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Speke Business Park Limited

Goodlass Road Speke
Liverpool
Transport Assessment

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1 Introduction

1.1 Sanderson Associates (Consulting Engineers) Limited have been appointed by Speke Business Park Limited to produce a Transport Assessment (TA) in support of a planning application for the erection of a series of industrial units at Goodlass Road, Speke, Liverpool.

1.2 This Transport Assessment considers in detail the impact of the development on the local highway network in terms of vehicle movements and the ease by which the site can be accessed by public transport, walking and cycling. The Transport Assessment will also comment on the former authorised use of the site and will provide comments on the net effect of the development once the traffic that was generated by the former use is considered.

1.3 The scope of the Transport Assessment has been agreed with Liverpool Council in connection with a previous planning application for a major office development on an immediately adjacent site and recent discussions have taken place with their highway officers on general traffic growth within the city and its suburbs.

1.4 Data used in the Transport Assessment is from a nationally accepted source and as relevant as possible to the circumstances of the application site. The data allows predictions to be made of not only the likely traffic movements from the development but trips by pedestrians, cyclist and public transport users.

1.5 The Transport Assessment looks at the physical layout of the local road network in detail and also examines road traffic accident data to determine common factors in the cause of any accidents.

1.6 It is normal practice to examine the impact of the traffic in both the morning and evening peak hours of use of the highway network when the level of background traffic is highest and hence the likelihood of queues and congestion is the greatest.

1.7 A detailed Travel Plan Framework is provided as part of the planning submission the measures set out in which will seek to encourage the use of sustainable modes of travel and thus reduce the level of single occupancy vehicle movements associated with the development. The Travel Plan Framework reference 6087/001/01 should therefore be read in conjunction with this Transport Assessment.

1.8 For the purposes of this report the site and the local network has recently been visited and measurements and photographs have been taken, together with general observations of existing traffic and pedestrian movements. In addition an audit of local facilities that may be accessed by sustainable modes of transport has been undertaken which reviews those previously examined in 2007 at the time of the office development alongside the site.

2 The Application Site and its Environs

2.1 The site is located on the western extremity of Goodlass Road approximately 0.9 km from the Speke town centre and 6.9 km from Liverpool City centre. It is understood that the site lies in an area which is allocated for B1, B2 and B8 uses on the LPA's approved Unitary Development Plan and its general location is illustrated in **Figure 1** in **Appendix A** at the rear of this report.

2.2 The site is currently cleared industrial land but is known to have been part of a former major paint factory, part of which still exists on adjacent land and is clearly seen from aerial photographs. The paint factory ceased operations in approximately 1990 at which time there were 800 people employed at the premises working on a "two shift system". The site was dormant until demolition of the buildings and plant took place in around 2000.

2.3 Since that date the work force on the remaining paint plant (Becker Industrial Coatings) has been significantly reduced and in 2007 comprised of a main day staff of 80 and a combined over night standby of 16. Given the current economic situation it is unlikely that this figure will have increased.

2.4 The site connects to Goodlass Road from a spur from the main Becker Industrial Coatings UK Ltd access road which runs directly into Goodlass Road.

2.5 Goodlass Road is an adopted, unclassified, public highway which on the immediate approach to the site has a carriageway width of 5.6m with a near footway of 2.1m and a far footway of 1.8m. The carriageway width of Goodlass Road is below the usual standard of 7.3m that would be required for modern industrial estate road design but is of adequate width for two way vehicle movements.

2.6 In addition as a balance the horizontal alignment of Goodlass Road is straight from the Becker Industrial Coatings access to Speke Hall Road and a driver, particularly in an HGV, has good, clear, forward vision along its length from Becker Industrial Coatings access to the junction of Goodlass Road with Speke Hall Road.

2.7 As part of the infrastructure to the Harvey Scott Business Centre a formal turning head has recently been provided to Goodlass Road, the location of which is immediately adjacent to the entrance to the development site. Notwithstanding this the existing premises that flank Goodlass Road generally have their own internal turning arrangements with Becker Industrial Coatings enjoying a second access via North Avenue to Speke Hall Road.

2.8 Goodlass Road serves a number of existing users which occupy buildings of a variety of ages. These are as follows:

Southern flank of Goodlass Road

- Armadillo Self Storage (adjacent to the Speke Hall Road Junction)
- Phoenix Park Industrial units
- The vacant application site
- Harvey Scott Business Centre

Northern flank of Goodlass Road

- BP Petrol filling Station (adjacent to the Speke Hall Road Junction)
- Vauxhall car dealership
- J'dore Fashion
- Tarway Ltd
- Super Travel/Home James Travel
- MCS Coffee
- Vacant site
- Gateway International Christian Centre
- Beckers Industrial Coatings Ltd

2.9 As may be seen from the above Goodlass Road is in a mixed industrial area where established industries are tending to be gradually replaced with more modern industrial or service uses. Since the date of the Transport Assessment for the Harvey Scott Business Centre (with the exception of the Business Centre) there appears to be little change in the makeup of the businesses accessed from Goodlass Road.

2.10 Traffic speed on Goodlass Road is subject to a 30 mph speed limit and there are Traffic Regulation Orders (TRO) currently in force which prohibits on-street parking

on both sides of the carriageway, over all of its length, during the working day. Given the previous comments on the width of Goodlass Road, it is likely that these Traffic Regulation Orders have been imposed to ensure that the through traffic movement is not impeded by any parked vehicles.

2.11 As part of the infrastructure to the Harvey Scott Business Centre street lighting on Goodlass Road has recently been improved is provided to a standard which seeks to provide a safe and convenient environment for pedestrians. In addition to this works were also carried out to provide improved footway crossings with tactile paving at existing access points along the length of Goodlass Road. These works now ensure that good pedestrian access is available on both flanks of the road.

3 The Local Highway Network

3.1 Goodlass Road connects to the main highway network at its junction with Speke Hall Road. This is a simple priority junction with a modest right turn lane and holding pocket to allow emerging right turning traffic to make a two stage entry to the main road.

3.2 Speke Hall Road acts as a local distributor road providing a well used link between Speke Boulevard to the south and Hillfoot Avenue/Hillfoot Road to the north. A traffic count undertaken on Speke Hall Road in March 2005 to the north of the Goodlass Road junction, indicates that the level of two way flow during the morning and evening peak hours is in the order of 1330 and 1696 vehicles respectively.

3.3 Traffic speed is subject to a 30 mph speed limit and there are traffic regulations currently in force which prohibit on-street parking between 08:00 and 18:30 along its length.

3.4 Street lighting is provided to main road standards and there are public service bus stops with modern shelters in close proximity to the Goodlass Road junction. Full details of the sustainable nature of the site are provided in section 8.0 of this report.

3.5 As part of the Transport Assessment for the Harvey Scott Business Centre a survey of the speed of vehicles on Speke Hall Road approaching the Goodlass Road junction was undertaken in dry weather and in free flowing conditions. When corrected for wet weather conditions it indicated that the 85th percentile wet weather speed of traffic was 30.5 and 31.7 mph for vehicles travelling north and south respectively on Speke Hall Road.

3.6 The recorded values indicate that in free flow conditions traffic speeds were in general accord with the speed limit and the approach speed over the adjacent railway bridge, which is deemed to be the critical direction, is not excessive.

3.7 Speke Hall Road is set out with a wide highway corridor comprising of footway/cycleways set back from the carriageway behind wide landscaped verges. In the vicinity of the Goodlass Road junction Speke Hall Lane has a carriageway width of 9.8m, a near verge and footway of 4.8 and 2.45m respectively and a far verge and footway of 5.6 and 2.45m respectively.

3.8 Due to the combination of the wide verge and footway visibility in either direction from the Goodlass Road junction is particularly good and at a setback of 4.5m vision to the bridge is 126m and vision towards Hillfoot Avenue is unrestricted.

3.9 Opposite but offset from the Goodlass Road junction is the junction of Edwards Lane with Speke Hall Road. Edwards Lane appears to originally been a through route connecting Speke Hall Road with Woodend Avenue at Hunts Cross. However due to recent redevelopment Edwards Lane has now been made into a cul-de-sac with a proper turning facility at its ends, serving established mixed industrial uses from Speke Hall Road and new residential from Woodend Road. A through pedestrian route appears to have been retained to assist sustainable access in the general area.

3.10 Like Goodlass Road, Edwards Lane enjoys a good level of vision at its junction with Speke Hall Lane.

3.11 Speke Hall Road is a main bus route and two bus stops with modern shelters and seating are located at a distance of 160 and 260m from the Goodlass Road junction, serving north and south bound services respectively. Further bus stops can be found further south along Speke Hall Road opposite Delf Lane. Full details of the services available from these stops are detailed in Section 5 of this report.

3.12 “20/20 Liverpool” has been requested to supply information on all recorded personal injury road accidents that have occurred in the past 5 years on Goodlass Road in the vicinity of its junction with Goodlass Road and Edwards Lane. At the time of writing this report that information is awaited and will be provided in an Addendum.

4 The Development Proposal

4.1 The development proposal comprises of 16 light units varying in internal net floor space between 180 sq m and 455 sq m, giving an overall net floor area of 4872 sq m. This mix of units of unit size will allow for flexibility of use between light and general industry with some storage and distribution. There are designed for small to medium size enterprises with the smaller units targeted as industrial starter units.

4.2 Each individual unit has its own forecourt for servicing which also acts as a turning space and the depth of forecourt and parking facilities reflects the size of each unit. A total of 84 parking spaces are to be provided to support the development which is a rate of 1 car space per 54 sqm.

4.3 The City Council's car parking standards are contained in the approved Unitary Development Plan, Supplementary Planning Guidance Note 8. The standards set out in the guidance note help to ensure that car parking requirements are kept to an operational minimum and to have some influence on the mode of travel used by the occupiers of the premises. The Guidance states:

> *"Reducing the amount of car parking available in new developments will contribute to the objective of reducing travel by car and encouraging people to use passenger transport".*

4.4 It also notes however that issues such as the relative accessibility of the site to passenger transport facilities and whether off site overspill parking would result in danger to highway safety. In the case of the application site passenger bus services are available in easy reach on Speke Hall Road and access to rail facilities is available at Hunts Cross Railway station. Details of the services available at both are included in Section 5 of this report.

4.5 With respect to overspill parking as mentioned previously Goodlass Road is currently subject to TRO parking control and as such any overspill parking would be unauthorised and subject to enforcement by the Police or the City Council.

4.6 An extract of Supplementary Planning Guidance Note 8 is attached in **Appendix B** which indicates the required maximum and minimum levels of parking that should be provided for new developments.

4.7 Given the mixture of potential uses and the industrial park layout of the units it is considered that the overall provision of 84 spaces, which represents a ratio of 1 space per 54 sqm net floor area is satisfactory as a higher provision would discourage the use of alternative sustainable modes of travel and would be against the principles of the Travel Plan Framework for the development.

4.8 Nevertheless it should be noted that this figure does not include for any parking on the forecourts to the units which in practice will be used for service vehicles associated with the development. In addition there are several areas within the layout where double parking of long stay staff parking could readily be accommodated without any detrimental impact on the operation of the units.

4.9 With respect to general servicing provision will also be made for commercial refuse bin storage in accordance with any Council guidelines and access for emergency vehicles is available to all units.

4.10 Finally mention has been made of the Travel Plan Framework for the development and in this respect as the number of employees in each individual unit is expected to be modest the Travel Plan Framework for the development proposes that a site wide Travel Plan Co-ordinator is appointed rather than a number of Travel Plan Co-ordinators for the individual units.

5 Access to the site by sustainable modes

Introduction

5.1 This section of the assessment sets out the present arrangements for access to the site by sustainable modes. There are two forms of sustainable travel – *active travel* - that is walking and cycling and *public passenger travel* - that is public service buses and trains. The ease of availability of each, to and from the Goodlass Road site, and expected local destinations/local facilities are as set out as follows.

Active travel – walking

5.2 Walking is the most important mode of "Active travel" and is an integral part of all journeys. It is an important mode of transport in the urban area; it can replace a large number of short car journeys which contribute to congestion, pollution and the need for car parking, as stated in PPG13. Walking is the most sustainable form of transport and provides one way of reducing pressure on the environment. People walking are also travelling at a pace that gives a greater engaging with their surroundings and can have positive benefits in relation to a community's security through increased surveillance. Finally Planning Policy Guidance Note PPG 13 identifies that walking is the most important mode of travel at the local level and offers the greatest potential to replace short car trips in journeys under 2 km. **Figure 2**, **Appendix A** at the rear of this report indicates those destinations within a 2km catchment.

5.3 Footways of an appropriate width already exist on Goodlass Road and as part of a recent planning approval for a large office development adjacent to the site dropped footway with tactile paving together with improved street lighting has recently been installed.

5.4 Footways on the main road network of Speke Hall Road are wide and generally set behind landscaped verges. Again adequate main road lighting is already provided.

5.5 In relation to pedestrian desire lines both Hunts Cross Station and the two bus stops on Speke Hall Road are located well within the 2km walking distance, at 1.6 km and 260m respectively. In addition there are a number of local centres within this distance which would provide a variety of shopping opportunities for employees during dinner break periods.

5.6 Hunts Cross Town Centre, Hunts Cross Retail Park and the New Mersey Shopping Centre are all within 2.0 km from the proposed development and provide a wide range of local shops, banks and public houses (further details being contained below).

5.7 Various timed "walks" from the site to neighbouring amenities were undertaken and are as detailed below:

Destination	**Approximate Time taken**
Bus Shelters (North) on Speke Hall Road	7 minutes
Hunts Cross Retail Park	9 minutes
Hunts Cross Town Centre	15 minutes
Hunts Cross Railway Station	17 minutes
Bus Stops (opposite Delf Lane)	7 minutes
New Mersey Retail Park	17 minutes

5.8 Direct pedestrian routes with signalised crossing facilities are provided on the route to the Hunts Cross Railway Station. The Hillfoot Avenue signalised junction can be avoided by cutting through the nearby residential estate (Barford Road, Leafield Road, Enstone Road) linking back onto Hillfoot Avenue just west of the Town Centre.

5.9 A general indication of the number and variety of retail facilities surrounding the site is as follows:

New Mersey Shopping Park

WHSmith	Clinton Cards	Mamas & Papas
Comet	Currys	GAME
Halfords	HMV	O2
Carphone Warehouse	Burton	Clarks
Dorothy Perkins	Evans	Gap
Laura Ashley	M&S Clothing	Next
River Island	Wallis	M&S Simply Food
McDonalds	Pizza Hut	Costa Coffee
Boots	Argos	B&Q Warehouse
Carpet Right	DFS	Harveys

ScS Sofas	CSL	First Choice
JD Sports	Sports World	Early Learning Centre
Smyths Toys	Pets at Home	

Hunts Cross Retail Park

Next Clearance	Instore	JJB Sports
Johnsons Dry Cleaners	Café	Boots Opticain
Matalan	Connexions	Asda
Asda PFS	Public House	Choices Video
Motorworld	Ladbrookes	Wickes
McDonalds		

Hunts Cross Town Centre

Burton	Newsagents	Barbers
Natwest	Barclays	Halifax
Sommerfield	Shell PFS	Coral
Supper Bar	Lloyds	McDonalds
Bakery	Opticians	Solicitors
Coffee & Sandwich Bar	Butchers	Post Office
RBS	HSBC	Booze Buster
Hallmark	Takeaway	

Active travel – cycling

5.10 Cycling has an important part to play in reducing congestion and air pollution and improving accessibility. A further benefit of cycling is linked to increased general health and fitness which has personal benefits as well as economic benefits for the nation in terms of health service costs. The bicycle is generally more affordable than the car and hence there are social equity benefits to the promotion of cycling. Cycling may also allow people without cars to reach destinations that they may otherwise be unable to reach.

5.11 Planning Policy Guidance PPG 13 identifies that cycling also has the potential to substitute for short car trips, particularly those below 5km. This distance is generally accepted as being ideal for commuting cyclists with cycling for leisure having a greater outreach. Thus there is the realistic opportunity for occupiers of the offices to cycle to Hunts Cross Retail Park, Hunts Cross Town Centre, Hunts Cross Railway

Station and the New Mersey Shopping Park in addition to "to and from" their home to the site.

5.12 **Figure 2 Appendix A** at the rear of this report also indicates those destinations within a 5km radius of the Goodlass Road site and a list of destinations within 5km, along with the corresponding cycle time based on 12 km per hour is summarised below:

	Distance	Time
Hunts Cross Retail Park	0.9km	4 ½ minutes
Hunts Cross Town Centre	1.5km	7 ½ minutes
Hunts Cross Railway Station	1.6km	8 minutes
New Mersey Shopping Park	1.6km	8 minutes

5.13 Allerton, Woolton, Grassendale and Speke are all within the 5km threshold which equates to a maximum cycle time of 25 minutes.

