

4. Private Car

4.1 Current Situation

Details of historic levels of car ownership in the areas of Norwich, and its comparator cities of Lincoln, Exeter and Ipswich, have been extracted from the 2001 census and are shown in Table 4.1, together with census data for 1991 and 2001 for Norwich.

Table 4.1: Car Ownership Levels

	Norwich 1991	Norwich 2001	Lincoln 2001	Exeter 2001	Ipswich 2001	England
No car	40%	35%	33%	28%	29%	27%
1 car	46%	48%	47%	49%	47%	44%
2 or more car	14%	17%	20%	23%	24%	29%
Level of Car Ownership	60%	65%	67%	72%	71%	73%

Source: Office of National Statistics – Neighbourhood Statistics

Table 4.1 shows that there has been a sizable decrease in the number of households in the Norwich area without a car from 40% in 1991 to 35% in 2001 with a reciprocal increase in overall levels of car ownership from 60% in 1991 to 65% in 2001, an increase of 8% over the 10 year period. According to the 2001 census results, Norwich has the lowest level of car ownership compared with its comparable cities, but with a rising trend for car ownership.

4.1.1 Car Club

Car Clubs have been operating throughout the UK for over 10 years, and provide access to cars for private individuals' occasional use. Two types of scheme operate in the UK; commercial and community, both allow anyone aged between 18 and 75 years, with a full valid drivers licence held for 12 months, to join.

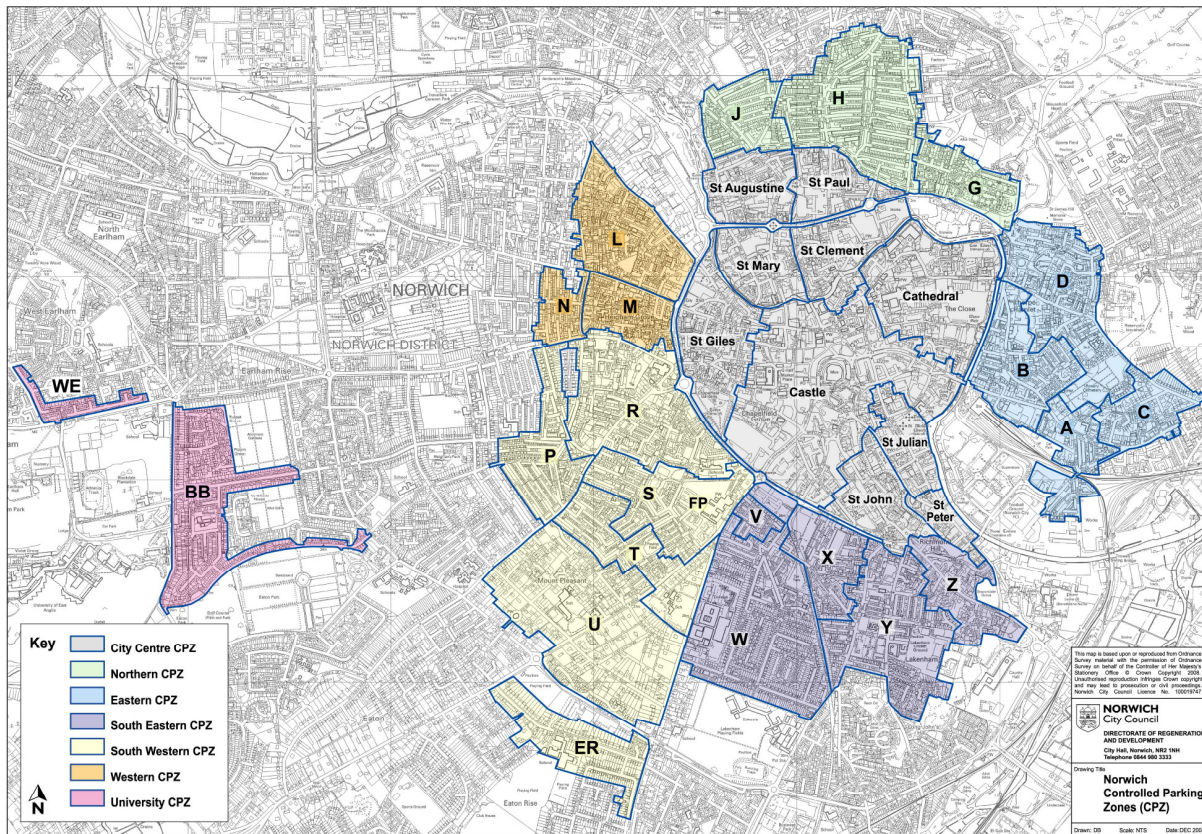
The schemes charge for a vehicle only when it is being used, which typically means that anyone who drives less than 8,000 miles per year, will benefit financially from joining. Payment is made per hour of use and typically includes mileage up to an agreed daily distance.

There are currently 16 Car Clubs operating in the UK, of which 4 are commercial and 12 are community, serving a total of 47 cities. Norwich has a small Car Club in operation, providing 5 vehicles in the city centre and in the residential area to the west of the city. However, at the time of writing there is some uncertainty around the future of the Club and it is likely that the operator in Norwich will change in early 2010.

4.1.2 Public Car parking

Both Norwich City Council and private companies operate car parks in Norwich. Charges for on-street parking are in operation within the city centre (generally within the Inner Ring Road). Residents-only parking zones (CPZ) are also in operation within much of the city. These extend from the city centre to a distance sufficient to deter commuters from parking and walking into the city centre, generally 1-2 miles, and Norwich City Council is responsible for their enforcement. Locations of the CPZs are detailed in Figure 4.1.

Figure 4.1: Location of Controlled Parking Zones in Norwich



Source: Norwich City Council

Figure 4.2 shows the location of both Norwich City Council and privately owned car parks within the Inner Ring Road available for public use. There are currently 14 council-owned public car parks with a total of 4,246 spaces and 10 privately run public car parks with a total of 2,850 spaces located within this area. In addition to the 7,096 spaces in car parks in the city, there are some 530 on street pay and display parking spaces available. Parking concessions for people with mobility difficulties travelling as drivers or passengers are provided through the Blue Badge Scheme. There are currently 59 spaces for holders of Blue Badges within the same area. Details of the parking charges within Norwich are detailed in Table 4.2.

Figure 4.2: Car Park Locations

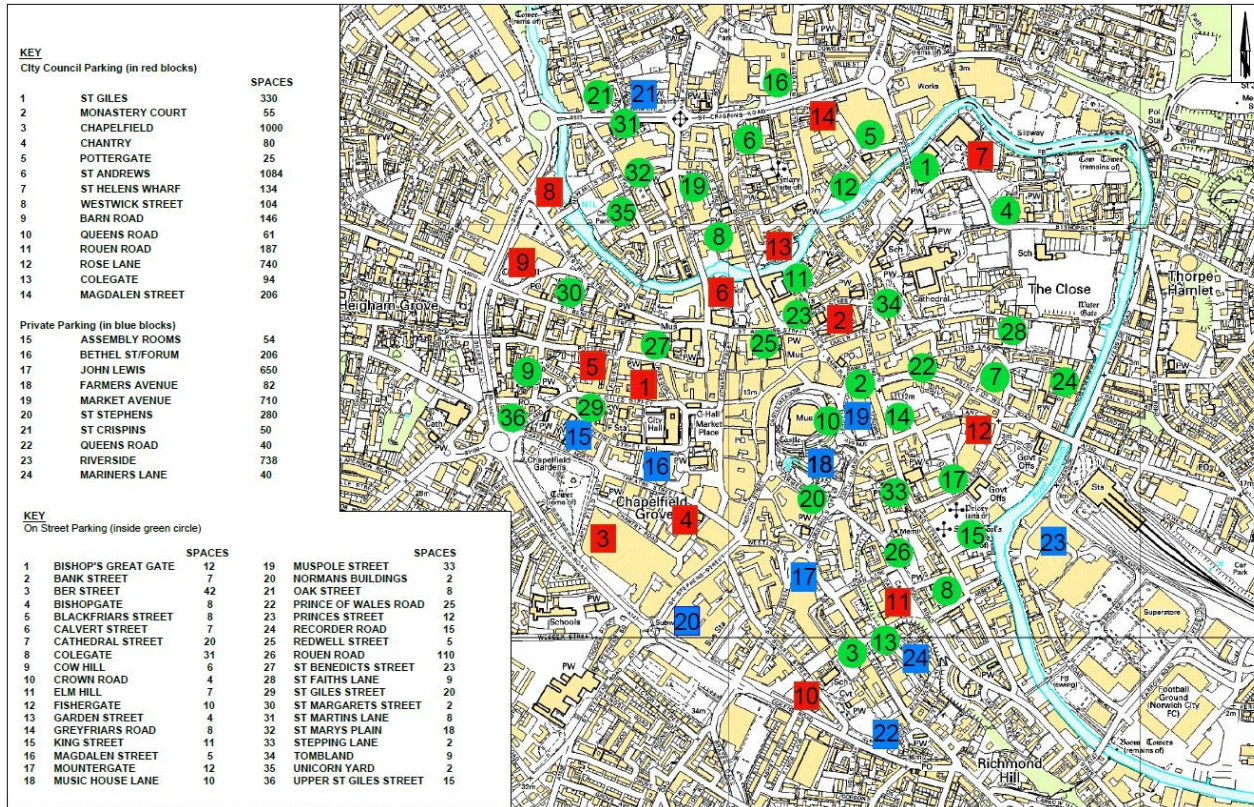


Table 4.2 shows that there is plentiful car parking within the city, with parking charges at several car parks being sufficiently high so as to actively discourage their use by commuters i.e. St Giles, Monastery Court, Chapelfield, John Lewis, St Stephens, Chantry and Pottergate. These car parks provide in the region of 1,490 spaces, which at approximately 20% of the 7,370 car parking spaces available in the city, means that ,combined, they are a discouragement to commuting trips in to the city for workers whose place of work does not provide car parking.

Table 4.2: Norwich Car Parking Charges

Car parks	Up to 1 hr	Up to 2 hrs	Up to 3 hrs	Up to 4 hrs	Up to 5 hrs	5 hrs +
City Council Car Parks						
St Giles	£1.40	£2.80	£4.20	£5.60	£8.00	£15.00
Monastery Court	£1.40	£2.80	£4.20	£5.60	£8.00	£15.00
Chapelfield	£1.40	£2.80	£4.20	£5.60	£8.00	£15.00
Chantry	£1.40	£2.80	£4.20	£5.60	£8.00	£15.00
Pottergate	£1.40	£2.80	£4.20	£5.60	£8.00	£15.00
St. Andrews	£1.20	£2.40	£3.60	£4.80	£5.00	£5.00
Westwick Street	£1.30	£2.60	£3.90	£4.00	£4.00	£4.00
Barn Road	£1.10 per hour or part of an hour					
Queens Road	£1.10 per hour or part of an hour					
Rouen Road	£1.10	£2.20	£3.30	£4.40	£5.00	£5.00
Rose Lane	£1.20	£2.40	£3.60	£4.50	£4.50	£4.50
Colegate	£1.10 per hour or part of an hour					
Magdalen Street	90p	£1.80	£2.70	£3.60	£4.00	£4.00
Exeter Street	80p	£1.60	£2.40	£3.00	£3.00	£3.00
St. Crispins	80p	£1.60	£2.40	£3.00	£3.00	£3.00
Commercial Car Parks						
Assembly Rooms	£1.40	£2.80	£4.20	£5.60	£8.00	£8.00
Bethel Street / Forum	£1.10	£2.20	£3.30	£4.40	£5.50	£5.50
John Lewis	£1.00	£2.00	£3.00	£4.50	£8.00	£11.00
Farmers Avenue	£1.00	£2.00	£3.00	£4.00	£6.00	£6.00
Market Avenue	£1.00	£2.00	£3.00	£4.00	£6.00	£6.00
St Stephens	£2.00	£2.00	£4.50	£6.00	£8.00	£11.00
Queens Road	£2.00	£3.00	£4.50	£6.00	£8.00	£8.00
Riverside	£1.20	£1.80	£2.60	£3.20	£3.60	£6.60
Mariners Lane	80p	£1.60	£2.40	£3.20	£3.50	£3.50

In the city centre, on-street parking charges range from 40p for 15 minutes and in the secondary areas from 20p for 15 minutes.

4.1.3 Motorcycle Parking

In addition to the car parking spaces, a total of 92 motorcycle parking spaces are provided in Norwich including:

- Farmers Avenue – 14 spaces;
- Chantry Road – 8 spaces;
- Theatre Street – 5 spaces;
- Bethel Street – 15 spaces; and
- St Giles Street – 34 spaces

4.1.4 Car Park Occupancy

Data has been automatically collected for the occupancy of 9 car parks in Norwich since 2006:

- Castle Mall Market Avenue and Farmers Avenue;
- Chapelfield;
- John Lewis;
- St Giles;
- Rose Lane;
- St Andrews;
- The Forum; and
- Riverside.

This data has been used to create Figure 4.3 and Figure 4.4 which show the aggregated occupancy of these 9 car parks on a weekday in a neutral month and on a corresponding Saturday in each year from 2006. Figure 4.3 shows that following two years of steady car parking use in Norwich, in 2009 the car parks are now operating at capacity on a weekday. A reason for this recent increase in car parking use may be that with Chapelfield and St Andrews car parks opening in 2005/06, patronage at these facilities has gradually increased as they have become two of the most popular car parks, and St Andrews in particular is a key car park for commuter use in the city.

Figure 4.3: Aggregated Car Parking Data – Weekday Occupancy

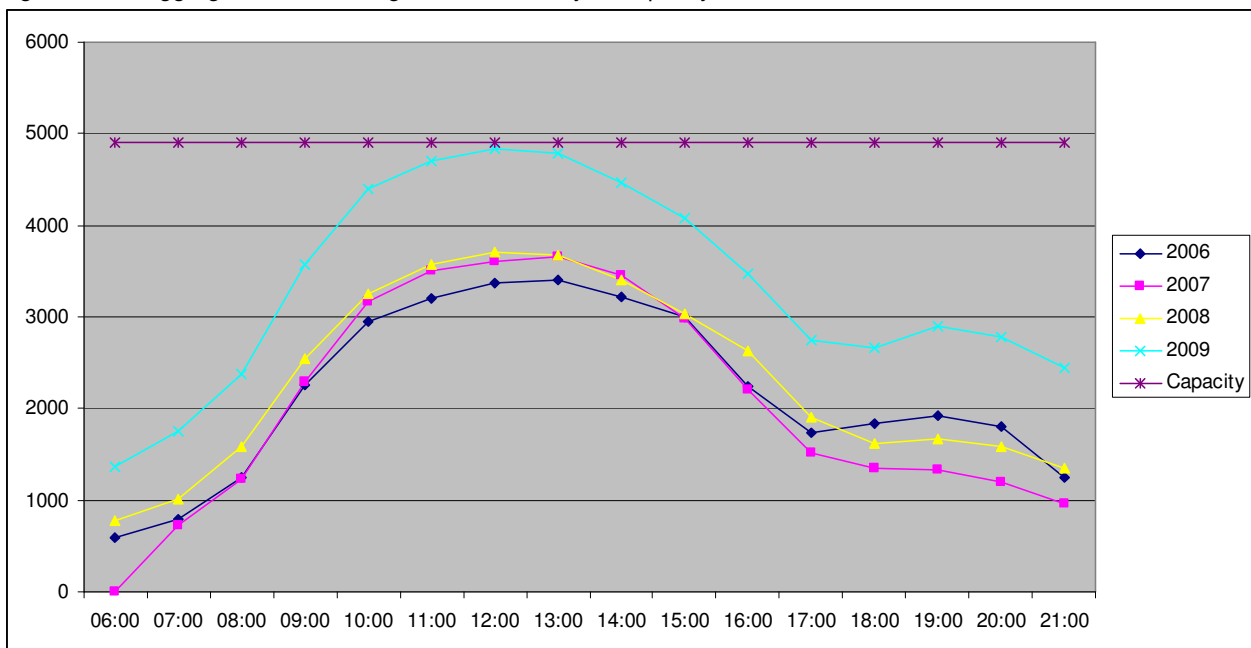
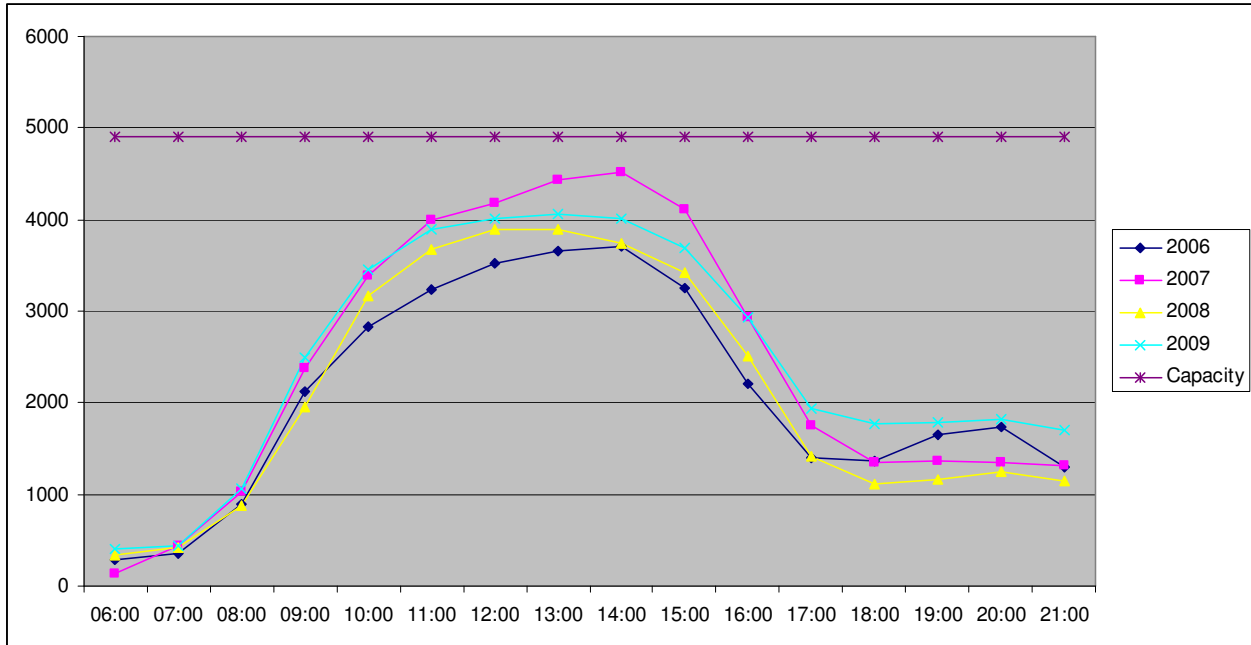


Figure 4.4 shows that levels of occupancy on Saturdays have fluctuated slightly over the 4 year period, but continue to operate close to capacity, with a sustained peak of approximately 4,000 cars parked being recorded in 2009. Figure 4.4 also shows that there are two peaks of occupancy on a Saturday, with the main peak occurring between 11.00am and 2.00pm and then a small, shorter peak occurring between 7.00pm and 9.00pm.

Figure 4.4: Aggregated Car Parking Data – Saturday Occupancy



The patterns of occupancies within a day, as well as the historical patterns, can be explained by the data collected for individual car parks. For example, Figure 4.5 indicates that car parking in Chapelfield has increased year on year since its opening in 2006. The spread of the peak occupancy is the midday period between 12 noon and 2pm with occupancy increasing significantly from 9am. In this city centre car park occupancy has more than doubled between 2006 and 2008 with the maximum recorded demand being approximately 950 vehicles.

