Cheshire West and Chester

Chester Transport Strategy Phase Two

Park and Ride Serving the A56 Hoole Road Corridor

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CONTENTS

TABLES

FIGURES

APPENDICES

1. EXECUTIVE SUMMARY

1.1.1 This Executive Summary highlights the key issues emerging from the workstream A2 commissioned as part of Phase 2 of the Chester Transport Strategy. The requirement to undertake this analysis emerges from the recommendations from the Chester Transport Strategy Phase 1. This highlighted a number of issues including:

- revised pricing strategy both for city centre car parking as well as Park and Ride;
- opportunities for marketing Park and Ride more effectively;
- progress to a net revenue contract as the basis of negotiations with potential operators;
- need for a fifth Park and Ride identified, with Hoole Road nominated as a possible location.

1.1.2 The proposal for a fifth Park and Ride site was intended to complement the existing sites at Upton, Boughton Heath, Wrexham Road and Sealand Road. Analysis confirmed that the 450 spaces at Upton were used the most intensively, with the proximity to Chester Zoo contributing to this outcome by generating a useful reverse travel flow. Whilst the Wrexham Road site has the largest number (1,200 spaces), it is poorly utilised with a significant number of spaces available at most times of the day. Furthermore, observational surveys indicated a number of drivers were using the site to park and then walk to the nearby business park or car share to other destinations in response to the shortage of parking in these locations. This issue was highlighted in the Chester Transport Strategy, although the impact of this behaviour versus the enforcement costs that would need to be implemented to reduce this activity would need to be carefully assessed.

1.1.3 It is also worthwhile noting that since the Phase 1 work was completed, passenger numbers using Park and Ride have dropped by 20% between 2011/12 and 2013/14. This represents a reduction from 780,000 to 630,000 journeys during this period. Within this total, Boughton Heath was affected by a 45% reduction from 255,000 to 160,000 trips. Although the general lack of marketing activity and the removal of English National Concessionary Fares have contributed to this overall decline, localised traffic congestion issues have contributed to the higher reduction in usage affecting Boughton Heath.

1.1.4 Parking charges in Chester city centre have been compared to those in other historic centres. This benchmarking exercise highlighted that there may be scope to increase city centre parking costs when the charges for Chester are compared with other historic cities. The political impact of any changes to the current structure would need to be sensitively considered, with a number of factors influencing this decision including the ‘strength’ of the economy, the attractiveness of the retail offer

for tourists and more regular visitors, plus the competition with other neighbouring retail and leisure facilities.

1.1.5 An inventory review of the existing Park and Ride facilities indicated that some were in a relatively poor condition. This highlighted concerns about the quality of surfaces, markings, pedestrian facilities, shelters / waiting areas and payment facilities. Comparisons with 'exemplar' Park and Ride sites including York reinforced these limitations affecting Chester.

Strategic Case for a New Park and Ride Site

1.1.6 As noted above, one of the recommendations from the Chester Transport Strategy Phase 1 was the potential demand for an additional Park and Ride site. A key part of this workstream was a critical review of the strategic case for a new facility, and its potential usage. This review comprised an assessment of the 'gaps' resulting from the coverage of existing sites, along with an examination of the traffic volumes using the radial corridors towards Chester city centre not served by Park and Ride, including the A50, A56, M53, A51 and A5104 to determine their relative traffic volumes. A combination of these traffic volumes, the synergies between alternative sites and the forecast change in traffic delays was used. The main gap highlighted that the A56 Hoole Road corridor, which would be served by the M53 southbound, the westbound M56 and the westbound A56, offered the strongest performing proposal. A site serving Hoole Road could also abstract traffic from the A540 corridor. Based on data taken from a traffic model, this demonstrated the overall travel market during the peak hour was about 1,200 vehicles, with about 725 vehicles during the off-peak hour.

Forecasting and Sensitivity Tests

1.1.7 A forecasting model was developed to estimate the number of trips that could use a new Park and Ride. The model was populated using travel times and costs for both car and Park and Ride. Initially, this model was used to demonstrate the current usage at the four existing Park and Ride sites could be replicated compared with the observed data. The model was then repopulated using information for Hoole Road. The assumed frequency of six buses per hour replicated the Park and Ride service characteristics offered by other major historic cities, although it is recognised this interval is higher than the other routes in Chester. A total of 195,000 passengers could be attracted to a Park and Ride on Hoole Road using a combination of car demand abstracted from the A56 / M53 and the A540 corridors. Based on an average yield of £1.80 per passenger estimated from the four Park and Ride sites in Chester, this equates to a total of £350,000 revenue per annum once the impact of the adjustment factors which reflect the time lag for passengers to adjust their journey patterns have been absorbed.

1.1.8 A number of sensitivity tests were conducted to demonstrate the impact of changes. For example, the introduction of higher city centre parking charges for motorists would help to generate an 82% increase in demand compared with the 5% impact from deteriorating congestion. A further sensitivity test indicated that the introduction of 5 buses per hour rather than 6 per hour during the peak periods would reduce total demand by 5%. This reflects the modest change in overall journey time which is only applicable at certain times of the day.

Operating Costs and Financial Appraisal

1.1.9 The annual operating costs were estimated to inform the financial impacts of the scheme. Three additional buses would be required, although this assumption did not take account of the requirement to cover for maintenance spares. Based on the journey times, service distance and operating period, the estimated annual costs were about £410,000. If a frequency of five buses per hour were operated rather six during the peak period, the differences in operating costs would negligible. Once journey patterns had become established, the service would require a £60,000 subsidy per annum assuming the recent decline in passenger numbers can be addressed. The funding required for the first year of operation would be an extra £100,000 subsidy per annum which reflects the lower usage.

Scheme Appraisal and Recommended Next Steps

1.1.10 At this stage of scheme development, no detailed scheme costs have been prepared, so estimates from other recent examples have been used. The appraisal demonstrates that the business case assessment would generate a weak value for money assessment based on current assumptions. This indicates that measures to boost demand will need to be identified, with some private sector contributions to supplement other funding sources. To help achieve the higher demand, an increased commercial focus will also be required from the new operator when the contract is renewed to address the limited marketing and an ineffective ticketing strategy. Furthermore, a more extensive range of city centre attractions will be required including the completion of the Northgate development and the completion of the theatre complex to diversify the range of attractions contributing to the evening economy in central Chester.

With revenue funding required, it is unrealistic to consider a date earlier than 2018 for opening the Hoole Road Park and Ride. Indeed, it would be more likely that the new site would need to coincide with the later development phases of the Chester Business Quarter and the Northgate scheme opening. This would be consistent with the time period to address the weaknesses associated with the existing system.

2. INTRODUCTION

2.1 Background to Park and Ride in Chester

2.1.1 Cheshire West & Chester Council has identified a site serving the A56 corridor as a possible gap in the Park and Ride network. Policies adopted through the 1990 Traffic Study provided a framework for the development of three park and ride sites serving Sealand Road, Boughton Heath and Upton. In 1997 a further three potential sites were identified in the Chester Transport Study to enhance the existing network and serve other corridors approaching the city. The three sites identified were Wrexham Road, M53/A56 (Hoole Road) and Parkgate Road. Following the completion of this study and the necessary feasibility work, the Wrexham Road Park and Ride site was constructed.

2.1.2 Once the proposal for a 5th Park and Ride site located at the M53/A56 junction had been identified, further work by Colin Buchanan & Partners Ltd led to the production of a Park and Ride Assessment report. This report identified the most appropriate option for expanding Chester's Park and Ride network and six sites were assessed in terms of transport and catchment and environmental impact. An initial study in 2005 concluded that 1,000 additional spaces would be required at sites to support city centre developments. The report also highlighted that 40% of this demand would be served by the Sealand Road and Wrexham Road Corridors, where additional capacity was available.

2.1.3 The 2007 report indicated that an additional 500 spaces would be required on a Saturday and 200 on weekdays to serve the corridors to the north east of Chester where there was no significant spare capacity. Each potential site was shortlisted and assessed in terms of their environmental and transport planning impacts. The report indicated that the Hoole Road site was the most favourable when assessed against scheme objectives, whilst this site also had the potential to operate as part of a guided bus-way through the utilisation of a disused railway line.

2.1.4 The Chester Transport Strategy Phase 1 report was produced by AECOM in February 2014 and emphasised a series of recommendations:

- Requirement for a general restructuring and consolidation of car parking provision in the city centre;
- The existing pricing strategy adopted at Park and Ride sites needed to be re-vamped, with prices increased by 10%, more flexible charging systems (24 hour parking) and multi-journey options;
- The Park and Ride offer needed to diversify to include a focus on retailing activities;

- A review of Park and Ride operations was advocated which would be conducted as part of the forthcoming contract review with a progression towards a net revenue contract;
- The cost of city centre parking also needed to be simplified, with standardised charges depending on the duration of stay;
- Park and Ride needed to be acknowledged as part of the parking strategy, rather than as part of the public transport network; and
- The management of the sites needed to be planned in such a way to safeguard revenue and minimise unauthorised parking by motorists who did not use the use buses into the city centre. However, the impact of the additional enforcement measures needed to traded off against the additional costs.

2.1.5 In addition to these generic themes, the requirement for a fifth Park and Ride were also identified which could potentially serve the A56 Hoole Road corridor. This identification for a fifth site, potentially serving the A56 forms the starting point for this study. One of the main objectives for bus based park and ride is encouraging car users travelling to large urban centres to transfer onto public transport for part of their journey. The introduction of Park and Ride can form part of a sustainable transport strategy by encouraging the use of public transport even if the journey origins are quite dispersed. The historic characteristics of some cities, including the shortage of central parking, pricing strategy and reductions in road space, has contributed to their wider success. Park and Ride sites can help to control congestion levels, particularly in historic centres where the generation of additional traffic could have a detrimental impact on the performance of the road network if it already operates close to capacity.

2.1.6 Looking at Chester specifically, encouraging some drivers who are travelling to the city centre to transfer to bus will help to make better use of scarce road space and reduce carbon emissions, particularly in the sensitive area bordered by Chester inner ring road. The deployment of Park and Ride services can be attractive for tourists since the availability of car parking close to the strategic road network removes the 'hassle factor' of parking when visiting a destination infrequently. The transfer of some of the car kilometres associated with a journey onto a bus is an important consideration, since the carbon emissions per bus passenger kilometre are about 30% lower compared with a car[1].

2.2 Context for Park and Ride in the UK

2.2.1 There are over 150 Park and Ride sites across the UK, with the most successful examples generally located in historic cities which have limited road space available to accommodate any increase in traffic resulting from economic growth. Examples include York, Norwich, Cambridge

[1] Source, Act on CO2, part of the DirectGov website, www.actonco2.direct.gov.uk

and Oxford. However, there have been a number of schemes in other towns which have been less successful, so understanding the contributory factors is useful to ensure the same issues do not arise with any proposals to further invest in service provision. A review of this cross-section of operations in other cities has identified a number of important characteristics which help to inform the outcome of park and ride schemes, which are summarised as follows:

- **Size of potential catchment:** the most successful schemes serve an urban centre with a population of at least 100,000 people. This size of catchment is required to ensure sufficient journeys will be completed to the city centre. There needs to be enough trips for Park and Ride to secure a meaningful share of the market, whilst supporting a high frequency bus service;
- **Location:** sites need to maximise their proximity to the potential catchment with a location close to the strategic road network which are subject to minimal delays from congestion. Effective signing is also required to promote the site. However, the site should not be too close to the urban centre since car drivers would generally prefer to sit in their cars during a traffic jam, rather than a bus which is affected by delays;
- **Service Frequency**: departures every 10 minutes mean passengers do not need a timetable. There are a small number of examples that operate at a lower frequency, but a service every 12-15 minutes is less attractive for short distance journeys. Schemes with just 4 buses per hour throughout the day may not be considered frequent enough, particularly for short distance trips;
- **Role of Demand Management:** a successful park and ride is an integral component of an effective urban transport policy. The most successful schemes are integrated into an overarching demand management strategy including the cost and availability of parking, especially in historic cities and towns. This is evident from the most successful English schemes; and
- **Costs:** the ratio of bus fare using the park and ride versus the typical peak and off-peak parking charges should be considered. This ratio needs to be considered for both regular peak commuters and off-peak tourists and shoppers. A lower ratio indicates the competitiveness of Park and Ride is reduced versus parking in the city centre since the dis-incentive to drive into the main urban area is reduced.

3. OVERVIEW OF LAND USE AND CAR PARKING IN CENTRAL CHESTER

3.1 Introduction

3.1.1 The purpose of this analysis is to assess the case for additional Park and Ride sites in terms of its location, and in particular, the requirement for a site at Hoole Road. To evaluate the feasibility of a new site, the potential service pattern, number of motorists that could use the site and hence the parking capacity need to be determined, along with the site facilities. Depending on the outcome of the financial and economic business case, the suitability of potential funding opportunities to deliver this proposal will then be examined.

3.2 Existing Land Uses and Major Employment Sites

3.2.1 **Figure 3.1** illustrates Chester city centre which is bordered by the inner ring road (St Martins Way). The city is well known for its historical urban centre and city wall which help to attract numerous tourists, whilst the racecourse and its range of bars, hotels, restaurants and retail outlets are further reasons to encourage visitors to the city centre.

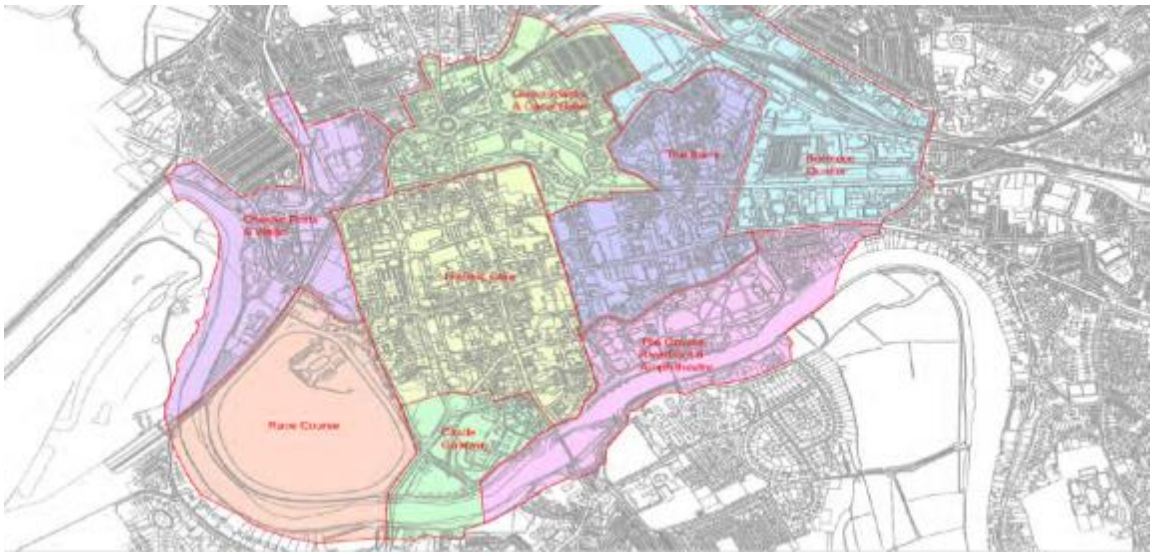


FIGURE 3-1 – CHESTER CITY CENTRE ZONES

3.2.2 Chester railway station has direct services to / from stations on the North Wales coast, London, Liverpool, Manchester, Shrewsbury and South Wales, plus Birmingham. Local bus services start / finish in the existing bus interchange in Northgate. However, existing bus and rail connections are fairly poor since they are located at opposite ends of the city. This issue will be partially addressed since the approved planning application for the Gorse Stacks bus interchange, as the walking distance between the stations for both modes would be reduced.

