PARSONS BRINCKERHOFF

March 2014

HEREFORD ENTERPRISE ZONE TRANSPORT STUDY

Herefordshire Council

3512983A-HHR 10.3

DRAFT

Hereford Enterprise Zone Transport Study

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CONTENTS

NON-TECHNICAL SUMMARY

Introduction

Parsons Brinckerhoff (PB) was commissioned by Herefordshire Council (HC) to estimate the size of potential development that could be unlocked at the Hereford Enterprise Zone (HEZ), whilst managing the impact on the A49.

HC are considering a number of schemes to reduce congestion on the A49. In the longer term, HC are also developing proposals for the South Wye Transport Package and Hereford Transport Strategy, although the impacts of these interventions have not been assessed in this study. This project is an interim assessment of 'quick win' interventions that can be implemented in the near future. This will allow Herefordshire Council to quickly quantify the level of development that could be accommodated at the site without significant interventions, and provide the basis for future work.

Previous Work

The existing Rotherwas Industrial Estate is the principal business / industrial area serving the city. Prior to 2008, the maintenance and expansion of employment at Rotherwas was significantly constrained by access problems on the primary link to the trunk road network, formed by the B4399 and Holme Lacy Road. Since there are no other suitable industrial sites in Hereford, HC commissioned a study to identify transport initiatives to maximise the employment opportunities at the Rotehrwas Industrial Estate. The ***Rotherwas Industrial Estate 'Integrated Access Study'*** was produced in June 2000. The study recommended that a new access road should be built, and also recommended a package of other transport initiatives to improve access for cyclists, pedestrians and public transport as well as a Travel Plan. The Rotherwas Access Road (RAR) was opened in July 2008 and facilitates access to the estate to/from the A49 (Source: Rotherwas Industrial Estate Phase 1 & 2 Transport Assessment, HC 2010).

The ***Rotherwas Industrial Estate Phase 1 & 2 Transport Assessment, May 2010*** included proposals to develop sections of the site with 6,790sqm B1, 13,353sqm B2, and 2,490sqm B8, equating to 22,633sqm of total floor space. The assessment had a 2008 base year, with trip distributions calculated using data from the 2008 SATURN model. Trip rates were obtained from the TRICs database. The development was estimated to generate the trips shown in Table NT.1.

Table NT.1 Trip Generation in Rotherwas Industrial Estate Phase 1&2 Transport Assessment, May 2010

LAND USE	TIME PERIOD	TRIPS		TOTAL TRIPS
		IN	OUT	
B1 Office	AM	121	15	136
	PM	21	91	112
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	PM	16	78	94
B8 Warehouse	AM	10	4	14
	PM	3	10	13
Total	AM	221	36	257
	PM	40	179	219

The assessment did "not take into consideration the implications of the Travel Plan or any reduction of car use due to the availability and promotion of sustainable modes of travel". However, both the Connect 2 scheme and Travel Plan were highlighted as potential mitigation measures. It is the aim of the present study to quantify the impact of the Connect 2 scheme and Travel Plan, and therefore build on the 2010 Transport Assessment.

The 2010 Transport Assessment was used as the basis for the ***Hereford Enterprise Zone Local Development Order (LDO), Adopted April 2013***, which applies a cap on the size of development at the Enterprise Zone based on the number of trips contained in Table NT.1. The LDO also mentions the 22,633sqm contained in the 2010 Transport Assessment, however, the cap on the size of development is determined by the number of trips.

Finally, the ***Rotherwas Enterprise Zone Transport Assessment, April 2013*** contains further analysis of the situation. The 2013 Transport Assessment contained proposals for a further 91,339sqm of floorspace at the Enterprise Zone. The assessment had a 2013 base year, with trip distributions calculated using data from the SATURN model. Crucially, trip rates were obtained from the TRICs database and found to be significantly lower than the trip rates used in the 2010 Transport Assessment. It is understood that JMP, acting on behalf of the Highways Agency, agreed the use of these trip rates. As such, the total size of development that can be delivered within the LDO limit on trips is larger than reported in the 2010 Transport Assessment (see Table NT.3 for exact figures).

Approach

An assessment was made of additional development that could be unlocked via the Connect 2 scheme and Travel Plan. The size of potential development that can be unlocked by these 'quick win' schemes is presented in land use terms (i.e. Gross Floor Area), with a comparison against development aspirations for the Enterprise Zone previously provided to PB.

We also sought to use the existing TRANSYT model to investigate the traffic capacity on the A49 that may be released as a result of A49 junction improvements at Bullingham Lane, Holme Lacy Road, and A465 Belmont Road. However, we found the model could not reliably estimate the potential impact of the schemes on the junctions. Consequently we recommend that the impact of these schemes is investigated using an extension to the VISSIM model currently under development by the Highways Agency. Any capacity released by these junction schemes could then be used to unlock further development at HEZ in the period 2015-18.

Our overall approach was discussed and approved by JMP, acting on behalf of the Highways Agency.

Results

The analysis shows that there is little potential for peak spreading from 08:00-09:00 to 07:00-08:00 as the latter period already experiences similar levels of congestion to the main peak. Peak spreading during the afternoon peak was not considered practical and was not considered.

Both the Connect 2 scheme and Travel Plan are likely to unlock development at the site in addition to that within the LDO. The development trips unlocked are shown in the table below. The figures below are a conservative estimate and the actual impact may be larger, albeit at a modest level. Taking the number of trips and trip rates into account, the main constraint on development is in the AM peak. As such, the analysis concentrated on this time period.

Table NT.2 Development trips unlocked by Connect 2, Travel Plan, and Junction Schemes 2018

Scheme	Development trips unlocked	
	AM	PM
Connect 2	15	22
Travel Plan	40	59
TOTAL	**55**	**81**

Using the same ratio of B1 Office, B1C Light Industry, B2 General Industrial and B8 Warehouse as the development aspirations for the site (24/24/51/1), these trips would result in the total additional development size shown below.