5.14 Off road combined cycle/footways are provided along Speke Hall Road. Advanced cycle stop lines are provided at the Speke Hall Road/Hillfoot Avenue signalised junction. Traffic free routes are also available along Speke Road and Woodend Avenue.

Public Passenger Transport - Service Buses

5.15 The nearest existing bus stops to the site are situated along Speke Hall Road, these bus stops are located within 260m of the proposed site. A southbound bus stop with modern shelter and seating facilities is located some 160m of the site with an northbound bus stop again with a modern shelter and seating facilities is located some 260m of the site. Further bus stops can be found along Speke Hall Road further south opposite Delf Lane.

5.16 A summary of the available services from these stops is as set out as follows:

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to Speke (Morrison's Store) via Western Avenue, Liverpool John Lennon Airport, (eve & Sun) Central Avenue, Eastern Avenue

Monday to Friday	3 per hour
Saturday	2 per hour
Sunday	2 per hour
Operator	Arriva

To Bootle Bus Station via Hunts Cross Station, Woolton Vilage, Childwall Fiveways, The Rocket, Queens Drive, Breeze Hill, Balliol Road, Oriel Road

Monday to Friday	3 per hour
Saturday	2 per hour
Sunday	2 per hour
Operator	Arriva

166/266 to Liverpool South Parkway via Speke Road, Woolton Road

Monday to Friday	3 per hour
Saturday	2 per hour
Sunday	1 per hour
Operator	Merseytravel

188/288 to Belle Vale Circular Via Higher Road, Leathers Lane, Church Road, Okell Drive, Caldway Drive, Naylorsfield Drive(188), Belle Vale Shopping Centre, Kings Frive, Allerton Road

Monday to Friday	3 per hour
Saturday	2 per hour
Sunday	1 per hour
Operator	Merseytravel

801 to Royal Liverpool Hospital via Speke Road, St Marys Road, Aigburth Road, Rose Lane, SMithdown Road, Upper Parliament Street, Womens Hospital, Grove Street, Low Hill

Monday – Friday	No Service
Saturday	No Service
Sunday	2 services

5.17 As can be seen from the above, 7 frequent and varied bus services run along Speke Hall Road. Potential occupiers of the proposed offices and their visitors will have a very realistic opportunity to utilise public transport as a means of commuting to work.

Public Passenger Transport - Rail Service

5.18 Hunts Cross Railway Station is located some 1.6 km from the proposed site. Trains services to Liverpool Central, Liverpool Lime Street, Warrington and Manchester are all accessible. A summary of services from these stations can be found below:

Trains to Liverpool Central (Platform 3)	
Monday to Saturday	4 per hour
Sunday	2 per hour
Trains to Warrington and Manchester	
Monday to Saturday	1 per hour
Sunday	1 per hour

Trains to Liverpool Lime Street (Platform 1)	
Monday to Saturday	4 per hour
Sunday	2 per hour
Additional peak period services	

5.19 Hunts Cross Railway Station offers free car parking for rail users and a 25 space car park (including 2 disabled spaces) and 22 cycle parking spaces. Hunts Cross Station with its links to the major stations, particularly Liverpool Central and Liverpool Lime Street at 4 trains per hour, therefore offers the opportunity for combined journeys to major destinations.

Summary

5.20 From the above it is apparent that the site can be easily accessed by a number of sustainable modes and occupants of the proposed development and visitors to it will have a realistic prospect of a variety of travel choices.

5.21 The existing highway and public transport infrastructure is satisfactory and as part of the Harvey Scott Business Centre improvement works have recently taken place to footways to aid access for pedestrians with improved lighting to benefit both pedestrians and cyclists.

5.22 This level of facilities justifies both the level of proposed car parking within the development and the use of average traffic generation values in modelling predictions.

6 Traffic Generation of the Current Site Use

6.1 To establish the trip generating potential of the proposed industrial development information has been drawn from the latest TRICS database (ref:2011A version6.7.1) which enables multi modal predictions to be made.

6.2 In line with the assessment used for the Harvey Scott Business Centre average trip rates have been used as these are a fair reflection on the ability to assess the site by sustainable modes.

6.3 In terms of site selection sites of between 4300 and 6515 sq m have been selected and includes sites in Lancashire and Merseyside but **excludes** sites in London, Scotland, Northern Ireland and Wales. The Merseyside survey undertaken in 2010 related to a site of 4800 sq m at Boaler Street Liverpool which lies approximately 9 km to the north west of Goodlass Road. The following table sets out the results and full details of the data are included in **Appendix C** of this report.

	Industrial Park Average Trip Rates			Average Trip Generation 4872 sq m		
AM Peak 0800 - 0900	Arrivals	Departures	Two Way	Arrivals	Departures	Two Way
Pedestrian	0.062	0.015	0.077	3	1	4
Cyclist	0.017	0.000	0.017	1	0	1
Public Transport	0.010	0.000	0.010	0	0	0
Vehicle Occupant	0.928	0.458	1.386	45	22	68
Total People	1.017	0.473	1.490	50	23	73

	Average Trip Rates			Average Trip Generation		
PM Peak 1600 - 1700	Arrivals	Departures	Two Way	Arrivals	Departures	Two Way
Pedestrian	0.029	0.036	0.065	1	2	3
Cyclist	0.004	0.007	0.011	0	0	1
Public Transport	0.002	0.000	0.002	0	0	0
Vehicle Occupant	0.441	0.729	1.170	21	36	57
Total People	0.476	0.772	1.248	23	38	61

	Average Trip Rates			Average Trip Generation		
24 Hours	Arrivals	Departures	Two Way	Arrivals	Departures	Two Way
Pedestrian	0.261	0.218	0.479	13	11	23
Cyclist	0.090	0.089	0.179	4	4	9
Public Transport	0.024	0.025	0.049	1	1	2
Vehicle Occupant	6.290	6.334	12.624	306	309	615
Total People	6.665	6.666	13.331	325	325	649

6.4 From the above it is possible to draw the number of actual vehicle movements taking into account that vehicle occupants will include “car shared trips”.

Peak Hour	Average Trips rates per 100sq m (vehicles)		4872 sq m industrial (gross floor space)		Total Trips
	Arrivals	Departures	Arrivals	Departures	
0800-0900	0.822	0.399	38	19	57
1600-1700	0.384	0.641	18	30	48

6.5 The times for traffic generations set out in the table above have been selected to reflect the peak times of use of Speke Hall Road so that the maximum impact is established.

6.6 In relation to the current use of the site whilst it is presently unused and is cleared of any buildings its access point and the former internal access roads still exist and can be seen from Goodlass Road and from aerial photographs.

6.7 As mentioned in Section 2, it is understood that historically the site was part of the adjacent paint factory which was a significant major employer in the area. The original paint factory ceased operations in approximately 1990 at which time there were in the order of 800 people employed at the premises working on a “two shift system”.

6.8 The number of employees working on the site is likely to have comprised of office and production staff with the office staff expected to be working “standard daily hours” and production staff on a two shift basis. Although a breakdown of the number of staff to either function is not known, clearly at times of shift change there would have been considerable activity extending on both sides of the shift change as arrivals and departures.

6.9 Although it is not possible to establish the level of traffic generation a work force of 800 staff is likely to have generated a significant level of vehicular movement and even allowing for shift working the level of use of Goodlass Road and Speke Hall Road would have been considerable and a noticeable part of daily traffic movements.

6.10 Whilst it is accepted that the site does not currently generate traffic its part in the operation of the former paint factory and the significant level of traffic that that was likely to have generated must be acknowledged. Clearly the present designation of the site for B1, B2 and B8 uses on the LPA's approved Unitary Development Plan indicates that the previous use is recognised as a contribution factor in the site's allocation for future development.

7 Impact on the Local Highway Network

7.1 In relation to the impact on the highway network the following issues require investigate.

- The suitability of Goodlass Road
- The suitability of the layout of the Goodlass Road/Speke Hall Road junction in safety terms
- The suitability of the layout of the Goodlass Road/Speke Hall Road junction in relation to its theoretical capacity

The suitability of Goodlass Road

7.2 Goodlass Road is an adopted, unclassified, public highway which on the immediate approach to the site has a carriageway width of 5.6m with a near footway of 2.1m and a far footway of 1.8m. The carriageway width of Goodlass Road varies between 5.6 and 5.7m and whilst is below the normal standard of 7.3m that is usual for modern industrial estate road design it is of adequate width for two way vehicle movements.

7.3 *Manual for Streets* provides guidance on the minimum width required for vehicles to pass in free flowing conditions. *Section 7 Street Geometry* provides specific guidance on street dimensions and Figure 7.1 illustrates that a width of 5.5m is required for two HGVs to pass where clearance to either flank, footways or verges are provided. **Appendix D** includes an extract of Figure 7.1 for confirmation.

7.4 The horizontal alignment of Goodlass Road is straight from the Becker Industrial Coatings access to Speke Hall Road and a driver, particularly in an HGV, has good, clear, forward vision along its length from Becker Industrial Coatings access to the junction of Goodlass Road with Speke Hall Road. There are also no issues with respect to vision being affected by the vertical alignment of Goodlass Road.

7.5 Furthermore on street parking Goodlass Road is currently subject to TRO restrictions which seek to ensure that the carriageway is fully available for use to and from premises sited along its length.

7.6 As such in a practical sense the carriageway width is suitable for its purpose.

7.7 With respect to facilities for pedestrians as part of the infrastructure to the Harvey Scott Business Centre street lighting on Goodlass Road has recently been improved is provided to a standard which seeks to provide a safe and convenient environment for pedestrians and cyclists. In addition to this works were also carried out to provide improved footway crossings with tactile paving at existing access points along the length of Goodlass Road. These works now ensure that good access by sustainable modes is available

7.8 Finally it must be noted that the site lies in an area which is allocated for B1, B2 and B8 uses on the LPA's approved Unitary Development Plan and Goodlass Road is the sole means of access to it. Historically Goodlass Road has served a substantially greater use by traffic generated by the former paint factory use in terms of both vehicle and pedestrian movements.

The suitability of the layout of the Goodlass Road/Speke Hall Road junction in safety terms

7.9 As part of the Transport Assessment for the Harvey Scott Business Centre the technical operation of the junction of Goodlass Road with Speke Hall Road was examined in detail. Previously particular concern had been raised by the City Council was over the safety of this junction in relation the adequacies of vision from the minor road right towards the adjacent railway bridge to the south.

7.10 In relation to the wider network the City Council gave an indication of the present situation regarding the junctions of Speke Hall Road with Speke Boulevard and Hillfoot Avenue and did not required a view on the impact of the development traffic apart from a general indication of the likely levels of flow.

7.11 As part of the Harvey Scott Business Centre assessment a radar survey of the speed of vehicles on Speke Hall Road approaching the Goodlass Road junction was undertaken in dry weather and in free flowing conditions. When corrected for wet weather conditions this indicated that the 85th percentile wet weather speed of traffic is 30.5 and 31.7 mph for vehicles travelling north and south respectively. Full details of the radar speed survey are attached as **Appendix E.**

7.12 These values show that in free flow conditions traffic speeds are in general accord with the speed limit and the approach speed over the adjacent railway bridge, which is deemed to be the critical direction, is not excessive.

7.13 With respect to the latest visibility standards set out in *Manual for Streets 1 and 2* a side road in an urban area such as Goodlass Road would require a set back or "X distance" of 2.4m. In relation to the "Y distance" the approach speeds of traffic, 30.5 and 31.7 mph, indicate that 47m should be provided.

7.14 As previously mentioned due to the combination of the wide verge and footway visibility in either direction from the Goodlass Road junction is particularly good and at a greater set back of 4.5m to allow for increased capacity vision to the bridge is 126m and vision towards Hillfoot Avenue is unrestricted. In relation to compliance with standard the level of vision afforded at the junction both meets the standard and is significantly above it.

7.15 With respect to the physical layout of the junction it currently has a modest right turn lane/holding pocket on the major road approach. As part of the approved infrastructure works for the Harvey Scott Business Centre minor improvement to this junction was proposed but since further investigation has been deemed that the junction operates satisfactory in its current form.

7.16 The accident record for the Goodlass Road junction with Speke Hall Road has been requested from Liverpool 20/20 and the results will be provided in an Addendum to this report. Given that the City Council has declined the minor highway improvement at this junction it is reasonable to assume that no significant accident issue is apparent in its normal use.

The capacity of the Goodlass Road/Speke Hall Road junction

7.17 With respect to the theoretical capacity of the Goodlass Road/Speke Hall Road junction it is normal practice to examine the impact of the traffic in both the morning and evening peak hours of use of the highway network when the level of background traffic is highest and hence the likelihood of queues and congestion is the greatest.

7.18 From the preceding section the table below indicates the level of traffic that could be generated by the proposed site use during the critical peak hours.

Peak Hour	Average Trips rates per 100sq m (vehicles)		4872 sq m industrial (gross floor space)		Total Trips
	Arrivals	Departures	Arrivals	Departures	
0800-0900	0.822	0.399	38	19	57
1600-1700	0.384	0.641	18	30	48

7.19 As in the case of the Harvey Scott Business Centre traffic has been distributed onto Speke Hall Road on the basis of a 50/50 even split north and south bound. These distributions provide the following assigned traffic movements

Peak Hour	Left in	Right in	Left out	Right out
AM Peak	19	19	10	9
PM Peak	15	15	9	9

7.20 The level of traffic generation when divided into the peak hour is not excessive and does not include any discounting with respect to possible reductions attributed to "peak hour spreading" or changes to modes of sustainable transport as workers do have the options of a realistic alternative to the private car. In addition the above takes **no** account of any existing or potential re-use of the site under its present authorised planning use.

7.21 Traffic growth on the local network has been the subject of discussions with highway officers of the City Council. Recent research by the Department of Transport carried out in connection with the Evaluation of the Urban Congestion Programme (http://www.dft.gov.uk/pgr/regional/policy/evaluationurbancongestionprog/pdf/summary.pdf) concurs with the experience of Sanderson Associates that traffic flow on primary routes has decreased or remain stable.

7.22 Extracts of the summary of the Evaluation of the Urban Congestion Programme states:

This report presents the findings of a research study to investigate the extent to which the recently observed reduction in urban congestion is the result of DfT's former Urban Congestion Programme and interventions put in place in Local Authorities, and the extent to which it was influenced by other factors such as rises in fuel prices and the recession.

The Urban Congestion Programme (UCP) was focused on the 10 largest urban areas in England, who set local targets to tackle road congestion over the five years to 2010/11. The 10 local targets were used to set a national target, which formed one of the Department's Public Service Agreement (PSA) indicators under the previous Labour Government.

The fieldwork for the research, and most of the writing of this report, was completed before the change of Government in May 2010. Accordingly, unless stated to the contrary, all references to the Government relate to the previous Labour Government, and references to policies and programmes relate to ones they had adopted. However, although the UCP has now ended, the research findings are mainly of a general nature and their validity should not be materially altered by a change of Government.

Recent data on the urban areas' performance has shown that all 10 areas were on track to meet their targets, and person journey times had decreased since the baseline (which uses a mix of 2004/05 and 2005/06 data). This study set out to explore the reasons for this, the extent to which this reduction was due to the UCP compared to wider influences such as the recent economic downturn, which interventions or packages of interventions were most successful, what the main drivers for action were and the likely impact of removing some of these drivers (such as the Congestion Performance Fund), and how the observed outcomes relate to wider policy processes.

The most recent data on the 10 urban areas' performance against their targets covered the 2008/09 academic year. These data showed that, on average, there has been a 5.5% improvement in person journey times across the 10 areas since the baseline, accompanied by a 0.8% reduction in travel volumes. All 10 areas have seen improvements in road journey times, with seven of the 10 having seen reductions in road travel volumes.

Given the limitations of data for the PSA period, longer term trends in traffic were analysed to attempt to understand how current patterns of congestion have evolved. This analysis was focused on broad, medium term trends over a period of 5 to 10 years, in the urban areas as a whole rather than just the PSA routes. To avoid the recent periods of high fuel prices and economic slow-down, where possible ***2007*** *was selected as the cut-off point for analysis.*

The main findings from this analysis were that:

- *Both nationally and within the urban areas, growth in car traffic and HGVs began to level off before the recession. In the same period, LCV (van) traffic grew strongly. Since the onset of the recession, all types of road traffic have declined in most types of areas.*

- *Reductions prior to 2008 in inbound morning peak road traffic to the urban areas generally had not been accompanied by increases in speeds. On the contrary speeds had been stable or had reduced, implying that congestion had increased.*

- *There is strong evidence, both from the data analysed and from interviews with the urban areas, to associate the reduction in morning peak traffic in urban areas to peak-spreading.*

- *Within the urban areas there is also evidence of a considerable shift to rail-based and walk/cycle modes.*

7.23 Finally with respect to *Influences on Congestion*

Urban characteristics, notably growth trends in urban population and employment that influence the demand for travel and hence commuting patterns and congestion. There is evidence to show that many of the urban areas have delivered growth in central area employment and population, but that there have nevertheless been recent reductions in road traffic.