3.2.3 In spite of several service sector firms being located in the city centre, the largest employment sites are located mainly on the outskirts of the city along four corridors. This indicates the majority of trips to the city centre are either for retail, tourism and leisure. The main employment sites in Chester are located on the following corridors:

- **A5116 (Liverpool Road):** several major employment sites include Countess of Chester Hospital, Chester Zoo and a Morrison Superstore;
- **A483 (Wrexham Road):** Chester Business Park is located opposite the Wrexham Road Park and Ride site. This site has attracted several major office based employers including; MBNA, M&S Money, Lloyds Banking Group and Bristol Myers Squibb Ltd; and
- **A548 (Sealand Road):** This route serves The Greyhound Retail Park and Sealand Industrial Estate. The former attracts large retailers such as DFS, Curry's and John Lewis, with the latter containing a mix of office, light industry and warehousing.

3.2.4 **Figure 3.2** illustrates the location of these employment sites relative to the city centre. This demonstrates that Chester city centre is primarily serving retail and tourist functions, whilst the main employment sites are located on radial corridors towards the city centre. This spatial pattern of jobs inevitably means journey patterns are more dispersed and this may affect the suitability of Park and Ride to encourage more sustainable travel patterns to the city centre.

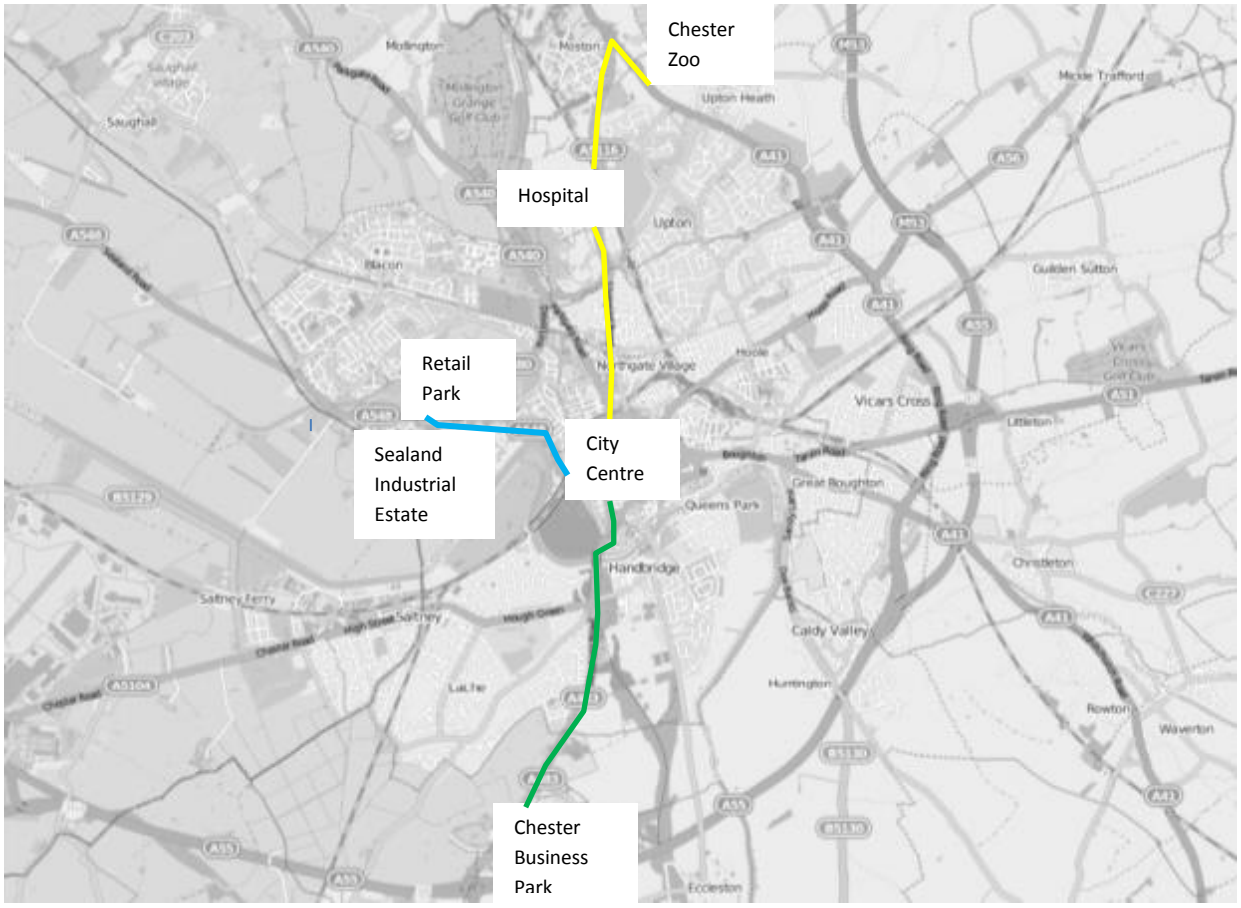


FIGURE 3-2 – MAJOR EMPLOYMENT SITES

3.3 Future Land Use

3.3.1 The assumptions set out above need to reflect the ongoing changes affecting assumptions. For example, a planning application was approved for the new Chester Bus Exchange at Gorse Stacks. The following developments as outlined in the One City Plan 2012 – 2027 could have a significant impact on city centre traffic and includes the following developments set out below:

- **Northgate Scheme**: Redevelopment of the Northgate Area intends to strengthen the position of Chester as a retail and visitor destination. Proposals for a new theatre, cinema, anchor store and other retail outlets have been put forward;
- **Chester Business Quarter**: A major initiative for Chester is the business quarter in the east of the city. Using the Railway Station as a gateway to the city, some 500,000 square feet of high quality new office space and new public realm will drive Chester's commercial offer and economic growth. Another commercial scheme is proposed to compliment Chester Central;

- **New Theatre**: Closely associated with the Northgate scheme, a new theatre attracting visitors at evenings and weekends is currently under construction on Hunter Street/Northgate Street; and
- **Waitrose Site**: South of Chester Central and the Shropshire Union Canal is the private sector retail-led mixed development of the former Boughton Retail Park.

3.3.2 These developments could potentially increase demand on the radial corridors to the city centre.

3.4 Parking Charges in Central Chester

3.4.1 As noted in the introductory comments above, the parking charges in the city centre are an important factor in determining the willingness of drivers to switch to Park and Ride rather than driving into the city centre. **Table 3.1** describes the number of spaces and costs for city centre car parks. At most car parks, there is separate pricing for short stay visitors and shoppers, although parking is generally more expensive for all-day visitors compared with the former. Interestingly, parking is free at the Gorse Stacks, Market and Brook Street sites after 15.00, albeit with motorists restricted to a maximum of stay of four hours. This approach will help to attract shoppers during the late afternoon and early evening visitors to the city centre, although such a policy will reduce the attractiveness of the Park and Ride sites for some shopping trips.

Location	No. of spaces	Cost
Cuppin Street	21	£4 - up to two hours, £4.90 - two to four hours, £5.90 - four to six hours, £7.80 - six hours or more, £1.50 after 5pm.
Garden Lane	120	£1.20 - up to one hour, £3.90 - one to two hours, £4 - two to three hours, £5 - three to six hours, £5.80 - over six hours, £1.50 after 5pm
Gorse Stacks (scheduled to close 2015)	110	£4 - up to two hours, £4.90 - two to four hours, £5.90 - four to six hours, £7.80 - over six hours, free after 3pm.
Little Roodee	452	£4 - up to three hours, £5 - three to six hours, £5.80 - over six hours, £1.50 - after 5pm
Market	625	£3.70 - up to two hours, £4.60 - two to four hours, £5.60 - four to six hours, £8.80 - over six hours, free after 3pm.
Brook Street	137	£1.80 - up to 1 hour, £3 - one to two hours, £4 - two to three hours, £5 - three to six hours, £5.80 - over six hours, Free after 3pm.
Trinity Street	145	£2 - up to 1 and a half hours, £4.90 - up to two hours, £7.40 up to 3 hours, £2 after 5pm.
Watergate Street	128	£4 - up to 3 hours, £5 - three to six hours, £5.80 - over six hours, £1.50 after 5pm.
Delamere Street	351	£4 – Up to two hours, £4.90 – two to four hours, £5.90 – four to six hours, £7.80 – over six hours. Medical Centre users - £1 – Up to two hours, Normal fees apply for over two hours, Free after 3pm 6.30am - 9.00pm.
Frodsham Street	80	8am to 6pm, blue badge (four hours) and permit holders only.£1.50 after 6pm.
Hamilton Place	9	Free for four hours - disabled places only

TABLE 3-1 – CHARGES FOR CITY CENTRE PARKING

Ticket Type		City						
		Chester	**York**	**Bath**	**Shrewsbury**	**Exeter**	**Oxford**	**Cambridge**
Park and Ride	**Service Frequencies (during peak periods)**							
	Parking charge	Free	Free	Free	Free	Free	£2-4	£1
	Single	Not available	£2.00	Not available	Not available	Not available	£1.70-£2.00	Not available
	Return	£2.00	£2.70	£3.20	£1.60	£2.40	£2.70-£3.20	£2.70
	Child	Free	Free	Free	Free	£1.60	£1.30	Free
	Week	No discount	£12.00	No discount	£6.40	£9.70	Not available	£12.50
	Month	No discount	£44.00	No discount	£24.00	£32.00	£39.00	£50.00
	Multi-tickets	5 + 2 free for £10.00	No discount	10 singles for £13	10 returns for £14.40	12 singles for £14	No discount	No discount
Short Stay Parking	***Example***	***Market***	***Castle Mills***	***Kingsmeade Square***	***Raven Meadows***	***Bampfield Street***	***Oxpens***	***Grand Arcade***
	1 hr	£3.70	£2.00	£1.60	£1.50	£1.20	£2.50	£2.20
	2 hrs	£3.70	£4.00	£3.10	£2.50	£2.20	£4.00	£4.50
	3 hrs	£4.60	£6.00	£4.30	£3.50	£3.30	£6.00	£6.80
	4 hrs	£4.60	£8.00	£5.40	£4.00	£5.70	£8.00	£10.00
	5 hrs	£5.60	£10.00	-	£5.00	£7.70	£12.00	£19.00
	6 hrs	£5.60	£11.50	-	£6.00	£10.80	£12.00	£25.00
	7 hrs	£8.80	£11.50	-	£8.00	£10.80	£18.00	£25.00
	8 hrs	£8.80	£11.50	-	£8.00	£10.80	£18.00	£25.00
	Eve	Free after 3pm	£2.00	As above	Free	Free	£3.00	£1.20 / hour
Long Stay Parking	***Example***	***Little Roodee***	***Bootham Row***	***Charlotte Street***	***St Julian's Friars***	***Triangle***	***Summer-town***	***Grafton Works***
	1 hr	£4.00	£2.30	£5.40	£1.20	£0.80	£1.20	£2.00
	2 hrs	£4.00	£4.60	£5.40	£2.70	£1.20	£1.70	£3.60
	3 hrs	£4.00	£6.90	£5.40	£2.70	£1.70	£3.20	£5.50
	4 hrs	£5.00	£8.20	£5.40	£4.00	£3.80	£5.20	£9.10
	5 hrs	£5.00	£10.50	£6.40	£4.00	£6.20	£13.10	£16.50
	6 hrs	£5.00	£12.80	£6.40	£4.00	£6.20	£13.10	£16.50
	7 hrs	£5.80	£15.10	£8.50	£4.00	£6.20	£13.10	£16.50
	8 hrs	£5.80	£17.40	£8.50	£4.00	£6.20	£13.10	£16.50
	Eve	£1.50	£2.00	£1.50	Free	Free	£1.20	£1.20/hour

TABLE 3-2- COMPARISON OF PARKING PRICES IN SELECTED HISTORIC CITIES[2]

3.4.2 A comparison of the relationship between typical parking charges for the city centre versus the Park and Ride has been completed for a sample of historic cities. This indicates whether the ratio in Chester is relatively low (for example, Park and Ride is relatively cheap compared with city centre parking) or high. **Table 3.3** summarises the impacts and there are two key observations emerging:

- **Firstly**, the Park and Ride cost in Chester is lower than the majority of other historic cities used as comparators, with only Stratford-upon-Avon offering a similar fare. This suggests there may be scope to increase the fares for Park and Ride in Chester;
- **Secondly**, some of the ratios between city centre parking and Park and Ride costs are lower in Chester compared with some of the other selected cities. Similar to the results for Chester, there is some variation in the parking charges between the city centre parks which reflects the mixture of private and local authority managed sites, along with the quality of facilities and their location. Whilst the ratios for some cities are comparable to Chester, the ratios for Cambridge, Oxford and York are significantly higher. This suggests there may be scope for increasing the parking charges in the city centre. Any changes would require discussion with local authority officers and other stakeholders given the resulting political implications. It is worthwhile reinforcing that any increase in city centre parking charges would strengthen the competitiveness of the Park and Ride sites serving Chester if the difference between their respective charges was increased.

3.4.3 Based on the typical costs of a return Park and Ride fare, plus the costs of an 8 hour visit to short or long stay parking, the ratios for Chester versus other examples shown in **Table 3.2** have been calculated, and are presented in **Table 3.3.** Using colour coding to illustrate those cities with higher (red) or lower (blue) car parking, this indicates the majority of comparators impose higher charges than Chester. The only exceptions are Shrewsbury (both long stay and short stay) and Bath (short stay only).

Ticket Type	City						
	Chester	York	Bath	Shrewsbury	Exeter	Oxford	Cambridge
Park and Ride	2.00	2.70	3.20	1.60	2.40	2.95	2.70
Short stay (8 hours)	8.80	11.50	5.40	8.00	10.80	18.00	25.00
Long stay (8 hours)	5.80	17.40	8.50	4.00	6.20	13.10	16.50
% difference: short stay		30%	-39%	-9%	23%	104%	184%
Absolute difference: short stay		£2.70	-£3.40	-£0.80	£2.00	£9.20	£16.20
% difference: long stay		200%	47%	-31%	7%	126%	184%
Absolute difference: long stay		£11.60	£2.70	-£1.80	£0.40	£7.30	£10.70

TABLE 3-3- COMPARISON OF PARKING PRICES IN SELECTED HISTORIC CITIES VERSUS CHESTER

4. EXISTING PARK AND RIDE IN CHESTER

4.1 Introduction

4.1.1 There are four existing Park and Ride sites which serve the following corridors as shown in **Figure 4.1**:

- **A5116** (Liverpool Road) – Upton;
- **A5115** (Whitchurch Road) – Boughton Heath;
- **A483** (Wrexham Road) – Wrexham Road; and
- **A548** (Sealand Road) – Sealand Road.