Table NT.3 Shortfall

Land Use	Potential additional development (sqm)				
	B1	B1C	B2	B8	Total
Connect 2 and Travel Plan	2,122	2,122	4,508	88	**8,840**
LDO Trip Limit (REZ TA Trip Rate)	9,914	9,914	21,067	413	**41,307**
TOTAL	**12,036**	**12,036**	**25,575**	**501**	**50,147**
Development Aspiration	26,000	26,000	56,500	1,500	110,000
SHORTFALL	**13,964**	**13,964**	**30,925**	**999**	**59,853**

The Connect 2 scheme and Travel Plan, added to the LDO Limit, results in a total of 50,147 sqm of development, which is a 59,853 sqm shortfall compared to the development aspirations for the site to 2018. Consequently further measures such as the A49 junction improvements are likely to be needed to unlock the full development aspiration for the site in the period to 2018. Clearly more substantive transport capacity improvements, such as that delivered by the South Wye Transport Package and Hereford Transport Strategy contained within the Local Development Framework, are required beyond 2018 and are the subject of bids to the Local Growth Fund.

In terms of job creation, the 2013 Travel Plan Survey results show that 25.5% of all respondents drive to work between 08:00 and 09:00. Therefore, 1 AM Peak (08:00-09:00) trip is equal to approximately 4 jobs, based on the existing development split. There could be an additional 55 AM Peak trips unlocked by the Connect 2 scheme and Travel Plan, and 221 additional trips to HEZ (arrivals) in the AM Peak already contained within the Local Development Order (LDO), resulting in 276 additional trips or approximately 1,104 jobs, depending on the exact mix of land uses[1]. These figures for job creation are indicative only.

Recommendations

- The development of the Enterprise Zone should proceed to the LDO Limit. If practicable, the LDO Limit should be increased to take account of the trips unlocked by the Connect 2 scheme and Travel Plan.
- The impacts of the three junction schemes should be tested further with an extension to the VISSIM model currently under development by the Highway's Agency. The HA Pinch Point Programme is also likely to have improved conditions on the A49, which should help accommodate further development trips at HEZ. The impact of these schemes should also be tested with the extended VISSIM model.
- The existing Rotherwas Travel Plan should be revitalised and promoted to achieve the target trip reduction figures.
- The impacts of future development should be monitored by placing permanent traffic counters on access roads such as Chapel Road and Netherwood Roads. These count sites should be used to monitor development against the LDO Limit and could support the case that further development could be accommodated at the site.

[1] The existing land use split is estimated to be B1=1%, B2=71%, and B8=28%. The development aspiration land use split is B1=24%,B1c=24%,B2=51%,B8=1%. This difference is likely to impact on the jobs per trip ratio, however, the exact impact on job numbers has not been estimated due to lack of suitable data. As such, the job creation figures presented should be treated with caution.

1 INTRODUCTION

1.1 Introduction

1.1.1 Parsons Brinckerhoff (PB) was commissioned by Herefordshire Council (HC) to estimate the size of potential development that could be unlocked at the Hereford Enterprise Zone (HEZ).

1.1.2 It is understood that HC would like to determine the maximum size of potential development that could be accommodated within HEZ, whilst managing the impact on the A49.

1.1.3 HC are considering a number of schemes to reduce congestion on the A49. In the longer term, HC are also developing proposals for the South Wye Transport Package and Hereford Transport Strategy, although the impacts of these interventions have not been assessed in this study. This project is an interim assessment of 'quick win' interventions that can be implemented in the near future (up to 2015). This will allow Herefordshire Council quickly to quantify the level of development that could be accommodated at the site without significant interventions, and provide the basis for future transport planning work. This information can then be incorporated into full scenario testing using Hereford Multi-Mode Model which would be the appropriate tool to employ for considering larger scale schemes, such as the Southern Link Road.

1.2 Previous Work

1.2.1 The existing Rotherwas Industrial Estate is the principal business / industrial area serving the city. Prior to 2008, the maintenance and expansion of employment at Rotherwas was significantly constrained by access problems on the primary link to the truck road network, formed by the B4399 and Holme Lacy Road. Since there are no other suitable industrial sites in Hereford, HC commissioned a study to identify transport initiatives to maximise the employment opportunities at the Rotehrwas Industrial Estate. The ***Rotherwas Industrial Estate 'Integrated Access Study'*** (hence forth referred to as 'the Access Study') was produced in June 2000. The Access Study recommended that a new access road should be built, and also recommended a package of other transport initiatives to improve access for cyclists, pedestrians and public transport as well as a Travel Plan. The Rotherwas Access Road (RAR) was opened in July 2008 and facilitates access to the estate to/from the A49 (Source: Rotherwas Industrial Estate Phase 1 & 2 Transport Assessment, HC 2010).

1.2.2 The ***Rotherwas Industrial Estate Phase 1 & 2 Transport Assessment, May 2010*** included proposals to develop sections of the site with 6,790sqm B1, 13,353sqm B2, and 2,490sqm B8, equating to 22,633sqm of total floorspace. The assessment had a 2008 base year, with trip distributions calculated using data from the 2008 SATURN model. Trip rates were obtained from the TRICs database. The development was estimated to generate the trips shown in Table 1.1.

