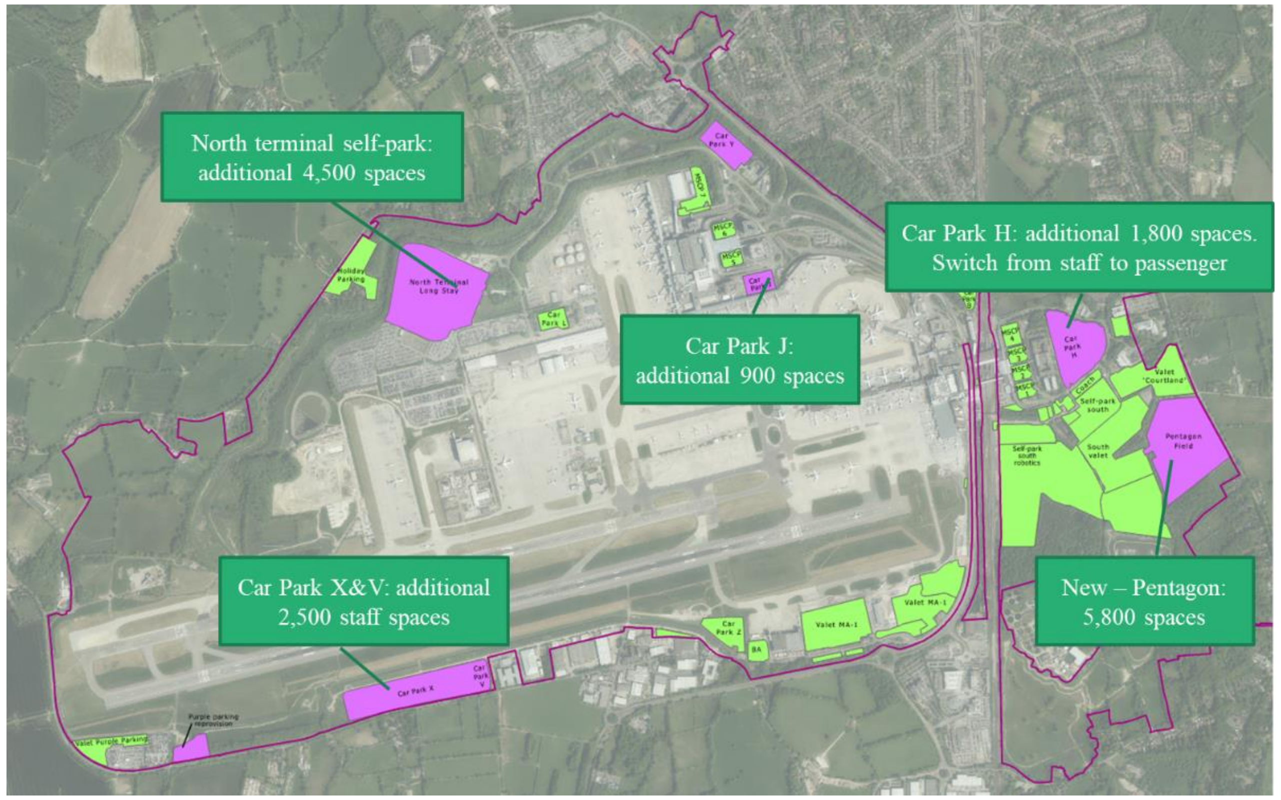
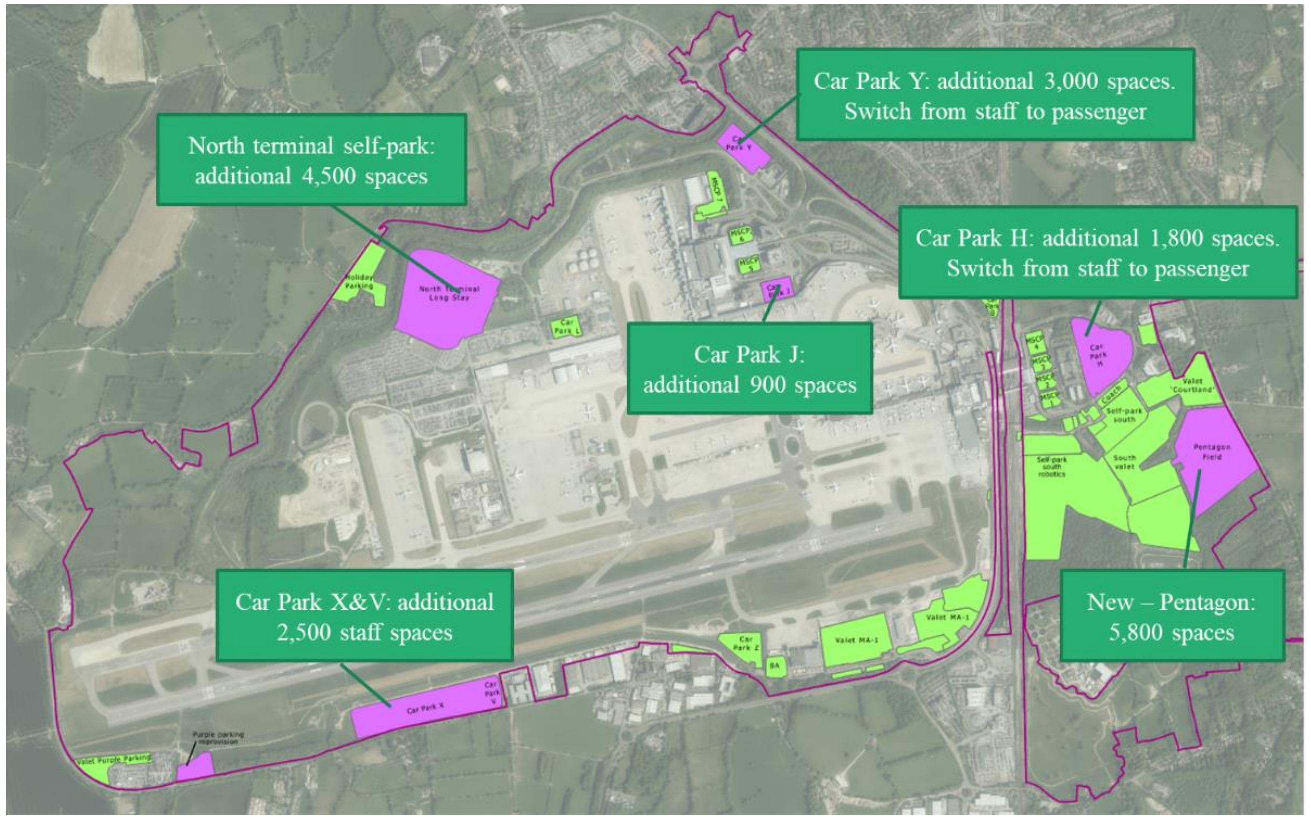


Figure 21: Changes in parking assumptions from Future Baseline to With Project , 2047



8.5.18 Offsite park and fly and valet are assumed to retain the same distribution and to be 80% occupied in 2016 with this increasing to a cap of 95% occupation of capacity for the forecast scenarios.

8.5.19 These assumptions were used to inform the surface access strategy for modelling the Project scenarios.

8.6 Proposed Mitigation

8.6.1 In order to accommodate the proposed increase in passenger numbers, and taking into account other known and planned developments in the area and expected access and mode share changes, highway works are proposed as part of Project. These are to both the South Terminal and North Terminal roundabouts, to improve capacity and mitigate against significant effects, with additional improvement works also proposed at the Longbridge Roundabout.

8.6.2 The final designs and details of the improvement works will be subject to further road traffic assessment and detailed engagement with highway authorities, including Highways England.

South Terminal Junction Improvements

8.6.3 The South Terminal roundabout (also known as the Welcome Roundabout) is the sole entry point into the South Terminal area and for local airport-related roads, including the terminal forecourt, long stay car parks and commercial premises. It is served by the M23 Gatwick Spur to the east (leading from the M23 Junction 9) and Airport Way from the west (leading from North Terminal roundabout). The majority of Gatwick traffic accesses the airport from the M23 and traffic for both the North Terminal and South Terminal passes through this roundabout.

8.6.4 The M23 Gatwick Spur has recently undergone an upgrade as part of the Highways England M23 Smart Motorway Project, completed in 2020. The hard shoulder of the westbound carriageway will become a permanent running lane, providing a total of three lanes approaching the airport. Further local improvements, involving signalisation and minor widening of entries/exits, are proposed in the absence of the Project.

8.6.5 In order to cater for additional road traffic demand associated with the Project, it is proposed that a significant improvement scheme will be required at the South Terminal roundabout. Details of the highway design are being developed and for the purpose of PEIR, it is assumed that grade separation of the roundabout is required. The highway scheme being considered for the South Terminal roundabout for PEIR involves the following.

- A new flyover taking through traffic from the M23 Gatwick Spur to Airport Way over the top of the existing roundabout to remove this traffic from the roundabout.
- The flyover will likely be around 8 metres above the existing ground level allowing for Highways England's safety and design standards.
- To deliver the grade separated solution, slip roads are required and these can be provided on public highway land to the north and GAL land to the south of the existing roundabout.
- Bridging structures are needed for the flyover at the roundabout. The existing structures either side of South Terminal roundabout (where the M23 Gatwick Spur crosses B2036 Balcombe Road, and where Airport Way crosses the Brighton-London main line railway) may require widening and strengthening or replacement.
- This scale of improvement would not preclude further enhancement relevant to serving any planned development north of the roundabout, should that be brought forward.

North Terminal Junction Improvements

8.6.6 The North Terminal roundabout is the entry point to the North Terminal and local access roads, including the north and east perimeter roads. The existing layout consists of a circular five-arm at-grade roundabout to the north east of the North Terminal, to the south west of the A23. There is currently no direct entry to the roundabout southbound from Horley and no direct exit from the roundabout on to the A23 southbound towards Crawley.

8.6.7 Local improvements are proposed in the absence of the Project, including some widening and signalling to provide additional capacity in the future baseline.

8.6.8 In order to cater for additional road traffic demand associated with the Project, together with traffic growth that is expected to arise as a result of background growth and other developments, it is assumed that a significant improvement scheme will be required at North Terminal roundabout. As for the South Terminal junction improvements, any improvement scheme will be subject to detailed assessment work and discussion with Highways England and the local highway authorities.

8.6.9 For the purposes of the PEIR, the highway scheme being considered for the North Terminal roundabout involves the following.

- An elevated flyover to carry traffic between Airport Way (from South Terminal and the M23) and the A23 towards Horley. This removes through traffic from the roundabout.
- The elevated links are likely to be approximately 8 metres above the roundabout to provide the required clearances as stipulated by Highways England's safety and design standards.
- The grade separation solution would include additional slip roads, in particular to provide connections between Airport Way, the A23 London Road and access to the airport. Not all movements are currently catered for at North Terminal Roundabout (e.g., from the airport to the A23 southbound) and the aim is to include as many movements as practicable in order to improve the flow of traffic.
- The configuration of roads beneath the flyover will mean providing specific signal-controlled routings which allow traffic to move directly between Airport Way, A23, Longbridge Way and the terminal forecourt.
- Options exist to accommodate all works within the existing highway boundary, or to take additional land from Riverside Garden Park by the A23 to provide alternative arrangements to meet design standards. These are subject to further design and approval by Highways England and alternative options are being explored to avoid additional land requirements.

Longbridge Roundabout

8.6.10 The existing Longbridge roundabout is where the A23 London Road meets Povey Cross Road, A217 and A23 Brighton Road. There is a dedicated left turn slip from Brighton Road to London Road. Signal controlled pedestrian crossings are provided on all four arms.

8.6.11 Preliminary modelling work shows that that the existing Longbridge roundabout would require works to improve capacity with the Project and to provide better integration with improvements at the North Terminal roundabout.

8.6.12 The proposed solution is to substantially improve the roundabout and provide full width running lanes throughout the junction, replacing the sub-standard narrow lanes that currently exist. These lanes create a capacity restriction due to goods vehicles needing to straddle two lanes for certain manoeuvres. The new roundabout would have a slightly larger inscribed diameter and would extend further west and north to accommodate wider circulating lanes, additional pedestrian crossing facilities and improved capacity on exit and entry lanes, particularly for the A23 arm to and from Horley.

9 Future demand by mode

9.1 Airport passengers

Future Baseline

9.1.1 Table 9.1.1 and Figure 22 show the modelled number of two-way trips made during a June weekday for airport passengers by mode, for the future baseline scenarios. The total demand grows by 36% from 2016 to 2029 and 48% to 2047 from 2016 levels.

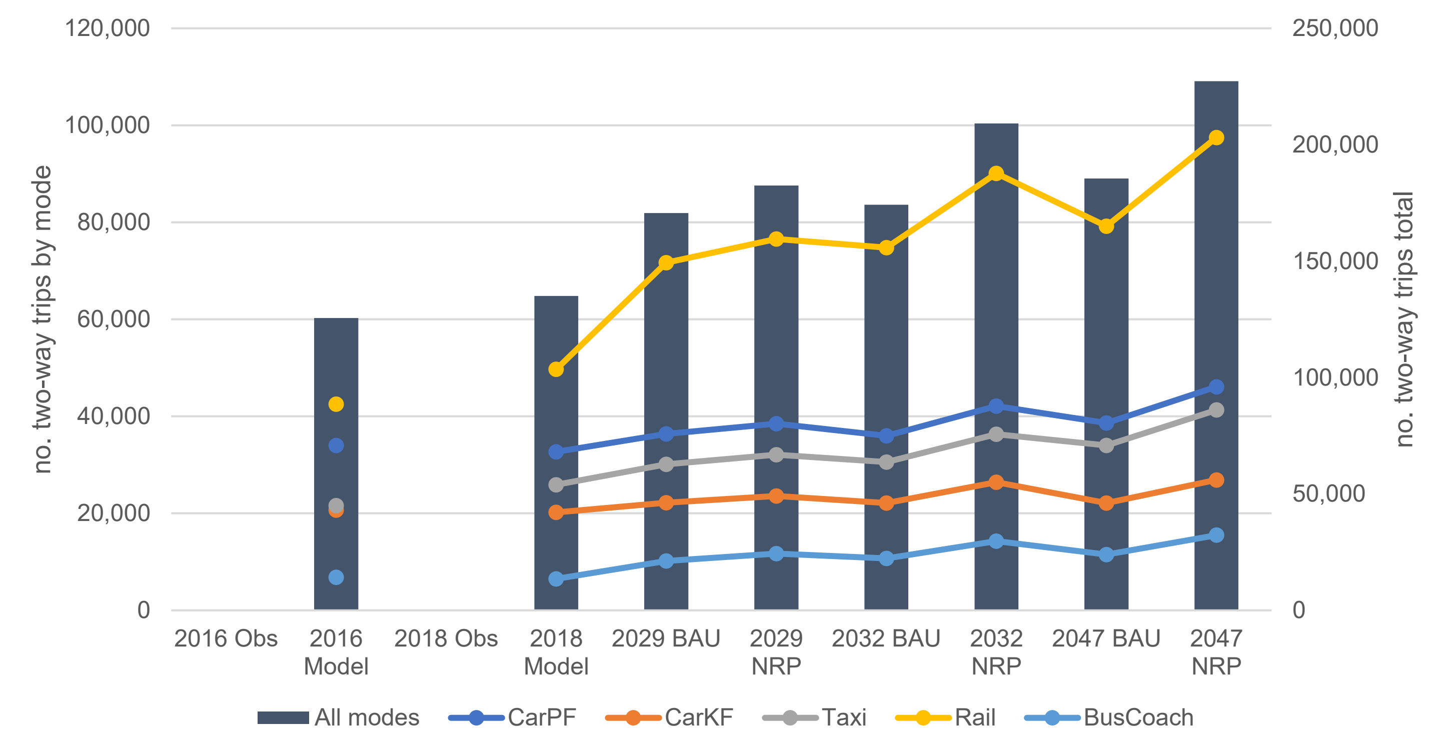
9.1.2 The amount of demand by each mode follows an increasing trend but with different rates. Around 40% of the total number of trips made across the modelled years is by rail, with a large increase of 87% in 2047 compared to the base year (from 42,500 to 79,200). Taxi usage by airport passengers increases by 39% in 2029 and 57% in 2047 from 2016. There are also small increases in trips by car, both parking at the airport and pick-up / drop-off and bus and coach.

Table 9.1.1: Airport Passenger Demand Future Baseline

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
CarPF	34,000	32,700	36,400	36,000	38,600
Share (%)	*(27.1%)*	*(24.2%)*	*(21.3%)*	*(20.7%)*	*(20.8%)*
CarKF	20,700	20,200	22,200	22,100	22,100
Share (%)	*(16.5%)*	*(15.0%)*	*(13.0%)*	*(12.7%)*	*(11.9%)*
Taxi	21,600	25,900	30,100	30,600	34,000
Share (%)	*(17.2%)*	*(19.2%)*	*(17.6%)*	*(17.6%)*	*(18.3%)*
Rail	42,500	49,700	71,700	74,800	79,200
Share (%)	*(33.8%)*	*(36.8%)*	*(42.0%)*	*(42.9%)*	*(42.7%)*
BusCoach	6,800	6,500	10,200	10,700	11,500
Share (%)	*(5.4%)*	*(4.8%)*	*(6.0%)*	*(6.2%)*	*(6.2%)*
All modes	125,600	135,000	170,600	174,200	185,400
Share (%)	*(100.0%)*	*(100.0%)*	*(100.0%)*	*(100.0%)*	*(100.0%)*

'CarPF': Car Park and Fly
'CarKF': Car "Kiss and Fly" (pick-up and drop-off)

Figure 22: Airport Passenger Demand Future Baseline



9.1.3 Table 9.1.2 summarises the number of modelled car trips made by airport passengers from 2016 to 2047 in future baseline scenarios. Included modes are car parking and fly, car pick-up and drop-off, and taxis. The total number of trips increases by 16.3% in 2029, stays level until 2032 then increases by 24.1% in 2047.

Table 9.1.2: Total Number of Car Trips Made by Airport Passenger Future Baseline

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
All car trips	76,300	78,800	88,700	88,700	94,700
	(60.8%)	*(58.4%)*	*(52.0%)*	*(50.9%)*	*(51.1%)*
Increase from 2016		2,500	12,400	12,400	18,400
% increase from 2016		3.3%	16.3%	16.3%	24.1%

9.1.4 Table 9.1.3 summarises the number of modelled sustainable mode trips made by airport passengers from 2016 to 2047 in future baseline scenarios. Included modes are rail, bus, coach, active and car share. The total number of trips increases by 36.6% in 2029, stays level until 2032 then increases by 24.1% in 2047.

Table 9.1.3: Total Number of Sustainable Mode Trips made by Airport Passenger Future Baseline

Two-way trips, weekday, June	2016	2018/2019	2029 BAU	2032 BAU	2047 BAU
All sustainable mode trips	132,400	141,500	180,800	184,900	196,900
	(39.2%)	*(41.6%)*	*(48.0%)*	*(49.1%)*	*(48.9%)*
Increase from 2016		9,100	48,400	52,500	64,500
% increase from 2016		6.9%	36.6%	39.7%	48.7%

Future Baseline with Project

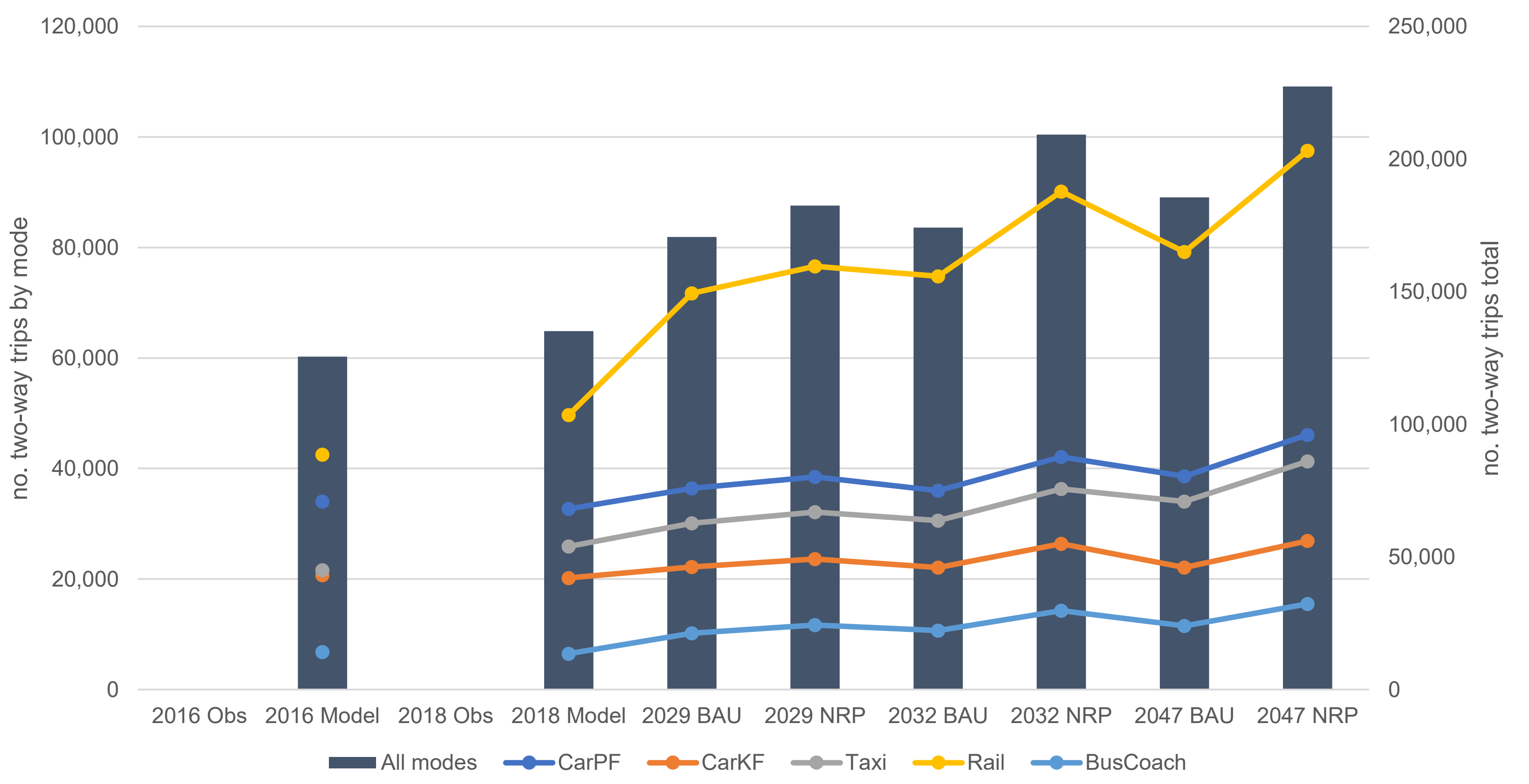
9.1.5 Table 9.1.4 and Figure 23 show the modelled number of two-way trips made during a June weekday for airport passengers by mode, for the future baseline with Project scenarios. The total demand increases by 45% in 2029 and 81% in 2047 from the base year, which is around 33% more growth by 2047 in surface access demand than that in the 2047 future baseline scenario.

9.1.6 There are greater increases by mode in with Project scenarios. The mode split proportions are similar to that of future baseline scenarios in respect of each modelled year.

Table 9.1.4: Airport Passenger Demand Future Baseline with Project

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
CarPF	34,000	32,700	38,500	42,100	46,100
Share (%)	*(27.1%)*	*(24.2%)*	*(21.1%)*	*(20.1%)*	*(20.3%)*
CarKF	20,700	20,200	23,600	26,400	26,900
Share (%)	*(16.5%)*	*(15.0%)*	*(13.0%)*	*(12.6%)*	*(11.8%)*
Taxi	21,600	25,900	32,100	36,300	41,300
Share (%)	*(17.2%)*	*(19.2%)*	*(17.6%)*	*(17.4%)*	*(18.2%)*
Rail	42,500	49,700	76,600	90,100	97,500
Share (%)	*(33.8%)*	*(36.8%)*	*(41.9%)*	*(43.1%)*	*(42.9%)*
BusCoach	6,800	6,500	11,700	14,300	15,500
Share (%)	*(5.4%)*	*(4.8%)*	*(6.4%)*	*(6.8%)*	*(6.8%)*
All modes	125,600	135,000	182,500	209,200	227,300
Share (%)	*(100.0%)*	*(100.0%)*	*(100.0%)*	*(100.0%)*	*(100.0%)*

Figure 23: Airport Passenger Demand Future Baseline with Project



9.1.7 Table 9.1.5 shows the total number of car trips made by airport passenger from 2016 to 2047 in future baseline with Project scenarios. The increase in car trips by 2047 in the future baseline with Project scenario compared with the future baseline scenario.

Table 9.1.5: Total Number of Car Trips Made by Airport Passenger Future Baseline with Project

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
All car trips	76,300	78,800	94,200	104,800	114,300
	(60.8%)	(58.4%)	(51.7%)	(50.1%)	(50.3%)
Increase from 2016		2,500	17,900	28,500	38,000
% increase from 2016		3.3%	23.5%	37.4%	49.8%

9.1.8 Table 9.1.6 summarises the number of modelled sustainable mode trips made by airport passengers from 2016 to 2047 in future baseline scenarios. The total number of trips increases by 46.7% in 2029, and almost double in 2047.

Table 9.1.6: Total Number of Sustainable Mode Trips made by Airport Passenger Future Baseline with Project

Two-way trips, weekday, June	2016	2018/2019	2029 BAU	2032 BAU	2047 BAU
All sustainable mode trips	132,400	141,500	194,200	223,500	242,800
	(39.2%)	*(41.6%)*	*(48.3%)*	*(49.9%)*	*(49.7%)*
Increase from 2016		9,100	61,800	91,100	110,400
% increase from 2016		6.9%	46.7%	68.8%	83.4%

9.2 Airport Employees

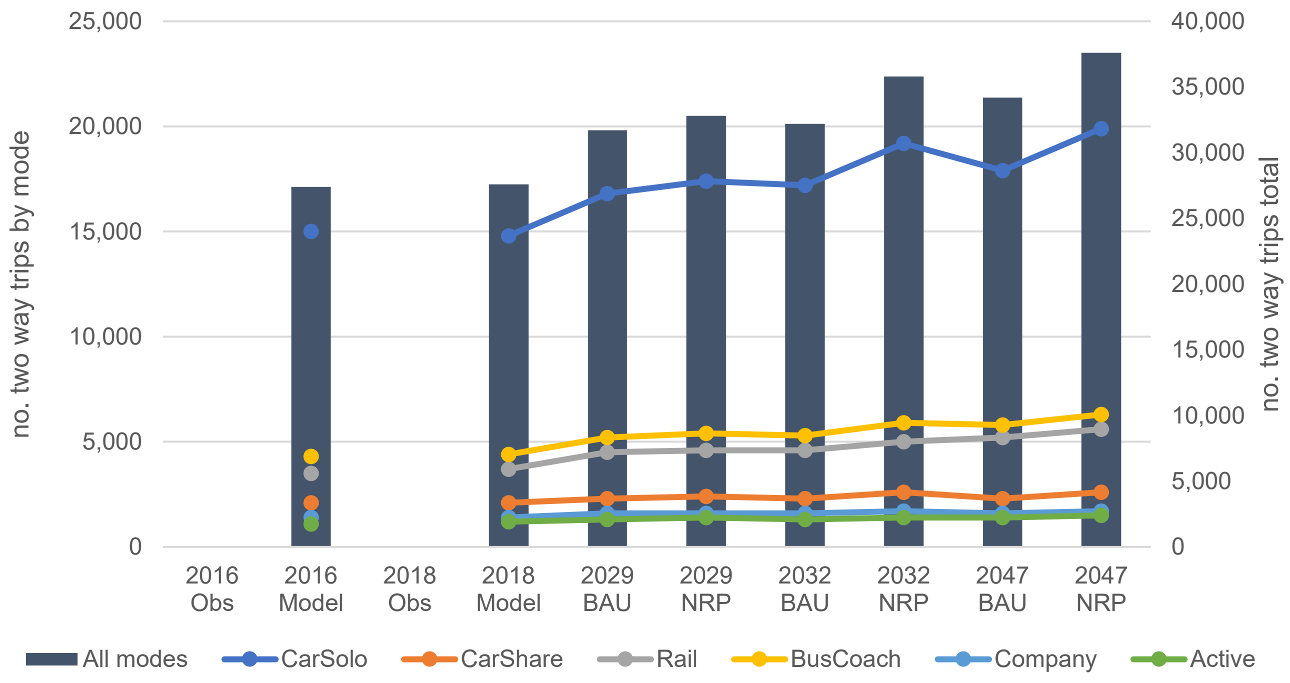
9.2.1 Table 9.2.1 and Figure 24 show the modelled number of employee two-way trips during a June weekday, by mode and in future baseline scenarios.

9.2.2 More than 50% of the total demand is made by solo car driving trips across the modelled years. There is a slight drop in 2018 but this increases back up in the future years. The number of trips by public transport increases slightly by around 4,000 from the base year to 2047, half of which are rail trips and the other half are bus or coach. The active travel, company shuttle service and car share demands show minor growth from 2016 to 2029 and then steady at that level through to 2047.

Table 9.2.1: Airport Employee Demand Future Baseline

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
CarSolo	15,000	14,800	16,800	17,200	17,900
Share (%)	*(54.7%)*	*(53.7%)*	*(53.1%)*	*(53.3%)*	*(52.3%)*
CarShare	2,100	2,100	2,300	2,300	2,300
Share (%)	*(7.6%)*	*(7.5%)*	*(7.2%)*	*(7.2%)*	*(6.8%)*
Rail	3,500	3,700	4,500	4,600	5,200
Share (%)	*(12.8%)*	*(13.5%)*	*(14.1%)*	*(14.3%)*	*(15.2%)*
BusCoach	4,300	4,400	5,200	5,300	5,800
Share (%)	*(15.7%)*	*(16.0%)*	*(16.5%)*	*(16.3%)*	*(17.0%)*
Company	1,400	1,400	1,600	1,600	1,600
Share (%)	*(5.1%)*	*(5.1%)*	*(4.9%)*	*(4.8%)*	*(4.7%)*
Active	1,100	1,200	1,300	1,300	1,400
Share (%)	*(4.2%)*	*(4.2%)*	*(4.1%)*	*(4.1%)*	*(4.1%)*
All modes	26,300	26,400	30,400	31,000	32,800
Share (%)	*(100.0%)*	*(100.0%)*	*(100.0%)*	*(100.0%)*	*(100.0%)*

Figure 24: Airport Employee Demand Future Baseline



9.2.3 Table 9.2.2 summarises the numbers of modelled car trips made by airport employees from 2016 to 2047 in future baseline scenarios, which sums the 'CarSolo', 'CarShare' and 'Company' trips. The total number of trips increases steadily to 17.8% in 2047.

Table 9.2.2: Total Number of Car Trips Made by Airport Employees Future Baseline

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
All car trips	18,500	18,300	20,700	21,100	21,800
	(67.4%)	*(66.3%)*	*(65.3%)*	*(65.3%)*	*(63.8%)*
Increase from 2016		-200	2,200	2,600	3,300
% increase from 2016		-1.1%	11.9%	14.1%	17.8%

9.2.4 Table 9.2.3 summarises the numbers of modelled sustainable mode trips made by airport employees from 2016 to 2047 in future baseline scenarios, which sums all trips of modes analysed apart from 'CarSolo'. The total number of trips increases steadily to 31.5% in 2047.

Table 9.2.3: Total Number of Sustainable Mode Trips Made by Airport Employees Future Baseline

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
All sustainable mode trips	12,400	12,800	14,900	15,100	16,300
	(45.3%)	*(46.3%)*	*(46.9%)*	*(46.7%)*	*(47.7%)*
Increase from 2016		400	2,500	2,700	3,900
% increase from 2016		3.2%	20.2%	21.8%	31.5%

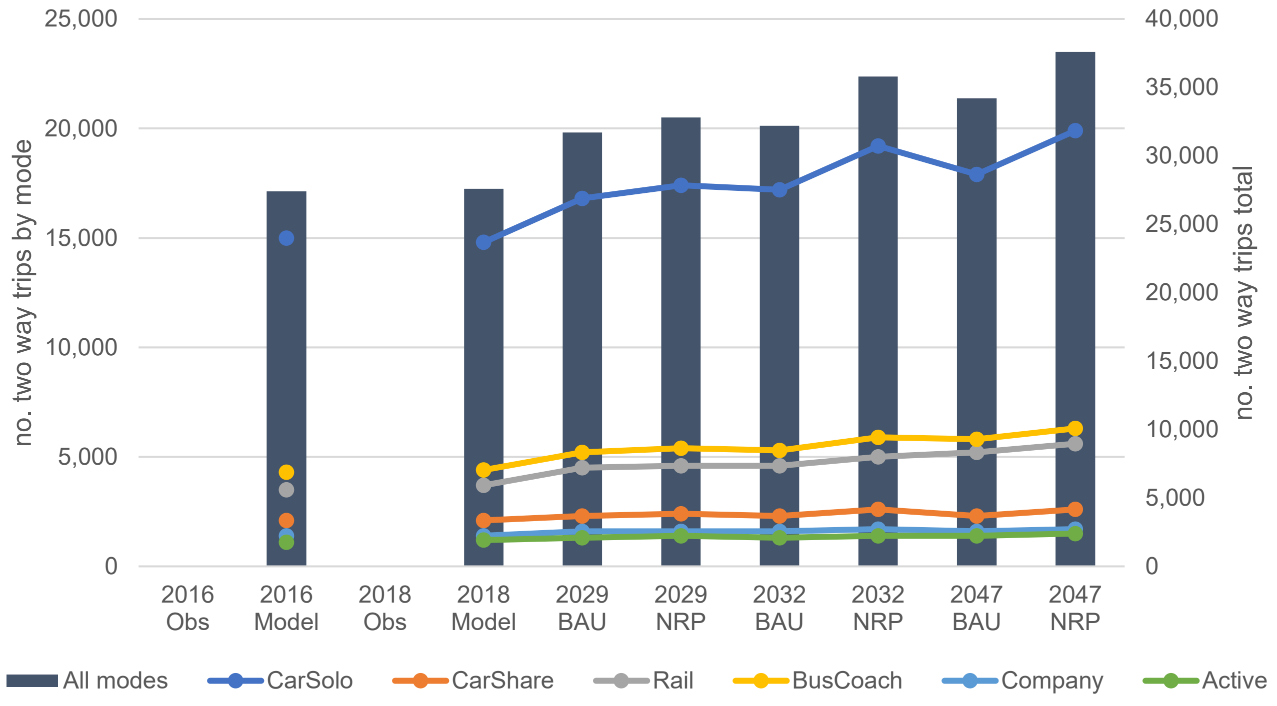
9.2.5 Table 9.2.4 and Figure 25 show the modelled number of two-way trips during a June weekday, made by airport employees by mode in future baseline with Project scenarios. The total demand increases by 4% in 2029 and 8% in 2047 compared to that in 2016.

9.2.6 It also shows greater demand increase by public transport from 2029 to 2047. The mode split proportions are similar to that of baseline scenarios in respect of each modelled year.

Table 9.2.4: Airport Employee Demand Future Baseline with Project

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
CarSolo	15,000	14,800	17,400	19,200	19,900
Share (%)	*(54.7%)*	*(53.7%)*	*(53.1%)*	*(53.7%)*	*(52.9%)*
CarShare	2,100	2,100	2,400	2,600	2,600
Share (%)	*(7.6%)*	*(7.5%)*	*(7.2%)*	*(7.2%)*	*(6.9%)*
Rail	3,500	3,700	4,600	5,000	5,600
Share (%)	*(12.8%)*	*(13.5%)*	*(14.1%)*	*(13.9%)*	*(14.8%)*
BusCoach	4,300	4,400	5,400	5,900	6,300
Share (%)	*(15.7%)*	*(16.0%)*	*(16.6%)*	*(16.4%)*	*(16.8%)*
Company	1,400	1,400	1,600	1,700	1,700
Share (%)	*(5.1%)*	*(5.1%)*	*(4.9%)*	*(4.8%)*	*(4.6%)*
Active	1,100	1,200	1,400	1,400	1,500
Share (%)	*(4.2%)*	*(4.2%)*	*(4.1%)*	*(4.0%)*	*(3.9%)*
All modes	26,300	26,400	31,400	34,400	36,100
Share (%)	*(100.0%)*	*(100.0%)*	*(100.0%)*	*(100.0%)*	*(100.0%)*

Figure 25: Airport Employee Demand Future Baseline with Project



9.2.7 Table 9.2.5 shows the total number of car trips made by airport employees from 2016 to 2047 in future baseline with Project scenarios. The number of car trips increases by 27% in 2032 and 30.8% in 2047, with significantly higher growth rate between 2016 and 2029 than the rate in baseline scenarios.

Table 9.2.5: Total Number of Car Trips Made by Airport Employees Future Baseline with Project

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
All car trips	18,500	18,300	21,400	23,500	24,200
	(67.4%)	*(66.3%)*	*(65.2%)*	*(65.7%)*	*(64.5%)*
Increase from 2016		-200	2,900	5,000	5,700
% increase from 2016		-1.1%	15.7%	27.0%	30.8%

9.2.8 Table 9.2.6 shows the total number of sustainable mode trips made by airport employees from 2016 to 2047 in future baseline with Project scenarios. The total number increases by 24.2% in 2029 and 42.7% in 2047.

Table 9.2.6: Total Number of Sustainable Mode Trips Made by Airport Employees Future Baseline with Project

Two-way trips, weekday, June	2016	2018/2019	2029	2032	2047
All sustainable mode trips	12,400	12,800	15,400	16,600	17,700
	(45.3%)	*(46.3%)*	*(46.9%)*	*(46.3%)*	*(47.1%)*
Increase from 2016		400	3,000	4,200	5,300
% increase from 2016		3.2%	24.2%	33.9%	42.7%

10 Highway Network Performance

10.1 Assessment approach

10.1.1 The following section details the performance of the highway model in relation to the Future Baseline and Future Baseline with Project respectively. This covers the three assessment years of 2029, 2032 and 2047.

10.1.2 The performance of the highway model is assessed by considering the changes in network operation for each assessment year between the Future Baseline and With Project scenarios. The assessment considers five performance areas presented in Figure 26 and consists of:

- Strategic Road Network (SRN): M25 (J5 to J10), M23, A23 & A27 (Lewes to Arundel);
- Performance Area A: Gatwick Airport, Crawley and Horley;
- Performance Area B: M25 to A272;
- Performance Area C: Inter-London; and
- Performance Area D: A272 – A27

10.1.3 To this end, the following network characteristics are explored in the analysis:

10.1.4 **Annual Average Daily Traffic (AADT)** – presented in vehicle units and represents the annual average daily volume of traffic expanded from the four individual modelled time periods. Summarised across all Performance Areas.

10.1.5 **Journey Times** – expressed as end-to-end travel times on key routes across the AoDM. These include the Strategic Route Network (SRN), routes in the vicinity of Gatwick Airport, the periphery of Crawley and other key distributor roads. The routes analysed capture trips to/from Gatwick Airport as well as other key strategic movements on the network. Presented for SRN, Performance Areas A, B and D.

10.1.6 **Volume to Capacity (V/C)** – ratios expressing the total traffic volume utilising a link with respect to its total available capacity, this is a common metric used to assess the level of congestion. Modelled values are presented to capture the worst performing links (i.e. the maximum across all time periods). V/C is segmented in to three key operational categories presented in Table 43 and is considered for SRN & Performance Areas A-D.

Table 10.1.1: Volume / Capacity Operational Categories

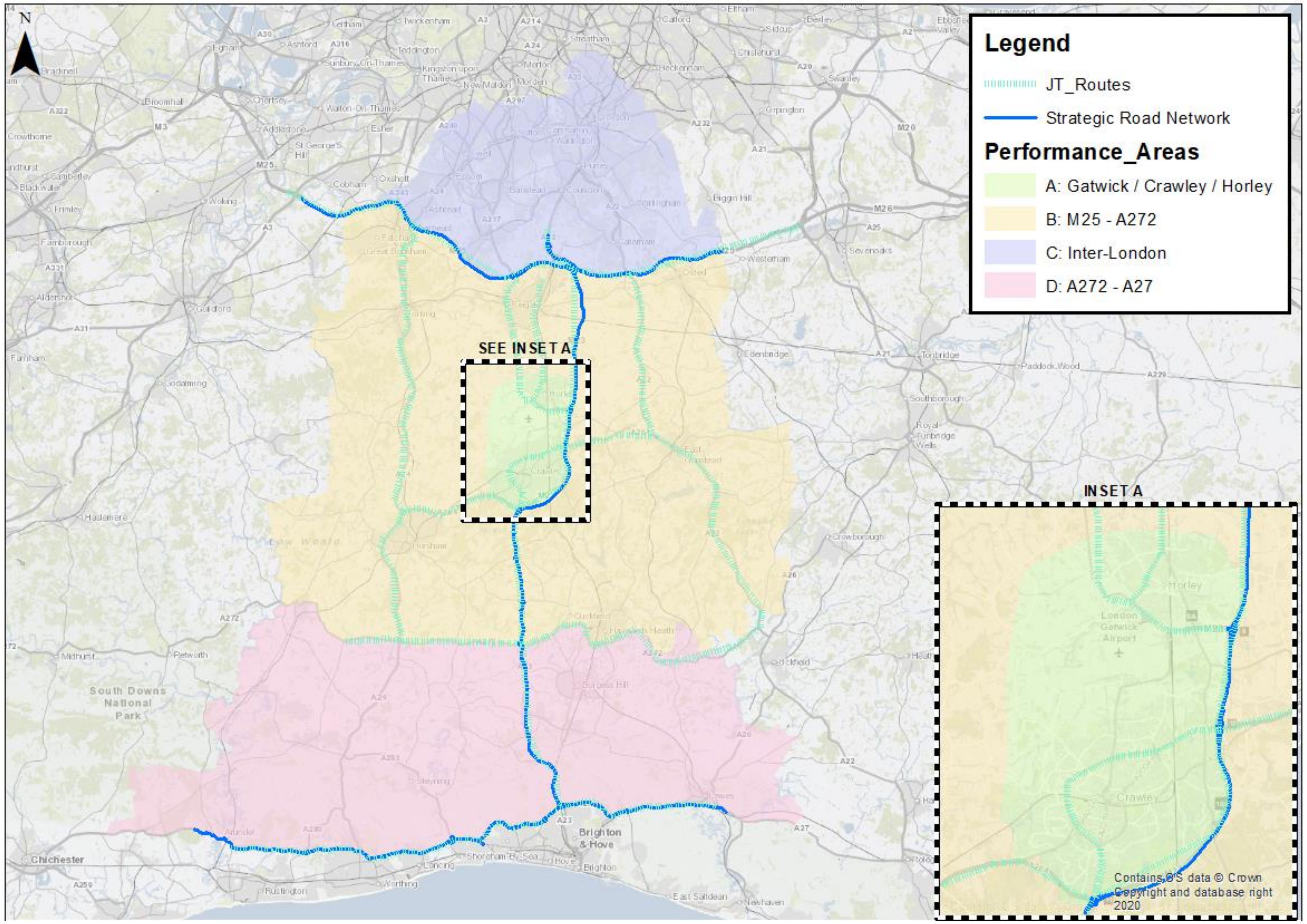
Category	V/C Definition
-	V/C < 50%
Green	50% < V/C < 85%
Amber	85% < V/C < 99%
Red	V\C > 100%

10.1.7 **Magnitude of Impact (Links / Nodes)** – Changes between link and node V/C metrics between the Future Baseline and With Project scenarios are categorised into Low, Medium and High and is presented for Performance Areas A-D. The categories are based on a combination of changes in V/C referred to as congestion indicators as well as the V/C standard in the With Project scenario. For example, an instance of V/C changing by >10% with a corresponding V/C of <85% in the With Project scenario is deemed 'Negligible', however if the V/C standard is 92-99% in this context the change would be classified as 'High'. An overview of the parameters enforced as part of the categorisation process is presented in Table 10.1.2.

Table 10.1.2: Magnitude of Impacts Grid

Criteria		Magnitude of impacts			
		Not significant	Minor	Moderate	Major
		<85%	85 - 92%	92 - 99%	99% or more
<2% change in Congestion Indicator	Very Low	Negligible	Negligible	Negligible	Negligible
2-5% change in Congestion Indicator	Low	Negligible	Low	Low	Medium
Between 5-10% change in Congestion Indicator	Medium	Negligible	Low	Medium	High
>10% change in Congestion Indicator	High	Negligible	Medium	High	High

Figure 26: Highway Model Performance Area



10.2 Actual Flow by time period

10.2.1 This section discusses the growth in hourly traffic volumes within the study area between modelled years for the base and Future Baseline scenarios to provide an understanding of the change in background traffic without the Project.

10.2.2 Increases in traffic flow are represented by variable band widths in shade of yellow to dark red, with decreases in blue to green. There are some sections of road where the network is not completely consistent between the two scenarios, where this is the case the total traffic volume for the later year is shown instead (shades of purple), this along with the bandwidths either side should indicate the change in volume in this area. Small changes in flow of between -50 and 50 are shown as grey links, to more clearly present where there are greater changes in modelled flows.

2016 to 2029 Future Baseline

10.2.3 The modelled flow difference between 2016 and the 2029 Future Baseline for AM1 is presented in Figure 27 to Figure 30 for AM1, AM2, IP and PM respectively

10.2.4 Between 2029 Future Baseline and 2016, the largest hourly increases in traffic volumes are seen on the M25 (particularly between Junction 7 and Junction 10) and M23 north of Junction 9. These areas align with where there are network improvements built between 2016 and 2029 on both the M23 and M25.

10.2.5 On the M25 these increases are between 500 and 2,500 vehicles in each direction in AM1, AM2 and PM, the AM2 in particular has increases of up to 2,500 on all sections of this part of the M25. An increase of 1,000-2,500 in both directions is expected on the M23 north of Junction 9 in all time periods except the IP where an increase of 500-1,000 vehicles is expected. These are likely to be as a result of the M25 South West Quadrant (and M25 J10-16 additionally increasing capacity on this side of the M25) and M23 Junction 8-10 Smart Motorway improvements.

10.2.6 There is some re-routing indicated by the reductions in traffic in the south west of London, in addition to re-routing from Horsham Road / A23 / A2011 onto the M23 around Crawley.

10.2.7 In the immediate vicinity of the airport, there are increases of 200-500 vehicles on Airport Way and the A23 London Road in all time periods, with 500-1,000 westbound on Airport Way in the PM.