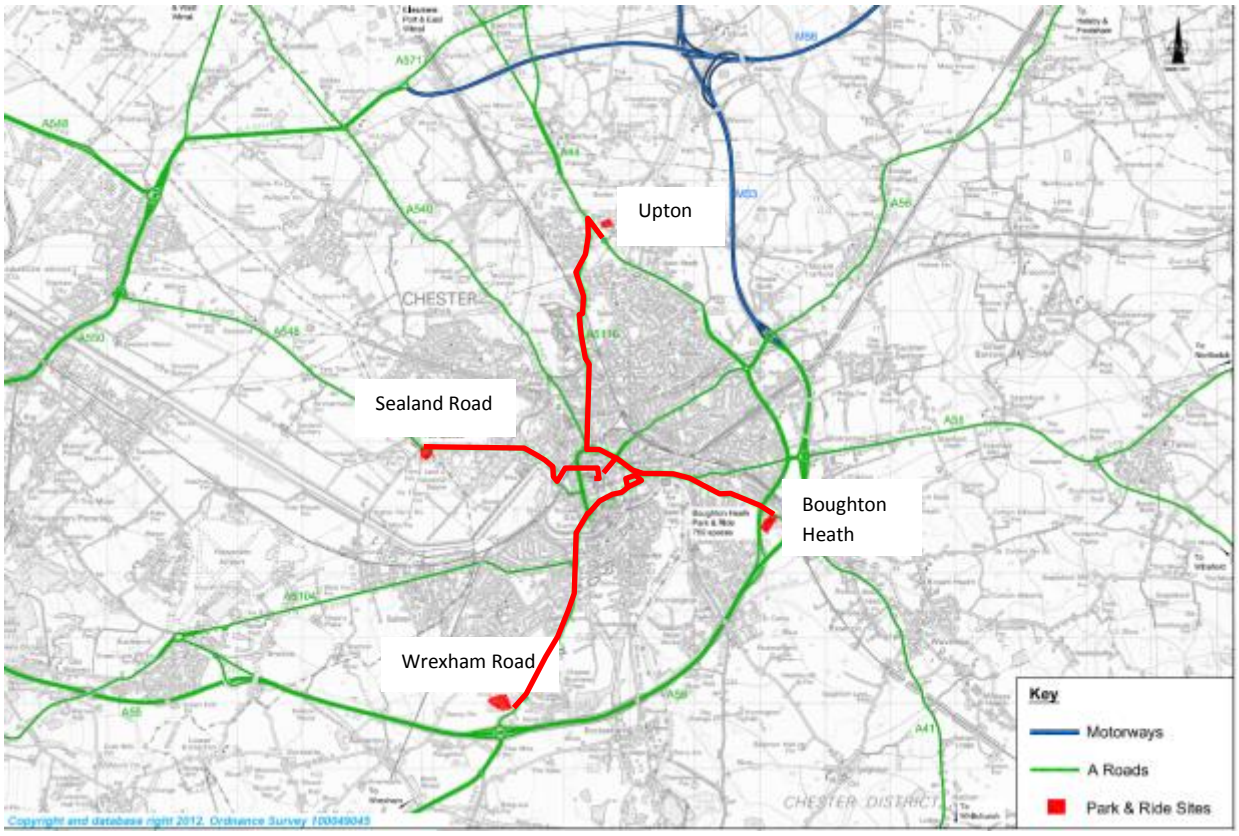


FIGURE 4-1 – EXISTING PARK AND RIDE SERVICES

4.1.2 Observational surveys were undertaken by CW&C staff to understand the vehicle occupancy levels and incidents of passengers 'leaking' from the Park and Ride, either by walking to nearby employment sites or other locations adjacent to the site, or incidents of being collected from the site by another motorist in order to share parking costs in the city centre.

4.2 Upton Park and Ride

4.2.1 With 450 spaces, Upton is the smallest site. However, previous AECOM studies have suggested it is the best performing site in terms of parking occupancy. The opportunity to serve Chester Zoo after 09.00 as a reverse direction flow has contributed to this outcome. The catchment for this site includes trips from Birkenhead, Ellesmere Port and various catchments on the Wirral that use the A5116 (Liverpool Road) corridor for routes to the city centre. Currently, signs from Junction 12 of the M53 direct traffic to this Park and Ride, although this does require a lengthy detour via A41. Journey time to the bus station is about 14 minutes. There are also stops at Frodsham Street close to the city centre with some services calling additionally at Chester Railway Station. The observational surveys indicated that the average vehicle occupancy is about 1.13 persons per vehicle during the AM peak period. Only 9 of the 282 people entering the site did not board a bus, demonstrating the site is being predominantly used for its intended purpose.

4.3 Boughton Heath Park and Ride

4.3.1 With 750 spaces available, Boughton Heath is the 3rd largest site. The service operates via the A5115. This park and ride is convenient for car drivers from the Whitchurch, Shrewsbury and Nantwich areas via the A41 and A51 corridors. However, this site is not convenient for car drivers diverting from the A55 / M53 from the north due to the configuration of the junctions on the former route which necessitate a lengthy detour via the A41. Journey times are about 9 minutes to the city centre. Similar to the results for Upton, there were a high percentage of trips arriving at the site which were using the Park and Ride services, albeit with a slightly higher vehicle occupancy (about 1.19 people per car). There were some extensive roadworks adjacent to the site in 2012/3 which affected the number of motorists using the site in response to the increased journey times.

4.4 Wrexham Road Park and Ride

4.4.1 With 1,200 spaces available, Wrexham Road is the largest Park and Ride site. The service operates via the A483 with stops at both Pepper Street and Foregate Street. There are some bus priority measures in place comprising with flow bus lanes. This site aims to intercept journeys to the city centre from the A483 northbound corridor from Wrexham and the A55 from North Wales. Journey times are approximately 12 minutes to the city centre. This site also offers a large bus shelter facility with an indoor seating area for waiting passengers. A survey conducted by CW&C indicated the average vehicle occupancy is about 1.21 people per vehicle. However, nearly 20% of users did not board one of the Park and Ride services. This highlights a significant number of users being collected by other drivers, or boarding other bus services including the shuttle serving the Chester Business Park.

4.5 Sealand Road Park and Ride

4.5.1 The second largest Park and Ride site serving Chester has 760 spaces available. It operates along the A548 corridor from the west, and there are stops at the existing bus interchange in Northgate. This site is intended to intercept trips from Sealand, Queensferry, Connah's Quay and other parts of Deeside. However, it is less convenient for car drivers using the A55 from North Wales compared with the Wrexham Road site. Journey times are about 8 minutes to the city centre, although this could potentially change given the decision to relocate the bus interchange to the Gorse Stacks site. Similar to the results for the Wrexham Road site, Sealand Road has also been observed to have a high number of non-users parking at the site. The average vehicle occupancy is 1.14, but there were over 30% of people arriving at the site who did not use one of the Park and Ride buses. Although there were a small number of incidents with car drivers collecting others who had already parked at the site and continuing their journey, the majority of users leaving the site without using Park and Ride walked to the nearby local businesses. It is assumed parking restrictions at these employment sites resulted in these outcomes. This issue would become more problematic when the car park starts to approach its capacity.

4.6 Historic Comparison of Passenger Demand

4.6.1 **Table 4.1** summarises the number of trips and the revenue generated by the Park and Ride sites for the last three financial years. This highlights a number of interesting trends:

- Overall demand has reduced by 20% between 2011-12 and 2013-14, and this includes a 45% reduction in the usage of Boughton Heath. The junction adjacent to the Park and Ride was remodelled in 2011-12 to cope with the anticipated extra traffic by a new homes development at Saughton. Subsequent issues arising from this new junction has meant that it has since been re-designed a number of times in 2012-13 and again in 2014;
- The reduction affecting other sites is smaller, with about 10% drop for Upton and Wrexham Road, although the Sealand site had a 18% reduction in usage;
- The removal of English National Concessionary Travel (ENCT) free and half fare travel affected all sites, although it has had the largest impact on Boughton Heath, since the latter had the highest number of ENCT travellers. This type of passenger accounted for 33% (or nearly 60,000) journeys generated in 2013-14 from Boughton Heath. Some ENCT passengers either paid the full fare or purchase discounted weekly booklets, but about half of this travel market was lost;
- Yields have also increased over this period, with an increase in November 2012 from £1.75 to £2, whilst free and half fare concessionary fare travel was removed in from 1st April 2013. With some concessionary passengers now having to pay full ticket prices, this has increased income in other ticket revenues;

- There were 45,000 trips in 2013/14 using free travel passes. In the longer term, the availability of these passes is likely to be further reduced. The omission of these journeys could enable the average yield to increase to £1.94. The impact of this revision will be examined as part of the sensitivity tests.

		Upton	Wrexham Road	Sealand	Boughton Heath	Total
2011 -12	Journeys	185,966	215,997	126,748	253,198	781,909
	Revenue (£)	207,384	339,023	190,761	297,930	1,035,098
	Yield (£)	1.12	1.57	1.51	1.18	1.32
2012 -13	Journeys	168,454	190,774	103,106	180,248	642,582
	Revenue (£)	208,445	303,439	172,645	218,996	903,525
	Yield (£)	1.24	1.59	1.67	1.21	1.41
2013 -14	Journeys	167,745	196,727	104,629	160,014	629,115
	Revenue (£)	299,259	351,847	192,539	290,686	1,134,331
	Yield (£)	1.78	1.79	1.84	1.82	1.80

[3] **TABLE 4-1 – SUMMARY OF ANNUAL PARK AND RIDE TRIPS AND REVENUE**

4.7 Comparison with Park and Ride in other cities

4.7.1 It is useful to place the 20% reduction in Park and Ride trips affecting the sites in Chester in a wider context. For example, have other historic cities experienced a similar reduction in Park and Ride usage during this period? Publicly available data has been used to understand recent trends, albeit acknowledging that much of this information is commercially sensitive and therefore not readily available to review. However, the following information has been collated.

- **Bath:** the Council was reluctant to release actual figures, but indicated that demand had risen slightly between 2011 and 2014;
- **Cambridge:** the recent introduction of a £1 parking charge at the sites has had a detrimental impact on passenger usage. There is a £1m annual cost to operate the car parks but this is only partially covered (27%) by the operator paying to run the services, so

[3] Sources: PR Income and Usage Statistics (journeys), Chester PR Operational Summary 2

the parking charges are intended to help cover these costs. The total number of vehicles using Park and Ride has dropped by 30% equating to a reduction of 40,000 cars per month. The number of passengers has reduced by only 12% indicating there is evidence of car sharing to access the sites or use of other modes since concessionary fare payments have increased during this period;

- **Oxford:** details of the actual park and ride were commercially confidential, but proposals have emerged which indicate the County Council is planning to relocate its Park and Ride sites further away from the city centre and expand the number of spaces. The replacement sites would offer double the number of spaces compared with the existing provision at Peartree, Water Eaton, Seacourt and Redbridge, with the six new sites connected by new cross-city bus rapid transit corridors. This level of expansion indicates the County Council recognises Park and Ride has a key role to play in the future transport strategy for Oxford;
- **York:** two new sites have recently opened during the last two years, although the site at Askham Bar replaced a former site which has subsequently closed given it had reached capacity. There was a 10% increase in passenger usage between 2012 and 2014.

4.7.2 Both Oxford and York have adopted a pro-active approach with Park and Ride prominently featuring in the overarching transport and parking strategies. In addition, both cities have limited availability of central area parking which is expensive and these outcomes help to reinforce the role of Park and Ride.

4.7.3 In summary, two of the four cities surveyed indicated passenger usage has increased, whilst a third city has announced plans to progress an ambitious expansion strategy. Whilst the number of car drivers using the Cambridge facility has reduced during the last 12 months, this outcome has resulted following the introduction of a specific intervention. The comparability of the emerging findings from Cambridge has limited relevance for Chester. However, this analysis has highlighted that no city has experienced a reduction in passenger usage which is comparable to Chester.

5. STRATEGIC CASE FOR OTHER PARK AND RIDE SITES

5.1 Introduction

5.1.1 Both the 2005 study and the recommendations from Phase 1 of the Chester Transport Strategy highlighted a potential requirement for a fifth Park and Ride site serving the city, possible serving the A56 Hoole Road corridor. This conclusion forms the starting point for the site assessment, although it is important to complete this evaluation by examining the potential travel markets and the gaps affecting the existing network rather than starting from a pre-determined solution. These considerations are reviewed below.

5.1.2 Whilst the majority of main radial corridors towards Chester city centre are already served by Park and Ride, there are some gaps. For example, there is no site serving the A5104 corridor from the west, but motorists could use the site at Wrexham Road instead. Equally, drivers using the A540 corridor from the Wirral would need to divert to either the Upton or Sealand Road sites for Park and Ride. The catchment for the A56 corridor is also poorly served. One of the other main gaps affects the routes from the east, particularly as the access from Boughton Heath is relatively inconvenient for car drivers arriving from the north or east. For example, motorists using the A56, M56 or M53 corridors arriving in Chester would generally find the Hoole Road corridor the most convenient to access the city centre. **Figure 5.1** illustrates the existing Park and Ride catchments in Chester and the main radial corridors served by these sites. A report issued by Colin Buchanan in 2006 indicated that the A56 site was the preferred location for a 5th P&R serving the city of Chester.

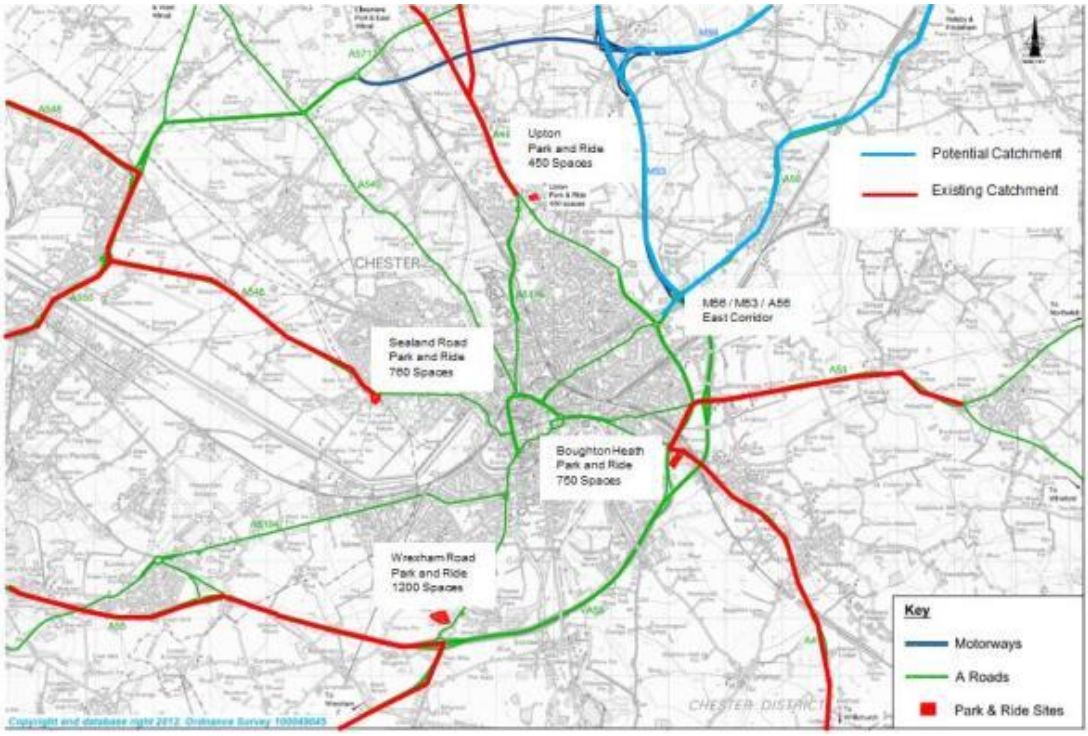


FIGURE 5-1 – EXISTING AND POTENTIAL PARK AND RIDE SITES

5.1.3 To help understand the potential traffic usage of these radial corridors, the number of cars travelling inbound during the AM peak and inter-peak hours is shown in **Table 5.1**, along with the number of trips in the outbound direction during the PM peak period. Data from the Local Model Validation Report (LMVR) has been used.

