



Brighton & Hove City Plan

Strategic Transport Assessment



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1 Introduction

- 1.1 JMP has been commissioned by Brighton & Hove City Council (BHCC) to develop a Strategic Transport Assessment (STA) for the city (shown in Figure 1.1) and part of the surrounding area which reviews the impact of committed developments and strategic land allocations, providing an evidence base for the proposed City Plan up to 2030.
- 1.2 To achieve this a forecast model has been developed from the existing SATURN¹ highway model (developed in 2010). This model is supported by a new public transport model using CUBE VOYAGER² software as well as a custom-built variable demand model, built using the principles outlined in the Department for Transport's (DfT) WebTAG unit 3.10 for assessing traffic management changes and testing of the behavioural responses of the multimodal model.
- 1.3 The underlying existing travel demand trends are contained in the base year model development. Full details are provided in the Local Model Validation Report (LMVR)

Objectives of the STA

- 1.4 The study objectives include:-
- Examining in more detail the impact of the policy objectives set out in CP9 of the Brighton & Hove City Plan
 - Understanding the transport impacts of the development strategy detailed in the City Plan including potential highway and public transport impacts and associated constraints on travel
 - Identifying the level of interventions (mitigation) required to manage traffic and transport in order to support sustainable development

Study Area

- 1.5 The following factors were considered when identifying the study area:
- Current and emerging strategic planning and transportation considerations, which are identified in the Local Development Framework (LDF) and the Local Transport Plan;
 - Best practice model guidance notes; and
 - Cross boundary issues that impact on travel patterns within Brighton & Hove.
- 1.6 The resultant study area covers the City of Brighton & Hove, along with Shoreham. All significant roads and junctions have been included, as have all bus and rail public transport services. Figure 1.1 below shows the boundary.
- 1.7 The northern boundary extends beyond the A27 to include the sections of the South Downs National Park which lie within Brighton & Hove but not as far north/west as Fulking or Steyning.

¹ SATURN is a traffic simulation and assignment model which models the time and distance taken to travel between origins and destinations, including delays due to congestion, and calculates the most likely route to be used by traffic travelling between different origins and destinations.

² CUBE VOYAGER is a package of programs for modelling travel including traffic assignment, public transport modelling and travel demand. It takes account of journey times and costs as part of the demand and mode split model.

- 1.8 The eastern boundary follows the Brighton & Hove administrative boundary extending to Saltdean, Peacehaven and Woodingdean which are key travel to work areas to the city.

Figure 1.1 Study Area



Development Areas

- 1.9 The proposed City Plan directs the majority of new housing, employment and retail development to eight specific development areas (DA1-8). These are areas:

- Which already benefit from close proximity to good sustainable transport links or areas that can be made sustainable through improvements to accessibility;
- Which offer significant capacity for new development; and
- Where new development and/or regeneration will secure substantial benefits for the city.

- 1.10 The eight development areas are defined as:

- DA1: Brighton Centre and Churchill Square Avenue;
- DA2: Brighton Marina, Gas Works and Black Rock Area;
- DA3: Lewes Road Area;
- DA4: New England Quarter and London Road Area;
- DA5: Eastern Road and Edward Street Area;
- DA6: Hove Station Area;
- DA7: Toads Hole Valley; and
- DA8: Shoreham Harbour.

- 1.11 These are described more fully in section 4 of this report.

Development Scenarios

- 1.12 The base model for this assessment has been developed from an existing SATURN model used for the previous Core Strategy and validated using recent travel surveys from 2010. Full details are provided in the LMVR. The public transport and demand model elements have been developed from first principles.
- 1.13 From this base model, three future forecast year scenarios have been developed for assessment:
- 2030 Committed Base – 2030 City Plan Reference Case less the Development Areas. This scenario will be compared to the 2030 City Plan Reference Case to reveal the changes to the operation of the public transport and highway network arising from the development and in so doing will assist in identifying potential mitigation measures that may be required. This assessment is detailed in section 8 of the report.
 - 2030 City Plan Reference Case – Base model plus committed developments and transport schemes plus the strategic development sites noted in the proposed City Plan. The level of economic and demographic growth has been controlled to TEMPRO³ growth rates. This assessment is detailed in section 8 of the report.
 - 2030 City Plan Mitigation Case – 2030 City Plan Reference Case plus the resultant additional mitigation measures identified by comparing it with the 2030 Committed Base. This scenario provides an evidence base for the mitigation measures. The flows from this scenario will be compared to the 2030 City Plan Reference Case flows to link measures to developments. This assessment is detailed in section 9 of the report.
- 1.14 The Highways Agency was consulted as a key stakeholder and the following was discussed and agreed:
- Evidence base;
 - Trip rates;
 - Development scenarios;
 - Forecasting methodology;
 - Examination of impacts on the Strategic Road Network (SRN); and
 - Scope of mitigation for SRN.

Structure of Report

- 1.15 Following this introductory chapter, This STA is structured as shown:
- **Section 2: Policy Review** – Provides an outline and review of the current and emerging National, Regional and Local transport planning policy and policy guidelines in the context of the assessment.
 - **Section 3: Transport Strategy Overview** – This sets out the objectives of the transport strategy and the methodology intended to help achieve these objectives.
 - **Section 4: Development Proposals** – Summarises the development proposals for the committed development sites and the City Plan Development Areas including details of land

³ TEMPRO uses local planning data from the National Trip End Model (NTEM) and traffic growth from the National Transport Model (NTM) to produce a local traffic growth factor.

use; quantum and location. The connection to the local transport networks for each development area is also defined

- **Section 5: Trip Generation** – Summarises the methodology used to derive the trip generation of the sites identified in Section 4.
- **Section 6: Committed City-Wide Interventions by 2030** – Details any committed City-wide transport interventions that are certain or near certain to be delivered in the plan period.
- **Section 7: Traffic and Public Transport Modelling** – Provides an overview of the agreed modelling methodology used including traffic distribution and assignment methodology.
- **Section 8: Impact Assessment – Provides a** discussion of the modelling results for the 2030 City Plan Reference Case and 2030 Committed Base scenarios, analysed at both the Citywide and the corridor level
- **Section 9: Transport Mitigation Measures** - Proposes a package of measures which could be implemented to mitigate the impact of the development areas. Some of the measures also address underlying transport challenges
- **Section 10: Summary and Conclusion** – Summarises and concludes the main points of the report.

1.16 In addition, OS Mastermap data has been obtained under sub-license from Brighton & Hove City Council No. L100020999, 2011. Unless specifically stated, all other map extracts are taken from OS Open data sources, © Crown Copyright 2011.

2 Policy Review

- 2.1 The approach of each element of this TA is based on the following national, regional and local policy documents.

National Policy

1. National Planning Policy Framework (NPPF), March 2012;
2. Guidance on Transport Assessment, March 2007;

Local Policy

1. Saved 2005 and 2011 Policies from the Brighton & Hove Local Plan;
2. Brighton & Hove Local Development Framework including the City Plan; and
3. Brighton & Hove Local Transport Plan (LTP3).

National Policy

National Planning Policy Framework (NPPF) March 2012

- 2.2 The NPPF was published on 27th March 2012. It came into effect immediately superseding the 2011 draft and all other planning policy guidance (except on waste).
- 2.3 The NPPF sets out the Government's expectations and requirements from the planning system. It is meant as high level guidance for local councils to use when defining their own personal local and neighbourhood plans. This approach allows the planning system to be tailored to reflect the needs and priorities of individual communities.
- 2.4 The NPPF defines the delivery of sustainable development through three roles:
1. Planning for prosperity (an economic role);
 2. Planning for people (a social role); and
 3. Planning for places (an environmental role).
- 2.5 It notes that to achieve sustainable development, these roles should be sought jointly and simultaneously through the planning system.
- 2.6 At the heart of the NPPF is a presumption in favour of sustainable development which 'should be seen as a golden thread running through both plan making and decision taking'(para 14). In paragraph 15, it goes on to say that: 'Policies in Local Plans should follow the approach of the presumption in favour of sustainable development so that it is clear that development which is sustainable can be approved without delay.'
- 2.7 NPPF recognises that transport policies have an important role to play in wider sustainability and health objectives as well as their direct influence on development. It seeks to ensure that the transport system is balanced in favour of sustainable transport modes giving people a real choice about how the travel.
- 2.8 Paragraph 32 states that all developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. It goes on to mention that plans and decisions should take account of whether:

- 'The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;
 - safe and suitable access to the site can be achieved for all people; and
 - Improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.'
- 2.9 Paragraph 34 seeks to ensure that: 'developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised.'
- 2.10 It notes, however, that this needs to take account of policies set out elsewhere in this Framework, particularly in rural areas. It goes on to mention that: 'Plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods or people.' Therefore, developments should be located and designed where practical to:
- 'Give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;
 - create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones;
 - incorporate facilities for charging plug-in and other ultra-low emission vehicles; and
 - consider the needs of people with disabilities by all modes of transport.'
- 2.11 Paragraph 39 of the NPPF sets out the criteria for setting local parking standards. It states that local planning authorities should take into account:
- 'The accessibility of the development;
 - the type, mix and use of development;
 - the availability of and opportunities for public transport;
 - local car ownership levels; and
 - an overall need to reduce the use of high emission vehicles.'
- 2.12 The Strategic Transport Assessment takes into account this policy direction with particular regard to the support of sustainable transport measures in the context of the City as whole and for the identified proposed development areas.

Guidance on Transport Assessment, March 2007

- 2.13 The Guidance on Transport Assessment (GTA) sets out the key transport and highway requirements that need to be considered as a consequence of seeking planning permission for a proposed development including:
- Encouraging environmental sustainability – reducing the need to travel (especially by car), tackling the environmental impact of travel, the accessibility of the location, influencing travel behaviour.
 - Managing the existing network – making best possible use of existing transport infrastructure, managing access to the highway network

- Mitigating residual impacts – through demand management, through improvements to the local public transport network, and walking and cycling facilities, through minor physical improvements in existing roads, through provision of new or expanded roads.
- 2.14 This document also explains the criteria for the production of a Transport Assessment including baseline data, public transport/walking/cycling/road assessment, traffic data and forecast, safety considerations and accident analysis, proposed development and appraisal of impact (environmental, safety, economy, accessibility, integration).
- 2.15 Appendix B of the guidance contains a table setting out the level of assessment required for various land uses based on the size of development. The key issue is the need to ensure that development proposals strive to achieve nil detriment ('no worse off') to the local and strategic network.
- 2.16 Applying this requirement would mean that the mitigation for the strategic development sites (DA 1 to 8) would return the operation of the network to that if none of these sites were to be developed.
- 2.17 In effect, the 2030 City Plan mitigation case would need to perform in a manner that was similar or equal to the 2030 committed base. The GTA does not imply that underlying existing transport problems would need to be rectified since it would be unrealistic to provide mitigation for 18 years of traffic growth which might be generated outside the local authority area or through changes to personal travel habits and car ownership.
- 2.18 Hence a key objective is to ensure that existing public transport and highway assets are managing as efficiently as possible. It is in this context that this Strategic Transport Assessment has been carried out.

Local Policy

Brighton & Hove Local Plan (Saved Policies)

- 2.19 The Brighton & Hove Local Plan was adopted in July 2005 and expired in July 2008 however, the majority of the policies have been saved and will continue until replaced. The saved policies will be replaced in stages by emerging development plan documents (DPDs) as discussed below. The saved policies are discussed in this section.
- 2.20 The Local Plan is a detailed plan for the use of buildings in Brighton & Hove and sets out policies for the control of development and use of land. It notes the council's vision for the area as 'a cosmopolitan, successful city by the sea where people have a high quality of life in a different environment.'
- 2.21 At the time it was approved, the council had defined a number of Strategic Priorities to achieve this:
- Getting people into work;
 - Reducing local poverty;
 - Delivering key investment projects;
 - Making it easier to travel about;
 - Developing a learning city; and
 - Improving the council's performance.

- 2.22 Following these priorities, a set of objectives are defined and it is from these that the policies and proposals are developed:
- Making the connection between land use and transport – promoting accessibility and managing demand;
 - A sustainable approach to energy, pollution and natural resources;
 - Design, safety and the quality of development;
 - Access to a decent home and neighbourhood;
 - Supporting the local economy and getting people into work;
 - Shopping and leisure – maintaining vitality and visibility;
 - An integrated approach to nature conservation and the countryside;
 - Managing change within a historic environment.
- 2.23 There are a total of three transport policies, that support these objectives. Some examples of these policies are described below.
- 2.24 Policy TR1 – Development and the demand for travel notes that proposals should provide for the demand for travel they create, maximising the use of public transport, walking and cycling. Applicants are required to manage the travel demands of their developments to discourage unnecessary car journeys. Travel demands associated with the site include occupiers, visitors and freight.
- 2.25 Policy TR2 requires applicants to provide the appropriate level of parking or contributions to the costs of improvements such as public transport or pedestrian improvements based on the level of public transport accessibility. Policy TR3 relates to development in areas of low public transport accessibility whereby applicants are required to install measure to increase the accessibility rating of the site or take steps to eliminate or reduce their car parking requirement by preparing, implementing and monitoring a 'travel plan'. Policy TR4 sets out the scenarios in which a travel plan should be produced.
- 2.26 Policy TR5 (sustainable transport corridors and bus priority corridors) states that traffic generating developments on sustainable transport corridors will be approved provided they are designed to 'accommodate bus priority measures and facilitate access to bus services and/or enhance their effectiveness'.
- 2.27 Sustainable Transport Corridors are main routes into Brighton & Hove where measures will be taken to improve access by public transport, for cyclists and for pedestrians. They are defined as:
- A23 from the A27 bypass to Preston Circus;
 - A259 from Saltdean to Shoreham Harbour;
 - A270 (Lewes Road);
 - Church Road / Western Road; and
 - Eastern Road / Edward Street.
- Brighton & Hove Local Development Framework – Draft City Plan (Part 1)**
- 2.28 The council is in the process of developing DPDs to update the Local Plan. The first of these is the City Plan which will be the key planning document providing the overall strategic vision for the

future up to 2030 and to which this evidence base relates. The Draft City Plan (Part 1) is currently being amended in response to comments received during consultation. This section summarises the currently published draft, pre-amendments.

2.29 The City Plan defines BHCC's vision for the area as:

- A strong prosperous city;
- A sustainable city;
- An attractive city; and
- Healthy and Balanced Communities.

2.30 The document also defines 23 strategic objectives to achieve this vision, noting that growth over the plan period will be designed to be balanced and sustainable.

2.31 There are a range of policies set as part of the City Plan including relating to transport. CP9 is the most relevant:

"The council will work with partners, stakeholders and communities to provide an integrated, safe and sustainable transport system that will accommodate new development; support the city's role as a sub-regional service and employment hub; and improve accessibility."

2.32 CP9 is discussed in more detail in section 3.

Brighton & Hove Local Transport Plan (LTP3)

2.33 LTP3 was adopted in May 2011. It highlights the importance of transport to creating a place that people want to live, work, visit and enjoy. It discusses the contribution that transport can make towards:

- Supporting economic growth;
- Reducing carbon emissions;
- Promoting equality of opportunity;
- Contributing to better safety, security and health; and
- Improving quality of life

2.34 It includes a long-term strategy for transport improvements to 2026 and a 3 year delivery plan outlining how the funding will be spent. The themes the plan is based on are:

- Maintain transport infrastructure in a good and safe condition;
- Manage the movement of people, vehicles and goods to make it easier for everybody to get around; and
- Improve the transport network in many different ways to achieve a number of benefits.

2.35 And the delivery of the schemes will be based on 5 broad principles:

- Being innovative and creative;
- Providing and using accurate/robust information;
- Involving partners, stakeholders and communities;

- Ensuring integration and co-ordination; and
- Securing additional investment.

Brighton & Hove Air Quality Action Plan (2011)

- 2.36 The Brighton & Hove Air Quality Action Plan (2011) acknowledges that levels of Nitrogen Dioxide are above legal limits in the city, and that road transport is the primary contributor to these high levels.
- 2.37 The action plan gives details of 38 measures in progress, and 48 future options to reduce air pollution in the city. Measures that are relevant to this report include the promotion and use of sustainable transport; provision of real time information for travellers; measures to improve traffic flow; redesigning urban spaces to better dissipate emissions; and managing freight to reduce emissions from large diesel vehicles

3 Transport Strategy Overview

- 3.1 The transport strategy for the City Plan is underpinned and has taken consideration of the aims and objectives of a number of policies; the key two being CP9 from the City Plan, and the Local Transport Plan. The relatively newly formed Coast to Capital Local Enterprise Partnership is also expected to play a greater role in influencing and delivering strategic planning and transport projects in the future. Each is discussed in more detail within this section.
- 3.2 National and Local policy also refers to a desire to provide a safe environment for all users and, as such, this is also an objective for the Transport Strategy. A summary of recent collision data across the study area is provided at the end of this section.

The City Plan - CP9 summary

- 3.3 As noted in section 2, CP9 is the policy directly related to sustainable transport within the City Plan. It defines its aim as promoting and providing *'measures that will help to manage and improve mobility and lead to a transfer of people and freight onto sustainable forms of transport'*.
- 3.4 At a regional level its objectives are to:
- Work with adjoining authorities, the Highways Agency, businesses and public transport operators to improve and provide cross boundary sustainable transport links
 - Promote and facilitate better use of existing large car parks on periphery of city and transfer journeys onto existing and improved bus and rail services
- 3.5 At a local level its objectives are aimed at:
- Directing significant development into areas with good sustainable transport links and major development will be located in areas where measures can be taken to secure accessibility (D1-D8)
 - Improving access to significant uses, facilities and services by supporting or providing sustainable transport measures.
 - Ensuring all new, major development schemes are accompanied by Transport Assessment and measures to mitigate any negative impact.
 - Working with communities to identify priorities for improved public realm and safer areas.
- 3.6 CP9 also defines transport measures designed to manage the demand for travel within and to/from the city for each mode:
- *Bus, Coaches and Taxis*
Implement strategic bus network investments including priority lanes on the following key routes into and across the city:
 - *Lewes Road (A270);*
 - *Edward Street and Eastern Road;*
 - *A259 Seafront serving Brighton Marina, Brighton Centre, Churchill Square and Shoreham Harbour Development areas; and London Road.*
 - *Rail*
Work with partners to:
 - *Improve capacity and efficiency of rail services, particularly at weekends; and*
 - *Promote transfer of journeys from car to rail by encouraging use of station parking.*

Cars and Freight

Work with communities and partners to promote and provide measures including:

- *Traffic management measures including Intelligent Transport Systems to improve traffic flow and reduce congestion;*
- *Prepare and implement a Highway Asset Management Plan;*
- *car clubs;*
- *20mph zones in residential areas; and*
- *promote use of alternative fuels and provide associated equipment, e.g. electric charging points.*

Prepare and implement a Freight Strategy for the city.

- *Walking and Cycling*

Improve the public realm in key areas to encourage walking and cycling. Measures will be undertaken in the following areas:

- *Valley Gardens*
- *Station Gateway*
- *Lewes Road*
- *London Road*
- *Edward Street and Eastern Road*
- *Old Shoreham Road*
- *A259 Seafront*
- *Seven Dials*
- *Hove Station*
- *Pool Valley*
- *Local shopping areas*

Implement an integrated cycle network by 2030.

Promote cycling and walking as 'active travel' by providing advice and information to residents, worker and visitors to the city.

Improve Rights of Way, wheelchair friendly provision and access to open spaces and the National Park.

- *Travel Plans*

Working with partners to increase and implement travel and mobility management measures to encourage more journeys by sustainable transport to reduce the number of car journeys to/from and within the city. Measures will include:

- *school travel plans; and*
- *workplace travel plans.*
- *personalised travel planning*

- *Parking*

Co-ordinate the provision of public parking and traffic management measures across the city through an integrated approach to car parking charges, car park improvements, (including signing and information), controlled parking zones and ensure that capacity of public car parks is not increased in central areas.

Prepare new guidance on parking and servicing requirements for new developments that will put a priority on minimising off-street parking provision and establishing clear criteria for car-free housing.

Prepare and implement a strategy to manage coach parking.

Local Transport Plan 3

3.7 The LTP3 transport strategy defines the plan for transport from 2011 through to 2026. As part of this it defines the following objectives, all of which in turn support the aims and objectives of CP9:

- *To ensure the local transport system operates efficiently, is well maintained and can cope with extreme occurrences*
- *To improve access to job opportunities, shopping areas and cultural and visitor attractions.*
- *To help inform travel decisions and improve reliability of journey times for all road users.*
- *To deliver transport improvements required to support sustainable housing growth.*
- *Increase the use of low emission forms of transport and support the use of associated technologies.*
- *To reduce the need to travel for some journeys and enable people to travel more sustainably.*
- *To increase the availability and accessibility of travel choices for everyone, particularly disadvantaged people, and those living outside the central area.*
- *To improve streets and the wider transport system that will assist in the regeneration of deprived areas and communities.*
- *To reduce the fear of danger and the risk of personal injury as a result of transport collisions.*
- *To minimise the impacts of transport-related air and noise pollution on people, and the natural and built environments.*
- *To encourage and enable greater levels of active and healthy travel, such as cycling and walking, especially for shorter journeys*
- *To create safe and attractive streets and places that everyone can use responsibly.*
- *To enable greater access to a wide range of goods, services, and places, including the city's natural environment.*

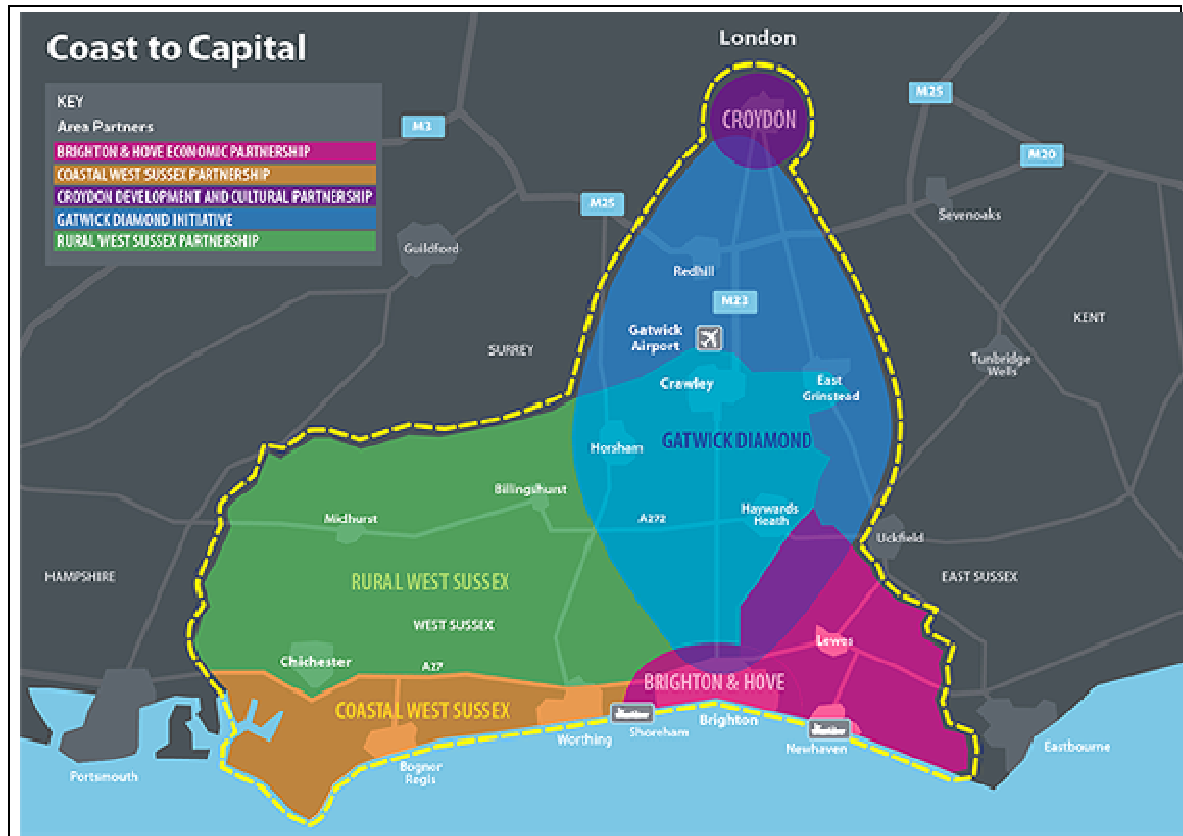
3.8 The LTP3 delivery plan outlines the basis on which investment in the transport network will be achieved in the short term (2011 to 2014) and focuses on small scale interventions given current funding constraints.

Coast to Capital Local Enterprise Partnership (LEP)

3.9 LEPs are part of Government's approach to localising economic development, with local businesses and authorities taking the lead on economic influences. LEPs are designed to be strategic bodies to work with and influence existing organisations who have responsibility for relevant issues.

3.10 The city is in a key part of the Coast to Capital LEP area which also covers the Gatwick Diamond (including Mole Valley, Tandridge and Reigate & Banstead), West Sussex and Croydon. This brings together five existing economic partnerships which are shown in Figure 3.1.

Figure 3.1 Coast to Capital LEP Area of Coverage



<http://www.coast2capital.org.uk/about-us/maps/map-coast-to-capital-area.html>

The aims of the Coast to Capital LEP are currently strategic in nature and are defined at the sub regional level as:

- Increasing the proportion of businesses which are internationalised from the level of 12% regular exporters by 1% per annum over the next 5 years – an additional 3,951;
- Increasing the level of entrepreneurship and business start-up rate to above the regional and England average – an additional 4500 new businesses over the next 5 years;
- Stimulating business growth, innovation, productivity and employment across a range of key sectors, bringing GVA and employment growth overall up to at least the regional average;
- Generating the required investment to bring about major catalytic investments in key business locations;
- Creating a planning environment which supports business development and growth; and
- Pressing for and helping to secure investment in transport infrastructure, business premises and other infrastructure.

3.11 Transport is only directly referenced in the last of these aims however, it is recognised the impact transport and connectivity can have on all aspects of economic development. When discussing creation of the right conditions for businesses to flourish, the LEP notes that, regarding transport, its focus is:

- Working with Gatwick Airport to support its ongoing promotion and development;
- Working with other operators and entry points to build the capacity of international links;

- Promoting better public transport services including investment in infrastructure; and
- Facilitating, where possible, private sector investment in transport infrastructure at the key catalytic development locations.

- 3.12 However, DfT has announced its firm intention to devolve funding for local major transport schemes in the LEP area, which could include Valley Gardens and sections of the bus-based rapid transport scheme (known as CTS) previously prioritised by the Regional Transport Board to Local Transport Bodies (LTBs) from 2015. LTBs will be voluntary partnerships between Local Authorities (LAs), Local Enterprise Partnerships (LEPs) and other organisations. (see section.
- 3.13 Their primary role will be to decide which investments should be prioritised, to review and approve individual business cases for those investments, and to ensure effective delivery of the programme. The delivery and funding of major schemes such as the Coastal Transit Scheme (see section 9) will in part be influenced by this process.

Safety

- 3.14 Casualty reduction is a key objective in the council's LTP3. This issue has been targeted through education, training, publicity and engineering measures and the total number of collisions in the City has reduced by 15% from 2007 to 2011.

Table 3.1 Collisions 2007 to 2011

Year	Collisions				Casualties			
	Fatal	Serious	Slight	Total	Fatal	Serious	Slight	Total
2007	6	152	891	1049	6	158	1129	1293
2008	5	124	811	940	5	136	1066	1207
2009	2	143	748	893	2	148	955	1105
2010	7	123	772	902	8	128	975	1111
2011	5	159	729	893	6	166	934	1106

www.brighton-hove.gov.uk; accessed December 2012

- 3.15 It is recognised that although there has been a downward trend in the overall number of collisions and casualties, the number of fatal casualties remained the same and there was a 5% increase in the number of serious collisions and casualties.
- 3.16 When the collisions are examined in more detail, the number of vulnerable road user casualties (cyclists, pedestrians, powered two wheelers) has increased. The proportion of severity for powered two wheelers and pedestrians remained similar in the previous 2 years, however, the proportion of KSI casualties has increased for cyclists. Brighton & Hove, as a popular tourist destination, has a number of visitors who will not be familiar with the network and transport patterns
- 3.17 BHCC are committed to reducing the number of collisions through education training and publicity but acknowledge that targeted engineering solutions would be beneficial in certain locations. Paragraph 7.2.3 of the Brighton & Hove LTP 3 notes that "a priority list of locations where collision data justifies more detailed investigation" is maintained in order to identify opportunities to improve safety and promote sustainable travel. BHCC Road Safety Team have investigated and identified locations where there are 4 or more accidents within a 25m radius by average number of collisions. The full report is provided in Appendix A. A summary of the top 10 locations for collisions is shown in **Table 3.2**.

Table 3.2 Collision Hot Spots

Rank	Location	Accidents						Accidents involving:			
		Fatal	Serious	Slight	Total	p.a	KSI	Peds	Cycs	Child	OAPs
1	Old Steine / St James's St	0	7	14	21	7.0	7	8	4	2	8
1	Aquarium Roundabout	0	1	20	21	7.0	1	0	11	1	2
3	Seven Dials	0	3	17	20	6.7	3	0	11	0	1
4	Clock Tower	0	3	16	19	6.3	3	8	3	3	5
5	Western Rd adjacent to Imperial Arcade	0	2	14	16	5.3	2	6	2	3	8
6	Lewes Rd / Bear Rd	0	5	9	14	4.7	5	7	2	0	1
6	London Rd / Cheapside / Queens Place / London Road /St	0	2	12	14	4.7	2	4	3	3	5
8	Lewes Rd / Franklin Rd / St Leonard's Rd	0	3	10	13	4.3	3	2	7	0	0
8	Lewes Rd / Coldean Lane	0	4	9	13	4.3	4	1	0	0	7
8	Gloucester PI / North Rd / Marlborough PI	0	1	12	13	4.3	1	1	1	3	0

BHCC Road Safety Team

3.18 Based on the information shown in Table 3.2 and other influential factors, BHCC are proposing works at the following locations during 2012/2013:

- Seven Dials
- Lewes Road/Bear Road
- Lewes Road/Coldean Lane
- Lewes Road/Hartington Road
- Goldstone Villas/Clarendon Villas

3.19 The development of future schemes should therefore take into account safety issues and increases in traffic flow will need to be managed particularly in pedestrian sensitive areas.

4 City Plan Development Proposals

4.1 The list of sites to be used in the development of the 2030 City Plan Reference Case and Committed Development scenarios were supplied by Brighton & Hove City Council. They include employment and residential sites and have been categorised according to the following planning scenarios:

- New Strategic Site (in City Plan)
- Local plan allocation carried over
- Committed – Not yet built out
- Committed – Under construction
- Committed – Built out
- Other

4.2 These categories have been grouped into 'committed' and 'proposed' (strategic and local plan allocations).

4.3 A composite table identifying the location of all the sites is provided in Appendix B including information, where available, on the existing and proposed land-use and quantum.

Committed Developments

4.4 The committed developments include a total of 3,459 residential dwellings and 7,704 full time employees.

4.5 The number of full time employees (FTE) has been derived based on '*Employment Densities Guide – 2nd Edition*', Homes and Communities Agency (2010). This document provides research based estimates of employment generated by various development types and notes its uses as including '*development of a masterplan for a regeneration or economic development project to inform the selection of the best option for developing the site*'. The values used are shown in Table 4.1.

Table 4.1 Employment Densities

Use Type	Area per FTE (m ²)	Floor Area Basis	Adjusted Area per FTE (m ²) (gross areas)
Office (single)	12	NIA	15
Office (business park)	10	NIA	12.5
Retail (local)	19	NIA	23.75
Retail (food store)	17	NIA	21.25
Retail (business park)	90	NIA	112.5
Leisure	70	GIA	87.5
Warehousing	70	GEA	70
School	36	GIA	36
Conference centre	90	GIA	90
Hospital	25	GIA	25

Employment Densities Guide - 2nd Edition, Homes and Communities Agency (2010), and TRICS 2012b (version 6.10.2)

- 4.6 The final column of Table 4.1 shows the adjusted ratio of FTEs based on gross area for all use types. No values are provided for Hospitals or C2 use classes. The value shown in the table is based on surveys recorded in the TRICS 2012b (version 6.10.2) database.
- 4.7 It is acknowledged that the employment density can vary depending on the nature of the business and style of operation, however, the values used are considered to be a robust approximation of average values.
- 4.8 The City Plan proposes the development within a number of development and special areas. These areas are places which either:
- already benefit from good sustainable transport links or are areas where accessibility can be improved;
 - are areas which offer significant capacity for new development; and
 - are areas where new development and/or regeneration will secure substantial benefits for the city.
- 4.9 The elements of the Development Areas which are already committed are detailed in Table 4.2. whilst Figure 4.1 shows the location of the Development Areas.

Table 4.2 Committed Developments by Area

Development Area	Description	Residential (dwellings)	Employment(Full Time Employees (FTE))
DA1	Brighton Centre and Churchill Square Area	-	-
DA2	Brighton Marina and Black Rock Site	853	-
DA3	Lewes Road	402	-
DA4	New England Quarter and London Road	351	578
DA5	Eastern Road and Edward Street	75	6268
DA6	Hove Station Area	299	414
DA7	Toads Hole Valley	-	-
DA8	Shoreham Harbour and South Portslade	-	41
SA1	The Seafront	-	-
Rest of City	-	1479	404

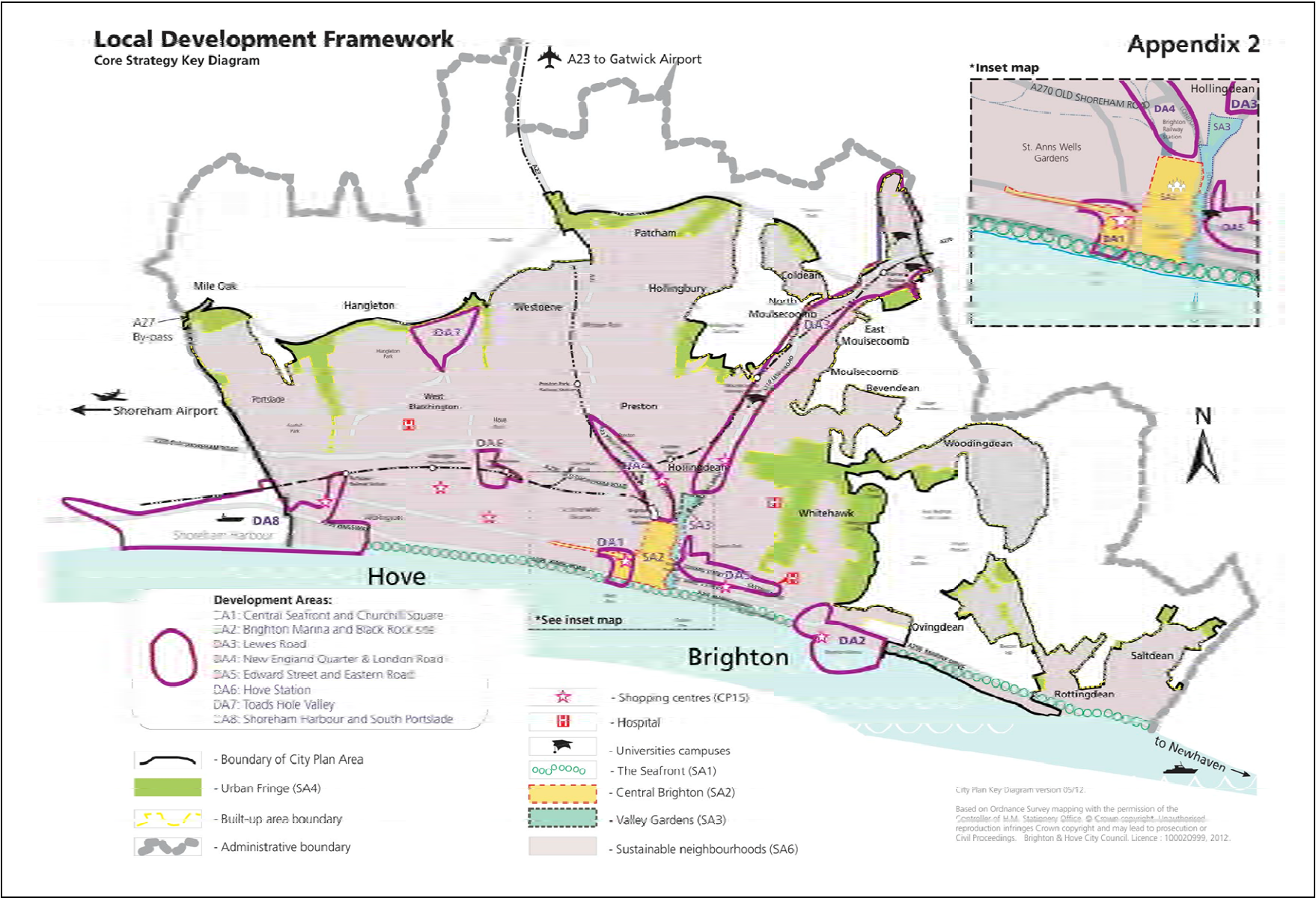
Proposed City Plan Development Areas

- 4.10 Further to the committed sites, there are a number of proposed sites within the City Plan Development Areas. There are no planning applications associated with these sites however, the proposed use and density has been suggested by the council. The distribution and size of proposed development is shown in Table 4.3 and the development areas are shown graphically in Figure 4.1.

Table 4.3 Proposed Developments by Area

Development Area	Description	Residential (dwellings)	Employment(Full Time Employees (FTE))
DA1	Brighton Centre and Churchill Square Area	-	1120
DA2	Brighton Marina and Black Rock Site	1085	464
DA3	Lewes Road	300	964
DA4	New England Quarter and London Road	546	1745
DA5	Eastern Road and Edward Street	305	2791
DA6	Hove Station Area	200	800
DA7	Toads Hole Valley	700	3389
DA8	Shoreham Harbour and South Portslade	400	109
SA1	The Seafront	400	59
Rest of City	-	137	-

Figure 4.1 City Plan Development Area



5 Trip Generation

- 5.1 A comprehensive trip generation note has been prepared and agreed with the Highways Agency. A copy is provided in Appendix B for reference. This section summarises the note.
- 5.2 Trip generation is the process of using existing information to predict the likely travel patterns associated with proposed developments including time and frequency of travel, mode split and journey purpose.
- 5.3 The trip generation exercise has been completed to provide a multi-modal assessment for AM Peak hour (8am – 9am), average Inter-Peak hour (10am-4pm) and a PM peak hour (5pm-6pm) for cars, HGVs and public transport trips.
- 5.4 Details of zoning and trip distribution are provided in section 7.
- 5.5 The trip generation exercise takes account of all sites discussed in Section 4 and listed in Appendix B. The planning status of each site is defined within one of the following categories:
- New Strategic Site in City Plan;
 - Local Plan Allocation Carried Over;
 - Other;
 - Consented not yet built out;
 - Consented and under construction; or
 - Consented built out.
- 5.6 Sites in the first two categories are assumed to have no current committed planning applications under construction or waiting to be built out. Therefore a generic trip rate has been derived using TRICS to approximate the likely rate.
- 5.7 For the committed and 'other' applications, information has been used from documents published on the Brighton & Hove Planning Portal where available. In cases where the information is not available, the generic trip rates for the Development Areas have been applied. The final column in Appendix B shows the approach used for each site.

Existing Use

- 5.8 The table of the sites in Appendix B includes details of their existing use. Sites listed as vacant or not specified have been assumed to have no existing trips associated with them.
- 5.9 Information on the existing level of trip generation and mode split was used, where available, from Transport Assessments (TAs) or Transport Statements (TSs). In cases where this information is not published on the planning register, but features such as land use and quantum are given, generic trips rates were used as defined below for 'proposed use'.

Proposed Use

Consented Applications

- 5.10 As noted above, trip generation information from approved documents published as part of consented applications has been used where available.
- 5.11 The extracted trip rates and any assumptions required are detailed in the trip generation note provided in Appendix B.

- 5.12 Mode splits have also been taken from TA's where available. Where this information is absent, mode splits from the 2001 Census data have been used instead as shown in Table 5.1. The mode split has been disaggregated down to Ward level.

Generic Trip Rates

TRICS database

- 5.13 TRICS® is an industry recognised database of transport surveys for a wide range of development types across the UK and Ireland. Trip rates can be influenced by a number of factors including:
- local environment and surroundings;
 - the composition and functions of the site;
 - its on-site and off-site parking facilities; and
 - availability of other modes of transport.
- 5.14 A trip generation rate for a development is derived by filtering the database to return only results that match the criteria required. The latest available version, 2012 (b) v 6.10.1, was used to derive a weekday AM, inter-peak and PM trip rates for this assessment.
- 5.15 The assessment was completed in line with best practice guidance and based on the following selection criteria:
- Use of multi-modal trip rates;
 - No surveys older than 2001;
 - Where possible surveys have been selected from the South East of England. There are a limited number of surveys available in this area, and, unless unavoidable, it is not recommended to base a trip rate assumption on a single site unless it is known to be a good representation of the development site. Therefore, where required, the search area has been widened although Greater London was excluded due to differences in travel behaviour;
 - Trip rates have been generated for Gross Floor Area (m2) or dwellings depending on land use; and
 - Urban surveys were defined as sites within 'Town Centre' or 'Edge of Town Centre' locations and suburban surveys as sites categorised as 'Suburban Area' or 'Edge of Town'.

Mode Split

- 5.16 The mode split has been based on the 2001 Census data which was the most recent data set available at the time that this STA was produced.
- 5.17 The mode split has been disaggregated down to Ward level as shown in Table 5.1

Table 5.1 Mode Split based on National Census Data

Mode of Travel	Ward									Brighton & Hove
	Regency	South Portslade	Brunswick and Adelaide	St. Peter's and North Laine	Goldsmid	Queen's Park	Hanover and Elm Grove	Wish	Patcham	
Work from Home	10%	8%	9%	9%	9%	9%	8%	11%	9%	9%
Train	16%	6%	12%	17%	14%	9%	9%	8%	4%	9%
Bus, Minibus or Coach	9%	11%	11%	10%	11%	12%	11%	13%	13%	12%
Taxi	0%	1%	0%	0%	1%	0%	0%	1%	1%	1%
Car Driver	23%	52%	33%	26%	37%	28%	35%	48%	58%	42%
Car Passenger	3%	7%	3%	3%	4%	3%	4%	4%	6%	5%
Motorcycle	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%
Bicycle	3%	2%	4%	3%	3%	4%	4%	3%	1%	3%
On-Foot	35%	12%	26%	30%	20%	33%	27%	11%	7%	17%
Other	1%	0%	1%	1%	0%	1%	0%	1%	0%	1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Public Transport	25%	17%	24%	26%	25%	21%	20%	20%	16%	21%

www.nomisweb.co.uk.

Net Change

- 5.18 Where possible, trips lost due to redevelopment have been discounted to result in a net change. Where an existing land use was unable to be defined due to uncertainty regarding its operational use then no discounting was applied in order to ensure a robust assessment.
- 5.19 A combination of the information extracted from approved documents and derived generic trip rates results in the vehicle trips per development area. The full details are provided in the trip generation note provided in Appendix B. Table 5.2 contains a summary of the net change.

TEMPRO Growth Rate

- 5.20 To ensure that the proposed multi-modal profile is in line with expected overall growth in the local area, the resultant trip generation shown above was capped using local based growth factors derived from TEMPRO.
- 5.21 Capping of the trip generation using TEMPRO growth factors ensures that the proposed multi-modal profile is in line with expected overall growth in the local area and distributes the growth across the city allowing the location and size of development areas to be considered in the assessment.
- 5.22 The methodology is discussed further in Section 7 and the uncapped values are shown in Table 5.2.

Table 5.2 Additional Trips by mode

	Cars									PT									HGV								
	AM			interpeak			PM			AM			interpeak			PM			AM			interpeak			PM		
	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total
DA1	383	44	428	163	146	309	92	281	373	401	40	441	132	114	245	82	284	365	7	6	13	11	9	20	16	8	24
DA2	227	400	627	320	302	622	532	335	867	63	234	297	56	65	121	161	65	225	3	5	8	6	6	12	4	3	7
DA3	287	173	460	84	86	170	138	250	388	51	24	74	8	7	15	6	34	41	1	1	1	2	1	3	4	4	8
DA4	361	175	536	89	92	182	139	311	450	139	60	199	46	43	89	15	97	112	0	0	1	1	1	1	1	1	2
DA5	905	198	1103	266	276	542	147	674	822	188	20	208	22	34	56	-2	102	101	-1	-1	-1	-4	1	-3	-1	-6	-8
DA6	142	53	195	45	43	88	-2	76	74	-19	-12	-31	3	-1	2	-61	-66	-126	-2	-1	-2	-6	-3	-8	0	-4	-4
DA7	505	287	792	242	264	506	311	476	786	94	27	121	11	17	28	24	17	41	10	10	20	8	10	17	3	1	4
DA8	61	109	170	45	40	85	88	61	150	13	54	67	3	5	8	19	5	24	0	1	1	1	1	3	0	0	1
Rest of City	223	459	681	157	143	292	397	235	632	93	208	301	39	39	78	97	76	173	-1	-1	-2	2	1	3	0	-1	-1
Total	3095	1897	4992	1412	1392	2796	1841	2701	4542	1023	654	1677	320	323	642	342	613	955	18	20	38	20	27	47	25	6	31

6 Committed City-Wide Interventions by 2030

- 6.1 The future year forecasting assumptions for the transport network include any schemes that can reasonably be expected to be delivered by the end of the plan period. These forecast schemes have been determined by allocating schemes to one of four categories as follows:
- Near Certain : The scheme will happen or there is a high probability that it will happen;
 - More than likely: The scheme is likely to happen but there is some uncertainty;
 - Reasonably Foreseeable: The scheme may happen but there is significant uncertainty; and
 - Hypothetical: There is considerable uncertainty whether the scheme will ever happen.
- 6.2 Based on the categorisation, the forecast schemes include schemes that are considered 'near certain' or 'more than likely', and should represent a realistic view of what is likely to happen in the absence of any specific scheme proposals.
- 6.3 These interventions broadly focus on implementing the more certain aspects of Local Transport Plan 3 and / or schemes that have recently been awarded funding such as the Local Sustainable Transport Fund and Better Bus Area projects for example.
- 6.4 These interventions are included in the City Plan and have been included in the 2030 Committed Base and 2030 City Plan Reference Case scenarios. The interventions are described in the following paragraphs and shown in Figure 6.1.

Figure 6.1 – Committed Transport Interventions



Lewes Road Improvements

6.5 Improvements on the Lewes Road Corridor consist of infrastructure improvements in combination with smarter choice measures. The combined package is designed to deliver significant economic benefits in terms of reduced bus journey times.

6.6 The infrastructure elements are as follows:-

- A new northbound cycle and bus lane on the Lewes Road between the Vogue Gyratory to just north of the A27 flyover
- A new southbound cycle and bus lane from just south of the A27 eastbound off slip to the Vogue Gyratory
- A new toucan crossing on Lewes Road just north of Queensdown School Road
- Rationalisation of 3 pedestrian crossings south of the Vogue Gyratory (nr Aberdeen Road) to two

These measures will require the reallocation of one general traffic lane to public transport and will also be accompanied by an increase in bus service frequencies on the Lewes Road corridor as shown in Table 6.1 below.

Table 6.1 – Bus frequencies – Existing and Proposed frequencies on the Lewes Road corridor

			Frequency			
			Existing		Proposed	
Period	Service	Direction	Interval (min)	bus /hr	Interval (min)	bus /hr
AM Peak	25	NB	6	10	3	20
	25	SB	7.5	8	3	20
	23	NB	20	3	20	3
	23	SB	30	2	20	3
	48	Based on 49A	20	3	15	4
PM Peak						
	25	NB	6	10	3	20
	25	SB	7.5	8	3	20
	23	NB	30	2	20	3
	23	SB	30	2	20	3
	48	Based on 49A	20	3	15	4

6.7 The current double decker bus fleet of 18 buses on key service 25 will be replaced with bendy buses and associated enlargement of the 20 busiest bus stops with high quality, large capacity shelters and Kassel (high level/accessible) kerbing. These measures will provide a 69% increase in passenger capacity.

6.8 The smarter choices element will comprise of a range of travel planning interventions targeting all sections of society in the bid area including:-

- Personalised Travel Planning (PTP) with local residents,
- Targeted travel planning work with Sussex and Brighton Universities

- Targeted travel planning work with 18 schools in the area.
- Community Road Safety Campaigns
- Electric Bikes Research and Promotion
- Enhancing both pedestrian and cycle access to the South Downs,
- Extension of the city centre pedestrian wayfinding system along the Lewes Road corridor.
- Bus Real Time Information (RTI) Extension and Upgrade to GPRS
- Development of Travel Plans for Falmer, Moulsecoomb and London Road Stations

Seven Dials reconfiguration

- 6.9 The Seven Dials proposals primarily aim to address road safety issues due to a poor accident record particularly with pedestrians and cyclists. The council is also aiming to improve the visual appearance of the area by introducing high quality new paving, removing unnecessary railings and street clutter.
- 6.10 The pedestrian environment will be improved by the introduction of zebra crossings as well as wider pavements, while cyclists will benefit from slower vehicle speeds and lanes designed so they can occupy the centre of the lane without the fear of colliding with overtaking vehicles – a common cause of cyclist accidents at roundabouts.
- 6.11 Turning movements for all sizes of vehicles will be accounted for and maintained, despite the introduction of a much larger central island. It will have an over-run area which larger vehicles will be able to use when necessary but will keep general traffic in a single circulatory lane.
- 6.12 The proposals are not designed to increase the capacity of the junction and are driven by safety concerns.

Edward Street / Eastern Road Public Transport Measures

- 6.13 As part of the Council's successful bid under the Department for Transport's Better Bus Areas programme, improvements are being proposed to facilitate bus and taxi priority along Edward Street in Brighton. There are currently existing delays for buses & taxis exiting Edward Street / Eastern Road heading towards the city centre.
- 6.14 Eastern Road/Edward Street are local attractors for business and labour markets, with the Royal Sussex County Hospital and American Express European HQ contributing as major employers. Brighton Marina is also located immediately adjacent to the area. The area also contains the recently approved £480 million development of Royal Sussex County Hospital which will create a world class regional medical facility for the region
- 6.15 The scheme proposes to introduce a westbound bus/taxi and cycle lane and an eastbound cycle lane from the junction of Edward Street/Pavilion Gardens to Upper Rock Gardens and then a shared bus/taxi and cycle lane eastbound from the junction with Upper Rock Gardens to the junction with Upper Bedford Street. There will also be a review and rationalisation of waiting and loading restrictions.

Valley Gardens

- 6.16 The Valley Gardens corridor is made up of a number of separate green spaces running from The Level down to the Old Steine and the seafront. The aim of the scheme is to upgrade the open

spaces and improve routes for pedestrians, cyclists, drivers and public transport so that it becomes:-

- an attractive, flexible, safe space that enhances the city centre's environment
- a place that will attract residents and visitors at all times of the day and year, with something for everyone to enjoy
- a meeting place, connecting the city efficiently and safely however people travel

6.17 The layout of the northbound and southbound carriageways will be realigned to provide a simpler road layout, with improved pedestrian crossing facilities and the provision of more contiguous bus / taxi and cycle lanes.

6.18 The scheme has yet to be drawn up in detail but preliminary microsimulation modelling suggests a scheme can be provided:-

- Which is traffic neutral because the capacity of junctions along the corridor is broadly unchanged;
- Where assignment to surrounding roads is minimal

6.19 On this basis and in the absence of an approved and defined scheme, the assumption has been made that any improvements to Valley Gardens will result in the operation of the network being similar for vehicular traffic to that experienced if no improvements were made. Bus and taxi users would however, benefit from priority measures.

6.20 Localised modelling will be necessary to define the scheme further but not for the purposes of this strategic transport assessment.

Brighton Station Gateway

6.21 The front entrance to Brighton Station Gateway is currently dominated by traffic with high levels of pedestrian footfall and taxi, cycle and bus use. These modes are all competing for a finite amount of space which creates a poor pedestrian environment.

