WinACC
Winchester Action on Climate Change

Car Parks in Winchester Town

Evidence for a strategy



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Fourth edition

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Introduction

All agree there is a problem with both congestion and air quality[1] in Winchester town. There is less agreement on the solutions.

Strong arguments are put forward about what changes are needed. Many of these suggest changes to car parking arrangements.

Winchester City Council will shortly review its car parking strategy.

This report provides new data and an evidence-based analysis showing where parking problems lie and the connection between car parking and congestion.

It explores how car parking arrangements can contribute to Winchester City Council Local Plan Part 1's policy WT1 which includes:

> " The spatial planning vision for Winchester Town will be achieved through:-
> " implementation of the Winchester Access Plan and the Winchester Air Quality Action Plan to ensure that transport provision and access to and within the Town provides opportunities for sustainable transport provision and reduces pollution and carbon emissions."

This report is based on detailed analysis of data from Winchester Action on Climate Change regular monitoring of parking in public car parks in and near Winchester town since 2010, our one-off survey of private non-residential car parks in the town in 2012, Winchester City Council data from surveys of car park users, and estimates of on-street parking. The detailed methodology is in Appendix 1 and Appendix 2.

Key points

These are very brief summaries. For the evidence and arguments, see the

Detailed findings section below.

1. There are always unused car parking places in Winchester. Even at Christmas there is unused capacity at the park-and-rides. Overall there are more car parking spaces than needed.
2. Peak demand could be met in other ways.
3. Under-used car parking space could be re-allocated to other uses for financial benefit to the Council.
4. Winchester town centre roads cannot cope with the number of cars using them. It is the roads, not the number of central car parking places, which limit car access to Winchester town centre.
5. Car parks on the edge of Winchester town centre and park-and-ride car parks are less well-used than those in the centre.

[1] See "Detailed Assessment and Associated Studies Report 2016 - The BV report" commissioned and published by Winchester City Council http://www.winchester.gov.uk/environment/pollution/air-quality/

6. Park-and-ride is under-performing; and there is scope to shift cars from the centre to car parks on routes into the city including the park-and-ride sites.
7. Pricing has not so far deterred parking in the centre, and signage and naming have not encouraged cars to park where there is capacity.
8. Many cars that park in Winchester town come from the northern fringe of the Solent conurbation, not a rural hinterland accessibly only by car.
9. Private non-residential parking in the centre contributes significantly to Winchester town's traffic problems.

Recommendations

Having looked at the way Winchester town car parks are used and having considered the urgent need to address pollution problems, Winchester Action on Climate Change Transport Action Group recommends that Winchester City Council:

1. Manage car parking more strategically to shift parking to car parks on the edge of the city, including park-and-ride, to reduce congestion and air pollution. A walk of 5 to 10 minutes is not a deterrent but with fewer cars in the centre visitors / shoppers / investors will find it more attractive.
2. Use the evidence in this document to demonstrate that new car parking places within the city centre are not required despite the loss of places from Friarsgate and Upper Brook St car parks.
3. Base any future proposals for changes in car parking provision on traffic flow analysis to prevent overloading of the central circulatory system and reduce air pollution.
4. Make stronger use of pricing as a tool for demand management, and set greater differentials in charges for parking in the centre and for parking outside the centre.
5. Improve car park naming and signage to promote changes in parking behaviour:
    - Abolition of the misleading distinction between 'long-stay' and 'short-stay.'
    - Signage that encourages the use of edge-of-centre car parks.
    - Signage and naming that emphasising the differences between central, edge of centre and park-and-ride car parks.

These recommendations are derived directly from our research and observations, set out below.

In addition, we recommend that the City and County Councils work together to:

6. Create better pedestrian and cycling infrastructure to reduce the need for car access.
7. Develop public transport to provide popular viable alternatives to car use.

The authors

Winchester Action on Climate Change (WinACC) is a network of local people and organisations working together to engage every household and organisation in the district in cutting the district's emissions by 40 per cent between 2004 and 2020. WinACC's vision is of a more equitable, more enjoyable and more resilient low carbon society across the district, with healthier lifestyles, stronger communities, and greater food and energy security.

WinACC's Transport Action Group focuses on cutting the carbon footprint of travel.

Detailed findings

Public car park occupancy

There are more car parking spaces than are needed

The number of public car parking spaces is far in excess of what is required in normal use. There are always unused car parking places in Winchester. Even at Christmas there is unused capacity at the park-and-rides. Overall there are more car parking spaces than needed.

The mean occupancy[2] of public car parking on normal weekdays (including the pre-Christmas peak) is 64%.[3] While some car parks are often over 85% full, this is more than balanced by other car parks with a large proportion of empty spaces (see table below).

For simplification we have grouped the car parks into five groups. The table below shows which car parks are within each group, and the patterns of mean occupancy on normal weekdays drawn from all the surveys.

Normal Weekdays from 2010			
	Capacity	Mean number of cars parked	Mean percentage of spaces filled
Surface car parks accessed via the central circulatory system			
Middle Brook Street	142	132	93.3%
Cossack Lane	45	37	83.1%
Upper Brook Street	52	45	86.4%
Jewry Street	39	35	89.8%
St Peter's	189	101	53.6%
River Park	169	116	68.7%
All central surface	636	467	73.5%
Multi-storey car parks accessed via the central circulatory system			
The Brooks	315	231	73.3%
Friarsgate[4]	251	102	40.6%
All central M-S	566	333	58.8%
Central Total			

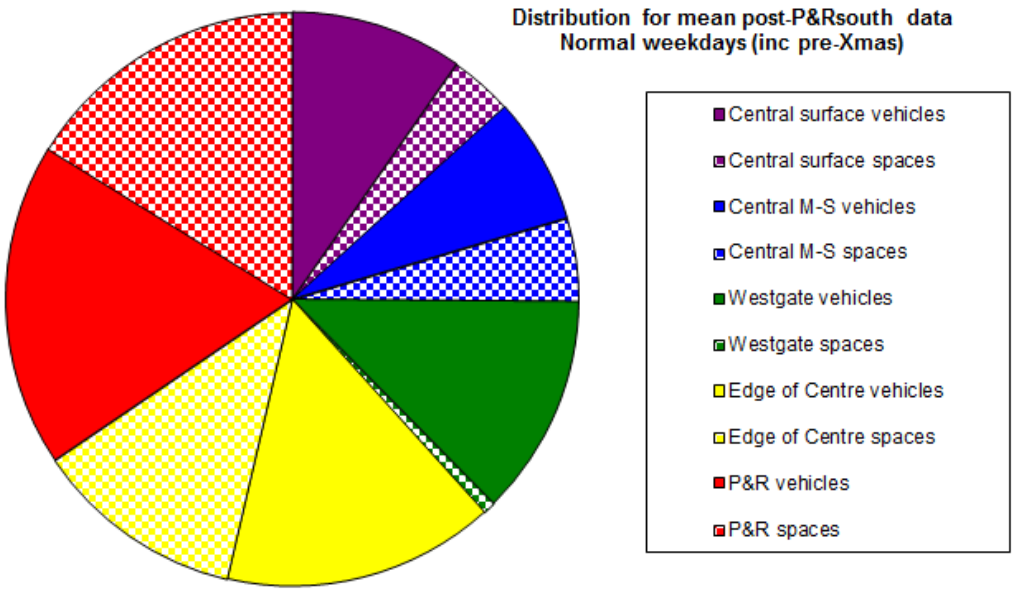
[2] Surveys are generally taken mid-morning to early afternoon, which for the most part corresponds to likely peak daily occupancy (see Appendix 3 for more discussion of this); "mean occupancy" thus means the average of these 'peak' occupancies.

[3] With a standard deviation of 12% - see Appendix 1 for definition of this.

[4] Friarsgate capacity at 2010, through to December 2013, when reduced by about 60, similar reduction in May 2014. Car park closed April 2015.

All central	1202	800	66.6%
Westgate			
Gladstone Street	108	102	94.5%
Tower Street	522	496	95.1%
All Westgate	630	598	95.0%
Edge of Centre (Inner)			
Chesil Multi-storey	625	306	49.0%
Chesil Surface	84	76	90.8%
Colebrook Street	77	70	91.1%
Durngate	67	40	59.6%
Cattle Market	195	106	54.6%
Worthy Lane	152	130	85.7%
Coach Park	103	33	31.9%
All Edge of Centre	1303	762	58.5%
Park-and-Ride (Outer)			
Barfield	194	191	98.3%
St Catherine's	591	282	47.8%
South Winchester	864	420	48.6%
All Park-and-Ride	1649	893	54.1%
Overall Total			
All Car Parks	4784	3053	63.8%

The pie chart below shows the average level of over-provision on normal weekdays. Solid colour represents parked cars; hashed colour represents empty spaces.



Peak demand could be met in other ways

Only in the pre-Christmas period does the occupancy of car parks reach the maximum observed value of 89% (13 December 2013). It would be more efficient to cater for peak demand through special arrangements including temporary car parking areas, more encouragement to use park-and-rides, promotion of parking at the station when station car parks are under-used at week-ends and holiday times, and additional public transport. Predictable peaks occur at Christmas and during festivals. Special arrangements to encourage greater use of park-and-ride at these times would manage the peaks more effectively and prevent the current levels of congestion.

Under-used car parking space could be re-allocated for financial gain

The 36% not normally in use could largely be re-allocated for residential or commercial uses. It would be worth a considerable amount to the City Council if put to other, higher value, uses. Car parks on the edge of town and the park-and-rides have the lowest rate of use, but if they were promoted to intercept cars before they enter Winchester the council could then find more profitable uses for the most valuable land covered by car parks in the centre.

Capacity of the road network, not capacity of car parks, limits parking in central Winchester town

When there is an exceptional volume of traffic, the streets are at gridlock, and our surveys show that car parks on the edge of the centre are completely full while those accessed via the central circulatory system are not. The photograph below shows how jams occur on North Walls long before car parks are full. The timing of the traffic congestion suggests strongly that it is caused mostly by cars wishing to access the centre, especially car parks in the centre.

Proposals to change parking provision in the centre should be accompanied by a traffic flow forecast to analyse the impact of changes on the central circulatory system.

More car parking in central Winchester could not be used by motorists without considerably more delay in gaining access, and even worse congestion and pollution[5].Upgrading the central road network would involve demolition of many of Winchester town's historic features, as well as being expensive and increasing pollution. It would be more politically viable to encourage drivers to use car parks further out.



Traffic jams occur long before central car parks are full

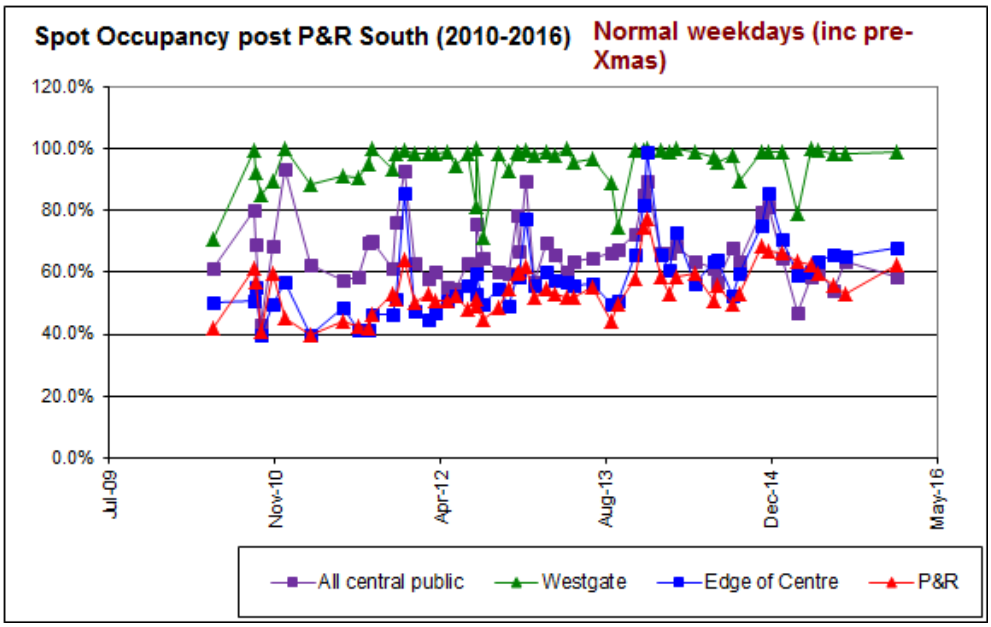
Car parks on the edge of the town centre and park-and- ride car parks are less well-used than those in the centre

The Winchester City Council (the City Council) Parking Strategy seeks to encourage more parking outside the centre to reduce pollution.

At planning inquiries into building the park-and-ride car parks, the City Council said that the purpose was to help relieve the town centre of the damaging pollution, health, quality-of-life and other environmental ill-effects of traffic by intercepting as much traffic as possible and providing more efficient modes of access. These themes were carried through into the 2014 Car Parking Strategy.

The chart below shows that the City Council is not yet successfully implementing its strategy. Much still needs to be done. Park-and-ride and edge-of-centre car parks remain persistently less than 60% full.

[5] Pollution would increase disproportionately as gridlock is approached.



To address this unevenness of usage we recommend:

- Better signage to encourage more cars to park in the least-used car parks such as Chesil multi-storey.
- Introduction of the three-zone labelling described in the City Council car parking strategy, indicating clearly that central car parks are the most expensive.
- Abandonment of the labels of 'short-stay' and 'long-stay' as a primary way of describing car parks, which gives the misleading impression that town centre car parks are the cheapest and most suitable places to park for short periods.
- A change to parking prices to encourage better use of Inner car parks, after identifying the differential in charging necessary to influence parking choice and persuade motorists to abandon parking in central car parks and park elsewhere see Publicity and parking charging structure.

Park-and-ride is under-occupied

At average occupancy of less than 50%, the two large park-and-ride car parks are not doing the job they were originally intended to do, of intercepting cars before they access Winchester town, nor are they getting better at doing this job. See Park-and-ride has not achieved the 'intercept' originally intended

Despite City Council statements that park-and-ride has been a success, our surveys demonstrate clearly that they have not achieved this primary aim. Park-and-ride intercept is now hardly any greater that it was when there was only one park-and-ride facility at St Catherine's, before the opening of South Winchester park-and-ride:

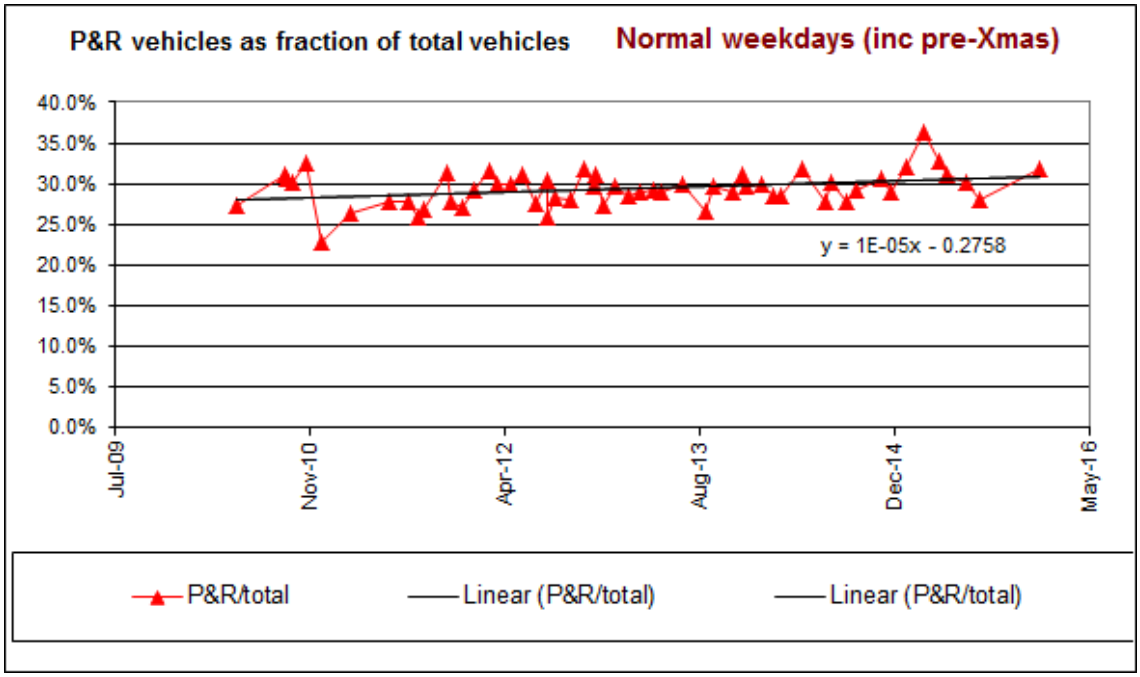


Figure 1 Park-and-ride vehicles as a fraction of all vehicles

There has been some increase in the number of vehicles parked in park-and-ride sites (about 12 cars for every 100 days of operation), but the greatest impact South Winchester park-and-ride has had has been to attract cars that previously parked at St Catherine's. Most of the 2010 increase in capacity is not used.

Current pricing structures do not deter parking in the centre

Our data show that pricing has not so far deterred parking in the centre, and the inconsistent signage and obscure naming have not encouraged cars to park where there is capacity.

Parking behaviour in Winchester currently seems unrelated to the price of parking. Our statistical examination of parking behaviour against distance from the centre and the pricing tariff shows that behaviour may be somewhat dependent on proximity to the centre, but not on price (see Pricing).

Sunday parking charges made no significant difference to the choice of car parks (for a short while, only car parks within the centre charged, but there was no discernible movement to the car parks elsewhere that did not charge).

There needs to be greater differential in charges for parking in the centre and for parking outside the centre.

Increasing the difference in charges between those car parks that are under-used and those that are over-used would probably encourage a more even distribution of parking and remove pressure on car parks in the centre.

Where car park users come from, and parking behaviour patterns

The council's parking survey March 2013 provides some useful information. See Appendix 3

Winchester City Council 2013 user survey for details of what the council's and WinACC's additional analyses showed.

A high proportion of cars come to park in Winchester town from the northern fringe of the Solent conurbation

We map likely access and egress routes for geographically related car parks. The City Council origins data allows reasonable guesses of the likely routes to car parks and hence traffic consequences. Our maps could be a starting point for designing signage and pricing to modify parking behaviour to reduce congestion and pollution.

The origin data in the City Council March 2013 survey showed that many cars came from places where public transport would have been a viable alternative, often on the northern fringes of the Solent conurbation. Improved public transport could make a substantial contribution to alleviating Winchester town congestion problems. The data does not support the assumption that Winchester town serves a rural hinterland inevitably dependent on the car.

The flow of parking throughout the day varies at different car parks

Awareness of which car parks are used and at what times of day (see charts) can help ensure that smart pricing and targeted signage can help rebalance car park use

Cars are parked for long periods from morning to evening at the park-and-ride sites, the Westgate sites, Worthy Lane, Durngate and Chesil multi-storey, suggesting all-day commuter parking.

Cars are parked at the central car parks for shorter periods, most commonly around lunchtime.

River Park and St Peter's have double peak distributions - one in the morning, the other in the afternoon; lunchtimes are low points (estimated from time of arrival and length of stay).

Turnover in central car parks is generally less than two per day

The traffic implications of a car park are only partly indicated by occupancy, it also matters how many cars come and go. The City Council origins data provides some information on the number of trips to a given car park in a day. Using the term *turnover* to represent the ratio of trips per day to the observed occupancy, the data shows turnovers of central car parks generally less than 2. The highest values for River Park and St Peter's are a little above this.

Private non-residential car parks

Private non-residential parking in the centre contributes significantly to Winchester town's traffic problems

This summarises the results of the WinACC survey of private non-residential car parks - details of the survey results are in Appendix 2

Private non-residential car parking survey results.

There is much more private non-residential parking than public car parking. However, within the central circulatory system where the traffic and pollution problems are most concentrated, we estimate that the number of trips accessing public car parking and those accessing private non-residential parking are similar, at around 2000 trips per day (because of the greater turnover of parking places in public car parks).

There are 9643 parking spaces in the private non-residential sites in the town centre and adjacent areas, which includes all significant commercial and institutional sites. (Of these, 8307 were marked and the rest were estimated.) This is over three times as many as public car parking spaces in the same area.

In those 9643 spaces, 6941 parked cars were observed. A very rough estimate is that 1200 of those were customers who come and go, leading to more traffic movement; the great majority were staff who park.

Contexts

Air quality



Thick pollution layer above Winchester from south east on 16 February 2016

Increasingly, pollution by road vehicles is seen as a major health threat. In their February 2016 report, Every Breath We Take the Royal College of Physicians identified pollution from diesel fumes as a major source of at least 40,000 premature deaths per year in the United Kingdom (see https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution). This compares with

Cause of premature death in UK 2014	Low Estimate	High Estimate
Illegal Drugs	2,248	2,248
Alcohol	5,000	8,000

Worse, high levels of particulates in traffic pollution are associated with low birth weight, delayed brain development and reductions in IQ.

A reduction in car mileage in Winchester town centre will improve air quality – annual average NO_2 concentration in central Winchester is persistently around 50µg.m^3, 25% above the 40µg.m^3 limit set by the EC Ambient Air Quality Directive 2008. Particulate (i.e. soot) pollution meets EU standards but remains high and has increased recently.

Winchester town's air quality problems are not going away, and more radical action is necessary. Nitrogen dioxide is emitted primarily by diesel vehicles, and diesel cars accessing central car parks are clearly major contributors. All the sites where the maximum was exceeded were either on the central circulatory system or on the approaches to it.