The executive summary of the Evaluation of the Urban Congestion Programme is attached in full as **Appendix F** of this report.

7.24 Given the above it is proposed to model the impact of the development traffic at the Goodlass Road Speke Hall Road junction on the basis of the traffic surveys produced in 2007 which are a publicly available as part of the Dylan Harvey planning application for the adjacent office development. Capacity will be estimated using the PICADY v5 computer program with no increase in traffic growth for either an opening or future design year.

7.25 Using PICADY v5, assessment of the operation of the junction with development traffic (and the traffic levels predicted for the Harvey Scott Business Centre from its approved Transport Assessment) has been summarised in the following table with full details provided in **Appendix G** with traffic flows for the base, base with Harvey Scott Business Centre and base with Harvey Scott Business Centre and the development proposal indicated in **Figure 2 Appendix A.**

Arm A: Speke Hall Road (North)

Arm B: Edward's Lane

Arm C: Speke Hall Road (South)

Arm D: Goodlass Road

Movement	Max Ratio of Flow to Capacity (RFC)	Max Queue Length (Veh)
B - ACD	0.203	0.25
A - D	0.374	0.59
D – AB	0.077	0.08
D - BC	0.320	0.46
C - B	0.073	0.08

Summary of AM modelling results

Movement	Max Ratio of Flow to Capacity (RFC)	Max Queue Length (Veh)
B - ACD	0.386	0.61
A - D	0.083	0.09
D – AB	0.522	1.06
D - BC	0.849	3.94
C - B	0.037	0.6

Summary of PM modelling results

7.26 As will be noted the ratio of flow to capacity value (RFC) does not exceed 0.850 which indicates that a junction will operate within capacity but some acceptable delays and queuing are likely to be experienced. An RFC value exceeding 1.000 normally suggests that a junction is operating beyond its theoretical capacity and significant queuing and delay will be experienced.

Summary of the impact of the proposal

7.27 The safety element of the Goodlass Road/Speke Hall Road junction has been carefully considered in relation to both its current layout and accident record. From the preceding information it is clear that the issue of approaching vehicles over the adjacent railway bridge has been satisfactorily addressed in relation to the level of vision that is available from the junction.

7.28 The present junction arrangement has been deemed to be suitable to accept turning movements to and from Speke Hall Road without change and the theoretical capacity of the junction has been confirmed as satisfactory in the opening year based on no change in overall traffic volumes from 2007.

7.29 Notwithstanding the above it must be acknowledged that the site had a relatively recent use as part of the larger Becker Industrial Coatings paint factory, which as previously stated is likely to have generated a significant level of traffic given the high number of staff employed. Although no discounting of traffic against the former use has been applied it is not unreasonable for the City Council to acknowledge this in its determination of the operation of this junction.

7.30 The development also include a Travel Plan Framework which will seek to change the mode of transport used by occupants of the industrial development and will seek to achieved by best practice annual reductions in the level of private car traffic generated by the development.

7.31 In relation to the traffic generation of the proposal and the connections to the highway network it should finally be noted that the site is allocated for B1, B2 and B8 uses on the LPA's approved Unitary Development Plan with Goodlass Road being the sole means of access to it.

8 Conclusions

8.1 Sanderson Associates (Consulting Engineers) Limited have been appointed by Speke Business Park Limited to produce a Transport Assessment (TA) in support of a planning application for the erection of a series of industrial units at Goodlass Road, Speke, Liverpool.

8.2 This Transport Assessment has considers in detail the impact of the development on the local highway network in terms of vehicle movements and the ease by which the site can be accessed by public transport, walking and cycling. The Assessment has also included comments on the former authorised use of the site and general traffic conditions on the local highway network.

8.3 Data used in the Transport Assessment is drawn from a nationally accepted source and as relevant as possible to the circumstances of the application site. The data has predicted not only the likely traffic movements from the development but trips by pedestrians, cyclist and public transport users.

8.4 The Transport Assessment has examined the ability of Goodlass Road to accommodate the additional traffic and also the suitability of the junction of Goodlass Road with Speke Hall Road in terms of safety and capacity.

8.5 The impact of the traffic has been examined in both the morning and evening peak hours of use of the highway network when the level of background traffic is highest and hence the likelihood of queues and congestion is the greatest. The assessment makes no allowance for future changes in modal split from private vehicles to sustainable forms of transport and does not include any discount for peak hour spreading. As such the assessment is considered to be particularly robust.

8.6 A detailed Travel Plan Framework reference 6087/001/01 is provided as part of the planning submission, the measures set out in which will seek to encourage the use of sustainable modes of travel and thus reduce the level of single occupancy vehicle movements associated with the development.

8.7 It is concluded that Goodlass Road is capable of accommodating the modest level of additional traffic proposed (57 and 48 two way trips in the AM and PM peak hours

respectively) and that this level of additional traffic can also be accommodated by the junction of Goodlass Road.

8.8 Subject to the submission of an Addendum reviewing accident data from Liverpool 20/20 and the imposition of suitable planning conditions it is considered that there are no transportation issues that should not let this development proceed. Sanderson Associates request that the City Council confirms the findings of this report and the accompanying Travel Plan Framework.

RG March 2011.

APPENDIX A

Figure 1 Site Location Plan

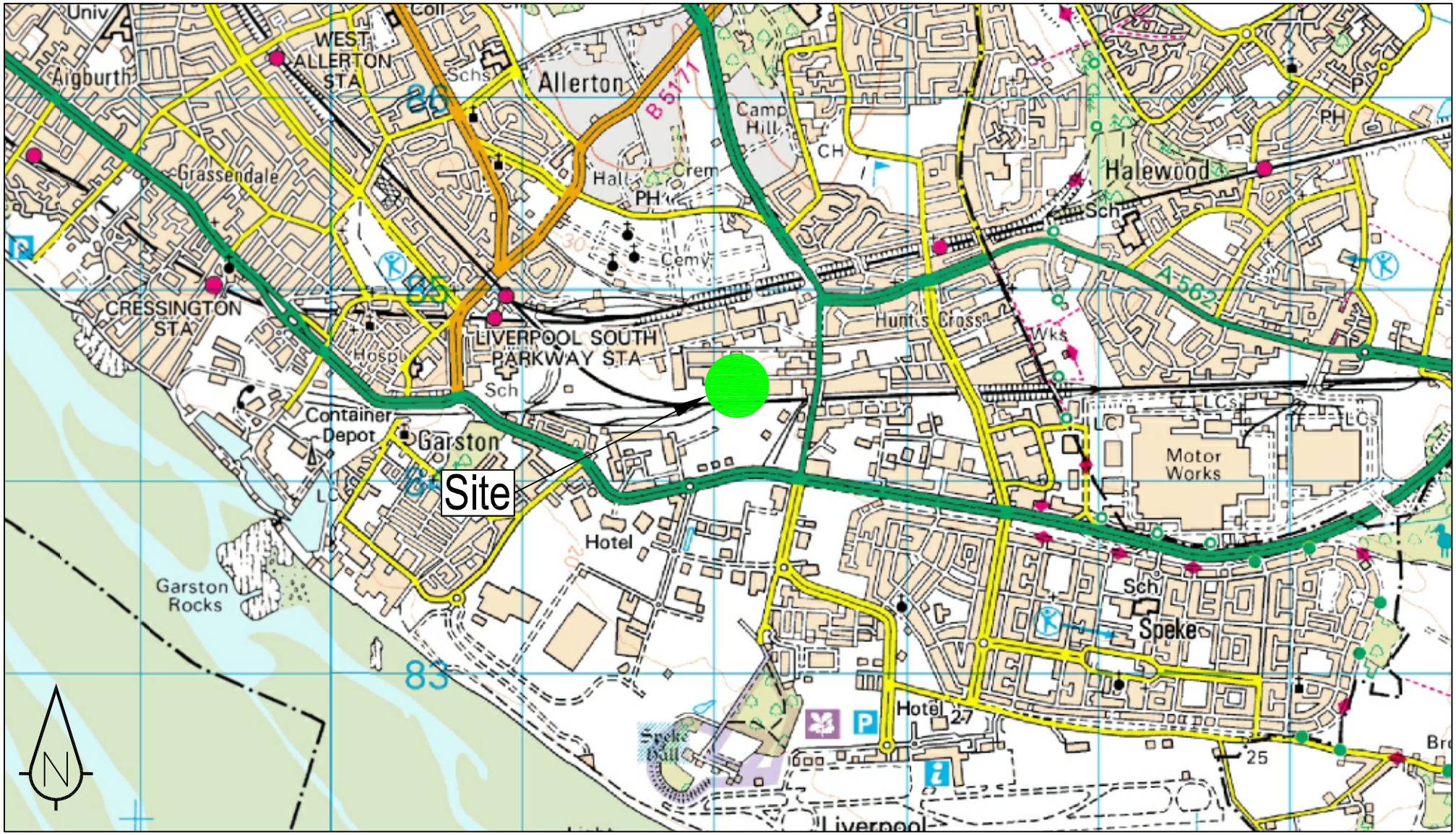
Figure 2 2km Walking and 5km Cycle Radius

Figure 3 Traffic flows for the base,

- base with Harvey Scott Business Centre

- and base with Harvey Scott Business Centre

and the development proposal



sanderson associates (consulting engineers) ltd
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T 01924 844080 mail@sandersonassociates.co.uk
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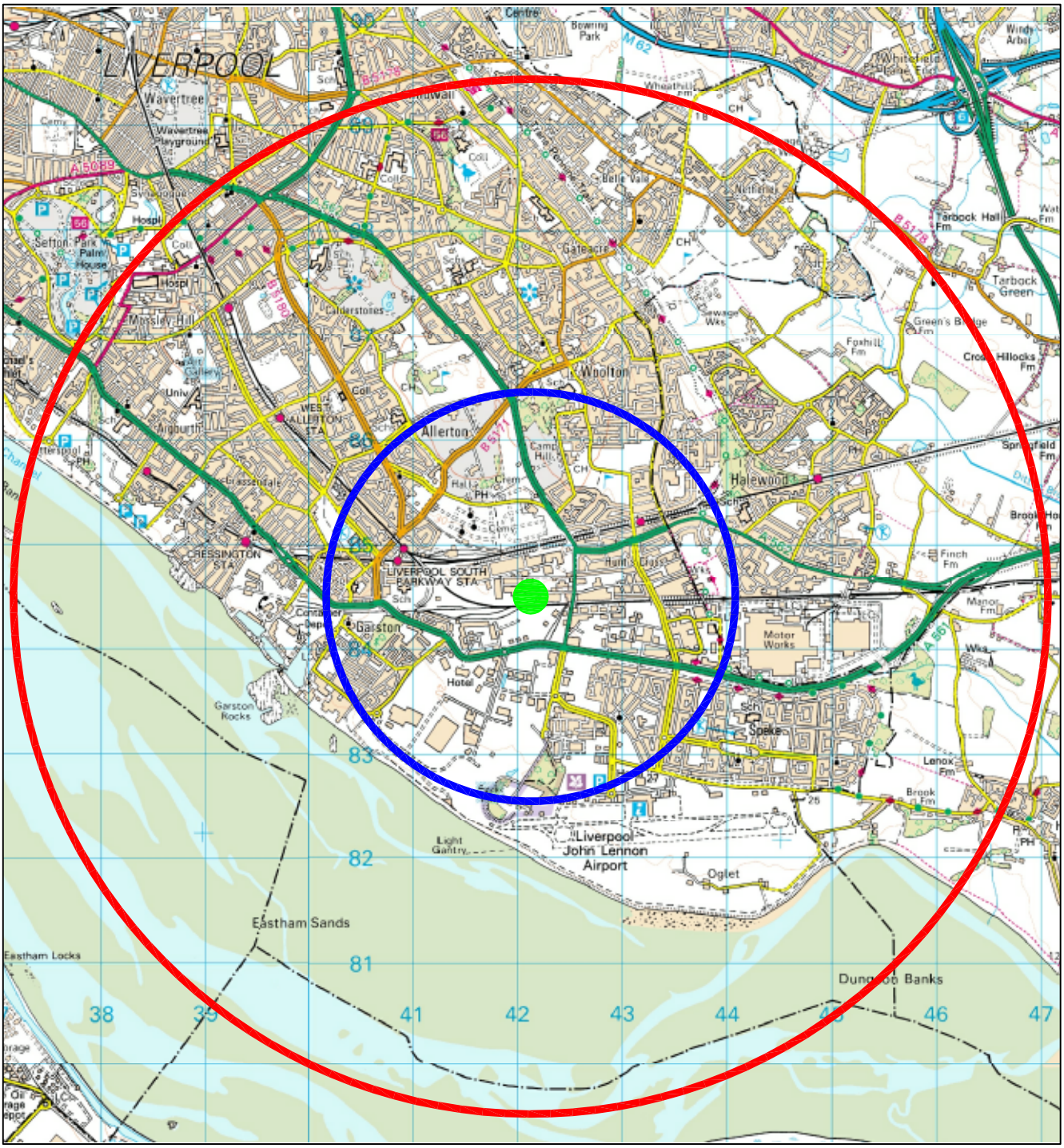
Goodlass Road, Speke
Liverpool

Site Location Plan

Drawn SB	Scale NTS	ISO 9001 REGISTERED FIRM
Checked RIG	Date March 2011	
Approved RIG	Drawing Number Figure 1	Size A4



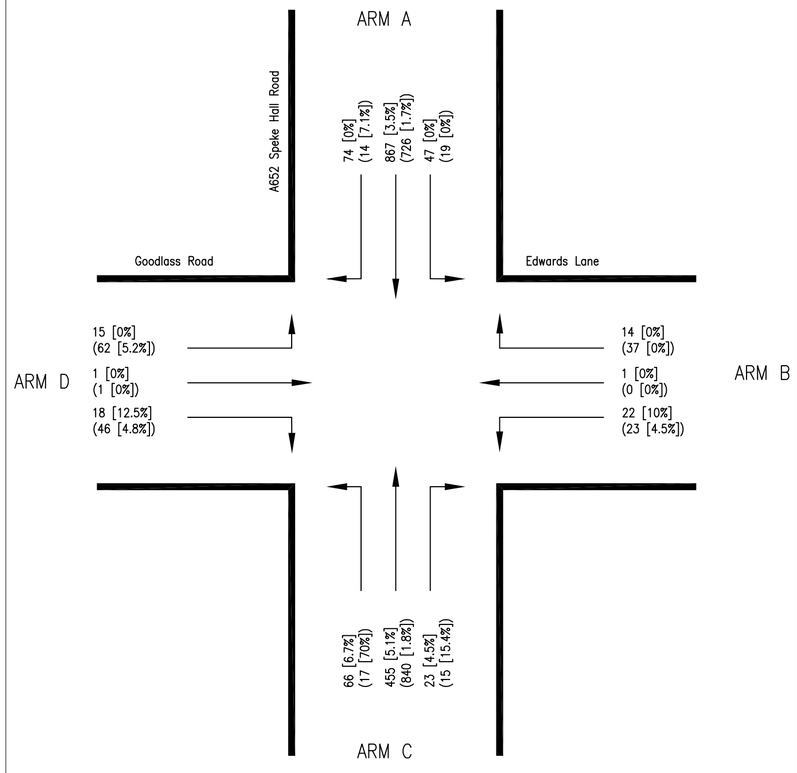
Key

- 2km Walking Radius
- 5km Cycle Radius
- Site

sanderson associates (consulting engineers) ltd Highways | Traffic | Transportation | Water T 01924 844080 mail@sandersonassociates.co.uk F 01924 844081 www.sandersonassociates.co.uk	2km Walking and 5km Cycle Radius Proposed Industrial Development Goodlass Road, Speke Liverpool	Drawn: SB	Scale: NTS
		Checked: RIG	Date: Feb 2011
		Approved: RIG	Drawing Number: Figure 2
			Size: A4