6.22 A series of traffic management proposals are proposed to encourage a better use of the space and to significantly improve the public realm.

6.23 The main features of the new proposal as of December 2012 but subject to further investigation and potential change are as follows:

- Buses will remain in their current arrangement directly in front of the station. Improvements will be made to the design of this bus area.
- Taxis - A new taxi rank will be provided in front of the station in Junction Road, and a queuing area for taxis waiting to join this rank will be provided in North Laine.
- Pedestrians - Queen's Road will be widened by around three metres on each side. Improvements will be made to junctions outside the station to make them easier to cross and the pavement will also be widened in Surrey Street.
- Cycling - Most cycle parking will be provided at the north of the station, however some will be provided in the area currently occupied by taxis.
- Traffic flow - Queens Road and Surrey Street will retain their current gyratory arrangement.

- Amendments to the current one way system in the North Laine are proposed to reduce current levels of through traffic, while retaining access for residents and businesses.

6.24 The proposals are still being defined and will be the subject of further refinement. However, a preliminary assessment indicates that traffic flow changes will be confined to a small number of residential streets within North Laine with minimal impact on key roads in the city centre and on radials. In this instance the impact of the scheme will be undertaken using analysis tools focused on the immediate residential and commercial areas to the east of the station and hence do not need to be modelled as part of this STA.

Introduction of 20mph zones on residential streets

- 6.25 The Council is committed to reducing road casualties through a joint programme of road safety engineering measures alongside education, training and publicity initiatives. To support this objective, 20mph zones will be introduced across the city in a phased manner.
- 6.26 By 2030, it is assumed that most of the residential streets in residential neighbourhoods will be subject to the 20mph limit with 30mph restrictions limited to key radial routes from the city centre.
- 6.27 Whilst the detail is still to be confirmed, for the purposes of this assessment (December 2012) we have assumed the following coverage across the city which is shown in Figure 6.2 below. This has been verified with council officers.

Figure 6.2 – Assumed location of 20 mph zones for modelling purposes (position as of December 2012)



Traffic Signal Review and Upgrade

- 6.28 Traffic congestion in the City Centre and along key radial routes into the city is identified as an issue that restricts economic development, discourages bus travel and results in poor air quality.

A contributory factor to this congestion is the ageing traffic signal equipment at key junctions along the corridor. The following recent and proposed upgrades to MOVA and UTC to link traffic signals along key corridors and ensure optimal efficiency have been included within the 2030 Committed Base and 2030 Reference Case models:-

- Falmer Rd/Warren Rd - Woodingdean
- Lewes Rd/Stoneymere Way - Stanmer
- Lewes Rd/Coldean Lane - Moulsecoomb
- Lewes Rd/Moulsecoomb Way - Brighton
- Marine Drive/High St - Rottingdean
- Marine Drive/Roedean Cafe - Brighton
- Western Rd/Montpelier Rd - Brighton
- Western Rd/Holland Rd - Brighton
- Kingsway/Grand Av - Hove
- Church Rd/The Drive/Grand Av - Hove
- Kingsway/Hove St - Hove
- Kingsway/Wharf Rd - Hove
- Kingsway/Boundary Rd - Portslade
- Church Rd/Wellington Rd - Portslade
- A259/Longridge Av - Peacehaven
- Lewes Rd/Coombe Rd/B&Q
- Cromwell Rd/The Drive
- Lewes Rd/The Vogue

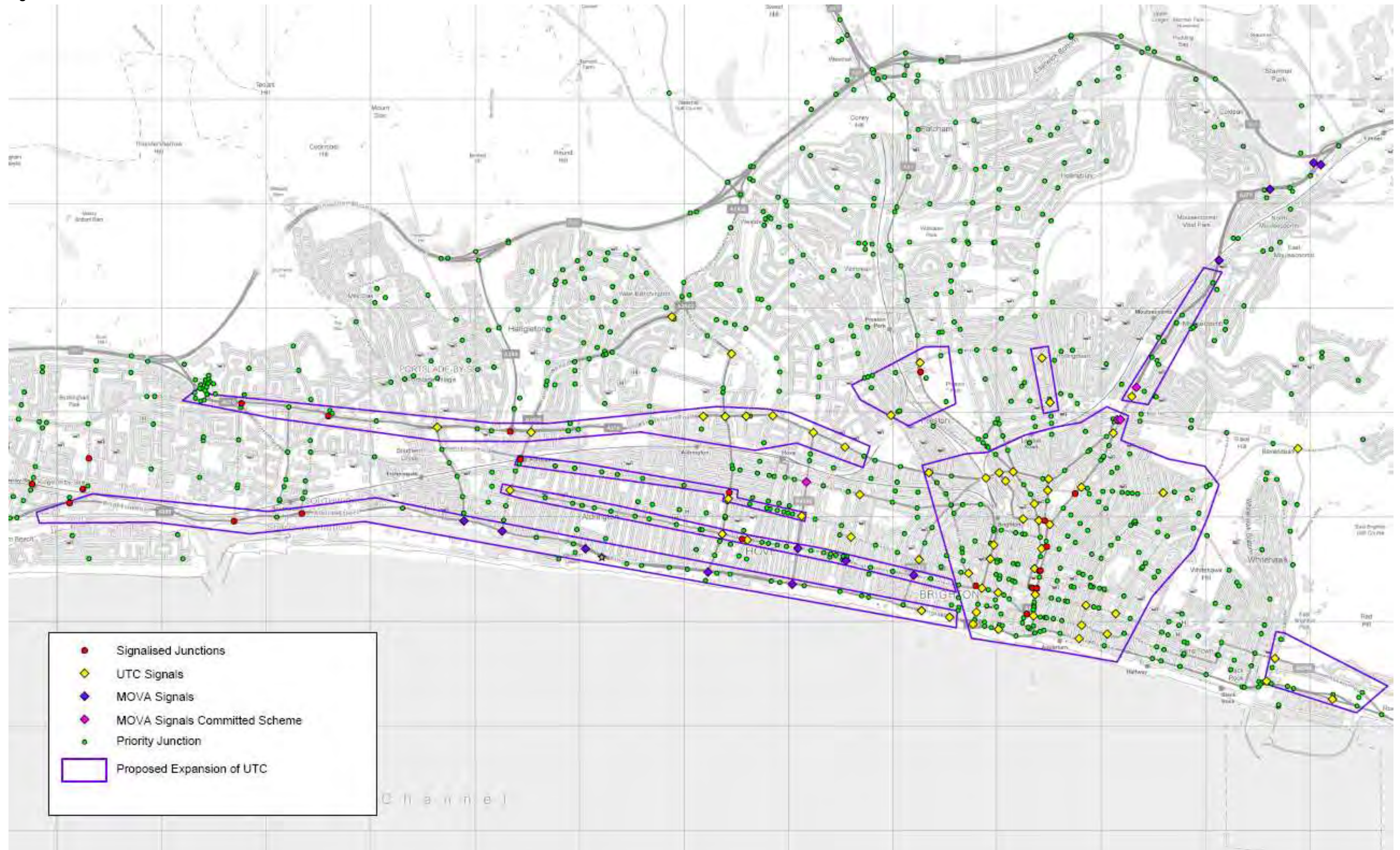
- 6.29 These are also shown on Figure 6.3 below

Other measures

- 6.30 A number of other recent transport and highway interventions have been included in the 2030 Committed Base and 2030 City Plan Reference Case modelling. These are:-

- Improvements associated with the AMEX stadium in the Stanmer Park Area
- Recent changes to improve pedestrian crossing facilities on Grand Junction Road

Figure 6.3 – Location of UTC and MOVA



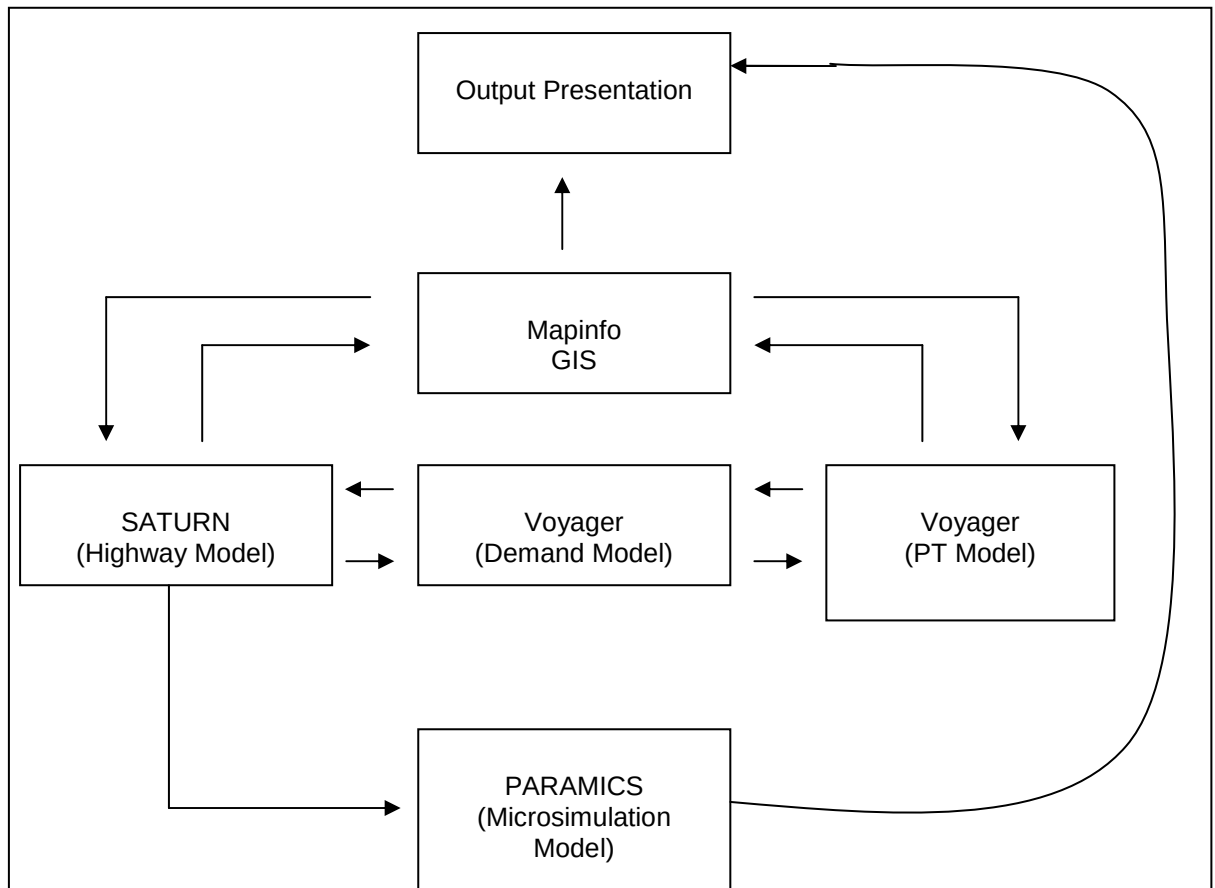
7 Traffic & Public Transport Modelling

- 7.1 This section sets out the methodology used for the impact assessment on the network including the scenarios tested, software used and assumptions made.

Model Structure

- 7.2 JMP were commissioned by Brighton & Hove City Council in September 2010 to develop a full multi-modal model for the city centre.
- 7.3 The study aim was to develop tools with which to investigate the impact of transport schemes and proposed developments in Brighton & Hove.
- 7.4 To achieve this it was deemed that the study objectives would be best achieved by developing and updating the existing SATURN highway model, building a new public transport model using the VOYAGER software, together with a custom-built variable demand model, built using the principals outlined in WebTAG Unit 3.10.
- 7.5 The methodology provides a modelling package suitable for testing proposed transport and development schemes with the demand model estimating changes in demand for trips made by all motorised modes of transport.
- 7.6 This approach has had a number of benefits including:-
- The ability to utilise the existing SATURN model as a basis for developing the highway network and zoning system
 - SATURN and VOYAGER are established software packages which are compatible with one another and have been widely used and are also accepted by DfT
- 7.7 These models were complemented by the provision of a PARAMICS city centre microsimulation model so that a fine-grain analysis of traffic management changes could be assessed within the core urban area as well as testing the behavioural responses of the multimodal model. Details of the validation of the PARAMICS model are contained in a separate report titled "Brighton & Hove Multi Modal Paramics Model – Local Model Validation Report (LMVR)", dated 3rd August 2011.
- 7.8 The key requirement of the Brighton & Hove model is that it should provide a robust multi-modal tool to facilitate the analysis of future traffic and transportation issues for the region.
- 7.9 The Brighton & Hove multi-modal model is comprised of three sub-models:
- A highway model using SATURN;
 - A public transport (PT) model using CUBE VOYAGER; and
 - A demand model using CUBE VOYAGER.
- 7.10 Figure 7.1 below gives a diagrammatic representation of the interaction between the different packages.

Figure 7.1 Multi-modal model structure



Study Area

- 7.11 In identifying the potential geographical coverage of the model, the following have been considered:
- The coverage of the existing Brighton & Hove multi-modal model.
 - Current and emerging strategic planning and transportation considerations, which are identified in the Local Development Framework (LDF) and the Local Transport Plan
 - Best practice model guidance notes and in particular WebTAG, DMRB and other DfT and Highways Agency guidance notes such as IAN 36/01 The Use and Application of Microsimulation Traffic Models.
 - Cross boundary issues that impact on travel patterns within Brighton & Hove.
- 7.12 The detailed model study area covers the City of Brighton & Hove, along with Shoreham. All significant roads and junctions have been included, as have all bus and rail public transport services. Figure 7.2 below shows the extent of the study area.
- 7.13 The western boundary is formed by Shoreham Airport, and replicates the existing Brighton & Hove model boundary. It includes the area for the proposed Shoreham Harbour development proposals to the west of the Brighton & Hove city boundary. The northern boundary extends beyond the A27 to include the sections of the South Downs National Park which lie within Brighton & Hove but not as far north as Fulking or Steyning. The eastern boundary extends to and includes Saltdean, following the urban boundary of Woodingdean and also including East Saltdean.

- 7.14 Outside of the detailed study area, the model represents the strategic highway network to the extent that it will have an influence on route choice and travel within the study area. The SATURN model highway network is shown in Figure 7.3.

Figure 7.2 Study Area

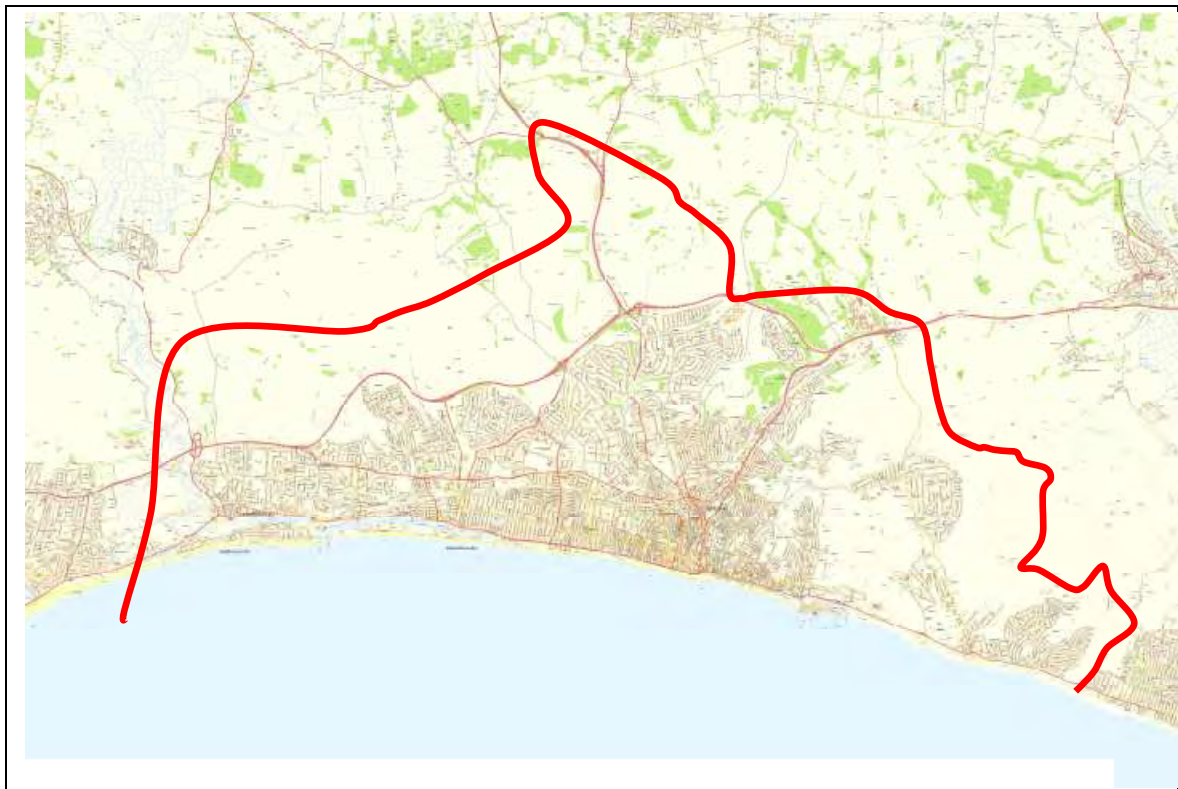


Figure 7.3 Detailed Model Area



Modes

- 7.15 The model is designed to estimate the routes chosen by persons travelling by the following modes:
- Car
 - Bus
 - Rail
 - Coach
- 7.16 An incremental demand model is used to perform the mode-choice calculations for all Future-Year model runs. This demand model estimates the changes in usage of each mode, compared to the Base situation, as a response to changes in the generalised costs of travel by each mode, again compared to the Base situation.

Temporal Scope

- 7.17 The model is designed to replicate travelling conditions during a neutral month (October) in the following three time periods:
- AM Peak Hour (8am to 9am)
 - An average Inter-Peak hour (10am-4pm)
 - PM Peak Hour (5pm to 6pm)
- 7.18 The model has a base year of 2010.

Journey Purposes

- 7.19 As recommended by WebTAG, the demand for travel in the modelled area is disaggregated by journey purpose. This allows trips made for different purposes to be treated differently in all aspects of the model. For example, trips made on employer's business generally have a higher Value-of-Time than trips made for leisure purposes. Therefore, it would be expected that business trips would choose routes through the public transport network, for example, that minimise the time spent travelling, perhaps by choosing rail over bus and thereby paying a higher fare.
- 7.20 The journey purposes used in the model are:
- Commute – including trips to and from education
 - Business – i.e. trips made on employer's business
 - Other – including shopping trips, leisure trips, trips to personal appointments etc.

Vehicle Classes

- 7.21 The following user classes were simulated in the transport model:

Highway Model

- Car – commute
- Car – business
- Car – other
- LGV – private
- LGV – work
- HGV
- Bus

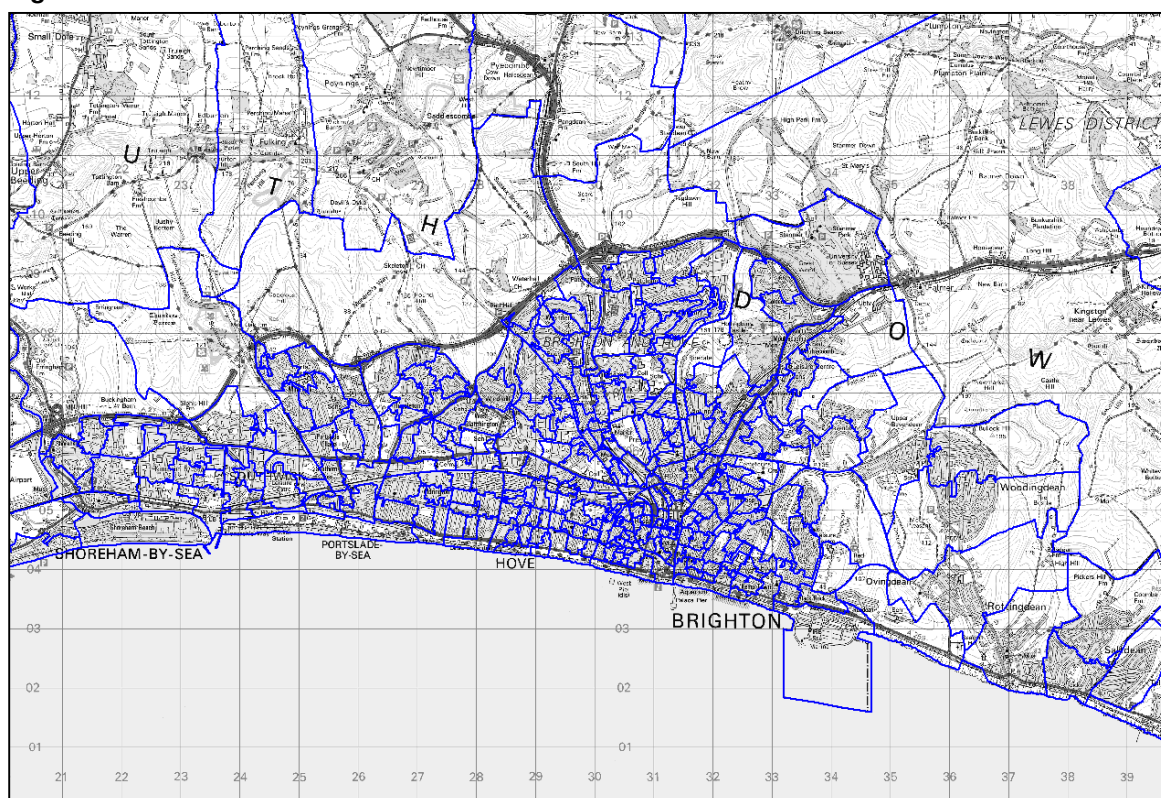
Public Transport Model

- Bus
- Coach
- Rail

Zoning System

- 7.22 The traffic model is structured around a series of zones connected into the model network. A key element of the model updating process was to revise the zoning system as appropriate to provide a robust basis for representing trip movement patterns within the model and also to aid future year forecasting of proposed developments using the model.
- 7.23 The existing zone boundaries were updated to be consistent with 2001 census output areas to facilitate the development of the base year matrix, and also to ensure compatibility with the TEMPRO zones for the region to enable growth forecasts to be applied more easily for future year testing.
- 7.24 As is standard practice, the zoning system is more detailed in the city centre to reflect the increased complexity of routing choices.
- 7.25 The updated highway model has 437 zones, with 7 dummy zones included to represent potential future park-and-ride sites. Figure 7.4 below shows the zoning system for the detailed area.

Figure 7.4 Model Zone Plan



Base Year

- 7.26 The base year highway model was developed from the existing SATURN model (developed in 2010) and adjusted using roadside interviews, car park surveys, Automatic Traffic Counts (ATCs),

Manual Classified Counts (MCCs), journey time surveys and bus passenger surveys. All survey data used were collected in 2010. The model has a base year of 2010 and the full methodology is provided in detail in the LMVR (August 2012).

- 7.27 From this a latent travel demand model has been developed, representing the 'starting point' demand for future years scenario prior to the application of the multi-modal transport model. The latent demand forecasts represent the effect caused by changes in car ownership levels, land use and goods vehicles demand.

Future Year Forecasting

- 7.28 The remainder of this section summarises the approach taken to forecasting the impacts during the City Plan period. Full details are provided in the Forecasting Report, provided in Appendix C for information.

Development Scenarios

- 7.29 From the base model, three scenarios have been developed for assessment:-

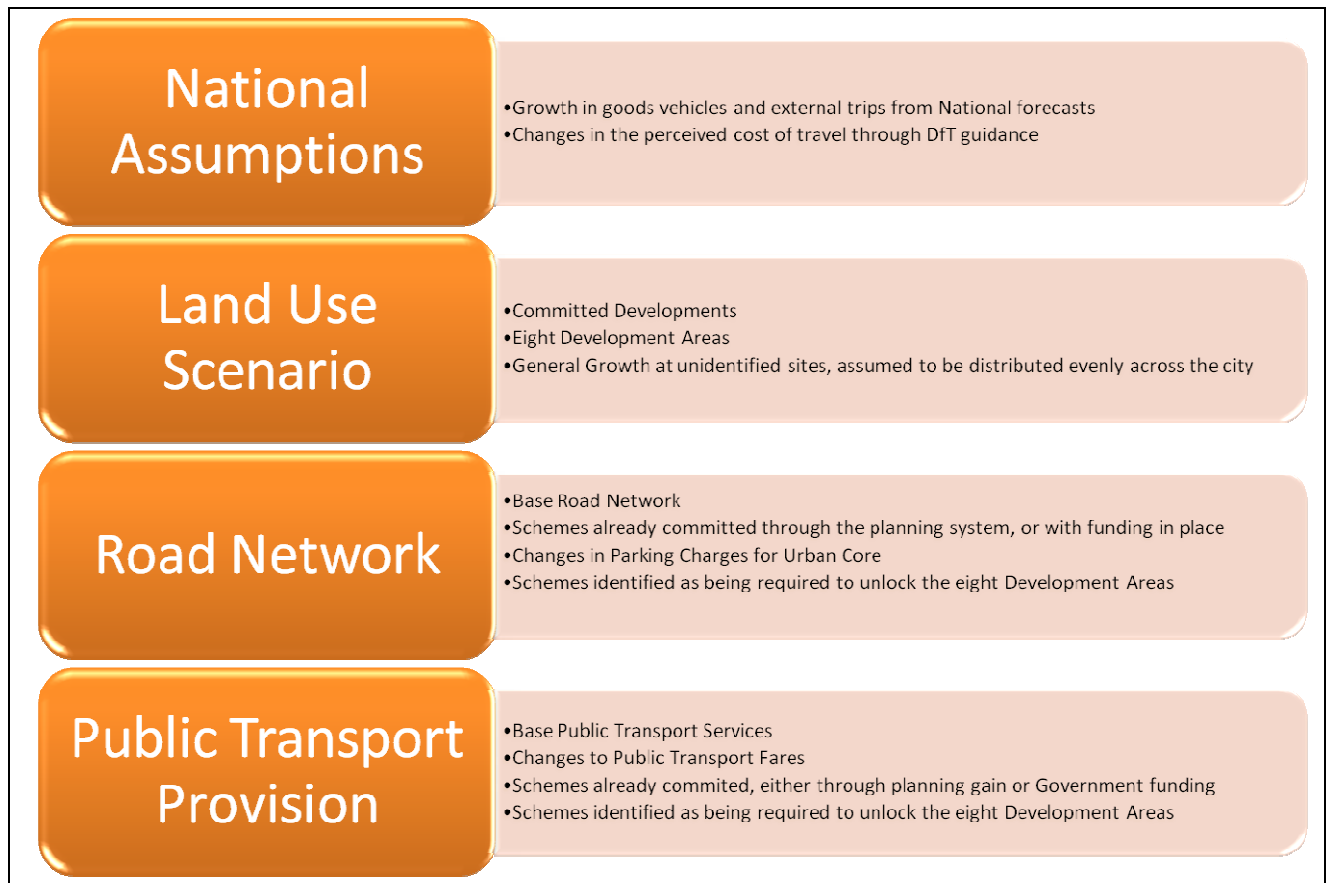
- 2030 Committed Base
- 2030 City Plan Reference Case; and
- 2030 City Plan Mitigation Case

- 7.30 The 2030 City Plan Reference Case is the:-

“Base model plus all planning data within the 2030 Plan period together with the measures identified in Section 6 which either have funding in place or measures that are site specific improvements required to facilitate the developments. The level of growth is to be controlled to TEMPRO growth rates as discussed later in this Section.”

- 7.31 This scenario is designed to enable the impact of the additional development through to 2030 to be evaluated against the already committed levels of development. Figure 7.5 summarises the contents of the 2030 City Plan Reference Case scenario.
- 7.32 Latent travel demand has also be input into the Brighton & Hove multi-modal model to allow for changes to travel destinations and mode (as a result of changes in the costs of travel) to be incorporated into the forecasts.

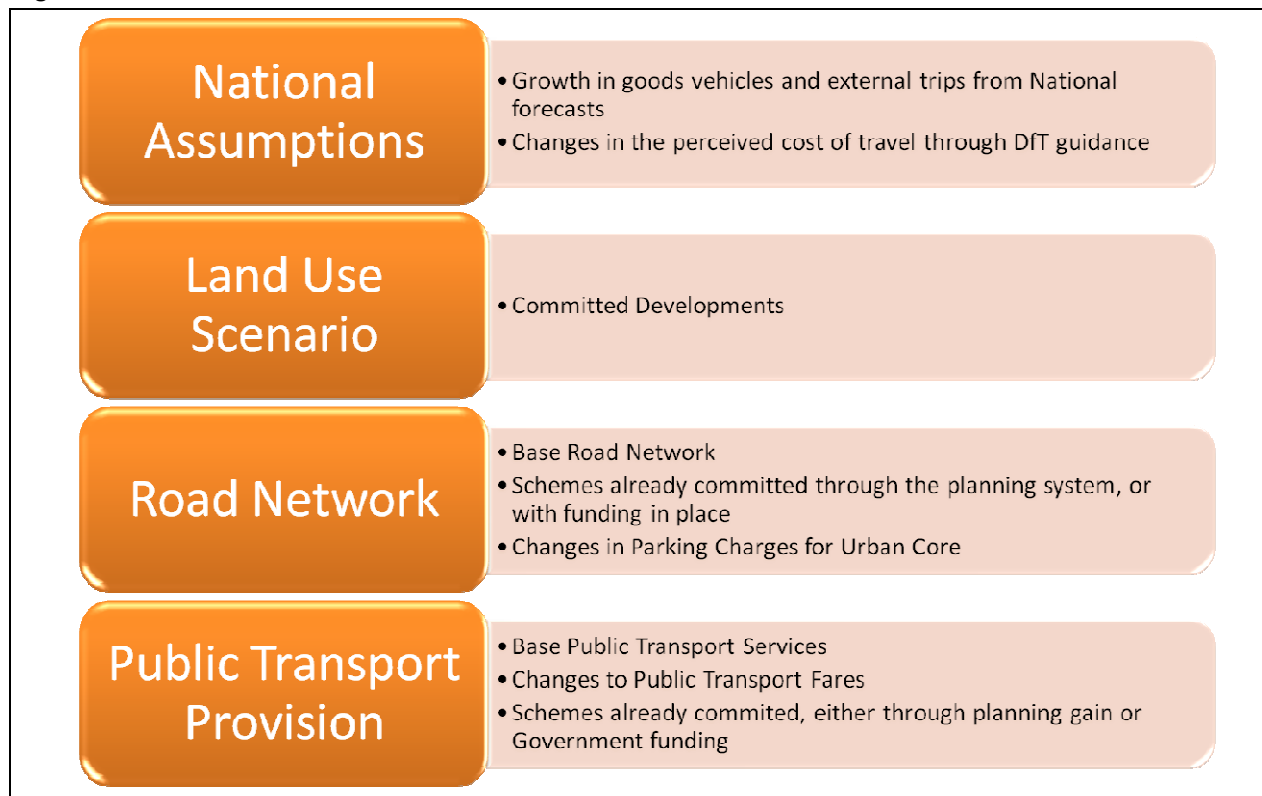
Figure 7.5 - 2030 City Plan Reference Case scenario



7.33 The 2030 Committed Base is the:

“2030 City Plan Reference Case plus any committed developments that were not operational during the surveys or 2010. This scenario will be compared to the 2030 City Plan Reference Case to reveal additional mitigation measures required. Figure 7.6 provides a summary of the contents of the 2030 Committed Base Scenario.”

Figure 7.6 2030 Committed Base scenario



JMP

7.34 The 2030 City Plan Mitigation Case is the:

“ 2030 City Plan Reference Case plus the resultant additional mitigation measures from the 2030 Committed Base. This scenario provides evidence of the impacts of the Development Sites and highlights where further mitigation measures will be required to help mitigate against negative impacts. The flows from this scenario have been compared to the 2030 City Plan Reference Case flows to link measures to developments”.

7.35 Of the sites discussed in Sections 3 and 5 and detailed in Appendix B, those listed as ‘New Strategic Site in City Plan’, ‘Local Plan Allocation Carried Over’ or ‘Other’ have been used for the 2030 City Plan Reference Case. Sites noted as ‘Consented not yet built out’, ‘Consented and under construction’ or ‘Consented built out’ have been used to develop the 2030 City Plan Reference Case and the 2030 Committed Base.

TEMPRO Constraints

7.36 To take account of changes in car ownership and ensure compatibility with national derived forecasts, trip totals have been constrained to that output by TEMPRO. The total levels of housing and jobs (as shown in Section 4) for the study area (committed and proposed) has been input into the TEMPRO program as an alternative planning scenario, with the output providing a total for future year trips by time period, journey purpose and mode for this level of development.

7.37 The following user class categories were used from TEMPRO

- Commute: Home based work and home based employment
- Business: Home based employer's business and non home based employer's business
- Other: All other

7.38 Also, the following mode categories were used from TEMPRO:

- Car: Car Driver and Car Passenger
- Public Transport: Rail/Underground and bus.

7.39 These targets have then been input as a control total into a doubly constrained trip factoring process that seeks to constrain the combination of the factored base year trip matrices and development area trip matrices to the total trips as output from TEMPRO. The outputs are journey purpose, mode and time period specific origin destination matrices that are then input into the Brighton & Hove multi-modal transport model to enable the inclusion of the effects of changes in travel costs to be incorporated into the forecasts.

7.40 The resultant trip factors are shown in Appendix D for information.

Goods Vehicle Growth

7.41 Rather than using national growth forecasts, the forecast goods vehicles growth has been based on trend analysis of automated traffic counts over the last ten years including the use of the Highways Agency's Traffic Flow Data System (TRADS) database. The forecast change for the period 2010 through to 2030 is shown in Table 7.1 below

Table 7.1 – Forecast change in Goods Vehicle Growth

Vehicle Type	Growth Rate		
	AM	IP	PM
Light Goods Vehicles	1.28	1.28	1.63
Heavy Goods Vehicles	1.32	1.02	0.91

Trip distribution & assignment

7.42 New zones were created in the model for each development area. Each development area was given an individual zone to allow separate analysis of their impacts on the performance of the road network. This is especially important for development area DA3 and DA7 due to their proximity to the strategic road network.

7.43 For all of the other model zones, a growth rate based on the change between the council supplied City Plan data and the base year planning data was used to growth the base year trip matrix. This will allow for the cumulative impact of all of the City Plan policies to be analysed.

7.44 The next stage has been to produce a set of travel patterns for each of the eight development areas. This is accomplished through the use of a calibrated gravity model. The base year travel demands have been analysed with respect to the base year travel costs to provide a set of 'cost curves' relating the cost of trips to the number of trips for each time period, journey purpose and mode combination.

- 7.45 This calibrated cost curve has been used in conjunction with identified trip origins (or destinations) of each of the eight development areas and the total base year destinations (or origins) to forecast a pattern of travel for each development area.
- 7.46 The resulting travel patterns were loaded onto the base year routes to produce a diagram for each development area. These diagrams demonstrate that the initial seeded trip distribution pattern is a plausible pattern of travel for the development areas. These diagrams are provided in Appendix E for information. The link bandwidths shown on the diagrams are colour coded to show those with 30 or less development trips (green) and over 30 development trips (red). Sites generating over 30 trips normally require transport assessments.
- 7.47 The trip distribution for the remaining developments which are outside development areas is based on the validated base model travel patterns. The percentage change in planning data terms will be applied to the trip matrices, with the change in households being a proxy for trip origins and the change in jobs being a proxy for destinations.

Detailed SRN modelling

- 7.48 Based on the results of the network models, local models have been developed for junctions on the SRN to provide more detailed assessment. These are discussed in greater detail in sections 8 and 9.

8 2030 City Plan Reference Case and 2030 Committed Base - Impact Assessments

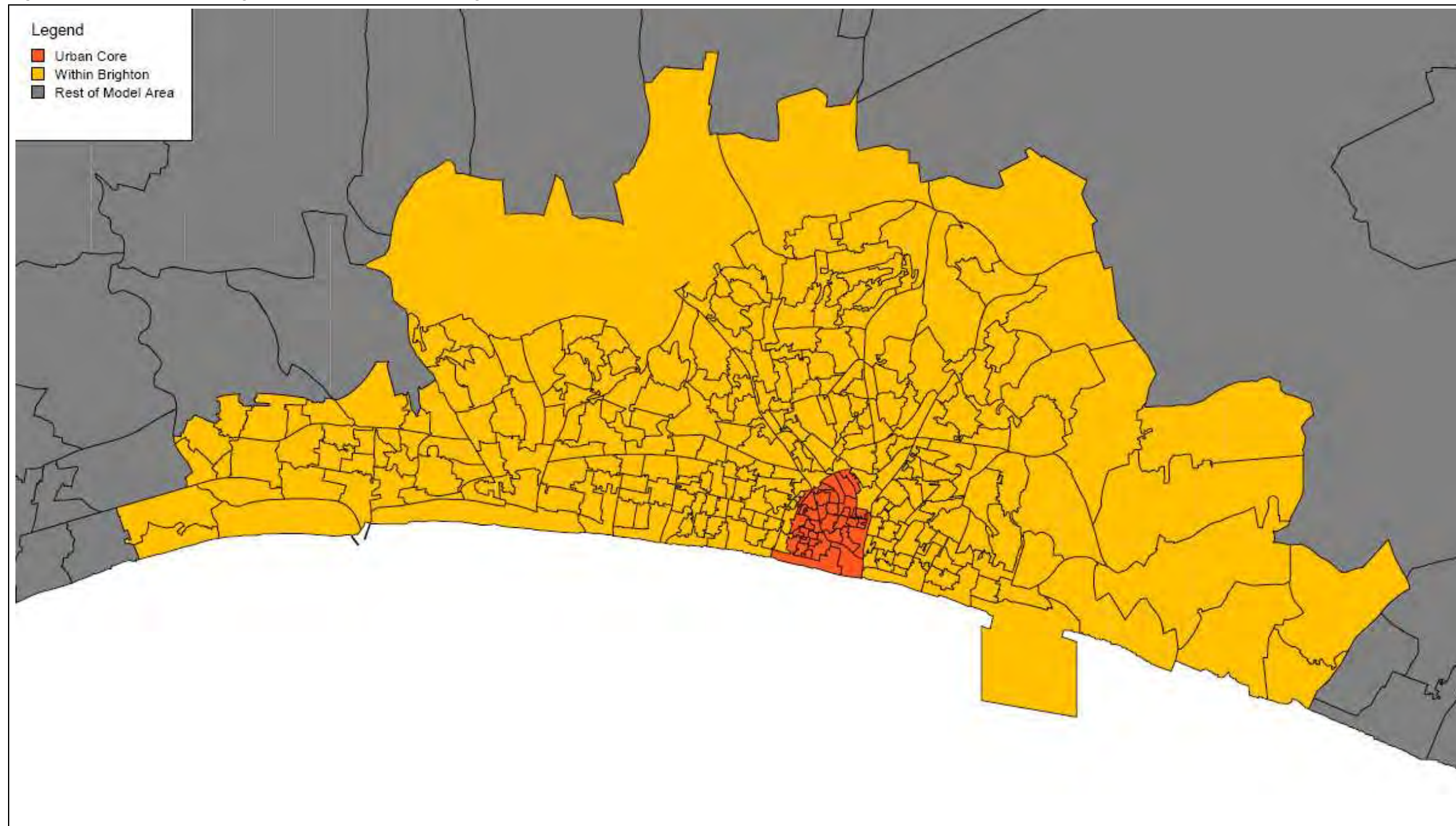
8.1 This section assesses the impact of the committed developments and Development Areas identified in Section 4 together with the impact of the committed city-wide interventions outlined in Section 6.

8.2 The analysis of impacts has been taken at two levels:-

- The Urban Core which contains the key employment, retail and tourist destinations in the city centre and also a significant proportion of flats; and
- Within Brighton & Hove which covers the outlying mainly residential areas between the A27 and the Urban Core (north – south) and between the Urban Core and the administrative boundary of Brighton & Hove (east- west).

8.3 These two areas were chosen because of the known differences in travel behaviour such as higher car ownership and lower public transport usage in the suburbs as identified in census data. The differentiation between zones is shown graphically in Figure 8.1 below.

Figure 8.1 Sector Plan for Brighton & Hove and surrounding area



8.4 Analyses have been produced at two levels:-

- Area Wide Statistics; and
- Corridor Based Analysis ;

8.5 A more detailed Strategic Road Network Analysis is included in Chapter 9

Area Wide Statistics

Total Change in Daily Trips/Time Period by mode

8.6 Table 8.1 shows the changes in trips for within Brighton & Hove and within the urban core excluding external trips.

8.7 When compared to the 2010 Base, both the 2030 Committed Base and 2030 City Plan Reference Case show an increase in both car trips and public transport trips. This is to be expected given 20 years of growth on the network from committed developments and background traffic growth and in the 2030 City Plan Reference Case, Development Areas also.

8.8 The table illustrates that growth from Development Areas will be the main contributor to increased rates of car person trips within Brighton & Hove and to/ and from the Urban Core. Hence car person trips associated with background traffic growth and growth from committed developments will be less than that generated by the Development Areas. Taking the morning peak as an example, growth in car person trips within Brighton & Hove is forecast to increase by 13% with 9% of growth coming from the Development Areas.

8.9 The percentage change in public transport person trips is greater than for car person trips as there were fewer public car trips than car trips to start with in the 2010 base. However for public transport person trips most of the growth will arise from the 2030 Committed Base and less from the Development Areas.

8.10 These figures illustrate that without public transport mitigation the mode share of public transport would be likely to fall once the Development Areas are built out.

8.11 Table 8.1 also reveals that the growth in car person trips to/ and from the urban core will be lower than for trips within Brighton & Hove. The primary reason is that the frequency of public transport and parking charges are greater in the urban core and hence car person trips are less attractive.

Table 8.1 Total Change in Daily Trips

		2010 Base to 2030 City Plan Reference Case				2010 Base to 2030 Committed Base				2030 Committed Base to 2030 City Plan Reference Case			
		Car Persons		PT Persons		Car Persons		PT Persons		Car Persons		PT Persons	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Trips within Brighton & Hove	AM Peak	4602	13%	4746	41%	1236	4%	3640	31%	3366	9%	1105	7%
	Inter-Peak	3816	15%	3082	31%	834	3%	3226	33%	2981	11%	-143	-1%
	PM Peak	3884	12%	4247	34%	1312	4%	3970	32%	2572	8%	277	2%
Trips to/from Urban Core (excluding External)	AM Peak	543	9%	1689	41%	37	1%	1226	30%	506	9%	463	9%
	Inter-Peak	530	10%	1365	34%	-27	0%	1389	35%	558	10%	-25	0%
	PM Peak	202	3%	1720	30%	-202	-3%	1485	26%	404	6%	236	3%

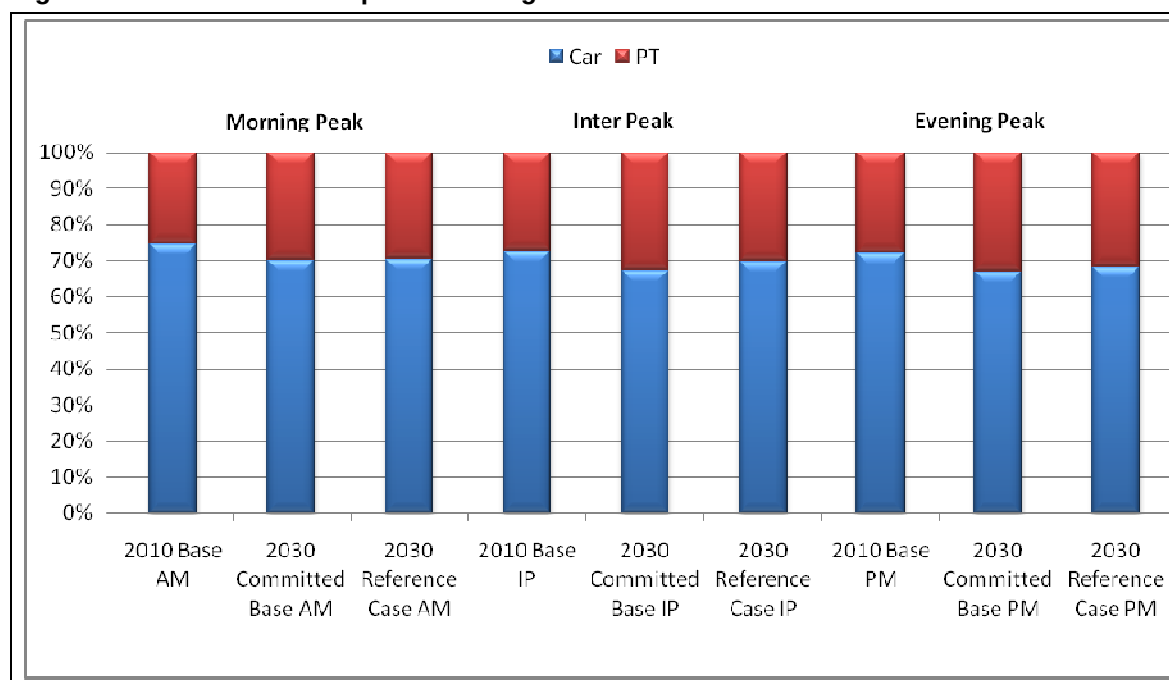
Demand Analysis by mode

- 8.12 In order to illustrate changes in mode share more effectively, Figures 8.2 and 8.3 show the change in modal share between the 2010 base year and the 2030 Committed Base and 2030 City Plan Reference Case for each of the peak periods assessed. It is noted that the 2030 assessment years have a lower car occupancy in line with DfT guidance.

Trips within Brighton & Hove

- 8.13 There are a higher proportion of trips within Brighton & Hove made by car than compared to trips to or from the urban core (not including external trips). Across Brighton & Hove as a whole, the mode share for public transport increases from between 25% to 28% in the base year to 30-33% in the 2030 Committed Base. In part, this is due to the increases in car travel times from lowering the speed limit and is based on the assumption that the reduction in speed limit would affect cars more than buses (given that buses operate at lower speeds than cars).
- 8.14 The 2030 Committed Base shows a 5% increase in travel by public transport in all peak periods in comparison to the 2010 base. The figure for the 2030 City Plan Reference Case is a 4% increase in public transport travel in the AM and PM peak periods. This confirms the statement made in paragraph 8.10 that public transport mode share will fall in the city when the Development Areas are built out unless mitigation is identified.
- 8.15 The impact of the 2030 City Plan Reference Case compared to the 2030 Committed Base equates to a 1% modal shift away from public transport to car travel in the PM peak.

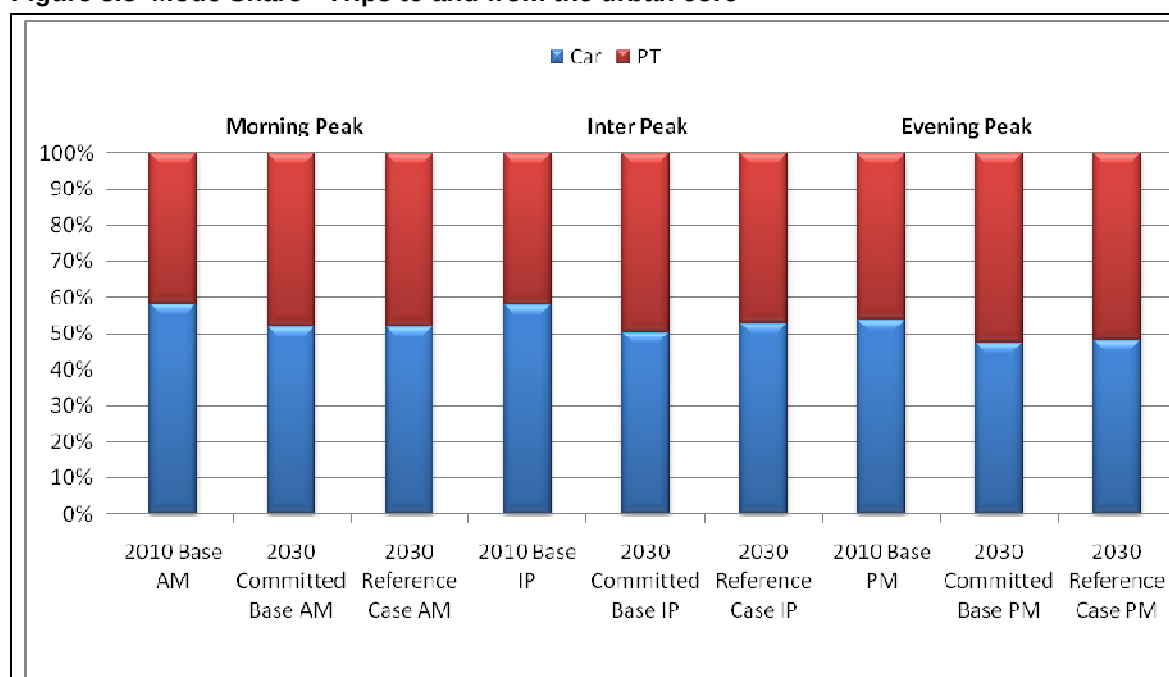
Figure 8.2 Mode Share - Trips within Brighton & Hove



Trips to/from the Urban Core (excluding external trips)

- 8.16 Figure 8.3 shows the equivalent modal share figures for trips to/from the urban core excluding external trips. The same patterns as those described above are also observed for these trip types.

Figure 8.3 Mode Share - Trips to and from the urban core



Total Vehicle Minutes & Total Vehicle Kilometres.

- 8.17 Total vehicle minutes is calculated by multiplying the total flow on a link by total time on link and total vehicle kilometres is calculated by multiplying total flow on a link by total distance travelled on a link. They provide an indication of the flow taking into account the effect that the 20mph limit may have on encouraging shorter journeys and mode shift.

- 8.18 The statistics are summarised in Tables 8.2 and 8.3. Table 8.2 provides a comparison of the 2030 Committed Base and 2030 City Plan Reference Case assessments to the results of the 2010 Base. Table 8.3 provides a comparison of the 2030 City Plan Reference Case to the 2030 Committed Base.
- 8.19 Table 8.2 shows that the 2030 Committed Base scenario results in an increase in total vehicle minutes in all areas of the model and peak periods. The greatest increases are found in the evening peak. The increases in all peaks is in part due to an increase in vehicle trips and also as a result of the 20mph limit reducing speeds on the network and therefore increasing journey times on link.
- 8.20 The measure of total vehicle kilometres gives an indication of the additional traffic as the overall link lengths have not changed. Compared to the 2010 Base, the 2030 Committed Base shows a 5-9% increase within the Urban Core, a 9-11% increase across Brighton and a 17-18% increase across the rest of the model. The 2030 City Plan Reference Case shows a similar pattern of increase although to a greater extent with values of 14-16%, 13-16% and 20-21% for the Urban Core, Brighton & Hove and rest of model respectively.
- 8.21 Table 8.3 highlights the local impact of the strategic developments with the overall percentage change in vehicle distance and minutes dissipating as the study area is widened.

Table 8.2 Difference relative to 2010 Base

Area	Total Vehicle Minutes					
	Morning Peak		Inter Peak		Evening Peak	
	2030 Committed Base	2030 City Plan Reference Case	2030 Committed Base	2030 City Plan Reference Case	2030 Committed base	2030 City Plan Reference Case
Urban Core	28%	41%	27%	44%	32%	49%
Brighton	33%	42%	26%	38%	36%	45%
Rest of Model	24%	26%	21%	25%	27%	29%
Area	Total Vehicle Kilometres					
	Morning Peak		Inter Peak		Evening Peak	
	2030 Committed Base	2030 City Plan Reference Case	2030 Committed Base	2030 City Plan Reference Case	2030 Committed Base	2030 City Plan Reference Case
Urban Core	8%	14%	5%	15%	9%	16%
Brighton	9%	13%	9%	16%	11%	15%
Rest of Model	18%	20%	17%	20%	19%	21%

Table 8.3 2030 City Plan Reference Case Difference relative to 2030 Committed Base

Area	Total Vehicle Minutes			Total Vehicle Kilometres		
	Morning Peak	Inter Peak	Evening Peak	Morning Peak	Inter Peak	Evening Peak
Urban Core	10%	14%	13%	6%	9%	6%
Brighton	7%	9%	7%	4%	7%	4%
Rest of Model	2%	3%	2%	1%	3%	2%

- 8.22 In summary the results suggest that without mitigation vehicle kilometres and vehicle minutes will increase between the 2030 Committed Base and the 2030 City Plan Reference Case as a result of the inclusion of the Development Areas.