Figure 4.5: Chapelfield Car Parking 2006-2009 Wednesday in June

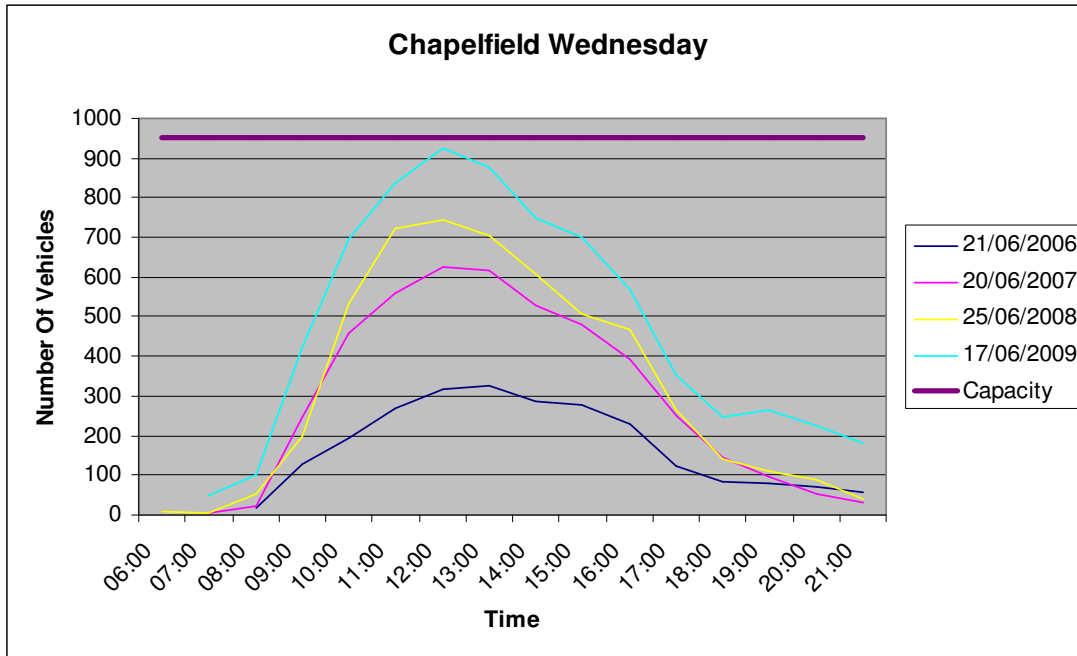


Figure 4.6 shows an increase in patronage of the Chapelfield car park on a Saturday between 2006 and 2008. The Chapelfield retail development is a very popular shopping destination and the consistent operation of the car park at full capacity on Saturdays readily demonstrates this.

Figure 4.6: Chapelfield Car Parking 2006-2009 Saturday in June

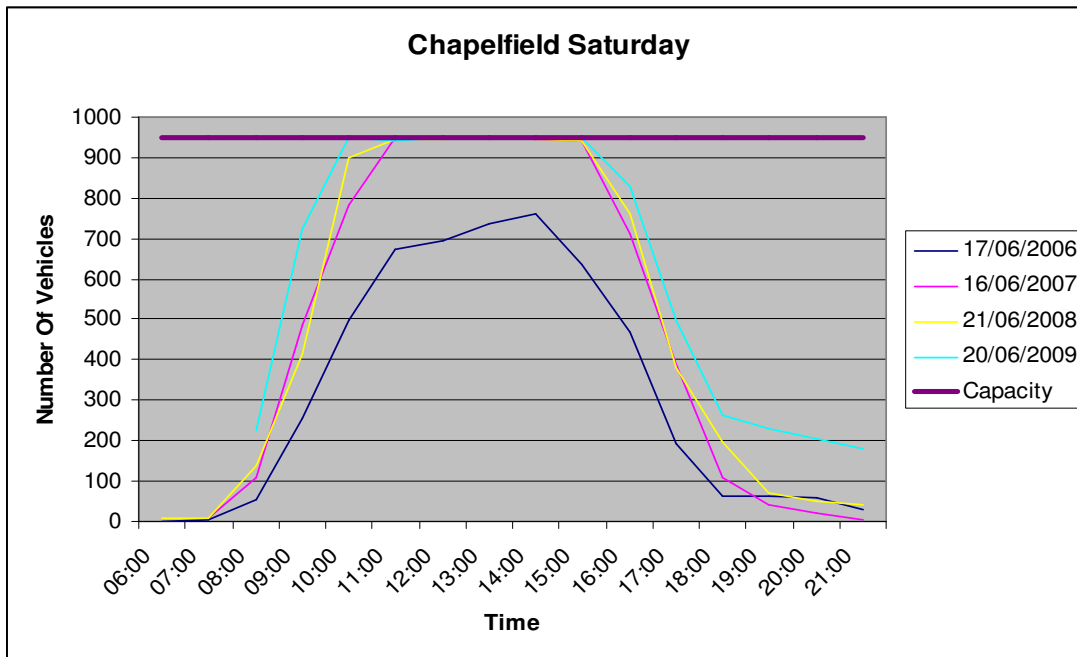


Figure 4.7 shows that the Forum car park has a consistent week day profile over all of the years modelled but that, unusually, the car park has two peak periods, one during the day and one in the evening. This evening peak is due to the proximity of the car park to popular evening destinations such as the Theatre Royal. The car park operated at capacity during both peak periods in 2009 and during earlier years.

Figure 4.7: Forum Car Parking 2004-2009 Wednesday in June

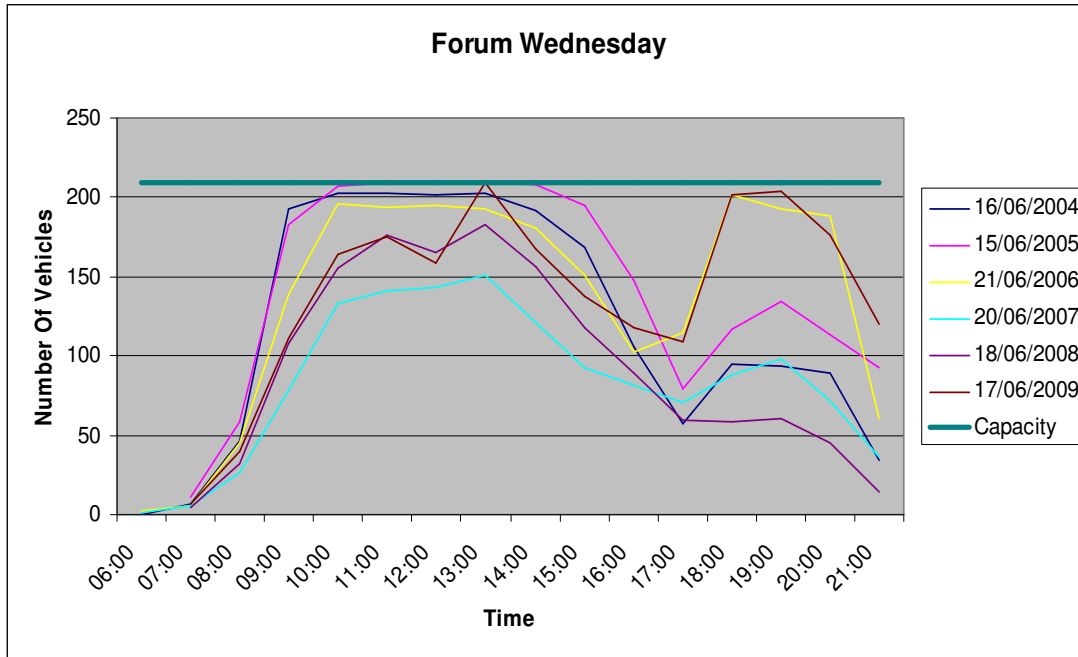
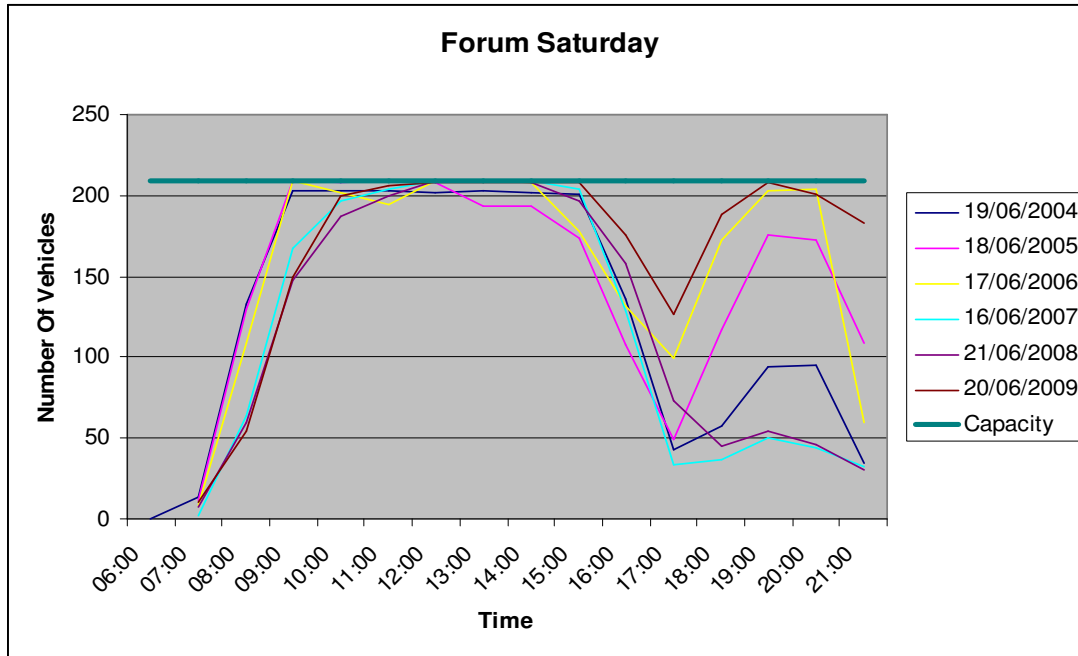


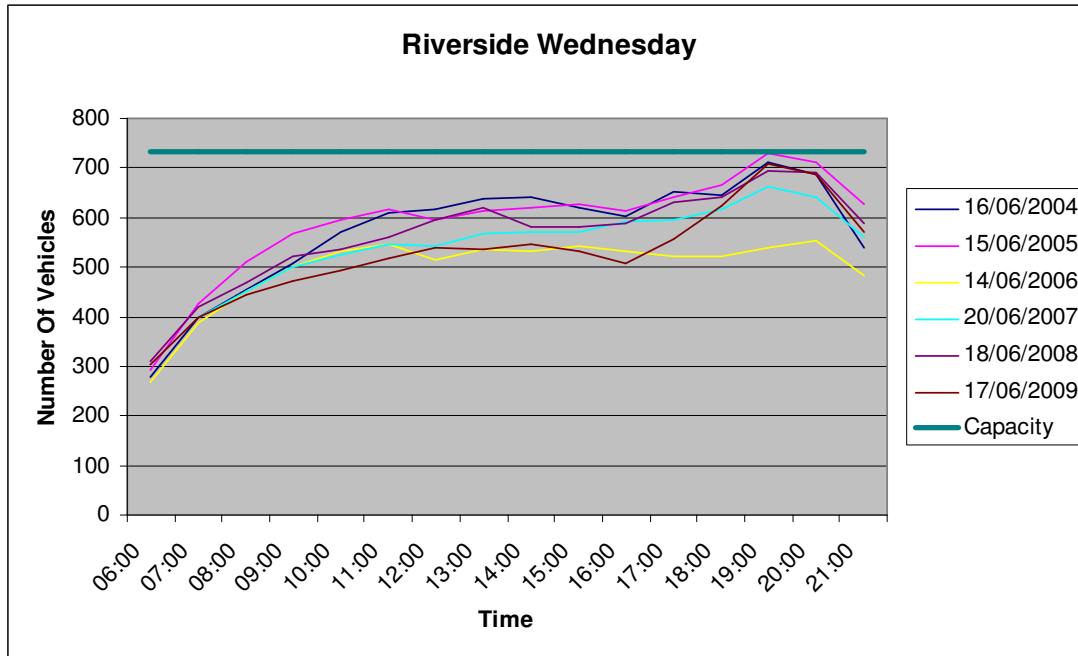
Figure 4.8 demonstrates that the Forum car park is also subject to two peak periods on Saturdays. This figure also shows that the daily profile been consistent across the years, and also that the car park has operated at capacity for at least one peak on Saturdays in every year.

Figure 4.8: Forum Car Parking 2004-2009 Saturday in June



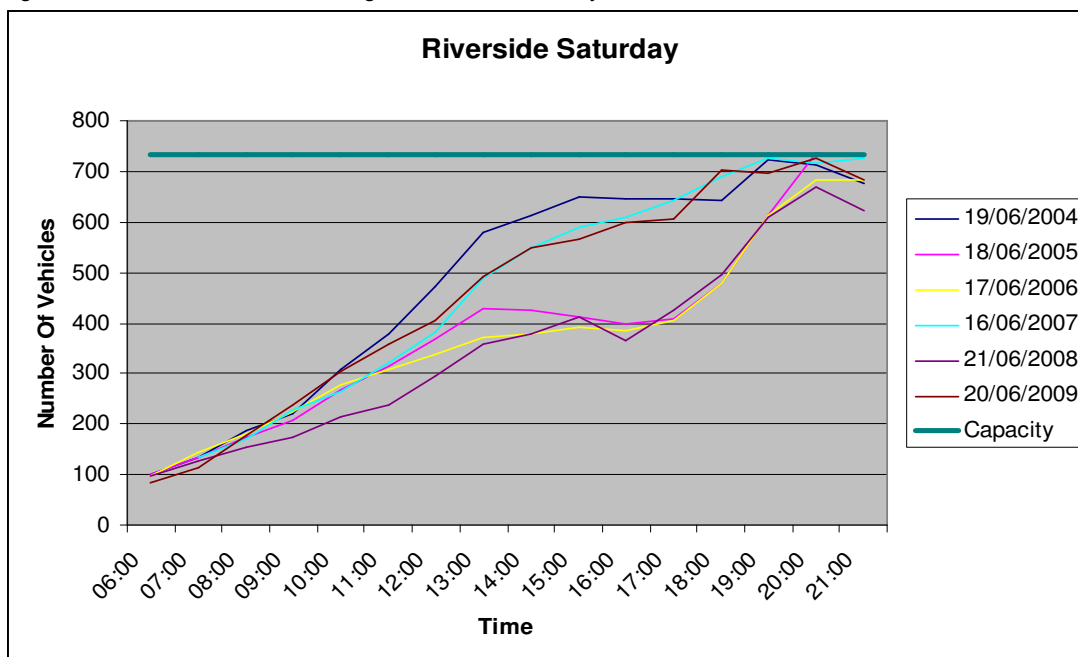
A final example is provided by Figure 4.9, which shows that the Riverside car park is a popular facility throughout the day on a weekday, although the daily profile is flatter than other car parks in the city. This reflects the fact that it is used by commuters using it to Park & Ride at Norwich Railway Station, and that it is the principal car park serving the leisure uses at Riverside leisure complex itself. Consequently, this car park has a higher occupancy level earlier in the day than other car parks in the city, and has operated close to or at capacity in the evenings across all of the years.

Figure 4.9: Riverside Car Parking 2004-2009 Wednesday in June



The popularity of the Riverside Leisure Complex is further demonstrated in Figure 4.10, which shows that the occupancy profile on a Saturday has been consistent across the years, with a gradual increase in car parking demand throughout the day, resulting in the car park operating at or close to capacity in the evening.

Figure 4.10: Riverside Car Parking 2004-2009 Saturday in June



Overall, it can be concluded that car parking facilities in Norwich have been, and continue to operate close to capacity during the week and on Saturdays. During peak periods this results in traffic on the highway network circulating to find spaces or queuing back onto the highway, which in turn causes congestion. As a result, Eventguard, a privately owned security firm who offer a traffic marshalling service, has been contracted to provide marshalling in the city during events and during the busy pre-Christmas period.

4.1.5 Transport Innovation Fund

NCC is one of only a few authorities which have given serious consideration to the implementation of a Road User Charging scheme in the city of Norwich, in order to tackle the issue of congestion in the area. Work to investigate whether road pricing is an appropriate demand management measure for the Norwich area was carried out in 2007/08.

The results of this work are provided in the Transport Innovation Fund (TIF) Status Report: Report by the Director of Planning and Transportation (NCC, 18 May 2008) and include the following conclusions:

- Road User Charging options were found to increase travel time as motorists take longer routes to avoid paying the charge. This suggests that Road User Charging alone would not deliver a more efficient transport network, although it may reduce traffic within the Outer Ring Road cordon. Neither would it do anything to address the traffic problems in the north of the city.
- With a cordon on the Outer Ring Road rather than the Inner Ring Road, more revenue would be collected but there would be fewer time saving benefits and more charge paid by users, leading to an overall negative effect. Time savings are eroded because avoidance of the charge would result in re-routing movements and such an inefficient charging scheme would not be publicly acceptable.
- Road User Charging does not attract sufficient benefits and in particular highlights the disbenefit of the charge to transport users, leading to longer journeys to avoid payment.
- In all the Road User Charging options tested, there was little or no impact on congestion.
- It appears that it would be possible to formulate a charging package that had a positive economic appraisal, albeit modest, but the revenues collected using a modest ring road cordon scheme would be unlikely to be sufficient, for example, to enable prudential borrowing to implement some of the necessary complementary capital measures.
- Overall, it is concluded that Road User Charging would not, at this time, be an appropriate strategy in helping to solve transport problems, and in particular congestion, in the Norwich area.

4.2 Future Situation

With the planned growth in housing and commercial development in the area, Norwich will increasingly become a popular shopping destination. Currently, the two main shopping centre car parks are collectively operating under, but close to capacity, which suggests that with the planned growth in place, and the consequent likely increase in trips to the city centre, these car parks will become oversubscribed. It is understood that Norwich City Council has a policy of providing no more car parking in the city in the future, which means that as the car parks are already operating close to, or at, their capacity during peak periods, the travel demand from commuters and shoppers associated with the growth agenda will not be accommodated by the existing facilities.

4.3 Policy

Paragraph 49 of PPG13 Transport states that *“The availability of car parking has a major influence on the means of transport people choose for their journeys. Some studies suggest that levels of parking can be*

more significant than levels of public transport provision in determining means of travel (particularly for the journey to work) even for locations very well served by public transport”.

Paragraph 51 states that *“In developing and implementing policies on parking, local authorities should:*

- *where appropriate, introduce on-street parking controls in areas adjacent to major travel generating development to minimise the potential displacement of parking where on-site parking is being limited”.*

In addition, paragraph 56 states *“a balance has to be struck between encouraging new investment in town centres by providing adequate levels of parking, and potentially increasing traffic congestion caused by too many cars”.*

Overall, given the implementation of CPZs in Norwich, there is strong policy compliance relating to car parking in the NPA.

4.4 Conclusions

Problems relating to car parking include the following factors:

- Car parks are collectively operating close to or at capacity during the week as well as at the weekend;
- During peak periods traffic circulates on the network looking for car parking spaces or queuing back onto the highway, resulting in congestion in the areas. This has resulted in a need for the appointment of marshals to direct traffic in the city during particularly busy periods;
- With the growth agenda for the NPA there may be pressure to provide further car parks in Norwich to relieve any oversubscription of the existing facilities that may take place;
- It is evident that the potential effect of the increasing popularity of Norwich as a regional shopping destination in combination with a growth agenda, will be to further increase pressure on parking provision in the city. Norwich City Council has stated that there is no intention to provide additional car parking in the city. Therefore in order to maintain strong policy compliance in relation to current levels of car parking provision in Norwich, it may well be necessary to consider other counteracting measures that can be implemented over the long term.

5. Public Transport

5.1 Local Bus

5.1.1 Current Picture

The majority of bus services in the NPA are provided on a commercial basis with no public subsidy. Services in the city area generally operate via the radial road network to and from the city centre. For orbital trips it is necessary to change services in the city centre, although several services do provide through-city links.

Passenger numbers have been rising on both scheduled and subsidised services in Norwich for a number of years and recently the County Council has delivered a new bus station and bus priority measures in the centre of Norwich. However, in 2002 during consultations on NCC's review of NATS, public transport was identified as one of the major problems in the Norwich Area. Survey results collected countywide in 2007/08 showed 55% of bus users to be satisfied with services.

Fewer services receive subsidy in the Norwich area than in rural areas. However, the Park & Ride system receives subsidy support, and subsidies are provided on some services in the evenings and weekends and services run primarily for school children. As well as commercial services and those supported by NCC, services may be funded through grants, usually pump priming funding for new services.

Bus services to Wymondham currently operate via Hethersett and the Norfolk and Norwich University Hospital. These services operate every 20 minutes Monday to Saturday daytime, increasing to at least every 15 minutes in the AM and PM peaks, with the typical journey time from Wymondham to Norwich city centre being 35 to 40 minutes. Some faster and more direct services are provided hourly.

Services to Long Stratton typically run every 30 minutes with a journey time of 30 minutes from Long Stratton to Norwich city centre. Other services operate via Harleston on the Norfolk / Suffolk border via Long Stratton to Norwich up to 5 times per day, with typically 4 return trips from Norwich per day.

The bus station in Norwich was developed as part of NATS and was opened to the public on the 30th August 2005 and is located in Surrey Street, Norwich. The bus station is served by a number of local and regional services as well as Park & Ride and long distance coach services. The bus station was built at a cost of £5 million and handles on average 7,800 bus movements, 200,000 passengers boarding, and the information centre helps 21,000 people per week. The travel centre contains a waiting area that can seat up to thirty people, toilets, baby changing and a café. The station has 12 bays for buses to drop and pick up passengers.