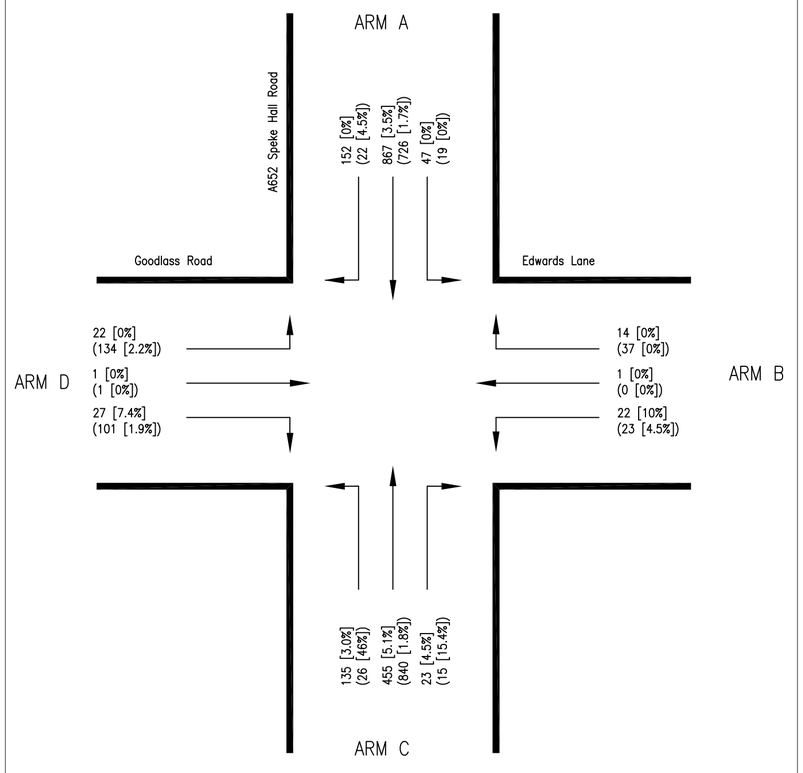
INDICATIVE

2007 Base Traffic Survey



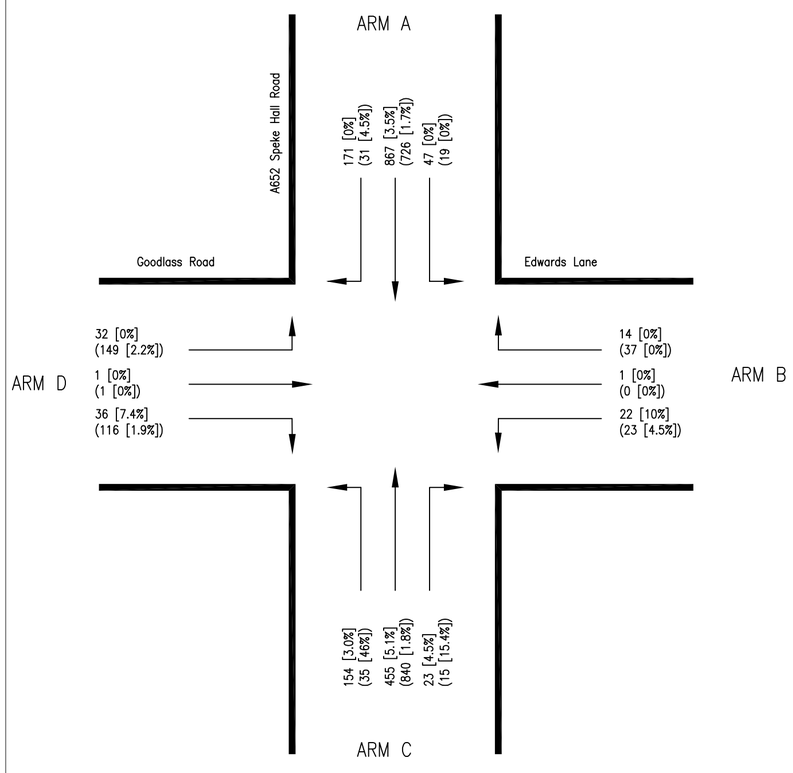
INDICATIVE

2007 Base Traffic Survey + Harvey Scott Business Centre



INDICATIVE

2007 Base Traffic Survey + Harvey Scott Business Centre + Proposed Industrial Estate



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Client: Speke Business Park Limited

Project Title: Goodlass Road, Speke, Liverpool

Drawing Title: 2007 Base Traffic Flows + Development Traffic

Rev	Amendment	Drawn	Date	Checked

Scale NYS		Drawn By	AA
Drawing Size	A2	Checked By	RG
Date	01.03.2011	Approved By	RG
QM S ISO 9001 REGISTERED FIRM	Drawing Number: Figure 3	Rev	

FILE REF:

APPENDIX B

Extract of LCC Supplementary Planning Guidance Note 8

Car and Cycle Parking Standards

Introduction

1. The purpose of this guidance note, which was adopted by the City Council in April 1996, is to set out the Council's standards for car parking, including layout and design, in relation to proposals for new development. This guidance note also supplements Policy T12 (Car Parking Provision in New Developments) and Policy T6 (Cycling) in the Liverpool Unitary Development Plan.

2. Parking standards are an important element of land use policy and are intended to ensure that parked vehicles do not become a safety hazard, an obstruction to vehicular and pedestrian movement or an environmental nuisance. They seek furthermore to ensure that the users of buildings and land have adequate parking provision to meet their needs. The standards set out below have been designed to achieve a balance between parking needs, the capacity of the road system, and environmental quality.

3. The application of cycle parking standards to development is designed to promote the contribution which cycling can make in helping meet the City's transport needs in the next decade.

4. Car parking standards are expressed as operational minimum and maximum standards, with the exception of Use Class C3 (Dwellinghouses) outside the City Centre for which there is a minimum standard only and for the City Centre where standards are expressed as a maximum figure only. The standards relate to gross floorspace unless otherwise specified.

5. The standards set out in this guidance note will help ensure that car parking requirements in general are kept to an operational minimum. The amount of car parking can determine which mode of transport people use. Reducing the amount of car parking available in new developments will contribute to the objective of reducing travel by car and encouraging people to use passenger transport. This is particularly true of the City Centre which is well served by passenger transport.

6. It is recognised, however, that there will be situations where it will be justifiable to apply the standards in a flexible way and the following factors will therefore be taken into account as part of the assessment of, and negotiations over, any particular scheme:

- the nature and type of development e.g. if a scheme is for affordable housing in an area of low car ownership;
- whether off site car parking would result in a danger to highway and pedestrian safety;
- whether the locality is which the proposed development is located is served by public parking facilities;
- the relative accessibility of the development site by passenger transport services;
- degree of combined or multiple usage;
- whether off site parking would result in demonstrable harm to residential amenity.

7. Where on-site car parking cannot be provided for a proposed development for example, A3 uses in District Centres, the car parking standards specified in this guidance note will be used to assess the availability and potential impact of on-street car parking in the surrounding areas.

Advice should be sought from the **Planning & Building Control Service** at an early stage.

Car Parking Requirements in the City Centre

8. For developments within the City Centre as defined in the Unitary Development Plan, the car parking standards are expressed as maximum

standards. With the exception of Use Classes B1 (Business and Light Industry including offices) and C3 (Dwellinghouses) for which specific standards have been adopted, the maximum standards for uses outside the City Centre apply. The operational minimums do not apply. However, the City Council is working on a policy of commuted sum payments for car parking which in the first instance will be applied in the City Centre. Further guidance on this will be issued in due course.

9. The car parking standards for the City Centre aim to support its regeneration and the needs of economic development. The City Council does not want to stifle development by setting standards which are too restrictive. The standards therefore, allow developers to provide a level of car parking to meet operational requirements up to a maximum level. Additionally by only adopting a maximum standard, developers will not be required to provide a high level of car parking on sites which because of their location can accomodate very little or no car parking.

10. Moreover given Liverpool City Centre's high level of accessibility by both bus and train, the improvements being undertaken to passenger transport facilities and the good supply of public car parking it was considered appropriate to adopt only maximum car parking standards for the City Centre. This will support the City Council's objective of reducing the amount of commuting by private car and encouraging a modal shift to passenger transport, which will in turn have benefits for the environment.

Layout and Design of Car Parks

11. Entrances and exits to and from the public highway network must be situated so as not to interfere with the free flow of traffic, or present a hazard to road users and pedestrians. In this respect, factors such as sight lines and kerb radii must be satisfactorily addressed. Wherever possible, pedestrian entrances/exits and paths should be separate from those used by vehicles.

12. Car parks should be adequately landscaped and constructed from good quality materials. The main visual objectives in the successful design of car parks are to minimise their intrusive impact on their surroundings and reduce their apparent scale when viewed from within the car park. Surface materials, landscaping and boundary treatments are important in this respect.

13. Car parks which are characterised by wide expanses of tarmac should be avoided. They should be broken up by landscaping features. Therefore, any measures aimed at improving the appearance of tarmac car parks through, for example, differing surface textures and colours, will be encouraged. The additional use of other materials such as cobbles, concrete block paving and setts will assist in providing more varied and attractive surfaces. Where the cost of using such materials is prohibitively high, they can be used to form surface drainage channels or to define individual parking bays.

14 Trees can also be used to soften the visual impact of car parks and a standard of 1 tree per car parking space will be required where appropriate in car parks with 20 or more spaces. Trees can be used as boundary treatment together with hedges and good quality fencing.

15. The internal layout of car parks should be user friendly eg. well lit and signposted. Car parking spaces should have minimum dimensions of 2.4m x 4.8m. Nose to tail car parking spaces should be at least 2.4m x 6m.

Car Parking for the Disabled

16. Car parking spaces should be designated for use by disabled people, clearly marked and clearly signed with the international symbol at the entrance to the site. Where possible, parking should be provided under cover to give protection during wet weather as transfer from car to wheelchair can be slow.

17. In general, the following specific standards will apply:-

- a minimum of 6% of the first 100 parking spaces in a development should be designated for use by Orange Badge holders, thereafter the number of spaces will be negotiable.

- parking bays for disabled people should be 4.8m x 3.6m or if there is a common transfer zone between two bays, a standard 2.4m wide bay can be used with a 1.2m transfer zone;

- parking spaces for disabled people should be located close to a building's accessible entrance, within 50m if the path is uncovered, or 100m if covered;

- where housing is specifically for elderly or disabled people, the allocated parking spaces

should be adjacent to the dwellings they are to serve and should be connected to the dwelling entrance by a covered way.

Servicing

18. Developments should incorporate satisfactory servicing arrangements. As a general principle, servicing provision should be based on the maximum number of vehicles likely to serve the development at any one time. Vehicles should be able to manoeuvre with ease and to stand for loading and unloading without inconvenience to other users of the site, so as to ensure that:-

- where feasible, all service vehicles are accommodated off the public highway;
- all service vehicles enter and leave the site in forward gear, with adequate turning facilities within the site;
- the maximum distance for refuse collection is 25m ;
- sufficient room is provided for emergency vehicles to enter and leave the site unobstructed, and;
- servicing is segregated within the site from any public car parking area.

Cycle Parking

19. The Cycle Parking standards set out in this Guidance Note are designed to ensure the provision of a minimum level of cycle parking facilities in association with new development and change of use. These are minimum standards and the Council would encourage greater provision.

20. Where the provision of cycle parking facilities are intended for use by the staff of that particular development, stands should be located within the curtilage of the development to ensure effective security and supervision. Cycle stands for use by visitors (and any additional staff facilities) should be carefully located to maximise convenience to the entrance of buildings, and positioned so as to ensure safety, security and supervision.

21.The cycle stands should provided in the style of the "Sheffield" rack which provides for two cycles and enables the whole cycle to be immobilised as both frame and two wheels can be locked to them. Alternatives will be considered but must offer at least the equivalent capacity, robustness and degree of protection for users.

Further Advice

Applicants are advised to discuss proposals in advance of a formal planning application by contacting:-

Planning & Building Control Service
4th Floor Millennium House
60 Victoria Street
Liverpol L1 6JF
Tel: 0151 233 3021

Schedule of Car and Cycle Parking Standards

Use Class and Development Type	Maximum Car Parking Requirement	Minimum Car Parking Requirement	Minimum Cycle Parking Requirement
Class A1 – Shops			
Individual Shops (up to 1000 sqm)	1 staff space per 75 sqm 1 visitor space per 17 sqm	1 staff space per 100sqm 1 visitor space per 20sqm	1 staff stand per 500sqm 1 visitor stand per 250 sqm
Supermarket (up to 2500 sqm)	1 staff space per 75 sqm 1 visitor space per 15 sqm	1 staff space per 100sqm 1 visitor space per 20 sqm	1 staff stand per 500sqm 1 visitor stand per 250 sqm
Superstore (over 2500 sqm)	1 staff space per 75 sqm 1 visitor space per 10 sqm	1 staff space per 100sqm 1 visitor space per 12 sqm	1 staff stand per 500sqm 1 visitor stand per 250 sqm
Retail Warehouse Unit (over 1000 sqm)	1 staff space per 75 sqm 1 visitor space per 10 sqm	1 staff space per 100sqm 1 visitor space per 20sqm	1 staff stand per 500sqm 1 visitor stand per 250 sqm
Wholesale Warehouse Unit (over 1000 sqm) open to members of the public for retail purposes (including Discount Club)	1 staff space per 75 sqm 1 visitor space per 17 sqm	1 staff space per 100sqm 1 visitor space per 20 sqm	1 staff stand per 500sqm 1 visitor stand per 250 sqm
Class A2 – Financial and Professional Services			
Professional and other services appropriate to a shopping area eg. banking; building society; solicitors etc	1 space per 15 sqm for staff and visitors	1 space per 25 sqm for staff and visitors	1 stand per 200 sqm for staff and visitors
Class A3 – Food and Drink			
Public Houses, Restaurants, Cafes etc	1 space per 2 staff 1 space per 2.5 sqm of public floorspace	1 space per 3 staff 1 space per 5 sqm of public floorspace	1 stand per 5 staff 1 stand per 40 sqm of public floorspace
Class B1 - Business			
Offices, Research and Development, Light Industrial Process	1 space per 25 sqm for staff and visitors	1 space per 30 sqm for staff and visitors	1 stand per 500 sqm for staff and visitors
Class B1 – (Within the City Centre)			
Offices	Maximum of 1 space per 100 sqm	No minimum standards	1 stand per 500 sqm for staff and visitors

(NB: Unless otherwise stated, for all other uses in the City Centre, the maximum standards apply. The operational minimum standards do not apply).

Use Class and Development Type	Maximum Car Parking Requirement	Minimum Car Parking Requirement	Minimum Cycle Parking Requirement
Class B2 – General Industrial			
Individual Units up to 2000 sqm	1 space per 40 sqm for staff and visitors	1 space per 50 sqm for staff and visitors	1 stand per 500 sqm for staff and visitors
Individual Units over 2000 sqm	1 space per 60 sqm for staff and visitors	1 space per 70 sqm for staff and visitors	1 stand per 600 sqm for staff and visitors
Class B8 – Storage and Distribution (NB: This class includes warehouse units not involved in retailing direct to businesses or members of the public)			
Individual Units up to 500 sqm	1 space per 30 sqm for staff and visitors	1 space per 35 sqm for staff and visitors	1 stand per 100 sqm for staff and visitors
Individual Units over 500 sqm	1 space per 75 sqm for staff and visitors	1 space per 100 sqm for staff and visitors	1 stand per 100 sqm for staff and visitors
Class C1 – Hotels			
Hotels	1 space per 3 staff 1 space per bedroom 1 space per 2.5 sqm of public floorspace for non-residents	1 space per 5 staff 1 space per bedroom 1 space per 5 sqm of public floorspace for non-residents	1 stand per 5 bedrooms for staff and visitors
Class C2 – Residential Institutions			
Hospitals	1 space per resident member of staff 1 space per 2 non-resident members of staff 1 space per 3 bedspaces	1 space per resident member of staff 1 space per 4 non-resident members of staff 1 space per 4 bedspaces	1 stand per 10 bedspaces for staff and visitors
Nursing Homes/Residential Homes	1 space per resident member of staff 1 space per 2 non-resident members of staff on duty at peak staffing period 1 space per 2 bedspaces for staff and visitors	1 space per resident member of staff 1 space per 2 non-resident members of staff on duty at peak staffing period 1 space per 4 bedspaces for staff and visitors	1 stand per 8 members of staff
Residential Schools and Colleges	1 space per resident member of staff 1 space per 3 bedspaces for residents over driving age	1 space per resident member of staff 1 space per 5 bedspaces for residents over driving age	1 stand per 3 bedpsaces for staff and visitors

Use Class and Development Type	Maximum Car Parking Requirement	Minimum Car Parking Requirement	Minimum Cycle Parking Requirement
Class C3 – Dwellinghouses			
Detached/Semi-Detached Houses	No maximum standards	2 spaces per dwelling	All units should be accessible by cycle
Terraced Housing	No maximum standards	1 space per dwelling located at front and 2 spaces per end of terrace property.	All units should be accessible by cycle
New Flats (Local Authority/Housing Association)	No maximum standards	1 space per 2 units for residents 1 space per 10 units for visitors	1 stand per unit
New Flats (Private)	No maximum standards	1 space per unit for residents 1 space per 2 units for visitors	1 stand per unit
Sheltered Housing (Private)	No maximum standards	1 space per warden 1 space per 2 units for residents and visitors	1 stand per 10 units for staff and visitors
Sheltered Housing (Local Authority/Housing Association)	No maximum standards	1 space per warden 1 space per 4 units for residents 1 space per 10 units for visitors	1 stand per 10 units for staff and visitors
Student Accommodation	1 space per 4 bedspaces	1 space per 6 bedspaces	1 stand per 3 bedspaces
Class C3 – (Within the City Centre)			
For all private residential development other than sheltered housing	1 space per private dwelling plus 10% for visitors	No minimum standards	All units should be accessible by cycle
Housing Association/Local Authority Dwellings	1 space per 4 dwellings	No minimum standards	All units should be accessible by cycle
Student Accommodation	1 space per 10 bedspaces plus 10% for visitors	No minimum standards	1 stand per 3 bedspaces

(NB: for residential development proposals on the periphery of the City Centre, a higher car parking standard may be required).