Corridor Analysis

- 8.23 The following assessment is focused on the impact of the 2030 Committed Base and City Plan developments along eight key radial routes as shown in figure 8.4. Each route has been modelled separately in each direction.

Figure 8.4 Corridors Analysis – Radial Routes from the Urban Core



Vehicle Traffic Flows and Journey Times

- 8.24 Volume to capacity ratios (v/c ratios) are useful proxies for understanding how congested junctions and links are along particular corridors . V/C ratios are expressed as the proportional volume of flow to available capacity (i.e. the level of congestion on the link). Maps showing full outputs for volume to capacity ratios are provided in Appendix F for information. It should be noted that the length of the bandwidths do not indicate queuing.
- 8.25 Journey times have also been extracted from the model based on the radial routes shown in Figure 8.4.

Corridor 1 – Falmer Road / Warren Road

- 8.26 The key pinchpoints on this corridor are the Falmer Interchange and the Woodingdean crossroads where Falmer Road and Warren Road meet. With the restrictions imposed by the topography this is the only north – south route linking Woodingdean and Saltdean with the A27 directly and is hence heavily trafficked. The 2030 City Plan Reference Case results indicate that both these junctions will be operating above capacity in the peak periods.
- 8.27 An analysis of journey times suggests that morning peak journey times would increase by around 31% in the northbound direction in the 2030 Committed Base and by 35% in the 2030 City Plan Reference Case compared to the 2010 base. The corresponding figures for the southbound direction would be 21% and 20%.
- 8.28 In the evening peak northbound flows would increase by 23% in the 2030 Committed Base and by 25% in the 2030 City Plan Reference Case. The corresponding figures for the southbound direction would be 32% and 40%.
- 8.29 The increase in journey times will be largely as a result of the introduction of a 20mph limit along Warren Road. There may also be some reassignment impacts from Lewes Road, although the introduction of a 20mph limit on Warren Road will reduce the attractiveness of this route for such movements. The model also indicates that the Woodingdean Crossroads will be a key pinchpoint on the network.

Corridor 2 – Lewes Road

- 8.30 The key pinchpoints on the Lewes Road corridor without mitigation will be around Coldean Lane and also the Vogue Gyratory. In particular the section between Coldean Lane and The Avenue (Southbound in the AM and northbound in PM) and between Saunders Park View and the Vogue Gyratory are predicted to be the most congested.
- 8.31 An analysis of journey times suggests that morning peak journey times would increase by around 31% in the northbound direction in both scenarios and by over 100% in the southbound direction with the 2030 City Plan Reference Case journey times slightly worse than the 2030 Committed Base. Increases in the northbound direction would be 64% in the 2030 Committed Base and 78% in the 2030 City Plan Reference Case . The corresponding figures for the southbound direction would be around 31% in both scenarios. Much of the increase is as a result of the reallocation of roadspace to buses/taxis which will reduce the existing capacity of Lewes Road.
- 8.32 A separate more detailed study undertaken for the council suggested that through careful signal optimisation the journey time increases for cars could be reduced significantly from those shown in this analysis.

- 8.33 It is also important to note that due to model limitations, no allowance has been made for the impact of travel planning measures at the universities nor the introduction of personalised travel planning to 32,000 households which are part of the Local Sustainable Transport Fund package. These funded measures are expected to have a significant impact on the level of background traffic on this route which in turn will reduce demand and hence journey times.

Corridor 3 – Ditchling Road

- 8.34 The key pinchpoints on Ditchling Road are at the Coldean Lane junction which acts as a collector distributor road for traffic to and from the A27 and at the southern end on the approach to Viaduct Road and the 'necklace' of junctions where the A270 and A23 meet. The performance of this junction is similar in the 2030 City Plan Reference Case to the 2030 Committed Base indicating that City Plan developments do not have a significant impact on the performance of the network.
- 8.35 An analysis of journey times suggests that morning peak journey times would increase by around 47% in the northbound direction in the 2030 Committed Base and by 52% in the 2030 City Plan Reference Case compared to the 2010 base. The corresponding figures for the southbound direction would be around 26% in both scenarios. Evening peak increases are very similar in the southbound direction and slightly greater in the northbound direction.
- 8.36 Much of the increase will be as a result of the introduction of a 20mph zone from Surrenden Road, south into the city.
- 8.37 Reassignment of flows from the Lewes Road as a result of capacity reductions is unlikely to greatly impact on Ditchling Road because the introduction of the 20mph zone will reduce the attractiveness of this route as a diversionary route.
- 8.38 In summary the main reasons for the increases in journey times on this corridor will be related to policy changes rather than City Plan development.

Corridor 4 – A23

- 8.39 This corridor provides the main access to the A23 which carries traffic north towards Gatwick Airport and London. It also distributes traffic onto the A27, east towards Lewes and west towards Worthing and Chichester. Despite this, the road runs through a number of residential areas punctuated by retail frontages.
- 8.40 The key pinchpoints in the 2030 Committed Base are the links at the northern end of the corridor approaching the junction with the A27 and at the southern end around Preston Circus. In the 2030 City Plan Reference Case, some of the intermediate junctions most notably at Preston Drove and Carden Avenue are also operating at capacity.
- 8.41 Analysis of the journey times indicates that increases in journey times are less than 20% comparing the 2030 Committed Base to the 2010 base. With the addition of City Plan development, southbound morning peak and northbound evening peak journey times will increase by around 10% compared to the 2030 Committed Base.
- 8.42 The most probable explanation for this, is the impact of the DA4 sites at the southern end of the corridor as the A23 will remain with a 30mph limit.

Corridor 5 – Dyke Road

- 8.43 The key pinchpoint on the network is the Devil's Dyke roundabout with the A27. Local experience suggests that Dyke Road is often used as an alternative to the A23 for trips heading north out of the city. Indeed the right turn flow from the Devil's Dyke Road to the A27 eastbound is a key

movement. However this corridor generally has less congestion than other radial routes into the city.

- 8.44 An analysis of journey times indicates that relative to 2010, there will be significant increases on this corridor of between 36% and 56% in the 2030 Committed Base depending on the peak hour direction of travel. The corresponding figures for the 2030 City Plan Reference Case are 43% to 74%.
- 8.45 The primary reason for this increase is the introduction of a 20mph zone along the full length of Dyke Road and the impact of the DA7 - Toads Hole Valley development which is located to the south west of the Devil's Dyke roundabout.

Corridor 6 & 7 - A259 between the Brighton & Hove eastern boundary & Western Hove

- 8.46 These corridors run along the seafront and as their travel characteristics are similar they have been grouped together.
- 8.47 By 2030, much of the route is operating at capacity particularly around Saltdean inbound in the morning peak and outbound in the evening peak. Parts of Kingsway in Hove are also close to capacity and also around the Aquarium roundabout. However, from the v/c plots there does not appear to be much variation in performance between the 2030 Committed Base and the 2030 City Plan Reference Case.
- 8.48 This is borne out by an analysis of journey times which shows that the difference between the 2030 Committed Base and the 2030 City Plan Reference Case is within 5% in most cases. The exception is the westbound movement from Brighton Marina to Western Hove in the evening peak where journey times increase by almost 10%. Hence it would appear that development traffic from DA2 Brighton Marina has a relatively localised impact such as the access onto the A259 and at the Aquarium roundabout. Further more detailed analysis will be required from the developer at the planning application stage to confirm the number of junctions that will be affected by their proposals.

Corridor 8 – Western Hove to Shoreham

- 8.49 The corridor covers the western section of the seafront route out to Shoreham. By 2030, the key pinchpoints will be the single carriageway sections around Fishergate Terrace and Wellington Road. The extent of delays and congestion in this area is likely to be greater in the 2030 City Plan Reference Case compared to the 2030 Committed Base because of the additional traffic generated by Shoreham Harbour.
- 8.50 An analysis of journey times reveals that there will be modest increases in journey times in the westbound direction (which is partly due to the reduced accuracy of forecasting given the location of the model boundary) but more substantial increases for eastbound trips towards the city.

Summary

- 8.51 Without mitigation traffic flows from the Development Areas will increase journey times on most of the routes modelled. Mitigation should therefore be identified that seeks to:-
- Reduces background traffic demand including freight movements
 - Provides alternative travel choices to the Development Areas; and
 - Improves the performance of key pinchpoints recognising funding constraints and the constrained nature of the existing network

9 2030 City Plan Mitigation Measures

- 9.1 A comparative analysis of the network performance for the 2030 City Plan Reference Case and 2030 Committed Base modelling indicates that there will be an increase in vehicle kilometres and a deterioration in journey times on some of the key radial routes without further transport interventions. Public Transport modal share is also forecast to decline slightly without further interventions.
- 9.2 In order to mitigate the impact of the Development Areas a list of transport interventions were identified which would meet one or more of the following objectives:-
- Building on successful behavioural change programmes
 - Increasing modal choice to the new strategic development areas by walking, cycling and public transport modes
 - Tackling safety issues on the strategic road network where queues block back to mainline carriageways; and
 - Addressing air quality issues through freight management and sustainable transport provision in the urban core
- 9.3 The objectives were derived from the analysis of the 2030 City Plan Reference Case and 2030 Committed Base modelling and also the policy objectives set out in sections 2 and 3 of this report.
- 9.4 The mitigations are described more fully in the following sections and have then been tested under the 2030 City Plan Mitigation scenario . The results are described in the latter part of this section.

Public Transport Mitigation

Rapid Express Bus Services

- 9.5 East – West Rapid Express bus services (as conceived by the Rapid/Coastal Transit System known as RTS and CTS) would provide a high quality frequent bus based rapid transport system linking Brighton & Hove, Shoreham and Worthing. The principle of such services remains a key priority for the council. It will serve existing passengers better and increase travel choice to a number of critical development sites on the route most notably:-
- DA1 - Brighton Centre and Churchill Square
 - DA2 - Brighton Marina, Gas Works and Black Rock Site
 - DA4 –New England Quarter and London Road area
 - DA5 –Eastern Road and Edward Street
 - DA6 – Hove Station Area;
 - DA8 – Shoreham Harbour; and
 - SA1 – The King Alfred Centre
- 9.6 The Core Route would be Brighton Marina – Brighton Station – Churchill Square – Hove seafront – Shoreham Harbour – Shoreham with a potential extension to West Worthing. In order to offer competitive journey times with the car it would be a limited stopping service operating at a 10 minute headway during the morning and evening peak periods. Bus priority through signals would be offered at key junctions. High quality bus infrastructure, interchange and real time information would be used.

Toads Hole Valley Bus Services

- 9.7 Good public transport provision to the site is a pre requisite to ensuring that the development comes forward in a sustainable manner.
- 9.8 In order to better connect the development to the city, extensions to the existing 14 and 14c services to the City Centre via Dyke Road and also the 81 and 81c to Hove Station are proposed. A 15 minute peak hour frequency has been assumed in order to replicate a 'turn up and go service'. An orbital service connecting the site to Shoreham Harbour is also proposed in order to cater for non – radial movements. All services would connect the site to key employment attractors and the rail network.
- 9.9 All areas of the site would be located within 400m of a bus stop with high quality bus shelters and the potential extension of real time information. Pedestrian routes to stops would be of a high quality to ensure that the service was accessible to as many residents as possible.

Intensification of bus services on Lewes Road

- 9.10 The intention of these proposals would be to connect the DA3 sites into the public transport network running along Lewes Road. This would be facilitated by extending or diverting existing, services including service 21 and 48.

Lengthening of West Coastway Rail Services in the morning and evening peaks

- 9.11 Services on the Southern network would be lengthened from 3 to 4 car units to ease congestion on inbound rail services arriving in Brighton in the morning peak hour particularly from Shoreham on Sea onwards. This would offer an alternative to the A27 and would improve rail access to DA6 Hove Station and DA8 Shoreham Harbour.
- 9.12 In addition the lengthening of the First Great Western service in the evening peak from a 2 car unit to a 4 car unit service is proposed.
- 9.13 Both schemes have been assessed as part of Network Rail's Sussex Rail Utilisation Study and both were found to have a positive BCR. There would not appear to be any operational constraints to their introduction.

Local Road Network Mitigation

- 9.14 The focus of the mitigation proposed is on improving modal choice given the need to reduce background traffic flows and the impact of growth on the highway network.
- 9.15 Space constraints on the local road network are also such that wholesale capacity improvements would be difficult to deliver within existing highway boundaries. However a number of localised interventions have been identified from the 2030 City Plan Reference Case Modelling. They are:-
- Rationalising movements from Saltdean side roads onto the A259
 - Extending MOVA / UTC to include those sites that were not under this form of control but need to be in order to provide a comprehensive coverage on the key radials and city centre as show in Figure 6.3.
 - Further signal optimisation to improve journey times on the Lewes Road corridor, Old Shoreham Road, the Woodingdean crossroads and junctions on the A259 seafront corridor.

Freight Management / Consolidation

- 9.16 The model trip generation work shows that there will be a considerable growth in freight traffic by 2030.
- 9.17 The result of this increase in Freight traffic could lead to:
- Deterioration in journey times along key radial routes as general traffic because stuck behind slow moving lorries;
 - An increased risk of collision between non-motorised vehicle users and HGVs
- 9.18 Freight vehicles also have a disproportionate impact on increases in air pollutants.
- 9.19 The 2011 Air Quality Action Plan states that:
- “Managing all vehicles (passenger and freight) so they are not driving at partial capacity is of the upmost importance going forward. It is advised that computer software is employed to optimise vehicle utilisation in order to reduce the number of journeys required in the city.” Page 76*
- Hence in order to mitigate the impacts associated with the increase in freight traffic; a feasibility study into the potential for freight consolidation and/or urban distribution centres should be developed. This would rationalise and reduce freight movements into the city by consolidating loads on the edge of the city boundary.
- 9.20 Freight would be consolidated into newer Euro IV compliant vehicles, which would reduce overall freight based trips and also improve air quality particularly in the urban core.
- 9.21 The Air Quality Management Plan also suggests that an Urban Freight Management Plan should be setup to investigate the following issues:
- Freight demand and capacity on existing and reconfigured routes;
 - Assessment of the appropriateness of alternative routes for freight;
 - Locations of businesses whose servicing would be directly affected by new traffic schemes, and any associated changes in traffic volumes;
 - Assessing opportunities for specific servicing roads, traffic management measures and signage for freight; and
 - Potential conflicts with buses and transport modes on constrained routes
- 9.22 The Wharf Road – Kingsway – Wellington road – Trafalgar Road route in Portslade has been identified as one of the busiest freight routes in the area, with goods being transported from Shoreham port. It is the designated route to the Port from the SRN.
- 9.23 Consideration should be given as to whether this freight should be shipped to other coastal ports such as Southampton or the London Port of Tilbury in order to minimise time on the road network.
- 9.24 The Air Quality Action Plan proposes a measure to implement the sharing of Heavy Diesel Vehicles frequenting the central AQMA (Air Quality Management Area), which is now being replaced by a Central Clear Zone.

Changing Travel Patterns through Promotion and Awareness

Personalised Travel Planning (PTP)

- 9.25 Personalised Travel Planning (PTP) can increase the number of people using sustainable transport modes. The greatest benefits of PTP work is seen when it is used in conjunction with the installation of sustainable infrastructure.
- 9.26 Personalised Travel Planning has been previously been used to great effect in Brighton & Hove and the LTP states that

“PTP began in Brighton & Hove in 2006 and has achieved notable success in reducing the proportion of car journeys made by one person, and raising the profile of sustainable transport such as walking and cycling, through a traditional PTP approach reaching over 60,000 households.

Since 2008, more innovative techniques have been developed and funded through the European CIVITAS programme. These include the use of social marketing and community participation in order to will seek to achieve mass behaviour change that can be sustained over a longer period of time. The marketing and promotion of travel choices is supported by the ‘JourneyOn’ campaign through combining with wider community events such as Bike Week and Car Free Day and carrying out one-to-one conversations with residents on their doorsteps.”.

- 9.27 As part of the LSTF it is proposed that an intensive round of PTP will be undertaken on the Lewes Road corridor, with up to 32,000 households being visited by personalised travel advisors. This will be complemented by travel planning work with Sussex and Brighton Universities as well as 18 schools in the area.
- 9.28 The targets are for:
- 4.5% reduction in vehicles trips;
 - 9% reduction in vehicle trips to and from the universities; and
 - 10% reduction in education trips for the schools within the area.
- 9.29 There are other inner urban wards such as Hanover, Elm Grove, Queens Park and St Peters, & North Laine which all experience congestion. Consideration should be given to extending the PTP work to include these wards and in association with public transport improvements at Valley Gardens and Edward Street.

Travel Planning

- 9.30 All new developments within the Development Areas should include their own Travel Plans to promote sustainable travel.
- 9.31 Travel Planning can help reduce the number of car trips in an area which provides benefits to local people through:
1. Promoting travel as a form of exercise (e.g. walking and cycling);
 2. Reducing emissions; and
 3. Reducing traffic congestion on local roads.

- 9.32 All Travel Plans should include aims, objectives and targets alongside travel planning measures and initiatives to demonstrate how alternatives to the car will be promoted. Travel Plans should also be monitored to establish whether the targets are being achieved.
- 9.33 It is noted from the LTP that BHCC has a dedicated School Travel Plan team to encourage both staff and pupils to travel to school in sustainable manner.

Parking

- 9.34 Controlled Parking Zones (CPZ) are in place in Brighton & Hove; aimed at reducing congestion and keeping traffic moving, whilst provide access safely to those that need it most.
- 9.35 The CPZ currently encompasses: the Boundary of Brighton Marina to the East; along the Kings Road to Aldrington in the West; and up to Preston / Roundhill in the North.
- 9.36 The Council is currently consulting the public regarding their management of parking since it took over enforcement in 2001.
- 9.37 The Council will then produce a report with recommendations to a meeting of the council's Transport Committee in January 2013. The report will make a number of recommendations on parking policy and include a timetable on future resident parking scheme consultations.
- 9.38 Additional residents parking schemes particularly around key employment generators and public transport nodes may encourage further transfer to public transport. However, as the precise details are not known no specific interventions have been modelled.

Walking and Cycling Interventions

Introduction

- 9.39 Encouraging the use of walking and cycling as an alternative to the use of cars for some short trips of under five miles has health benefits to the user as well as reducing carbon emissions and congestion on the roads.
- 9.40 Brighton & Hove was designated as a 'Cycle Town' and as such has received additional funding and support for cycle facilities across the City.

"The cycle network, although incomplete, includes over 20 km of designated routes. National Cycle Routes 2 and 20, and Regional Cycle Routes 82 and 90 have all been improved. Between 2006 and 2009 monitoring confirmed that cycling in the city has increased by 27%."

LTP 3 Para. 2.7.17

- 9.41 The LTP also demonstrates that walking is also a popular mode share amongst residents, with approximately 10% of the population walking to work each day (which is over the national and regional averages).
- 9.42 Brighton & Hove is also a major tourist destination and the city centre can experience an estimated 100% increase in pedestrian footfall in the summer months when compared with the winter months.
- 9.43 The stations into Brighton act as 'gateways' into the City and it is therefore essential that they are of a good standard; and facilitate movement to other popular destinations across the City, such as the seafront and the city centre.

General

- 9.44 All transport improvements should consider non-motorised users. Any improvements to vehicle movements should seek to include infrastructure for all road users such as the implementation of Toucan Crossings and Advanced Stop lines at junctions.
- 9.45 Areas where there are gaps in 'Way Finding' should be identified and where necessary further signage should be provided to help people navigate around the City. Given the nature of Brighton & Hove as a tourist area, way finding is an important aspect for facilitating pedestrian movements.
- 9.46 Where possible there should be a general drive to reduce or consolidate Street Furniture to enhance the pedestrian and cyclist environment.
- 9.47 All Developments Areas should adhere to minimum cycle parking standards. The proposed walking and cycling interventions for the development areas are shown in Table 9.2 below.

Table 9.1 - Walking and Cycling interventions associated with the development areas

Development Area	Description	Summary of the City Plan Proposals	Further Suggested Mitigation
DA1	Brighton Centre and Churchill Square Area	- The proposals will seek to secure improved: eligibility, permeability and connectivity within the area through high quality building design townscape and public realm. - This work includes a better pedestrian environment around Churchill Square, a new Gateway link through from Churchill Square Shopping Centre to the seafront and an improved junction at West Street / Kings Road; - The proposals will also seek to reduce the severance between the northern side of the A259 and the seafront to accord with the Public Space Public Life Study; - The proposals will seek to provide appropriate pedestrian links to the Coastal Transit Scheme should be provided to support sustainable transport at the new development;	- Proposed developments should include cycle parking provision and facilitate pedestrian movement through the busy shopping area; - Cycle links should be included to link the Development Area with the Station to the north; and the seafront Cycleway to the south.

Development Area	Description	Summary of the City Plan Proposals	Further Suggested Mitigation
DA2	Brighton Marina and Black Rock Site	- The proposals will seek to secure improved legibility, permeability and connectivity within the Marina and the surrounding areas through high quality building design townscape and public realm; - There is a proposed inclusion of a cycleway to the west of the Development Area. - The proposals will also seek to enhance linkages between the Gas Works, Black Rock and Brighton Marina.	- Reduced parking provision (to discourage unnecessary use of private vehicles to the area) should be considered; - Modifications to key junctions directly affected by the developments should also be considered; - The proposed cycleway to the west of the Development Area could be in the form of a cycleway at the eastern end of Madeira Drive Supply Road connecting the Marina with the existing cycleway on Madeira Drive
DA3	Lewes Road	- There are proposed improvements to Lewes Road for pedestrians and cyclists; - The proposals should ensure that there are appropriate links to Moulscroomb Station.	The proposals should consider links over the railway line to reduce severance in the area.

Development Area	Description	Summary of the City Plan Proposals	Further Suggested Mitigation
DA4	New England Quarter and London Road	- The Station Gateway proposals include: better access to the Station, widening of the pavement, and improvements to junctions, cycle parking, and contraflow cycle lanes. - The proposals also include Strengthening pedestrian / cycling links between the New England Quarter, London Road shopping centre and the North Laine shopping area.	The proposals should also consider cycling provision on the southern section of Preston road to connect existing cycling infrastructure with those at the Level
DA5	Eastern Road and Edward Street	The proposals should seek to improve the Public Realm and townscape through the adoption of comprehensive design guidance;	Cycle links connecting the Development Area to the seafront cycleway should be considered.
DA6	Hove Station Area	- Hove Station proposals will seek to improve the public realm within the area; - Old Shoreham Road cycle lanes will link The Development Area with central Brighton - The Hove Station proposals should be underpinned with strong urban design principles and facilitate cycle / pedestrian movement through the Development Area;	A cycle link should be included on Cromwell Road to link the Development Area to the cycle infrastructure on the Drive.

Development Area	Description	Summary of the City Plan Proposals	Further Suggested Mitigation
DA7	Toads Hole Valley	The proposals seek to incorporate cycle and pedestrian access to the South Downs National park.	- Cycle provision on Goldstone Crescent in order to link DA7 with Hove DA6 (Hove Station) via Hove Park should also be considered - Severance issues occur at the Development Area due to its proximity with King George V1 Road. Toucan Crossings should be considered to ensure that pedestrian and cyclists can access the Development Area safely.
DA8	Shoreham Harbour and South Portslade	The proposals seeks to improve connections and townscape around key linkages including Boundary Road / Station Road district retailing centre, Church Road and along the A259.	- A cycle link through Shoreham Harbour should be included within the design to ensure that the coastal cycle route is continued. - A cycle link which connects the Development Area with Portslade Station should also be considered.
SA1	The Seafront	The proposals seek to provide for sustainable means of transport to and from the site and demonstrate good linkages for pedestrians and cyclists.	
Other	-		Blocking off of the access from Saltdean Park Road onto Marine Parade will allow for better pedestrian cycle access down onto the Undercliff walk from the subway.

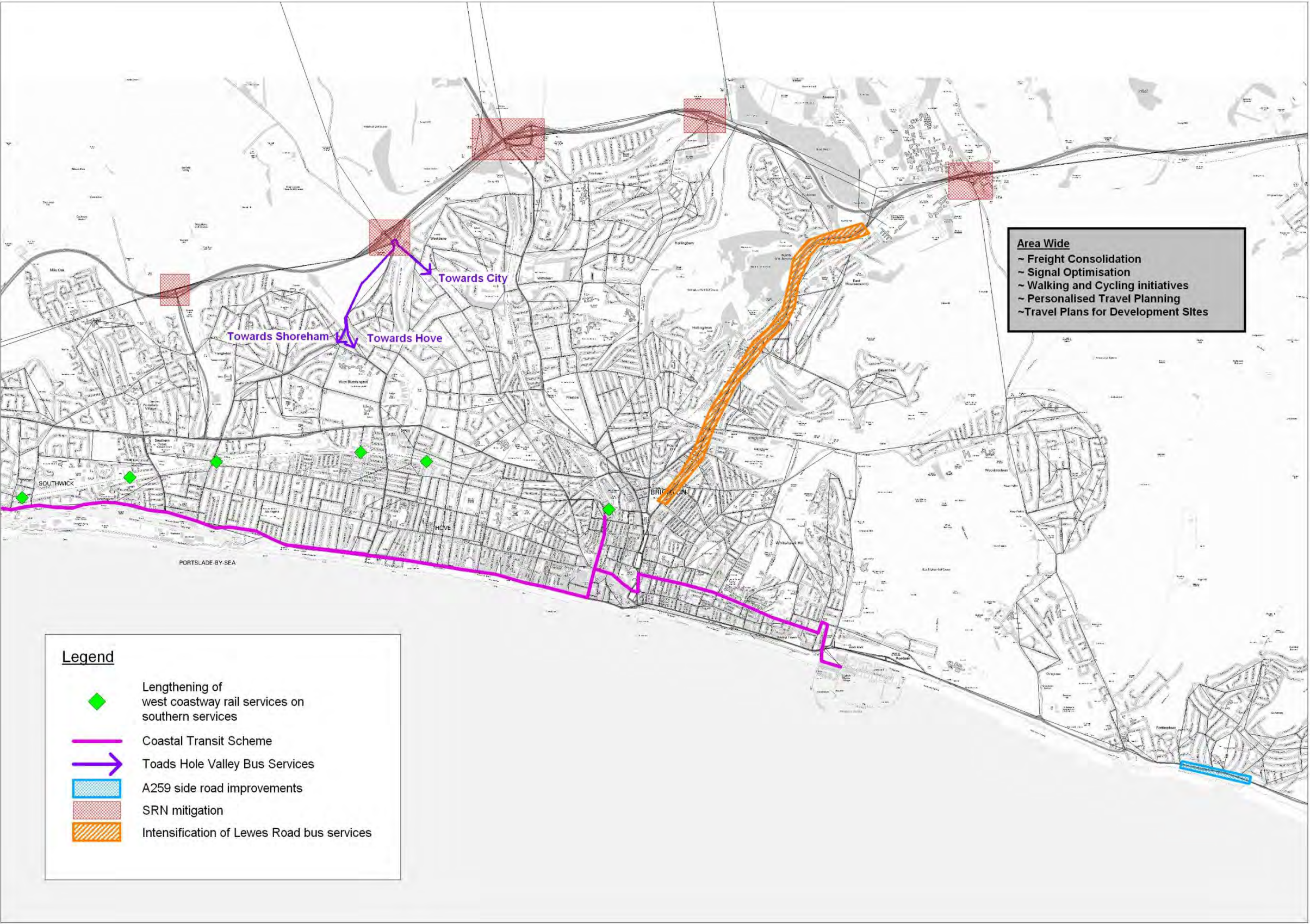
9.48 Table 9.2 below provides a summary of the key transport interventions which are also shown graphically in Figure 9.1

Table 9.2 - Summary of Transport Interventions for 2030 City Plan Mitigation Scenario

Scheme	City Plan Mitigation Case - Objectives			
	Behaviour change to reduce background traffic growth	Modal Choice to new strategic sites	SRN Safety - Reducing demand on SRN and selective infrastructure improvements	Improving air quality in the urban core - Sustainable Transport and Freight Management
Implementation of Coastal Transit Scheme (Brighton Station to Marina)	✓	✓		✓
Implementation of Coastal Transit Scheme (Brighton Station to Shoreham Harbour / Worthing)	✓	✓	✓	✓
Toads Hole Valley Bus Services		✓	✓	
Intensification of Lewes Road Bus Services		✓		✓
A259 Side Road Improvements - Saltdean				
Lengthening of West Coastway rail services on Southern Services		✓	✓	✓
Freight Consolidation / Management	✓			✓
Local road signal optimisation and UTC/ MOVA roll out				✓
SRN Infrastructure Mitigation at five junctions			✓	
Walking and Cycling Initiatives in development areas and connectivity to surrounding areas	✓	✓		✓
Personalised Travel Planning on congested corridors	✓			
Travel Plans for development sites	✓	✓	✓	

9.49 It should be noted that the A259 side road improvements are related to improving the flow of traffic onto the A259 during the morning peaks.

Figure 9.1 - 2030 City Plan Mitigation Measures



Testing the impact of the 2030 City Plan Mitigation Strategy

- 9.50 The mitigation strategy identified above was tested using the multi modal model. Analyses were produced at three levels:-
- Area Wide Statistics
 - Corridor Based Analysis ; and
 - Strategic Road Network Analysis
- 9.51 The strategic road network analysis was undertaken using local models to provide a finer grain of analysis.

Area Wide Statistics

Total Change in Daily Trips/Time Period by mode

- 9.52 Table 9.3 shows the changes in trips for 'within Brighton & Hove' and 'within the urban core' (excluding external trips i.e. those to or from the rest of the model shown in Figure 8.7).
- 9.53 When compared to the 2010 Base and 2030 Committed Base, the 2030 City Plan Mitigation Case shows an increase in both car trips and public transport trips. This is largely due to the overall increase in trips associated with the Development Areas.
- 9.54 However, when compared against the 2030 City Plan Reference Case, the 2030 City Plan Mitigation Case actually shows a reduction in car trips and an increase in public transport trips. This would suggest that the additional bus mitigation measures that are being proposed are transferring trips away from the car and onto public transport.
- 9.55 The enhanced public transport provision in the mitigation case compared to the 2010 base also has a significant impact on the rate of increase of public transport person trips compared to car person trips. For example public transport person trips increase on average by a ratio of 4 to 1 compared to car person trips. The introduction of 20mph zones coupled with the increase in public transport provision particularly on the Lewes Road and Coastal Transit Scheme corridors are expected to be the main causal factors underpinning the growth in public transport trips.

Table 9.3 - Growth in Daily Trips

		2010 Base to 2030 City Plan Mitigation Case				2030 Committed Base to 2030 City Plan Mitigation Case				2030 City Plan Reference Case to 2030 City Plan Mitigation Case			
		Car Persons		PT Persons		Car Persons		PT Persons		Car Persons		PT Persons	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Trips within Brighton & Hove	AM Peak	3869	11%	5436	46%	2634	7%	1796	12%	-732	-2%	691	4%
	Inter-Peak	2974	11%	3894	40%	2139	8%	668	5%	-842	-3%	812	6%
	PM Peak	2769	9%	5104	41%	1457	4%	1134	7%	-1115	-3%	857	5%
Trips to/from Urban Core (excluding External)	AM Peak	561	8%	2380	43%	487	7%	848	12%	-74	-1%	188	3%
	Inter-Peak	423	6%	2096	43%	325	5%	426	6%	-296	-4%	118	6%
	PM Peak	145	2%	2744	37%	200	2%	741	8%	-298	-3%	85	4%

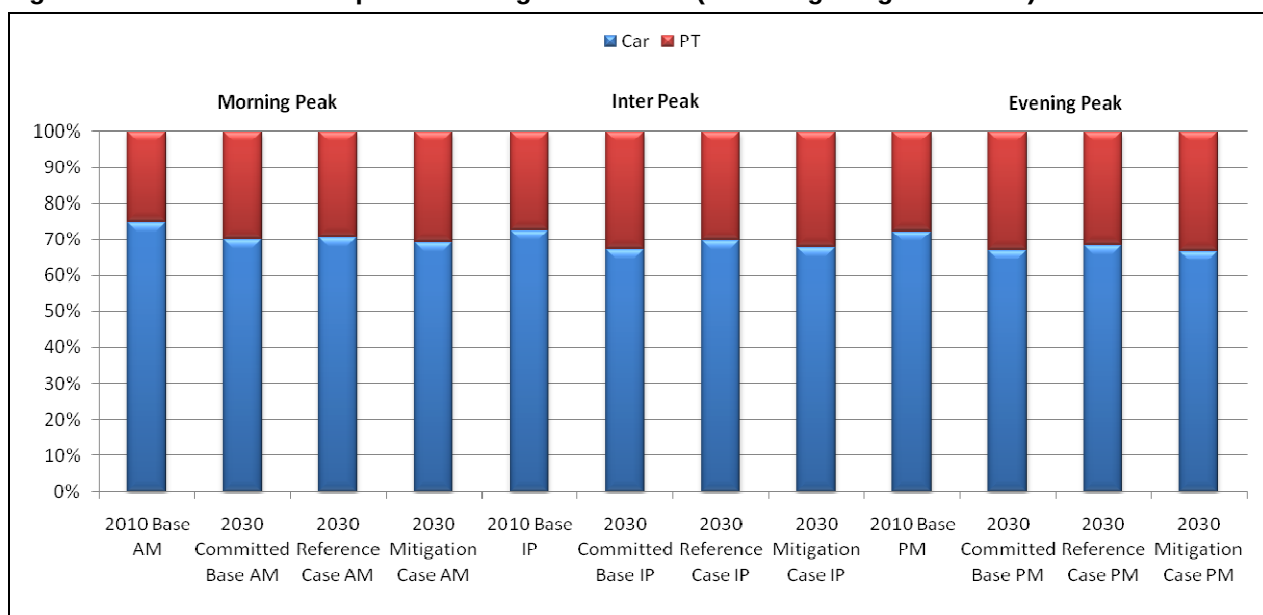
Demand Analysis by mode/journey purpose

- 9.56 Figures 9.2 and 9.3 show the change in modal share for each of the scenarios and it should be noted that the 2030 assessment years have a lower car occupancy in line with DfT guidance.

Trips within Brighton

- 9.57 As discussed in Chapter 8, Figure 9.2 shows an increase in public transport mode share from the 2010 Base to the 2030 Committed Base. The inclusion of the Development Area trips (i.e. the 2030 City Plan Reference Case) generally shows a slight reduction in the public transport mode share when compared to the 2030 Committed Base.
- 9.58 However, the introduction of City Plan Mitigation shows the public transport mode share return to similar levels to that of the 2030 Committed Base. These results suggest that without the additional mitigation suggested in paragraphs 9.5 to 9.50, the inclusion of the development areas will have a slight adverse impact on public transport mode share because of the absence of credible alternatives and sustainable travel choices.

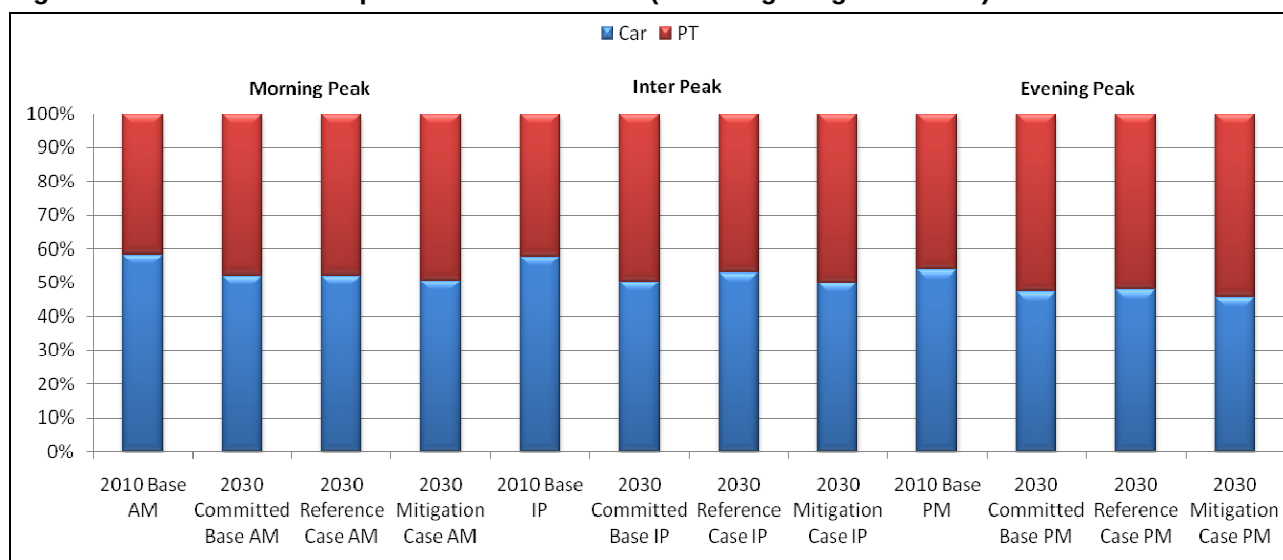
Figure 9.2 Mode Share - Trips within Brighton & Hove (including Mitigation Case)



Trips to/from the Urban Core (excluding external trips)

- 9.59 Figure 9.3 also shows an increase in public transport mode share from the 2010 Base to the 2030 Committed Base. The inclusion of the Development Area trips (i.e. the 2030 City Plan Reference Case) generally shows a slight reduction in the public transport mode share when compared to the 2030 Committed Base (with the exception being the morning peak, where the mode share remains fairly constant).
- 9.60 However, the introduction of the mitigation identified earlier in this chapter, shows that the public transport mode share will increase when compared to both the 2030 Committed Base and the 2030 City Plan Reference Case. This indicates that the public transport improvements outlined earlier are not only mitigating the impact of the Development Areas, they are also creating betterment in terms of the proportion of bus users attracted to the system compared to the 2030 Committed Base.
- 9.61 Given that the mitigation shows a bigger shift in public transport users for the trips to / from the urban core; it is suggested that the improvements to the radial bus routes are having the greatest impact.
- 9.62 The Toad's Hole Valley – Shoreham Harbour bus service is still considered to be an important route as it provides vital access to the new Development Area and allows people the option of travel by public transport. If sufficient patronage cannot be achieved on this route, it is suggested that Development contributions will be required to subsidise the service.
- 9.63 It is also noted that the time period most affected by the shift in Public transport users is the inter-peak period. This suggests that the mitigation is most effective outside peak commuting times. This is to be expected, as these trips are more likely to be leisure based and therefore less time reliant.

Figure 9.3 Mode Share - Trips to/from Urban Core (including Mitigation Case)



Journey Times

9.64 Table 9.4 presents the changes in average journey times across eight corridors (see Figure 8.8 for routes) and has been compared with the 2010 base and the 2030 Committed Base and 2030 City Plan Reference Case scenarios. The analysis reveals that journey times across all routes are forecast to increase by between 32% and 37% between the 2010 base and the 2030 City Plan Reference Case.

9.65 The increase is in part due to a number of factors including:-

- Reallocation of roadspace on the Lewes Road corridor
- Introduction of 20mph zones on part of route 1 (Warren Road), Route 3 (southern end of Ditchling Road) and Route 5 (Dyke Road)
- Traffic Growth on the network

Table 9.4 – Average difference in journey times relative to the 2010 base across eight radial corridors

Time Period	Difference in Journey times relative to 2010 Base		
	2030Committed Base	2030 CityPlan Reference Case	2030 City Plan Mitigation Case
Morning Peak	28%	32%	27%
Evening Peak	30%	37%	24%

9.66 When the 2030 City Plan Mitigation Case is compared to the 2030 Committed Base the journey times are between 1% and 3% lower. This indicates that the interventions proposed will fully

mitigate the impact of the development areas returning the operation of the network to slightly better than if the developments were not there.

Table 9.5 – Average difference in journey times relative to the 2030 Committed Base across eight radial corridors

Time Period	Difference in Journey times relative to 2030 Committed Base	
	2030 CityPlan Reference Case	2030 City Plan Mitigation Case
Morning Peak	3%	-1%
Evening Peak	5%	-3%

Corridor Analysis

- 9.67 This section analyses how the 2030 City Plan Mitigation Case impacts on car journey times on the eight corridors. Table 9.6 provides an overview of the difference in journey times by corridor and for each direction.
- 9.68 Warren Road / Falmer Road, Lewes Road, Ditchling Road and Dyke Road all show a significant deterioration in journey times relatively to the 2010 Base in the peak hour. Much of the increase is related to the adoption of a 20mph zone on Warren Road, lower Ditchling Road and also on Dyke Road. The reallocation of roadspace on Lewes Road is the main contributory factor to slower journey times on this corridor. The other routes most notably on the seafront show much smaller increases in journey times. This suggest the impact of the Coastal Transit Scheme on car journey times will be relatively modest.

Table 9.6 – Difference in journey times by corridor relative to the 2010 Base

Difference relative to 2010 Base			Route Journey Times					
Corridor	Corridor Name	Direction	Morning Peak			2030 Committed	2030 City Plan Reference Case	2030 City Plan Mitigation Case
			2030 Committed	2030 City Plan Reference Case	2030 City Plan Mitigation Case			
1	Falmer Road / Warren Road	Northbound	31%	35%	17%	23%	25%	6%
1	Falmer Road / Warren Road	Southbound	21%	20%	30%	32%	40%	22%
2	Lewes Road	Northbound	31%	31%	14%	64%	78%	-12%
2	Lewes Road	Southbound	118%	129%	107%	98%	109%	91%
3	Ditchling Road	Northbound	47%	52%	44%	57%	61%	41%
3	Ditchling Road	Southbound	26%	26%	26%	25%	25%	24%
4	A23	Northbound	8%	11%	7%	18%	27%	20%
4	A23	Southbound	10%	20%	14%	9%	10%	9%
5	Dyke Road	Northbound	56%	69%	61%	54%	74%	64%
5	Dyke Road	Southbound	41%	44%	43%	36%	43%	39%
6	A259 - Brighton Boundary to Marina	Westbound	17%	22%	21%	1%	4%	2%
6	A259 - Marina to Brighton Boundary	Eastbound	0%	0%	0%	5%	10%	8%
7	A259 - Marina to Western Hove	Westbound	3%	5%	2%	8%	19%	21%
7	A259 - Western Hove to Marina	Eastbound	2%	8%	5%	22%	26%	20%
8	A259 - Western Hove to Shoreham	Westbound	6%	8%	6%	10%	14%	8%
8	A259 - Shoreham to Western Hove	Eastbound	30%	34%	32%	21%	21%	25%

9.69 Table 9.7 shows the relative difference in journey times by corridor relative to the 2030 Committed Base. Radial routes in the north eastern part of the city all perform better than the 2030 Committed Base indicating that the interventions proposed will fully mitigate the impact of the development areas.

9.70 For other routes most notably the Seafront, increases of up to 5% are predicted to occur. As the Seafront routes compare favourably with the 2010 Base the actual change to 2030 is likely to be small. This suggests that the rapid express bus services along the seafront may be taking traffic off the A259 onto public transport.

Table 9.7 – Difference in journey times by corridor relative to the 2030 Committed Base

Difference relative to Committed Base			Route Journey Times			
Corridor	Corridor Name	Direction	Morning Peak		Evening Peak	
			2030City Plan Reference Case	2030City Plan Mitigation Case	2030City Plan Reference Case	2030City Plan Mitigation Case
1	Falmer Road / Warren Road	Northbound	3%	-11%	2%	-14%
1	Falmer Road / Warren Road	Southbound	-1%	7%	6%	-8%
2	Lewes Road	Northbound	0%	-13%	9%	-46%
2	Lewes Road	Southbound	5%	-5%	5%	-4%
3	Ditchling Road	Northbound	3%	-2%	3%	-10%
3	Ditchling Road	Southbound	0%	0%	0%	0%
4	A23	Northbound	3%	-1%	8%	2%
4	A23	Southbound	8%	3%	2%	0%
5	Dyke Road	Northbound	8%	3%	13%	7%
5	Dyke Road	Southbound	2%	2%	5%	2%
6	A259 - Brighton Boundary to Marina	Westbound	4%	3%	3%	1%
6	A259 - Marina to Brighton Boundary	Eastbound	0%	0%	5%	3%
7	A259 - Marina to Western Hove	Westbound	1%	-1%	11%	12%
7	A259 - Western Hove to Marina	Eastbound	6%	3%	3%	-2%
8	A259 - Western Hove to Shoreham	Westbound	2%	0%	4%	-1%
8	A259 - Shoreham to Western Hove	Eastbound	3%	1%	0%	3%

9.71 In summary, the results indicate that the 2030 City Plan Mitigation case has a generally positive impact on reducing journey times with many routes performing better than in the 2030 Committed Base. This suggests that the impact of the development areas can be adequately mitigated.

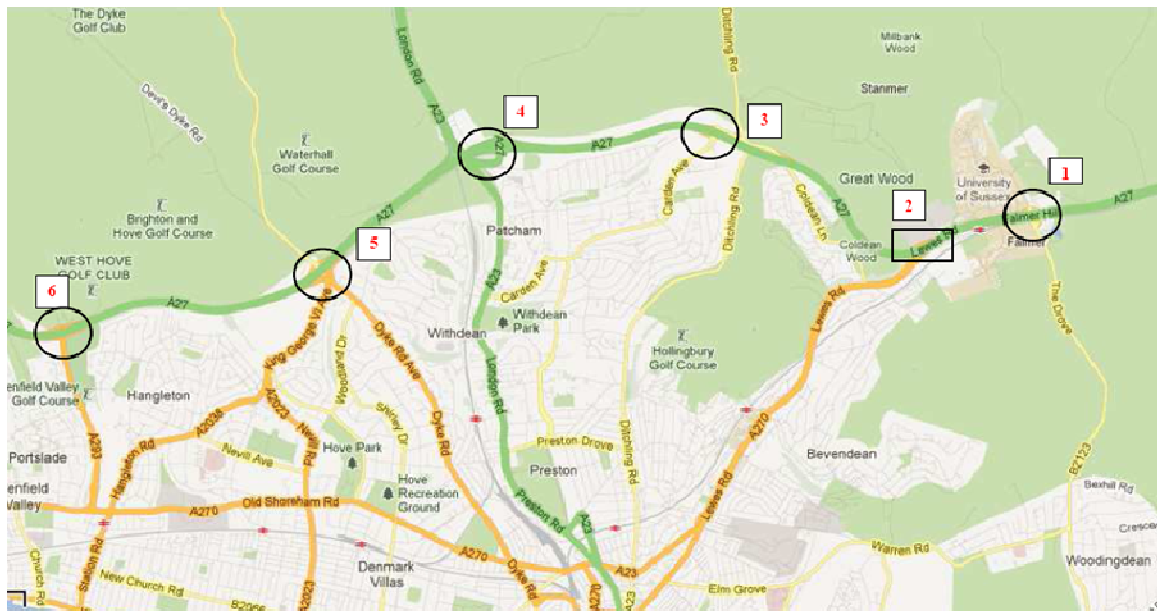
SRN Mitigation

9.72 The results of the strategic modelling noted that further investigation would be beneficial for the following junctions in order to model the behaviour of users of these junctions in greater detail and also to aid the development of appropriate mitigation:

1. A27 / Falmer Interchange – north and south roundabouts;
2. A27 / Carden Avenue roundabouts to the north and south of the A27
3. A27 / A23 Junction – north, south and west roundabouts;
4. A27 / King George VI / Devils Dyke Road Junction – north and south roundabouts; and
5. A27 / A293 Junction – north and south roundabouts.

9.73 The SRN junctions warranting further investigation are shown in Figure 9.4 and sit within the Brighton administrative boundary. The exception is the Falmer Interchange which is located in East Sussex but is very much 'Brighton facing' given that access roads to the junction from the south and west are located in Brighton & Hove.

Figure 9.4 SRN Junctions warranting further investigation



9.74 These junctions have been modelled using ARCADY⁴ as all of the junctions on the A27 are roundabouts, with dumbbell⁵ arrangements to the north and south of the mainline dual carriageway.

9.75 The ARCADY base models have been validated using surveyed queue length data for both AM and PM peaks for the base year 2012

⁴ ARCADY is a piece of software designed to predict capacities, queues and delays at roundabouts.

⁵ A Dumbbell arrangement refers to twin roundabouts separated by a short stretch of road. In the case of junction interchanges on trunk roads, the connecting link is generally a bridge across the mainline flow.

- 9.76 The future year scenarios for '2030 City Plan Reference Case' and '2030 Committed Base' were developed by either taking the difference between the 2030 City Plan Reference Case and the 2010 Base or the 2030 Committed Base and 2010 Base and adding these flows to the base ARCADY model flows. The results and subsequent impact are discussed in greater detail below.
- 9.77 In order to assess these in more detail, calibrated and validated ARCADY base year models have been developed given that all of the junctions on the A27 are roundabouts, with dumbbell⁶ arrangements to the north and south of the mainline dual carriageway.
- 9.78 Forecast year assessments have been developed for the 2030 Committed Base and 2030 City Plan Reference Case scenarios. The results from these assessments can be found in Appendix G. Their impacts can be summarised as follows:-
- Falmer Interchange – Blocking back from the southern roundabout to the overbridge and onto the northern roundabout. Traffic is not able to efficiently leave the A27 eastbound off slip with queuing affecting the mainline. This is an existing problem which would be exacerbated by 2030
 - Carden Avenue Junction (also known as Hollingbury) – At the northern roundabout, the high circulatory flow associated with right turners from Carden Avenue to Coldean Lane results in traffic unable to exit from the eastbound off slip efficiently. This generates queuing on the slip road which extends onto the mainline during the morning and evening peak. The junction is overcapacity in the 2030 committed Base scenario without the addition of traffic flows from the development sites. The impact of additional traffic from the strategic development sites is marginal and does not significantly worsen the performance of the junction. At the southern roundabout, the Crowhurst Road and Carden Avenue arms operate in excess of capacity although there is no blocking back onto the mainline from the westbound off slip
 - Patcham Interchange – Queues on the A27 south roundabout are generated by blocking back from the Mill Road / A23 junction with the predominant movement being the right turn to the A23 North. This impacts on the efficiency of the westbound off slip where queues are generated which extend onto the mainline particularly in the morning peak. This is a current problem which would be exacerbated by background traffic and committed development. The impact of additional traffic from the strategic development sites is marginal and does not significantly worsen the performance of the junction. There is also some lesser queuing on the A27 eastbound off slip at the A27 north roundabout.
 - Devils Dyke roundabout – There is insufficient capacity at the northern roundabout associated with right turning movements from Dyke Road to the A27 eastbound on slip road and onto the A23 northbound which is used as an alternative to the A23. As this movement has priority traffic is unable to exit from the eastbound off slip generating queuing which extends onto the mainline carriageway.
 - A293 Hangleton Link arm – Queues would be generated on the northbound approach to the junction which would result in this arm operating in excess of capacity. Queues on the westbound and eastbound off slips would not result in blocking back to the mainline.
- 9.79 A characteristic of the ARCADY assessments for nearly all the junctions tested was the imbalance in delays and queuing across the arms. In discussions with the Highways Agency it was considered

⁶ A Dumbbell arrangement refers to twin roundabouts separated by a short stretch of road. In the case of junction interchanges on trunk roads, the connecting link is generally a bridge across the mainline flow.

that most of these junctions would probably benefit from some form of signalisation by the end of the plan period in order to better distribute queues and delays.