Figure 27: Traffic flow change 2016 base year to 2029 Future Baseline, AM1

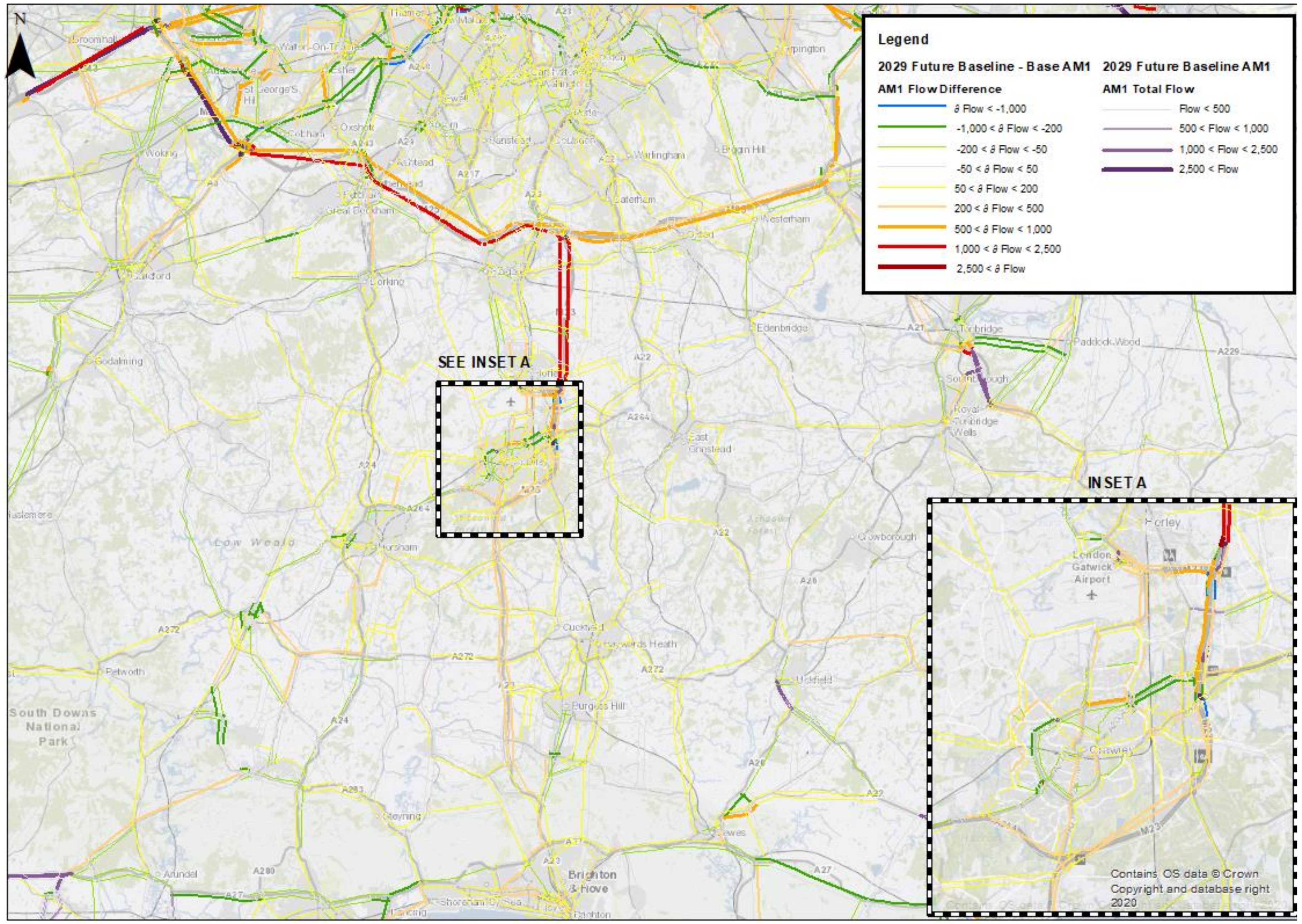


Figure 28: Traffic flow change 2016 base year to 2029 Future Baseline, AM2

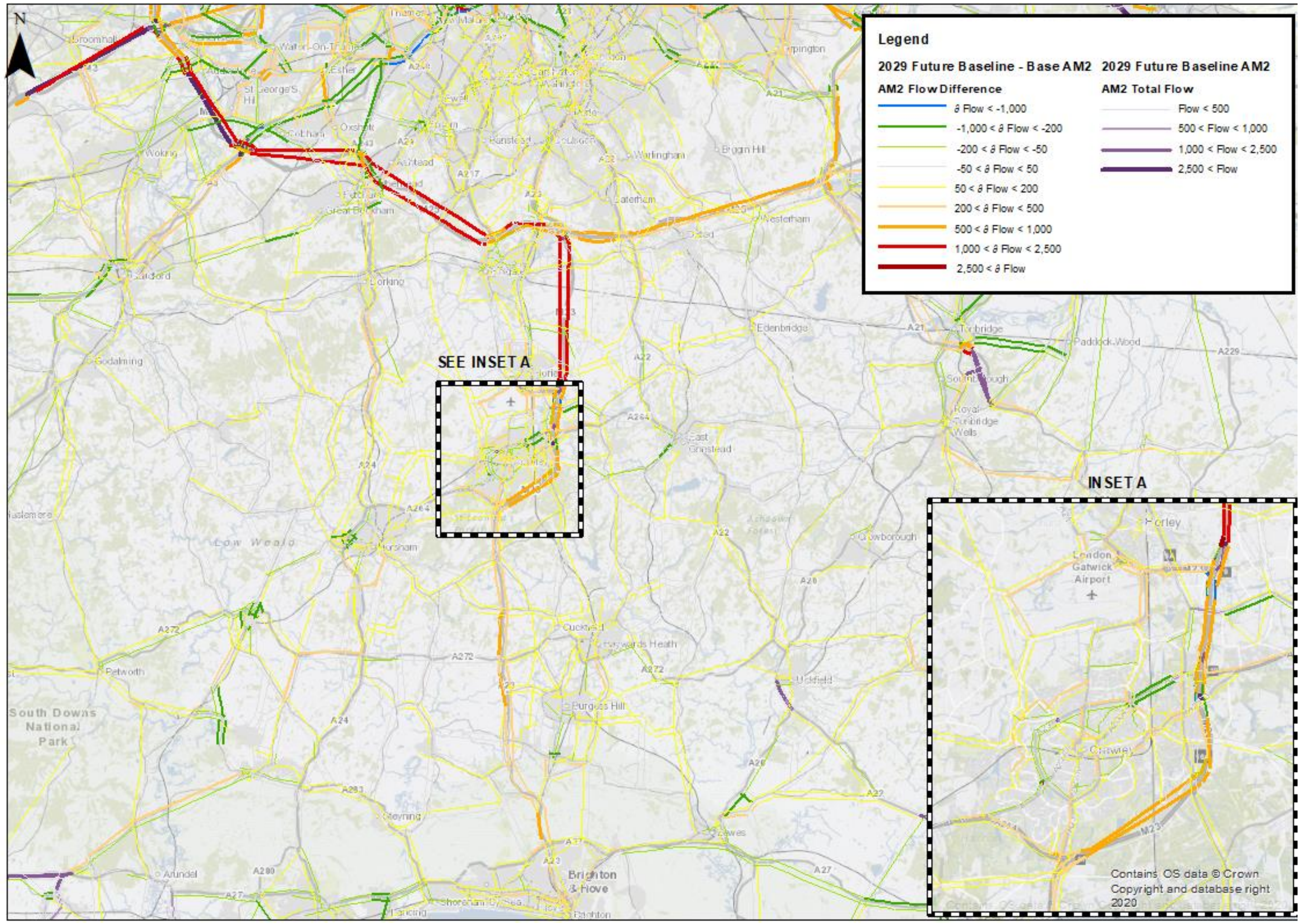


Figure 29: Traffic flow change 2016 base year to 2029 Future Baseline, IP

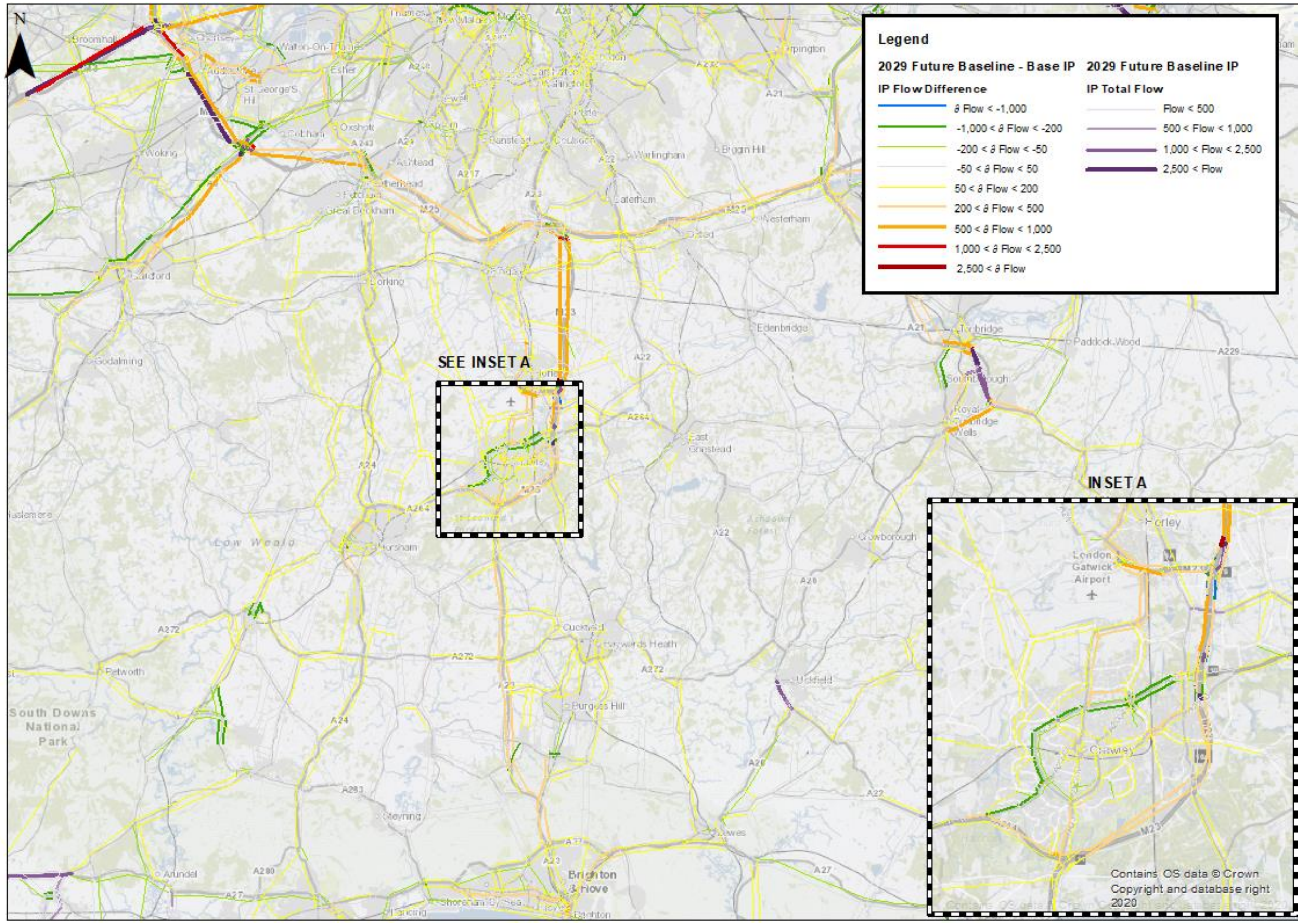
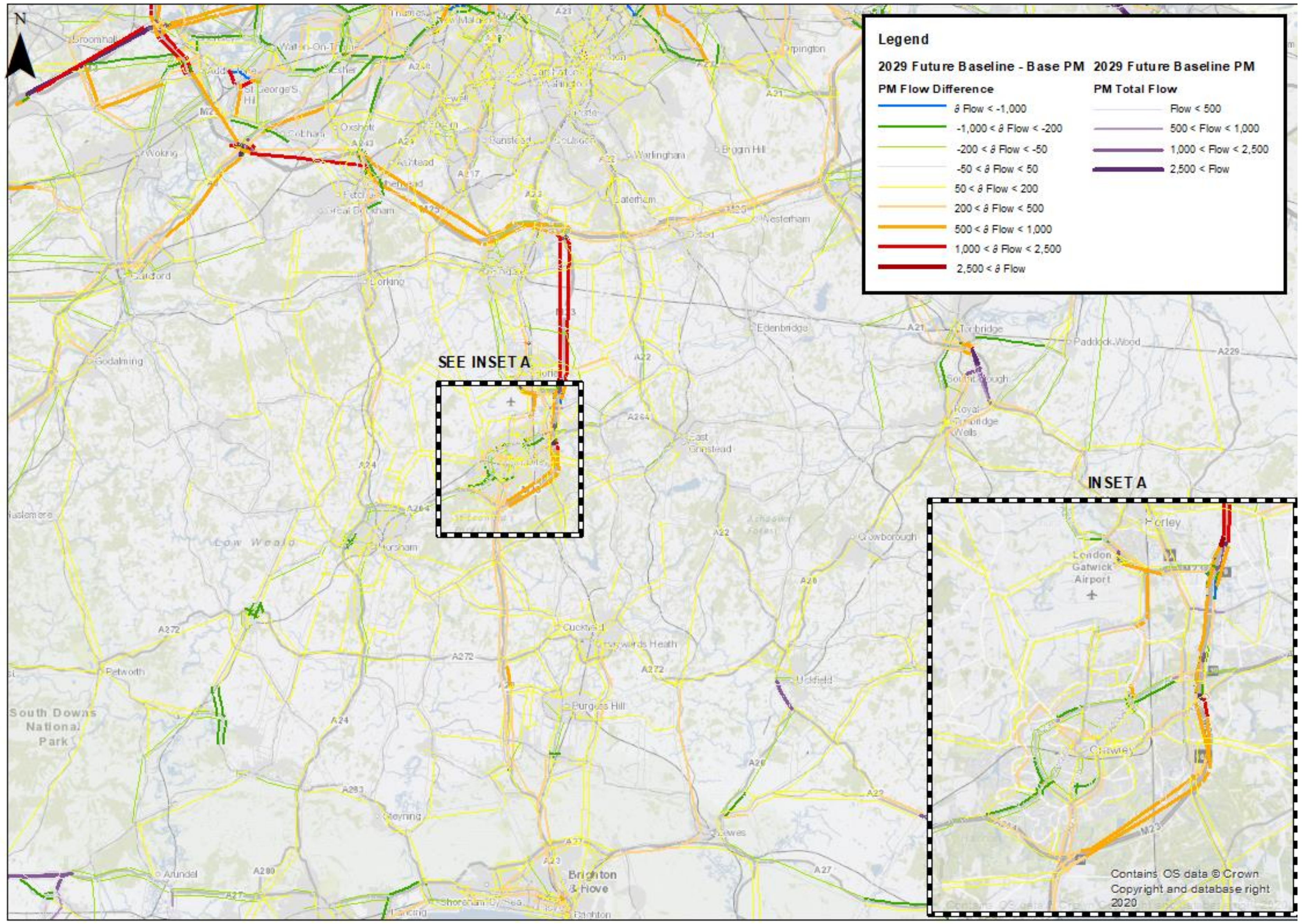


Figure 30: Traffic flow change 2016 base year to 2029 Future Baseline, PM



2029 to 2032 Future Baseline

10.2.8 Figure 31 to Figure 34 show the change in traffic volumes between 2029 and 2032 Future Baseline scenarios for AM1, AM2, IP and PM respectively. There are no additional changes to the networks, or supply assumptions, as such the changes are related to background growth changes.

10.2.9 These show that flow changes are generally on motorways and major A roads, the largest of these being increases of between 200 and 500 in each direction on the M23 north of Junction 11 and on the M25.

10.2.10 In the immediate vicinity of the airport, there are increases of between 50 and 200 vehicles between the M23 and North Terminal in AM1 and PM, and on A23 London Road to the east of the airport in AM1 and AM2.

Figure 31: Traffic flow change 2029 to 2032 Future Baseline, AM1

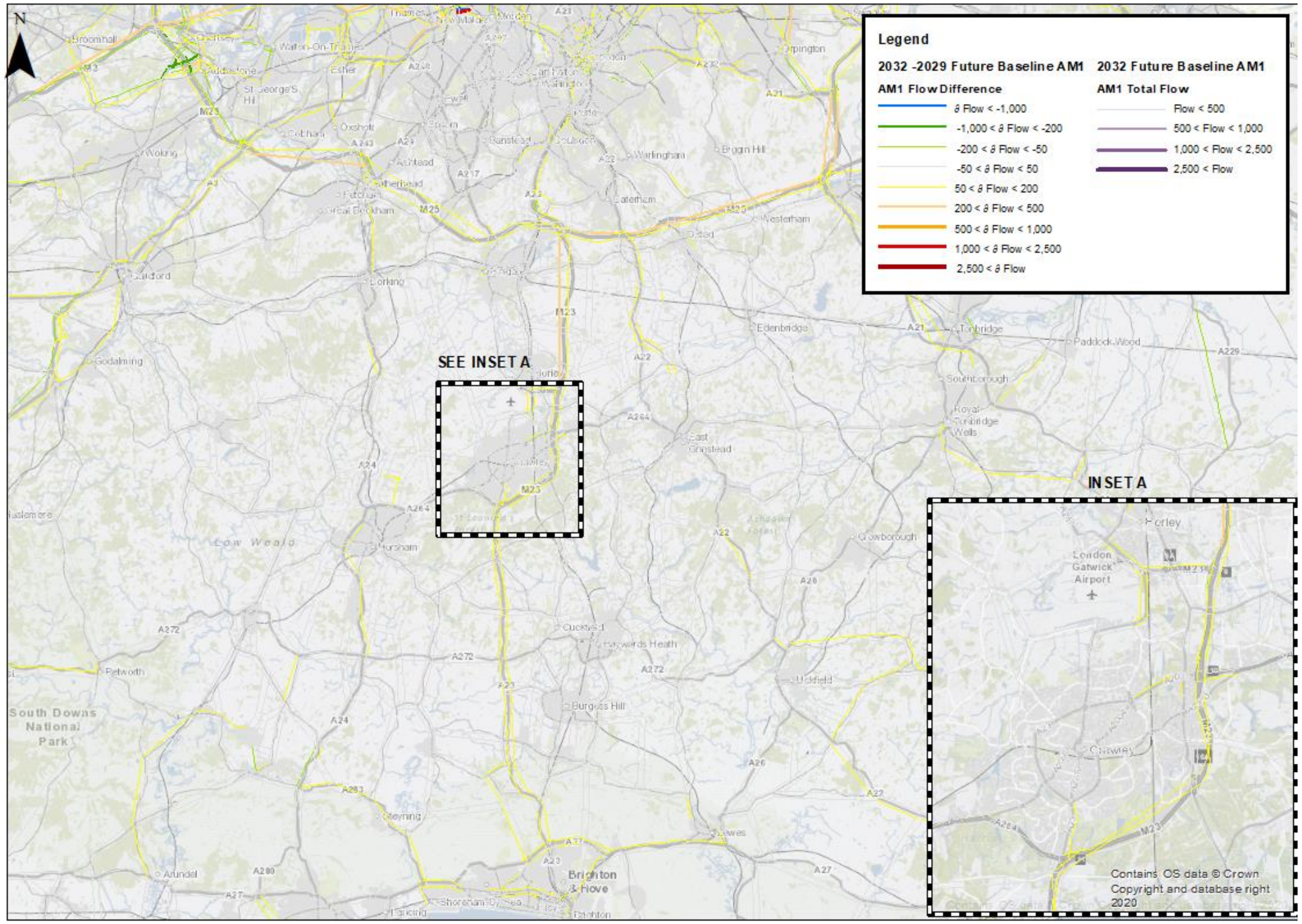


Figure 32: Traffic flow change 2029 to 2032 Future Baseline, AM2

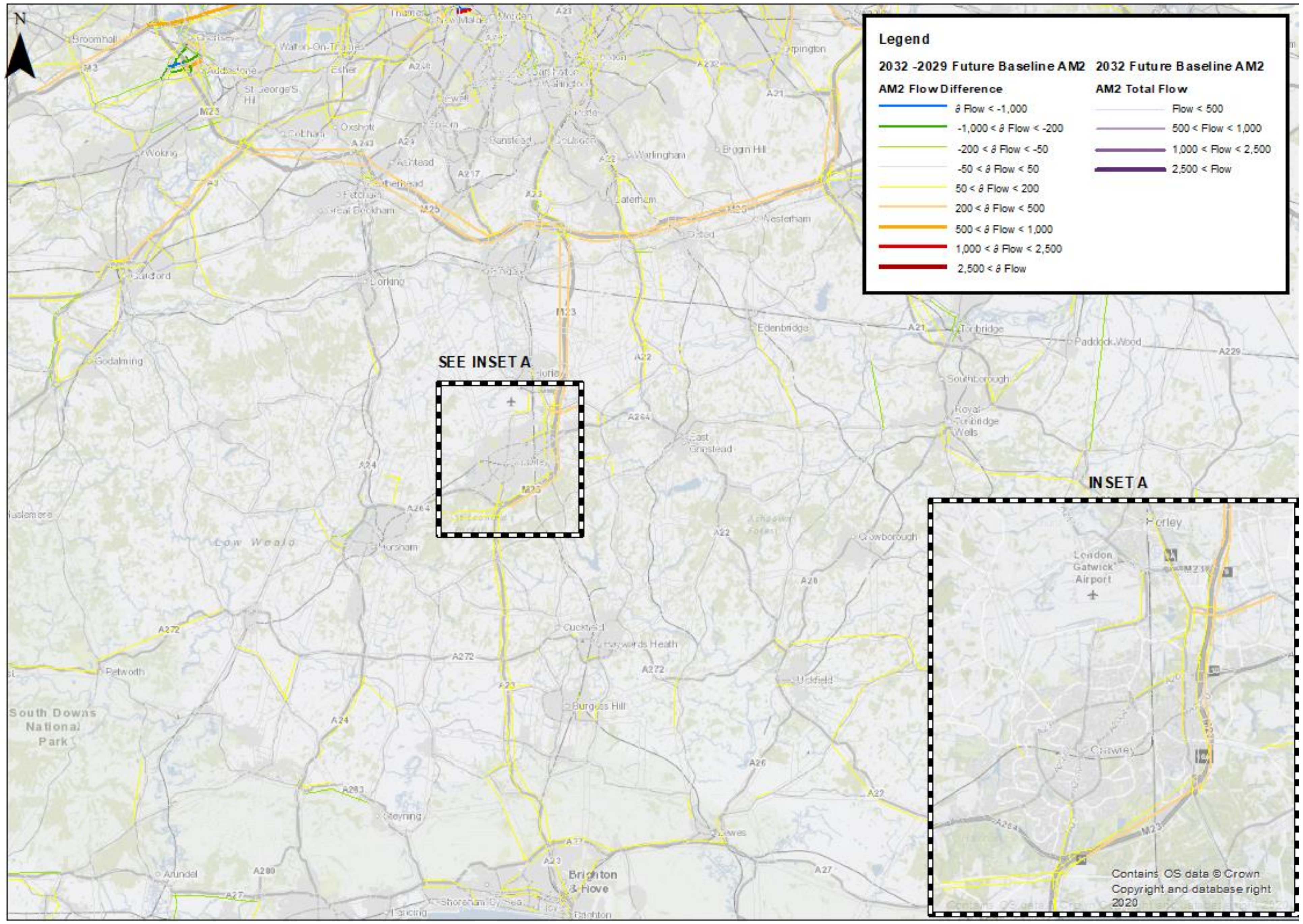


Figure 33: Traffic flow change 2029 to 2032 Future Baseline, IP

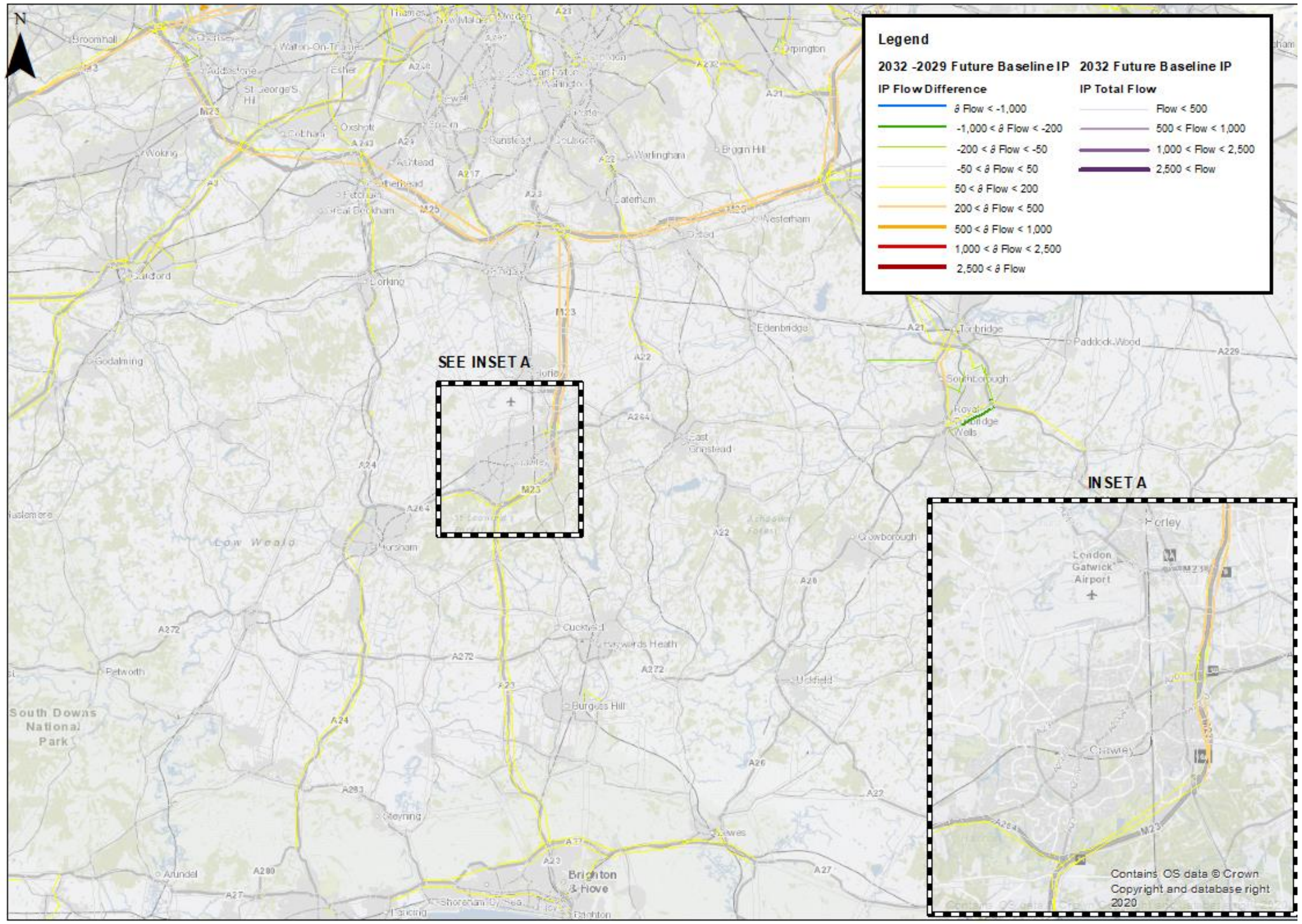
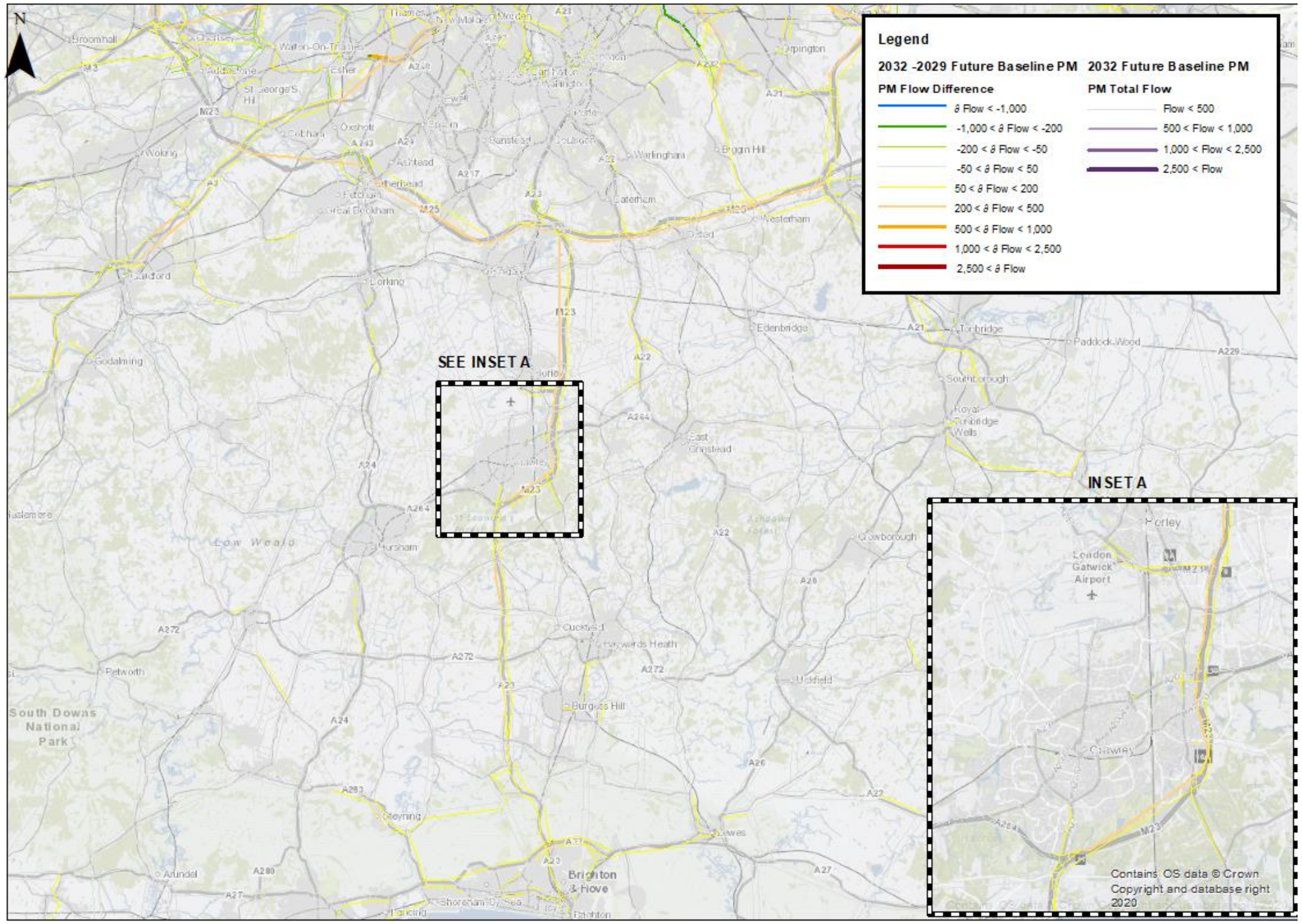


Figure 34: Traffic flow change 2029 to 2032 Future Baseline, PM



2032 to 2047 Future Baseline

10.2.11 Figure 35 to Figure 38 show the change in traffic volume between 2032 and 2047 for AM1, AM2, IP and PM respectively. These show increases of 500-1,000 on the M25 to the east of M25 Junction 7 in all time periods, and on the A3 and M3 into London. Changes in traffic volumes to the north of Horsham are related to the North of Horsham development.

10.2.12 In the immediate vicinity of the airport, traffic volumes are expected to increase between 50 and 200 vehicles.

Figure 35: Traffic flow change 2032 to 2047 Future Baseline, AM1

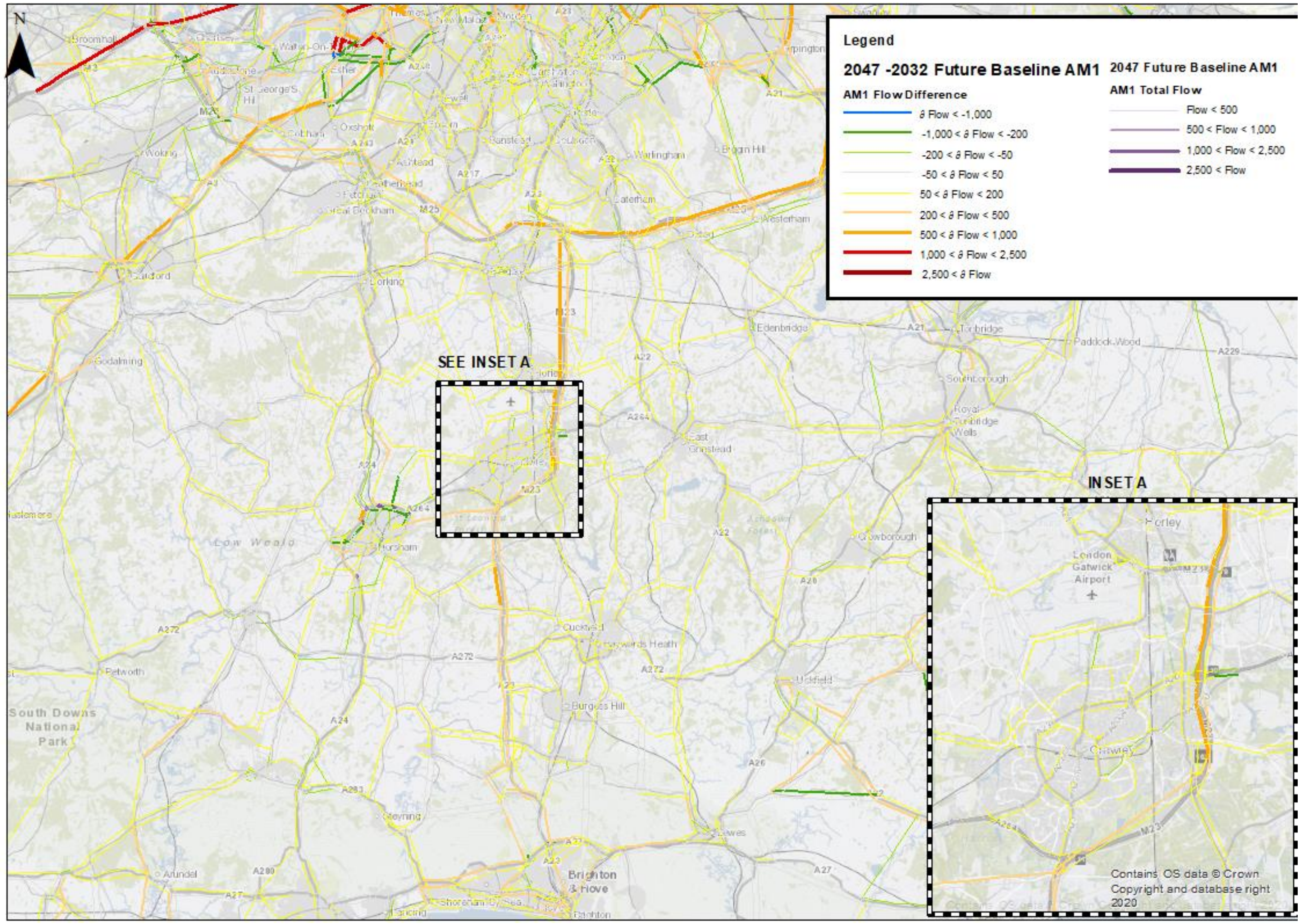


Figure 36: Traffic flow change 2032 to 2047 Future Baseline, AM2

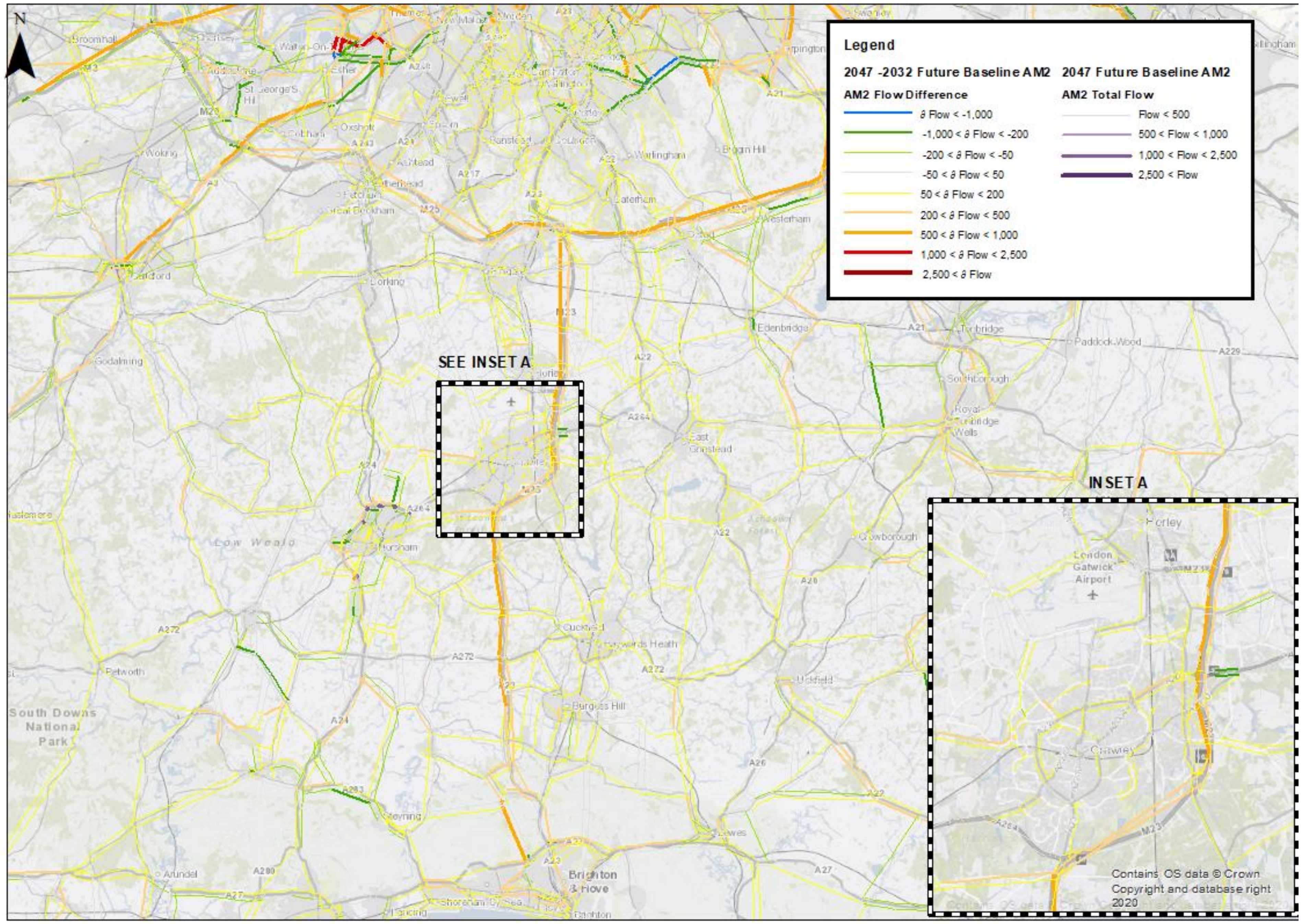


Figure 37: Traffic flow change 2032 to 2047 Future Baseline, IP

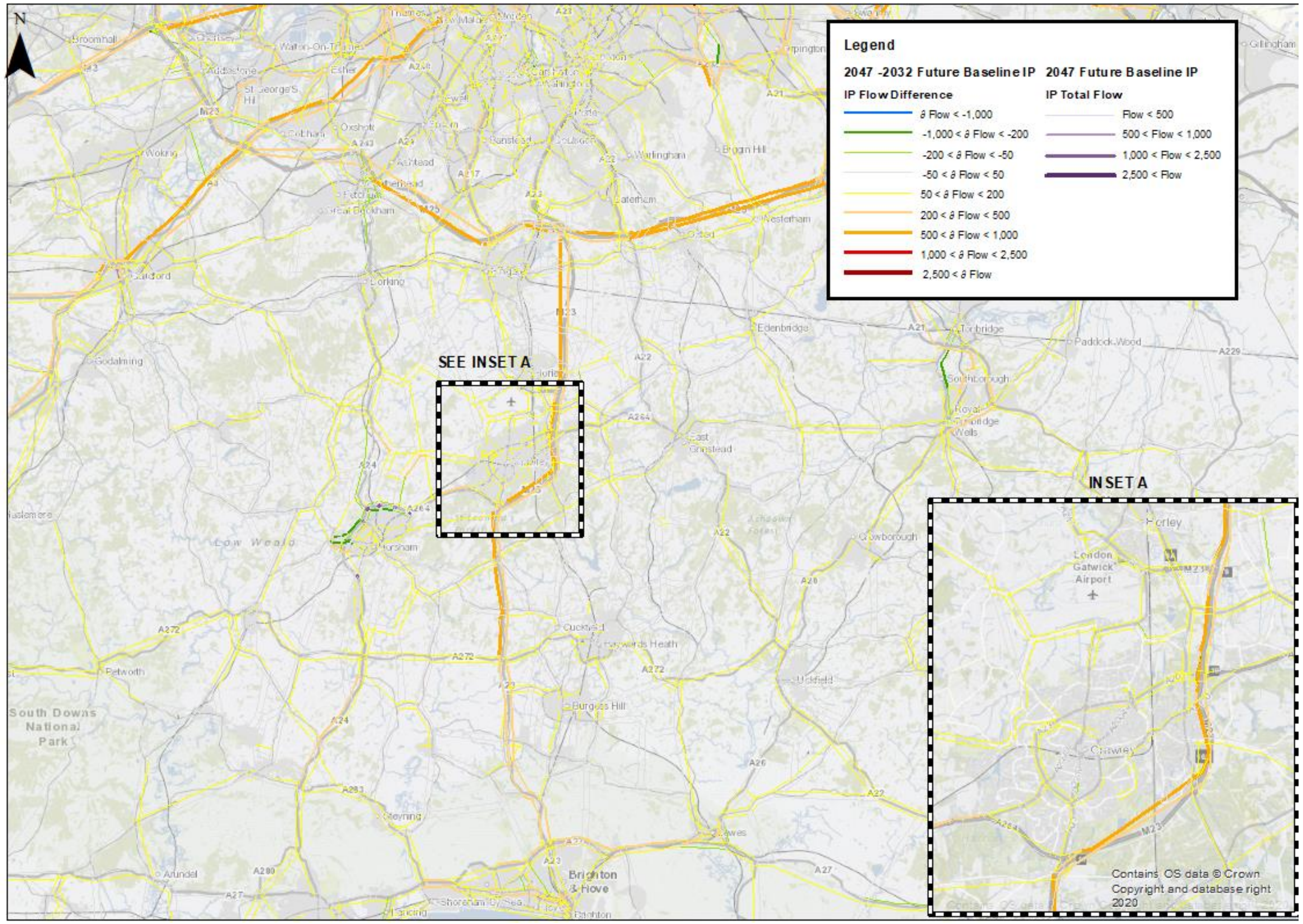
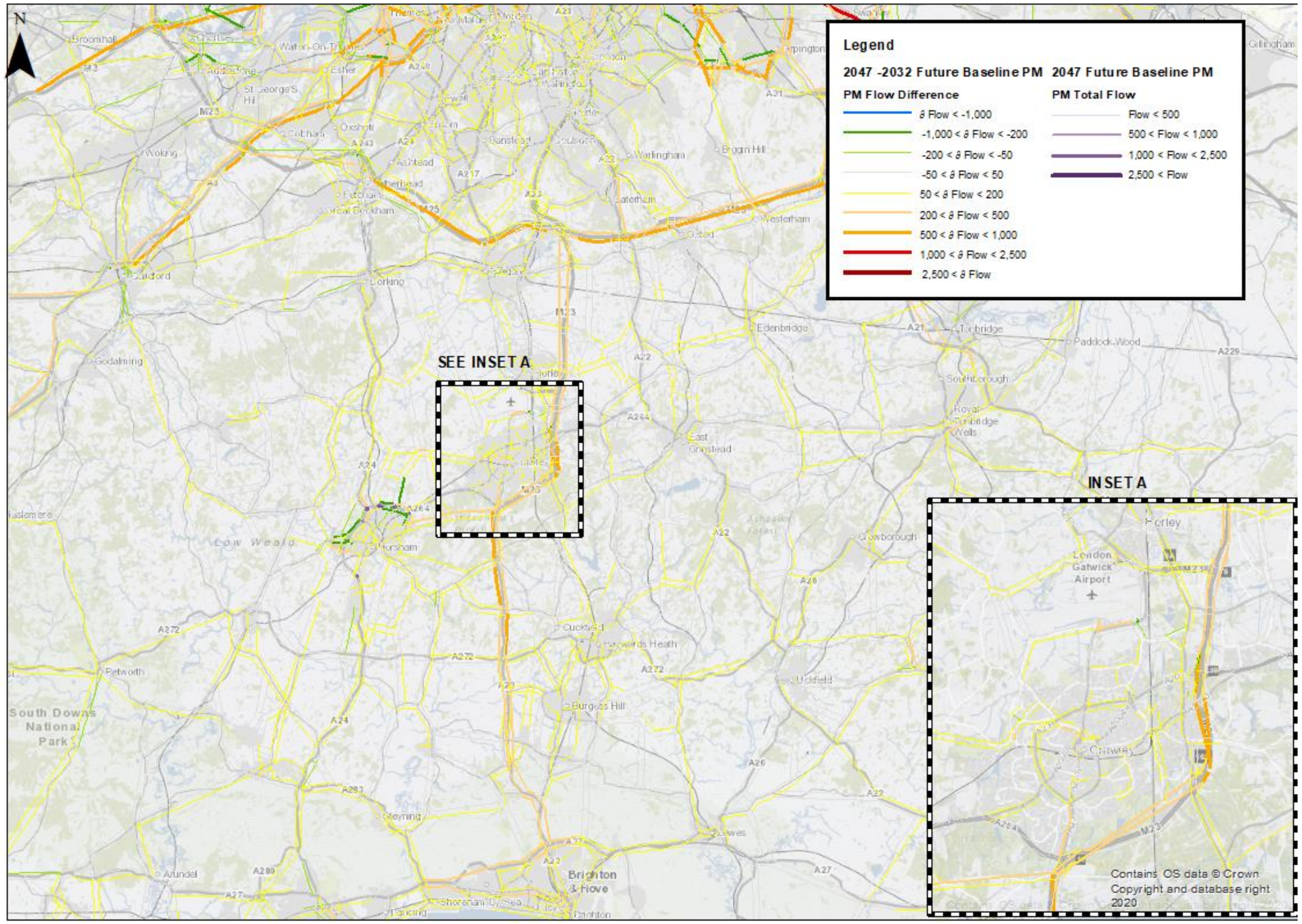


Figure 38: Traffic flow change 2032 to 2047 Future Baseline, PM



10.3 Annual Average Daily Traffic

10.3.1 Modelled traffic volumes extracted for the four modelled time periods are combined and expanded to represent Average Annual Daily Traffic (AADT) volumes. These averages represent (Monday-Sunday) traffic volumes at 24-hour levels. Details underpinning the process of calculating these are provided further in section 13.

10.3.2 Comparisons across the three assessment years, considering the differences between the Future Baseline and With Project scenario, are presented in Figure 39 - Figure 41 for all modelled links respective to the aforementioned performance areas. The purpose of this analysis is to demonstrate the characteristics of changes in traffic volume, henceforth denoted as ∆AADT and distinguishes which corridors are affected and the nature in which the highway model responds in the With Project scenario.

10.3.3 Banding for ∆AADT are defined in consideration of guidance from the Design Manual for Road and Bridges, HA 207/07[10] (see section 3.12). Guidance thresholds are presented as two-way flows whereas modelled values are represented as one-way links. Link changes with ∆AADT greater than 1,000 vehicle units draw attention to links with noteworthy differences. Links with an ∆AADT of between 0 and 100 vehicles per day are deemed as small changes and are otherwise presented as grey links. Subsequent banding is introduced to segment the largest changes between 1,000 and 2,500; between 2,500 and 5,000; between 5,000 and 10,000 and finally, changes in excess of 10,000 vehicles per day. This latter band tends to apply to the surface access points on the network rather than the wider network itself.

2029 Assessment

10.3.4 Results for the 2029 assessment year identify differences for ∆AADT > 2,500 vehicles per day only in relation to access to Perimeter Road South. This is associated with relocation of employee trips from Gatwick South Terminal in the opening year and is evidenced within Inset A of Figure 39.

10.3.5 The key corridor effected between the scenarios for the band 1,000 < ∆AADT < 2,500 is the M23 (both directions) between J9 to the M23 J8/M25 J7. The remaining changes for links in the band 0 < ∆AADT < 1,000 are predominantly on the M25 east and west of junction 7 to M25 J5 and J10 respectively and the A217 corridor from the M23 spur to M25 J8 as well as the periphery of Crawley.

2032 Assessment

10.3.6 Assessment year 2032 illustrates similar patterns to those described for assessment year 2029 with the following key differences:

- M23 corridor northbound/southbound as well as access to the airport along the spur showing changes related to 5,000 < ∆AADT < 10,000;
- M23 northbound between junction 11 and junction 9 increases to 1,000 < ∆AADT < 2,500;
- M25 east / west of junction 7 show tidal changes on links approaching the airport of 1,000 < ∆AADT < 2,500;
- M25 eastbound/westbound J9 to J10 show changes of 1,000 < ∆AADT < 2,500;
- Additional links captured for 0 < ∆AADT < 1,000 related to the A23 and A24.
- There are some reductions in traffic volumes at Longbridge roundabout with Project as access from Gatwick North Terminal to the M23 is improved. In the Future Baseline scenario, some vehicles exit Gatwick North Terminal roundabout, U-turn at Longbridge roundabout and then access the M23 via the off slip from London Road instead of using Airport Way. There are also some reductions in demand between Reigate and Crawley in the With Project scenario during the IP, which results in a slight decrease in AADT southbound towards Longbridge roundabout.

2047 Assessment

10.3.7 Assessment year 2047 changes do not present any additional noteworthy differences compared with the other assessment years.

10.3.8 The following sections discuss the extent to which the highway network can adequately satisfy these changes without detriment to operational performance and by categorising the magnitude of impact.

10 [redacted]

Figure 39: 2029 AADT Delta, With Project (-) Future Baseline

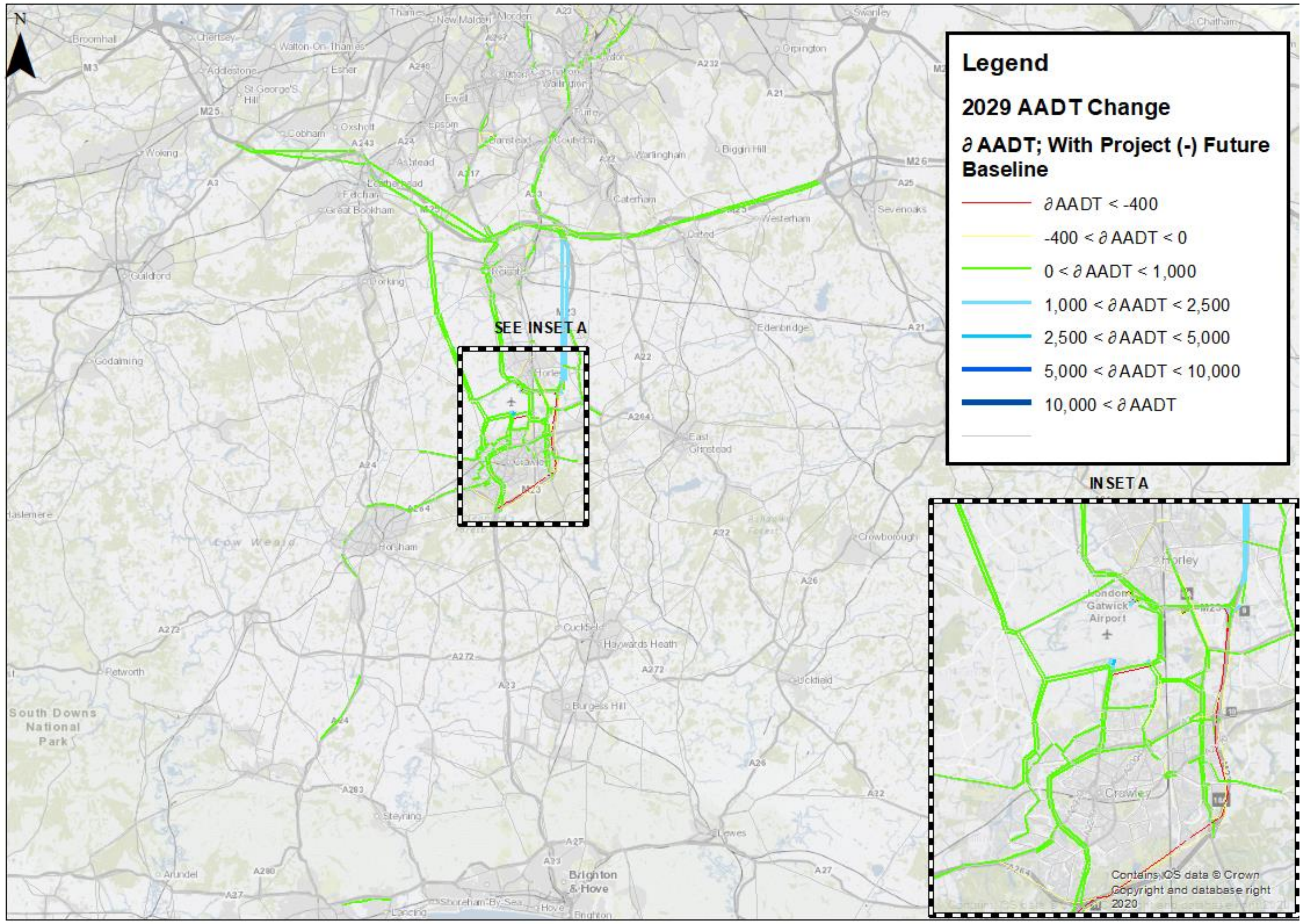


Figure 40: 2032 AADT Delta, With Project (-) Future Baseline

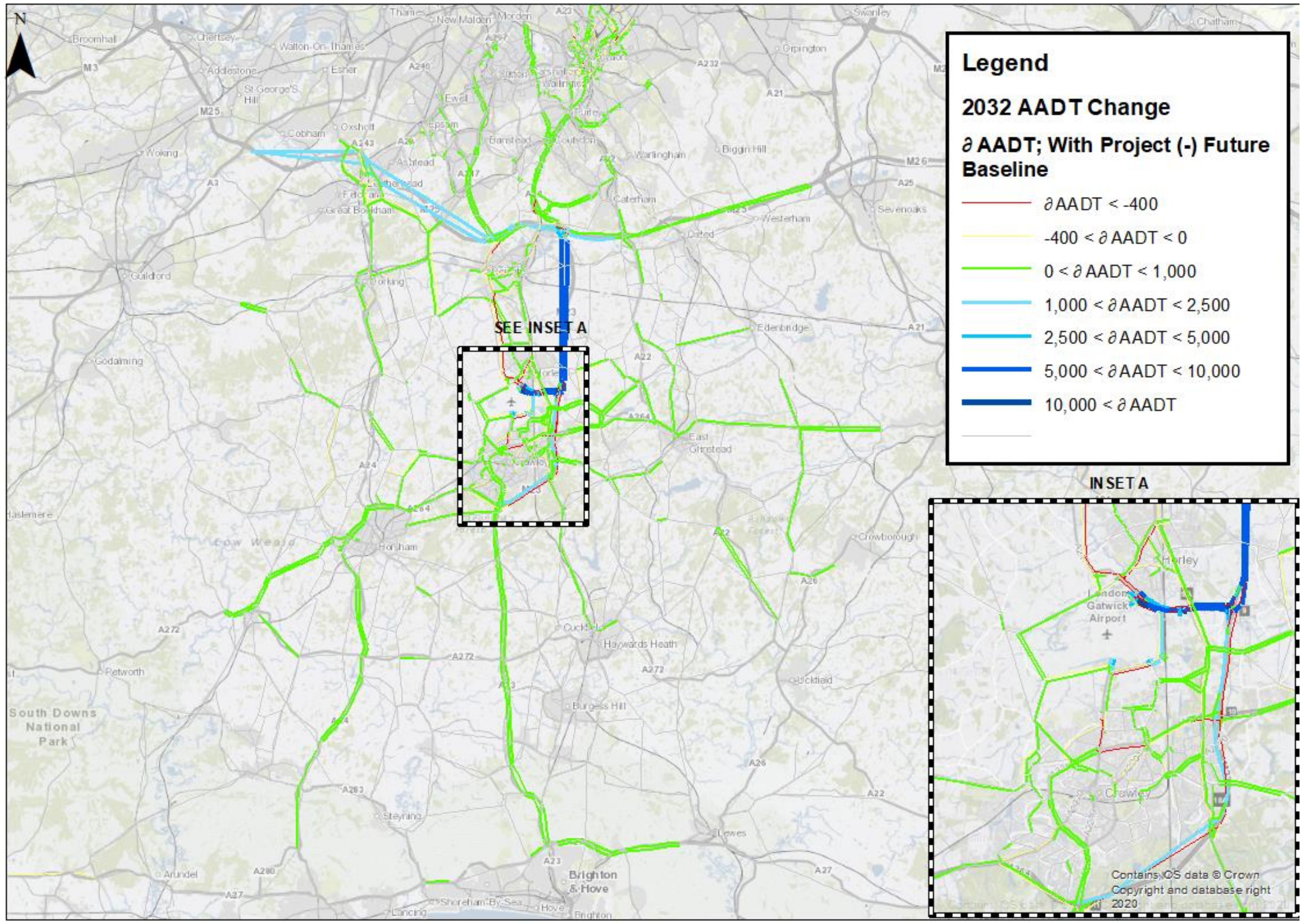
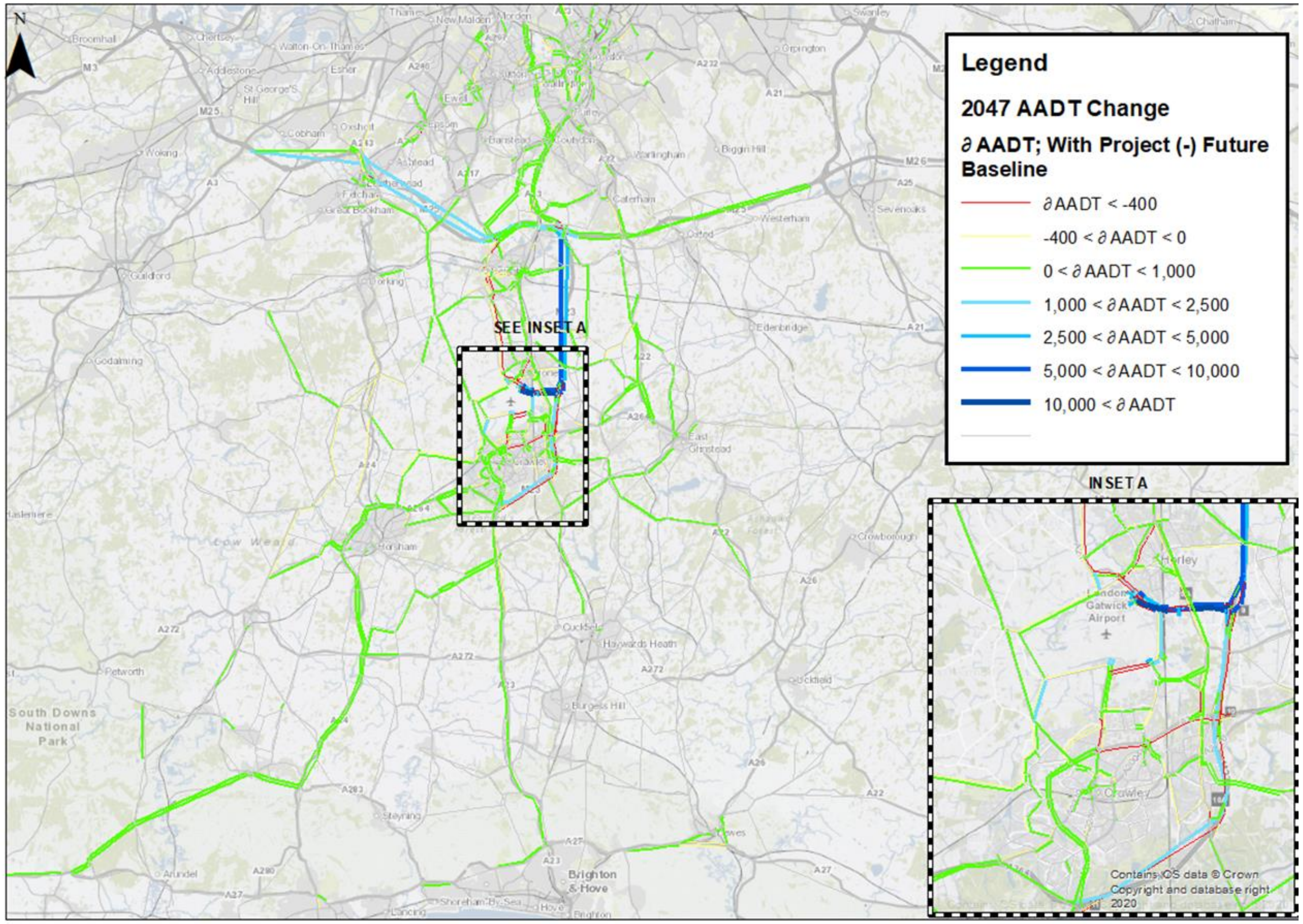


Figure 41: 2047 AADT Delta, With Project (-) Future Baseline



10.4 Strategic Road Network

Journey Times

10.4.1 Journey times routes have been assessed for the strategic road network (SRN) including the following:

- M25 from J5 to J10, westbound and eastbound;
- M23 northbound and southbound;
- A23 northbound and southbound; and
- A27 from Lewes to Arundel westbound and eastbound.

