

Buro Happold

007640 Kingston Town Centre

--- DRAFT FOR COMMENT ---

Part 5 – Summary of Transport Assessment and
Sensitivity Testing

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1 Introduction

Buro Happold Limited (BHL) has been working closely with the Hammerson design team and the Royal Borough of Kingston upon Thames (RBK) to develop proposals for Kingston town centre (KTC). One of the key tasks has been to analyse transport and general movement within the area for both existing and future conditions to establish confidence that there is scope for accommodating the extent of developments identified by Kingston's K+20 Strategy (Kingston Town Centre Area Action Plan prepared by RBK to guide future development and improvements over the period to 2020). This report summarises the work undertaken to date and also presents and outline sensitivity test.

The work has been presented as a series of documents as described below:

- **Part 1 - Existing Transport Conditions** - Describes existing transport capacity and demand including technical support notes and a validated traffic model (VISSIM).
- **Part 2 – Approach and Methodology for Assessment Work** - Describes the work undertaken to establish a robust assessment of future development scenarios, including description of developments assessed, year for assessment, development of a travel demand model and modal split proposals.
- **Part 3 – Assessment of Completed and Committed Schemes** - Analysis of trip generation for known, committed developments overlaid on existing transport conditions with due allowance for background travel growth and capacity improvements. This forms a baseline for this work.

Part 4 – Transport Assessment for the Eden Quarter, Eastern Gateway and Fife Road and Development Sites– As Part 3 above, but includes detailed modelling and analysis of the trip demand likely to be generated from the Eden Quarter proposals and immediately surrounding committed developments against the baseline of current transport which was established in Part 1.

- **Part 5 – Summary and Sensitivity Testing** - report of the material presented, conclusions drawn and sensitivity testing (this report).

2 Basis of the Assessment

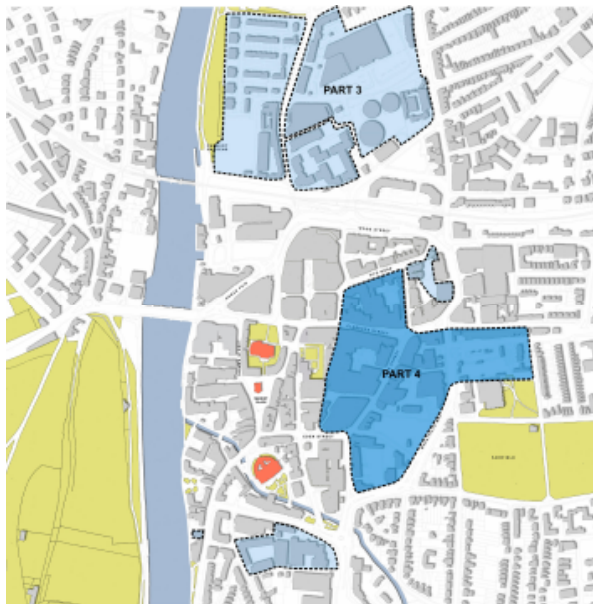
2.1 Extent of Development

Through K+20, RBK envisages significant development in the town centre. This development can broadly be categorised in the following two principle areas that have been considered in the Transport Assessment:

- Committed development and development completed since the transport data was collected for the assessment – referred to as “Part 3”.
- Possible development in the vicinity of Fife Road, Eastern Gateway and the Eden Quarter – referred to as “Part 4”.

The location of the potential development “zones”/ sites is provided below.

Figure 2.1: Location of Completed, Committed and Possible Development



The quantum and mix of development that has been identified and forms the basis of the travel demand assessment is as follows:

Table 2.1 - Area Schedule

Land Use	Committed / Completed Development (sq.m)	Possible Development (sq.m)	Total
	GFA sqm	GFA sqm	GFA sqm

Retail	0	44,500	44,500
A3	0	450	450
Office	0	0	0
Hotel	5,050	5,050	10,100
Residential	67,600	83,300	150,900

Total	72,650	133,300	205,950
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In summary, the completed/committed and possible development allowed for in the TA makes provision for the following increase in development in the town centre:

- 44,500m² of retail, with some A3 uses;
- 1,300 new residential dwellings;
- A new 200 bed hotel; and
- Office provision is assumed to remain at current levels.

Two key aspects that drive the transport strategy for the town centre are:

- Bus Planning – Kingston relies heavily on bus services to maintain a high degree of accessibility. The current proposals for the Eden Quarter envisage Eden Street being pedestrianised to better link the south eastern parts of the town centre to

the retail core. This requires a satisfactory alternative for buses to be delivered, as some 140 buses per hour presently use Eden Street at peak times.

- Interceptor Car Parks – Kingston is served by just over 7,000 public parking spaces. Demand for these is however not balanced and it is typical for the car parks in the north west to be oversubscribed whilst there is spare capacity in the south and east. There is a need to improve traffic circulation around the town and particularly reduce cross town journeys by Kingston bound traffic by improving the appeal of parking in interceptor car parks on the approach routes.

2.2 Assessment Principles

The assessment is based on traffic data gathered for the modelling exercise obtained in 2003/2004. This data was collected prior to the Bentalls B car park being closed for reconstruction as a consequence of problems with the car park structure which resulted in the loss of 600 parking spaces.

In order to get a reasonable representation of the likely impacts of the extent of development proposed the following peak periods were agreed with RBK and TfL Officers and have been used in the assessment:

- Weekday AM Peak 08:00 to 09:00
- Weekday PM Peak 17:00 to 18:00
- Saturday Peak 12:45 to 13:45

A bespoke travel demand model has been built for Kingston. This is derived from first principles for each land use and mode of travel as follows:

- Estimating the anticipated site populations that would result from the various land uses, their occupation and floor areas being developed;
- Establishing daily travel demands generated by visitors, staff, and residents;
- Taking account of the proportion of trips between the various land uses on the site (internal trips) and estimates of linked trips have been made
- Assessing the mode share for each land use and trip category undertaken

- Developing profiles of inbound and outbound movements across the full day.

This approach provides a clear and logical basis for understanding the derivation of trip demands and enables finer issues, regarding current and future lifestyles of living and working in Kingston, to be incorporated into the assessment

3 Transport Objectives, and Strategy

3.1 Introduction and Objectives

The mix and quantum assessed have been derived through close collaboration between the RBK and Hammerson teams and reflect the ongoing partnership approach between the parties involved. They incorporate relevant transport policies and strive towards delivering the Council's and TfL's objectives for Kingston Town Centre. The national, regional and local policies regarding transport highlight the core principles of sustainability and integrated land use as well as transport planning. A summary of the key policy objectives follows:

- Development of mixed-use communities to reduce the need to travel;
- Emphasis on development that includes major trip generators to be located adjacent to major public transport interchanges and public transport corridors;
- Creation of development that encourages walking, cycling and the use of public transport;
- Restraint of road traffic through various management mechanisms;
- Encouragement of new bus services and introduction of bus priority measures;
- Limits on parking provision and an emphasis on demonstrating the need for parking;
- Accessibility to public areas for all; and
- Improvements to transport interchanges.

3.2 Aims and Aspirations

RBK identified the following measures to improve general traffic movement, interchanges and bus services:

- Reduce traffic flows by 5% in real terms by 2005 and 10% by 2010;
- Improve bus interchange on orbital and radial services in conjunction with the London Bus Priority Network (LBPN) and the London Bus Initiative;

- Undertake a comprehensive review of waiting and loading restrictions on bus routes;
- Secure further bus priority measures where appropriate on main bus corridors;
- Seek improvements to public transport at peak times;
- Consider a permanent Park & Ride to reduce car usage; and
- Lobby for the provision of a quality orbital route between Croydon, Sutton, Kingston and Heathrow.

From further consultations with Transport for London (TfL), the following expectations have been expressed:

- Retention of bus access on or near Eden Street to provide easy access to main shopping, leisure and office areas and maintain the attractiveness of bus compared to the car. Improvements should tackle passenger crowding, bus queues etc;
- Improvements to bus routings around the town centre through shorter journey times and simplification of routes. Road layout revisions can be considered;
- Better use of bus stations, such as Fairfield bus station in relation to location and level of use; and
- Retention of Cromwell Road bus station to continue providing excellent penetration to shopping areas for buses arriving from the south.

In addition to integrating public transport facilities and services to deliver the transport objectives, the following issues arising from discussions have also been noted:

- The intensive use of Eden Street by buses with considerable passenger density is threatening to undermine the urban environment and safety of bus passengers and pedestrians;
- Expansion of retail core should be directed towards the southeast of the town;
- Developments east / south of Eden Street with significant traffic (including buses) retained are unlikely to be accepted by retailers;

- A stronger sense of arrival in the southeast is desired with buses forming part of this strategy;
- Facilitating cross-town movement and providing new opportunities for buses; and
- Provision of better links between the Fairfield bus station and the town centre.

3.3 Delivering the Concept

To achieve the various objectives, the development options have adopted an integrated approach to meet the transport needs of commuters, visitors and residents alike. These also addressed the relevant policies and reinforced Kingston's economic position in retail and other commercial activities. This approach aimed to create an extension to the core retail area to the south, in order to accommodate new facilities and provide regeneration. Furthermore the approach set out to enhance public transport services and facilities, improve the highway network, increase pedestrian accessibility and facilities as well as consolidating parking as part of an overall strategy to increase the use of more sustainable modes of transport.

The proposals seek to regenerate the under-developed southern parts of Kingston Town Centre. This part of the town centre currently lacks major attractions and regeneration would help to rebalance the town centre and compliment the already well established and successful retail core to the north. Through extensive consultations and transport workshops with RBK and TfL, it is recognised that the introduction of a new landmark "anchor" department store located in the vicinity of Wheatfield Way/ Brook Street, which is linked to Clarence Street in the north would require a number of transport issues to be addressed. A key issue is the introduction of pedestrian priority on Eden Street which currently serves as a main northbound link for public transport, cyclists and some car users in the town centre.