- 9.80 To test this further, LINSIG⁷ assessments were developed for the aforementioned junctions with schemes developed to a level of detail sufficient for the purposes of transport modelling and high-level assessment of feasibility. The results of this assessment under the mitigation heading are also included in Appendix G
- 9.81 These assessments reveal that a package of junction improvements can be developed which would enable traffic to more efficiently leave the A27, with reduced queuing affecting the mainline of the motorway.
- 9.82 Whilst full operational assessments and engineering design will be required at a later date, the proposals are considered appropriate and deliverable subject to funding availability (including contributions from third parties, detailed design and potential requirements for departures from standard), and have been developed to a level of detail appropriate to this stage of the planning process.
- 9.83 The potential package of works identified in conjunction with the HA is summarised in paragraphs 9.84 to 9.87 and shown indicatively in Appendix H. The precise nature of works will need to be identified as development sites come forward with more detailed modelling, optioneering and design work conducted at the planning application stage.
- 9.84 At the Falmer Interchange a more wholesale upgrade of the northern and southern roundabouts to signalised junctions is likely to be required in order to reduce eastbound off slip queuing. This may necessitate departures from standard given the constraints imposed by the width of the A27 overbridge and would need to be considered in conjunction with the Village Way junction to the south and the Falmer Road corridor in general given the often congested conditions approaching the Woodingdean crossroads.
- 9.85 At the Carden Avenue junction, the signalisation and remodelling of the northern roundabout to create a 't junction' would prevent blocking back onto the mainline from the eastbound off slip. The Carden Avenue south roundabout could be remodelled as a 'teardrop junction' to provide additional capacity on the circulatory carriageway. With an accompanying part signalisation of the junction, queues blocking back to the mainline would be unlikely to occur on the westbound off slip.
- 9.86 At the Patcham Interchange, the signalisation and remodelling of the northern roundabout to create a teardrop junction and the part signalisation of the southern roundabout would provide additional capacity and would enable the queues on the westbound off slip to be better managed
- 9.87 At the Devils Dyke roundabout, the package of improvements will be very much dependent on the detailed planning application for the Toads Hole Valley site and potential to realign the King George VI arm. However it is likely that the northern roundabout would need to be converted to a teardrop junction to increase the stacking capacity across the bridge with part signalisation likely to provide benefits to the operation of the eastbound off slip. The provision of two northbound lanes across the bridge is also likely to be required. This could be achieved by reducing the southbound movement to one lane or possibly relocating the footway on a new parallel bridge structure across the A27 to provide the necessary width for general traffic lanes.

⁷ LINSIG is a piece of software used for design and modelling of signalised traffic junctions including optimisation of signal stage, phase and cycle timings.

- 9.88 In addition improvements to the Hangleton Link / A27 junction may be required in order to reduce the queuing on the northbound section under the bridge. Part signalling the southern roundabout to regulate flow into this section could be adopted to better manage flows.
- 9.89 The preferred strategy is therefore to carefully manage the volume of traffic entering the city on the A27 through selective improvements which minimise reassignment to local roads and to maximise opportunities for residents of the development sites closest to the SRN (such as Toads Hole Valley and Lewes Road DA's) to use public transport alternatives.

10 Conclusions

- 10.1 This report has documented the transport impacts of the emerging 2030 Brighton & Hove City Plan. The key objectives are:
- Examining in more detail the impact of the policy objectives set out in CP9 of the Brighton & Hove City Plan
 - Determining the transport impacts of the development strategy detailed in the City Plan including potential highway and public transport impacts and associated constraints on travel
 - Determining the level of interventions (mitigation) required to manage traffic and transport in order to support sustainable development and the City Plan
- 10.2 To establish the impacts of the proposed City Plan three future forecast year scenarios have been used for assessment:
- 2030 Committed Base – 2030 City Plan Reference Case less the Development Areas. This scenario has been compared to the 2030 City Plan Reference Case to reveal the changes to the operation of the public transport and highway network and any potential additional mitigation measures that may be required
 - 2030 City Plan Reference Case – Base model plus committed developments and transport schemes that are certain or near certain of being delivered in the plan period plus the strategic developments noted in the proposed City Plan (Development Areas 1 to 7). The level of economic and demographic growth has been controlled to TEMPRO⁸ growth rates.
 - 2030 City Plan Mitigation Case – 2030 City Plan Reference Case plus additional mitigation measures required to address travel constraints. This scenario provides an evidence base for the mitigation measures and has been compared to the 2030 City Plan Reference Case flows to link measures to developments.
- 10.3 The 2030 City Plan Reference Case and 2030 Committed Base scenarios has included the following transport interventions which are shown in Table 11.1 below:-

Table 10.1 2030 City Plan Reference Case and 2030 Committed Base scenarios – Schemes identified

Scheme	City Plan Reference Case and Committed Base
Edward St/Eastern Rd Scheme	✓
Seven Dials	✓
Lewes Rd Corridor Improvements	✓
Selective Traffic Signal Review and Upgrade	✓
20mph zone	✓
Brighton Station Gateway	✓
Valley Gardens Proposals	✓

- 10.4 The assessment of these scenarios has been conducted for a morning and evening weekday peak period and revealed the following:-

⁸ TEMPRO uses local planning data from the National Trip End Model (NTEM) and traffic growth from the National Transport Model (NTM) to produce a local traffic growth factor.

- The proposals within the City Plan show an increase in both car trips and public transport trips. This is to be expected given 20 years of growth on the network from committed developments and background traffic growth.
- Taking the morning peak as an example, the growth in car person trips within Brighton & Hove is forecast to increase by 13% of which 9% of growth is coming from the development areas
- The percentage increase in public transport is greater than for car person trips as a result of the City Plan. This percentage increase ranges from between 30% and 40% for the morning and evening peaks. The increase is from a much lower base
- Across Brighton & Hove as a whole the modal share increases from between 25% (morning peak) and 28% (evening peak) in 2010 to 33% in both peaks by 2030.

10.5 Whilst this change in travel patterns is positive towards the use of sustainable transport, the results of the modelling show that a sustained improvement in public transport provision and walking and cycling facilities accompanied by personalised travel planning and behaviour change campaigns is required to maintain as a minimum the mode share targets set out above. Further sustainable transport measures will be required to be implemented during the plan period, the objectives and themes of which are set out below:-

- Build on successful behavioural change programmes to reduce background traffic growth
- Increase modal choice to the new strategic development areas by walking, cycling and public transport modes
- Tackle safety issues on the strategic road network where queues block back to mainline carriageways; and
- Address air quality issues in the urban core through increased take up of sustainable transport modes and freight management

10.6 The mitigation measures have been derived from a combination of assessing the outcomes of the 2030 City Plan Reference Case and 2030 Committed Base runs and schemes previously identified but not committed which could potentially be delivered within the lifetime of the plan period. The mitigation schemes identified are shown in Table 10.2 including their alignment with the City Mitigation case objectives.

Table 10.2 2030 City Plan Mitigation scenario – Schemes identified

Scheme	City Plan Mitigation Case - Objectives			
	Behaviour change to reduce background traffic growth	Modal Choice to new strategic sites	SRN Safety - Reducing demand on SRN and selective infrastructure improvements	Improving air quality in the urban core - Sustainable Transport and Freight Management
Implementation of Coastal Transit Scheme (Brighton Station to Marina)	✓	✓		✓
Implementation of Coastal Transit Scheme (Brighton Station to Shoreham Harbour / Worthing)	✓	✓	✓	✓
Toads Hole Valley Bus Services		✓	✓	
Intensification of Lewes Road Bus Services		✓		✓
A259 Side Road Improvements - Saltdean				
Lengthening of West Coastway rail services on Southern Services		✓	✓	✓
Freight Consolidation / Management	✓			✓
Local road signal optimisation and UTC/ MOVA roll out				✓
SRN Infrastructure Mitigation at five junctions			✓	
Walking and Cycling Initiatives in development areas and connectivity to surrounding areas	✓	✓		✓
Personalised Travel Planning on congested corridors	✓			
Travel Plans for development sites	✓	✓	✓	

10.7 These effects have been modelled at an area wide analysis level and also at the strategic road network level.

10.8 The area wide analysis assessed:-

- Total vehicle kilometres (which is the total vehicles * distance of a link taking into account)
- Journey Times; and
- Car / PT modal share.

10.9 Total vehicle kilometres for the four scenarios identified that background traffic growth and traffic growth from committed developments would be greater than that generated by the City Plan Development Areas particularly outside the urban core. This is shown in Table 10.3 and 10.4 below

Table 10.3 Total Vehicle Kilometres – Morning Peak

Area	Total Vehicle Kilometres			
	Morning Peak			
	2010Base	2030 Committed Base	2030 CityPlan Reference Case	2030 Mitigation Case
Urban Core	13,415	14,438	15,334	14,915
Rest of Brighton & Hove	218,791	238,223	246,684	248,135
Rest of Model	613,959	724,600	734,312	732,735
Brighton & Hove (Total)	232,206	252,660	262,018	263,050

Table 10.4 Total Vehicle Kilometres – Evening Peak

Area	Total Vehicle Kilometres			
	Evening Peak			
	2010Base	2030 Committed Base	2030 CityPlan Reference Case	2030 Mitigation Case
Urban Core	13,040	14,253	15,102	14,096
Rest of Brighton & Hove	210,544	232,788	241,242	240,708
Rest of Model	584,144	693,055	706,457	705,515
Brighton & Hove (Total)	223,583	247,041	256,344	254,804

- 10.10 Overall, the 2030 City Plan Reference Case scenario will result in a 13% increase in vehicle kilometres between the 2010 base and 2030. Of this 13%, 4% is attributable to City Plan Development Areas. This is shown in Table 10.5 below.
- 10.11 The impact of improved public transport in the urban core can be seen in the fall in vehicle kilometres between the 2030 City Plan Mitigation scenario and the 2030 City Plan Reference Case shown in Tables 10.3 and 10.4. In the evening peak, in the urban core, vehicle kilometres in the 2030 mitigation case will drop significantly and will be slightly improved compared to the 2030 committed scheme. This indicates that the mitigation measures identified in Table 10.2 will have a significant beneficial impact on traffic volumes in the urban core.
- 10.12 Vehicle kilometres outside the urban core will be more static but as the journey time statistics indicate, this is principally because reduced congestion on the network with 2030 mitigation in place will allow more vehicles to complete their journeys in the peak hour. Hence improvements in public transport and mode shift away from car use will generate a small amount of additional capacity. In this respect, the impact of reduced car vehicle kilometres on the highway network arising from modal shift will be offset by improved vehicular movement on the network allowing more journeys to be completed. The net effect will therefore be neutral.

Table 10.5 Total Vehicle Kilometres – Changes in the morning and evening peak relative to the 2010 base and 2030 Committed Base scenarios

Area	Difference relative to 2010 Base			
	Morning Peak			
	2010Base	2030Committed Base	2030 CityPlan Reference Case	2030 City Plan Mitigation
Urban Core		8%	14%	11%
Rest of Brighton & Hove		9%	13%	13%
Rest of Model		18%	20%	19%
Brighton & Hove (Total)		9%	13%	13%

Area	Difference relative to 2030 Committed Base			
	Morning Peak			
	2010Base	2030Committed Base	2030 CityPlan Reference Case	2030 City Plan Mitigation
Urban Core			6%	3%
Rest of Brighton & Hove			4%	4%
Rest of Model			1%	1%
Brighton & Hove (Total)			4%	4%

Area	Difference relative to 2010 Base			
	Evening Peak			
	2010Base	2030Consented	2030CityPlan	2030Mitigation
Urban Core		9%	16%	8%
Rest of Brighton & Hove		11%	15%	14%
Rest of Model		19%	21%	21%
Brighton & Hove (Total)		10%	15%	14%

Area	Difference relative to 2030 Committed Base			
	Evening Peak			
	2010Base	2030Consented	2030CityPlan	2030Mitigation
Urban Core			6%	-1%
Rest of Brighton & Hove			4%	3%
Rest of Model			2%	2%
Brighton & Hove (Total)			4%	3%

- 10.13 In terms of journey times the City Plan Mitigation Case will deliver journey times that are between 1% and 3% lower than the 2030 Committed Base. This indicates that the interventions proposed will fully mitigate the impact of the development areas returning the operation of the network to slightly better than if the Development Areas were not implemented
- 10.14 In terms of modal shift, the 20mph zones are shown to be very effective in reducing speeds and hence the attractiveness of car travel particularly to the city centre. Coupled with improvements to bus services on the Lewes road corridor in particular there would be a significant increase in modal shift to public transport (see Table 10.6) with the mode share for public transport trips within Brighton & Hove increasing from 25% in the morning peak in 2010 to 30% in the 2030 committed case. The corresponding figures are 28% to 33% in the evening peak . The figures for trips to the urban core would be an increase from 47% to 53% in the morning peak and from 40% to 45% in the evening peak.
- 10.15 In order to maintain these improvements to mode share with the Development Areas in place, further public transport interventions would be required. In the mitigation scenario these interventions would increase the public transport mode share to 55% in the morning peak and 47% in the evening peak for trips to the urban core.

Table 10.6 Modal Share

Area	Time Period	2010 Base Year				2030 Committed Base				2030 City Plan Reference Case				2030 Mitigation				
		Car Persons	PT Persons	Car %	PT %	Car Persons	PT Persons	Car %	PT %	Car Persons	PT Persons	Car %	PT %	Car Persons	PT Persons	Total	Car %	PT %
Trips within Brighton	Morning Peak	34734	11699	75%	25%	35969	15340	70%	30%	39335	16445	71%	29%	38603	17136	55739	69%	31%
	Evening Peak	32146	12412	72%	28%	33458	16383	67%	33%	36030	16660	68%	32%	34915	17517	52432	67%	33%
Trips to Urban Core	Morning Peak	4871	4332	53%	47%	4861	5471	47%	53%	5272	5960	47%	53%	5147	6195	11343	45%	55%
	Evening Peak	4777	3134	60%	40%	4942	4038	55%	45%	5212	4159	56%	44%	4949	4354	9303	53%	47%
Trips from Urban Core	Morning Peak	3488	1378	72%	28%	3683	1806	67%	33%	3963	1979	67%	33%	3922	2010	5931	66%	34%
	Evening Peak	5258	4541	54%	46%	5077	5703	47%	53%	5426	6044	47%	53%	5214	6246	11460	45%	55%
Trips to/from Urban Core	Morning Peak	7375	5573	57%	43%	7450	7104	51%	49%	8011	7691	51%	49%	7937	7952	15889	50%	50%
	Evening Peak	8876	7456	54%	46%	8821	9458	48%	52%	9319	9817	49%	51%	9021	10200	19221	47%	53%
Trips to/from Urban Core (not inc	Morning Peak	5779	4137	58%	42%	5817	5363	52%	48%	6323	5826	52%	48%	6240	6064	12304	51%	49%
	Evening Peak	6683	5711	54%	46%	6481	7196	47%	53%	6885	7431	48%	52%	6582	7806	14389	46%	54%

10.16 In summary the 2030 City Plan Mitigation strategy would:-

- Ensure that growth in public transport trips will outstrip highway trips by ratios of at least 2.5 to 1.
- Mode Share will increase across all areas of Brighton & Hove but with the largest increases for trips with an origin or destination in the urban core. Public Transport Mode Share will be significantly higher in 2030 compared to 2010 with increases of between 6% and 9%.
- Mitigation will reduce vehicle kilometres on the network in the 2030 morning peak in the urban core towards levels experienced if there were no Development Areas. In the evening peak, vehicle kilometres in the urban core in the 2030 mitigation scenario would be less than in the 2030 committed case. This indicates that further mitigation will be effective in reducing the impact of development trips on the urban core.
- Overall vehicle kilometres across Brighton will be broadly similar in all 2030 scenarios. This suggests that the impact of trips generated by the Development Areas can be largely mitigated without a significant deterioration in network performance.

10.17 In addition to the strategic modelling undertaken, SRN mitigation analysis was undertaken at a more localised level given the need for a fuller understanding of the traffic behaviour on the network. The analysis revealed that many of the junctions on the A27 will operate in excess of capacity with blocking back onto the mainline by 2030 irrespective of whether the City Plan development sites are built and occupied. That is background growth and growth from committed developments will be sufficient to alter the operation of these junctions.

10.18 The Development Areas would not significantly worsen the operation of these junctions (other than perhaps Toads Hole Valley). However a package of junction improvements has been identified and discussed with the HA which would enable traffic to more efficiently leave the A27, with reduced queuing affecting the mainline carriageway.

Appendix A

Road Safety

Job No	Report No	Issue no	Report Name	Page
ST13119	1	1	Brighton & Hove City Plan	A1

Accidents between dates 01/10/2009 and 30/09/2012 (36) months

Selection:

4 accidents within a radius of 25 metres

Ranked by Total Accidents

Notes:

Cluster ID	Rank	Location	Node No.	Grid Reference		Severity Ratio	Accidents						Casualties						Accidents involving			
							Fa	Se	SI	Tot.	p.a.	KSI	Fa	Se	SI	Tot.	p.a.	KSI	Peds	Cycs	Child	OAPs
1	1	Old Steine/ St James's St	Y	531350	104050	0.333	0	7	14	21	7.0	7	0	7	18	25	8	7	8	4	2	8
2	1	Aquarium R,about	C	531350	103890	0.048	0	1	20	21	7.0	1	0	1	21	22	7	1	0	11	1	2
3	3	Severn Dials	L	530560	105120	0.150	0	3	17	20	6.7	3	0	3	20	23	8	3	0	11	0	1
4	4	Clock Tower	A	530850	104320	0.158	0	3	16	19	6.3	3	0	3	21	24	8	3	8	3	3	5
5	5	Western Rd adjacent to Imperial Arcade	G	530720	104330	0.125	0	2	14	16	5.3	2	0	2	14	16	5	2	6	2	3	8
6	6	Lewes Rd/ Bear Rd	T	532180	105930	0.357	0	5	9	14	4.7	5	0	5	12	17	6	5	7	2	0	1
7	6	London RD/ Cheapside/ Queens Place / London Rd/ St	LD / FO	531390	105000	0.143	0	2	12	14	4.7	2	0	2	25	27	9	2	4	3	3	5
8	8	Lewes Rd/ Franklin Rd/ St Leonard's Road	JH	532030	105590	0.231	0	3	10	13	4.3	3	0	3	11	14	5	3	2	7	0	0
9	8	Lewes Rd/ Coldean Lane	GD	533610	108150	0.308	0	4	9	13	4.3	4	0	4	18	22	7	4	1	0	0	7
10	8	Gloucester Pl/ North Rd/ Marlborough Pl	BT	531353	104507	0.077	0	1	12	13	4.3	1	0	1	16	17	6	1	1	1	3	0
11	11	Lewes Rd/ Hartington Rd	Z	532070	105680	0.250	0	3	9	12	4.0	3	0	3	10	13	4	3	2	9	0	1
12	11	London Rd - 20m N oxford Pl	JK	531370	105070	0.250	0	3	9	12	4.0	3	0	3	9	12	4	3	7	1	1	3
13	11	North St/ Ship St/ Kings Pl	Q	531000	104280	0.250	0	3	9	12	4.0	3	0	3	12	15	5	3	8	1	1	4
14	14	London Rd/ Baker St	M	531320	105220	0.000	0	0	11	11	3.7	0	0	0	12	12	4	0	1	6	1	4
15	15	North St/ Dyke Rd/ Western Rd	CC	530800	104340	0.200	0	2	8	10	3.3	2	0	2	9	11	4	2	2	2	2	2
16	15	Edward St/ John St/ George St	H	531520	104220	0.100	0	1	9	10	3.3	1	0	1	9	10	3	1	4	4	1	1
17	15	Old Steine/ Castle Sq	J	531270	104070	0.200	0	2	8	10	3.3	2	0	2	8	10	3	2	5	2	0	2
18	18	Western Rd/ Montpelier Rd	FA	530200	104450	0.222	0	2	7	9	3.0	2	0	2	9	11	4	2	6	1	0	3
19	18	Goldstone Villas/ Clarendon Villas	K	528810	105150	0.000	0	0	9	9	3.0	0	0	0	10	10	3	0	2	3	0	2

Accidents between dates 01/10/2009 and 30/09/2012 (36) months

Selection:

Notes:

4 accidents within a radius of 25 metres

Ranked by Total Accidents

Cluster ID		Rank	Location	Node No.	Grid Reference		Severity Ratio	Accidents						Casualties						Accidents involving			
								Fa	Se	SI	Tot.	p.a.	KSI	Fa	Se	SI	Tot.	p.a.	KSI	Peds	Cycs	Child	OAPs
20	18		Lewes Rd/ The Avenue (N)	AH	532780	106950	0.333	0	3	6	9	3.0	3	0	3	7	10	3	3	2	5	1	1
21	18		Old Shoreham Rd/ The Drive	BI	529240	105810	0.000	0	0	9	9	3.0	0	0	0	17	17	6	0	0	0	1	1
22	18		St George's Pl 25m N of Gloucester St	IP	531420	104730	0.111	0	1	8	9	3.0	1	0	1	14	15	5	1	3	3	1	1
23	18		Falmer Rd/ Warren Rd	E	535620	105910	0.000	0	0	9	9	3.0	0	0	0	13	13	4	0	0	0	1	2
24	18		London Rd/ Oxford St/ Ann St	W	531358	105124	0.222	0	2	7	9	3.0	2	0	2	8	10	3	2	4	2	0	0
25	25		Church Rd/ The Drive	CA	529080	104700	0.125	0	1	7	8	2.7	1	0	1	7	8	3	1	0	2	0	2
26	25		King's Rd/ Middle St	HF	530880	103950	0.250	0	2	6	8	2.7	2	0	2	7	9	3	2	5	2	0	0
27	25		Kings Rd/ West St	I	530770	103980	0.125	0	1	7	8	2.7	1	0	1	8	9	3	1	4	0	0	1
28	25		North St/ New Rd	AY	531120	104220	0.125	0	1	7	8	2.7	1	0	1	8	9	3	1	2	0	0	4
29	25		Warren Rd/ Bear Rd	AB	533630	105710	0.000	0	0	8	8	2.7	0	0	0	10	10	3	0	0	1	1	3
30	25				530734	103978	0.375	0	3	5	8	2.7	3	0	3	5	8	3	3	6	1	1	1
31	25		Marine Parade/ Charles St & Broad St	AR	531460	103910	0.125	0	1	7	8	2.7	1	0	1	9	10	3	1	2	1	0	3
32	25		Preston Circus	BV	531160	105440	0.125	0	1	7	8	2.7	1	0	1	8	9	3	1	1	4	0	0
33	33				527536	105380	0.000	0	0	7	7	2.3	0	0	0	9	9	3	0	1	1	1	3
34	33		Queen's Rd/ Junction Rd	DR	531000	104850	0.143	0	1	6	7	2.3	1	0	1	7	8	3	1	3	0	1	3
35	33		London Rd/ Tongdean Lane	BW	529976	107555	0.000	0	0	7	7	2.3	0	0	0	8	8	3	0	1	1	0	2
36	33				529195	104688	0.429	0	3	4	7	2.3	3	0	3	4	7	2	3	3	2	0	2
37	33		Blatchington Rd/ George St, Hove	GE	528770	105090	0.286	0	2	5	7	2.3	2	0	2	5	7	2	2	3	1	0	4
38	33				530334	104419	0.143	0	1	6	7	2.3	1	0	1	6	7	2	1	0	2	0	2
39	33				529539	104600	0.143	0	1	6	7	2.3	1	0	1	6	7	2	1	0	6	0	0
40	33		Old Shoreham Rd/ Foredown Dr	DV	526020	105850	0.286	0	2	5	7	2.3	2	0	2	8	10	3	2	0	0	0	3

Appendix B

Trip Generation Note

Job No	Report No	Issue no	Report Name	Page
ST13119	1	1	Brighton & Hove City Plan	B1

Technical Note

Date 7 November 2012

Job No/ Name ST13119

Subject Brighton & Hove City Plan - Trip Generation Methodology

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Introduction

- 1.1 This note has been prepared with reference to the Brighton & Hove City Plan and provides a methodology for estimating trip generation for consented and strategic sites.
- 1.2 Where available, information has been used from approved Transport Assessments (TAs) submitted as part of planning applications to develop a trip generation rate for each of the consented developments. Where information is unavailable a generic trip rate developed for the strategic sites has been applied.
- 1.3 The following approaches have been reviewed for strategic sites without planning consent:-
 - Trip rates used for developing the synthetic matrix of the Brighton & Hove Highway Model;
 - Use of Halcrow trip rates derived from 2002/03 household survey data; and
 - Information output from the TRICS® database.

Sites Assessed

- 1.4 For developing the forecast models, JMP was requested to include the sites listed in **Tables 1** and **2**. The proposed location and trip rate type are shown in the last two columns of each table and the reasoning behind this is discussed below.
- 1.5 It has been that there are no consented applications under construction or waiting to be built out associated with any of the sites listed as 'New Strategic Site in City Plan', 'Local Plan Allocation Carried Over' or 'Other'.
- 1.6 The BHCC online planning register was searched to collect all available information associated with transport and trip generation relating to sites listed as 'Consented Not yet built out', 'Consented & Under Construction' or 'Consented Built Out'. It is noted that information was not available for all of the sites.
- 1.7 Where there is insufficient information available to predict the future trip generation (i.e. there is either no land use type, development quantum or both), it has been assumed that the level of trip generation remains as existing. The only exception to this is the former Falmer High School site which is currently vacant and therefore not producing any trips. The intended use and size of this site are not known and therefore the level of trip generation cannot be calculated.
- 1.8 **Tables 1** and **2** below summarises the findings.

Table 1 Employment Sites Assessed

BHCC Reference/ Address	Spatial Area	Employment Type	Planning Status	Information available from Transport Assessment/ Statement	Development Quantum (m ²)	Site	2010 Status of Brownfield Land	2010 Land Use of Brownfield Land	Brownfield (2010 floorspace)	Urban/ Suburban	Trip Rate Type
125-135 Preston Road (Telecom House)	DA4	B1 - Office	New Strategic Site	N	4000	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	Office (single)
137-147 Preston Road	DA4	B1 - Office	New Strategic Site	N	4000	Brownfield	-	-	-	Urban	Office (single)
149 -151 Preston Road	DA4	B1 - Office	New Strategic Site	N	2667	Brownfield	-	-	-	Urban	Office (single)
153 Preston Road	DA4	B1 - Office	New Strategic Site	N	2667	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	Office (single)
157-159 Preston Road	DA4	B1 - Office	New Strategic Site	N	2667	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	Office (single)
161-163 Preston Road	DA4	B1 - Office	New Strategic Site	N	2667	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	Office (single)
Black Rock site	DA2	Leisure	New Strategic Site	N	7000	Brownfield	Vacant	-	-	Suburban	Leisure
Blackman Street Site (land adjacent to Britannia House)	DA4	-	New Strategic Site	N	2000	Brownfield	Occupied till redeveloped	Retail	-	Assumed to remain as existing	
Brighton Marina Inner Harbour	DA2	Retail	New Strategic Site	N	5000	Brownfield	Occupied till redeveloped	Retail	-	Suburban	From TA
Brighton Marina Inner Harbour	DA2	Leisure	New Strategic Site	N	3500	Brownfield	Occupied till redeveloped	Leisure	-	Suburban	From TA
Cheapside (south between Blackman Street and Whitecross Street)	DA4	-	New Strategic Site	N	2000	Brownfield	Occupied till redeveloped	Retail	-	Assumed to remain as existing	
Circus Street Site	DA5	B1 - Office	New Strategic Site	N	3200	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	Office (single)
Circus Street Site (University Education Floorspace)	DA5	Schools	New Strategic Site	N	3800	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	School
Conway Street Industrial Area	DA6	B1 - Office	New Strategic Site	N	12000	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	Office (single)
Edward Street Quarter	DA5	B1 - Office	New Strategic Site	N	20000	Brownfield	Occupied till redeveloped	-	-	Urban	Office (Business Park)
Falmer Released Land, Former Falmer High School	DA3	-	New Strategic Site	N	-	Brownfield	Vacant	-	-	Not included at this time	
Freshfield Road Business Park and Gala Bingo Hall	DA5	B1 - Office	New Strategic Site	N	18500	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	Office (Business Park)
Freshfield Road Business Park and Gala Bingo Hall	DA5	B8 - Warehousing and Distribution	New Strategic Site	N	18500	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	Warehousing
Gas Works site	DA2	B1 - Office	New Strategic Site	N	2000	Brownfield	-	-	-	Suburban	Office (single)
King Alfred/RNR site	Rest of City	Leisure	New Strategic Site	N	-	Brownfield	Occupied till redeveloped	Leisure	5124	Assumed to remain as existing	
New Brighton Centre and expansion of Churchill Square.	DA1	Retail	New Strategic Site	N	20000	Brownfield	Occupied till redeveloped	Retail	-	Urban	Retail (Business Park)
New Brighton Centre and expansion of Churchill	DA1	Conference Centre	New Strategic Site	N	25000	Brownfield	Occupied till redeveloped	-	-	Urban	Conference Centre

BHCC Reference/ Address	Spatial Area	Employment Type	Planning Status	Information available from Transport Assessment/ Statement	Development Quantum (m ²)	Site	2010 Status of Brownfield Land	2010 Land Use of Brownfield Land	Brownfield (2010 floorspace)	Urban/ Suburban	Trip Rate Type
Square.											
New England House, New England Road	DA4	-	New Strategic Site	N	-	Brownfield	Occupied till redeveloped	Employment - B1	-	Assumed to remain as existing	
Preston Barracks and Brighton University (Mithras House and Watts/Cockcroft Site)	DA3	B1 - Office	New Strategic Site	N	10600	Brownfield	Vacant	-	-	Urban	Office (single)
Richardson's Scrapyard and Brewers Paint Merchant Site, New England Street	DA4	-	New Strategic Site	N	3000	Brownfield	Occupied till redeveloped	Employment - B8	-	Assumed to remain as existing	
Toad's Hole Valley	DA7	B1 - Office	New Strategic Site	N	25000	Greenfield	-	-	-	Suburban	Office (Business Park)
Toad's Hole Valley	DA7	Schools	New Strategic Site	N	50000	Greenfield	-	-	-	Suburban	School
Trade Warehousing (Longley Industrial Estate) 4-6 New England Street	DA4	-	New Strategic Site	N	3000	Brownfield	-	-	-	Assumed to remain as existing	
Vantage Point, Elder Place (including Circus Parade)	DA4	-	New Strategic Site	N	1333	Brownfield	Occupied till redeveloped	Employment - B1	-	Assumed to remain as existing	
Woollards Field South	DA3	B1 – Office or alternative employment generating uses	New Strategic Site	N	5000	Brownfield	Vacant	-	-	Urban	2500 Office (single)+ 2500 mixed B1, B2 & B8 (equal proportions)
Shoreham Harbour	DA8	B1/B2/B8	New Strategic Site	N	3000	-	-	-	-	Suburban	1/3 Office (B1) (single), 1/3 Industrial Unit (B2) and 1/3 Warehousing (B8)
177 Preston Road Brighton	DA4	B1 - Office	Consented Not yet built out	N	1378	Brownfield	-	-	-	Urban	Office (single)
Amex House Edward Street Brighton	DA5	B1 - Office	Consented Not yet built out	N	1620	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	Office (single)
Block J Brighton Station Site	DA4	Retail	Consented Not yet built out	N	424	Brownfield	Vacant	-	-	Urban	Retail (local)
Block J Brighton Station Site	DA4	Leisure	Consented Not yet built out	N	734	Brownfield	Vacant	-	-	Urban	Leisure
Block K Brighton Station Site	DA4	B1 - Office	Consented Not yet built out	Y	3554	Brownfield	Vacant	-	-	Urban	From TA
St Marys Hall Eastern Road Brighton	DA5	B1 - Office	Consented Not yet built out	N	5168	Brownfield	Occupied till redeveloped	-	-	Suburban	Office (single)
Asda Stores Ltd 1 Crowhurst Road Brighton	Rest of city	Retail	Consented Not yet built out	N	1676	Brownfield	Occupied till redeveloped	Retail	12,378 A1	Suburban	Scaled from model (+4.5%)
GB Liners site, Blackman Street	DA4	B1 - Office	Consented Not yet built out	N	3327	Brownfield	Occupied till redeveloped	Employment - B8	-	Urban	Office (single)
Sackville Road Trading Estate Sackville Road Hove	DA6	B1 - Office	Consented Not yet built out	Y	5287	Brownfield	Occupied till redeveloped	Retail	5,000 A1 , 2,600 B1c, 490 B8, 2,000 Trade Counter	Urban	From TA

BHCC Reference/ Address	Spatial Area	Employment Type	Planning Status	Information available from Transport Assessment/ Statement	Development Quantum (m ²)	Site	2010 Status of Brownfield Land	2010 Land Use of Brownfield Land	Brownfield (2010 floorspace)	Urban/ Suburban	Trip Rate Type
Sackville Road Trading Estate Sackville Road Hove	DA6	Retail	Consented Not yet built out	N	6907	Brownfield	Occupied till redeveloped	Retail	5,000 A1 , 2,600 B1c, 490 B8, 2,000 Trade Counter	Urban	Retail (Business Park)
Sussex Education Centre Nevill Avenue Hove	Rest of city	B1 - Office	Consented Not yet built out	Y	1566	Brownfield	Occupied till redeveloped	-	-	Urban	From TA
Woodingdean Business Park Bexhill Road Woodingdean Brighton	Rest of city	B1 - Office	Consented & Under Construction	N	1131	Brownfield	Vacant	-	-	Suburban	Office (single)
Woodingdean Business Park Sea View Way Bexhill Road Woodingdean	Rest of city	B1 - Office	Consented & Under Construction	N	1537	Brownfield	Vacant	-	-	Suburban	Office (single)
Woodingdean Business Park Sea View Way Bexhill Road Woodingdean	Rest of city	B8 - Warehousing and Distribution	Consented & Under Construction	N	1942	Brownfield	Vacant	-	-	Suburban	Warehousing
Land adjacent to Amex House fronting John Street Carlton Hill Mighell Street and land adjacent to 31 White Street Brighton	DA5	B1 - Office	Consented & Under Construction	Y	34750	Brownfield	Vacant	-	-	Urban	From TA
Sussex County Cricket Club Eaton Road Hove	Rest of city	Leisure	Consented & Under Construction	Y	1353	Brownfield	Occupied till redeveloped	Leisure	4054 D1	Urban	From TA
Travis Perkins Baltic Wharf Wellington Road Portslade	DA8	B1 - Office	Consented & Under Construction	N	326	Brownfield	Occupied till redeveloped	Employment - B2	5600 SG	Suburban	Office (single)
Travis Perkins Baltic Wharf Wellington Road Portslade	DA8	B8 - Warehousing and Distribution	Consented & Under Construction	Y	1348	Brownfield	Occupied till redeveloped	Employment - B2	5600 SG	Suburban	From TA
Royal Sussex County Hospital, Eastern Road, Brighton	DA5	-	Consented	Y	73,000	-	-	-	20,000	-	From TA

- information not available

 Spatial Area Estimated

Table 2 Residential Sites Assessed

Unique Reference	Address	Spatial Area	Ward Name	Dwelling Type	Number of Dwellings	% Affordable	Planning Status (2010 onwards)	Information available from Transport Assessment/ Statement	Site	2010 Status of Brownfield Land	2010 Land Use of Brownfield Land	Brownfield (2010 floorspace)	Urban/ Suburban	Trip Rate Type
1	Gas Works Site Boundary Road Brighton	DA2	Rottingdean Coastal	Flats	85	0.4	New Strategic Site in City Plan	N	Brownfield	Vacant	-	-	Suburban	60% x flats (private), 40% x flats (affordable)
3	Land at Brighton Marina (Inner Harbour) Brighton	DA2	Rottingdean Coastal	Flats	1000	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Retail	-	Suburban	60% x flats (private), 40% x flats (affordable)
4	Land at Brighton Marina comprising Outer Harbour West Quay and adjoining land Brighton	DA2	Rottingdean Coastal	Flats	853	0.4	Consented Not yet built out	Y	Brownfield	Occupied - Due to be vacated	Retail	-	Suburban	From TA
5	Pavilion Retail Park Lewes Road Brighton	DA3	Hollingbury and Stanmer	Flats	180	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	Four retail units and car parking	Urban	60% x flats (private), 40% x flats (affordable)
6	Former Moulsecoomb Infant School Hodshrove Lane Brighton	DA3	Moulsecoomb and Bevendean	Flats	110	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	60% x flats (private), 40% x flats (affordable)
14	Preston Barracks Lewes Road Brighton	DA3	Hollingbury and Stanmer	Flats and Houses	300	0.4	New Strategic Site in City Plan	N	Brownfield	Vacant	-	-	Urban	60% x mixed (private), 40% x mixed (affordable)
23	Co-Op Site 94-103 London Road Brighton	DA4	St. Peter's and North Laine	Flats	60	0.4	Other	N	Brownfield	Vacant	-	31,100 A1	Urban	60% x flats (private), 40% x flats (affordable)
24	Open Market, Marshall's Row London Road Brighton	DA4	St. Peter's and North Laine	Flats	87	1	Consented & Under Construction	N	Brownfield	Occupied - Due to be vacated	Retail	780 A1	Urban	100% x flats (affordable). N.B. Car Free
27	BT Site bottom side Freshfield Road Brighton	DA5	Queen's Park	Flats	45	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	60% x flats (private), 40% x flats (affordable)
29	Gala Bingo Car Park Freshfield Way Brighton	DA5	Queen's Park	Flats	30	0.4	Other	N	Brownfield	Occupied till redeveloped	-	D2 and Car park	Urban	60% x flats (private), 40% x flats (affordable)
30	Municipal Market Site Circus Street Brighton	DA5	Queen's Park	Flats	160	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Employment - B1	5003 D1/D2 - Temporary (Otherwise B8 use)	Urban	60% x flats (private), 40% x flats (affordable)
32	The Edward Street Quarter Edward Street Brighton	DA5	Queen's Park	Flats	65	0.4	New Strategic Site in City Plan	N	Brownfield	Vacant	-	30,000 office 43,000 DWP/Job plus centre	Urban	60% x flats (private), 40% x flats (affordable)
33	Goldstone Retail Park, Old Shoreham Road, Newtown Road & Goldstone Lane Hove	DA6	Stanford	Flats	163	0.4	Other	N	Brownfield			Four retail sheds and Burger King	Urban	60% x flats (private), 40% x flats (affordable)
35	PO Sorting Office Denmark Villas Hove	DA6	Goldsmid	Flats	44	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	60% x flats (private), 40% x

Unique Reference	Address	Spatial Area	Ward Name	Dwelling Type	Number of Dwellings	% Affordable	Planning Status (2010 onwards)	Information available from Transport Assessment/ Statement	Site	2010 Status of Brownfield Land	2010 Land Use of Brownfield Land	Brownfield (2010 floorspace)	Urban/ Suburban	Trip Rate Type
														flats (affordable)
36	Tates Garage 7-17 Old Shoreham Road Portslade	Rest of City	South Portslade	Flats	77	-	Other	N	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	100% x flats (private) (assumed to be private as details of % split not provided so worst case taken)
41	(Smoky Estate) Corner of Church Road, Lincoln Road & Gladstone Road Portslade	Rest of City	South Portslade	Flats	32	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B8	-	Suburban	60% x flats (private), 40% x flats (affordable)
45	King Alfred Kingsway Hove	SA1	Central Hove	Flats	400	0.4	Local Plan Allocation carried over	N	Brownfield	Occupied till redeveloped	Leisure	5124	Urban	60% x flats (private), 40% x flats (affordable)
47	Brighton General Hospital Elm Grove Brighton	Rest of City	Hanover and Elm Grove	Flats	105	0.4	Local Plan Allocation carried over	N	Brownfield	Occupied till redeveloped	-	-	Urban	60% x flats (private), 40% x flats (affordable)
50	The Post Office 44-51 Ship Street Brighton	Rest of City	Regency	Flats	32	0.4	Local Plan Allocation carried over	N	Brownfield	Occupied till redeveloped	Retail	650 A1	Urban	60% x flats (private), 40% x flats (affordable)
67	Reservoir site, Pope's Folly Freehold Terrace Brighton	DA3	Hollingbury and Stanmer	Flats	40	0.4	Other	N	Brownfield	Occupied till redeveloped	-	-	Urban	60% x flats (private), 40% x flats (affordable)
70	Corner John Street/ Sussex Street Brighton	Rest of City	Queen's Park	Flats	42	0.4	Other	N	Brownfield	-	-	-	Urban	60% x flats (private), 40% x flats (affordable)
71	(Not Zylo Works) Factory site Marine View Brighton	Rest of City	Queen's Park	Flats	32	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	60% x flats (private), 40% x flats (affordable)
94	Telephone Engineering Centre 274 Old Shoreham Road Hove	Rest of City	Stanford	Flats	71	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	60% x flats (private), 40% x flats (affordable)
132	to north of Theobald House Blackman Street/Cheapside Whitecross Street Brighton	DA4	St. Peter's and North Laine	Flats	32	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Retail	VACANT	Urban	60% x flats (private), 40% x flats (affordable)
137	Corner of Spring Gardens Church Street Brighton	Rest of City	St. Peter's and North Laine	Flats	34	0.4	Other	N	Brownfield	Occupied till redeveloped	-	-	Suburban	60% x flats (private), 40% x flats (affordable)
139	35-39 The Droveaway Hove	Rest of City	Stanford	Flats	33	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	60% x flats (private), 40% x flats (affordable)

Unique Reference	Address	Spatial Area	Ward Name	Dwelling Type	Number of Dwellings	% Affordable	Planning Status (2010 onwards)	Information available from Transport Assessment/ Statement	Site	2010 Status of Brownfield Land	2010 Land Use of Brownfield Land	Brownfield (2010 floorspace)	Urban/ Suburban	Trip Rate Type
141	Reservoir between 45/47 The Martlet Hove	Rest of City	Hove Park	Flats	30	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	60% x flats (private), 40% x flats (affordable)
151	Cover's Yard Melbourne Street Brighton	DA3	Hanover and Elm Grove	Flats	39	1	Consented & Under Construction	Y	Brownfield	Occupied till redeveloped	-	-	Urban	From TA
164	Area to rear of Bluebird Court,12-14 Hove Street Hove	Rest of City	Westbourne	Flats	50	0.4	Other	N	Brownfield	Occupied till redeveloped	Retail	-	Urban	60% x flats (private), 40% x flats (affordable)
180	Sackville Road Trading Estate Sackville Road Hove	DA6	Goldsmid	Flats	92	0.4	Consented Not yet built out	Y	Brownfield	Occupied till redeveloped	Retail	5,000 A1 , 2,600 B1c, 490 B8, 2,000 Trade Counter	Urban	From TA
186	Royal Alexandra Hospital 57 Dyke Road Brighton	Rest of City	Regency	Flats	121	0.2	Consented & Under Construction	Y	Brownfield	Vacant	-	6,200 C2	Urban	From TA
187	Former Bellerby's College, Park House Old Shoreham Road Hove	Rest of City	Hove Park	Flats	47	0.4	Other	N	Brownfield	Vacant	-	1785 C2	Urban	60% x flats (private), 40% x flats (affordable)
262	25-28 St James's Street and 24 Dorset Gardens Brighton	Rest of City	Queen's Park	Flats	33	0.4	Consented Not yet built out	N	Brownfield	Occupied till redeveloped	Retail	-	Urban	60% x flats (private), 40% x flats (affordable). N.B. Car Free
517	Ocean Hotel Longridge Avenue Brighton	Rest of City	Rottingdean Coastal	Flats	48	0.4	Consented Built Out	N	Brownfield	Vacant	-	C1	Suburban	60% x flats (private), 40% x flats (affordable)
653	Saunders Glassworks Sussex Place Brighton	Rest of City	Queen's Park	Flats and Houses	49	0.4	Consented Not yet built out	N	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	From TA
666	Block J Brighton Station site Brighton	DA4	St. Peter's and North Laine	Flats	147	0.4	Consented Not yet built out	N	Brownfield	Vacant	-	-	Urban	60% x flats (private), 40% x flats (affordable)
671	331 Kingsway Hove	Rest of City	Wish	Flats	40	0.4	Consented & Under Construction	Y	Brownfield	Vacant	-	-	Urban	From TA
679	Gala Bingo Hall, 191 Portland Road Hove	Rest of City	Wish	Flats	35	0.4	Consented & Under Construction	N	Brownfield	Vacant	-	-	Urban	60% x flats (private), 40% x flats (affordable)
732	Toads' Hole Valley King George VI Avenue Hove	DA7	Hangleton & Knoll	Flats and Houses	700	0.4	New Strategic Site in City Plan	N	Greenfield	-	-	-	Suburban	60% x mixed (private), 40% x mixed (affordable)
853	Brighton & Hove Corals Stadium Nevill Road Hove	Rest of City	Hove Park	Flats	75	0.4	Other	N	Brownfield	Occupied till redeveloped	Leisure	-	Urban	60% x flats (private), 40% x

Unique Reference	Address	Spatial Area	Ward Name	Dwelling Type	Number of Dwellings	% Affordable	Planning Status (2010 onwards)	Information available from Transport Assessment/ Statement	Site	2010 Status of Brownfield Land	2010 Land Use of Brownfield Land	Brownfield (2010 floorspace)	Urban/ Suburban	Trip Rate Type
														flats (affordable)
859	Tyre Co, Coombe Road Brighton	DA3	Moulsecoomb and Bevendean	Flats	33	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B8	-	Urban	60% x flats (private), 40% x flats (affordable)
860	EM2 Anston House Preston Road Brighton	DA4	Preston Park	Flats	216	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Employment - B1	4000 approx	Urban	60% x flats (private), 40% x flats (affordable)
861	(EM1) EDF Portland Road Business Park Portland Road Hove	Rest of City	Wish	Flats	151	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	9,100 B1, B8 Trade Counter	Suburban	60% x flats (private), 40% x flats (affordable)
862	Conway Street Industrial Area Conway Street Hove	DA6	Goldsmid	Flats	200	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Employment - B2	18,700 B1 B8	Urban	60% x flats (private), 40% x flats (affordable)
864	(EM2) Telecom House 123 -135 Preston Road Brighton	DA4	Preston Park	Flats	59	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	60% x flats (private), 40% x flats (affordable)
866	(EM2) (Natwest) 153 Preston Road Brighton	DA4	Preston Park	Flats	84	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	60% x flats (private), 40% x flats (affordable)
868	(EM2) Park Gate 161-163 Preston Road Brighton	DA4	Preston Park	Flats	33	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	60% x flats (private), 40% x flats (affordable)
869	87 Preston Road Brighton	DA4	Preston Park	Flats	57	0.4	Other	N	Brownfield	Occupied till redeveloped	Schools	-	Urban	60% x flats (private), 40% x flats (affordable)
870	Knoll Business Centre Old Shoreham Road Bellingham Crescent Hove	Rest of City	Hangleton and Knoll	Flats	50	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	B1/B2	Urban	60% x flats (private), 40% x flats (affordable)
871	Peacock Industrial Estate (incl 141 Davigdor Road) Lyon Close Hove	Rest of City	Goldsmid	Flats	80	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	-	Urban	60% x flats (private), 40% x flats (affordable)
873	Vale House Vale Road Portslade	Rest of City	South Portslade	Flats	35	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B1	-	Suburban	60% x flats (private), 40% x flats (affordable)
878	(EM1) School Road Industrial Area School Road Hove	Rest of City	Wish	Flats	46	0.4	Other	N	Brownfield	Occupied till redeveloped	Employment - B2	6,800 B1/B2/D1	Urban	60% x flats (private), 40% x flats (affordable)
881	EM1 Freshfield Road Business Park Eastern Road Brighton	DA5	Queen's Park	Flats	80	0.4	New Strategic Site in City Plan	N	Brownfield	Occupied till redeveloped	Employment - B2	19,500 B8 and Trade centre	Urban	60% x flats (private), 40% x flats (affordable)
894	Richardson's Scrap Yard and Brewers Paint Merchants New	DA4	St. Peter's and North Laine	Flats	32	0.4	New Strategic Site in City	N	Brownfield	Occupied till redeveloped	Employment - B8	-	Urban	60% x flats (private), 40% x

Unique Reference	Address	Spatial Area	Ward Name	Dwelling Type	Number of Dwellings	% Affordable	Planning Status (2010 onwards)	Information available from Transport Assessment/ Statement	Site	2010 Status of Brownfield Land	2010 Land Use of Brownfield Land	Brownfield (2010 floorspace)	Urban/ Suburban	Trip Rate Type
	England Street Brighton						Plan							flats (affordable)
916	Dresden House 34-38 Medina Villas Hove	Rest of City	Central Hove	Flats	32	0.4	Consented Built Out	N	Brownfield	-	-	4620 C2	Urban	60% x flats (private), 40% x flats (affordable)
941	Former Nurses Accommodation Brighton General Hospital Pankhurst Avenue Brighton	Rest of City	Hanover and Elm Grove	Flats	95	0.8	Consented & Under Construction	Y	Brownfield	Vacant	-	4,140 C2	Urban	From TA
942	(RSL site) St Benedicts Convent 1 Manor Road Brighton	Rest of City	East Brighton	Flats	55	0.4	Other	N	Brownfield	Occupied till redeveloped	-	1879 SG	Suburban	60% x flats (private), 40% x flats (affordable)
2008	EDF Whitegates Substation Site London Road Brighton	Rest of City	Withdean	Flats	36	0.4	Other	N	Brownfield	Occupied till redeveloped	-	-	Urban	60% x flats (private), 40% x flats (affordable)
2009	PO Delivery Office 62 North Road Brighton	Rest of City	St. Peter's and North Laine	Flats	50	0.4	Other	N	Brownfield	-	-	B8	Suburban	60% x flats (private), 40% x flats (affordable)
893/899	Vantage Point and Circus Parade New England Street Brighton	DA4	St. Peter's and North Laine	Flats	90	0.4	Local Plan Allocation carried over	N	Brownfield	Occupied till redeveloped	Employment - B1	-	Urban	60% x flats (private), 40% x flats (affordable)
1000	Shoreham Harbour	DA8	-	-	400	-	New Strategic Site in City Plan	N	-	-	-	-	Suburban	100% x flats (private) (assumed to be private as details of % split not provided so worst case taken)

- information not available

Trip Generation

- 1.9 Sites noted as 'New Strategic Site in City Plan', 'Local Plan Allocation Carried Over' and 'Other' are assumed to have no current consented applications under construction or waiting to be built out. Therefore a generic trip rate has been derived to estimate the likely trip generation associated with these developments.
- 1.10 Three approaches have been considered. The first using trip rates from the synthetic matrix; second using household survey data collected by Halcrow; and third using the industry approved TRICS database.
- 1.11 It was considered that trip rates may have been derived as part of the development of the synthetic matrix. However, this was not the case as Temprow trip totals based on percentage of population and jobs were used. The reason that trip rates were not used is due to the low confidence in the data collected from the 2010 household survey. As no reliable trip rates can be derived, this approach has not been taken forward.
- 1.12 As for the 2003 household survey, this recorded trips by mode from residential properties and categorised them by trip purpose. In comparison, TRICS provides a more global assessment for each land use type and does not disaggregate by purpose. The summarised data is shown in **Appendix A** for information. These differences make it difficult to draw direct comparison between the two data sets; for example, the household survey data aggregates all employment trips and does not provide information on how many are to or from office sites, how many are to industrial places of work, and so on. This makes it difficult to develop appropriate trip rates from this data for the different types of development shown in **Tables 1** and **2**.
- 1.13 Therefore, as it is an industry recognised approach and produces trip rates which are more specific to the types of land uses which are required for the modelling exercise, it is proposed to use information extracted from TRICS® to derive generic trip generation rates by use class.
- 1.14 It is noted that the household survey data could be used to derive a trip rate for the residential properties shown in **Table 2** however, the summary data available in the Local Model Validation Report (LMVR) aggregates by different units (i.e. trips per 100 workers versus trips per 100 education places) and therefore it is not possible to derive a rate per residential unit from this summarised data. The summarised data is shown in **Appendix A** for information. The alternative is to calculate it from the raw information however this data is not currently available for use and therefore it has been decided to use the industry approved TRICS® methodology in the same manner as used for employment sites.
- 1.15 It is noted that a number of sites have no land use allocated or details on the size of the development. Without this information it is not possible to apply a trip rate calculation to those developments and therefore these sites have been excluded from the trip generation exercise.