In 2014 monitoring identified 14 places where the legal maximum average pollution levels was exceeded, often by a considerable margin, and in many places pollution is on the increase

AIR QUALITY SUMMARY 2014

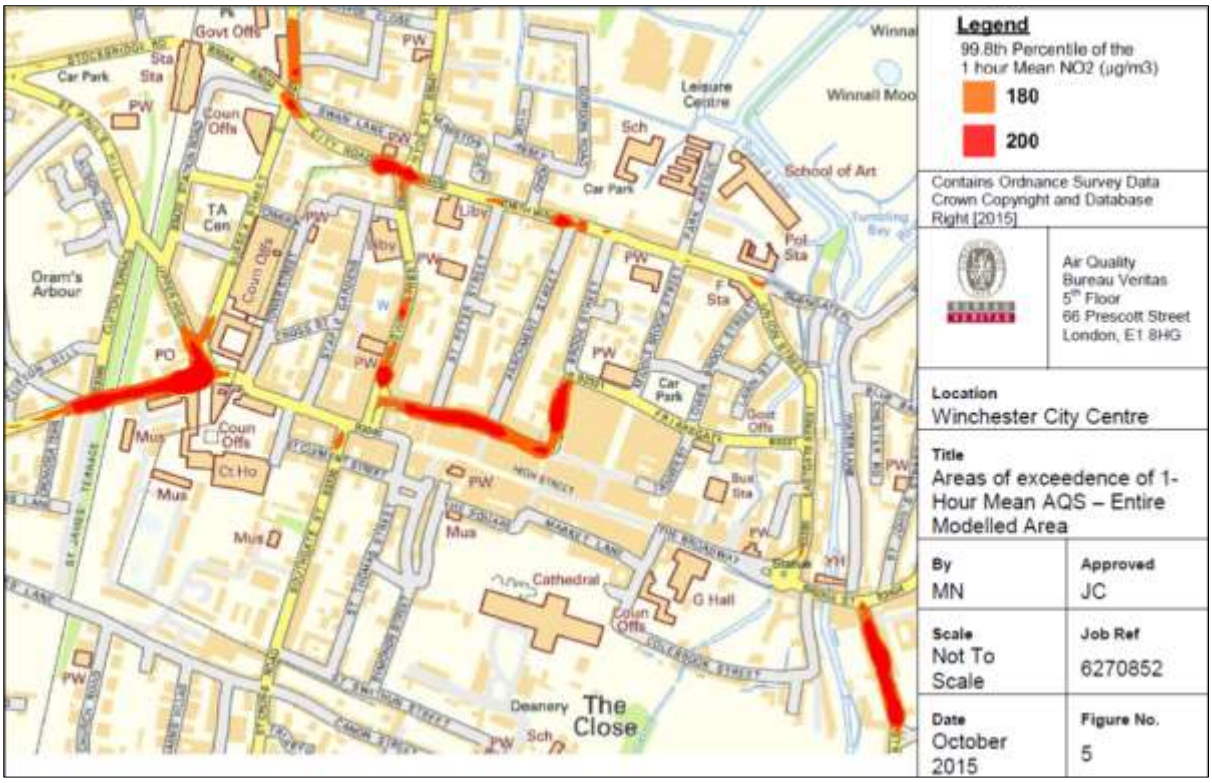
1.0 NITROGEN DIOXIDE DIFFUSION TUBES – WINCHESTER CITY CENTRE

LOCATION	GRID REF (SU)	2014 AVERAGE BIAS CORRECTED		PERCENTAGE CHANGE FROM 2013
		UG/M3	Percentage Collection	
Site 1, 10 Eastgate St	48563 29391	42.0	100.0	-3.1
Site 2, Greyfriars 3	48566 29560	37.8	90.0	0.4
Site 3, Friarsgate	48426 29523	31.2	100.0	7.1
Site 4, Upper Brook St	48227 29504	43.1	100.0	-0.6
Site 5, Roadside Monitor	48213 29504	44.9	100.0	-3.9
Site 6, Roadside Monitor	48213 29504	44.9	100.0	-4.5
Site 7, Roadside Monitor	48213 29504	44.7	100.0	-2.1
Site 8, St Georges St	48106 29541	60.5	100.0	-3.1
Site 9, St Georges St Lad	48163 29512	62.4	90.0	3.1
Site 10, Jewry St	48046 29692	52.0	100.0	3.0
Site 11, Southgate St	47918 29413	42.4	90.0	-1.7
Site 12, Sussex St	47804 29741	39.9	100.0	3.9
Site 13, City Road	47963 29875	41.7	100.0	4.0
Site 14, 74 Northwalls	48234 29794	34.2	100.0	3.0
Site 15, Wales St	48842 29820	34.8	100.0	1.9
Site 16, Alresford Rd	49557 29437	45.7	90.0	-1.1
Site 17, Chesil St	48679 29068	47.1	100.0	3.9
Site 18, Stockbridge Rd	47534 30006	27.4	100.0	6.2
Site 19, Andover Rd	47745 30456	31.2	90.0	7.9
Site 20, Worthy Rd 1	48092 30411	31.6	100.0	5.8
Site 21, Worthy Rd 2	48092 30411	32.5	100.0	7.8
Site 22, Worthy Rd 3	48092 30411	31.4	100.0	6.2
Site 23, St Cross Rd	47842 29050	37.2	80.0	0.9
Site 24, Romsey Rd	47495 29511	63.8	100.0	-0.9
Site 25, Andover Rd	47898 30065	40.2	90.0	2.2
Site 26, Bus Station	48427 29401	39.8	90.0	2.3

RED = Exceeds air quality objective

In February 2016, Winchester City Council published an air quality study Detailed Assessment and Associated Studies Report 2016 by Bureau Veritas that suggested the need for increased monitoring (see http://www.winchester.gov.uk/assets/files/26002/Winchester-Bus-Upgrade-DA-and-AS-v3.pdf). It included a new map showing (in orange and red) points on the road system where the report predicted that there were illegal levels of peak pollution events where the 1 hour mean Air Quality Standard was probably exceeded too many times per year[6].

[6] The report recommends three new air quality management areas to measure exceedances of the 1-hour mean air quality standard.



Parking categories

Parking in Winchester town may be categorised under four main type headings:

- Public off-street
    - Surface car parks
    - Multi-storey car parks
- Public on-street
    - Residential parking schemes
    - Charged street parking
    - Free street parking
- Private non-residential
    - Commercial employee parking
    - Commercial customer parking
    - Institutional parking
- Private Residential

Car parking provision reflects two centres of attraction – the shopping area and the office/station (Westgate) area - linked by a figure-of-eight circulation system. It is useful to aggregate parking provision according to location, relating the provision to its likely traffic effects:

- Central parking - only accessed via the central traffic circulatory system; includes River Park, even though this is a distinctly different type of destination from other central car parks
- Edge-of-centre car parks – i.e. outside the central circulatory system
- Park-and-ride car parks

Categorising by likely trip purpose isn't easy. Central car parks are mostly accessed for the purpose of visiting or working in the town centre, although River Park car park is mainly a destination in its own right. The edge-of-centre car parks are more complicated. Chesil multi-storey primarily serves the town centre, whereas Tower Street also serves both employment in the Westgate area and the station.

Signage to car parks distinguishes between 'short stay' and 'long stay' car parks. This is misleading. Most car parks permit both lengths of stay, but signs give occasional visitors the incorrect impression that it is not possible to pay for short periods of parking in 'long-stay' car parks. In many cases it is more expensive to stay in a 'short stay' car park for, for example, an hour, than it is in a 'long stay' car park for an hour. For these reasons we have not used this distinction, and recommend it is no longer used on signs.

People mostly focus complaints on the town centre, but there is also air pollution by traffic accessing edge-of-centre car parks. Romsey Road near the Westgate has pollution levels comparable to and as worrying as St George's Street.

Traffic reduction

Reducing car parking can be the principal element of any traffic reduction plan, but it is not enough by itself. Support for alternatives such as walking, cycling and public transport is essential, as are signage, naming and pricing of car parking, route management to manage traffic flow, and measures to deter cross-town traffic.

Car parks and congestion

The need for a proportionate relationship between car park provision and the size of the road network

Two types of problem can arise if these are out of kilter:

- A disproportionately large number of parking spaces with inadequate road network access will result in frequent congestion and unused parking spaces, as cars try to park in the spaces provided and take a long time to get to them. The provision of parking spaces will only be useful if the road network has the capacity to enable cars to access the car parks.
- A small number of parking spaces on a generous road network will result, if there is a demand, in continually full car parks, and traffic jams caused by car queuing to take their turn to use the few spaces that become available.

The data and observation show that central Winchester town exhibits the first problem. Spaces remain empty while the central circulatory system is congested in the mornings, at lunchtime, and in the evenings. The network simply cannot deliver traffic to the unused parking spaces in the centre.

The need to reduce parking spaces

It would not be acceptable to widen the central circulatory network (proposals were rightly abandoned long ago). The only viable solution is to reduce the number of parking spaces. Greater effort would have to be put into encouraging more cars to park in the unused car parks outside the centre and to encouraging modal transfer from cars to public transport.

Health and environmental benefits

This would have the major incidental benefit of reducing pollution in central Winchester town, and improving the environment, releasing more space for shoppers and cyclists.

Economic benefits

Experience nationally suggests that businesses would benefit from traffic reduction. WinACC recently compared two national surveys: one on town centre vitality by Harper Dennis Hobbs, see http://www.hdh.co.uk/uploads/properties/HDH_Vitality_Index3.pdf.; another on how far town centres were dependent on cars, see http://www.bettertransport.org.uk/sites/default/files/pdfs/Car_Dep_Scorecard_2014_LOW_RES.pdf. We discovered that those town centres that were less dependent on cars for access were the more vital. There was a very close correlation (97% probability). It seems that reducing car dependency is good for business.

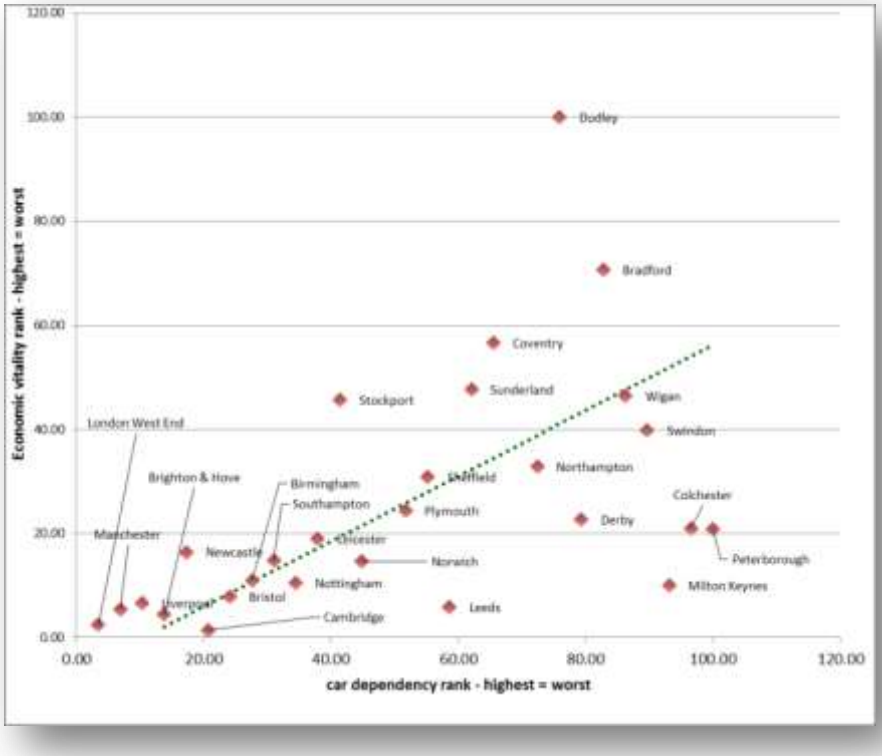


Figure 2 High car dependency leads to low vitality

What will happen without change?

Figure 7 Spaces Available shows there are enough spaces in central car parks to encourage even more traffic into the central circulatory system even at times when car parks are fullest.

At the very highest occupancy levels, pre-Christmas, the central network is visibly saturated (to the extent that traffic in queues at junctions does not clear the junction in one cycle of lights) and yet the central car parks are still not absolutely full. At the same time the edge-of-centre car parks are fuller.

Take for example the situation on Thursday 12 December 2013. The car parks of the central circulatory system had 90% occupancy. The edge-of-centre car parks, including the Westgate car parks, had almost 100 % occupancy. Park-and-ride car parks had 77% occupancy.

There seems to be only one logical conclusion. Motorists accessing Winchester town tend to fill central car parks first; in doing so, at a certain level of parking, the central circulatory system jams (or is perceived to jam); motorists then fill up the edge-of-centre car parks, then the park-and-ride sites.

Clearly traffic jams may act as a discouragement and ultimately prevent further traffic growth, but that must be the worst possible approach to the problem – very little gain in access at the cost of massive pollution, significant health impacts, quality of life deterioration for residents and an increasingly unpleasant shopping and visitor experience.

The surveys

Sources of data

Since May 2010 WinACC has been carrying out occupancy surveys for all Winchester town's off-street public car parks. In spring 2012 WinACC also carried out a one-off survey of private non-residential parking availability and use. We have also estimated (by use of Google Street View) public on-street parking availability and use. These data are analysed together with data given to us by Winchester City Council (including two car park user surveys).

The surveys analysed in this report

WinACC has carried out two types of survey:

- Public off-street car parking surveys – data accumulated since May 2010 supplemented with some City Council survey data (including a week of data acquired in 2007).
- A single survey of private non-residential car parking

In addition the City Council has carried out occasional surveys of public car parks (for a week in 2007 and in March 2013), and a further survey was done by Urban Flow in 2014 as part of preparations for development in the station approach area. Unfortunately the analysis was seriously opaque, and the opportunity here for greater understanding of parking behaviour was lost. See Urban Flow (UF) 2015 user survey .

Some park-and-ride ticketing data has also been provided by the City Council. The results of these are compatible with WinACC findings, and the data has been included in our tables.

Parking trends 2007-2016

Numbers of vehicles parked

The number of vehicles parked in Winchester town's public car parks on normal weekdays is shown in Figure 3 Vehicles parked 2007-2016..

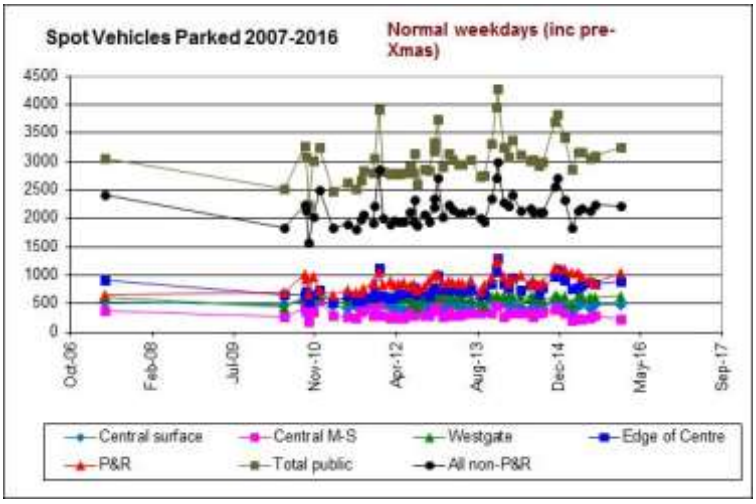


Figure 3 Vehicles parked 2007-2016

Figure 4 focuses on the same data, but only after 2010 and omitting totals for greater clarity.

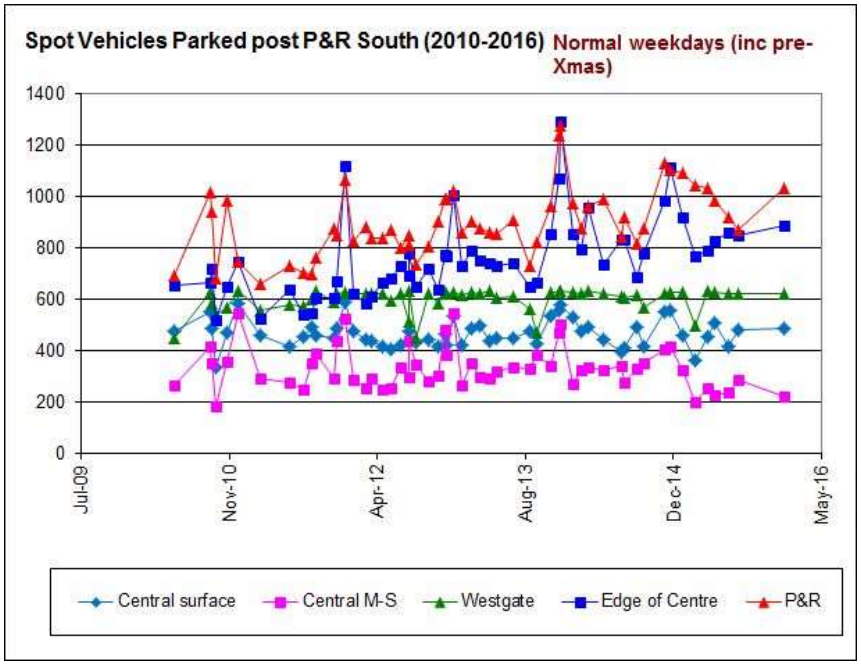


Figure 4 Vehicles parked by group after 2010

The number of parked vehicles[7] is not a reliable measure of traffic, which depends also on turnover of parking places, (unmeasured) on-street parking, private off-street parking and through traffic. But looked at as a trend it is probably a proxy for level of busyness, peaking just before Christmas and dipping during school holidays. The available car parking for Winchester town increased by 864 places after the 2007 survey with some small losses since.[8]

[7] Public car parks are likely to have higher turnover than private non-residential car parks and higher than public on-street parking which includes a large amount of residential parking.

[8] St Peter's car park has lost some places over the survey period. Friarsgate suffered a progressive loss until closure in 2015. Chesil Street surface car park closed and Pitt Manor park-and-ride opened in February 2016.

Percentages of spaces filled

The figures below use the same data to show the percentages of spaces occupied. The overall occupancy[9] of car parks is an indication of the efficiency of use of an expensive public resource. Figure 5 shows the data from May 2007 to the present, including the occupancy of the total public off-street car parking provision.

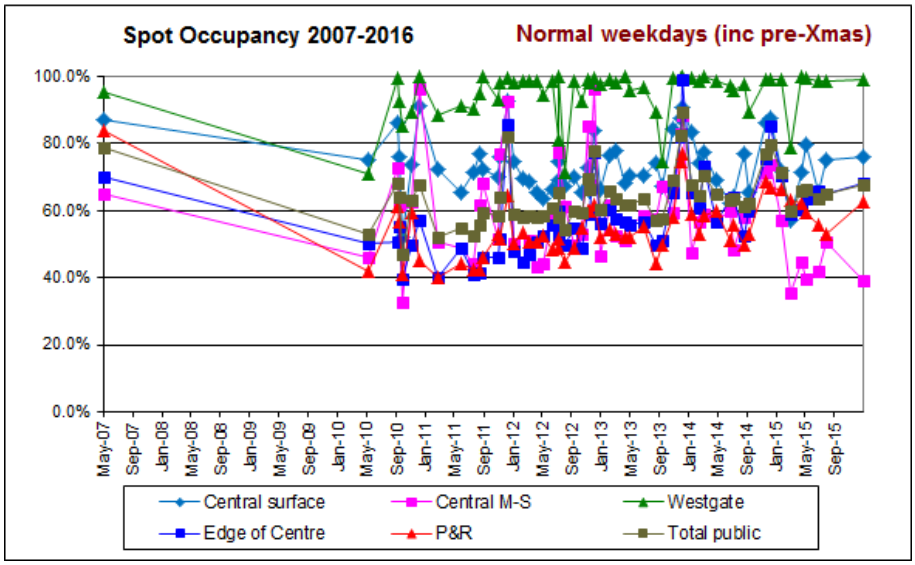


Figure 5 Occupancy 2007-2016

Figure 6 shows the same data but focuses on the period since the opening of Park-and-Ride Winchester South and omits the 'total public' line to show more clearly the pattern of use of each of the four car park groups.

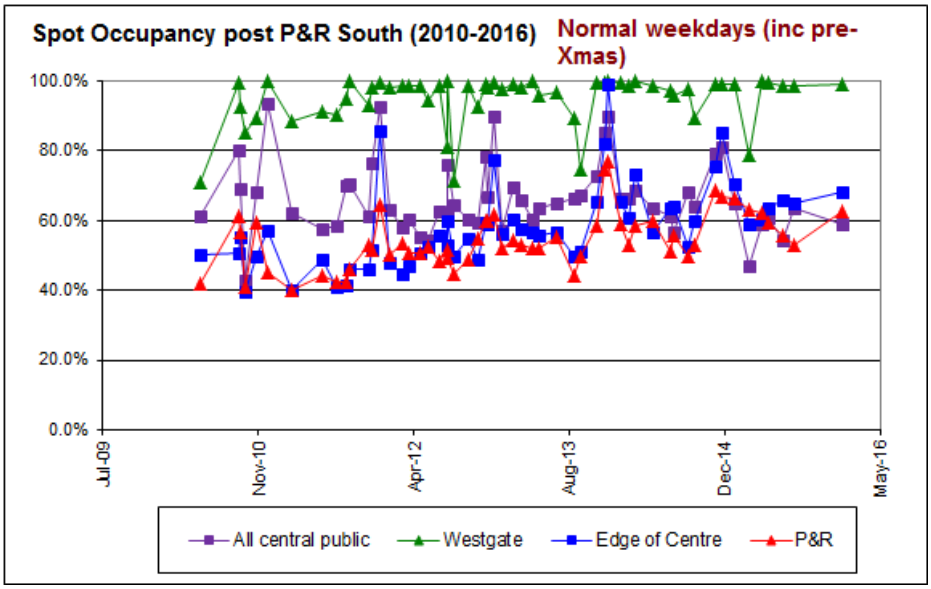


Figure 6 Occupancy by group 2010-2016

[9] *Actual* occupancy indicates the single sampling of occupancy (all of WinACC data) whilst *Max* occupancy is the maximum of a set of measurements taken over a number of days and sampling times (WCC data)

Mean occupancy

The mean average occupancy of all car parks for all surveys is 60%. This is a huge waste of public money: the land will be worth tens of millions of pounds to the City Council if it is put to other higher value uses, residential or commercial. It would be better to cater for normal parking demand, and develop creative ways of managing maximum demand.

The maximum surveyed use of Winchester town's car parks at the pre-Christmas peak on 12 December 2013 was 89% occupancy. There were still 500 spaces available even then. These levels of use occur only once per year, and better management of the peak with more focus on park-and-ride would enable a more efficient way of using the city's resources.

Least and most used car park groups

Figure 6 also illustrates which groups of car parks are least or most used. In increasing order of occupancy they are:

- Edge of centre
- Park-and-ride
- Central circulatory system
- Westgate

This is the reverse of a usage that would reduce traffic and air pollution in central streets and by the station.

We can display almost the same data as empty spaces, i.e. potential generators of traffic. Figure 7 shows the mean (or actual) number of parking spaces available.[10]

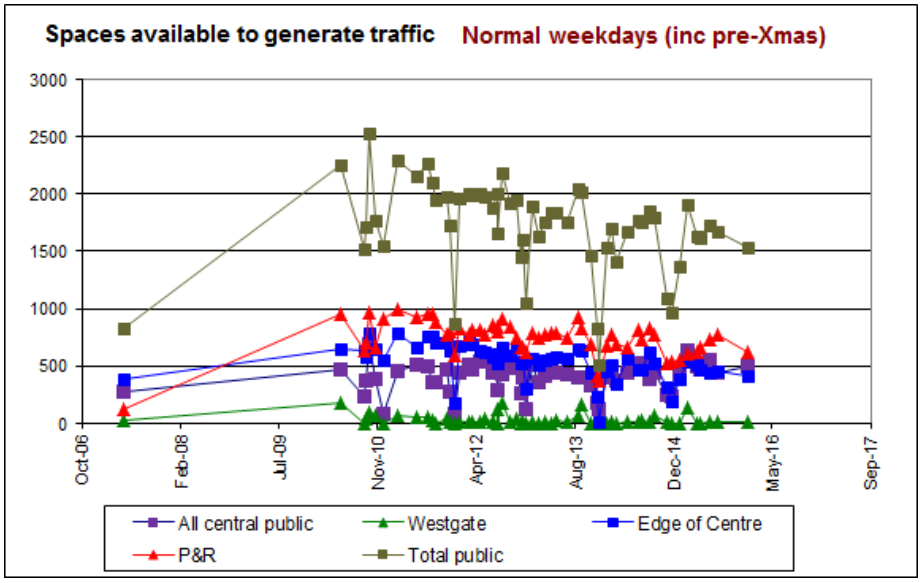


Figure 7 Spaces Available

[10] For the Council data the mean number of spaces available indicates a greater potential for additional total traffic than the maximum number (since congested networks tend towards spreading the peaks).

For the WinACC data we should observe that, although it is single sampling, we have tried to choose times of day between 10 am and 1pm (with some earlier afternoon surveys) when we think our observations of occupancy ought to be higher (there is some evidence for this – Figure 21) – the 'actual' samples are therefore likely to be closer to maximum occupancy than to mean occupancy. This graph, therefore, will tend to represent a low estimate of the potential for traffic growth, carbon growth, air pollution and environmental damage in the District.