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1.2.5 Finally, the ***Rotherwas Enterprise Zone Transport Assessment, April 2013*** contains further analysis of the situation. The 2013 Transport Assessment contained proposals for a further 91,339sqm of floorspace. The assessment had a 2013 base year, with trip distributions calculated using data from the 2026 SATURN model. Crucially, trip rates were obtained from the TRICs database and found to be significantly lower than the trip rates used in the 2010 Transport Assessment. It is understood the floorspace proposals were not agreed, however, JMP, acting on behalf of the Highways Agency, agreed the use of the trip rates. As such, the total size of development that can be delivered within the LDO limit on trips is much larger than reported in the 2010 Transport Assessment (see Table NT.3 for exact figures).

1.3 Methodology

1.3.1 An assessment was made of additional development that could be unlocked via the Connect 2 scheme and Travel Plan. We also sought to use the existing TRANSYT models to investigate the traffic capacity on the A49 that may be released as a result of A49 junction improvements at Bullingham Lane, Holme Lacy Road, and A465 Belmont Road. It is understood that the A49 junction with (j/w) Belmont Roundabout and A49 j/w Holme Lacy Road are the most congested junctions on the A49 in Hereford (see Figure 1.1).

1.3.2 The TRICS database and survey data from the area was then used to identify the potential size of development that could be accommodated on the HEZ site. The

process used is shown in Figure 1.2. The size of potential development that can be unlocked by these 'quick win' schemes is presented in land use terms (i.e. Gross Floor Area), with a comparison against development aspirations for HEZ previously provided to PB.

1.3.3 Our overall approach was discussed and approved by JMP, acting on behalf of the Highways Agency.

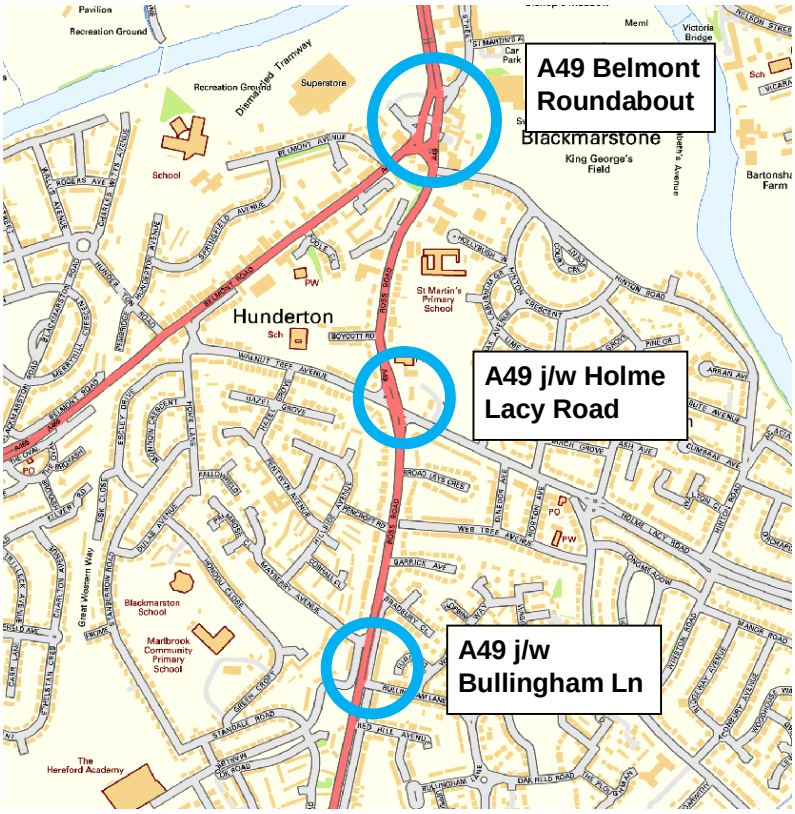

Figure 1.1 TRANSYT models used in assessment *(Contains Ordnance Survey data © Crown copyright and database right 2014)*