2029 Assessment

10.4.2 Modelled journey times extracted for these routes demonstrate that the travel times along these sections of the SRN are not notably affected between the Future Baseline and With Project Scenario in 2029. These are summarised in Figure 42.

2032 Assessment

10.4.3 The response between the Future Baseline and With Project scenario for 2032 show some small changes in end-to-end journey times and are presented in Figure 43. The A27 eastbound/westbound as well as the M25 in the AM1 period show changes of circa 1 minute.

2047 Assessment

10.4.4 Similar responses are evident in the modelled journey times for 2047 as with 2032 and are presented in Figure 44.

10.4.5 On balance, there are no notable changes in journey times with respect to the SRN between the Future Baseline and With Project scenarios.

Figure 42: Highway Journey Times - Primary SRN, 2029

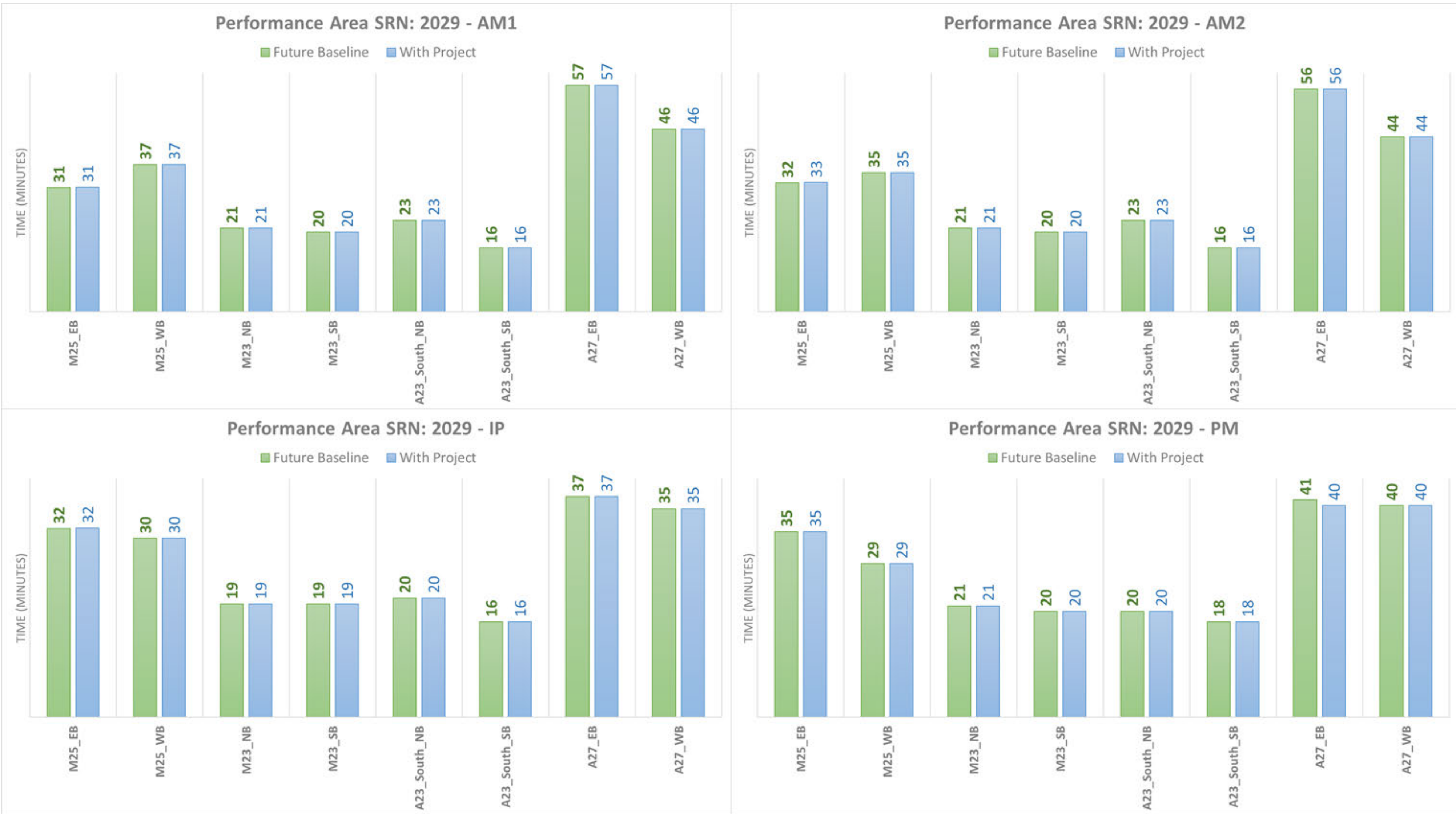
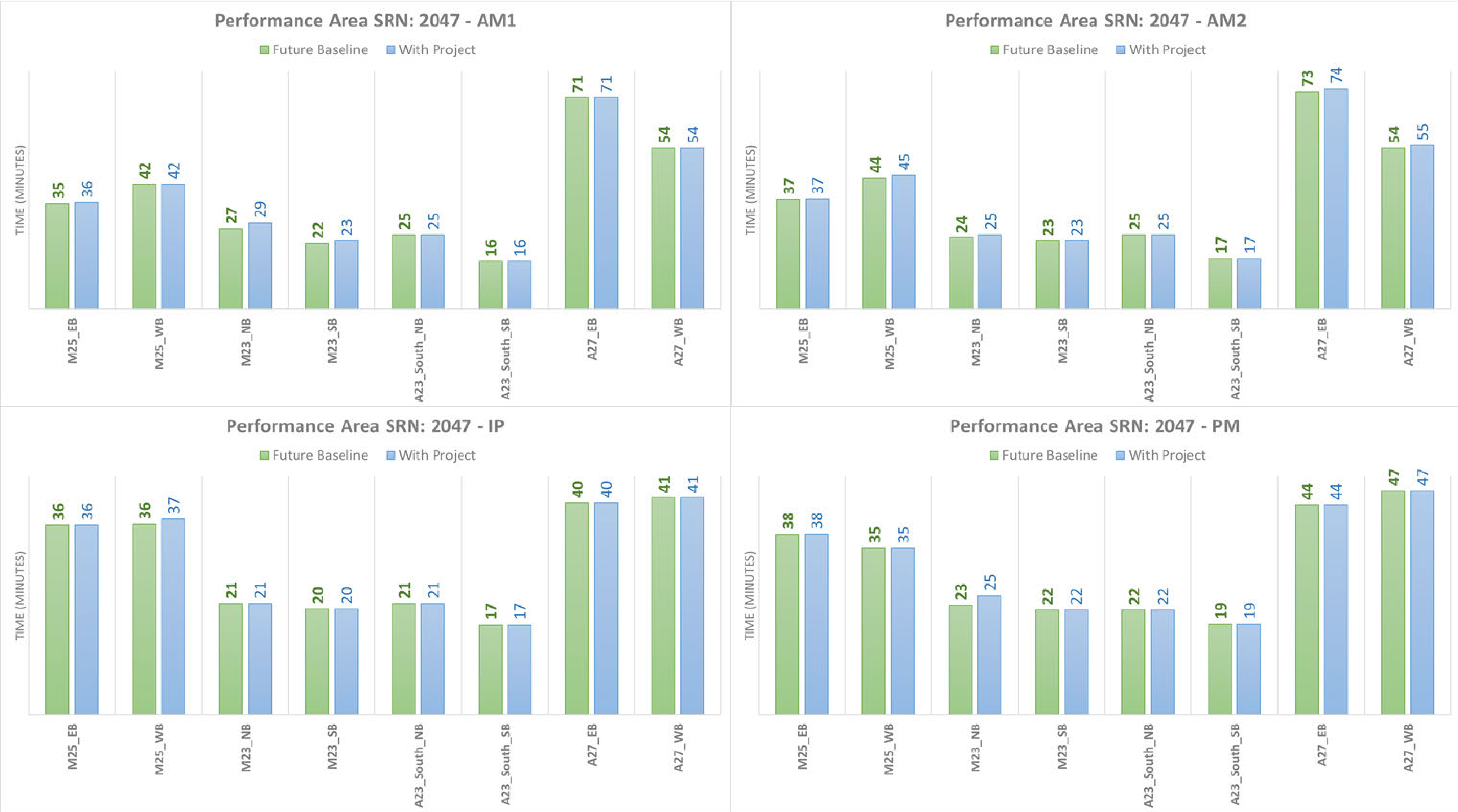


Figure 43: Highway Journey Times - Primary SRN, 2032

Figure 44: Highway Journey Times - Primary SRN, 2047



Operational Performance - Volume / Capacity ratios

10.4.6 Modelled Volume / Capacity ratios were extracted for each of the four modelled time periods. The maximum value across all time periods was selected to identify the highest value modelled and this is presented in Figure 45 to Figure 50.

10.4.7 The modelling suggests that there are no occurrences of SRN links that have changed operational categories between the Future Baseline and With Project scenario across all assessment years.

Figure 45: Maximum V/C - 2029, Future Baseline – SRN

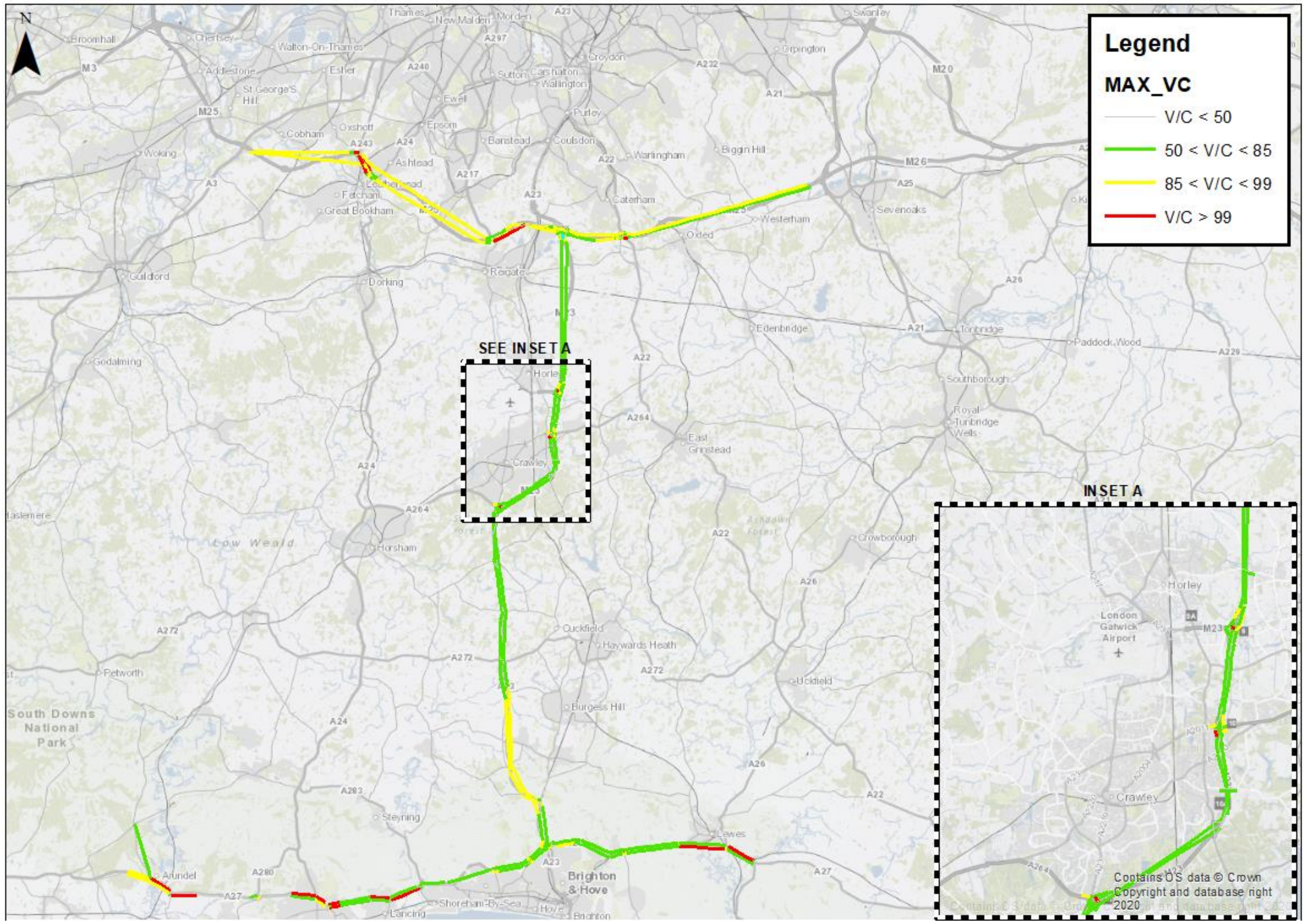


Figure 46: Maximum V/C - 2029, Future Baseline with Project - SRN

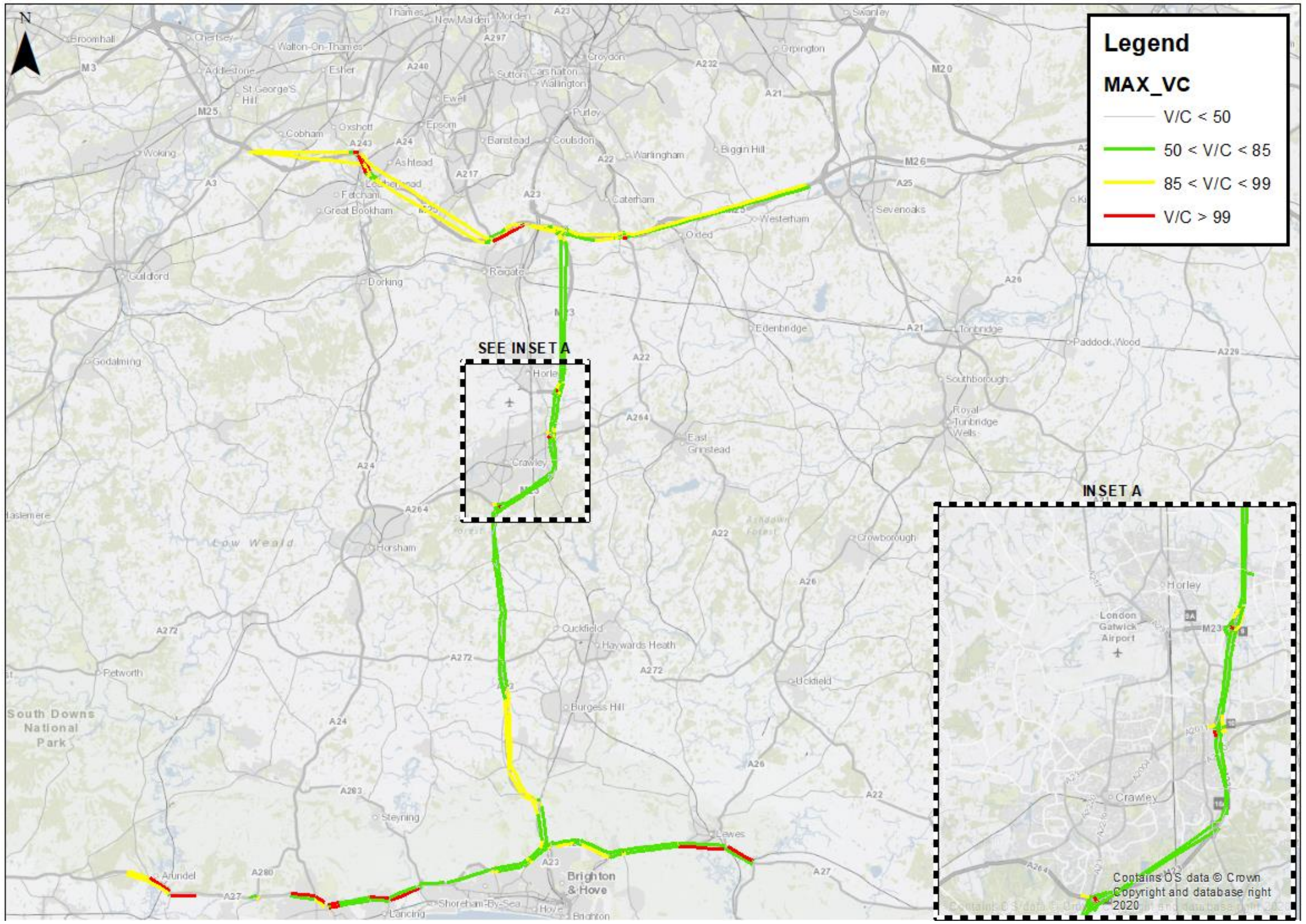


Figure 47: Maximum V/C - 2032, Future Baseline - SRN

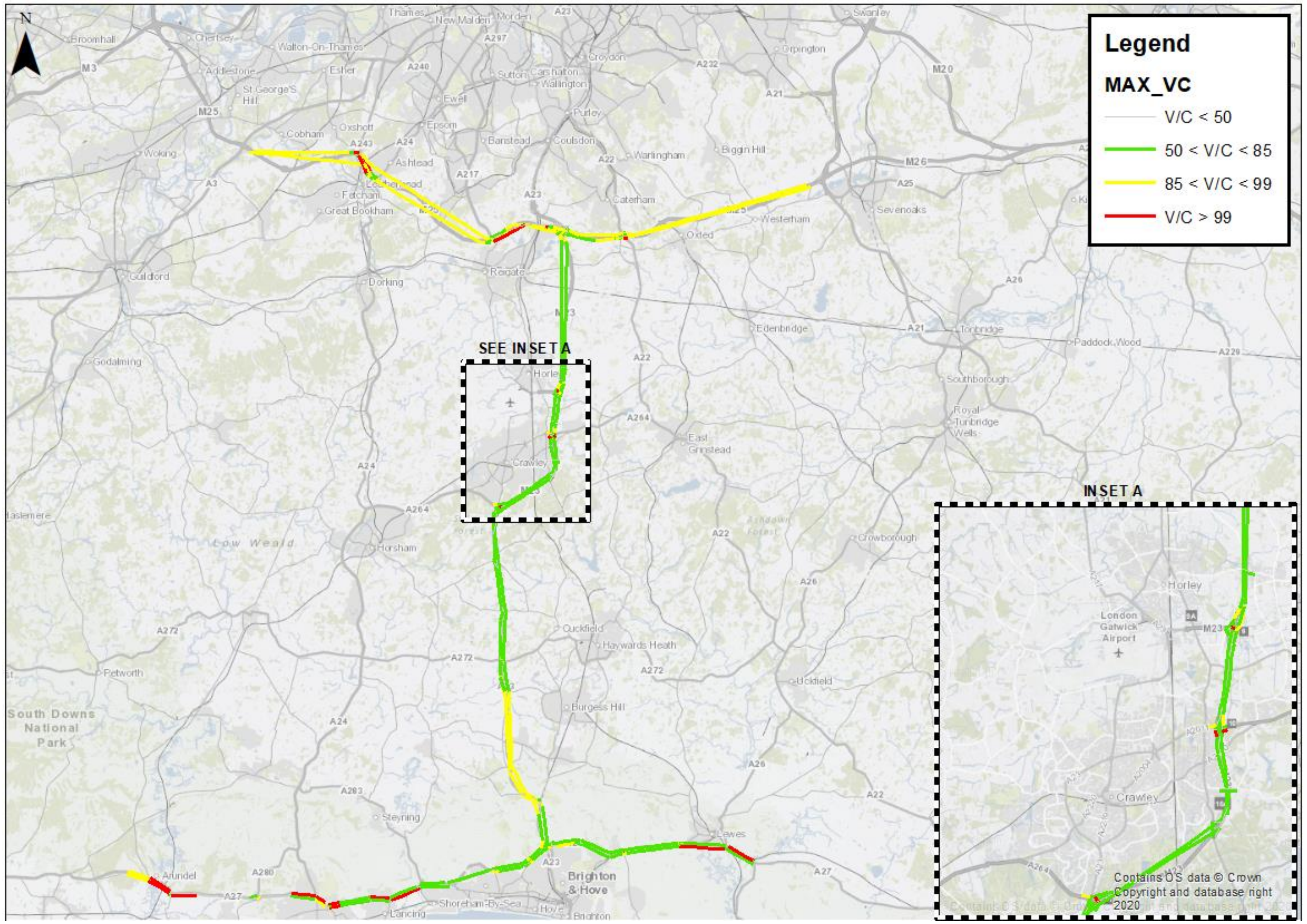


Figure 48: Maximum V/C - 2032, Future Baseline with Project - SRN

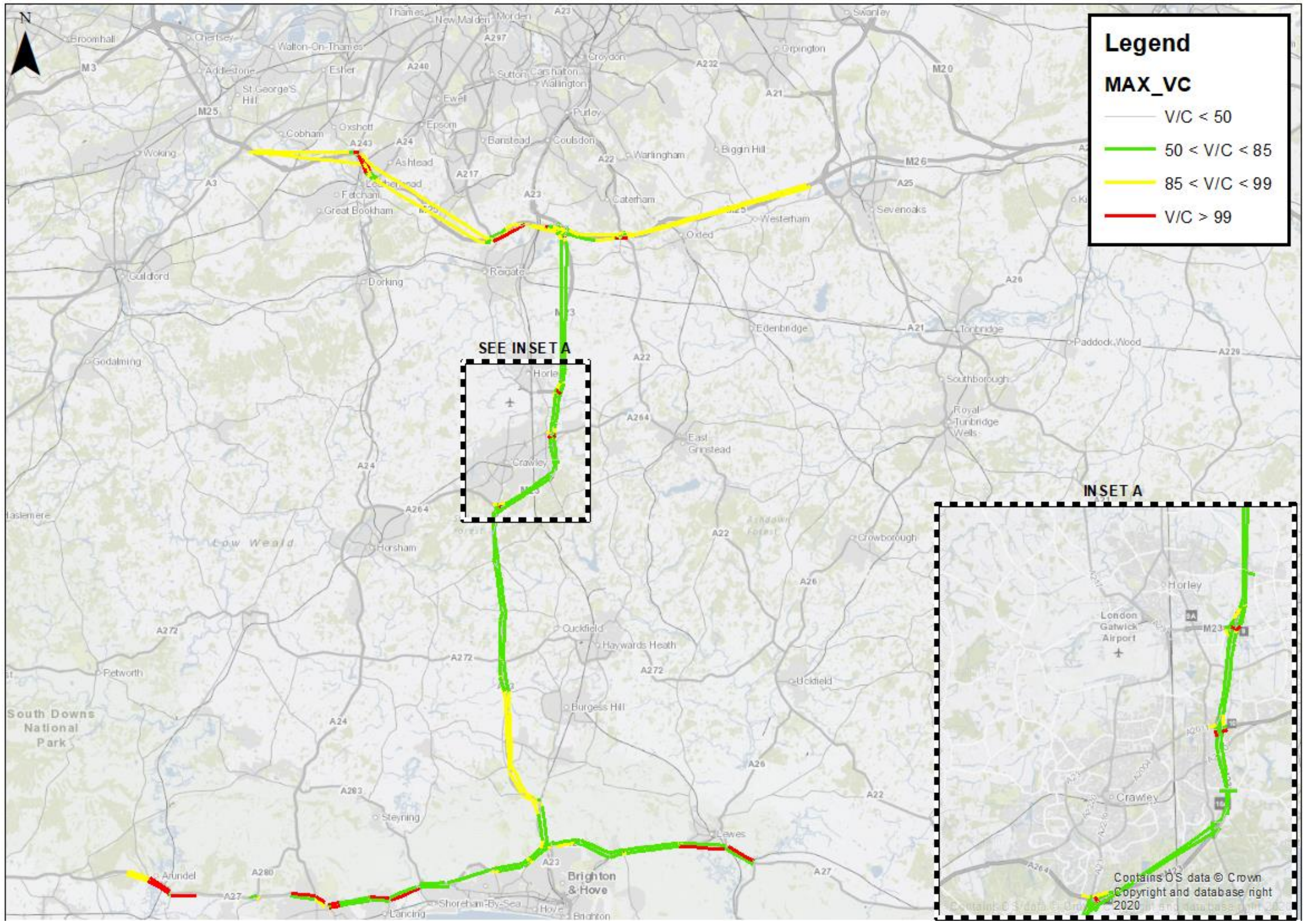


Figure 49: Maximum V/C - 2047, Future Baseline - SRN

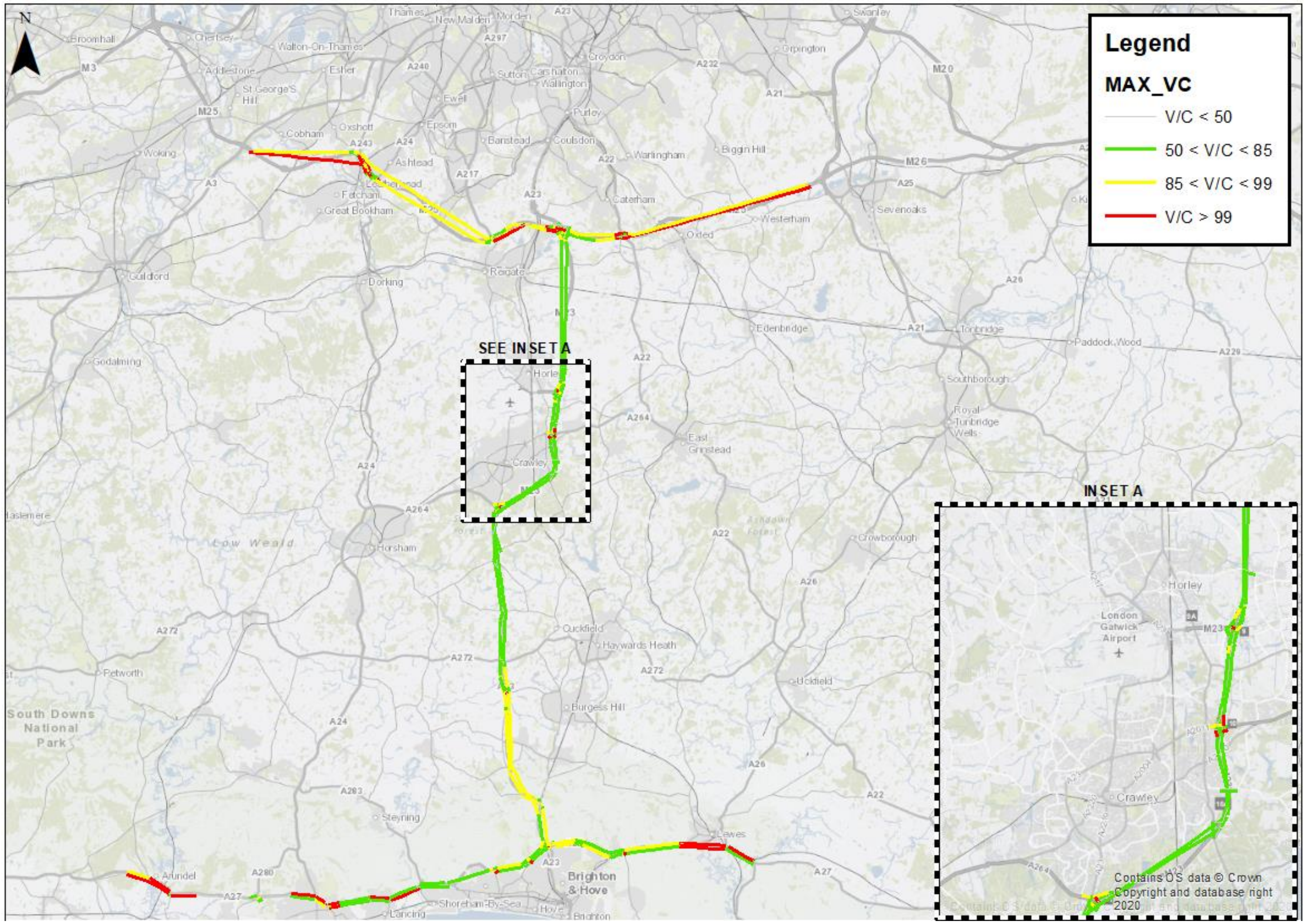
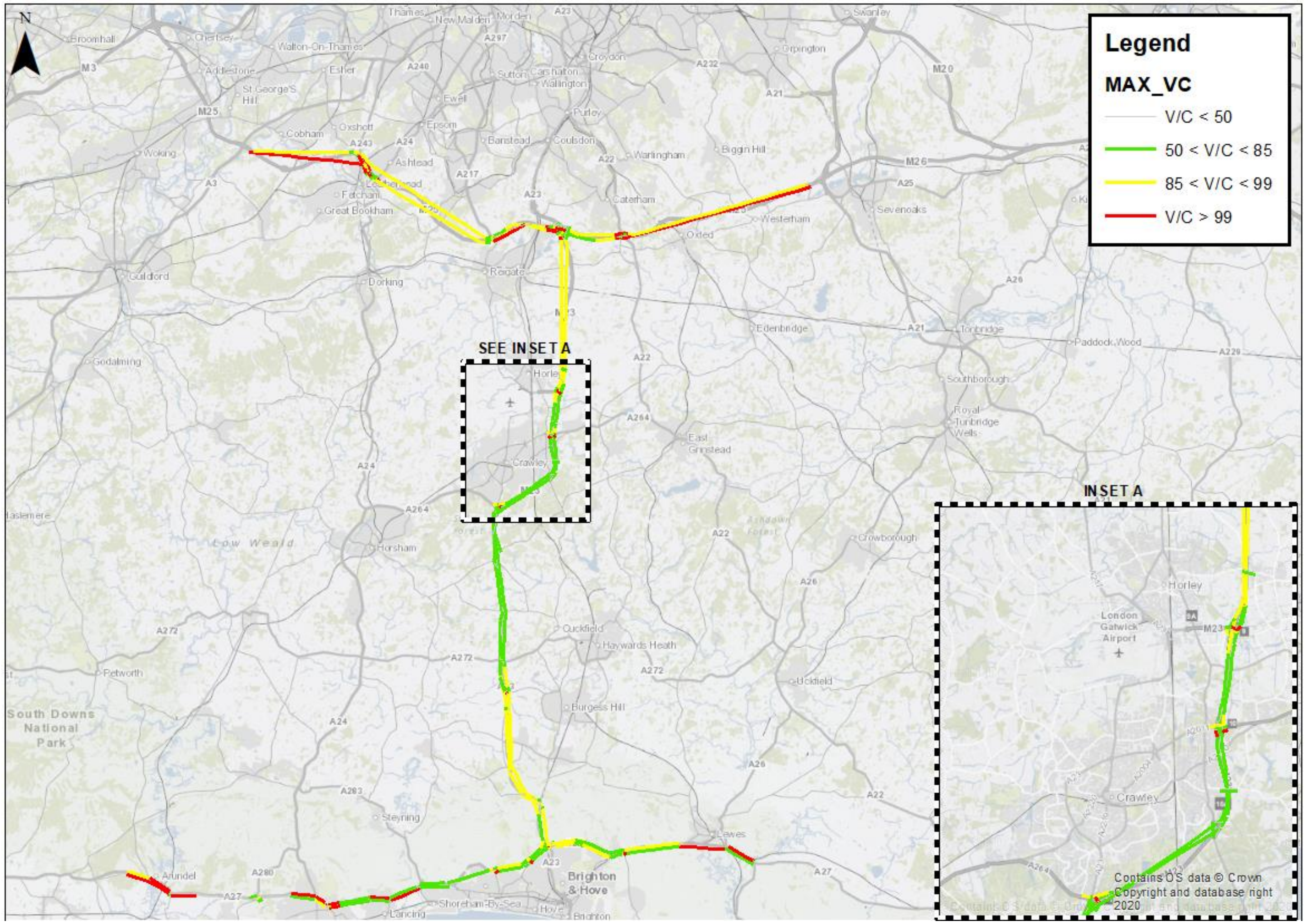


Figure 50: Maximum V/C - 2047, Future Baseline with Project – SRN



10.5 Performance Area A

Journey Times

10.5.1 Journey times routes covering the local road network include the following routes:

- A23 from Longbridge Roundabout to A23 (south of M25, nr Merstham), northbound and southbound; and
- A217 from M23 Spur via A217 to M25 J8, northbound and southbound.

2029 Assessment

10.5.2 Modelled journey times extracted for 2029, 2032 and 2047 are illustrated in Figure 51 to Figure 53. The comparisons between the Future Baseline and With Project scenarios show slight differences of up to 1 minute but no instances of end-to-end journey times being notably worsened between the scenarios.

2032 Assessment

10.5.3 Similar to 2029 there are no notable changes between the Future Baseline and Future Baseline with Project in 2032.

2047 Assessment

10.5.4 On balance, there are no notable changes in journey times with respect to the Performance Area A between the Future Baseline and With Project scenario.

Figure 51: Highway Journey Times – Performance Area A, 2029

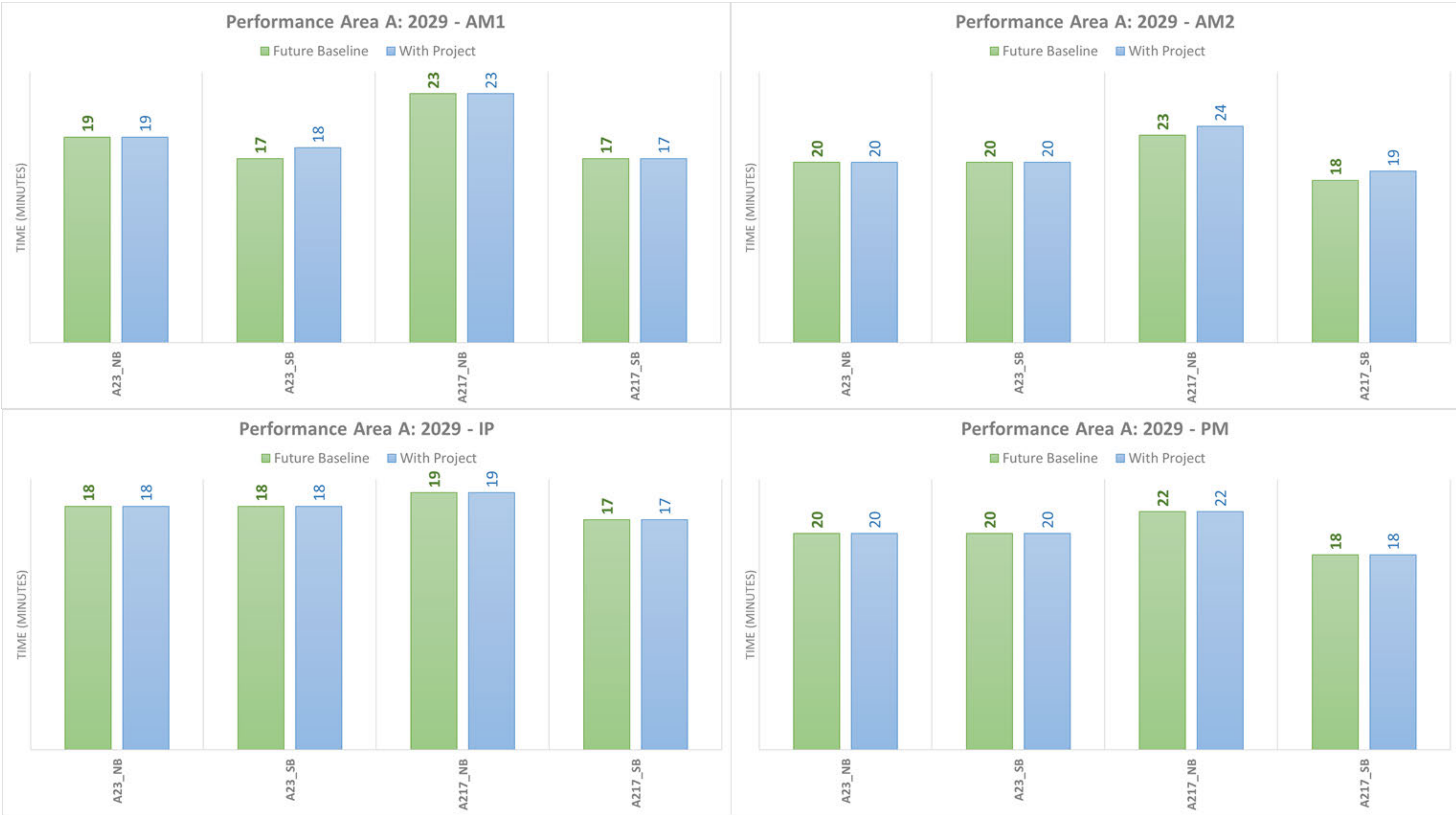


Figure 52: Highway Journey Times - Performance Area A, 2032

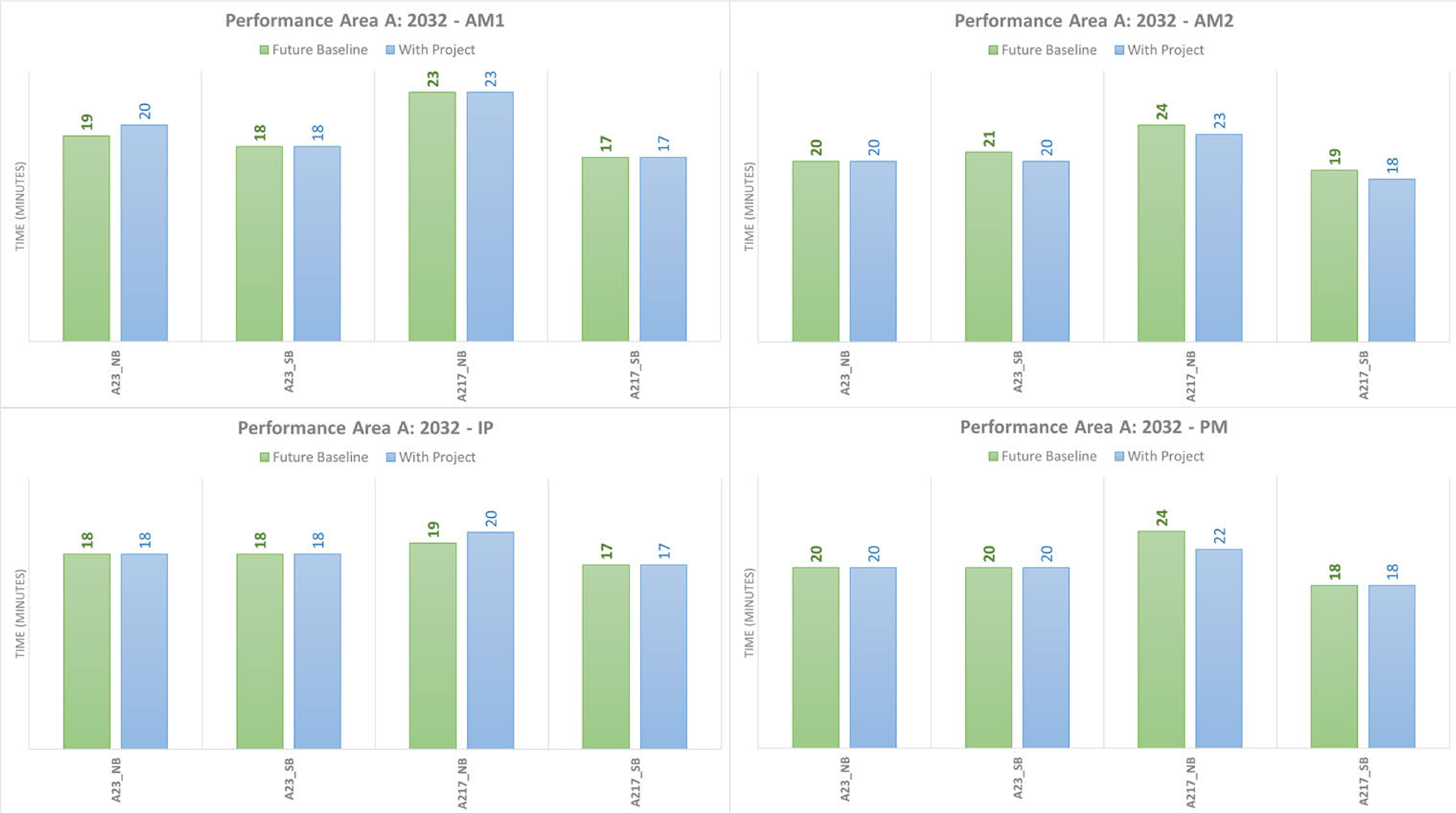
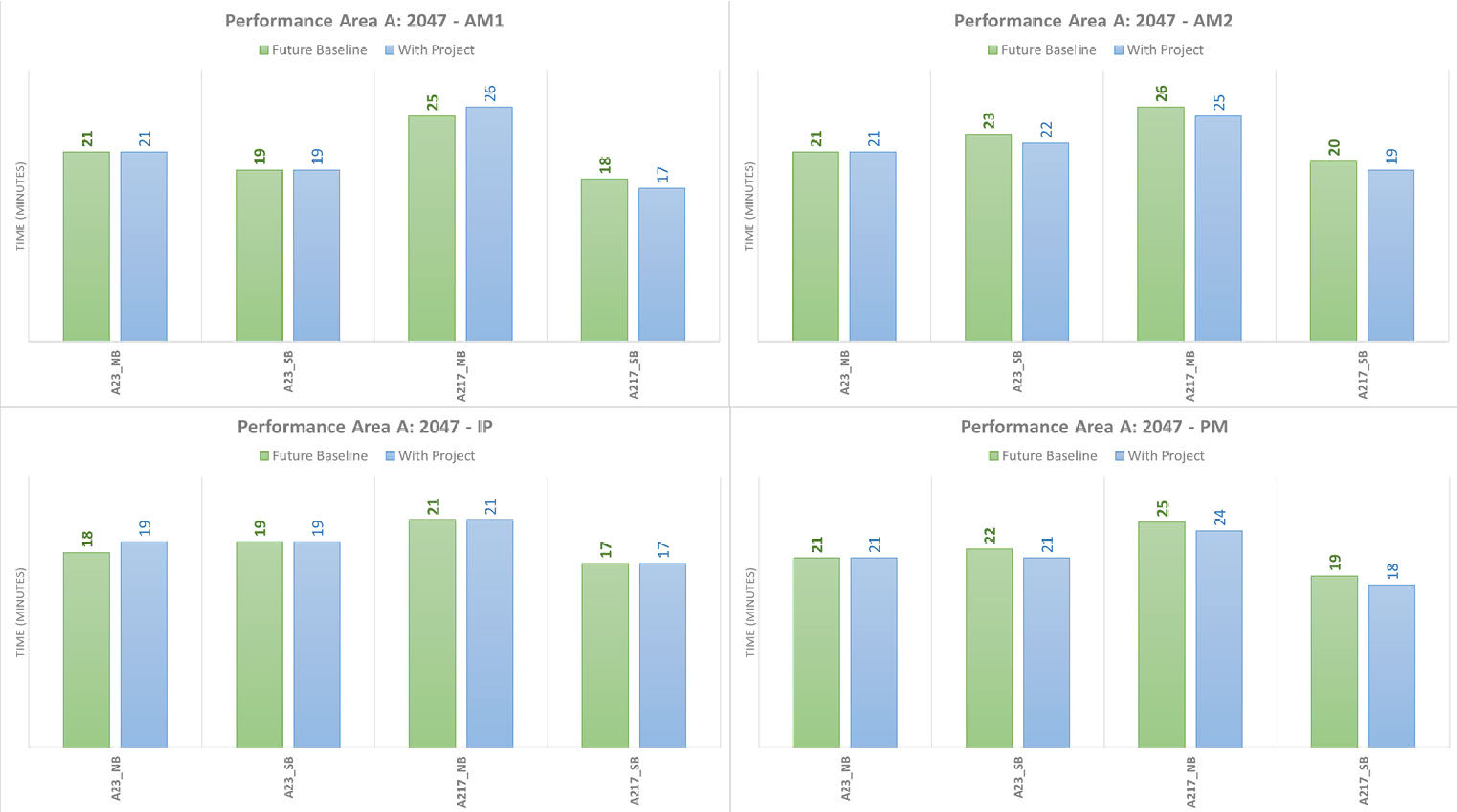


Figure 53: Highway Journey Times – Performance Area A, 2047



Operational Performance - Volume / Capacity ratios

10.5.5 Modelled Volume / Capacity ratios were extracted for each of the four modelled time periods. The maximum value across all time periods was selected to identify the highest value modelled and this is presented in Figure 57 to Figure 62.

10.5.6 The modelling suggests that there are some instances of relevant links that have changed operational categories between the Future Baseline and With Project scenario across all assessment years.

10.5.7 For 2029, there are notable changes in the approach arms to Gatwick Road roundabout, specifically the western arm. Note, in 2047 this change in operational performance does not occur.

10.5.8 Both Gatwick Road roundabout and Lowfield Heath roundabout experience some capacity issues With Project. This is because the capacity of staff parking wills double at this location in With Project compared to the Future Baseline, providing additional demand accessing the network via these roundabouts. There is some switching in which route is used, which affects the operational performance of both junctions and London Road in between. However, the operation of these junctions will be looked at in more detail in the VISSIM model.

10.5.9 2032 indicates that the M23 J9 off-slip for access towards the airport changes from yellow (85%<V/C<99%) to red (V/C > 99%) highlighting the increased conflict in movements between the circulatory and offslip at the roundabout. Additionally in 2032 and 2047 Future Baseline With Project a link on airport way flags as >99%, however as with the operation of Junction 9 these will be specifically looked at operationally in the VISSIM model.

10.5.10 Aside from the instances mentioned, the changes between scenarios across all assessment years show no other changes in links that were operating within capacity (V/C<100%) and links over capacity (V/C > 100%). Further analysis is undertaken to contextualise these impacts by categorisation with respect to magnitude of impacts.

Magnitude of Impact

10.5.11 In accordance with the criteria specified in section 10.1, the following section elaborates on instances of 'High', 'Medium' and 'Low' impacts for each assessment year. The graphics consider data for all time periods. The view extent relating to Performance Area A has been centred around the airport as no links/nodes outside of the vicinity of Gatwick Airport within Performance Area A have been flagged using these criteria.

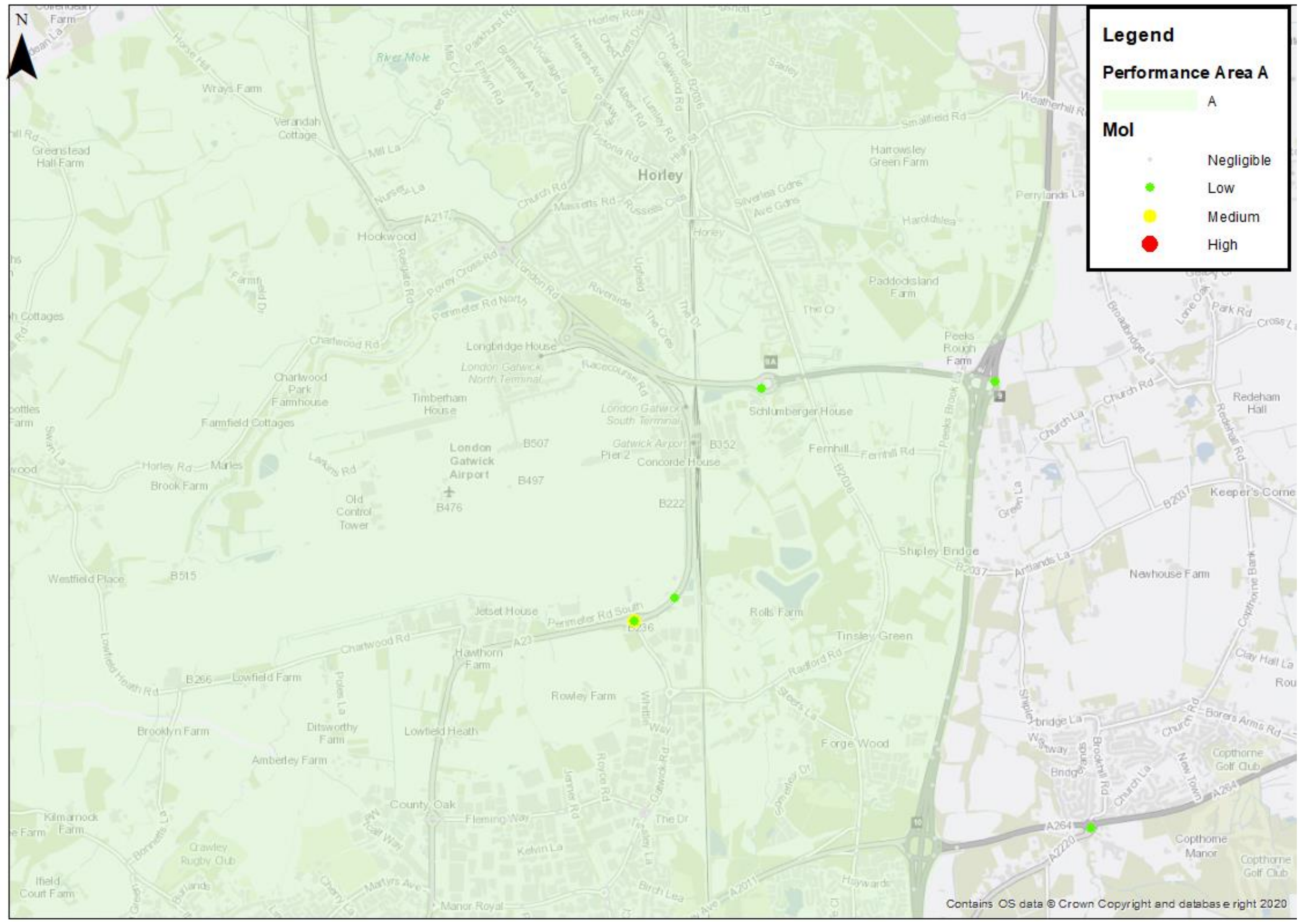
2029

10.5.12 When considering 2029, the only instance of 'Medium' impact relates to the Gatwick Road roundabout junction for both in the PM period. This change is predominantly driven by increase in the volume of southbound trips accessing the Gatwick car park zone to the north and turning right via the eastern arm of the junction denoted in Figure 54.

Table 10.5.1: Magnitude of Impacts: Performance Area A, 2029 Nodes

2029	Performance Area A - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	279	220	154	172
Low	4	3	1	0
Medium	0	0	0	1
High	0	0	0	0

Figure 54: Magnitude of Impacts: Performance Area A, 2029 Nodes



2032

10.5.13 The 2032 assessment year impacts are summarised in Table 10.5.2. The table outlines that there is a maximum of one ‘High’ magnitude impact and one ‘Medium’ across all modelled periods. Figure 55 outlines all occurrences across all peaks. The highway mitigation introduced in the vicinity of the airport has positively contributed to the mitigation of the ‘Low’ impact at South Terminal Roundabout recognised in 2029.

10.5.14 The ‘High’ impact occurrence of Gatwick Road roundabout for the PM period relates to the issue described in the 2029 assessment year and is being investigated further in the VISSIM modelling.

Table 10.5.2: Magnitude of Impacts: Performance Area A, 2032 Nodes

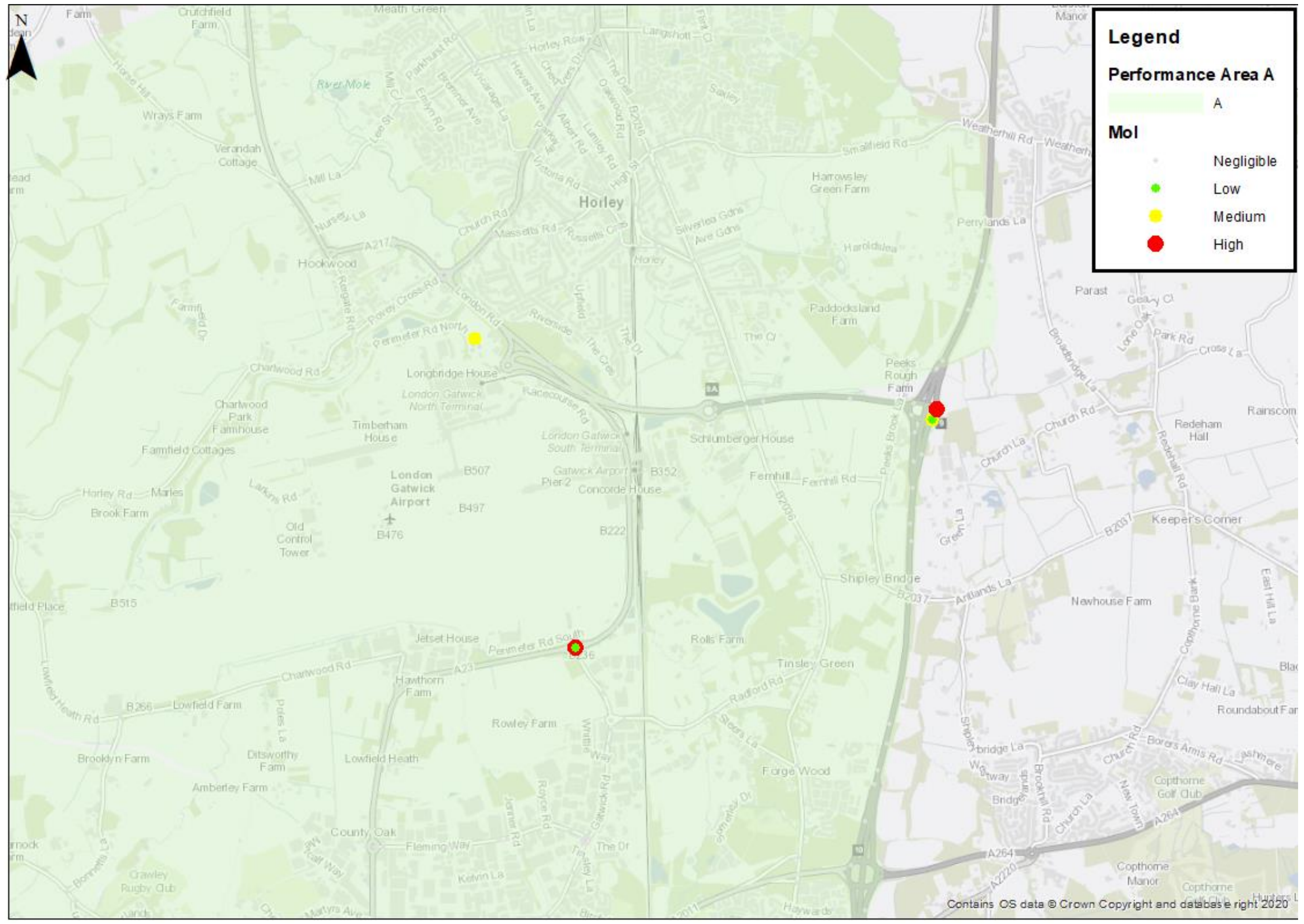
2032	Performance Area A - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	243	185	211	252
Low	2	0	1	0
Medium	1	1	0	0
High	1	1	0	1

10.5.15 The AM1 and AM2 ‘High’ instance relates to the M23 J9 southbound off-slip / circulatory and is associated with additional demand accessing the airport and the operation of this is being looked at in the VISSIM modelling to improve the circulation of traffic at the junction. The differences between the scenarios are presented in Table 10.5.3, whereby AP denotes airport related trips. The ‘Medium’ occurrence relates to access via North Terminal in the AM1 period. The PM ‘High’ instance occurs at Gatwick Roundabout and as explained above the operation of this roundabout will be looked at further in the VISSIM model.