Appendix 1

Public car parks: our raw data and analysis in detail

We summarise the raw statistics of our observations from 2010 (including one weekly average result from 2007 obtained by the City Council) for 'Normal Weekdays' in Table 1. We show the mean and maximum values.[11] We also show a measure of observation variance, which we represent as the standard deviation (SD – see Appendix 5).[12,13]

Normal weekdays (inc pre-Xmas) 2010-2016							
	Capacity	Max	%	Mean	%	SD	%
Central Circulatory Surface							
MIDDLEBROOK	142	142	100.0%	132	93.3%	20	13.8%
COSSACK LANE	45	45	100.0%	37	83.1%	7	15.5%
UPPER BROOK ST.	52	52	100.0%	45	86.4%	9	16.4%
JEWRY STREET	39	39	100.0%	35	89.8%	6	15.1%
ST PETERS	189	183	96.8%	101	53.6%	32	17.0%
RIVER PARK	169	169	100.0%	116	68.7%	33	19.4%
All central surface	636	590	92.8%	467	73.5%	82	13.0%
Central Circulatory M-S							
THE BROOKS	315	305	96.8%	231	73.3%	52	16.5%
FRIARSGATE	251	247	98.4%	102	40.6%	58	23.0%
All central M/S	566	546	96.5%	333	58.8%	95	16.8%
All central circulatory	1202	1126	93.7%	800	66.6%	165	13.8%
Westgate							
GLADSTONE ST.	108	108	100.0%	102	94.5%	16	15.2%
TOWER MULTI	522	522	100.0%	496	95.1%	78	14.9%
All Westgate	630	630	100.0%	598	95.0%	92	14.6%
Edge of centre							
CHESIL MULTI	625	625	100.0%	306	49.0%	95	15.1%
CHESIL SURFACE	84	84	100.0%	76	90.8%	14	16.4%
COLEBROOK STREET	77	77	100.0%	70	91.1%	13	16.4%
DURNGATE	67	67	99.6%	40	59.6%	12	18.3%
CATTLEMARKET	195	195	100.0%	106	54.6%	55	28.4%
WORTHY LANE	152	152	100.0%	130	85.7%	30	19.5%
COACH PARK	103	99	96.1%	33	31.9%	17	17.0%
All edge of centre	1303	1291	99.1%	762	58.5%	187	14.3%
P&R							
BARFIELD P&R	194	194	100.0%	191	98.3%	26	13.5%
ST CATHERINES	591	478	80.9%	282	47.8%	82	13.9%
SOUTH	864	634	73.4%	420	48.6%	111	12.8%
All P&R	1649	1272	77.1%	893	54.1%	181	11.0%
Original total capacity	4784	4272	89.3%	3053	63.8%	557	11.6%

Table 1 Statistical summary of parking data (normal weekdays)

[11] The maximum value for an aggregate (e.g. the central circulatory system grouping) is not the sum of the maxima of individual car parks, a measure that the Council computes but which we do not see as meaningful.

[12] with the caveat that the distribution of statistics about the mean when close to capacity cannot approximate to a normal Gaussian (a mean occupancy of 90% with a SD of 15% cannot signify a possibility of values greater than 100%) – see Appendix 5

[13] Though there is some confusion with Friarsgate – a City Council count on a Farmers' Market Sunday (i.e. not in the Normal Weekdays table of Table 1 gave 255 vehicles, which is four more vehicles than we had counted as available spaces in recent years. Friarsgate occupancy is an increasingly difficult measure to interpret as the number of available spaces declined irregularly over the period from December 2013 until its closure in April 2015. Upper Brook Street can also lead to confusion about capacity and occupancy, since available areas are ill-defined and sometimes cars are parked without being in marked bays.

Central car parks never full

Our data do not substantiate the statement in the City Council Parking Strategy concerning the 'Shopping Quarter' car parks:

> *'But ALL spaces often full, especially peak times'*

Table 1 Statistical summary of parking data (normal weekdays), which in our view corresponds to peak times, including pre-Christmas rush, shows that we have **never** observed all spaces full. In 57 'Normal Weekday' surveys the maximum occupancy in central car parks was 94.0% and even if we define the Shopping Quarter as this data less that of River Park and St Peter's, the maximum occupancy was 98.3% and only on 6 occasions did the maximum occupancy of the Shopping Quarter car parks exceed 85%. On the basis of our complete corpus of data, including pre-Christmas Saturdays, that is 69 surveys in total, the maximum occupancy of the Quarter was 97% with only 8 occasions (all in Decembers) exceeding 85%.

Westgate car parks heavily used

The Parking Strategy statement is in fact much more applicable to the Westgate area. In our complete corpus of 69 surveys the two car parks have been simultaneously full on two occasions, but have together been in excess of 85% occupied on 56 occasions. There is usually a dip in school holidays

Park-and-ride has not achieved the 'intercept' originally intended

The graphs above show a fairly slowly growing park-and-ride use since 2010 when the largest site (Park-and-Ride South) was opened near M3 Junction 11. We can best see this through a linear trend graph:

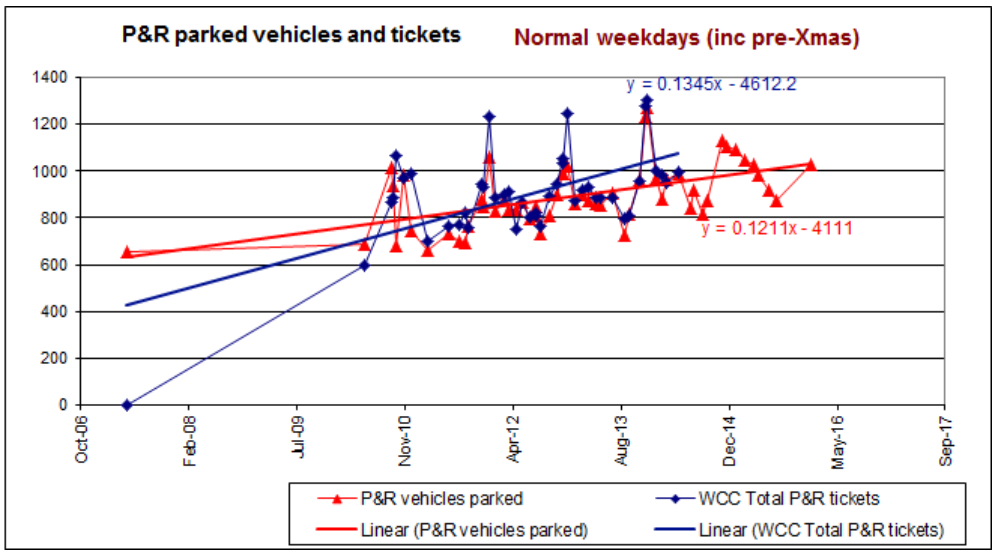


Figure 8 Trends in park-and-ride parked vehicles and tickets

We compare the number of cars we counted in park-and-ride car parks with the Winchester City Council records of the number of park-and-ride tickets sold. The latter data covers all days of operation (up to mid-2013) – we have extracted those dates that correspond to our parking surveys. The linear trend line for the number of parked vehicles is broadly similar to

the linear trend line for tickets sold, and most data is very similar apart from the first data point. It is re-assuring that the two sets of data correlate. The ticket numbers exceed the numbers observed parked, as we would expect, since cars will come and go during the day.

We see that the linear trend of car use in park-and-ride is around 40 extra cars per year, though the 'error' in this is quite large, given that there is a significant seasonal variation.

The only comparable figure we have from before the opening of South Winchester park-and-ride is 657 total vehicles in May 2007, which is much the same as the May figure in 2010 of 690. Apart from the small trend increase over the last four years, the main effect (see Figure 9) of building South Winchester park-and-ride has been to transfer parking from St Catherine's. This is not surprising: the majority of access to Winchester town is from the large settlements to the south and South Winchester park-and-ride is the obvious gateway car park for this.

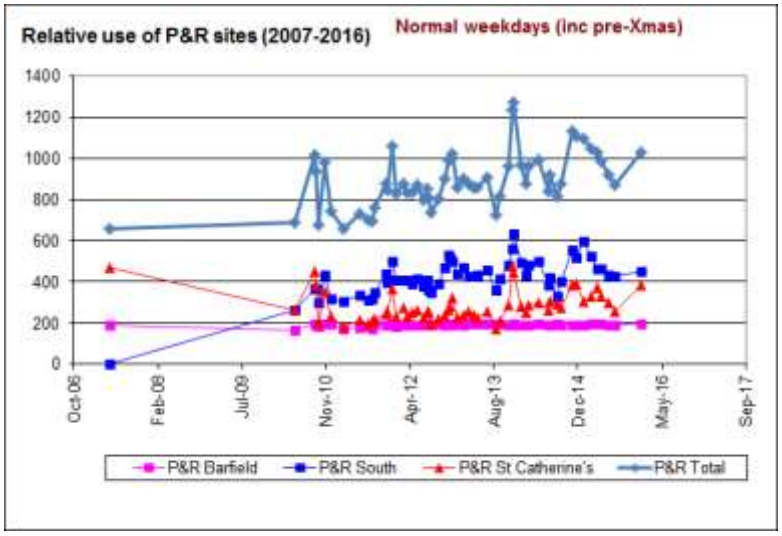


Figure 9 Relative use of different park-and-ride sites

The most important question is whether park-and-ride is doing what it was intended to do (as stated to have at both the St Catherine's and the South Winchester park-and-ride inquiries) i.e. intercepting traffic before it reaches Winchester town centre. The clear answer is that it could do better. We can see this in a couple of ways.

Figure 10 clearly shows the park-and-ride car parks are less well-used than the central car parking. This is not what was intended when they were built. It is clearly preferable on environmental grounds to intercept traffic as far out as possible[14] and Inner car parking is also less expensive to provide than central car parking (especially if land resource costs are counted). This back-to-front result suggests the pricing policy is not encouraging enough use of the park-and-ride facilities (*see* Pricing)

[14] Indeed the best, most efficient result, is to intercept as much as possible at source through (conventional) public transport – there are several academic papers that put park-and-ride in question.

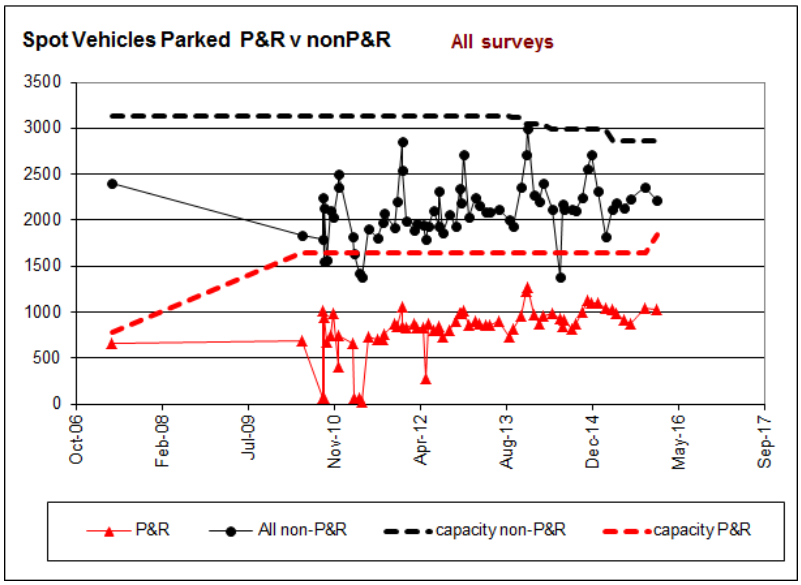


Figure 10 Observations and capacity park-and-ride v. non- park-and-ride all surveys

The small upward trend in the use of park-and-ride does not mean that intercept is gradually being achieved. Non-park-and-ride use in Figure 10 rises more steeply than park-and-ride use - another strong indication that policy is back-to-front. The measure of intercept in relation to radial traffic[15] is the total number of vehicles parked in park-and-ride sites during the day compared with the total number parked in the town during the day.

Our survey data does not yet permit this, since we have taken no measurements of turnover of spaces. Instead we take the spot measurements for both kinds of car parks. The ratio of the two will over-estimate the intercept, since one can expect the turnover of park-and-ride sites[16] to be lower than that of central sites (indeed the turnover information implied by the City Council origin data – see Table 4 Traffic multipliers (turnover) – implies an overestimate of 4-5%). Nevertheless we plot this ratio as an indication of *"intercept"* in Figure 11 below.

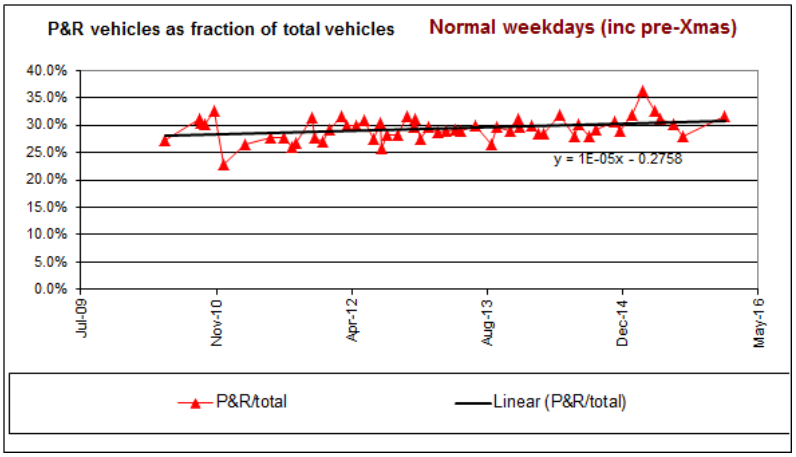


Figure 11 How well park-and-ride has intercepted cars

[15] Cross-town and through traffic is a matter for separate analysis. Unfortunately there is very little reliable data on this.

[16] The difference between spot vehicle count and ticket sales (see Figure 8) is quite small suggesting that most of the custom for the park-and-ride sites has arrived before our mid-to-late morning surveys.

This appears to show that in terms of intercepting traffic there has been almost no progress since the opening of South Winchester park-and-ride six years ago. The linear trend line is positive but shows that if we put the “intercept” at say 28% in April 2010 it has risen by about 2.8% in 5½ years. In fact the statistics of the fit are such that there is about a 0.3% chance that the trend line would have a negative slope.

Logically we should add to this the growth in the use of the station car parks, which we feel to have been significant. We do not have any data prior to June 2014 but observe that the capacity has been significantly increased and the station car parks are now heavily used. It seems quite likely that the growth in this traffic will eliminate any of the small growth in intercept calculated from the other car parks.

Park-and-ride is not really doing its job and, more importantly, it is not really getting better at doing its job.

Saturday parking

We have sparse data on Saturday parking, but can compare the parking patterns for Saturdays with normal weekdays. Figure 12 Parking choices weekdays v. Saturdays shows a pronouncedly lower use of park-and-ride on Saturdays than on weekdays.

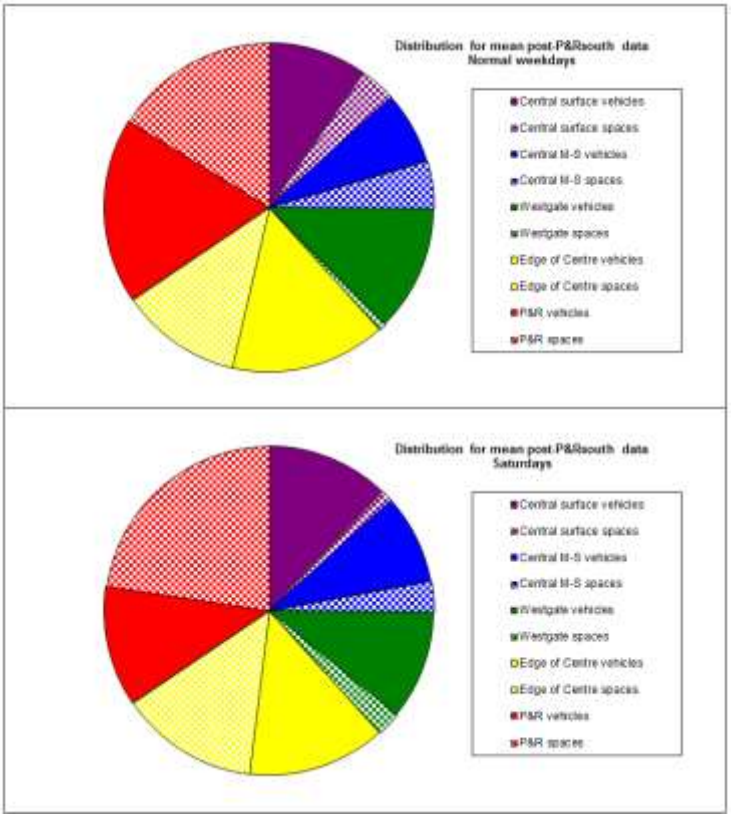


Figure 12 Parking choices weekdays v. Saturdays

On weekdays drivers seem more willing to use multi-storey parking in the centre, rather than surface parking. This could be because Saturday parking is 90% of the volume of weekday parking and people use multi-storey car parks only if they have to. We can test this by comparing two otherwise normal weekdays with a large difference of total parking (Aug 2013 = 2736; Mar 2014 = 3371):

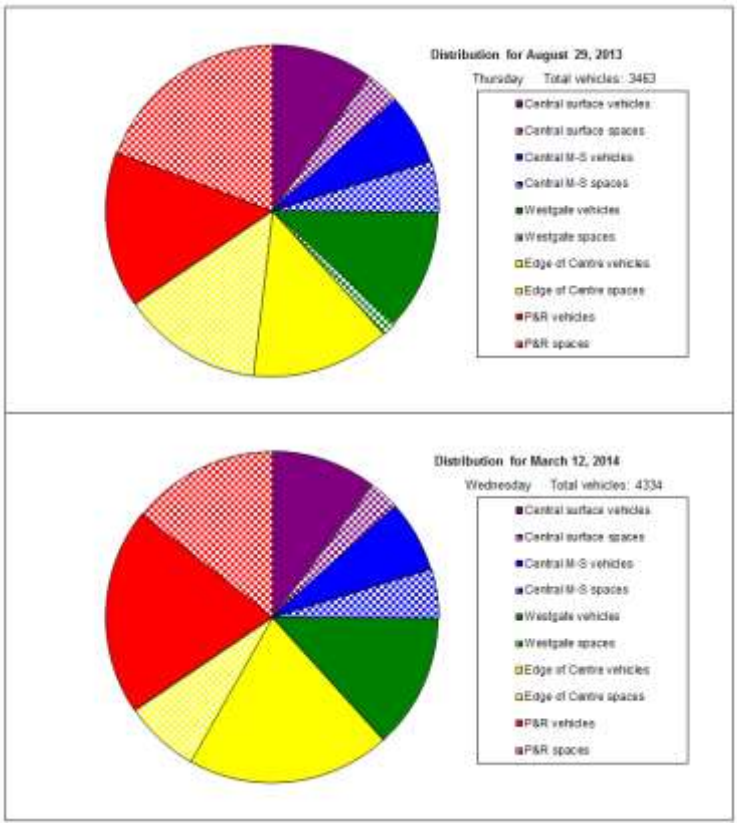


Figure 13 Two weekdays with different totals

This appears to indicate a tendency to use edge-of-centre and park-and-ride more as the total parking increases, before filling up central car parks. It would be encouraging if this were found to be a response to information on variable message boards on approach roads.

Parking during half-term holiday

Again we have only a little data on this (three surveys on half-term weekdays). Apart from a small propensity to use park-and-ride more, there is very little behavioural difference between half-term data and normal weekday data.

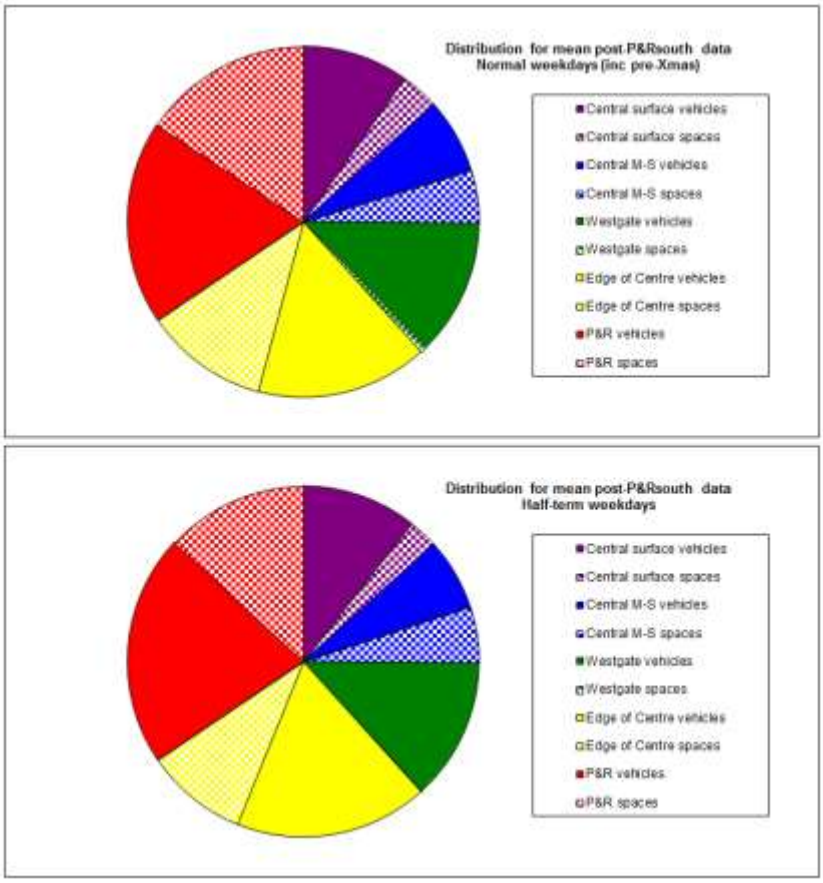


Figure 14 Half-term weekdays v. normal weekdays

What factors influence parking behaviour?

Distance from destination.

From all car parks except Park-and-Ride South[17] at least some users will walk to the centre.