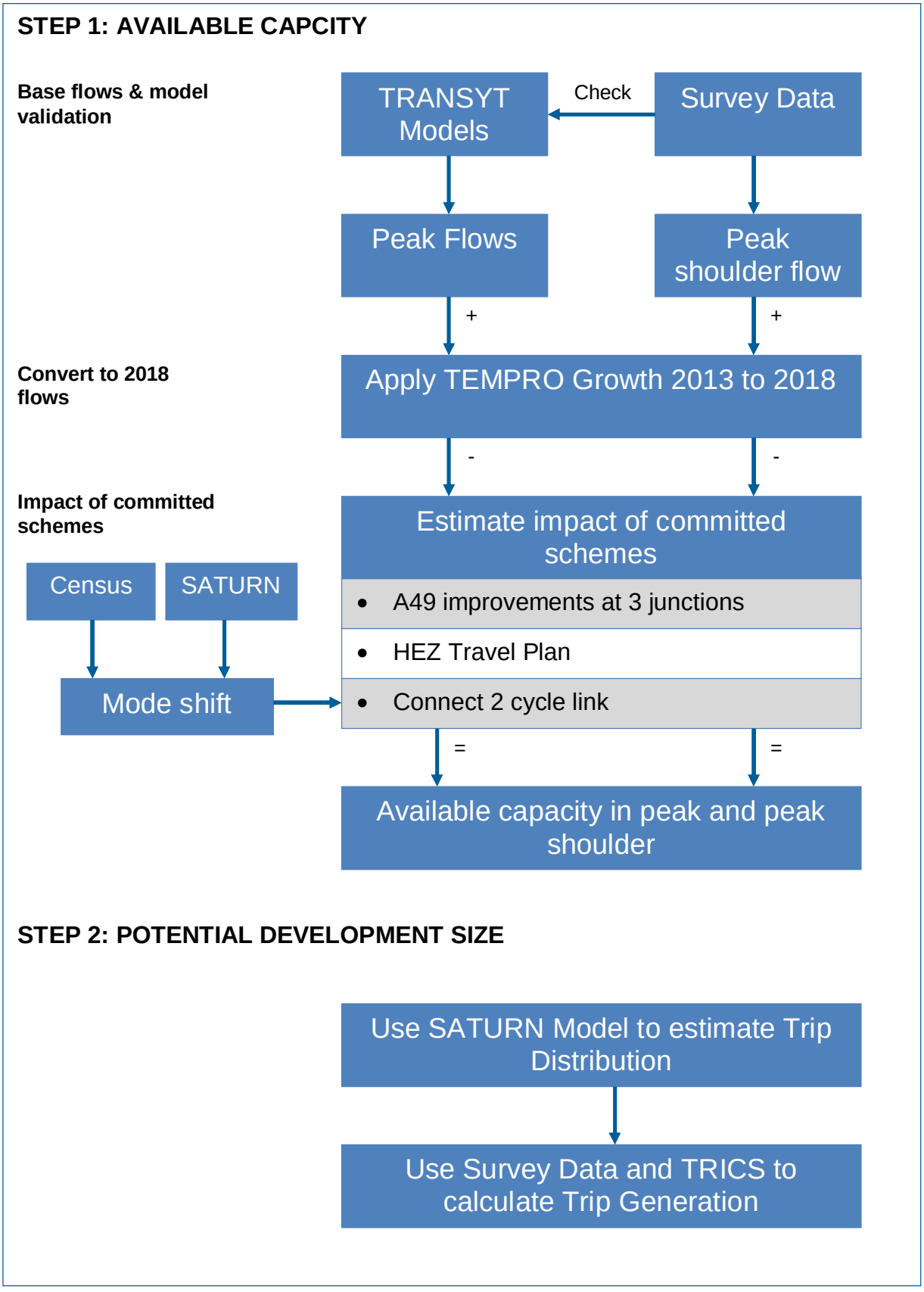

Figure 1.2 Methodology

2 BASE FLOWS & MODEL VALIDATION

2.1 Introduction

2.1.1 Traffic survey data was used to assess the traffic flows one hour either side of the peak periods to help identify whether the impacts on the A49 could be reduced by peak spreading[2].

2.2 TRADS Data

2.2.1 Three permanent traffic counts sites within the HA TRADS database were identified in the study area, comprising of two sites on the A49 Greyfriars Bridge north of Belmont Roundabout (Site no. 30014850, 30014851), and one site south of the B4399 Rotherwas Access Road (RAR) (Site no. 30013699).

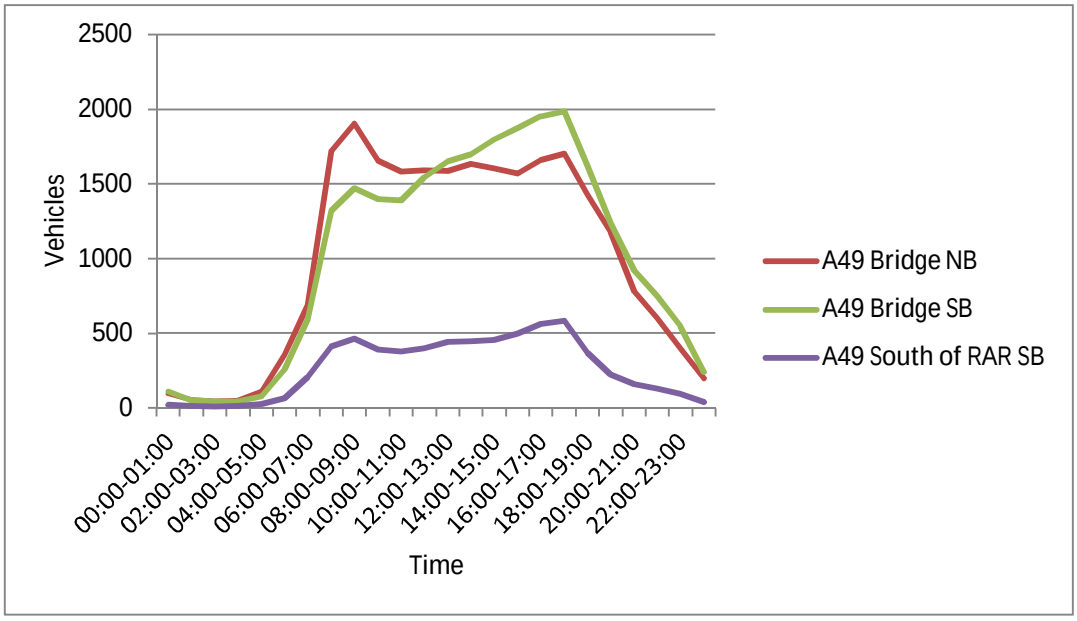

Figure 2.1 Average Wednesday 2012 (TRADS)

2.2.2 Analysis of the TRADS data reveals that the flow on the A49 to the north of Belmont Roundabout is tidal, with a NB peak between 08:00-09:00 and a SB peak between 17:00-18:00, as shown in Figure 2.1.

2.3 Peak shoulders

2.3.1 Analysis of movements to/from the Netherwood Road junctions with The Straight Mile shows that the AM peak for this part of the site is 07:00-08:00 rather than 08:00-09:00 (see Table 2.1). The PM peak is also earlier at 16:00-17:00 rather than 17:00-18:00.

[2] Peak spreading in this instance involves encouraging people to travel outside of the main peak traffic periods of 08:00-09:00 in the morning and 17:00-18:00 in the evening.

Table 2.1 Netherwood Road junctions with The Straight Mile (Total Vehicles)

Time	IN	OUT	TOTAL
07:00-08:00	393	41	434
08:00-09:00	343	18	361
09:00-10:00	184	27	211
15:00-16:00	117	154	271
16:00-17:00	120	429	549
17:00-18:00	86	366	452

2.3.2 This earlier peak may be the result of the land uses present at the site and the type of jobs supported. If more of the same land use split is provided the majority of the trips may also occur outside of the network peak hours of 08:00-09:00 and 17:00-18:00 – essentially in the shoulder peaks.