Details on levels of patronage on Norfolk's bus services have been obtained for the period from 2003, and are shown in Figure 5.1.

Figure 5.1: Total Bus Passengers in Norfolk from 2003 to 2009

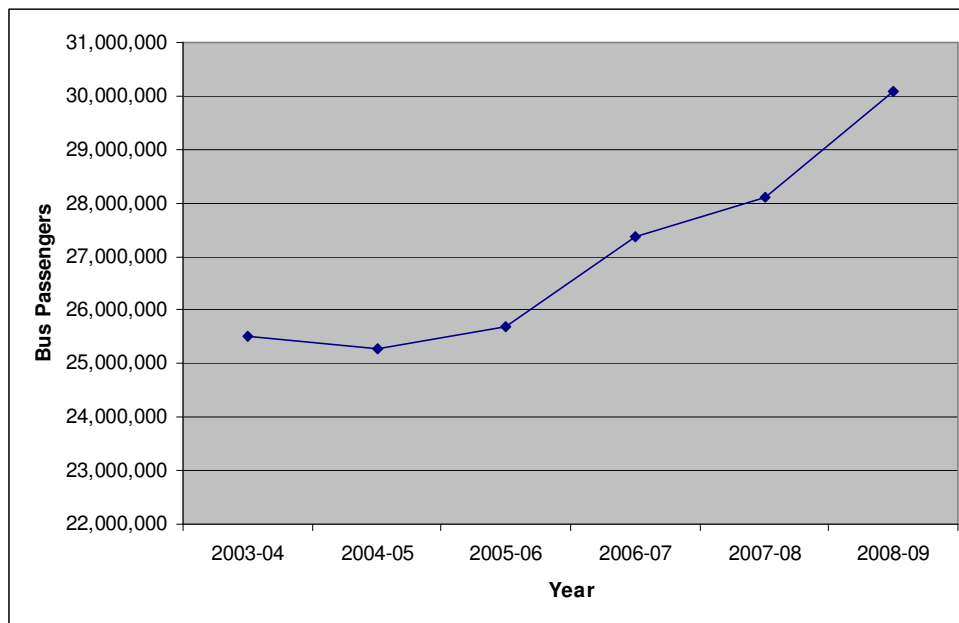


Figure 5.1 shows that bus patronage levels have increased significantly since 2003 with an overall increase in patronage of 18% from 2003 levels. A significant increase in patronage of 6.6% occurred in 2006-2007, which coincided with the introduction of free concessionary travel on local bus services within residents' locality in April 2006.

There was a further significant increase of 7.0% in 2008-09. This coincides with the introduction of free concessionary travel on local bus services across the UK in April 2008. The role of concessionary travel passes will have contributed to this increase.

Bus patronage information for Norwich is available based on the operation of commercial services and shown in Figure 5.2 covering years from 2006/7 to 2008/9.

Figure 5.2: Total Bus Passengers in Norwich from 2006/7 to 2008/9 (Commercial services)

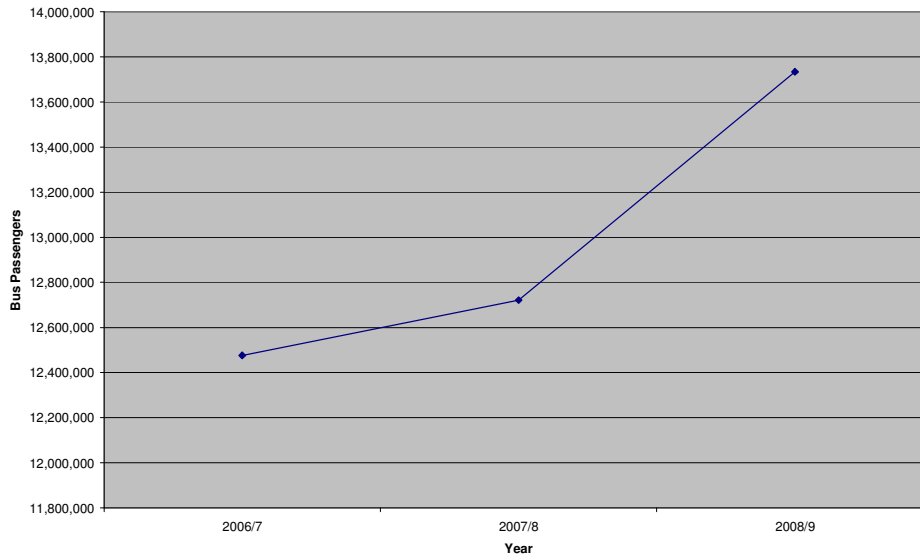


Figure 5.2 shows a similar pattern of increased patronage as seen for Norfolk. This upward trend is encouraging and bucks the trend shown in other areas of the country where a decline in bus usage can be found.

Within the NPA there are several areas where there is significant boarding and alighting of buses and interchange between modes and other bus services. These areas include Norwich bus and rail stations, Anglia Square, Castle Meadow, St Stephens Street, Red Lion Street, Norfolk & Norwich University Hospital and the UEA.

Bus stops within the city centre, including the bus station, are generally operating close to capacity, with many stops serving a number of different routes and operators. As changes of bus service are made, assessments are to identify whether there is a requirement to move services to alternative stops to minimise congestion. Moving established services to different stops is not done lightly as this can cause confusion amongst passengers. Boarding times of buses is an important factor in influencing the capacity of a stop and recent initiatives such as Concessionary Travel and off-bus ticketing have helped to reduce bus boarding times and therefore increase the capacity of the stops. Discussions are held on a regular basis between NCC, Norwich City Council and bus operators to discuss bus stop issues and identify new locations.

As part of Discrimination Disability Act (DDA) requirements, all bus stops are required to have accessible boarding and alighting facilities. NCC has a rolling programme of works to achieve this through the provision of raised kerbing, adequate hard-standing and bar-faced paving. Printed timetable information at bus stops is provided by NCC and bus operators. NCC provides information at over 80 stops, including the bus and rail stations and key city centre interchanges. Although the majority of well used stops have printed information, some of the lesser used stops on in-frequent routes may do not. However, all stops have a bus stop sign that provides customers with a unique reference number for the stop. This can be used when accessing an SMS text service to enable scheduled and real time bus departure information to be sent to the customer for any stop in Norfolk and the NPA. Use of this SMS service has increased significantly over the last few years.

258104/BNI/NOR/1/B 24 November 2009

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A number of stops in the NPA have electronic displays providing a mixture of scheduled and real time bus departure information. Such displays are located at Norwich bus and rail stations, Castle Meadow, St Stephens Street, Red Lion Street and along the Dereham Road. These signs provide the opportunity to provide additional information on service disruption, multi-modal travel information, County Council messages and other promotional material.

The quality of vehicles operating within the NPA has increased significantly over the last few years with several operators investing heavily in new and updated vehicles. Virtually all vehicles are now low-floor in construction, which aids access for those with wheelchairs, pushchairs and reduced mobility. The low-emission zone in Castle Meadow requires vehicles with clean engines to operate through this area, which has played a role in encouraging operators to invest in newer vehicles. Quality of vehicle presentation varies across operators and this is an area of concern for some customers where they would like to see overall standards raised.

5.1.1.1 Joint Investment Plan

An agreement was signed in 2007 between NCC, Norwich City Council and First Bus to increase the reliability, frequency and quality of bus services in Norwich. The 'Joint Investment Plan' is a voluntary agreement covering an initial two year period with the option to extend. As part of the agreement, any changes to First Bus's network must be mutually agreed by the operator and local authorities.

The Plan aims to enable passengers to make decisions about using the bus with greater confidence and will help tackle congestion in the city. NCC has agreed to invest in infrastructure improvements including bus priority, CCTV on buses, improved customer information and publicity and intelligent transport schemes. First Bus has agreed to invest in newer vehicles, extra engineering and cleaning staff and improved driver training. Clear targets include:

- More real time information displays at bus stops
- Raised kerbing at more than 250 stops in the city
- More CCTV cameras
- Enforcement of bus stop clearways
- Driver training
- Increased reliability and punctuality

5.1.1.2 Punctuality Improvement Partnerships

NCC successfully introduced Punctuality Improvement Partnerships (PIPs) in 2006 with bus companies serving the NPA. PIPs are identified within the Local Transport Plan as a way of working with operators to improve and maintain punctuality and reliability of bus services. Norfolk is a leading authority in the development of PIPs and has more than any other shire County. NCC is recognised as very proactive in this area and hold regular forums with operators and the Senior Traffic Commissioner.

The PIP is a voluntary agreement and represents a "joint commitment to achieve continuous improvement in punctuality and overall reliability of bus services". Under the terms of the agreement both parties agree to:

- monitor and collate information using BusNet to measure reliability against targets
- to jointly validate the data with on-road surveys where necessary
- to meet quarterly to identify trends and mutually agree actions to improve punctuality.

Planned actions will result from the information gathered and include:

258104/BNI/NOR/1/B 24 November 2009

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- identifying areas for bus priority measures
- revision of or recasting of timetables to improve punctuality and reliability
- better communication of planned road works and closures across the network
- improved planning of engineering and staff resources.

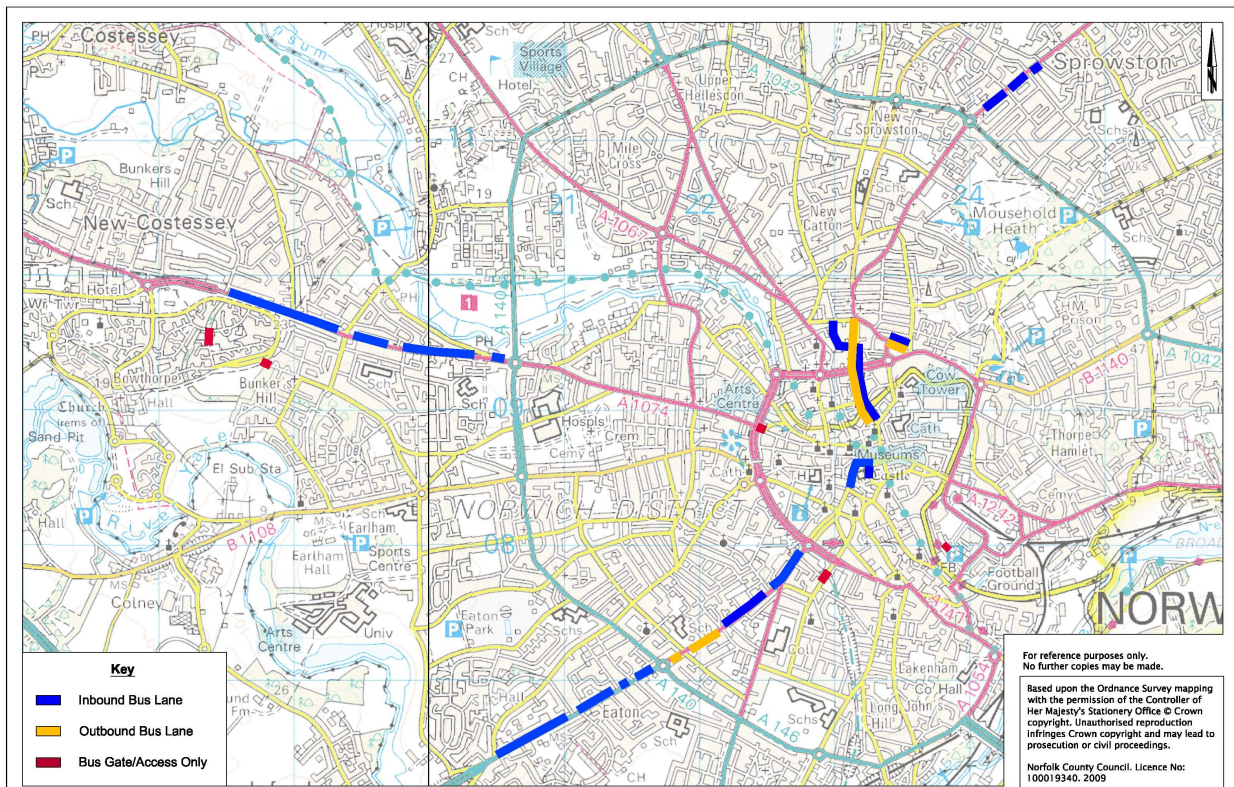
5.1.1.3 Bus Priority Measures

Currently in the NPA there are a number of different types of bus priority measures.

- Inbound Bus Lane = Totals approximately 5.4km
- Outbound Bus Lane = Totals approximately 1.3km

In addition to bus lanes there are also several other bus priority measures including several 'Bus Gates'. Figure 5.3 shows the locations of the bus priority measures in place in Norwich.

Figure 5.3: Locations of Norwich's Bus Priority Measures



5.1.1.4 Bus Journey Time Data

NCC in partnership with bus operators uses a bus tracking system called BusNet to track vehicles and compare the progress of vehicles against the scheduled timetables. BusNet is an automatic vehicle locator system which uses global positioning satellites to track vehicles and data from this system has been used for the following data analysis. Bus journey time data is recorded by NCC and has been analysed to identify any effects to bus journey times or journey time variability on specific links into Norwich city centre over different periods of time.

Data has been obtained for 8 specific links located in the northern suburbs of Norwich as this area has been shown to suffer from worse bus service punctuality than other areas (see later section). These links are predominantly located on key radial routes and approaches to the Outer Ring Road. Data has been obtained for average bus journey times on;

- Plumstead Road (Witard Road to ORR);
- Wroxham Road (Bus Lane to ORR);
- Constitution Hill (George Hill to ORR);
- Cromer Road (Fifers Lane to ORR);
- Drayton High Road (Middletons Lane to ORR);
- Drayton High Road (Drayton to Middletons Lane);
- Aylsham Road (Woodcock to Drayton Road); and
- Catton Grove Road to Edward Street

Graphs showing the variation in journey times on the routes are shown in Figure 5.4 -5.22.

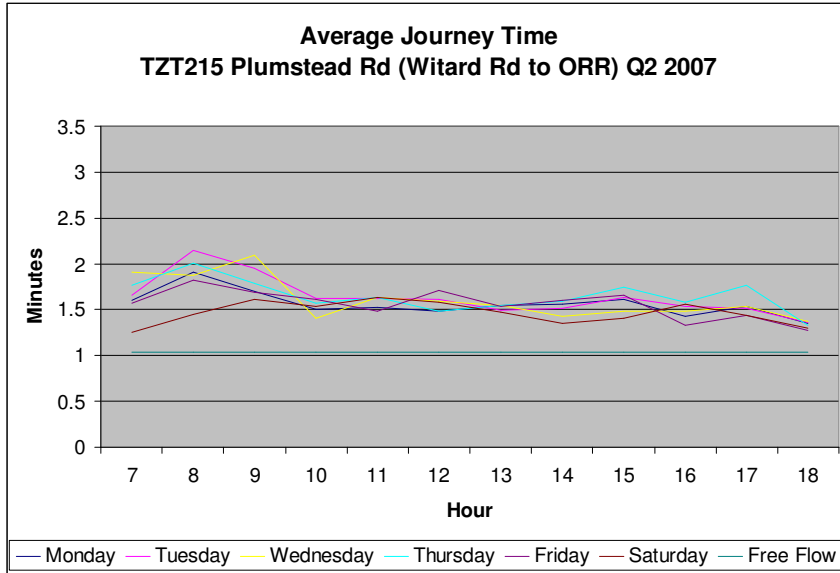
5.1.1.5 Plumstead Road (Witard Road to ORR)

Figure 5.4- Figure 5.22 detail the average bus journey times recorded in Quarter 2 of 2007, 2008 and 2009 on Plumstead Road from its junction with Witard Road to the Outer Ring Road, over a 12 hour period for Monday-Saturday.

The graphs indicate that average bus journey times on Plumstead Road have increased over the three year period. This is particularly apparent in the AM peak hour (08.00-09.00) with average journey times increasing by approximately 30 seconds from 2007-2009. The graphs also illustrate how the average bus journey times have become more variable, depending on the day of the week.

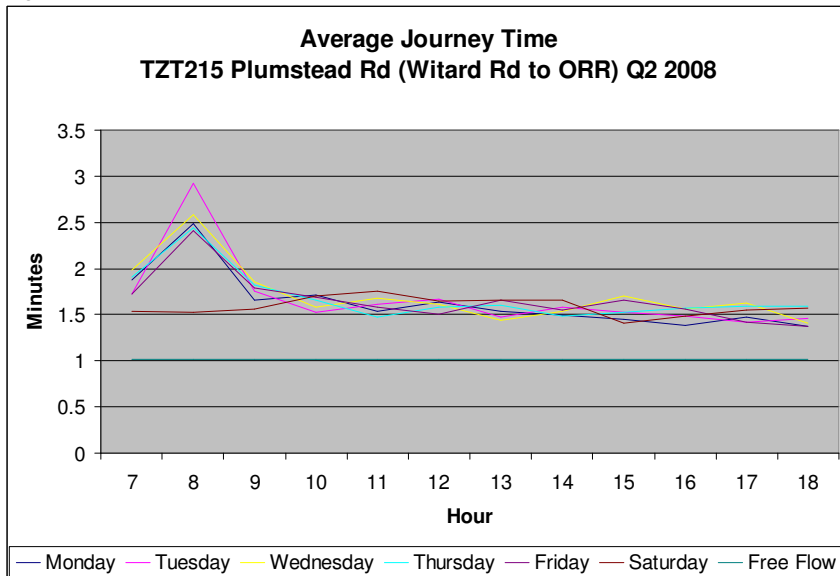
Overall, buses on this link are generally performing worse in 2009 than they were in 2007, which would suggest an increase in congestion. Specific problems affecting the movement of buses on this corridor include queues on Ketts Hill and at Bishop Bridge Road at the Ketts Hill Roundabout. Figure 3.10 identifies that there has only been a very small reduction in daily traffic flows over recent years on Bishop Bridge Road, suggesting that the increase in journey times is due to the congested operation of the network in this area. Currently there are no existing measures in place on this corridor to assist the movement of buses.

Figure 5.4: Plumstead Road Q2 2007



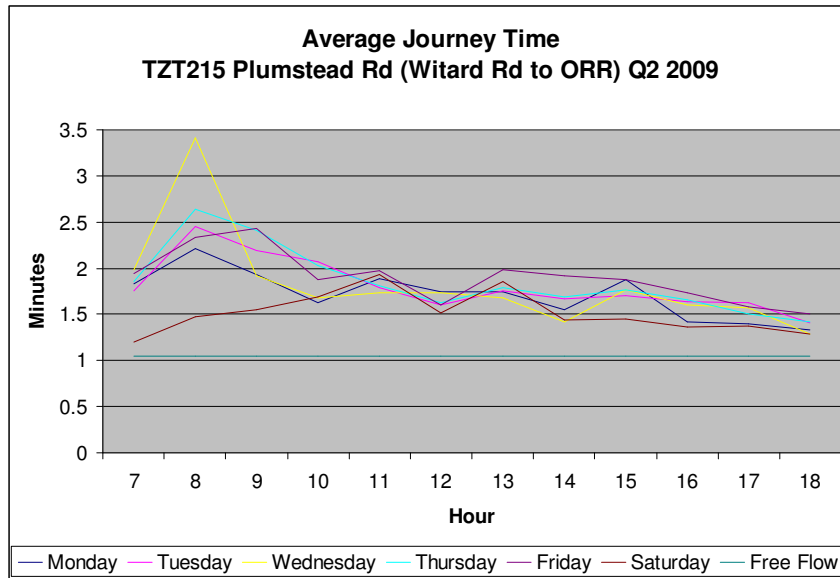
Source: Norfolk County Council – based on 2471 records

Figure 5.5: Plumstead Road Q2 2008



Source: Norfolk County Council – based on 4432 records

Figure 5.6: Plumstead Road Q2 2009



Source: Norfolk County Council – based on 2649 records

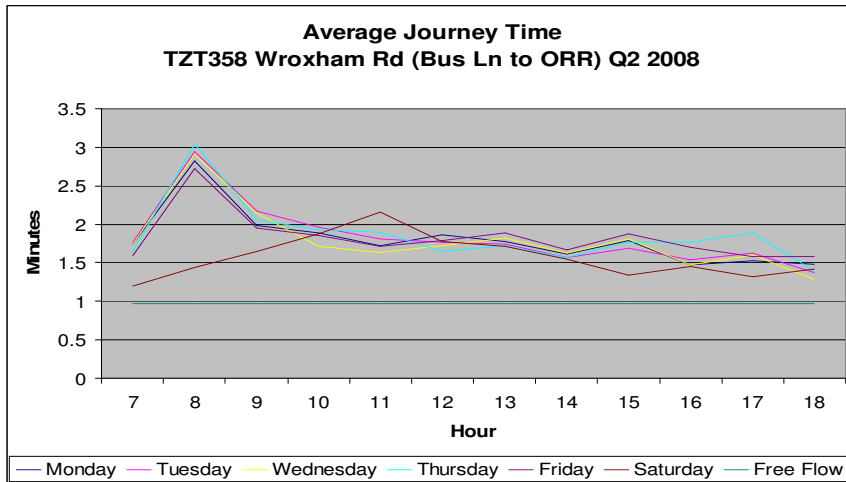
5.1.1.6 Wroxham Road (Bus Lane to Outer Ring Road)

Figure 5.7 and Figure 5.8 details the average bus journey times recorded in Quarter 2 of 2008 and 2009 on Wroxham Road from the start of the inbound bus lane to the Outer Ring Road, over a 12 hour period for Monday-Saturday.