TRICS database

- 1.16 TRICS® is an industry recognised database of transport surveys for a wide range of development types across the UK and Ireland. The level of detail collected as part of each survey can vary slightly however as each record contains information on the site's local environment and surroundings, the composition and functions of the site, its on-site and off-site parking facilities and hourly directional transport count results across a range of modes.
- 1.17 A trip generation rate for a development is derived by filtering the database to return only results that match the criteria required. The latest available version, 2012 (b) v 6.10.1, was used to derive a weekday AM, inter-peak and PM trip rates for this assessment. The assessment was completed in line with best practice guidance and based on the following selection criteria:
- Use of multi-modal trip rates

- No surveys older than 2001
- Where possible surveys have been selected from the South East of England. There are a limited number of surveys available in this area, and, unless unavoidable, it is not recommended to base a trip rate assumption on a single site unless it is known to be a good representation of the development site. Therefore, where required, the search area has been widened although Greater London has always been excluded due to differences in travel behaviour.
- Trip rates have been generated for Gross Floor Area (m²)
- Urban surveys were defined as sites within 'Town Centre' or 'Edge of Town Centre' locations and suburban surveys as sites categorised as 'Suburban Area' or 'Edge of Town'.

1.18 As the strategic sites do not have a specific proposal, only a land allocation, the following assumptions have been made regarding land use types. The definition provided by TRICS® is given beneath each bullet point:

- Retail (local) = Shopping centre: local shops (use class A1)
A collection of small local shops within close proximity, possibly with shared parking facilities.
- Retail (Retail Park) = Retail Park (excluding food) (use class A1)
Mixed site comprising of range of sub-categories
- Retail Food Store = Food Superstores (use class A1)
A single food superstore with or without a petrol filling station as part of the site.
- Office (single) = Office (Use class B1)
Single office building. May include a number of different organisations within the same building.
- Office (Business Park) = Business Park (use class B1)
Collection of office buildings hosting separate organisations.
- Industrial Unit = Industrial Unit (single) (use class B2)
Single industrial building, used by one organisation. May be light or general industry
- Warehousing = Warehousing (commercial) (use class B8)
All commercial warehousing. Both internal and external storage areas should be included as appropriate in the GFA.
- Schools = College/University (Use class D1)
Includes colleges, universities, or sixth form centres.
- Leisure = Leisure Centre (use class D2)
Local leisure centre with gym, classes, etc. Usually owned by the local authority.

Leisure is a difficult category to generalise as there are a number of different activities that would be categorised under 'leisure'. A leisure centre trip rate has been selected as it is felt that it provides a robust assessment for all leisure activities as it generally has a high proportion of car-based travel and a significant number of visitors each day and during peak periods.
- Conference Centre = Exhibition Centre (use class D1)
Dedicated centre for hosting exhibitions and conferences.
- Flats (Private) = Flats Privately Owned (use class C3)
Includes properties that are privately owned and then privately rented.
- Flats (Affordable) = Flats for Rent (use class C3)
'Non-privately owned' may be council rented or housing association rented/part-owned.

- Flats and Houses (Private) = Mixed Private Housing (Use class C3)
Of the total number of units, less than 75% must be houses and less than 75% must be flats
- Flats and Houses (Affordable) = Mixed Private Housing (Use class C3)
Of the total number of units, less than 75% must be houses and less than 75% must be flats.
'Non-privately owned' may be council rented or housing association rented/part-owned.

1.19 **Tables 3, 4 and 5** contain the trip rates derived from TRICS® for the AM (0800-0900) and PM (1700-1800) peak hours respectively, including car and public transport (PT) trip rates. A summary of the surveyed sites used is provided in **Appendix B** for information.

Table 3: AM vehicle and public transport trip rates by land use based on TRICS® Assessment

AM Peak Hour		Calculator	Cars		PT		HGV	
			Urban	Suburban	Urban	Suburban	Urban	Suburban
Retail (Local)	Origin	per 100 sqm	3.471	2.795	0.096	0.055	0.032	0.027
	Dest.		4.14	3.013	0.064	0.11	0.032	0.055
Retail (Food Store)	Origin	per 100 sqm	1.861	2.53	0.059	0.015	0.01	0.042
	Dest.		2.34	3.629	0.196	0.021	0.007	0.039
Retail (Business Park)	Origin	per 100 sqm	-	0.258	-	0	-	0.007
	Dest.		-	0.469	-	0	-	0.007
Office (single)	Origin	per 100 sqm	0.095	0.09	0.004	0	0.002	0.004
	Dest.		1.549	1.209	0.337	0.196	0.002	0.004
Office (business park)	Origin	per 100 sqm	0.229	0.332	0	0.011	0	0.04
	Dest.		1.824	1.397	0.305	0.055	0	0.039
Industrial Unit (single)	Origin	per 100 sqm	0.019	0.133	0	0	0.015	0.016
	Dest.		0.152	0.966	0.003	0	0.013	0.022
Warehousing	Origin	per 100 sqm	-	0.024	-	0	-	0.033
	Dest.		-	0.136	-	0.005	-	0.022
Education (uni)	Origin	per 100 sqm	0.413	1.098	0.031	0	0.004	0.009
	Dest.		1.417	2.255	1.806	2.116	0.004	0.009
Leisure	Origin	per 100 sqm	0.422	0.409	0.013	0	0	0
	Dest.		0.435	0.639	0.013	0.004	0	0
Flats (Private)	Origin	Per unit	0.3	0.257	0.044	0.132	0	0
	Dest.		0.066	0.066	0	0.02	0	0
Flats (Affordable)	Origin	Per unit	0.063	0.116	0.063	0.067	0	0.006
	Dest.		0.125	0.073	0.016	0.012	0	0.003
Flats and Houses (Private)	Origin	Per unit	0.161	0.171	0	0.057	0	0
	Dest.		0.081	0.076	0	0	0	0
Flats and Houses (Affordable)	Origin	Per unit	0.425	0.322	0	0	0	0
	Dest.		0.175	0.136	0	0	0	0

- information not available

Table 4: Inter-peak vehicle and public transport trip rates by land use based on TRICS® Assessment

AM Peak Hour		Calculator	Cars		PT		HGV	
			Urban	Suburban	Urban	Suburban	Urban	Suburban
Retail (Local)	Origin	per 100 sqm	4.453	3.923	0.138	0.133	0.117	0.073
	Dest.		4.406	3.913	0.149	0.16	0.122	0.078
Retail (Food Store)	Origin	per 100 sqm	4.527	6.177	0.284	0.035	0.008	0.024
	Dest.		4.614	6.204	0.376	0.05	0.007	0.024
Retail (Business Park)	Origin	per 100 sqm	-	1.387	-	0	-	0.035
	Dest.		-	1.398	-	0.001	-	0.035
Office (single)	Origin	per 100 sqm	0.24	0.119	0.027	0.012	0.003	0.004
	Dest.		0.212	0.11	0.031	0.015	0.003	0.004
Office (business park)	Origin	per 100 sqm	0.519	0.455	0.08	0.014	0.013	0.031
	Dest.		0.502	0.3944	0.051	0.003	0.015	0.023
Industrial Unit (single)	Origin	per 100 sqm	0.055	0.209	0.001	0	0.009	0.024
	Dest.		0.047	0.189	0.001	0	0.01	0.022
Warehousing	Origin	per 100 sqm	-	0.081	-	0.001	-	0.028
	Dest.		-	0.067	-	0.001	-	0.039
Education (uni)	Origin	per 100 sqm	0.372	0.562	0.282	0.339	0.005	0.003
	Dest.		0.302	0.545	0.123	0.261	0.005	0.003
Leisure	Origin	per 100 sqm	0.363	0.608	0.147	0.397	0	0.003
	Dest.		0.385	0.623	0.141	0.298	0	0.003
Flats (Private)	Origin	Per unit	0.076	0.077	0.003	0.009	0.001	0.002
	Dest.		0.075	0.093	0.004	0.003	0.001	0.002
Flats (Affordable)	Origin	Per unit	0.068	0.099	0.003	0.016	0	0.002
	Dest.		0.076	0.096	0.005	0.027	0	0.002
Flats and Houses (Private)	Origin	Per unit	0.1	0.132	0	0.002	0.005	0.002
	Dest.		0.097	0.112	0	0	0.005	0.002
Flats and Houses (Affordable)	Origin	Per unit	0.138	0.263	0	0	0.004	0.003
	Dest.		0.179	0.271	0	0	0.004	0.003

- information not available

Table 5: PM vehicle and public transport trip rates by land use based on TRICS® Assessment

PM Peak Hour		Calculator	Cars		PT		HGV	
			Urban	Suburban	Urban	Suburban	Urban	Suburban
Retail (Local)	Origin	per 100 sqm	3.694	3.315	0.064	0.192	0.032	0.055
	Dest.		4.204	3.644	0.064	0.11	0	0
Retail (Food Store)	Origin	per 100 sqm	5.302	6.766	0.259	0.045	0.003	0.03
	Dest.		4.774	6.353	0.238	0.027	0.003	0.018
Retail (Business Park)	Origin	per 100 sqm	-	0.679	-	0.014	-	0.014
	Dest.		-	0.551	-	0	-	0.02
Office (single)	Origin	per 100 sqm	1.256	1.028	0.232	0.168	0.005	0.003
	Dest.		0.057	0.039	0	0.001	0.005	0
Office (business park)	Origin	per 100 sqm	1.375	1.273	0.248	0.045	0	0.004
	Dest.		0.124	0.242	0	0	0	0.011
Industrial Unit (single)	Origin	per 100 sqm	0.157	0.781	0.012	0	0.01	0.006
	Dest.		0.012	0.082	0.008	0	0.006	0.003
Warehousing	Origin	per 100 sqm	-	0.14	-	0.001	-	0.018
	Dest.		-	0.036	-	0	-	0.024
Education (uni)	Origin	per 100 sqm	0.702	0.721	0.402	0.14	0.001	0
	Dest.		0.345	0.172	0.03	0	0.001	0
Leisure	Origin	per 100 sqm	1.213	1.285	0.105	0.033	0	0
	Dest.		1.081	1.931	0.105	0.029	0	0.004
Flats (Private)	Origin	Per unit	0.097	0.079	0	0	0	0
	Dest.		0.225	0.211	0	0.046	0	0
Flats (Affordable)	Origin	Per unit	0.078	0.104	0	0.003	0	0.003
	Dest.		0.078	0.119	0	0.021	0	0.003
Flats and Houses (Private)	Origin	Per unit	0.145	0.152	0	0	0	0
	Dest.		0.177	0.286	0.016	0.057	0	0
Flats and Houses (Affordable)	Origin	Per unit	0.1	0.237	0	0	0.025	0
	Dest.		0.275	0.441	0	0	0.025	0

- information not available

- 1.20 It is noted that the conference centre has not been included in **Tables 3, 4** and **5**. This is because there are no multi-modal surveys available for this land use type. Instead the vehicular trip rate has been extracted. It has been assumed that all vehicular movements into or out of the sites surveyed would be made by car and to provide a robust assessment it has been assumed that there is one person in each car. The vehicular trip rate found in TRICS® is shown in **Table 6**. To derive the proportion using public transport the census data for Brighton and Hove has been extracted from the 2001 Census, shown in **Table 7**, and used to factor the assumed car trips. The conference centre is located in the ward 'Regency' and therefore the values relating to this area have been used to tailor the information as far as possible. The derived trip generation rate for the conference centre is shown in **Table 8**.

Table 6: TRICS Vehicular Trip Rate for Conference Centre

Conference Centre		Units	Cars		HGVs	
			Urban	Suburban	Urban	Suburban
AM Peak	Origin	per 100 sqm	0.147	0.192	0.017	0.03
	Dest.		1.477	0.86	0.023	0.059
Inter-Peak	Origin	per 100 sqm	0.418	1.041	0.007	0.04
	Dest.		0.485	1.221	0.016	0.03
PM Peak	Origin	per 100 sqm	1.043	0.89	0.02	0
	Dest.		0.3	0.252	0.047	0

Table 7 Mode Split based on National Census Data

Mode of Travel	Ward									Brighton and Hove
	Regency	South Portslade	Brunswick and Adelaide	St. Peter's and North Laine	Goldsmid	Queen's Park	Hanover and Elm Grove	Wish	Patcham	
Work from Home	10%	8%	9%	9%	9%	9%	8%	11%	9%	9%
Train	16%	6%	12%	17%	14%	9%	9%	8%	4%	9%
Bus, Minibus or Coach	9%	11%	11%	10%	11%	12%	11%	13%	13%	12%
Taxi	0%	1%	0%	0%	1%	0%	0%	1%	1%	1%
Car Driver	23%	52%	33%	26%	37%	28%	35%	48%	58%	43%
Car Passenger	3%	7%	3%	3%	4%	3%	4%	4%	6%	5%
Motorcycle	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%
Bicycle	3%	2%	4%	3%	3%	4%	4%	3%	1%	3%
On-Foot	35%	12%	26%	30%	20%	33%	27%	11%	7%	17%
Other	1%	0%	1%	1%	0%	1%	0%	1%	0%	1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Public Transport	25%	17%	24%	26%	25%	21%	20%	20%	16%	21%

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Table 8: Derived Trip Rate for Conference Centre

Conference Centre		Units	Cars		PT		HGVs	
			Urban	Suburban	Urban	Suburban	Urban	Suburban
AM Peak	Origin	per 100 sqm	0.147	0.192	0.159	0.209	0.017	0.03
	Dest.		1.477	0.86	1.605	0.935	0.023	0.059
PM Peak	Origin	per 100 sqm	0.418	1.041	0.454	1.132	0.007	0.04
	Dest.		0.485	1.221	0.527	1.327	0.016	0.03
PM Peak	Origin	per 100 sqm	1.043	0.89	1.134	0.967	0.02	0
	Dest.		0.3	0.252	0.326	0.274	0.047	0

- 1.21 In addition, the urban trip rates for warehousing and distribution and retail (business park) are not directly available from the surveys contained in TRICS®.
- 1.22 The warehousing and distribution trip rate for urban sites has been derived using the vehicular trip rate collected from manual count surveys, as shown in **Table 9**. These should be factored to show the number of public transport trips using the mode split shown in **Table 7**. The disaggregation has not been completed at this stage as there are multiple examples of this land use in **Table 2** which are in a range on wards. Therefore disaggregation should be completed for each site individually using mode split proportions for the relevant ward.

Table 9: Vehicular Trip Rate for Warehousing and Distribution

Warehousing and Distribution		Units	Cars	HGVs
			Urban	Urban
AM Peak	Origin	per 100 sqm	0.051	0.017
	Dest.		0.085	0.017
Inter-Peak	Origin	per 100 sqm	0.130	0.048
	Dest.		0.094	0.094
PM Peak	Origin	per 100 sqm	0.153	0.068
	Dest.		0.068	0.017

- 1.23 The urban trip rate for retail (business park) is a complex rate to derive as a retail park in such a location is likely to have a high proportion of pass-by trips as well as having a greater number of trips made by public transport than in a suburban area. To provide a robust assessment it has been assumed that there is no change in the number of trips made compared to the suburban area and instead the trip rate has been discounted by 85% to account for pass-by trips. The 85% value is based on the findings of TRICS report 95/2, "Pass By and Diverted Traffic – A Resume" which recommends discounting by 90% however, that is a generic value and therefore to ensure that the proportion of pass-by traffic in Brighton is not overestimated, the reduced value of 85% is used for cars and public transport. The HGV trips have not been discounted as these would not normally form part of pass-by trips. The derived rate is shown in **Table 10** below:

Table 10: Derived Trip Rate for Retail (Business Park)

Retail (Business Park)		Units	Cars		PT		HGVs	
			Urban	Suburban	Urban	Suburban	Urban	Suburban
AM Peak	Origin	per 100	0.039	0.258	0	0	0.007	0.007
	Dest.	sqm	0.070	0.469	0	0	0.007	0.007
Inter-Peak	Origin	per 100	0.208	1.387	0.000	0	0.035	0.035
	Dest.	sqm	0.210	1.398	0.000	0.001	0.035	0.035
PM Peak	Origin	per 100	0.102	0.679	0.002	0.014	0.014	0.014
	Dest.	sqm	0.083	0.551	0	0	0.02	0.02

Comparison of TRICS Values to Consented Applications

- 1.24 The TRICS assessment has been tailored as far as possible however it is appreciated that there will be variation between different locations. The values shown in Tables 3, 4 and 5 are designed to be generic values. This section compares the generic values to those used in consented applications which have been developed specifically for a site. The proposed office element of the Sackville Business Estate has been used as a case study. It is for 5.287m² of B1 office development.
- 1.25 The values quoted in the consented application are shown in **Tables 11** and the TRICS assessment in **Table 12**. The values from the consented application are derived based on a first principles approach using an estimated number of staff.

Table 11 Sackville Road Trading Estate – Total trips from consented application

	AM Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures
Car Driver	100	0	0	100
Public Transport	17	0	0	17

Table 12 Sackville Road Trading Estate – Total trips based on TRICS assessment

	AM Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures
Car Driver	82	5	3	66
Public Transport	18	0	0	12

- 1.26 There is a difference between the values produced by the two methods, however this is not considered to be significant and therefore, when additional information is not available, the TRICS® assessment is the most reasonable method to use.

Net Difference

- 1.27 When considering incorporating the sites listed above into the model, the existing land use at each of these sites has been considered. It is important to discount replaced existing trips where possible to avoid double counting and overestimation of the traffic expected on the network.
- 1.28 Of the 108 employment and residential sites listed in **Tables 1** and **2**, nine have details available from transport statements or assessments and seven have both the existing (2010) floorspace and land use indicated. The remaining 92 existing sites are listed as currently occupied and should therefore have an application associated with the site, however these are commonly historic applications and therefore not always available on the planning register. Also, due to lack of

additional information, it is not possible to explore each of these in detail and therefore it has been assumed that the existing trips at each of the sites are retained in addition to the trips generated by the proposals. It is noted that this provides a very robust assessment as there will be a significant proportion of double counting.

- 1.29 Sites listed as Vacant or not specified have been assumed to have no existing trips associated.

Occupied Sites with Consented Proposed Developments

177 Preston Road Brighton

- 1.30 This site is subject to planning application ref: BH2008/02405 however the documents available on the planning register do not contain information on trip generation either from the existing or proposed land uses. As there is neither a land use or floorspace indicated in Table 1 for this site there is insufficient information to derive a trip rate and therefore it has been assumed that all of the existing trips remain following the redevelopment of the site.

Amex House, Edward Street

- 1.31 The planning register only has a consented application for a temporary office building at this site and the associated consent expired 30th June 2009. It has therefore been assumed that the site does not currently have any trips associated with it.

St Marys Hall, Eastern Road

- 1.32 The planning register refers to planning application ref: BH2011/01833 however this does not return any results. Therefore, due to lack of additional information it has been assumed that the existing trips remain in addition to the trips generated by the planning application.

Asda Stores Ltd, 1 Crowhurst Road

- 1.33 This site is subject to planning application ref: BH2012/01438 which is an extension to the time limit for planning application ref: BH2009/00508. The application is for an expansion not a replacement of any area and therefore no trips are to be discounted.

GB Liners Site, Blackman Street

- 1.34 There are no applications available on the planning register associated with the gross floor area shown for the proposed development. Due to lack of information on the area to be redeveloped it is not possible to derive an existing trip rate. It therefore has been assumed that all of the existing trips remain following the redevelopment of the site.

Sackville Road Trading Estate, Sackville Road, Hove (Office, Retail, Residential)

- 1.35 There are three applications for this site in **Tables 1** and **2**. They all have the same floor space for the 2010 scenario and therefore it has been assumed that all three will be constructed within this area. The application available for the site (ref: BH2009/00761) notes the existing travel as shown in **Table 13**.

Table 13 Sackville Road Trading Estate - Existing Vehicle Trips

	IN	OUT
AM	88	60
PM	100	140

- 1.36 The mode split provided in **Table 7** has been used to disaggregate the data by mode. It is noted that the site is located in the ward 'Goldsmid'.

Table 14 Sackville Road Trading Estate – Car & PT trips

	AM Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures
Car Driver	88	60	100	140
Public Transport	59	41	68	95

- 1.37 The TA derives the AM and PM peak period flows for the site based on surveys carried out at the time. Survey data is not available for the interpeak period so the existing trip rate has been derived based on the generic rates and the land 2010 floor space use listed in Table 1 (5000m² retail, 2600m² light industrial, 490m² warehousing and 2000m² trade counter)

	Inter-Peak	
	Arrivals	Departures
Car Driver	34	35
Public Transport	3	4
HGV	3	3

Sussex Education Centre, Nevill Avenue, Hove (Office)

- 1.38 This site is subject to application ref: BH2008/03220 which involves the expansion of the existing education centre and therefore there are no trips to be discounted.

Sussex County Cricket Club, Eaton Road, Hove

- 1.39 This application (ref: BH2010/02011) involved the demolition and redevelopment of the site however the transport assessment concluded that there would not be a material change in the number of trips generated and therefore there are no trips to be discounted.

Travis Perkins, Baltic Wharf, Wellington Road, Portslade

- 1.40 There are two proposed developments for this site listed in the sites to be assessed. One has an application with associated transport assessment available and the other does not. As both have the same size quoted for the existing floorspace it has been assumed they are both within the same area being redeveloped. The available transport assessment notes the consented developed is an expansion on the existing use. It has been assumed the other application is also an expansion and therefore there are no trips to be discounted

Saunders Glassworks, Sussex Place

- 1.41 This site is subject to planning application ref: BH2010/03791 which was submitted with a transport statement which does not contain information on the existing level of trip generation. As **Table 2** does not contain information on the existing floorspace it has been assumed that all of the existing trips remain following the redevelopment of the site.

Land at Brighton Marina comprising Outer Harbour, West Quay and adjoining land

- 1.42 The transport assessment associated with application ref: BH2006/01124 does not appear to discount existing trips from the number of trips generated, suggesting that all trips generated by the site will be new trips.

25-28 St James's Street and 24 Dorset Gardens

- 1.43 It is understood that this site is subject to application ref: BH2008/03121 which does not have a transport assessment or statement associated with it. As **Table 2** does not contain a floorspace for the existing development, it is not possible to derive an existing trip rate and therefore it has been

assumed that all of the existing trips are retained in addition to the new trips generated by the redevelopment of the site.

Open Market, Marshall's Row, London Road

- 1.44 This site is subject to application ref: BH2010/03744 however the transport assessment available on the planning portal does not quantify the number of existing trips associated with the site. **Table 2** does however have a floorspace and land use specified for the site and therefore the existing trip rate can be derived from the generic trip rates. It is noted that this site is categorised as urban and the retail is likely to be local shops rather than a business/retail park development.

Cover's Yard, Melbourne Street

- 1.45 This site is subject to planning application ref: BH2009/00655 which states the vehicular trip generation for the former use of the site however also notes that it has "*been unoccupied since Covers Builders Merchants ceased trading in August 2005*". It has therefore been assumed that the existing site does not generate any trips.

Strategic, Other or Local Plan Allocation Sites

- 1.46 These sites are listed as 'strategic', 'other' or 'local plan allocation carried over' and it is understood that there are no consented applications for the sites that would contain existing trip generation levels. Where there is information on the existing land use and floorspace, a trip rate can be derived using the generic trip rates. This is the approach that has been used for the sites discussed below, however, where there is insufficient information to calculate the rate it has been assumed that there has been no trips discounted as part of the redevelopment of the site. It is noted that this approach will result in overestimation of the number of trips, however, it will provide a robust assessment of the network.

King Alfred/RNR site (Leisure & Residential)

- 1.47 **Table 1** notes the existing land use as leisure and the floor space as 5,124m². It is noted that the proposed leisure element of this strategic site has been assumed to remain as existing with the residential units creating additional trips.

RSL site, St Benedicts Convent, 1 Manor Road, Brighton

- 1.48 **Table 2** lists this site as 1,879m² of sui generis land use. The sui generis land use definition indicates that it is not a standard land use type and the existing trip rate should be defined based on a survey of the site. It is not possible to define a trip rate for the existing use of this site without additional information and therefore it has been assumed that all of the existing trips remain in addition to the additional trips generated by the redevelopment of the site.

School Road Industrial Area, School Road, Hove

- 1.49 **Table 2** lists the existing use at this site as B2 and also as 6,800m² of B1, B2 and D1. The proportional split between B1, B2 and D1 is not indicated. Comparison of the generic trip rates for each of the land use types indicates that the rate for B2 is slightly greater than D1 but notably less than B1. As the proportion of each land use within the site is not specified the rate for B2 has been applied to the entire site as an approximation and ensures a robust assessment. The resultant trip generation is shown below.

Table 15: Derived Trips for School Road Industrial Area

		Cars	PT	HGV
AM Peak	Origin	1	0	1
	Dest.	10	0	1
Inter-Peak	Origin	4	0	1
	Dest.	3	0	1
PM Peak	Origin	11	1	1
	Dest.	1	1	0

Anston House, Preston Road, Brighton

- 1.50 This site is listed as approximately 4000m² of B1 land use. It has been assumed that the B1 land use in this case is office and the floorspace suggests a single office. Application of the generic trip rate for urban office (single) locations results in the following expected trip rate for the existing site

Table 16: Derived Trips for Anston House, Preston Road

		Cars	PT	HGV
AM Peak	Origin	4	0	0
	Dest.	62	13	0
Inter-Peak	Origin	10	1	0
	Dest.	8	1	0
PM Peak	Origin	50	9	0
	Dest.	2	0	0

Freshfield Road Business Park, Eastern Road, Brighton

- 1.51 **Table 2** notes the existing use of this site as B2 however the floorspace notes 19,500m² B8 and trade centre. It has been assumed that the floorspace land use is correct and both the B8 land use and the trade centre are within the 19,500m². Therefore the rate for urban warehousing has been applied and disaggregated using the mode split in **Table 7** based on its location in Queen's Park.

Table 17: Derived Trips for Freshfield Road Business Park

		Cars	PT	HGV
AM Peak	Origin	10	7	3
	Dest.	17	12	3
Inter-Peak	Origin	25	19	9
	Dest.	18	14	18
PM Peak	Origin	30	22	13
	Dest.	13	10	3

- 1.52 The information provided indicates that the existing land is to be redeveloped into 80 residential units as well as office (B2) and warehousing (B8) land uses. The B2 and B8 land uses are indicated as taking up a total of 18,500m². The proportional split of each type is not known so it has been assumed to be equal with 9,250m² of office and 9,250m² of warehousing.

Conway Street Industrial Area, Conway Street, Hove

- 1.53 This site is noted as B2 land use however the floorspace is described as a mix of B1, B2 and B8 land use within 18,000m². However, the proportional split between the B1, B2 and B8 land use is not indicated so an equal split between the three uses has been assumed. It is understood that the site

is located in the ward of Goldsmid and the surrounding area is urban in nature. The resultant trip generation is as shown in **Table 18** below.

Table 18: Derived Trips for Conway Street Industrial Area

		Cars	PT	HGV
AM Peak	Origin	10	3	2
	Dest.	107	24	2
Inter-Peak	Origin	26	8	4
	Dest.	21	6	6
PM Peak	Origin	94	22	5
	Dest.	8	4	2

The Post Office, 44-51 Ship Street, Brighton

- 1.54 This site is noted as currently occupied by 650m² of retail in **Table 2**. The type of retail is unknown but based on the floorspace it has been assumed that it would be most similar to 'local retail' in type. Based on the generic trip rates the trip generation is provided in **Table 19**.

Table 19: Derived Trips for The Post Office, 44-51 Ship Street

		Cars	PT	HGV
AM Peak	Origin	23	1	0
	Dest.	27	0	0
Inter-Peak	Origin	29	1	1
	Dest.	29	1	1
PM Peak	Origin	24	0	0
	Dest.	27	0	0

Portland Road Business Park, Portland Road, Hove

- 1.55 This site is not subject to a planning application that provides information about the existing level of trip generation. It does state the land use and floorspace as '9100 B1, B8 Trade Counter'. It has been that the B1, B8 and Trade Counter land uses are within the 9,100m² however without further information defining the proportion occupied by each land use it is not possible to derive a trip rate for the site. It is therefore assumed that 75% of the site is B8 and 25% is B1. The derived trip rate is shown in **Table 20**:

Table 20: Derived Trips for Portland Road Business Park

		Cars	PT	HGV
AM Peak	Origin	4	0	2
	Dest.	37	5	2
Inter-Peak	Origin	8	0	2
	Dest.	7	0	3
PM Peak	Origin	33	4	2
	Dest.	3	0	2

Consented Sites

Employment Sites

- 1.56 Of the 18 sites noted as consented, approved information from the application is only available for 9. Each site is discussed individually below and a trip generation rate provided where available. Where an approved trip rate was not available, the generic rate developed above has been applied.

177 Preston Road, Brighton (Office)

- 1.57 It has been that the planning application BH2008/02405 is the relevant application relating to this address. The application is for change of use from medical services (D1) to office (B1) on the fifth and sixth floors and rear of the fourth floor.
- 1.58 It was approved in November 2008 however unfortunately the documents published online do not reference expected trip generation rates. Therefore, the generic office trip rate should be applied. The location has been defined as urban.

Amex House, Edward Street, Brighton (Office)

- 1.59 The planning register only has a consented application for a temporary office building at this site and the consent expired 30th June 2009. The expired consent was for a temporary expansion of an existing office and it was expected that there would be no increase in the number of staff and therefore no additional trips generated associated with the expansion.
- 1.60 It has been assumed there has been a subsequent application for office development at this site however to provide a robust assessment the generic office trip rate has been applied instead of assuming no increase in staff numbers. The location has been defined as urban.

Block J, Brighton Station Site (Retail)

- 1.61 The BHCC planning register does not have an application for Block J Brighton Station Site relating to the size quoted in **Table 1**. It has been assumed that there has been an additional scheme submitted which has achieved consent. As the information about this application is not available, the generic trip rate for retail has been applied. The location has been classified as urban.

Block J, Brighton Station Site (Leisure)

- 1.62 As described in paragraph 1.60, there is no record of a consented application available for this site and therefore the generic leisure trip rate has been applied. The location has been classified as urban.

St Marys Hall, Eastern Road, Brighton (Office)

- 1.63 The planning register references planning application ref: BH2011/01833 however this reference returns no results. There are no other applications for the site available on the planning portal associated with office developments. Therefore the generic office rate has been applied. The location has been defined as suburban.

Block K, Brighton Station Site (Office)

- 1.64 It has been assumed that this site is subject to planning application reference BH2008/01148 for an office building with a gross floor area of 3,554m². The total trip generation rates quoted in the TA are provided in **Table 21**. It is noted that there is not expected to be an increase in car trips compared to the existing development and the trip rate provided below is only for information:

Table 21 Block K, Brighton Station Site – Total people trips

	AM Peak		Inter-Peak		PM peak	
	Per 100m ²	For development	Per 100m ²	For development	Per 100m ²	For development
Arrivals	2.968	105	1.535	55	0.411	15
Departures	0.381	14	1.529	54	2.366	84

- 1.65 A mode split was not supplied as part of the Transport Statement, therefore the values shown in **Table 6** have been used to disaggregate the information. It is noted that the site is located in the ward 'St. Peter's and North Laine'. As the development is understood to be car free, the car mode split has been transferred to public transport.

Table 22 Block K, Brighton Station Site (Office) Trips by mode

	AM Peak		Inter-Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Public Transport	56	7	29	29	8	45

Asda Stores Ltd, 1 Crowhurst Road, Brighton (Retail)

- 1.66 It is understood that this site is subject to planning application reference BH2012/01438 which is an extension to the time limit for application reference BH2009/00508 for 1676m² retail space expansion to the existing store (12,378m²).
- 1.67 The Transport Statement (TS) notes that on average, this increase in store size leads to a 4.5% increase in transactions. As part of the discussions for this application, it was agreed that this increase was sufficiently small not to require detailed traffic analysis.
- 1.68 There are two approaches that could be taken. It could be assumed that all the trips to and from the zone in the model which contains this development site are destined for the development site itself and therefore could be scaled up by 4.5% to represent the expansion of the store.
- 1.69 Alternatively the generic retail (food store) trip rate could be applied. This site has been defined as suburban.
- 1.70 A comparison of the two approaches is shown below based on the full development size of the existing store plus the expansion.

Table 23 Asda Store, Crowhurst Road - Approach comparison

Vehicle Trips	AM Peak		Inter-Peak		PM Peak	
	Scaled from Model	From Generic Trip Rates	Scaled from Model	From Generic Trip Rates	Scaled from Model	From Generic Trip Rates
Arrivals	983	510	289	872	1015	893
Departures	584	356	259	868	912	951

- 1.71 As shown the values scaled from the model are greater the morning and evening peaks, this is likely to be due to the additional trips associated with the other uses within the zone. However, as there is no evidence to prove this fact, the scaled values have been used to ensure a robust assessment.

- 1.72 Combination of these scaled vehicle trips and the mode split for the site based on its location in Patcham result in the trips shown in **Table 24**. It is noted that the number of trips shown represent the 4.5% expansion expected.

Table 24 Asda Store, Crowhurst Road - Trips by mode

	AM Peak		Inter-Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Car Driver	42	25	12	11	44	39
Public Transport	18	10	5	5	18	16
HGV	0	0	3	2	1	1

GB Liners Site, Blackman Street (Office)

- 1.73 There are no applications available on the planning register with the gross floor area shown in **Table 1**. It has been there has been an additional application submitted and therefore the generic office use trip rate has been applied. The site has been defined as urban.

Sackville Road Trading Estate, Sackville Road, Hove (Office)

- 1.74 It has been assumed that this site is in reference to the office element of application ref: BH2009/00761. This application is for a mixed development of food retail, non-food retail, residential apartments, office and car parking. The office trips are provided in **Table 25**.
- 1.75 It is noted that the arrivals and departures in the AM and PM peak period were derived as part of the TA using first principles assuming a total of 200 staff on site. The TA does not provide information for inter-peak arrivals and departures so the trip generation has been derived based on the generic rates for B1 office use.

Table 25 Sackville Road Trading Estate – Trips by Mode

	AM Peak		Interpeak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Car Driver	100	0	11	13	0	100
Public Transport	17	0	2	1	0	17
HGV	0	0	0	0	0	0

Sackville Road Trading Estate, Sackville Road, Hove (Retail)

- 1.76 The application referenced in paragraph 1.71 has a retail element however it is noted that the gross floor area measurements are not the same as in **Table 1**. Therefore it has been assumed that an additional application was approved for the area and the generic retail trip rate has been applied. The area is defined as urban.

Sussex Education Centre, Nevill Avenue, Hove (Office)

- 1.77 This site is subject to planning application reference BH2008/03220 for office space associated with the new headquarters for Sussex Partnership NHS Foundation Trust. The trip rate given is shown in **Table 26** below. The proportion of trips made by public transport has been derived based on national census data for the ward (Brunswick and Adelaide).
- 1.78 It is noted that the application did not assess an inter-peak period and the raw data they derived there trip generation from was not available from the planning register. Instead, the trip rate for the inter-peak period has been derived using the generic rate for urban office use.

Table 26 Sussex Education Centre – Trips by mode

	AM Peak				Inter-Peak				PM peak			
	Trip Rate Per 100m ²		Development Trips		Trip Rate Per 100m ²		Development Trips		Trip Rate Per 100m ²		Development Trips	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Car Driver	2.973	0.373	50	6	0.212	0.240	4	4	0.540	2.203	9	37
Public Transport	2.162	0.271	36	5	0.031	0.027	1	0	0.393	1.602	7	27
HGV	0.002	0.002	0	0	0.003	0.003	0	0	0.005	0.005	0	0

Woodingdean Business Park, Bexhill Road and Sea View Way, Woodingdean (2 x Office and 1 x Warehousing & Distribution)

- 1.79 There are a number of applications available on the planning register associated with the Woodingdean Business Park however none are clearly associated with the development quantum shown in **Table 1**. Furthermore, of the applications available, only one contains information on trip generation rates, however it is from a TRICS® assessment completed in 1999. It is therefore assumed that these three applications have been submitted and approved in addition to those available on the planning register and the generic trip rate for office or warehousing and distribution has been applied as relevant. The generic rate has been used instead of the 1999 data as the existing information is considered outdated. The area has been classified as suburban.

Land adjacent to Amex House fronting John Street, Carlton Hill, Mighell Street and Land adjacent to 31 White Street Brighton (Office)

- 1.80 It is understood that this site is subject to planning application ref: BH2009/01477. The traffic and transport note states that the proposals will not alter traffic flows to the site and therefore it has been assumed that this site will generate no additional trips.

Sussex County Cricket Club, Eaton Road, Hove (Leisure)

- 1.81 It has been assumed that this site is subject to application ref: BH2010/02011 which notes that there is not expected to be a change in the number of attendees to the site and therefore it has been assumed that this site will generate no additional trips.

Travis Perkins, Baltic Wharf, Wellington Road, Portslade (Warehousing & Distribution)

- 1.82 This site is subject to application ref: BH2007/02974. The derived trips are shown in **Table 27** below using the TRICS outputs provided in the TA. This trip rate has been factored by the mode split shown in **Table 7** to derive the number of trips made by car, public transport and HGV. It is noted that the development is located in the ward 'South Portslade':

Table 27 Travis Perkins, Baltic Wharf – Total trips

	AM Peak	Inter-Peak	PM peak
Arrivals	8	4	2
Departures	3	4	7

Travis Perkins, Baltic Wharf, Wellington Road, Portslade (Office)

- 1.83 The planning register does not contain an application for office development at this site. It has been assumed that one has been submitted and therefore the generic office trip rate has been applied. The site is classified as suburban.

Royal Sussex County Hospital, Eastern Road, Brighton

- 1.84 This site is subject to the consented application BH2011/02886. This application involves demolition of 20,000m² of existing hospital buildings and construction of 73,000m² of new hospital buildings plus additional facilities such as a helicopter landing pad. a net change of 53,000m². The associated TA provided a TRICS based assessment and based the mode split on the results of the selected surveys. The resultant net change trip generation is shown in Table 29 below.

Table 28 Royal Sussex County Hospital, Eastern Road

	AM Peak		Inter-peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Cars	155	33	67	72	37	113
Public Transport	8	3	5	6	2	6
OGV	1	1	1	1	1	0

Woollards Field South

- 1.85 This site is a new strategic site however it is understood that there is the intention to construct an ambulance make ready centre on half of the 5,000m² land. It has therefore been assumed that half (2,500m²) will be used in equal portions for B1, B2 and B8 land uses as part of the ambulance make ready centre and the other half will be used for B1 office. The trip rate has been derived using the generic trip rates and the result is shown in Table 29.

Table 29 Woollards Field South

	AM Peak		Inter-peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Cars	54	4	8	10	3	44
Public Transport	12	0	2	2	0	9
OGV	0	0	1	1	0	1

Shoreham Harbour

- 1.86 Shoreham Harbour is considered a key strategic site. It is noted that overall it is a large development with part in Brighton & Hove and park in the adjacent district of Adur. The part within Brighton & Hove is understood to have a mix of B1, B2 and B8 land uses proposed. The exact proportion of each is unknown so an equal split has been assumed and the generic trips rates for suburban sites applied. The result is shown in Table 30.

Table 30 Shoreham Harbour

	AM Peak		Inter-peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Cars	23	2	2	0	0	1
Public Transport	4	4	0	0	1	1
OGV	2	19	0	2	0	0

Residential Sites

Saunders Glassworks, Sussex Place, Brighton

- 1.87 This site is subject to planning application reference BH2010/03791 which is an application to extend application ref: BH2005/00343/FP to demolish the existing former glassworks and erect a 5 storey block of flats, 2 bungalows and 1 house in its place. The site comprises of 50 units, 20 of which are affordable.
- 1.88 The application was submitted with a transport statement which does not contain information on expected trip generation for the proposed site. It does however state that *'no car parking is provided as part of the development... all journeys can be conveniently made on foot, by bicycle or by public transport'*. There are however 3 disabled parking bays provided as part of the development and it is therefore assumed that there are 3 trips made by car each day to and from the development. It has been that these occur in the AM and PM peak periods.
- 1.89 The displaced car trips are transferred to walking, cycling and public transport based on the proportions of the generic trip rate.

Land at Brighton Marina comprising Outer Harbour, West Quay and adjoining land

- 1.90 This site is subject to planning application reference BH2006/01124. The application is for redevelopment of the marina into 853 apartments (40% affordable) as well as 27,192 sq ft of retail and community leisure use and new pedestrian, cycle and vehicular links. Only the residential element is included in the list of sites to be assessed provided by Brighton and Hove City Plan and therefore the retail and community leisure trips have been discounted at present.
- 1.91 It is noted that the mode split has been adjusted to take account of the proposed improvements in facilities for sustainable transport modes.
- 1.92 Information was not available in the TA for the inter-peak period so it has been derived based on the 2010 floor space and the generic trip rate. This approach has also been used to derive the HGV trips in the AM and PM peak periods.
- 1.93 The estimated trips by mode are shown in **Table 31**.

Table 31 Land at Brighton Marina – Trips by Mode

	AM Peak			Inter-Peak			PM peak		
	Car	PT	HGV	Car	PT	HGV	Car	PT	HGV
Arrivals	43	40	1	80	11	2	128	119	1
Departures	128	119	2	73	10	2	60	56	1

Block J Brighton Station Site (Residential)

- 1.94 As stated in paragraphs 1.60 and 1.61, there is no application registered at this site. Therefore the generic residential trip rate has been applied for the affordable and private elements. The site has been categorised as Urban and it is noted that 40% of the quantity of units are designated as affordable.

Sackville Road Trading Estate, Sackville Road, Hove (Residential)

- 1.95 It has been that this site is in reference to the office element of application ref: BH2009/00761. This application is for a mixed development of food retail, non-food retail, residential apartments, office and car parking. The residential trips are as provided in **Table 32**.
- 1.96 It is noted that the TA does not assess an inter-peak period. It has been derived using the TRICS sites listed in the TA as the TRICS outputs are missing from the submissions on the planning register.

Table 32 Sackville Road Trading Estate – Trips by Mode

	AM Peak		Inter-Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Car Driver	10	25	19	18	26	16
Public Transport	4	10	5	5	11	6
HGV	0	1	0	0	0	0

25-28 St James's Street and 24 Dorset Gardens Brighton

- 1.97 It is understood that this site is subject to application ref: BH2008/03121. There is not a transport assessment or statement available on the planning register however the design and access statement notes that it is a car free development. Therefore it has been assumed that there will be no car based trips generated by the development. To derive the number of public transport trips the generic rate has been used for the affordable and private elements of flats shown in **Table 33**. The car trips displaced due to the car free nature of the development are assumed to be transferred to walking and cycling, encouraged by the facilities offered such as providing each flat with an electric bike. It is noted that the site has been defined as urban.

Table 33 St James's Street and 24 Dorset Gardens – Trips by Mode

	AM Peak		Inter-Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Car Driver	0	0	0	0	0	0
Public Transport	2	0	0	0	0	0

Ocean Hotel, Longridge Avenue, Brighton

- 1.98 There are a number of applications on the planning register connected with this site however none of them are in the magnitude of 48 dwellings. As it is listed as consented and built out it has been that an earlier application has been consented and not included on the register. Therefore the generic trip rate for flats in a suburban area has been applied for the private and affordable elements as appropriate.

Dresden House, 34 – 38 Medina Villas, Hove

- 1.99 This site is listed as consented and built out. There are no applications on the planning register for this site and it is therefore assumed that the documents have not been included on it. Therefore the generic trip rate for flats in an urban area has been applied for the private and affordable elements.

Royal Alexandra Hospital, 57 Dyke Road, Brighton

- 1.100 This site is subject to planning application ref: BH2010/03379. The Transport Assessment defines total vehicular trips and a multimodal split. Without further information to disaggregate it by, it has been that the vehicle trips are equal to car trips and the mode split based on census data has been applied to derive the number of trips by public transport.

Table 34 Royal Alexandra Hospital – Trips by Mode

	AM Peak		Inter-Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Car Driver	6	18	8	10	13	8
Public Transport	10	29	13	16	22	14

Former Nurses Accommodation, Brighton General Hospital, Pankhurst Avenue

- 1.101 This site is subject to planning application ref: BH2010/01054 involving the demolition of the former accommodation buildings and the construction of 3 apartment blocks containing a total of 95 units as well as a community facility.
- 1.102 The assessment notes that the community facility is for use by local residents and therefore assumes that there will be no vehicular trips to or from the site. The trip generation for the residential element is as shown in **Table 35**.
- 1.103 The trips generated for the AM and PM peak period by car are lifted directly from the submitted TA. The TA does not assess the inter-peak period and the TRICS outputs are missing from the appendices so the assessment has been derived based on the generic rates for private and affordable flats.

Table 35 Former Nurses Accommodation –Trips by Mode

	AM Peak		Inter-Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Car Driver	8	36	7	7	29	15
Public Transport	4	18	0	0	15	8

Open Market, Marshall's Row, London Road

- 1.104 Planning application ref: BH2010/03744 has been consented for this site allowing it to be redeveloped into a new partly covered market, workshops, central square, public toilets, offices, and 87 residential units. The development is car-free with no on-site parking provided and it was agreed that residents would not be eligible for on-street parking permits.
- 1.105 The TA does not contain values for residential trips generated by modes other than private car and therefore the generic trip rates have been applied. The car driver trips have been transferred to public transport, walking and cycling to account for the car free nature of the development. It is noted that 40% of the units are affordable and the site is designated as Urban.

331 Kingsway, Hove

- 1.106 This site is subject to application ref: BH2011/00227 involving construction of a mixed commercial and residential development containing 40 apartments. The commercial element was not included in the employment sites to be assessed and therefore has been discounted at present. The Transport Statement shows the number of vehicular trips expected to be generated by the site. This has been factored by the values shown in **Table 7** to derive the proportion of public transport trips. It is noted that the site is located in the ward 'Brunswick and Adelaide'.

Table 36 331 Kingsway, Hove – Trips by Mode

	AM Peak		Inter-Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Car Driver	5	15	6	7	15	9
Public Transport	4	11	5	5	11	7

Cover's Yard, Melbourne Street, Brighton

- 1.107 Planning application ref: BH2009/00655 has been consented for the site involving demolition of the existing buildings and construction of 39 residential units in their place. The TA provides a TRICS assessment of the expected number of trips and factors it by a mode split taken from National Census Data. The derived values are shown in **Table 37** below.
- 1.108 The number of trips in the AM and PM peak periods has been lifted directly from the submitted application however it does not contain information for the inter-peak which has instead been derived based on the generic trips rates.

Table 37 Cover's Yard, Melbourne Street

	AM Peak		Inter-Peak		PM peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
All Trips	4	17	-	-	12	5
Car Driver	1	5	3	3	4	2
Public Transport	1	4	0	0	3	1

Gala Bingo Hall, 191 Portland Road, Hove

- 1.109 The register has one application for 191 Portland Road however it had a different number of residential units than shown in **Table 2** and was also refused planning permission. It has been that this site is actually in reference to development at 193 Portland Road, subject to planning reference BH2009/03154. The residential element of the development was originally meant to be car free however when the application went to appeal it was decided to supply 18 car parking spaces to resolve local residents concerns.
- 1.110 There is no Transport Assessment available on the planning register and therefore the generic rates for the affordable and private elements of the site have been applied. The site has been defined as urban.

Summary & Next Steps

- 1.111 In summary, information has been collected from approved applications where possible for the consented and strategic development sites requested. Generic trip rates have been applied to the remaining sites. The generic trip rates were derived using TRICS®, an industry recognised database for use in trip generation.
- 1.112 Existing trips removed due to redevelopment of the sites have been taken into account where possible but limited information means that not all can be discounted from the model. This results in overestimation of the number of trips on the network but provides a robust assessment.
- 1.113 A summary of the vehicular trips per development area, before adjustment in line with the TEMPRO rates, is shown in **Tables 38 to 41** for information.