Class D1 – Non Residential Institutions

Medical or Health Service facilities	1 space per member of medical staff 1 space per 3 other staff 3 spaces per consulting room	1 space per member of medical staff 1 space per 3 other staff 2 spaces per consulting room	1 stand per 8 members of staff 1 stand per consulting room for visitors
Creches, Day Nurseries and Day Centres	1 space per 2 members of staff 3 spaces for any additional residential unit	1 space per 3 members of staff 2 spaces for any additional residential unit	1 stand per 8 members of staff
Primary Schools	1 space per member of staff 1 additional visitor space per 3 members of staff	1 space per member of staff 1 additional visitor space per 5 members of staff	1 stand per 10 members of staff 1 stand per 80 pupils
Secondary Schools	1 space per member of staff 1 additional visitor space per 3 members of staff	1 space per member of staff 1 additional visitor space per 5 members of staff	1 stand per 10 members of staff 1 stand per 20 pupils
College of Further Education	1 space per member of staff 1 space per 10 students	1 space per member of staff 1 space per 15 students	1 stand per 10 members of staff 1 stand per 10 pupils
Museums and Art Galleries	1 space per 2 members of staff 1 visitor space per 30 sqm of public floorspace	1 space per 3 members of staff 1 visitor space per 35 sqm of public floorspace	1 stand per 10 members of staff 1 stand per 60 sqm of public floorpsace for visitors
Libraries and Reading Rooms	1 space per 2 members of staff 1 space per 40 sqm of public floorspace for visitors	1 space per 3 members of staff 1 space per 50 sqm of public floorspace for visitors	1 stand per 10 members of staff 1 stand per 30 sqm of public floorspace for visitors
Public or Exhibition Hall	1 space per 2 members of staff 1 space per 5 sqm of public floorspace for visitors	1 space per 3 members of staff 1 space per 10 sqm of public floorspace for visitors	1 stand per 10 members of staff 1 stand per 35 sqm of public floorspace for visitors
Places of Worship, Religious Instruction etc	1 space per 2 members of staff 1 space per 5 fixed seats or 1 space per 5 sqm of public floorspace for visitors where no formal seating arrangements exists	1 space per 3 members of staff 1 space per 10 fixed seats or 1 space per 10 sqm of public floorspace for visitors where no formal seating arrangements exists	1 stand per 10 members of staff 1 stand per 50 sqm of public floorspace for visitors

Use Class and Development Type	Maximum Car Parking Requirement	Minimum Car Parking Requirement	Minimum Cycle Parking Requirement
Class D2 – Assembly and Leisure			
Cinemas, Concert Halls, Bingo Halls, Casino, Dance Halls	1 space per 2 members of staff 1 space per 3 seats for visitors	1 space per 3 members of staff 1 space per 5 seats for visitors	1 stand per 50 seats for staff and visitors
Indoor Sports Centres including Swimming Baths, Skating Rinks	1 space per 2 members of staff 1 space per 3 sqm of public floorspace for visitors	1 space per 3 members of staff 1 space per 5 sqm of public floorspace for visitors	1 stand per 10 staff 1 stand per 15 sqm of public floorspace
Outdoor Sport Centres and Recreation Centres (not involving motorised vehicles or firearms)	Given the nature of these developments and the wide variation on car and cycle parking requirements, the Local Planning Authority should be consulted at an early stage to ascertain appropriate parking stands.		
Sue Generis			
Hostels	1 space per residential member of staff 1 space per 5 bedspaces	1 space per residential member of staff 1 space per 10 bedspaces	1 stand per 4 bedrooms for staff and visitors

APPENDIX C

TRICS Data

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : D - INDUSTRIAL ESTATE
MULTI-MODAL VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	BR	BRISTOL CITY	2 days
	CW	CORNWALL	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	2 days
05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	1 days
08	NORTH WEST		
	LC	LANCASHIRE	1 days
	MS	MERSEYSIDE	1 days

Filtering Stage 2 selection:

Parameter: Gross floor area
Range: 4300 to 6515 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/02 to 09/09/10

Selected survey days:

Tuesday	2 days
Thursday	4 days
Friday	2 days

Selected survey types:

Manual count	8 days
Directional ATC Count	0 days

Selected Locations:

Suburban Area (PPS6 Out of Centre)	5
Edge of Town	2
Neighbourhood Centre (PPS6 Local Centre)	1

Selected Location Sub Categories:

Industrial Zone	6
Residential Zone	1
No Sub Category	1

LIST OF SITES relevant to selection parameters

1 BR-02-D-02 INDUSTRIAL ESTATE, BRISTOL BRISTOL CITY
NOVERS HILL
BEDMINSTER
BRISTOL
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 6000 sqm
Survey date: THURSDAY 19/11/09 Survey Type: MANUAL

2 BR-02-D-03 INDUSTRIAL ESTATE, BRISTOL BRISTOL CITY
CROFTS END ROAD
SPEEDWELL
BRISTOL
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 6000 sqm
Survey date: TUESDAY 20/10/09 Survey Type: MANUAL

3 CA-02-D-01 IND. ESTATE, PETERBOROUGH CAMBRIDGESHIRE
STURROCK WAY
BRETTON
PETERBOROUGH
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 4300 sqm
Survey date: TUESDAY 13/05/08 Survey Type: MANUAL

4 CA-02-D-03 IND. ESTATE, PETERBOROUGH CAMBRIDGESHIRE
SAVILLE ROAD
WESTWOOD
PETERBOROUGH
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Gross floor area: 4425 sqm
Survey date: THURSDAY 22/10/09 Survey Type: MANUAL

5 CW-02-D-02 INDUSTRIAL ESTATE, CAMBORNE CORNWALL
DRUIDS ROAD

CAMBORNE
Edge of Town
Industrial Zone
Total Gross floor area: 6515 sqm
Survey date: FRIDAY 21/09/07 Survey Type: MANUAL

6 LC-02-D-04 INDUSTRIAL ESTATE, GARSTANG LANCASHIRE
GREEN LANE WEST

GARSTANG
Edge of Town
Industrial Zone
Total Gross floor area: 4555 sqm
Survey date: FRIDAY 16/06/06 Survey Type: MANUAL

7 LN-02-D-01 INDUSTRIAL ESTATE, GRANTHAM LINCOLNSHIRE
BELTON LANE

GRANTHAM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 5347 sqm
Survey date: THURSDAY 12/05/05 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

8 MS-02-D-06 INDUSTRIAL EST., LIVERPOOL MERSEYSIDE
BOALER STREET

LIVERPOOL
Neighbourhood Centre (PPS6 Local Centre)
Industrial Zone
Total Gross floor area: 4800 sqm
Survey date: THURSDAY 09/09/10 Survey Type: MANUAL

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30	0	0	0.000	0	0	0.000	0	0	0.000
00:30 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 01:30	0	0	0.000	0	0	0.000	0	0	0.000
01:30 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 02:30	0	0	0.000	0	0	0.000	0	0	0.000
02:30 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 03:30	0	0	0.000	0	0	0.000	0	0	0.000
03:30 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 04:30	0	0	0.000	0	0	0.000	0	0	0.000
04:30 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 05:30	0	0	0.000	0	0	0.000	0	0	0.000
05:30 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 06:30	0	0	0.000	0	0	0.000	0	0	0.000
06:30 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 07:30	8	5243	0.153	8	5243	0.079	8	5243	0.232
07:30 - 08:00	8	5243	0.317	8	5243	0.086	8	5243	0.403
08:00 - 08:30	8	5243	0.405	8	5243	0.172	8	5243	0.577
08:30 - 09:00	8	5243	0.417	8	5243	0.227	8	5243	0.644
09:00 - 09:30	8	5243	0.336	8	5243	0.224	8	5243	0.560
09:30 - 10:00	8	5243	0.274	8	5243	0.257	8	5243	0.531
10:00 - 10:30	8	5243	0.284	8	5243	0.238	8	5243	0.522
10:30 - 11:00	8	5243	0.210	8	5243	0.212	8	5243	0.422
11:00 - 11:30	8	5243	0.234	8	5243	0.219	8	5243	0.453
11:30 - 12:00	8	5243	0.246	8	5243	0.265	8	5243	0.511
12:00 - 12:30	8	5243	0.277	8	5243	0.303	8	5243	0.580
12:30 - 13:00	8	5243	0.255	8	5243	0.267	8	5243	0.522
13:00 - 13:30	8	5243	0.246	8	5243	0.257	8	5243	0.503
13:30 - 14:00	8	5243	0.260	8	5243	0.236	8	5243	0.496
14:00 - 14:30	8	5243	0.257	8	5243	0.260	8	5243	0.517
14:30 - 15:00	8	5243	0.203	8	5243	0.224	8	5243	0.427
15:00 - 15:30	8	5243	0.248	8	5243	0.277	8	5243	0.525
15:30 - 16:00	8	5243	0.234	8	5243	0.253	8	5243	0.487
16:00 - 16:30	8	5243	0.160	8	5243	0.305	8	5243	0.465
16:30 - 17:00	8	5243	0.224	8	5243	0.336	8	5243	0.560
17:00 - 17:30	8	5243	0.165	8	5243	0.427	8	5243	0.592
17:30 - 18:00	8	5243	0.076	8	5243	0.238	8	5243	0.314
18:00 - 18:30	8	5243	0.045	8	5243	0.124	8	5243	0.169
18:30 - 19:00	8	5243	0.021	8	5243	0.029	8	5243	0.050
19:00 - 19:30	0	0	0.000	0	0	0.000	0	0	0.000
19:30 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 20:30	0	0	0.000	0	0	0.000	0	0	0.000
20:30 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 21:30	0	0	0.000	0	0	0.000	0	0	0.000
21:30 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 22:30	0	0	0.000	0	0	0.000	0	0	0.000
22:30 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 23:30	0	0	0.000	0	0	0.000	0	0	0.000
23:30 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			5.547			5.515			11.062

Parameter summary

Trip rate parameter range selected:	4300 - 6515 (units: sqm)
Survey date date range:	01/01/02 - 09/09/10
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL OGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30	0	0	0.000	0	0	0.000	0	0	0.000
00:30 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 01:30	0	0	0.000	0	0	0.000	0	0	0.000
01:30 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 02:30	0	0	0.000	0	0	0.000	0	0	0.000
02:30 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 03:30	0	0	0.000	0	0	0.000	0	0	0.000
03:30 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 04:30	0	0	0.000	0	0	0.000	0	0	0.000
04:30 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 05:30	0	0	0.000	0	0	0.000	0	0	0.000
05:30 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 06:30	0	0	0.000	0	0	0.000	0	0	0.000
06:30 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 07:30	8	5243	0.000	8	5243	0.005	8	5243	0.005
07:30 - 08:00	8	5243	0.014	8	5243	0.012	8	5243	0.026
08:00 - 08:30	8	5243	0.002	8	5243	0.010	8	5243	0.012
08:30 - 09:00	8	5243	0.017	8	5243	0.010	8	5243	0.027
09:00 - 09:30	8	5243	0.036	8	5243	0.026	8	5243	0.062
09:30 - 10:00	8	5243	0.024	8	5243	0.029	8	5243	0.053
10:00 - 10:30	8	5243	0.045	8	5243	0.029	8	5243	0.074
10:30 - 11:00	8	5243	0.019	8	5243	0.024	8	5243	0.043
11:00 - 11:30	8	5243	0.021	8	5243	0.029	8	5243	0.050
11:30 - 12:00	8	5243	0.019	8	5243	0.014	8	5243	0.033
12:00 - 12:30	8	5243	0.019	8	5243	0.014	8	5243	0.033
12:30 - 13:00	8	5243	0.010	8	5243	0.010	8	5243	0.020
13:00 - 13:30	8	5243	0.017	8	5243	0.017	8	5243	0.034
13:30 - 14:00	8	5243	0.012	8	5243	0.019	8	5243	0.031
14:00 - 14:30	8	5243	0.012	8	5243	0.017	8	5243	0.029
14:30 - 15:00	8	5243	0.010	8	5243	0.010	8	5243	0.020
15:00 - 15:30	8	5243	0.024	8	5243	0.019	8	5243	0.043
15:30 - 16:00	8	5243	0.012	8	5243	0.019	8	5243	0.031
16:00 - 16:30	8	5243	0.010	8	5243	0.007	8	5243	0.017
16:30 - 17:00	8	5243	0.010	8	5243	0.012	8	5243	0.022
17:00 - 17:30	8	5243	0.007	8	5243	0.005	8	5243	0.012
17:30 - 18:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
18:00 - 18:30	8	5243	0.000	8	5243	0.000	8	5243	0.000
18:30 - 19:00	8	5243	0.000	8	5243	0.002	8	5243	0.002
19:00 - 19:30	0	0	0.000	0	0	0.000	0	0	0.000
19:30 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 20:30	0	0	0.000	0	0	0.000	0	0	0.000
20:30 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 21:30	0	0	0.000	0	0	0.000	0	0	0.000
21:30 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 22:30	0	0	0.000	0	0	0.000	0	0	0.000
22:30 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 23:30	0	0	0.000	0	0	0.000	0	0	0.000
23:30 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			0.340			0.339			0.679

Parameter summary

Trip rate parameter range selected:	4300 - 6515 (units: sqm)
Survey date date range:	01/01/02 - 09/09/10
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL CYCLISTS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30	0	0	0.000	0	0	0.000	0	0	0.000
00:30 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 01:30	0	0	0.000	0	0	0.000	0	0	0.000
01:30 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 02:30	0	0	0.000	0	0	0.000	0	0	0.000
02:30 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 03:30	0	0	0.000	0	0	0.000	0	0	0.000
03:30 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 04:30	0	0	0.000	0	0	0.000	0	0	0.000
04:30 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 05:30	0	0	0.000	0	0	0.000	0	0	0.000
05:30 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 06:30	0	0	0.000	0	0	0.000	0	0	0.000
06:30 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 07:30	8	5243	0.002	8	5243	0.000	8	5243	0.002
07:30 - 08:00	8	5243	0.012	8	5243	0.000	8	5243	0.012
08:00 - 08:30	8	5243	0.010	8	5243	0.000	8	5243	0.010
08:30 - 09:00	8	5243	0.007	8	5243	0.000	8	5243	0.007
09:00 - 09:30	8	5243	0.005	8	5243	0.005	8	5243	0.010
09:30 - 10:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
10:00 - 10:30	8	5243	0.000	8	5243	0.000	8	5243	0.000
10:30 - 11:00	8	5243	0.002	8	5243	0.000	8	5243	0.002
11:00 - 11:30	8	5243	0.000	8	5243	0.000	8	5243	0.000
11:30 - 12:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
12:00 - 12:30	8	5243	0.002	8	5243	0.000	8	5243	0.002
12:30 - 13:00	8	5243	0.002	8	5243	0.005	8	5243	0.007
13:00 - 13:30	8	5243	0.005	8	5243	0.010	8	5243	0.015
13:30 - 14:00	8	5243	0.005	8	5243	0.000	8	5243	0.005
14:00 - 14:30	8	5243	0.005	8	5243	0.000	8	5243	0.005
14:30 - 15:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
15:00 - 15:30	8	5243	0.007	8	5243	0.007	8	5243	0.014
15:30 - 16:00	8	5243	0.010	8	5243	0.017	8	5243	0.027
16:00 - 16:30	8	5243	0.002	8	5243	0.002	8	5243	0.004
16:30 - 17:00	8	5243	0.002	8	5243	0.005	8	5243	0.007
17:00 - 17:30	8	5243	0.012	8	5243	0.024	8	5243	0.036
17:30 - 18:00	8	5243	0.000	8	5243	0.005	8	5243	0.005
18:00 - 18:30	8	5243	0.000	8	5243	0.002	8	5243	0.002
18:30 - 19:00	8	5243	0.000	8	5243	0.007	8	5243	0.007
19:00 - 19:30	0	0	0.000	0	0	0.000	0	0	0.000
19:30 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 20:30	0	0	0.000	0	0	0.000	0	0	0.000
20:30 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 21:30	0	0	0.000	0	0	0.000	0	0	0.000
21:30 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 22:30	0	0	0.000	0	0	0.000	0	0	0.000
22:30 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 23:30	0	0	0.000	0	0	0.000	0	0	0.000
23:30 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			0.090			0.089			0.179