The graphs indicate that average bus journey times on Wroxham Road have decreased over the two year period and this is particularly apparent in the AM peak hour with average journey times decreasing by approximately 40 seconds from 2008-2009, in the PM peak period journey time reliability has also improved.

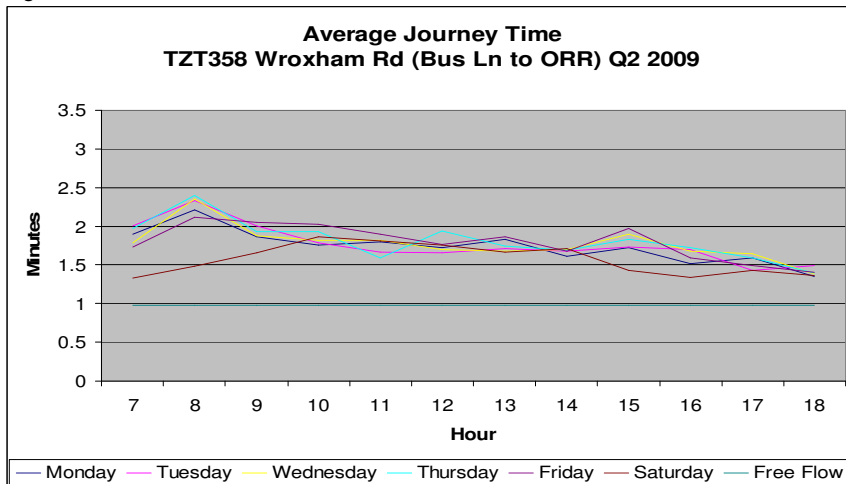
The graphs also illustrate how the average bus journey times have become less variable over the 6 days shown. The data shows that buses are performing better in 2009 than they were in 2008 on this link. A contributing factor to this is the inbound bus lane on Wroxham Road from south of Rosemary Road to the Outer Ring Road, which is operational 0730 to 0930 Monday to Saturday.

Figure 5.7: Wroxham Road Q2 2008



Source: Norfolk County Council – based on 4977 records

Figure 5.8: Wroxham Road Q2 2009



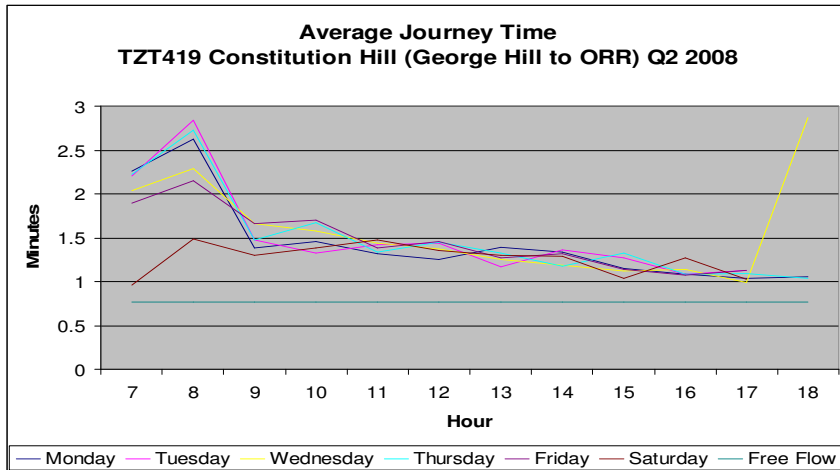
Source: Norfolk County Council – based on 6049 records

5.1.1.7 Constitution Hill (George Hill to Outer Ring Road)

Figure 5.9 and Figure 5.10 details the average bus journey times recorded in Quarter 2 of 2008 and 2009 on Constitution Hill, from George Hill to the Outer Ring Road, over a 12 hour period for Monday-Saturday. The graphs indicate that average bus journey times on Constitution Hill have decreased over the two year period.

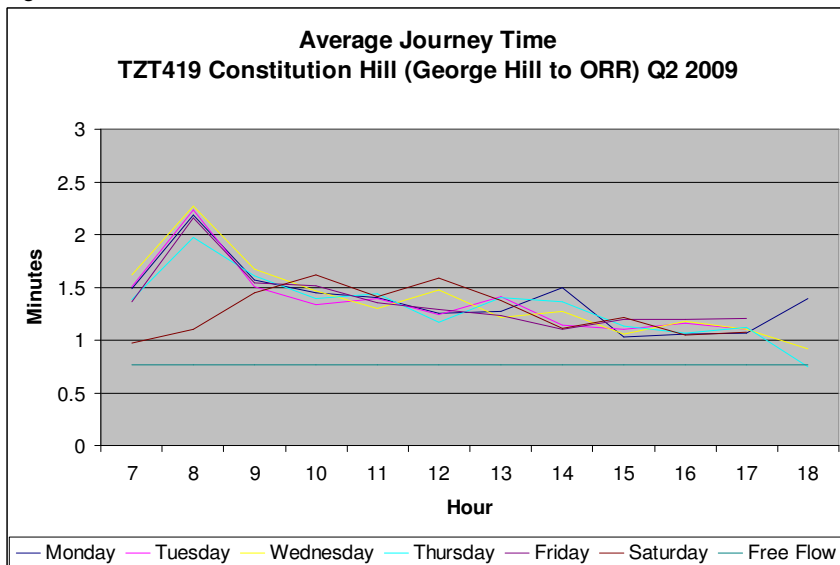
This is particularly apparent in the AM peak hour (08.00-09.00) with average journey times decreasing by approximately 30 seconds from 2008-2009. There are no existing bus priority measures on this corridor.

Figure 5.9: Constitution Hill Q2 2008



Source: Norfolk County Council – based on 2322 records

Figure 5.10: Constitution Hill Q2 2009



Source: Norfolk County Council – based on 1725 records

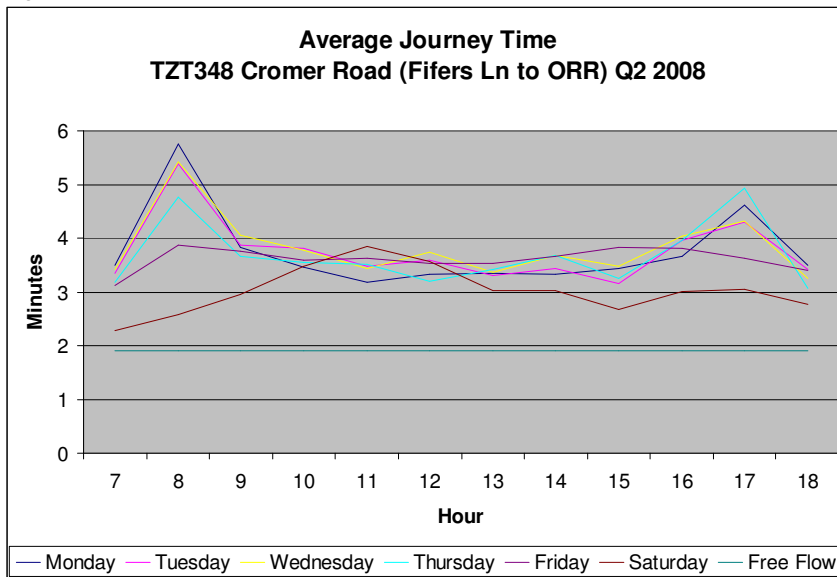
5.1.1.8 Cromer Road (Fifers Lane to Outer Ring Road)

Figure 5.11 and Figure 5.12 detail the average bus journey times recorded over the same period on Cromer Road from Fifers Lane to the Outer Ring Road. This is the most significant corridor in the North Sector in terms of number of bus movements.

The graphs indicate that average bus journey times on Cromer Road have increased by between 30 seconds to a minute in the inter peak. The graphs also show that average journey times fluctuate more between the 6 days in 2009 compared with 2008. There are no existing bus priority measures on this corridor. These figures also suggest that the AM peak hour is lengthening, with the peak extending

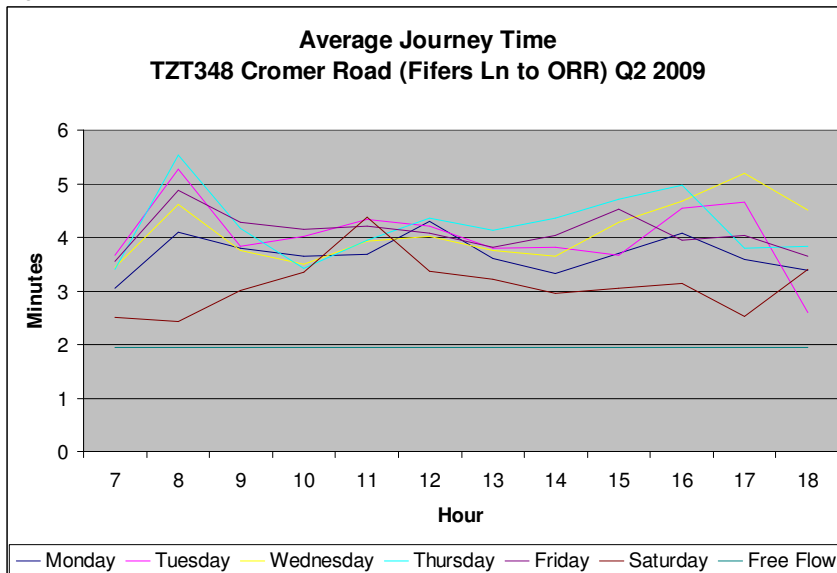
towards 10am in 2009, with nearly a 30 second increase in journey time between the 2 years between 9am and 10am. This would indicate that the peak hour on the network as a whole is extending, with the general traffic causing delay to public transport on the route.

Figure 5.11: Cromer Road Q2 2008



Source: Norfolk County Council – based on 6212 records

Figure 5.12: Cromer Road Q2 2009



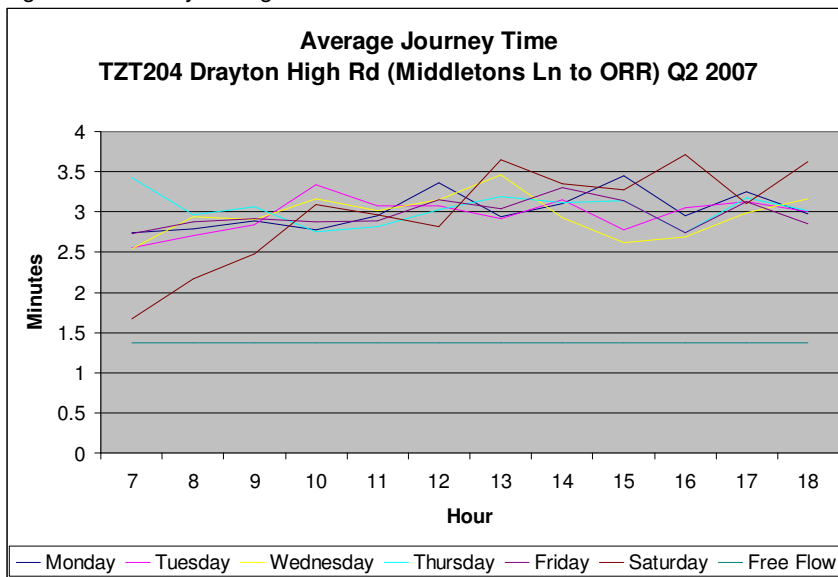
Source: Norfolk County Council – based on 1265 records

5.1.1.9 Drayton High Road (Middletons Lane to Outer Ring Road)

Figure 5.13 – Figure 5.15 detail the average bus journey times recorded in Quarter 2 of 2007, 2008 and 2009 on Drayton High Road from Middletons Lane to the Outer Ring Road, over a 12 hour period for Monday-Saturday.

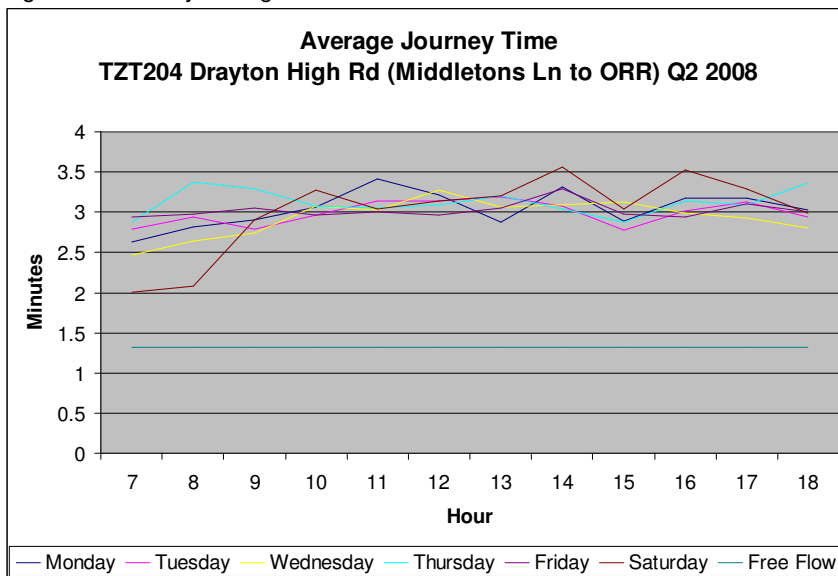
The graphs indicate that average bus journey times on Middletons Lane have decreased in the AM peak hour, from 2007 to 2009. The graphs also show that journey time variability has reduced over the time of the day and over the days modelled. There are no existing bus priority measures on this corridor, but it would appear that the capacity of the upstream Middletons Lane junction constrains inbound traffic flow on this link during the AM peak and as a result inbound buses experience little delay at the Asda and Outer Ring Road junctions.

Figure 5.13: Drayton High Road Q2 2007



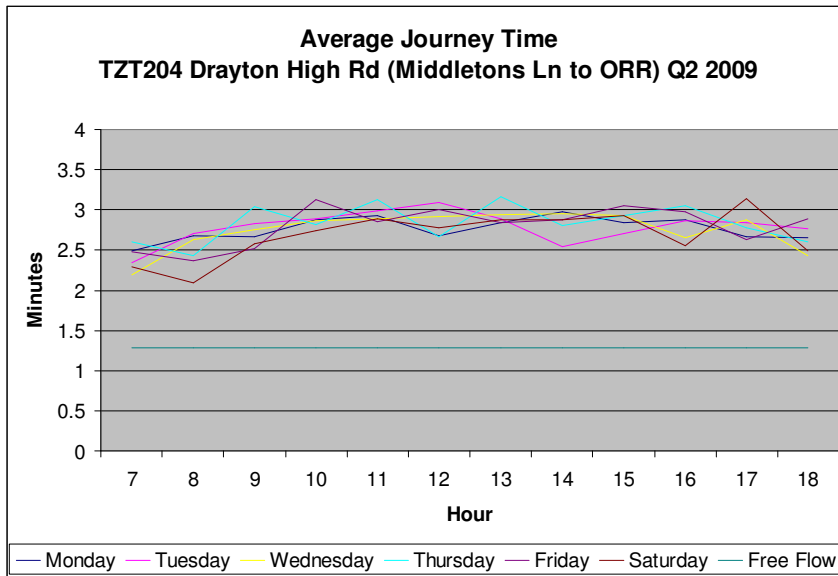
Source: Norfolk County Council – based on 1993 records

Figure 5.14: Drayton High Road Q2 2008



Source: Norfolk County Council – based on 3829 records

Figure 5.15: Drayton High Road Q2 2009



Source: Norfolk County Council – based on 2499 records

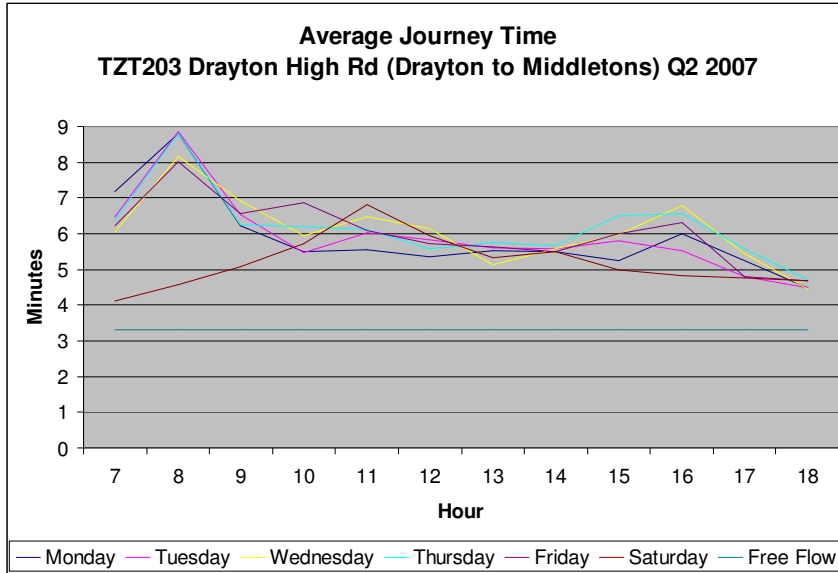
5.1.1.10 Drayton High Road (Drayton to Middletons Lane)

Figure 5.16 – Figure 5.18 detail the average bus journey times recorded in Quarter 2 of the three year period on Drayton High Road from Drayton Centre to Middletons Lane. Currently this road does not benefit from bus priority measures.

The impact of congestion on the approach to Middletons Lane junction during the AM peak is clearly seen in the data, average journey times for this link are significantly higher in the AM peak period. However since 2007 journey times in the AM peak have reduced from between 8.0 to 8.5 minutes to between 6.5 to 7.0 minutes in 2009.

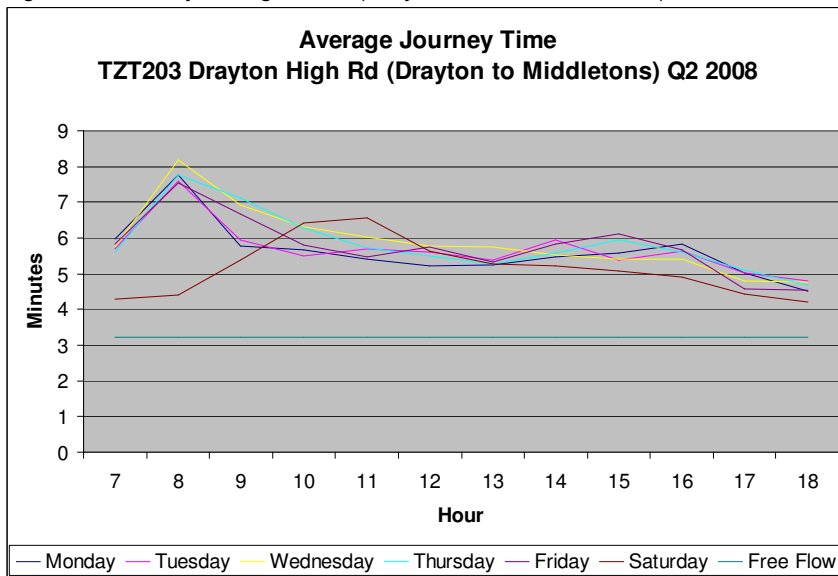
Again, these figures also suggest that the peak hour is extending to 10am with the change in journey times between 9.00am and 10.00am reducing. Average journey times for other periods remain largely unchanged from 2007, with times fluctuating in the period 14.00 to 17.00. In the PM peak journey times are getting worse and the PM peak has spread.