Table 10.5.3: M23 J9 Off-slip, 2032 Differences (Total Vehicles)

Period	With Project		Future Baseline		With Project (-) Future Baseline	
	Total	AP	Total	AP	Total	AP
AM1	2,767	2,416	2,334	2,006	433	410
AM2	2,575	2,291	2,168	1,959	407	332

Figure 55: Magnitude of Impacts: Performance Area A, 2032 Nodes



2047

10.5.16 The 2047 assessment year impacts are summarised in Table 10.5.4. The table outlines that there is a maximum of two ‘High’ impact and two ‘Medium’ instances across all modelled periods. Figure 56 outlines all occurrences across all peaks. Similar to 2032, the proposed highway mitigation shows that there is no impact on the M23 Spur and Airport Way in the With Project scenario.

10.5.17 The additional ‘High’ impact occurrence introduced in 2047 is due to additional volume incurred on the North Terminal access described in 2032.

Table 10.5.4: Magnitude of Impacts: Performance Area A, 2047 Nodes

2047	Performance Area A - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	235	209	190	228
Low	2	3	1	3
Medium	2	1	1	0
High	2	1	0	1

10.5.18 The additional ‘Medium’ impact relates to the M23 J9 circulatory and follows from the issue described for traffic volumes accessing via the M23 J9 southbound off-slip.

Figure 56: Magnitude of Impacts: Performance Area A, 2047 Nodes

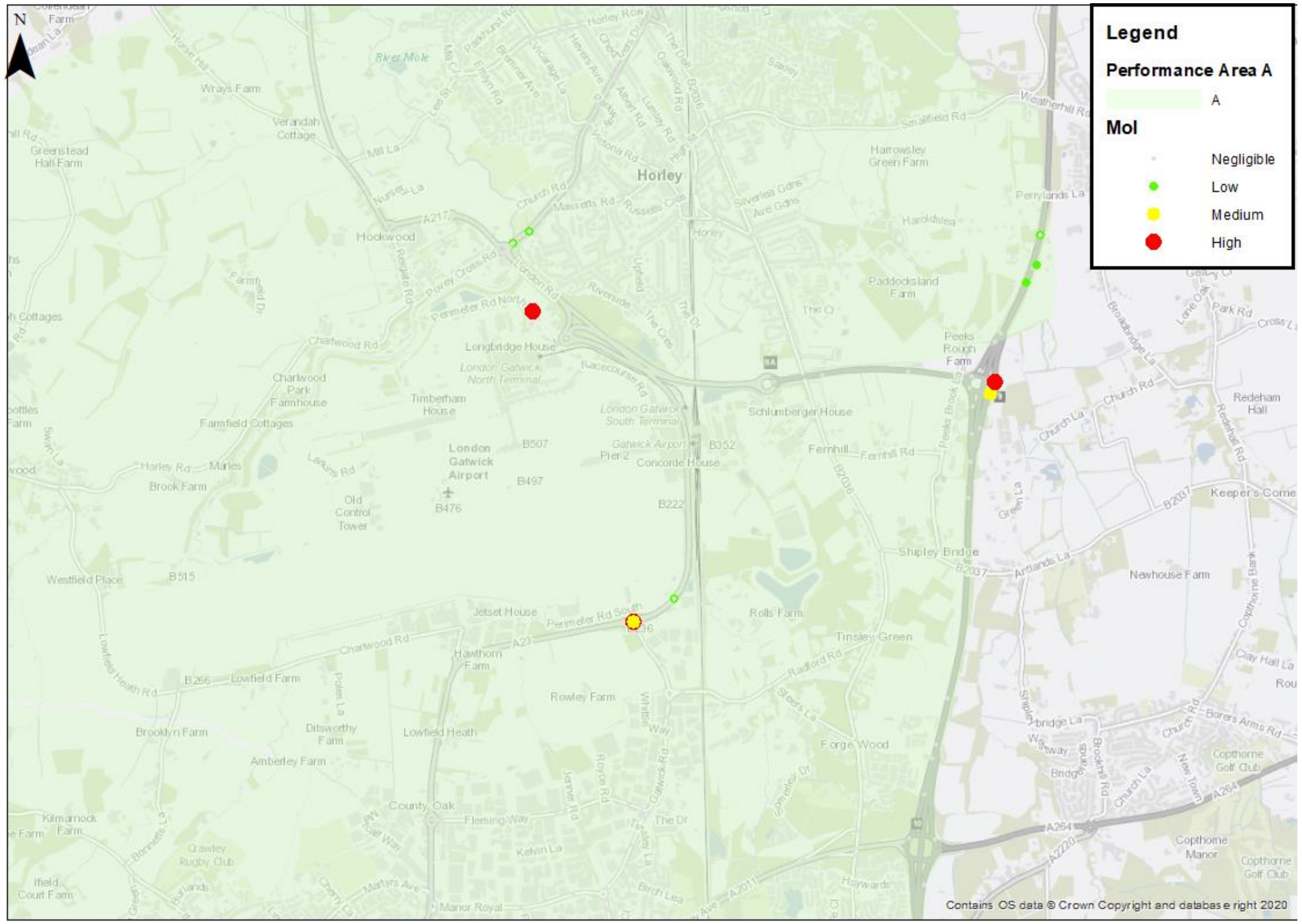


Figure 57: Maximum V/C - 2029, Future Baseline – Performance Area A

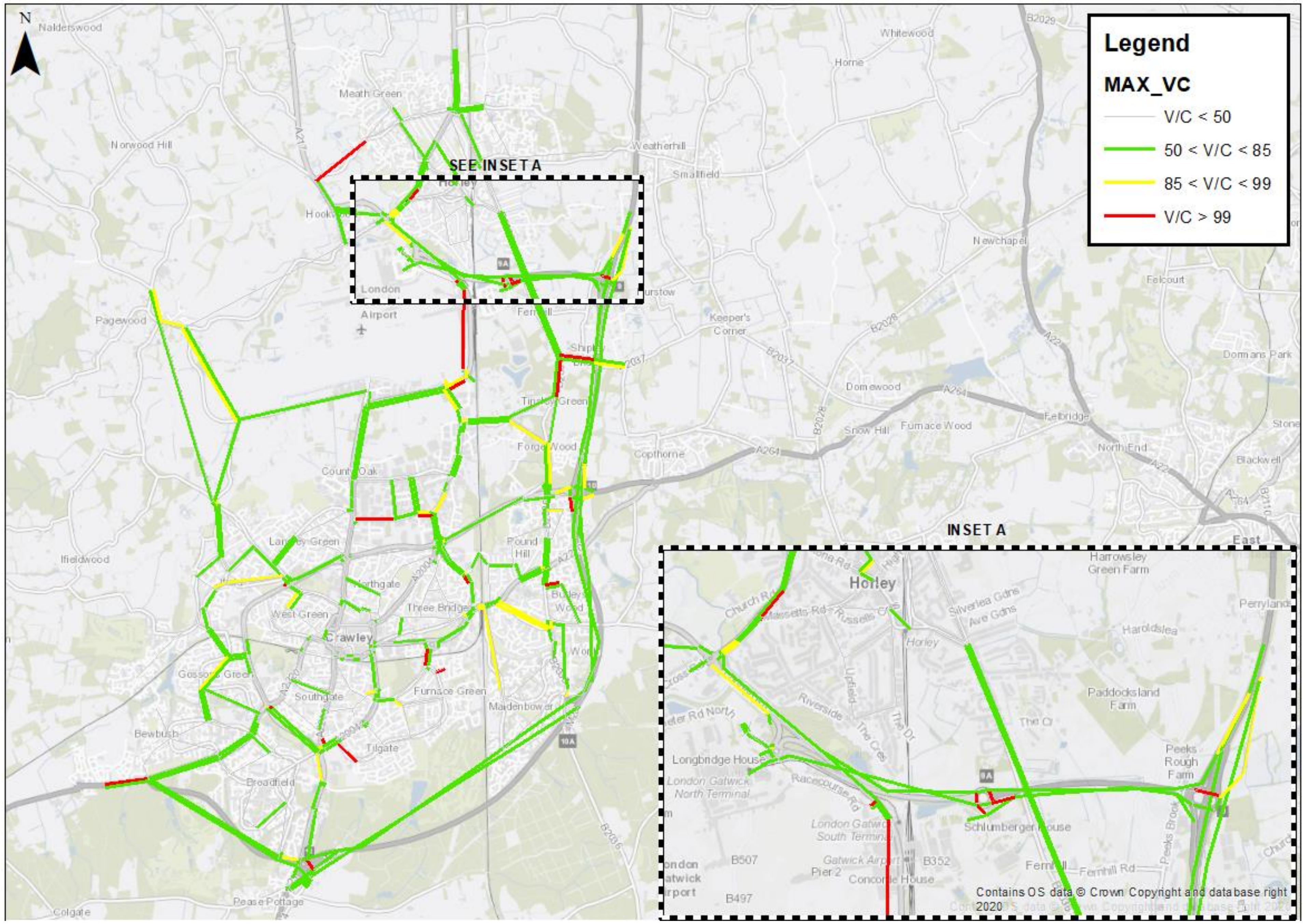


Figure 58: Maximum V/C - 2029, With Project – Performance Area A

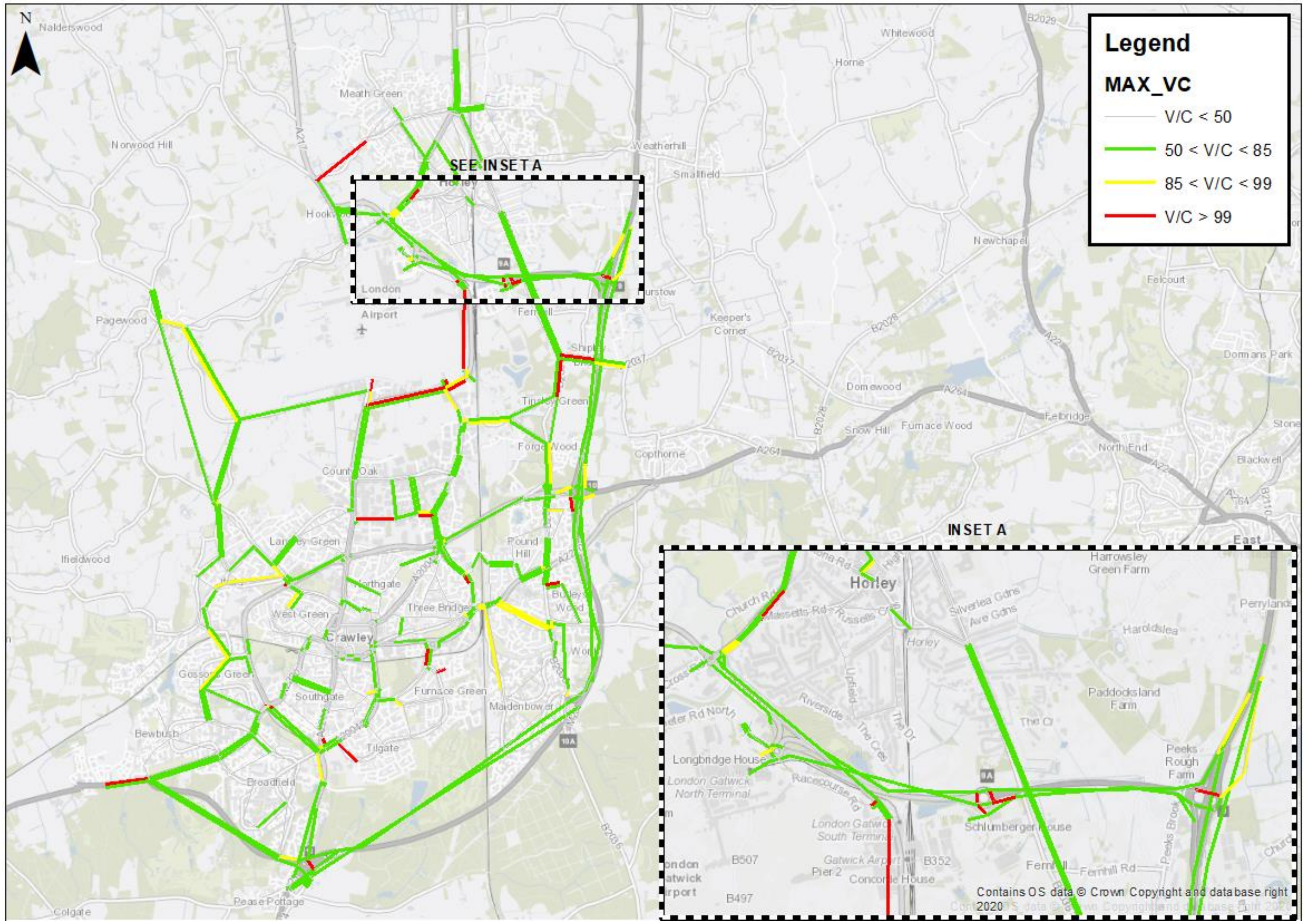


Figure 59: Maximum V/C - 2032, Future Baseline - Performance Area A

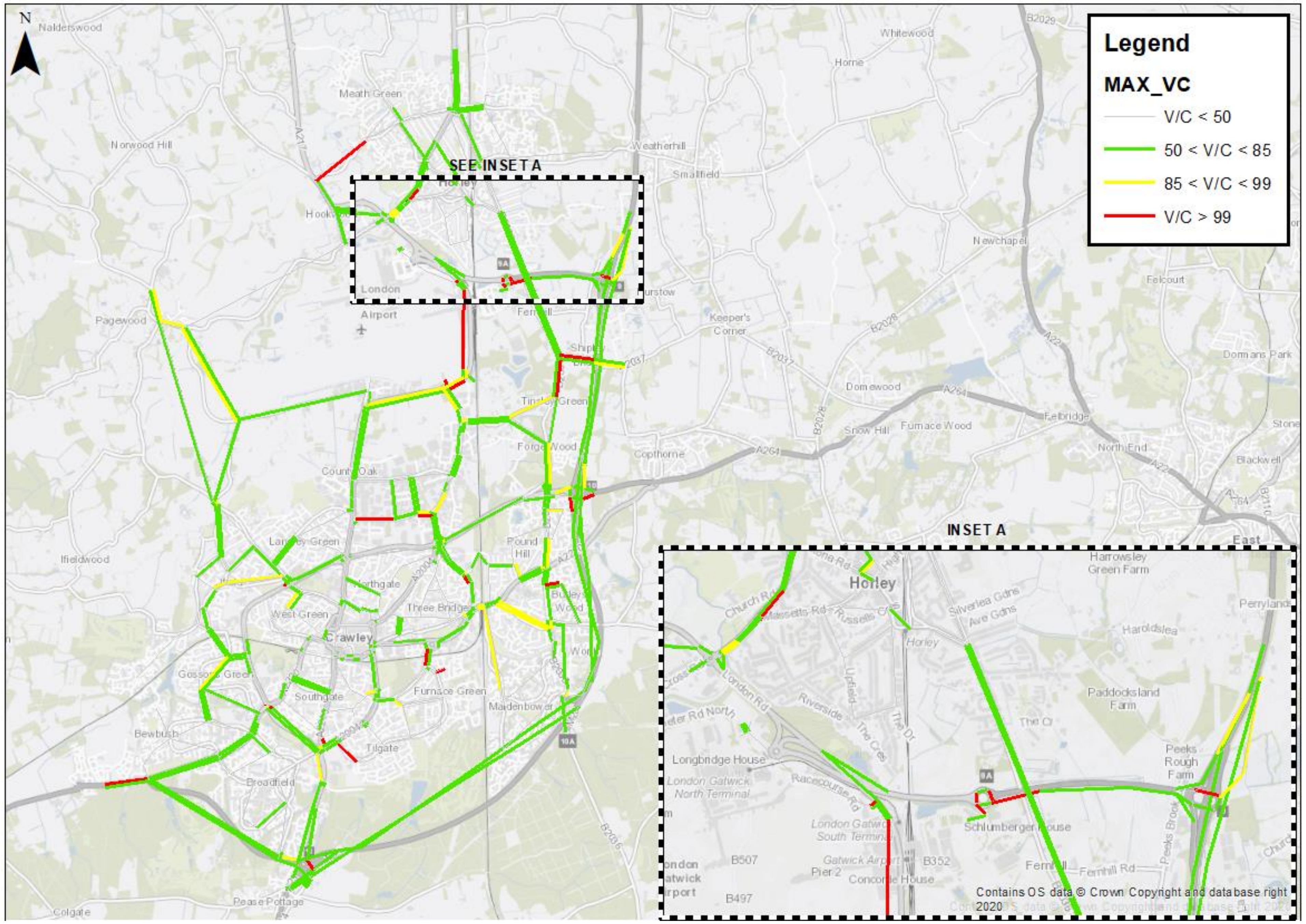


Figure 60: Maximum V/C - 2032, With Project - Performance Area A

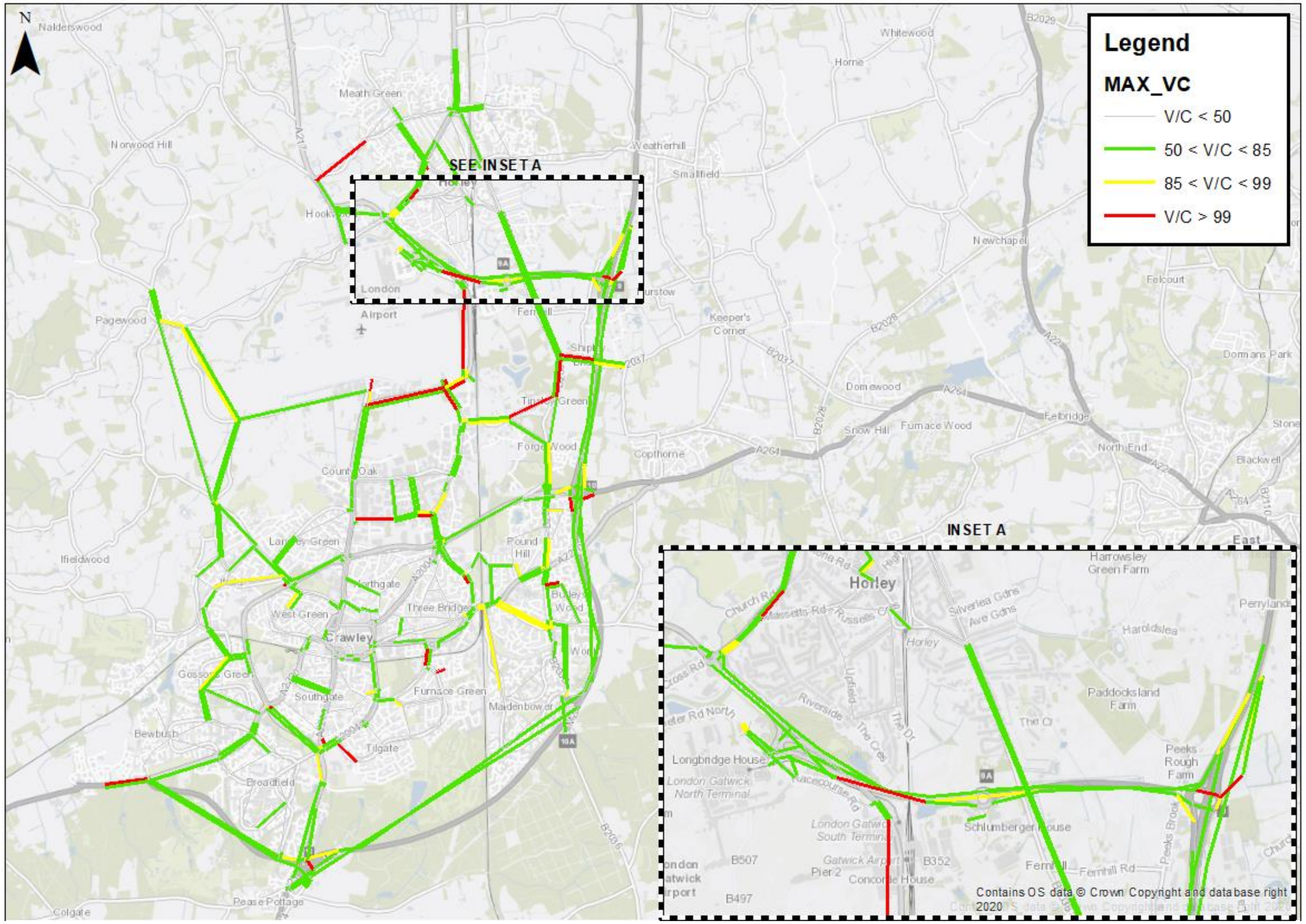


Figure 61: Maximum V/C - 2047, Future Baseline - Performance Area A

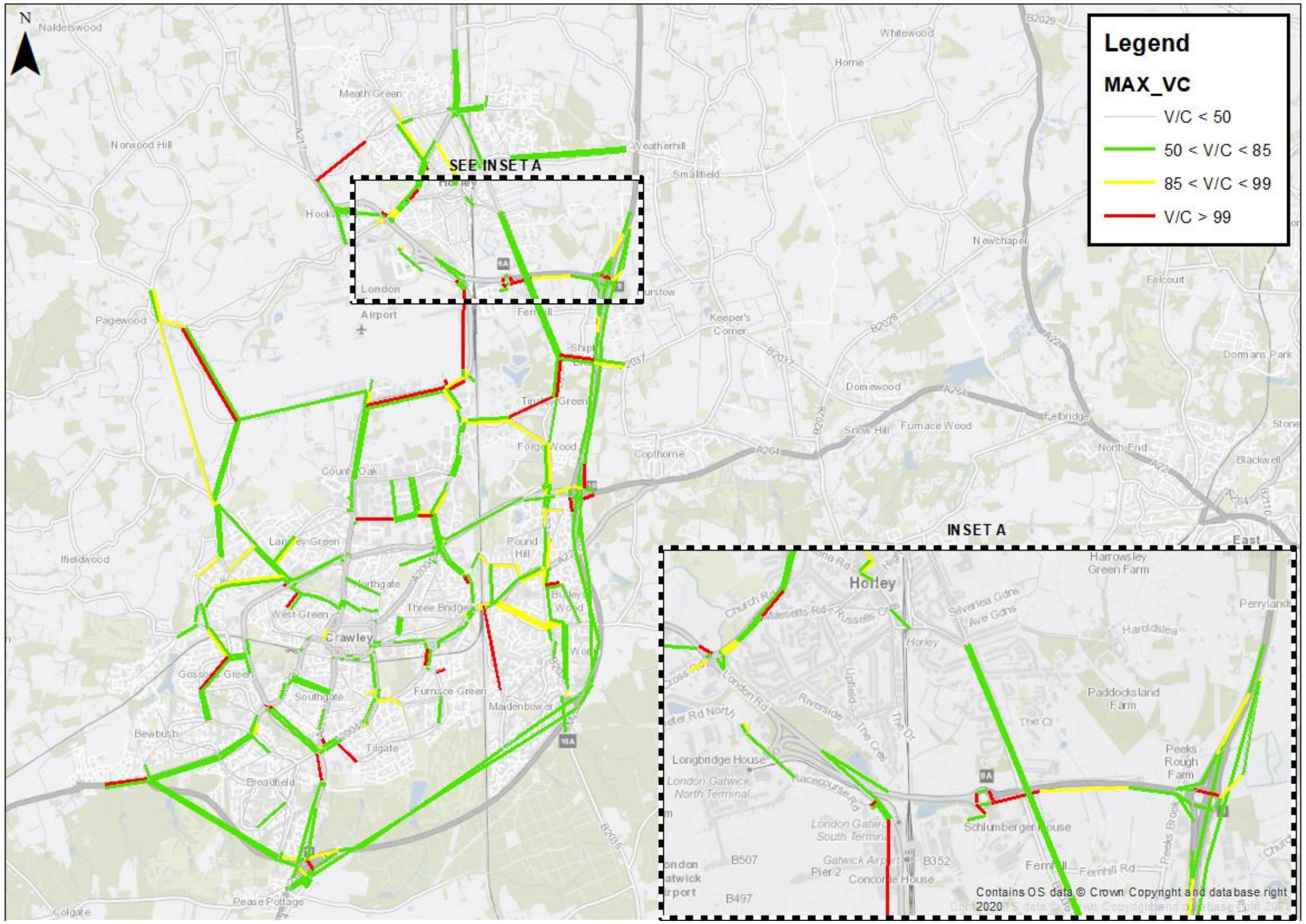
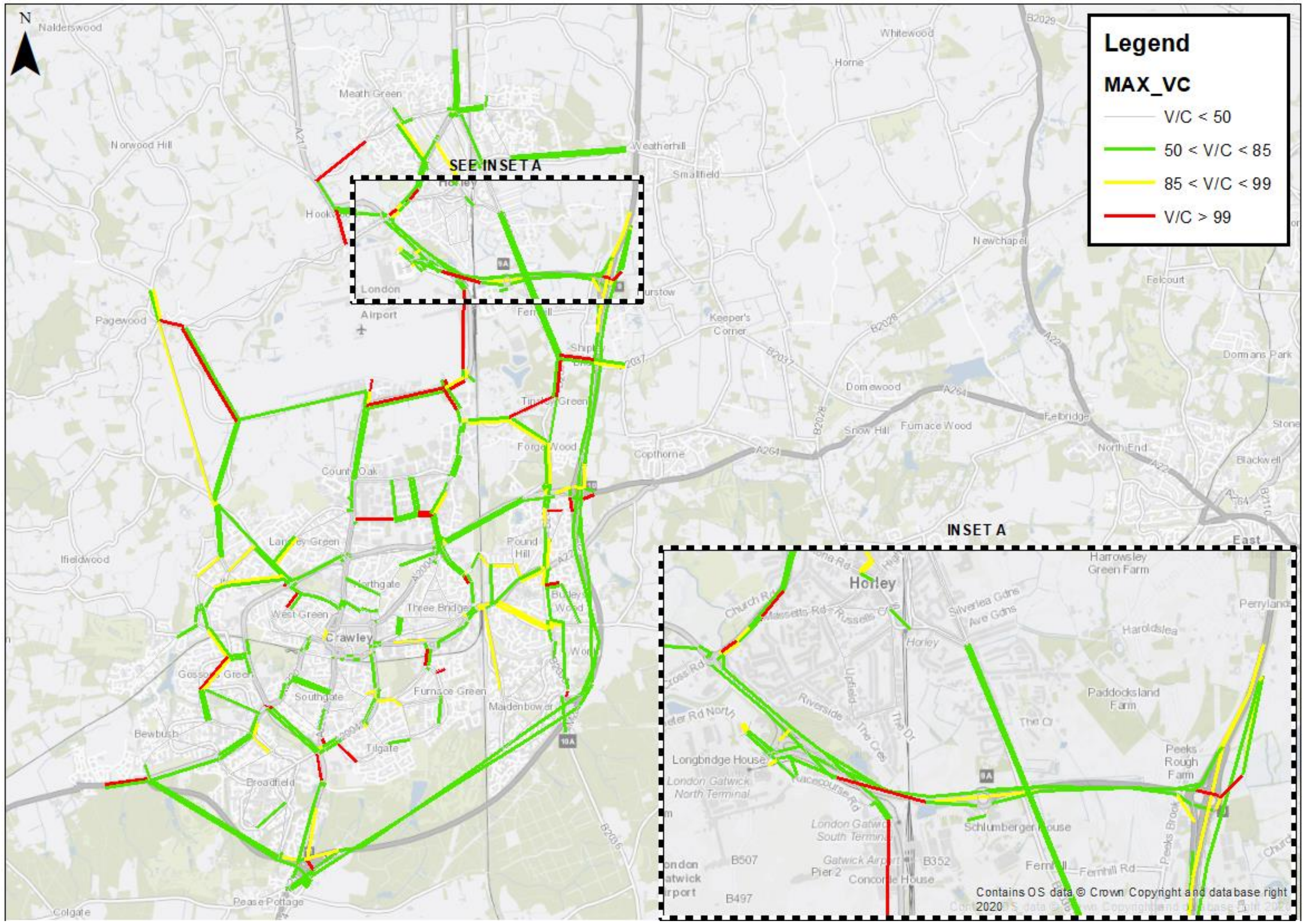


Figure 62: Maximum V/C - 2047, With Project - Performance Area A



10.6 Performance Area B

Journey Times

10.6.1 Journey times routes covering the strategic road network include the following:

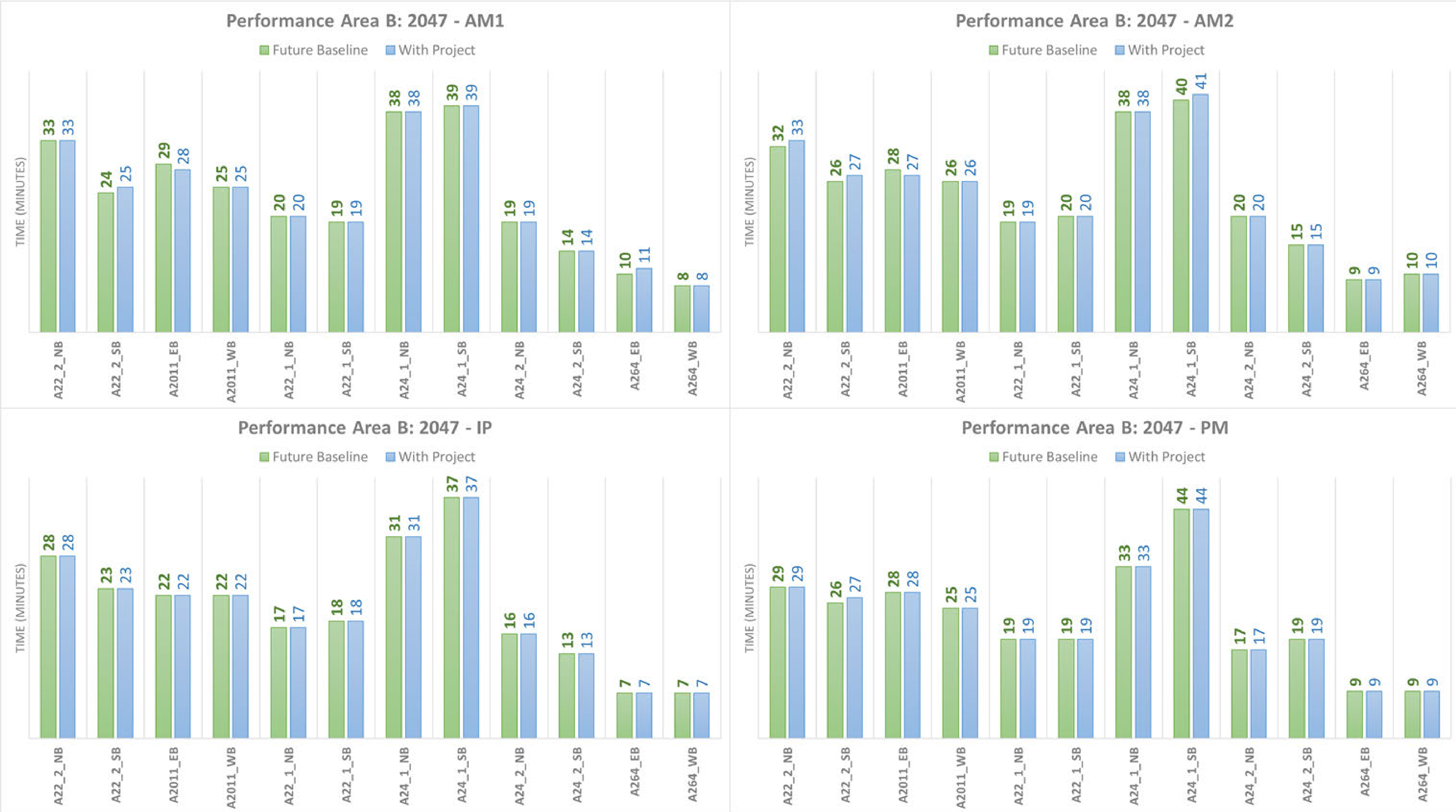
- A22 [1] from M25 J6 to East Grinstead, Southbound and northbound;
- A22 [2] from East Grinstead to Maresfield, southbound and northbound;
- A2011 from M23 J11 to East Grinstead via Crawley, eastbound and westbound;
- A24 [1] from near M25 J9 (Leatherhead) to north Horsham, southbound and northbound;
- A24 [2] from north Horsham to A272/A24 near West Grinstead, southbound and westbound; and
- A264 from north Horsham to M23 J11, eastbound and westbound.

10.6.2 Modelled journey times extracted for these routes summarised in Figure 63 - Figure 65 demonstrate that no routes are notably impacted between the Future Baseline and With Project Scenario in 2029, 2032 and 2047. There are no instances of journey times exceeding changes greater than one minute. The modelled journey times evidence that although these corridors are affected in the With Project scenario, summarised in AADT terms referenced in Figure 39 - Figure 41, there are no significant impacts in end-to-end journey times in comparison to the Future Baseline.

Figure 63: Highway Journey Times – Performance Area B, 2029

Figure 64: Highway Journey Times - Performance Area B, 2032

Figure 65: Highway Journey Times – Performance Area B, 2047



Operational Performance - Volume / Capacity ratios

10.6.3 Modelled Volume / Capacity ratios were extracted for each of the four modelled time periods. The maximum value across all time periods was selected to identify the highest value modelled and this is presented in Figure 69 to Figure 74.

10.6.4 For 2029, the modelled data demonstrates that the vast majority of links do not change operational categories with the exception of one instance on Horsham Road northbound with a category shift of yellow (85%<V/C<99%) to red (V/C > 99%). The Future Baseline scenario is associated with a V/C of 97% in the AM1 period whereas in the With Project scenario the V/C the corresponding value is 100%. The associated change is a result of 15 additional vehicles. 2032 and 2047 exhibit similar patterns in terms of changes in operation categories. Further analysis is undertaken to contextualise these impacts by categorisation with respect to magnitude of impacts.

Magnitude of Impact

10.6.5 In accordance with the criteria specified in section 9.1, the following section elaborates on instances of 'High' and 'Medium' and impacts for each assessment year. An overview of 'Low', 'Medium' and 'High' impacts is presented in Figure 66 to Figure 68. The graphics consider data for all periods respective to Performance Area B.

2029

10.6.6 When considering 2029, there are no instances of 'Medium' or 'High' magnitude impacts and is presented in Table 10.6.1.

Table 10.6.1: Magnitude of Impacts: Performance Area B, 2029 Nodes

2029	Performance Area B - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	225	134	124	64
Low	2	3	0	0
Medium	0	0	0	0
High	0	0	0	0

Figure 66: Magnitude of Impacts: Performance Area B, 2029 Nodes

2032

10.6.7 The 2032 assessment year impacts are summarised in Table 10.6.2. The table outlines that there are a maximum of two 'Medium' magnitude impacts across all modelled periods. Figure 67 illustrates all occurrences across for all peaks.

10.6.8 The 'Medium' instances relate to the M25 westbound near junction 6 and the M25 SB off-slip on to the M23 southbound for the AM1 and AM2 period. The incident flagged near junction 6 is due to the V/C increasing from 99% to 101% in the With Project scenario. The M25 southbound off-slip instance has V/C of 87% and 94% in the Future Baseline and With Project scenarios respectively and although is flagged as a 'Medium' impact link still operates within the same operation capacity of 85%<V/C<99%.

Table 10.6.2: Magnitude of Impacts: Performance Area B, 2032 Nodes

2032	Performance Area B - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	380	309	335	320
Low	5	6	2	5
Medium	2	2	0	0
High	0	0	0	0

Figure 67: Magnitude of Impacts: Performance Area B, 2032 Nodes

2047

10.6.9 The 2047 assessment year impacts are summarised in Table 10.6.3. The table outlines that are no 'High' magnitude impact instances and a maximum of two 'Medium' magnitude impact instances are recognised across all modelled periods. Figure 68 outlines all occurrences across all peaks. These occur at the M23 J8 on the northbound off-slip at in AM1 and PM and southbound on slip in AM2.

Table 10.6.3: Magnitude of Impacts: Performance Area B, 2047 Nodes

2047	Performance Area B - Nodes			
MoI	AM1	AM2	IP	PM
Negligible	348	252	278	202
Low	4	5	4	4
Medium	1	2	0	1
High	0	0	0	0

Figure 68: Magnitude of Impacts: Performance Area B, 2047 Nodes

Figure 69: Maximum V/C - 2029, Future Baseline – Performance Area B

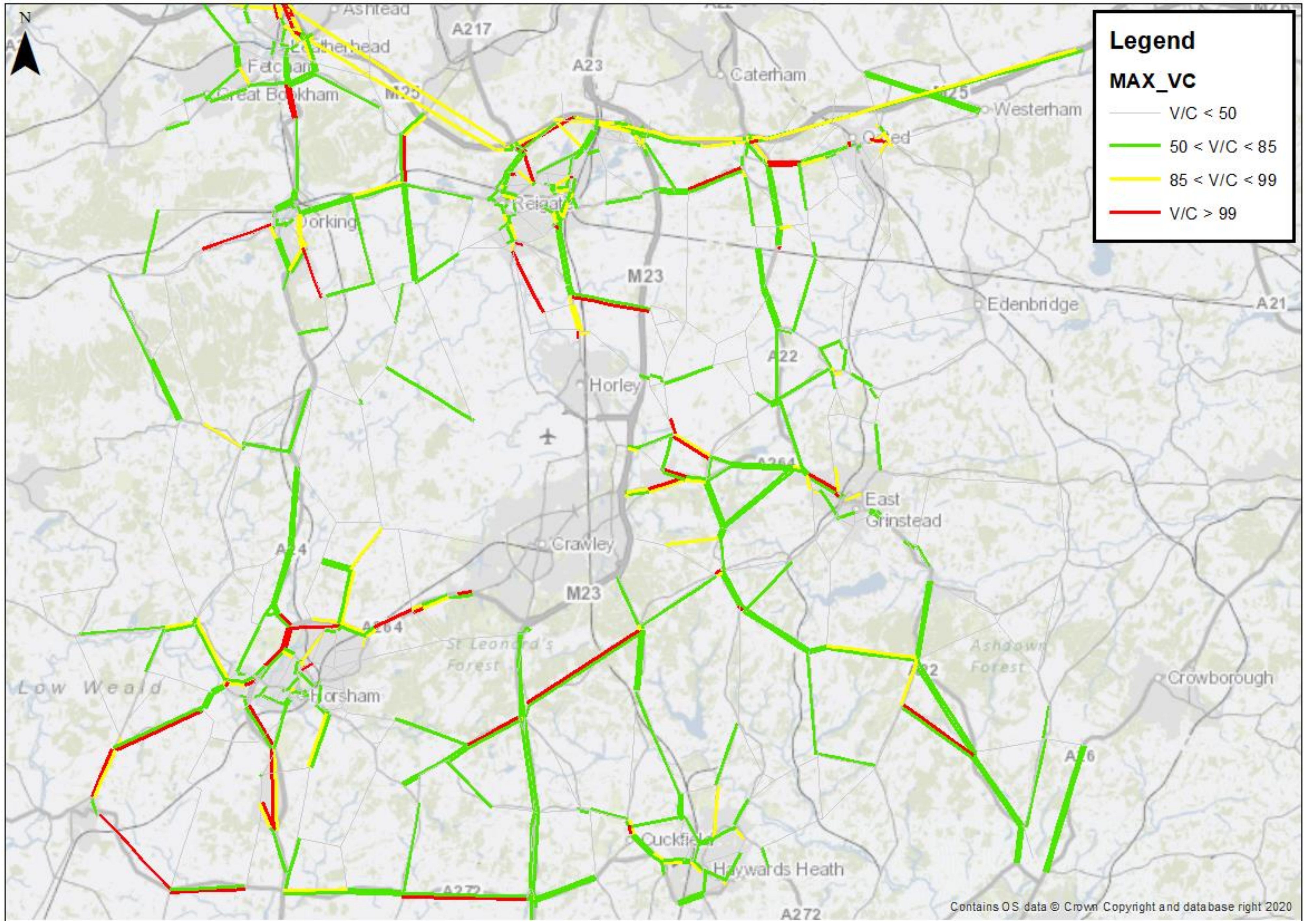


Figure 70: Maximum V/C - 2029, With Project – Performance Area B

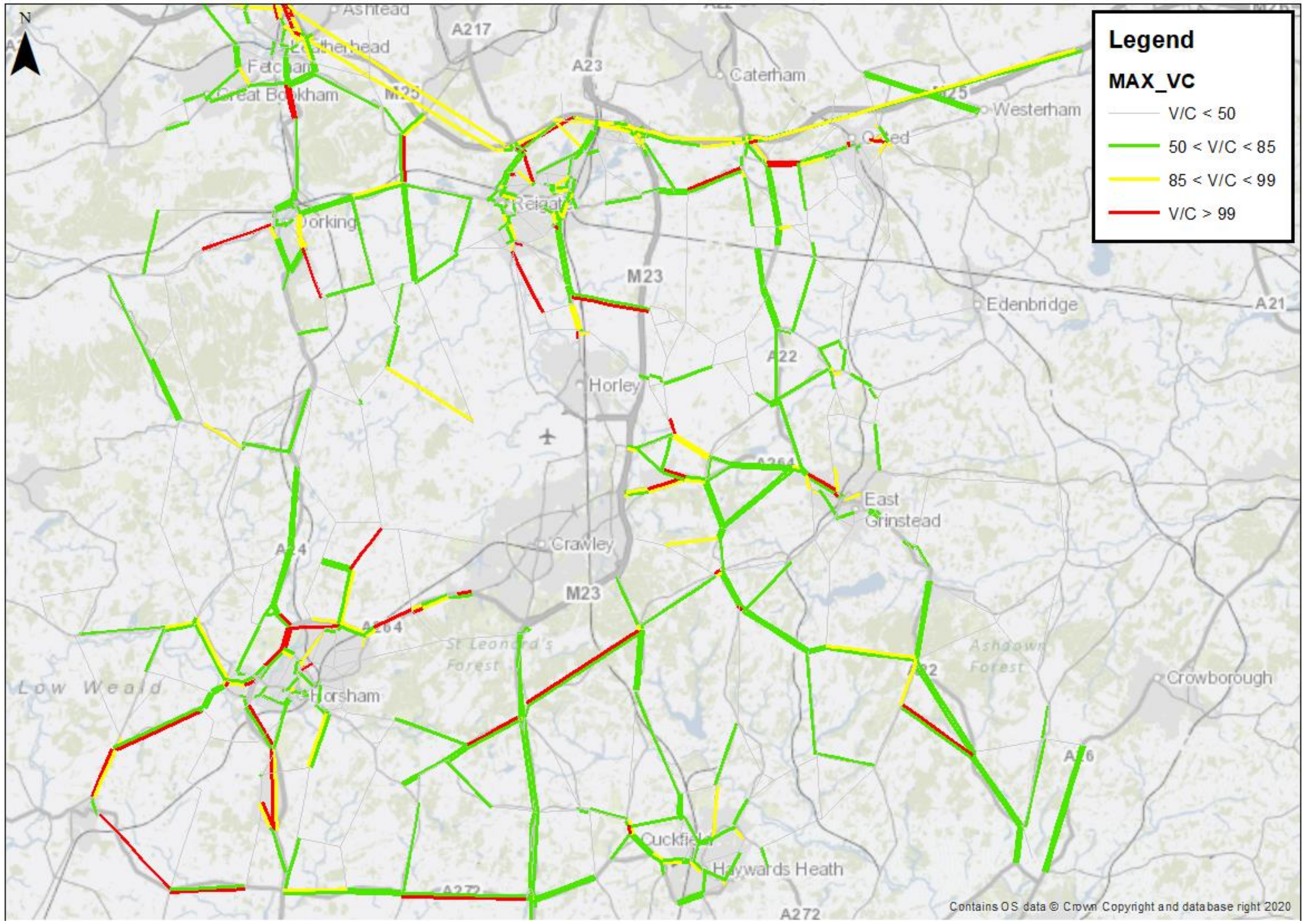


Figure 71: Maximum V/C - 2032, Future Baseline - Performance Area B

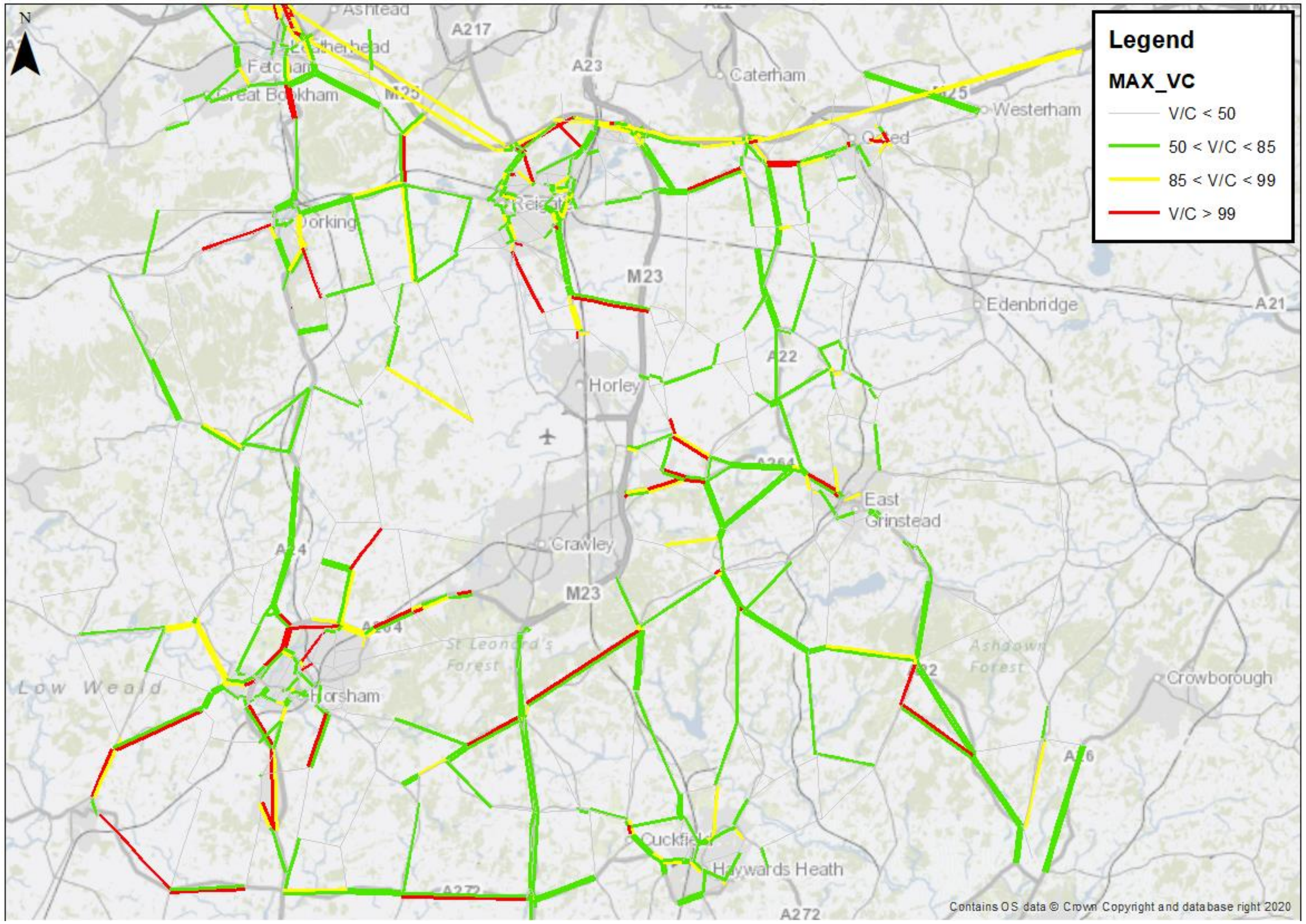


Figure 72: Maximum V/C - 2032, With Project - Performance Area B

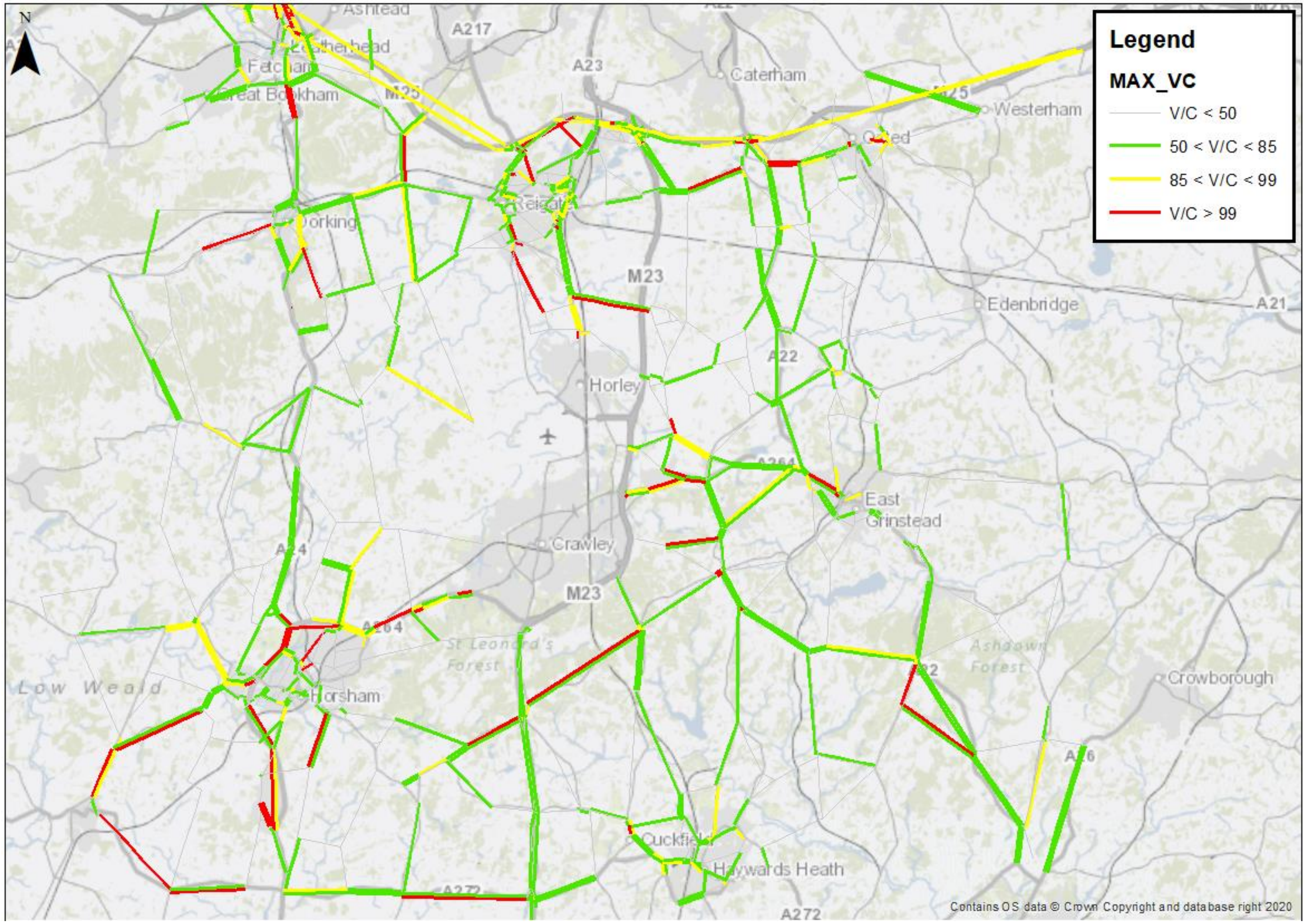
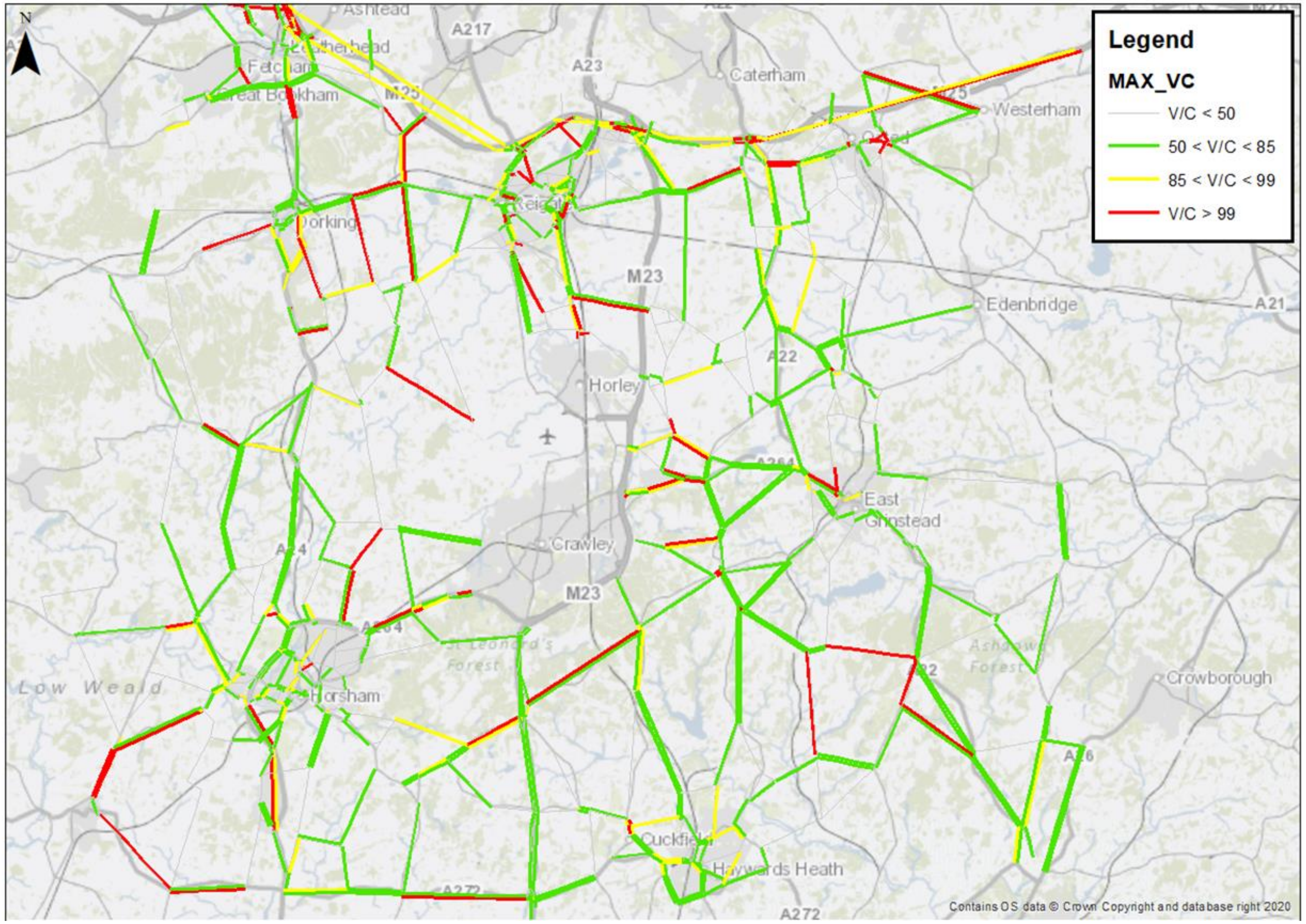
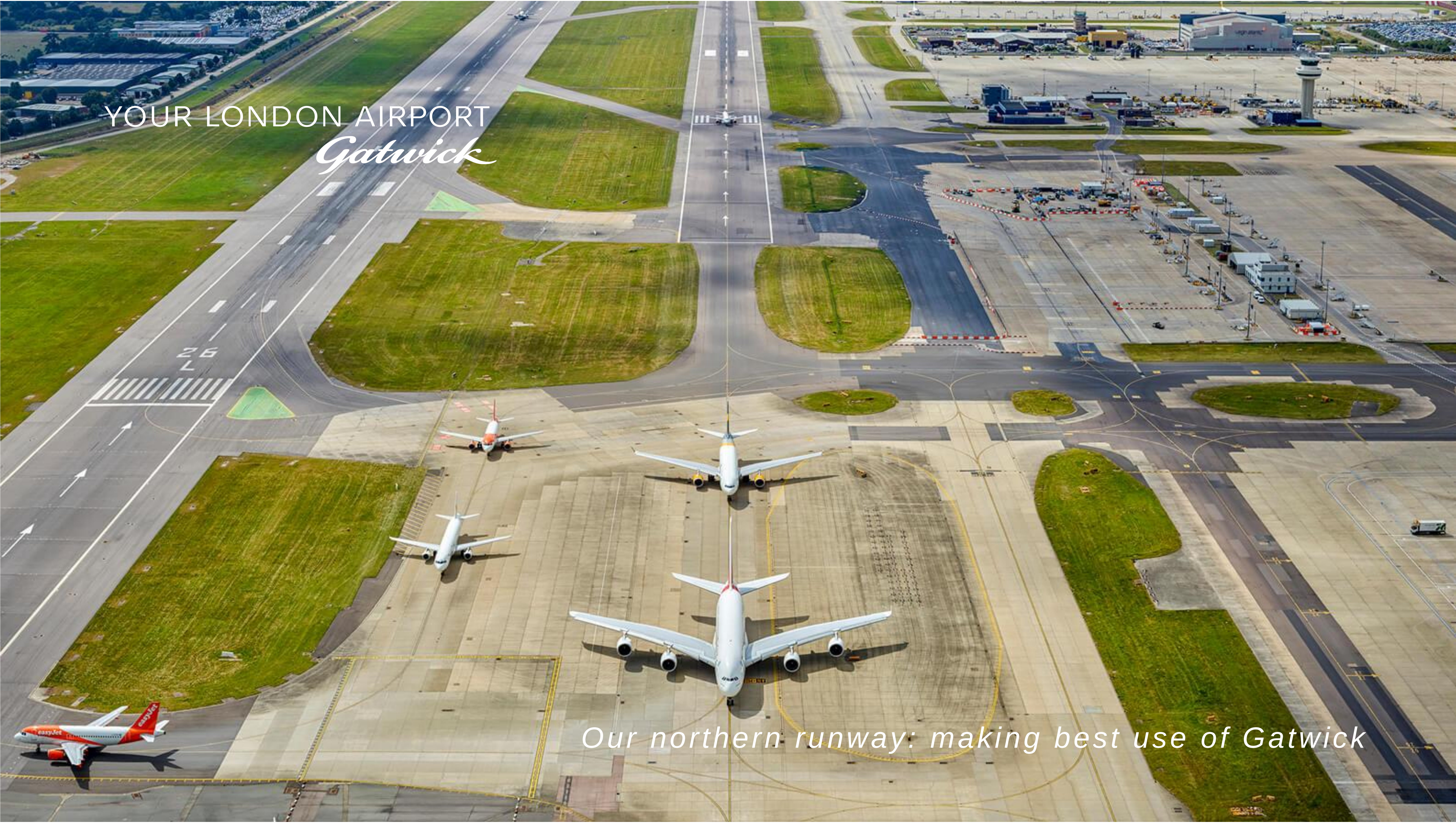


Figure 73: Maximum V/C - 2047, Future Baseline - Performance Area B





Preliminary Environmental Information Report
Appendix 12.9.2: Highway Flows

September 2021

Link Sensitivity and IEMA Rules 1 & 2

Approach to Pedestrian and Cyclist Sensitivities

Negligible	No footway or pedestrian / cyclist desire lines
Low	With footway and / or cycle provision
Medium	Alongside residential frontages, or sensitive receptors (e.g. doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways un-segregated cycle ways, community centres, parks, recreation facilities, retirement homes).
High	Alongside sensitive receptors (e.g. schools, colleges, playgrounds, accident black spots, urban / residential roads without footways that are used by pedestrians)
Very High	Alongside receptors with greatest sensitivity due to site-specific characteristics which make them particularly sensitive to changes in traffic flows (eg community with high incidence of mobility impairment requiring to cross roads to access essential facilities).