Route	Direction	AM Peak	Direction	Off Peak	Direction	PM Peak
A540	s/b	730	s/b	348	n/b	661
A56	w/b	1015	w/b	630	e/b	894
M53	s/b	3560	s/b	2090	n/b	3396
A51	w/b	584	w/b	363	e/b	735
A5104	e/b	623	e/b	441	w/b	580

[4] **TABLE 5-1 – SUMMARY OF HOURLY TRAFFIC FLOWS**

5.1.4 The construction of a Park and Ride site serving the Hoole Road adjacent to the A55 / A56 / M53 roundabout could help to address a strategic gap in the Park and Ride provision given the limited access from the M53 / M56 corridors. Similarly, a site to the east of Chester could also serve the A51 corridor too, albeit with a short diversion via the A55, since the traffic volumes using these routes towards the city would not be sufficient to justify two sites. Whilst a high proportion of traffic using the busy 2-lane M53 comprise longer distance trips towards Wrexham (A483) or the North Wales coast corridor (A55), some of the local journeys to the city centre could be diverted to Park and Ride if a site was available.

5.1.5 The A540 corridor from the north attracts between 660 and 730 vehicles per hour in the peak direction of travel, although it is one of the quietest routes during the daytime with fewer than 350 cars per hour. This suggests the case for a Park and Ride site serving this corridor should be a lower priority compared with the Hoole Road site. Furthermore, car drivers approaching Chester from the west via the A5104 could use the Wrexham Road Park and Ride without incurring a significant detour. Given the proximity to the A483, the traffic volumes suggest there may be insufficient traffic using the A5104 to justify a dedicated Park and Ride.

5.1.6 The analysis presented in the first part of this note suggests there may be a case for an additional Park and Ride site serving the eastern corridors into Chester. This conclusion supports the Council decision to designate a plot of land adjacent to the A56 / M53 junction for a new Park and Ride, and the previous recommendations emerging from Phase 1 of the Transport Strategy produced by AECOM. However, it is evident from the review of best practice from other Park and Ride sites that a number of criteria will need to be incorporated into the scheme design, and possibly wider transport policies, to achieve a successful scheme. The following characteristics should be considered:

[4] Source: Chester Traffic Model - Local Model Validation Report

- ensuring the location to the strategic highway network is convenient;
- availability of a high frequency bus service;
- deployment of demand management measures in the city centre which are intended to restrict the level of traffic using the ring road; and
- the relationship between the costs for the Park and Ride versus the charges for city centre parking.

5.1.7 As well as testing the feasibility of a Park and Ride site based on the current parking charges, an alternative sensitivity test will be examined which assumes a charging regime comparable to other historic cities to assess the impacts. The remainder of this note describes the suitability of the modelling tools to evaluate a new Park and Ride site, along with the preparation of an initial business case and the development of the operational characteristics.

5.2 Suitability of the SATURN Traffic Model

Model Development

5.2.1 A SATURN traffic model has previously been developed by consultants for CW&C. Its suitability to evaluate a potential new Park and Ride site at Hoole Road has been examined. For example, link counts were conducted at three locations on the A56 corridor between the city centre ring road and the M53 / A55 / A56. Furthermore, turning movement surveys were conducted the M53 / A55 / A56 junction, and the A56 / A41 junction, whilst a manual survey was completed at Ermine Road / Lightfoot Street / A56 junction.

5.2.2 A roadside interview survey was also completed to the west of the M53 / A55 / A56 junction to record the origin / destination details of car drivers crossing this cordon recorded as part of surveys completed in 2010. As well as examining the functionality of the model for the Hoole Road corridor, several other routes were reviewed including Wrexham Road and Sealand Road given the requirement to undertake a back-casting exercise. This review indicated there was a mix of manual and automatic traffic counts, turning movement surveys and roadside interviews to illustrate journey patterns using these corridors.

5.2.3 This range of data indicates the model should be suitable to assess the potential demand for Park and Ride using Hoole Road as well cross-checking the Sealand Road and Wrexham Road sites. Details of the methodology to develop the SATURN model are outlined in the Chester Traffic Model Local Model Validation Report.

5.2.4 Demonstrating there is a good representation between observed data and the modelled information for the A56 corridor is critical if the model outputs then need to be used for a secondary purpose.

Comparisons between journey time and link flows are the most common indicators used to evaluate these outcomes.

5.2.5 For example, an accurate comparison between the modelled times and the actual timings demonstrates the traffic model is capable of reproducing journey times which could then be included in the development of the Park and Ride forecasts. If the relationship between observed and modelled timings was poor, an alternative data source would be required to populate this part of the model. Secondly, if the comparison between the actual and modelled flows and hence the number of in-scope trips was poor, this would affect the outturn forecasts. These issues are examined in the sections below.

Journey Time Surveys

5.2.6 Journey time surveys were conducted to compare observed timings versus modelled outputs. This assessment was completed for the AM peak, off-peak and PM peak periods for the A56 Hoole Road corridor, plus the A483 Wrexham Road and the A548 Sealand Road. **Tables 5.2 to 5.4** below demonstrate the journey time comparisons fulfil the DMRB criteria with the percentage difference between the observed and modelled totals less than 15%.

5.2.7 For the A56 corridor, the inbound modelled journey times are 10-15% faster than the observed totals throughout the day. During the off-peak period, the modelled times are 2% slower than the observed totals, whilst they are 6-11% faster at other times of the day. The journey time comparisons are also presented for individual route sections to highlight the differences between the observed and modelled data which showed the following time periods;

- AM peak inbound
- AM peak outbound
- Off-peak inbound
- Off-peak outbound
- PM peak inbound
- PM peak outbound

The modelled journey time comparisons for the Wrexham Road and Sealand Road sites are generally closer to the observed timings versus the results for Hoole Road.

Corridor	Dir	Obs	Mod	% diff	Within DMRB
A56 between M53 Junction 12 and the A5268 roundabout	In	7m 3s	6m 2s	-14%	Yes
	Out	6m 9s	5m 31s	-11%	Yes
A483 Wrexham Road between the A55 and Grosvenor Roundabout	In	6m 34s	5m 55s	1%	Yes
	Out	5m 47s	5m 38s	9%	Yes
A548 between Seahill Road and Nicholas Street	In	9m 45s	10m 34s	8%	Yes
	Out	8m 29s	8m 10s	-4%	Yes

[5] **TABLE 5-2 - COMPARISON OF MODELLED AND OBSERVED AM PEAK JOURNEYS**

[5] Source: Chester Traffic Model - Local Model Validation Report

Corridor	Dir	Obs	Mod	% diff	Within DMRB
A56 between M53 Junction 12 and the A5268 roundabout	In	5m 34s	5m 21s	-10%	Yes
	Out	5m 46s	5m 15s	2%	Yes
A483 Wrexham Road between the A55 and Grosvenor Roundabout	In	5m 7s	5m 22s	5%	Yes
	Out	5m 2s	5m 38s	12%	Yes
A548 between Seahill Road and Nicholas Street	In	10m 22s	10m 24s	0%	Yes
	Out	8m 41s	8m 21s	-4%	Yes

[6] **TABLE 5-3 COMPARISON OF MODELLED AND OBSERVED OFF PEAK JOURNEYS**

Corridor	Dir	Obs	Mod	% diff	Within DMRB
A56 between M53 Junction 12 and the A5268 roundabout	In	6m 35s	5m 37s	-15%	Yes
	Out	6m 17s	5m 55s	-6%	Yes
A483 Wrexham Road between the A55 and Grosvenor Roundabout	In	6m 49s	5m 55s	-13%	Yes
	Out	6m 12s	5m 20s	-14%	Yes
A548 between Seahill Road and Nicholas Street	In	12m 35s	11m 31s	-9%	Yes
	Out	9m 29s	10m 32s	11%	Yes

[7] **TABLE 5-4 - COMPARISON OF MODELLED AND OBSERVED PM PEAK JOURNEYS**

Link Flow Comparisons

5.2.8 **Tables 5.5 to 5.7** below present the comparative results for the modelled and observed flows for the A56, A548 and A483 corridors. These results indicate the modelled flows replicate the observed data accurately with GEH[8] values less than 5.0. The combination of accurate modelled flows and journey times indicates it will be possible to use outputs from the model with confidence to help populate the Park and Ride model.

Route	Direction	Obs Flow	Mod Flow	Diff	% Diff	DMRB Criteria	GEH Value
A56 Hoole Road	EB	584	514	-70	-12%	OK	3.0
	WB	845	815	-30	-4%	OK	1.0
	EB	742	712	-30	-4%	OK	1.1
	WB	1,016	969	-47	-5%	OK	1.5
A548 Sealand Road	EB	843	788	-55	-6	OK	1.9
	WB	630	594	-35	-6	OK	1.4
A483 Wrexham Road (north of the A55)	NB	1069	1082	13	1	OK	0.4
	SB	815	785	-29	-4	OK	1.0

[9] **TABLE 5-5 - AM PEAK FLOW: COMPARISON OF MODELLED AND OBSERVED FLOWS (2010)**

[6] Source: Chester Transport Model - Local Model Validation Report for Chester

[7] Source: Chester Transport Model - Local Model Validation Report for Chester

[8] GEH is a statistical measurement used to illustrate the difference between the observed and modelled values. Values less than 5.0 are generally assumed to be acceptable

[9] Source: Chester Transport Model - Local Model Validation Report for Chester

Route	Direction	Obs Flow	Mod Flow	Diff	% Diff	DMRB Criteria	GEH Value
A56 Hoole Road	EB	645	549	-95	-15%	OK	3.9
	WB	636	594	-42	-7%	OK	1.7
	EB	607	534	-73	-12%	OK	3.0
	WB	630	578	-53	-8%	OK	2.1
A548 Sealand Road	EB	679	642	-37	-5%	OK	1.4
	WB	694	684	-10	-1%	OK	0.4
A483 Wrexham Road (north of the A55)	NB	552	524	-28	-5%	OK	1.2
	SB	727	715	-12	-2%	OK	1.9

[10] TABLE 5-6 - OFF PEAK FLOW: COMPARISON OF MODELLED AND OBSERVED FLOWS (2010)

Route	Direction	Obs Flow	Mod Flow	Diff	% Diff	DMRB Criteria	GEH Value
A56 Hoole Road	EB	827	719	-108	13%	OK	3.9
	WB	652	603	-49	-8%	OK	2.0
	EB	894	812	-82	-9%	OK	2.8
	WB	846	772	-74	-9%	OK	2.6
A548 Sealand Road	EB	774	758	-16	-2%	OK	0.6
	WB	834	811	-23	-3%	OK	0.8
A483 Wrexham Road (north of the A55)	NB	638	595	-43	-7%	OK	1.7
	SB	2077	2029	-47	-2%	OK	1.0

[11] TABLE 5-7 - PM PEAK FLOW: COMPARISON OF MODELLED AND OBSERVED FLOWS (2010)

Journey Pattern Data

5.2.9 **Table 5.8** estimates the percentage of traffic using each corridor with a destination in the city centre. Data from the 2012 Parking Strategy has been used to identify the relative proportions of inbound traffic using weekday counts which shows the relative importance of each corridor. It is important to note that due to the importance of trips into Chester's city centre for retail, leisure and tourism, the availability of a similar survey illustrating weekend travel patterns would be beneficial. The Hoole Road corridor has 14% of trips with a destination in the city centre which is similar to the percentage of journeys using other corridors with an existing Park and Ride site including Liverpool Road, Whitchurch Road and Sealand Road.

Transport Corridor	Percentage of Traffic
A5116 Liverpool Road	15%
A5115 Whitchurch Road (A51 Tarvin Road)	12% (8%)
A483 Wrexham Road	24%
A548 Sealand Road	14%
A56 Hoole Road	14%

[12] TABLE 5-8 - PM PEAK FLOW: COMPARISON OF MODELLED AND OBSERVED FLOWS (2010)

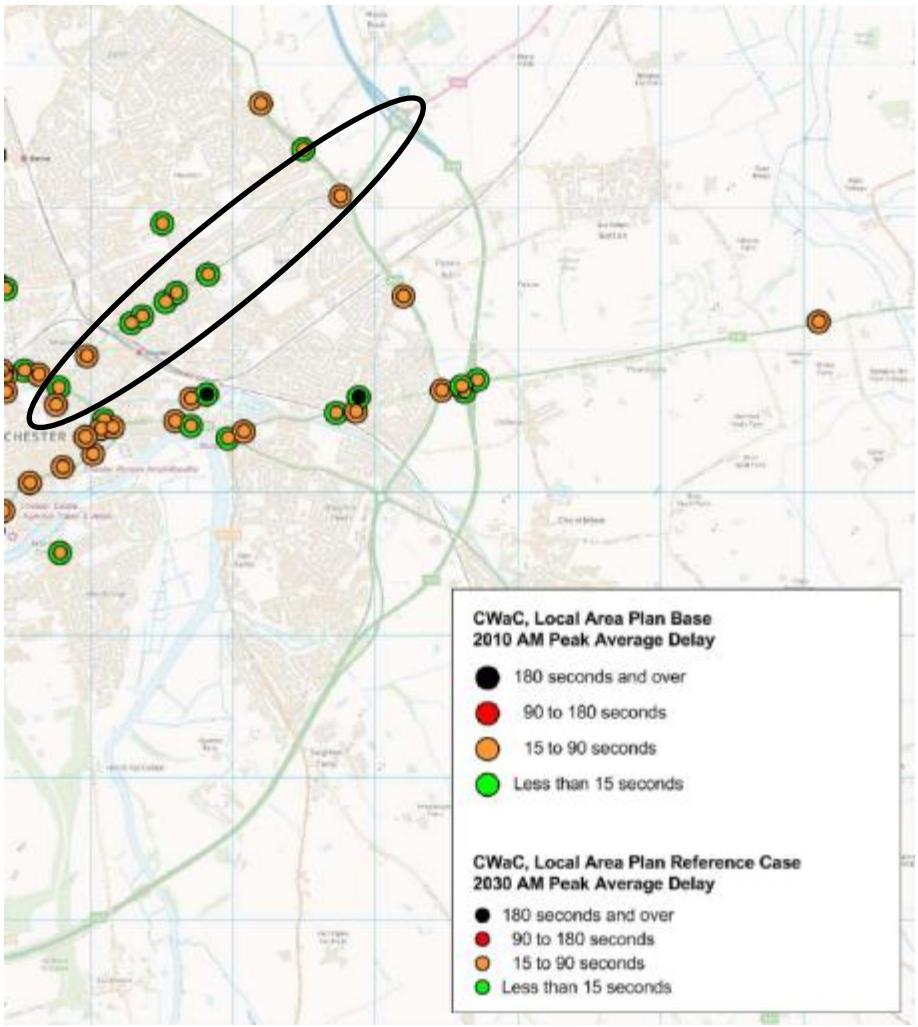
[10] Source: Chester Transport Model - Local Model Validation Report for Chester

[11] Source: Chester Transport Model - Local Model Validation Report for Chester

[13] Source: Chester Parking Strategy 2012

Traffic Delay Forecasts

5.2.10 In addition to traffic count data, current and future traffic delays have been analysed to determine how the A56 corridor may be affected. **Figure 5.2** illustrates the junction hotspot analysis which compares the AM peak delay times in 2010 against projected delays for 2030. Seven hotspots have been identified along the Hoole Road corridor. Within this dataset, there are five locations with a delay of 15 seconds or less, although these delays are expected to deteriorate to 15-90 seconds by 2030. This deterioration in network performance helps to further make the argument for a Park and Ride service on Hoole Road to help intercept some of the traffic and minimise the impact of future congestion issues.