We believe the following two factors are significant:

- Few journeys to Winchester town are made with the sole purpose of accessing the Brooks or a specific central supermarket, since such sole-purpose journeys are more likely to involve an edge-of-town supermarket.
- The average car park user is more interested in going to the centre generally. In order to analyse behaviour, as with classic traffic modelling, we have to decide on a point to represent the central zone – our suggestion is the Buttercross.[18]

We can plot the occupancy of car parks as a function of walking distance from the Buttercross. There may be a small discernible tendency towards a decrease in occupancy as

[17] And presumably Pitt Manor now

[18] It is very likely that this is not appropriate for the Westgate area as that is a separate attractor (station and HCC).

distance increases between the car park and the Buttercross, but it is of negligible statistical significance[19]:

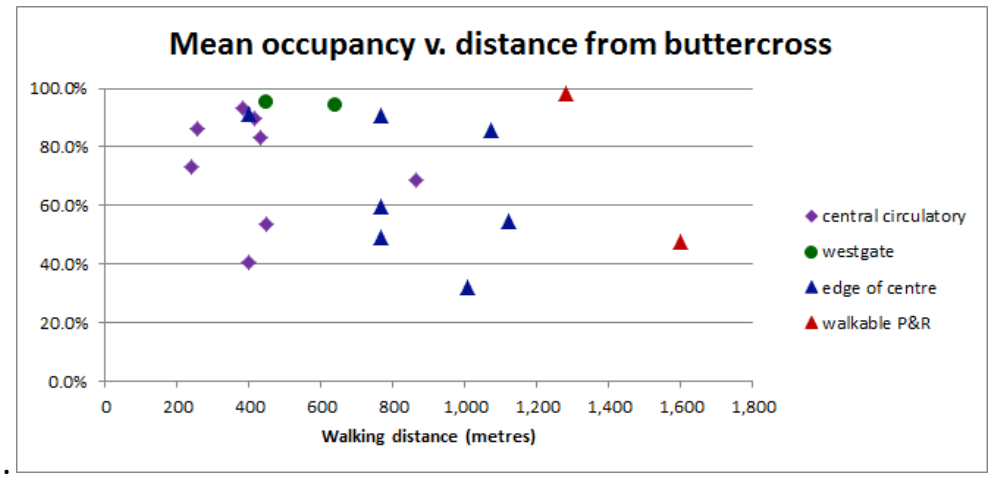


Figure 15 Occupancy as function of walking distance

Pricing

The relationship between occupancy and parking price is a bit more difficult to tie down. To simplify the analysis, we have chosen a single time-band available at all car parks: 4 hours.[20] Figure 16 shows this data. It is obvious that price does not affect parking behaviour. If anything, the higher the price the greater the occupancy, but this is not significant[21].

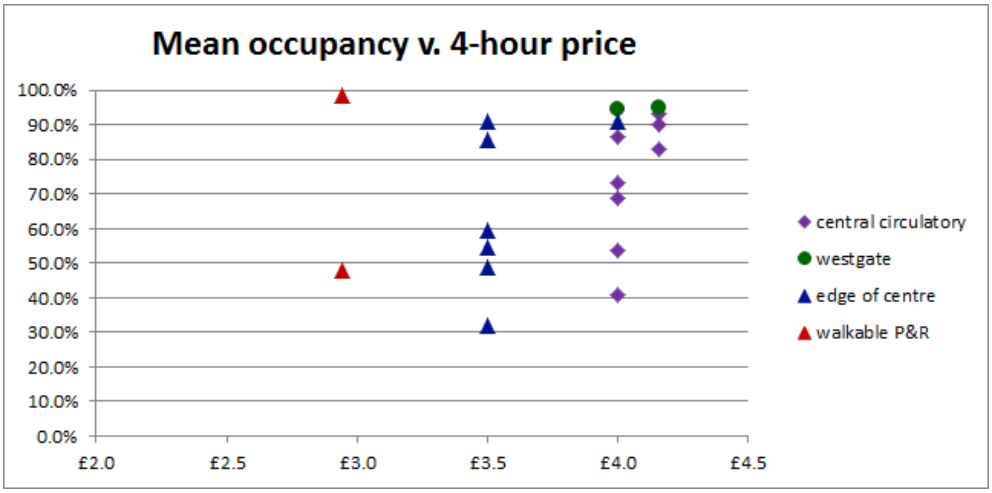


Figure 16 Level of occupancy v. 4-hour parking price

[19] The linear fit of the data is about 0.02% occupancy decline per 100metres, with a fit error in this value of 0.05% occupancy – i.e. no plausible relationship

[20] Clearly with Park and Ride car parks the ticket buys more than 4 hours

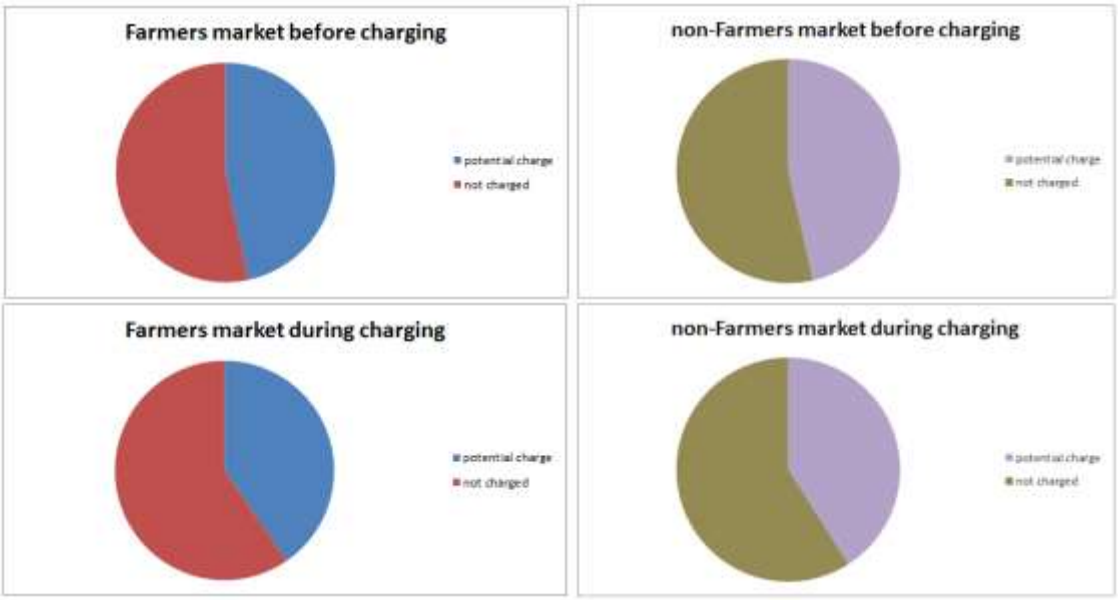
[21] The linear fit of the data is about 18% occupancy increase for every additional £, with a fit error of 51% - i.e. no plausible relationship.

A rise in occupancy with a rise in price is not what you would expect if prices influenced parking choices. A possible explanation might be that people are prepared to pay more to be close to the centre. However, the evidence of Figure 15 Occupancy as function of walking distance suggests this is not the case.

This then raises the question of whether the combination of both price and distance from the centre influences parking behaviour.

We have extensively examined bivariate (i.e. functions of price and distance) fits[22] but without any successful outcome.[23] This is not just an abstruse observation – it signifies that parking behaviour in Winchester town may be slightly dependent on proximity to the centre, but seems entirely unrelated to the price of parking, at the level of prices in the current tariff. Putting it another way, to use price to affect behaviour, prices need greater differentiation in the tariffs.[24]

Another set of data supports the finding that price is not a significant factor in parking behaviour in Winchester town. For a short time in 2011 the City Council charged for Sunday use of central car parks but did not introduce any charge at inner car parks. We measured the occupancy of all central and inner car parks on Sundays before and during the charging regime. We show this data for two types of Sunday – Farmers' Market days and ordinary Sundays. The pie-charts compare the proportions of cars parked in the central car parks where there were charges and the proportions in the inner car parks where there were no charges.



[22] Simple linear, quadratic and exponential least-squares fits.

[23] Technically the data is ill-conditioned – we can fit data but the fit is unstable – tiny changes to input data make large changes to the fitted data. The price of parking in particular appears to have no statistically discriminating capability.

[24] If one had a good data fit one could work out what parking tariff was necessary to achieve a particular behaviour. Unfortunately, because the data fits are so ill-conditioned it is not possible to do this. If the Council wishes to affect parking behaviour it would need to stretch the tariff experimentally until a statistically significant pattern of behaviour emerged.

Figure 17 Behavioural response to Sunday charging

There seems to be no significant difference in behaviour between Market Sundays and non-Market Sundays. While the charging regime was in place, there was a small increase in the proportion of drivers choosing car parks where there was no charge, but the change was small – only about 12% of those who would have used the central car parks when there was no charge actually moved to free car parks when the charge was imposed.

Multi-storey v surface car parks

We looked at whether there was a preference for multi-storey or surface car parks. Our data offers no evidence of a preference.

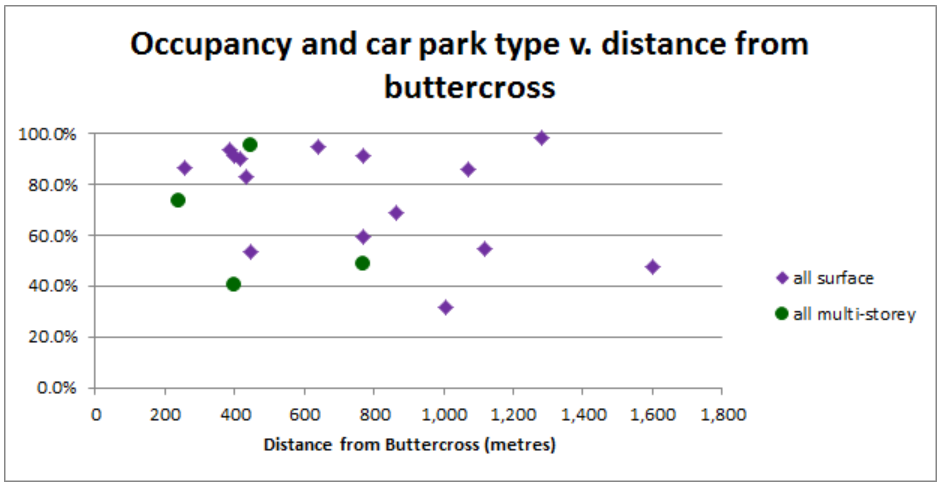


Figure 18 Occupancy and car park type

The multi-storey car park with the highest occupancy is Tower Street. Its attractiveness results from its proximity to the station, Hampshire County Council and other offices make it different from other multi-storey car parks. Without Tower Street Figure 18 would indicate that surface car parking is generally more attractive than multi-storey. With Tower Street included, however, there is no good statistical evidence to show whether people prefer using surface car parks or multi-storey ones.

There could have been many reasons why Friarsgate Car Park was unpopular, other than that it was multi-storey – it was a cramped and badly-lit car park with a significant likelihood of scraping bodywork against concrete pillars. It had always been an unpleasant environment and of recent years verged on the sordid.

Perhaps the most baffling behaviour relates to the Chesil multi-storey. Occupancy of this car park is extraordinarily low, considering it is a very short walk from the Broadway. It does not have an especially unpleasant interior and the top floor has a splendid view of the cathedral. The extremely narrow dangerous pavement over St Swithun's Bridge may be a factor. The low occupancy is even more remarkable if one considers that the City Council asks many of its own officers to park there and some residential permits are used there too. Despite these two initiatives, the rate of use is still low – on 27 August 2014 we counted 102 vehicles

above level 4[25] that had no Pay-and-Display tickets (presumably cars belonging to city council officers) – this of a total of 256 vehicles.

Are there too many public car park spaces in Winchester town?

Do car parks need 15% empty spaces?

The City Council Parking Strategy (see http://www.winchester.gov.uk/parking/winchester-district-car-parking-strategy/) says provision should be sufficient to ensure that occupancy does not exceed 85%[26] (requiring 17.6% over-provision). This commitment may be neither possible nor necessary in all car parks. People are clearly not put off from parking at the edge-of-centre car parks when occupancy exceeds 85%. Tower Street averages 95% on a normal weekday mid-morning. In the pre-Christmas example, even the unpopular multi-storey at Chesil can fill to 100%, even though traffic could easily go back to St Catherine's Park-and-Ride with an occupancy of 75%. The occupancy of Chesil multi-storey car park is no obvious deterrent to motorists (except of course if it is actually full), whereas the choked street network in the centre clearly is likely to force a behavioural change.

The provision of a permanent oversupply of 15% is, in our view, neither a reasonable policy objective, nor one sanctioned by any guidance or research. There is a reference in the Institute of Highways and Transportation guidance on parking management to considering increasing parking charges when peak occupancy reaches 85%, but that is not the same thing as increasing capacity to meet a perceived demand at a subsidised price.

WinACC views on access to Winchester town that have a bearing on the question *'how much car parking do we need?'* are covered in another report, see http://winacc.org.uk/news/2014-01-30/traffic-access-and-parking-winaccs-position.

Are Winchester town public car parks under-used?

Given present policy is parking provided (and paid for) by the City Council used to a reasonable level of occupancy?

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[25] There may have been more from level 4 downwards – but it would have been hard work and our activity would have looked increasingly suspicious had we exhaustively checked these areas – our understanding is that WCC officers use the upper decks, so that is where we concentrated effort.

[26] A new factor in Council thinking in 2013, in which 85% occupancy seems to be taken as a reason to provide more capacity. The reason the Council gives in its strategy is that

> *It should be noted that within the parking industry 85% occupancy is considered to be the figure whereby operational capacity has been reached. At this level of usage people find some difficulty locating a vacant space and may leave to look for an alternative elsewhere.*

The Council gives no reference to justify this 'received wisdom'. We can find the same sort of statement in lots of other documents from other councils, used in the same sense of being a reason for providing increased capacity. The only definitive statement from any formal guidance that we can establish comes from the Institution of Highways and Transportation paper 'Parking Strategies and Management' :

> *Set charges and controls at a level that will keep peak demand at no more than about 85% capacity.*

This is logically the exact inverse of the position the Council state. The IHT says that when you come close to capacity you increase charges to deter use; the Council says that when you come close to capacity you increase capacity.

It is not sensible to use the exceptional period of the Christmas Market to set the peak use of car parks. Many authorities cater for exceptional access in special ways (e.g. temporary park-and-ride sites on fields, with additional public transport).

The maximum occupancy we ever observed (12 December 2013) was 89% in all car parks combined. 11% of car park capacity is never used.

The peak times during non-exceptional period is a more reasonable measure. At 'normal' weekday peak times in our sample, the maximum occupancy is 70% and the mean occupancy rate is 61% (SD 11%). Even when we include peak periods, the mean occupancy rate is only 63% (SD 12%).

Filling park-and-ride and inner car parks first

If parking were to be managed in ways that minimise the environmental damage of car access to Winchester town[27], charging tariffs would have to be adjusted to encourage drivers to park in park-and-ride and inner car parks first and central car parks last. In Figure 19 below we show how it would be possible to accommodate the cars that currently park in the centre, on a normal weekday morning in park-and-ride car parks and inner car parks. There would be no need for cars to park in the centre, and very few would need to park at Westgate and there would be a major reduction in congestion and pollution.

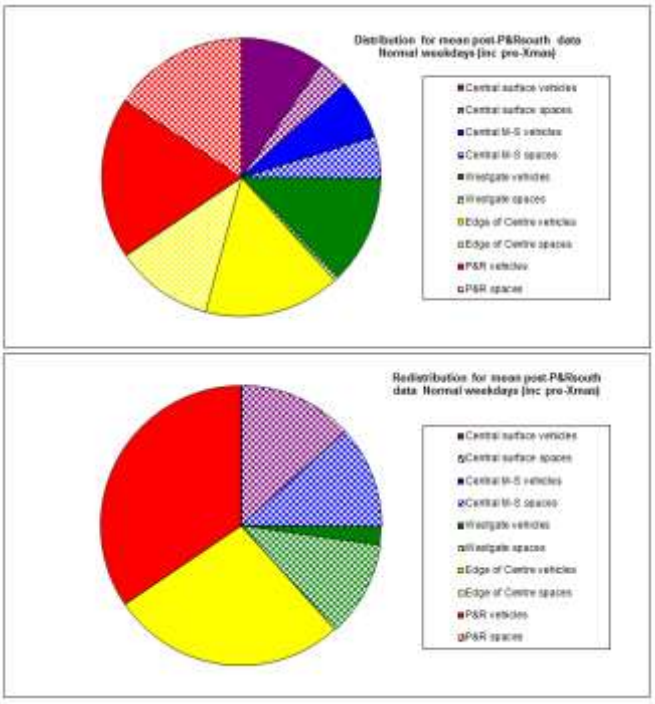


Figure 19 Current situation (above) compared with what would happen if inner car parks were filled first (below)

[27] Clearly it is not – there is a clear supposition in the present Parking Strategy that there is some economic disbenefit to minimising environmental damage. We think this is a mistaken view (see Economic benefits).

Since there is a significant pollution problem at Westgate[28], on Romsey Road, in this exercise we have treated Tower Street and Gladstone Street as central car parks, like the City Council does.

Even in the most extreme case we have seen, there was hardly any need for central surface car parking. It would have been possible even on 12 December 2013 for the council to manage parking choice so that very few cars needed to enter the centre (Figure 20):

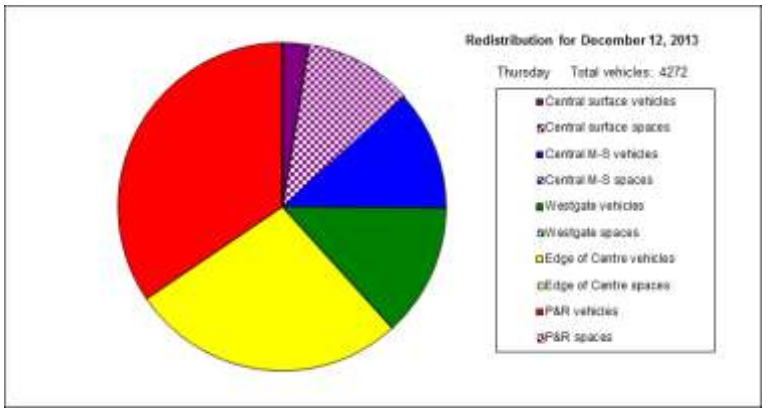


Figure 20 Redistribution of 'extraordinary' data

Periods of ‘extraordinary’ traffic should be treated by special measures, and not used in any calculations about the level of permanent parking provision.

These calculations do not include the new park-and-ride provision at Pitt Manor; there is now even more capacity for removing cars from the centre and in future the extra 200 spaces at Barton Farm will increase the capacity still further.

[28] Second only to St George’s Street.

Appendix 2
Private non-residential car parking survey results

What we did

The survey was carried out by WinACC in the spring of 2012.

The aggregated data is recorded in Table 2. The data, for each aggregation of individual sites, comprises:

- The number of marked car parking spaces (if any)
- The number of parked cars observed
- An estimate of the capacity of the sites

Methodology

All parking sites in this area that were public car parks, or that were clearly limited to residents, were excluded from the survey. The survey did not include parking for vehicles other than cars.

With some businesses (e.g. car sales showrooms or car repair shops) it was sometimes difficult to distinguish cars parked as part of the business, and cars parked by customers and staff. Where possible we ignored the cars parked as part of the business and counted only those cars parked by staff and customers and the spaces available for staff and customers.

Estimating capacity was sometimes difficult – at many sites the space for parking cars was also used for other things (like waste bins, lorries or buses). Some sites were clearly car parks, but individual spaces were not marked out.

Even the figure for marked spaces can be problematic – some establishments have marked spaces that have clearly been used for some time for other purposes. Nevertheless these spaces are included in the total spaces figures.

Some long-disused sites (especially at Bar End) had significant possible capacities, but since this would be to prejudge the use of the sites before they were re-opened, we did not include them in our 2012 survey.

Data

Aggregation	Sub-area Index		Marked car parking spaces	Occupied spaces (weekday mid a.m. or p.m.)	Assessed capacity
By Main Providers					
RHCH			985	925	995
Station			625	621	625
University			403	280	403
HCC			343	501	658
Bar End Industrial			381	400	575
Winnall Industrial			1603	1178	1848
Police, Courts & Prison			414	381	429
Schools			434	506	485
Tesco's, Homebase, Halford/Curry			973	356	973
		Totals:	**5176**	**4223**	**5996**
By effect on central circulation system					
likely central circuln			1441	1311	1544
very likely central circuln			612	625	797
		Totals:	**2053**	**1936**	**2341**
By subarea					
SE					
Bar End Ind Est south of Barfield	SE_1		208	374	548
Bar End Ind Est north of Barfield	SE_2		56	41	144
Bar End Road	SE_3		101	88	31
Chesil Street	SE_4		80	28	88
		Totals:	**445**	**531**	**811**
NE					
Moorside Rd estate	NE_1		830	571	954
North of Winnall Manor Rd	NE_2		418	192	427
South of WMR	NE_3		276	261	303
Nickel Close & Easton Lane estate	NE_4		82	123	127
West side of Easton Lane	NE_5		416	158	456
Durngate	NE_6		0	5	24
Tesco	NE_7		626	258	626
		Totals:	**2648**	**1568**	**2917**
N					
Rugby club	N_1		85	121	136
Durngate	N_2		138	128	138
Hyde Abbey Rd, Gordon Rd	N_3		95	74	95
Hyde Street	N_4		71	55	103
Victoria Road	N_5		144	129	144
Swan Lane	N_6		49	36	49
Andover Rd - station side	N_7		365	215	365
Worthy Lane & Andover Road east	N_8		154	112	154
Bereweeke/Stockbridge Rd N side	N_9		152	209	152
		Totals:	**1253**	**1079**	**1336**
Central					
West side of station	C_1		526	567	579
Sussex Street & west	C_2		59	94	130
West of Jewry Street	C_3		348	316	365
ST peter Street & west	C_4		141	203	253
Upper Brook St and west	C_5		97	106	153
Friarsgate and Eastgate	C_6		129	102	137
		Totals:	**1300**	**1388**	**1617**
S					
South of Kingsgate	S_1		132	144	195
Southgate St and west	S_2		122	97	135
North of Kingsgate	S_3		132	144	189
Colebrook Street Market Lane	S_4		84	84	116
Law Courts & St Clement	S_5		49	53	76
Upper Peninsula	S_6		43	27	43
		Totals:	**562**	**549**	**754**
W					
SW of St paul /Stockbridge Rd	W_1		65	49	72
Romsey Rd and North	W_2		530	441	530
Hospital	W_3		966	916	976
University	W_4		334	208	334
Monarch Way (HCC)	W_5		106	116	198
Westgate & Western schools	W_6		98	96	98
		Totals:	**2099**	**1826**	**2208**
Sub_area totals:			**8307**	**6941**	**9643**

Table 2 Private non-residential parking

Findings

Totals

There are some 8307 marked parking spaces in these private non-residential sites. The best estimate of the overall capacity (a measure of traffic generation capability, assuming a once per day turnover) of the sites is 9643.

6941 parked cars were observed. It is thought that the great majority of car parking relates to staff parking, but a very rough estimate of customer parking suggests a figure of 1200.

Railway station increase in spaces

Of the major providers of parking shown in the survey it is worth noting that Winchester Station has since increased its capacity to 680, and will be making a further increase in 2016

The high numbers

The amount of the private non-residential parking is noteworthy. In the town centre and on the margins, the total number of parked cars observed at private non-residential sites was 6941 against 2331, the average number of cars parked in public car parks in the same area at the time of the 2012 survey (see Table 3). We also make a rough estimate of cars parked in this zone using Google street view[29]

Cars parked in private non-residential parking spaces in these zones far outnumber cars parked in public car parks and must make a major contribution to Winchester town's traffic congestion and pollution. However, this may be less significant than it would first appear because:

- The preponderance of private non-residential parking over public car parking is not so marked in car parks accessed directly by the central circulatory system and the impact of pollution and congestion on the central circulatory system is a crucial factor, and
- The turnover of cars parked in private non-residential spaces is probably lower than turnover in public car parks. This will have to remain speculation, however, because data on turnover at public car parking spaces varies.[30]

Impact on central circulatory system

The following analysis applies to the period before the closure of Friarsgate and before a deck was added to the car park on the eastern side of the station.

[29] It must be pointed out that Google Street View for Winchester clearly covers different days and even different seasons.