Table 38: Trips by mode for existing and proposed land uses (AM Peak)

Trips by mode for existing and proposed	AM																	
	Cars						PT						HGV					
	Existing			Proposed			Existing			Proposed			Existing			Proposed		
	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total
DA1	0	0	0	383	44	428	0	0	0	401	40	441	0	0	0	7	6	13
DA2	0	0	0	227	400	627	0	0	0	63	234	297	0	0	0	3	5	8
DA3	0	0	0	287	173	460	0	0	0	51	24	74	0	0	0	1	1	1
DA4	94	31	125	455	206	662	14	1	15	152	61	214	0	0	1	1	1	1
DA5	17	10	27	922	208	1129	12	7	20	201	27	228	3	3	7	3	3	5
DA6	195	70	265	337	123	460	83	44	127	64	31	96	2	2	5	1	2	2
DA7	0	0	0	505	287	792	0	0	0	94	27	121	0	0	0	10	10	20
DA8	0	0	0	61	109	170	0	0	0	13	54	67	0	0	0	0	1	1
Rest of City	74	28	102	297	486	783	5	1	6	99	208	307	3	4	6	2	2	4
Total	380	138	518	3475	2036	5510	115	53	168	1138	706	1844	9	10	18	27	29	56

Table 39: Trips by mode for existing and proposed land uses (Inter-Peak)

Trips by mode for existing and proposed	Inter-Peak																	
	Cars						PT						HGV					
	Existing			Proposed			Existing			Proposed			Existing			Proposed		
	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total
DA1	0	0	0	163	146	309	0	0	0	132	114	245	0	0	0	11	9	20
DA2	0	0	0	320	302	622	0	0	0	56	65	121	0	0	0	6	6	12
DA3	0	0	0	84	86	170	0	0	0	8	7	15	0	0	0	2	1	3
DA4	43	44	87	132	137	269	2	2	5	48	45	94	1	1	2	2	2	3
DA5	18	25	44	284	302	586	14	19	33	36	53	89	18	9	28	15	10	24
DA6	55	60	116	100	103	204	9	12	21	12	11	23	9	6	16	4	4	7
DA7	0	0	0	242	264	506	0	0	0	11	17	28	0	0	0	8	10	17
DA8	0	0	0	45	40	85	0	0	0	3	5	8	0	0	0	1	1	3
Rest of City	39	41	80	196	184	372	1	1	3	41	41	80	4	4	8	6	5	11
Total	155	171	326	1567	1563	3122	26	34	61	346	357	703	33	20	53	53	47	100

Table 40: Trips by mode for existing and proposed land uses (PM Peak)

PM																		
Trips by mode for existing and proposed	Cars						PT						HGV					
	Existing			Proposed			Existing			Proposed			Existing			Proposed		
	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total
DA1	0	0	0	92	281	373	0	0	0	82	284	365	0	0	0	16	8	24
DA2	0	0	0	532	335	867	0	0	0	161	65	225	0	0	0	4	3	7
DA3	0	0	0	138	250	388	0	0	0	6	34	41	0	0	0	4	4	8
DA4	35	79	114	174	391	564	0	10	10	16	107	122	0	0	1	1	1	2
DA5	13	30	43	161	704	865	10	22	32	8	125	133	3	13	17	2	7	9
DA6	108	234	342	106	310	416	72	117	188	11	51	62	3	6	9	2	2	4
DA7	0	0	0	311	476	786	0	0	0	24	17	41	0	0	0	3	1	4
DA8	0	0	0	88	61	150	0	0	0	19	5	24	0	0	0	0	0	1
Rest of City	31	68	99	429	303	731	1	5	6	98	81	179	2	3	5	2	2	4
Total	188	410	599	2029	3111	5141	83	154	237	425	767	1192	8	23	31	34	29	62

Table 41: Additional Trips by mode

Additional Trips by mode	Cars									PT									HGV								
	AM			interpeak			PM			AM			interpeak			PM			AM			interpeak			PM		
	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total	Arrivals	Departures	Total
DA1	383	44	428	163	146	309	92	281	373	401	40	441	132	114	245	82	284	365	7	6	13	11	9	20	16	8	24
DA2	227	400	627	320	302	622	532	335	867	63	234	297	56	65	121	161	65	225	3	5	8	6	6	12	4	3	7
DA3	287	173	460	84	86	170	138	250	388	51	24	74	8	7	15	6	34	41	1	1	1	2	1	3	4	4	8
DA4	361	175	536	89	92	182	139	311	450	139	60	199	46	43	89	15	97	112	0	0	1	1	1	1	1	1	2
DA5	905	198	1103	266	276	542	147	674	822	188	20	208	22	34	56	-2	102	101	-1	-1	-1	-4	1	-3	-1	-6	-8
DA6	142	53	195	45	43	88	-2	76	74	-19	-12	-31	3	-1	2	-61	-66	-126	-2	-1	-2	-6	-3	-8	0	-4	-4
DA7	505	287	792	242	264	506	311	476	786	94	27	121	11	17	28	24	17	41	10	10	20	8	10	17	3	1	4
DA8	61	109	170	45	40	85	88	61	150	13	54	67	3	5	8	19	5	24	0	1	1	1	1	3	0	0	1
Rest of City	223	459	681	157	143	292	397	235	632	93	208	301	39	39	78	97	76	173	-1	-1	-2	2	1	3	0	-1	-1
Total	3095	1897	4992	1412	1392	2796	1841	2701	4542	1023	654	1677	320	323	642	342	613	955	18	20	38	20	27	47	25	6	31

Distribution

Name/ Signed Orla Wickenden

Appendix A – Household Survey Data

Table A.1: AM Trip Rate by purpose based on Household Survey

		Units	Cars		PT		Elsewhere
			Centre	Suburbs	Centre	Suburbs	
HBW	Origin	Trips per 100 Workers	11.06	21.46	5.53	4.53	1.1
	Dest.	Trips per 100 Jobs	17.71	24.61	4.81	2.5	1.1
HEM	Origin	Trips per 100 Workers	2.17	2.12	0.28	0.24	1.1
	Dest.	Trips per 100 Jobs	0.48	0.96	0.19	0.18	1.1
HED	Origin	Trips per 100 Households	3.73	5.65	2.68	3.05	1.03
	Dest.	Trips per 100 Education Places	20	25	20	11.5	1.03
HBS	Origin	Trips per 100 Households	1	2.6	0.5	0.4	1.16
	Dest.	Trips per 100 Retail Space	0.5	2.9	0.2	2.9	1.16
HBO	Origin	Trips per 100 popn	1	2.8	0.9	0.9	1.13
	Dest.	Trips per 100 popn	1	1	1	1	1.13

Table A.2: PM Trip Rate by purpose based on Household Survey

		Units	Cars		PT		
			Centre	Suburbs	Centre	Suburbs	Elsewhere
HBW	Origin	Trips per 100 Workers	15.06	20.91	4.09	2.13	1.1
	Dest.	Trips per 100 Jobs	9.4	18.24	4.7	3.85	1.1
HEM	Origin	Trips per 100 Workers	0.43	0.86	0.17	0.16	1.1
	Dest.	Trips per 100 Jobs	1.95	1.9	0.25	0.21	1.1
HED	Origin	Trips per 100 Households	1.14	-	-	-	1.16
	Dest.	Trips per 100 Education Places	1.06	-	-	-	1.16
HBS	Origin	Trips per 100 Households	0.17	0.42	0.16	0.22	1.2
	Dest.	Trips per 100 Retail Space	0.35	0.14	0.22	0.13	1.2
HBO	Origin	Trips per 100 popn	0.58	0.92	0.05	0.03	1.12
	Dest.	Trips per 100 popn	1.06	1.73	0.08	0.06	1.12

Appendix B – TRICS® Sites

Table B.1 - TRICS Sites used in Assessment

Land Use	Urban		Suburban	
	TRICS Ref:	Description	TRICS Ref:	Description
Retail (Local)	EB-01-I-01	LOCAL SHOPS, EDINBURGH	GS-01-I-01	LOCAL SHOPS, CHELTENHAM
	GS-01-I-01	LOCAL SHOPS, CHELTENHAM	SG-01-I-01	LOCAL SHOPS, BRISTOL
	SG-01-I-01	LOCAL SHOPS, BRISTOL	SH-01-I-01	LOCAL SHOPS, TELFORD
	WM-01-I-01	LOCAL SHOPS, COVENTRY	WM-01-I-01	LOCAL SHOPS, COVENTRY
			WM-01-I-02	LOCAL SHOPS, SOLIHULL
Retail (Food Store)	AN-01-A-03	TESCO EXTRA, ANTRIM	CW-01-A-09	ASDA, PENRYN
	DU-01-A-04	TESCO EXTRA, DUNDEE	DV-01-A-21	MORRISONS, PLYMOUTH
	MA-01-A-01	TESCO, CASTLEBAR	GS-01-A-03	SAINSBURYS, GLOUCESTER
	SC-01-A-08	SAINSBURY'S, REDHILL	LE-01-A-01	SAINSBURYS, LEICESTER
			SH-01-A-02	MORRISONS, SHREWSBURY
Retail (Business Park)			DL-01-K-02	RETAIL PARK, DUBLIN
			GS-01-K-01	RETAIL PARK, GLOUCESTER
Office (single)	ES-02-A-07	DISTRICT COUNCIL, HAILSHAM	HC-02-A-11	DIY CO. HQ, CHANDLER'S FORD
	KC-02-A-09	COUNCIL OFFICES, MAIDSTONE	KC-02-A-06	LAND REGISTRY,TBRDGE WELLS
	KC-02-A-10	COUNCIL OFFICES, MAIDSTONE	KC-02-A-07	KCC HIGHWAYS REG., ASHFORD
	KC-02-A-11	COUNTY HALL, MAIDSTONE	KC-02-A-08	KCC HIGHWAYS REG., AYLESFD
			SC-02-A-14	UNILEVER, LEATHERHEAD
			SC-02-A-15	ACCOUNTANTS, GUILDFORD
			SC-02-A-16	BANK OF AMERICA, CAMBERLEY
			SC-02-A-17	PHARMACEUTICALS, WEYBRIDGE

Land Use	Urban		Suburban	
	TRICS Ref:	Description	TRICS Ref:	Description
Office (business park)	SH-02-B-02	BUSINESS PARK, TELFORD	DC-02-B-01	BUSINESS PARK, POOLE
	TW-02-B-01	BUSINESS PARK, NEWCASTLE	LN-02-B-01	BUSINESS PARK, LINCOLN
			NF-02-B-02	BUSINESS PARK, NORWICH
			NT-02-B-01	BUSINESS PARK, NOTTINGHAM
			SH-02-B-01	BUSINESS PARK, SHREWSBURY
			SH-02-B-03	BUSINESS CENTRE, TELFORD
			WL-02-B-01	BUSINESS PK,WOOTTON BASSETT
			WM-02-B-01	BUSINESS PARK, COVENTRY
			WO-02-B-01	BUSINESS PARK, REDDITCH
Industrial Unit (single)	GM-02-C-02	BREWERY, MANCHESTER	BR-02-C-01	MECH. ENGINEERS, BRISTOL
	GS-02-C-01	HEALTH PRODUCTS,GLOUCESTER	CW-02-C-01	FOOD DISTRIBUTION, CAMBORNE
	LC-02-C-01	BREWERY, BLACKBURN	CW-02-C-02	LIGHTING COMPANY, BODMIN
			DC-02-C-07	NEW LOOK, WEYMOUTH
			HF-02-C-01	IND.UNIT, W.GARDEN CITY
Warehousing	DS-02-F-01	ARMADILLO S. STORAGE, DERBY	AN-02-F-02	DISTRIBUTION CENTRE, BELFAST
	WM-02-F-01	LEGETT LOGIS., BIRMINGHAM	CR-02-F-01	WAREHOUSING ESTATE, CORK
			LN-02-F-01	BOOK SERVICE, GRANTHAM
			TV-02-F-02	ARGOS WAREHOUSE, DARL'TON

Land Use	Urban		Suburban	
	TRICS Ref:	Description	TRICS Ref:	Description
Education (uni)	CA-04-C-01	COLLEGE, PETERBOROUGH	BD-04-C-01	SIXTH FORM COLLEGE, LUTON
	GM-04-C-01	UNI. CAMPUS, MANCHESTER	ES-04-C-05	COLLEGE, BEXHILL
	HI-04-C-01	COLLEGE, FORT WILLIAM		
	LI-04-C-01	COLLEGE, LIMERICK		
	NF-04-C-02	COLLEGE, NORWICH		
	SF-04-C-01	COLLEGE, BURY ST. EDMUNDS		
	TV-04-C-01	ART COLLEGE, HARTLEPOOL		
Leisure	GS-07-C-01	LEISURE CENTRE, GLOUCESTER	CW-07-C-01	LEISURE CENTRE, ST AUSTELL
	WS-07-C-05	LEISURE CEN., BILLINGSHURST	DC-07-C-06	LEISURE CEN., BLANDFORD
			HC-07-C-06	LEISURE CENTRE, SOUTHAMPTON
			WS-07-C-04	LEISURE CENTRE, CRAWLEY
Flats (Private)	DC-03-C-01	BLOCKS OF FLATS, WEYMOUTH	HC-03-C-02	FLATS, BASINGSTOKE
	SC-03-C-01	FLATS, CAMBERLEY	HF-03-C-02	FLATS, WELWYN GARDEN CITY
	WM-03-C-03	FLATS, SOLIHULL	OX-03-C-01	BLOCK OF FLATS, OXFORD
			SC-03-C-02	FLATS, WOKING
Flats (Affordable)	HC-03-D-04	BLOCK OF FLATS, WINCHESTER	ES-03-D-01	BLOCKS OF FLATS, BRIGHTON
	KC-03-D-01	RETIREMENT FLATS, RAMSGATE	ES-03-D-03	BLOCKS OF FLATS, BRIGHTON
			HC-03-D-02	FLATS, EASTLEIGH
			HC-03-D-05	BLOCK OF FLATS, BASINGSTOKE
			OX-03-D-01	FLATS, OXFORD

Land Use	Urban		Suburban	
	TRICS Ref:	Description	TRICS Ref:	Description
Flats and Houses (Private)	DC-03-K-03	MIXED HOUSING, DORCHESTER	RE-03-K-01	SEMI DETACHED/FLATS, READING
	NY-03-K-01	MIXED HOUSING, BORO'BRIDGE	WS-03-K-02	MIXED HOUSING, CRAWLEY
	NY-03-K-02	MIXED HOUSING, BOROBRIDGE		
Flats and Houses (Affordable)	CH-03-L-01	MIXED HOUSING, MACCLESFIELD	HC-03-L-02	HOUSES/FLATS, NEAR FAREHAM
Conference Centre	SH-07-S-01	EXHIBITION CENTRE, TELFORD	NY-07-S-01	EXHIBITION CEN., HARROGATE
			SH-07-S-02	CONFERENCE CEN., DONNINGTON
			TW-07-S-01	CONFERENCE CEN., NEWCASTLE

Appendix C

Forecasting Note

Job No	Report No	Issue no	Report Name	Page
ST13119	1	1	Brighton & Hove City Plan	C1

Discussion Note

Date 31 July 2012

Job No/ Name STH13119

Subject Brighton City Plan Modelling - Transport Evidence Base

Introduction

This discussion note documents the methodology JMP propose to adopt for the preparation of the future year model forecasts for the Brighton City Plan transport evidence base.

The first stage will be the creation of latent travel demand forecasts, representing the 'starting point' demand for a future year scenario prior to the application of the multi-modal transport model.

Consequently these forecasts do not take into account the changes in income as represented through future year values of time, monetary transport cost changes such as fuel and fare costs, or changes caused by the feedback of these effects.

The latent demand forecasts represent the changes brought about by car ownership changes, the effects of changes in land use and the changes in goods vehicles demand.

The forecasts that are to be generated are for two land use scenarios for a 2030 horizon year.

The remainder of this note is structured as follows:

- Concepts and Methodology – Providing an outline of the methodology together with a rationale for the underlying concepts and reasons behind the choice of the proposed methodology;
- Forecast Models Network Coding – Providing an outline of the stages and order of work in creating the future year networks and public transport network coding;
- Trip Generation for Key Sites – Detailing the proposed methodology for the calculation of trip volumes for the key development sites, segmented by travel purpose and time of day;
- Trip Distribution for Key Sites – Documenting the proposed methodology for distributing the above trip ends across the potential travel opportunities in the model; and
- Constraining to TEMPRO – Detailing the proposed methodology for constraining to TEMPRO, in effect including all of the proposed developments and the background growth that is expected through DfT National Transport Model forecasts.

The concepts and methodology section has been written for a non-technical audience, with the remaining sections detailing both the processes and the expected sources of information to be used to develop the forecasts.

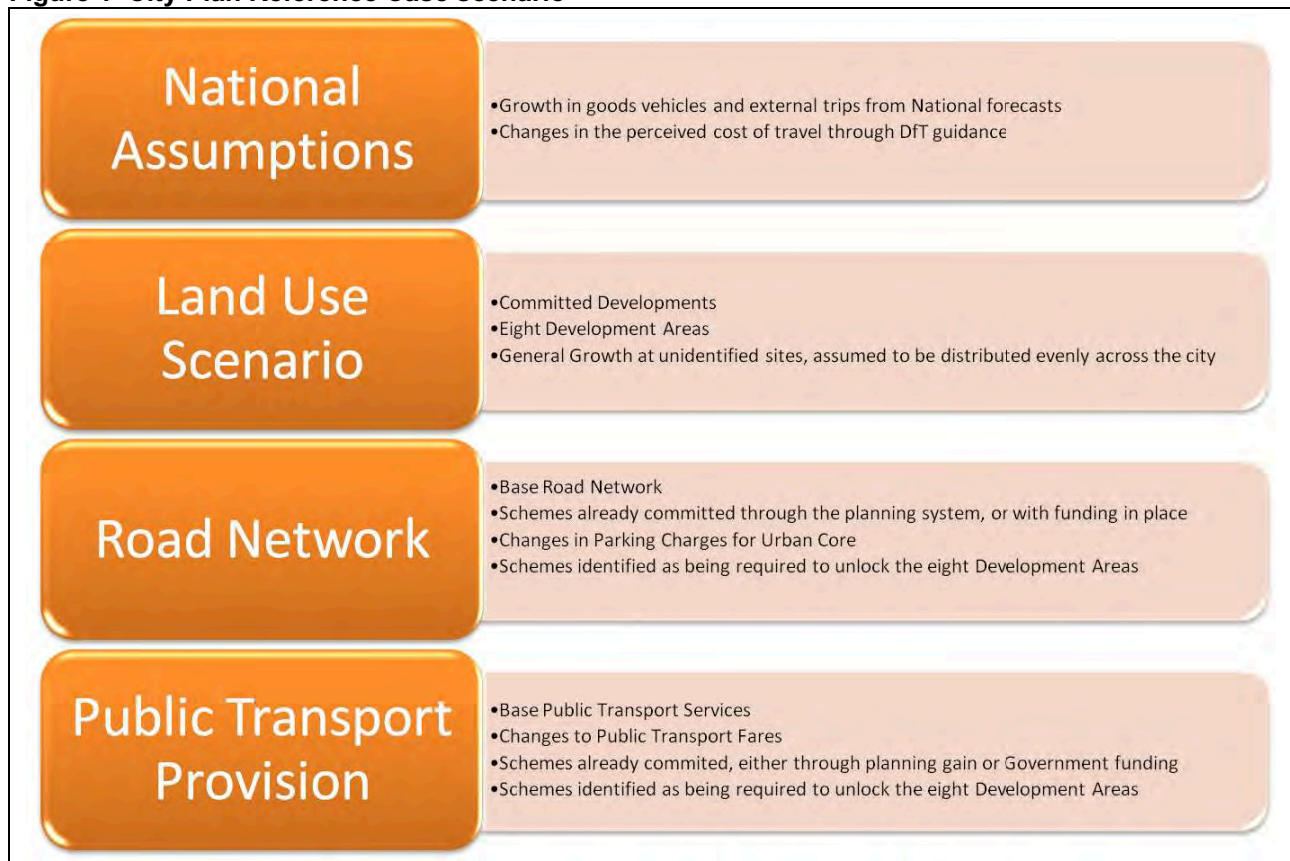
Concepts and Methodology

The first requirement of the modelling assessment is to evaluate the impact of the additional development through to 2030 against the already committed levels of development. To achieve this, we first propose to develop a **City Plan Reference Case** scenario.

This scenario will include all of the planning data within the 2030 Plan together with the already identified measures that either have funding in place or measures that are site specific improvements required to facilitate the developments.

As a summary, the figure overleaf lists the contents of the City Plan Reference Case scenario:

Figure 1 City Plan Reference Case scenario



JMP

The eight development areas will be coded through additional zones in the network model to allow for separate analysis of their impacts on the performance of the road network, which will be especially important for development area DA3 and DA7 due to their proximity to the strategic road network.

For all of the other model zones, a growth rate based on the change between the council supplied 2030 forecasts and the base year planning data will be used to growth the base year trip matrix. This will allow for the creation of a set of zone factors to retain the proportion of the planning data that is the City Plan developments as this will allow for the cumulative impact of all of the City Plan to be analysed.

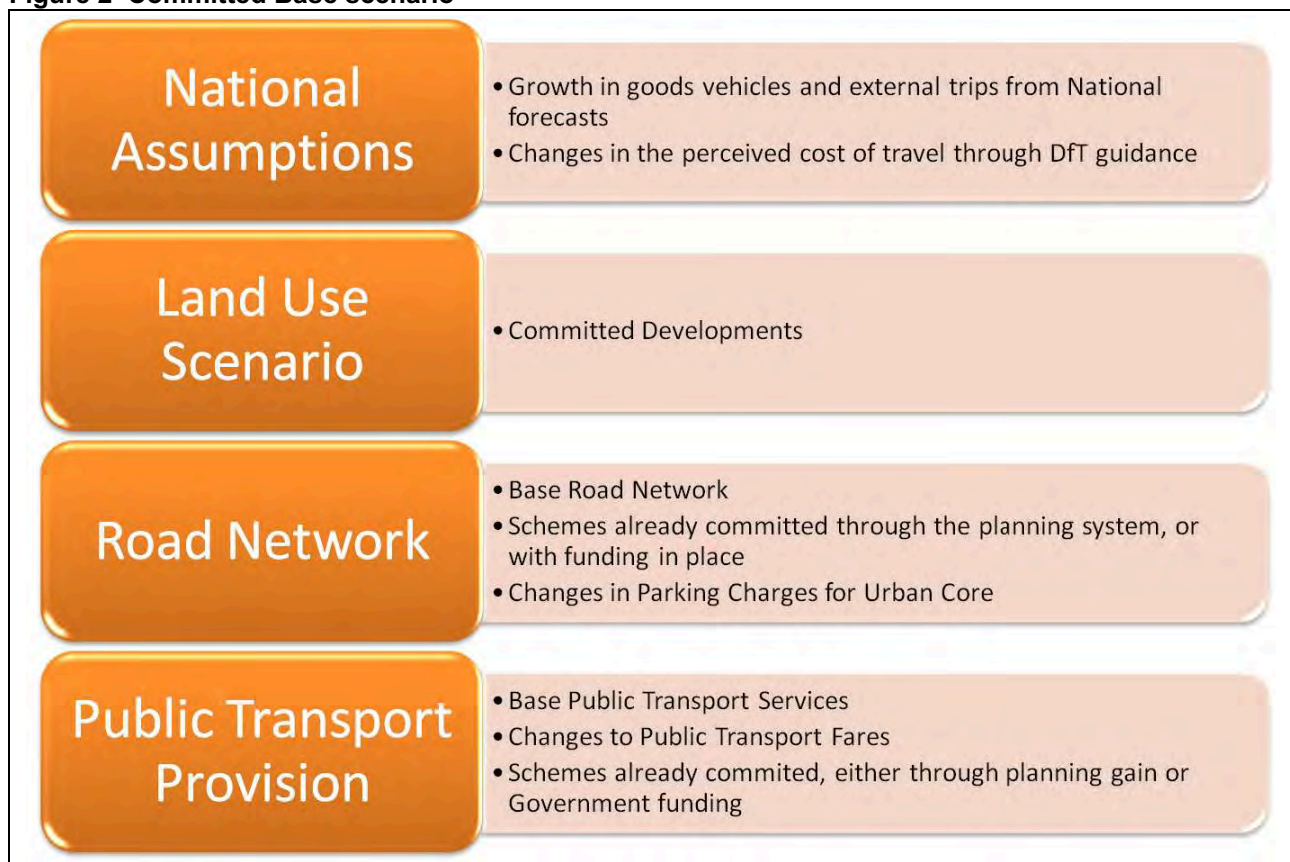
These factored base matrices and eight key development area travel demands will be combined to form a travel pattern and then constrained to a total level of trip making as output by the DfT TEMPRO software for 2030. Preliminary assessments of the planning data contained within TEMPRO for Brighton indicates that the proposed plan is broadly similar to the totals within TEMPRO, nevertheless the alternative planning scenario tool within TEMPRO will be used to establish the level of trips implied by TEMPRO using the planning data supplied by Brighton & Hove City Council.

These latent travel demands will then be input into the Brighton multi-modal model to allow for changes to travel destinations and mode as a result of changes in the cost of travel to be incorporated into the forecasts, yielding the final **City Plan Reference Case**.

The ability to identify the additional City Plan trips allows the formulation of the second forecast, that of the **Committed Base** which will represent the base year and the build out of all of the currently permitted developments.

The latent travel demands calculated for the City Plan Reference Case will be reduced by the extraction of the demands that are City Plan only, and the removal of some schemes related to the eight development areas, such that only committed schemes with funding in place are included. The scenario will contain the following:

Figure 2 Committed Base scenario



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Comparison of the output produced by the model of the **City Plan Reference Case** and the **Committed Base** scenarios will provide evidence of the impacts of the City Plan and provide insights into where further mitigation measures will be required.

Following discussions with the client, the further mitigation measures identified will be packaged into a third scenario called the **City Plan Mitigation Case** scenario.

This scenario will use the City Plan Reference Case scenario as a starting point for further interventions such as road improvements schemes, enhanced public transport provision and demand management measures such as smarter choices that are targeted to mitigate the impact of the City Plan.

The plan of modelling work is conceptually laid out in the figure overleaf.

Forecast Models Network Coding

The first network coding task will be the coding of eight additional zones into both the highways and public transport networks to represent the eight development areas.

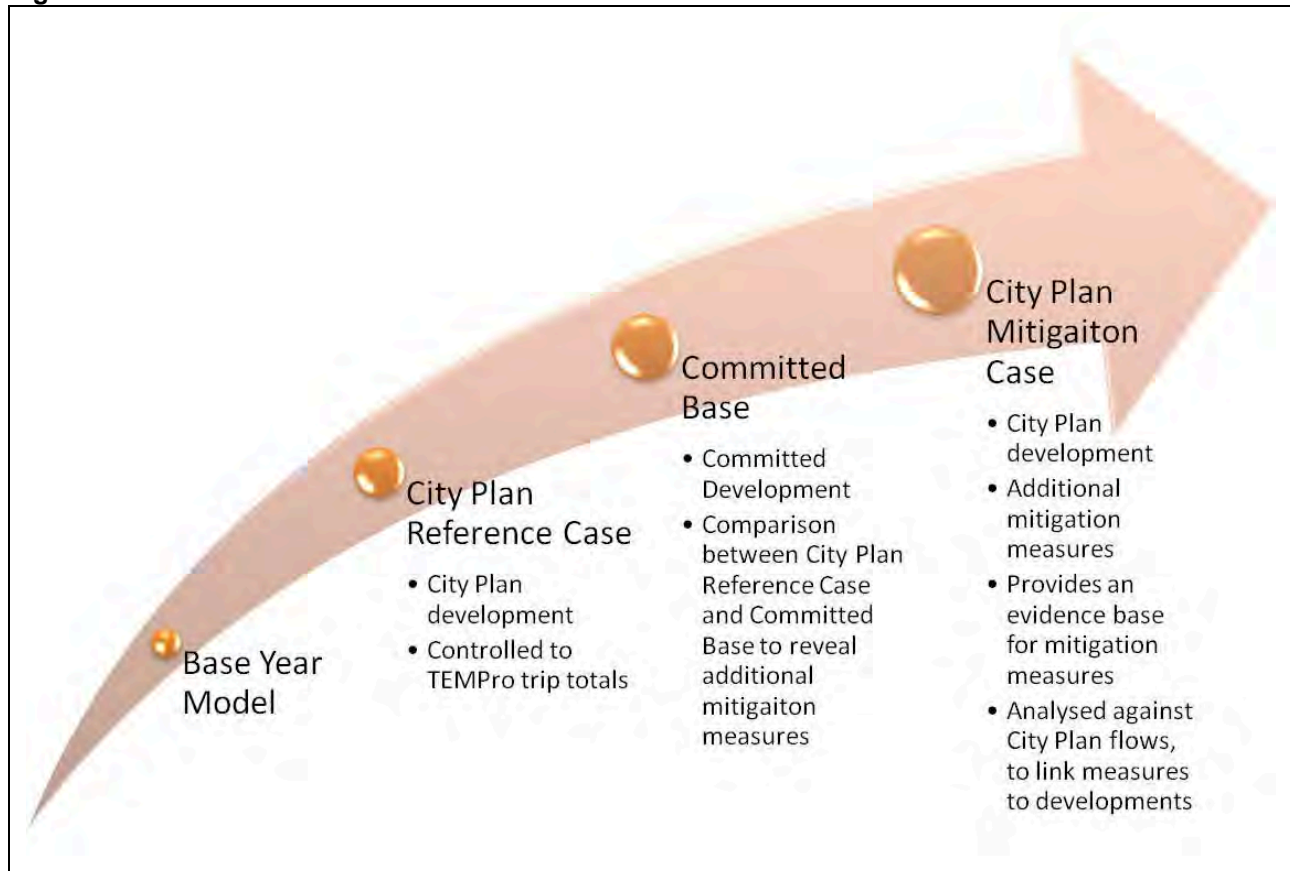
The base year model will then be rerun through to enable cost skims to be calculated for use in the trip distribution of these eight development areas. The results of the base year model will be unchanged as a result of these zones being included as no additional demands will be loaded into the model.

The second task will be the inclusion of all currently committed schemes that have identified funding or are conditioned through the planning system. This network will have updated generalised costs using 2030 values of time coded into it and will represent the supply side of the **Committed Base** scenario.

Onto this Committed Base Network, the schemes identified as being required to facilitate the growth of the City Plan will be coded to produce the supply networks for the **City Plan Reference Case** scenario.

Finally, schemes identified for the **City Plan Mitigation Case** scenario will be added into the City Plan Reference Case networks.

Figure 3 Scenario Schematic



JMP

Trip Generation for Developments

A development database will be constructed for all sites for housing, employment floorspace and employment job numbers. The eight development areas will be forecast through the standard transport assessment process to enable discrete analysis with the remaining developments either located per zone if a site is identified or pro-rata distributed across the city.

For the eight development sites, a set of trip rates will be derived from a review of trip rates used for previous local development framework assessment work, transport assessments from the area and information used in the development of the base year trip matrices. These derived trip rates will then be applied to the planning data to yield a set of trips by journey purpose, mode and time period for inclusion into the trip distribution modelling.

For the remaining developments, the database of planning data will be compared to the base year planning data to provide a set of growth rates and proportions of City Plan developments.

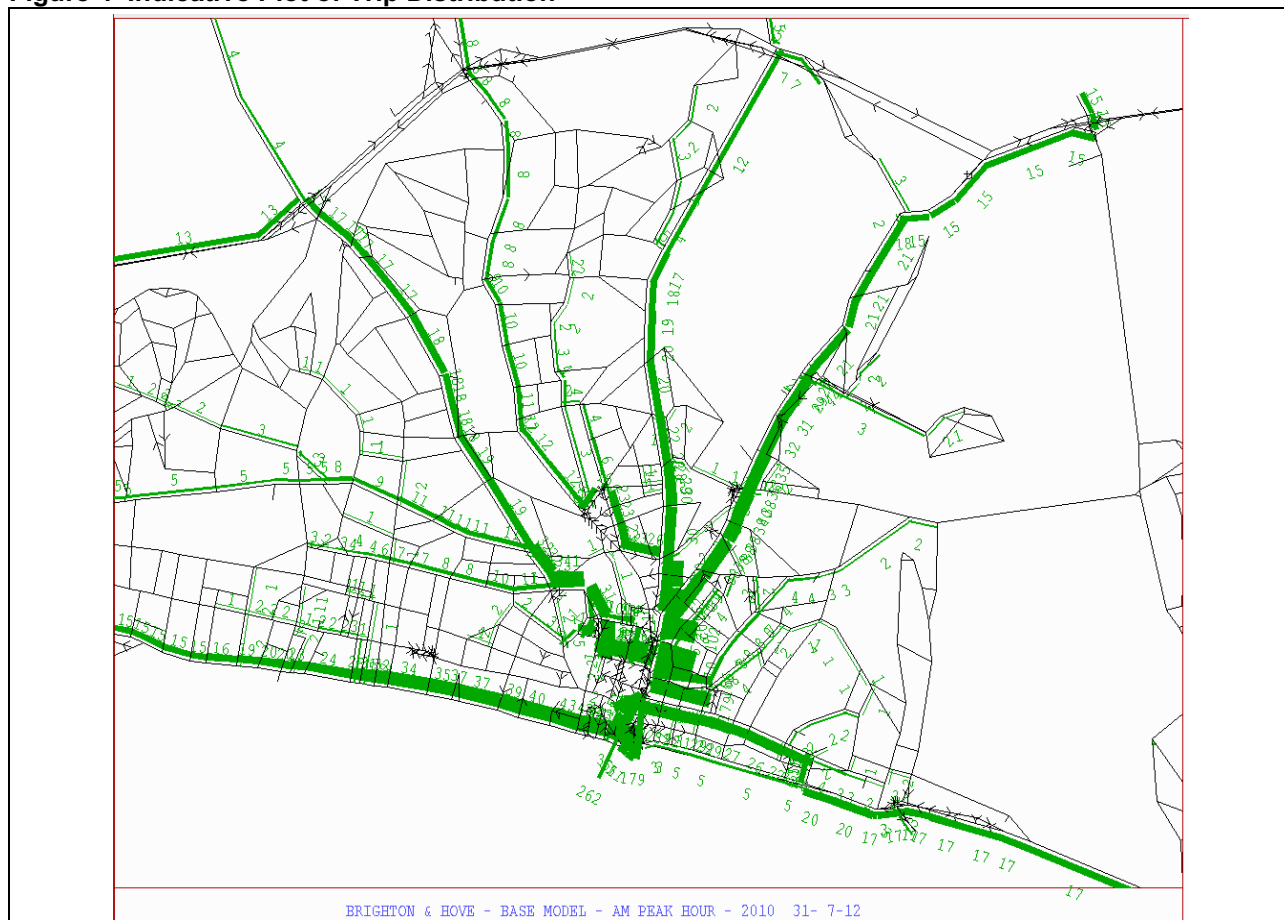
Trip Distribution for Development Areas

The next stage will be to produce a set of travel patterns for each of the eight development areas, and will be accomplished through the use of a calibrated gravity model. The base year travel demands will be analysed with respect to the base year travel costs to provide a set of 'cost curves' relating the cost of trips to the number of trips for each time period, journey purpose and mode combination.

This calibrated cost curve will then be used in conjunction with each of the eight developments identified trip origins (or destinations) and the total base year destinations (or origins) to forecast a pattern of travel for each development area.

The resulting travel patterns will be loaded onto the base year routes to produce a diagram for each development area as per the example below. These diagrams will provide confidence that the initial seeded trip distribution pattern is a plausible pattern of travel for the development areas.

Figure 4 Indicative Plot of Trip Distribution



JMP

The trip distribution for the remaining developments will be based on the validated base model travel patterns. The percentage change in planning data terms will be applied to the trip matrices, with the change in households being a proxy for trip origins and the change in jobs being a proxy for destinations.

Constraining to TEMPRO

The final stage of the forecasting will be to constrain the trip totals to those output by TEMPRO. This is required to allow for changes in car ownership to be reflected within the forecasts and to ensure compatibility with nationally derived forecasts. While this compatibility is not required for a LDF assessment, it is recommended as future work leading towards business case submissions will require compatibility as a pre-requisite for bid submission.

The total levels of housing and jobs for the study area (committed plus City Plan) will be input into the TEMPRO program as an alternative planning scenario, with the output providing a total for future year trips by time period, journey purpose and mode for this level of development.

These targets will then be input as control totals into a doubly constrained trip factoring process that will seek to constrain the combination of the factored base year trip matrices and development area trip matrices to the total trips as output from TEMPRO. The output will be journey purpose, mode and time period specific origin destination matrices that can be input into the Brighton multi-modal transport model to enable the inclusion of the effects of change in travel costs to be incorporated into the forecasts.

Distribution Emma Young, Chris Sibthorpe,

Name/ Signed Paul Gray

Appendix D

TEMPRO Factors

Job No	Report No	Issue no	Report Name	Page
ST13119	1	1	Brighton & Hove City Plan	D1

Appendix E

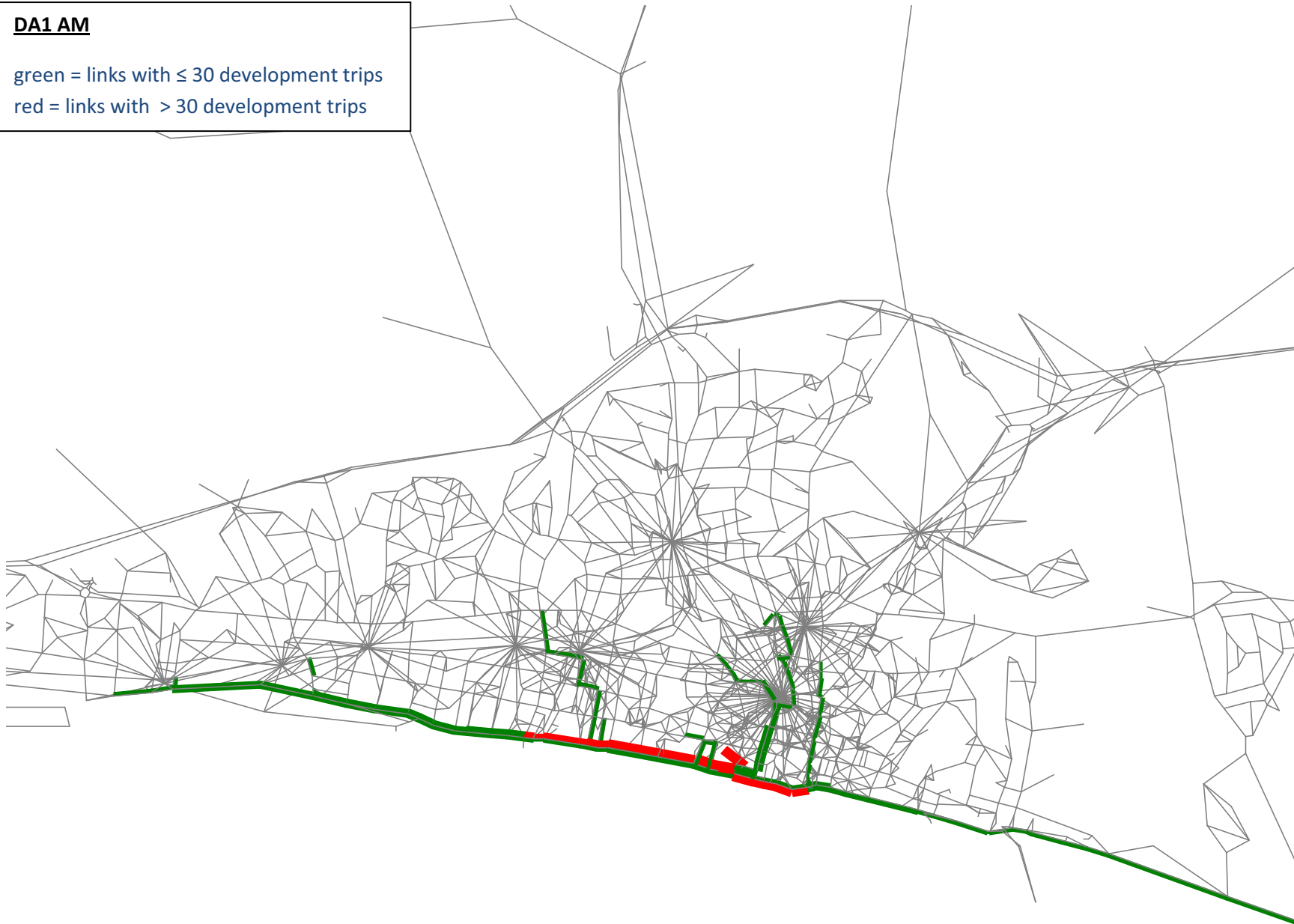
Development Areas Trip Distribution Maps

Job No	Report No	Issue no	Report Name	Page
ST13119	1	1	Brighton & Hove City Plan	E1

DA1 AM

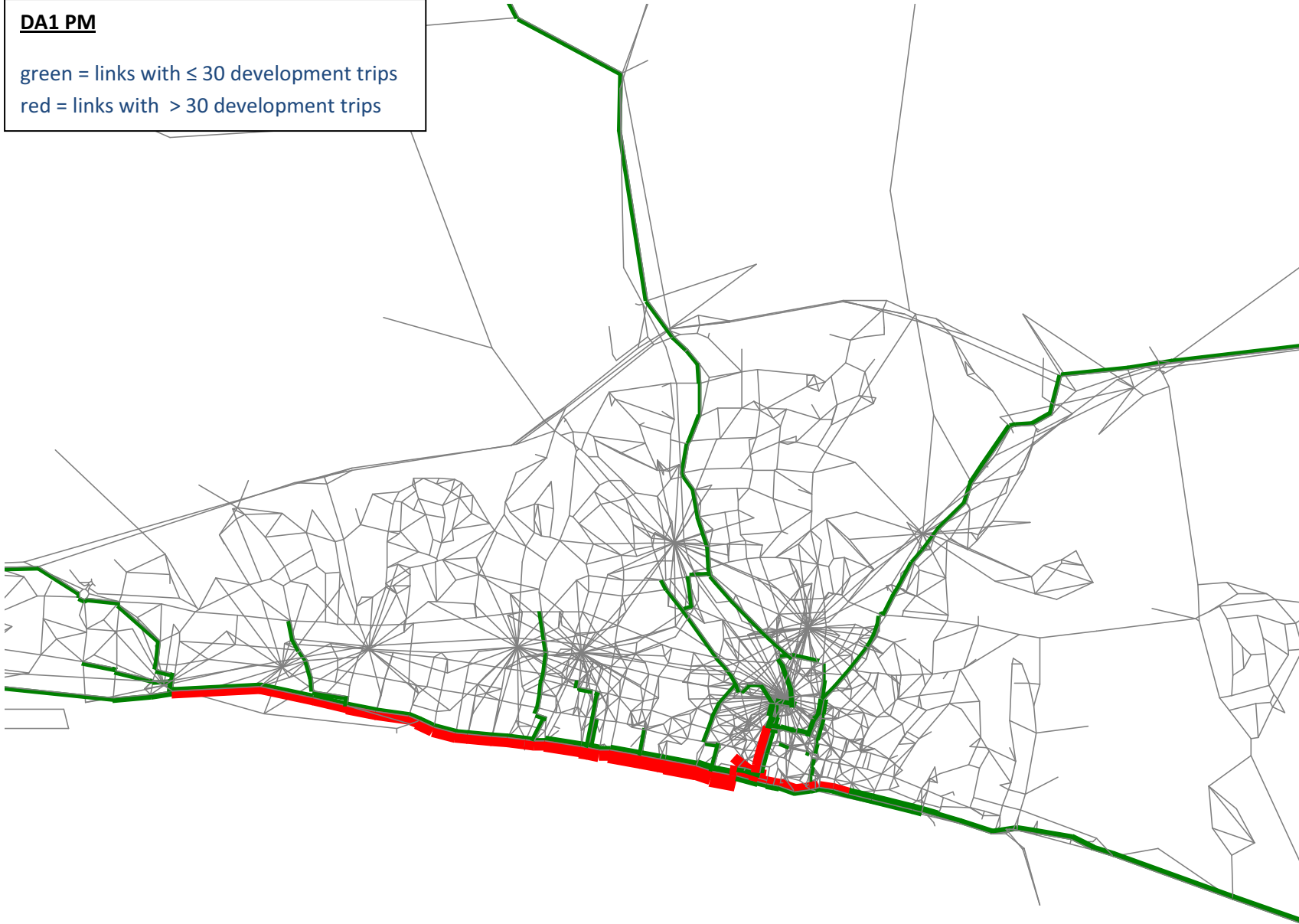
green = links with ≤ 30 development trips

red = links with > 30 development trips



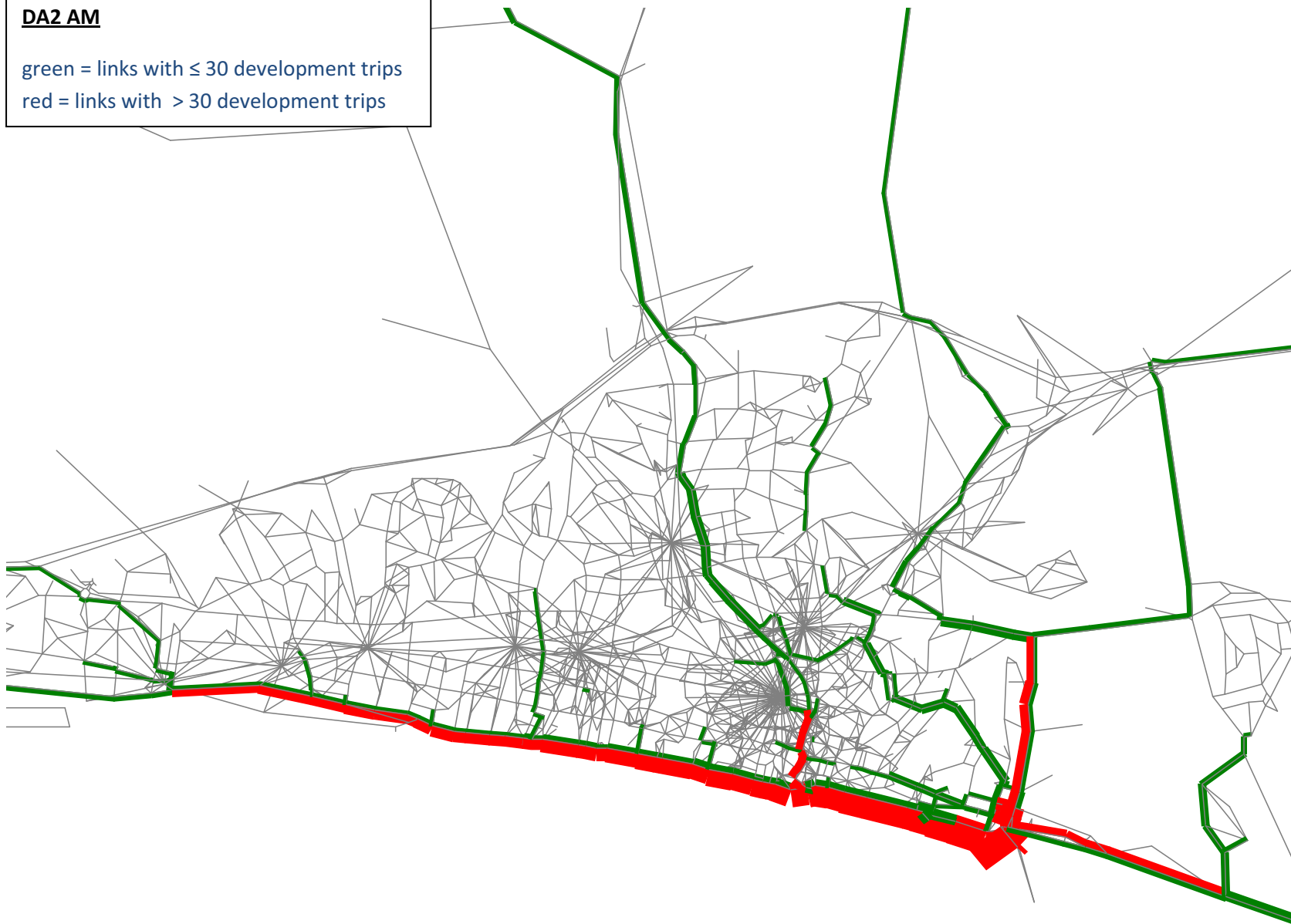
DA1 PM

green = links with ≤ 30 development trips
red = links with > 30 development trips



DA2 AM

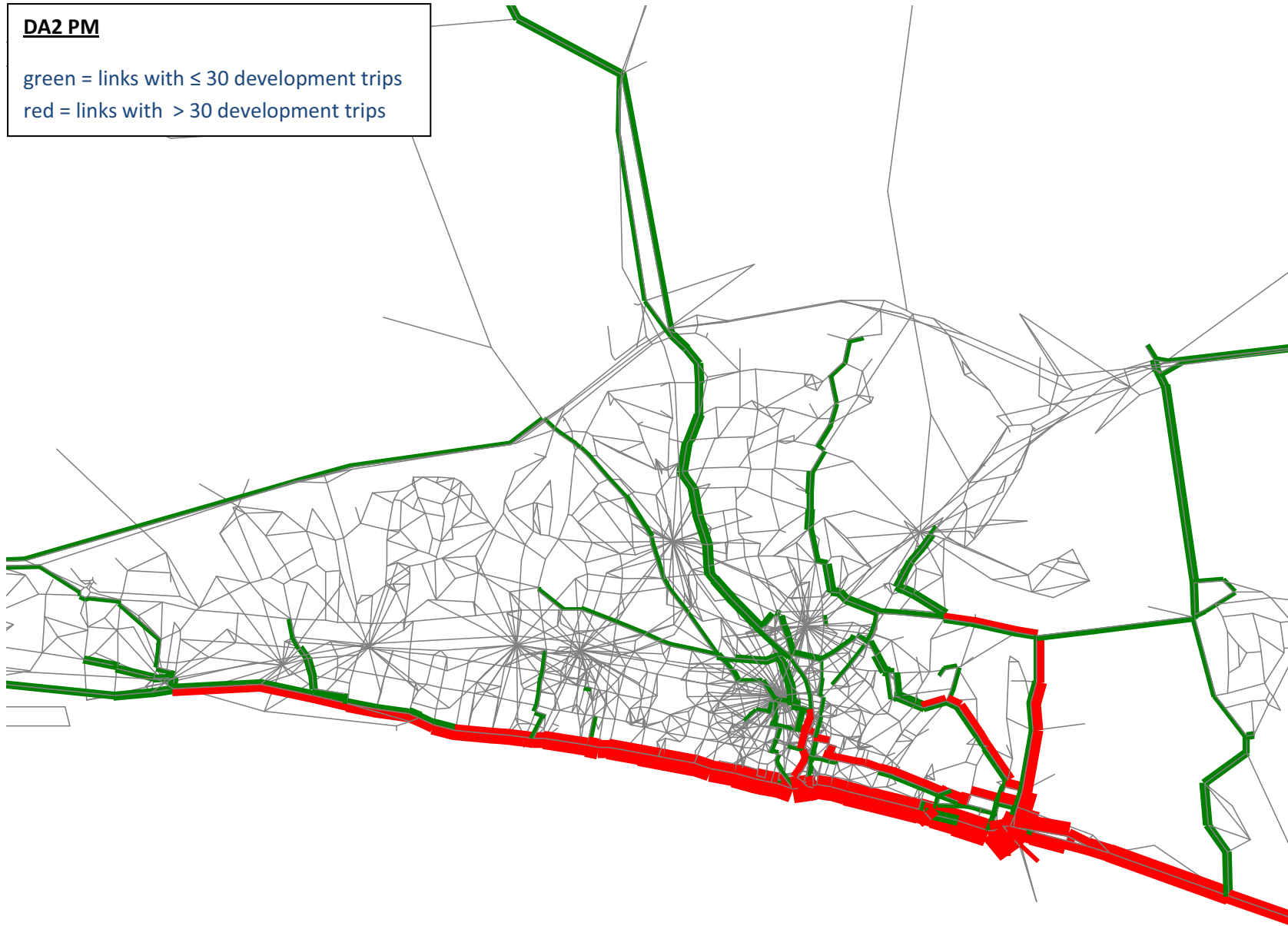
green = links with ≤ 30 development trips
red = links with > 30 development trips