Parameter summary

Trip rate parameter range selected:	4300 - 6515 (units: sqm)
Survey date date range:	01/01/02 - 09/09/10
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL VEHICLE OCCUPANTS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30	0	0	0.000	0	0	0.000	0	0	0.000
00:30 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 01:30	0	0	0.000	0	0	0.000	0	0	0.000
01:30 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 02:30	0	0	0.000	0	0	0.000	0	0	0.000
02:30 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 03:30	0	0	0.000	0	0	0.000	0	0	0.000
03:30 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 04:30	0	0	0.000	0	0	0.000	0	0	0.000
04:30 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 05:30	0	0	0.000	0	0	0.000	0	0	0.000
05:30 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 06:30	0	0	0.000	0	0	0.000	0	0	0.000
06:30 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 07:30	8	5243	0.162	8	5243	0.079	8	5243	0.241
07:30 - 08:00	8	5243	0.353	8	5243	0.103	8	5243	0.456
08:00 - 08:30	8	5243	0.451	8	5243	0.186	8	5243	0.637
08:30 - 09:00	8	5243	0.477	8	5243	0.272	8	5243	0.749
09:00 - 09:30	8	5243	0.374	8	5243	0.260	8	5243	0.634
09:30 - 10:00	8	5243	0.298	8	5243	0.286	8	5243	0.584
10:00 - 10:30	8	5243	0.317	8	5243	0.279	8	5243	0.596
10:30 - 11:00	8	5243	0.246	8	5243	0.255	8	5243	0.501
11:00 - 11:30	8	5243	0.277	8	5243	0.236	8	5243	0.513
11:30 - 12:00	8	5243	0.284	8	5243	0.310	8	5243	0.594
12:00 - 12:30	8	5243	0.303	8	5243	0.341	8	5243	0.644
12:30 - 13:00	8	5243	0.279	8	5243	0.298	8	5243	0.577
13:00 - 13:30	8	5243	0.284	8	5243	0.279	8	5243	0.563
13:30 - 14:00	8	5243	0.286	8	5243	0.272	8	5243	0.558
14:00 - 14:30	8	5243	0.281	8	5243	0.284	8	5243	0.565
14:30 - 15:00	8	5243	0.229	8	5243	0.248	8	5243	0.477
15:00 - 15:30	8	5243	0.281	8	5243	0.315	8	5243	0.596
15:30 - 16:00	8	5243	0.281	8	5243	0.315	8	5243	0.596
16:00 - 16:30	8	5243	0.176	8	5243	0.355	8	5243	0.531
16:30 - 17:00	8	5243	0.265	8	5243	0.374	8	5243	0.639
17:00 - 17:30	8	5243	0.219	8	5243	0.510	8	5243	0.729
17:30 - 18:00	8	5243	0.100	8	5243	0.281	8	5243	0.381
18:00 - 18:30	8	5243	0.048	8	5243	0.160	8	5243	0.208
18:30 - 19:00	8	5243	0.019	8	5243	0.036	8	5243	0.055
19:00 - 19:30	0	0	0.000	0	0	0.000	0	0	0.000
19:30 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 20:30	0	0	0.000	0	0	0.000	0	0	0.000
20:30 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 21:30	0	0	0.000	0	0	0.000	0	0	0.000
21:30 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 22:30	0	0	0.000	0	0	0.000	0	0	0.000
22:30 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 23:30	0	0	0.000	0	0	0.000	0	0	0.000
23:30 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			6.290			6.334			12.624

Parameter summary

Trip rate parameter range selected:	4300 - 6515 (units: sqm)
Survey date date range:	01/01/02 - 09/09/10
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL PEDESTRIANS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30	0	0	0.000	0	0	0.000	0	0	0.000
00:30 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 01:30	0	0	0.000	0	0	0.000	0	0	0.000
01:30 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 02:30	0	0	0.000	0	0	0.000	0	0	0.000
02:30 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 03:30	0	0	0.000	0	0	0.000	0	0	0.000
03:30 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 04:30	0	0	0.000	0	0	0.000	0	0	0.000
04:30 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 05:30	0	0	0.000	0	0	0.000	0	0	0.000
05:30 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 06:30	0	0	0.000	0	0	0.000	0	0	0.000
06:30 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 07:30	8	5243	0.010	8	5243	0.000	8	5243	0.010
07:30 - 08:00	8	5243	0.005	8	5243	0.002	8	5243	0.007
08:00 - 08:30	8	5243	0.038	8	5243	0.005	8	5243	0.043
08:30 - 09:00	8	5243	0.024	8	5243	0.010	8	5243	0.034
09:00 - 09:30	8	5243	0.024	8	5243	0.017	8	5243	0.041
09:30 - 10:00	8	5243	0.007	8	5243	0.005	8	5243	0.012
10:00 - 10:30	8	5243	0.005	8	5243	0.002	8	5243	0.007
10:30 - 11:00	8	5243	0.014	8	5243	0.010	8	5243	0.024
11:00 - 11:30	8	5243	0.010	8	5243	0.005	8	5243	0.015
11:30 - 12:00	8	5243	0.002	8	5243	0.002	8	5243	0.004
12:00 - 12:30	8	5243	0.007	8	5243	0.010	8	5243	0.017
12:30 - 13:00	8	5243	0.019	8	5243	0.012	8	5243	0.031
13:00 - 13:30	8	5243	0.010	8	5243	0.014	8	5243	0.024
13:30 - 14:00	8	5243	0.010	8	5243	0.007	8	5243	0.017
14:00 - 14:30	8	5243	0.007	8	5243	0.002	8	5243	0.009
14:30 - 15:00	8	5243	0.000	8	5243	0.005	8	5243	0.005
15:00 - 15:30	8	5243	0.005	8	5243	0.000	8	5243	0.005
15:30 - 16:00	8	5243	0.007	8	5243	0.002	8	5243	0.009
16:00 - 16:30	8	5243	0.017	8	5243	0.029	8	5243	0.046
16:30 - 17:00	8	5243	0.012	8	5243	0.007	8	5243	0.019
17:00 - 17:30	8	5243	0.026	8	5243	0.043	8	5243	0.069
17:30 - 18:00	8	5243	0.000	8	5243	0.010	8	5243	0.010
18:00 - 18:30	8	5243	0.002	8	5243	0.014	8	5243	0.016
18:30 - 19:00	8	5243	0.000	8	5243	0.005	8	5243	0.005
19:00 - 19:30	0	0	0.000	0	0	0.000	0	0	0.000
19:30 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 20:30	0	0	0.000	0	0	0.000	0	0	0.000
20:30 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 21:30	0	0	0.000	0	0	0.000	0	0	0.000
21:30 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 22:30	0	0	0.000	0	0	0.000	0	0	0.000
22:30 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 23:30	0	0	0.000	0	0	0.000	0	0	0.000
23:30 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			0.261			0.218			0.479

Parameter summary

Trip rate parameter range selected:	4300 - 6515 (units: sqm)
Survey date date range:	01/01/02 - 09/09/10
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL PUBLIC TRANSPORT USERS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30	0	0	0.000	0	0	0.000	0	0	0.000
00:30 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 01:30	0	0	0.000	0	0	0.000	0	0	0.000
01:30 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 02:30	0	0	0.000	0	0	0.000	0	0	0.000
02:30 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 03:30	0	0	0.000	0	0	0.000	0	0	0.000
03:30 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 04:30	0	0	0.000	0	0	0.000	0	0	0.000
04:30 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 05:30	0	0	0.000	0	0	0.000	0	0	0.000
05:30 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 06:30	0	0	0.000	0	0	0.000	0	0	0.000
06:30 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 07:30	8	5243	0.002	8	5243	0.000	8	5243	0.002
07:30 - 08:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
08:00 - 08:30	8	5243	0.005	8	5243	0.000	8	5243	0.005
08:30 - 09:00	8	5243	0.005	8	5243	0.000	8	5243	0.005
09:00 - 09:30	8	5243	0.002	8	5243	0.000	8	5243	0.002
09:30 - 10:00	8	5243	0.002	8	5243	0.000	8	5243	0.002
10:00 - 10:30	8	5243	0.000	8	5243	0.000	8	5243	0.000
10:30 - 11:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
11:00 - 11:30	8	5243	0.002	8	5243	0.002	8	5243	0.004
11:30 - 12:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
12:00 - 12:30	8	5243	0.000	8	5243	0.000	8	5243	0.000
12:30 - 13:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
13:00 - 13:30	8	5243	0.002	8	5243	0.000	8	5243	0.002
13:30 - 14:00	8	5243	0.000	8	5243	0.002	8	5243	0.002
14:00 - 14:30	8	5243	0.002	8	5243	0.002	8	5243	0.004
14:30 - 15:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
15:00 - 15:30	8	5243	0.000	8	5243	0.002	8	5243	0.002
15:30 - 16:00	8	5243	0.000	8	5243	0.002	8	5243	0.002
16:00 - 16:30	8	5243	0.000	8	5243	0.000	8	5243	0.000
16:30 - 17:00	8	5243	0.002	8	5243	0.000	8	5243	0.002
17:00 - 17:30	8	5243	0.000	8	5243	0.010	8	5243	0.010
17:30 - 18:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
18:00 - 18:30	8	5243	0.000	8	5243	0.005	8	5243	0.005
18:30 - 19:00	8	5243	0.000	8	5243	0.000	8	5243	0.000
19:00 - 19:30	0	0	0.000	0	0	0.000	0	0	0.000
19:30 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 20:30	0	0	0.000	0	0	0.000	0	0	0.000
20:30 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 21:30	0	0	0.000	0	0	0.000	0	0	0.000
21:30 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 22:30	0	0	0.000	0	0	0.000	0	0	0.000
22:30 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 23:30	0	0	0.000	0	0	0.000	0	0	0.000
23:30 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			0.024			0.025			0.049

Parameter summary

Trip rate parameter range selected:	4300 - 6515 (units: sqm)
Survey date date range:	01/01/02 - 09/09/10
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30	0	0	0.000	0	0	0.000	0	0	0.000
00:30 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 01:30	0	0	0.000	0	0	0.000	0	0	0.000
01:30 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 02:30	0	0	0.000	0	0	0.000	0	0	0.000
02:30 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 03:30	0	0	0.000	0	0	0.000	0	0	0.000
03:30 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 04:30	0	0	0.000	0	0	0.000	0	0	0.000
04:30 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 05:30	0	0	0.000	0	0	0.000	0	0	0.000
05:30 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 06:30	0	0	0.000	0	0	0.000	0	0	0.000
06:30 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 07:30	8	5243	0.176	8	5243	0.079	8	5243	0.255
07:30 - 08:00	8	5243	0.370	8	5243	0.105	8	5243	0.475
08:00 - 08:30	8	5243	0.503	8	5243	0.191	8	5243	0.694
08:30 - 09:00	8	5243	0.513	8	5243	0.281	8	5243	0.794
09:00 - 09:30	8	5243	0.405	8	5243	0.281	8	5243	0.686
09:30 - 10:00	8	5243	0.308	8	5243	0.291	8	5243	0.599
10:00 - 10:30	8	5243	0.322	8	5243	0.281	8	5243	0.603
10:30 - 11:00	8	5243	0.262	8	5243	0.265	8	5243	0.527
11:00 - 11:30	8	5243	0.288	8	5243	0.243	8	5243	0.531
11:30 - 12:00	8	5243	0.286	8	5243	0.312	8	5243	0.598
12:00 - 12:30	8	5243	0.312	8	5243	0.350	8	5243	0.662
12:30 - 13:00	8	5243	0.300	8	5243	0.315	8	5243	0.615
13:00 - 13:30	8	5243	0.300	8	5243	0.303	8	5243	0.603
13:30 - 14:00	8	5243	0.300	8	5243	0.281	8	5243	0.581
14:00 - 14:30	8	5243	0.296	8	5243	0.288	8	5243	0.584
14:30 - 15:00	8	5243	0.229	8	5243	0.253	8	5243	0.482
15:00 - 15:30	8	5243	0.293	8	5243	0.324	8	5243	0.617
15:30 - 16:00	8	5243	0.298	8	5243	0.336	8	5243	0.634
16:00 - 16:30	8	5243	0.196	8	5243	0.386	8	5243	0.582
16:30 - 17:00	8	5243	0.281	8	5243	0.386	8	5243	0.667
17:00 - 17:30	8	5243	0.257	8	5243	0.587	8	5243	0.844
17:30 - 18:00	8	5243	0.100	8	5243	0.296	8	5243	0.396
18:00 - 18:30	8	5243	0.050	8	5243	0.181	8	5243	0.231
18:30 - 19:00	8	5243	0.019	8	5243	0.048	8	5243	0.067
19:00 - 19:30	0	0	0.000	0	0	0.000	0	0	0.000
19:30 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 20:30	0	0	0.000	0	0	0.000	0	0	0.000
20:30 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 21:30	0	0	0.000	0	0	0.000	0	0	0.000
21:30 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 22:30	0	0	0.000	0	0	0.000	0	0	0.000
22:30 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 23:30	0	0	0.000	0	0	0.000	0	0	0.000
23:30 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			6.664			6.663			13.327

Parameter summary

Trip rate parameter range selected:	4300 - 6515 (units: sqm)
Survey date date range:	01/01/02 - 09/09/10
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

APPENDIX D

Manual For Streets – Section 7 Street Geometry – Figure 7.1 Extract

Chapter aims

- Advise how the requirements of different users can be accommodated in street design.
- Summarise research which shows that increased visibility encourages higher vehicle speeds.
- Describe how street space can be allocated based on pedestrian need, using swept path analysis to ensure that minimum access requirements for vehicles are met.
- Describe the rationale behind using shorter vehicle stopping distances to determine visibility requirements on links and at junctions.
- Recommend that the design of streets should determine vehicle speed.
- Recommend a maximum design speed of 20 mph for residential streets.

7.1 Introduction

7.1.1 Several issues need to be considered in order to satisfy the various user requirements detailed in Chapter 6, namely:

- street widths and components;
- junctions;
- features for controlling vehicle speeds;
- forward visibility on links; and
- visibility splays at junctions.

7.2 Street dimensions

7.2.1 The design of new streets or the improvement of existing ones should take into account the functions of the street, and the type, density and character of the development.

7.2.2 Carriageway widths should be appropriate for the particular context and uses of the street. Key factors to take into account include:

- the volume of vehicular traffic and pedestrian activity;
- the traffic composition;
- the demarcation, if any, between carriageway and footway (e.g. kerb, street furniture or trees and planting);
- whether parking is to take place in the carriageway and, if so, its distribution, arrangement, the frequency of occupation, and the likely level of parking enforcement (if any);
- the design speed (recommended to be 20 mph or less in residential areas);
- the curvature of the street (bends require greater width to accommodate the swept path of larger vehicles); and
- any intention to include one-way streets, or short stretches of single lane working in two-way streets.