It was agreed with RBK that the overarching principles that would shape the EQ would be those that are aimed at providing a fully integrated transport system for Kingston Town Centre to facilitate and support the demand generated by the extension of the existing retail core without compromising existing public transport services and patronage as well as the highway network and well established through cycle routes. The following are distinct areas of opportunity where these principles could be achieved:

- a) The provision of a new bus strategy that would re-provide for existing buses along Eden Street, and allow for TfL's aspirations for growth in bus use;
- b) The development of a town centre-wide parking strategy;
- c) Developing the already well established cycle network further, and providing state of the art secure cycle parking;
- d) Enhancing the pedestrian movement network and permeability of the town centre and
- e) Optimising traffic capacity in the town centre.

3.4 Public Transport Improvements

One of the greatest transport challenges is the rationalisation of Kingston Town Centre's bus services as a result of the proposal to introduce pedestrian priority on Eden Street. Furthermore, whilst it is recognised that some further car parking may be required, RBK also emphasised the importance of promoting public transport as an alternative and sustainable means of transport.

Through extensive discussions with RBK and TfL, a proposal which includes the following elements evolved:

- a) A modern, state of the art bus station as part of the Eden Quarter development, which will serve as the primary pick-up and drop-off terminus with 11 stops.
- b) An improved Fairfield Bus Station with 4 stops and 8 stands, which will serve as a drop-off and layover terminus that compliments Eden Quarter bus station, as well as southbound through services approaching the town centre from the east; Rationalising the Eden Quarter and Fairfield bus stations into a single facility was considered. This is however not deemed to be feasible, for a number of reasons, viz. as the land take required to combined the two is significant. The bus movements required would be extremely difficult to accommodate, and there is little benefit in providing the standing area for terminating services "inside" the

Relief Road.. Retaining the two stations ensures future flexibility and minimises the impacts upon existing routing.

- c) Bus penetration to all parts of the Town Centre including two-way routes through the Market Place / Guildhall area.

These facilities have been designed in accordance to TfL's requirement to allow for 30% growth on existing bus patronage and based 12 buses per hour per stop. The design of the bus station layouts are based on London Buses' requirements and will incorporate the latest passenger facilities. The design of waiting areas and covered passenger facilities incorporate Health & Safety and Discrimination and Disability Act (DDA) standards, although this will need to be tested iteratively as the more detailed design progresses.

3.5 Highway Network Improvements

As a result of the EQ proposal, the southern section of Eden Street, leading to Ashdown Road, will be pedestrianised and Lady Booth Road will be redesigned as a two-way access to the existing Fairfield NCP car park accessed from Lady Booth Road. The introduction of the new bus station along Wheatfield Way will also require certain improvements to be made to the existing highway network. These highway improvements will need to be co-ordinated with the car parking strategy for the proposed development.

a) Bus Access

In order to facilitate turning movements in and out of the Eden Quarter and Fairfield bus stations, and to maintain bus penetration into the Civic Quarter, the proposals incorporate significant elements of bus priority on Wheatfield Way and a number of associated junction amendments have been identified.

b) Car Park Access

The proposals present an opportunity to rationalise car parking in the town centre, allowing traffic approaching from all directions to be intercepted on their approach into the town centre and reduce travel across town on the Relief Road. This would be expected to have a beneficial effect on bus journey times. The EQ proposal incorporates the following key features:

- The removal of existing Eden Walk car park and other car parks affected by the EQ proposal i.e. Brook Street, and Ashdown Road car parks. These are consolidated into new high quality parking designed to intercept traffic from the south. This would help reduce traffic flow along St James' Road and hence reduce conflicts at the junction between St James' Road and High Street;
- Improvements to the quality and signage of the existing Cattle Market car park. Parking provision at this location could also be increased to intercept traffic from the east; and
- Remodelling of the Brook Street / Wheatfield Way junction to only provide access to the new car park and existing properties. The removal of bus entry into Brook Street will reduce existing conflicts between buses, cars and service vehicles.

3.6 Cyclists and Pedestrians

The proposed cycle strategy seeks to maintain and build upon as much of the existing cycle network as possible. However, it acknowledges the importance of balancing the need for maintaining continuity of cycle routes with safety implications of routing cyclists via busy pedestrian areas. Introducing pedestrian priority on Eden Street will have an impact on existing cycle route, and it is proposed that a number of alternatives be considered to address this, including the provision of a new route to the north of Clarence Street along Wood Street.

3.7 Parking Policy

RBK's current planning policies are found in its Unitary Development Plan (UDP) Adopted March 1998. Broadly, it conforms to the aspirations of the Government's White Paper and builds on these principles as well as strategic aims of the London Plan.

With regards to parking policies, RBK's parking strategy forms one of the key building blocks of K+20. The strategy emphasises the provision of interceptor car parks at key "gateway" locations into the town centre. RBK's parking standards have been set to ensure that the attractiveness of the Town Centre is protected and that congestion is reduced. The car parking standards follow a maximum provision and reflect Government guidance which aims to restrain the car use as set out in PPG3 and PPG13, as well as the

Mayor for London's London Plan. The table below represents a summary of RBK's parking standards for the various land uses that will be provided.

Table 3.1: Parking Standards (Extract from Appendix 1 of UDP First Alteration August 2005)

Type of Land Use	Sqm of Gross Floor Area per Parking Space
A1 Shops General retail up to 1000 sqm General retail exceeding 1000 sqm	1 space per 35 sqm
A3 Food & Drink	1 space per 19 sqm
C1 Hotels & Hostels	1 space per 2 bedrooms PLUS provision of 1 coach parking space per 100 bedrooms <i>Note: The range of types of hostels and the variety of facilities which may be offered by hotels are such that alternative provision could be justified. For example, a higher provision could be required to accommodate conference facilities and public rooms, and a lower provision could be required for special needs hostels. Each case will therefore be assessed individually.</i>
C3 Dwelling Houses Residential	Provision up to a maximum standard of: <ul style="list-style-type: none"> - Studio/ 1 bedroom: 1 space unassigned - 2 bedrooms: 1 space assigned plus 1 unassigned space per 5 units - 3+ bedrooms: 2 spaces at least one of which shall be unassigned

3.8 Servicing

The British Council of Shopping Centres (BCSC) recommendations for servicing provision have been referenced as an initial basis for estimating the likely requirements of the proposed development. This has then been refined to suit the servicing requirements of prospective retailers and other land uses which are not considered in the BCSC analysis

e.g. residential, A3 etc. The following section describes the analysis that has been undertaken using BCSC's recommendations:

- A service yard or lay-by is to be used only for delivery and operational activities (i.e. servicing only);
- The service yard shall not be used for operational staff parking, collection points for customers or emergency access; and
- The analysis has assumed that there will be sufficient space to provide refuse compactors in the service yard but this has been considered as a secondary requirement in comparison to the provision of service bays.

Based on BCSC's research, it recommended that a reasonable guideline for designing shopping centre service areas is the provision of 5.5 to 6.5 service bays per 100,000 sqft Gross Lettable Area (GLA).

Using the recommendations above, the servicing requirements would be as follows:

Table 3.2: Servicing Provisions

Provision	Service Bay Spaces	Refuse Compactors Spaces
Minimum	18	4
Maximum	21	5

4 Travel Demand Assessment

4.1 Methodology

Process

The main steps taken to forecast travel demands have been explained in the Part 2 report (Approach and Methodology for Assessment Work). In the Part 3 and 4 reports, the travel demand generated by schemes that have been completed since 2003, as well as potential future developments was assessed. A summary of the key assumptions and inputs for the travel demand process are summarised in the sections below.

Population

The total site population can be divided into two main categories:

- Staff and visitor population generated by the Development for non-residential uses (e.g. hotel, retail); and
- Residential population.

For the purposes of estimating the residential population, a 60:40 split between private and affordable housing has been applied.

Trip Making

Most people visiting the town centre will be making two trips; one in and one away. In some cases, people will be making more than two trips. For example, a worker who makes additional trips during the day for business or personal reasons. Trip rates have been established for each user group reflecting the trips they are likely to make during the full day.

Mode Share

The mode shares adopted for this assessment have been taken from the Kingston Park & Ride study (Colin Buchanan) with an assumption of 1.2 car occupancy for commuters (NTS 1998-2000).

Temporal Profiles

The temporal profiles for retail, A3, residential and hotel trip making are as reported in Part A of the Part 3 study and are replicated below for residential and retail trips, which make up the majority of development trips. These profiles are specific to weekdays and Saturdays.