2.3.3 In order to assess the implications of this earlier peak on the wider network, traffic survey data from May 2012 was analysed to assess the level of spare capacity in the peak shoulders in the study area. The traffic surveys shown in Figure 2.2 were used. Table 2.2 shows the flows in the AM peak.

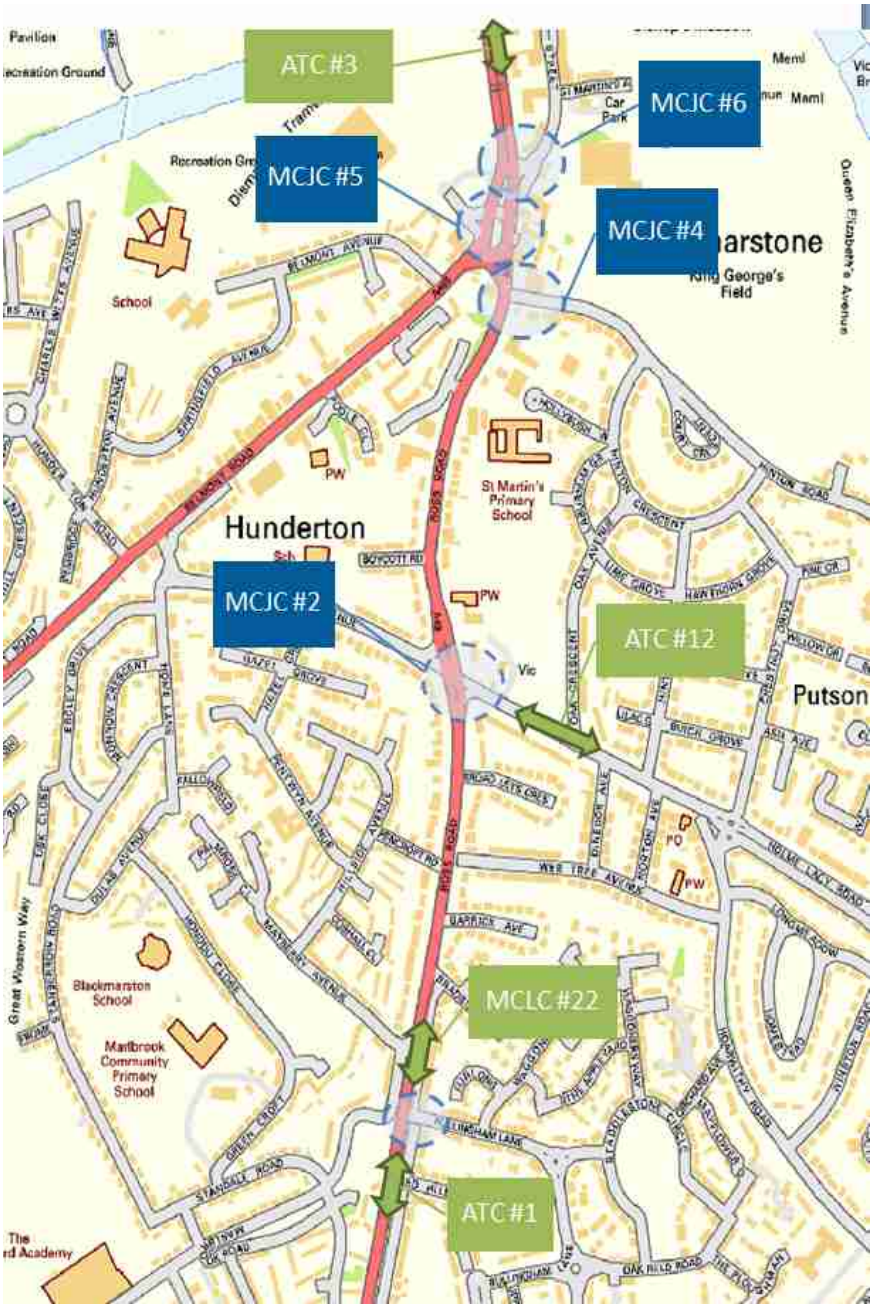

Figure 2.2 Survey sites (ATC = Automatic Traffic Count, MCLC = Manual Classified Link Count, MCJC = Manual Classified Junction Count) *(Contains Ordnance Survey data © Crown copyright and database right 2014)*

Table 2.2 AM Peak shoulder analysis

Site	Road	Direction	ALL VEHICLES 07:00 - 07:30	07:30 - 08:00	08:00 - 08:30	08:30 - 0900	7.30-8.00 or 8.00-8.30	Pc Diff
ATC #3	A49 Victoria Street	NB	832	832	901	901	8.00	-8%
		SB	588	588	697	697	8.00	-16%
MCJC #6	A49 & St Martins Street	NB		1078	1034	979	7.30	4%
		SB		862	873	818	8.00	-1%
		EB		71	102	101	8.00	-30%
		WB		17	39	46	8.00	-56%
MCJC #5	A49 North @ASDA	NB		1102	1103	1078	8.00	0%
		SB		864	853	821	7.30	1%
	A49 South @ASDA	NB		662	712	692	8.00	-7%
		SB		555	547	477	7.30	1%
	A465 Belmont Road	NB		495	449	446	7.30	10%
		SB		340	328	386	7.30	4%
	ASDA	WB		67	75	74	8.00	-11%
		EB		43	39	56	7.30	10%
MCJC #4	A49 & Hinton Road	NB		682	838	664	8.00	-19%
		SB		432	406	366	7.30	6%
		EB		104	133	125	8.00	-22%
		WB		31	55	58	8.00	-44%
MCJC #2	Holme Lacy Road	EB		325	301	306	7.30	8%
		WB		336	356	350	8.00	-6%
	Walnut Tree Av	EB		120	114	128	7.30	5%
		WB		67	73	114	8.00	-8%
	A49 North @Holme Lacy	NB		627	748	622	8.00	-16%
		SB		411	414	345	8.00	-1%
	A49 South @Holme Lacy	NB		416	545	481	8.00	-24%
		SB		264	307	262	8.00	-14%
ATC #12	Holme Lacy Road (West of Oak Crescent)	EB	270	270	255	255	7.30	6%
		WB	251	251	333	333	8.00	-25%
MCLC #22	Ross Road (North of Bullingham Lane)	NB		434	573	448	8.00	-24%
		SB		281	296	264	8.00	-5%
ATC #1	Ross Road (South of Bullingham Lane)	NB	224	224	320	320	8.00	-30%
		SB	207	207	207	207	8.00	0%