ID	Link	Pedestrian / Cyclist Sensitivities	IEMA Rules 1 & 2														
			2029 ACON			2029			2029 HCON			2032			2047		
			30% All	30% HGV	10% All	30% All	30% HGV	10% All	30% All	30% HGV	10% All	30% All	30% HGV	10% All	30% All	30% HGV	10% All
1	M23 SPUR, J9-SOUTH TERMINAL ROUNDABOUT	*Negligible*	No	Yes	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes
2	A23 AIRPORT WAY,	*Negligible*	No	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes
3	A23 LONDON ROAD, NORTH TERMINAL-LONGBRIDGE ROUNDA	*Low*	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
4	NORTH TERMINAL ENTRY/EXIT	*Low*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
5	LONGBRIDGE WAY	*Low*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
6	NORTHGATE ROAD	*Negligible*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
7	PERIMETER ROAD NORTH, LONGBRIDGE WAY	*Low*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
8	GATWICK WAY	*Low*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
9	PERIMETER ROAD NORTH, SOUTH TERMINAL-NORTH TERMINA	*Low*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
10	SOUTH TERMINAL ENTRY/EXIT	*Low*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
11	A23 LONDON ROAD, BEEHIVE RING ROAD-SOUTH TERMINAL	*Low*	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	Yes
12	A23 LONDON ROAD, BEEHIVE RING ROAD-A23 LONDON ROAD	*Low*	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
13	PERIMETER ROAD SOUTH, AT GATWICK ROAD ROUNDABOUT	*Low*	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
14	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOU	*Low*	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
15	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOU	*Low*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	Yes
16	LOWFIELD HEATH ROAD, CHARLWOOD ROAD-HORLEY ROAD/T	*Low*	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
17	RADFORD ROAD, GATWICK ROAD-STEERS LANE	*Low*	No	No	No	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
18	B2036 BALCOMBE ROAD, A2011 CRAWLEY AVENUE-STEERS LAN	*Low*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
19	B2036 BALCOME ROAD, STEERS LANE-RADFORD ROAD	*Medium*	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	No
20	B2036 BALCOMBE ROAD, RADFORD ROAD-B2037 ANTLANDS LA	*High*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
21	B2036 BALCOMBE ROAD, B2037 ANTLANDS LANE-VICTORIA RO	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
22	GATWICK ROAD, FLEMING WAY-RUTHERFORD WAY	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
23	B2037 ANTLANDS LANE, B2036 BALCOME ROAD-SHIPLEY BRIDG	*Low*	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes	Yes	No	Yes
24	B2037 ANTLANDS LANE, SHIPLEY BRIDGE LANE-COPTHORNE BA	*Negligible*	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
25	WOODCOTE SIDE, WOODCOTE GREEN ROAD-A24 DORKING RO	*Medium*	No	No	No	No	No	Yes	No	No	No	No	No	Yes	Yes	No	Yes
26	WOODCOTE GREEN ROAD, WOODCOTE SIDE ROAD-WOODCOT	*Medium*	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
27	WOODCOTE GREEN ROAD, WOODCOTE HURST-AVENUE ROAD	*Medium*	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
28	B386 LONGCROSS ROAD/HOLLOWAY HILL/CHERTSEY ROAD, A2	*Medium*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
29	A320 GUILDFORD ROAD, HOLLOWAY HILL-HILLWOOD DRIVE/B	*Low*	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
30	A320 GUILDFORD ROAD, HILLSWOOD DRIVE/BITTAMS LANE-A3	*Low*	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No
31	A320 SAINT PETERS WAY, A320 GUILDFORD ROAD-M25 J11	*Low*	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
32	BEDDINGTON FARM ROAD/ MARLOWE WAY, B272 BEDDINGTO	*Low*	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
33	BEDDINGTON FARM ROAD/ MARLOWE WAY, A23 PURLEY WAY	*Low*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
34	WADDON NEW ROAD/CAIRO NEW ROAD, RECTORY GROVE-REI	*Medium*	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No
35	REEVES CORNER, REEVES CORNER-CAIRO NEW ROAD	*Medium*	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No
36	REEVES CORNER, REEVES CORNER-CHURCH ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes
37	CHURCH STREET/DRUMMOND ROAD, CHURCH STREET/REEVES	*Medium*	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes
38	FIRTH ROAD, DRUMMOND STREET-TAMWORTH ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes
39	LONDON ROAD, DERBY ROAD-MEAD PLACE/OAKFIELD ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
40	LONDON ROAD, DERBY ROAD-STATION ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No
41	POPLAR WALK/NORTH END, STATION ROAD-ST MICHAELS ROA	*Medium*	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No
42	POPLAR WALK, ST MICHAELS ROAD-A212 WELLESLEY ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No
43	A212 WELLESLEY ROAD, POPLAR WALK-STATION ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes
44	A212 WELLESLEY ROAD, POPLAR WALK-SYDENHAM ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes
45	A212 LOWER COMBE STREET, SOUTH END-236 SOUTHBRIDGE R	*Medium*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
46	A235 SOUTH END, A235 BRIGHTON ROAD/B275 WARHAM ROA	*High*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
47	A235 BRIGHTON ROAD, A235 SOUTH END/B275 WARHAM ROA	*Medium*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
48	A235 BRIGHTON ROAD, BARTLETT STREET-BARTLETT STREET	*Medium*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
49	A235 BRIGHTON ROAD, BARTLETT STREET-UPLAND ROAD	*Medium*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
50	A235 BRIGHTON ROAD, UPLAND ROAD-HALING PARK ROAD	*Medium*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
51	B275 ST PETERS ROAD, ABERDEEN ROAD/TEMPLE ROAD-BLUNT	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
52	B275 ST PETERS ROAD, A235 SOUTH END/B234 CROHAM ROAD	*Medium*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
53	A232 FAIRFIELD ROAD, B243 PARK HILL ROAD-A222 ADDISCOM	*Medium*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
54	LESLIE PARK ROAD, LEBANON ROAD-ADDISCOMBE COURT ROA	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
55	LESLIE PARK ROAD, A222 LOWER ADDISCOMBE ROAD-ADDISCO	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
56	A213 WINDMILL ROAD, A222 ST JAMES'S-ST JAMES'S PARK	*High*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
57	A213 WINDMILL ROAD, ST JAMES'S PARK-QUEENS ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
58	A213 WINDMILL ROAD, QUEENS ROAD-A212 WHITEHORSE RO/	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
59	A212 WHITEHORSE ROAD, A213 WINDMILL ROAD-UNION ROAI	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
60	HOGARTH CRESCENT, A222 ST JAMES'S ROAD-A212 WHITEHOR	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
61	B266 WHITEHORSE LANE, PARK ROAD-CANHAM ROAD	*Medium*	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
62	A212 CHURCH ROAD, A215 SOUTH NORWOOD HILL-STAMBOU	*High*	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No
63	A213 CROYDON ROAD/PENGE ROADA214 ANERLEY ROAD-SUN	*Medium*	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No
64	A213 SUNNY BANK, A213 PENGE ROAD-MANOR ROAD	*Medium*	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No
65	MANOR ROAD, A213 SUNNY BANK-A215 SOUTH NORWOOD HI	*Medium*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
66	CARMICHAEL ROAD/BIRCHANGER ROADCLIFFORD ROAD-ELBO	*High*	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
67	M23 J9, NB SLIP (SOUTH OF J9)	*Negligible*	No	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes	No	Yes
68	M23 J9, NB SLIP (NORTH OF J9)	*Negligible*	No	Yes	No	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes
69	M23 J9, SB SLIP (NORTH OF J9)	*Negligible*	No	Yes	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
70	M25 J7, EB SLIP TO M23 J8 SB	*Negligible*	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	No
71	M23 J8, SB SLIP FROM M25	*Negligible*	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
72	M23 J8, NB SLIP TO M25 EB	*Negligible*	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
73	M25 J11, NB SLIP (NORTH OF J11)	*Negligible*	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
74	M25 J11, NB SLIP (SOUTH OF J11)	*Negligible*	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
75	M25 J11, SB SLIP (SOUTH OF J11)	*Negligible*	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No

Highway Flows 2029 Airfield Construction

2029 Future Baseline

ID	Highway Link	AM1			IP			PM		
		All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	M23 SPUR, J9-SOUTH TERMINAL ROUNDABOUT	5789	129	2%	4648	194	4%	4764	73	2%
2	A23 AIRPORT WAY,	4546	162	4%	3840	244	6%	4266	112	3%
3	A23 LONDON ROAD, NORTH TERMINAL-LONGBRIDGE ROUNDABOUT	3928	146	4%	3597	206	6%	4296	101	2%
4	NORTH TERMINAL ENTRY/EXIT	2441	32	1%	2318	54	2%	2191	26	1%
5	LONGBRIDGE WAY	824	108	13%	817	144	18%	847	58	7%
6	NORTHGATE ROAD	616	74	12%	598	143	24%	560	41	7%
7	PERIMETER ROAD NORTH, LONGBRIDGE WAY	1124	179	16%	1150	248	22%	847	76	9%
8	GATWICK WAY	461	32	7%	399	39	10%	324	16	5%
9	PERIMETER ROAD NORTH, SOUTH TERMINAL-NORTH TERMINAL	1044	134	13%	972	194	20%	884	69	8%
10	SOUTH TERMINAL ENTRY/EXIT	2836	14	0%	2398	45	2%	2324	26	1%
11	A23 LONDON ROAD, BEEHIVE RING ROAD-SOUTH TERMINAL	3431	223	6%	3542	314	9%	3802	165	4%
12	A23 LONDON ROAD, BEEHIVE RING ROAD-A23 LONDON ROAD	3348	203	6%	3527	295	8%	3831	161	4%
13	PERIMETER ROAD SOUTH, AT GATWICK ROAD ROUNDABOUT	821	77	9%	893	151	17%	802	56	7%
14	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-CHARLWOOD ROAD/CHURCH ROAD	739	31	4%	606	24	4%	682	9	1%
15	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-PERIMETER ROAD SOUTH	314	16	5%	225	16	7%	286	13	5%
16	LOWFIELD HEATH ROAD, CHARLWOOD ROAD-HORLEY ROAD/THE STREET	718	54	8%	562	56	10%	712	40	6%
17	RADFORD ROAD, GATWICK ROAD-STEERS LANE	889	38	4%	594	23	4%	990	17	2%
18	B2036 BALCOMBE ROAD, A2011 CRAWLEY AVENUE-STEERS LANE	1244	36	3%	1014	45	4%	1536	30	2%
19	B2036 BALCOME ROAD, STEERS LANE-RADFORD ROAD	850	21	2%	693	37	5%	1072	28	3%
20	B2036 BALCOMBE ROAD, RADFORD ROAD-B2037 ANTLANDS LANE	1440	38	3%	1119	51	5%	1807	36	2%
21	B2036 BALCOMBE ROAD, B2037 ANTLANDS LANE-VICTORIA ROAD	1219	23	2%	1132	33	3%	1654	27	2%
22	GATWICK ROAD, FLEMING WAY-RUTHERFORD WAY	1459	90	6%	1293	92	7%	1677	67	4%
23	B2037 ANTLANDS LANE, B2036 BALCOME ROAD-SHIPLEY BRIDGE LANE	1281	29	2%	1122	23	2%	1354	18	1%
24	B2037 ANTLANDS LANE, SHIPLEY BRIDGE LANE-COPTHORNE BANK/REDEHALL ROAD	973	21	2%	890	17	2%	965	14	1%
25	WOODCOTE SIDE, WOODCOTE GREEN ROAD-A24 DORKING ROAD	298	9	3%	145	9	6%	305	8	3%
26	WOODCOTE GREEN ROAD, WOODCOTE SIDE ROAD-WOODCOTE HURST	104	15	14%	14	14	100%	128	14	11%
27	WOODCOTE GREEN ROAD, WOODCOTE HURST-AVENUE ROAD	384	21	5%	311	19	6%	497	16	3%
28	B386 LONGCROSS ROAD/HOLLOWAY HILL/CHERTSEY ROAD, A230 GUILDFORD ROAD-B383 WINDSOR ROAD	978	206	21%	674	249	37%	748	141	19%
29	A320 GUILDFORD ROAD, HOLLOWAY HILL-HILLWOOD DRIVE/BITTAMS LANE	1779	218	12%	1739	271	16%	1996	153	8%
30	A320 GUILDFORD ROAD, HILLSWOOD DRIVE/BITTAMS LANE-A320 SAINT PETERS WAY	2343	224	10%	2184	274	13%	2593	153	6%
31	A320 SAINT PETERS WAY, A320 GUILDFORD ROAD-M25 J11	3591	330	9%	3195	375	12%	3521	163	5%
32	BEDDINGTON FARM ROAD/ MARLOWE WAY, B272 BEDDINGTON LANE-BEDDINGTON FARM ROAD	390	13	3%	301	11	4%	362	11	3%
33	BEDDINGTON FARM ROAD/ MARLOWE WAY, A23 PURLEY WAY-BEDDINGTON FARM ROAD	382	5	1%	294	4	1%	355	3	1%
34	WADDON NEW ROAD/CAIRO NEW ROAD, RECTORY GROVE-REEVES CORNER	152	33	22%	63	31	49%	75	31	41%
35	REEVES CORNER, REEVES CORNER-CAIRO NEW ROAD	130	33	25%	41	30	73%	40	30	75%
36	REEVES CORNER, REEVES CORNER-CHURCH ROAD	568	45	8%	292	38	13%	398	33	8%
37	CHURCH STREET/DRUMMOND ROAD, CHURCH STREET/REEVES CORNER-FIRTH ROAD	568	45	8%	292	38	13%	398	33	8%
38	FIRTH ROAD, DRUMMOND STREET-TAMWORTH ROAD	568	45	8%	292	38	13%	398	33	8%
39	LONDON ROAD, DERBY ROAD-MEAD PLACE/OAKFIELD ROAD	262	104	40%	195	103	53%	111	101	91%
40	LONDON ROAD, DERBY ROAD-STATION ROAD	714	112	16%	676	114	17%	764	108	14%
41	POPLAR WALK/NORTH END, STATION ROAD-ST MICHAELS ROAD	50	50	100%	238	52	22%	229	51	22%
42	POPLAR WALK, ST MICHAELS ROAD-A212 WELLESLEY ROAD	70	70	100%	257	71	28%	248	70	28%
43	A212 WELLESLEY ROAD, POPLAR WALK-STATION ROAD	3287	232	7%	1730	214	12%	2594	200	8%
44	A212 WELLESLEY ROAD, POPLAR WALK-SYDENHAM ROAD	2253	276	12%	1287	267	21%	1857	261	14%
45	A212 LOWER COMBE STREET, SOUTH END-236 SOUTHBRIDGE ROAD	916	32	3%	951	45	5%	872	13	1%
46	A235 SOUTH END, A235 BRIGHTON ROAD/B275 WARHAM ROAD-ABERDEEN ROAD	1904	170	9%	1588	180	11%	1869	142	8%
47	A235 BRIGHTON ROAD, A235 SOUTH END/B275 WARHAM ROAD-BARTLETT STREET	2295	135	6%	1603	140	9%	1766	101	6%
48	A235 BRIGHTON ROAD, BARTLETT STREET-BARTLETT STREET	1919	113	6%	1304	119	9%	1436	81	6%
49	A235 BRIGHTON ROAD, BARTLETT STREET-UPLAND ROAD	2205	124	6%	1560	131	8%	1722	85	5%
50	A235 BRIGHTON ROAD, UPLAND ROAD-HALING PARK ROAD	2291	129	6%	1884	142	8%	1973	91	5%
51	B275 ST PETERS ROAD, ABERDEEN ROAD/TEMPLE ROAD-BLUNT ROAD	732	20	3%	242	15	6%	672	18	3%
52	B275 ST PETERS ROAD, A235 SOUTH END/B234 CROHAM ROAD	951	26	3%	424	20	5%	863	20	2%
53	A232 FAIRFIELD ROAD, B243 PARK HILL ROAD-A222 ADDISCOMBE GROVE	1790	24	1%	1587	39	2%	1622	9	1%
54	LESLIE PARK ROAD, LEBANON ROAD-ADDISCOMBE COURT ROAD	872	14	2%	515	8	2%	798	8	1%
55	LESLIE PARK ROAD, A222 LOWER ADDISCOMBE ROAD-ADDISCOMBE COURT ROAD	872	14	2%	515	8	2%	798	8	1%
56	A213 WINDMILL ROAD, A222 ST JAMES'S-ST JAMES'S PARK	913	12	1%	589	30	5%	729	10	1%
57	A213 WINDMILL ROAD, ST JAMES'S PARK-QUEENS ROAD	1386	21	2%	898	38	4%	1178	12	1%
58	A213 WINDMILL ROAD, QUEENS ROAD-A212 WHITEHORSE ROAD	1157	30	3%	777	47	6%	972	25	3%
59	A212 WHITEHORSE ROAD, A213 WINDMILL ROAD-UNION ROAD	823	98	12%	1051	104	10%	962	87	9%
60	HOGARTH CRESCENT, A222 ST JAMES'S ROAD-A212 WHITEHORSE ROAD	1410	62	4%	1114	68	6%	1456	48	3%
61	B266 WHITEHORSE LANE, PARK ROAD-CANHAM ROAD	983	49	5%	972	44	5%	925	35	4%
62	A212 CHURCH ROAD, A215 SOUTH NORWOOD HILL-STAMBOURNE WOODLAND WALK	1018	26	3%	646	13	2%	894	7	1%
63	A213 CROYDON ROAD/PENGE ROADA214 ANERLEY ROAD-SUNNY BANK	1433	40	3%	1347	45	3%	1681	20	1%
64	A213 SUNNY BANK, A213 PENGE ROAD-MANOR ROAD	917	29	3%	802	31	4%	896	23	3%
65	MANOR ROAD, A213 SUNNY BANK-A215 SOUTH NORWOOD HILL	712	26	4%	658	30	5%	698	22	3%
66	CARMICHAEL ROAD/BIRCHANGER ROADCLIFFORD ROAD-ELBOROUGH ROAD	436	9	2%	393	10	3%	541	4	1%
67	M23 J9, NB SLIP (SOUTH OF J9)	1300	11	1%	785	34	4%	726	15	2%
68	M23 J9, NB SLIP (NORTH OF J9)	1598	24	2%	1627	62	4%	1983	17	1%
69	M23 J9, SB SLIP (NORTH OF J9)	2324	79	3%	1666	70	4%	1418	38	3%
70	M25 J7, EB SLIP TO M23 J8 SB	1198	0	0%	1340	2	0%	1745	15	1%
71	M23 J8, SB SLIP FROM M25	3244	98	3%	2598	138	5%	3172	59	2%
72	M23 J8, NB SLIP TO M25 EB	2694	41	2%	2222	107	5%	2531	23	1%
73	M25 J11, NB SLIP (NORTH OF J11)	1294	83	6%	1268	105	8%	1277	4	0%
74	M25 J11, NB SLIP (SOUTH OF J11)	878	104	12%	853	144	17%	1356	112	8%
75	M25 J11, SB SLIP (SOUTH OF J11)	1224	111	9%	998	119	12%	1181	43	4%

2029 Future Baseline + Airfield Construction

ID	AM1			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	5793	190	3%	4628	256	6%	4780	136	3%
2	4526	224	5%	3807	306	8%	4277	175	4%
3	4021	272	7%	3601	326	9%	4345	226	5%
4	2430	32	1%	2312	53	2%	2190	26	1%
5	828	108	13%	857	143	17%	896	58	6%
6	616	73	12%	643	144	22%	616	41	7%
7	1122	178	16%	1149	248	22%	846	76	9%
8	463	32	7%	358	39	11%	379	16	4%
9	1047	134	13%	975	194	20%	892	69	8%
10	2834	14	0%	2398	45	2%	2322	26	1%
11	3523	287	8%	3565	374	10%	3834	227	6%
12	3440	268	8%	3549	354	10%	3863	224	6%
13	906	79	9%	888	148	17%	801	56	7%
14	749	30	4%	606	24	4%	678	9	1%
15	378	14	4%	230	20	9%	286	13	5%
16	746	51	7%	575	60	10%	730	40	5%
17	883	37	4%	599	24	4%	989	17	2%
18	1274	37	3%	1028	45	4%	1554	30	2%
19	869	21	2%	704	37	5%	1088	28	3%
20	1442	38	3%	1131	52	5%	1821	36	2%
21	1236	24	2%	1145	33	3%	1674	26	2%
22	1466	90	6%	1295	92	7%	1673	67	4%
23	1276	28	2%	1123	24	2%	1346	18	1%
24	953	20	2%	890	18	2%	954	14	1%
25	296	9	3%	145	9	6%	299	8	3%
26	101	15	15%	14	14	100%	120	14	12%
27	384	21	5%	311	19	6%	490	16	3%
28	978	208	21%	677	253	37%	746	140	19%
29	1776	220	12%	1737	274	16%	2000	151	8%
30	2340	226	10%	2182	277	13%	2598	152	6%
31	3583	331	9%	3196	378	12%	3517	161	5%
32	396	13	3%	303	11	4%	367	11	3%
33	388	6	2%	296	4	1%	359	3	1%
34	153	33	22%	63	31	49%	74	31	42%
35	131	33	25%	41	30	73%	40	30	75%
36	577	45	8%	292	38	13%	398	33	8%
37	577	45	8%	292	38	13%	398	33	8%
38	577	45	8%	292	38	13%	398	33	8%
39	254	104	41%	196	103	53%	108	101	94%
40	727	112	15%	680	114	17%	763	108	14%
41	50	50	100%	238	52	22%	230	51	22%
42	70	70	100%	258	71	28%	249	70	28%
43	3245	230	7%	1726	214	12%	2602	201	8%
44	2250	276	12%	1284	267	21%	1871	262	14%
45	785	25	3%	954	44	5%	869	13	1%
46	1896	166	9%	1586	180	11%	1878	142	8%
47	2323	139	6%	1597	139	9%	1767	101	6%
48	1938	117	6%	1296	118	9%	1445	82	6%
49	2221	128	6%	1550	130	8%	1729	85	5%
50	2310	129	6%	1878	141	8%	1993	92	5%
51	855	27	3%	237	15	6%	673	18	3%
52	1077	32	3%	420	20	5%	859	20	2%
53	1975	32	2%	1597	39	2%	1626	9	1%
54	901	14	2%	509	8	2%	812	8	1%
55	901	14	2%	509	8	2%	812	8	1%
56	946	13	1%	594	30	5%	736	8	1%
57	1403	23	2%	911	39	4%	1199	10	1%
58	1155	32	3%	775	47	6%	987	24	2%
59	868	96	11%	1040	104	10%	967	89	9%
60	1454	63	4%	1110	68	6%	1456	49	3%
61	963	48	5%	965	43	4%	968	35	4%
62	1012	26	3%	647	13	2%	900	7	1%
63	1430	39	3%	1346	44	3%	1657	19	1%
64	921	29	3%	799	30	4%	869	22	3%
65	712	26	4%	654	29	4%	672	21	3%
66	439	9	2%	385	10	3%	521	4	1%
67	1260	16	1%	777	39	5%	716	21	3%
68	1617	49	3%	1644	87	5%	2002	42	2%
69	2346	105	4%	1642	95	6%	1432	63	4%
70	1192	16	1%	1320	17	1%	1731	27	2%
71	3261	121	4%	2587	160	6%	3166	84	3%
72	2710	56	2%	2234	123	6%	2534	39	2%
73	1290	83	6%	1269	105	8%	1267	4	0%
74	875	105	12%	853	146	17%	1347	110	8%
75	1223	113	9%	998	121	12%	1188	43	4%

Net Change

ID	AM1			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	4	61	1%	-20	62	1%	16	63	1%
2	-20	62	1%	-33	62	2%	11	63	1%
3	93	126	3%	4	120	3%	49	125	3%
4	-11	0	0%	-6	-1	0%	-1	0	0%
5	4	0	0%	40	-1	-1%	49	0	0%
6	0	-1	0%	45	1	-2%	56	0	-1%
7	-2	-1	0%	-1	0	0%	-1	0	0%
8	2	0	0%	-41	0	1%	55	0	-1%
9	3	0	0%	3	0	0%	8	0	0%
10	-2	0	0%	0	0	0%	-2	0	0%
11	92	64	2%	23	60	2%	32	62	2%
12	92	65	2%	22	59	2%	32	63	2%
13	85	2	-1%	-5	-3	0%	-1	0	0%
14	10	-1	0%	0	0	0%	-4	0	0%
15	64	-2	-1%	5	4	2%	0	0	0%
16	28	-3	-1%	13	4	0%	18	0	0%
17	-6	-1	0%	5	1	0%	-1	0	0%
18	30	1	0%	14	0	0%	18	0	0%
19	19	0	0%	11	0	0%	16	0	0%
20	2	0	0%	12	1	0%	14	0	0%
21	17	1	0%	13	0	0%	20	-1	0%
22	7	0	0%	2	0	0%	-4	0	0%
23	-5	-1	0%	1	1	0%	-8	0	0%
24	-20	-1	0%	0	1	0%	-11	0	0%
25	-2	0	0%	0	0	0%	-6	0	0%
26	-3	0	0%	0	0	0%	-8	0	1%
27	0	0	0%	0	0	0%	-7	0	0%
28	0	2	0%	3	4	0%	-2	-1	0%
29	-3	2	0%	-2	3	0%	4	-2	0%
30	-3	2	0%	-2	3	0%	5	-1	0%
31	-8	1	0%	1	3	0%	-4	-2	0%
32	6	0	0%	2	0	0%	5	0	0%
33	6	1	0%	2	0	0%	4	0	0%
34	1	0	0%	0	0	0%	-1	0	1%
35	1	0	0%	0	0	0%	0	0	0%
36	9	0	0%	0	0	0%	0	0	0%
37	9	0	0%	0	0	0%	0	0	0%
38	9	0	0%	0	0	0%	0	0	0%
39	-8	0	1%	1	0	0%	-3	0	3%
40	13	0	0%	4	0	0%	-1	0	0%
41	0	0	0%	0	0	0%	1	0	0%
42	0	0	0%	1	0	0%	1	0	0%
43	-42	-2	0%	-4	0	0%	8	1	0%
44	-3	0	0%	-3	0	0%	14	1	0%
45	-131	-7	0%	3	-1	0%	-3	0	0%
46	-8	-4	0%	-2	0	0%	9	0	0%
47	28	4	0%	-6	-1	0%	1	0	0%
48	19	4	0%	-8	-1	0%	9	1	0%
49	16	4	0%	-10	-1	0%	7	0	0%
50	19	0	0%	-6	-1	0%	20	1	0%
51	123	7	0%	-5	0	0%	1	0	0%
52	126	6	0%	-4	0	0%	-4	0	0%
53	185	8	0%	10	0	0%	4	0	0%
54	29	0	0%	-6	0	0%	14	0	0%
55	29	0	0%	-6	0	0%	14	0	0%
56	33	1	0%	5	0	0%	7	-2	0%
57	17	2	0%	13	1	0%	21	-2	0%
58	-2	2	0%	-2	0	0%	15	-1	0%
59	45	-2	-1%	-11	0	0%	5	2	0%
60	44	1	0%	-4	0	0%	0	1	0%
61	-20	-1	0%	-7	-1	0%	43	0	0%
62	-6	0	0%	1	0	0%	6	0	0%
63	-3	-1	0%	-1	-1	0%	-24	-1	0%
64	4	0	0%	-3	-1	0%	-27	-1	0%
65	0	0	0%	-4	-1	0%	-26	-1	0%
66	3	0	0%	-8	0	0%	-20	0	0%
67	-40	5	0%	-8	5	1%	-10	6	1%
68	19	25	2%	17	25	1%	19	25	1%
69	22	26	1%	-24	25	2%	14	25	2%
70	-6	16	1%	-20	15	1%	-14	12	1%
71	17	23	1%	-11	22	1%	-6	25	1%
72	16	15	1%	12	16	1%	3	16	1%
73	-4	0	0%	1	0	0%	-10	0	0%
74	-3	1	0%	0	2	0%	-9	-2	0%
75	-1	2	0%	0	2	0%	7	0	0%

% Change

ID	AM1			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	0%	47%	1%	0%	32%	1%	0%	86%	1%
2	0%	38%	1%	-1%	25%	2%	0%	56%	1%
3	2%	86%	3%	0%	58%	3%	1%	124%	3%
4	0%	0%	0%	0%	-2%	0%	0%	0%	0%
5	0%	0%	0%	5%	-1%	-1%	6%	0%	0%
6	0%	-1%	0%	8%	1%	-2%	10%	0%	-1%
7	0%	-1%	0%	0%	0%	0%	0%	0%	0%
8	0%	0%	0%	-10%	0%	1%	17%	0%	-1%
9	0%	0%	0%	0%	0%	0%	1%	0%	0%
10	0%	0%	0%	0%	0%	0%	0%	0%	0%
11	3%	29%	2%	1%	19%	2%	1%	38%	2%
12	3%	32%	2%	1%	20%	2%	1%	39%	2%
13	10%	3%	-1%	-1%	-2%	0%	0%	0%	0%
14	1%	-3%	0%	0%	0%	0%	-1%	0%	0%
15	20%	-13%	-1%	2%	25%	2%	0%	0%	0%
16	4%	-6%	-1%	2%	7%	0%	3%	0%	0%
17	-1%	-3%	0%	1%	4%	0%	0%	0%	0%
18	2%	3%	0%	1%	0%	0%	1%	0%	0%
19	2%	0%	0%	2%	0%	0%	1%	0%	0%
20	0%	0%	0%	1%	2%	0%	1%	0%	0%
21	1%	4%	0%	1%	0%	0%	1%	-4%	0%
22	0%	0%	0%	0%	0%	0%	0%	0%	0%
23	0%	-3%	0%	0%	4%	0%	-1%	0%	0%
24	-2%	-5%	0%	0%	6%	0%	-1%	0%	0%
25	-1%	0%	0%	0%	0%	0%	-2%	0%	0%
26	-3%	0%	0%	0%	0%	0%	-6%	0%	1%
27	0%	0%	0%	0%	0%	0%	-1%	0%	0%
28	0%	1%	0%	0%	2%	0%	0%	-1%	0%
29	0%	1%	0%	0%	1%	0%	0%	-1%	0%
30	0%	1%	0%	0%	1%	0%	0%	-1%	0%
31	0%	0%	0%	0%	1%	0%	0%	-1%	0%
32	2%	0%	0%	1%	0%	0%	1%	0%	0%
33	2%	20%	0%	1%	0%	0%	1%	0%	0%
34	1%	0%	0%	0%	0%	0%	-1%	0%	1%
35	1%	0%	0%	0%	0%	0%	0%	0%	0%
36	2%	0%	0%	0%	0%	0%	0%	0%	0%
37	2%	0%	0%	0%	0%	0%	0%	0%	0%
38	2%	0%	0%	0%	0%	0%	0%	0%	0%
39	-3%	0%	1%	1%	0%	0%	-3%	0%	3%
40	2%	0%	0%	1%	0%	0%	0%	0%	0%
41	0%	0%	0%	0%	0%	0%	0%	0%	0%
42	0%	0%	0%	0%	0%	0%	0%	0%	0%
43	-1%	-1%	0%	0%	0%	0%	0%	0%	0%
44	0%	0%	0%	0%	0%	0%	1%	0%	0%
45	-14%	-22%	0%	0%	-2%	0%	0%	0%	0%
46	0%	-2%	0%	0%	0%	0%	0%	0%	0%
47	1%	3%	0%	0%	-1%	0%	0%	0%	0%
48	1%	4%	0%	-1%	-1%	0%	1%	1%	0%
49	1%	3%	0%	-1%	-1%	0%	0%	0%	0%
50	1%	0%	0%	0%	-1%	0%	1%	1%	0%
51	17%	35%	0%	-2%	0%	0%	0%	0%	0%
52	13%	23%	0%	-1%	0%	0%	0%	0%	0%
53	10%	33%	0%	1%	0%	0%	0%	0%	0%
54	3%	0%	0%	-1%	0%	0%	2%	0%	0%
55	3%	0%	0%	-1%	0%	0%	2%	0%	0%
56	4%	8%	0%	1%	0%	0%	1%	-20%	0%
57	1%	10%	0%	1%	3%	0%	2%	-17%	0%
58	0%	7%	0%	0%	0%	0%	2%	-4%	0%
59	5%	-2%	-1%	-1%	0%	0%	1%	2%	0%
60	3%	2%	0%	0%	0%	0%	0%	2%	0%
61	-2%	-2%	0%	-1%	-2%	0%	5%	0%	0%
62	-1%	0%	0%	0%	0%	0%	1%	0%	0%
63	0%	-3%	0%	0%	-2%	0%	-1%	-5%	0%
64	0%	0%	0%	0%	-3%	0%	-3%	-4%	0%
65	0%	0%	0%	-1%	-3%	0%	-4%	-5%	0%
66	1%	0%	0%	-2%	0%	0%	-4%	0%	0%
67	-3%	45%	0%	-1%	15%	1%	-1%	40%	1%
68	1%	104%	2%	1%	40%	1%	1%	147%	1%
69	1%	33%	1%	-1%	36%	2%	1%	66%	2%
70	-1%	0%	1%	-1%	750%	1%	-1%	80%	1%
71	1%	23%	1%	0%	16%	1%	0%	42%	1%
72	1%	37%	1%	1%	15%	1%	0%	70%	1%
73	0%	0%	0%	0%	0%	0%	-1%	0%	0%
74	0%	1%	0%	0%	1%	0%	-1%	-2%	0%
75	0%	2%	0%	0%	2%	0%	1%	0%	0%

Highway Flows 2029

2029 Future Baseline

ID	Highway Link	AM1			AM2			IP			PM		
		All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	M23 SPUR, J9-SOUTH TERMINAL ROUNDABOUT	5789	129	2%	5516	155	3%	4648	194	4%	4764	73	2%
2	A23 AIRPORT WAY,	4546	162	4%	4306	184	4%	3840	244	6%	4266	112	3%
3	A23 LONDON ROAD, NORTH TERMINAL-LONGBRIDGE ROUNDABOUT	3928	146	4%	4124	163	4%	3597	206	6%	4296	101	2%
4	NORTH TERMINAL ENTRY/EXIT	2441	32	1%	2463	57	2%	2318	54	2%	2191	26	1%
5	LONGBRIDGE WAY	824	108	13%	848	95	11%	817	144	18%	847	58	7%
6	NORTHGATE ROAD	616	74	12%	570	71	12%	598	143	24%	560	41	7%
7	PERIMETER ROAD NORTH, LONGBRIDGE WAY	1124	179	16%	947	151	16%	1150	248	22%	847	76	9%
8	GATWICK WAY	461	32	7%	407	42	10%	399	39	10%	324	16	5%
9	PERIMETER ROAD NORTH, SOUTH TERMINAL-NORTH TERMINAL	1044	134	13%	1002	150	15%	972	194	20%	884	69	8%
10	SOUTH TERMINAL ENTRY/EXIT	2836	14	0%	2847	23	1%	2398	45	2%	2324	26	1%
11	A23 LONDON ROAD, BEEHIVE RING ROAD-SOUTH TERMINAL	3431	223	6%	3792	269	7%	3542	314	9%	3802	165	4%
12	A23 LONDON ROAD, BEEHIVE RING ROAD-A23 LONDON ROAD	3348	203	6%	3707	221	6%	3527	295	8%	3831	161	4%
13	PERIMETER ROAD SOUTH, AT GATWICK ROAD ROUNDABOUT	821	77	9%	813	118	15%	893	151	17%	802	56	7%
14	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-CHARLWOOD ROAD/CHURCH ROAD	739	31	4%	810	35	4%	606	24	4%	682	9	1%
15	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-PERIMETER ROAD SOUTH	314	16	5%	294	18	6%	225	16	7%	286	13	5%
16	LOWFIELD HEATH ROAD, CHARLWOOD ROAD-HORLEY ROAD/THE STREET	718	54	8%	805	51	6%	562	56	10%	712	40	6%
17	RADFORD ROAD, GATWICK ROAD-STEERS LANE	889	38	4%	902	35	4%	594	23	4%	990	17	2%
18	B2036 BALCOMBE ROAD, A2011 CRAWLEY AVENUE-STEERS LANE	1244	36	3%	1400	41	3%	1014	45	4%	1536	30	2%
19	B2036 BALCOME ROAD, STEERS LANE-RADFORD ROAD	850	21	2%	892	27	3%	693	37	5%	1072	28	3%
20	B2036 BALCOMBE ROAD, RADFORD ROAD-B2037 ANTLANDS LANE	1440	38	3%	1433	44	3%	1119	51	5%	1807	36	2%
21	B2036 BALCOMBE ROAD, B2037 ANTLANDS LANE-VICTORIA ROAD	1219	23	2%	1308	26	2%	1132	33	3%	1654	27	2%
22	GATWICK ROAD, FLEMING WAY-RUTHERFORD WAY	1459	90	6%	1690	88	5%	1293	92	7%	1677	67	4%
23	B2037 ANTLANDS LANE, B2036 BALCOME ROAD-SHIPLEY BRIDGE LANE	1281	29	2%	1122	23	2%	1122	23	2%	1354	18	1%
24	B2037 ANTLANDS LANE, SHIPLEY BRIDGE LANE-COPTHORNE BANK/REDEHALL ROAD	973	21	2%	772	17	2%	890	17	2%	965	14	1%
25	WOODCOTE SIDE, WOODCOTE GREEN ROAD-A24 DORKING ROAD	298	9	3%	575	10	2%	145	9	6%	305	8	3%
26	WOODCOTE GREEN ROAD, WOODCOTE SIDE ROAD-WOODCOTE HURST	104	15	14%	378	14	4%	14	14	100%	128	14	11%
27	WOODCOTE GREEN ROAD, WOODCOTE HURST-AVENUE ROAD	384	21	5%	506	18	4%	311	19	6%	497	16	3%
28	B386 LONGCROSS ROAD/HOLLOWAY HILL/CHERTSEY ROAD, A230 GUILDFORD ROAD-B383 WINDSOR ROAD	978	206	21%	1042	172	17%	674	249	37%	748	141	19%
29	A320 GUILDFORD ROAD, HOLLOWAY HILL-HILLWOOD DRIVE/BITTAMS LANE	1779	218	12%	1879	191	10%	1739	271	16%	1996	153	8%
30	A320 GUILDFORD ROAD, HILLSWOOD DRIVE/BITTAMS LANE-A320 SAINT PETERS WAY	2343	224	10%	2452	195	8%	2184	274	13%	2593	153	6%
31	A320 SAINT PETERS WAY, A320 GUILDFORD ROAD-M25 J11	3591	330	9%	3530	285	8%	3195	375	12%	3521	163	5%
32	BEDDINGTON FARM ROAD/ MARLOWE WAY, B272 BEDDINGTON LANE-BEDDINGTON FARM ROAD	390	13	3%	407	13	3%	301	11	4%	362	11	3%
33	BEDDINGTON FARM ROAD/ MARLOWE WAY, A23 PURLEY WAY-BEDDINGTON FARM ROAD	382	5	1%	400	6	2%	294	4	1%	355	3	1%
34	WADDON NEW ROAD/CAIRO NEW ROAD, RECTORY GROVE-REEVES CORNER	152	33	22%	131	33	25%	63	31	49%	75	31	41%
35	REEVES CORNER, REEVES CORNER-CAIRO NEW ROAD	130	33	25%	110	32	29%	41	30	73%	40	30	75%
36	REEVES CORNER, REEVES CORNER-CHURCH ROAD	568	45	8%	539	44	8%	292	38	13%	398	33	8%
37	CHURCH STREET/DRUMMOND ROAD, CHURCH STREET/REEVES CORNER-FIRTH ROAD	568	45	8%	539	44	8%	292	38	13%	398	33	8%
38	FIRTH ROAD, DRUMMOND STREET-TAMWORTH ROAD	568	45	8%	539	44	8%	292	38	13%	398	33	8%
39	LONDON ROAD, DERBY ROAD-MEAD PLACE/OAKFIELD ROAD	262	104	40%	214	104	49%	195	103	53%	111	101	91%
40	LONDON ROAD, DERBY ROAD-STATION ROAD	714	112	16%	675	112	17%	676	114	17%	764	108	14%
41	POPLAR WALK/NORTH END, STATION ROAD-ST MICHAELS ROAD	50	50	100%	50	50	100%	238	52	22%	229	51	22%
42	POPLAR WALK, ST MICHAELS ROAD-A212 WELLESLEY ROAD	70	70	100%	70	70	100%	257	71	28%	248	70	28%
43	A212 WELLESLEY ROAD, POPLAR WALK-STATION ROAD	3287	232	7%	2640	213	8%	1730	214	12%	2594	200	8%
44	A212 WELLESLEY ROAD, POPLAR WALK-SYDENHAM ROAD	2253	276	12%	1805	264	15%	1287	267	21%	1857	261	14%
45	A212 LOWER COMBE STREET, SOUTH END-236 SOUTHBRIDGE ROAD	916	32	3%	912	30	3%	951	45	5%	872	13	1%
46	A235 SOUTH END, A235 BRIGHTON ROAD/B275 WARHAM ROAD-ABERDEEN ROAD	1904	170	9%	1899	166	9%	1588	180	11%	1869	142	8%
47	A235 BRIGHTON ROAD, A235 SOUTH END/B275 WARHAM ROAD-BARTLETT STREET	2295	135	6%	2255	127	6%	1603	140	9%	1766	101	6%
48	A235 BRIGHTON ROAD, BARTLETT STREET-BARTLETT STREET	1919	113	6%	1856	105	6%	1304	119	9%	1436	81	6%
49	A235 BRIGHTON ROAD, BARTLETT STREET-UPLAND ROAD	2205	124	6%	2140	116	5%	1560	131	8%	1722	85	5%
50	A235 BRIGHTON ROAD, UPLAND ROAD-HALING PARK ROAD	2291	129	6%	2269	125	6%	1884	142	8%	1973	91	5%
51	B275 ST PETERS ROAD, ABERDEEN ROAD/TEMPLE ROAD-BLUNT ROAD	732	20	3%	635	21	3%	242	15	6%	672	18	3%
52	B275 ST PETERS ROAD, A235 SOUTH END/B234 CROHAM ROAD	951	26	3%	850	26	3%	424	20	5%	863	20	2%
53	A232 FAIRFIELD ROAD, B243 PARK HILL ROAD-A222 ADDISCOMBE GROVE	1790	24	1%	1873	23	1%	1587	39	2%	1622	9	1%
54	LESLIE PARK ROAD, LEBANON ROAD-ADDISCOMBE COURT ROAD	872	14	2%	823	12	1%	515	8	2%	798	8	1%
55	LESLIE PARK ROAD, A222 LOWER ADDISCOMBE ROAD-ADDISCOMBE COURT ROAD	872	14	2%	823	12	1%	515	8	2%	798	8	1%
56	A213 WINDMILL ROAD, A222 ST JAMES'S-ST JAMES'S PARK	913	12	1%	781	12	2%	589	30	5%	729	10	1%
57	A213 WINDMILL ROAD, ST JAMES'S PARK-QUEENS ROAD	1386	21	2%	1225	17	1%	898	38	4%	1178	12	1%
58	A213 WINDMILL ROAD, QUEENS ROAD-A212 WHITEHORSE ROAD	1157	30	3%	980	28	3%	777	47	6%	972	25	3%
59	A212 WHITEHORSE ROAD, A213 WINDMILL ROAD-UNION ROAD	823	98	12%	961	90	9%	1051	104	10%	962	87	9%
60	HOGARTH CRESCENT, A222 ST JAMES'S ROAD-A212 WHITEHORSE ROAD	1410	62	4%	1375	57	4%	1114	68	6%	1456	48	3%
61	B266 WHITEHORSE LANE, PARK ROAD-CANHAM ROAD	983	49	5%	918	46	5%	972	44	5%	925	35	4%
62	A212 CHURCH ROAD, A215 SOUTH NORWOOD HILL-STAMBOURNE WOODLAND WALK	1018	26	3%	837	16	2%	646	13	2%	894	7	1%
63	A213 CROYDON ROAD/PENGE ROADA214 ANERLEY ROAD-SUNNY BANK	1433	40	3%	1428	34	2%	1347	45	3%	1681	20	1%
64	A213 SUNNY BANK, A213 PENGE ROAD-MANOR ROAD	917	29	3%	840	25	3%	802	31	4%	896	23	3%
65	MANOR ROAD, A213 SUNNY BANK-A215 SOUTH NORWOOD HILL	712	26	4%	670	23	3%	658	30	5%	698	22	3%
66	CARMICHAEL ROAD/BIRCHANGER ROADCLIFFORD ROAD-ELBOROUGH ROAD	436	9	2%	354	7	2%	393	10	3%	541	4	1%
67	M23 J9, NB SLIP (SOUTH OF J9)	1300	11	1%	1142	18	2%	785	34	4%	726	15	2%
68	M23 J9, NB SLIP (NORTH OF J9)	1598	24	2%	1691	30	2%	1627	62	4%	1983	17	1%
69	M23 J9, SB SLIP (NORTH OF J9)	2324	79	3%	2123	84	4%	1666	70	4%	1418	38	3%
70	M25 J7, EB SLIP TO M23 J8 SB	1198	0	0%	1137	0	0%	1340	2	0%	1745	15	1%
71	M23 J8, SB SLIP FROM M25	3244	98	3%	3165	74	2%	2598	138	5%	3172	59	2%
72	M23 J8, NB SLIP TO M25 EB	2694	41	2%	2420	59	2%	2222	107	5%	2531	23	1%
73	M25 J11, NB SLIP (NORTH OF J11)	1294	83	6%	1307	145	11%	1268	105	8%	1277	4	0%
74	M25 J11, NB SLIP (SOUTH OF J11)	878	104	12%	1090	166	15%	853	144	17%	1356	112	8%
75	M25 J11, SB SLIP (SOUTH OF J11)	1224	111	9%	1243	93	7%	998	119	12%	1181	43	4%