7.2.3 In lightly-trafficked streets, carriageways may be narrowed over short lengths to a single lane as a traffic-calming feature. In such single lane working sections of

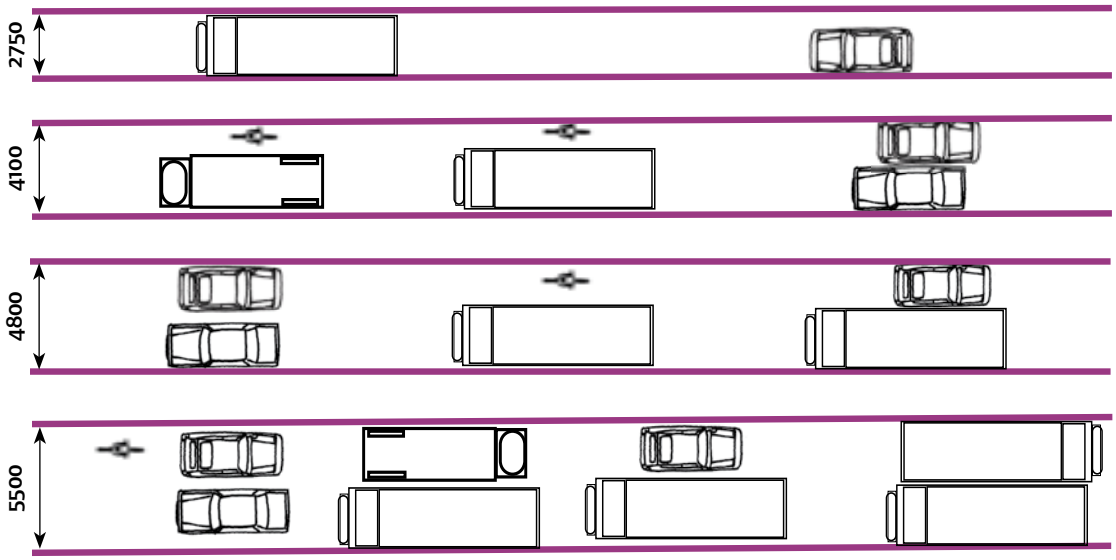

Figure 7.1 Illustrates what various carriageway widths can accommodate. They are not necessarily recommendations.

APPENDIX E

Radar Speed Survey

SANDERSON ASSOCIATES (CONSULTING ENGINEERS) LTD
24 Wakefield Road, Waterloo, Huddersfield, HD5 0HA
Tel: 01484 519333
Fax: 01484 519444

SPEED SURVEY

Location Goodlass Road, Speke, Liverpool
Direction of Travel Northbound

Job Number 4544
Date of Survey 22/03/07
Start Time 11:12
Finish Time 11:32

Speed	No. of Readings	Speed	No. of Readings	Speed	No. of Readings	Speed	No. of Readings
1		26	4	51		76	
2		27	9	52		77	
3		28	12	53		78	
4		29	13	54		79	
5		30	9	55		80	
6		31	8	56		81	
7		32	10	57		82	
8		33	8	58		83	
9		34	3	59		84	
10		35	3	60		85	
11		36	3	61		86	
12		37		62		87	
13		38		63		88	
14		39		64		89	
15		40		65		90	
16		41	1	66		91	
17		42		67		92	
18		43		68		93	
19	2	44		69		94	
20	1	45		70		95	
21	2	46		71		96	
22	4	47		72		97	
23	2	48		73		98	
24	4	49		74		99	
25	3	50		75		100	

Number of Readings = 101
Mean Speed = 28.940594
Standard Deviation = 4.0517201
85 Percentile Speed = 32.992314
85 Percentile Wet Weather Speed = 30.507314 <<<<

Dual C'way Y/N? N
Single C'way Y/N? Y
Wet Road Surface Y/N? N

SANDERSON ASSOCIATES (CONSULTING ENGINEERS) LTD
24 Wakefield Road, Waterloo, Huddersfield, HD5 0HA
Tel: 01484 519333
Fax: 01484 519444

SPEED SURVEY

Location Goodlass Road, Speke, Liverpool
Direction of Travel Southbound

Job Number 4544
Date of Survey 22/03/07
Start Time 13:23
Finish Time 13:47

Speed	No. of Readings	Speed	No. of Readings	Speed	No. of Readings	Speed	No. of Readings
1		26	3	51		76	
2		27	8	52		77	
3		28	9	53		78	
4		29	15	54		79	
5		30	18	55		80	
6		31	6	56		81	
7		32	11	57		82	
8		33	9	58		83	
9		34	7	59		84	
10		35	6	60		85	
11		36	1	61		86	
12		37	2	62		87	
13		38	1	63		88	
14		39		64		89	
15		40	1	65		90	
16		41		66		91	
17		42		67		92	
18		43		68		93	
19		44		69		94	
20		45	1	70		95	
21		46		71		96	
22	1	47		72		97	
23	1	48		73		98	
24		49		74		99	
25	1	50		75		100	

Number of Readings = 101
Mean Speed = 30.762376
Standard Deviation = 3.4151091
85 Percentile Speed = 34.177485
85 Percentile Wet Weather Speed = 31.692485 <<<<

Dual C'way Y/N? N
Single C'way Y/N? Y
Wet Road Surface Y/N? N

Appendix F

Executive Summary of the Evaluation of the Urban Congestion Program

EVALUATION OF THE URBAN CONGESTION PROGRAMME

EXECUTIVE SUMMARY

Introduction

1. This report presents the findings of a research study to investigate the extent to which the recently observed reduction in urban congestion is the result of DfT's former Urban Congestion Programme and interventions put in place in Local Authorities, and the extent to which it was influenced by other factors such as rises in fuel prices and the recession.
2. The Urban Congestion Programme (UCP) was focused on the 10 largest urban areas in England, who set local targets to tackle road congestion over the five years to 2010/11. The 10 local targets were used to set a national target, which formed one of the Department's Public Service Agreement (PSA) indicators under the previous Labour Government.
3. The fieldwork for the research, and most of the writing of this report, was completed before the change of Government in May 2010. Accordingly, unless stated to the contrary, all references to the Government relate to the previous Labour Government, and references to policies and programmes relate to ones they had adopted. However, although the UCP has now ended, the research findings are mainly of a general nature and their validity should not be materially altered by a change of Government.
4. Recent data on the urban areas' performance has shown that all 10 areas were on track to meet their targets, and person journey times had decreased since the baseline (which uses a mix of 2004/05 and 2005/06 data). This study set out to explore the reasons for this, the extent to which this reduction was due to the UCP compared to wider influences such as the recent economic downturn, which interventions or packages of interventions were most successful, what the main drivers for action were and the likely impact of removing some of these drivers (such as the Congestion Performance Fund), and how the observed outcomes relate to wider policy processes.
5. Although the initial focus of the research was the PSA period itself, it became clear that answering these questions also required an examination of longer term changes in traffic and causatory factors and this is reflected in the report structure.

The PSA Period

6. The most recent data on the 10 urban areas' performance against their targets covered the 2008/09 academic year. These data showed that, on average, there has been a 5.5% improvement in person journey times across the 10 areas since the baseline, accompanied by a 0.8% reduction in travel volumes. All 10 areas have seen improvements in road journey times, with seven of the 10 having seen reductions in road travel volumes.
7. Data on the 10 areas' performance against their targets was analysed further to assess the extent to which reductions in congestion (measured as average person journey times per mile) were linked to reductions in travel volumes, and how this relationship had changed over the target period.
8. This showed that the greatest reductions in congestion are not necessarily in those areas that have seen the greatest falls in travel volumes. In addition, there

is considerable year-on-year variability in the data, possibly due to sampling and measurement errors, and the fluctuations in congestion and travel volumes caused by events such as roadworks. The variability in the data was further amplified when analysed at individual route level, and so a decision was made not to use these data to investigate the effectiveness of individual congestion measures within the urban areas.

9. Whilst this data did not enable detailed analysis, it does indicate that the congestion reductions cannot be accounted for solely by the rise in fuel prices and the recession. The fall in travel volumes, whilst similar to that in other areas over the PSA period, appears to have started earlier, and the fall in congestion was larger than could be explained by the fall in travel – indicating a positive impact from the UCP itself. Other data sources and analysis were used to unpick these factors so that firmer conclusions could be drawn.

Evolving Patterns of Urban Congestion

10. Given the limitations of data for the PSA period, longer term trends in traffic were analysed to attempt to understand how current patterns of congestion have evolved. This analysis was focused on broad, medium term trends over a period of 5 to 10 years, in the urban areas as a whole rather than just the PSA routes. To avoid the recent periods of high fuel prices and economic slow-down, where possible 2007 was selected as the cut-off point for analysis.

11. The main findings from this analysis were that:

    - Both nationally and within the urban areas, growth in car traffic and HGVs began to level off before the recession. In the same period, LCV (van) traffic grew strongly. Since the onset of the recession, all types of road traffic have declined in most types of areas.
    - Reductions prior to 2008 in inbound morning peak road traffic to the urban areas generally had not been accompanied by increases in speeds. On the contrary speeds had been stable or had reduced, implying that congestion had increased.
    - There is strong evidence, both from the data analysed and from interviews with the urban areas, to associate the reduction in morning peak traffic in urban areas to peak-spreading.
    - Within the urban areas there is also evidence of a considerable shift to rail-based and walk/cycle modes.

Influences on Congestion

12. Having identified the changing patterns of traffic and congestion, it is important to understand the main influences on congestion outcomes and their relevance for future policy decisions. In this context, four main influences can be identified:

    - *Urban characteristics*, notably growth trends in urban population and employment that influence the demand for travel and hence commuting patterns and congestion. There is evidence to show that many of the urban areas have delivered growth in central area employment and population, but that there have nevertheless been recent reductions in road traffic.
    - *Traffic characteristics*, in particular changes in the mix of traffic that result in greater use of road space per vehicle or greater disruption to traffic flow, or increases in the numbers of 4+ wheeled vehicles; increased numbers of LCVs (vans) with associated pick-up and drop-off activities, more cyclists, motorcyclists and pedestrians will all affect traffic flow and hence the likelihood and incidence of congestion.

- *Wider policy measures* that exert an indirect influence on congestion outcomes, particularly measures that affect *road capacity*, and changes in planning policy and land use. The trend towards peak-spreading in the urban areas indicates that the observed reduction in traffic is due to changes in supply, i.e. reductions in road capacity, rather than changes in demand. This could be due to an increase in measures such as bus and cycle only lanes, pedestrianisation, traffic calming, junction closures and changes to traffic signals in favour of public transport or pedestrians.
- *Planning policy and land use changes* can also have indirect impacts on congestion, as widely acknowledged in discussions with the urban areas. Recent development, guided by planning policy, has been focused on city centres which tend to be well served by public transport and is less likely to increase congestion. However, past planning decisions have led to peripheral urban development nearer or on the strategic road network, leading to increased congestion because these places are difficult to serve by public transport. There is, however, encouraging evidence that more recent, integrated approaches to planning land use and transport have exerted a positive influence on central area congestion.

13. Discussions with transport professionals in the urban areas revealed that many had been pursuing congestion reduction strategies for some years and that a wide range of measures have been introduced. The areas were asked which measures are believed to have reduced congestion locally, and the most popular was bus priority, with eight of the areas having successfully invested in this measure. Other measures believed to be successful include improving urban traffic control, Park and Ride facilities and travel planning techniques.

14. To capture the views of practising professionals, an interactive voting session was held to gather technical views on the effectiveness of possible measures to reduce congestion. The results indicated that measures to manage supply ranked more highly than measures to manage demand – for example *more efficient use of road capacity* and *reallocation of road capacity* scored highly. But there was also strong support for some demand management measures – for example *behaviour change* and *inducement to travel by public transport* - in a complementary role. There was little support for *increasing supply* through adding to the road network rather than making better use of it.

15. During interviews, many urban areas stressed that their approach to congestion management relied upon the implementation of packages of complementary measures. Measures that persuade or help travellers to switch mode or time of travel are believed to be particularly effective.

Assessment of Measures

16. Using empirical analysis and consultation, an assessment was made of the effectiveness of measures that are deliberately designed to reduce congestion either directly or indirectly. The most commonly reported measures in use are *inducement* measures (i.e. those that persuade or help travellers to switch mode or time of travel) and *more efficient use of road capacity*. Comparing this to the perceived potential effectiveness of measures, there is general consistency in how measures are ranked, with the main exception of *road pricing* and *workplace charging*, where consideration or use of such measures are well below their perceived effectiveness.

17. Individual policy measures applied in isolation are unlikely to result in major reductions in urban congestion. Effective policy depends on a combination of measures, but the basis for effective packaging is a clear understanding of what

works best where; disentangling the effects and assessing how to combine measures to create added value is fundamental to the design of effective policy.

Influence of the Urban Congestion Programme

18. Consultation was carried out with the 10 urban areas to develop a better understanding of the role of the UCP in their overall approach to tackling congestion. Discussions covered:

    - The main drivers for action and relative importance of the UCP and the Congestion Performance Fund;
    - Congestion management strategy and focus on congestion reduction;
    - The wider influence of data availability, monitoring, measuring and performance management;
    - Future sustainability and focus on congestion.

19. A wide range of factors was identified by the urban areas as providing them with an incentive to address local congestion issues, with the availability of additional funding the most commonly identified factor. Although many sources of funding are used for congestion measures, the most commonly cited were the Congestion Performance Fund and Local Transport Plan funding. All areas felt that the UCP had provided an additional incentive to prioritise tackling congestion, and there was clear evidence that the requirement to produce Congestion Delivery Plans had led to a more rigorous approach to congestion than had previously been the case. The Congestion Performance Fund had also undoubtedly encouraged authorities to focus more on delivering congestion reduction measures and had given this work greater priority. All areas indicated that the introduction of the Programme, and the adoption of targets in Local Area Agreements, meant that congestion problems had become a focus for attention.

20. Looking at the wider influences of the UCP, most areas believe that the Trafficmaster monitoring data provides a basis for effectively tracking changes in congestion levels, although there were concerns about the sheer volume of data available, the complexities of analysing and interpreting it effectively, and the time-lag between measurement and dissemination.

21. In many areas, the requirement to produce and monitor a Congestion Delivery Plan had led to the establishment of new inter-authority working groups, while in other areas specific posts or teams, funded by the Congestion Performance Fund, have been created to take the lead on congestion monitoring and reporting.

22. Urban areas were also asked about their views on the sustainability of current congestion levels into the future. The majority felt that congestion levels were likely to deteriorate while none thought that levels of congestion were likely to improve. In general, the areas were confident that the focus on congestion is likely to remain, although a number of areas expressed concern that the availability of the Congestion Performance Fund was a key factor in ensuring a continued focus and without this financial incentive the focus might be diminished. Therefore it is possible that the extent and pace of delivery may reduce without the drive and incentives provided by the Programme.

Lessons for the Future

23. A number of technical findings and recommendations emerged during the course of the study which would lead to improvements in practice. These relate to specific improvements to the design and implementation of models used to forecast the effectiveness of congestion related measures, improvements in data

and research into the factors that influence congestion, the strengths and weaknesses of the PSA target monitoring process, suggestions for future improvements in the definition of the target, and guidance on evaluating the impacts of congestion interventions.

24. A number of specific recommendations have been made for consideration, including:

- Transport models developed to forecast the impacts of congestion mitigation measures in urban areas should adopt an integrated representation of the demand for walk and cycle trips. This should operate consistently throughout the trip generation, distribution and mode choice stages. These models should also reflect more accurately the cumulative impact of measures that reduce network capacity for private four-wheeled vehicles.
- Authorities should consider initiating similar investigations and inventories to those carried out by TfL, who have assembled an informative annual summary of information on the various past measures that have led to reductions in road capacity.
- DfT should re-run surveys directly comparable with those of 2003-05 for company owned and privately owned vans. This could helpfully be followed by a research study using this evidence base to understand and quantify the factors that have led to the rapid growth in urban and inter-urban van traffic, which has continued even where growth in car traffic has been limited by lack of available capacity.
- If a new national target is to be developed in the future, consideration should be given to:
  - Including Highways Agency managed trunk roads and motorways adjacent to principal centres;
  - Extending the road network covered by the target to provide more complete or area-wide coverage;
  - How to reduce the variability in the data on journey time and person miles, if these are to be included in the target.
- Further post-hoc impact evaluations on congestion interventions are needed. Authorities should use the guidance recently published by DfT (Tavistock Institute and AECOM[1], 2010) to inform the design of their impact evaluations.