Figure 4.1: Temporal Profile for Retail Use - Weekday

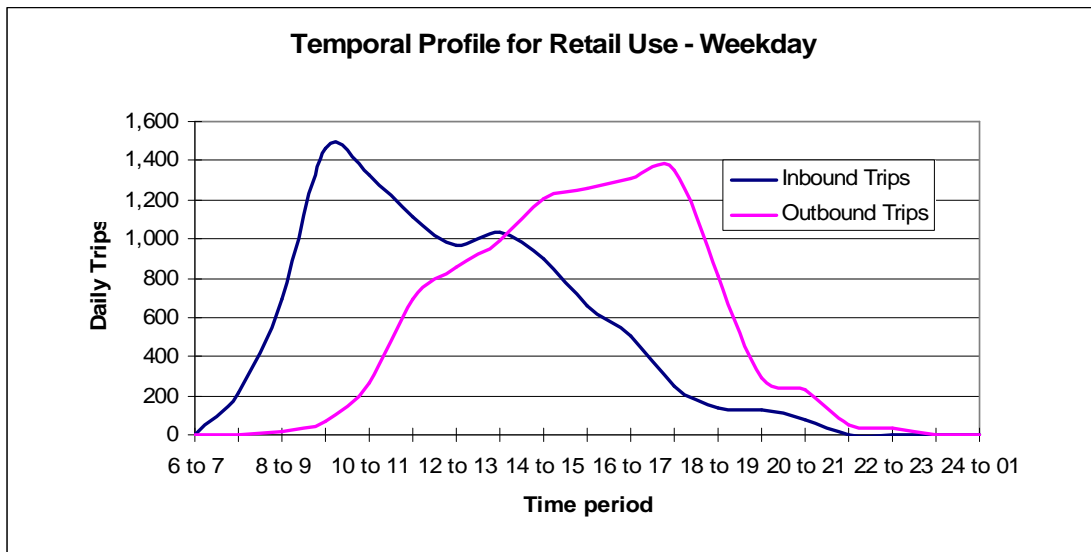


Figure 4.2: Temporal Profile for Residential Use - Weekday

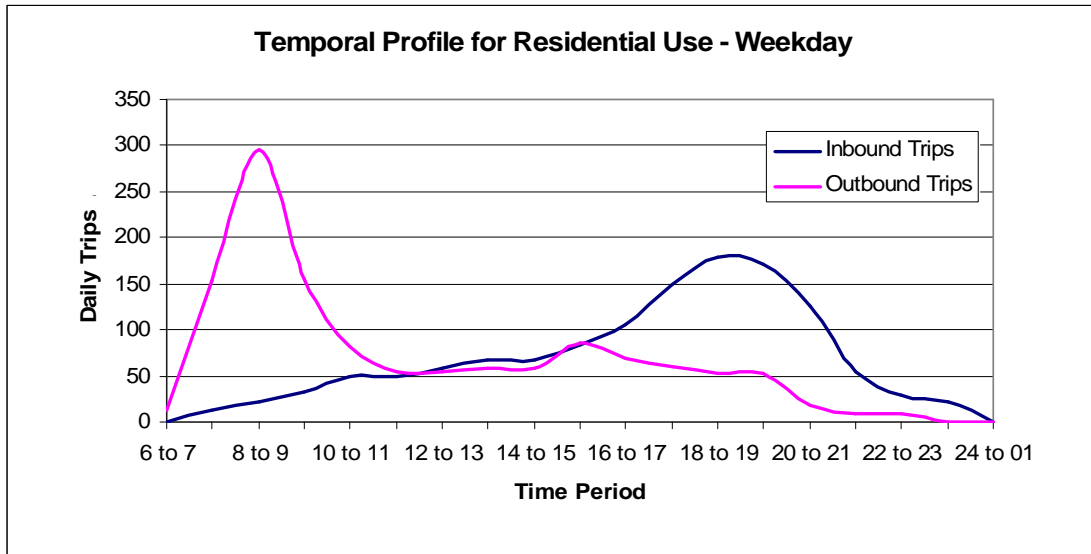


Figure 4.3: Temporal Profile for Retail Use – Saturday

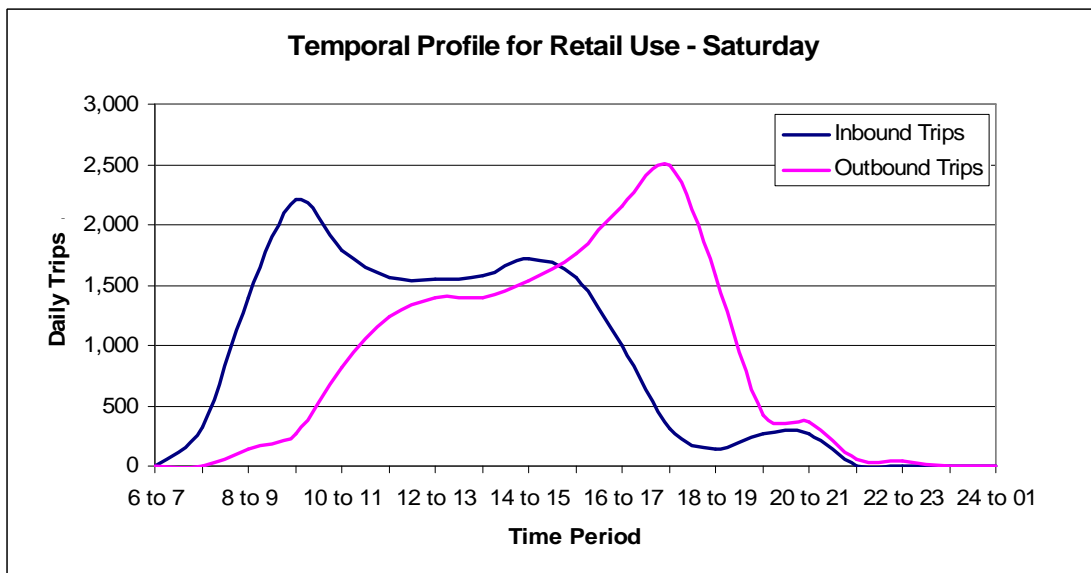
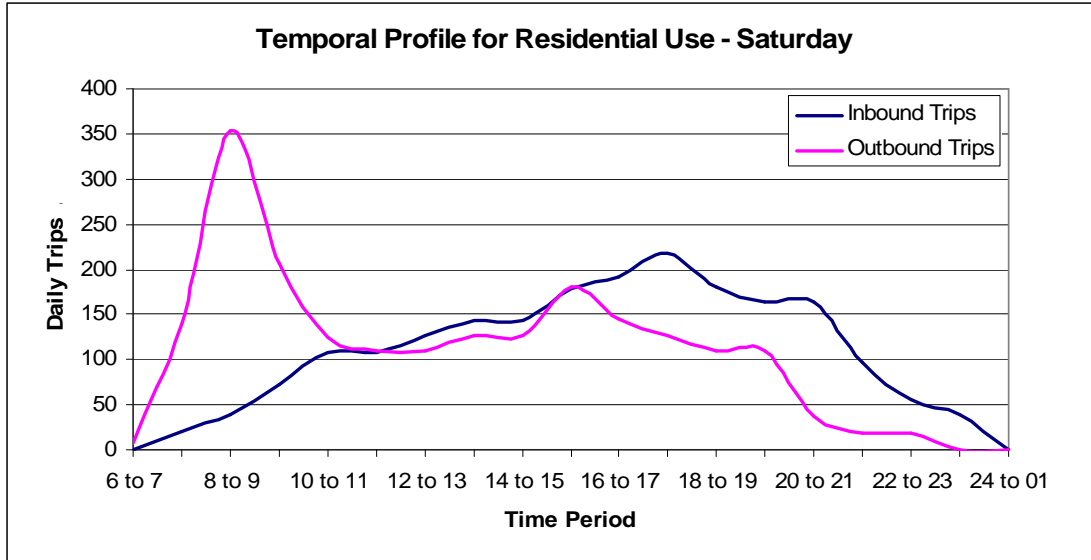


Figure 4.4: Temporal Profile for Residential – Saturday



4.2 Travel Demand Results

The assessment of travel demand forecast to be generated by the individual committed schemes provides the key outputs allowing the effects of the EQ to be assessed i.e. the number and type of trips in each time period.

Trip Generation

Total person trips are shown below in Table 4.1 for the weekday and Saturday peak periods.

Table 4.1: Person Trips Generated

	Weekday				Saturday	
	AM In	AM Out	PM In	PM Out	In	Out
Person Trips	721	325	412	1,434	1,727	1,528

The results indicate that:

- There is a larger number of “AM In” trips during the weekdays compared to the “AM Out”;
- The number of “AM In” trips is less than the number of “PM Out” trips.

Based on the above, it is evident that a significant proportion of people commute into the Town Centre for work. However, the PM Out trips indicates that there could also be a significant number of inbound trips generated during off peak period. The number of car trips generated including taxis followed a similar pattern. This may be due to the increased number of visitors / shoppers. The average proportion of total car trips to total person trips is approximately 30% for the weekday and 26% for Saturday.

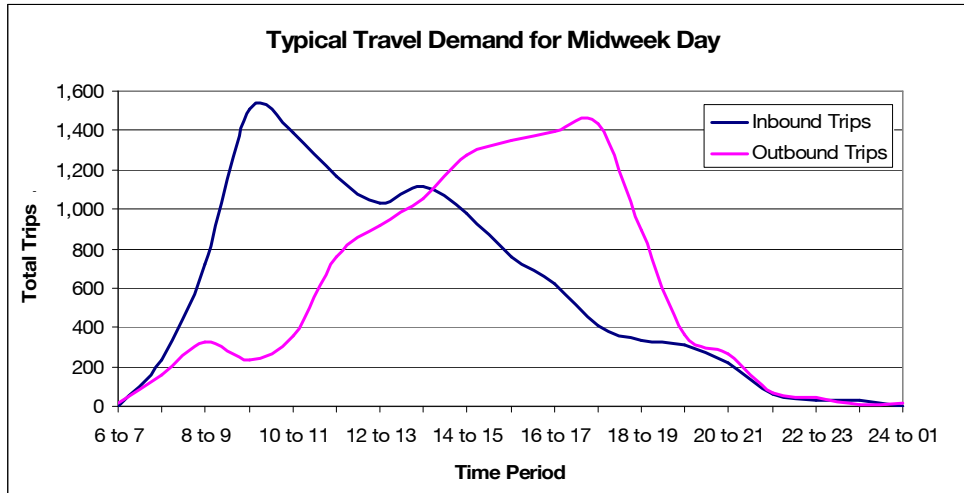
Table 4.2: Car Trips Generated

	Weekday				Saturday	
	AM In	AM Out	PM In	PM Out	In	Out
Car Trips	234	99	116	417	450	394

Weekday Trip Generation

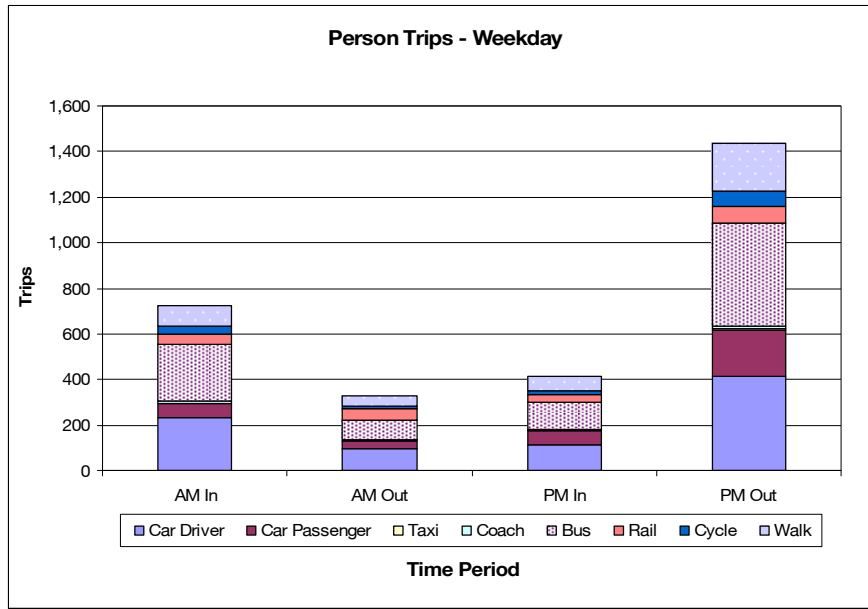
The weekday travel demand profiles are shown below:

Figure 4.5: Travel Demand Profile for Midweek Day (People Trips)



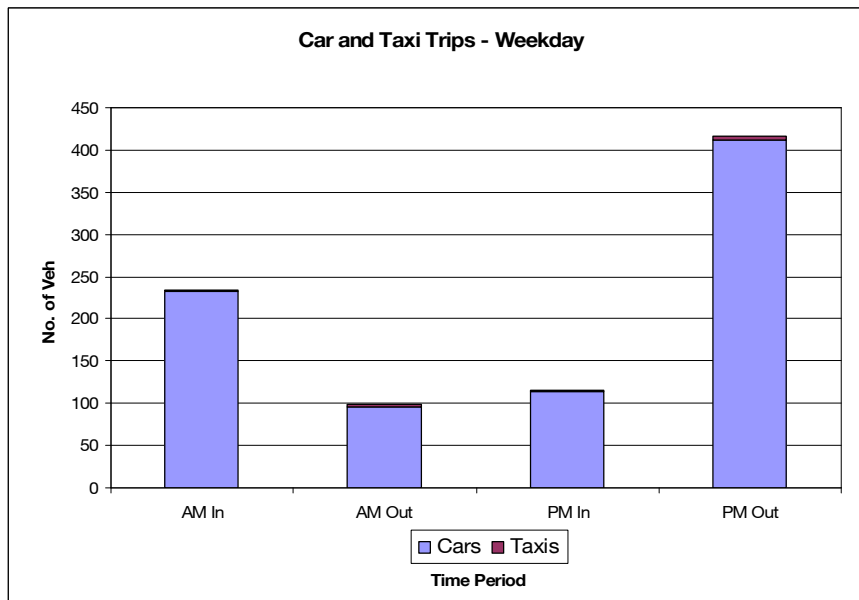
The profiles indicate that about 325 outbound trips and 721 inbound trips would occur during the morning peak period. During the evening peak period, about 400 people are estimated to travel outbound and about 1,400 arrive. Of these trips, some 330 person trips are made by car in the morning peak and around 530 person trips are made by car in the evening peak. The weekday peak period travel demands are also summarised in the graph below. These are shown for each mode of transport.

Figure 4.6: Person Trips by Mode - Weekday



Weekday car and taxi trips during the morning and evening peak periods are summarised in the graph below.

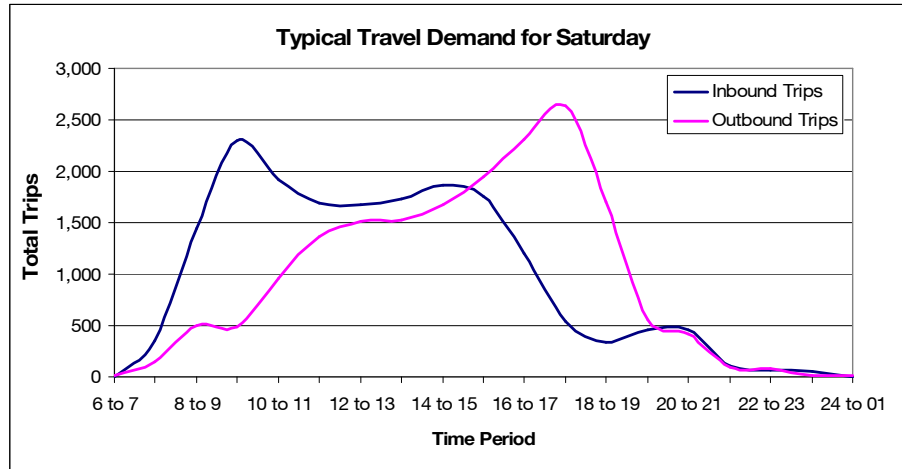
Figure 4.7: Car and Taxi Trips - Weekday



Saturday Trip Generation

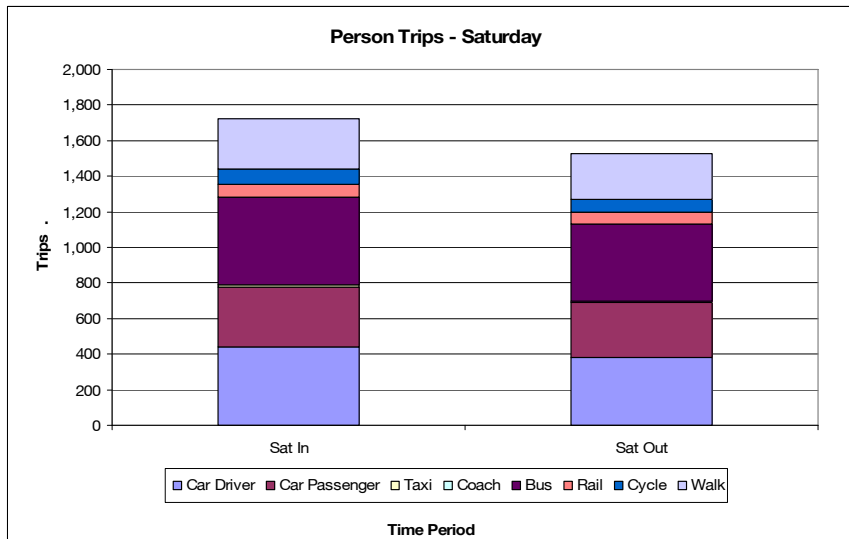
Saturday travel demand profiles are shown below:

Figure 4.8: Typical Travel Demand for Saturday

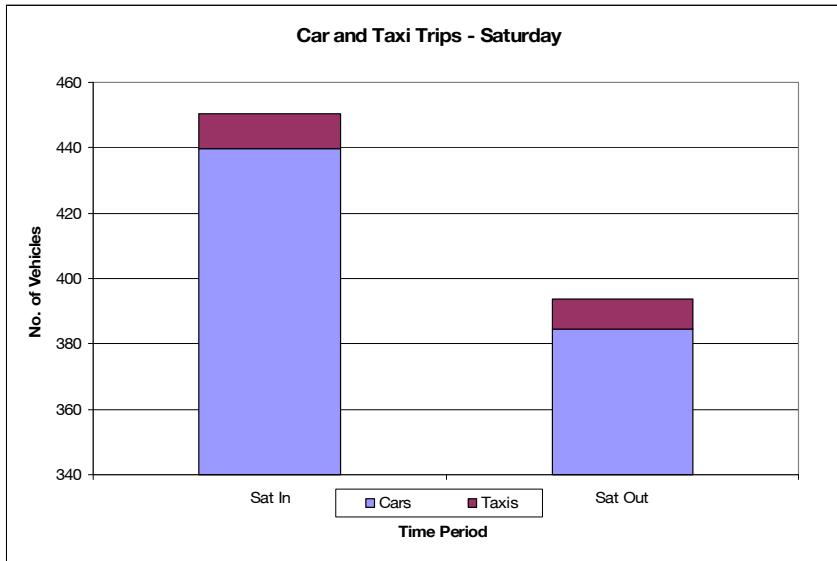


The above profile shows that during the Saturday peak about 1,700 people would travel in the town centre and some 1,530 people travel out during this period. Of these trips, a total of 844 person trips are made by car. The number of trips by mode of transport for the midday peak period is summarised in the figure below.

Figure 4.9: Person Trips – Saturday



The number of trips that would be made by car and taxi are summarised in the graph below.



5 Traffic Assessment

5.1 Highway Network Modelling

Buro Happold instructed JMP Consulting on behalf of Hammerson, to investigate the impact of the network changes, proposed parking strategy and development traffic on the road network within Kingston town centre using VISSIM, an industry approved micro-simulation modelling software.

The main objectives of the study was to establish a calibrated accurate / representative model of existing traffic conditions, as well as future conditions as a result of the development proposals and to test sensitivities of network changes. These models focused on the three peak periods (Weekday AM, and PM as well as Saturday) and have been built, in coordination with Buro Happold and approved by TfL. An initial model of Kingston town centre was acquired from TfL and was used as a starting point for the assessment process. Refinements and augmentations were made to provide clear representation of the study area, and to provide a suitable basis for comparing existing and future conditions. Updating of the model included updating traffic turning counts, signal timings, link structure, and traffic composition. Augmentation of the model involved increasing the model extents and taking into account relevant car parks. A full traffic assessment report is provided by JMP Consulting.

5.2 Traffic Flow

In order to establish the likely number of trips in Kingston by the estimated completion of development in 2011, surveyed traffic information from RBK was used as a starting point. Traffic survey information from the Kingston Town Centre Area Action Plan (Consultation June 2005) indicates that 64,000 vehicles enter Kingston Town Centre in a 12 hour period on a weekday. Assuming that the inbound traffic flows are the same for outbound traffic, the total traffic for Kingston in a 12-hour period is 128,000. Since RBK's cordon counts showed that Saturday flows were approximately 90% of the weekday flows and RBK has adopted a 10% reduction target in car, taxi, van and HGV traffic for 2011, the targeted weekend passenger trip by 2011 is estimated to be 115,200 trips.

In the travel demand assessment, the estimated daily car trips generated by the travel demand model for the weekday and Saturday have been overlaid on the baseline flows. In addition, a “No Reduction” scenario i.e. where no reduction is applied to the estimated trips in year 2004 has also been included in the assessment for discussion purposes. The results of this exercise are indicated in Figure 5.1 and Table 5.1 below.