[30] We have been unable to find a reference, but we believe that some very old data showed daily turnover for a parking place in the old central car park (Brooks site) of 5-7. These figures may not be helpful - there were far fewer parking places then and a fuller car park will tend to have higher 'turnover' defined as trips per parking space. The highest turnovers we can determine from modern data are just over two (see Table 4). Where spaces are used for staff parking turnover could be as low as 1 per day.

Private

We have tried to aggregate data according to the likelihood of the parking being accessed by vehicles using the central circulatory system. Since the origin of the trips that use the parking is unknown, this is likely to be a very rough estimate. 1311 parked cars were deemed likely to have used the central circulatory system (the estimated capacity of the sites involved is about 1544). A further 625 cars were deemed very likely to have used the central circulatory system (the estimated capacity of these sites is about 797).

Public

These figures should be compared with the average total number of parked cars per day in public parking (off-street and on-street) in or using the central circulatory system. This figure is currently unknown and we hope that work will be done on this. The mean number of cars parked at peak time in off-street car parks in the central circulatory system is 809. The Google estimate for on-street public parking in this area is 187. If we had a multiplier of peak occupancy to represent the total turnover of, say, 2, we would estimate the public's car park use in or using the central circulatory system to be around 2000 per day much the same as that for private non-residential parking.

Area	Cars parked	Estimated capacity	Comment
Central			
Private non-residential (average normal weekday 2010-2012)	1388	1617	Survey as described. Estimates of capacity are very rough
Public off-street	1189	1563	The Brooks, Middle Brook St, Upper Brook St, Cossack Lane, Friarsgate, Jewry St, Tower St, Gladstone St
Public on-street	187	238	From Google Streetview. Estimates of capacity are very rough
North-east			
Private non-residential	1568	2917	
Public off-street	0	0	
Public on-street	126	199	
South-east			
Private non-residential	531	811	
Public off-street	566	903	Chesil Multi-storey, Chesil Surface, Barfield P&R
Public on-street	161	286	
South			
Private non-residential	549	754	
Public off-street	70	77	Colebrook St
Public on-street	314	476	
West			
Private non-residential	1826	2208	
Public off-street	0	0	
Public on-street	372	648	
North			
Private non-residential	1079	1336	
Public off-street	508	680	River Park, St Peters, Durngate, Cattle Market, Worthy Lane, Coach Park
Public on-street	616	962	
All			
Private non-residential	6941	9643	
Public off-street	2333	3223	
Public on-street	1776	2809	
Total	11050	15675	

Table 3 All parking in areas surveyed for private non-residential parking

Appendix 3
Winchester City Council 2013 user survey results

The City Council carried out a survey of users of public car parks in March 2013. This was particularly useful in providing information on where people came from to park in Winchester, and other data.

The survey, we understand, involved leaving questionnaires and return envelopes with parked vehicles. We do not know the time of day when questionnaires were left, or whether it was at several different times a day. However, since the survey was primarily about establishing where trips to car parks come from, getting a response that is fully representative of trip patterns across the day may not be of great importance.

Occupancy by time of day

We can deduce further information from the data. For example, since we have time of arrival and length of stay, we can estimate the occupancy of the car parks. To do this we have drawn histograms to illustrate vehicle occupancy by time of day.

Since we have only a sub-sample of all the vehicles that use a given car park, we can scale this distribution to match the occupancy at some sort of average time of a WinACC survey. Our survey data includes the time of day at which a car park is visited. Our survey times for the most part are fairly similar, but they can be haphazardly different, so that a median time is probably a more representative average than the mean.

With these scalings we produce the distributions in Figure 21 In spite of the reservations about the data, there are some credible (and some interesting) observations to make.

- The park-and-ride sites, the Westgate sites, Worthy Lane, Durngate and Chesil multi-storey all have broad plateau distributions. A simple explanation would be that these car parks are used as all-day sites, e.g. for work commuting – fill during the morning rush hour and empty in the evening rush. This is not the only way to explain such a distribution but it seems the likely one.
- The central car parks for the most part have much sharper distributions centred on lunch time. River Park and St Peter's[31] have double peak distributions; lunchtimes are low points. River Park is certainly one of the more variable in our observations (see the standard deviations (SD) in Table 1) perhaps because our surveys tend to cluster around lunch-time when the distribution curve is so significantly changing. We do not, however, know what the underlying reason is for a lunch-time dip in the use of the River Park site. The double-peaked distribution at the St Peter's site may have something to do with school pick up at St Bede's.

[31] Durngate and Cossack Lane also show a dip but the amount of data available from the Council's origin survey for these car parks is so small that the dips could be the result of low number counting (Poisson statistics).

- We do not hazard an explanation for the distributions at the Cattle-market and the Coach Park, though we observe with the latter that this location appears to be a place for taxi drivers to rest. This may explain the sudden drop in occupancy in the late afternoon as presumably trade picks up.

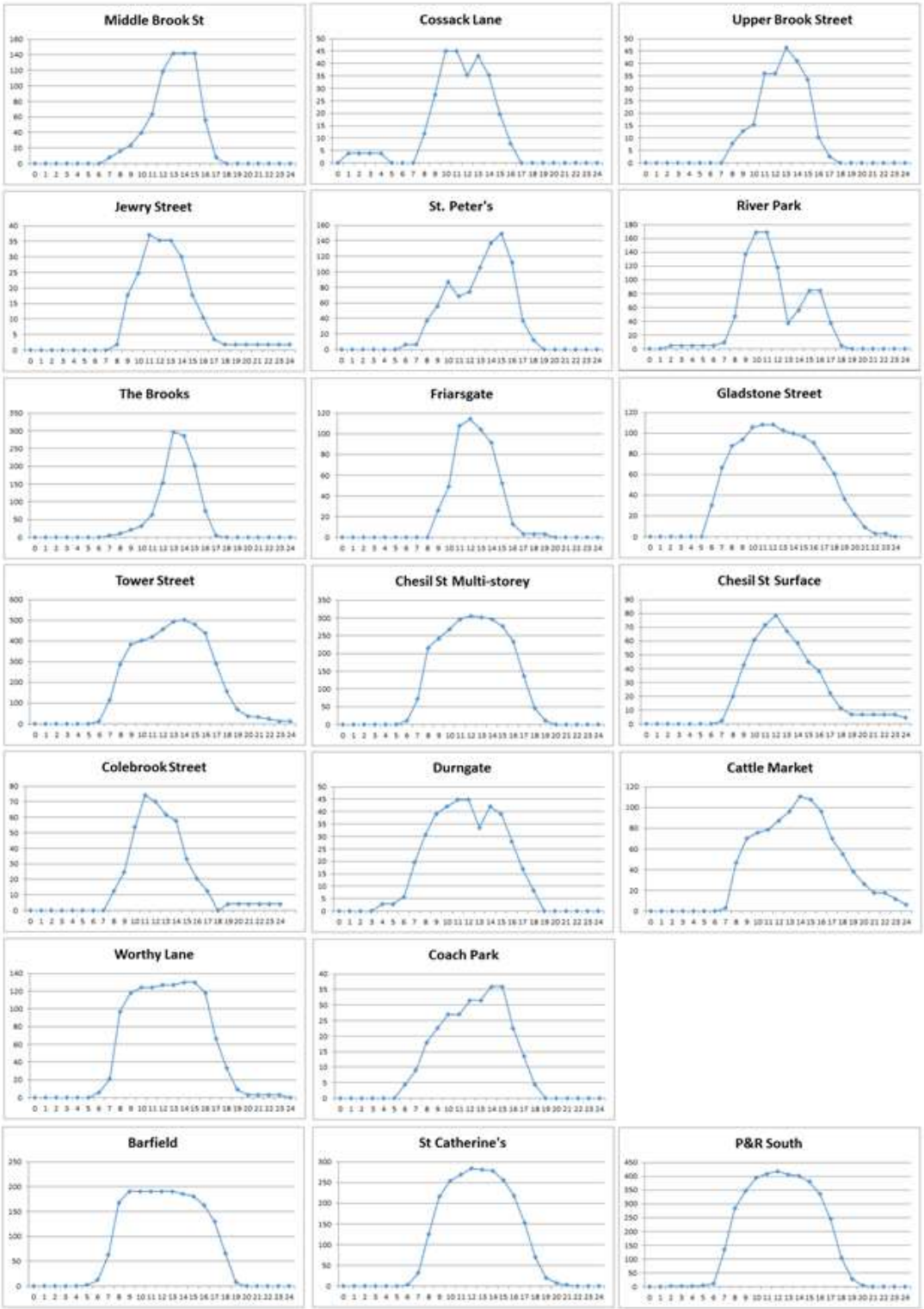


Figure 21 Occupancy as function of time of day

Turnover

The WinACC surveys note the occupancy at a moment of time. To examine the traffic implication of the car park occupancy, we need to relate that occupancy to the total number of vehicles using the car park in a single day. If a car park were permanently full, this ratio would be the 'turnover', i.e. the number of vehicles parked in each space on average per day. Since on average most car parks are not fully occupied a significant flow of vehicles into an out of a car park may not result in a high 'turnover' for the site.

Again, despite reservations about the representativeness of a single trip origin survey, we have used the survey to obtain a traffic multiplier and have applied this multiplier to convert observed occupancy to the total number of vehicles that use the car park per day[32]. We have taken the ratio of the total number of vehicles in the City Council origins survey to the implied occupancy of a car park at the median WinACC observation time. For example, Middlebrook has a mean normal weekday occupancy of 133. The traffic multiplier of 1.6 suggests that the traffic generated is 133*1.6, or 213 cars per day.

The results are shown in Table 4[33]:

	baseline capacity	current capacity	mean normal weekday	median survey time of day	O&D survey max occupancy time	survey time correction multiplier	traffic multiplier
MIDDLEBROOK	142		133	12:10	13:00	1.54	1.60
COSSACK LANE	45		37	12:15	10:30	1.26	1.89
UPPER BROOK ST.	52		45	12:52	13:00	1.03	1.20
JEWRY STREET	39		35	13:00	11:00	1.05	1.65
ST PETERS	189	167	99	12:47	15:00	1.51	2.07
RIVER PARK	169		118	12:45	10:00	1.56	2.20
THE BROOKS	315		230	12:32	13:00	1.29	1.36
FRIARSGATE	251	136	113	12:07	00:00	1.01	1.15
GLADSTONE ST.	108		102	13:15	11:30	1.07	1.13
TOWER MULTI	522		495	13:10	14:00	1.02	1.05
CHESIL MULTI	625		303	11:45	12:00	1.01	1.02
CHESIL SURFACE	84		76	11:35	12:00	1.04	1.13
COLEBROOK STREET	77		70	11:57	11:00	1.06	1.52
DURNGATE	67		39	12:32	11:30	1.15	1.44
CATTLEMARKET	195		97	13:02	14:00	1.15	1.18
WORTHY LANE	152		127	13:03	14:30	1.02	1.07
COACH PARK	103		32	13:04	14:30	1.13	1.27
BARFIELD P&R	194		191	11:30	11:00	1.00	1.03
ST CATHERINES	591		274	11:22	12:00	1.03	1.06
SOUTH	864		409	11:04	12:00	1.02	1.11

Table 4 Traffic multipliers (turnover) March 2013

[32] One could have a parameter that relates trips to car park capacity and for the most part that is easily constructed from Table 4 Traffic multipliers (turnover). Some capacities vary over time but our survey measure is cars parked (even where we count empty spaces the figure is unambiguously converted to parked vehicle number) and the traffic consequence of the number of cars observed is what we believe is more important.

[33] Note this data pertains to the period before the final closure of Friarsgate.

River Park and St Peter's seem to have a higher 'turnover' than other car parks. Chesil multi-storey and Tower Street have surprisingly comparable values for this parameter though occupancies differ enormously.

The traffic multiplier for the Park-and- Ride sites together works out at 1.085. The other estimate we have of park-and-ride site turnover is the ratio of ticket sales to our occupancy measure, which we can deduce from the fitted lines in Table 4 as 1.059. Considering the assumptions behind the figures in Table 4 this seems a good match.

Routes taken to park in Winchester town

The council's 2013 car park survey provided a first opportunity to estimate where people come from to park in Winchester town. Even more precise results could be achieved through repeat exercises if questions could be fine-tuned and sampling/presentation methods were enhanced.

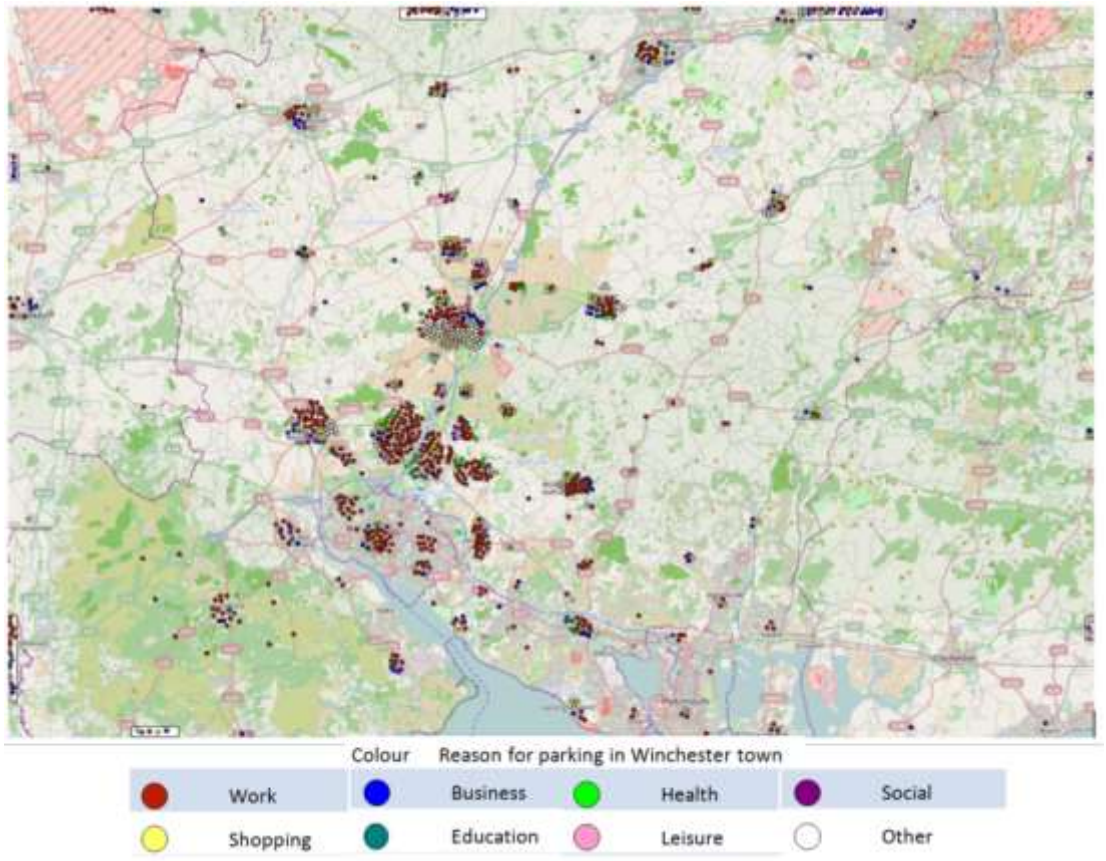


Figure 22 Where people come from to park in Winchester town

The results[34] show that the received wisdom that Winchester town serves a predominantly rural hinterland necessarily dependent on car transport is completely false. It is, rather, a

[34] Each dot is on the place of origin for each reply given in the survey. Where the origin is outside the map the dot is placed on a white panel at the probable point of entry to the map.

centre catering primarily for the needs of people living in the urban northern edge of the Solent conurbation. The council car parking survey responses also enabled us to estimate the routes used to drive to Winchester town to use the car parks. The overwhelming volume of cars from the south means this should be a priority for encouraging modal transfer to public transport.

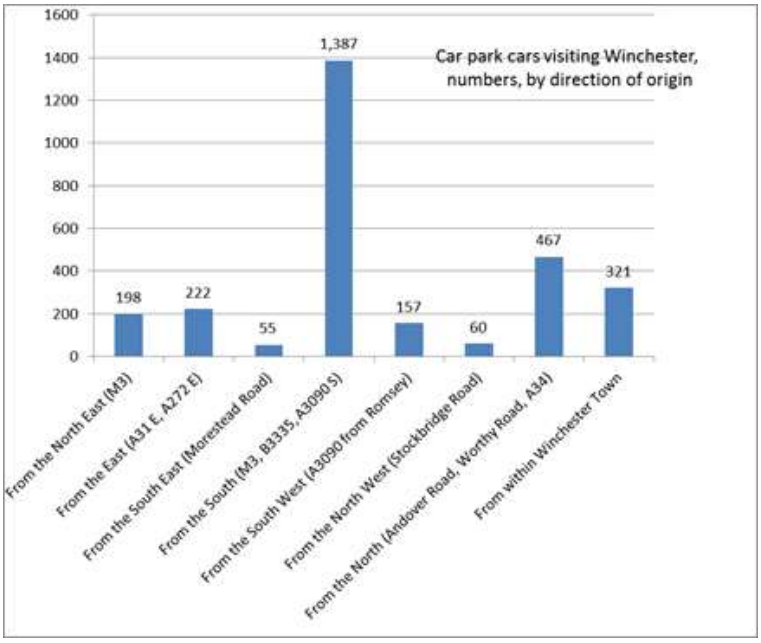


Figure 23 Totals reflect the total maximum of parked cars, apportioned to reflect the 'origin' given in the March 2013 car park survey. Routes used are those recommended by Google Maps

Routes taken to and from car park groups

The Winchester City Council origins data allowed us to estimate the likely routes taken to each group of car parks. In cases where two routes seem highly competitive (e.g. Alresford origin trips accessing Westgate car parks might equally use City Bridge or Worthy Road access) we have simply split the data in two. We have scaled WinACC observed vehicles parked by our rough 'turnover' estimates. We map the journeys as likely traffic lines with the line width scaled appropriately. Some trip origins are vaguely described as 'Winchester'. We show these as a blue arrow with no particular origin.

We have data for individual car parks, but for simplification we have aggregated it into certain groups of car parks likely to give rise to similar traffic flows. Thus Figure 24 combines the maps for the Tower Street and Gladstone Street car parks. The maps look quite different, reflecting in particular the likely use of Romsey Road for egress and Southgate Street for ingress.

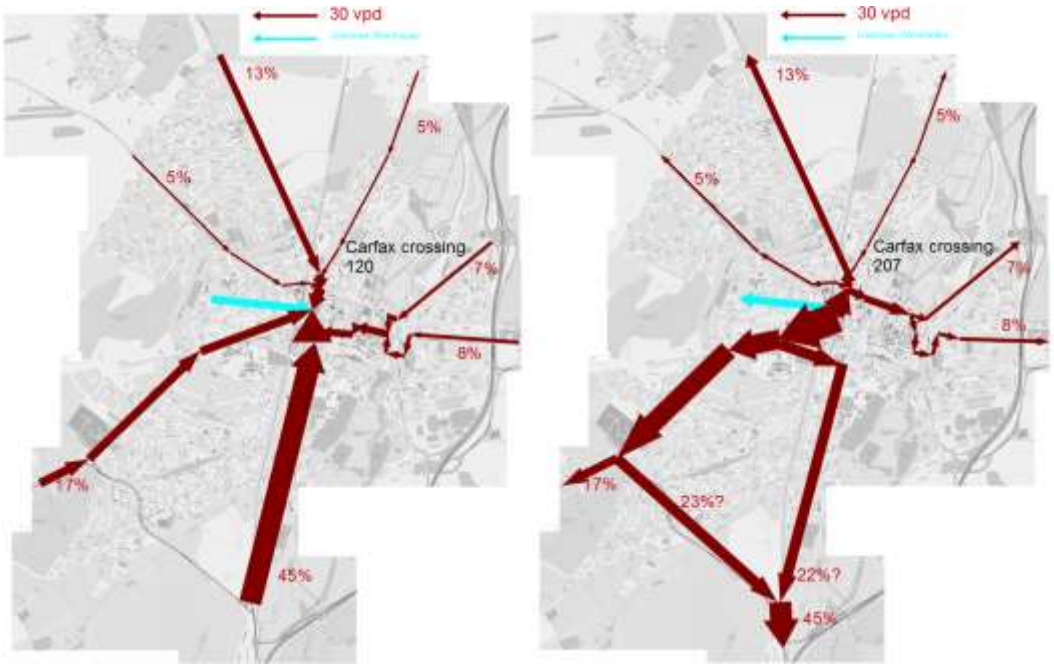


Figure 24 Tower Street / Gladstone Street car parks access and egress routes

We give similar maps for the other car park groups below:

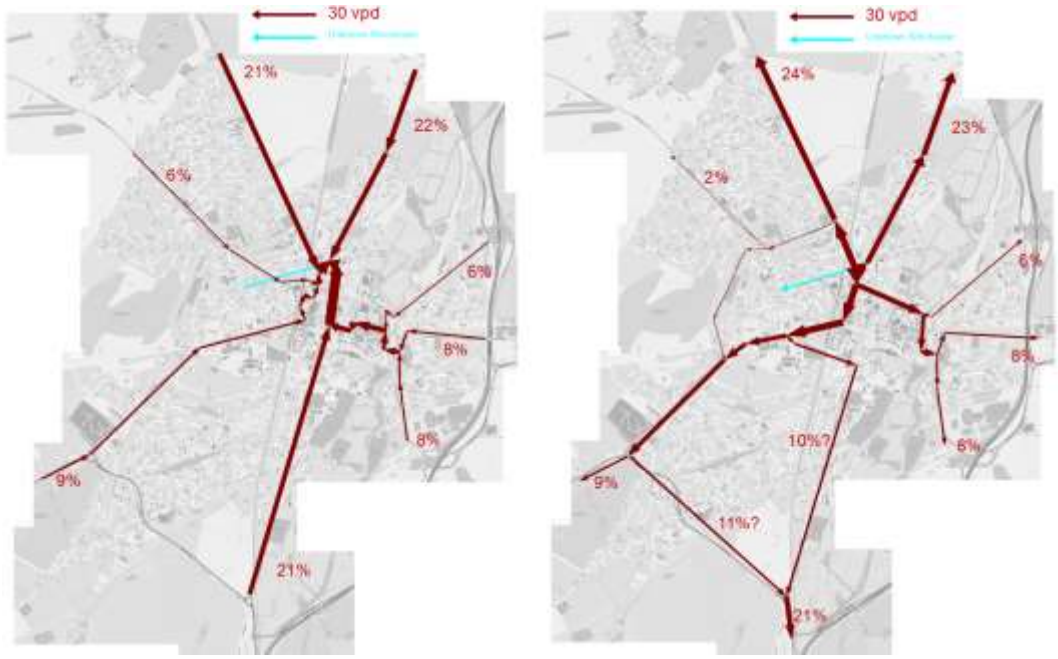


Figure 25 Worthy Lane car parks access and egress routes



Figure 26 Jewry Street access and egress routes

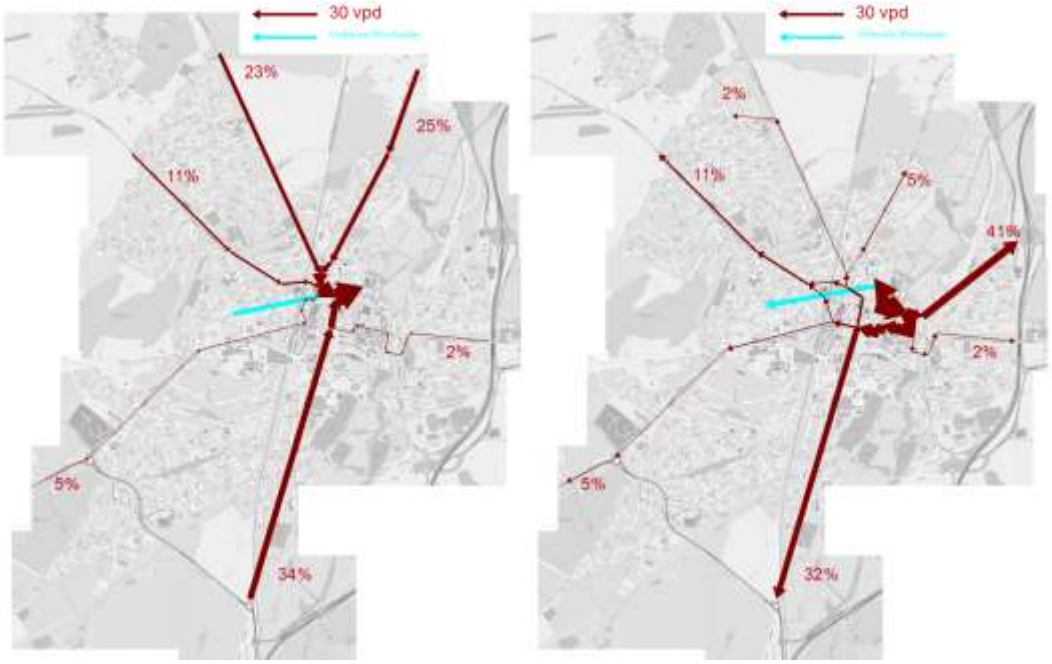


Figure 27 River Park and St. Peter's access and egress routes



Figure 28 Brooks car parks access and egress routes (note scale change)