[13] **FIGURE 5-2 – 2010 AND 2030 DELAY HOTSPOTS**

[14] Source: Cheshire West and Chester

5.3 Understanding the Potential Travel Market

5.3.1 As noted in the introductory comments, the size of the potential Park and Ride travel market is a key factor influencing the success of a site. If the size of the travel market is too small, it is unlikely to justify the introduction of a new Park and Ride site based on typical 'intercept' rates noted from other examples. **Figure 5.3** illustrates the distribution of journeys using the Hoole Road corridor to determine the potential Park and Ride travel market during the AM Peak. For example, there are 870 trips in the high peak hour from the M53 southbound plus a further 360 from the A56 Warrington Road.

5.3.2 After passing the proposed Park and Ride on Hoole Road, almost 700 trips have a destination towards the city centre. This analysis illustrates the total number of car trips which could use transfer to other modes, with a further 470 trips using the A41 (north) and about 80 trips using the A41 towards the south. The two latter destinations would not be convenient for Park and Ride users, so only demand towards the city centre should be considered. There is no traffic from the model using the A55 in the northbound direction, since any trips from the south would have already diverted onto the A483 or the A41 / A5115 depending on their final destination in the city centre.

5.3.3 The pattern of trips noted is similar during the Off Peak compared with the AM Peak, albeit with a smaller number of journeys affected. For example, there are 730 trips passing the proposed Park and Ride site which includes 70% from the M53 corridor. An estimated 55% of these trips have a destination in the city centre, which is comparable to the distribution during the AM Peak.

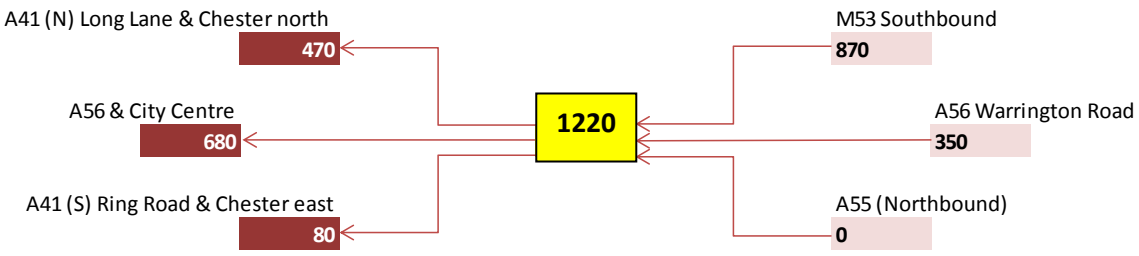


FIGURE 5-3 – SUMMARY OF THE TRIP DISTRIBUTION VIA HOOLE ROAD – AM PEAK

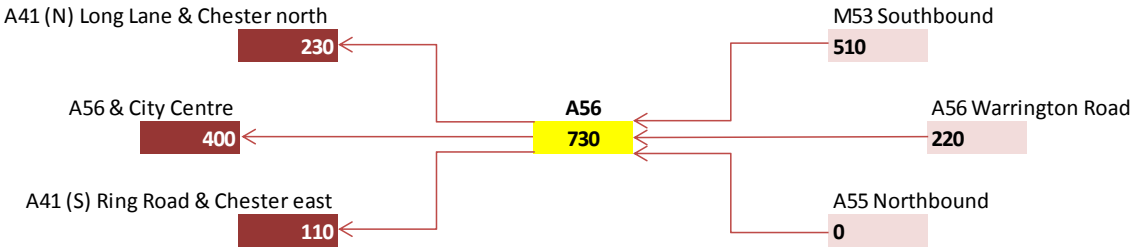


FIGURE 5-4 – SUMMARY OF THE TRIP DISTRIBUTION VIA HOOLE ROAD – OFF PEAK

5.3.4 The total trips with a destination in the city centre indicate the overall travel market. This dataset will then be incorporated into a bespoke Park and Ride model which compares the travel times and costs by car versus Park and Ride. The outputs from this analysis will then be used to estimate the percentage of motorists choosing each mode.

5.4 Summary of the Bespoke Park and Ride Model

5.4.1 The bespoke Park and Ride model has two core functions – firstly to include data for existing sites to demonstrate the model is working accurately and is capable of reproducing the observed data. This activity is an important stage, since it demonstrates whether the model parameters are capable of replicate actual user behaviour. If the comparison of observed versus modelled data is accurate, the framework of the model can then be used to assess the likely demand for a new Park and Ride site serving Hoole Road. The following summarises the data inputs needed to populate the model:

- **Car data inputs**

- **Car trips:** represents the total number of trips identified in the traffic model passing the individual Park and Ride sites with a destination in the city centre. A procedure known as 'select link analysis' has been used to identify the potential trips and has been used to ensure the potential demand included in the model only represents journeys that could transfer;
- **Speeds** represent the average speed via the individual radial corridors, both currently and in the future. The latter takes account of the likely future congestion that could affect overall journey times and lower the competitiveness of private transport versus public transport;
- **Car parking costs:** represents the typical parking cost in pence assumed for a commuter or shopping trip. These costs have been halved to reflect the return characteristics of the journey;
- **Distance:** this input is used in conjunction with the fuel cost per kilometre to estimate car travel costs;
- **Egress time** incorporates the travel time from the car park to the final destination. The car egress time is generally shorter than public transport egress time and reflects the greater flexibility offered by private transport;
- **Car occupancy** with inputs that vary by time of the day in accordance with WebTAG guidance.

- **Park and Ride data inputs**

  - **Parking costs** at the Park and Ride site is expressed in pence. This part of the model is not currently used, since parking is free at present;
  - **Transfer time** includes the travel time which is incurred when car drivers need to divert to the Park and Ride site;
  - **Travel time** spent on the bus which reflects the timetable information;
  - **Egress time** includes the walk time from the bus stop to the assumed final destination;
  - **Fare** is expressed in pence and has been halved to represent the return fare;
  - **Wait time** which is based on half the headway between Park and Ride services. This parameter takes account of the frequency of services from the individual sites.

- **Other inputs**

- **WebTAG fuel parameters** to estimate an average fuel cost per kilometre based on a trip distance;
- **Model coefficients** to convert the various journey time and cost inputs described above to a common base. The coefficients have been adapted from other AECOM project work and are used to estimate the proportion of drivers likely to switch to Park and Ride depending on the relative 'cost' of travel by car or Park and Ride;

5.5 Back-casting

5.5.1 The requirement for 'back-casting' was identified in the methodology since it offers an useful indicator to demonstrate the bespoke forecasting model is capable of producing accurate patronage estimates for the existing Park and Ride sites. A robust comparison indicates car drivers to / from Chester demonstrates broadly consistent travel behaviour with the calibrated Park and Ride model. As a result, the model can be used with confidence to estimate the likely demand that would use a new Park and Ride site serving the Hoole Road corridor. It is important to highlight that the data has been compiled using information from the 2010 base year traffic model. Whilst this provides the most recent dataset that uses consistent information, this set of assumptions will not take account of the recent decline in usage which was noted in **Table 4.1**.

5.5.2 **Table 5.8** presents some key indicators including total traffic flows passing the four existing sites during the AM Peak and Off Peak hours, the Park and Ride mode share during each time period, assumed car occupancy and the estimated modelled daily trips using Park and Ride. These inputs are collated for Saturday and Sunday, and the total annual demand estimated. The modelled total is then compared with the observed totals for each site. This demonstrates the percentage difference between the observed and modelled totals are generally within 4%, whilst the modelled total for the Wrexham Road site is within the 7% of the observed usage. This confirms the model is able to replicate observed user behaviour for the existing Chester Park and Ride sites, and therefore represents a robust framework to estimate potential usage for the proposed new site at Hoole Road.

Park and Ride Site:	Upton	Boughton Heath	Wrexham Road	Sealand Road
Assumed corridors:	A41 from the north & south	A41 and A51 from the west	A483 north of the A55 junction	A548 from the west
Inputs	**Data**			
Weekday AM Peak link flow (hourly)	1,762	1,071	1,069	843
Weekday Off Peak link flow (hourly)	824	1,238	552	694
Weekday AM Peak P&R mode share	21%	21%	23%	26%
Weekday Off Peak P&R mode share	16%	16%	18%	20%
Car occupancy – AM Peak	1.37	1.37	1.37	1.37
Car occupancy – Off Peak	1.59	1.59	1.59	1.59
Total daily trips	352	310	406	197
Total annual modelled trips	192,868	247,520	233,012	130,884
Comparison with observed data (2011/12)	185,966	253,198	215,997	126,748
Percentage difference	-4%	2%	-7%	-3%

[14] **TABLE 5-9 – BACK CASTING EXERCISE FOR EXISTING PARK AND RIDE SITES IN CHESTER**

[15] Source: AECOM Forecasting Model

6. HOOLE ROAD PARK AND RIDE

6.1 Estimating the Potential Demand and Revenue

6.1.1 The demand forecasts for the proposed Hoole Road site are presented in **Table 6.1**. The forecasts have been sub-divided into two sections – firstly, demand passing the proposed site via the A56 which includes traffic from the M53 southbound, the A55 northbound and the A56 westbound. The availability of other Park and Ride sites serving the eastern part of Chester including Boughton Heath means the number of car drivers using the A55 towards the north is likely to be very limited, so the majority of car drivers using the Hoole Road will originate from the A56 westbound or the M53 southbound.

6.1.2 The second travel market to include is car drivers from the M56 westbound who access city centre via the A540 corridor. The availability of a convenient Park and Ride on the eastern side of Chester could also be attractive for these motorists, albeit this represents a smaller number compared with the flow using the A56.

6.1.3 The identification of the two corridors serving the Hoole Road corridor means the size of this travel market is larger than three of the four other Park and Sites serving Chester during the AM Peak. It also generates a travel demand which is similar to Upton during the off-peak. Whilst the Boughton Heath site serves a larger daytime flow, the demand that would serve Hoole Road is significantly larger than Wrexham Road or Sealand Road. **Table 6.1** indicates demand from the M53 / A56 corridor would generate about 154,100 trips per annum with the inclusion of the A540 demand generating a further 40,900 journeys.

6.1.4 It is assumed a charge of £1.80 per passenger will be applied for the Hoole Road Park and Ride, so the total annual revenue is £358,200. The average yield reflects the total revenue from passengers divided by the number of journeys. This yield is less than £2.00 fare, since it reflects the impact of free travel for Council staff. The forecasts presented in **Table 5.8** do not take include 'ramp-up' factors which adjusts demand to reflect the time needed for car drivers to adjust their travel behaviour once the new site has opened. These adjustment factors are usually applied in the first three years of operation, with evidence from other Park and Ride sites indicating values of 50%, 75% and 90% would be suitable. Furthermore, the results in **Table 6.1** are based on 2010 traffic flows and will need to be adjusted to take account of other factors, including changes in traffic growth and the removal of concessionary fares. The temporary revisions to the road layout at Boughton Heath which has had a major adverse impact on usage of this site between 2011-12 and 2013-14 would not be applicable to the Hoole Road site.

Park and Ride Site: Hoole Road			
Assumed corridors:	via the M53 / A55 / A56	Via the A540	Total
Inputs	**Data**		
Weekday AM Peak link flow (hourly)	1,230	200	1,430
Weekday Off Peak link flow (hourly)	630	187	813
Weekday AM Peak P&R mode share	23%	23%	
Weekday Off Peak P&R mode share	18%	18%	
Car occupancy – AM Peak	1.37	1.37	
Car occupancy – Off Peak	1.59	1.59	
Total daily trips	269	64	333
Total annual modelled trips	154,100	44,900	198,900
Total annual revenue (£)	277,400	80,800	358,200

TABLE 6-1 – DEMAND FORECASTS FOR THE HOOLE ROAD PARK AND RIDE SITE
Total annual modelled trips and revenue is rounded to the nearest 100 journeys and £100

6.1.5 If an average adjustment was calculated based on the results for three of the four existing sites and this was added to the forecasting model for Hoole Road (the impact for Boughton Heath was excluded since this takes account of the specific congestion issues), the inclusion of this parameter would reduce demand by around 18%. This would mean a reduction of 160,000 annual users and almost £290,000 revenue would result.

6.2 Sensitivity Testing

6.2.1 To supplement the central case Park and Ride forecasts presented in **Table 6.1**, the impact of some further sensitivity tests have been examined. For example, the change in demand resulting from slower car journey times to reflect worsening congestion levels has been tested, along with the impact of higher car park charges. The third sensitivity test applies a higher yield to all new journeys, based on the alternative £1.94 yield per passenger rather than the £1.80 presented in **Table 3.1**. **Table 6.2** presents the results for two possible sensitivity tests which assume the mode constant is not applied. The first sensitivity demonstrates there would be a relatively modest impact on patronage if car journey times deteriorated by about 20%. Deteriorating car journey times would be consistent with the results presented in **Figure 5.2**, and would lead to a 5% increase in demand.

6.2.2 This sensitivity test assumes sufficient bus priority measures would be introduced to ensure bus journey times for Park and Ride remain constant compared with the current estimate. The second sensitivity test presents the results if the future car parking charges were increased. This revision would have a much larger impact on the generalised costs and hence the relative competitiveness of individual modes. The higher parking charges that would affect motorists in the Chester city centre would encourage a higher number to use Park and Ride, and would double the patronage

forecasts compared with the current scenario. This conclusion reinforces the importance of critically reviewing the charges presented in **Table 3.2**.