2.3.4 Most of the traffic surveys available only cover the period from 07:30 to 09:30, which meant only half hour either side of the peak could be fully assessed. For the majority of sites only hourly data was available. In these cases, the hourly flows were divided by 2 to obtain 30 minute flows.

2.3.5 While the overall peak is from 08:00-09:00, as shown in Table 2.2, there are a number of links with higher flows between 07:30-08:00 than 08:00-08:30, particularly on the access routes to HEZ including A465 Belmont Road, A49 SB from Belmont Road, and Holme Lacy Road EB. These results indicate that there would be little benefit in further shifting working hours at HEZ to start before 08:00 as the key access routes are already as congested as the peak hour at this time. Peak spreading during the afternoon peak was not considered practical by the Enterprise Zone and as such this has not been considered.

3 CONVERSION TO 2018 FLOWS

3.1.1 The 2012 traffic flows were factored to produce 2018 flows using TEMPRO. We have assumed that the opening year for the HEZ development will be 2018 as this is understood to be the latest likely date before the Southern Link Road is opened. We also assumed that TEMPRO accounts for all additional trips on the network other than those specifically at the HEZ and the additional trips already committed as part of the Rotherwas Industrial Estate Phase 1 & 2 Transport Assessment (May 2010).

3.1.2 Growths rates were obtained for Hereford, with a weighted average of growth in Origins and Destinations used for the AM and PM peaks, as shown in Table 3.1.

Table 3.1 TEMPRO Growth

Year	AM		PM	
	Origin	Destination	Origin	Destination
2012	17,849	22,004	28,482	24,122
2018	18,193	22,757	29,360	24,646
Growth	**1.0275**		**1.0267**	

4 IMPACT OF HEZ INTERVENTIONS

4.1 Scope and Methodology

4.1.1 We have estimated the impact on the A49 of the following schemes

- Connect 2 scheme
- Travel Plan

4.1.2 These schemes were selected as they can be robustly assessed using the modelling tools currently available. We have not included schemes that cannot be robustly assessed as this may undermine the overall assessment.

4.1.2 There are also a number of schemes that are likely to have a beneficial impact on the A49, but cannot be robustly assessed without use of the HMMM and/or additional information (see **Appendix A**). These schemes include:

- A49 j/w Bullingham Lane relocation of pedestrian crossing including reallocation of green time
- A49 j/w Holme Lacy Road additional right turn lane including re-allocation of green time
- A49 j/w A465 Belmont Road increase of dual lane section and reallocation of green time
- A49 Corridor Capacity schemes, HA Pinch Point Programme, walking and cycling schemes, and new link roads

4.1.3 The impact of the Connect 2 and Travel Plan schemes was estimated using the methods below.

- Connect 2 Scheme – the new Connect 2 walking and cycling link is likely to have an impact on modal share in the area. Mode shift at the two A49 junctions was estimated using the following steps:
  - Use the existing HMMM highway element (the SATURN model) to identify car trips that could shift to walk/cycle as a result of the scheme
  - Apply mode splits based on distance to work for Herefordshire obtained from Census Journey to Work data.
- Travel Plan – estimate a percentage reduction in overall trips from the site through the junctions to be applied based on existing research and best practice guidance.

4.2 Connect 2 Scheme

4.2.1 The Connect 2 scheme is a new high quality piece of walking and cycling infrastructure that may impact on travel patterns to HEZ. To estimate the extent of

this impact, the first step was to identify car trips travelling to HEZ within 2km, and 5km that may switch to walking or cycling as a result of the scheme (see Figure 4.1).