Figure 5.16: Drayton High Road (Drayton to Middletons Lane) Q2 2007



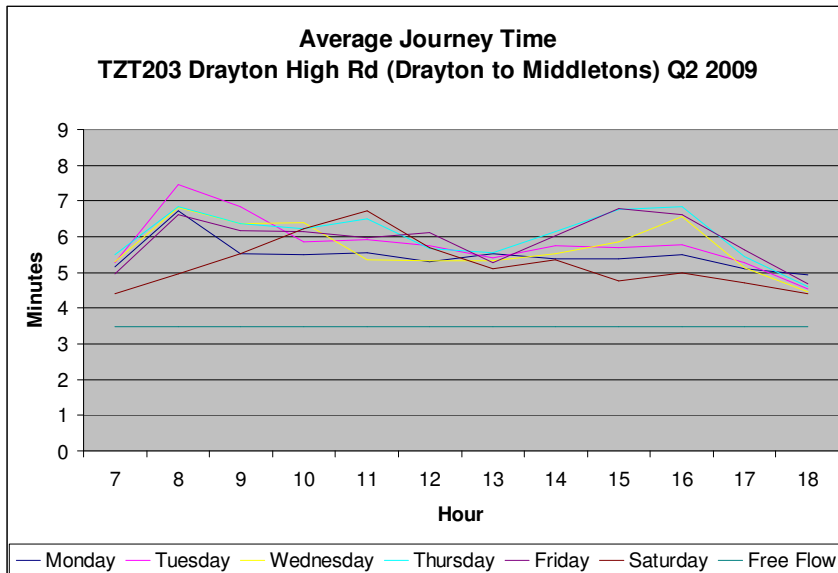
Source: Norfolk County Council – based on 2713 records

Figure 5.17: Drayton High Road (Drayton to Middletons Lane) Q2 2008



Source: Norfolk County Council – based on 4328 records

Figure 5.18: Drayton High Road (Drayton to Middletons Lane) Q2 2009

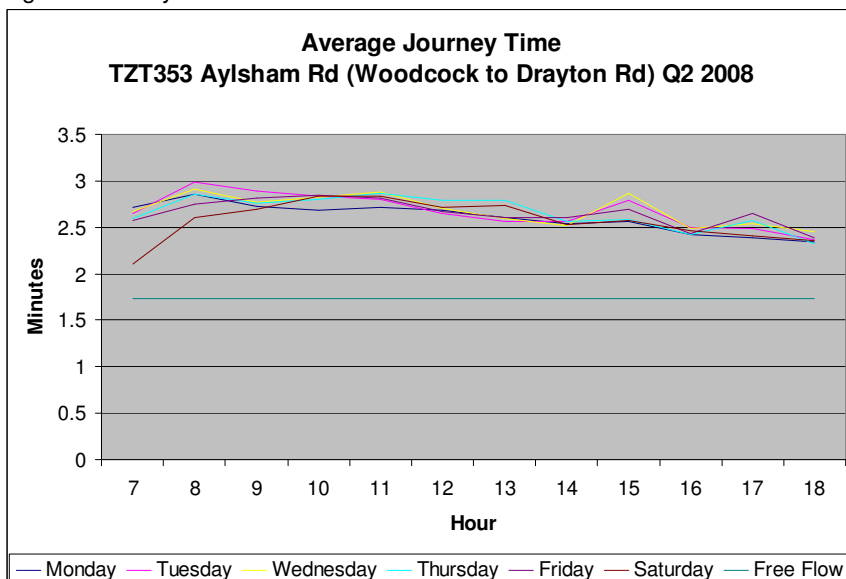


Source: Norfolk County Council – based on 2602 records

5.1.1.11 Aylsham Road (Woodcock Road to Drayton Road)

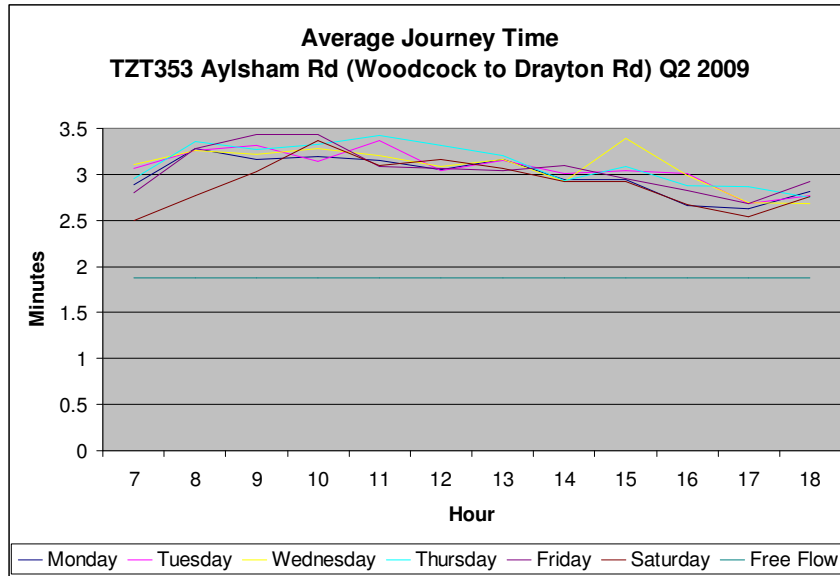
Figure 5.19 and Figure 5.20 details the average bus journey times recorded in quarter 2 of 2008 and 2009 on Aylsham Road from Woodcock Road to Drayton Road, over a 12 hour period for Monday-Saturday. Average journey times for this link have increased in all periods from between 2 to 2.5 minutes in 2008 up to 3 to 3.5 minutes in 2009. Journey time variability has also increased since 2009 most notably in the AM and PM peak periods. This data suggests that this link experiences heavy level of congestion not only during the peak hours but throughout the day, and that the absence of bus priority measures on the route means that the buses and their reliability are subject to the network peak traffic.

Figure 5.19: Aylsham Road Q2 2008



Source: Norfolk County Council – based on 10674 records

Figure 5.20: Aylsham Road Q2 2009



Source: Norfolk County Council – based on 5210 records

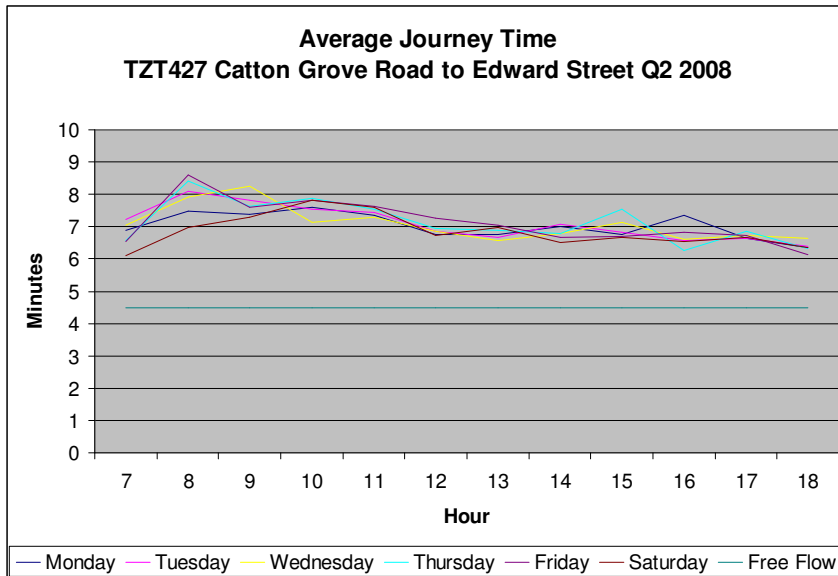
5.1.1.12 Catton Grove Road (Catton Grove Road to Edward Street)

Figure 5.21 and Figure 5.22 details the average bus journey times recorded in quarter 2 of 2008 and 2009 on Catton Grove Road to Edward Street, over a 12 hour period for Monday-Saturday.

Average journey times for this link in the 2009 AM period remain largely unchanged from the same period in 2008, although there is a slight increase in journey time variability. Data for the inter peak period in 2009 is also unchanged from 2008. In the PM period average journey times in 2009 are slightly reduced from the same period in 2008, although as in the AM period there is an increase in the level of journey time variability experienced on this link.

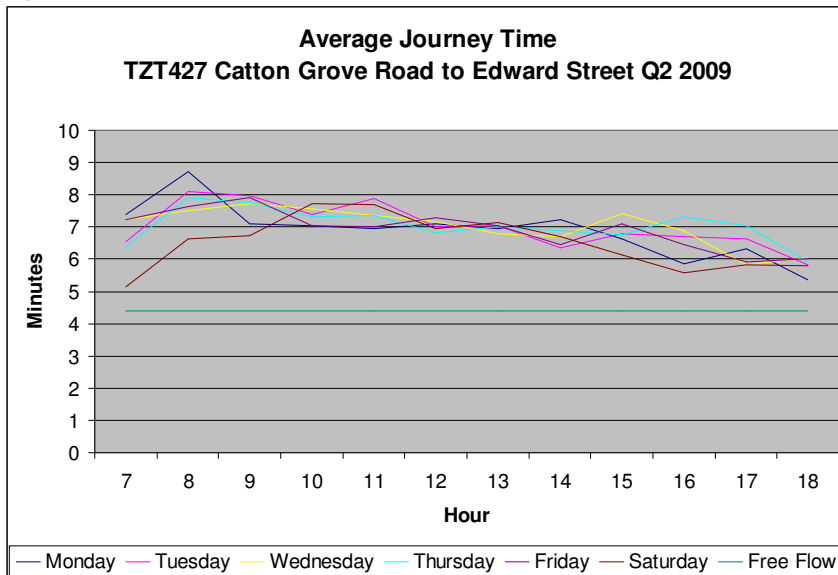
Buses using this corridor benefit from the existing bus gate located on Catton Grove Road immediately south of the junction with Woodcock Road. This is operational during the AM peak only (0730 to 0900 Monday to Friday). This measure was originally implemented to assist the movement of inbound Airport Park & Ride buses using the Catton Grove route, but has been retained following the decision to reroute the Airport Park & Ride service via Aylsham Road.

Figure 5.21: Catton Grove Road Q2 2008



Source: Norfolk County Council – based on 2992 records

Figure 5.22: Catton Grove Road Q2 2009



Source: Norfolk County Council – based on 1277 records

5.1.1.13 TZT Data Summary

The TZT (Trigger Zone Timing) average journey time data that is shown in Figure 5.4 – Figure 5.22 provides an indication of how journey times and journey time variability has changed over time on specific links and the overall findings are summarised in Table 5.1.

Table 5.1: Summary of TZT Findings

	Journey Times	Variability	Bus Priority Measures
Wroxham Road	↓	↓	√
Constitution Hill	↓	↓	X
Drayton Road (Drayton Rd to Middletons Lane)	↓	↑	X
Drayton Road (Middletons Lane to Outer Ring Road)	↓	↑	X
Plumstead Road	↑	↑	X
Cromer Road	↑	↑	X
Aylsham Road	↑	↑	X
Catton Grove Road	↔	↓	√

Overall, the data shows how bus journey times on four of the eight routes (Wroxham Road, Constitution Hill and Drayton High Road – both routes) have reduced over the time periods shown. Journey times have increased on three of the eight routes (Plumstead Road, Cromer Road, and Aylsham Road) and remained largely unchanged on Catton Grove Road.

Routes which experience a reduction in journey times over the period shown include Wroxham Road. In the AM peak data shows a reduction in journey time on this link from 3 minutes in 2008 to 2.5 minutes in 2009. Data for the Aylsham Road link indicates a slight increase in journey times for all of the periods shown. Catton Grove Road journey times remain largely unchanged over all periods.

However, average journey times have become more variable on five of the eight links (Plumstead Road, Cromer Road, and Drayton High Road – both routes and Aylsham Road) over the periods shown, with journey times becoming less variable on the remaining three links. Interestingly, the routes which have a higher degree of variability are those without bus priority measures, suggesting that the conditions on the network as a whole are directly affecting the bus service operations in Norwich.

An increase in average journey times is typically an indicator of persistent heavy congestion. Such traffic conditions have an adverse impact on bus service performance. A high level of journey time variability is an indicator of transient congestion and the type of unpredictable delays that is very difficult for bus operators to schedule for. A reduction in average journey times and the level of journey time variability is difficult to quantify, but could be attributed to the following;

- Highway or junction improvements;
- The introduction of bus priority measures;
- Changes to signal timings;
- A reduction in the level of services provided on the link; or
- As a result of circumstances on other links.

It therefore follows that bus priority measures along the routes with high journey time variability, or where journey times have increased in recent years, for example Drayton Road, Aylsham Road and Plumstead Road may be appropriate. However, taking these routes as examples, it can be seen in Figure 3.20 that a significant amount of traffic would need to be removed from the network on these roads in order to provide this type of measure. With V/Cs on Drayton Road, Aylsham Road and Plumstead Road likely to be in

excess of 90% at multiple locations by 2031, it is unlikely that such measures involving a reduction in capacity for general traffic could be provided on the network in its current form.

5.1.1.14 Average Bus Speeds

Low average bus speeds are an indicator of persistent heavy congestion. Such traffic conditions have an adverse impact in terms of encouraging modal shift from car to bus.

Roads with particularly low bus speeds of less than 10 kph during the peak as shown on Figure 5.23 are;

- Magdalen Road between Sprowston Road and Magpie Road during both the AM and PM peaks; and
- Riverside Road from Ketts Hill Roundabout to Foundry Bridge during the AM peak.
- Aylsham Road / Drayton Road junction to St Augustines (AM peak inbound);
- Magdalen Road / Magpie Road junction to St Augustines (PM peak outbound); and
- Magdalen Road / Magpie Road junction to St Faiths Road / Outer Ring Road junction (PM peak outbound)
- Dereham Road from Bowthorpe Road to the Outer Ring Road during the PM peak; and
- Chapelfield Road from St Stephens Roundabout to Convent Road during the PM peak

Figure 5.23: Roads with Low Average Bus Speeds

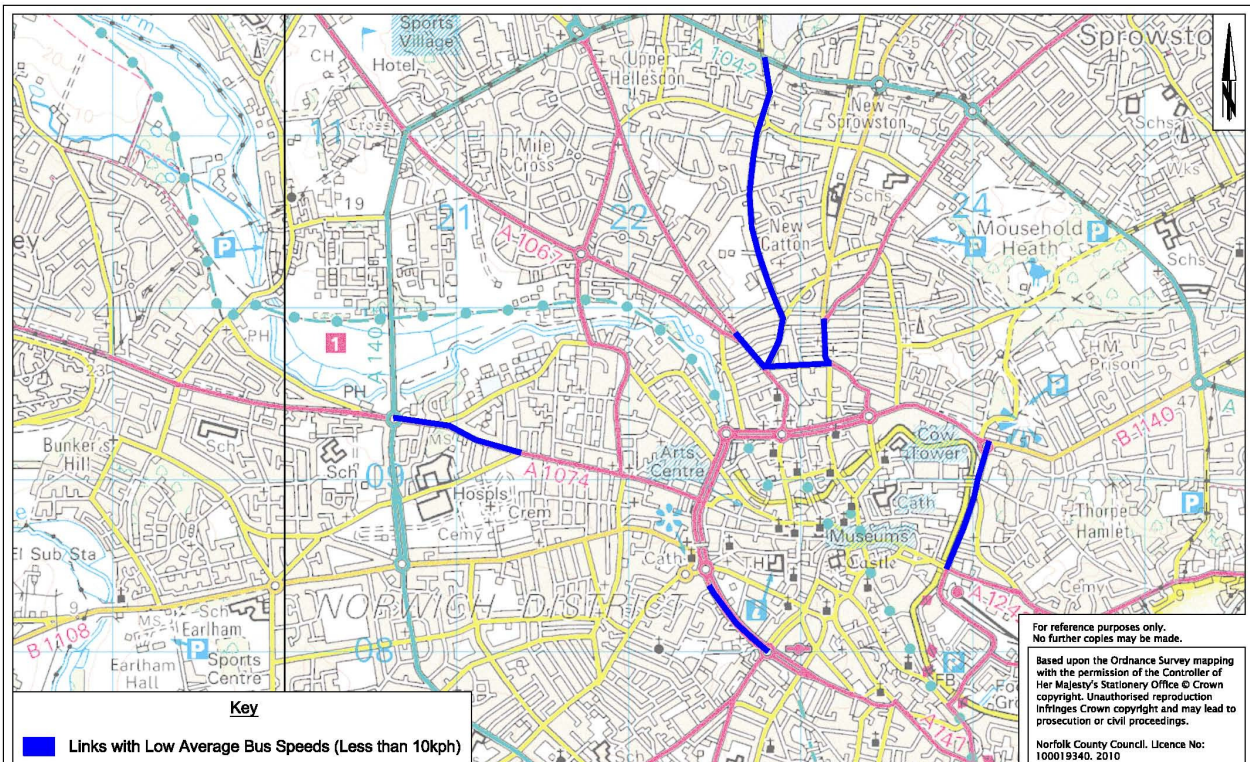


Figure 5.23 shows that the main links which suffer from low average bus speed are on the northern radial roads into Norwich as well as sections of the Inner Ring Road. The Inner Ring Road has already been identified as a road which has congestion in the peak hours, but this also demonstrates that the northern roads also are subject to problems on the network, resulting in operational difficulties for the bus services.

Dereham Road is shown in Figures 5.23 as having a low average bus speed. This is an important corridor for buses with some 17 buses an hour in each direction travelling along this stretch of road in the peak periods. This represents a significant number of passengers inconvenienced and affected by congestion. Over 230,000 passenger journeys are made along this corridor in a typical month. Roads from the north affected by slow journey times also cater for significant numbers of bus movements during peak periods.

5.1.1.15 Journey Time Variability

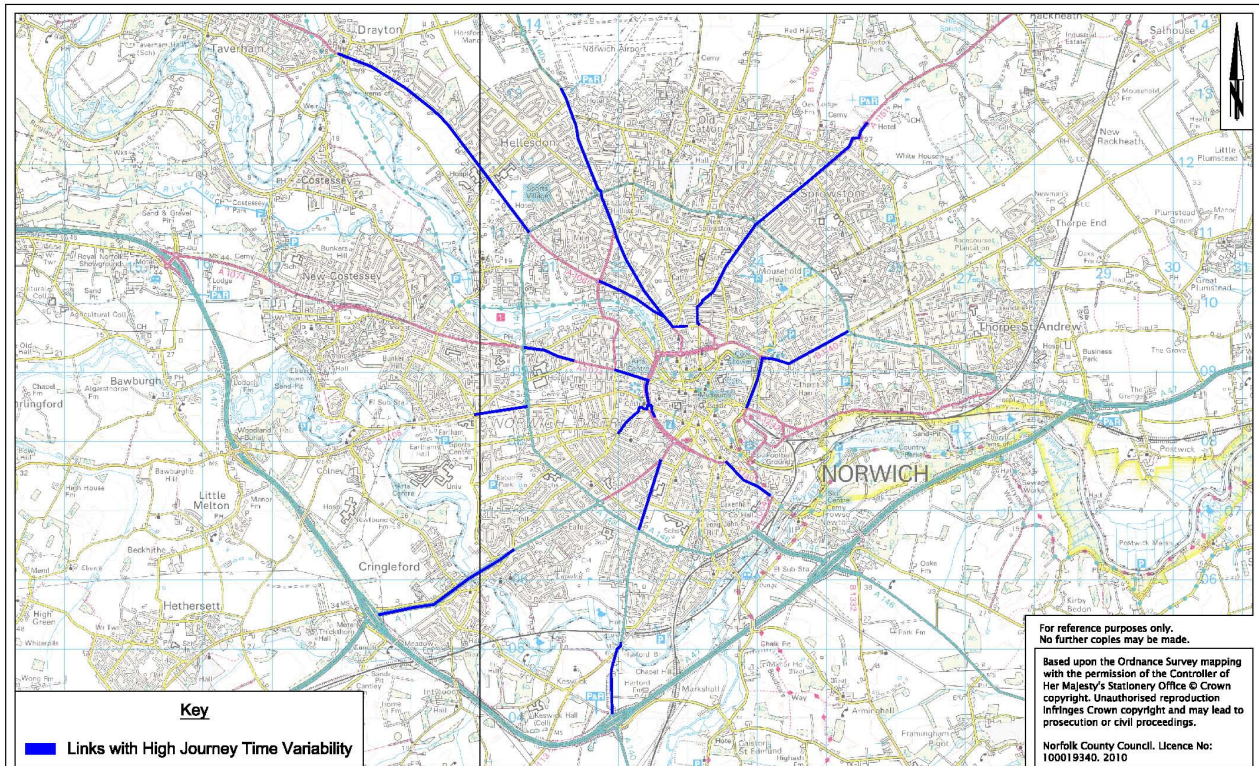
A high level of journey time variability is an indicator of transient congestion and the type of unpredictable delays that are very difficult for bus operators to schedule for. The inbound sections of road with the highest level of journey time variability are shown on Figure 5.24 and during the weekday AM peak period are;

- Wroxham Road from Sprowston Park & Ride site to the Outer Ring Road;
- Magdalen Road from Sprowston Road to Magpie Road;
- The A140 from Harford Park & Ride to Harford Bridges;
- Ipswich Road from the Outer Ring Road to Newmarket Road;
- Plumstead Road from Heartsease Roundabout to Ketts Hill Roundabout;
- Riverside Road from Ketts Hill Roundabout to Foundry Bridge
- Drayton Road from Drayton Centre to Middletons Lane;
- Drayton Road from Mile Cross Road to Aylsham Road;
- Cromer Road from Airport Park & Ride to the Outer Ring Road;
- Aylsham Road from the Outer Ring Road to Drayton Road;
- Aylsham Road from Drayton Road to St Augustines;
- Magpie Road from St Augustines to Edward Street
- Earlham Road from Fiveways to the Outer Ring Road; and
- Unthank Road from Park Lane to Convent Road

The outbound links with the highest levels of journey time variability during the weekday PM peak period are;

- Top of Bracondale to Martineau Lane / A146 junction;
- Sprowston Road from Magdalen Road to the Outer Ring Road
- Drayton Road from Aylsham Road to Mile Cross Road;
- Drayton Road from the Outer Ring Road to Middletons Lane;
- Aylsham Road from Drayton to the Outer Ring Road
- Grapes Hill;
- Dereham Road from Grapes Hill to Old Palace Road;
- Dereham Road from Bowthorpe Road to the Outer Ring Road;
- Earlham Road from the Outer Ring Road to Fiveways; and
- Newmarket Road from Unthank Road to Thickthorn Interchange

Figure 5.24: Roads with High Bus Journey Time Variability



There is consistency between Figures 5.23 and 5.24 in terms of low average bus speeds and high bus journey time variability. The majority of roads affected by high journey time variability are radial routes from the north. Combined, these roads carry significant numbers of passengers during peak periods, all of which will be inconvenienced through variances in bus journey time. All of the Park & Ride services are affected by links with high bus journey time variability, with sites in the north at the airport and Sprowston being particularly affected.