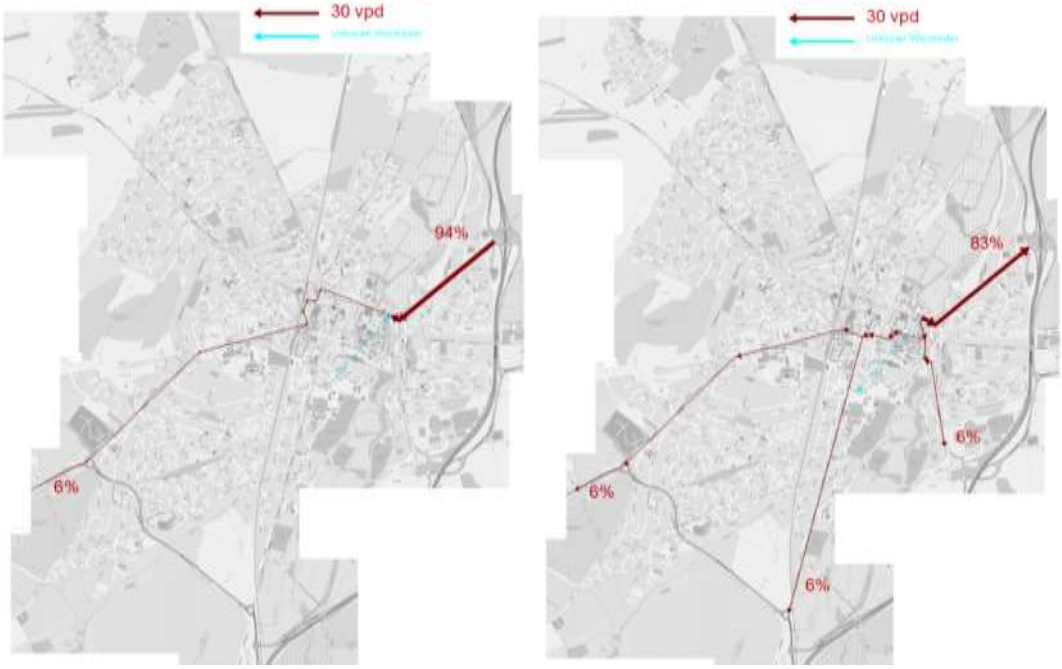


Figure 29 Durngate access and egress routes



Figure 30 Access and egress routes for Eastgate car parks incl. Colebrook St

Appendix 4
Urban Flow (UF) 2015 user survey

To inform decisions on the Station Area development, the City Council commissioned a further survey by Urban Flow (UF) of users of public car parks in the Westgate and Cattle Market areas. A key question was whether the transfer of parking spaces from Worthy Lane / Cattle Market car parks to Gladstone Street would increase or decrease the volume of traffic at the Carfax or Albion Junction (City Road / Stockbridge Road / Andover Road / Sussex Street / Swan Lane). The Urban Flow report concluded that the transfer would result in a 'slight reduction'. We have analysed the data they collected and based on this we found that the transfer would result in a major increase in traffic.

Having looked at the report and data collected we feel the work contained a number of serious flaws:

- The questionnaire failed to ask drivers the routes they used to access and go away from the car park (given the context of the work this was fundamental).
- The questions on the reasons for parking confused categories of reply in such a way as to render useful analysis impossible. It is a standard rule in questionnaire design that, where one reply is asked for, reply options should be mutually exclusive. UF did not follow this rule by, for example, offering 'commuting' and 'work' as reply options to a question about trip purpose.
- Assumptions about the routes taken by the drivers were in many cases highly improbable; maps showing access routes included oddly unnecessary or difficult routes.
- The work assumed drivers would leave the car parks by the same route they used to access the car park; the Winchester one-way system made this impossible, especially at the Albion Junction, whose traffic patterns were the main reason for the exercise.
- The level of the 'slight reduction' given in their working document was so slight that it was within the margin of error and did not justify the conclusion.
- There is no adequate description of the methodology used.

We include below details of our analysis, which we have done to demonstrate that the data collected can be put to good use despite our worries about how UF did their analysis and the conclusions they reached. We feel it would be a waste to disregard it in any future exercises and hope to open discussion on how this type of exercise could be carried out more rigorously and more transparently in future. We also hope that a number of obvious shortcomings will not be repeated. If we are to manage car parking provision in Winchester in a way that minimises congestion and pollution, it is essential that exercises like this are specified in a way that ensures that:

- the nature of the strategic decisions the council needs to make is set out clearly
- the work will be policy led; the work should not be done in a policy vacuum in the hope that the findings will give rise to a reactive set of policies[35]

[35] We give the following example of how a strong policy direction could inform attempts to resolve the specific problem that has arisen here. There clearly is a traffic problem in the Westgate area of Winchester, and the

- it collects robust data
- questionnaires are designed in such a way that they will facilitate good analysis
- appropriate analysis is done transparently, and
- sound rationale is used to ensure that recommendations derive clearly from the work done.

Assigning routes

We explored how far the survey data supported the UF report's[36] weekday car park access diagrams by doing our own careful assignments of routes taken to and from the car parks.

To do this we used data relating to one car park north of Carfax Junction, and one car park south of Carfax Junction:

- Cattle Market car park as representative of responses from all car parks in the Northgate Car Park Group (Cattle Market, Worthy Lane, and Coach Park car parks). Because the entrances to all three car parks are adjacent to each other, or in the same place, there is nothing to suggest that routes taken to any of the car parks would have been significantly different, whatever the journey origins.
- Gladstone Street car park as representative of responses from both car parks in the Westgate Car Park Group (Gladstone Street, and Tower Street car parks). Since cars from the north would reach Gladstone Street car park only after first passing the entrance to Tower Street car park, the selection would understate slightly the proportion of cars from the north currently using the Westgate Car Park Group, and understate therefore the impact on the current arrangements on the volume of traffic crossing the Carfax Junction to use the Westgate Car Park Group.

We selected the UF Cattle Market and the Gladstone Street parking survey data as exemplars of the two main locations of car parks involved. The route assignments we carried out in Appendix 3 were about large scale traffic movement so we guessed likely routes from a given origin to destination. When we analysed the UF data, however, there was a more detailed focus on the impact on the Carfax junction, so we felt it necessary to do some exhaustive (and exhausting) analysis using on-line route finding packages to determine routes taken in detail.

Gateways and corridors

We assigned route corridors through gateways 1 to 7 to codify the possible corridors used by each of the respondents to the UF survey. Using AA Route Planner

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station area discussions suggested it is dominated by movements from south of Winchester. The most effective response to the local traffic control problem would not be to look for a technical traffic flow fix, or to transfer parking spaces, but to encourage trips from the south to take place by alternative modes or to intercept them further out at the park-and-rides. The catchment of Winchester as a whole is certainly dominated by urban populations to the south, which have existing public transport routes which could be much better supported. The park-and-ride system from the south has large unused capacity. It would be used more if parking price policy were adjusted to make it so.

[36] Our analysis has also treated separate data for Saturdays, but this paper mostly confines itself to weekdays. We do not believe it materially affects conclusions.

(http://www.theaa.com/route-planner/index.jsp), we forced routes from the point of origin postcode to the car park used along corridors through the following gateways:

1	SO22 6AE	Andover Rd – Jolly Farmer
2	SO23 7BJ	Donnington Ct, – Worthy Rd
3	SO23 0ET	Easton Lane, – 43 Wales Street
4	SO23 9BH	Friarsgate – Brooks
5	SO23 9EF	Southgate Street – Hotel du Vin
6	SO22 5BE	Romsey Rd – St James Tavern
7	SO22 6RL	Stockbridge Rd – No. 66 (between St Pauls Hill and station)

Sometimes this gateway forcing did not do sensible things. For example a journey from Morestead computed through the Romsey Rd gateway came west (by 3, 4, or 5) through to Westgate, went up the Romsey Rd to St James Tavern and then turned back to Westgate. Generally, however, these oddities were easily detected and discounted, and should not affect overall conclusions about routes taken.

Alternative routes

It appears that UF allocated a single route to each journey, and the choice of route was made through a process they have not published. The route they chose was not always the quickest or most obvious. We used the following method for reflecting driver choice where there was more than one viable route.

First we used AA Route Planner to tell us how long it would take to follow any viable route along any of the Gateways. In some cases there was more than one possible route. Where there were alternative routes of similar length, we allocated a probability to the choice of routes. If the AA Route Planner assigned the same time (up to thirty seconds' difference because its minimum time interval appears to be one minute) to two different routes for a vehicle arriving at a car park we registered that vehicle trip as two half-trips on the two separate routes (50% probability for either route). By the same token if two different routes took different but closely related amounts of time we registered the vehicle trip also as two trips, but weighted them to reflect the likelihood they would be chosen– e.g. we treated a trip by one route as twice as likely as a trip by another route that takes a minute longer, and registered the trip as a ⅔ trip (66% probability) by one route and a ⅓ trip (33% probability) by the slightly slower route.

See Methodology for calculating probability of choice of route in Appendix 5 for the argument and maths for carrying out such calculations. [37]

[37] We explored two criteria for route assignment, characterised by a standard deviation (σ) of 0.1 and one minute (1). For σ=0.1 the route chosen is simply the minimum time route and for σ=1 there is some probability of routes one minute longer contributing to the statistics. Routes that differ by more than a minute from the minimum-time route make an insignificant contribution and have been left out of this analysis.

Routes used to/from the Northgate Car Park Group

The UF route assignment assumption in relation to the Northgate Car Park Group (Cattle Market, Worthy Lane, Coach Park car parks) appeared to be that all cars using Gateways 3-7 went on to cross the Carfax junction, whereas the AA Route Planner consistently shows that gateways 3 and 4 favour the de Lunn crossing (Hyde Street / Jewry Street / City Road / North Walls), both on inbound and outbound trips:



Figure 31 Alresford Road inbound/outbound routes for the Cattle Market (WinACC AA Route Planner)

Drivers using the routes from Easton Lane and Bar End are assumed by AA Route Planner to behave in the same way.

For easy comparison with our own work, we show below UF traffic figures for the Cattle Market using the UF route assignments in the same format as the one we have used to present our own calculations:

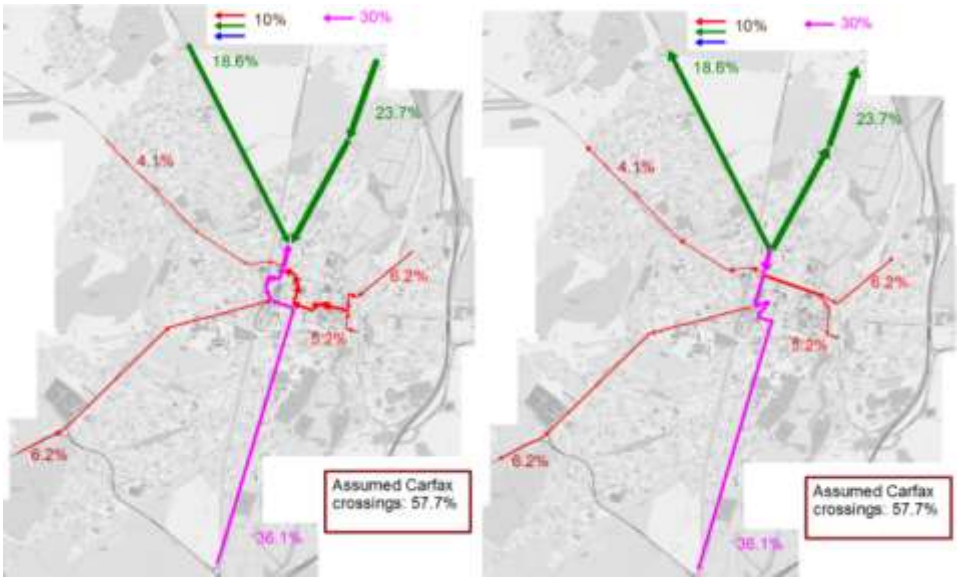


Figure 32 Urban Flow weekday assignments to Cattle Market inbound/outbound.

There is no distinction between inbound and outbound in the UF assignment. We assumed the same proportions of outward destination as inward origin but we have made changes to the outbound routes where the one-way system would have made them different (North Walls and St Clement Street rat-run for example). Arrow thickness is proportional to flow,

but we have scaled down the arrow representations of the major flows in the centre (in magenta) by a factor of three so as to be readable.

The UF spreadsheet tables[38] also appear to assign routes that show Carfax crossings dominating the access to the Cattle Market (specifically via Southgate Street). It is not clear whether Winchester City Council regards the corridors 3 and 4 as crossing Carfax junction, but since we have not seen anything stating that these corridors do anything different from the assumptions implicit in the original Urban Flow maps, we make these cross at Carfax (i.e. via City Road).

The results of our route reassignments using AA Route Planner are shown below. First, the straightforward assignments allocate cars only to the routes that took least time (σ=0.1 minutes).

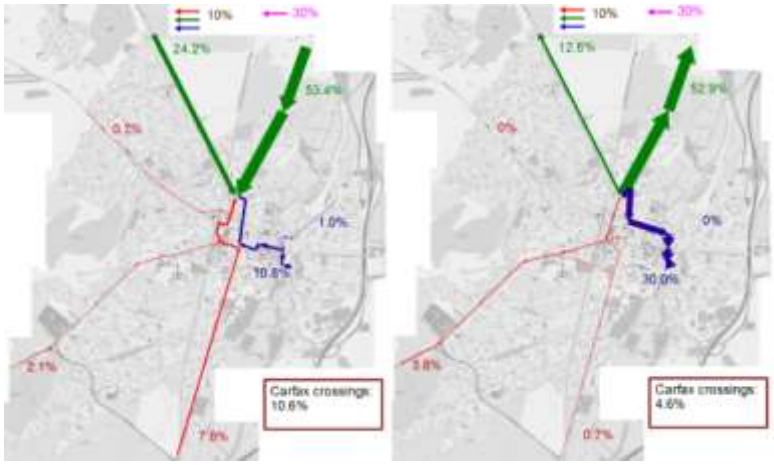


Figure 33 WinACC weekday assignments of Cattle Market inbound/outbound (quickest route only).

These images are qualitatively and quantitatively so different from the Urban Flow assignments as to represent an almost opposite conclusion to be drawn about the use of the Carfax junction. The UF report for example makes great play of asserting the majority of access to the Cattle Market group of car parks coming from the south, with *'42% of drivers using the Cattle Market car park arrive from the north or north-east'*, whereas route-finding software makes this 78%. The AA route planner gives the same time for corridor 5 exits via the Cross Street rat-run as for the St James Lane rat run. The Route Planner does not favour St James Lane for the inward journey.

The situation changes quantitatively but not qualitatively if we assume that drivers will sometimes opt for routes that take up to 1 minute longer than the alternative(s) for more realistic choices of σ:

[38] There are some entries in the spreadsheets which have been assigned corridor numbers when there is no information at all on where the journey has come from. We have deleted such anomalous data, which may explain the small difference between our summing up of the spreadsheet data and the UF Report maps.

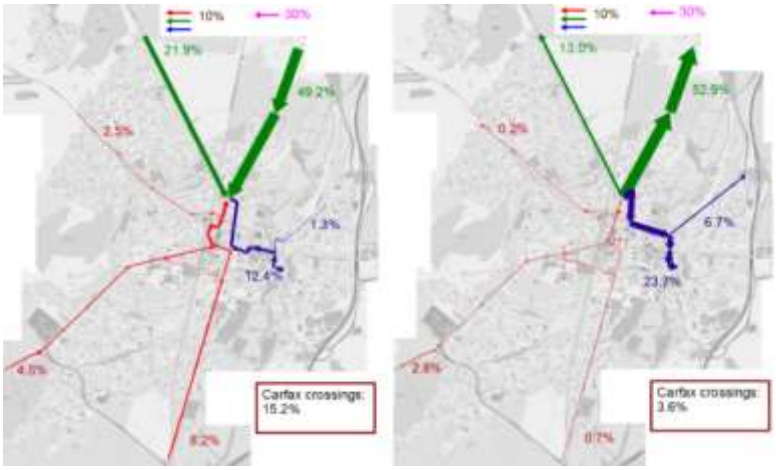


Figure 34 WinACC AA assignments to weekday Cattle Market (including apportioning for alternative routes that take 1 minute longer) inbound and outbound

The St James Lane rat-run on the inward journey is only one minute slower than the High Street route, so it does have a probability of being used (16% probability).

Routes used to/from Gladstone Street

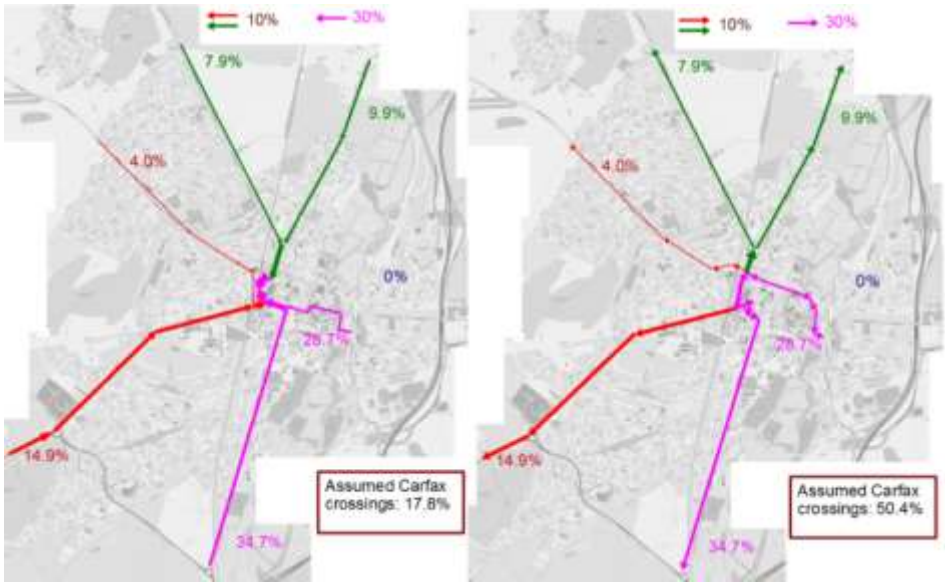


Figure 35 Urban Flow weekday assignments to Gladstone Street inbound/outbound.

UF maps do not show outbound traffic. For our map of outbound traffic reflecting the UF corridor assignments, we have therefore applied the same corridor assignments as those given by UF to the inbound traffic. Because of the one-way system outbound journeys along corridors 3, 4 and 7 would be forced to cross Carfax junction, so the volume of traffic crossing Carfax is nearly three times as great as it is on the inbound journeys.

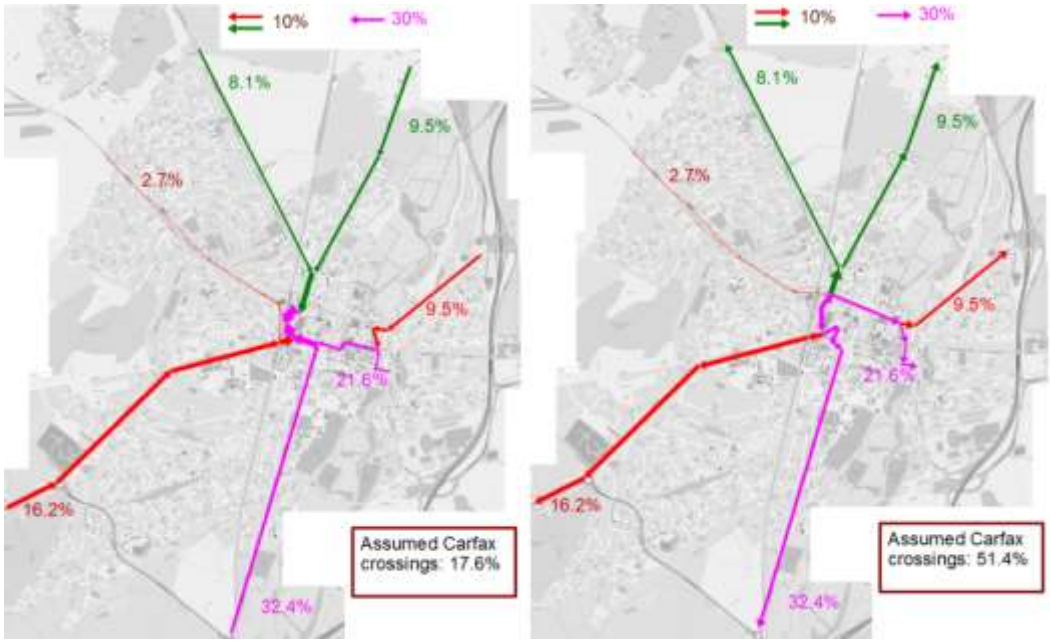


Figure 36 UF weekday assignments to Gladstone Street inbound/outbound with minor WinACC AA Route Planner route reassignment.