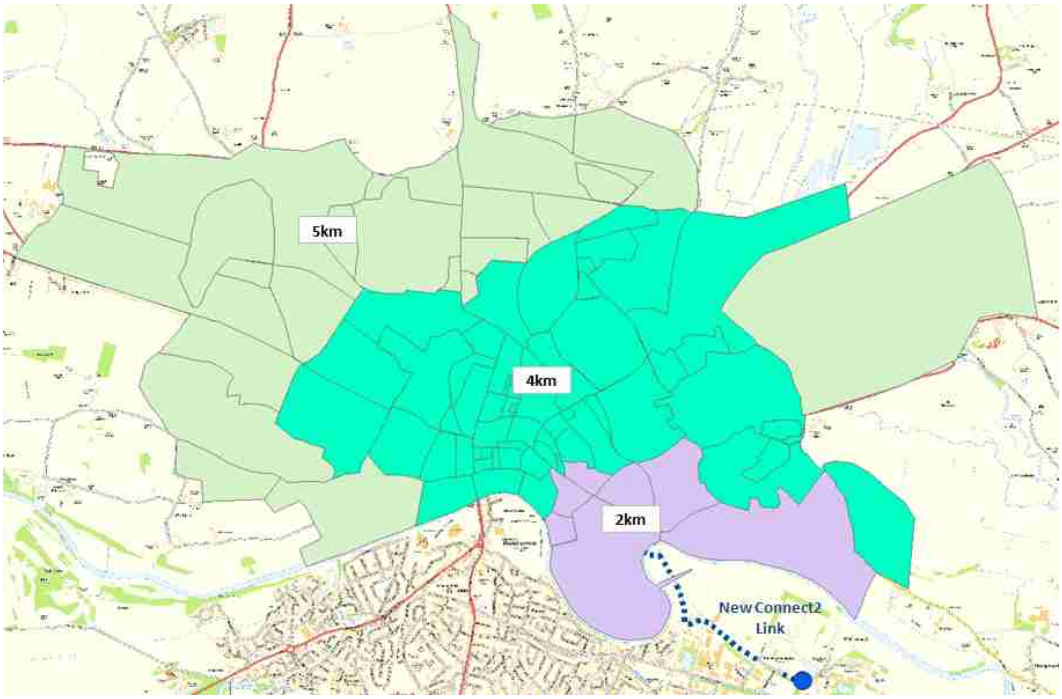

Figure 4.1 Connect 2 catchment area *(Contains Ordnance Survey data © Crown copyright and database right 2014)*

4.2.2 The existing SATURN 2012 model was used to identify the home based work car trips travelling to/from HEZ. TEMPRO growth was then applied to convert to 2018 flows. Results are shown in Table 4.1.

Table 4.1 Home based work car trips, travelling to/from HEZ

Distance	2012		2018	
	AM Peak TO HEZ (08:00-09:00)	PM Peak FROM HEZ (17:00-18:00)	AM Peak TO HEZ (08:00-09:00)	PM Peak FROM HEZ (17:00-18:00)
<2km	2	25	2	26
2-4km	78	69	80	70
4-5km	10	10	11	11
Total	**90**	**104**	**93**	**107**

4.2.3 Distance and mode travelled to work data in Herefordshire was then obtained from the 2001 Census (see Figure 4.2), which will be the most recent dataset of this kind available until the corresponding 2011 Census data is made available.

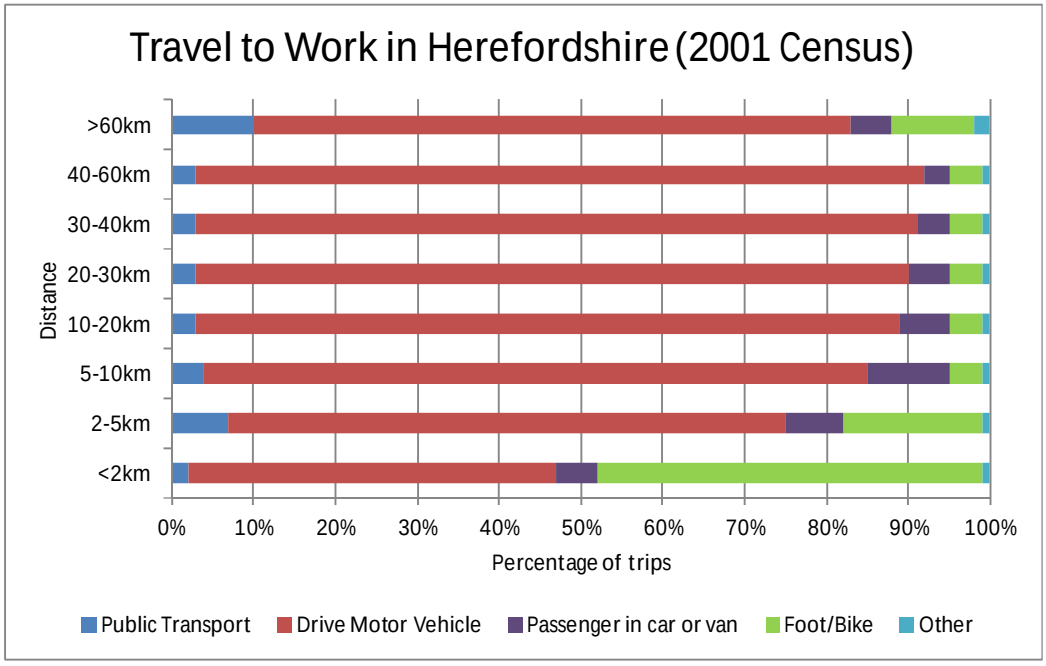

Figure 4.2 Travel to Work in Herefordshire (2001 Census)

4.2.4 For all trips that are now within 2km of HEZ as a result of the Connect 2 scheme, the difference in mode split between 2-5km and <2km (34% reduction in drive motor vehicle) was applied. For all trips within 5km of HEZ, the difference in mode split between 5-10km and 2-5km (16% reduction in drive motor vehicle) was applied. The resulting reduction in trips in 2018 is shown in Table 4.2 below.

Table 4.2 Reduction in car trips as a result of Connect 2, 2018

Time Period	Trips (2018)
AM (08:00-09:00)	15
PM (17:00-18:00)	22

4.2.5 To remove these trips from the highway network, it was assumed that all AM trips would have been travelling south down the A49 and Hinton Road/Holme Lacy Road. The resulting distribution can be found in **Appendix C**.

4.3 HEZ Travel Plan

4.3.1 A travel plan is a package of measures with the aim of to encouraging staff to use alternatives to driving to work alone. A travel plan can offer real benefits, not only to the organisation and its employees, but also the community and environment that surrounds it. Typically, the plan will include initiatives such as car sharing, discounted public transport tickets, cycle parking or showers.