Figure 5.1: Daily Car and Taxi Trips Forecast

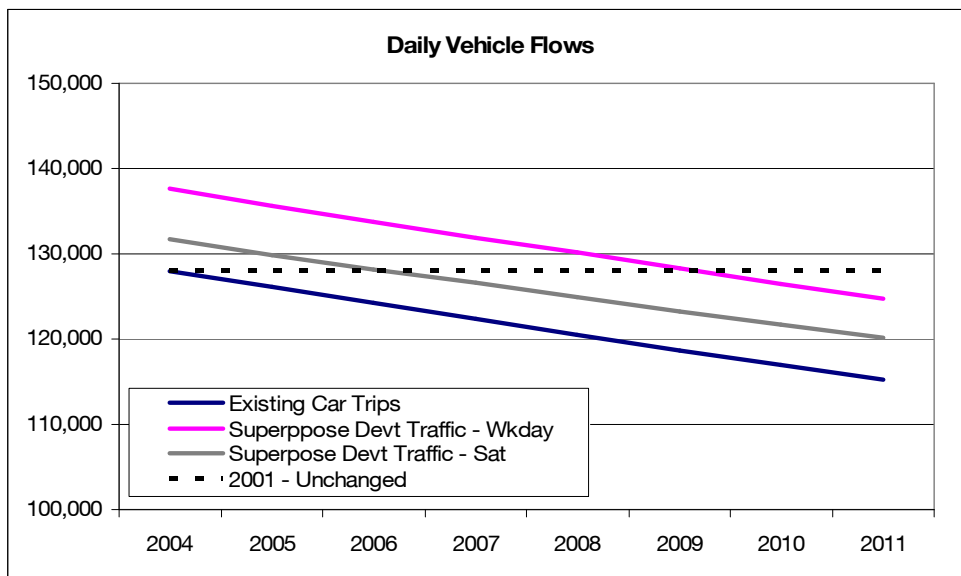


Table 5.1: Traffic Flow Summary

Vehicle Flows	Weekday	Saturday
Development Travel Demand as % of Future Flows	8.3%	14.2%
% Effective Reduction in Flow	2.5%	6.2%

From the above results, car trips generated by the proposed development equate to 8.3% and 14.2% of total 2001 weekday and Saturday flows respectively. If the trend for background traffic to decline continues, this additional traffic flow would be negated. In

fact daily flows with the development traffic added could reduce by 2.5% and 6.2% for weekday and Saturday respectively by 2011.

5.3 Traffic Distribution

A spreadsheet based network model has been built for the town centre to predict flows to and from various entry and exit points as well as car parks within the Town Centre. The 3-step process adopted for evaluating future car parking demand and town centre traffic is as follows:

- Redistribution of existing car parking traffic to take account of consolidation of car park capacities and network changes;
- Distribution of traffic generated by the proposed EQ; and
- Combining the results from 1 & 2 above to obtain the net effect on the future network.

5.3.1 Redistribution of Existing Traffic

A car parking survey was conducted by Steer Davis Gleave (SDG report for KTC as part of their K+20 Car Parking Strategy – Consultation Draft, Aug 2004) on behalf of RBK. With the introduction of pedestrian priority on Eden Street and consolidation of car parks in the town centre, the assessment has made provision for existing traffic to be redistributed to reflect the changes in routes taken to the car parks. Furthermore, the principle of interceptor car parks will be enhanced by other improvements to encourage car parking traffic to use the first available car park upon arriving at Kingston Town Centre. This should reduce unnecessary travel across the town centre by car. Provision has been made for relatively small changes in the modelling however.

Distribution of Development Traffic

From the travel demand model, peak hour traffic generated by the proposed development is distributed across the road network to the various car park groups. The distribution takes into account the origin and proximity to the various car parks as well as their relative attractiveness.

The proportional split of trips from the various origins and destinations are assumed to be similar to that of the survey data as it is unlikely that there will be any significant changes

in route choice into the town centre. However, the routes to the various car parks within the town centre will be different due to the changes in car parking provision. The results reflect an increased efficiency of car parks in the Town Centre on the basis that car parks are able to intercept entering traffic as quickly as possible. For outbound traffic, it is envisaged that the vast majority of traffic will leave Kingston Town Centre via a similar route to that used for their arrival. Therefore, the outbound traffic distribution is likely to follow the same inbound principles.

6 Car Parking Supply and Demand

6.1 Existing Provision and Strategy

In comparison with several other town centres with similar retail and town centre attributes as Kingston - such as Reading, Basingstoke, Bromley, Guildford and Croydon, - Kingston's parking provision and usage is similar to that of Guildford and is within the average limits of all town centres considered. This suggests that Kingston town centre provides an appropriate level of car parking provision that is sufficient to meet the demand.

Using information provided by RBK for Kingston Town Centre, there are 1,599 contract and 5,470 public car parking spaces available, totalling 7,069 spaces. On a Saturday there are 126 contract and 6,943 public car parking spaces available. Provision is made for increasing the capacity of the Cattle Market car park, with consolidation of car parking at a new car park in Brook Street and closure of Ashdown Road and Eden Walk car parks, maintaining overall car park capacity within this area of the town centre.

In the emerging design of the EQ scheme, proposals for car park locations have been discussed and agreed with RBK and TfL officers. The proposed car park in Brook Street is located adjacent to the southern part of the Relief Road (Wheatfield Way) and will have an access that is segregated from the proposed bus station. This will reduce the potential for conflict between buses, cars and service vehicles.

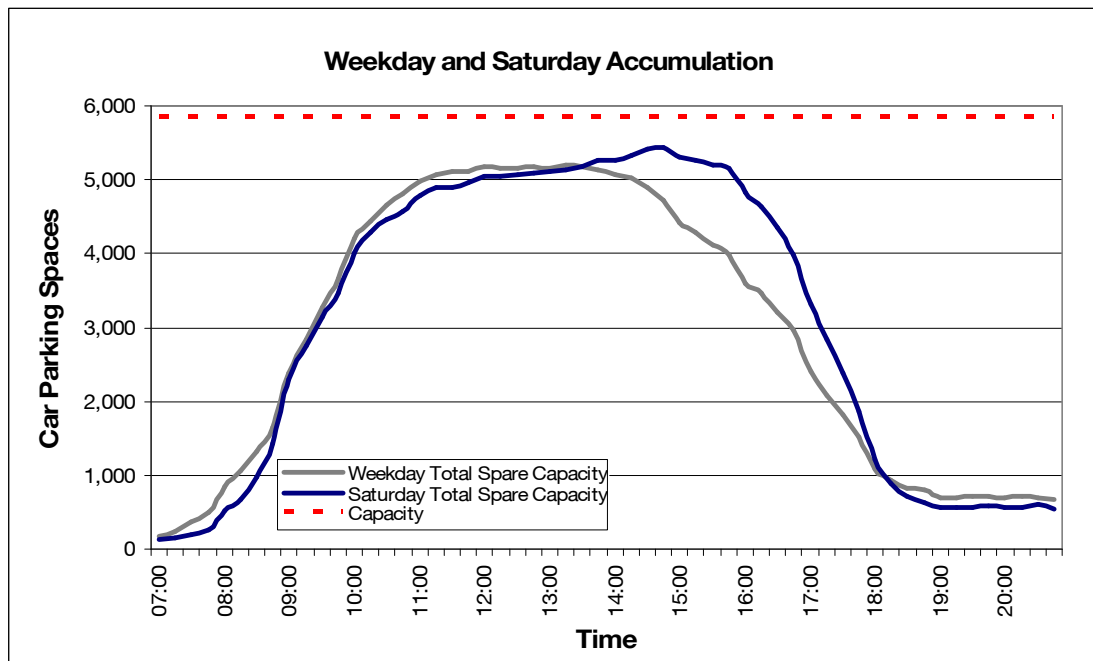
6.2 Car Park Consolidation

It is proposed that the existing car parks located in the south of Kingston Town Centre be consolidated into one main car park located adjacent to Brook Street/ Wheatfield Way. Existing surface car parks in Ashdown Road along Wheatfield Way would be closed. The consolidation of this provision will improve the efficiency of Kingston Town Centre's overall car park supply and increase accessibility as well as clarity for users. This proposal compliments Kingston Town Centre's Car Parking Strategy and will reinforce its popularity as a retail destination whilst meeting the future needs of motorists without compromising its highway network capacity.

6.3 Accumulation

The parking accumulation profiles generated for both weekday and Saturday have been used to investigate the adequacy of the car parking capacity provided by the developments. Information on existing car parking profiles was contained in the Steer Davies Gleave Parking Study report referred to previously. The car park profiles were surveyed during a relatively quiet period of the year (May), and to account for this an “uplift” factor of 10% was applied to the surveyed car park profiles to build robustness into the car parking analysis and to achieve a closer representation of the normal car parking profiles.

Figure 6.1: Existing Car Parking Accumulation and Capacity (note this only includes surveyed car parks, rather than the capacity that exists in the town centre)



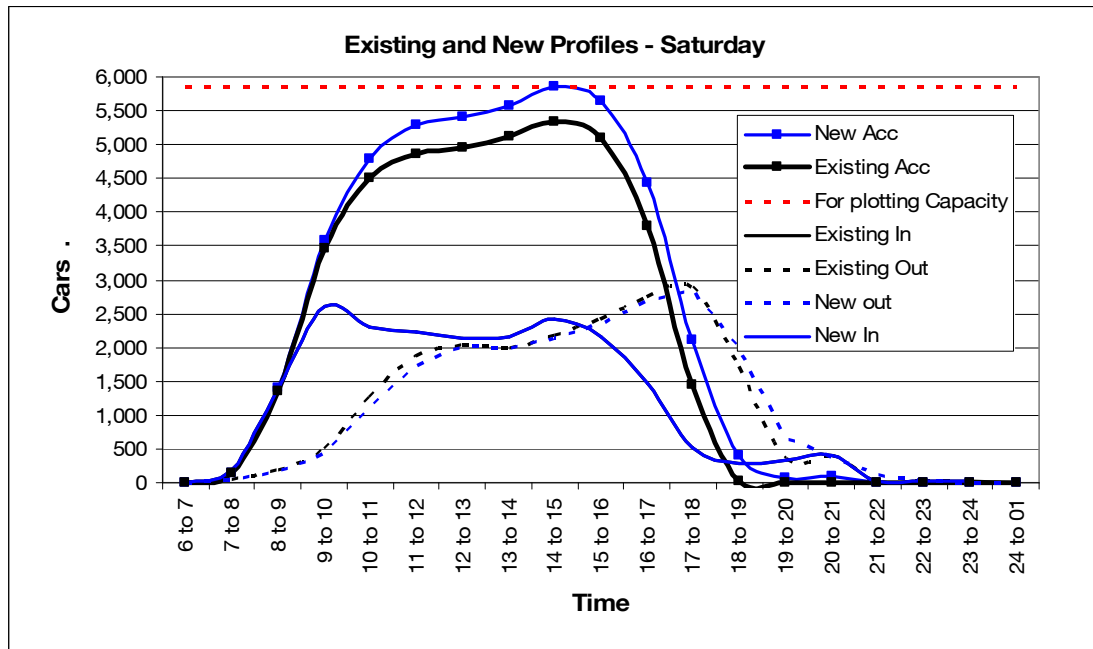
Based on the parking accumulation assessment, the maximum accumulations for the weekday and Saturday are 5,101 and 5,440 respectively.