Again, we can find no indication in the UF spreadsheet that the outbound traffic is being assigned. The inbound assignment for corridor 7 replicates the UF map's route along Clifton Terrace, though it is intuitively unlikely that anybody would choose to go that way. If we reflect the recommendations of route-planner software the volume of outbound traffic that crosses the Carfax junction outbound from Gladstone Street, is even greater than in our maps illustrating UF assignments in Figure 36:

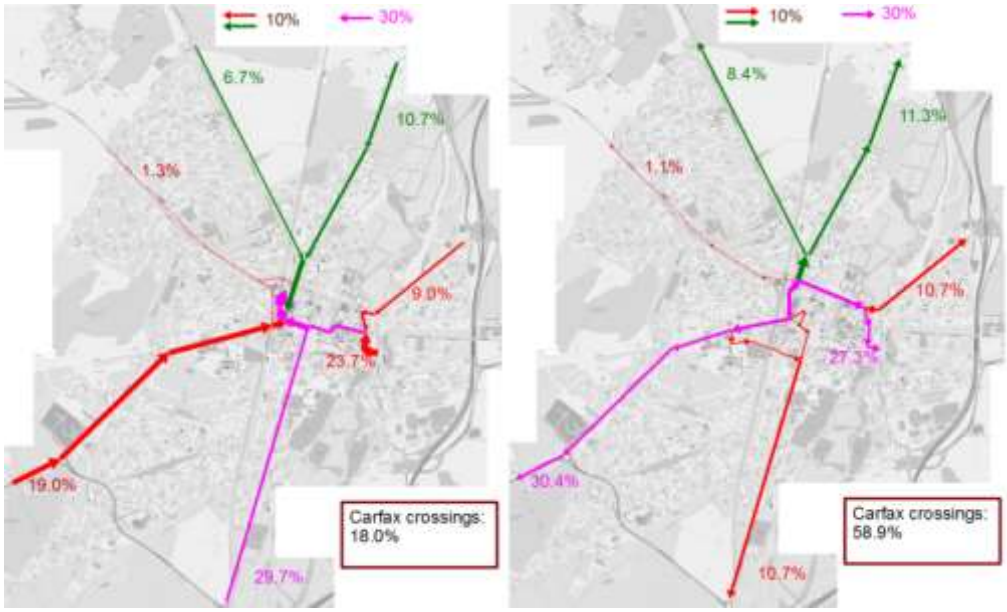


Figure 37 WinACC AA Route Planner weekday assignments to Gladstone Street inbound/outbound (quickest route only).

On the grounds of simple minimal route time, the outbound Carfax-crossing traffic from Gladstone Street is 58%. The more realistic treatment makes this figure 60%:

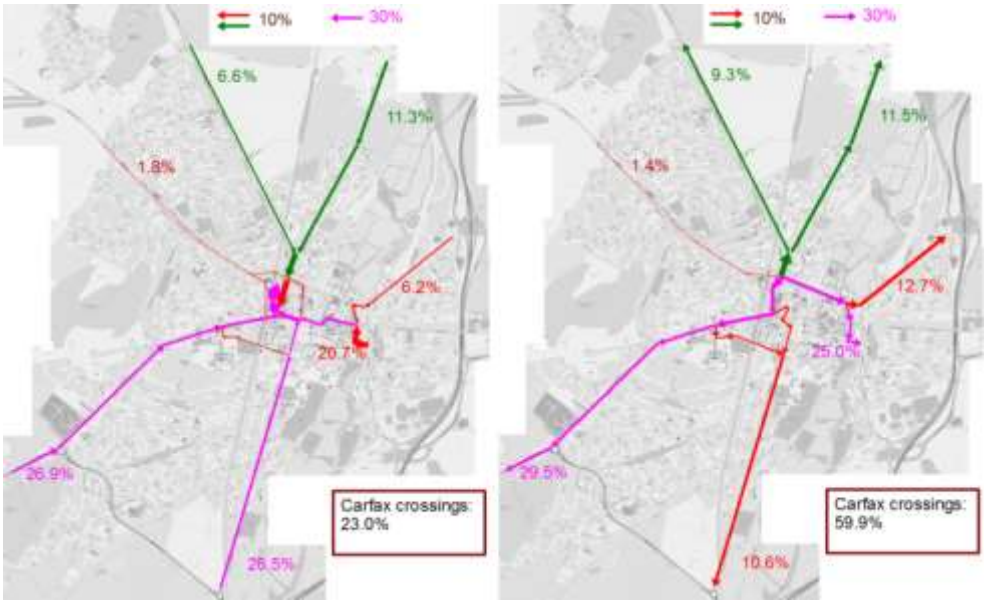


Figure 38 WinACC AA Route Planner weekday assignments to Gladstone Street inbound/outbound (including apportioning for alternative routes that take 1 minute longer than the fastest route).

According to the AA Route Planner, the inbound traffic from St George's Street would take only a minute longer via Jewry St than it does via High Street, which signifies that about 16% of it would thus go through Carfax. The left-hand diagram indicates that some 23 % of traffic inbound to Gladstone Street is likely to come through the Carfax junction. Remember that the original Urban Flow report for Tibbald's put this figure at zero: *'None of these car park trips are therefore passing through the City Road junction'*.[39]

Crossing Carfax junction

It is stated in the Station Area Design Brief that

> *Work done by the Council's retained consultants suggests that careful provision in this area can provide both a sufficient number of purposeful car parking spaces, and* ***may reduce traffic flow across the 'Carfax' Junction.***

We disagree. UF have overestimated the volume of cars using Cattle Market car park that cross Carfax junction, and have underestimated the volume of cars using Gladstone Street car park that cross Carfax junction. This means their estimate of the impact of moving car park spaces from Cattle Market to Gladstone Street is unsound.

We compare UF's estimate of the percentage of car park users crossing Carfax junction with our two estimates[40] using the UF raw data:

[39] And no attention is paid at all in the Tibbald's report, the 2015 Urban Flow report or the WCC Station Area Brief to the crossing of Carfax junction by outbound traffic. Unless one looked at this critically one might naïvely assume that their conclusions for inbound traffic (which are quite badly wrong in any case) applied to outbound traffic. Yet around 60% of Gladstone Street traffic is likely to exit via Carfax and the rest via highly polluted Romsey Road or the Cross Street rat-run.

[40] One assumes only the shortest route will be used, the other assumes a small probability that drivers will take a route that is 1 minute longer.

	Weekday			Saturday		
	UF	WinACC Quickest route only	WinACC Inc. routes 1 Min slower	UF	WinACC Quickest route only	WinACC Inc. routes 1 Min slower
Cattle Market inbound	58.6%	10.6%	15.2%	44.1%	7.1%	7.7%
Cattle Market outbound	**58.6%**	4.6%	3.6%	**44.1%**	6.6%	6.0%
Gladstone Street inbound	17.8%	18.0%	23.0%	25.7%	27.9%	32.3%
Gladstone Street outbound	**50.4%**	58.9%	59.9%	**50.5%**	60.3%	62.1%

Figure 39 Proportions of trips using the Carfax junction: UF and WinACC AA Route Planner analyses compared

UF do not give figures for outward journeys. For the Cattle Market we assume that the outward journeys in **red** reverse the Carfax crossing and therefore have the same magnitude as the inbound UF figures. The figures in **purple** represent what we have to assume from the corresponding lack of treatment of outbound traffic from Gladstone Street. UF do not say what assumptions they make about such data, if any. But, given their inbound corridor assignments, we have inferred the routes that have to be followed to reverse those assignments. Exit from Gladstone Street to any of the corridors 1-4 and 7 would necessarily involve crossing the Carfax junction and in this respect cause a major increase of cars crossing Carfax junction.

Moving parking spaces from Cattle Market to Gladstone Street

Assuming no growth in journeys and making no assumption about trip purpose, we calculated the likely consequence of moving parking spaces (the Design Brief suggests moving 250 spaces) from Northgate group (NG) to Westgate group (WG)

We took the UF report figures for capacity of car parks (which are slightly different from ours). We assumed the NG group comprised 446 spaces; and the WG group 617 spaces.

Our further initial assumptions were:

1) There were two representative groups of car parks in question: those north of the Carfax junction and those south of it.
2) There was an underlying (and unknown) traffic pattern arising from trips to/from all other car parks, public and private and street parking, plus cross-town and through traffic. We assumed that flow calculations are simply additive. This is a reasonable assumptionfor low traffic volumes, but a poor assumption in congested conditions. However, in the absence of a detailed all-embracing traffic model for Winchester we have to make this assumption.
3) Station East's inbound access routes, as assigned by UF, were even more dominated by the northern corridors 1 and 2 than is the NG group. Unfortunately, limited time prevented us from exploring this more deeply, even though we assumed that the station car parks were an important part of the underlying picture.
4) We took the Cattle Market survey to be representative of the Northgate Group car parks and the Gladstone Street survey can stand for Westgate Group. The reason we make this assumption is that our analysis requires systematic accessing of the AA

Route Planner via website and this is a slow process. We have run the data for Gladstone Street and Cattle Market completely. We have made a simple plausibility check on our assumption by comparing the City Council route assignments for Cattle Market with those for Worthy Lane and those for Gladstone Street with those for Tower Street:

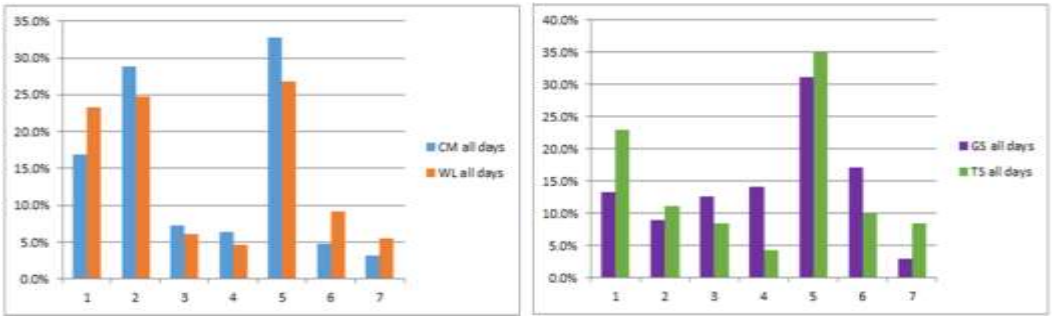


Figure 40 UF Assignments Northgate and Westgate car park groups

The Cattle Market and Worthy Lane distributions are pretty well aligned. Those of Tower Street and Gladstone Street somewhat less so, but still not implausibly aligned.[41]

5) There is no specific reason for attraction to one or the other group, other than their respective accessibilities. This is less substantiated – Tower Street may well have a more specific employment attraction for example, but we have no real data that allows us to test this.
6) That all these car parks are close to full capacity. Until the last year this would not have been a fair assumption for Cattle Market[42]- over the last year, however, the average weekday late morning occupancy of Cattle Market and Worthy Lane has been 91%. It is reasonable to assume that the Barton Farm development will stress the northern approaches more in the near future[43] so that full capacity is increasingly likely, unless there is substantial change in pricing policy.
7) There is not enough information to make reliable computations that include car park turnover. However, we computed this from the previous the City Council data – see Table 4 and we show the relevant part of this table here:

[41] Clearly more traffic to Tower Street comes directly across the Carfax junction.

[42] It is not a good assumption for the Coach Park Car Park either, but this car park is relatively small and not greatly significant in our calculations; it also has peculiarities, e.g. it is much used as a taxi driver resting place rather than a car park proper.

[43] Indeed on CALA's own calculations there will be a significant increase of traffic on Andover Road in spite of the provision of new Park and Ride there.

Car park	capacity	turnover	capacity times turnover (cars parked)
Cattle Market	202	1.18	238
Coach Park	95	1.27	121
Worthy Lane	149	1.07	159
Gladstone Street	108	1.13	122
Tower Street	509	1.05	534
Northgate Group	446	1.16	518
Westgate Group	617	1.06	656
Ratio Northgate:Westgate	0.72		0.79

Table 5 Turnover for the Northgate and Westgate car park groups

The ratio of trip ends for Northgate Group : Westgate Group is a little greater than the ratio of capacities for Northgate Group : Westgate Group. We do not consider this significant, but point out that if it were it would make Northgate car parks more significant proportionally in traffic terms than Westgate and would strengthen the conclusions reached below on the effect of transferring car parking places from Northgate to Westgate.

We begin by plotting the access/egress routes for both groups of car park together:

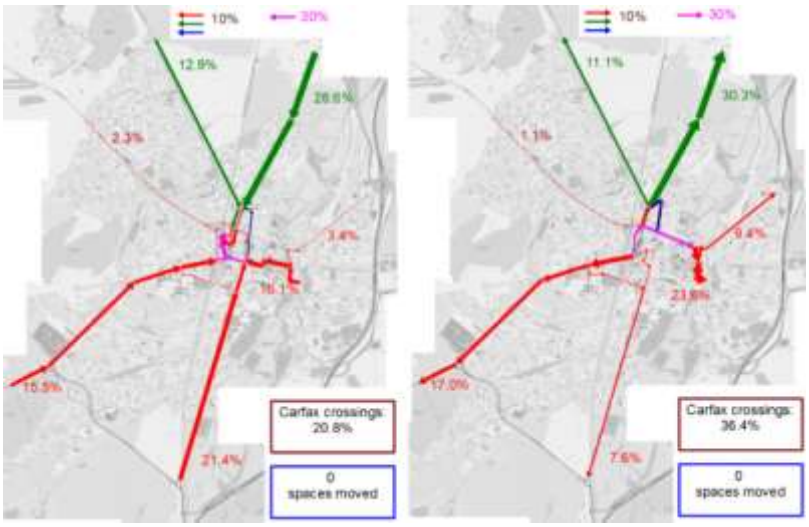


Figure 41 WinACC AA Route Planner weekday assignments to Northgate and Westgate groups inbound/outbound (including apportioning for alternative routes that take 1 minute longer than the fastest route).

In Figure 42 WinACC AA Route Planner weekday assignments to Northgate and Westgate groups, with 300 spaces moved from Northgate to Westgate (Case 1), (including apportioning for alternative routes that take 1 minute longer than the fastest route). We have modelled the effect of moving a number of parking spaces from the Northgate Group to the Westgate Group.

Case 1: We assume that the trips taken to/from Northgate Group are taken in the same route proportions as before transfer of spaces. Without going through a whole new assignment process there is no reason to choose another distribution[44] [45].

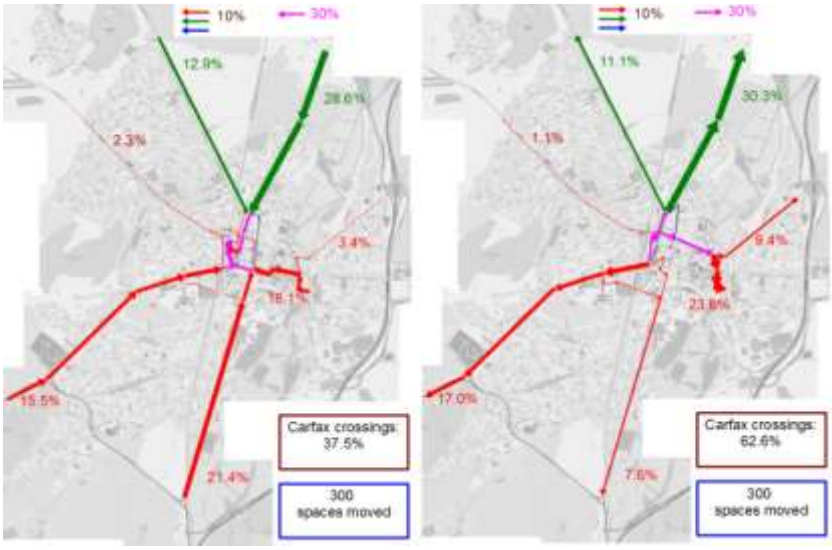


Figure 42 WinACC AA Route Planner weekday assignments to Northgate and Westgate groups, with 300 spaces moved from Northgate to Westgate (Case 1), (including apportioning for alternative routes that take 1 minute longer than the fastest route).

The result of this transfer of places is to load the Carfax junction substantially more than previously. This result is, for us, intuitive, but it is clearly completely at odds with the assertion in the Station Area Brief based on the UF study quoted above.

We can in fact compute the additional loading on the Carfax junction as a function of the number of places transferred:

[44] Quite apart from the effort involved, reassignment of trips (e.g. using AA Route Planner) is quite problematic – which of the current trips does one choose to transfer to GS prior to determining whether they change access corridor? Furthermore we have no reason to suppose that the trip purpose of traffic from southern routes, say, was actually to reach the Westgate area and defaulted to the Northgate area for whatever reason – the drivers may have had specific reasons to get to the Northgate area.

[45] A rough working of a scheme in which the residual Northgate places are assigned firstly to routes 1 and 2, followed by all other trips (if there are any beyond the residual capacity) in the previous proportions, does not greatly affect the results of this analysis.

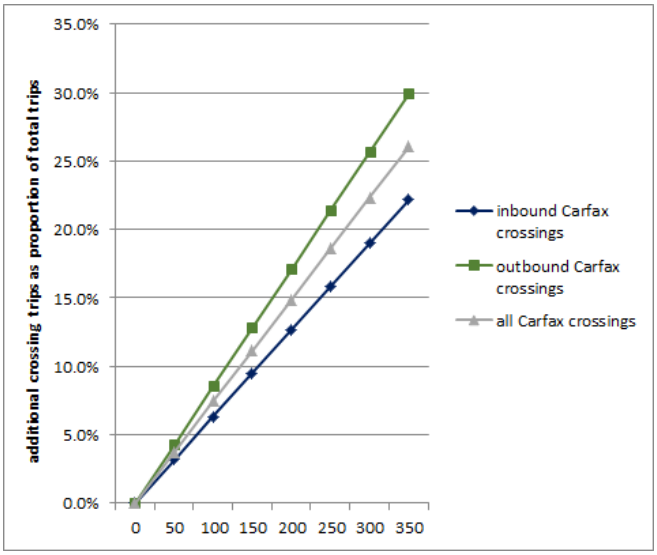


Figure 43 Additional Carfax crossings (Case 1) as function of spaces transferred from Northgate Car Park Group to Westgate Car Park Group (WinACC AA weekday assignments including apportioning for alternative routes that take 1 minute longer than the fastest route).

Even if we were to take the UF assignments in its data and even if we were to assume (nonsensically) that the outbound route assignments should be the same as the inbound, the calculation still shows a gain in the number of cars crossing the Carfax Junction:

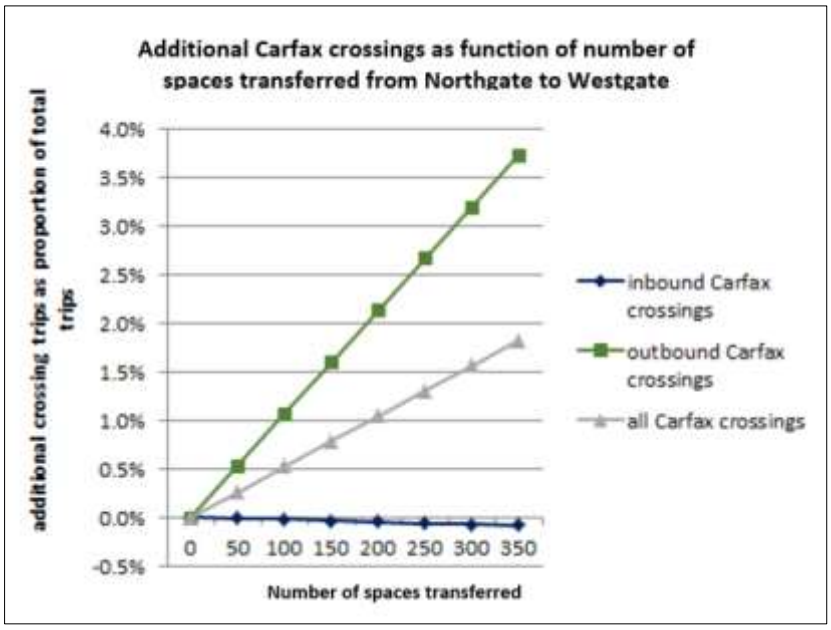


Figure 44 Additional Carfax crossings (Case 1) as function of spaces transferred from Northgate to Westgate (using the UF assignments outbound = inbound).

We have yet to understand how UF have come to the conclusion that their assignments lead to a non-intuitive decline in trips across Carfax and would welcome an explanation.

Using our own AA-based route assignments we map out below the likely traffic effects of a transfer. We show the difference between the number of trips at key points in the network

after the proposed transfer and at the time of the survey[46]. Red figures show percentage increase, green figures preceded by a minus sign show percentage decrease.



Figure 45 Parking trip winners and losers in the proposed (Case 1) transfer of parking spaces from Northgate Group to Westgate Group (red figures, losers, show percentage gains; green figures, gainers, show percentage reductions)

The main losers would be in the already problematic area of Upper High Street, Newburgh Street, Gladstone Street, Sussex Street and Andover Road. Jewry Street is the only significant gainer (Hyde Street and Stockbridge Road have only small numbers of car-park related trips) and this relates to a much smaller number of trips than in the Westgate Area.

Case 2: In response to a suggestion from UF that the Carfax crossing calculation with a transfer of places from NG to WG is flawed under our assumption of an unchanged radial route assignment, we have carried out a further test. Looking only (for economy of effort) at the AA first choice routeing we run the Cattle Market trips to a destination in Westgate and examine where each trip involves a change in Carfax crossing. We can then again assume that the trip distribution for Cattle Market is a good proxy for the Northgate Group and that for Gladstone Street as a proxy for the Westgate Group. The corresponding graph is:

[46] This is not a traffic multiplier since there are many more journeys in the underlying traffic distribution; it refers only to cars using car parks in the survey. The after:before ratio of trips on a link, however, gives some estimate of whether the link benefits or suffers from the transfer.

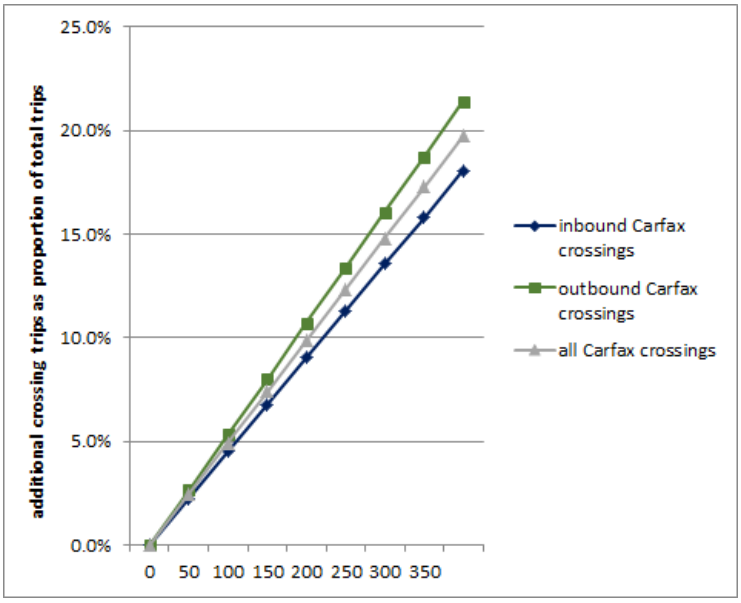


Figure 46: Additional Carfax crossings (Case 2) as function of spaces transferred from Northgate Car Park Group to Westgate Car Park Group (WinACC AA weekday minimum assignments)

This does show a smaller change in Carfax crossing, but qualitatively draws the same conclusion. There is a caveat. The great majority of assignment changes involve an increase in route 5 on both ingress and egress. The AA outbound assignments usually then involve the rat-runs of St Clement Street (mostly) and St James Lane. Since both these rat-runs are significantly congested in the evening rush hour it must be questionable whether they could bear the extra journeys that a car park move would then entail. The traffic diversion consequent upon such congestion would for south and south-east trip ends most likely be via gateways 2-4, i.e. involve further crossing of Carfax.