DA2 PM

green = links with ≤ 30 development trips

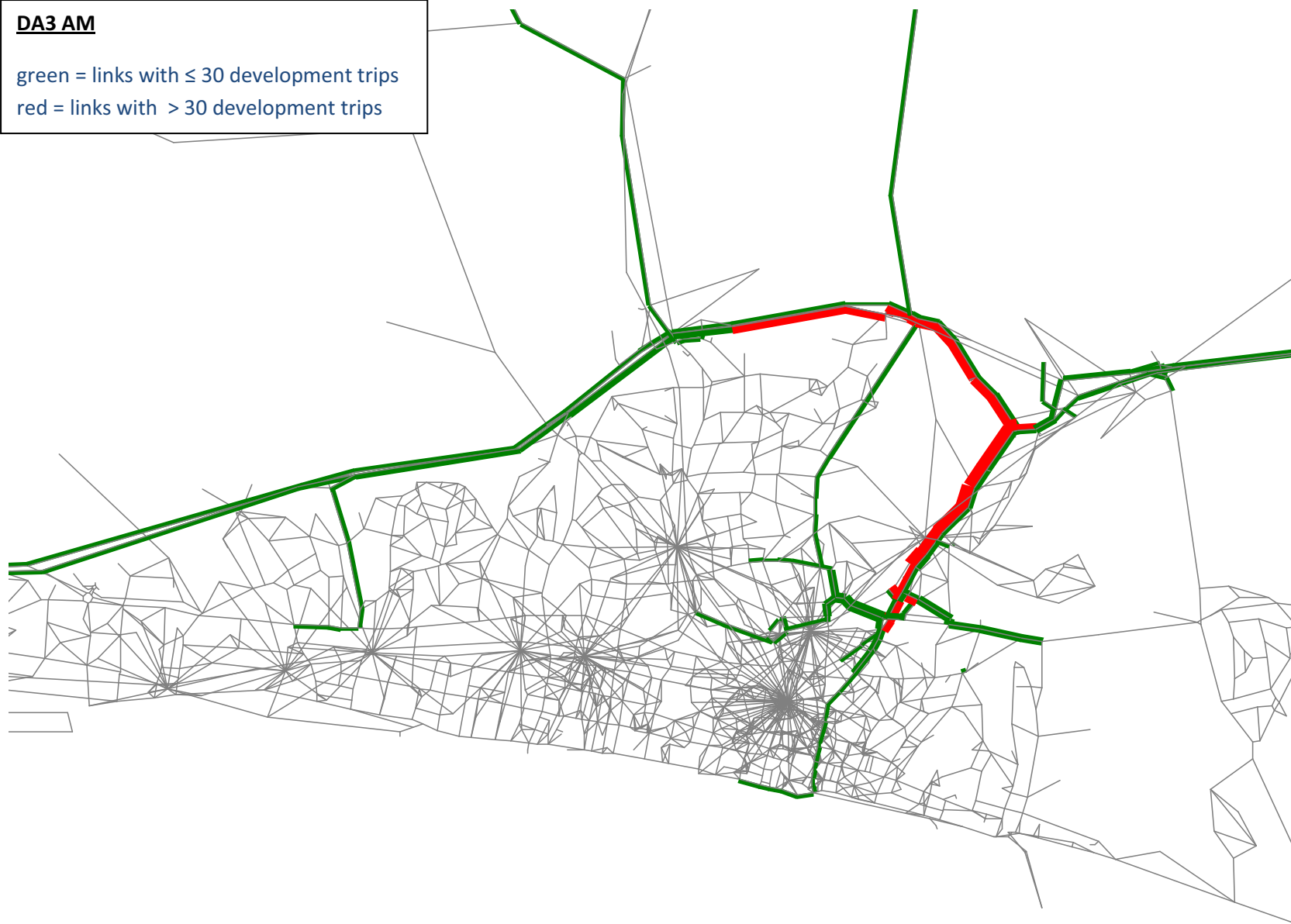
red = links with > 30 development trips



DA3 AM

green = links with ≤ 30 development trips

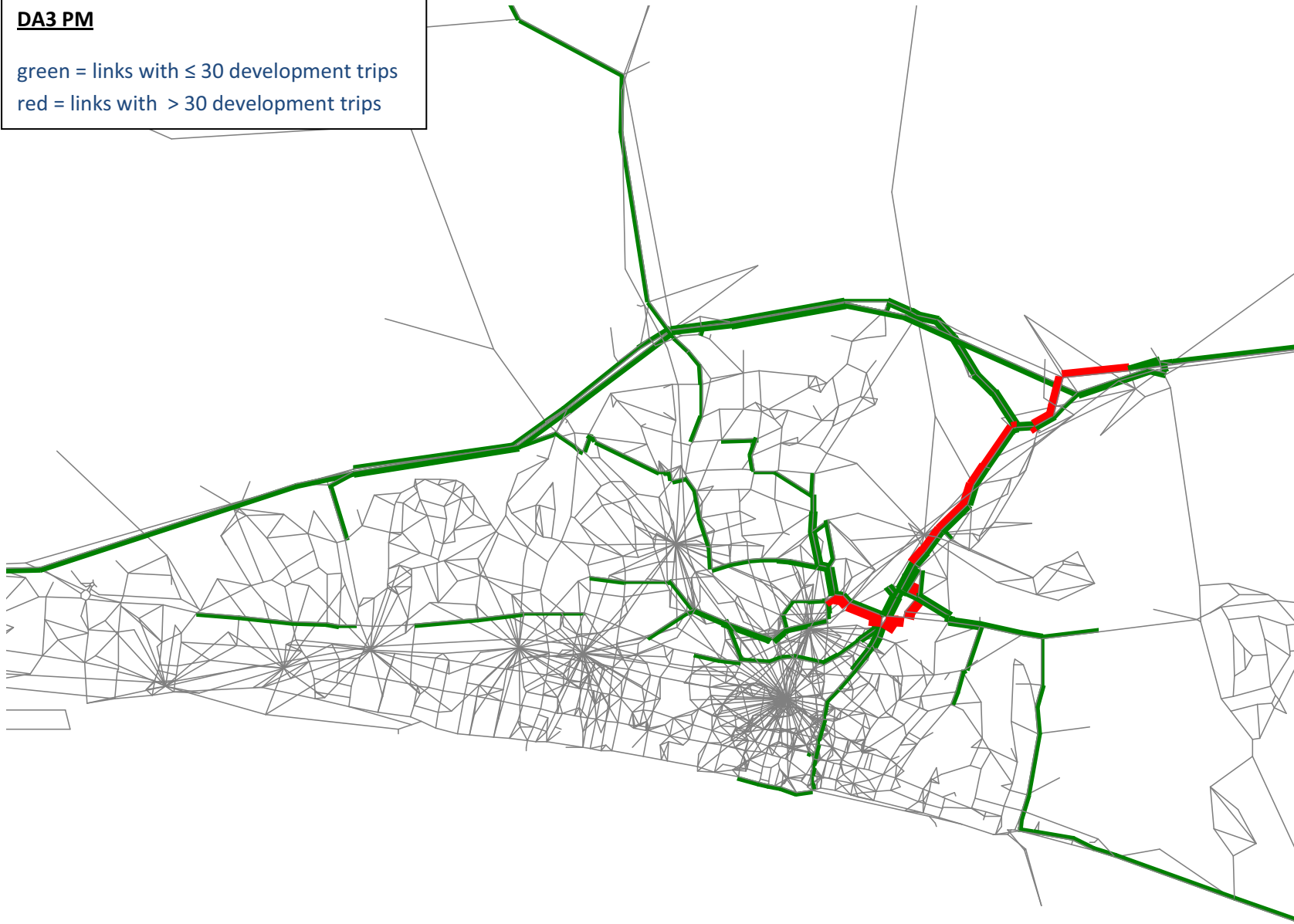
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DA3 PM

green = links with ≤ 30 development trips

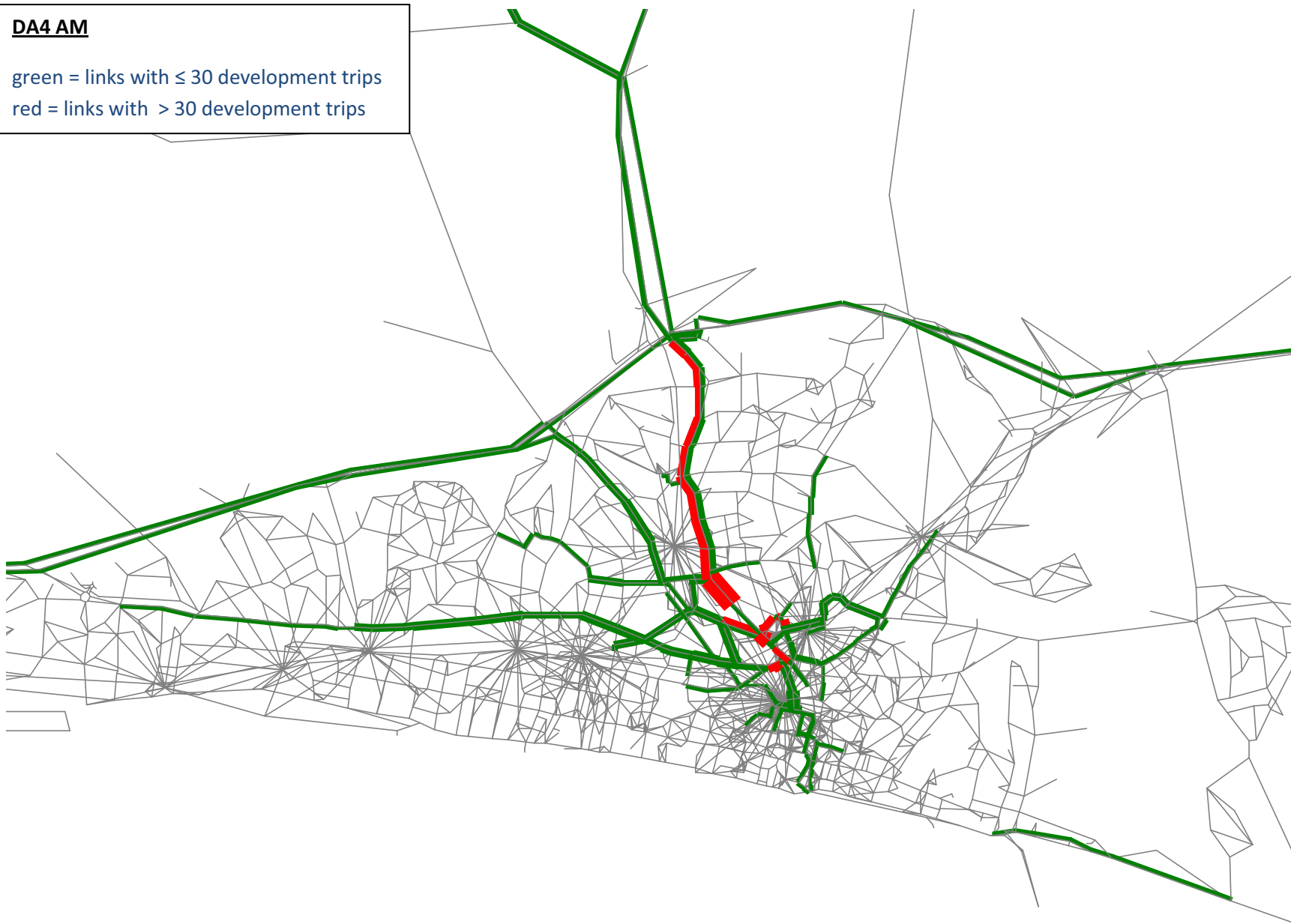
red = links with > 30 development trips



DA4 AM

green = links with ≤ 30 development trips

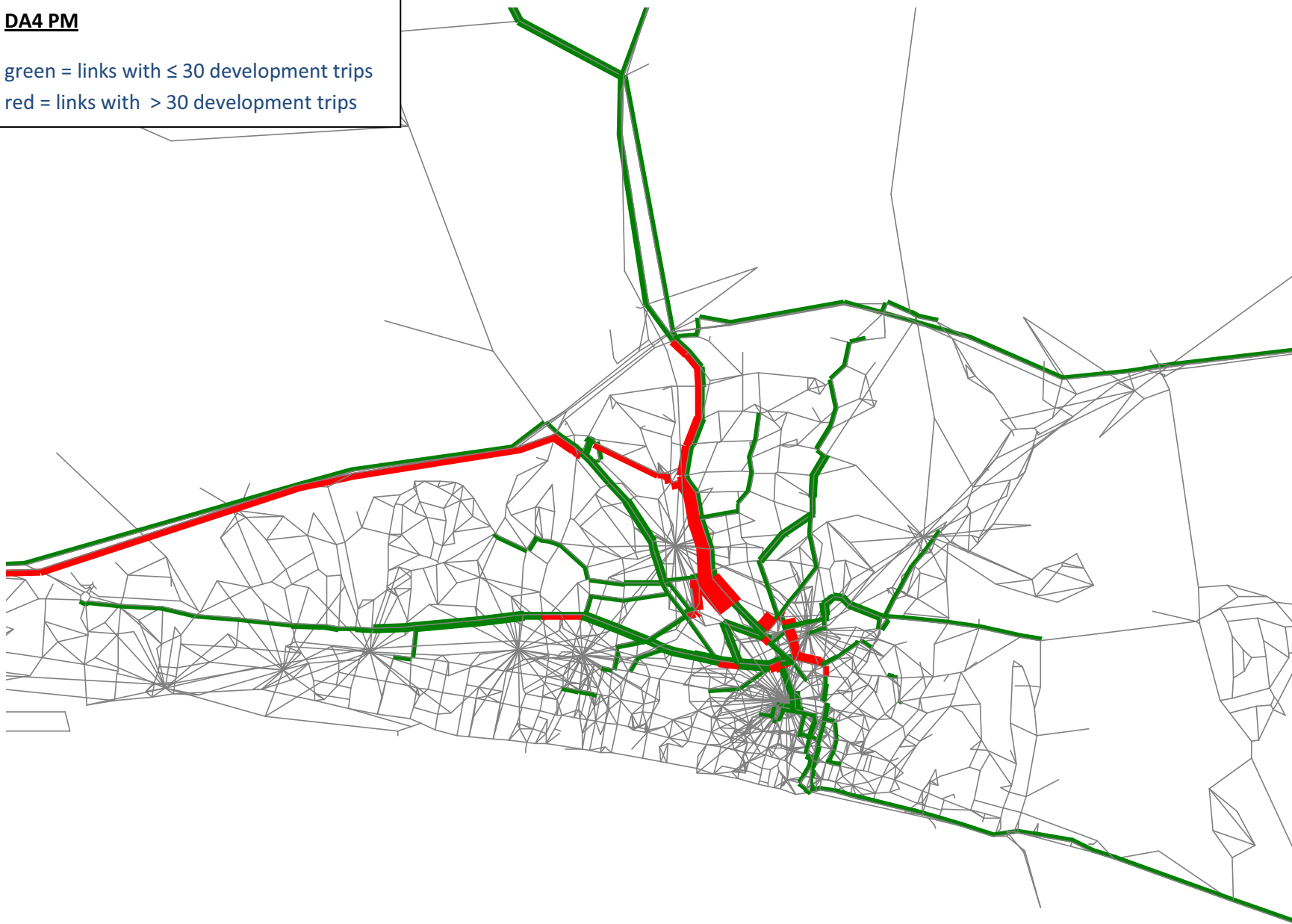
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DA4 PM

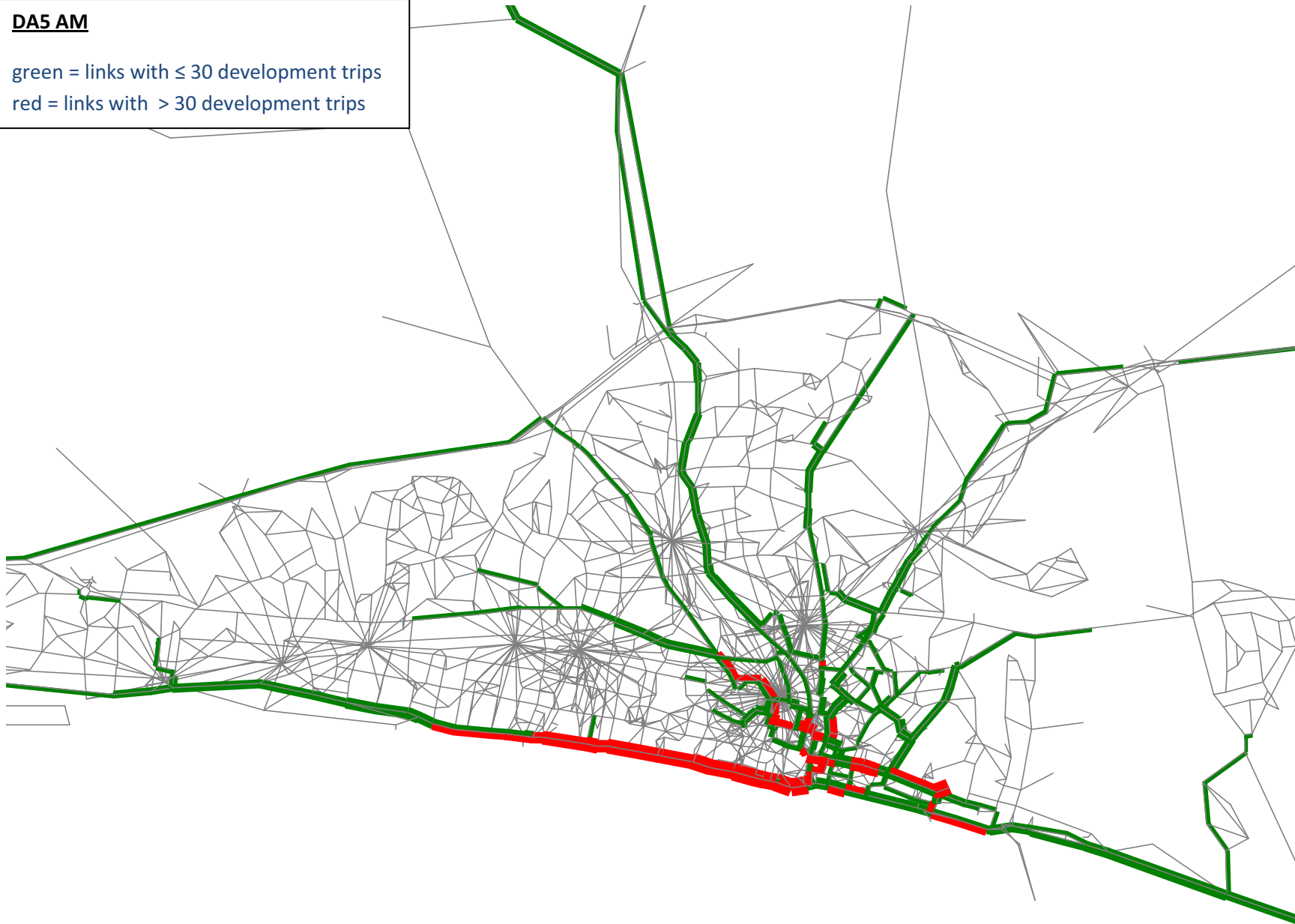
green = links with ≤ 30 development trips

red = links with > 30 development trips



DA5 AM

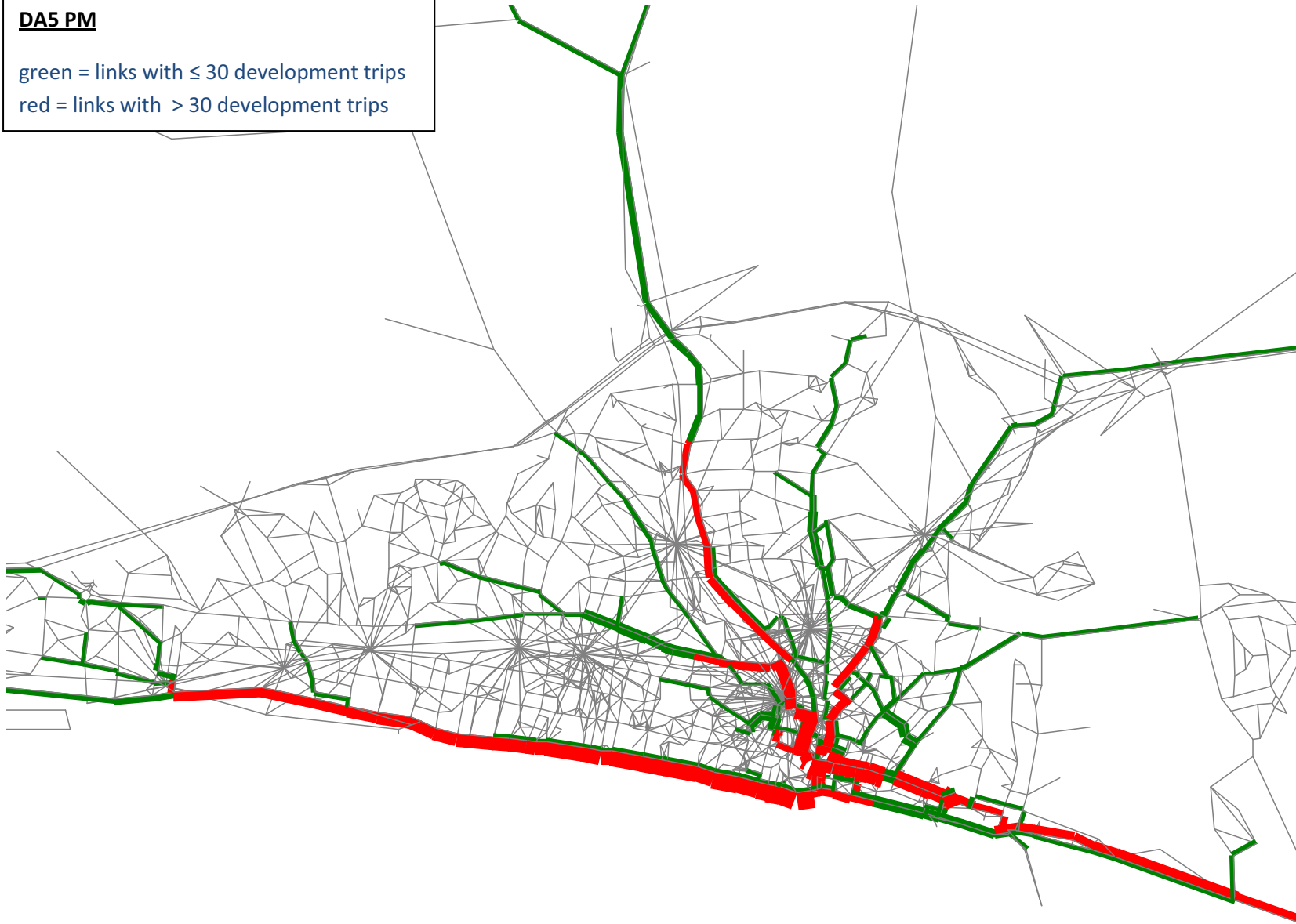
green = links with ≤ 30 development trips
red = links with > 30 development trips



DA5 PM

green = links with ≤ 30 development trips

red = links with > 30 development trips



DA6 AM

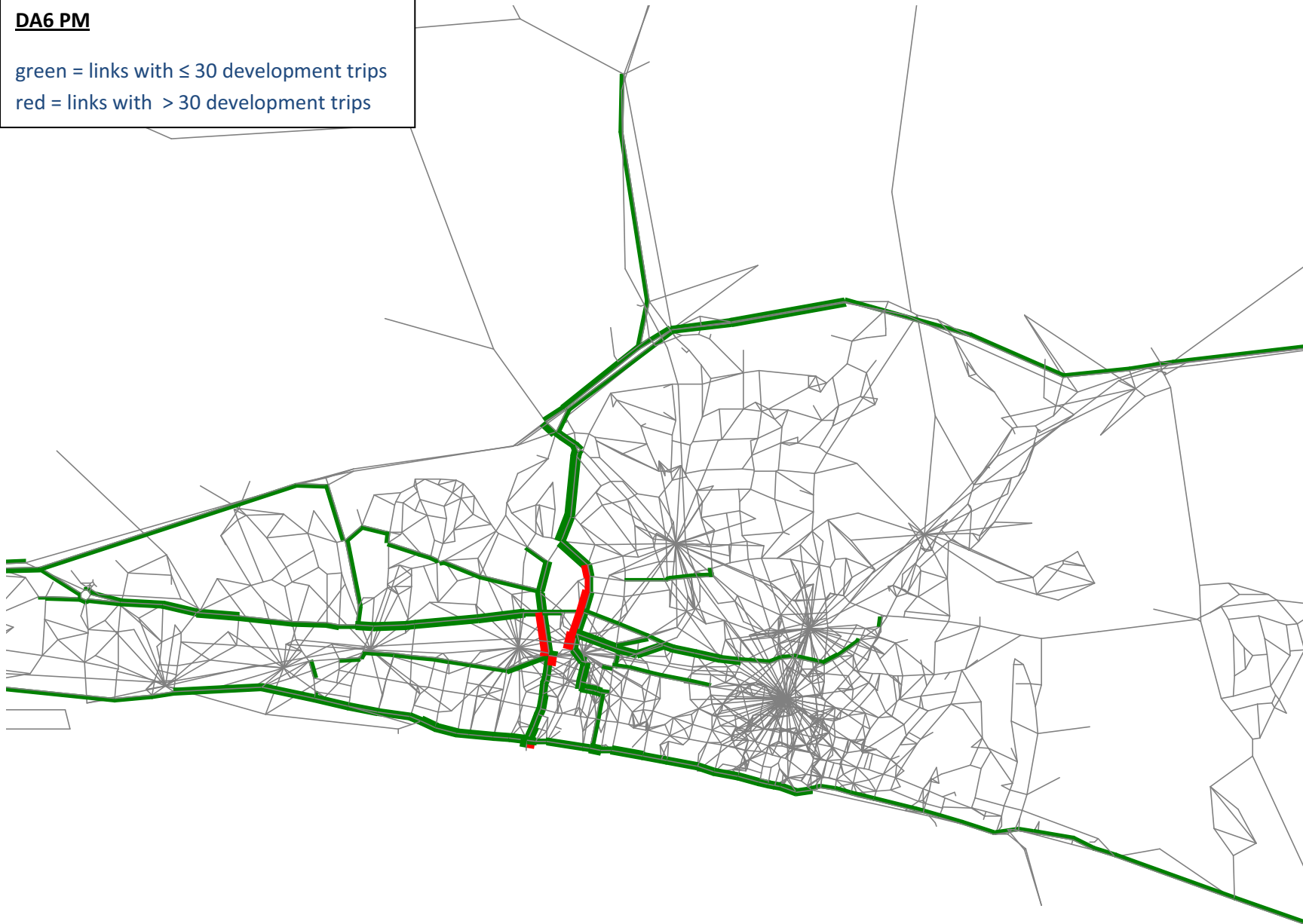
green = links with ≤ 30 development trips
red = links with > 30 development trips



DA6 PM

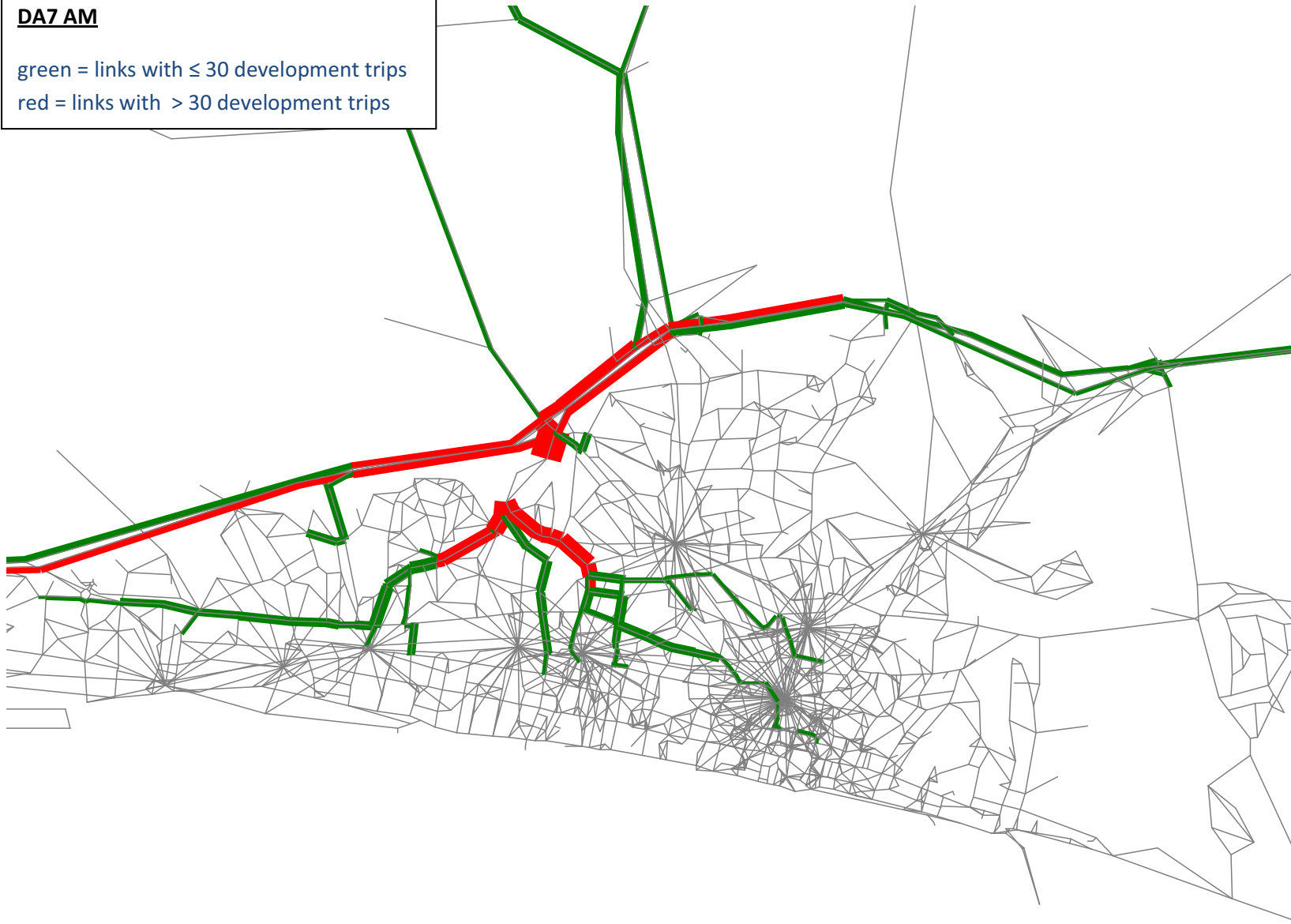
green = links with ≤ 30 development trips

red = links with > 30 development trips



DA7 AM

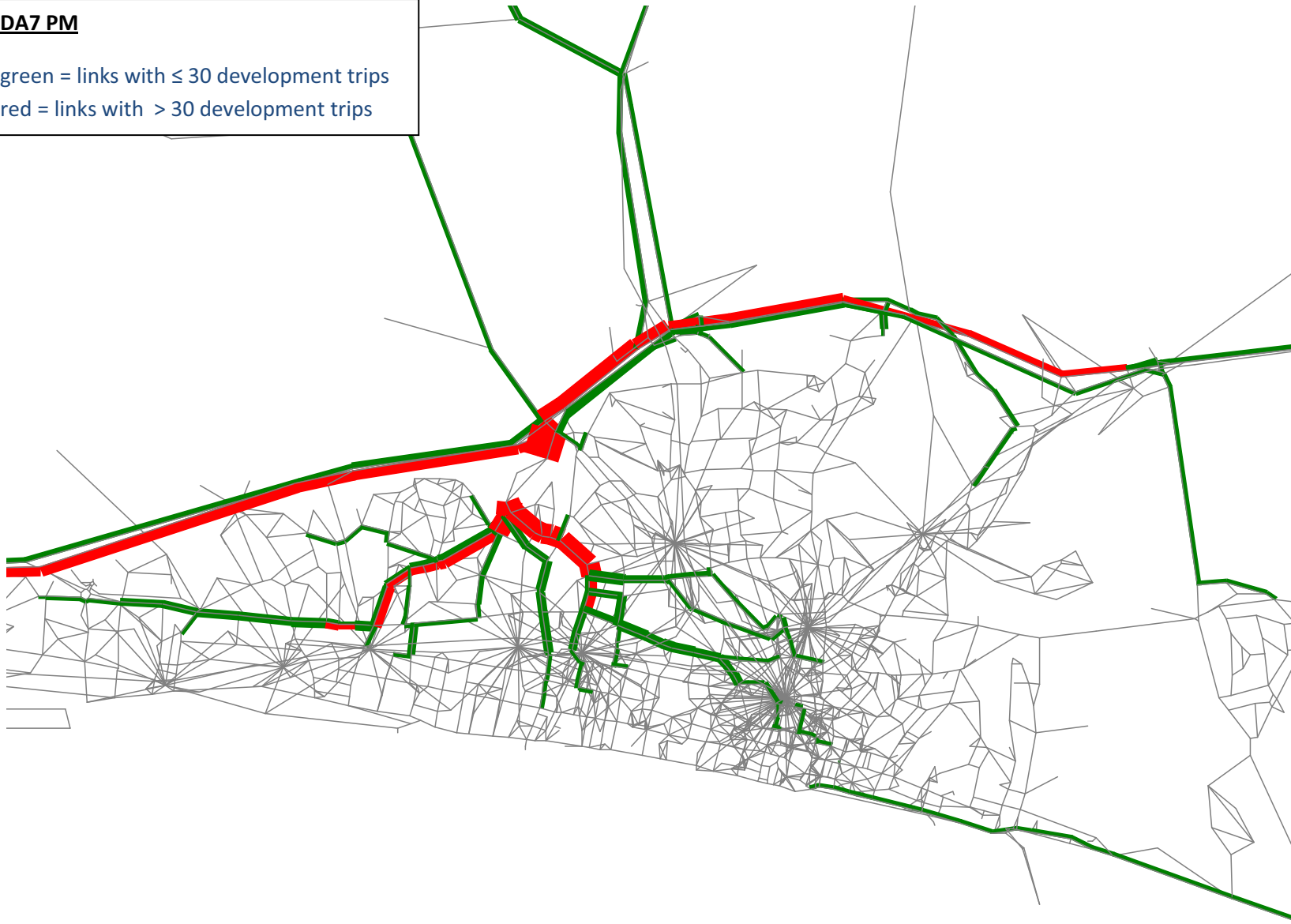
green = links with ≤ 30 development trips
red = links with > 30 development trips



DA7 PM

green = links with ≤ 30 development trips

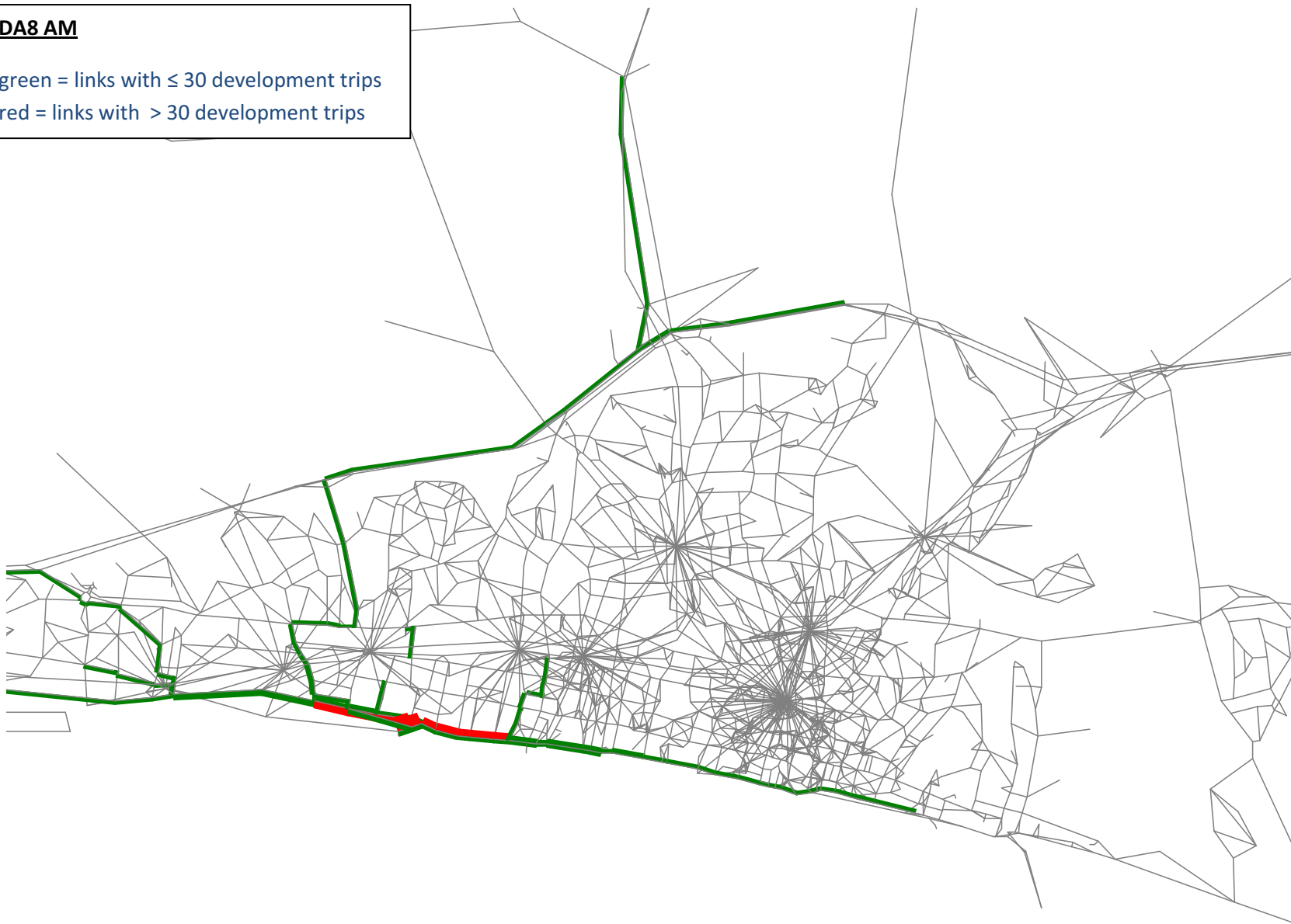
red = links with > 30 development trips



DA8 AM

green = links with ≤ 30 development trips

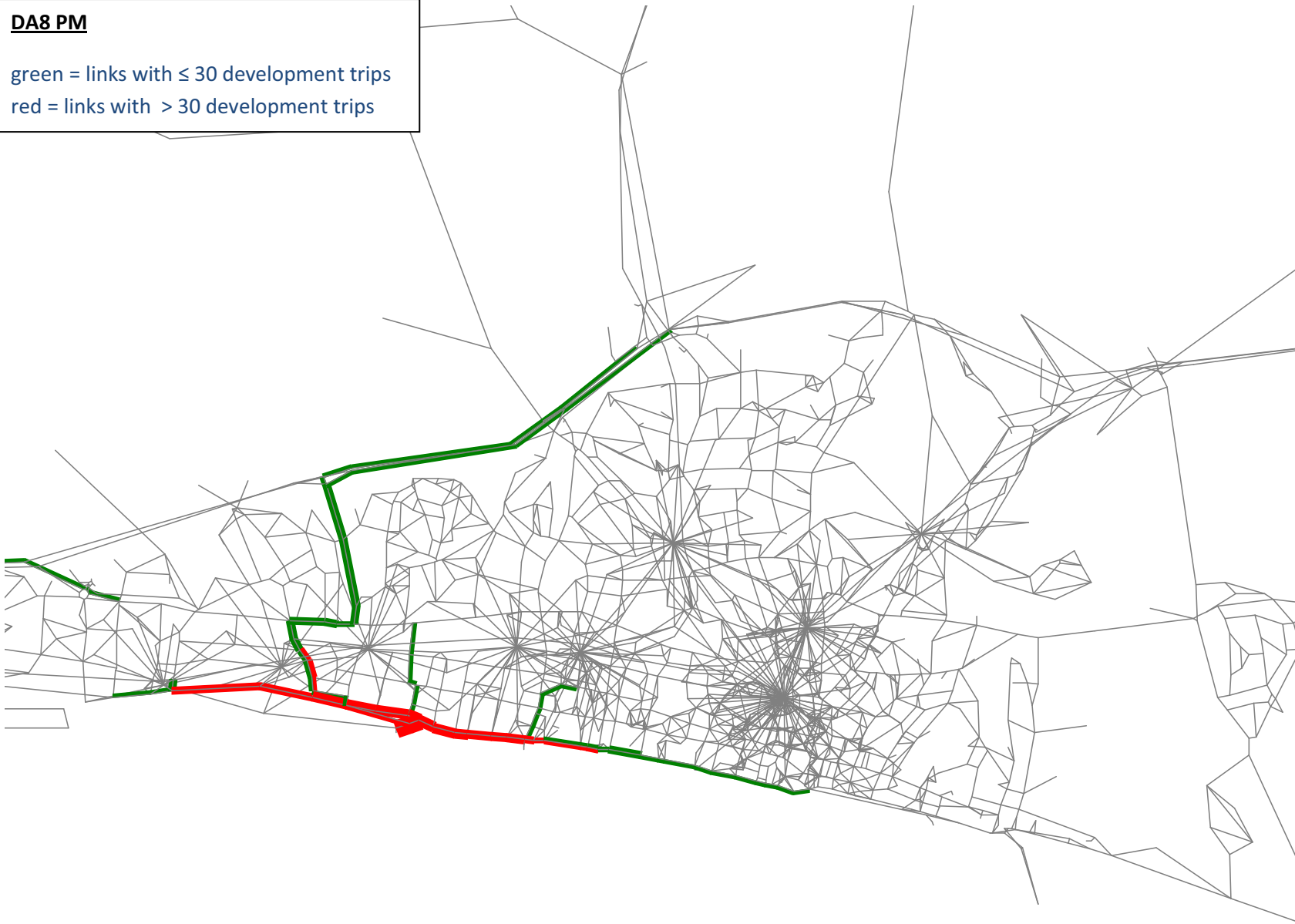
red = links with > 30 development trips



DA8 PM

green = links with ≤ 30 development trips

red = links with > 30 development trips

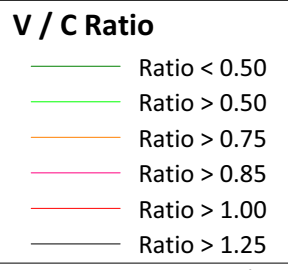


Appendix F

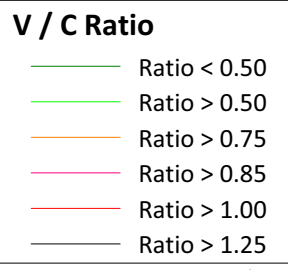
Volume to Capacity Ratio Plots

Job No	Report No	Issue no	Report Name	Page
ST13119	1	1	Brighton & Hove City Plan	F1

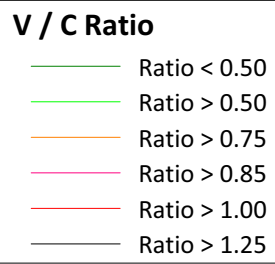
Brighton City Plan Modelling
2030 Consented Plan
Volume over Link Capacity Ratio
Morning Peak



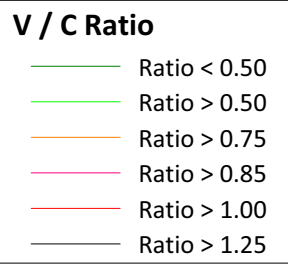
Brighton City Plan Modelling
2030 City Plan Reference Case
Volume over Link Capacity Ratio
Morning Peak



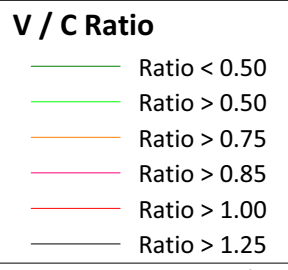
Brighton City Plan Modelling
2030 Consented Plan
Volume over Link Capacity Ratio
Inter Peak



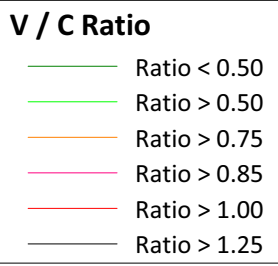
Brighton City Plan Modelling
2030 City Plan Reference Case
Volume over Link Capacity Ratio
Inter Peak



Brighton City Plan Modelling
2030 Consented Plan
Volume over Link Capacity Ratio
Evening Peak



Brighton City Plan Modelling
2030 City Plan Reference Case
Volume over Link Capacity Ratio
Evening Peak

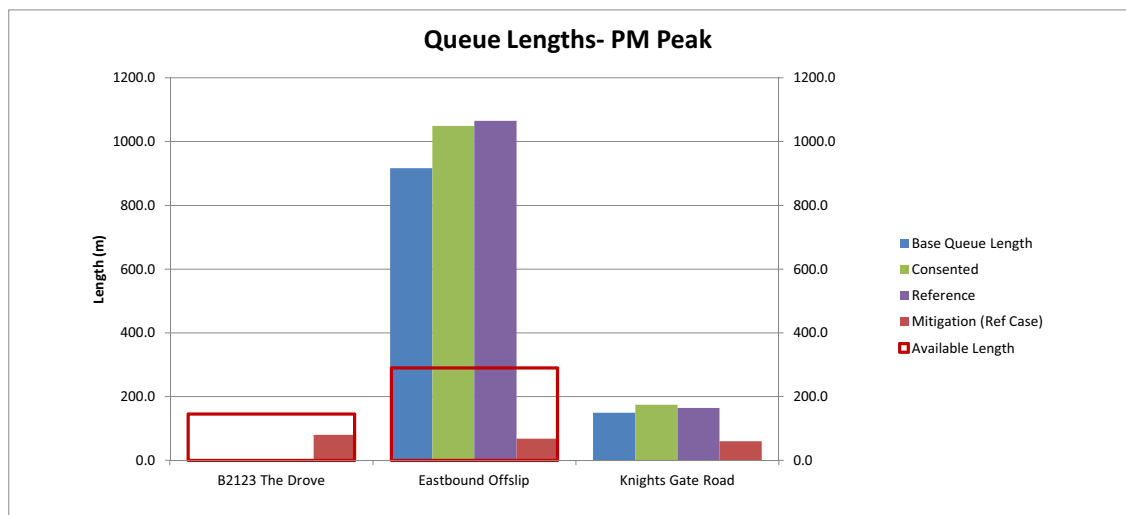
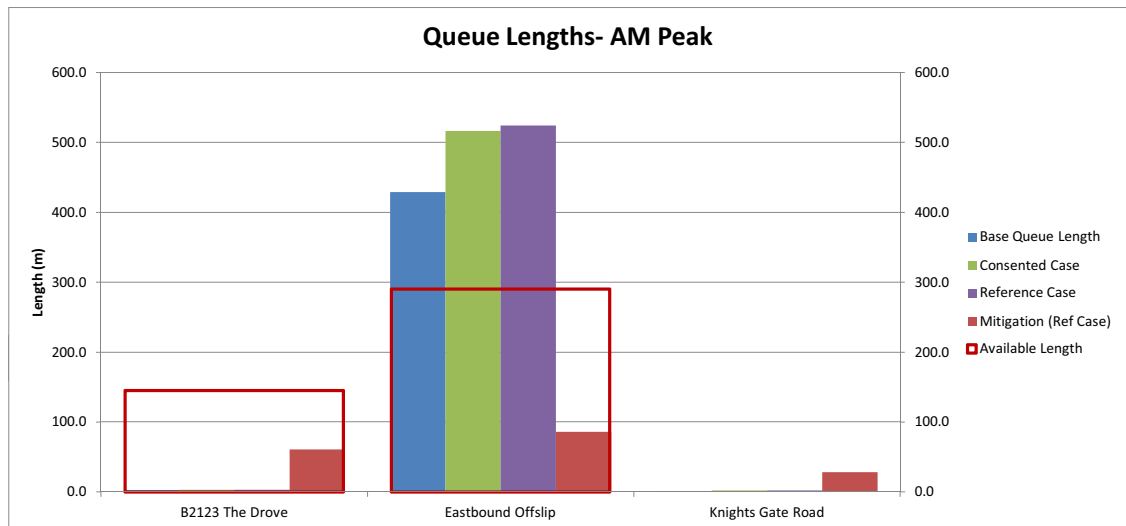


SRN Junction Assessments

Job No	Report No	Issue no	Report Name	Page
ST13119	1	1	Brighton & Hove City Plan	G1

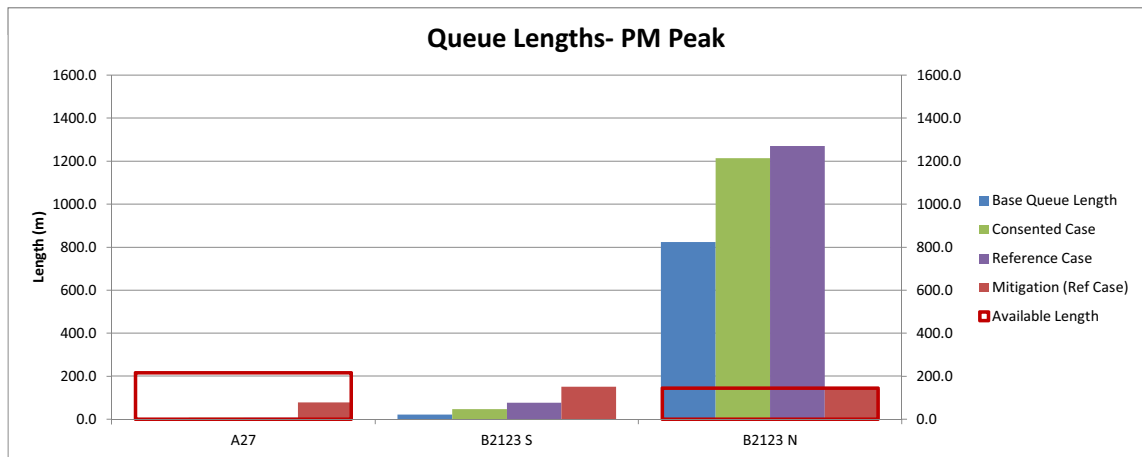
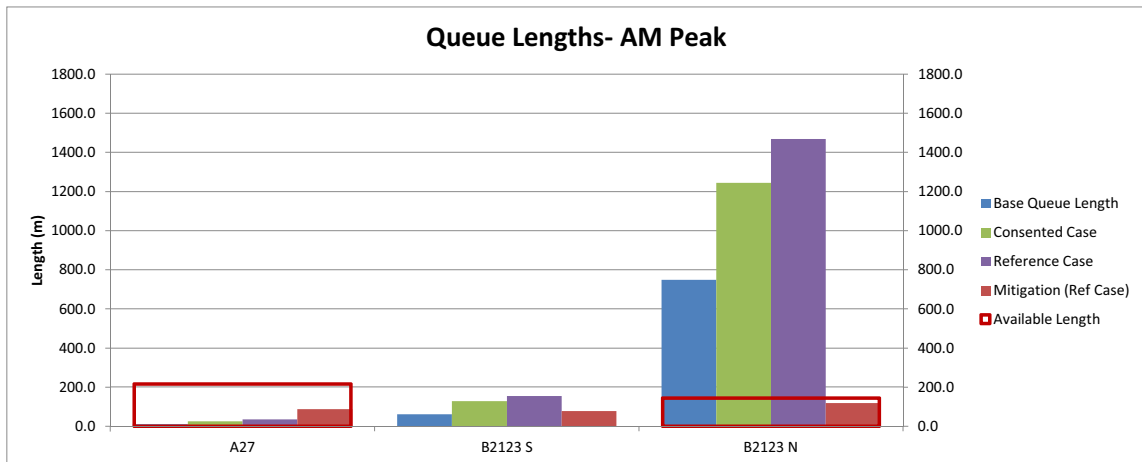
Site 1- Falmer Interchange, North Roundabout

	AM						PM					
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Existing Layout - 2012 Existing							Existing Layout - 2012 Existing					
B2123 The Drove	0.47	3.68	0.31	A			0.35	3.42	0.25	A		
Eastbound Offslip	74.57	167.52	1.1	F			159.43	733.87	1.36	F		
Knights Gate Road	0.24	4.51	0.17	A			25.94	186.95	1.08	F		
Existing Layout - Consented Case							Existing Layout - Consented Case					
B2123 The Drove	0.55	3.87	0.35	A			0.42	3.58	0.29	A		
Eastbound Offslip	89.83	202.24	1.12	F			182.55	860.14	1.4	F		
Knights Gate Road	0.39	4.83	0.25	A			30.42	218.86	1.1	F		
Existing Layout - Ref Case						Mitigation - Ref Case	Existing Layout - Ref Case					Mitigation - Ref Case
B2123 The Drove	0.56	3.89	0.35	A	10.6	0.78	0.49	3.76	0.32	A	14.0	0.79
Eastbound Offslip	91.19	205.41	1.13	F	15.0	0.73	185.29	872.76	1.4	F	11.8	0.65
Knights Gate Road	0.42	4.96	0.26	A	4.9	0.77	28.59	204.67	1.1	F	10.5	0.66



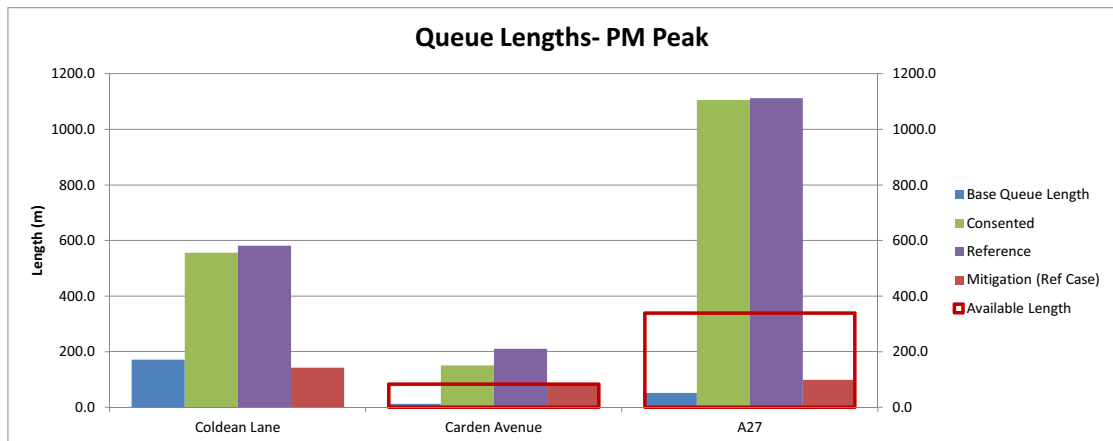
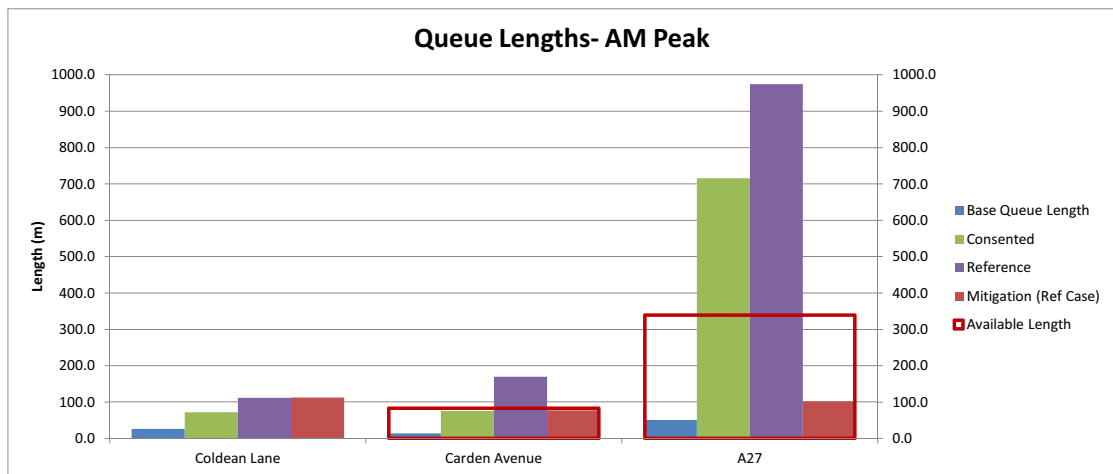
Site 1- Falmer Interchange, South Roundabout