It is interesting to note that along corridors where bus priority is available in the form of bus lanes (see Figure 5.3), sections where there is high variability in journey time are in locations where bus priority is not provided.

Reasons for the slow journey times and high levels of journey time variability on these links could include;

- Congestion on the corridors, leading to queuing;
- Lack of bus priority measures;
- Poor existing road layouts; and
- On-street parking, resulting in buses having to wait or mount the footways to pass oncoming traffic.

5.1.1.16 Bus Journey Times

Despite the introduction of measures to improve bus journey times in the Norwich urban area, traffic delays to buses have increased in recent years both during the peak and inter peak periods, such that the quality of the bus journey is being eroded. Table 5.2 illustrates changes in journey times of buses on a typical cross-city route; First service 19/20, over six years, 1996 to 2002.

Table 5.2: Change to Bus Journey Times on First service 19/20

Year	1996	1997	2001	2002
Journey time (minutes)	105	100	110	120
Frequency (minutes)	15	10	10	15
Buses required (number)	7	10	11	8

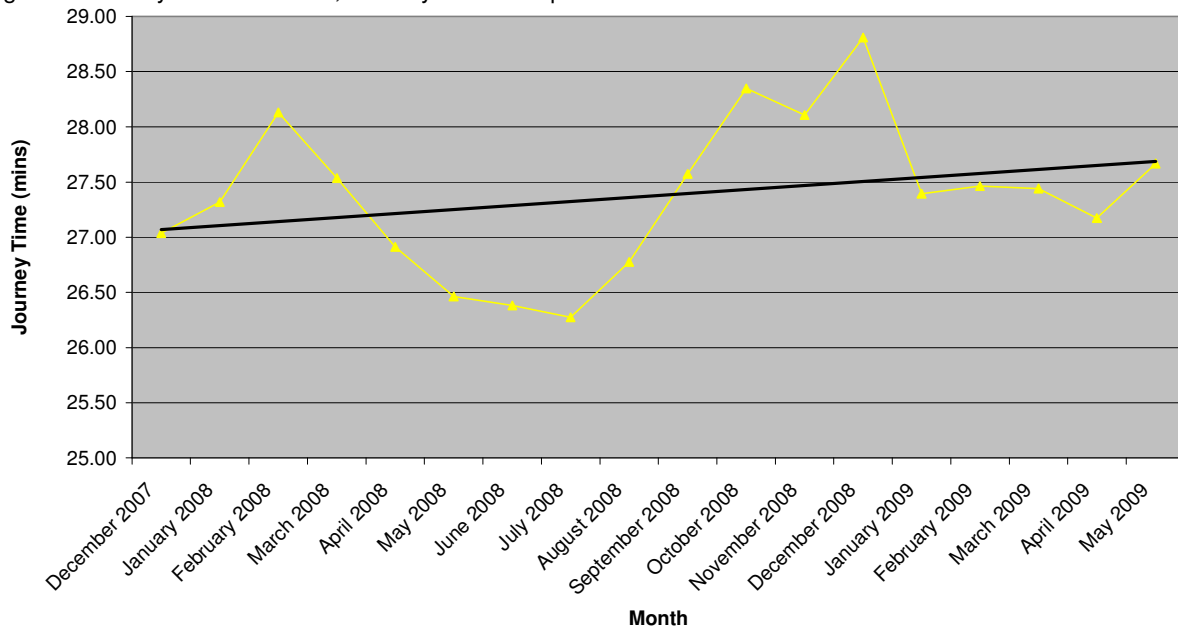
Source: Norwich City Centre, Interchange and Bus Priorities, ANNEX E Appraisal (July 2002)

The passenger benefits of 1997 with increased frequency and faster journey times have gradually been lost. The changes have involved a reduction in bus frequency in order to allow journey time increases that reflect more accurately current traffic conditions without committing unacceptable additional vehicle resources. The service changes have restored the reliability of the bus service for passengers, but at the expense of frequency and journey time.

More recently in December 2009, following a review of bus service reliability in Norwich, First Bus amended the timetables of key city centre routes to add additional journey time. In most cases, this led to an increase of 2-3 minutes, which was applied either throughout the entire route or at specific locations where known problems were experienced,

Figure 5.25 shows the end to end journey time of a service that operates entirely within the built up area of the city centre. This graph shows an actual increase in the end to end journey time over the period shown, with a reduction in journey time coinciding with the University and school summer holidays when there is typically less traffic on the network generally. The pattern of extended journey times during the winter months is common across the majority of routes and reflects increased traffic and congestion during this period.

Figure 5.25: City Centre Service, Journey Time Comparison

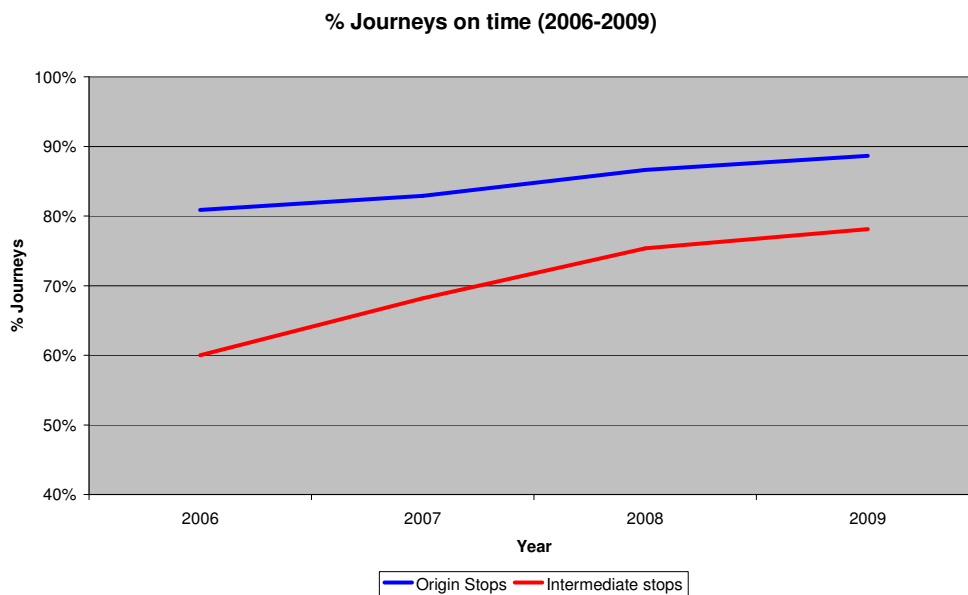


Source: Norfolk County Council

5.1.1.17 Bus Service Reliability

Bus service reliability data has been reviewed to identify any changes in reliability over time and to identify particular routes that are currently affected by poor bus reliability. Overall performance in terms of services running on time (between 1 minute early and 5 minutes late) at origin and intermediate stops is shown in Figure 5.26.

Figure 5.26: Percentage of Bus Services on Time at Origin and Intermediate Stops

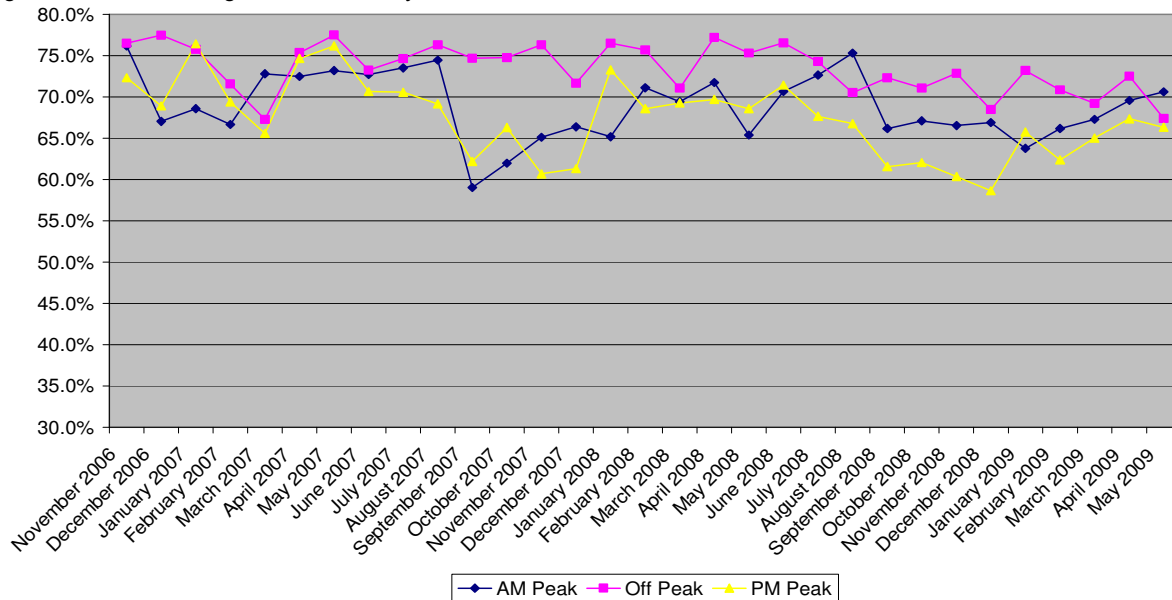


Source: Norfolk County Council

Figure 5.26 shows that in general, no operator is able to achieve an on-time punctuality of more than 80% across all stops. In order to achieve an improvement, further interventions are required, such as additional bus priority measures. The graph also shows that on time performance has increased over time. Some of the improvement shown in the graph can be attributed to bus operators using software provided by the bus tracking system to assist them in improving performance by identifying where their vehicles are at any given time. This aids day-to-day operation and assists in route planning and timetabling. This information is used by bus operators and NCC to jointly identify areas where improvements should be focussed.

When looking at performance at intermediate stops during peak and off-peak periods, differences can be found. Figure 5.27 illustrates the percentage of journeys on time for the different time periods.

Figure 5.27: Percentage of Bus Journeys on Time for Different Time Periods



Source: Norfolk County Council

Figure 5.27 shows that off peak performance is generally the best. However, there is little difference between both peaks which vary throughout, with the PM peak getting worse since Summer 2008. This is to be expected due to the significantly reduced levels of traffic on the network during the off peak period, leading to less delay and therefore less variability in journey times.

Performance of bus services along different corridors in Norwich has been compared over the period from 2006 to 2009 in terms of the proportion of services on time at intermediate stops. Whilst performance is shown to not fluctuate significantly between the corridors, this assessment suggests that corridors from the south perform better when compared to corridors from other directions. The worst performing corridors are those accessing the city from the north.

The Ipswich Road and Newmarket Road corridors accessing from the south have a typical on-time performance at intermediate stops of 82-86%. Plumstead Road, Drayton Road and Wroxham Road accessing from the north have the lowest on-time performance at intermediate stops ranging from 69-73%. The other corridors have an on-time performance of 73-77%. These findings are consistent the information presented in Figure 5.24, which suggests that roads with high bus journey time variability have fewer buses running on time.

The Plumstead Road corridor has the worst on-time performance of 69% and is clearly shown in Figures 5.23 and 5.24 to have low average bus speeds and high journey time variability. In December 2009, First increased the journey time of the main service along this route by three minutes in response to poor punctuality, which will further reduce the average bus speed.

The Drayton Road corridor had an on-time performance of 72%. This is consistent with the information presented in Figure 5.24, which indicates that a significant length of this route is affected by high journey time variability. In December 2009, First reviewed performance along this route and applied an increased journey time of two or three minutes throughout the day. In addition, off-peak frequency was reduced from

15 minutes to 20 minutes. These changes were introduced in response to increasingly unreliable journey times and poor performance.

5.1.2 Level of Service in the NPA

Key changes in bus services have been identified for the NPA. Overall, there has been an increase in the number of services across all operators. In addition, throughout the year, there are a considerable number of changes to services in response to traffic conditions, feedback from customers and overall route performance.

Changes to services operated by First Bus are outlined in Table 5.3 and this provides useful information on what changes have been undertaken by a single operator.

Table 5.3: Key Changes to Bus Services Since 1999

Nature of Change	Number of Services Affected
New Service Started	5
Service Cancelled	12
Service Level Increased	2
Service Level Decreased	9
Service Unchanged	8

Source: Norfolk County Council Passenger Transport Group

In examining the reasons for changes that have been implemented to services, volume of traffic in Norwich and its impact on service punctuality and reliability is a significant factor in services being reviewed and adjusted. However, assessment by operators has identified the following additional factors having an adverse impact on bus service performance:

- Parked cars create pinchpoints along routes, with some locations being significantly worse than others
- Parking associated with school drop-off and pick-up causes significant delay on some routes (impact dependent on number of schools along the route)
- Turning movements at particular junctions causes delays (e.g. at roundabouts where faster flowing traffic causes delays in accessing the junction)
- Roadworks have a varying impact but some routes are particularly sensitive. This is the case where there is single carriageway and few alternative routes suitable for buses
- Operation of some routes impacts on performance where little recovery time is allocated. This is particularly the case where there may be terminating loops at both ends of the route without an obvious location where appropriate layover can be scheduled
- Deliveries to retail premises can cause delays where roads are partially blocked. In some instances, it is not possible to access bus stops due to delivery vehicles blocking access
- Heavy traffic loadings at certain times of the day and from specific establishments can be a problem, such as the hospital and UEA where there are concentrations of people trying to travel within a short timescale

5.1.3 Future Situation

In 2031 the increase in background traffic and its consequences on the network will necessarily have a detrimental impact on the operation of bus services in the area. As this section has discussed, both transient congestion and persistent heavy congestion at particular locations already affect journey times

and reliability of existing bus services and this situation is likely to significantly worsen in the 2031 Do Minimum scenario.

5.1.4 Benchmarking

Benchmarking data has been obtained for the punctuality of bus services in Norfolk, based on the Traffic Commissioner's national standards for bus service punctuality.

Table 5.4: Bus Punctuality by County

Area	Year	Bus Punctuality Level
Norfolk	2008/09	81%
Cumbria	2007/08	95%
Derbyshire	2007/08	83%
Lincolnshire	2007/08	59%

Source: Annual Progress Reports for each County's 2nd Local Transport Plan

Table 5.4 shows that although Norfolk has bus punctuality levels well in excess of those in Lincolnshire, they are falling behind those of Cumbria and Derbyshire. In particular, the punctuality level in Cumbria of 95% suggests that there is scope for Norfolk to significantly improve on its current level.

5.1.5 Relevant Policy Requirements

The following policies are affected by the public transport provision in the NPA:

- Planning Policy Guidance Note 13: One of the over arching principles of promoting accessibility to jobs, shopping, leisure facilities and services by public transport;
- A New Deal for Transport White Paper: Local Highway Authorities are required to produce a Local Transport Plan and to consider road schemes as part of an integrated transport strategy;
- Delivering a Sustainable Transport System: Support of cross-cutting initiatives like those which encourage a modal shift to public transport, and making better use of the existing network by improving reliability and resilience;
- Norfolk's 2nd Local Transport Plan: Encourage a modal shift to sustainable modes of travel, reduce emissions from transport, reduce the need to travel and improve access to jobs and services and integrate delivery of spatial, economic and transport planning.

The Traffic Commissioner's Practice Direction: Standards for Local Bus Services states that

*"Traffic Commissioners have set a target whereby 95% of services should depart from the Timing Points within the bracket of up to 1 minute early and up to 5 minutes late. Decisions by the Court of Appeal and the Transport Tribunal have endorsed this approach. Whilst accepting that a general benchmark of this nature may not always be achievable, that target is the one to which operators should work."*¹³

¹³ Practice Direction: Standards for Local Bus Services (DfT, 2005, p.2)

5.2 Park & Ride

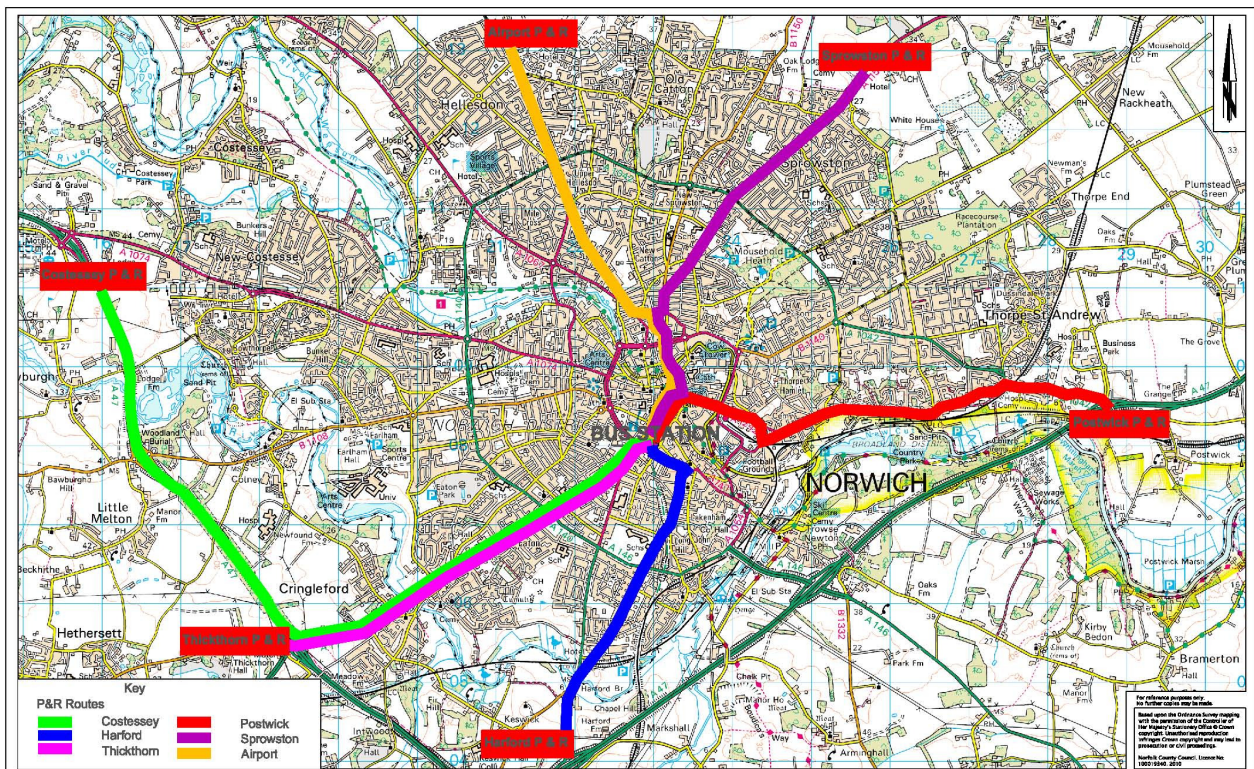
5.2.1 Current Picture

NCC operates six purpose built Park & Ride sites, more than any other city in the UK, providing 4,876 spaces, located on the main routes into Norwich city centre. Figure 5.2 shows the locations of the Park & Ride sites as well as the routes taken by the buses into the city. In 2008 more than 3.1 million passengers in over 860,000 vehicles used the Park & Ride.