6.4 Duration of Stay

Based on the car park survey data, a simple model was set up to determine the duration of stay of car park users. The analysis yields the following results:

- Saturday period experiences a higher maximum accumulation than the weekday, which hence represents the more critical period;
- On the Saturday, the existing duration of stay is 92 minutes (1.54 hours) and the estimated maximum hourly accumulation is 91% of the total car park capacity;
- The effects of an increased duration of stay can be investigated by shifting the outbound profile and/or uniform scaling of the profiles. The results are shown in Figure 6.2 below.

Figure 6.2: Existing and New Parking Profiles - Saturday



It has been estimated that with the development, the future duration of stay is 118 minutes (1.94 hours), which represents an increase of about 28% whilst the maximum

allowable duration of stay is 130 minutes. For this scenario, the maximum allowable increase in car parking volume will be the spare capacity i.e. $100\% - 91\% = 9\%$.

6.5 Park and Ride

In 2001, RBK commissioned Colin Buchanan and Partners (CBP) to undertake a feasibility study of the potential to provide a Permanent Park and Ride (P & R) to serve Kingston Town Centre. The objective of the study was to investigate the feasibility of introducing an all-year round P & R system for the town centre due to the positive results and public reception since the P & R scheme was introduced in Christmas 1993. Since then, RBK has supported a P & R site at Chessington World of Adventures for the Christmas period only and nine potential sites, including Chessington, were examined.

Of the nine initial sites that were identified and assessed in the CBP study, three sites, namely Tolworth, followed by Sandown and Kempton Park racecourses were identified as having potential in the Study. However following further consideration Council's Executive in July 2003 resolved not to pursue the Tolworth site for reasons related to planning, existing congestion in the area and potential detrimental impact on travel demand choices. The sites for further consideration were to be Kempton Park, Sandown Park and land in the vicinity of the M25 Junction 9.

7 Effect of Generated Trips

7.1 Introduction

A comprehensive analysis has been undertaken to assess the effect of the development on all modes of transport. This has focussed a little more on the primary and more sensitive modes, viz. buses and traffic, as these are likely to require a greater level of investment to meet the requirements. That said it is recognised that other modes are of equal importance and they have also been considered.

7.2 Bus Routes

London Buses has provided details of future bus stop requirements for Kingston Town Centre. These allow for a targeted 30% increase in bus patronage and the additional passengers generated by the development proposal. The following represent the guiding principles that were used to shape the proposed bus routes:

- Minimise any impact which the re-routing of buses may have on existing Public Transport Accessibility Levels (PTAL);
- Minimise negative impacts on bus kilometres as a result of these changes;
- Return bus services to their existing route pattern as soon as possible; and
- Group bus routes serving similar corridors. Wherever possible, services within a particular group will serve the same stop. Such an arrangement provides passengers with increased choice of bus routes without the need to move between stops.

Following the introduction of pedestrian priority on Eden Street, bus services will be re-routed via Wheatfield Way. A new state-of-the-art bus station on Wheatfield Way is proposed. This will help to consolidate existing services, improve bus penetration and encourage patronage through its proximity to key destinations.

It is proposed that buses will enter and exit the bus station from Wheatfield Way before continuing northwards for northbound services. For southern services, buses will turn right to enter the new bus station. After setting down and picking up passengers, buses will turn right again onto Wheatfield Way to continue southwards. Appropriate bus priority

measures will need to be provided to maximise priority and minimise delay. With these proposals, changes to bus traffic flow will be isolated to Wheatfield Way as routes to the north and south remain unchanged. The various peak periods have similar bus service levels.

7.3 Bus Trips and Capacity

Development Trips

From the travel demand model, the estimated travel demand for bus trips generated by the proposed developments is summarised in Table 7.1 below:

Table 7.1 Estimated Travel Demand for Bus Trips

Bus	Peak Period					
	AM In	AM Out	PM In	PM Out	Sat In	Sat Out
Trips	249	86	117	455	490	431

Existing Demand

From the survey, the number of hourly passenger trips in the morning peak period was estimated to be 1,726 and 1,191 for the inbound and outbound respectively. For the evening period 1,197 inbound and 1,795 outbound trips were estimated.

The existing capacities for both periods in both directions were 4,835. Information supplied by Transport for London's (TfL) 2004 Bus Origin-Destination Survey (BODS) for Kingston town centre has identified a target of 30% increase in capacity for 2011. It is assumed that existing patronage will continue to grow by 30% for 2011. Using the projected bus trip profiles, development bus trips have been added to existing figures. Graphs have been generated for the weekday AM and PM periods for each direction which show the following:

- Projected increase in capacity up to 30% increase in 2011;
- Projected demand without development (i.e. growth in existing passenger numbers);
- Projected demand including development; and

- Existing capacity remaining unchanged.