2029 Future Baseline + Project

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	5732	135	2%	5419	158	3%	4664	203	4%	4944	80	2%
2	4606	171	4%	4344	186	4%	3876	255	7%	4328	118	3%
3	3989	152	4%	4244	159	4%	3642	202	6%	4173	102	2%
4	2740	33	1%	2666	60	2%	2459	56	2%	2224	28	1%
5	791	118	15%	749	103	14%	815	157	19%	781	63	8%
6	609	82	13%	487	79	16%	595	156	26%	562	44	8%
7	1223	197	16%	1004	164	16%	1241	273	22%	888	83	9%
8	439	33	8%	438	42	10%	395	40	10%	306	16	5%
9	1006	143	14%	950	158	17%	1003	207	21%	866	72	8%
10	2786	15	1%	2713	25	1%	2401	48	2%	2213	28	1%
11	3531	236	7%	3795	276	7%	3581	320	9%	3750	168	4%
12	3434	217	6%	3699	228	6%	3569	301	8%	3782	165	4%
13	1116	87	8%	1073	125	12%	1067	156	15%	510	59	12%
14	844	31	4%	886	36	4%	697	24	3%	1134	9	1%
15	526	12	2%	509	19	4%	373	23	6%	1026	15	1%
16	740	49	7%	844	53	6%	593	63	11%	710	39	5%
17	913	38	4%	956	35	4%	645	23	4%	979	17	2%
18	1303	36	3%	1511	45	3%	1059	44	4%	1563	30	2%
19	875	21	2%	1044	31	3%	702	36	5%	1078	28	3%
20	1452	39	3%	1561	49	3%	1142	51	4%	1786	35	2%
21	1229	23	2%	1421	30	2%	1127	33	3%	1611	26	2%
22	1509	91	6%	1682	87	5%	1297	92	7%	1711	66	4%
23	1294	28	2%	1335	26	2%	1113	22	2%	1361	17	1%
24	989	21	2%	985	23	2%	878	17	2%	974	14	1%
25	298	9	3%	571	10	2%	145	9	6%	299	8	3%
26	102	15	15%	374	14	4%	14	14	100%	125	14	11%
27	382	21	5%	500	18	4%	312	19	6%	496	16	3%
28	987	211	21%	1042	179	17%	676	251	37%	747	141	19%
29	1779	223	13%	1876	198	11%	1739	272	16%	1999	153	8%
30	2339	228	10%	2435	202	8%	2184	275	13%	2596	153	6%
31	3586	335	9%	3575	291	8%	3196	376	12%	3520	163	5%
32	391	13	3%	409	13	3%	303	11	4%	368	11	3%
33	384	5	1%	402	6	1%	296	3	1%	360	3	1%
34	158	33	21%	130	33	25%	63	31	49%	76	31	41%
35	136	33	24%	108	32	30%	41	30	73%	40	30	75%
36	574	45	8%	538	44	8%	292	38	13%	396	33	8%
37	574	45	8%	538	44	8%	292	38	13%	396	33	8%
38	574	45	8%	538	44	8%	292	38	13%	396	33	8%
39	263	104	40%	213	104	49%	194	103	53%	111	101	91%
40	727	112	15%	665	112	17%	679	114	17%	764	108	14%
41	50	50	100%	50	50	100%	239	52	22%	230	51	22%
42	70	70	100%	70	70	100%	258	71	28%	249	70	28%
43	3257	230	7%	2654	212	8%	1729	213	12%	2541	200	8%
44	2238	275	12%	1797	264	15%	1286	267	21%	1841	261	14%
45	875	30	3%	929	28	3%	961	45	5%	861	13	2%
46	1956	167	9%	1898	167	9%	1583	181	11%	1863	142	8%
47	2291	135	6%	2228	128	6%	1608	140	9%	1754	101	6%
48	1925	112	6%	1843	106	6%	1307	119	9%	1419	81	6%
49	2216	124	6%	2132	117	5%	1563	131	8%	1703	85	5%
50	2312	128	6%	2271	123	5%	1887	142	8%	1953	91	5%
51	728	24	3%	660	19	3%	241	15	6%	683	18	3%
52	952	29	3%	870	24	3%	423	20	5%	872	20	2%
53	1825	25	1%	1888	25	1%	1588	39	2%	1653	9	1%
54	873	13	1%	821	12	1%	511	8	2%	811	8	1%
55	873	13	1%	821	12	1%	511	8	2%	811	8	1%
56	900	12	1%	800	12	2%	591	30	5%	724	8	1%
57	1365	21	2%	1253	17	1%	904	39	4%	1153	10	1%
58	1154	30	3%	995	28	3%	776	48	6%	953	24	3%
59	858	98	11%	906	89	10%	1057	104	10%	1020	89	9%
60	1442	63	4%	1346	57	4%	1118	68	6%	1463	49	3%
61	988	49	5%	915	45	5%	970	44	5%	908	35	4%
62	1017	27	3%	832	15	2%	643	12	2%	880	7	1%
63	1441	39	3%	1419	33	2%	1345	44	3%	1688	20	1%
64	939	30	3%	839	25	3%	800	31	4%	904	24	3%
65	726	27	4%	664	23	3%	654	29	4%	703	22	3%
66	452	9	2%	383	7	2%	401	10	2%	568	5	1%
67	1079	10	1%	907	15	2%	733	36	5%	750	16	2%
68	1678	24	1%	1727	30	2%	1673	64	4%	2049	18	1%
69	2414	86	4%	2230	90	4%	1702	75	4%	1508	40	3%
70	1238	0	0%	1174	0	0%	1345	1	0%	1740	14	1%
71	3349	101	3%	3254	79	2%	2626	142	5%	3185	60	2%
72	2735	41	1%	2430	60	2%	2236	107	5%	2570	24	1%
73	1286	83	6%	1293	132	10%	1265	105	8%	1282	4	0%
74	876	107	12%	1078	149	14%	854	145	17%	1354	111	8%
75	1233	113	9%	1248	102	8%	999	120	12%	1179	43	4%

Net Change

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	-57	6	0%	-97	3	0%	16	9	0%	180	7	0%
2	60	9	0%	38	2	0%	36	11	0%	62	6	0%
3	61	6	0%	120	-4	0%	45	-4	0%	-123	1	0%
4	299	1	0%	203	3	0%	141	2	0%	33	2	0%
5	-33	10	2%	-99	8	3%	-2	13	2%	-66	5	1%
6	-7	8	1%	-83	8	4%	-3	13	2%	2	3	1%
7	99	18	0%	57	13	0%	91	25	0%	41	7	0%
8	-22	1	1%	31	0	-1%	-4	1	0%	-18	0	0%
9	-38	9	1%	-52	8	2%	31	13	1%	-18	3	1%
10	-50	1	0%	-134	2	0%	3	3	0%	-111	2	0%
11	100	13	0%	3	7	0%	39	6	0%	-52	3	0%
12	86	14	0%	-8	7	0%	42	6	0%	-49	4	0%
13	295	10	-2%	260	7	-3%	174	5	-2%	-292	3	5%
14	105	0	-1%	76	1	0%	91	0	-1%	452	0	-1%
15	212	-4	-3%	215	1	-2%	148	7	-1%	740	2	-3%
16	22	-5	-1%	39	2	0%	31	7	1%	-2	-1	0%
17	24	0	0%	54	0	0%	51	0	0%	-11	0	0%
18	59	0	0%	111	4	0%	45	-1	0%	27	0	0%
19	25	0	0%	152	4	0%	9	-1	0%	6	0	0%
20	12	1	0%	128	5	0%	23	0	0%	-21	-1	0%
21	10	0	0%	113	4	0%	-5	0	0%	-43	-1	0%
22	50	1	0%	-8	-1	0%	4	0	0%	34	-1	0%
23	13	-1	0%	213	3	0%	-9	-1	0%	7	-1	0%
24	16	0	0%	213	6	0%	-12	0	0%	9	0	0%
25	0	0	0%	-4	0	0%	0	0	0%	-6	0	0%
26	-2	0	0%	-4	0	0%	0	0	0%	-3	0	0%
27	-2	0	0%	-6	0	0%	1	0	0%	-1	0	0%
28	9	5	0%	0	7	1%	2	2	0%	-1	0	0%
29	0	5	0%	-3	7	0%	0	1	0%	3	0	0%
30	-4	4	0%	-17	7	0%	0	1	0%	3	0	0%
31	-5	5	0%	45	6	0%	1	1	0%	-1	0	0%
32	1	0	0%	2	0	0%	2	0	0%	6	0	0%
33	2	0	0%	2	0	0%	2	-1	0%	5	0	0%
34	6	0	-1%	-1	0	0%	0	0	0%	1	0	-1%
35	6	0	-1%	-2	0	1%	0	0	0%	0	0	0%
36	6	0	0%	-1	0	0%	0	0	0%	-2	0	0%
37	6	0	0%	-1	0	0%	0	0	0%	-2	0	0%
38	6	0	0%	-1	0	0%	0	0	0%	-2	0	0%
39	1	0	0%	-1	0	0%	-1	0	0%	0	0	0%
40	13	0	0%	-10	0	0%	3	0	0%	0	0	0%
41	0	0	0%	0	0	0%	1	0	0%	1	0	0%
42	0	0	0%	0	0	0%	1	0	0%	1	0	0%
43	-30	-2	0%	14	-1	0%	-1	-1	0%	-53	0	0%
44	-15	-1	0%	-8	0	0%	-1	0	0%	-16	0	0%
45	-41	-2	0%	17	-2	0%	10	0	0%	-11	0	0%
46	52	-3	0%	-1	1	0%	-5	1	0%	-6	0	0%
47	-4	0	0%	-27	1	0%	5	0	0%	-12	0	0%
48	6	-1	0%	-13	1	0%	3	0	0%	-17	0	0%
49	11	0	0%	-8	1	0%	3	0	0%	-19	0	0%
50	21	-1	0%	2	-2	0%	3	0	0%	-20	0	0%
51	-4	4	1%	25	-2	0%	-1	0	0%	11	0	0%
52	1	3	0%	20	-2	0%	-1	0	0%	9	0	0%
53	35	1	0%	15	2	0%	1	0	0%	31	0	0%
54	1	-1	0%	-2	0	0%	-4	0	0%	13	0	0%
55	1	-1	0%	-2	0	0%	-4	0	0%	13	0	0%
56	-13	0	0%	19	0	0%	2	0	0%	-5	-2	0%
57	-21	0	0%	28	0	0%	6	1	0%	-25	-2	0%
58	-3	0	0%	15	0	0%	-1	1	0%	-19	-1	0%
59	35	0	0%	-55	-1	0%	6	0	0%	58	2	0%
60	32	1	0%	-29	0	0%	4	0	0%	7	1	0%
61	5	0	0%	-3	-1	0%	-2	0	0%	-17	0	0%
62	-1	1	0%	-5	-1	0%	-3	-1	0%	-14	0	0%
63	8	-1	0%	-9	-1	0%	-2	-1	0%	7	0	0%
64	22	1	0%	-1	0	0%	-2	0	0%	8	1	0%
65	14	1	0%	-6	0	0%	-4	-1	0%	5	0	0%
66	16	0	0%	29	0	0%	8	0	0%	27	1	0%
67	-221	-1	0%	-235	-3	0%	-52	2	1%	24	1	0%
68	80	0	0%	36	0	0%	46	2	0%	66	1	0%
69	90	7	0%	107	6	0%	36	5	0%	90	2	0%
70	40	0	0%	37	0	0%	5	-1	0%	-5	-1	0%
71	105	3	0%	89	5	0%	28	4	0%	13	1	0%
72	41	0	0%	10	1	0%	14	0	0%	39	1	0%
73	-8	0	0%	-14	-13	-1%	-3	0	0%	5	0	0%
74	-2	3	0%	-12	-17	-1%	1	1	0%	-2	-1	0%
75	9	2	0%	5	9	1%	1	1	0%	-2	0	0%

% Change

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	-1%	5%	0%	-2%	2%	0%	0%	5%	0%	4%	10%	0%
2	1%	6%	0%	1%	1%	0%	1%	5%	0%	1%	5%	0%
3	2%	4%	0%	3%	-2%	0%	1%	-2%	0%	-3%	1%	0%
4	12%	3%	0%	8%	5%	0%	6%	4%	0%	2%	8%	0%
5	-4%	9%	2%	-12%	8%	3%	0%	9%	2%	-8%	9%	1%
6	-1%	11%	1%	-15%	11%	4%	-1%	9%	2%	0%	7%	1%
7	9%	10%	0%	6%	9%	0%	8%	10%	0%	5%	9%	0%
8	-5%	3%	1%	8%	0%	-1%	-1%	3%	0%	-6%	0%	0%
9	-4%	7%	1%	-5%	5%	2%	3%	7%	1%	-2%	4%	1%
10	-2%	7%	0%	-5%	9%	0%	0%	7%	0%	-5%	8%	0%
11	3%	6%	0%	0%	3%	0%	1%	2%	0%	-1%	2%	0%
12	3%	7%	0%	0%	3%	0%	1%	2%	0%	-1%	2%	0%
13	36%	13%	-2%	32%	6%	-3%	19%	3%	-2%	-36%	5%	5%
14	14%	0%	-1%	9%	3%	0%	15%	0%	-1%	66%	0%	-1%
15	68%	-25%	-3%	73%	6%	-2%	66%	44%	-1%	259%	15%	-3%
16	3%	-9%	-1%	5%	4%	0%	6%	13%	1%	0%	-3%	0%
17	3%	0%	0%	6%	0%	0%	9%	0%	0%	-1%	0%	0%
18	5%	0%	0%	8%	10%	0%	4%	-2%	0%	2%	0%	0%
19	3%	0%	0%	17%	15%	0%	1%	-3%	0%	1%	0%	0%
20	1%	3%	0%	9%	11%	0%	2%	0%	0%	-1%	-3%	0%
21	1%	0%	0%	9%	15%	0%	0%	0%	0%	-3%	-4%	0%
22	3%	1%	0%	0%	-1%	0%	0%	0%	0%	2%	-1%	0%
23	1%	-3%	0%	19%	13%	0%	-1%	-4%	0%	1%	-6%	0%
24	2%	0%	0%	28%	35%	0%	-1%	0%	0%	1%	0%	0%
25	0%	0%	0%	-1%	0%	0%	0%	0%	0%	-2%	0%	0%
26	-2%	0%	0%	-1%	0%	0%	0%	0%	0%	-2%	0%	0%
27	-1%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
28	1%	2%	0%	0%	4%	1%	0%	1%	0%	0%	0%	0%
29	0%	2%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
30	0%	2%	0%	-1%	4%	0%	0%	0%	0%	0%	0%	0%
31	0%	2%	0%	1%	2%	0%	0%	0%	0%	0%	0%	0%
32	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%	0%
33	1%	0%	0%	0%	0%	0%	1%	-25%	0%	1%	0%	0%
34	4%	0%	-1%	-1%	0%	0%	0%	0%	0%	1%	0%	-1%
35	5%	0%	-1%	-2%	0%	1%	0%	0%	0%	0%	0%	0%
36	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
37	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
38	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
39	0%	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%
40	2%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
41	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
42	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
43	-1%	-1%	0%	1%	0%	0%	0%	0%	0%	-2%	0%	0%
44	-1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
45	-4%	-6%	0%	2%	-7%	0%	1%	0%	0%	-1%	0%	0%
46	3%	-2%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
47	0%	0%	0%	-1%	1%	0%	0%	0%	0%	-1%	0%	0%
48	0%	-1%	0%	-1%	1%	0%	0%	0%	0%	-1%	0%	0%
49	0%	0%	0%	0%	1%	0%	0%	0%	0%	-1%	0%	0%
50	1%	-1%	0%	0%	-2%	0%	0%	0%	0%	-1%	0%	0%
51	-1%	20%	1%	4%	-10%	0%	0%	0%	0%	2%	0%	0%
52	0%	12%	0%	2%	-8%	0%	0%	0%	0%	1%	0%	0%
53	2%	4%	0%	1%	9%	0%	0%	0%	0%	2%	0%	0%
54	0%	-7%	0%	0%	0%	0%	-1%	0%	0%	2%	0%	0%
55	0%	-7%	0%	0%	0%	0%	-1%	0%	0%	2%	0%	0%
56	-1%	0%	0%	2%	0%	0%	0%	0%	0%	-1%	-20%	0%
57	-2%	0%	0%	2%	0%	0%	1%	3%	0%	-2%	-17%	0%
58	0%	0%	0%	2%	0%	0%	0%	2%	0%	-2%	-4%	0%
59	4%	0%	0%	-6%	-1%	0%	1%	0%	0%	6%	2%	0%
60	2%	2%	0%	-2%	0%	0%	0%	0%	0%	0%	2%	0%
61	1%	0%	0%	0%	-2%	0%	0%	0%	0%	-2%	0%	0%
62	0%	4%	0%	-1%	-6%	0%	0%	-8%	0%	-2%	0%	0%
63	1%	-3%	0%	-1%	-3%	0%	0%	-2%	0%	0%	0%	0%
64	2%	3%	0%	0%	0%	0%	0%	0%	0%	1%	4%	0%
65	2%	4%	0%	-1%	0%	0%	-1%	-3%	0%	1%	0%	0%
66	4%	0%	0%	8%	0%	0%	2%	0%	0%	5%	25%	0%
67	-17%	-9%	0%	-21%	-17%	0%	-7%	6%	1%	3%	7%	0%
68	5%	0%	0%	2%	0%	0%	3%	3%	0%	3%	6%	0%
69	4%	9%	0%	5%	7%	0%	2%	7%	0%	6%	5%	0%
70	3%		0%	3%		0%	0%	-50%	0%	0%	-7%	0%
71	3%	3%	0%	3%	7%	0%	1%	3%	0%	0%	2%	0%
72	2%	0%	0%	0%	2%	0%	1%	0%	0%	2%	4%	0%
73	-1%	0%	0%	-1%	-9%	-1%	0%	0%	0%	0%	0%	0%
74	0%	3%	0%	-1%	-10%	-1%	0%	1%	0%	0%	-1%	0%
75	1%	2%	0%	0%	10%	1%	0%	1%	0%	0%	0%	0%

Highway Flows 2029

2029 Future Baseline + Project

ID	Highway Link	AM1			AM2			IP			PM		
		All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	M23 SPUR, J9-SOUTH TERMINAL ROUNDABOUT	5732	135	2%	5419	158	3%	4664	203	4%	4944	80	2%
2	A23 AIRPORT WAY,	2007	61	3%	1894	71	4%	1841	118	6%	2299	46	2%
3	A23 LONDON ROAD, NORTH TERMINAL-LONGBRIDGE ROUNDABOUT	3989	152	4%	4244	159	4%	3642	202	6%	4173	102	2%
4	NORTH TERMINAL ENTRY/EXIT	2740	33	1%	2666	60	2%	2459	56	2%	2224	28	1%
5	LONGBRIDGE WAY	791	118	15%	749	103	14%	815	157	19%	781	63	8%
6	NORTHGATE ROAD	609	82	13%	487	79	16%	595	156	26%	562	44	8%
7	PERIMETER ROAD NORTH, LONGBRIDGE WAY	1223	197	16%	1004	164	16%	1241	273	22%	888	83	9%
8	GATWICK WAY	439	33	8%	438	42	10%	395	40	10%	306	16	5%
9	PERIMETER ROAD NORTH, SOUTH TERMINAL-NORTH TERMINAL	1006	143	14%	950	158	17%	1003	207	21%	866	72	8%
10	SOUTH TERMINAL ENTRY/EXIT	2786	15	1%	2713	25	1%	2401	48	2%	2213	28	1%
11	A23 LONDON ROAD, BEEHIVE RING ROAD-SOUTH TERMINAL	3531	236	7%	3795	276	7%	3581	320	9%	3750	168	4%
12	A23 LONDON ROAD, BEEHIVE RING ROAD-A23 LONDON ROAD	3434	217	6%	3699	228	6%	3569	301	8%	3782	165	4%
13	PERIMETER ROAD SOUTH, AT GATWICK ROAD ROUNDABOUT	1116	87	8%	1073	125	12%	1067	156	15%	510	59	12%
14	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-CHARLWOOD ROAD/CHURCH ROAD	844	31	4%	886	36	4%	697	24	3%	1134	9	1%
15	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-PERIMETER ROAD SOUTH	526	12	2%	509	19	4%	373	23	6%	1026	15	1%
16	LOWFIELD HEATH ROAD, CHARLWOOD ROAD-HORLEY ROAD/THE STREET	740	49	7%	844	53	6%	593	63	11%	710	39	5%
17	RADFORD ROAD, GATWICK ROAD-STEERS LANE	913	38	4%	956	35	4%	645	23	4%	979	17	2%
18	B2036 BALCOMBE ROAD, A2011 CRAWLEY AVENUE-STEERS LANE	1303	36	3%	1511	45	3%	1059	44	4%	1563	30	2%
19	B2036 BALCOME ROAD, STEERS LANE-RADFORD ROAD	875	21	2%	1044	31	3%	702	36	5%	1078	28	3%
20	B2036 BALCOMBE ROAD, RADFORD ROAD-B2037 ANTLANDS LANE	1452	39	3%	1561	49	3%	1142	51	4%	1786	35	2%
21	B2036 BALCOMBE ROAD, B2037 ANTLANDS LANE-VICTORIA ROAD	1229	23	2%	1421	30	2%	1127	33	3%	1611	26	2%
22	GATWICK ROAD, FLEMING WAY-RUTHERFORD WAY	1509	91	6%	1682	87	5%	1297	92	7%	1711	66	4%
23	B2037 ANTLANDS LANE, B2036 BALCOME ROAD-SHIPLEY BRIDGE LANE	1294	28	2%	1335	26	2%	1113	22	2%	1361	17	1%
24	B2037 ANTLANDS LANE, SHIPLEY BRIDGE LANE-COPTHORNE BANK/REDEHALL ROAD	989	21	2%	985	23	2%	878	17	2%	974	14	1%
25	WOODCOTE SIDE, WOODCOTE GREEN ROAD-A24 DORKING ROAD	298	9	3%	571	10	2%	145	9	6%	299	8	3%
26	WOODCOTE GREEN ROAD, WOODCOTE SIDE ROAD-WOODCOTE HURST	102	15	15%	374	14	4%	14	14	100%	125	14	11%
27	WOODCOTE GREEN ROAD, WOODCOTE HURST-AVENUE ROAD	382	21	5%	500	18	4%	312	19	6%	496	16	3%
28	B386 LONGCROSS ROAD/HOLLOWAY HILL/CHERTSEY ROAD, A230 GUILDFORD ROAD-B383 WINDSOR ROAD	987	211	21%	1042	179	17%	676	251	37%	747	141	19%
29	A320 GUILDFORD ROAD, HOLLOWAY HILL-HILLWOOD DRIVE/BITTAMS LANE	1779	223	13%	1876	198	11%	1739	272	16%	1999	153	8%
30	A320 GUILDFORD ROAD, HILLSWOOD DRIVE/BITTAMS LANE-A320 SAINT PETERS WAY	2339	228	10%	2435	202	8%	2184	275	13%	2596	153	6%
31	A320 SAINT PETERS WAY, A320 GUILDFORD ROAD-M25 J11	3586	335	9%	3575	291	8%	3196	376	12%	3520	163	5%
32	BEDDINGTON FARM ROAD/ MARLOWE WAY, B272 BEDDINGTON LANE-BEDDINGTON FARM ROAD	391	13	3%	409	13	3%	303	11	4%	368	11	3%
33	BEDDINGTON FARM ROAD/ MARLOWE WAY, A23 PURLEY WAY-BEDDINGTON FARM ROAD	384	5	1%	402	6	1%	296	3	1%	360	3	1%
34	WADDON NEW ROAD/CAIRO NEW ROAD, RECTORY GROVE-REEVES CORNER	158	33	21%	130	33	25%	63	31	49%	76	31	41%
35	REEVES CORNER, REEVES CORNER-CAIRO NEW ROAD	136	33	24%	108	32	30%	41	30	73%	40	30	75%
36	REEVES CORNER, REEVES CORNER-CHURCH ROAD	574	45	8%	538	44	8%	292	38	13%	396	33	8%
37	CHURCH STREET/DRUMMOND ROAD, CHURCH STREET/REEVES CORNER-FIRTH ROAD	574	45	8%	538	44	8%	292	38	13%	396	33	8%
38	FIRTH ROAD, DRUMMOND STREET-TAMWORTH ROAD	574	45	8%	538	44	8%	292	38	13%	396	33	8%
39	LONDON ROAD, DERBY ROAD-MEAD PLACE/OAKFIELD ROAD	263	104	40%	213	104	49%	194	103	53%	111	101	91%
40	LONDON ROAD, DERBY ROAD-STATION ROAD	727	112	15%	665	112	17%	679	114	17%	764	108	14%
41	POPLAR WALK/NORTH END, STATION ROAD-ST MICHAELS ROAD	50	50	100%	50	50	100%	239	52	22%	230	51	22%
42	POPLAR WALK, ST MICHAELS ROAD-A212 WELLESLEY ROAD	70	70	100%	70	70	100%	258	71	28%	249	70	28%
43	A212 WELLESLEY ROAD, POPLAR WALK-STATION ROAD	3257	230	7%	2654	212	8%	1729	213	12%	2541	200	8%
44	A212 WELLESLEY ROAD, POPLAR WALK-SYDENHAM ROAD	2238	275	12%	1797	264	15%	1286	267	21%	1841	261	14%
45	A212 LOWER COMBE STREET, SOUTH END-236 SOUTHBRIDGE ROAD	875	30	3%	929	28	3%	961	45	5%	861	13	2%
46	A235 SOUTH END, A235 BRIGHTON ROAD/B275 WARHAM ROAD-ABERDEEN ROAD	1956	167	9%	1898	167	9%	1583	181	11%	1863	142	8%
47	A235 BRIGHTON ROAD, A235 SOUTH END/B275 WARHAM ROAD-BARTLETT STREET	2291	135	6%	2228	128	6%	1608	140	9%	1754	101	6%
48	A235 BRIGHTON ROAD, BARTLETT STREET-BARTLETT STREET	1925	112	6%	1843	106	6%	1307	119	9%	1419	81	6%
49	A235 BRIGHTON ROAD, BARTLETT STREET-UPLAND ROAD	2216	124	6%	2132	117	5%	1563	131	8%	1703	85	5%
50	A235 BRIGHTON ROAD, UPLAND ROAD-HALING PARK ROAD	2312	128	6%	2271	123	5%	1887	142	8%	1953	91	5%
51	B275 ST PETERS ROAD, ABERDEEN ROAD/TEMPLE ROAD-BLUNT ROAD	728	24	3%	660	19	3%	241	15	6%	683	18	3%
52	B275 ST PETERS ROAD, A235 SOUTH END/B234 CROHAM ROAD	952	29	3%	870	24	3%	423	20	5%	872	20	2%
53	A232 FAIRFIELD ROAD, B243 PARK HILL ROAD-A222 ADDISCOMBE GROVE	1825	25	1%	1888	25	1%	1588	39	2%	1653	9	1%
54	LESLIE PARK ROAD, LEBANON ROAD-ADDISCOMBE COURT ROAD	873	13	1%	821	12	1%	511	8	2%	811	8	1%
55	LESLIE PARK ROAD, A222 LOWER ADDISCOMBE ROAD-ADDISCOMBE COURT ROAD	873	13	1%	821	12	1%	511	8	2%	811	8	1%
56	A213 WINDMILL ROAD, A222 ST JAMES'S-ST JAMES'S PARK	900	12	1%	800	12	2%	591	30	5%	724	8	1%
57	A213 WINDMILL ROAD, ST JAMES'S PARK-QUEENS ROAD	1365	21	2%	1253	17	1%	904	39	4%	1153	10	1%
58	A213 WINDMILL ROAD, QUEENS ROAD-A212 WHITEHORSE ROAD	1154	30	3%	995	28	3%	776	48	6%	953	24	3%
59	A212 WHITEHORSE ROAD, A213 WINDMILL ROAD-UNION ROAD	858	98	11%	906	89	10%	1057	104	10%	1020	89	9%
60	HOGARTH CRESCENT, A222 ST JAMES'S ROAD-A212 WHITEHORSE ROAD	1442	63	4%	1346	57	4%	1118	68	6%	1463	49	3%
61	B266 WHITEHORSE LANE, PARK ROAD-CANHAM ROAD	988	49	5%	915	45	5%	970	44	5%	908	35	4%
62	A212 CHURCH ROAD, A215 SOUTH NORWOOD HILL-STAMBOURNE WOODLAND WALK	1017	27	3%	832	15	2%	643	12	2%	880	7	1%
63	A213 CROYDON ROAD/PENGE ROADA214 ANERLEY ROAD-SUNNY BANK	1441	39	3%	1419	33	2%	1345	44	3%	1688	20	1%
64	A213 SUNNY BANK, A213 PENGE ROAD-MANOR ROAD	939	30	3%	839	25	3%	800	31	4%	904	24	3%
65	MANOR ROAD, A213 SUNNY BANK-A215 SOUTH NORWOOD HILL	726	27	4%	664	23	3%	654	29	4%	703	22	3%
66	CARMICHAEL ROAD/BIRCHANGER ROADCLIFFORD ROAD-ELBOROUGH ROAD	452	9	2%	383	7	2%	401	10	2%	568	5	1%
67	M23 J9, NB SLIP (SOUTH OF J9)	1079	10	1%	907	15	2%	733	36	5%	750	16	2%
68	M23 J9, NB SLIP (NORTH OF J9)	1678	24	1%	1727	30	2%	1673	64	4%	2049	18	1%
69	M23 J9, SB SLIP (NORTH OF J9)	2414	86	4%	2230	90	4%	1702	75	4%	1508	40	3%
70	M25 J7, EB SLIP TO M23 J8 SB	1238	0	0%	1174	0	0%	1345	1	0%	1740	14	1%
71	M23 J8, SB SLIP FROM M25	3349	101	3%	3254	79	2%	2626	142	5%	3185	60	2%
72	M23 J8, NB SLIP TO M25 EB	2735	41	1%	2430	60	2%	2236	107	5%	2570	24	1%
73	M25 J11, NB SLIP (NORTH OF J11)	1286	83	6%	1293	132	10%	1265	105	8%	1282	4	0%
74	M25 J11, NB SLIP (SOUTH OF J11)	876	107	12%	1078	149	14%	854	145	17%	1354	111	8%
75	M25 J11, SB SLIP (SOUTH OF J11)	1233	113	9%	1248	102	8%	999	120	12%	1179	43	4%

2029 Future Baseline + Project + Highway Construction

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	4881	133	3%	4729	159	3%	4131	207	5%	4365	91	2%
2	1489	48	3%	1587	68	4%	1441	101	7%	1891	45	2%
3	3057	138	5%	3342	150	4%	2841	194	7%	3655	101	3%
4	2142	33	2%	2073	60	3%	1909	56	3%	1742	29	2%
5	843	114	14%	752	103	14%	802	155	19%	672	60	9%
6	748	89	12%	579	82	14%	739	158	21%	530	47	9%
7	1166	199	17%	945	165	17%	1185	273	23%	836	84	10%
8	458	33	7%	415	43	10%	439	42	10%	426	17	4%
9	1160	150	13%	1013	161	16%	1080	206	19%	953	77	8%
10	2208	15	1%	2149	25	1%	1869	48	3%	1776	28	2%
11	3197	232	7%	3114	262	8%	3069	299	10%	3271	172	5%
12	3123	213	7%	3036	214	7%	3055	279	9%	3295	168	5%
13	1066	79	7%	1023	122	12%	1029	155	15%	1025	61	6%
14	759	30	4%	680	34	5%	664	28	4%	752	12	2%
15	553	20	4%	537	23	4%	383	24	6%	483	14	3%
16	780	58	7%	1008	57	6%	681	70	10%	817	43	5%
17	902	39	4%	1010	30	3%	732	23	3%	1039	17	2%
18	1469	39	3%	1664	49	3%	1120	44	4%	1624	28	2%
19	1044	22	2%	1199	35	3%	760	37	5%	1181	25	2%
20	1573	40	3%	1602	48	3%	1283	53	4%	1863	32	2%
21	1380	27	2%	1494	34	2%	1275	33	3%	1682	23	1%
22	1417	94	7%	1669	94	6%	1251	108	9%	1609	66	4%
23	1272	30	2%	1236	22	2%	1120	24	2%	1314	16	1%
24	950	22	2%	846	18	2%	883	18	2%	932	13	1%
25	295	9	3%	580	10	2%	146	9	6%	289	8	3%
26	97	15	15%	383	14	4%	14	14	100%	116	14	12%
27	372	21	6%	509	18	4%	312	19	6%	488	16	3%
28	965	211	22%	1043	172	16%	670	244	36%	749	139	19%
29	1771	223	13%	1883	191	10%	1745	265	15%	1998	151	8%
30	2336	229	10%	2445	195	8%	2191	269	12%	2595	152	6%
31	3585	335	9%	3613	285	8%	3190	370	12%	3528	161	5%
32	396	13	3%	411	13	3%	304	11	4%	370	11	3%
33	388	5	1%	403	6	1%	297	4	1%	362	4	1%
34	158	33	21%	132	33	25%	63	31	49%	76	31	41%
35	136	33	24%	113	32	28%	41	30	73%	40	30	75%
36	576	45	8%	540	44	8%	293	38	13%	397	33	8%
37	576	45	8%	540	44	8%	293	38	13%	397	33	8%
38	576	45	8%	540	44	8%	293	38	13%	397	33	8%
39	256	104	41%	216	104	48%	196	103	53%	111	101	91%
40	722	112	16%	677	112	17%	680	114	17%	763	108	14%
41	50	50	100%	50	50	100%	239	52	22%	230	51	22%
42	70	70	100%	70	70	100%	258	71	28%	249	70	28%
43	3258	231	7%	2689	214	8%	1729	214	12%	2567	200	8%
44	2241	275	12%	1828	266	15%	1283	267	21%	1853	261	14%
45	903	33	4%	938	32	3%	957	45	5%	881	13	1%
46	1953	171	9%	1908	167	9%	1577	180	11%	1858	142	8%
47	2270	135	6%	2217	129	6%	1594	140	9%	1743	101	6%
48	1899	113	6%	1815	107	6%	1298	119	9%	1420	81	6%
49	2188	124	6%	2107	118	6%	1552	131	8%	1707	84	5%
50	2293	130	6%	2281	124	5%	1880	142	8%	1957	90	5%
51	729	21	3%	538	17	3%	241	15	6%	679	18	3%
52	947	26	3%	744	22	3%	424	20	5%	861	20	2%
53	1789	23	1%	1800	23	1%	1605	39	2%	1645	9	1%
54	851	13	2%	811	12	1%	506	8	2%	806	8	1%
55	851	13	2%	811	12	1%	506	8	2%	806	8	1%
56	948	14	1%	856	13	2%	590	30	5%	705	8	1%
57	1417	23	2%	1342	19	1%	905	38	4%	1129	10	1%
58	1161	32	3%	1064	29	3%	775	47	6%	937	24	3%
59	801	96	12%	836	89	11%	1046	104	10%	1045	89	9%
60	1400	61	4%	1397	56	4%	1116	68	6%	1463	50	3%
61	989	49	5%	907	45	5%	969	44	5%	957	35	4%
62	1016	27	3%	873	19	2%	645	13	2%	889	7	1%
63	1458	40	3%	1395	30	2%	1344	44	3%	1674	20	1%
64	930	30	3%	829	26	3%	800	31	4%	895	23	3%
65	723	27	4%	645	23	4%	655	29	4%	698	22	3%
66	435	9	2%	372	7	2%	407	10	2%	579	5	1%
67	654	7	1%	601	11	2%	553	34	6%	616	16	3%
68	1343	19	1%	1314	26	2%	1250	52	4%	1450	18	1%
69	1803	86	5%	1615	90	6%	1302	75	6%	1172	41	3%
70	1115	0	0%	1077	0	0%	1280	1	0%	1742	8	0%
71	2997	107	4%	2952	78	3%	2377	138	6%	3004	60	2%
72	2668	41	2%	2281	60	3%	2101	113	5%	2343	25	1%
73	1296	83	6%	1269	102	8%	1268	105	8%	1273	4	0%
74	880	104	12%	1006	119	12%	850	143	17%	1359	110	8%
75	1215	117	10%	1253	92	7%	993	115	12%	1185	44	4%

Net Change

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	-851	-2	0%	-690	1	0%	-533	4	1%	-579	11	0%
2	-518	-13	0%	-307	-3	1%	-400	-17	1%	-408	-1	0%
3	-932	-14	1%	-902	-9	1%	-801	-8	1%	-518	-1	0%
4	-598	0	0%	-593	0	1%	-550	0	1%	-482	1	0%
5	52	-4	-1%	3	0	0%	-13	-2	0%	-109	-3	1%
6	139	7	-2%	92	3	-2%	144	2	-5%	-32	3	1%
7	-57	2	1%	-59	1	1%	-56	0	1%	-52	1	1%
8	19	0	0%	-23	1	1%	44	2	-1%	120	1	-1%
9	154	7	-1%	63	3	-1%	77	-1	-2%	87	5	0%
10	-578	0	0%	-564	0	0%	-532	0	1%	-437	0	0%
11	-334	-4	1%	-681	-14	1%	-512	-21	1%	-479	4	1%
12	-311	-4	1%	-663	-14	1%	-514	-22	1%	-487	3	1%
13	-50	-8	0%	-50	-3	0%	-38	-1	0%	515	2	-6%
14	-85	-1	0%	-206	-2	1%	-33	4	1%	-382	3	1%
15	27	8	1%	28	4	1%	10	1	0%	-543	-1	1%
16	40	9	1%	164	4	-1%	88	7	0%	107	4	0%
17	-11	1	0%	54	-5	-1%	87	0	0%	60	0	0%
18	166	3	0%	153	4	0%	61	0	0%	61	-2	0%
19	169	1	0%	155	4	0%	58	1	0%	103	-3	0%
20	121	1	0%	41	-1	0%	141	2	0%	77	-3	0%
21	151	4	0%	73	4	0%	148	0	0%	71	-3	0%
22	-92	3	1%	-13	7	0%	-46	16	2%	-102	0	0%
23	-22	2	0%	-99	-4	0%	7	2	0%	-47	-1	0%
24	-39	1	0%	-139	-5	0%	5	1	0%	-42	-1	0%
25	-3	0	0%	9	0	0%	1	0	0%	-10	0	0%
26	-5	0	1%	9	0	0%	0	0	0%	-9	0	1%
27	-10	0	0%	9	0	0%	0	0	0%	-8	0	0%
28	-22	0	0%	1	-7	-1%	-6	-7	-1%	2	-2	0%
29	-8	0	0%	7	-7	0%	6	-7	0%	-1	-2	0%
30	-3	1	0%	10	-7	0%	7	-6	0%	-1	-1	0%
31	-1	0	0%	38	-6	0%	-6	-6	0%	8	-2	0%
32	5	0	0%	2	0	0%	1	0	0%	2	0	0%
33	4	0	0%	1	0	0%	1	1	0%	2	1	0%
34	0	0	0%	2	0	0%	0	0	0%	0	0	0%
35	0	0	0%	5	0	-1%	0	0	0%	0	0	0%
36	2	0	0%	2	0	0%	1	0	0%	1	0	0%
37	2	0	0%	2	0	0%	1	0	0%	1	0	0%
38	2	0	0%	2	0	0%	1	0	0%	1	0	0%
39	-7	0	1%	3	0	-1%	2	0	-1%	0	0	0%
40	-5	0	0%	12	0	0%	1	0	0%	-1	0	0%
41	0	0	0%	0	0	0%	0	0	0%	0	0	0%
42	0	0	0%	0	0	0%	0	0	0%	0	0	0%
43	1	1	0%	35	2	0%	0	1	0%	26	0	0%
44	3	0	0%	31	2	0%	-3	0	0%	12	0	0%
45	28	3	0%	9	4	0%	-4	0	0%	20	0	0%
46	-3	4	0%	10	0	0%	-6	-1	0%	-5	0	0%
47	-21	0	0%	-11	1	0%	-14	0	0%	-11	0	0%
48	-26	1	0%	-28	1	0%	-9	0	0%	1	0	0%
49	-28	0	0%	-25	1	0%	-11	0	0%	4	-1	0%
50	-19	2	0%	10	1	0%	-7	0	0%	4	-1	0%
51	1	-3	0%	-122	-2	0%	0	0	0%	-4	0	0%
52	-5	-3	0%	-126	-2	0%	1	0	0%	-11	0	0%
53	-36	-2	0%	-88	-2	0%	17	0	0%	-8	0	0%
54	-22	0	0%	-10	0	0%	-5	0	0%	-5	0	0%
55	-22	0	0%	-10	0	0%	-5	0	0%	-5	0	0%
56	48	2	0%	56	1	0%	-1	0	0%	-19	0	0%
57	52	2	0%	89	2	0%	1	-1	0%	-24	0	0%
58	7	2	0%	69	1	0%	-1	-1	0%	-16	0	0%
59	-57	-2	1%	-70	0	1%	-11	0	0%	25	0	0%
60	-42	-2	0%	51	-1	0%	-2	0	0%	0	1	0%
61	1	0	0%	-8	0	0%	-1	0	0%	49	0	0%
62	-1	0	0%	41	4	0%	2	1	0%	9	0	0%
63	17	1	0%	-24	-3	0%	-1	0	0%	-14	0	0%
64	-9	0	0%	-10	1	0%	0	0	0%	-9	-1	0%
65	-3	0	0%	-19	0	0%	1	0	0%	-5	0	0%
66	-17	0	0%	-11	0	0%	6	0	0%	11	0	0%
67	-425	-3	0%	-306	-4	0%	-180	-2	1%	-134	0	0%
68	-335	-5	0%	-413	-4	0%	-423	-12	0%	-599	0	0%
69	-611	0	1%	-615	0	2%	-400	0	1%	-336	1	1%
70	-123	0	0%	-97	0	0%	-65	0	0%	2	-6	0%
71	-352	6	1%	-302	-1	0%	-249	-4	0%	-181	0	0%
72	-67	0	0%	-149	0	0%	-135	6	1%	-227	1	0%
73	10	0	0%	-24	-30	-2%	3	0	0%	-9	0	0%
74	4	-3	0%	-72	-30	-2%	-4	-2	0%	5	-1	0%
75	-18	4	0%	5	-10	-1%	-6	-5	0%	6	1	0%

% Change

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	-15%	-1%	0%	-13%	1%	0%	-11%	2%	1%	-12%	14%	0%
2	-26%	-21%	0%	-16%	-4%	1%	-22%	-14%	1%	-18%	-2%	0%
3	-23%	-9%	1%	-21%	-6%	1%	-22%	-4%	1%	-12%	-1%	0%
4	-22%	0%	0%	-22%	0%	1%	-22%	0%	1%	-22%	4%	0%
5	7%	-3%	-1%	0%	0%	0%	-2%	-1%	0%	-14%	-5%	1%
6	23%	9%	-2%	19%	4%	-2%	24%	1%	-5%	-6%	7%	1%
7	-5%	1%	1%	-6%	1%	1%	-5%	0%	1%	-6%	1%	1%
8	4%	0%	0%	-5%	2%	1%	11%	5%	-1%	39%	6%	-1%
9	15%	5%	-1%	7%	2%	-1%	8%	0%	-2%	10%	7%	0%
10	-21%	0%	0%	-21%	0%	0%	-22%	0%	1%	-20%	0%	0%
11	-9%	-2%	1%	-18%	-5%	1%	-14%	-7%	1%	-13%	2%	1%
12	-9%	-2%	1%	-18%	-6%	1%	-14%	-7%	1%	-13%	2%	1%
13	-4%	-9%	0%	-5%	-2%	0%	-4%	-1%	0%	101%	3%	-6%
14	-10%	-3%	0%	-23%	-6%	1%	-5%	17%	1%	-34%	33%	1%
15	5%	67%	1%	6%	21%	1%	3%	4%	0%	-53%	-7%	1%
16	5%	18%	1%	19%	8%	-1%	15%	11%	0%	15%	10%	0%
17	-1%	3%	0%	6%	-14%	-1%	13%	0%	0%	6%	0%	0%
18	13%	8%	0%	10%	9%	0%	6%	0%	0%	4%	-7%	0%
19	19%	5%	0%	15%	13%	0%	8%	3%	0%	10%	-11%	0%
20	8%	3%	0%	3%	-2%	0%	12%	4%	0%	4%	-9%	0%
21	12%	17%	0%	5%	13%	0%	13%	0%	0%	4%	-12%	0%
22	-6%	3%	1%	-1%	8%	0%	-4%	17%	2%	-6%	0%	0%
23	-2%	7%	0%	-7%	-15%	0%	1%	9%	0%	-3%	-6%	0%
24	-4%	5%	0%	-14%	-22%	0%	1%	6%	0%	-4%	-7%	0%
25	-1%	0%	0%	2%	0%	0%	1%	0%	0%	-3%	0%	0%
26	-5%	0%	1%	2%	0%	0%	0%	0%	0%	-7%	0%	1%
27	-3%	0%	0%	2%	0%	0%	0%	0%	0%	-2%	0%	0%
28	-2%	0%	0%	0%	-4%	-1%	-1%	-3%	-1%	0%	-1%	0%
29	0%	0%	0%	0%	-4%	0%	0%	-3%	0%	0%	-1%	0%
30	0%	0%	0%	0%	-3%	0%	0%	-2%	0%	0%	-1%	0%
31	0%	0%	0%	1%	-2%	0%	0%	-2%	0%	0%	-1%	0%
32	1%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
33	1%	0%	0%	0%	0%	0%	0%	33%	0%	1%	33%	0%
34	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
35	0%	0%	0%	5%	0%	-1%	0%	0%	0%	0%	0%	0%
36	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
37	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
38	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
39	-3%	0%	1%	1%	0%	-1%	1%	0%	-1%	0%	0%	0%
40	-1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
41	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
42	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
43	0%	0%	0%	1%	1%	0%	0%	0%	0%	1%	0%	0%
44	0%	0%	0%	2%	1%	0%	0%	0%	0%	1%	0%	0%
45	3%	10%	0%	1%	14%	0%	0%	0%	0%	2%	0%	0%
46	0%	2%	0%	1%	0%	0%	0%	-1%	0%	0%	0%	0%
47	-1%	0%	0%	0%	1%	0%	-1%	0%	0%	-1%	0%	0%
48	-1%	1%	0%	-2%	1%	0%	-1%	0%	0%	0%	0%	0%
49	-1%	0%	0%	-1%	1%	0%	-1%	0%	0%	0%	-1%	0%
50	-1%	2%	0%	0%	1%	0%	0%	0%	0%	0%	-1%	0%
51	0%	-13%	0%	-18%	-11%	0%	0%	0%	0%	-1%	0%	0%
52	-1%	-10%	0%	-14%	-8%	0%	0%	0%	0%	-1%	0%	0%
53	-2%	-8%	0%	-5%	-8%	0%	1%	0%	0%	0%	0%	0%
54	-3%	0%	0%	-1%	0%	0%	-1%	0%	0%	-1%	0%	0%
55	-3%	0%	0%	-1%	0%	0%	-1%	0%	0%	-1%	0%	0%
56	5%	17%	0%	7%	8%	0%	0%	0%	0%	-3%	0%	0%
57	4%	10%	0%	7%	12%	0%	0%	-3%	0%	-2%	0%	0%
58	1%	7%	0%	7%	4%	0%	0%	-2%	0%	-2%	0%	0%
59	-7%	-2%	1%	-8%	0%	1%	-1%	0%	0%	2%	0%	0%
60	-3%	-3%	0%	4%	-2%	0%	0%	0%	0%	0%	2%	0%
61	0%	0%	0%	-1%	0%	0%	0%	0%	0%	5%	0%	0%
62	0%	0%	0%	5%	27%	0%	0%	8%	0%	1%	0%	0%
63	1%	3%	0%	-2%	-9%	0%	0%	0%	0%	-1%	0%	0%
64	-1%	0%	0%	-1%	4%	0%	0%	0%	0%	-1%	-4%	0%
65	0%	0%	0%	-3%	0%	0%	0%	0%	0%	-1%	0%	0%
66	-4%	0%	0%	-3%	0%	0%	1%	0%	0%	2%	0%	0%
67	-39%	-30%	0%	-34%	-27%	0%	-25%	-6%	1%	-18%	0%	0%
68	-20%	-21%	0%	-24%	-13%	0%	-25%	-19%	0%	-29%	147%	0%
69	-25%	0%	1%	-28%	0%	2%	-24%	0%	1%	-22%	2%	1%
70	-10%		0%	-8%		0%	-5%	0%	0%	0%	-43%	0%
71	-11%	6%	1%	-9%	-1%	0%	-9%	-3%	0%	-6%	0%	0%
72	-2%	0%	0%	-6%	0%	0%	-6%	6%	1%	-9%	4%	0%
73	1%	0%	0%	-2%	-23%	-2%	0%	0%	0%	-1%	0%	0%
74	0%	-3%	0%	-7%	-20%	-2%	0%	-1%	0%	0%	-1%	0%
75	-1%	4%	0%	0%	-10%	-1%	-1%	-4%	0%	1%	2%	0%