6.2.3 There are a number of other factors which could also influence the patronage forecasts. Firstly, the completion of the Chester Business Quarter and Northgate developments will generate new journeys that could transfer to Park and Ride. Secondly, the interface with the availability and cost of the car park at Lightfoot Street and the resulting impact on Park and Ride demand needs to be considered. With potentially 500+ spaces available, and current charges at car parks adjacent to Chester station being £6, changes to these current assumptions will affect potential demand.

		Total daily trips	Total annual trips	Total annual revenue (£)
Core option	M53 / A55 / A56	269	154,100	277,400
	A540	57	44,900	80,800
	Sub-total	326	199,000	358,200
Sensitivity test 1 (worsening congestion)	M53 / A55 / A56	285	161,200	290,200
	A540	60	46,900	76,320
	Sub-total	345	208,100	367,560
Sensitivity test 2 (higher parking charges)	M53 / A55 / A56	597	280,650	505,200
	A540	130	81,400	146,500
	Sub-total	727	362,050	651,700
Sensitivity test 3 (higher yields)	M53 / A55 / A56	269	154,100	299,000
	A540	57	44,900	87,100
	Sub-total	326	199,000	386,100

TABLE 6-2 – IMPACT OF SENSITIVITY TEST – HOOLE ROAD PARK AND RIDE
Total annual modelled trips and revenue is rounded to the nearest 100 journeys and £100

6.3 Operational Issues

6.3.1 To understand the financial implications for the Hoole Road Park and Ride site, the estimated operating costs have been collated for the proposed service. Taking account of the forecast revenue, the annual operating costs will determine whether the service will require financial support or whether a surplus will be generated. It is understood that the current Park and Ride services in Chester require financial support, since the sites do not attract sufficient motorists to cover the operating costs. It is understood that a direct subsidy of £300,000 is paid by CW&C, whilst there is a further cost of £300,000 for site operation and maintenance.

6.3.2 For the Hoole Road site, a departure is assumed every 10 minutes between 07.00 and 19.00 from Monday to Saturday, with a service every 15 minutes on Sundays between 10.00 and 18.00. The single journey distance is about 4.6km from the Park and Ride site to the city centre with a round trip journey time of about 20-24 minutes. There is an assumed layover of 6-10 minutes at the Park and Ride site which should provide motorists with a waiting bus to board at all times. Industry standard operating costs for driver wages, fuel and the cost of buses has been used to estimate the total annual operating cost, as set out below:

- Driver's wages - £173,000 based on the planned operating times (the cost model applies hourly wage rates for weekday and weekend for the expected operating periods;
- Vehicle depreciation costs - £63,000 based on three vehicles;
- Fuel and vehicle maintenance - £170,000 based on three vehicles;
- Total - £410,000.

6.3.3 This total does not include any allowance for 'spare' vehicles to cover scheduled maintenance and repairs, or buses breaking down when in service. However, this allocation could be apportioned across the other four Park and Ride routes in Chester. If the day time frequency is reduced to 5 buses per hour, operating costs would be reduced by around £20,000 per annum in response to the fuel savings realised.

6.3.4 Based on the revenue forecasts presented in **Table 6-2**, a subsidy will be required, particularly in the early years of operation when the demand is still in 'ramp-up', although the impact of traffic growth will subsequently reduce this gap between revenue and operating costs. The impact of highway decongestion and other societal benefits will be quantified to determine whether these impacts are sufficient to offset the capital costs for the scheme and demonstrate the proposal offers good value for money. The forthcoming contract re-letting of the Park and Ride contract could create a framework to achieve this outcome, since this offers a mechanism to identify an appropriate number of 'spare' vehicles for scheduled maintenance or break-downs.

6.4 Abstraction from other sites

6.4.1 The demand forecasts for the potential Hoole Road Park and Ride site are based on existing car drivers travelling to the city centre and not using one of the existing Park and Ride sites. However, it is possible that some existing Park and Ride users may switch to the Hoole Road site since this alternative location may be more convenient. In particular, some drivers using the Boughton Heath and Upton sites may find the Hoole Road site easier to access. If a proportion of drivers did switch, their behaviour would not strengthen the overall case for Park and Ride, since the extra revenue generated for the Hoole Road site would simply be abstracted from another site. However, these changes would affect the number of spaces required at the Hoole Road car park.

6.4.2 To assess the possible abstraction of car drivers from the Boughton Heath and Upton sites to the Hoole Road site, a short postcode survey was undertaken by interviewing car drivers at the existing sites. Permission was obtained from CW&C to interview bus passengers waiting to board and almost 370 surveys were completed on 3rd and 10th March 2015 from 07.00 to 14.00. The distribution of postcodes was aggregated into various postcode sectors with the results shown in **TABLE 6-3** (Upton) and **TABLE 6-4** (Boughton Heath). This analysis revealed that:

- The catchment for the Upton site is relatively small with about one-third of total respondents originating from postcode CH66 which includes the area around Ellesmere Port. A total of 30 respondents originate from CH65 and CH2 which includes Ellesmere Port / Flint and Hoole /. Ince / Mickle Trafford;
- Nearly 40% of the total respondents are using the Upton Park and Ride at least 5 days per week which highlights the importance of regular users. As well as this, nearly 45% of total journeys are made by car drivers travelling once or twice a week indicating there is also a substantial demand from those who are using the site less frequently;
- The postcode origin of drivers using the Boughton Heath site are significantly more dispersed compared with Upton, although the former's closer location to the strategic road network compared with latter may be a contributory factor for this outcome;
- With the exception of trips from CH3, (45% of the total), the pattern of journeys is relatively dispersed with drivers originating from Warrington, Stockport, Crewe and Stoke-on-Trent using the site. Similar to the Upton site, about 40% of car drivers use the Boughton Heath site on a daily basis, with a comparable percentage using Park and Ride once or twice a week. This reinforces the importance of both regular commuters and less frequent leisure users using Park and Ride.

Postcode	Frequency			
	1-2 trips /	3-4 trips / week	5+ trips / week	Total
CH66	23	12	33	67
CH21	5	1	6	12
CH65	12	6	12	30
CH64	6	4	2	12
CH24	3	1	4	8
CH63	5	1	2	8
CH60	2	2	2	6
WA6	4	0	1	5
Other	29	7	14	50
Total	**89**	**34**	**76**	**199**

TABLE 6-3 – DISTRIBUTION OF TRIPS USING UPTON PARK AND RIDE

Postcode	Frequency			
	1-2 trips /	3-4 trips / week	5+ trips / week	Total
CH3	39	19	18	**76**
CW5	2	3	0	**5**
CW6	4	2	4	**10**
CW9	4	1	1	**6**
ST14	1	0	4	**5**
Other	17	13	37	**67**
Total	**67**	**38**	**64**	**169**

TABLE 6-4 – DISTRIBUTION OF TRIPS USING BOUGHTON HEATH PARK AND RIDE

6.5 Concept Access Junction Design

6.5.1 Initial considerations are that access to the proposed Hoole Road Park and Ride site should be via the section of the A56 between the M53/A55 junction and the junction with the A41 Ring Road. This would provide the most convenient access point for vehicles travelling from the M53 and A55 wishing to park at the site and the most direct route to buses along the Hoole Road corridor into the City Centre.

6.5.2 The section of the A56 features a central reserve between the eastbound and westbound carriageways, which feature two running lanes on either side of the carriageway for the full distance between the two roundabout junctions at either end. In order to enable motorists wishing to access the Park and Ride site it will be necessary to remove a section of the central reserve to create a new signal junction.

6.5.3 A Concept Access Junction Design has been produced and can be seen in APPENDIX B

6.5.4 As previously mentioned, the section of the A56 Warrington Road adjacent to the site is dual carriageway with a central reserve. The central reserve is approximately 2.5m wide and both eastbound and westbound carriageways are approximately 8m wide. This section of the A56 adjacent to the site is straight and has a speed limit of 50mph in both directions.

6.5.5 In order to ensure priority to buses and accommodate an all movement access arrangement to the site, a signal junction is proposed as the most appropriate solution for access. The signal junction has been designed with due regard to *Design Manual for Roads and Bridges TD50/04, The Geometric Layout of Signal Controlled Junctions and Signalised Roundabouts (TD50/04). TD50/04* sets out standards, methodology and good practice for the design of geometric layouts for signal controlled junctions where the 85th percentile speed on the approach roads are below 104kph (65mph).

6.5.6 The positioning of a signal junction along the section of A56 adjacent to the proposed park and ride site is constrained by the close proximity of M53 Junction 12 and an existing highway bridge over the disused railway line (currently 'Greenway' cycle route).

6.5.7 As a consequence of providing an all movements signal junction, it is proposed that a 15m section of the existing central reserve be removed to accommodate an all vehicle right turn into the site and a bus only right turn out of the site.

6.5.8 The existing constraints at this location have significantly influenced the geometric layout of the proposed signal junction. The proposed left slip lane into the site has a 15m taper and 40m stacking capacity. The proposed right turn lane into the site has a 15m taper length and a 60m stacking capacity. The westbound stop line is located approximately 116m from M53 Junction 12. The centre of the proposed access is located approximately 75m from the end of the bridge parapet. It should be noted that this concept junction design has not been modelled using junction capacity software.

6.5.9 If the scheme where to progress further, it is recommended that the following be undertaken;

- Speed surveys / traffic counts;
- Junction modelling;
- Further investigation into adequate warning signage for vehicles exiting M53 Junction 12 onto the A56;
- Potential requirement for a vehicle restraint system; and
- At the least, a Stage 1 Road Safety Audit.

6.6 Inventory of Facilities

6.6.1 The following section provides a critical overview of existing Park and Ride facilities at the four sites in Chester. A number of indicators are used to compare the availability and quality of facilities at Chester versus other sites. The Park and Ride sites at York have been used as an exemplar for two main reasons. The total number of motorists using the sites means it is one of the most successful examples in the UK in terms of overall usage. Secondly, two new Park and Ride sites have recently been opened which should provide an excellent comparator to the examples at Chester, whilst the existing facilities including Askham Bar and Rawcliffe Bar must offer a high quality product given the strong competition with city centre parking.

6.6.2 Additionally, comparisons to exemplar sites in comparator historic cities, such as York, will be drawn to justify a case for the inclusion of high quality on-site infrastructure at the Hoole Road site. Where appropriate, references will be made to photographs obtained from a previous site visit to illustrate any significant findings and visually convey key information. A review of some indicators

including lighting and signs highlighted no obvious issues. For example at Upton, the need for signage was fairly minimal due to its size and simplicity. All signs were in good condition with clear information visible to all road users. At the larger Wrexham Road site, there was clear signage to direct drivers from the larger car park to the bus stop. There was also good signing from the strategic network to the Park and Ride sites.

6.6.3 The buses in Chester are approximately 6 years old (except replacement buses), with 38 / 40 seats on-board, plus allocated areas for the disabled. The quality of the on board facilities was generally good with clean, comfortable seating. Unfortunately, these buses were not as modern as those in York. The fleet serving the Park and Ride sites in Yorkshire were newer and comprised a mixture of sustainable types of fuel including hybrid and bio-diesel. Although buses were single deck, the busier routes necessitated the introduction of articulated vehicles to provide sufficient capacity. As noted earlier, the process to re-let the Park and Ride contract during 2015 provides an opportunity to address these constraints.

6.6.4 In addition, the sites at York will offer electric charging points for vehicles and numerous cycle parking spaces. This reflects the wider sustainability objectives that are being pursued by City of York Council and might be a consideration for inclusion in a future design specification for a new Park and Ride site. However, the site visits to the Chester Park and Ride highlighted a number of issues including:

- Surface quality;
- Pedestrian facilities;
- Road markings;
- Shelters and displays;
- Payment facilities; and
- No toilet facilities.

6.6.5 The main factors affecting these performance indicators for the Park and Ride sites in Chester are highlighted, along with the conclusions from the exemplar sites in York. For each indicator, the recommendations for the proposed Hoole Road site were identified, as set out in the summary tables contained in **APPENDIX A**.

7. COSTS AND ECONOMIC APPRAISAL

7.1 Scheme Costs

7.1.1 There are several elements to prepare a business case for the Hoole Road Park and Ride. This includes understanding the likely magnitude of the capital costs for the new site, as well as evaluating whether there is a strong economic business case for investment. Finally, the availability of funding sources will determine the type of mechanisms that could be explored to deliver the scheme.

7.1.2 The first part of this section examines the likely capital costs for the scheme. The preparation of detailed scheme costs is outside the current scope of work, so examples which have been implemented recently to provide an estimated cost, and accompanying description.

- **York:** £22.7m for two sites and several traffic management improvements, constructed in 2013;
- **Trumpington (Cambridge):** £5m for 1000 spaces constructed in 2001;
- **Thickthorn Norwich:** £3.65m for 800 spaces constructed in 2005;
- **Cardiff East:** £4m for 1000 spaces constructed in 2009;
- **Leeds Elland Road:** £2.8m for 800 spaces, note the site was previously a derelict car park at Leeds United football ground, constructed in 2014.

7.1.3 Based on the likely patronage estimates presented in **Table 6.1**, there will be a requirement for about 500 parking spaces (includes an allowance for abstraction from other sites). Using the comparator schemes presented above, the estimated capital costs could be about £4.5m. This has been used to populate the economic appraisal.

7.1.4 The second part of this section examines the potential economic business case, depending on a number of different assumptions. A core scenario has been generated, although the impact of various different assumptions will be tested to assess the impact on the benefit cost ratio. In addition to the core scenario, two sensitivity tests are also examined which represent scenarios that assume that a private sector contribution is secured to part-fund the capital costs with a £2m contribution which would reduce the total scheme to £2.5m.

7.2 Economic Appraisal and Sensitivity Tests

7.2.1 Furthermore, a notional scenario that assumes that the patronage forecasts are 20% higher than the core scenario is also assumed. Based on the results in **Table 7.1**, the city centre parking charges will need to be revised in order to achieve the higher traffic levels. Scheme benefits are based on the potential highway decongestion and journey time savings and evaluated using

WebTAG criteria. The results presented in **Table 7.1** indicate that the economic case based on the central case assumptions is just 0.89, although this does increase to 1.22 if some private sector contribution can be secured. To achieve a scenario that offers good value for money and a benefit cost ratio above 2.0, it will be necessary to attract a higher number of motorists to use the Park and Ride site at Hoole Road. The outputs from the modelling work indicate one of the main mechanisms to achieve this outcome is increasing the car parking charges in the city centre.

Economic Indicator	Core Scenario	Sensitivity 1: Private sector contribution	Sensitivity 2: 20% increase in passengers
Present Value – Benefits	9,781	9,781	12,715
Present Value – Costs	10,963	8,036	5,277
Net Present Value	-1,182	1,745	7,438
Benefit Cost Ratio	0.89	1.22	2.41

TABLE 7-1 – SUMMARY OF THE ECONOMIC APPRAISAL RESULTS (£'000'S)

7.2.2 The results in **Table 7.1** do not take account of the recent reduction in Park and Ride usage noted in **Table 4.1**, and the resulting application of the mode constants to replicate this user behaviour. The inclusion of a mode constant in the Hoole Road business case means the benefit cost ratio is very weak and would not justify the investment. However, these results do not take account of the following factors:

- The potential demand that could be generated from the intermediate stops;
- The possible overflow from the Upton Park and Ride which may be diverted to Hoole Road once the former site reaches capacity. If there is insufficient parking provision available, some of these trips may switch from Park and Ride;
- The proposed introduction of parking fees to help boost revenue from either car sharing or drivers walking to nearby businesses. Based on the instructions in the Invitation to Tender for the Park and Ride contract, this could equate to 30 spaces at Boughton Heath, 100 spaces at both Sealand Road and Wrexham Road and 10 spaces at Upton.