Figure 7.1: Peak Hour Bus Trips – Weekday AM In

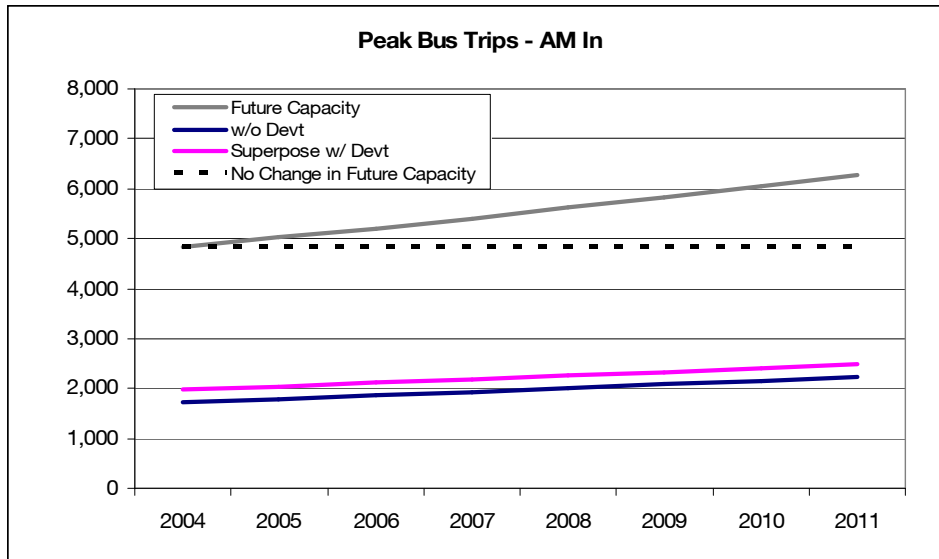


Figure 7.2: Peak Hour Bus Trips – Weekday AM Out

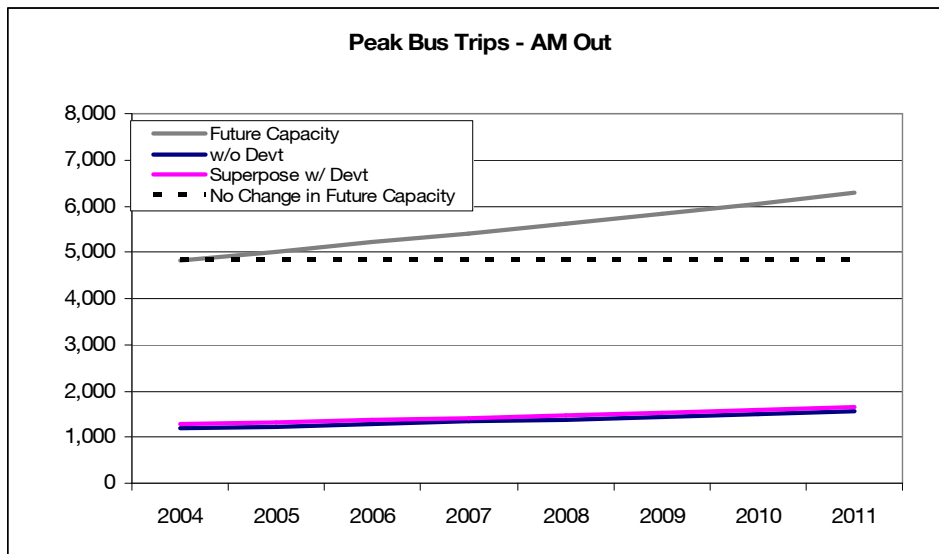


Figure 7.3: Peak Hour Bus Trips – Weekday PM In

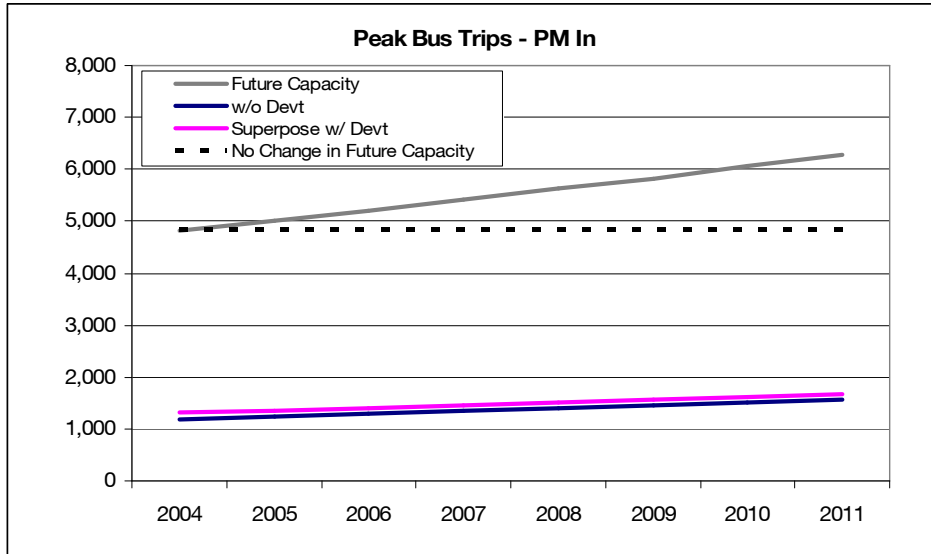


Figure 7.4: Peak Hour Bus Trips – Weekday PM Out

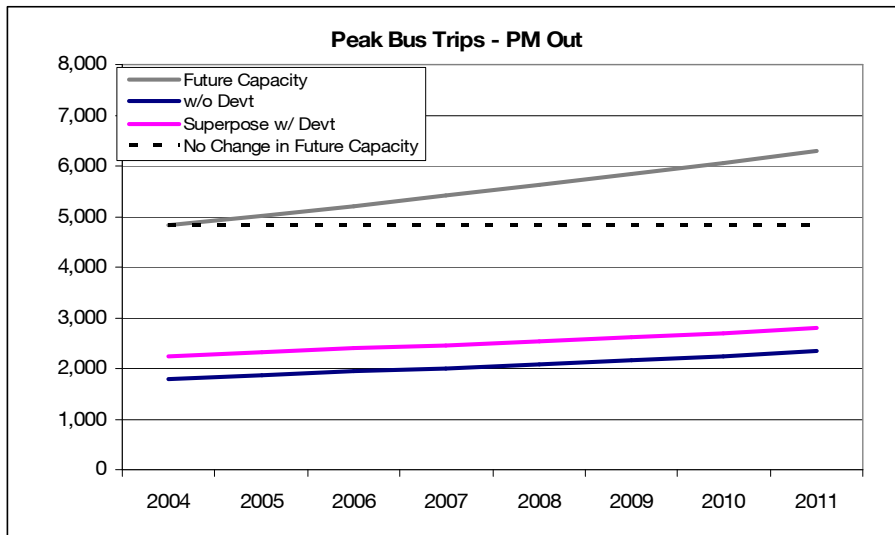


Table 7.2: Impact of Development Bus Trips and Remaining Spare Capacity

Buses	Weekday			
	AM In	AM Out	PM In	PM Out
Development Bus Trips as % of Future Trips	11.1%	5.5%	7.5%	19.5%
% Capacity Available	60.3%	74.0%	73.4%	55.6%

This indicates that the future capacity of bus services in Kingston will be able to meet the anticipated demand generated from the growth in bus trips and the proposed development satisfactorily.

7.4 Rail

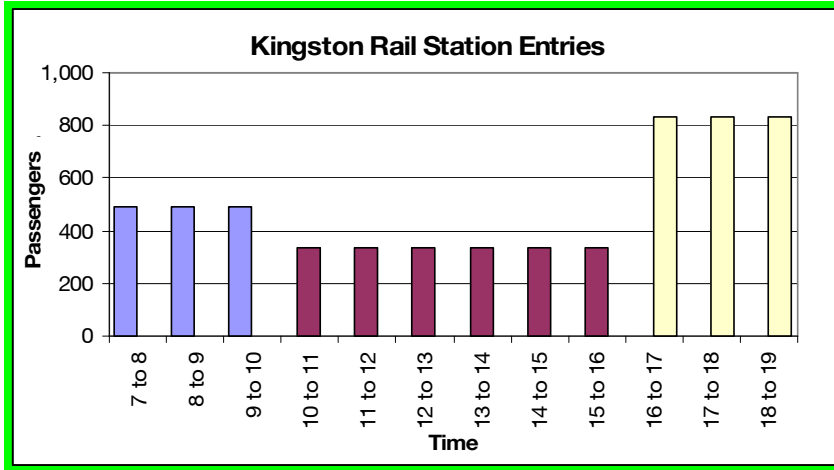
RBK provided information relating to the London Area Travel Survey (LATS) in 2001, which contains rail journey to work information for the Council's ten stations. The data indicates that a significant portion of the working population use at least one of the Borough's stations to commute to work, predominantly to inner / central London. Passenger trips originating from Kingston station is presented below:

Table 7.3: Rail Passenger Survey for Kingston (LATS 2001)

Time Period	0700-1000hrs	1000-1600hrs	1600-1900hrs	12 Hour
Passengers	1,470	2,026	2,504	6,000

The figures above represent one-way entries to the station. Therefore, it is assumed that the total number of journeys would be twice this amount since most trips are likely to be 2-way trips. By assuming a uniform distribution within each time period the following profile is obtained:

Figure 7.5: Kingston Rail Station Entries



The existing rail capacity provided by services at Kingston Station are as shown below. These have been compared with the travel demand generated by the development:

Table 7.4: Existing Rail Capacity and Travel Demand

Peak Period	Capacity		Travel Demand	
	Arriving	Departing	Arriving	Departing
AM	6,400	6,400	46	48
PM	5,600	4,800	36	75
Saturday	4,800	4,000	76	67

This indicates that the travel demand generated by the development will contribute less than 1% of existing rail capacity for all periods.

7.5 Cycle

From the travel demand model, the estimated level of cycle usage is summarised in Table 7.5 below. This includes all land uses. It should be noted that the residential elements account for approximately 63% of developments and for the retail elements this is approximately 33%.

Table 7.5: Cycle Travel Demand

Cycle	Peak Period					
	AM In	AM Out	PM In	PM Out	Sat In	Sat Out
Trips	30	14	18	64	81	72

As it is reasonable to expect the residential and hotel elements to provide separate non-public cycle parking, the maximum accumulations for the remaining land uses of retail and A3 can be obtained. This is 182 and 249 for the weekday and Saturday respectively.

Figure 7.6: Cycle Parking Level - Weekday

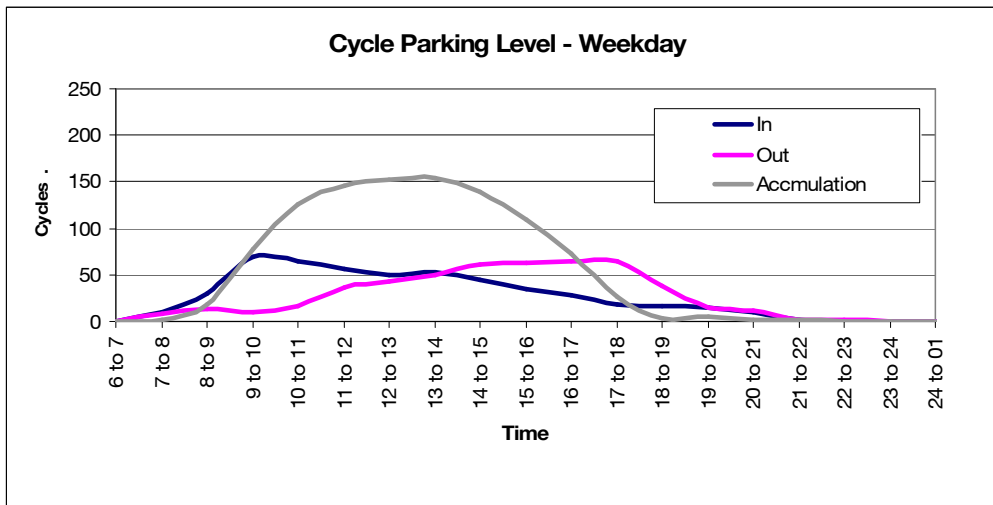
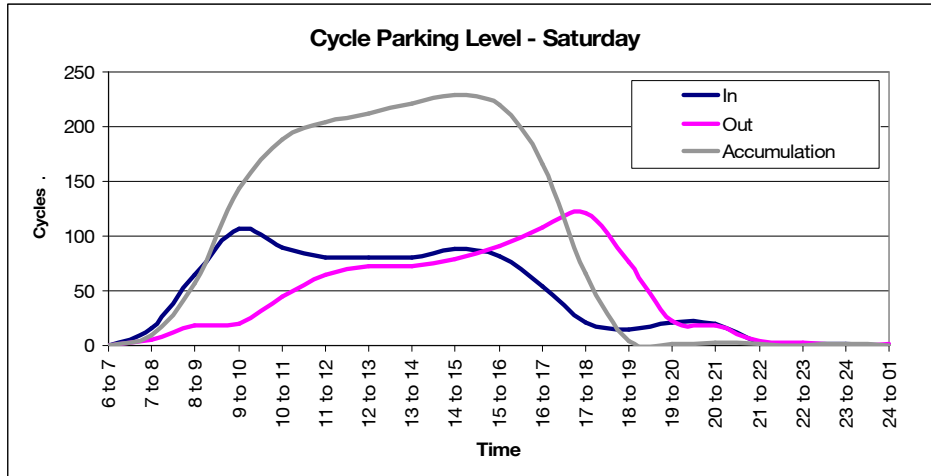


Figure 7.7: Cycle Parking Level - Saturday



7.6 Walk

From the travel demand model, number of walk trips forecast are as summarised below:

Table 7.6: Walking Trips

Walk	Peak Period					
	AM In	AM Out	PM In	PM Out	Sat In	Sat Out
Trips	90	42	60	209	289	259

These number fall well within the capacity of the pedestrian areas around the town centre.

8 Sensitivity

8.1 Introduction

A number of assumptions have had to be made to progress the transport assessment process. It was recognised during the early stages of this work that collecting and testing every piece of information would prove to be both impractical and cost ineffective. Thus, by relying on relevant experience and dependable sources, sensible and realistic inputs have been used in agreement with RBK, TFL and the Hammerson design team.