Highway Flows 2032

2032 Future Baseline

ID	Highway Link	AM1			AM2			IP			PM		
		All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	M23 SPUR, J9-SOUTH TERMINAL ROUNDABOUT	5844	131	2%	5507	154	3%	4668	200	4%	4867	76	2%
2	A23 AIRPORT WAY,	4600	164	4%	4328	184	4%	3874	246	6%	4397	114	3%
3	A23 LONDON ROAD, NORTH TERMINAL-LONGBRIDGE ROUNDABOUT	4083	150	4%	4176	161	4%	3670	200	5%	4431	102	2%
4	NORTH TERMINAL ENTRY/EXIT	2508	32	1%	2538	58	2%	2344	55	2%	2181	28	1%
5	LONGBRIDGE WAY	812	110	14%	831	98	12%	827	146	18%	940	60	6%
6	NORTHGATE ROAD	611	77	13%	594	74	12%	613	148	24%	566	41	7%
7	PERIMETER ROAD NORTH, LONGBRIDGE WAY	1144	183	16%	971	156	16%	1173	255	22%	856	78	9%
8	GATWICK WAY	467	32	7%	392	43	11%	407	39	10%	404	16	4%
9	PERIMETER ROAD NORTH, SOUTH TERMINAL-NORTH TERMINAL	1046	137	13%	1009	155	15%	987	199	20%	885	70	8%
10	SOUTH TERMINAL ENTRY/EXIT	2823	15	1%	2831	24	1%	2377	46	2%	2323	27	1%
11	A23 LONDON ROAD, BEEHIVE RING ROAD-SOUTH TERMINAL	3549	229	6%	3855	273	7%	3598	314	9%	3835	166	4%
12	A23 LONDON ROAD, BEEHIVE RING ROAD-A23 LONDON ROAD	3465	210	6%	3770	225	6%	3583	295	8%	3865	163	4%
13	PERIMETER ROAD SOUTH, AT GATWICK ROAD ROUNDABOUT	840	82	10%	820	121	15%	899	149	17%	810	58	7%
14	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-CHARLWOOD ROAD/CHURCH ROAD	757	31	4%	798	36	5%	644	24	4%	710	9	1%
15	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-PERIMETER ROAD SOUTH	318	14	4%	304	19	6%	246	24	10%	299	14	5%
16	LOWFIELD HEATH ROAD, CHARLWOOD ROAD-HORLEY ROAD/THE STREET	732	52	7%	852	53	6%	598	64	11%	747	40	5%
17	RADFORD ROAD, GATWICK ROAD-STEERS LANE	902	38	4%	931	36	4%	629	25	4%	1021	17	2%
18	B2036 BALCOMBE ROAD, A2011 CRAWLEY AVENUE-STEERS LANE	1291	36	3%	1476	44	3%	1070	44	4%	1579	31	2%
19	B2036 BALCOME ROAD, STEERS LANE-RADFORD ROAD	881	21	2%	1017	30	3%	733	36	5%	1105	28	3%
20	B2036 BALCOMBE ROAD, RADFORD ROAD-B2037 ANTLANDS LANE	1467	39	3%	1615	51	3%	1175	52	4%	1861	36	2%
21	B2036 BALCOMBE ROAD, B2037 ANTLANDS LANE-VICTORIA ROAD	1225	22	2%	1420	29	2%	1169	34	3%	1693	26	2%
22	GATWICK ROAD, FLEMING WAY-RUTHERFORD WAY	1479	92	6%	1696	89	5%	1294	92	7%	1701	66	4%
23	B2037 ANTLANDS LANE, B2036 BALCOME ROAD-SHIPLEY BRIDGE LANE	1325	30	2%	1384	28	2%	1146	23	2%	1338	17	1%
24	B2037 ANTLANDS LANE, SHIPLEY BRIDGE LANE-COPTHORNE BANK/REDEHALL ROAD	1013	22	2%	1054	24	2%	886	17	2%	916	14	2%
25	WOODCOTE SIDE, WOODCOTE GREEN ROAD-A24 DORKING ROAD	305	9	3%	591	10	2%	146	9	6%	309	8	3%
26	WOODCOTE GREEN ROAD, WOODCOTE SIDE ROAD-WOODCOTE HURST	111	15	14%	388	14	4%	14	14	100%	130	14	11%
27	WOODCOTE GREEN ROAD, WOODCOTE HURST-AVENUE ROAD	380	21	6%	532	19	4%	315	20	6%	503	16	3%
28	B386 LONGCROSS ROAD/HOLLOWAY HILL/CHERTSEY ROAD, A230 GUILDFORD ROAD-B383 WINDSOR ROAD	978	109	11%	1028	116	11%	703	258	37%	837	134	16%
29	A320 GUILDFORD ROAD, HOLLOWAY HILL-HILLWOOD DRIVE/BITTAMS LANE	1571	117	7%	1297	131	10%	1781	280	16%	2031	145	7%
30	A320 GUILDFORD ROAD, HILLSWOOD DRIVE/BITTAMS LANE-A320 SAINT PETERS WAY	2156	119	6%	1822	134	7%	2248	283	13%	2576	145	6%
31	A320 SAINT PETERS WAY, A320 GUILDFORD ROAD-M25 J11	2745	221	8%	1927	186	10%	3250	384	12%	3502	154	4%
32	BEDDINGTON FARM ROAD/ MARLOWE WAY, B272 BEDDINGTON LANE-BEDDINGTON FARM ROAD	370	12	3%	391	13	3%	297	11	4%	341	10	3%
33	BEDDINGTON FARM ROAD/ MARLOWE WAY, A23 PURLEY WAY-BEDDINGTON FARM ROAD	362	5	1%	383	5	1%	290	3	1%	333	3	1%
34	WADDON NEW ROAD/CAIRO NEW ROAD, RECTORY GROVE-REEVES CORNER	164	33	20%	140	33	24%	65	31	48%	73	31	42%
35	REEVES CORNER, REEVES CORNER-CAIRO NEW ROAD	139	33	24%	120	32	27%	42	30	71%	40	30	75%
36	REEVES CORNER, REEVES CORNER-CHURCH ROAD	607	45	7%	593	45	8%	299	38	13%	404	33	8%
37	CHURCH STREET/DRUMMOND ROAD, CHURCH STREET/REEVES CORNER-FIRTH ROAD	607	45	7%	593	45	8%	299	38	13%	404	33	8%
38	FIRTH ROAD, DRUMMOND STREET-TAMWORTH ROAD	607	45	7%	593	45	8%	299	38	13%	404	33	8%
39	LONDON ROAD, DERBY ROAD-MEAD PLACE/OAKFIELD ROAD	282	104	37%	246	104	42%	197	103	52%	109	101	93%
40	LONDON ROAD, DERBY ROAD-STATION ROAD	760	112	15%	734	112	15%	696	113	16%	773	108	14%
41	POPLAR WALK/NORTH END, STATION ROAD-ST MICHAELS ROAD	50	50	100%	50	50	100%	241	52	22%	230	51	22%
42	POPLAR WALK, ST MICHAELS ROAD-A212 WELLESLEY ROAD	70	70	100%	70	70	100%	260	71	27%	249	70	28%
43	A212 WELLESLEY ROAD, POPLAR WALK-STATION ROAD	3309	229	7%	2835	215	8%	1772	214	12%	2676	201	8%
44	A212 WELLESLEY ROAD, POPLAR WALK-SYDENHAM ROAD	2289	276	12%	1966	268	14%	1325	268	20%	1899	262	14%
45	A212 LOWER COMBE STREET, SOUTH END-236 SOUTHBRIDGE ROAD	867	23	3%	777	29	4%	936	44	5%	876	13	1%
46	A235 SOUTH END, A235 BRIGHTON ROAD/B275 WARHAM ROAD-ABERDEEN ROAD	1950	169	9%	1957	163	8%	1593	180	11%	1848	146	8%
47	A235 BRIGHTON ROAD, A235 SOUTH END/B275 WARHAM ROAD-BARTLETT STREET	2337	140	6%	2223	125	6%	1617	139	9%	1812	104	6%
48	A235 BRIGHTON ROAD, BARTLETT STREET-BARTLETT STREET	1983	119	6%	1831	103	6%	1319	118	9%	1493	85	6%
49	A235 BRIGHTON ROAD, BARTLETT STREET-UPLAND ROAD	2258	130	6%	2121	114	5%	1582	130	8%	1779	88	5%
50	A235 BRIGHTON ROAD, UPLAND ROAD-HALING PARK ROAD	2339	131	6%	2262	122	5%	1900	141	7%	2023	94	5%
51	B275 ST PETERS ROAD, ABERDEEN ROAD/TEMPLE ROAD-BLUNT ROAD	835	25	3%	646	21	3%	247	15	6%	721	16	2%
52	B275 ST PETERS ROAD, A235 SOUTH END/B234 CROHAM ROAD	1059	30	3%	875	27	3%	434	20	5%	919	18	2%
53	A232 FAIRFIELD ROAD, B243 PARK HILL ROAD-A222 ADDISCOMBE GROVE	1908	32	2%	1921	24	1%	1601	39	2%	1681	9	1%
54	LESLIE PARK ROAD, LEBANON ROAD-ADDISCOMBE COURT ROAD	874	14	2%	806	12	1%	557	8	1%	835	8	1%
55	LESLIE PARK ROAD, A222 LOWER ADDISCOMBE ROAD-ADDISCOMBE COURT ROAD	874	14	2%	806	12	1%	557	8	1%	835	8	1%
56	A213 WINDMILL ROAD, A222 ST JAMES'S-ST JAMES'S PARK	1014	15	1%	893	13	1%	608	31	5%	687	7	1%
57	A213 WINDMILL ROAD, ST JAMES'S PARK-QUEENS ROAD	1481	25	2%	1344	21	2%	920	39	4%	1119	9	1%
58	A213 WINDMILL ROAD, QUEENS ROAD-A212 WHITEHORSE ROAD	1086	32	3%	1148	32	3%	795	48	6%	916	23	3%
59	A212 WHITEHORSE ROAD, A213 WINDMILL ROAD-UNION ROAD	743	92	12%	968	89	9%	1056	104	10%	990	89	9%
60	HOGARTH CRESCENT, A222 ST JAMES'S ROAD-A212 WHITEHORSE ROAD	1277	59	5%	1464	57	4%	1136	68	6%	1463	49	3%
61	B266 WHITEHORSE LANE, PARK ROAD-CANHAM ROAD	926	46	5%	891	44	5%	959	44	5%	940	35	4%
62	A212 CHURCH ROAD, A215 SOUTH NORWOOD HILL-STAMBOURNE WOODLAND WALK	1035	28	3%	866	20	2%	670	13	2%	937	8	1%
63	A213 CROYDON ROAD/PENGE ROADA214 ANERLEY ROAD-SUNNY BANK	1515	37	2%	1456	31	2%	1417	45	3%	1684	19	1%
64	A213 SUNNY BANK, A213 PENGE ROAD-MANOR ROAD	951	28	3%	864	26	3%	830	31	4%	898	22	2%
65	MANOR ROAD, A213 SUNNY BANK-A215 SOUTH NORWOOD HILL	726	25	3%	669	24	4%	679	29	4%	689	21	3%
66	CARMICHAEL ROAD/BIRCHANGER ROADCLIFFORD ROAD-ELBOROUGH ROAD	467	9	2%	417	7	2%	399	10	3%	568	4	1%
67	M23 J9, NB SLIP (SOUTH OF J9)	1284	11	1%	1071	14	1%	784	34	4%	754	16	2%
68	M23 J9, NB SLIP (NORTH OF J9)	1644	25	2%	1701	30	2%	1652	66	4%	2035	18	1%
69	M23 J9, SB SLIP (NORTH OF J9)	2334	80	3%	2168	87	4%	1658	71	4%	1433	38	3%
70	M25 J7, EB SLIP TO M23 J8 SB	1286	0	0%	1343	0	0%	1442	3	0%	1765	19	1%
71	M23 J8, SB SLIP FROM M25	3356	95	3%	3376	77	2%	2746	151	5%	3267	59	2%
72	M23 J8, NB SLIP TO M25 EB	2790	41	1%	2524	60	2%	2299	111	5%	2650	23	1%
73	M25 J11, NB SLIP (NORTH OF J11)	1420	124	9%	1528	106	7%	1270	104	8%	1298	4	0%
74	M25 J11, NB SLIP (SOUTH OF J11)	1137	118	10%	1248	122	10%	862	146	17%	1305	101	8%
75	M25 J11, SB SLIP (SOUTH OF J11)	1009	50	5%	1007	55	5%	1027	126	12%	1230	44	4%

2032 Future Baseline + Project

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	7033	159	2%	6757	209	3%	5678	237	4%	5809	92	2%
2	5949	197	3%	5761	244	4%	4608	268	6%	5070	127	3%
3	3878	151	4%	4264	155	4%	3195	178	6%	4059	91	2%
4	3131	36	1%	3055	69	2%	2579	63	2%	2354	33	1%
5	1021	138	14%	829	115	14%	1134	248	22%	851	71	8%
6	441	99	22%	382	88	23%	344	94	27%	202	49	24%
7	1411	238	17%	1163	202	17%	1433	331	23%	991	99	10%
8	1167	128	11%	1017	136	13%	943	121	13%	659	54	8%
9	765	60	8%	676	84	12%	624	51	8%	483	30	6%
10	3103	15	0%	3026	27	1%	2839	56	2%	2685	33	1%
11	3575	250	7%	3684	299	8%	3636	337	9%	3900	169	4%
12	3480	231	7%	3590	251	7%	3621	317	9%	3934	165	4%
13	1258	100	8%	1213	149	12%	1216	185	15%	667	72	11%
14	929	33	4%	911	33	4%	694	26	4%	1112	9	1%
15	594	16	3%	564	20	4%	405	25	6%	1059	16	2%
16	759	55	7%	936	51	5%	679	52	8%	777	29	4%
17	974	38	4%	990	34	3%	728	24	3%	1076	18	2%
18	1275	36	3%	1426	41	3%	1132	40	4%	1561	26	2%
19	840	20	2%	956	28	3%	771	32	4%	1093	23	2%
20	1475	37	3%	1570	48	3%	1292	47	4%	1880	31	2%
21	1190	22	2%	1379	28	2%	1266	30	2%	1619	22	1%
22	1492	91	6%	1696	87	5%	1280	92	7%	1802	67	4%
23	1352	28	2%	1392	28	2%	1155	21	2%	1359	18	1%
24	1034	21	2%	1054	24	2%	902	15	2%	955	15	2%
25	333	9	3%	581	10	2%	148	9	6%	333	8	2%
26	135	15	11%	379	14	4%	14	14	100%	144	14	10%
27	395	21	5%	508	19	4%	318	20	6%	520	16	3%
28	1030	201	20%	1077	132	12%	705	260	37%	828	135	16%
29	1737	211	12%	1515	139	9%	1782	283	16%	2028	145	7%
30	2328	214	9%	2053	143	7%	2250	286	13%	2582	146	6%
31	3289	318	10%	2343	218	9%	3247	386	12%	3492	153	4%
32	369	12	3%	371	13	4%	298	11	4%	323	10	3%
33	362	5	1%	364	5	1%	291	3	1%	316	3	1%
34	161	33	20%	133	33	25%	64	31	48%	223	32	14%
35	140	33	24%	113	32	28%	41	30	73%	199	32	16%
36	627	46	7%	562	44	8%	303	38	13%	601	36	6%
37	627	46	7%	562	44	8%	303	38	13%	601	36	6%
38	627	46	7%	562	44	8%	303	38	13%	601	36	6%
39	303	104	34%	225	104	46%	197	103	52%	234	102	44%
40	802	112	14%	709	112	16%	709	114	16%	955	106	11%
41	50	50	100%	50	50	100%	246	52	21%	358	51	14%
42	70	70	100%	70	70	100%	265	71	27%	377	70	19%
43	3354	229	7%	2800	212	8%	1781	213	12%	2982	201	7%
44	2331	275	12%	1872	263	14%	1340	267	20%	2178	262	12%
45	792	22	3%	907	30	3%	951	43	5%	834	14	2%
46	1964	169	9%	1933	166	9%	1609	180	11%	2088	146	7%
47	2313	140	6%	2222	128	6%	1640	139	8%	2068	105	5%
48	1941	118	6%	1826	106	6%	1338	118	9%	1759	88	5%
49	2234	130	6%	2120	117	6%	1605	130	8%	2050	91	4%
50	2326	131	6%	2267	123	5%	1917	141	7%	2276	99	4%
51	785	25	3%	623	19	3%	259	15	6%	672	18	3%
52	1007	31	3%	842	24	3%	444	20	5%	879	20	2%
53	1930	34	2%	1879	25	1%	1602	38	2%	1671	9	1%
54	882	14	2%	859	12	1%	579	9	2%	862	8	1%
55	882	14	2%	859	12	1%	579	9	2%	862	8	1%
56	1002	14	1%	772	12	2%	606	32	5%	903	12	1%
57	1446	24	2%	1174	17	1%	923	40	4%	1376	14	1%
58	1185	34	3%	917	28	3%	791	49	6%	1063	27	3%
59	913	95	10%	1017	87	9%	1079	103	10%	998	88	9%
60	1460	63	4%	1358	57	4%	1142	68	6%	1446	48	3%
61	980	46	5%	861	42	5%	969	44	5%	958	35	4%
62	1047	27	3%	858	15	2%	671	12	2%	960	8	1%
63	1513	38	3%	1454	34	2%	1413	46	3%	1646	18	1%
64	994	29	3%	864	26	3%	828	31	4%	880	22	3%
65	748	25	3%	670	24	4%	675	30	4%	668	21	3%
66	474	9	2%	410	8	2%	426	10	2%	615	4	1%
67	1648	15	1%	1478	25	2%	975	41	4%	1009	19	2%
68	2068	28	1%	2066	39	2%	2020	79	4%	2362	21	1%
69	2767	100	4%	2575	119	5%	2094	88	4%	1787	47	3%
70	1404	0	0%	1451	0	0%	1511	5	0%	1773	21	1%
71	3582	106	3%	3600	98	3%	2982	154	5%	3387	66	2%
72	2913	41	1%	2634	66	3%	2472	115	5%	2786	22	1%
73	1324	144	11%	1480	140	9%	1263	103	8%	1304	4	0%
74	1044	157	15%	1291	155	12%	872	148	17%	1287	99	8%
75	1184	114	10%	1058	62	6%	1030	127	12%	1206	44	4%

Net Change

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	1189	28	0%	1250	55	0%	1010	37	0%	942	16	0%
2	1349	33	0%	1433	60	0%	734	22	-1%	673	13	0%
3	-205	1	0%	88	-6	0%	-475	-22	0%	-372	-11	0%
4	623	4	0%	517	11	0%	235	8	0%	173	5	0%
5	209	28	0%	-2	17	2%	307	102	4%	-89	11	2%
6	-170	22	10%	-212	14	11%	-269	-54	3%	-364	8	17%
7	267	55	1%	192	46	1%	260	76	1%	135	21	1%
8	700	96	4%	625	93	2%	536	82	3%	255	38	4%
9	-281	-77	-5%	-333	-71	-3%	-363	-148	-12%	-402	-40	-2%
10	280	0	0%	195	3	0%	462	10	0%	362	6	0%
11	26	21	1%	-171	26	1%	38	23	1%	65	3	0%
12	15	21	1%	-180	26	1%	38	22	1%	69	2	0%
13	418	18	-2%	393	28	-2%	317	36	-1%	-143	14	4%
14	172	2	-1%	113	-3	-1%	50	2	0%	402	0	0%
15	276	2	-2%	260	1	-3%	159	1	-4%	760	2	-3%
16	27	3	0%	84	-2	-1%	81	-12	-3%	30	-11	-2%
17	72	0	0%	59	-2	0%	99	-1	-1%	55	1	0%
18	-16	0	0%	-50	-3	0%	62	-4	-1%	-18	-5	0%
19	-41	-1	0%	-61	-2	0%	38	-4	-1%	-12	-5	0%
20	8	-2	0%	-45	-3	0%	117	-5	-1%	19	-5	0%
21	-35	0	0%	-41	-1	0%	97	-4	-1%	-74	-4	0%
22	13	-1	0%	0	-2	0%	-14	0	0%	101	1	0%
23	27	-2	0%	8	0	0%	9	-2	0%	21	1	0%
24	21	-1	0%	0	0	0%	16	-2	0%	39	1	0%
25	28	0	0%	-10	0	0%	2	0	0%	24	0	0%
26	24	0	-2%	-9	0	0%	0	0	0%	14	0	-1%
27	15	0	0%	-24	0	0%	3	0	0%	17	0	0%
28	52	92	8%	49	16	1%	2	2	0%	-9	1	0%
29	166	94	5%	218	8	-1%	1	3	0%	-3	0	0%
30	172	95	4%	231	9	0%	2	3	0%	6	1	0%
31	544	97	2%	416	32	0%	-3	2	0%	-10	-1	0%
32	-1	0	0%	-20	0	0%	1	0	0%	-18	0	0%
33	0	0	0%	-19	0	0%	1	0	0%	-17	0	0%
34	-3	0	0%	-7	0	1%	-1	0	1%	150	1	-28%
35	1	0	0%	-7	0	2%	-1	0	2%	159	2	-59%
36	20	1	0%	-31	-1	0%	4	0	0%	197	3	-2%
37	20	1	0%	-31	-1	0%	4	0	0%	197	3	-2%
38	20	1	0%	-31	-1	0%	4	0	0%	197	3	-2%
39	21	0	-3%	-21	0	4%	0	0	0%	125	1	-49%
40	42	0	-1%	-25	0	1%	13	1	0%	182	-2	-3%
41	0	0	0%	0	0	0%	5	0	0%	128	0	-8%
42	0	0	0%	0	0	0%	5	0	-1%	128	0	-10%
43	45	0	0%	-35	-3	0%	9	-1	0%	306	0	-1%
44	42	-1	0%	-94	-5	0%	15	-1	0%	279	0	-2%
45	-75	-1	0%	130	1	0%	15	-1	0%	-42	1	0%
46	14	0	0%	-24	3	0%	16	0	0%	240	0	-1%
47	-24	0	0%	-1	3	0%	23	0	0%	256	1	-1%
48	-42	-1	0%	-5	3	0%	19	0	0%	266	3	-1%
49	-24	0	0%	-1	3	0%	23	0	0%	271	3	-1%
50	-13	0	0%	5	1	0%	17	0	0%	253	5	0%
51	-50	0	0%	-23	-2	0%	12	0	0%	-49	2	0%
52	-52	1	0%	-33	-3	0%	10	0	0%	-40	2	0%
53	22	2	0%	-42	1	0%	1	-1	0%	-10	0	0%
54	8	0	0%	53	0	0%	22	1	0%	27	0	0%
55	8	0	0%	53	0	0%	22	1	0%	27	0	0%
56	-12	-1	0%	-121	-1	0%	-2	1	0%	216	5	0%
57	-35	-1	0%	-170	-4	0%	3	1	0%	257	5	0%
58	99	2	0%	-231	-4	0%	-4	1	0%	147	4	0%
59	170	3	-2%	49	-2	-1%	23	-1	0%	8	-1	0%
60	183	4	0%	-106	0	0%	6	0	0%	-17	-1	0%
61	54	0	0%	-30	-2	0%	10	0	0%	18	0	0%
62	12	-1	0%	-8	-5	-1%	1	-1	0%	23	0	0%
63	-2	1	0%	-2	3	0%	-4	1	0%	-38	-1	0%
64	43	1	0%	0	0	0%	-2	0	0%	-18	0	0%
65	22	0	0%	1	0	0%	-4	1	0%	-21	0	0%
66	7	0	0%	-7	1	0%	27	0	0%	47	0	0%
67	364	4	0%	407	11	0%	191	7	0%	255	3	0%
68	424	3	0%	365	9	0%	368	13	0%	327	3	0%
69	433	20	0%	407	32	1%	436	17	0%	354	9	0%
70	118	0	0%	108	0	0%	69	2	0%	8	2	0%
71	226	11	0%	224	21	0%	236	3	0%	120	7	0%
72	123	0	0%	110	6	0%	173	4	0%	136	-1	0%
73	-96	20	2%	-48	34	3%	-7	-1	0%	6	0	0%
74	-93	39	5%	43	33	2%	10	2	0%	-18	-2	0%
75	175	64	5%	51	7	0%	3	1	0%	-24	0	0%

% Change

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	20%	21%	0%	23%	36%	0%	22%	19%	0%	19%	21%	0%
2	29%	20%	0%	33%	33%	0%	19%	9%	-1%	15%	11%	0%
3	-5%	1%	0%	2%	-4%	0%	-13%	-11%	0%	-8%	-11%	0%
4	25%	13%	0%	20%	19%	0%	10%	15%	0%	8%	18%	0%
5	26%	25%	0%	0%	17%	2%	37%	70%	4%	-9%	18%	2%
6	-28%	29%	10%	-36%	19%	11%	-44%	-36%	3%	-64%	20%	17%
7	23%	30%	1%	20%	29%	1%	22%	30%	1%	16%	27%	1%
8	150%	300%	4%	159%	216%	2%	132%	210%	3%	63%	238%	4%
9	-27%	-56%	-5%	-33%	-46%	-3%	-37%	-74%	-12%	-45%	-57%	-2%
10	10%	0%	0%	7%	13%	0%	19%	22%	0%	16%	22%	0%
11	1%	9%	1%	-4%	10%	1%	1%	7%	1%	2%	2%	0%
12	0%	10%	1%	-5%	12%	1%	1%	7%	1%	2%	1%	0%
13	50%	22%	-2%	48%	23%	-2%	35%	24%	-1%	-18%	24%	4%
14	23%	6%	-1%	14%	-8%	-1%	8%	8%	0%	57%	0%	0%
15	87%	14%	-2%	86%	5%	-3%	65%	4%	-4%	254%	14%	-3%
16	4%	6%	0%	10%	-4%	-1%	14%	-19%	-3%	4%	-28%	-2%
17	8%	0%	0%	6%	-6%	0%	16%	-4%	-1%	5%	6%	0%
18	-1%	0%	0%	-3%	-7%	0%	6%	-9%	-1%	-1%	-16%	0%
19	-5%	-5%	0%	-6%	-7%	0%	5%	-11%	-1%	-1%	-18%	0%
20	1%	-5%	0%	-3%	-6%	0%	10%	-10%	-1%	1%	-14%	0%
21	-3%	0%	0%	-3%	-3%	0%	8%	-12%	-1%	-4%	-15%	0%
22	1%	-1%	0%	0%	-2%	0%	-1%	0%	0%	6%	2%	0%
23	2%	-7%	0%	1%	0%	0%	1%	-9%	0%	2%	6%	0%
24	2%	-5%	0%	0%	0%	0%	2%	-12%	0%	4%	7%	0%
25	9%	0%	0%	-2%	0%	0%	1%	0%	0%	8%	0%	0%
26	22%	0%	-2%	-2%	0%	0%	0%	0%	0%	11%	0%	-1%
27	4%	0%	0%	-5%	0%	0%	1%	0%	0%	3%	0%	0%
28	5%	84%	8%	5%	14%	1%	0%	1%	0%	-1%	1%	0%
29	11%	80%	5%	17%	6%	-1%	0%	1%	0%	0%	0%	0%
30	8%	80%	4%	13%	7%	0%	0%	1%	0%	0%	1%	0%
31	20%	44%	2%	22%	17%	0%	0%	1%	0%	0%	-1%	0%
32	0%	0%	0%	-5%	0%	0%	0%	0%	0%	-5%	0%	0%
33	0%	0%	0%	-5%	0%	0%	0%	0%	0%	-5%	0%	0%
34	-2%	0%	0%	-5%	0%	1%	-2%	0%	1%	205%	3%	-28%
35	1%	0%	0%	-6%	0%	2%	-2%	0%	2%	398%	7%	-59%
36	3%	2%	0%	-5%	-2%	0%	1%	0%	0%	49%	9%	-2%
37	3%	2%	0%	-5%	-2%	0%	1%	0%	0%	49%	9%	-2%
38	3%	2%	0%	-5%	-2%	0%	1%	0%	0%	49%	9%	-2%
39	7%	0%	-3%	-9%	0%	4%	0%	0%	0%	115%	1%	-49%
40	6%	0%	-1%	-3%	0%	1%	2%	1%	0%	24%	-2%	-3%
41	0%	0%	0%	0%	0%	0%	2%	0%	0%	56%	0%	-8%
42	0%	0%	0%	0%	0%	0%	2%	0%	-1%	51%	0%	-10%
43	1%	0%	0%	-1%	-1%	0%	1%	0%	0%	11%	0%	-1%
44	2%	0%	0%	-5%	-2%	0%	1%	0%	0%	15%	0%	-2%
45	-9%	-4%	0%	17%	3%	0%	2%	-2%	0%	-5%	8%	0%
46	1%	0%	0%	-1%	2%	0%	1%	0%	0%	13%	0%	-1%
47	-1%	0%	0%	0%	2%	0%	1%	0%	0%	14%	1%	-1%
48	-2%	-1%	0%	0%	3%	0%	1%	0%	0%	18%	4%	-1%
49	-1%	0%	0%	0%	3%	0%	1%	0%	0%	15%	3%	-1%
50	-1%	0%	0%	0%	1%	0%	1%	0%	0%	13%	5%	0%
51	-6%	0%	0%	-4%	-10%	0%	5%	0%	0%	-7%	13%	0%
52	-5%	3%	0%	-4%	-11%	0%	2%	0%	0%	-4%	11%	0%
53	1%	6%	0%	-2%	4%	0%	0%	-3%	0%	-1%	0%	0%
54	1%	0%	0%	7%	0%	0%	4%	13%	0%	3%	0%	0%
55	1%	0%	0%	7%	0%	0%	4%	13%	0%	3%	0%	0%
56	-1%	-7%	0%	-14%	-8%	0%	0%	3%	0%	31%	71%	0%
57	-2%	-4%	0%	-13%	-19%	0%	0%	3%	0%	23%	56%	0%
58	9%	6%	0%	-20%	-13%	0%	-1%	2%	0%	16%	17%	0%
59	23%	3%	-2%	5%	-2%	-1%	2%	-1%	0%	1%	-1%	0%
60	14%	7%	0%	-7%	0%	0%	1%	0%	0%	-1%	-2%	0%
61	6%	0%	0%	-3%	-5%	0%	1%	0%	0%	2%	0%	0%
62	1%	-4%	0%	-1%	-25%	-1%	0%	-8%	0%	2%	0%	0%
63	0%	3%	0%	0%	10%	0%	0%	2%	0%	-2%	-5%	0%
64	5%	4%	0%	0%	0%	0%	0%	0%	0%	-2%	0%	0%
65	3%	0%	0%	0%	0%	0%	-1%	3%	0%	-3%	0%	0%
66	1%	0%	0%	-2%	14%	0%	7%	0%	0%	8%	0%	0%
67	28%	36%	0%	38%	79%	0%	24%	21%	0%	34%	19%	0%
68	26%	12%	0%	21%	30%	0%	22%	20%	0%	16%	147%	0%
69	19%	25%	0%	19%	37%	1%	26%	24%	0%	25%	24%	0%
70	9%		0%	8%		0%	5%	67%	0%	0%	11%	0%
71	7%	12%	0%	7%	27%	0%	9%	2%	0%	4%	12%	0%
72	4%	0%	0%	4%	10%	0%	8%	4%	0%	5%	-4%	0%
73	-7%	16%	2%	-3%	32%	3%	-1%	-1%	0%	0%	0%	0%
74	-8%	33%	5%	3%	27%	2%	1%	1%	0%	-1%	-2%	0%
75	17%	128%	5%	5%	13%	0%	0%	1%	0%	-2%	0%	0%

Highway Flows 2047

2047 Future Baseline

ID	Highway Link	AM1			AM2			IP			PM		
		All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	M23 SPUR, J9-SOUTH TERMINAL ROUNDABOUT	5939	151	3%	5619	190	3%	4785	232	5%	5067	85	2%
2	A23 AIRPORT WAY,	4717	173	4%	4355	217	5%	4042	276	7%	4649	128	3%
3	A23 LONDON ROAD, NORTH TERMINAL-LONGBRIDGE ROUNDABOUT	4269	153	4%	4323	149	3%	3977	214	5%	4718	105	2%
4	NORTH TERMINAL ENTRY/EXIT	2677	34	1%	2626	63	2%	2441	59	2%	2307	30	1%
5	LONGBRIDGE WAY	953	128	13%	875	118	13%	917	181	20%	1175	71	6%
6	NORTHGATE ROAD	770	99	13%	673	89	13%	729	172	24%	722	48	7%
7	PERIMETER ROAD NORTH, LONGBRIDGE WAY	1314	224	17%	1081	189	17%	1370	313	23%	968	95	10%
8	GATWICK WAY	356	34	10%	339	44	13%	332	35	11%	538	16	3%
9	PERIMETER ROAD NORTH, SOUTH TERMINAL-NORTH TERMINAL	1077	160	15%	1036	170	16%	955	218	23%	895	76	8%
10	SOUTH TERMINAL ENTRY/EXIT	2883	16	1%	2842	27	1%	2535	52	2%	2510	29	1%
11	A23 LONDON ROAD, BEEHIVE RING ROAD-SOUTH TERMINAL	3697	252	7%	3942	276	7%	3673	337	9%	3813	173	5%
12	A23 LONDON ROAD, BEEHIVE RING ROAD-A23 LONDON ROAD	3611	233	6%	3855	228	6%	3656	318	9%	3850	170	4%
13	PERIMETER ROAD SOUTH, AT GATWICK ROAD ROUNDABOUT	900	87	10%	860	125	15%	982	170	17%	472	63	13%
14	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-CHARLWOOD ROAD/CHURCH ROAD	831	33	4%	741	40	5%	747	29	4%	1112	12	1%
15	OLD BRIGHTON ROAD SOUTH, LOWFIELD HEATH ROUNDABOUT-PERIMETER ROAD SOUTH	334	21	6%	327	31	9%	272	25	9%	722	17	2%
16	LOWFIELD HEATH ROAD, CHARLWOOD ROAD-HORLEY ROAD/THE STREET	750	60	8%	903	68	8%	742	69	9%	815	41	5%
17	RADFORD ROAD, GATWICK ROAD-STEERS LANE	992	42	4%	1079	39	4%	782	26	3%	1065	18	2%
18	B2036 BALCOMBE ROAD, A2011 CRAWLEY AVENUE-STEERS LANE	1417	38	3%	1681	52	3%	1218	46	4%	1696	29	2%
19	B2036 BALCOME ROAD, STEERS LANE-RADFORD ROAD	982	21	2%	1203	31	3%	837	38	5%	1326	27	2%
20	B2036 BALCOMBE ROAD, RADFORD ROAD-B2037 ANTLANDS LANE	1570	42	3%	1701	48	3%	1387	54	4%	2030	34	2%
21	B2036 BALCOMBE ROAD, B2037 ANTLANDS LANE-VICTORIA ROAD	1277	24	2%	1483	29	2%	1345	36	3%	1810	27	1%
22	GATWICK ROAD, FLEMING WAY-RUTHERFORD WAY	1581	94	6%	1782	91	5%	1332	97	7%	1848	70	4%
23	B2037 ANTLANDS LANE, B2036 BALCOME ROAD-SHIPLEY BRIDGE LANE	1470	32	2%	1432	26	2%	1314	25	2%	1348	15	1%
24	B2037 ANTLANDS LANE, SHIPLEY BRIDGE LANE-COPTHORNE BANK/REDEHALL ROAD	1154	25	2%	1082	22	2%	1042	18	2%	885	11	1%
25	WOODCOTE SIDE, WOODCOTE GREEN ROAD-A24 DORKING ROAD	506	10	2%	847	10	1%	155	9	6%	397	8	2%
26	WOODCOTE GREEN ROAD, WOODCOTE SIDE ROAD-WOODCOTE HURST	299	15	5%	627	15	2%	14	14	100%	199	14	7%
27	WOODCOTE GREEN ROAD, WOODCOTE HURST-AVENUE ROAD	482	20	4%	762	20	3%	333	20	6%	587	16	3%
28	B386 LONGCROSS ROAD/HOLLOWAY HILL/CHERTSEY ROAD, A230 GUILDFORD ROAD-B383 WINDSOR ROAD	1240	127	10%	1223	113	9%	792	272	34%	970	131	14%
29	A320 GUILDFORD ROAD, HOLLOWAY HILL-HILLWOOD DRIVE/BITTAMS LANE	1470	121	8%	1334	131	10%	1859	294	16%	2065	138	7%
30	A320 GUILDFORD ROAD, HILLSWOOD DRIVE/BITTAMS LANE-A320 SAINT PETERS WAY	2050	127	6%	1869	134	7%	2362	297	13%	2545	137	5%
31	A320 SAINT PETERS WAY, A320 GUILDFORD ROAD-M25 J11	2565	233	9%	1933	189	10%	3328	400	12%	3583	146	4%
32	BEDDINGTON FARM ROAD/ MARLOWE WAY, B272 BEDDINGTON LANE-BEDDINGTON FARM ROAD	399	15	4%	285	12	4%	293	10	3%	370	11	3%
33	BEDDINGTON FARM ROAD/ MARLOWE WAY, A23 PURLEY WAY-BEDDINGTON FARM ROAD	391	7	2%	277	5	2%	286	3	1%	362	3	1%
34	WADDON NEW ROAD/CAIRO NEW ROAD, RECTORY GROVE-REEVES CORNER	229	35	15%	201	33	16%	64	31	48%	74	31	42%
35	REEVES CORNER, REEVES CORNER-CAIRO NEW ROAD	201	34	17%	179	33	18%	43	30	70%	42	30	71%
36	REEVES CORNER, REEVES CORNER-CHURCH ROAD	722	48	7%	631	46	7%	333	39	12%	427	34	8%
37	CHURCH STREET/DRUMMOND ROAD, CHURCH STREET/REEVES CORNER-FIRTH ROAD	638	48	8%	628	46	7%	333	39	12%	427	34	8%
38	FIRTH ROAD, DRUMMOND STREET-TAMWORTH ROAD	722	48	7%	631	46	7%	333	39	12%	427	34	8%
39	LONDON ROAD, DERBY ROAD-MEAD PLACE/OAKFIELD ROAD	398	106	27%	383	105	27%	210	103	49%	104	101	97%
40	LONDON ROAD, DERBY ROAD-STATION ROAD	909	115	13%	808	114	14%	766	111	14%	838	108	13%
41	POPLAR WALK/NORTH END, STATION ROAD-ST MICHAELS ROAD	50	50	100%	50	50	100%	252	52	21%	238	51	21%
42	POPLAR WALK, ST MICHAELS ROAD-A212 WELLESLEY ROAD	70	70	100%	70	70	100%	272	71	26%	257	70	27%
43	A212 WELLESLEY ROAD, POPLAR WALK-STATION ROAD	3682	232	6%	3358	215	6%	2140	216	10%	3107	196	6%
44	A212 WELLESLEY ROAD, POPLAR WALK-SYDENHAM ROAD	2566	276	11%	2149	263	12%	1627	269	17%	2195	258	12%
45	A212 LOWER COMBE STREET, SOUTH END-236 SOUTHBRIDGE ROAD	757	19	3%	801	19	2%	896	41	5%	850	10	1%
46	A235 SOUTH END, A235 BRIGHTON ROAD/B275 WARHAM ROAD-ABERDEEN ROAD	2064	179	9%	1981	169	9%	1731	184	11%	1867	144	8%
47	A235 BRIGHTON ROAD, A235 SOUTH END/B275 WARHAM ROAD-BARTLETT STREET	2332	142	6%	2227	133	6%	1729	141	8%	2052	104	5%
48	A235 BRIGHTON ROAD, BARTLETT STREET-BARTLETT STREET	1970	124	6%	1842	112	6%	1417	121	9%	1748	86	5%
49	A235 BRIGHTON ROAD, BARTLETT STREET-UPLAND ROAD	2260	136	6%	2133	124	6%	1692	132	8%	2031	90	4%
50	A235 BRIGHTON ROAD, UPLAND ROAD-HALING PARK ROAD	2351	137	6%	2213	126	6%	1973	143	7%	2243	96	4%
51	B275 ST PETERS ROAD, ABERDEEN ROAD/TEMPLE ROAD-BLUNT ROAD	680	20	3%	702	23	3%	370	16	4%	830	17	2%
52	B275 ST PETERS ROAD, A235 SOUTH END/B234 CROHAM ROAD	921	26	3%	937	28	3%	540	21	4%	1053	20	2%
53	A232 FAIRFIELD ROAD, B243 PARK HILL ROAD-A222 ADDISCOMBE GROVE	2046	34	2%	1844	31	2%	1672	37	2%	1825	9	0%
54	LESLIE PARK ROAD, LEBANON ROAD-ADDISCOMBE COURT ROAD	598	12	2%	674	10	1%	776	11	1%	882	8	1%
55	LESLIE PARK ROAD, A222 LOWER ADDISCOMBE ROAD-ADDISCOMBE COURT ROAD	596	12	2%	676	10	1%	776	11	1%	882	8	1%
56	A213 WINDMILL ROAD, A222 ST JAMES'S-ST JAMES'S PARK	1193	16	1%	1013	15	1%	661	31	5%	887	9	1%
57	A213 WINDMILL ROAD, ST JAMES'S PARK-QUEENS ROAD	1673	27	2%	1451	24	2%	1081	40	4%	1333	11	1%
58	A213 WINDMILL ROAD, QUEENS ROAD-A212 WHITEHORSE ROAD	1198	35	3%	1037	31	3%	867	47	5%	973	25	3%
59	A212 WHITEHORSE ROAD, A213 WINDMILL ROAD-UNION ROAD	820	95	12%	919	90	10%	1017	103	10%	902	84	9%
60	HOGARTH CRESCENT, A222 ST JAMES'S ROAD-A212 WHITEHORSE ROAD	1443	63	4%	1411	57	4%	1264	68	5%	1454	47	3%
61	B266 WHITEHORSE LANE, PARK ROAD-CANHAM ROAD	1315	55	4%	1166	46	4%	935	43	5%	1063	36	3%
62	A212 CHURCH ROAD, A215 SOUTH NORWOOD HILL-STAMBOURNE WOODLAND WALK	1612	48	3%	1463	39	3%	796	13	2%	1262	13	1%
63	A213 CROYDON ROAD/PENGE ROADA214 ANERLEY ROAD-SUNNY BANK	1420	25	2%	1620	24	1%	1537	43	3%	1694	15	1%
64	A213 SUNNY BANK, A213 PENGE ROAD-MANOR ROAD	800	21	3%	1078	26	2%	946	28	3%	986	20	2%
65	MANOR ROAD, A213 SUNNY BANK-A215 SOUTH NORWOOD HILL	463	17	4%	715	22	3%	740	27	4%	664	19	3%
66	CARMICHAEL ROAD/BIRCHANGER ROADCLIFFORD ROAD-ELBOROUGH ROAD	626	13	2%	872	15	2%	496	10	2%	659	4	1%
67	M23 J9, NB SLIP (SOUTH OF J9)	1320	12	1%	1124	20	2%	839	42	5%	817	18	2%
68	M23 J9, NB SLIP (NORTH OF J9)	1760	28	2%	1741	44	3%	1737	77	4%	2132	20	1%
69	M23 J9, SB SLIP (NORTH OF J9)	2255	91	4%	2179	99	5%	1622	81	5%	1465	42	3%
70	M25 J7, EB SLIP TO M23 J8 SB	1549	0	0%	1687	2	0%	1674	16	1%	1806	25	1%
71	M23 J8, SB SLIP FROM M25	3431	109	3%	3549	91	3%	2949	168	6%	3428	72	2%
72	M23 J8, NB SLIP TO M25 EB	2970	45	2%	2640	80	3%	2528	123	5%	2818	27	1%
73	M25 J11, NB SLIP (NORTH OF J11)	1633	120	7%	1548	113	7%	1284	101	8%	1243	4	0%
74	M25 J11, NB SLIP (SOUTH OF J11)	1321	89	7%	1386	121	9%	869	165	19%	1231	87	7%
75	M25 J11, SB SLIP (SOUTH OF J11)	998	71	7%	1085	55	5%	1094	122	11%	1278	47	4%

2047 Future Baseline + Project

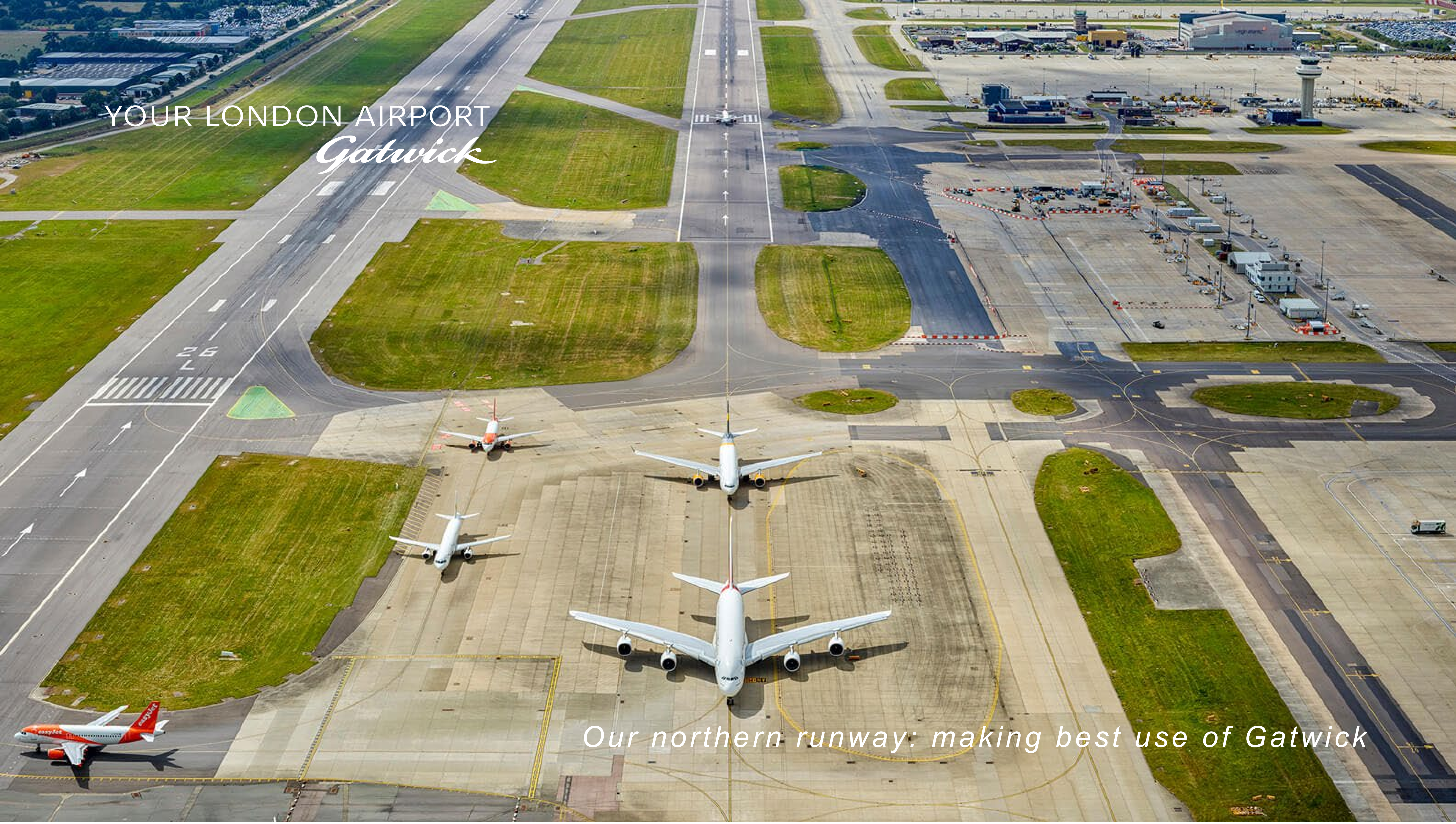
ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	7221	177	2%	6973	241	3%	6121	264	4%	6219	114	2%
2	6078	217	4%	5900	273	5%	5035	296	6%	5437	150	3%
3	4064	147	4%	4352	134	3%	3470	191	6%	4285	82	2%
4	3485	39	1%	3351	75	2%	2773	67	2%	2463	36	1%
5	1181	157	13%	953	132	14%	1289	278	22%	940	79	8%
6	463	110	24%	396	97	24%	382	108	28%	221	54	24%
7	1559	269	17%	1273	228	18%	1597	376	24%	1075	111	10%
8	1069	142	13%	982	140	14%	983	134	14%	736	65	9%
9	651	62	10%	632	80	13%	631	53	8%	543	37	7%
10	3220	16	0%	3110	29	1%	3074	62	2%	2868	36	1%
11	3743	258	7%	3815	309	8%	3678	356	10%	3950	176	4%
12	3640	239	7%	3717	261	7%	3663	337	9%	3988	172	4%
13	1321	106	8%	1255	158	13%	1282	203	16%	758	80	11%
14	935	35	4%	781	39	5%	782	28	4%	1155	9	1%
15	617	23	4%	586	28	5%	447	27	6%	1052	17	2%
16	841	62	7%	983	61	6%	834	54	6%	821	30	4%
17	1116	41	4%	1132	38	3%	846	25	3%	1126	17	2%
18	1490	40	3%	1648	51	3%	1216	46	4%	1626	25	2%
19	1015	23	2%	1171	31	3%	846	38	4%	1353	22	2%
20	1591	42	3%	1699	46	3%	1474	54	4%	2051	29	1%
21	1265	25	2%	1495	30	2%	1414	35	2%	1784	22	1%
22	1595	93	6%	1728	91	5%	1288	96	7%	1882	70	4%
23	1485	31	2%	1432	24	2%	1315	24	2%	1337	14	1%
24	1166	24	2%	1088	20	2%	1048	17	2%	888	10	1%
25	528	10	2%	1194	15	1%	156	9	6%	404	8	2%
26	321	15	5%	972	20	2%	14	14	100%	207	14	7%
27	501	21	4%	1116	25	2%	336	20	6%	599	16	3%
28	1249	141	11%	1203	115	10%	799	271	34%	971	130	13%
29	1455	133	9%	1333	135	10%	1860	292	16%	2061	137	7%
30	2026	141	7%	1863	137	7%	2362	296	13%	2540	135	5%
31	2514	250	10%	1946	192	10%	3326	398	12%	3568	145	4%
32	435	15	3%	262	12	5%	304	10	3%	565	12	2%
33	427	8	2%	254	5	2%	297	3	1%	557	5	1%
34	230	35	15%	198	33	17%	65	31	48%	75	31	41%
35	203	34	17%	176	33	19%	43	30	70%	41	30	73%
36	723	49	7%	640	45	7%	335	39	12%	422	34	8%
37	638	49	8%	637	45	7%	335	39	12%	422	34	8%
38	723	49	7%	640	45	7%	335	39	12%	422	34	8%
39	412	107	26%	380	105	28%	211	103	49%	103	101	98%
40	916	115	13%	813	113	14%	773	111	14%	838	108	13%
41	50	50	100%	50	50	100%	253	52	21%	238	51	21%
42	70	70	100%	70	70	100%	272	71	26%	257	70	27%
43	3717	231	6%	3332	215	6%	2155	216	10%	3149	197	6%
44	2556	275	11%	2125	263	12%	1641	269	16%	2225	258	12%
45	779	20	3%	790	19	2%	882	41	5%	842	11	1%
46	2052	177	9%	2006	171	9%	1743	183	10%	1889	144	8%
47	2318	140	6%	2215	134	6%	1736	140	8%	2042	103	5%
48	1961	123	6%	1842	113	6%	1421	120	8%	1707	86	5%
49	2250	134	6%	2129	125	6%	1695	131	8%	1993	90	5%
50	2346	135	6%	2216	127	6%	1974	142	7%	2202	96	4%
51	718	22	3%	690	23	3%	384	17	4%	774	17	2%
52	953	28	3%	930	28	3%	554	21	4%	995	20	2%
53	2066	35	2%	1858	30	2%	1686	37	2%	1778	9	1%
54	556	11	2%	800	11	1%	782	12	2%	877	8	1%
55	556	11	2%	800	11	1%	782	12	2%	877	8	1%
56	1163	18	2%	983	15	2%	682	31	5%	838	9	1%
57	1665	29	2%	1401	24	2%	1113	40	4%	1285	11	1%
58	1162	34	3%	980	32	3%	895	47	5%	924	24	3%
59	804	93	12%	994	89	9%	999	103	10%	996	85	9%
60	1444	62	4%	1416	58	4%	1281	68	5%	1467	48	3%
61	1253	50	4%	1314	50	4%	929	43	5%	1060	36	3%
62	1533	45	3%	1610	41	3%	800	13	2%	1264	12	1%
63	1571	28	2%	1508	24	2%	1540	43	3%	1674	16	1%
64	926	23	2%	931	24	3%	958	29	3%	982	21	2%
65	600	19	3%	580	20	3%	747	27	4%	664	19	3%
66	755	12	2%	874	14	2%	501	9	2%	634	3	0%
67	1625	17	1%	1495	29	2%	1144	47	4%	1118	22	2%
68	2275	32	1%	2234	66	3%	2236	90	4%	2564	30	1%
69	2702	108	4%	2634	121	5%	2127	94	4%	1857	55	3%
70	1644	3	0%	1731	4	0%	1683	37	2%	1810	26	1%
71	3638	115	3%	3720	103	3%	3154	174	6%	3502	82	2%
72	3033	45	1%	2803	99	4%	2679	126	5%	2923	29	1%
73	1606	120	7%	1553	112	7%	1284	101	8%	1246	5	0%
74	1309	88	7%	1391	122	9%	872	162	19%	1220	85	7%
75	1008	87	9%	1096	57	5%	1089	123	11%	1271	48	4%

Net Change

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	1282	26	0%	1354	51	0%	1336	32	-1%	1152	29	0%
2	1361	44	0%	1545	56	0%	993	20	-1%	788	22	0%
3	-205	-6	0%	29	-15	0%	-507	-23	0%	-433	-23	0%
4	808	5	0%	725	12	0%	332	8	0%	156	6	0%
5	228	29	0%	78	14	0%	372	97	2%	-235	8	2%
6	-307	11	11%	-277	8	11%	-347	-64	5%	-501	6	18%
7	245	45	0%	192	39	0%	227	63	1%	107	16	1%
8	713	108	4%	643	96	1%	651	99	3%	198	49	6%
9	-426	-98	-5%	-404	-90	-4%	-324	-165	-14%	-352	-39	-2%
10	337	0	0%	268	2	0%	539	10	0%	358	7	0%
11	46	6	0%	-127	33	1%	5	19	1%	137	3	0%
12	29	6	0%	-138	33	1%	7	19	1%	138	2	0%
13	421	19	-2%	395	33	-2%	300	33	-1%	286	17	-3%
14	104	2	0%	40	-1	0%	35	-1	0%	43	-3	0%
15	283	2	-3%	259	-3	-5%	175	2	-3%	330	0	-1%
16	91	2	-1%	80	-7	-1%	92	-15	-3%	6	-11	-1%
17	124	-1	-1%	53	-1	0%	64	-1	0%	61	-1	0%
18	73	2	0%	-33	-1	0%	-2	0	0%	-70	-4	0%
19	33	2	0%	-32	0	0%	9	0	0%	27	-5	0%
20	21	0	0%	-2	-2	0%	87	0	0%	21	-5	0%
21	-12	1	0%	12	1	0%	69	-1	0%	-26	-5	0%
22	14	-1	0%	-54	0	0%	-44	-1	0%	34	0	0%
23	15	-1	0%	0	-2	0%	1	-1	0%	-11	-1	0%
24	12	-1	0%	6	-2	0%	6	-1	0%	3	-1	0%
25	22	0	0%	347	5	0%	1	0	0%	7	0	0%
26	22	0	0%	345	5	0%	0	0	0%	8	0	0%
27	19	1	0%	354	5	0%	3	0	0%	12	0	0%
28	9	14	1%	-20	2	0%	7	-1	0%	1	-1	0%
29	-15	12	1%	-1	4	0%	1	-2	0%	-4	-1	0%
30	-24	14	1%	-6	3	0%	0	-1	0%	-5	-2	0%
31	-51	17	1%	13	3	0%	-2	-2	0%	-15	-1	0%
32	36	0	0%	-23	0	0%	11	0	0%	195	1	-1%
33	36	1	0%	-23	0	0%	11	0	0%	195	2	0%
34	1	0	0%	-3	0	0%	1	0	-1%	1	0	-1%
35	2	0	0%	-3	0	0%	0	0	0%	-1	0	2%
36	1	1	0%	9	-1	0%	2	0	0%	-5	0	0%
37	0	1	0%	9	-1	0%	2	0	0%	-5	0	0%
38	1	1	0%	9	-1	0%	2	0	0%	-5	0	0%
39	14	1	-1%	-3	0	0%	1	0	0%	-1	0	1%
40	7	0	0%	5	-1	0%	7	0	0%	0	0	0%
41	0	0	0%	0	0	0%	1	0	0%	0	0	0%
42	0	0	0%	0	0	0%	0	0	0%	0	0	0%
43	35	-1	0%	-26	0	0%	15	0	0%	42	1	0%
44	-10	-1	0%	-24	0	0%	14	0	0%	30	0	0%
45	22	1	0%	-11	0	0%	-14	0	0%	-8	1	0%
46	-12	-2	0%	25	2	0%	12	-1	0%	22	0	0%
47	-14	-2	0%	-12	1	0%	7	-1	0%	-10	-1	0%
48	-9	-1	0%	0	1	0%	4	-1	0%	-41	0	0%
49	-10	-2	0%	-4	1	0%	3	-1	0%	-38	0	0%
50	-5	-2	0%	3	1	0%	1	-1	0%	-41	0	0%
51	38	2	0%	-12	0	0%	14	1	0%	-56	0	0%
52	32	2	0%	-7	0	0%	14	0	0%	-58	0	0%
53	20	1	0%	14	-1	0%	14	0	0%	-47	0	0%
54	-42	-1	0%	126	1	0%	6	1	0%	-5	0	0%
55	-40	-1	0%	124	1	0%	6	1	0%	-5	0	0%
56	-30	2	0%	-30	0	0%	21	0	0%	-49	0	0%
57	-8	2	0%	-50	0	0%	32	0	0%	-48	0	0%
58	-36	-1	0%	-57	1	0%	28	0	0%	-49	-1	0%
59	-16	-2	0%	75	-1	-1%	-18	0	0%	94	1	-1%
60	1	-1	0%	5	1	0%	17	0	0%	13	1	0%
61	-62	-5	0%	148	4	0%	-6	0	0%	-3	0	0%
62	-79	-3	0%	147	2	0%	4	0	0%	2	-1	0%
63	151	3	0%	-112	0	0%	3	0	0%	-20	1	0%
64	126	2	0%	-147	-2	0%	12	1	0%	-4	1	0%
65	137	2	-1%	-135	-2	0%	7	0	0%	0	0	0%
66	129	-1	0%	2	-1	0%	5	-1	0%	-25	-1	0%
67	305	5	0%	371	9	0%	305	5	-1%	301	4	0%
68	515	4	0%	493	22	0%	499	13	0%	432	10	0%
69	447	17	0%	455	22	0%	505	13	-1%	392	13	0%
70	95	3	0%	44	2	0%	9	21	1%	4	1	0%
71	207	6	0%	171	12	0%	205	6	0%	74	10	0%
72	63	0	0%	163	19	1%	151	3	0%	105	2	0%
73	-27	0	0%	5	-1	0%	0	0	0%	3	1	0%
74	-12	-1	0%	5	1	0%	3	-3	0%	-11	-2	0%
75	10	16	2%	11	2	0%	-5	1	0%	-7	1	0%

% Change

ID	AM1			AM2			IP			PM		
	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV	All	HGV	% HGV
1	22%	17%	0%	24%	27%	0%	28%	14%	-1%	23%	34%	0%
2	29%	25%	0%	35%	26%	0%	25%	7%	-1%	17%	17%	0%
3	-5%	-4%	0%	1%	-10%	0%	-13%	-11%	0%	-9%	-22%	0%
4	30%	15%	0%	28%	19%	0%	14%	14%	0%	7%	20%	0%
5	24%	23%	0%	9%	12%	0%	41%	54%	2%	-20%	11%	2%
6	-40%	11%	11%	-41%	9%	11%	-48%	-37%	5%	-69%	13%	18%
7	19%	20%	0%	18%	21%	0%	17%	20%	1%	11%	17%	1%
8	200%	318%	4%	190%	218%	1%	196%	283%	3%	37%	306%	6%
9	-40%	-61%	-5%	-39%	-53%	-4%	-34%	-76%	-14%	-39%	-51%	-2%
10	12%	0%	0%	9%	7%	0%	21%	19%	0%	14%	24%	0%
11	1%	2%	0%	-3%	12%	1%	0%	6%	1%	4%	2%	0%
12	1%	3%	0%	-4%	14%	1%	0%	6%	1%	4%	1%	0%
13	47%	22%	-2%	46%	26%	-2%	31%	19%	-1%	61%	27%	-3%
14	13%	6%	0%	5%	-3%	0%	5%	-3%	0%	4%	-25%	0%
15	85%	10%	-3%	79%	-10%	-5%	64%	8%	-3%	46%	0%	-1%
16	12%	3%	-1%	9%	-10%	-1%	12%	-22%	-3%	1%	-27%	-1%
17	13%	-2%	-1%	5%	-3%	0%	8%	-4%	0%	6%	-6%	0%
18	5%	5%	0%	-2%	-2%	0%	0%	0%	0%	-4%	-14%	0%
19	3%	10%	0%	-3%	0%	0%	1%	0%	0%	2%	-19%	0%
20	1%	0%	0%	0%	-4%	0%	6%	0%	0%	1%	-15%	0%
21	-1%	4%	0%	1%	3%	0%	5%	-3%	0%	-1%	-19%	0%
22	1%	-1%	0%	-3%	0%	0%	-3%	-1%	0%	2%	0%	0%
23	1%	-3%	0%	0%	-8%	0%	0%	-4%	0%	-1%	-7%	0%
24	1%	-4%	0%	1%	-9%	0%	1%	-6%	0%	0%	-9%	0%
25	4%	0%	0%	41%	50%	0%	1%	0%	0%	2%	0%	0%
26	7%	0%	0%	55%	33%	0%	0%	0%	0%	4%	0%	0%
27	4%	5%	0%	46%	25%	0%	1%	0%	0%	2%	0%	0%
28	1%	11%	1%	-2%	2%	0%	1%	0%	0%	0%	-1%	0%
29	-1%	10%	1%	0%	3%	0%	0%	-1%	0%	0%	-1%	0%
30	-1%	11%	1%	0%	2%	0%	0%	0%	0%	0%	-1%	0%
31	-2%	7%	1%	1%	2%	0%	0%	-1%	0%	0%	-1%	0%
32	9%	0%	0%	-8%	0%	0%	4%	0%	0%	53%	9%	-1%
33	9%	14%	0%	-8%	0%	0%	4%	0%	0%	54%	67%	0%
34	0%	0%	0%	-1%	0%	0%	2%	0%	-1%	1%	0%	-1%
35	1%	0%	0%	-2%	0%	0%	0%	0%	0%	-2%	0%	2%
36	0%	2%	0%	1%	-2%	0%	1%	0%	0%	-1%	0%	0%
37	0%	2%	0%	1%	-2%	0%	1%	0%	0%	-1%	0%	0%
38	0%	2%	0%	1%	-2%	0%	1%	0%	0%	-1%	0%	0%
39	4%	1%	-1%	-1%	0%	0%	0%	0%	0%	-1%	0%	1%
40	1%	0%	0%	1%	-1%	0%	1%	0%	0%	0%	0%	0%
41	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
42	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
43	1%	0%	0%	-1%	0%	0%	1%	0%	0%	1%	1%	0%
44	0%	0%	0%	-1%	0%	0%	1%	0%	0%	1%	0%	0%
45	3%	5%	0%	-1%	0%	0%	-2%	0%	0%	-1%	10%	0%
46	-1%	-1%	0%	1%	1%	0%	1%	-1%	0%	1%	0%	0%
47	-1%	-1%	0%	-1%	1%	0%	0%	-1%	0%	0%	-1%	0%
48	0%	-1%	0%	0%	1%	0%	0%	-1%	0%	-2%	0%	0%
49	0%	-1%	0%	0%	1%	0%	0%	-1%	0%	-2%	0%	0%
50	0%	-1%	0%	0%	1%	0%	0%	-1%	0%	-2%	0%	0%
51	6%	10%	0%	-2%	0%	0%	4%	6%	0%	-7%	0%	0%
52	3%	8%	0%	-1%	0%	0%	3%	0%	0%	-6%	0%	0%
53	1%	3%	0%	1%	-3%	0%	1%	0%	0%	-3%	0%	0%
54	-7%	-8%	0%	19%	10%	0%	1%	9%	0%	-1%	0%	0%
55	-7%	-8%	0%	18%	10%	0%	1%	9%	0%	-1%	0%	0%
56	-3%	13%	0%	-3%	0%	0%	3%	0%	0%	-6%	0%	0%
57	0%	7%	0%	-3%	0%	0%	3%	0%	0%	-4%	0%	0%
58	-3%	-3%	0%	-5%	3%	0%	3%	0%	0%	-5%	-4%	0%
59	-2%	-2%	0%	8%	-1%	-1%	-2%	0%	0%	10%	1%	-1%
60	0%	-2%	0%	0%	2%	0%	1%	0%	0%	1%	2%	0%
61	-5%	-9%	0%	13%	9%	0%	-1%	0%	0%	0%	0%	0%
62	-5%	-6%	0%	10%	5%	0%	1%	0%	0%	0%	-8%	0%
63	11%	12%	0%	-7%	0%	0%	0%	0%	0%	-1%	7%	0%
64	16%	10%	0%	-14%	-8%	0%	1%	4%	0%	0%	5%	0%
65	30%	12%	-1%	-19%	-9%	0%	1%	0%	0%	0%	0%	0%
66	21%	-8%	0%	0%	-7%	0%	1%	-10%	0%	-4%	-25%	0%
67	23%	42%	0%	33%	45%	0%	36%	12%	-1%	37%	22%	0%
68	29%	14%	0%	28%	50%	0%	29%	17%	0%	20%	147%	0%
69	20%	19%	0%	21%	22%	0%	31%	16%	-1%	27%	31%	0%
70	6%	0%	0%	3%	100%	0%	1%	131%	1%	0%	4%	0%
71	6%	6%	0%	5%	13%	0%	7%	4%	0%	2%	14%	0%
72	2%	0%	0%	6%	24%	1%	6%	2%	0%	4%	7%	0%
73	-2%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	25%	0%
74	-1%	-1%	0%	0%	1%	0%	0%	-2%	0%	-1%	-2%	0%
75	1%	23%	2%	1%	4%	0%	0%	1%	0%	-1%	2%	0%



Preliminary Environmental Information Report
Appendix 13.2.1: Summary of Local Planning Policy: Air Quality
September 2021

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1 Introduction

1.1.1 This document forms Appendix 13.2.1 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process for the proposal to make best use of Gatwick Airport's existing runways (referred to within this report as 'the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in the Chapter 5: Project Description.