[1] *Guidance for Transport Impact Evaluations: Choosing an Evaluation Approach to Achieve Better Attribution.* http://www.dft.gov.uk/pgr/evaluation/evaluationguidance/transportimpact/

Appendix G

Picady Outputs

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

FOR SALES AND DISTRIBUTION INFORMATION,
PROGRAM ADVICE AND MAINTENANCE CONTACT:
TRL SOFTWARE SALES
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EMAIL: software@trl.co.uk

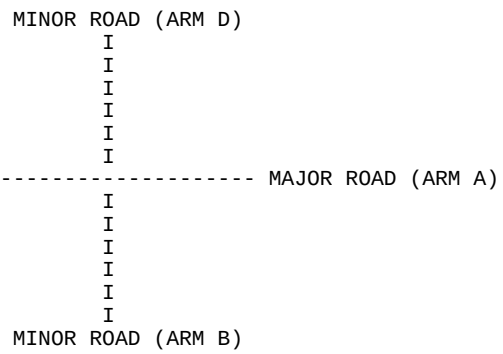
Run with file:-
"J:\6000\6087_GoodlassRoad\Engineering\Traffic\Picady\2007 AM Ind Est.vpi"
(drive-on-the-left) at 16:01:45 on Tuesday, 1 March 2011

RUN INFORMATION

RUN TITLE	: Goodlass Road, Speke, Liverpool
LOCATION	:
DATE	: 22/05/07
CLIENT	:
ENUMERATOR	: james.mcgavin [PC97]
JOB NUMBER	: 6087
STATUS	:
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Speke Hall Road North
ARM B IS Edwards Lane
ARM C IS Speke Hall Road South
ARM D IS Goodlass Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B	MINOR ROAD D
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 6.60 M.	(W) 6.60 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.20 M.	(WA-D) 3.20 M.
- VISIBILITY	(VC-B)200.00 M.	(VA-D)120.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 45.0 M.	(VD-A) 18.0 M.
- VISIBILITY TO RIGHT	(VB-A) 29.0 M.	(VD-C) 26.0 M.
- LANE 1 WIDTH	(WB-C) 3.70 M.	(WD-A) -
- LANE 2 WIDTH	(WB-A) 0.00 M.	(WD-C) -
WIDTH AT 0 M FROM JUNCTION	-	8.70 M.
WIDTH AT 5 M FROM JUNCTION	-	3.20 M.
WIDTH AT 10 M FROM JUNCTION	-	3.05 M.
WIDTH AT 15 M FROM JUNCTION	-	3.05 M.
WIDTH AT 20 M FROM JUNCTION	-	3.05 M.
- LENGTH OF FLARED SECTION	-	DERIVED: 0 PCU

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
687.20	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
0.00	0.00	0.00

* Due to the presence of a flare, data is not available

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
541.92	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
0.00	0.00	0.00	0.00	0.00

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.00	0.00	0.00	0.00

* Due to the presence of a flare, data is not available

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
764.86	0.29	0.29	0.41

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
713.49	0.27	0.38	0.27

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
541.92	0.24	0.24	0.10	0.35

Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
0.15	0.15

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
541.92	0.24	0.24	0.10	0.35

Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
0.15	0.15

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
0.00	0.00	0.00	0.00	0.00

Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
0.00	0.00

* Due to the presence of a flare, data is not available

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
0.00	0.00	0.00	0.00	0.00

Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
0.00	0.00

* Due to the presence of a flare, data is not available

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: Proposed

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	1.21	1.82	1.21
ARM B	15.00	45.00	75.00	0.00	0.00	0.00
ARM C	15.00	45.00	75.00	1.10	1.65	1.10
ARM D	15.00	45.00	75.00	0.45	0.67	0.45

Demand set: 2012 Base

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	13.20	19.80	13.20
ARM B	15.00	45.00	75.00	0.46	0.69	0.46
ARM C	15.00	45.00	75.00	7.24	10.86	7.24
ARM D	15.00	45.00	75.00	0.43	0.64	0.43

Demand set: Proposed

TIME	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	ARM A	0.000	0.000	0.000	1.000
		0.0	0.0	0.0	97.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM B	0.000	0.000	0.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000	1.000
		0.0	0.0	0.0	88.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM D	0.472	0.000	0.528	0.000
		17.0	0.0	19.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: 2012 Base

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15		TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S)			
	ARM A	0.000	0.045	0.885	0.070
		0.0	47.0	935.0	74.0
		(0.0)	(0.0)	(3.5)	(0.0)
	ARM B	0.378	0.000	0.595	0.027
		14.0	0.0	22.0	1.0
		(0.0)	(0.0)	(10.0)	(0.0)
	ARM C	0.846	0.040	0.000	0.114
		490.0	23.0	0.0	66.0
		(5.1)	(4.5)	(0.0)	(6.7)
	ARM D	0.441	0.029	0.529	0.000
		15.0	1.0	18.0	0.0
		(0.0)	(0.0)	(12.5)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT
FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-ACD	0.46	5.72	0.081		0.00	0.09	1.2		0.19
A-B	0.59								
A-C	11.73								
A-D	2.15	9.50	0.226		0.00	0.29	4.2		0.14
D-AB	0.41	9.43	0.043		0.00	0.04	0.7		0.11
D-BC	0.47	4.04	0.116		0.00	0.13	1.8		0.28
C-D	1.93								
C-A	6.15								
C-B	0.29	7.84	0.037		0.00	0.04	0.5		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-ACD	0.55	4.79	0.116		0.09	0.13	1.9		0.24
A-B	0.70								
A-C	14.01								
A-D	2.56	9.04	0.284		0.29	0.39	5.7		0.15
D-AB	0.49	8.85	0.055		0.04	0.06	0.9		0.12
D-BC	0.56	3.24	0.173		0.13	0.20	2.9		0.37
C-D	2.31								
C-A	7.34								
C-B	0.34	6.98	0.049		0.04	0.05	0.8		0.15

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-ACD	0.68	3.35	0.202		0.13	0.25	3.5		0.37
A-B	0.86								
A-C	17.16								
A-D	3.14	8.39	0.374		0.39	0.59	8.4		0.19
D-AB	0.60	7.84	0.076		0.06	0.08	1.2		0.14
D-BC	0.69	2.14	0.319		0.20	0.44	6.0		0.67
C-D	2.83								
C-A	8.99								
C-B	0.42	5.81	0.073		0.05	0.08	1.1		0.19

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-ACD	0.68	3.35	0.203		0.25	0.25	3.7		0.37
A-B	0.86								
A-C	17.16								
A-D	3.14	8.39	0.374		0.59	0.59	8.8		0.19
D-AB	0.60	7.82	0.077		0.08	0.08	1.2		0.14
D-BC	0.69	2.14	0.320		0.44	0.46	6.8		0.69
C-D	2.83								
C-A	8.99								
C-B	0.42	5.80	0.073		0.08	0.08	1.2		0.19

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-ACD	0.55	4.79	0.116		0.25	0.13	2.1		0.24
A-B	0.70								
A-C	14.01								
A-D	2.56	9.03	0.284		0.59	0.40	6.2		0.16
D-AB	0.49	8.83	0.055		0.08	0.06	0.9		0.12
D-BC	0.56	3.23	0.173		0.46	0.22	3.5		0.38
C-D	2.31								
C-A	7.34								
C-B	0.34	6.97	0.049		0.08	0.05	0.8		0.15

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-ACD	0.46	5.71	0.081		0.13	0.09	1.4		0.19
A-B	0.59								
A-C	11.73								
A-D	2.15	9.50	0.226		0.40	0.30	4.6		0.14
D-AB	0.41	9.42	0.043		0.06	0.05	0.7		0.11
D-BC	0.47	4.03	0.117		0.22	0.13	2.1		0.28
C-D	1.93								
C-A	6.15								
C-B	0.29	7.83	0.037		0.05	0.04	0.6		0.13

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.1	
08.15	0.1	
08.30	0.2	
08.45	0.3	
09.00	0.1	
09.15	0.1	

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.3	
08.15	0.4	
08.30	0.6	*
08.45	0.6	*
09.00	0.4	
09.15	0.3	

QUEUE FOR STREAM D-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.0

QUEUE FOR STREAM D-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.1
08.15	0.2
08.30	0.4
08.45	0.5
09.00	0.2
09.15	0.1

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-ACD	50.9	34.0	13.8	0.27	13.8	0.27
A-B	64.7	43.1				
A-C	1287.0	858.0				
A-D	235.4	156.9	37.9	0.16	37.9	0.16
D-AB	44.9	29.9	5.5	0.12	5.5	0.12
D-BC	51.5	34.3	23.1	0.45	23.1	0.45
C-D	212.0	141.3				
C-A	674.4	449.6				
C-B	31.7	21.1	5.0	0.16	5.0	0.16
ALL	2652.4	1768.2	85.3	0.03	85.3	0.03

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 16:01:56 on 01/03/2011]

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

FOR SALES AND DISTRIBUTION INFORMATION,
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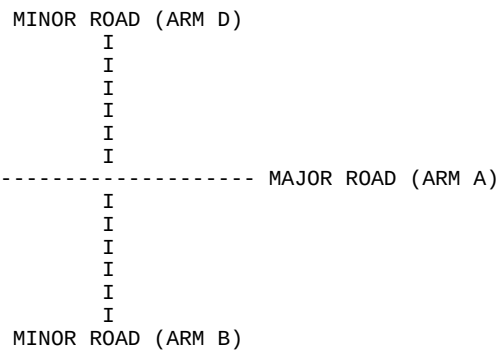
Run with file:-
"J:\6000\6087_GoodlassRoad\Engineering\Traffic\Picady\2007 PM Ind Est.vpi"
(drive-on-the-left) at 16:03:57 on Tuesday, 1 March 2011

RUN INFORMATION

RUN TITLE	: Goodlass Road, Speke, Liverpool
LOCATION	:
DATE	: 22/05/07
CLIENT	:
ENUMERATOR	: james.mcgavin [PC97]
JOB NUMBER	: 6087
STATUS	:
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Speke Hall Road North
ARM B IS Edwards Lane
ARM C IS Speke Hall Road South
ARM D IS Goodlass Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B	MINOR ROAD D
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 6.60 M.	(W) 6.60 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.20 M.	(WA-D) 3.20 M.
- VISIBILITY	(VC-B)200.00 M.	(VA-D)120.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 45.0 M.	(VD-A) 18.0 M.
- VISIBILITY TO RIGHT	(VB-A) 29.0 M.	(VD-C) 26.0 M.
- LANE 1 WIDTH	(WB-C) 3.70 M.	(WD-A) -
- LANE 2 WIDTH	(WB-A) 0.00 M.	(WD-C) -
WIDTH AT 0 M FROM JUNCTION	-	8.70 M.
WIDTH AT 5 M FROM JUNCTION	-	3.20 M.
WIDTH AT 10 M FROM JUNCTION	-	3.05 M.
WIDTH AT 15 M FROM JUNCTION	-	3.05 M.
WIDTH AT 20 M FROM JUNCTION	-	3.05 M.
- LENGTH OF FLARED SECTION	-	DERIVED: 0 PCU

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
687.20	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
0.00	0.00	0.00

* Due to the presence of a flare, data is not available

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
541.92	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
0.00	0.00	0.00	0.00	0.00

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.00	0.00	0.00	0.00

* Due to the presence of a flare, data is not available

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
764.86	0.29	0.29	0.41

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
713.49	0.27	0.38	0.27

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
541.92	0.24	0.24	0.10	0.35

Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
0.15	0.15

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
541.92	0.24	0.24	0.10	0.35

Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
0.15	0.15

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
0.00	0.00	0.00	0.00	0.00

Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
0.00	0.00

* Due to the presence of a flare, data is not available

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
0.00	0.00	0.00	0.00	0.00

Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
0.00	0.00

* Due to the presence of a flare, data is not available

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2007 Base

TIME PERIOD BEGINS 15.45 AND ENDS 17.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	9.50	14.25	9.50
ARM B	15.00	45.00	75.00	0.75	1.13	0.75
ARM C	15.00	45.00	75.00	10.90	16.35	10.90
ARM D	15.00	45.00	75.00	1.36	2.04	1.36

Demand set: Proposed

TIME PERIOD BEGINS 15.45 AND ENDS 17.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	0.21	0.32	0.21
ARM B	15.00	45.00	75.00	0.00	0.00	0.00
ARM C	15.00	45.00	75.00	0.22	0.34	0.22
ARM D	15.00	45.00	75.00	1.96	2.94	1.96

Demand set: 2007 Base

TIME	TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S) FROM/TO	ARM A	ARM B	ARM C	ARM D
15.45 - 17.15	ARM A	0.000	0.025	0.955	0.020
		0.0	19.0	726.0	15.0
		(0.0)	(0.0)	(1.7)	(7.1)
	ARM B	0.617	0.000	0.383	0.000
		37.0	0.0	23.0	0.0
		(0.0)	(0.0)	(4.5)	(0.0)
	ARM C	0.963	0.017	0.000	0.019
		840.0	15.0	0.0	17.0
		(1.8)	(15.4)	(0.0)	(70.0)
	ARM D	0.569	0.009	0.422	0.000
		62.0	1.0	46.0	0.0
		(5.2)	(0.0)	(4.8)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Proposed

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C	ARM D
15.45 - 17.15	ARM A	0.000	0.000	0.000	1.000
		0.0	0.0	0.0	17.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM B	0.000	0.000	0.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000	1.000
		0.0	0.0	0.0	18.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM D	0.554	0.000	0.446	0.000
		87.0	0.0	70.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT
FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
15.45-16.00									
B-ACD	0.75	5.32	0.142		0.00	0.16	2.3		0.22
A-B	0.24								
A-C	9.11								
A-D	0.40	8.48	0.047		0.00	0.05	0.7		0.12
D-AB	1.88	7.51	0.250		0.00	0.33	4.7		0.18
D-BC	1.46	4.50	0.324		0.00	0.47	6.4		0.32
C-D	0.44								
C-A	10.54								
C-B	0.19	8.52	0.022		0.00	0.02	0.3		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.00-16.15									
B-ACD	0.90	4.35	0.207		0.16	0.25	3.6		0.29
A-B	0.28								
A-C	10.88								
A-D	0.48	7.89	0.061		0.05	0.06	0.9		0.13
D-AB	2.24	6.71	0.334		0.33	0.49	7.1		0.22
D-BC	1.74	3.67	0.475		0.47	0.85	11.7		0.51
C-D	0.52								
C-A	12.59								
C-B	0.22	8.03	0.028		0.02	0.03	0.4		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.15-16.30									
B-ACD	1.10	2.89	0.381		0.25	0.58	7.9		0.55
A-B	0.35								
A-C	13.32								
A-D	0.59	7.08	0.083		0.06	0.09	1.3		0.15
D-AB	2.75	5.38	0.511		0.49	1.00	13.8		0.37
D-BC	2.13	2.51	0.847		0.85	3.27	37.0		1.54
C-D	0.64								
C-A	15.41								
C-B	0.28	7.35	0.037		0.03	0.04	0.6		0.14

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.30-16.45									
B-ACD	1.10	2.85	0.386		0.58	0.61	9.0		0.57
A-B	0.35								
A-C	13.32								
A-D	0.59	7.08	0.083		0.09	0.09	1.3		0.15
D-AB	2.75	5.27	0.522		1.00	1.06	15.5		0.40
D-BC	2.13	2.51	0.849		3.27	3.94	54.7		2.04
C-D	0.64								
C-A	15.41								
C-B	0.28	7.35	0.037		0.04	0.04	0.6		0.14

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-ACD	0.90	4.30	0.209		0.61	0.27	4.3		0.30
A-B	0.28								
A-C	10.88								
A-D	0.48	7.89	0.061		0.09	0.07	1.0		0.14
D-AB	2.24	6.59	0.341		1.06	0.53	8.4		0.23
D-BC	1.74	3.66	0.476		3.94	0.97	19.4		0.64
C-D	0.52								
C-A	12.59								
C-B	0.22	8.03	0.028		0.04	0.03	0.4		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-ACD	0.75	5.30	0.142		0.27	0.17	2.6		0.22
A-B	0.24								
A-C	9.11								
A-D	0.40	8.48	0.047		0.07	0.05	0.8		0.12
D-AB	1.88	7.48	0.251		0.53	0.34	5.3		0.18
D-BC	1.46	4.50	0.325		0.97	0.50	8.0		0.34
C-D	0.44								
C-A	10.54								
C-B	0.19	8.52	0.022		0.03	0.02	0.3		0.12

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.00	0.2	
16.15	0.3	
16.30	0.6	*
16.45	0.6	*
17.00	0.3	
17.15	0.2	

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
16.00	0.0
16.15	0.1
16.30	0.1
16.45	0.1
17.00	0.1
17.15	0.1

QUEUE FOR STREAM D-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.00	0.3	
16.15	0.5	
16.30	1.0	*
16.45	1.1	*
17.00	0.5	*
17.15	0.3	

QUEUE FOR STREAM D-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.00	0.5	
16.15	0.9	*
16.30	3.3	***
16.45	3.9	****
17.00	1.0	*
17.15	0.5	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
16.00	0.0
16.15	0.0
16.30	0.0
16.45	0.0
17.00	0.0
17.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	82.6	55.1	29.9	0.36	29.9	0.36
A-B	26.2	17.4				
A-C	999.3	666.2				
A-D	44.0	29.4	6.1	0.14	6.1	0.14
D-AB	206.2	137.5	54.8	0.27	54.8	0.27
D-BC	159.9	106.6	137.1	0.86	137.2	0.86
C-D	48.2	32.1				
C-A	1156.2	770.8				
C-B	20.6	13.8	2.7	0.13	2.7	0.13
ALL	2743.2	1828.8	230.5	0.08	230.6	0.08

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

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