8.2 Assumptions

The following inputs for the travel demand model have been identified to have contributed to robustness:

- Traffic growth to stabilise in 2003;
- Higher shopper densities used for retail population; and
- Higher trip rates for home-based work trips.

a) Traffic Growth

The transport assessment worked on the basis that background traffic growth will stabilise at 2003 levels. This is a cautious approach when taking into account of RBK's ongoing efforts to reduce people's need to travel by car. The mode share for the proposed development will remain broadly as existing, thereby using a higher than expected level of use by car to ensure robustness and flexibility. With respect to other modes of transport, capacities have been found to be sufficient for accommodating growth in passenger numbers when the development is completed.

b) Shopper Density

In order to develop an understanding of the likely shopper density (visitors generated by unit area) a footfall data has been gathered for a number of major retail centres. The footfall data is summarised in the table below.

Table 9.1 Footfall Data of Mixed-Use Centres

	Meadowhall	Metro Centre	Bluewater	Trafford Centre	Merryhill	Average
Floor area	1,452,600	2,049,220	1,650,000	1,399,000	1,558,394	1,621,843
Annual Footfall	24,400,000	23,750,000	26,000,000	24,000,000	21,726,190	23,975,238
No. of staff	1,495,840	2,110,221	1,699,116	1,440,645	1,604,783	1,670,121
Visitors/yr	22,904,160	21,639,779	24,300,884	22,559,355	20,121,407	22,305,117
Visitors/sqft/yr	16	11	15	16	13	14

The information above provides a sound basis for estimating the number of shoppers per annum that a given quantum of retail floor space will generate. This data needs to be disaggregated to represent the time periods identified by the assessment.

Based on the above methodology the density of shoppers forecast on a Weekday and Saturday can be calculated as follows:

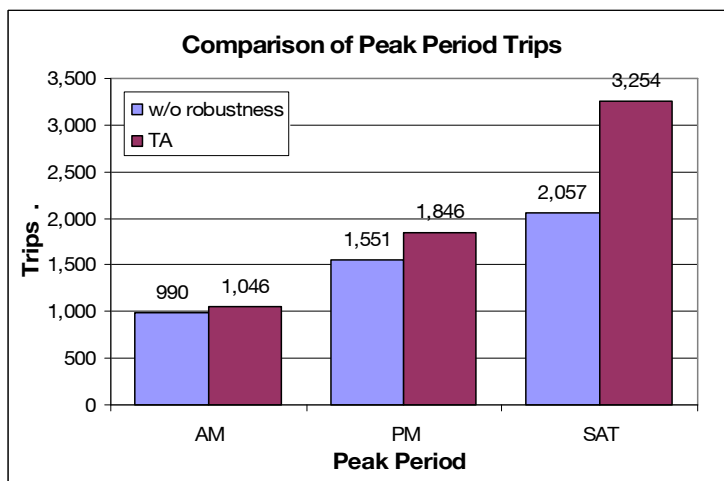
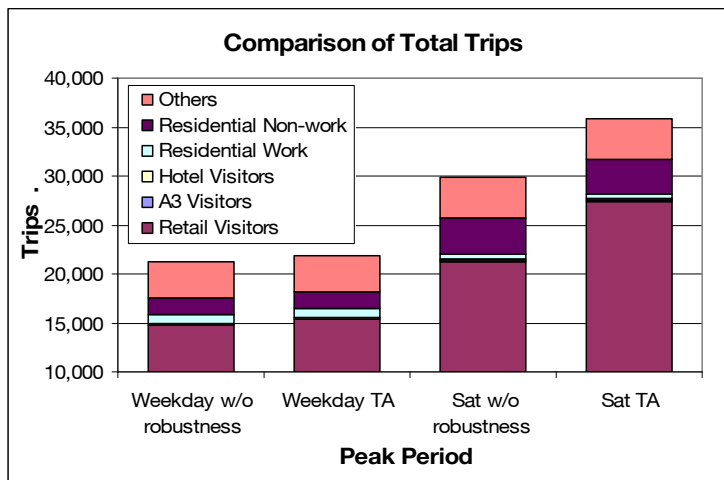
Derivation of Density Rates from Annual Footfall

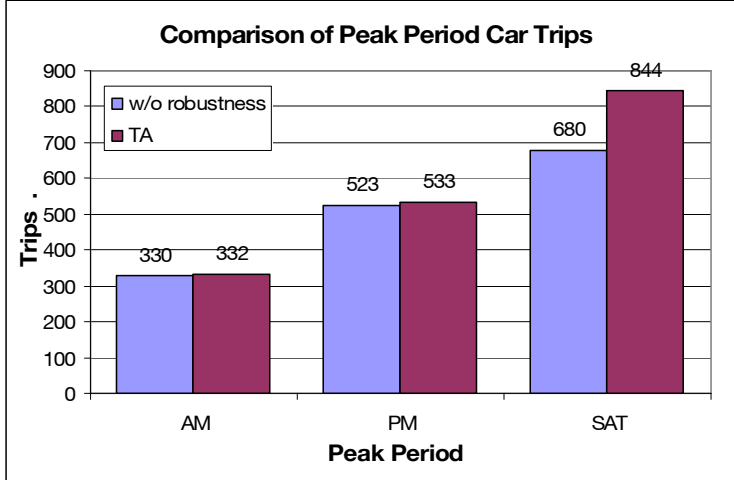
Period	Factor	Average Visitor
Annual	NA	22,305,117
Month	8%	1,784,409
Week	23%	410,414
Friday	15%	61,562.12
Saturday	22%	90,291.11

Floor Area		1,621,843 sqft
Density (area per shopper)	Weekday	26 sqft per shopper 2.4 sqm per shopper
	Saturday	18 sqft per shopper 1.7 sqm per shopper

Based on the above shopper data, it is proposed that figures of 25 sqft/person on a Weekday and 14 sqft/person on a Saturday would provide a robust estimate for the travel demand model used for the Kingston Town Centre. This in turn is equivalent to an overestimation of 590 trips on the weekday and 6,083 trips on the Saturday.

8.3 Overestimates





9 Comments and Conclusions

9.1 Trips

The travel demand forecast to be generated by the committed schemes indicate that the maximum total person trips will occur during the Saturday peak period and total 1,727 trips in the inbound direction. Similarly, the maximum total car trips is 450 and occurs in the same period. The rate of increase for inbound trips is higher in the weekday as people working in the town centre need to reach their work place on time (e.g. common constraint). For the same reason, the inbound trips reduce more quickly in the weekday after the morning peak period. The reduced inbound trips thereafter throughout the day is similar between the weekday and Saturday with the exception that the rate of reduction is greater for the weekday as people are expected to return home in a more dispersed fashion for the Saturday.

Comparing the outbound trips between the evenings and mornings, the Saturday profile is greater than the weekday. People can also be expected to travel more in the evenings for Saturday. Similarly, the weekday inbound trips as a proportion of outbound trips in the evening peak period is higher than for the Saturday, as people complete their working day and return to their homes. This also explains the steeper decline in trip generation thereafter. A diffused pattern of travel is observed seeing that travel back to the home is not immediate in the evening peak period due to people can travelling elsewhere after work (e.g. restaurant, shopping).

9.2 Other Modes

Apart from car driver and taxi, there are a total of 487 inbound and 227 outbound trips in the morning peak period. There are 296 inbound and 1,017 outbound trips in the evening peak period. In the Saturday peak period, there are 1,277 inbound and 1,134 outbound trips. The combined weekday bus and rail travel demand is 295 and 134 inbound and outbound trips respectively in the morning peak period and 154 inbound and 503 outbound trips respectively in the evening peak period. In the Saturday peak period, the combined bus and rail travel demand is 566 and 497 inbound and outbound trips respectively.

9.3 Conclusion of impacts

Having not seen any new retail development for over a decade, retail studies indicate that Kingston town centre is now under threat from competing centres undergoing expansion with the potential to lose both trade and shoppers. Retail studies show that there is a need, demand and capacity for new shops. From stakeholder engagement, the K+20 Area Action Plan identifies strengths to be built upon and weaknesses to be addressed including traffic congestion, parking, poor approaches, poor quality streetscape in some areas and the need to manage the vibrant evening economy and broaden the range of attractions .

The proposed development strives to strengthen Kingston's position as a retail destination and at the same time offer enhanced leisure, residential and commercial opportunities. Establishing the right mix of land uses and rebalancing the range of attractions across the town centre with associated transport access and environmental improvements are important elements of K+20. Proposed developments aim to compliment existing land uses and work collectively to meet the needs and aspirations of people in Kingston.

The proposals include:

- the provision of a new pedestrianised shopping street enhancing and extending the core retail areas;
- the associated pedestrianisation of Eden Street including the removal of bus movements, resulting in a new bus station along Wheatfield Way;
- upgrading Fairfield bus station;
- enhancing pedestrian links, cycle routes and secure cycle parking throughout the scheme,
- Improving the usage of all the car parks around the town centre to reduce the amount of cross town traffic and queuing on the highway network, and
- Addressing local capacity constraints and sensitive parts of the highway network..

Focus on public transport sees additional space allocated for bus stops and stands in the Market Place/ Guildhall area, reflecting the commitment towards encouraging more sustainable modes of travel with due attention to enhancing the visitor experience in the town centre itself. These address the aspirations of providing further expansion and improvements to existing bus facilities and increasing service capacity. Safety is the top priority and appropriate treatment is given to the highway network by prioritising pedestrian accessibility and public modes of transport.

In addition to fulfilling the Council's objectives and responding to the relevant policies, the proposals have been tested in close collaboration with the Council, TfL and other key stakeholders. The overall conclusion of the Transport Assessment work over the past three years is that the proposed level of development provides a sufficiently robust transport strategy capable of supporting itself within Kingston town centre. The analysis has made no provision for the decline in background traffic to continue or a significant shift in mode share away from the private car. Notwithstanding this, the model do demonstrate that only the weekday morning peak will experience increased travel time across the town centre. The network improvements associated with the proposals have been shown to perform at a similar level of service to the existing situation.

It is thus concluded that provided the proposals are accompanied by appropriate transport measures, the mix and quantum of development identified in the K+20 studies can be accommodated in the town centre.

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