Table 5.5: Park and Ride Sites and Spaces

Location	Opening Year	Spaces
The Airport	1994	620
Postwick	1998	550
Costessey	2001	1100
Sprowston	2003	792
Harford	2004	1088
Thickthorn	2005	726
Total	-	4876

Figure 5.2: Park & Ride Locations and Routes into Norwich



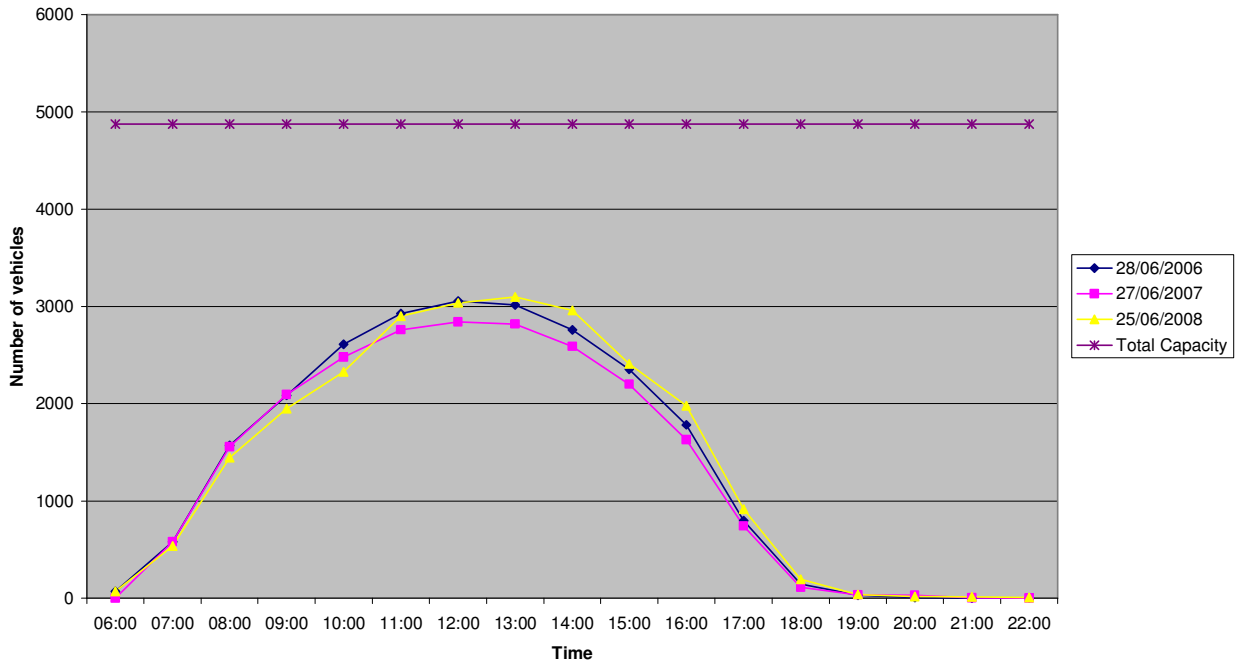
Park & Ride services are provided at a frequency of approximately every 7-10 minutes between 0700 and 1900 Monday to Saturday. The services are enhanced in the period leading up to Christmas, operating a later service on Thursdays and a Sunday service.

The sites range in size from 550 to 1100 car parking spaces, including parking bays for disabled users and parents with young children.

A key element of the Park & Ride service is a rapid journey time into the city centre. In most cases, the most direct route achieves this through use of the nearest radial road. However, regular reviews of journey time and reliability are undertaken. In the case of Costessey, the route used is via the A47 and Newmarket Road rather than use of Dereham Road, which would offer a more direct route. This alternative route is quicker and more reliable and benefits from high levels of bus priority measures along Newmarket Road. Routing along Dereham Road would be slower and less reliable based on current traffic flows.

Aggregated data has been collected for car park occupancy at the Park & Rides as a whole over 2006 to 2008, on a weekday, the results of which are detailed in Figure 5.3. The data provided for the weekday levels of use show that the level of use of Park & Ride facilities is stable, but that as a whole, the level of use falls well below the available capacity, with the maximum level of car parking recorded at 3,096 vehicles being 36.5% below capacity.

Figure 5.3: Aggregated Park & Ride Occupancy Levels - Weekday



Source: Norfolk County Council

Figure 5.3 shows that the Park & Rides collectively are operating below their capacity, with nearly 2000 car parking spaces being available on a weekday across the facilities. However, the story is different when individual sites are investigated. Figure 5.4 shows the year on year occupancy data for the Airport Park & Ride and Figure 5.5 shows that for the Postwick facility.

Figure 5.4: Airport Park & Ride Occupancy Levels – Weekday

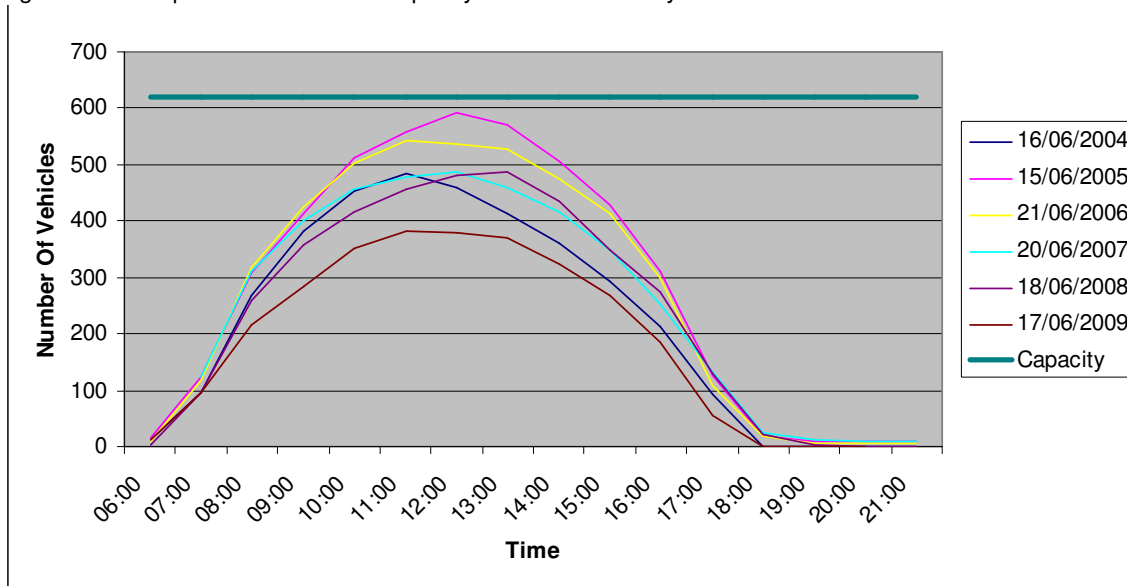
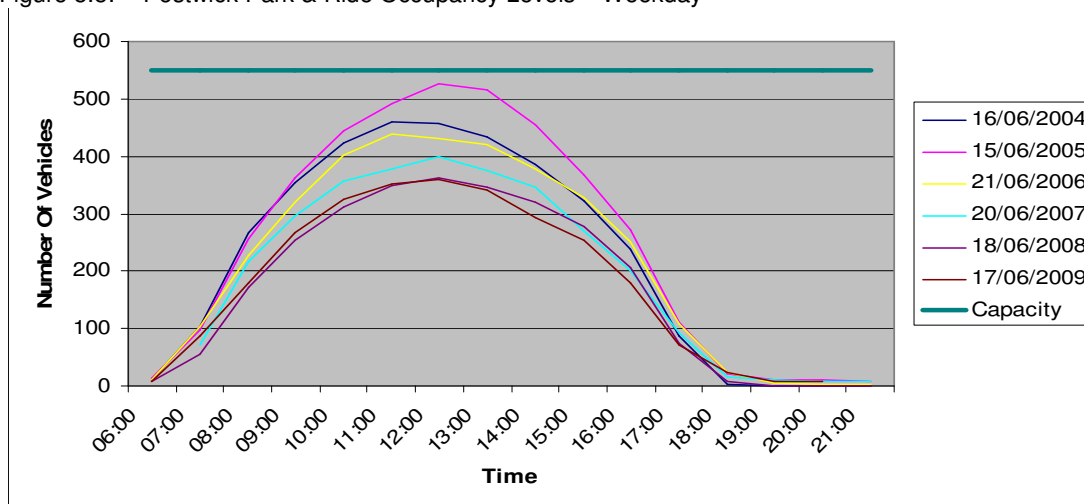


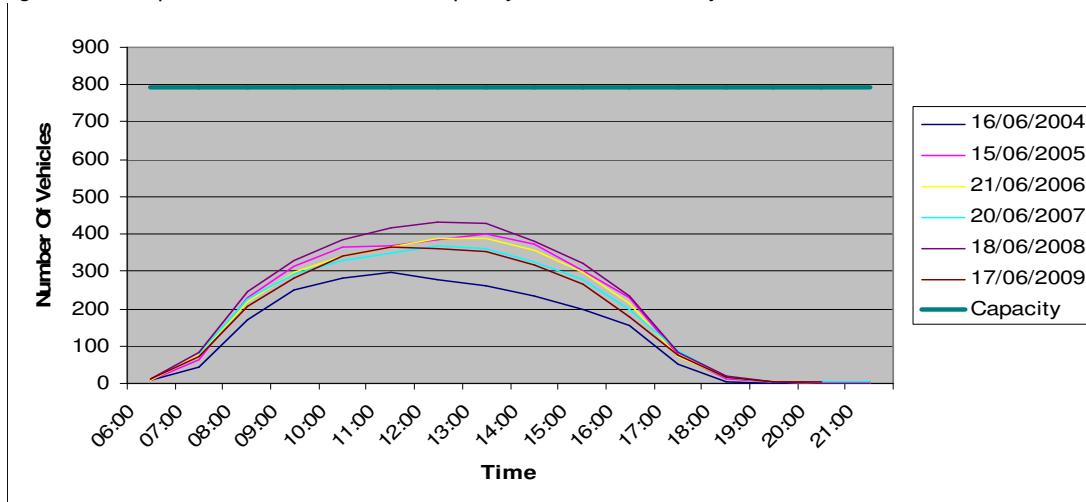
Figure 5.3 and Figure 5.4 show that these Park & Ride facilities have been operating close to, or at capacity for at least two of the last 6 years, but that the decrease in usage at both started in 2007, thereby coinciding with the start of the economic downturn.

Figure 5.5: Postwick Park & Ride Occupancy Levels – Weekday



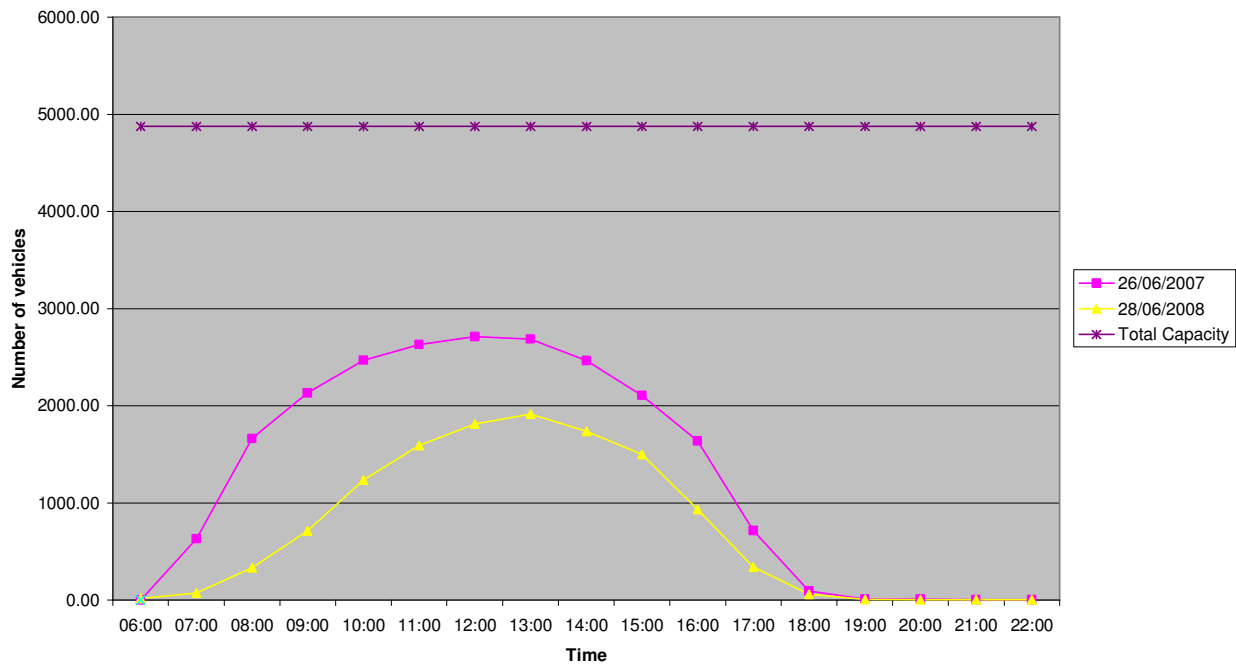
Whilst the facilities at Postwick and the Airport have been very successful historically, others such as Sprowston have had moderate levels of use since opening as detailed in Figure 5.6.

Figure 5.6: Sprowston Park & Ride Occupancy Levels – Weekday



The data shown in these Figures shows that, although, as a collective the Park & Ride sites are operating under capacity, the Postwick and Airport facilities have been very successful historically. This suggests that there is realistic opportunity to increase levels of use across all the Park & Rides, particularly once contributing factors, such as the economy, has improved.

Figure 5.7: Aggregated Park & Ride Occupancy Levels – Saturday



Source: Norfolk County Council

Data for the levels of use on a Saturday is available for 2007 and 2008 and shows that, as could perhaps be anticipated for a facility which tends to serve commuters, the level of use at the weekend falls well below the available capacity. In the two years, the maximum level of occupancy was recorded as 1,914 vehicles, 258104/BNI/NOR/1/B 24 November 2009
 P:\Norwich\MM Projects\258104 - NCC NATS Plus\258104-AL T12 Final Report\Baseline Traffic Information Report\Work from 07 01 2010\20100128 Baseline Conditions V1.doc

which is 61% below the capacity of 4,876 vehicles. It can also be seen that the levels of occupancy have fallen between the two years which coincides with the economic downturn, commencing in 2007.

5.2.2 Future Situation

An extension to the Postwick Park & Ride received planning approval in early 2010 and it is likely that this will be delivered by the end of 2010. This will coincide with the provision of additional commercial and employment uses in Norwich city centre, which should result in an increased level of demand for this facility.

When considering V/C as an indication of junction performance, Figure 3.14 suggests that all but one of the Park & Ride sites (Airport) will be affected by growth in traffic on the highway network and consequent delays in junctions en-route to the city centre (see Table 5.6). However, V/C is only one indication of delay and when overall junction delay is taken into account, all of the Park & Ride sites will be affected by increasing delay at junctions.

Table 5.6: The Impact of Traffic Growth on Park & Ride Routes: 2031

Park & Ride Facility	Junction	2031 V/C	2006 V/C
Postwick	A47 Postwick Junction	>90%	<90%
Sprowston	Wroxham Road Junction with the Outer Ring Road	>90%	>90%
	Bull Close Road Junction with the Inner Ring Road	>90%	>90%
Costessey & Thickthorn	A47 Junction with the A11	>100%	<90%
	Newmarket Road Junction with the Outer Ring Road	>100%	>90%
	St Stephens Road with the Inner Ring Road	>90%	<90%
Harford	A47 Harford Junction	>100%	<90%
	St Stephens Road with the Inner Ring Road	>90%	<90%

Table 5.6 shows that the impact of the anticipated growth in traffic on seven junctions on the network will have a detrimental impact on the operation of bus services to and from the Park & Ride sites. In addition to delay being incurred by buses, the congested operation of five junctions on the A47, as well as multiple junctions on several of the bus routes, may deter people from using several of the sites as users would be subject to delay in travelling to the Park & Ride, waiting for a bus departure and then delays on the inbound journey to the city centre. Park & Ride sites in the north of the city do not have the benefit of bus priority measures being in place which would help minimise delays to the buses.

5.2.3 Benchmarking

Table 5.7 shows that a comparison of the Park & Ride sites of Norwich has been done with that of Bristol, Cambridge and York as the data for other near neighbour cities were not readily available.

Table 5.7: Comparison of Park and Ride Service of Norwich with York, Cambridge and Bristol

Park & Ride Site	Site	Spaces	Year	Passenger Figures
York	Askham Bar	542	2008	2,252,859
	Grimston Bar	920	2008	2,625,250
	Designer Outlet	350	2008	3,038,953
	Monks Cross	750	2008	3,020,000
	Rawcliff Bar	1000	2008	3,000,000
Cambridge	Baden Road	945	N/A	N/A
	Maddingley Road	930		
	Milton	542		
	Newmarket	873		
	Trumpington	1452		
Bristol	Portway	550	N/A	309,498
	Long Ashton	1500		475,539
	Bath Road	1300		626,414
Norwich	Thickthorn	736	2008/09	602,464
	Costessey	1,100	2008/09	278,714
	Airport	620	2008/09	630,635
	Sprowston	788	2008/09	499,617
	Postwick	525	2008/09	522,429
	Harford	1,088	2008/09	589,449

Table 5.8 to

Table 5.10 show a comparison in the fare structures of the Park & Ride sites of Norwich, Ipswich and York.

Table 5.8: Park & Ride Fares – Ipswich

Ipswich	Single	Return	Smartcard
Bury road	£2.00	£2.90	from £26.00
London Road	£2.00	£2.90	from £26.00
Martlesham	£2.00	£2.90	from £26.00
Bury Road to Hospital		£3.50	
London road to Hospital		£3.50	
Martlesham to Bury Road		£3.50	
Martlesham to Ipswich Hosp		£2.70	

Table 5.9: Park & Ride Fares – York

Single	£1.80
Return	£2.30
Smartcard Return	£2.05
Weekly Smartcard	£9.20
Monthly Smartcard	£36.80
Annual Smartcard	£368.00

Table 5.10: Park & Ride Fares – Norwich

Norwich	
Adult daily return before 1230	£2.00
Adult daily return after 1230	£1.70
Group return tickets	
Maximum of 5 Adults per vehicle (Mon - Fri)	£3.50
Maximum of 5 Adults per vehicle (Sat, Sun and Bank Holidays)	£3.30
Season Tickets	
10 Trip Ticket (£1.80 per return trip)	£18.00
Rainbow Rider (4 weeks unlimited Park & Ride travel)	£34.00
*Annual Ticket	£340.00
*Annual Student term time tickets – college ID required at time of purchase. These passes are valid for travel during term time only (£1.31 per return trip)	£255.00
Other	
Cycle and Ride	£1.00
Concessionary pass holders (after 0930 Mon - Fri, anytime at weekend)	Free

The fare data indicates that all single tickets are broadly similar in price around £2 and that the cost of Park & Ride in Norwich is broadly comparable, although slightly cheaper, than that in York for individual travellers. There is an economy of scale available for users of the Norwich Park & Ride facilities however, in that group return fares are significantly cheaper per person than the fares charged for single travellers.

5.2.4 Policy

PPG13 includes details on Park & Ride schemes *“Park & Ride schemes, in appropriate circumstances, can help promote more sustainable travel patterns, both at local and strategic levels, and improve the accessibility and attractiveness of town centres”*.

“Schemes need to be developed as an integral part of the planning and transport strategy for the area, and should be included on the local transport plan and, where possible, in the development plan”.

The provision of the six Park & Ride sites at their strategic locations on key radial routes into Norwich, complies with Transport Planning Policy.

5.3 Community Transport

In the NPA and Norfolk, there are a number of community transport schemes, which are summarised within Table 5.11.