	AM						PM					
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Existing Layout - 2012 Base												
A27	1.81	11.94	0.64	B			0.79	7.68	0.44	A		
B2123 S	10.84	36.46	0.93	E			3.76	12.83	0.79	B		
B2123 N	130.26	718.21	1.4	F			143.21	757.75	1.41	F		
Existing Layout - Consented Case												
A27	4.51	23.42	0.83	C			1.23	9.21	0.55	A		
B2123 S	22.49	67.44	0.99	F			8.13	25.18	0.9	D		
B2123 N	216.34	1235.98	1.58	F			211.1	1184.99	1.59	F		
Existing Layout - Ref Case				Mitigation - Ref Case			Existing Layout - Ref Case				Mitigation - Ref Case	
A27	6.07	30.27	0.87	D	15.2	0.85	1.21	9.1	0.55	A	13.6	0.75
B2123 S	26.97	77.81	1.01	F	13.7	0.88	13.32	39.34	0.95	E	26.2	0.90
B2123 N	255.32	1470.23	1.66	F	20.6	0.87	220.94	1257.01	1.62	F	24.5	0.89



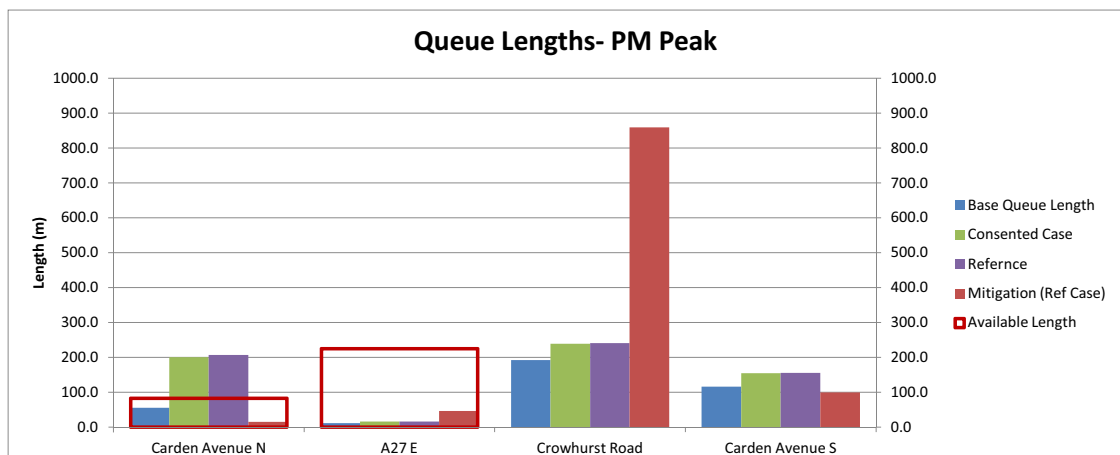
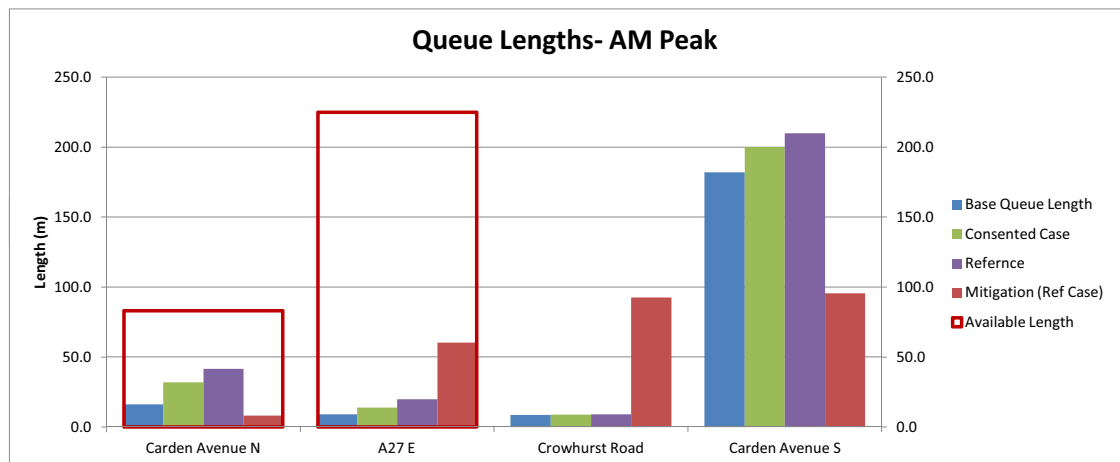
Site 3- A27/Carden Avenue, North Roundabout

	AM						PM					
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Existing Layout - 2012 Base												
Coldean Lane	4.61	18.92	0.83	C			29.78	95.2	1.02	F		
Carden Avenue	2.5	13.37	0.72	B			2.25	12.32	0.69	B		
A27	8.88	32.36	0.91	D			9.05	32.4	0.91	D		
Existing Layout - Consented Case												
Coldean Lane	12.57	48.41	0.95	E			96.75	321.58	1.16	F		
Carden Avenue	13.14	54.59	0.95	F			26.11	94.83	1.01	F		
A27	124.52	378.12	1.23	F			192.18	623.49	1.34	F		
Existing Layout - Ref Case												
Coldean Lane	19.37	69.16	0.99	F	19.5	0.78	101.02	334.17	1.17	F	24.9	0.85
Carden Avenue	29.45	104.59	1.03	F	13.5	0.78	36.55	123.96	1.05	F	14.5	0.77
A27	169.53	563.18	1.3	F	17.7	0.83	193.37	635.21	1.33	F	17.2	0.89



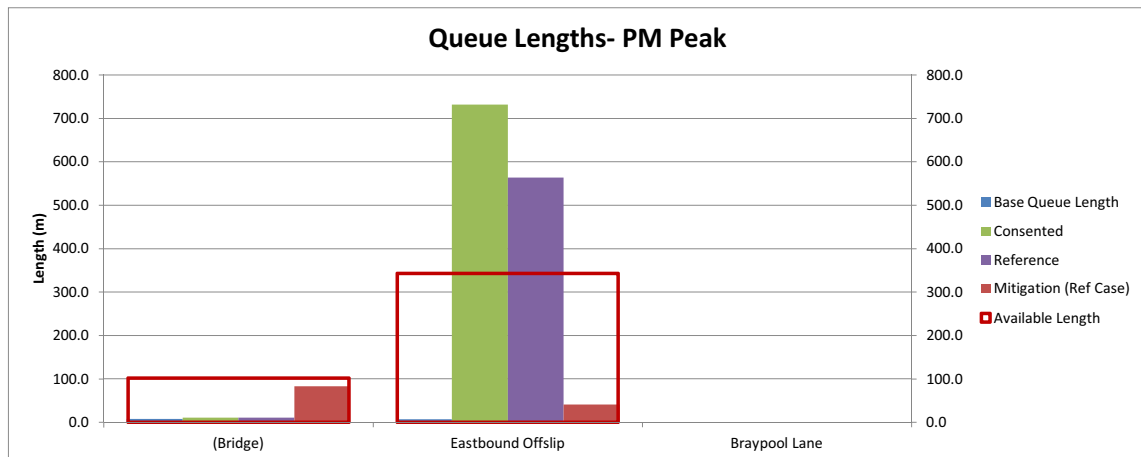
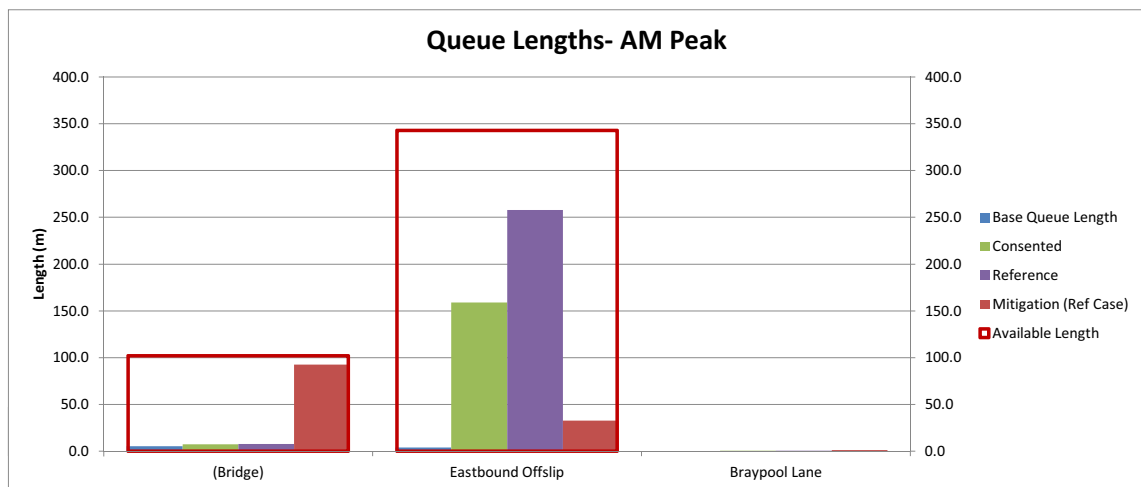
Site 3- A27/Carden Avenue, South Roundabout

	AM						PM					
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Existing Layout - 2012 Base												
A27 E	1.56	12.88	0.62	B			2.06	20.14	0.69	C		
Crowhurst Road	1.5	21.22	0.59	C			34.19	294.71	1.13	F		
Carden Avenue S	31.67	134.12	1.05	F			20.23	108.92	1.08	F		
Carden Avenue N	2.83	8.94	0.74	A			9.65	25.27	0.92	D		
Existing Layout - Consented Case												
A27 E	2.4	18.94	0.72	C			2.77	27.5	0.75	D		
Crowhurst Road	1.55	22.07	0.6	C			41.53	356.45	1.22	F		
Carden Avenue S	34.81	148.76	1.06	F			26.99	150.61	1.11	F		
Carden Avenue N	5.56	13.93	0.86	B			34.94	63.19	1.06	F		
Existing Layout - Ref Case				Mitigation - Ref Case		Existing Layout - Ref Case				Mitigation - Ref Case		
A27 E	3.46	25.18	0.8	D	10.5	0.87	2.81	27.91	0.76	D	8.1	0.59
Crowhurst Road	1.58	22.66	0.6	C	16.1	0.96	41.99	360.37	1.23	F	149.4	1.55
Carden Avenue S	36.52	156.72	1.06	F	16.6	0.78	27.1	151.02	1.11	F	17.3	0.88
Carden Avenue N	7.21	16.82	0.89	C	1.4	0.73	36.09	65.29	1.06	F	2.6	0.83



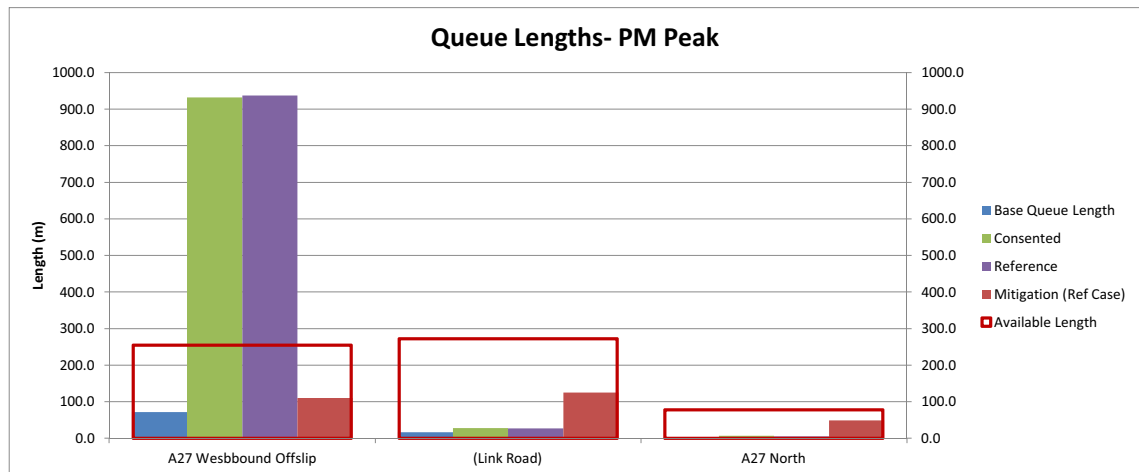
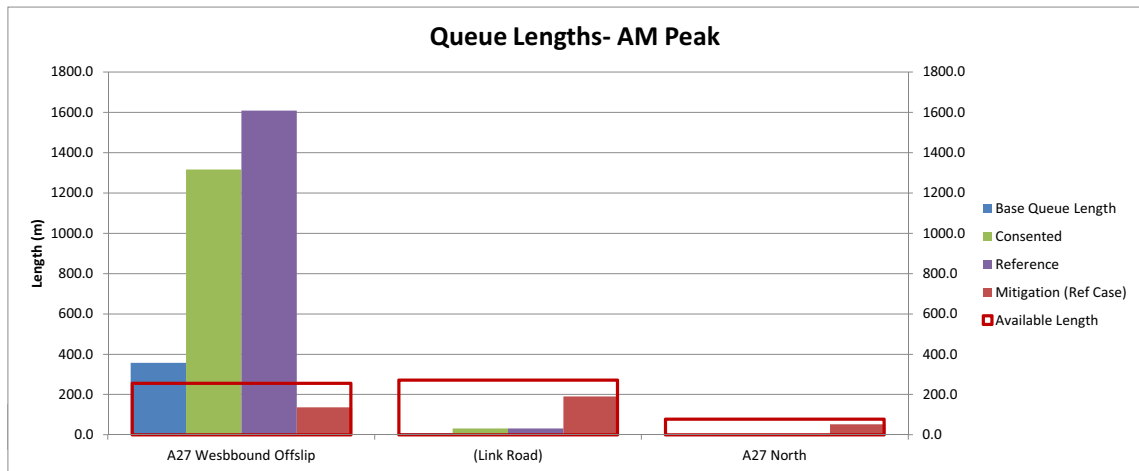
Site 4- A27/A23, North Roundabout

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Existing Layout - 2012 Base												
(Bridge)	0.96	2.94	0.47	A			1.36	3.46	0.57	A		
Eastbound Offslip	0.72	12.79	0.41	B			1.26	23.34	0.56	C		
Braypool Lane	0.06	4.84	0.05	A			0.05	6.07	0.04	A		
Existing Layout - Consented Case												
(Bridge)	1.32	3.46	0.55	A			1.88	4.22	0.65	A		
Eastbound Offslip	27.65	220.32	1.11	F			127.29	1414.93	1.97	F		
Braypool Lane	0.08	7.29	0.08	A			0.06	8.41	0.06	A		
Existing Layout - Ref Case					Mitigation - Ref Case		Existing Layout - Ref Case					Mitigation - Ref Case
(Bridge)	1.34	3.5	0.56	A	16.1	0.84	1.86	4.19	0.65	A	14.5	0.89
Eastbound Offslip	44.85	329.25	1.21	F	5.7	0.61	98.05	836.57	1.74	F	7.1	0.90
Braypool Lane	0.09	7.38	0.08	A	0.2	0.10	0.06	8.36	0.06	A	0.1	0.07



Site 4- A27/A23, South Roundabout

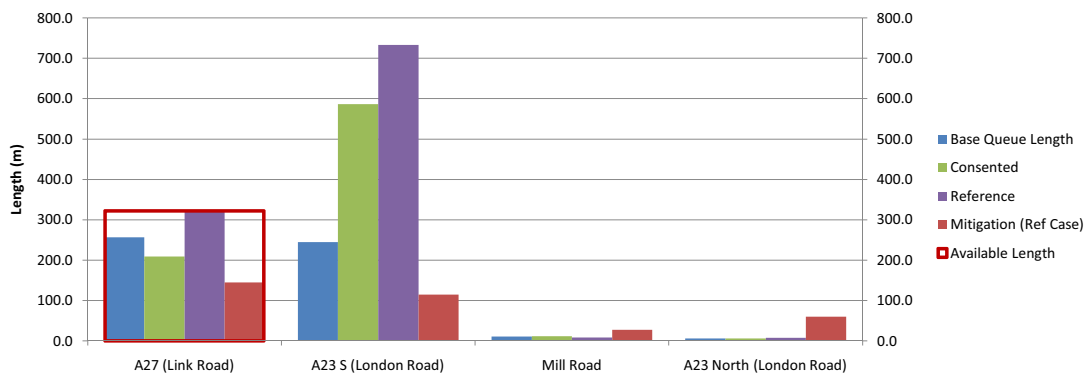
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Existing Layout - 2012 Base												
A27 Westbound Offslip	62.13	172.44	1.09	F			12.43	49.89	0.95	E		
(Link Road)	1.39	4.17	0.57	A			2.89	6.68	0.74	A		
A27 North	0.28	4.57	0.22	A			0.31	4.92	0.24	A		
Existing Layout - Consented Case												
A27 Westbound Offslip	228.97	776.26	1.38	F			162.13	625.8	1.34	F		
(Link Road)	5.47	11.29	0.84	B			4.86	10.15	0.83	B		
A27 North	0.76	6.25	0.43	A			1.14	8.03	0.53	A		
Existing Layout - Ref Case				Mitigation - Ref Case			Existing Layout - Ref Case				Mitigation - Ref Case	
A27 Westbound Offslip	279.66	960.59	1.45	F	23.8	0.89	162.94	614.72	1.33	F	19.1	0.88
(Link Road)	5.51	11.36	0.84	B	33.2	0.90	4.76	9.98	0.83	A	21.8	0.82
A27 North	0.87	6.61	0.46	A	9.2	0.26	0.93	7.26	0.48	A	8.5	0.53



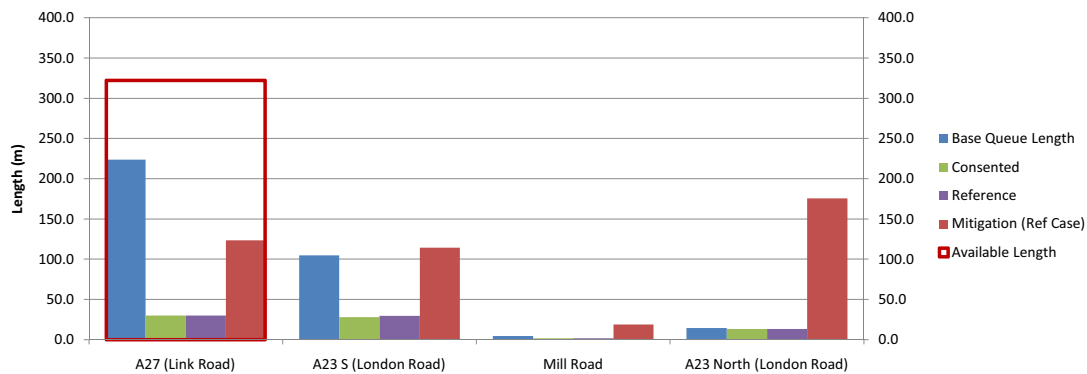
Site 4- A27/A23, A23 Roundabout

	AM						PM					
	Queue (PCU)	Delay (s)	RFC	LOS	MMQ (PCU)	Deg Sat (%)	Queue (PCU)	Delay (s)	RFC	LOS	MMQ (PCU)	Deg Sat (%)
Existing Layout - Base 2012												
A27 (Link Road)	44.64	90.2	1.03	F			38.94	96.49	1.03	F		
A23 S (London Road)	42.6	117.04	1.06	F			18.22	55.56	0.98	F		
Mill Road	1.8	36.38	0.66	E			0.76	15.84	0.44	C		
A23 North (London Road)	0.99	3.3	0.49	A			2.52	5.98	0.72	A		
Existing Layout - Consented Case												
A27 (Link Road)	36.33	75.64	1.02	F			5.2	14.24	0.84	B		
A23 S (London Road)	102.01	206.06	1.14	F			4.84	14.95	0.83	B		
Mill Road	1.97	52.88	0.69	F			0.3	10.41	0.23	B		
A23 North (London Road)	1.05	3.5	0.5	A			2.3	5.44	0.7	A		
Existing Layout - Ref Case				Mitigation - Ref Case			Existing Layout - Ref Case				Mitigation - Ref Case	
A27 (Link Road)	56.11	110.31	1.05	F	25.1	0.88	5.18	14.19	0.84	B	21.5	0.89
A23 S (London Road)	127.59	299.34	1.17	F	19.9	0.89	5.16	15.99	0.84	C	19.9	0.88
Mill Road	1.48	39.23	0.61	E	4.7	0.76	0.3	10.49	0.24	B	3.3	0.60
A23 North (London Road)	1.27	3.92	0.55	A	10.4	0.56	2.29	5.41	0.69	A	30.5	0.89

Queue Lengths- AM Peak



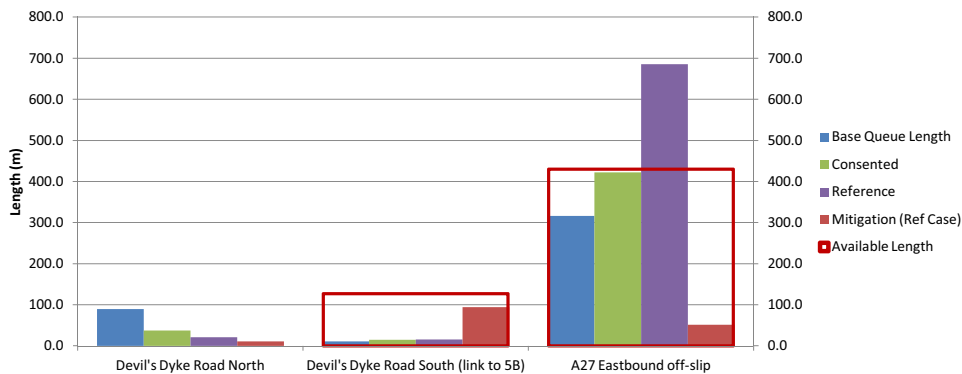
Queue Lengths- PM Peak



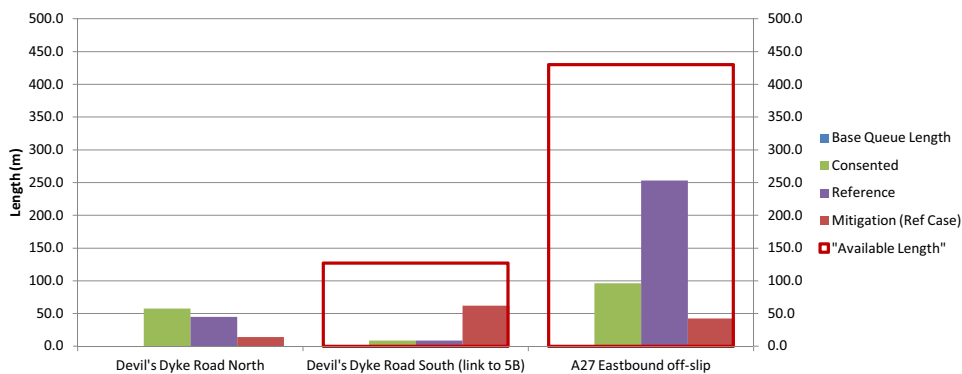
Site 5- A27/Dyke Road/King George VI, North Roundabout

	AM							PM					
	Queue (PCU)	Delay (s)	RFC	LOS	MMQ (PCU)	Deg Sat (%)		Queue (PCU)	Delay (s)	RFC	LOS	MMQ (PCU)	Deg Sat (%)
Existing Layout - 2012 Base							Existing Layout - 2012 Base						
Devil's Dyke Road North	15.57	235.53	1.09	F			Devil's Dyke Road North	7.65	90.98	0.93	F		
Devil's Dyke Road South (link to 5B)	1.87	3.56	0.65	A			Devil's Dyke Road South (link to 5B)	1.13	2.64	0.53	A		
A27 Eastbound off-slip	54.95	375.65	1.27	F			A27 Eastbound off-slip	3.03	25.09	0.76	D		
Existing Layout - Consented Case							Existing Layout - Consented Case						
Devil's Dyke Road North	6.55	175.02	0.96	F			Devil's Dyke Road North	10.06	175.78	1.02	F		
Devil's Dyke Road South (link to 5B)	2.53	4.38	0.72	A			Devil's Dyke Road South (link to 5B)	1.55	3.15	0.61	A		
A27 Eastbound off-slip	73.4	614.97	1.56	F			A27 Eastbound off-slip	16.71	128.06	1.02	F		
Existing Layout - Ref Case							Existing Layout - Ref Case						
Devil's Dyke Road North	3.68	132.05	0.84	F	1.9	0.53	Devil's Dyke Road North	7.84	142.6	0.97	F	2.5	0.67
Devil's Dyke Road South (link to 5B)	2.74	4.64	0.73	A	16.4	0.87	Devil's Dyke Road South (link to 5B)	1.5	3.1	0.6	A	10.8	0.83
A27 Eastbound off-slip	119.19	1439.83	2.04	F	9.0	0.87	A27 Eastbound off-slip	44.02	262.78	1.16	F	7.4	0.83

Queue Lengths- AM Peak



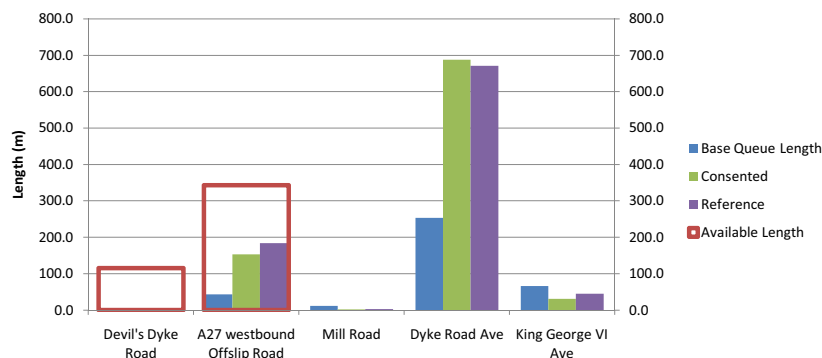
Queue Lengths- PM Peak



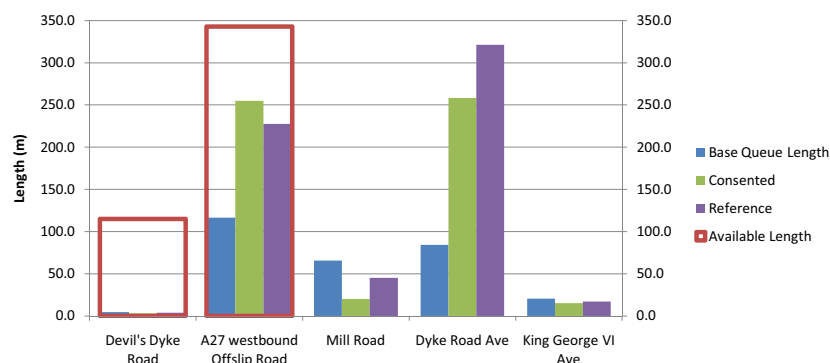
Site 5- A27/Dyke Road/King George VI, South Roundabout

	AM					PM			
	Queue (PCU)	Delay (s)	RFC	LOS		Queue (PCU)	Delay (s)	RFC	LOS
Existing Layout - 2012 Base					Existing Layout - 2012 Base				
Devil's Dyke Road	0.63	3.71	0.38	A	Devil's Dyke Road	0.76	3.96	0.43	A
westbound Offslip Road	7.43	19.95	0.89	C	westbound Offslip Road	20.23	49.88	0.98	E
Mill Road	1.95	19.36	0.67	C	Mill Road	11.39	87.8	0.97	F
Dyke Road Ave	44.04	132.34	1.06	F	Dyke Road Ave	14.64	58.15	0.97	F
King George VI Ave	11.47	34.51	0.94	D	King George VI Ave	3.55	11.86	0.78	B
Existing Layout - Consented Case					Existing Layout - Consented Case				
Devil's Dyke Road	0.41	3.11	0.29	A	Devil's Dyke Road	0.51	3.27	0.34	A
A27 westbound Offslip Road	26.68	56.86	0.99	F	A27 westbound Offslip Road	44.34	86.53	1.03	F
Mill Road	0.27	9.03	0.21	A	Mill Road	3.51	34.96	0.8	D
Dyke Road Ave	119.57	301.87	1.18	F	Dyke Road Ave	44.95	120.7	1.06	F
King George VI Ave	5.34	18.06	0.85	C	King George VI Ave	2.67	10.5	0.73	B
Existing Layout - Ref Case					Existing Layout - Ref Case				
Devil's Dyke Road	0.47	3.25	0.32	A	Devil's Dyke Road	0.64	3.57	0.39	A
A27 westbound Offslip Road	32.04	66.7	1.01	F	A27 westbound Offslip Road	39.6	81.28	1.02	F
Mill Road	0.39	10.27	0.28	B	Mill Road	7.86	70.13	0.93	F
Dyke Road Ave	116.63	302.68	1.18	F	Dyke Road Ave	55.9	146.45	1.08	F
King George VI Ave	7.73	24.64	0.9	C	King George VI Ave	2.99	11.34	0.75	B

Queue Lengths- AM Peak



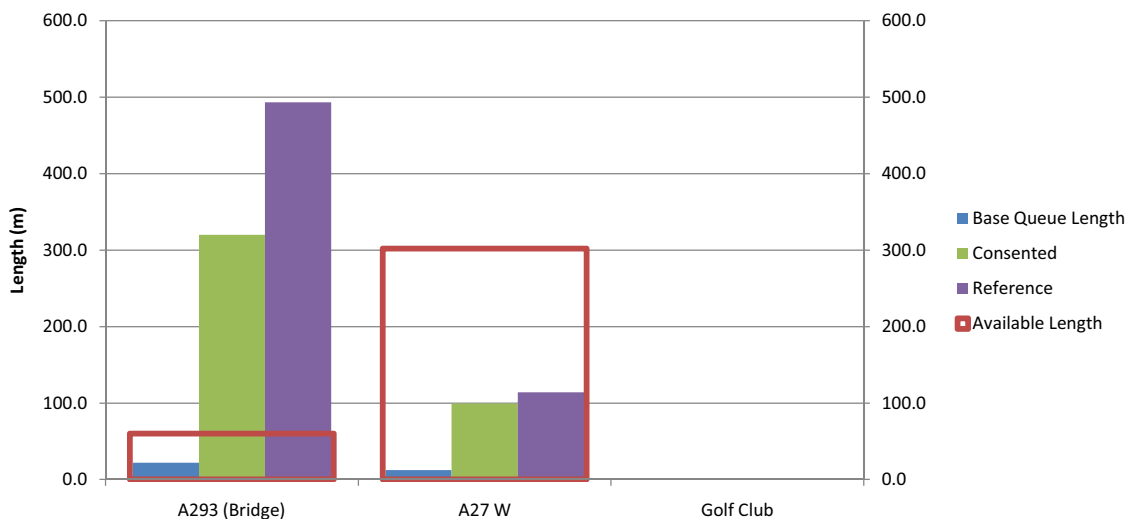
Queue Lengths- PM Peak



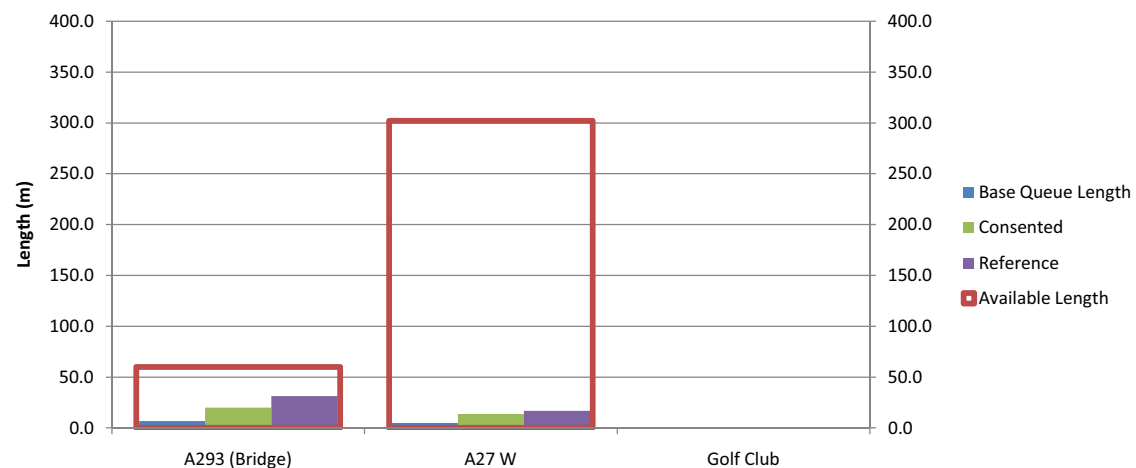
Site 6- A27/A293, North Roundabout

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
Existing Layout - 2012 Base								
A293 (Bridge)	3.78	12.12	0.79	B	1.16	5.36	0.53	A
A27 Eastbound Offslip	2.14	19.79	0.69	C	0.86	8.44	0.46	A
Golf Club	0	0	0	A	0.05	8.45	0.05	A
Existing Layout - Consented Case								
A293 (Bridge)	55.61	119.38	1.05	F	3.49	11.28	0.78	B
A27 Eastbound Offslip	17.29	145.48	1.04	F	2.37	21.01	0.71	C
Golf Club	0	0	0	A	0.09	16.51	0.09	C
Existing Layout - Ref Case								
A293 (Bridge)	85.75	174.48	1.1	F	5.44	16.4	0.85	C
A27 Eastbound Offslip	19.86	164.53	1.05	F	2.95	27.61	0.76	D
Golf Club	0	0	0	A	0.12	20.62	0.11	C

Queue Lengths- AM Peak



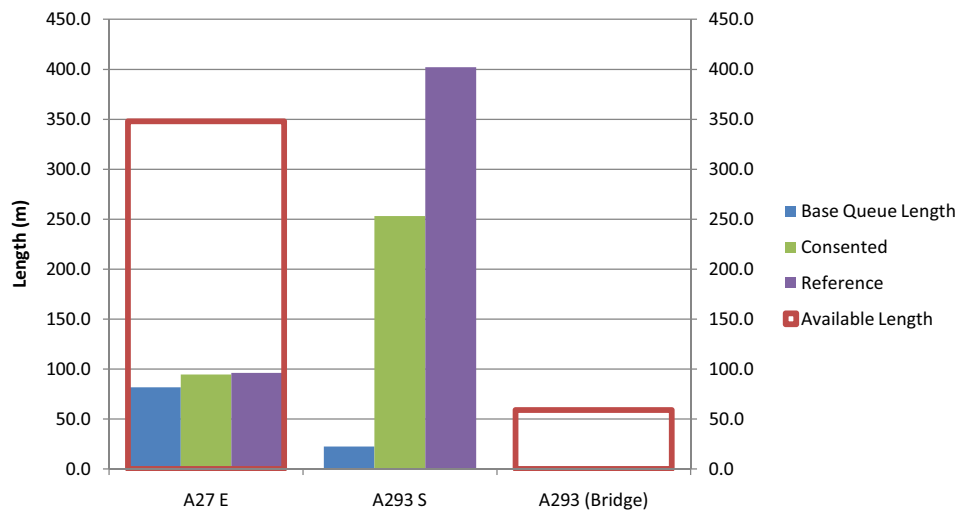
Queue Lengths- PM Peak



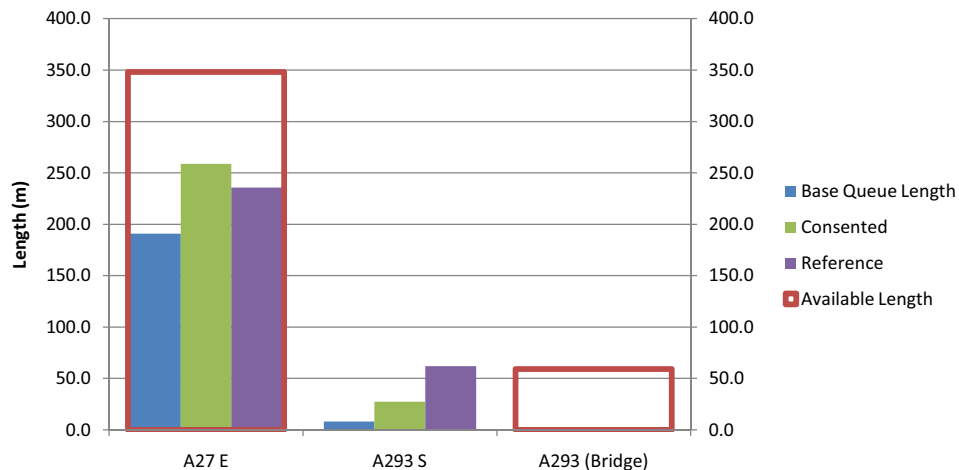
Site 6- A27/A293, South Roundabout

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
Existing Layout - Base 2012								
A27 E	14.18	49.23	0.95	E	33.17	96.63	1.03	F
A293 S	3.88	10.11	0.79	B	1.41	4.92	0.58	A
A293 (Bridge)	0.36	3.27	0.26	A	0.36	3.25	0.26	A
Existing Layout - Consented Case								
A27 E	16.4	56.31	0.97	F	44.99	126.51	1.06	F
A293 S	44.02	82.1	1.02	F	4.76	11.94	0.83	B
A293 (Bridge)	0.39	3.34	0.28	A	0.42	3.41	0.3	A
Existing Layout - Ref Case								
A27 E	16.72	57.31	0.97	F	40.98	116.35	1.05	F
A293 S	69.95	120.07	1.06	F	10.74	24.96	0.93	C
A293 (Bridge)	0.39	3.35	0.28	A	0.4	3.36	0.29	A

Queue Lengths- AM Peak



Queue Lengths- PM Peak





Falmer Interchange



Falmer Interchange



Carden Avenue



Carden Avenue



Patcham Interchange



Patcham Interchange



Devil's Dyke



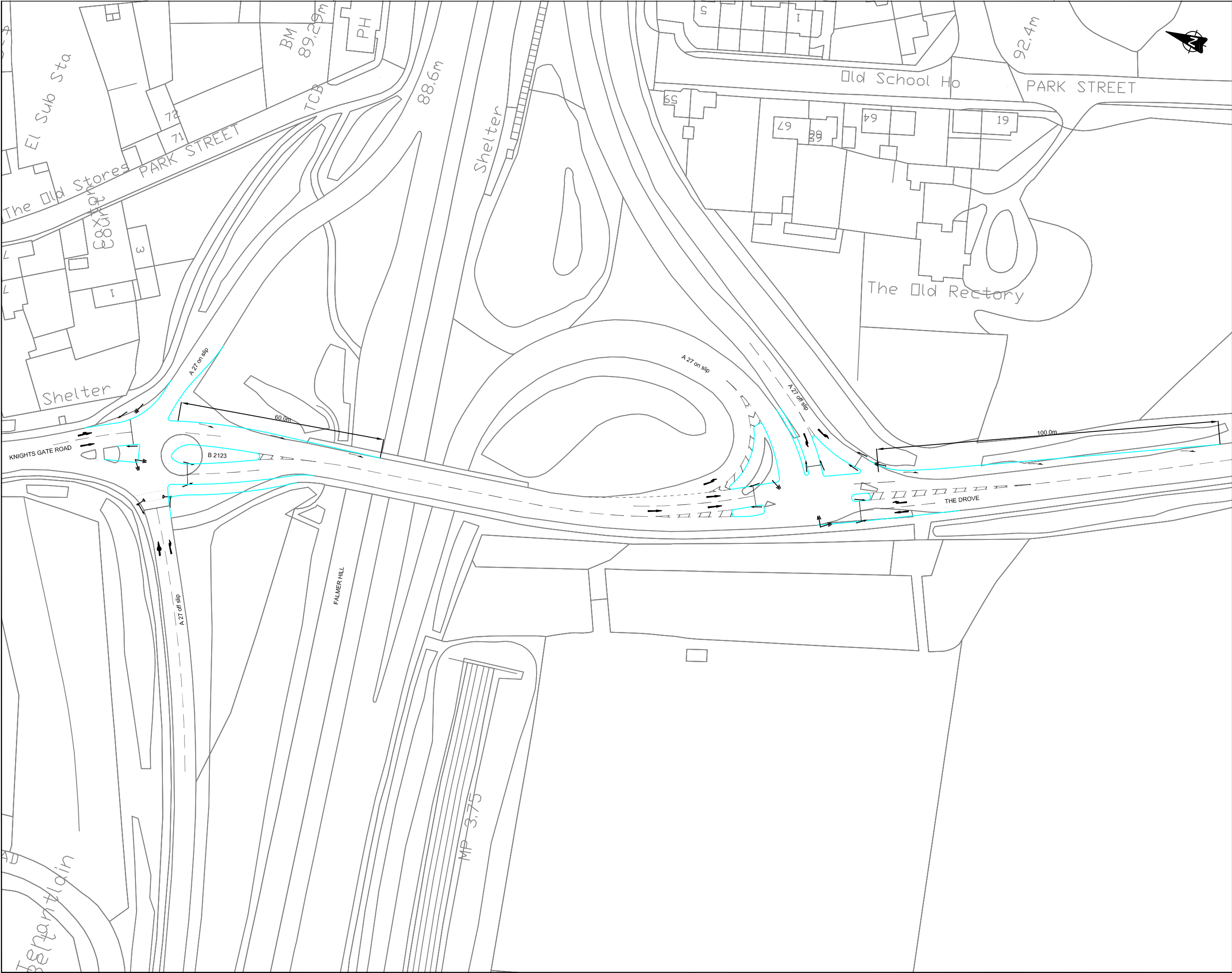
Devil's Dyke



A293

SRN Indicative Layouts

Job No	Report No	Issue no	Report Name	Page
ST13119	1	1	Brighton & Hove City Plan	H3



Notes:

1. Do not scale from this drawing. If in doubt refer to the project manager for clarification.

Key

— Survey base

— Proposed kerb

Rev.	Date	Revision details	Drawn	Checked	Approved
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Client					
BRIGHTON AND HOVE CITY COUNCIL					
Project					
BRIGHTON CITY PLAN					
Title					
FALMER INTERCHANGE					
Drawn		Checked		Approved	
SRP		CS		CS	
Original dsg. size		Date		Scale	
A1		18-12-12		1:500	
Drawing Status		Drawing Number		Rev.	
Information		ST131119-01			



Notes:
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Key
— Survey base
— Proposed kerb

Rev.	Date	Revision details	Drawn	Checked	Approved
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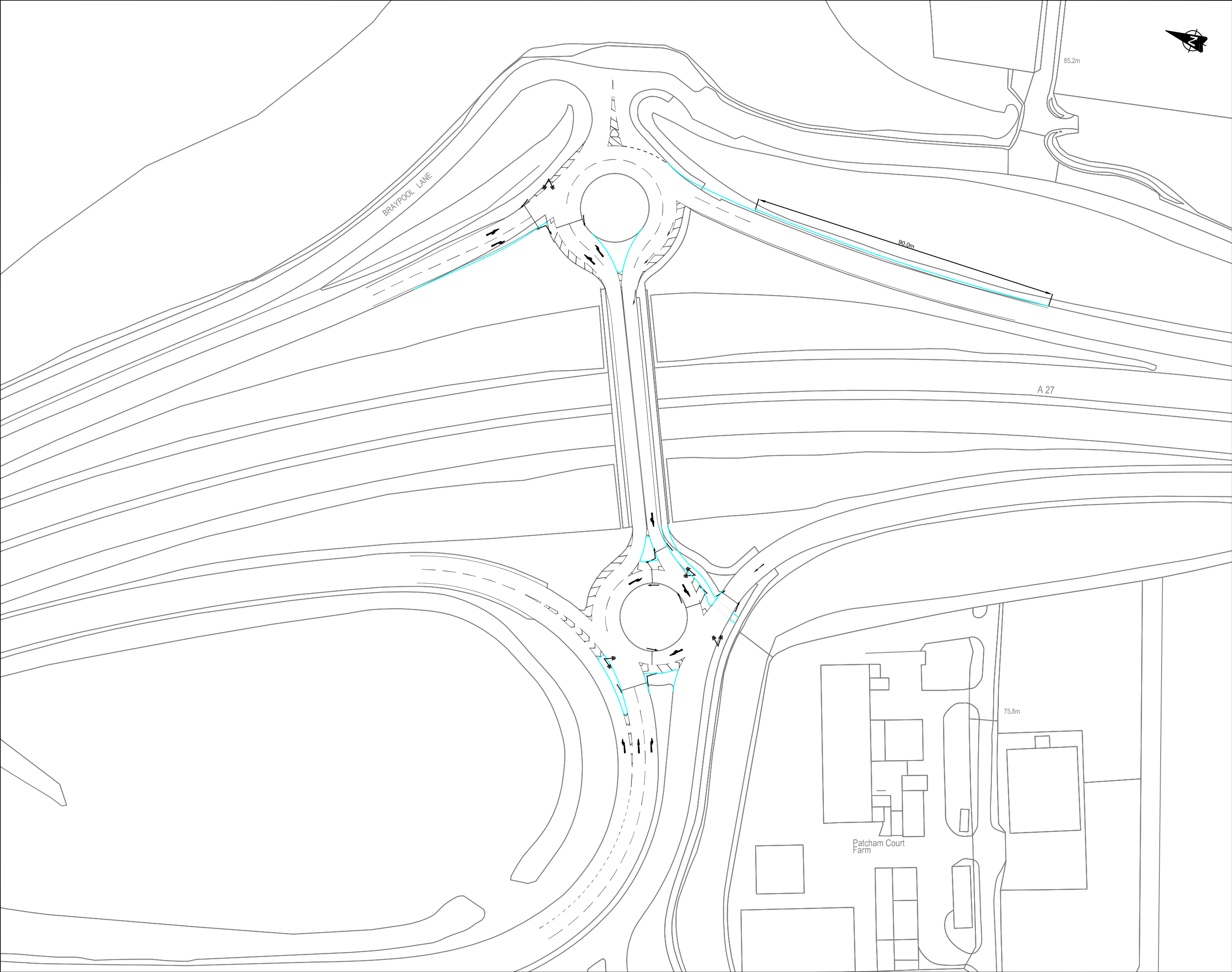


Client
BRIGHTON AND HOVE CITY COUNCIL

Project
BRIGHTON CITY PLAN

Title
CARDEN AVENUE JUNCTION

Drawn	SRP	Checked	CS	Approved	CS
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Drawing Status	Information		Drawing Number		Rev.
			ST13119-02		



Notes:

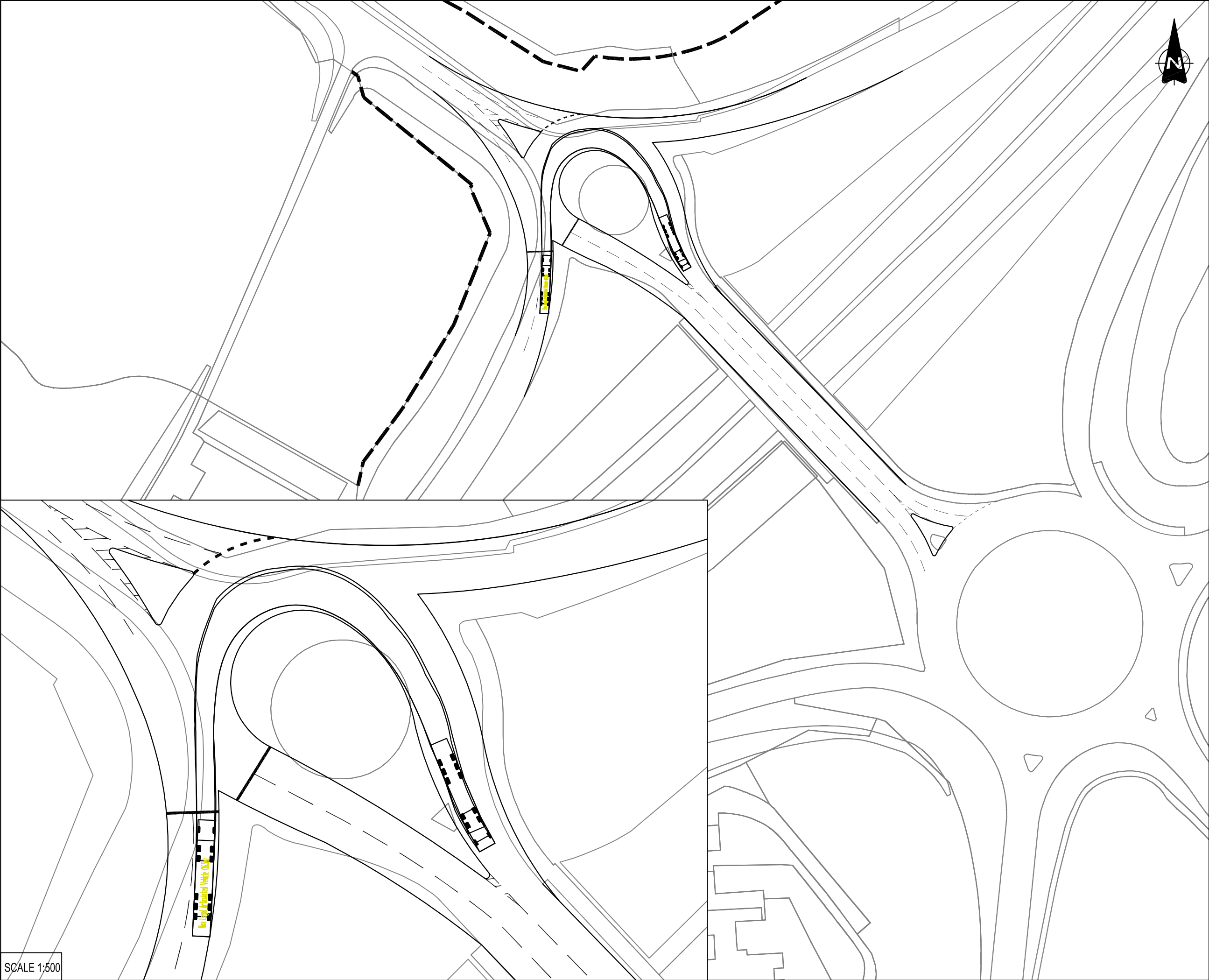
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Key

— Survey base

— Proposed kerb

Rev.	Date	Revision details	Drawn	Checked	Approved
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Client					
BRIGHTON AND HOVE CITY COUNCIL					
Project					
BRIGHTON CITY PLAN					
Title					
PATCHAM INTERCHANGE (A27 NORTH AND SOUTH)					
Drawn		Checked		Approved	
SRP		CS		CS	
Original dwg. size		Date		Scale	
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Drawing Status			Drawing Number		
Information			ST13119-04		
Rev.					

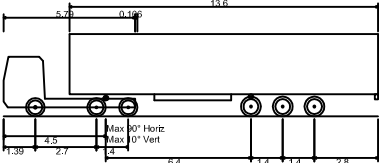


Notes:

1. Do not scale from this drawing. If in doubt refer to the project manager for clarification.

Key

- Existing Features
- Proposed Features
- Highway Boundary



Max Legal Articulated Vehicle (16.5m)	
Overall Length	16.500m
Overall Width	2.500m
Overall Body Height	3.632m
Min Body Ground Clearance	0.396m
Max Track Width	2.500m
Lock to Lock Time	6.00 sec
Kerb to Kerb Turning Radius	6.870m

Rev.	Date	Revision details	Drawn	Checked	Approved

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Brighton & Hove
City Council

Brighton City Plan

Proposed Roundabout
Layout Option 5
Teardrop Junction &
Two Lanes Northbound on Bridge Deck &
Teardrop Buildout

PG	SD	SD
A3	12/04-2013	1:1000
INFORMATION	STH12212-1-5	-