7.2.3 It is recommended the scheme appraisal is updated to take account of these impacts in due course as proposals carry more certainty.

8. CONCLUSIONS AND IMPLEMENTATION PLAN

8.1 Main Findings

8.1.1 There are several important messages emerging from this analysis including:

- There is an urgent requirement to address the issues affecting the current Park and Ride services in Chester. A package of measures urgently need to be implemented to reverse the recent decline in passenger numbers covering marketing and ticketing. Potential changes to the current measures could be addressed as part of the forthcoming contract renewal process;
- Furthermore, improvements to the passenger facilities at each site covering surface quality, waiting facilities and information are required to ensure they are comparable to the 'exemplar' sites identified elsewhere in the UK;
- The completion of these short term measures to deliver a stronger commercial focus would provide a more robust framework to evaluate the feasibility of proposals to introduce a fifth Park and Ride serving Chester;
- However, there are two factors which have determined that this proposal should not represent a short term priority. Firstly, extra subsidy will be required since the scheme is not expected to generate sufficient revenue to cover its operating costs. This subsidy could be about £150,000 in the first year of operation, reducing to about £60,000 once journey patterns have been established. An alternative funding source would need to be identified to cover the additional subsidy;
- Secondly, there is a relatively weak economic business case based on the current forecasts. This indicates further measures are needed to help boost these results. The expected completion of the Northgate development and the construction of the theatre will help to boost the daytime and evening economy, and hence introduce some new trip attractors into Chester city centre.

8.2 Implementation Plan

8.2.1 The analysis presented earlier in this report highlighted there is no current business case for a new Park and Ride site. However, this conclusion could be altered if some of the underlying assumptions are revised. As a result, the following Implementation Plan summarises the stakeholders that will need to be consulted, the preparatory tasks to be undertaken to progress the scheme and the timeline to complete these tasks **assuming these issues can be satisfactorily addressed.**

8.2.2 Based on similar schemes, the following stakeholders will need to be involved in the development of this proposal:

- Highways England (formerly Highways Agency)
- Department for Transport
- Local councillors for the ward
- Parish councils
- Residents neighbourhood forum
- Bus operators (for commercial services operating along the A56 corridor)
- New operator for the Park and Ride services
- CW&C including the land use planning, transport planning, parking and highway authority;
- MPs;
- Environment Agency;
- English Heritage (based on the potential for removing traffic from a sensitive environmental area).

8.2.3 **FIGURE 8-1** illustrates the activities to be completed and the expected timescales to undertake these tasks. There is a high level of dependencies within this Gantt chart. Consequently, it is recognised that the activities must be completed sequentially and 'signed-off' before the next stage is commenced. Some of the tasks including measures to revitalise the existing Park and Ride offer as part of the ongoing contractual renewal, and the completion of the proposed Northgate development and initiatives to enhance the city centre, are more fundamental than the others. These measures must be delivered in a timely manner, since they affect the overall viability of the scheme. If these measures are **not** adequately resolved, there is a very strong likelihood that the proposals would not generate sufficient demand to operate the service without requiring significant financial support. The timeline is intended to minimise the financial risks incurred, ensure the financial business case becomes more robust and enable appropriate opportunities to consult with stakeholders at various key milestones to secure their buy-in to the scheme.

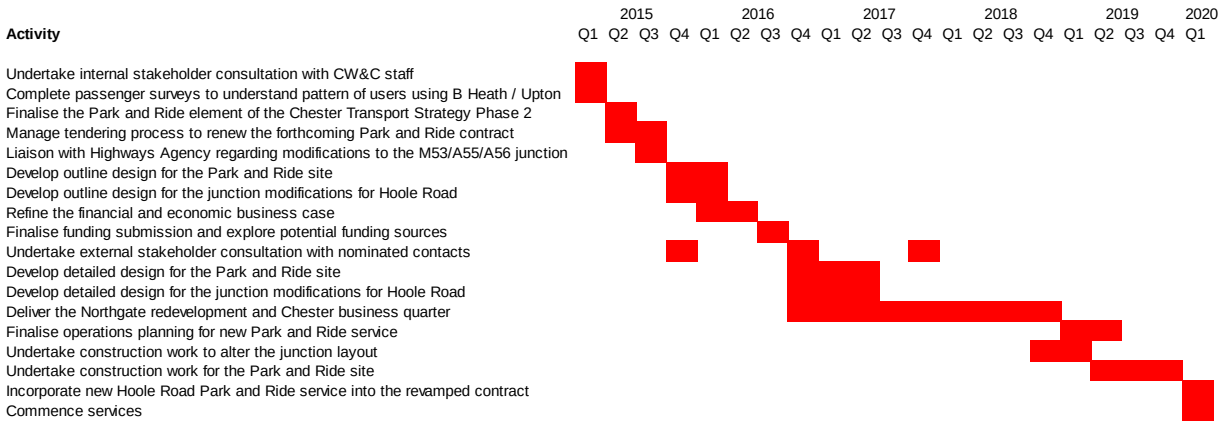


FIGURE 8-1 – PROPOSED IMPLEMENTATION PLAN

8.2.4 In addition to the activities and timescales described above, it is useful to take account of the following issues to try and achieve and then maintain a general consensus throughout the lifecycle of the project:

- Early involvement of local stakeholders and the development of various possible media channels including a website, questionnaire and / or a project newsletter which could be published at key milestones. This information will need to be specifically to residents and other stakeholders located within 1km of the site;
- Liaison with the owner, tenant, leaseholder or occupier of the land;
- Preparation of a Statement of Community Consultation;
- Liaison with the statutory bodies identified in the Infrastructure Planning (Applications Prescribed Forms and Processes);
- Review the impact of the proposals, specifically in relation to greenbelt, conservation, wildlife, construction impacts and severance impacts;
- Commence political engagement dialogue with MPs and parish councils affected by the proposal;

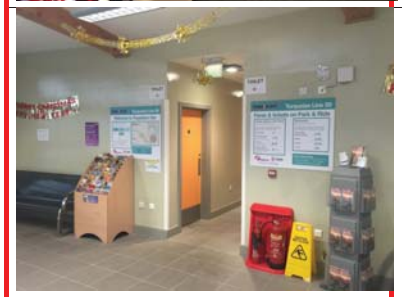
8.2.5 The outputs from these supplementary tasks will enable the project to be progressed in a timely manner. However, it is strongly recommended that work undertaken to complete these tasks, along with the periodic progress reviews are undertaken to ensure these milestones are adequately addressed throughout the nominated project lifecycle.

APPENDIX A – INVENTORY OF FACILITIES

<table>
<tr><th>Indicator</th><th>Exemplar Scheme</th><th colspan="4">Examples in Chester</th></tr>
<tr><td rowspan="3">Surface quality</td><td>  </td><td>  </td><td>Upton: Some parts of the car park would benefit from re-surfacing and improved maintenance. Eroded road surfaces as seen in the picture can present safety hazards for pedestrians. Car users generally expect high design standards. If these are not met, the attractiveness of the Park and Ride as the alternative to driving would be reduced.</td><td>Boughton Heath: Some areas of the car park would benefit from re-surfacing / maintenance. Weathered road surfaces present safety hazards for pedestrians, especially during times of wet weather when water pools in these areas. Equally, some parts of the Park and Ride are in very good condition with the paved areas draining effectively. They also offer a more attractive appearance than weathered tarmac.</td><td>  </td></tr>
<tr><td> 
Overview: The top image illustrates the high quality surface at the newly opened at Poppleton site. The second image is the Designer Outlet which was opened in 1998 which is still in good condition. Parking at the second Park and Ride site is shared with a major out of town retail centre</td><td>Wrexham Road: In terms of surface quality some areas of the car park would benefit from re-surfacing / maintenance. Weathered road surfaces as seen in the picture can present safety hazards for pedestrians. This is especially the case during times of wet weather when water pools. Additionally, vehicle users expect certain standards, if these are not met, the attractiveness of the P&R as an alternative option to the private car could be reduced. Wrexham Road is the largest and oldest of the Park and Ride sites serving Chester, although parts of the car park area appear to have been neglected.</td><td> 
  </td><td> 
  </td><td>Sealand Road: Some areas of the car park would benefit from re-surfacing / maintenance. Weathered road surfaces present safety hazards for pedestrians, especially during times of wet weather when water collects. Alternatively, some sections of the road surface at the entrance of Sealand Road are a higher standard with water effectively draining without leaving puddles on the carriageway.</td></tr>
<tr><td colspan="5">Conclusion: Based on the evidence from York, there is an urgent requirement to improve the surface quality of the Park and Ride sites at Chester to ensure they offer a uniform high standard. Whilst some parts of the Park and Ride sites are comparable to the facilities at York, at least some of the sites at Upton, Wrexham, Boughton Heath and Sealand Road would benefit from resurfacing. Furthermore, the proposed Hoole Road site should adhere to the quality standards demonstrated by the examples in York.</td></tr>
</table>

<table>
<tr><th>Indicator</th><th>Exemplar Scheme</th><th colspan="4">Examples in Chester</th></tr>
<tr><td rowspan="3">Pedestrian facilities</td><td>  </td><td>  </td><td>Upton: In general, pedestrian facilities are acceptable since they can be easily distinguished from the vehicular routes through the use of paving stones. These routes provide direct access to the waiting area. In some instances, the footways were covered in moss and weeds which meant they were slippery. Consequently, this presents trip hazards for pedestrians. It is important that such facilities are maintained to an acceptable standard to encourage the use of the Park and Ride.</td><td>Boughton Heath: The pedestrian facilities are acceptable and can be easily distinguished from the vehicular routes. These routes provide direct access to the payment and waiting area. In a few instances, the footways were slightly overgrown with grass and weeds. A traffic cone was noted obstructing a footway which was otherwise in good condition and makes the site appear untidy.</td><td>  </td></tr>
<tr><td>  </td><td>Wrexham Road: The pedestrian facilities at this Park and Ride require some remedial work. In some instances it is difficult to distinguish between a footpath and the main carriageway due to leaves and mud covering the footways. Several paths are not lit which creates an intimidating environment for more vulnerable pedestrians. There are further safety related issues with the footway. Part of the site was covered in slippery mud which was also located close to the disabled parking bays and thus presents a slip hazard.</td><td>  </td><td>  </td><td>Sealand Road: Pedestrian facilities at the Sealand Road site do not meet the required standards. The footpaths are not as easily distinguished from the vehicular routes although some areas are paved. These routes do not provide the most direct access routes to the payment and waiting area. In some instances, the footways were slightly overgrown with grass and weeds. Additionally, slip and trip hazards were present due to water collecting in on some of the footways leaving behind wet mud.</td></tr>
<tr><td>Overview: The two examples illustrate the exemplar sites at York offer a high quality, safe environment for pedestrians to transfer between their vehicles and the Park and Ride services.</td></tr>
<tr><td colspan="5">Conclusion: The sites in Chester demonstrate a number of issues that could lead to safe concerns for pedestrians when transferring to the Park and Ride service. The exemplar sites highlight examples of good design including safe, well lit routes which are free from obstructions and potential hazards. This good practice should be incorporated into the specification for the proposed Hoole Road Park and Ride site</td></tr>
</table>

<table>
<tr><th>Indicator</th><th>Exemplar Scheme</th><th colspan="4">Examples in Chester</th></tr>
<tr><td rowspan="2">Markings</td><td>  </td><td>  </td><td>Upton: The standard of the road markings are generally good. Directional arrows were easy to follow and it was easy to distinguish between the car parking spaces. Disabled bays were located close to the bus shelter. In some instances, leaves and overhang from vegetation leads to decreased visibility of the markings. However, this would be easily rectified through regular on-site maintenance.</td><td>Boughton Heath: The standard of road markings was very good. The directional arrows were easy to follow and it was easy to distinguish between each car parking space. Disabled bays were well situated in terms of access to the bus shelter.</td><td>  </td></tr>
<tr><td> 
Overview: Whilst the newly opened Park and Ride site at Askham Bar (bottom) has clearly marked parking bays, the spaces at Rawcliffe Bar (top) are also clearly marked.</td><td>Wrexham Road: The clarity of the road markings was mixed. Directional arrows were fairly easy to follow, but it was difficult to distinguish between the parking bays on some parts of the site due to the faded lines and fallen leaves. Disabled bays were conveniently situated to access the bus shelter. However, the condition of the road surface in these areas had become fairly abrasive which could present certain safety issues.</td><td>  </td><td>  </td><td>Sealand Road: The standard of the road markings at the Sealand Road site were poor. Directional arrows and the marking to distinguish between car parking spaces was a challenge. However, the poor markings could lead to confusion with leading to drivers parking in the wrong location. This also makes the site appearance look unattractive. Disabled bays were well situated in terms of access to the bus shelter.</td></tr>
<tr><td></td><td colspan="4">Conclusions: The age of the Park and Ride sites at Chester and the apparent lack of maintenance have resulted in some parking bays being poorly marked. Using the exemplar sites as an example, the layout of the Hoole Road site must be designed to ensure spaces are clearly marked to provide easy access for car drivers using the Park and Ride.</td></tr>
</table>

Indicator	Exemplar Scheme	Examples in Chester			
Shelters and displays			**Upton:** The shelters have a similar design to Sealand Road and Boughton Heath. They provide shelter from adverse weather conditions. However, there is no seating available inside the shelter which could be difficult for mobility impaired passengers. Timetable information is available in paper format, but there is no real time information available.	**Boughton Heath:** The design of the shelters is consistent with Sealand Road and Upton. They provide shelter from adverse weather conditions but there is no seating available inside the shelter. All service information is presented in paper format. There are no live services to advise passengers of congestion and traffic delays.	
		**Wrexham Road:** The shelters differ compared to those at other Park and Ride sites. The indoor seating area provides shelter from adverse weather. Therefore, such a facility is likely to improve the attractiveness of Park and Ride. All timetable information is presented in paper format. There are no live services, so disseminating information in the event of traffic delays is difficult.			**Sealand Road:** The design of shelters is consistent with Boughton Heath and Upton. They provide shelter from adverse weather conditions, but there is no seating. Information is disseminated in a similar way to the other Park and Ride sites.
	Most Park and Ride sites in York offer indoor waiting areas and seating. They also feature real time information to inform passengers if services are affected by traffic congestion				
	Conclusions: The sites in Chester offer basic facilities with covered shelters, but many lack seating, indoor waiting areas, and the provision of real time passenger information. The exemplar sites offer these facilities and these would help to provide a higher quality 'offer' to motorists. On this basis, it is strongly recommended that the facilities at the proposed Hoole Road site include these features, which could, potentially offer additional revenue streams.				