Table 5.11: Community Transport Provision (by District)

District	Service	Vehicles	Run Times	Catchment
Broadland District	Aldborough Community Bus	Mini Buses	Weekdays	Holt, Aylsham, Wroxham Norwich
	AMZA Travel	Flexabus	Dial-a-ride	Acle from 5 mile radius
	Aylsham Care Trust	Mini bus/ car	Shopping and lunch club	Marsham, Cawston & Aylsham
	Car link	Volunteer Drivers	As Required	All Norfolk
	Kickstart Norfolk	Moped loans	As required	All Norfolk
	North Walsham Transport	Mini bus	Weekdays	Parishes in Reepham and Aylsham Area
	Norwich door to Door	Mini bus & wheelchairs	Charity service as required	Greater Norwich area
	Reepham Rover	Mini bus	weekdays	Reepham
	Taverham Patch	Cars	As required	Taverham
Norwich	British Red cross	Cars and Mini Buses	Dr visits, hospital, shopping	Norwich
	CarLink	Volunteer drivers	As required	Norwich
	Norwich Door to door	Mini buses	Dr clinics, social, FE	Greater Norwich
	Norwich Shopmobility	Wheelchairs and scooters	As required	City Centre
	St. Christophers Coaches	Coaches	As required	30 mile radius of Norwich
	West Norwich Transport	Mini bus dial a ride	As required	Earlham, ,Bowthorpe, W. Earlham
South Norfolk	Project Switch	Mini bus dial a ride	Clinics, FE, work, social	Greater Norwich
	Waveney community Bus	Bus	As required	Harleston, Mendham,

Source: - Info from Community Transport for Norfolk and The countryside Agency

Community Transport is an increasingly popular form of transport, with patronage at 50,530 users in 2008/09 which is a 39% increase on the 36,333 users in 2003/04, despite there being no change in service level¹⁴.

5.4 Coach Services

National Express runs regular long distance coach services from Norwich to Birmingham, London and Airports in the South East of England. These services depart from a dedicated departure bay at Norwich bus station, where coach tickets can be purchased.

Increasing numbers of people come to Norwich by coach for leisure purposes and visiting coaches tend to drop-off and pick-up in the city centre. It has been stated that there is currently a lack of provision for coach parking within the city.

¹⁴ Passenger Transport Group, Norfolk County Council

5.5 Rail Services

5.5.1 Current Picture

In the NPA there are rail stations at Norwich, Wymondham, Salhouse, Brundall and Brundall Gardens. Rail services operating from Norwich can generally be classified as longer distance services with destinations to Cambridge, London Liverpool Street, the Midlands and the north as well as local services. Local services provide links to surrounding towns and villages including Cromer and Sheringham (Bittern Line) and Great Yarmouth and Lowestoft (Wherry Lines). National Express East Anglia (NXEA) operates the majority of services out of Norwich, with East Midlands Trains operating services to the north and the Midlands via Ely.

The Bittern and Wherry Lines operate as Community Rail Partnerships (CRPs) with NCC working with NXEA and other stakeholders to promote rail use. These have been successful and Figures 5.34 and 5.35 show patronage on these lines over recent years.

Figure 5.34: Bittern Line Patronage

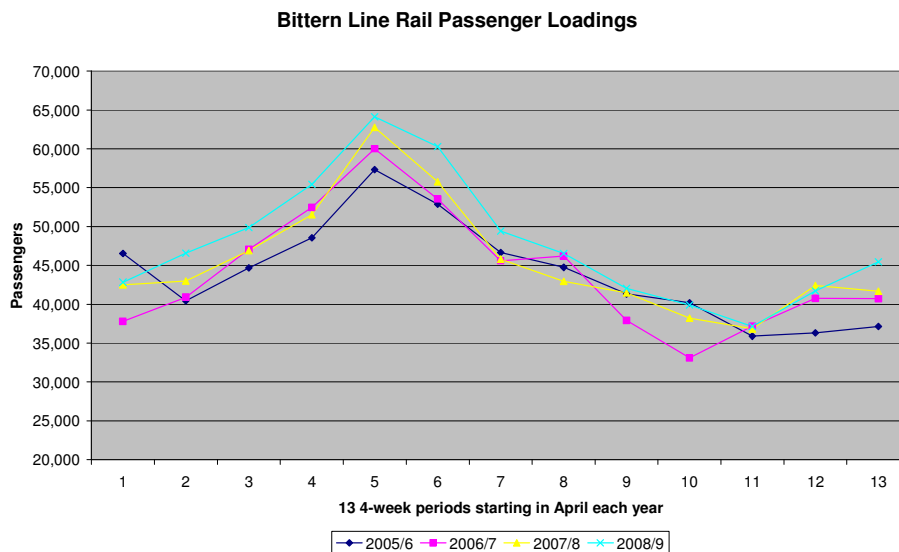


Figure 5.35: Wherry Lines Patronage



Norwich railway station is situated some 800 metres east of the city centre. Short-stay pay and display parking is provided on the station forecourt, with long-stay parking provision situated in a multi-storey car park constructed as part of the Riverside Development, allowing for Park & Ride to be used for commuters out of Norwich. The station includes a modern bus interchange which has good cycle storage facilities.

Other stations within the NATS area are Wymondham, Salhouse, Brundall and Brundall Gardens. Wymondham has two car parks, one in front of the station and another parish car park on Cemetery Road and is well used by commuters into Norwich and Cambridge. Brundall and Salhouse stations have limited parking and Brundall Gardens does not have any parking.

In recent times, the Norwich to London mainline service has experienced increased journey times and varying levels of unreliability. There is generally engineering work undertaken on this route during weekends and Bank Holidays, which discourages use at this time. Rolling stock is becoming dated based on standards experienced on other routes and an upgrade is being sought.

High passenger loadings and some overcrowding is experienced during peak times on rail routes into Norwich. Without additional services or capacity being provided, any additional growth along rail corridors is likely to worsen this situation.

Recent improvement schemes that have been delivered at these stations include new seating, information boards and signage, CCTV, electronic passenger information screens, hearing loops and cycle parking.

Rail links across to the Midlands and North-West are generally poor and Norfolk is part of the East-West rail consortium, which supports enhanced rail services across to the west. In addition, Norfolk has a 'Norfolk Rail Alliance' established, which seeks to ensure key improvements in rail services are delivered.

5.5.2 Future Situation

Numerous studies have been undertaken to look at options for enhancing train services and station facilities, including the provision of new rail stations. This has considered the ability of the current rail infrastructure to accommodate additional services and stations. Key findings are outlined below:

- Additional passing loops will be required
- Enhancements to Norwich station (throat) approaches will be needed
- An additional platform may be required depending on how many schemes are taken forward

Any new station would require feasibility work to identify whether this can be accommodated within the existing timetable or whether re-timetabling and additional rolling stock is needed.

5.6 Norwich Airport

5.6.1 Current Picture

Norwich International Airport (NIA) is located approximately 4 miles to the north of Norwich city centre. The airport serves Norfolk, Suffolk and parts of Cambridgeshire, all of which are within a 90 minute drive of the airport. It is estimated that the catchment area of the airport consists of 1.5 million people. NIA presently handles 50,000 aircraft movements and has the capacity to handle up to 1.4 million passengers per year. A masterplan for the airport is currently being developed and should be available Feb/March 2010.

There have been several attempts over recent years to develop a regular bus service between the city centre and the airport, but these have been aborted due to a lack of patronage. Consequently almost all surface arrivals at the airport are by car or taxi. Access by road to the airport is also somewhat constrained as it is achievable only by travelling either through the city, or around the Outer Ring Road, via its congested junction with Boundary Road, to the A140 Cromer Road.

The biggest aircraft that can use the airport is the Airbus A320 which is a short to medium-range commercial passenger airliner which accommodates 180 passengers (1 Class) or 148 passengers (2 Classes).

In terms of passenger throughput, in 2008 the airport recorded 517,690 passengers based on ticket sales, with 70% of passengers originating from Norfolk and 25% from Norwich. Key destinations served by NIA include those shown in Table 5.12, which include the 6 new destinations to be served from the airport announced on the 4th December 2009 of Tenerife, Bulgaria, Madeira, Tunisia, Portugal and Guernsey.

Table 5.12: Destinations Offered by Norwich International Airport

Destination	Schedule
Aberdeen	Daily
Alicante	From November – April
Amsterdam	Daily
Bulgaria – Bourgas	July – August
Corfu	May – October
Crete – Heraklon	May – July & August – September
Croatia – Pula	1 flight in June, 1 flight in September
Edinburgh	Daily
Egypt – Sharm El Sheikh	November – April
Exeter	Monday, Wednesday and Friday
Geneva	Saturdays in the Winter only
Guernsey	May – September
Ibiza	May – October
Jersey	March – September
Lake Garda	Special departures only
Madeira	4 flights per year
Majorca – Palma	May – October
Malta	May – October
Manchester	Daily
Menorca – Mahon	May – October
Sorrento	Special Departures
Tenerife	November – April
Tunisia	Periodically throughout the year
Turkey – Dalaman & Antalya	April – October

Source: www.norwichairport.co.uk

Passenger and staff shift patterns in relation to peak hours are relatively seasonal with the summer season busy as there is high demand for flights abroad. There are currently 96 key members of staff employed at the airport, of which 60 are operational, 21 are associated with air traffic control and 15 are security. Further employee numbers are associated with the ancillary uses at the airport such as retail and site cleaning.

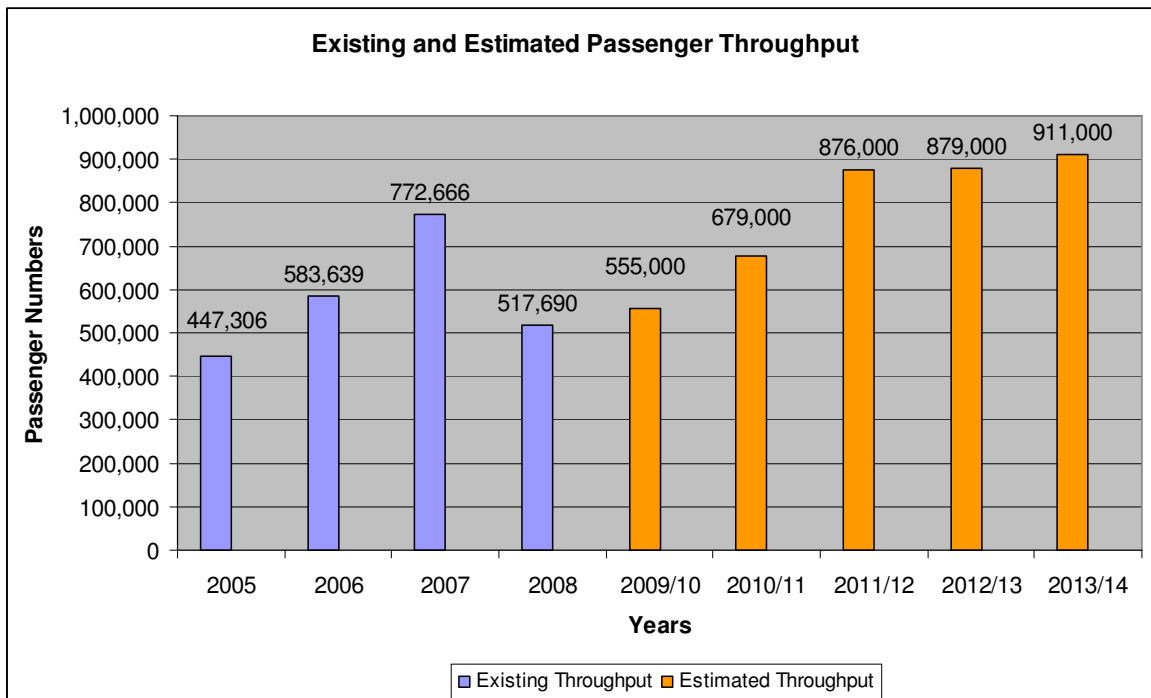
Freight services at the airport are currently provided on a small scale; there is a secure freight shed available with newspaper deliveries currently forming the majority of freight using the airport. Freight operations also consist of helicopter flights which replenish the North Sea oil and gas rigs. Airport management have indicated that freight operations at the airport are limited due to restrictions on night flights with none permitted after 9.30pm. There is poor local and strategic road network access for freight and the short runway length limits the size of aircraft able to use the airport.

There is a lack of manufacturing and therefore demand in the area, and the Outer Harbour at Great Yarmouth is predicted to reduce freight operations further once completed. At present there are no intentions to increase the level of freight operations as there is competition from larger airports such as Stansted and Heathrow which benefit from their locations close to London and the associated high quality strategic transport infrastructure.

5.6.2 Future Situation

Figure 5.36 shows a general increase in passenger throughput year on year to 2007 but then the sharp fall in passenger numbers of 32% from 772,639 to 517,690 between 2007 and 2008 was due to the loss of the passenger carrier BMI Baby, reducing the number of destinations available overseas. The prediction however with proposed new routes is a steady increase in the throughput with levelling off between the years 2012 to 2014. NIA has developed a five year plan from 2009/10 to 2013/14 which aims to increase passenger numbers and which would lead to a 10% increase in the number of staff employed at the airport to accommodate that growth.

Figure 5.36: Existing and Estimated Passenger Throughput at Norwich International Airport



Source: Norwich International Airport

The increase in passenger through at NIA will impact on the operation of the highway network in the vicinity of the airport.

5.6.3 Benchmarking

A comparison of airports at Leeds/Bradford, Doncaster, Bristol and Norwich as sample regional airports is presented in Table 5.13. Historically, Norwich has the lowest employee and passenger numbers out of the four airports, although it has a similar passenger catchment to Doncaster Airport (1.8 million at Robin Hood Airport compared to 1.5 million at NIA). NIA has less aircraft movements than Bristol Airport but more than Leeds Bradford Airport, which had 37,600 movements in 2008 compared with the 50,000 made at NIA. Freight is relatively low at all of these airports with Robin Hood Airport accounting for the highest at 109 tonnes in 2008. Bristol Airport and NIA have restricted larger aircraft movements due to runway size.

Table 5.13: Comparison of Norwich International Airport with Other City Airports

Airport	Bristol	Leeds Bradford	Robin Hood(Doncaster)	Norwich
Location	Close to city and motorways	Needs expansion to airport to attract more passengers	Has 5 major motorways within 20 minutes, rail links and 40 miles from Humber port	Close to city, within 15 minutes from A11 and within 90 minutes drive to Ipswich and Cambridge
Employees	2900	2,200	Not Known	210
Passengers	2,500,000	2,449,000	1,800,000	555,000
Passenger Catchment	2,500,000 within one hour travel	25% of potential 3,700,000 rest use Manchester Liverpool and East Midlands	1,800,000	1,500,000
Aircraft Movements	60,000 in 2008	37,600 in 2008 5% down on 2008	24 Hours no slot restrictions	50,000 per annum
Largest Aircraft	Limited to Boeing 767	No limits, any aircraft	No restrictions - any wide bodied aircraft	A320 due to short runways
Freight in Tonnage	Only 3 in 2008	109 Tonnes in 2008 which is up 8% on 2007	1.350 tonnes down 16% on 2007	Limited due to restriction on night flight

In terms of accessibility to the airport, the mode share of passengers' journeys to and from all the above airports has been identified as detailed in Table 5.14.

Table 5.14: Mode Share at Regional Airports

Mode	Leeds/Bradford Airport (2004)	Doncaster Airport (2007)	Bristol Airport (2004)	Norwich Airport (2004)
Car	68%	74%	81%	76%
Taxi	29%	19%	12%	22%
Bus	2%	8%	5%	1%

Source: http://www.liverpoolairport.com/assets/_files/documents/oct_08/peel__1225450568_RHADS_Airport_Surface_Access.pdf - Figure 4

5.6.4 Policy

The following policies are affected:

- East of England Plan: Norwich Airport has an important regional role in meeting local and niche markets, for example by providing business aviation and passenger routes not served by larger airports. Their services may also help to relieve congestion at the major South East airports;
- Broadland Local Plan: TRA9 Maintaining Norwich Airport's needs taking into account national airport policy, landscape and environmental impact and surface access considerations.

NIA is designated as regionally significant in the East of England Plan, where it is also proposed that it can relieve other airports in the region. To achieve this, strategic access could be a limiting factor at present.

To summarise, it has been shown that the airport has a key role to play in both the local and wider economy by providing jobs and access to the region from a number of national and international destinations. The airport and its associated commercial areas provide an important access point to the wider region.

5.7 Taxis

The District Councils - Norwich, South Norfolk and Broadland all license taxis within the NPA. Only hackney cabs in Norwich are required to have facilities for people with disabilities which generally comprise ramps and seatbelts, all other vehicles are usually family saloons. Hackney cabs licensed in one District cannot pick up passengers in other Districts, although private hire cabs can, if pre-booked. Table 5.15 indicates the current provision of taxis within the three districts.

Table 5.15: Number of Licensed Taxis by District (August 2009)

Taxis	Norwich	Broadland	South Norfolk
Hackney	228	0	90
Private Hire	370	265	30

Source: District Councils

5.8 Water Transport

Although Norwich is on a navigable waterway, there is little in the way of water-borne commercial traffic with river traffic almost wholly related to tourism. A river bus operates from Norwich to Surlingham Broad, but again this is largely tourist-related.

5.9 Conclusions

- Bus passenger numbers in Norwich and Norfolk are rising, which is bucking the national trend in many areas where patronage is falling. The introduction of the concessionary travel scheme has played a role in this, reflecting the high proportion of people of pensionable age in Norfolk
- Substantial work is being undertaken in partnership with transport operators to improve the quality and reliability of bus service through initiatives such as the Joint Investment Plan and Punctuality Improvement Partnerships. Whilst these initiatives have brought improvements, scope for further benefits is likely to reduce as the transport network becomes increasingly congested from future growth
- Bus service performance in terms of on-time departures from origin and intermediate bus stops has increased over the period 2006-2009, with performance being significantly better at origin stops compared to intermediate stops. However, these improvements are showing signs of levelling off and on-time performance at intermediate stops remains below 80% for all operators combined
- Bus performance is generally higher during the off-peak when levels of transport are lower. This shows how bus performance varies with traffic levels and suggests improvements in bus service could be delivered through reduced traffic flows
- Roads affected by low average bus speeds coincide with those with high journey time reliability. In general, these roads are radial routes from the north and bus services along these corridors perform worse than those along corridors from other directions. Bus services along corridors from the south perform the best at 82-86% on time (2006-2009), which compares to corridors from the north performing at 69-73% over this same period. Other corridors are 73-77% on time
- Increased levels of congestion and journey time variability has resulted in bus operators regularly reviewing their services and increasing journey time. Most recent changes were in December 2009,

which resulted in increased journey times of 2-3 minutes and in some cases a reduction in frequency from 15 to 20 minutes. Increased congestion in the future is likely to lead to further increases in journey time, which is likely to hinder modal shift to buses

- Park & Ride services are currently operating below capacity and usage varies between sites. Recent falls in Park & Ride use since 2007 correlate with a general economic decline in the UK
- All Park & Ride routes are affected by links that experience high bus journey time variability, with sites in the north at Airport and Sprowston particularly affected. Proposed future growth and increased congestion will have a detrimental impact on the performance of Park & Ride bus services and the ability of customers to access the site. The attractiveness of Park & Ride will be diminished
- Community transport provides an invaluable service in the NPA by providing flexible transport options for those not able to access conventional transport. However, these services are subject to the same congestion and journey time variability as conventional transport. Demand for these services is currently increasing and forecast growth will increase pressure on these services
- Coach services play an important role in terms of bringing visitors to Norwich and providing access to longer distance destinations and key airports. Inadequate facilities for drop-off and pick-up as well as coach parking have been identified as a problem
- Rail services play an important role in local, regional and longer distance travel and use of rail is increasing, particularly on the local rail network where successful Community Rail Partnerships exist. High passenger loadings and some overcrowding occurs at present and this is likely to worsen with forecast growth along key corridors, such as the A11 corridor and to route to Rackheath
- The main line to London suffers from unreliability, aging rolling stock and slow journey times when compared to other main line routes in the country
- To accommodate new growth, additional services and stations would be required along with associated new rail infrastructure
- Norwich International Airport (NIA) serves a large catchment area and plays an important role in the local and regional economy. It is designated as being regionally significant in the East of England Plan in terms of relieving other airports in the region.
- Whilst passenger numbers at NIA have declined in recent years, of which the downturn in the economy is a factor, new passenger routes are planned for 2010, which should see passengers increase. Passenger throughput by 2013 is estimated to be above 900,000 per annum
- Significant employment is provided at the airport itself and in surrounding business areas. However, strategic access to the airport is poor and future development of the airport site for employment and freight / passenger use will lead to increased congestion on the surrounding highway

Taxis provide an important service within the NPA and provide flexible and accessible transport.

However, these services are subject to congestion and journey time variability as conventional transport.