Conclusions

The central transport thesis of the Station Area Design Brief is that moving parking from the Cattle Market area to the Gladstone Street area would be beneficial, in particular that crossings of the Carfax junction would be reduced. Our analysis shows that this thesis is not just highly suspect, it represents the opposite of the truth. The faulty reasoning behind the thesis is several-fold:

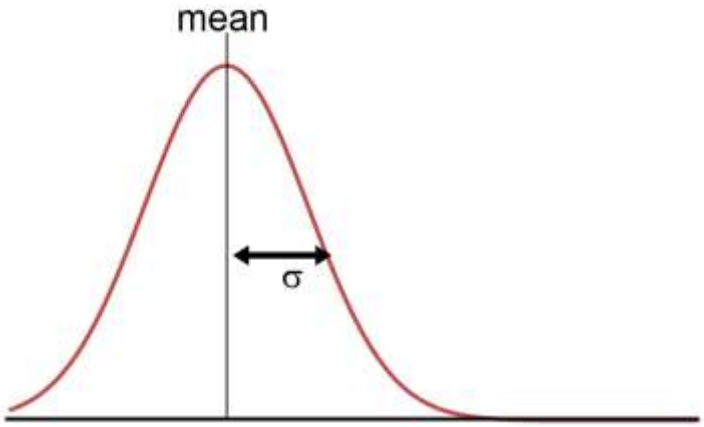
1) It appears completely to ignore the huge difference in route assignment between inbound and outbound traffic.
2) The actual assignment of routes on the inbound trips does not accord with the routes that route-planner software would assign. It also chooses all-or-nothing routes without regard to probability of choice between closely competing routes.
3) Even if one takes the UF assignment and one assumes that outbound trips are assigned identically to the inbound trips, our calculations lead to additional Carfax crossings. The UF calculation of reduced Carfax crossings resulting from their assignments remains inscrutable.

Appendix 5
Methodology for calculating probability of choice of route

Statistical processes

Statistical terms

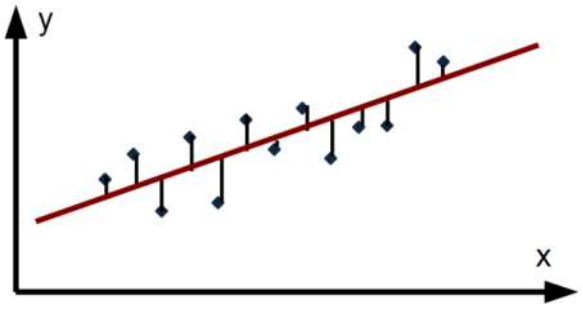
All statistical analysis in this report is based on the assumption that the 'error' distributions of data are 'Normal' (or Gaussian). Measurements of any quantity will be distributed about a mean according to a bell-shaped curve:



The spread of the measurements is characterised by the so-called 'standard deviation' (written SD or σ). 68% of the measurements will fall within one standard deviation of the mean, 95% within 2σ. Clearly car park occupancy cannot be completely represented by a normal distribution since it is bounded between empty and full whereas 'normal' implies allowed values from -infinity to +infinity. But as a device for useful statistical analysis (averages and spreads of data) it is mostly adequate. The standard deviation for car parks that are very close to being full (Westgate car parks and Barfield), however, is not very meaningful.

Data fitting

Trend lines are fitted on various graphical representations in this paper. We use the standard spreadsheet facility for this and exclusively confine ourselves to straight line fits, there being no *a priori* reason to use higher order fits. It is well, however, to understand what the process involves. The trend line is a form of 'least squares fitting', in other words, finding the line that minimises a measure of the distances of the data from it.

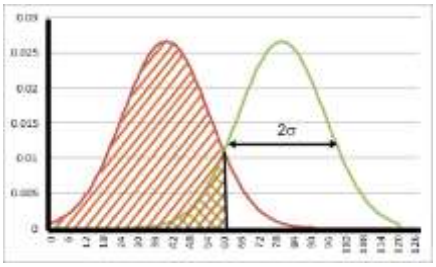


In the usual case it is assumed that one variable (x) is known precisely, but that the other (y) is subject to variability, either as a result of a natural variation in the quantity or as an error in the measurement of it, or both[47]. In all cases our best assumption is that the variation from a trend line obeys 'normal' statistics, in which case the 'best' fit of the trend line is that which minimises the sum of the squares of the deviations of data points from the line. With this minimised sum one can also compute the error in the slope of the fitted line and its intersection with the y axis. This, for example, allows the calculation of the probability that a positive trend-line could be negative (see section on the park-and-ride intercept).

Use of normal distributions in route assignment

The resolution of AA Route Planner assignments is 1 minute, which is adequate (see below). The minimum journey time is one way of assigning actual route, though one can often find more than one route with the same minimum. Where, for example, two different routes have the same assigned minimum time the sensible traffic analysis is to resolve this into two half-journeys. Clearly any AA assignment must be deemed to have a time 'error' in it, by which we mean a variability in making exactly the same journey[48]. If we assume a normal distribution of route time we could characterise it by a standard deviation. What is reasonable?

A traffic light junction like Carfax has a cycle typically of 3-4 minutes. A standard deviation (σ) of a given journey might therefore very reasonably be pitched at one or two minutes[49]. If we select a σ and take the minimum AA-assigned route time as the normal distribution mean, then a route with a close but differing (longer) mean time will have some probability of being a valid assignment.



In the figure, if the red normal distribution corresponds to the (or a) minimum-time AA route and the green distribution to an alternative slightly longer time AA route, then the expectation is that the ratio of uses of the two routes would be the ratio of the hatched areas red:green. Assuming that the two distributions are the same (and it is hard to argue

[47] For the data collected in this report we are largely talking about natural variation – we are definite about the date of collection and confident that we can count vehicles or spaces without error.

[48] The AA assignment may be a precise algorithm result assuming an average traffic speed or allowed traffic speed, but there will be variability in the conditions of traffic and arrival times at junctions as well as variability in driver choice.

[49] In a 6-phase (to include pedestrian phases) 4 minute cycle the mean wait time is about 1.4 minutes with a standard deviation of about 1.1 minute, assuming that there are no queues (i.e. no other traffic – just the statistics of arrival time). The real σ for the Carfax junction is likely to be significantly greater than one minute. Note also that the resolution of the AA Route Planner is one minute.

for a particular difference), this is an easy calculation to make. The argument and calculation are extendable to the case where there are more than one minimum time routes and closely competing routes. We have set up an algorithm to do the calculation for any assumption of σ, including virtually zero (i.e. the case where only exactly minimum time routes are wanted).[50]

[50] For a one-minute σ, two AA journey times separated by one minute would imply one route being chosen 84% of the time and the other (longer) 16% of the time.

Appendix 6
WinACC surveys

Two types of survey have been carried out by WinACC:

- Public off-street car parking surveys – data accumulated since May 2010. Supplemented with some City Council survey data (including a week of data acquired in 2007).
- A single survey of private non-residential car parking

Very recently we have considered that there is an important overlap of these two groups, in that the station car parks in terms of function and traffic effect are more akin to public parking than private non-residential parking. We have begun regular surveying of these but at this time there is not enough data on which to report.

Public car park surveys

There is a difference in method between WinACC surveys which are sequential and those of the City Council which are simultaneous, but this is not thought to make a material difference.

All public car parks, including park-and-ride sites are surveyed, typically once a month. The essential measurement is the number of cars in a car park, but this may be either from direct counting of cars or derived from counting spaces and assuming an overall capacity[51]. The most useful derived measure is occupancy (i.e. the number of spaces occupied at the time of survey, as a fraction of the total number of allocated spaces). Surveys have been mostly on ordinary weekdays (most often Wednesdays, which consistency allows trend information to be more meaningful), but the data includes some Saturday and Sunday surveys. School half-term weeks are usually avoided though a few weekday surveys took place in a school half-term. All surveys have been confined to mid-morning to mid-afternoon, which are the likeliest periods for maximum overall occupancy.

Though occasional surveys are carried out on the spur of the moment, most are planned ahead. The point of this is that, because we carry out our surveys by bicycling round all the car parks, we try not to be tempted to do the work only in pleasant weather – this could bias results.

The off-street car parks are indicated in Table 6, categorised according to a convention which loosely describes location and car park type. Where possible we have adopted Winchester City Council terminology, though we think that there are strong arguments for reviewing the terminology used, to improve the impact of signage and publicity on car park choice.

[51] Care has to be taken in using a previously estimated capacity. This sometimes changes either permanently (as in St Peter's or Friarsgate) or temporarily (as with recent works in Colebrook Street). The recorded measure is cars parked and should not be subject to interpretation. The interpretation (e.g. occupancy) can change with assumption (e.g. in the historical series of measurements for Friarsgate does occupancy relate to an original capacity or the current capacity?).

Central surface	Central multi-storey	Inner surface	Inner multi-storey	Park and Ride (Outer)
Middle Brook St.	The Brooks	Gladstone Street	Chesil Street	Barfield
Colebrook Street	Friarsgate	Chesil Street		St. Catherine's
Cossack Lane	Tower Street	Cattle Market		South Winchester
Upper Brook St.		Worthy Lane		
Jewry Street		Coach Park		
St Peter's		River Park		
		Durngate		

Table 6 Off-street public car parks - conventional categorisation

Categorisation by length of stay

The City Council has also categorised by length of stay, but while short-stay car parking tends to be geographically central and long-stay further out, there seems no particular reason to tie parking categories to this historical description. Indeed visitors to Winchester may well believe that it is not possible to buy tickets for short periods at a long stay car park and may unnecessarily continue to a central car park as a result. The nomenclature is misleading: at all 'long-stay' car parks it is cheaper to park for two hours than it is at a short stay car park.

Categorisation by impact on the road system

Since WinACC sees the issue of car parking as closely related to the problems of traffic and pollution it seems logical to categorise by the contribution that individual car parks are likely to make to these problems. The simplest aggregation would be to recognise that the main problems are concerned with the central circulatory system – Jewry Street, North Walls, Eastgate Street, Friarsgate and St George's Street. The shopping centre is the main attractor here (though not the only one – River Park and the Leisure Centre are separate attractors).

A second problematic category relates to the attractors of the station and the County Council office complex. It is especially problematic because Romsey Road outside the Westgate has comparable pollution levels to St George's Street.

Central circulatory system	Westgate area	Edge of centre	Park and Ride
Middle Brook Street	Tower Street	Chesil Street multi-storey	Barfield
The Brooks	Gladstone Street	Chesil Street Surface	St. Catherine's
Cossack Lane		Cattle Market	South Winchester
Upper Brook Street		Worthy Lane	Pitt
Jewry Street		Coach Park	
St Peters		Colebrook Street	
Friarsgate		Durngate	
River Park			

Table 7 Off-street public car parks - categorisation by traffic effect

It is probable that users of Durngate do not significantly enter the central circulatory system and likely that Colebrook Street similarly avoids this part of the network (though it does involve St Swithun's (City) Bridge and thus contributes to some of the traffic problem).

In relation to traffic effect this categorisation does ignore the differences between surface and multi-storey provision. Behaviourally there is a tendency to avoid parking in multi-storey provision (e.g. note the popular use of Chesil surface car park and the relative emptiness of the multi-storey; also there will be queues for Middle Brook Street when Friarsgate and the Brooks are under-used). In relation to traffic policy, however, existing multi-storey parking ought to have more of an investment inertia.

Capacity reduction priorities

If the Council were to take measures to reduce traffic it ought logically to begin by closing surface parks. These are straightforward disposable assets of high development or housing value; their closure moreover represents no loss of capital investment. Multi-storey provision, however, represents both capital investment that would have to be written off and an impediment to new development since the structures are unlikely to have any potential for conversion to more useful buildings and would entail demolition costs. Such considerations would not apply to Friarsgate, however, since it is a structure in rapid decline and would need demolition in any case.

Private non-residential car park survey

WinACC volunteers surveyed private non-residential off-street parking in Winchester town during November 2011 on weekdays between 10am and 4pm. The survey covered areas within easy walking distance of Winchester town centre. An initial decision not to include parking at Tesco's and Westgate School with Western primary School was later reviewed and thought to be an illogical omission. In the absence of direct survey data it was decided to make estimates for these sites using Google Earth.

Some long-derelict sites (especially at Bar End) had (have) significant potential parking capacities, but since this would be to prejudge the use of the sites when they become re-opened, they were not counted in the 2011 survey.

Figure 30 and Figure 47 show the surveyed areas. In this report the data is aggregated into the sub-areas shown in Figure 47. WinACC has the data collected for individual businesses or institutions. The sub-areas have been chosen roughly to reflect either a distinct zonal nature or a distinctly different access likelihood.

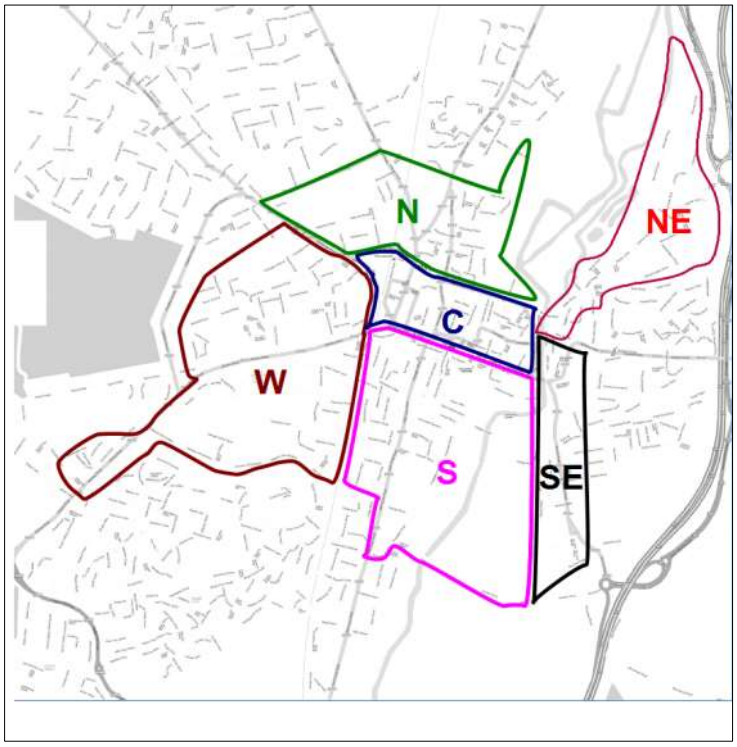


Figure 47: Zones surveyed for private non-residential parking

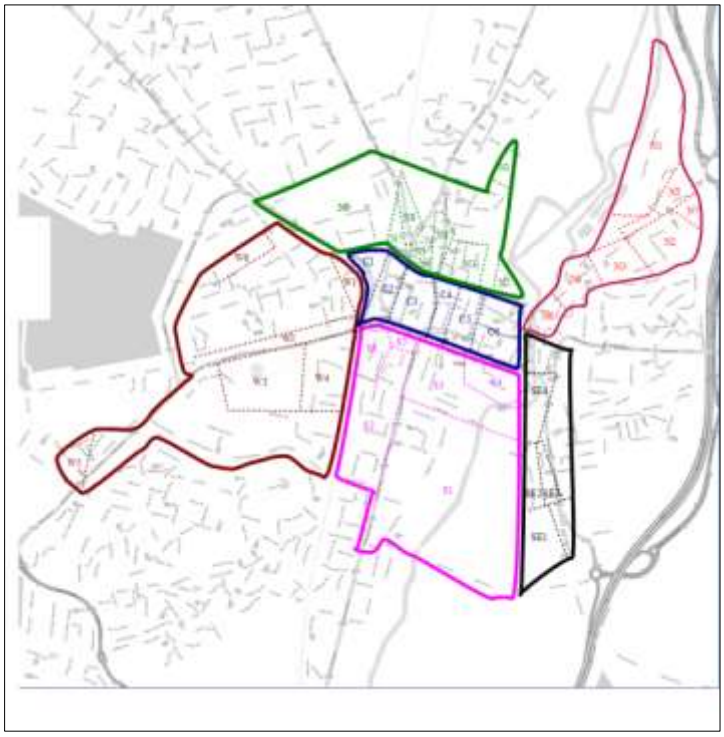


Figure 48: Sub-zones for private non-residential survey

Appendix 7
Winchester car park publicity and the current charging régime

Promoting lower pollution/emissions parking behaviour

Publicity and parking charging structure

Currently the publicity and charging structure seem to encourage maximum congestion and city centre emissions. At the time of writing (February 2016) the essential web page on Winchester town parking looks like this:

Winchester City Council

	MONDAY TO SATURDAY							Season Ticket Group
	Up to ½ Hour £	Up to 1 Hour £	Up to 2 Hours £	Up to 3 Hours £	Up to 4 Hours £	Over 4 Hours £	Up to 6 Hours (Sat only) £	
'Centre' Car Parks								
The Brooks		1.30	2.70	3.50	4.50	15.00	6.00	
Middle Brook Street		1.30	2.70	3.50	4.50	15.00	6.00	
Colebrook Street (7566)		1.30	2.70	3.50	4.50			
Guildhall Yard (Sat Only) EV		1.30	2.70	3.50	4.50			
Jewry Street (7217)		1.30	2.70	3.50	4.50			
Cossack Lane (7218)		1.30	2.70	3.50	4.50			
Upper Brook Street (7222)		1.30	2.70	3.00	4.00			
St.Peters (7563)	0.30	1.30	2.70	3.00	4.00			Group B
Tower Street (7565)		1.30	2.70	3.50	4.50	8.00		Group B
Gladstone Street (7562)		1.30	2.70	3.00	4.00	8.00		Group B
'Inner' Car Parks								
Chesil (Multi-Storey) (7559)		1.10	1.80	2.70	3.50	6.00		Group DC
Durngate (7220)			1.80	2.70	3.50	7.00		Group D
The Cattle Market (7560)			1.80	2.70	3.50	7.00		Group D
Worthy Lane (7564)			1.80	2.70	3.50	7.00		Group D
Coach Park (Cars) (7561)			1.80	2.70	3.50	7.00		Group D
Coach Park (Coaches)						7.00		
River Park Leisure Centre (9am-5pm) (7221)		0.70	0.90	1.20	Up to 5 hours 5.00	5hrs + 10.00 Mon-Fri 8.00 Sat		
Crowder Terrace / The Lido	Season Ticket Holders Only							Group D
Barfield Close (89053)	Season Ticket Holders Only							Group E

'Outer' Car Parks - Park & Ride					
Barfield (2545) / St Catherines (2547)	3.00 per day (Mon-Sat)	2.50 off-peak (after 10:30 Mon- Fri)	£1.50 (Saturday only – 3hr max)	(Free after 4pm)	Smart Cards Available Discounted parking £2.70 per day
South Winchester (2546) EV	3.00 per day (Mon-Sat)	2.50 off-peak (after 10:30 Mon- Fri)			
Pitt (2548)	3.00 per day (Mon-Sat)	2.50 off-peak (after 10:30 Mon- Fri)			

Winchester City Council

OFF-STREET PARKING CHARGES

Mon-Sat 8am-6pm
(River Park 9am-5pm)

As from 8th Feb 2016

Key
- Disabled Bays
- Parent & Child Bays
- Motorcycle Parking
- Coach Parking
- Motorhome Parking
- Caravans
- (7566) Pay by Phone Code
- Not Available

SEASON TICKETS

ANNUAL PRICES

Group B	£1472.00
Group D	£1288.00
Group DC	£1104.00
Group E	£552.00
Group F	£275.00

QUARTERLY PRICES

Group B	£400.00
Group D	£350.00
Group DC	£300.00
Group E	£150.00
Group F	£75.00

CATTLE MARKET AND WORTHY LANE ONLY
(Purchase from car park machine)

28 Day Ticket	£85.00
7 Day Ticket	£25.00

Discouragement of parking in the centre

The ordering of the sections puts central car parks at the top, and reinforces the idea of the centre as 'the place to park'. The order of the three bands should be reversed.

The differential in charging is clearly too little to discourage parking in the centre and should be increased.

Park-and-ride car parks are dealt with in an insignificant band at the bottom of the page. Visitors wishing to use them will need reassurance that the buses run at a reasonable frequency, and cyclists would like information about park-and-cycle, unless it has been abolished. Some information on the bus service and cycle route seems essential. If this an example of how park-and-cycle has been promoted it perhaps explains a low take-up. This publicity needs a redesign that actively promotes park-and-ride car parks.

A major omission is any reference to the station car parks. Integrated information will enable facility sharing, reduce the perceived need for duplicate facilities, and help cope with occasional influxes at Christmas and during festivals. In particular, the station car park could reduce Saturday traffic in the centre, and enable closure of a number of central car parks so they can be put to better use. The station west car park is well-placed to intercept traffic from the south and west, and well-placed to relieve Tower Street Car Park and obviate the development of Gladstone Street Car Park. At £2.00 all day on Saturday, it is good value.

Winchester Station Car Park Rates	
Mon-Fri in 00:00-16:00 out by 00:00	£8.00
Mon-Fri in after 16:00 out by 00:00	£2.00
Saturday, Sunday, Bank Holidays 0.00 to 0.00	£2.00

The need for greater structural simplicity

In publicity speak, this is the car parking offer for Winchester. However it does not obey the usual rules of simplicity and clarity. As a system, the car parks in Winchester charging régime is as arcane as the train fares or the benefits systems, similarly full of perverse incentives, and similarly an inducement to gaming behaviour (such as car park flipping). Simplification is long overdue. Curious anomalies will intrigue intending visiting drivers interested in detail and best value, and will baffle and irritate everybody else, namely:

- the 50 pence discount on some time bands at Upper Brook Street and St Peter's, the £1 discount on parking at Chesil (Multi-Storey) for over 4 hours,
- the confusing anachronism of the names of St Peter's car park (nothing adjacent still carries the name – the church and similarly named street are 10 minutes' walk away, the school is on the edge of town), and of Cattle Market (cows were last seen there 60 years ago)
- the unhelpful name 'Coach Park' which does not advertise its car park role,
- the financial benefit of buying serial half-hour tickets at St Peters,
- the prohibition of paying for up to an hour at Durngate, Cattle Market, Worthy Lane, and Coach Park, and for over four hours at Colebrook Street, Cossack Lane, Upper Brook Street, Jewry Street and St Peter's,
- the prohibition of parking in the Guildhall Yard on Mon – Fri,
- the cheap parking for up to 3 hours at River Park, and cheap parking for over 4 hours at Middle Brook Street and the Brooks on Saturdays undercutting car park fees for further out at Durngate, Cattlemarket, Coach Park and Worthy Lane,
- the complete silence about what happens on Sunday (Begging questions: What are the charges? Can you park in Guildhall Yard? Are any car parks closed like Cattle Market sometimes is? Do the park-and-ride buses run?)
- the Saturday price reduction at Barfield and St Catherine's, but subject to a 3-hour maximum stay; a Pavlovian encouragement and discouragement.
- the reduced price at South Winchester and Pitt after 10:30 on week-days but the lack of a reduced price after 10:30 on Saturdays even though they are emptier on

Saturdays and traffic congestion in the centre is worse, so their use needs to be promoted even more on Saturdays. At least there does not appear to be a time limit in these car parks like there is in Barfield on Saturdays. Why these differences? Why are they not free after 16:00 on Saturday like Barfield and St Catherine's.?

- the greater expense of using park-and-ride smart cards than normal tariffs in off-peak hours, or, than at St Catherine's and Barfield, on Saturdays. Why is there no off-peak smart card?

The need for a better map

The current map fails to tell visitors how they can get to South Winchester park-and-ride from anywhere but Winchester town centre. They are unlikely to retrace their steps once they are in Winchester, by which time they are probably emitting pollution, bewildered, on the one-way system. This is not going to encourage drivers to park at South Winchester park-and-ride.

Coloured rings showing the difference between centre, inner, and outer bands would help people spot good value car parks.