Indicator	Exemplar Scheme	Examples in Chester			
Payment facilities			**Upton:** Signs clearly state where motorists should pay, the method and the costs. However, the design of the infrastructure seems to be dated when compared to Park and Ride sites across other historic UK cities. The shelter containing the payment machines is not representative of a modern facility. The machines are very basic, with no change given and they do not accept notes or bank cards. Whilst there is a change booth, it is not always open and hence can be inconvenient for users.	The payment facilities are consistent with those at other Chester Park and Ride sites. The payment machines are also very basic, no change is given and they do not accept notes or bank cards. There is a change booth, but this is not always open, and the resulting queues could mean some passengers must wait outside in the event of inclement weather.	
		**Wrexham Road:** the payment facilities are consistent with those located at other Chester Park and Ride sites. The payment machines are also very basic, no change is given and they do not accept notes or bank cards. However, at Wrexham Road a change machine is provided. Additionally, a change booth located inside the building which is sometimes staffed.			**Sealand Road:** The payment facilities are consistent with those located at other Chester Park and Ride sites. The payment machines are also very basic, with no change given and they do not accept notes or bank cards. There is a change booth, but this is not always open. Delays in buying a ticket could also lead to queues waiting to purchase tickets which mean passengers are required to wait outside.
	Overview: the Park and Ride sites at York have a staff presence and this enables passengers to pay using a wider variety of methods compared with the examples in Chester. York offers a smartcard system which includes discounted tickets for regular passengers. This enables passengers to pay using credit / debit cards, as well as paying the driver. This approach offers significantly more flexibility compared with the systems in Chester	It is recommended that any new P&R site benefits from more advanced and flexible payment systems such as those which accept payment over the phone, to make P&R more user friendly and as a consequence a more viable travel option for car users.			
	Conclusions: It is recommended that any new Park and Ride serving the Hoole Road site offers a significantly more flexible approach to payment compared with the current systems operated in Chester. The exemplar sites in York demonstrate the scope for introducing more flexible payment systems should also be examined to be implemented at other Park and Ride sites in Chester. The letting of the new Park and Ride service contract in April 2016 allows the opportunity to realise improvements in payment facilities at the existing sites.				

Access Issues and Bus Priority Measures

The opportunities to reduce bus journey times on the Hoole Road corridor needs to be examined. If a package of bus priority measures that would make journey times more competitive could be identified, this outcome would strengthen the case for Park and Ride by ensuring the 'offer' is more attractive for motorists. Table 16 summarises some of the potential priority measures that could be introduced, provides examples of successful introduction, and assesses their suitability for the Hoole Road corridor. The specific bus priority measures include:

- With flow bus lanes;
- Pre-signals and bus advance areas;
- Selective vehicle detection;
- High occupancy vehicle lanes
- Other complementary measures;

Bus Priority Measure	Description	Successful Examples	Suitability for Hoole Road
With Flow Bus Lanes	With-flow bus lanes are specifically for bus use. For successful implementation, adequate carriageway width is essential. These measures are the most commonly used physical measure to achieve journey time reductions through priority measures  A more extensive example of with flow bus lanes is the construction of a guided bus corridor.	With-flow bus lanes have been introduced on the Wrexham Road corridor. This allows bus services to avoid congestion and reach the city centre faster than other traffic which increases the attractiveness of buses. Many UK bus lanes now operate using defined operating periods depending on whether the lane is inbound or outbound. Lanes are monitored using ANPR cameras to prosecute drivers who fail to adhere to the restrictions.  There are several examples of guided bus corridors, both in the UK and elsewhere in the world, including Cambridge to St Ives. The forecast number of passengers using the corridor will need to be higher to reflect the additional infrastructure costs associated with constructing the guideway.	The eastern section of Hoole Road has scope to implement a 'with flow' bus lane which would help to minimise buses queuing during the peak periods. This solution could only be introduced in a single direction due to the carriageway width. The journey time analysis suggests that the AM peak traffic is more affected by delays compared with services during the evening, so this indicates a westbound lane (i.e. into the City Centre) would be more advantageous than an eastbound lane. The bus lane measures could potentially be introduced from the A56 /A41 roundabout and continue westbound along Hoole Road until carriageway width narrows at the junction with Hamilton Street. Vehicles currently parked along Hoole Road would need to be relocated since they would interfere with successful operation of a new bus lane. Additionally, the proposed operating period would need to be considered, with signing and lining set out in accordance with best practice (Implementing Bus Lanes: A Practical Approach, MCC, 2009) The scope for widening the Hoole Road Bridge is being examined as part of a separate workstream. If a solution can be identified, this may create opportunities to implement bus priority measures closer to the city centre, since the existing width of the bridge would prevent such a solution. A guided bus running along the 'Greenway' corridor from the Hoole Road Park and Ride site was previously identified as the first part of a future BRT network. The successful implementation of this proposal will depend on the completion of the Park and Ride site, and the justification for operating a more intensive local bus service for other passengers. The guideway should be treated as a possible medium to long term scheme

Pre Signals and Bus Advance Areas	Pre-signal and bus advance areas give vehicles priority at junctions. This essentially allows the bus to get in front of other traffic and helps to minimise the impact of long delays without reducing network capacity. 	This measure features signals for general traffic being set further back from the junction with controls for buses closer to the junction. This allows the bus to get in front of the other traffic. The initiative has been introduced along Sealand Road in Chester. On the approach to the junction with the Greyhound Retail Park, bus lane signals are located ahead of general traffic controls allowing the bus to gain priority. This solution has also been successfully introduced in Perth 	The corridor has a limited number of signal controlled junctions as well as a restricted carriageway width to accommodate a 'with flow' bus lane. Although traffic signals have been installed along Hoole Road, the layout of the pedestrian crossings would also need to be modified to accommodate such a design, The most realistic location for these measures could be Hoole Way to the west of the Hoole Road Bridge. The carriageway width would be sufficient to accommodate a bus lane, with the existing traffic signals moved. If the carriageway width could be widened nearer to the Hoole Way Roundabout, this section could also be modified to support this measure. However, in highway capacity would need to be reduced to accommodate a bus lane which could lead to negative consequences for other road users. However, if capacity is increased under the proposals to widen Hoole Road Bridge, this solution then becomes more viable. There is a possibility that such measures during the peak periods will reduce network capacity and lead to increased delays for other road users which will make Park and Ride more attractive.
Selective Vehicle Detection (SVD), MOVA, Bus SCOOT and Automatic Vehicle Location (AVL)	They are referred to as 'virtual' bus priority as they do not feature physical road measures and instead use detection techniques to identify buses and activate traffic signals to green to give priority at junctions. Other systems detect the location of a bus as it passes along its route and sets the lights ahead to provide priority.	There are several examples of this type, mainly based on the MOVA (Microprocessor Optimised Vehicle Actuation) system. It is a signal control strategy that alters signal timings in response to actual traffic conditions at isolated junctions. Inductive loops on the approach to the signals allow MOVA to allocate the optimum green time to the different traffic movements. The system can be programmed to reduce the waiting time of the priority vehicle. With the introduction of the MOVA system, delays for Park and Ride buses can be halved. 	There are no signal control junctions along Hoole Road. The existing signal controlled junction is located on Hoole Way close to the city centre. Figure 5 highlights the areas to the west of Hoole Road bridge as existing and future delay hotspots in the AM peak. In both directions, the junction between Hoole Way and Black Diamond Street is a signalised junction which permits all turning movements. At the Hoole Way / Black Diamond street signal junction travelling westbound there are currently four lanes, with each lane designated for a particular turning movement. The number of lanes then decreases to two prior to the signalised junction at Hoole Way Roundabout. In the opposite direction leaving the Hoole Way Roundabout two lanes increase to three lanes prior to the junction with Black Diamond Street and each lane is designated for a separate turning movement. Selected vehicle detection systems in place at the above signalised junctions would detect the presence or approach of buses and look to switch to or increase the period of green time in order to provide priority to buses and improve bus journey times. This priority measure would not generate any journey time savings associated with physical measures such as bus lanes. However, as carriageway capacity is not reduced as a result of introducing SVD, other road users won't experience adverse increases in journey time delay. In terms, of Hoole Road, east of Hoole Road Bridge, there might be potential to signalise some of the priority junctions with residential side streets along this corridor and implement SVD measures to reduce bus journey times in both directions. This would inevitably require further analysis and is likely to incur more costs.

High Occupancy Vehicle (HOV) lanes and no car lanes	This proposal is a variant on the bus lane discussed above. However, their designation and the type of vehicle allowed differ. They are often suitable when the level of bus service is insufficient to justify a dedicated bus lane, although there is desire to award more priority to multi-occupancy vehicles. As a result, the lanes could also be made available to taxis. 	A successful example is the A647 Stanningley Road, Leeds. A HOV / 2 + lane was created to provide priority for vehicles travelling towards Leeds during peak periods. The objective was reduced journey times for high occupancy vehicles and to discourage single occupancy trips to the city centre. When the scheme was introduced, it included police enforcement laybys, although there are more technologically advanced methods available 	Towards the North East section of Hoole Road there is scope to implement a HOV, since the carriageway width would be sufficient, albeit for a single direction only. The analysis of delays indicates that AM peak traffic experiences longer delays, so a westbound lane would be more beneficial. Buses would benefit from this measure during peak periods by cutting journey times. The measure could potentially be installed from the A56 / A41 roundabout until the width narrow at the junction with Hamilton Street. Existing parking layouts along Hoole Road would need to be revised since they would interfere with the construction. This solution would not alleviate all the congestion bottlenecks, since parts of the route are too narrow. The scope to widen Hoole Road Bridge is also being considered. This measure might be less suitable compared with other solutions due to the piecemeal scope to introduce these measures since the exemplar schemes generally extend for more than 2km to deliver a tangible journey time benefit. The limited scope to provide a continuous lane means this option is less attractive. However, this approach may help to reduce the number of vehicles approaching the city centre. However, it could also be argued that the journey time benefits for buses might not be as attractive as a regular bus lane.
Complementary Measures	Complementary measures should be used in conjunction with the bus priority measured described above. This can help to improve the bus stop environment, reduce boarding times and cut overall journey times. Measures such as pre-paid ticketing can also assist this process. Introduction of a new signal junction along Hoole Rd to build in bus priority.	Other exemplar Park and Ride sites including York provide a variety of payment options. Users can pay using debit cards, pre-paid cards and ticket machines which offer changes, all help to reduce boarding time. The sites at York also have personnel present to rectify any problems. Good design and infrastructure provision such as, quality and direct pedestrian footways could also have a positive impact on transfer times. The scope to identify potential examples is determined by the road layout and the interface with the main radial corridor. Local road layouts will need to be revised to accommodate these changes	As previously discussed, any new P&R site serving the Hoole Road corridor must be designed to incorporate these complementary measures. Such features would raise the profile of the Park and Ride to boost patronage and encourage mode share from car. Since Park and Ride will be competing with private car, it is essential the overall experience is convenient and efficient. There are a number of side streets accessed via Hoole Road and some of these could be potentially consolidated to improve local traffic and grant increased priority to buses. This proposal will require further access to explore the resulting issues and opportunities.

APPENDIX B – CONCEPT ACCESS DESIGN

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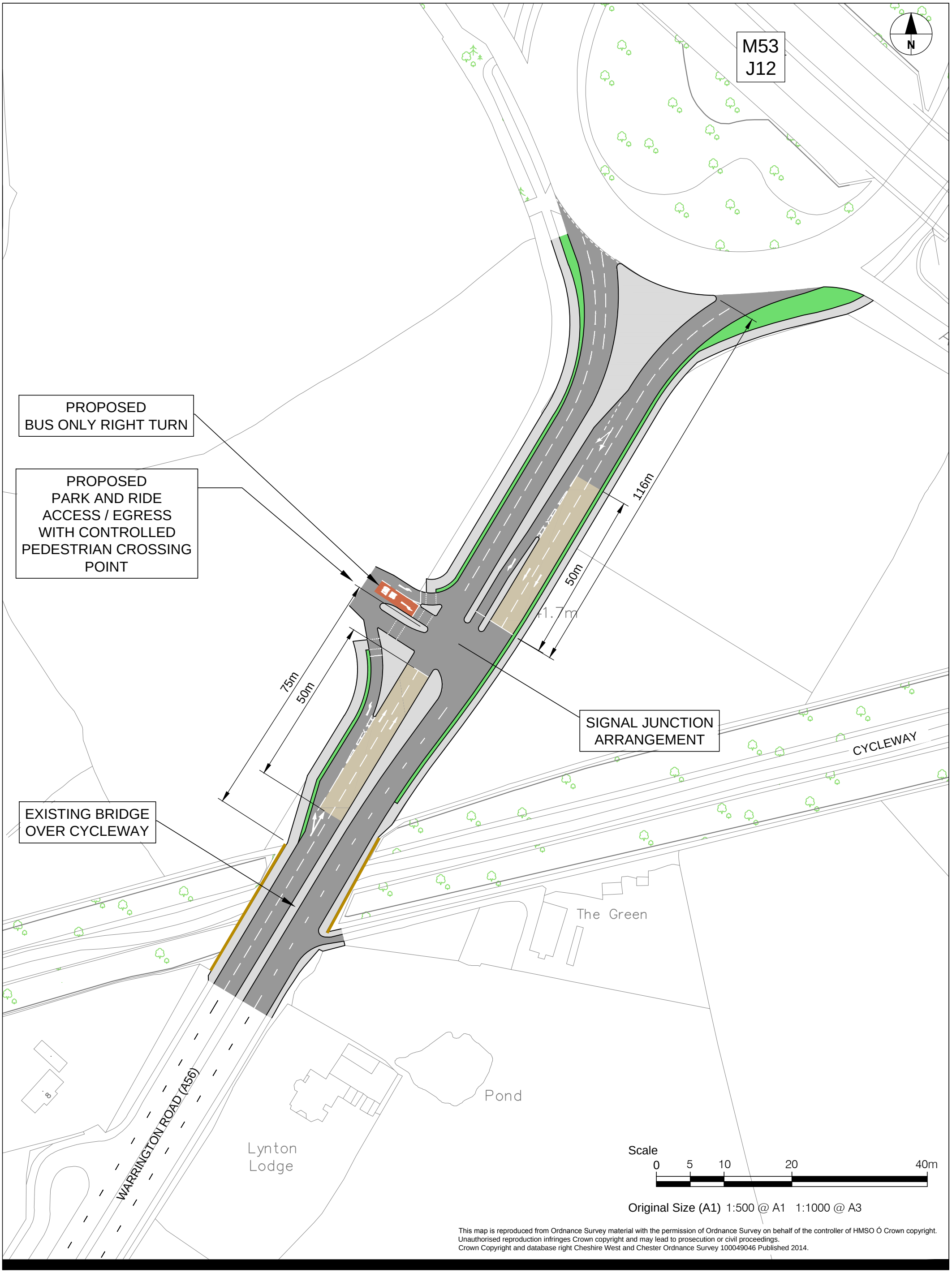
Project Management Initials: Designer: PG Checked: KT Approved: APL ISO A1 594mm x 841mm



Chester Transport Strategy Phase II
A2 Park and Ride
Client : Cheshire West and Chester
Project No : 60334355
Date : March 2015

A56 - Park and Ride
Concept Design

DRAFT

Cheshire West and Chester AECOM