2 Local Planning Policy

Table 2.1.1: Local Planning Policy

Policy	Summary
Adopted Policy	
Crawley Borough Council Air Quality Action Plan 2018	
Priority 3 Sustainability (Planning and Policy Guidance)	This priority highlights the aim of the local planning authority to strengthen local planning policy for air quality on future developments, emissions mitigation and reduction reporting through the requirement for damage cost calculations.
Crawley 2030: Crawley Borough Local Plan 2030	
Policy ENV12 Air Quality	This policy states that development proposals must *"not result in a material negative impact on air quality"*. Proposals must *"be supported by evidence detailing the air quality impact of the proposed development"* and outline appropriate mitigation that will be implemented to minimise the impact on air quality. Development proposals within a declared Air Quality Management Area (AQMA), setting out measures to address objectives in the relevant Air Quality Action Plan.
Horsham District Planning Framework (excluding South Downs National Park) 2015	
Strategic Policy 24 Environmental Protection	Horsham District has declared the whole district an 'Emission Reduction Area' under this policy and therefore all developments must endeavour to minimise emissions (air pollution and greenhouse gas) and where necessary, offset the development's impacts on the environment.
Mid Sussex District Plan 2014 – 2031	
DP29: Noise, Air and Light Pollution	This policy states that developments should not *"cause unacceptable levels of air pollution"* and proposals should be *"consistent with Air Quality Management Plans"*.
The Mole Valley Core Strategy	
CS Policy 20: Reduced Flood Risk and Environmental Pollution	This policy ensures that development is not proposed if it *"is likely to lead to a significant increase in pollution (be that to air, water or noise)"*.
Reigate and Banstead Local Plan: Core Strategy 2014	
Policy CS9: Gatwick Airport	This policy sets out the evidence base and consultation the council requires to "*support the development of Gatwick Airport, within the existing airport boundary and existing legal limits*".
Policy CS10 Sustainable development	This policy sets a requirement for proposed developments to be designed to minimise air pollution.
Reigate and Banstead Local Plan Development Management Plan 2019	
Policy DES8: Construction management	Construction management statements may be required for proposed developments under this policy, which must set out potential dust, emissions and odour impacts and mitigation measures to minimise these.
Policy DES9: Pollution and contaminated land	This policy states that developments will only be permitted if they will not result in a significant adverse impact on air quality at construction or operational phases. Where a development is proposed in an area of poor air quality (such as AQMAs), it must be designed to minimise the user's exposure to internal and external air pollution.
Tandridge District Core Strategy 2008	
Policy CSP 16 Aviation Development	Although the document states that "*poor air quality is not a significant issue in Tandridge*", it is stipulated in this policy that when referring to Gatwick Airport "*the Council will oppose any expansion beyond the agreed limits that would adversely affect communities in Tandridge by way of aircraft noise or reduced air quality*".
Tandridge Local Plan Part 2: Detailed Policies 2014 – 2029	
DP22: Minimising Contamination, Hazards & Pollution	There is a section in this policy specifically on air pollution. Under this policy, a development would only be permitted "*provided it would not have an adverse impact on health, the natural or built environment or amenity of existing or proposed uses by virtue of odour, dust and/or other forms of air pollution*". In addition, it will not be permitted if it is "*likely to suffer unacceptable nuisance*" from existing sources of these emissions.
Surrey County Council Electric Vehicle Strategy	
Surrey Transport Plan: Electric Vehicle Strategy (2018)	Surrey County Council produced this document as part of a wider sustainable transport approach to the area. Through this strategy the council hope that a transition from conventional to electric vehicles will improve air quality in the area through reduced exhaust emissions.
Surrey County Council Low Emissions Transport Strategy	
Surrey Transport Plan: Low Emissions Transport Strategy (2018)	The aim of the low emissions transport strategy is "*to reduce polluting emissions from road transport across the county which are harmful to health and the environment, and work with partners to achieve legal compliance for air quality locally*". This will be achieved through a variety of measures such as changing travel behaviour, promoting electric vehicles and considering "*air quality issues in planning*".

Policy	Summary
Emerging Policy	
Consultation on Proposed Changes to Crawley's Air Quality Management Area (AQMA)	
Proposed extension to Hazelwick AQMA	Due to monitoring exceedances of nitrogen dioxide (NO_2) in an area just outside of the Hazelwick AQMA, the AQMA is proposed to be extended to "*include the Three Bridges area, forming a single extended 'Crawley AQMA'*". This will add an additional area onto the south eastern 'arm' of the current AQMA. Consultation has ended and the extension recommendation has been approved.
Draft Crawley Borough Local Plan 2021-2037	
Policy EP5: Air Quality	This policy states that "*development should help to improve air quality and enhance the environment*" with background air pollution levels reduced through "*sustainable design principles*" of the development. With regards to odour emissions, the policy states that "*where amenity sensitive development is proposed within 800 metres of a Waste Water Treatment Works an Odour Impact Assessment will be required as part of the planning application*".
Strategic Policy GAT1: Development of the Airport with a Single Runway	This policy is specifically about the development of Gatwick Airport. Air quality is stated in one of the four points on which the development needs to adhere to for the council to "*support the development of facilities which contribute to the sustainable growth of Gatwick Airport as a single runway, two terminal airport*". The policy states that "*the impacts of the operation of the airport on the environment, including noise, air quality…are minimised, where necessary satisfactory safeguards are in place to ensure they are appropriately mitigated and, as a last resort, fair compensation is secured…*".
Strategic Policy SD1: Presumption in Favour of Sustainable Development	This policy states that "*when considering development proposals the council will take a positive approach to approving development which is sustainable*". The council will support developments that demonstrate "*progress towards Crawley's commitment to being carbon neutral by 2050*" and, create and enhance availability opportunities for Green Infrastructure in Crawley.
Draft Horsham District Local Plan 2019-2036	
Strategic Policy 1 – Sustainable Development	Through this policy the council will favour development proposals that embed sustainability in their design, aligning with the National Planning Policy Framework. The council will work with applicants to ensure development "*improves the economic, social and environmental conditions in the area*".
Policy 25 – Strategic Policy: Environmental Protection	This policy states that "*developments will be expected to minimise exposure to, and the emission of, pollutants.*" (including odour and air pollution) "*…from all stages of development*". Development proposals need to protect human health and the environment by demonstrating that they will "*minimise the air pollution and greenhouse gas emissions*", align with the local Air Quality Plans and objectives, and "*maintain or reduce the number of people exposed to poor air quality including odour*" especially for vulnerable groups.
Policy 26 – Air Quality	This policy focuses on air quality with all "*major development proposals and proposals within an Air Quality Management Area (AQMA), or in relevant proximity to an AQMA*" needing an "*Emissions Mitigation Assessment*" and "*an Air Quality Impact Assessment*". Through this policy the council stipulates requirements such as proposals taking into account "*The Air Quality and Emissions Mitigation Guidance for Sussex (2019)*", contributing and aligning with the "*local Air Quality Plans*" and objectives, and ensuring appropriate cumulative impact assessment of "*relevant committed developments*".
Future Mole Valley 2018 – 2033 Consultation Draft Local Plan	
Policy EN13: Promoting Environmental Quality	This policy states that "*development should minimise exposure to, and the emission of, pollutants including noise, odour, air, and light pollution*". This includes avoiding "*increasing exposure to poor air quality, including odour, particularly where vulnerable people (such as older people, care homes or schools) may be exposed to areas of poor air quality*".
Policy EN14: Responding to the Climate Emergency	This policy states that "*measures to mitigate the effects of, and adapt to, climate change will be supported*" these include methods such a reducing energy consumption through sustainable construction protocols and promoting the use of low carbon and renewable energy technologies.
Tandridge District Council Our Local Plan: 2033 (Regulation 22 submission)	
TLP46: Pollution and Air Quality	This policy states that "*all development proposals must be located and designed to not cause a significant adverse effect*" on the health of residents, residential amenity or the environment through air pollution, odour or dust. "*Development will be supported where it would not result in the national Air Quality Objectives being exceeded; and it would not lead to a significant deterioration in local air quality*" with all new development proposals needing to take into account the Council's Air Quality Impact Assessment requirements.

3 References

3.1 Published Documents

Crawley Borough Council (2021) Consultation on Proposed Changes to Crawley's Air Quality Management Area (AQMA).

Crawley Borough Council (2015) Crawley 2030, Crawley Borough Local Plan 2015 – 2030.

Crawley Borough Council (2018) Crawley Borough Council Air Quality Action Plan.

Crawley Borough Council (2021) Draft Crawley Borough Local Plan 2021 – 2037.

Horsham District Council (2015) Horsham District Planning Framework (excluding South Downs National Park).

Horsham District Council (2020) Draft Horsham District Local Plan 2019-2036.

Mid Sussex District Council (2018) Mid Sussex District Plan 2014 – 2031.

Mole Valley District Council (2009) Mole Valley Core Strategy DPD – Adopted October 2009.

Mole Valley District Council (2018) Future Mole Valley 2018 – 2033 Consultation Draft Local Plan (Regulation 18).

Reigate and Banstead Borough Council (2014) Reigate and Banstead Local Plan: Core Strategy.

Reigate and Banstead Borough Council (2019) Reigate and Banstead Local Plan: Development Management Plan.

Surrey County Council (2018) Electric Vehicle Strategy, Surrey Transport Plan.

Surrey County Council (2018) Surrey Transport Plan, Low Emissions Transport Strategy.

Tandridge District Council (2008) Tandridge District Core Strategy.

Tandridge District Council (2014) Tandridge Local Plan, Part 2: Detailed Policies 2014 – 2029.

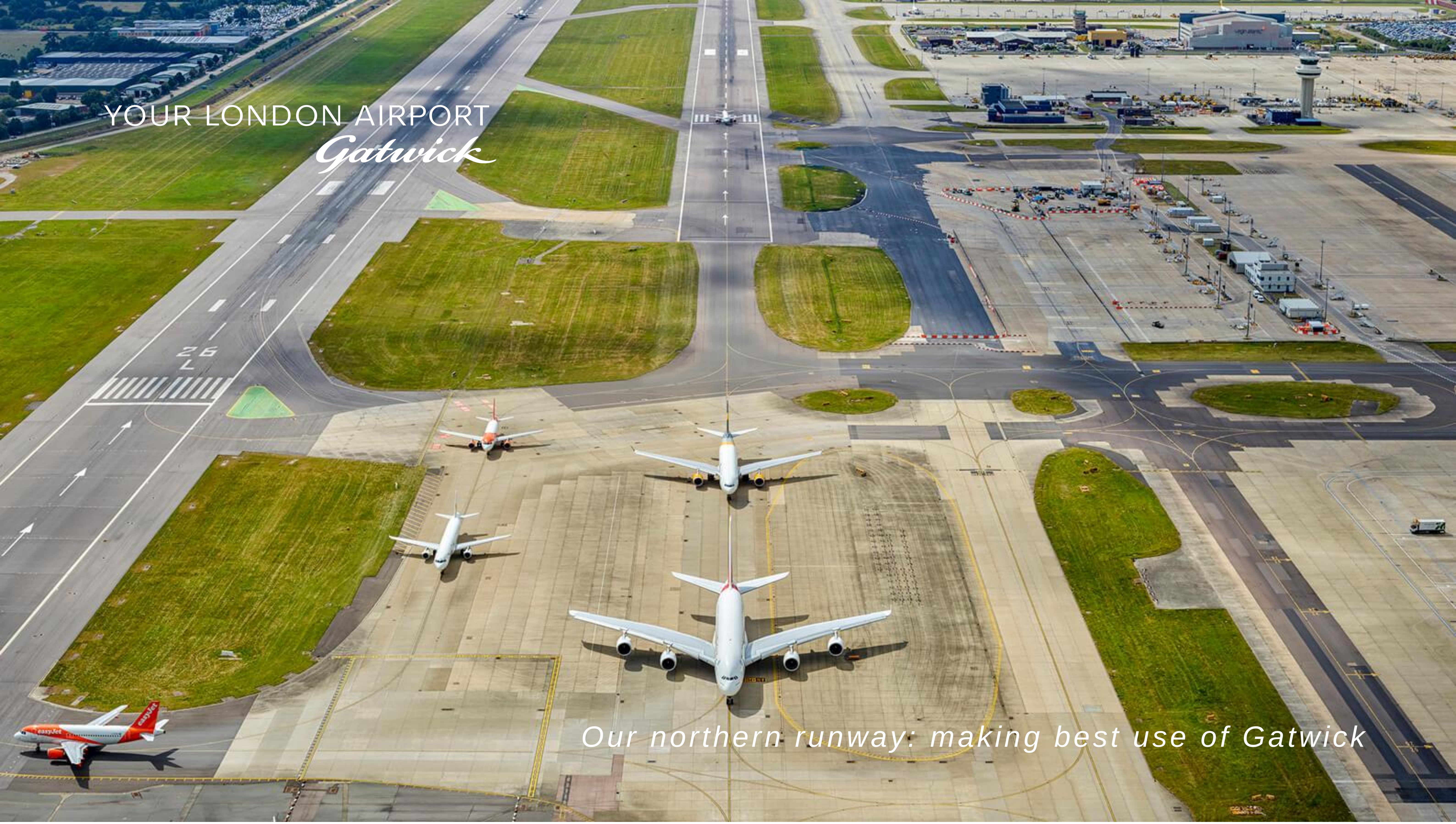
Tandridge District Council (2019) Our Local Plan: 2033 (Regulation 22 submission).

4 Glossary

4.1 Glossary of Terms

Table 4.1: Glossary of Terms

Term	Description
AQMA	Air Quality Management Area
NO_2	Nitrogen Dioxide



Preliminary Environmental Information Report
Appendix 13.3.1: Summary of Stakeholder Scoping Responses - Air Quality

September 2021

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1 Introduction

1.1.1 This document forms Appendix 13.3.1 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process for the proposal to make best use of Gatwick Airport's existing runways (referred to within this report as 'the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in the Chapter 5: Project Description.

2 Summary of Stakeholder Scoping Responses for Air Quality

Table 2.1.1: Summary of Stakeholder Scoping Responses

Stakeholders	Date received	Stakeholder Comment	Arup Response
Charlwood Parish Council	30 October 2019	The proposals to assess the health impacts of noise changes quantitatively and qualitatively are insufficiently clear and might not result in the thorough health impact assessment that is required. We believe there must be a specific, quantified, assessment of the health impacts on people under flight paths who would suffer the effects of significant increases in aircraft numbers. We also believe there needs to be a thorough assessment of the health effects of expansion on air quality taking account the additional traffic forecast to be generated.	A detailed air quality assessment has been undertaken for the Preliminary Environmental Information Report (PEIR), taking into account predicted increases in aircraft numbers and traffic forecast. The air quality standards against which the impacts of the Project are assessed are based on the effects the pollutants have on human health. The results of the air quality assessment have been used as input to the health impact assessment.
Crawley Borough Council	30 September 2019	The requirements of the National Emission Ceilings Regulations (NEC) Regulations should be considered (para 7.7.1). These requirements should be reported within the ES to demonstrate that the development will not affect CBC's ability to comply with its legal obligations during both the construction and operational phases of the proposed development.	The requirements of the NEC have been considered in the PEIR.
Crawley Borough Council	30 September 2019	Para 7.7.27 states that the study area for emissions from construction traffic will be based on the routes assessed within the ADMS-Roads dispersion model. Due to the size and duration of the construction phase, as well as uncertainty of future baseline projections, CBC would expect the ES assessment process to follow a conservative approach and precautionary study area. This is particularly relevant in areas within or adjacent to AQMAs, or where temporary traffic management schemes will displace traffic onto roads where concentrations are approaching the air quality objectives and where small deteriorations may have significant impact.	All sensitive receptors and Air Quality Management Areas (AQMA) were examined in the air quality assessment for the PEIR. The study area for emissions from construction traffic has been defined by the availability of transport information screened for changes in traffic flows using the Environmental Protection UK (EPUK)/The Institute of Air Quality Management (IAQM) guidance criteria in addition to all roads in the 11 km by 10 km domain (Moorcroft and Barrowcliffe. et al., 2017). The more stringent AQMA screening criteria in the guidance was used where appropriate in the study area for both the operational and construction scenarios. All routes anticipated to be used by construction traffic have been included in the air quality assessment.
Crawley Borough Council	30 September 2019	The study area for the operational phase focuses on the affected road network based on changes to road traffic during operation. Although current committed and planned development would be included in the traffic growth figures, the uncertainty about the scale and location of future growth in the wider area and associated with the proposed development means that traffic forecasts may considerably underestimate the changes and consequently the modelled air quality impacts. The Project would result in 3,000 on-airport jobs and many more indirectly employed and these commuters are considered to have a disproportionate effect on the local transport network. CBC would therefore expect to see a precautionary approach with a range of potential future	Throughout the assessment reasonable worst case assumptions and suitable data have been used to address the uncertainties providing a robust, conservative approach to the PEIR. The transport figures will be updated for the ES and these will include future growth assumptions agreed with the local planning authorities.

Stakeholders	Date received	Stakeholder Comment	Arup Response
		growth scenarios reflecting traffic volumes that are consistent with future economic and housing growth. This is important to check that the cost-benefit evaluation of the Project is not skewed in favour of economic growth at the expense of environmental impacts.	
Crawley Borough Council	30 September 2019	This is acknowledged in para 7.7.9 of the EIASR. The roads in and around the AQMA provide the main routes into the Manor Royal Business District and commuter routes into Gatwick for local airport staff. Many of the businesses on Manor Royal are airport related and will see an increase in airport generated road traffic due to the development during the operational phase. The mineral and aggregate industries located within the business district (Gatwick Road) are also likely to see an increase in HGV movements during the construction phase. The ES should provide a detailed assessment of the air quality impacts of this traffic on the AQMA.	The air quality assessment for the PEIR has included all routes likely to be used by construction traffic around the airport. Pollutant concentrations have been predicted at discrete receptors in the AQMAs and the wider study area.
Crawley Borough Council	30 September 2019	The EIASR fails to acknowledge the emergence of airports as a significant source of ultrafine particulate pollution in the past eight years and that Gatwick is no exception to this. While at this stage it would be impractical to expect the airport to model any such impact, it should recognise in its submission documents that a potential issue does exist, and that to help mitigate any potential future risk from this pollutant that it will undertake long term monitoring to 2039 as a minimum, examining both particle number and the particle size distribution at a representative residential site downwind of the airport. This need for ultrafine particle monitoring in the vicinity of airports is in line with the recommendations of the Government's air quality expert group (AQEG), and the Government's draft aviation strategy.	We agree that it is not possible to practically model these impacts although ultrafine particles are included within the $PM_{2.5}$ fraction which is modelled. Where any practical assessment methods are available, then these would be considered for the ES.
Crawley Borough Council	30 September 2019	Paragraphs 7.7.32 and 7.7.33 set out the proposed air quality model verification. Pollutant concentrations for each scenario year (2018, 2026, 2029, and 2038) will be predicted using the ADMS-Airport dispersion model. CBC request that the specific receptor sites modelled in Crawley should be agreed with the Council and as a minimum, should include sites used in previous (2015) air quality assessments of the airport, so that the work is comparable. Modelling outcomes in previous air quality assessments of the airport, have consistently under-estimated roadside pollutant concentrations by significant amounts at receptor sites in Crawley. If predicted results from the model differ significantly from measured concentrations, it is requested that a choice of suitable additional sites for model verification should be agreed with CBC.	The air quality assessment contains receptor sites included in previous assessments of the airport. Zonal adjustment factors have been derived for the model verification to take into account local regions within the wider study area. The process of model verification is to address any over or underprediction of the model and this was undertaken in line with the Defra Technical Guidance (TG16) (Defra, 2021). Further details of the model verification can be found in Appendix 13.6.1.
Crawley Borough Council	30 September 2019	CBC welcomes Gatwick's commitment to produce a detailed emissions inventory for airport ground sources as well as LTO aircraft emissions and on/off airport traffic emissions (para 7.7.28). The data should be presented within the ES in a source apportionment format to indicate the airport contribution compared to non-airport contribution.	The PEIR has included a source apportionment of predicted pollutant emissions for the main sources, such as aircraft in the air, aircraft on ground, airport activities, car parks, airport related and non-airport related road traffic. The same level of detail will be included in the ES.
Crawley Borough Council	30 September 2019	CBC have concerns that uncertainties about future growth associated with the Project and the potential air quality impacts of cumulative developments may contribute to a "creeping baseline" in emissions that may go unrecognised. This is because even major developments are often shown as not having a significant air quality impact based on their predicted concentrations. To address this the proposed ES scoping methodology should make reference to the Air Quality and Emissions Mitigation Guidance for Sussex.	The Air Quality and Emissions Mitigation Guidance for Sussex will be considered in the ES.
Crawley Borough Council	30 September 2019	The proposed ES scoping methodology should make reference to the Air Quality and Mitigation Guidance for Sussex.	The Air Quality and Emissions Mitigation Guidance for Sussex will be considered in the ES.
Crawley Borough Council	30 September 2019	CBC consider the approach in the EIASR (para 7.7.38) for assessment of odour is too simplistic to adequately assess the odour impacts from the airport operations. Odour around the airport at residential locations tends to be described as having a distinctive smell of "aviation fuel". The IAQM guidance advises that best practice is to use a multi-tool approach where practicable, which may include screening, sampling and dispersion modelling.	Records of odour complaints were obtained from Crawley Borough Council and Reigate & Banstead Borough Council for the last 5 years and a qualitative assessment has been included in the PEIR. In the ES, a multi-tool approach using the IAQM odour guidance will be used

Stakeholders	Date received	Stakeholder Comment	Arup Response
		This approach would be more appropriate for this ES assessment in identifying locations where odour is most likely to be detected and inform suitable mitigation.	if deemed necessary. However, as the IAQM guidance notes, modelling is not always the preferred approach and "*it should always be considered in an odour assessment that there are some types of odour source that may exist that are not easily modelled (eg diffuse sources, fugitive emissions or intermittent sources)…*" (Bull *et al.*, 2018).
Crawley Borough Council	30 September 2019	The ES should include and address any odour or other emissions from the proposed CARE centre and water treatment facilities.	Records of odour complaints were obtained from Crawley Borough Council and Reigate & Banstead Borough Council for the last 5 years and a qualitative assessment included in the PEIR. No changes are proposed to the Crawley Sewage Treatment Works as part of the Project and therefore no detailed air quality assessment is required.
Epsom and Ewell Borough Council	27 September 2019	Proposed scope of the air quality assessment is agreed. Epsom and Ewell has declared an AQMA in respect to emissions from road transport. The environmental impact assessment needs to take into account potential impacts, and harm from the proposal particularly in view of the Borough's significant housing requirement.	All areas of interest, sensitive receptors and AQMAs were examined as part of the PEIR and will be for the air quality assessment in the ES.
Highways England	1 October 2019	Traffic and environmental impact arising from changes to the SRN, the increase/re-routing of traffic post-opening (including phased opening) of the proposed development, during construction, traffic volume (including cumulative effects), composition or routing change and transport infrastructure modification should be fully assessed and reported. Adverse changes to noise and air quality should be particularly considered, including in relation to compliance with the European air quality limit values and/or in local authority designated Air Quality Management Areas (AQMAs).	All areas of interest, sensitive receptors and AQMAs were examined as part of the PEIR and will be for the air quality assessment in the ES. The ES will also include an assessment of compliance with European Union (EU) limit values.
Horley Town Council	25 September 2019	Careful consideration needs to be given to the impact from the regular use of the Northern Runway on the residents living in the southern part of Horley adjacent to the airport boundary. This is because it is much closer to residences than the main runway; particularly as its centre line which is 210 m closer than the main runway. Our concerns centre around noise & air quality.	Sensitive receptors have been modelled close to the edge of the airport and along the main roads around the airport. Further details are provided in the PEIR chapter Section 13.4.9 to 13.4.14 with all listed sensitive receptors in Appendix 13.6.2.
Horley Town Council	25 September 2019	The impact of noise and air quality from the increase in the number of movements and the fact that the peak will now be spread across a greater part of the day than presently; as airlines fill up the current spare capacity in the shoulder periods.	The air quality assessment takes into account the additional aircraft and traffic movements associated with the Project.
Horsham District Council	27 September 2019	In the event that the Heathrow third runway cannot be delivered in 2026, the opening year of 2030 will be modelled. The Study should allow for consideration of new information which may emerge over this period, for example, improvements in road traffic emissions, but nevertheless consider that it will be important to consider the worse case scenario. The Council would also wish to see the distinction between airport-related and non-airport-related road traffic.	The PEIR and ES will be based on the most likely scenarios at the time of the assessment. The PEIR is currently based on a no Heathrow third runway scenario. The air quality assessment for the PEIR includes a breakdown of airport and non-airport related road vehicles. The same level of detail will be included in the ES. Throughout the assessment reasonable worst case assumptions have been made to address the uncertainties providing a robust, conservative approach.
Horsham District Council	27 September 2019	It is strongly recommended that the applicant has regard to the Air Quality and Emissions Mitigation Guidance for Sussex (2019) in assessing air quality impacts. The guidance takes a low-emissions strategies' approach to avoiding cumulative impacts of new development, by seeking to mitigate or offset emissions from the additional	The Air Quality and Emissions Mitigation Guidance for Sussex will be considered in the ES.

Stakeholders	Date received	Stakeholder Comment	Arup Response
		traffic. In accordance with the guidance, a damage cost calculation is required from all 'Major' developments. Applicants are required to submit a mitigation plan detailing proposed measures to mitigate and/or offset the impacts. The estimated value of the proposed measures should be equal to the environmental damage costs.	
Horsham District Council	27 September 2019	The proposed modelling will be using a 10 x 11 km grid, yet in previous studies a 10 x 10 km grid has been used and historically a 10 x 8 km grid has been used. This makes comparison of the ratio of airport to non-airport car traffic emissions impossible. The data regarding emissions from road vehicles must separate out airport-related traffic from non-airport related traffic.	This 11 km by 10 km domain will be used to provide contour plots of predicted concentrations for the ES. It does not limit or define the extent of the emissions calculations. All roads are included in the air quality model within this 11 km by 10 km domain, and traffic screening using the IAQM/EPUK criteria has been undertaken outside this domain to define the relevant wider study area for each scenario. The road traffic emissions have been presented as airport and non-airport related in the PEIR. The same level of detail will be included in the ES. The Planning Inspectorate (PINS) "*agrees that the study area is not appropriately defined by an 'arbitrary limit' and instead should be defined by the area over which significant air quality effects could arise*". This approach has been taken for this assessment. The scoping response from PINS is included in Chapter 13 Air Quality.
Horsham District Council	27 September 2019	The Council expects that the impacts of additional traffic on town centres in Horsham District, including Horsham, Cowfold, Henfield and Storrington are included in the assessment as the increase in housing, associated employment as well as passenger numbers travelling to the airport is envisaged will have an impact on traffic flows and air quality in the district. In addition, we suggest the Study should include monitoring of ultrafine particles.	All sensitive receptors and AQMAs were examined in the air quality assessment for the PEIR. All roads within the 11 km by 10 km domain were modelled with the additional traffic extent defined by changes in traffic flows screened using the IAQM/EPUK criteria to identify areas for detailed modelling. Monitoring of PM_{10} is undertaken at continuous monitors in the study area.
Horsham District Council	27 September 2019	There is an ongoing issue with unrealistic emission rates being used for diesel vehicles. The issue is more significant with modelling concentrations for future years. Therefore, a sensitivity analysis must be carried out when assessing future years. It is recommended that future year emissions are held constant (at the baseline level or an alternative agreed level) or that alternative emission rates are used for diesels, for example, the Air Quality Consultants 'Calculator Using Realistic Emissions for Diesels' (CURED) V3A.	The emissions factors toolkit (EFT) developed by Department for Environment, Food and Rural Affairs (Defra) has since been updated to account for these emission rates mentioned. The air quality assessment has been based on latest available tools by Defra. Air Quality Consultants now acknowledge that the CURED model is no longer appropriate as the Defra EFT is now considered representative of actual emissions (Air Quality Consultants, 2020).
Horsham District Council	27 September 2019	The proposal to scope out pollutants other than NOx, NO_2, PM_{10} and $PM_{2.5}$ is not supported because it is not only road and air traffic that are relevant. This list should be expanded to include consideration of the emissions from the stack of the CARE energy-from-waste facility.	PINS has requested that further justification be provided to scope out other pollutants and this will be provided within the ES. Should any pollutant be found to be emitted at levels that require a detailed assessment then these will be included in the air quality assessment in the ES.
Mid Sussex District Council	1 October 2019	What year of emission factors are to be used for each modelling year?	Emission factors for the year of each assessment scenario have been used, with the exception of the 2032 scenario. For the PEIR assessment, 2030 emissions have been used for this scenario, as this is the latest year provided in the Defra predictions.
Mid Sussex District Council	1 October 2019	What year of background concentration are to be used for each modelling year?	Background concentration for the year of each assessment scenario have been used, with the exception of the 2032 scenario. For the PEIR

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			assessment, 2030 backgrounds have been used for this scenario, as this is the latest year provided in the Defra predictions.
Mid Sussex District Council	1 October 2019	Further justification that there will be no emissions of odour from excavation of soil is required.	An odour assessment for the construction phase was screened out in the PEIR as no odorous materials are expected to be excavated. This will be checked in the ES (based on any updated results of the contaminated land assessment) and a more detailed assessment of odour emissions during the construction phase undertaken if needed.
Mid Sussex District Council	1 October 2019	Further information about the methodology to be used to determine the mitigation measures that will be required.	The mitigation measures proposed will be based on the level of impact predicted, typical good practice for major developments and the availability of suitable measures. Construction mitigation measures will be based on the recommendations of the IAQM guidance.
Mid Sussex District Council	1 October 2019	What point of the construction phase is to be assessed?	For the construction dust assessment, all construction elements have been assessed. For the assessment of construction traffic emissions, the peak construction traffic flows were modelled using emissions and backgrounds from the first year of airport construction (2024) and first year of highways construction (2029). This provides a conservative assessment and the same method will also be used for the ES.
Mid Sussex District Council	1 October 2019	The Air Quality and Emissions Mitigation Guidance for Sussex (2019) should be included as a key document for the assessment	The Air Quality and Emissions Mitigation Guidance for Sussex will be considered in the ES following the update of the air quality assessment using the updated transport data.
Mid Sussex District Council	1 October 2019	Following Sussex and Defra Guidance, a damage cost calculation should be undertaken to inform the mitigation measures.	The Air Quality and Emissions Mitigation Guidance for Sussex will be considered in the ES.
Mid Sussex District Council	1 October 2019	Operational traffic impacts should be screened for the other AQMAs in Reigate and Banstead. Particularly the one along the M25, which could potentially see an increase in traffic.	All areas of interest, sensitive receptors and AQMAs were examined as part of the PEIR and will be for the air quality assessment in the ES. All traffic data provided for the assessment has been screened against the EPUK/IAQM guidance screening criteria with any traffic exceeding the criteria being modelled (Moorcroft and Barrowcliffe. et al., 2017).
Mole Valley District Council	30 September 2019	Paragraph 7.7.21 – Pollutant concentration predictions must also consider and reflect the impact of the proposed replacement CARE facility.	This is considered in the air quality assessment in the PEIR and will be in the ES.
Mole Valley District Council	30 September 2019	Paragraph 7.7.24 – Air quality assessments should include direct links to the Health Impact Assessment, in order to understand the likely impacts on residents of any change to air quality surrounding the airport.	The results of the air quality assessment have been used as input to the health impact assessment.
Mole Valley District Council	30 September 2019	Paragraph 7.7.30 – Air quality assessments should clearly outline the split between emissions from airport related road traffic, and non-airport related traffic.	The air quality assessment for the PEIR includes a breakdown of airport and non-airport related road vehicles. The same level of detail will be included in the ES.
Mole Valley District Council	30 September 2019	Paragraph 7.7.40 – The proposal to scope out pollutants other than NOx, NO_2, PM_{10} and $PM_{2.5}$ is not supported, as the effects of any emissions from the replacement CARE facility should be assessed. The Applicant should also commit to monitoring of ultrafine particles around the airport in the future.	PINS has requested that further justification be provided to scope out other pollutants and this will be provided within the ES. Should any pollutant be found to be emitted at levels that require a detailed assessment then these will be included. The works on the Central Area Recycling Enclosure (CARE) facility would include the replacement/relocation of a biomass boiler and an introduction of an additional biomass boiler for organic matter. The facility will only

Stakeholders	Date received	Stakeholder Comment	Arup Response
			contain conventional biomass boilers and no incineration, therefore the pollutants for this assessment have been appropriately screened taking into account the activities of the Project elements.
Mole Valley District Council	30 September 2019	Paragraph 7.9.8 – The Government's commitment to achieving an emissions' reduction target of 100% by 2050, as set out in the Climate Change Act 2008 (2050 Target Amendment) Order 2019, should be considered.	This is considered in the climate change assessment.
Public Health England	30 September 2019	Our position is that pollutants associated with road traffic and combustion eg airplane engines or movements, particularly particulate matter and oxides of nitrogen are non-threshold; ie, an exposed population is likely to be subject to potential harm at any level and that reducing public exposures of non-threshold pollutants (such as particulate matter and nitrogen dioxide) below air quality standards will have potential public health benefits. We support approaches which minimize or mitigate public exposure to non-threshold air pollutants, address inequalities (in exposure), and maximise co-benefits (such as physical exercise). We encourage their consideration during development design, environmental and health impact assessment, and development consent.	A detailed air quality assessment has been undertaken for the PEIR, taking into account predicted increases in aircraft numbers and traffic forecast. The results of the air quality assessment have been used as input to the health impact assessment.
Reigate and Banstead Borough Council	27 September 2019	Following the adoption of the DMP on 26th September, references to the "emerging Reigate & Banstead Borough Development Management Plan 2018-2027" should be amended to "Reigate and Banstead Development Management Plan (Reigate and Banstead Borough Council, 2019)" to ensure consistency with other adopted Local Plan documents.	This has been included in the PEIR.
Reigate and Banstead Borough Council	27 September 2019	The policy and legislative context for air quality needs to also include Surrey County Council's Electric Vehicle Strategy and Low Emission Strategy.	This has been included in the PEIR.
Reigate and Banstead Borough Council	27 September 2019	The Council considers that the scope of the assessment should include air quality impacts of airport generated road traffic on the A23 Hooley Air Quality Management Area (AQMA) given that a significant proportion of the airport's passenger traffic comes from London and is likely to access the airport via the A23/ M23 route out of London.	All areas of interest, sensitive receptors and AQMAs were examined as part of the PEIR and will be for the air quality assessment in the ES.
Reigate and Banstead Borough Council	27 September 2019	We also consider that for any assessment of air quality as part of the DCO process (regardless of the year under consideration) the scope of the assessment should include the following: i) Isopleth/ contour maps for each of the pollutants under consideration and for each of the assessment scenarios (baseline and with development), 2018, 2026, 2029 and 2038 given the construction of Pier 7 post-2032. ii) A table of concentrations of each pollutant for each assessed year (including 2038) at specific receptors/ points around the airport, which as a minimum includes all receptors used in previous air quality assessments of the airport (so as to ensure that the work is comparable to previous assessments of air quality in relation to the Horley AQMA). iii) For each of the points in (ii) above, a source apportionment breakdown that includes APU contribution, aircraft ground contribution, aircraft elevated contribution, ground support equipment, carparks, airside vehicles, airport related road traffic, non-airport related road traffic, and the background contribution. The Council considers that it is imperative that the contribution from airport related road traffic and non-airport related road traffic are presented separately.	The ES will include contour plots with predicted concentrations for all pollutants and assessment scenarios in the 11 km by 10 km domain. The air quality assessment has included receptors used in previous assessments of the airport. Predicted pollutant concentrations have been presented in tabular format in the PEIR Appendix 13.9.1 and the same level of detail will be included in the ES. The PEIR has included a source apportionment of predicted pollutant emissions for the main sources, such as aircraft in the air, aircraft on ground, airport activities, car parks, airport related and non-airport related road traffic. The same level of detail will be included in the ES. The results from the air quality assessment have been used to inform the health and wellbeing assessment relating to changes in air quality (Chapter 17). At the PEIR stage, the health assessment is qualitative in nature, but a quantitative health assessment relating to changes in local air quality concentrations will be undertaken for the final ES. The

Stakeholders	Date received	Stakeholder Comment	Arup Response
		iv) A calculation of the years of life lost (not a relative or percentage change) due to the airport pollution for each of the assessment years under consideration, both with and without the Project in place, using the latest COMEAP report and DEFRA valuation of a life year lost as this will help interested parties clearly understand the air pollution health costs of the proposed Project.	assessment does not however intend to convey health and wellbeing effects in economic terms, as while useful when comparing projects at a strategic level,; at a project level it masks the potential type, distribution and significance of impact, runs the risk of dismissing health and wellbeing effects when compared to the economic gains to be achieved and prevents the development of effective mitigation.
Reigate and Banstead Borough Council	27 September 2019	The Council considers that given GAL's stated sustainability objective of 'improving air quality impacts using new technology, processes and systems', the outputs from points iii) and iv) are particularly important to demonstrate to local residents that the airport is playing its part in reducing air pollution, and not relying on wider societal improvements to mask/ offset increasing pollution from its own estate as has been the case since 2012.	The proposals include a range of embedded mitigation measures taken by the airport to reduce their air quality impacts (detailed in the PEIR Chapter 13).
Reigate and Banstead Borough Council	27 September 2019	The Council notes that the EIA Scoping Report fails to acknowledge the emergence of airports as a significant source of ultrafine particulate pollution over the past eight years and that Gatwick is no exception to this. While at this stage it would be impractical to expect the airport to model any such impact, the Council considers that it should recognise in its subsequent submission document that a potential issue does exist, and that to help mitigate any potential future risk from this pollutant that it will undertake long term monitoring to 2039 as a minimum, examining both particle number and the particle size distribution at a representative residential site downwind of the airport. This need for ultrafine particle monitoring in the vicinity of airports is in line with the recommendations of the Government's air quality expert group (AQEG), and the Government's draft aviation strategy.	It is not possible to practically model these impacts although ultrafine particles are included within the $PM_{2.5}$ fraction which is modelled. Where any practical assessment methods are available, then these would be considered for the ES.
Reigate and Banstead Borough Council	27 September 2019	In order to mitigate against the potential air quality impacts of the proposed Project, and to check that any forecast pollutant concentrations subsequently occur in practice, we expect GAL to continue to fund a programme of long-term monitoring of air pollution (NOx, PM_{10}, as a minimum) at residential sites downwind of the airport. We would welcome such certainty stated in the ES.	An air quality survey was undertaken between 2016 and 2020 at key areas of concern around the airport, ie along the A23 Brighton Road in Horley and around Hazelwick roundabout in Crawley. GAL also support a continuous monitoring site on the airport (LGW3). It is anticipated the airport will continue this in the future. Air quality monitoring forms part of the mitigation measures for the air quality assessment and this is detailed in the PEIR.
West Sussex County Council		In reference to Paragraph 7.7.30 – The data regarding emissions from road vehicles must separate out airport-related traffic from non-airport related traffic.	The air quality assessment for the PEIR includes a breakdown of airport and non-airport related road vehicles. The same level of detail will be included in the ES.
West Sussex County Council	27 September 2019	In reference to Paragraph 7.7.32 – The scenarios considered should compare the baseline with the anticipated opening year (2026), as well as 2029, and 2039.	The air quality assessment has been undertaken for future 'with' and 'without Project' scenarios and an existing baseline year scenario. Predicted concentrations have been provided in the PEIR for all assessment scenarios and the same level of detail will be included in the ES.
West Sussex County Council	27 September 2019	In reference to Paragraph 7.7.33 – The grids used for the modelling of air quality must be consistent over time. Air quality modelling for this project will be using a 10km x 11km grid, yet previously (ARUP for 2015) used 10km x 10km, and historically 10km x 8km was used which makes a comparison of ratio of airport to non-airport car traffic emissions from previous work impossible.	This 11 km by 10 km domain will be used to provide contour plots of predicted concentrations for the ES. It does not limit or define the extent of the emissions calculations as the extent of the study area is defined by the traffic screening using the IAQM/EPUK criteria in addition to everything contained in the 11 km by 10 km domain. The road traffic emissions have been presented as airport and non-airport

Stakeholders	Date received	Stakeholder Comment	Arup Response
			related in the PEIR. The same level of detail will be included in the ES. The Planning Inspectorate (PINS) "*agrees that the study area is not appropriately defined by an 'arbitrary limit' and instead should be defined by the area over which significant air quality effects could arise*". This approach has been taken for this assessment. The scoping response from PINS is included in Chapter 13 Air Quality.
West Sussex County Council	27 September 2019	In reference to Paragraph 7.7.36 – It is understood the assessment will be based on meteorological data from 2018. The data must take into account increased temperatures due to climate change and the resulting increase Auxiliary Power Usage as once above 25C the standard Gatwick Airport Directives (GAD) no longer apply.	An In-combination Climate Change Impacts (ICCI) assessment has been completed for the PEIR. The airport already has provision for fixed electrical ground power (FEGP) on any new stands to further reduce the use of auxiliary power units (APU).
West Sussex County Council	27 September 2019	In reference to Paragraph 7.7.39 – The EIA should clearly set out the mitigation proposed to ensure that the CARE facility and WWTW do not result in odour impacts, or impacts through other emissions to air, on either people or the environment. Consideration of air quality impacts and the mitigation/monitoring required should link closely with the Health Impact Assessment and more general considerations of health.	Records of odour complaints were obtained from Crawley Borough Council and Reigate & Banstead Borough Council for the last 5 years and a qualitative assessment included in the PEIR. It is proposed that three new pumping stations are provided that will connect to existing infrastructure. Therefore, no detailed odour assessment is required for the Project. The results of the air quality assessment have been used as input to the health impact assessment and will inform any mitigation and monitoring required.
West Sussex County Council	27 September 2019	In reference to Paragraph 7.7.40 – The proposal to scope out pollutants other than NOx, NO_2, PM_{10} and $PM_{2.5}$ is not supported because it is not only road and air traffic that are relevant. The list should be expanded to include consideration of the emissions from the stack of the CARE energy-from-waste facility, including (subject to EA confirmation) sulphur dioxide, total organic carbon, hydrogen chloride, carbon monoxide, cadmium/thallium and their compounds, mercury and its compounds, dioxins/furans, and heavy metals. The list considered in the assessment, and in future monitoring, should also include ultra-fine particles.	PINS has requested that further justification be provided to scope out other pollutants and this will be provided within the ES. Should any pollutant be found to be emitted at levels that require a detailed assessment then these will be included.
Wealden District Council	26 September 2019	The Council consider that all appropriate considerations have been made. However, we would question scoping out 'odours from construction phase' when the report is uncertain whether odorous materials will be excavated or not as part of building plans. The same principle applies to emissions of other pollutants from aircraft emissions, where the report states that the effects are unlikely to be significant. Whilst it is appreciated that the Defra TG 16 Guidance note does not require the assessment of other pollutants than those listed, there is still ambiguity whether concentrations of these pollutants will exceed their respective air quality standards. It is therefore reasonable to scope this in.	An odour assessment from the construction phase was screened out in the PEIR as no odorous materials are expected to be excavated. This will be checked in the ES (based on any updated results of the contaminated land assessment) and a more detailed assessment of odour emissions during the construction phase undertaken if needed. PINS has requested that further justification be provided to scope out other pollutants and this will be provided within the ES. Should any pollutant be found to be emitted at levels that require a detailed assessment then these will be included.
Waverley Borough Council	30 September 2019	No air quality measurement sites are located within the Borough or indeed beyond the close confines of the Gatwick Site. Any potential impacts on air quality from aircraft, over a wider area, including Waverley Borough, need to be fully assessed and the methodology for the assessment should take account of this. Additional vehicle movements across the Borough or its fringes as a result of the airports expansion may also have an impact on the air quality within the Borough, this will need to be considered.	A detailed air quality assessment has been undertaken for the PEIR, taking into account predicted increases in aircraft numbers and traffic forecast. All areas of interest, sensitive receptors and AQMAs were examined as part of the PEIR and will also be for the air quality assessment presented in the ES.
Transport for London	October 2019	The air quality and noise impacts of traffic and transport should be assessed as part of the EIA within their respective chapters, as indicated by GAL.	A detailed air quality assessment has been undertaken for the PEIR, including predicted changes in traffic flows.

Stakeholders	Date received	Stakeholder Comment	Arup Response
Tandridge District Council	30 September 2019	As with other areas of impact, the uncertainties around the rate of growth resulting from the Project are such that air quality impacts cannot be accurately assessed.	Noted, however, the assessment will be undertaken following normal EIA guidelines, based on best available information, for assessing the likely significant effects on air quality from the Project. Throughout the assessment reasonable worst case assumptions have been made to address the uncertainties providing a robust, conservative approach.
Tandridge District Council	30 September 2019	It is noted also that the EIASR does not make reference to emerging evidence in relation to ultra-fine particulate pollution resulting from airports. The potential future risk from this type of pollutant should be addressed in the ES.	It is not possible to practically model these impacts although ultrafine particles are included within the $PM_{2.5}$ fraction which is modelled. Where any practical assessment methods are available, then these would be applied for the ES.

3 References

3.1 Web Articles

Air Quality Consultants (2020) Defra's Emission Factor Toolkit Now Matching Measurements [online source]. Available at: https://www.aqconsultants.co.uk/news/march-2020/defra%E2%80%99s-emission-factor-toolkit-now-matching-measu

3.2 Published Documents

Bull *et al.* (2018) IAQM Guidance on the assessment of odour for planning – version 1.1, Institute of Air Quality Management, London.

Department for Environment Food and Rural Affairs (Defra) (2021) Local Air Quality Management Technical Guidance (TG16).

Moorcroft and Barrowcliffe. *et al.* (2017) Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London.

Sussex Air Partnership (2019) Air Quality and Emission Mitigation Guidance for Sussex [Online]. Available at: https://sussex-air.net/Reports/Sussex_AQ_Guidance_2019.pdf

4 Glossary

4.1 Glossary of Terms

Table 4.1.1: Glossary of Terms

Term	Description
AQEG	Air Quality Expert Group
AQMA	Air Quality Management Area
APU	Auxiliary Power Unit
CARE	Central Area Recycling Enclosure
CBC	Crawley Borough Council
COMEAP	Committee on the Medical Effects of Air Pollutants
CURED	Calculator Using Realistic Emissions for Diesels
DCO	Development Consent Order

Term	Description
Defra	Department for Environment, Food and Rural Affairs
DMP	Development Management Plan
EA	Environment Agency
EFT	Emissions Factors Toolkit
EIA	Environmental Impact Assessment
EIASR	Environmental Impact Assessment Scoping Report
EPUK	Environmental Protection UK
ES	Environmental Statement
EU	European Union
FEGP	Fixed Electrical Ground Power
GAD	Gatwick Airport Directive
GAL	Gatwick Airport Limited
HGV	Heavy Goods Vehicle
IAQM	The Institute of Air Quality Management
ICCI	In-combination Climate Change Impacts
LTO	Landing and Take-off
NEC	National Emission Ceilings
NO_x	Nitrogen Oxide
NO_2	Nitrogen Dioxide
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
$PM_{2.5}$	Particulate Matter, less than 2.5 micrometers in diameter
PM_{10}	Particulate Matter, less than 10 micrometers in diameter
SRN	Strategic Road Network
WwTW	Wastewater Treatment Work