4.3.2 To estimate the impact of an enhanced Travel Plan at the site, survey results from the previous Rotherwas Travel Plan were obtained. The results show that car use at the site has fallen since the introduction of the Travel Plan in 2003 from 74% drive car alone in 2003 to 60% drive car alone in 2008.

4.3.3 Table 4.3 shows the most recent set of results from the Travel Plan Survey. The results have been filtered to show only those trips that occur between 08:00-09:00 and as such cannot be directly compared to previous year's results.

Table 4.3 Rotherwas Travel Survey Results 2013 (AM Peak 08:00-09:00)

Mode	2013 Percentage
Walk	5%
Cycle	14%
Motorbike / Scooter	1%
Bus	1%
Rail	0%
Car Passenger	8%
Drive Car (with passengers)	70%
Drive Car Alone	
Total	**100%**

4.3.4 Evidence shows that a 15% reduction in car use over 5 years is an achievable target for a Travel Plan[3]. Whilst a reduction has already been achieved at Rotherwas, the Connect 2 scheme and wider work in Hereford on walking and cycling will provide even greater opportunities for more sustainable mode choices. As such, we have assumed that a 10% reduction in AM peak car trips could be achieved at the site by 2018.

4.3.5 This 10% reduction was applied to all home base work trips to/from the site in 2012, factored up to 2018 flows using TEMPRO growth, to take account of growth in car ownership, as shown in Table 4.4.

Table 4.4 Reduction in car trips as a result of the Travel Plan

Time Period	Home based work trips		
	2012	2018	10% reduction
AM (08:00-09:00)	386	397	40
PM (17:00-18:00)	579	594	59

4.3.6 These trips were removed from the network using the trip distribution shown in Section 6. The resulting distribution can be found in **Appendix C**.

4.4 A49 Junction Improvements

4.4.1 The following three junction improvement schemes were also investigated:

- A49 j/w Holme Lacy Road – Right turn to A49 northbound permitted from both lanes of westbound Holme Lacy Road.

[3] See Cairns, Goodwin, Sloman & Newson (2004) *Smarter Choices – Changing the way we travel*, DfT (2008) *The Essential Guide to Travel Planning*, DfT (2002) *Making travel plans work: Lessons from UK case studies*

- A49 j/w Bullingham Lane – Move pedestrian crossing on the A49 from the north side of the junction to the south side, to remove the need for an all red period.

- A49 j/w A465 – Extension of two lane approach on the A465.

4.4.2 The intention of all of these schemes is to give more green time to the A49 and therefore help to maintain journey times. The schemes were tested with an existing TRANSYT model. Further details can be found in Section 5.

4.5 Other Walking and Cycling Schemes

4.5.1 It is understood that HC are implementing a range of walking and cycling schemes that may result in mode shift and a reduction in trips on the A49. A map of key schemes can be found in **Appendix D**.

4.5.2 The schemes most likely to have an impact are:

- B1 – Park & Share / Park & Cycle 50 spaces and 10 lockers. To connect to the rest of the network HC are developing a link into Saxon Gate which avoids the A49 and then allows cyclists to continue to the city via King George V's playing fields and Bishop's Meadow or on to Rotherwas.

- B6 – Proposed shared use path providing a more attractive alternative to Belmont Road. The scheme extends from the existing signed quiet road route between Belmont and Rotherwas following the riverside.

- D4 – An extension of shared use paths along the north side of the Straight Mile. There will also be shared use paths alongside the new internal roads within HEZ.

- Holme Lacy Road traffic calming and cycle facilities

4.5.3 These schemes will be supported by wider Active Travel schemes, improvements elsewhere in Hereford and a cycling festival.

4.5.4 HC has not yet undertaken any robust analysis of the likely mode share impacts of these schemes, and as such it is not possible to quantify the likely impacts on the A49.

4.6 Summary of impacts

4.6.1 The Connect 2 scheme and the Travel Plan for the existing site are currently the main schemes that could unlock development potential at the site. The trip reduction associated with these schemes is shown in Table 4.5.

Table 4.5 Reduction in car trips as a result of Connect 2 and Travel Plan

Scheme	Trip reduction	
	AM	PM
Connect 2	15	22
Travel Plan	40	59
TOTAL	**55**	**81**

4.6.2 An indicative assessment of the Holme Lacy Road Bus Gate and Chapel Road Park & Cycle, which are not included in the main assessment, can be found in **Appendix B**.

5 TRANSPORT ASSESSMENT

5.1 Introduction

5.1.1 The potential development size will depend on both the future trip distribution and trip generation rate.

5.2 Trip Rates

5.2.1 Trip rates were based on the rates previously determined in the Rotherwas Enterprise Zone Transport Assessment (Amey, April 2013), which were obtained from the TRICS 2012(b) v6.10.2 database. The trip rates are based on similar size developments (GFA) for B1 office, B2 industrial units and B8 warehousing usage, with locations being edge of town centres. Full details of the TRICS sites used can be found in **Appendix E**.

Table 5.1 Trip rate

Land Use	Time Period	Trip Rate (per 100sqm)		
		Arrivals	Departures	Totals
B1 Office	08:00-09:00	1.079	0.268	1.347
	17:00-18:00	0.196	0.908	1.104
B1/B2 Industrial	08:00-09:00	0.330	0.067	0.397
	17:00-18:00	0.038	0.271	0.309
B8 Warehouse	08:00-09:00	0.069	0.045	0.114
	17:00-18:00	0.030	0.076	0.106

5.3 Trip Distribution

5.3.1 The trip distribution was established using the existing SATURN model. Select Link Analysis was used to identify the current distribution of trips to/from HEZ zones[4], and in particular through the three junctions of interest. The resulting trip distributions are shown in Figures 5.1 to 5.3.

[4] HEZ zones refers to the zones within the SATURN model that cover the enterprise zone.

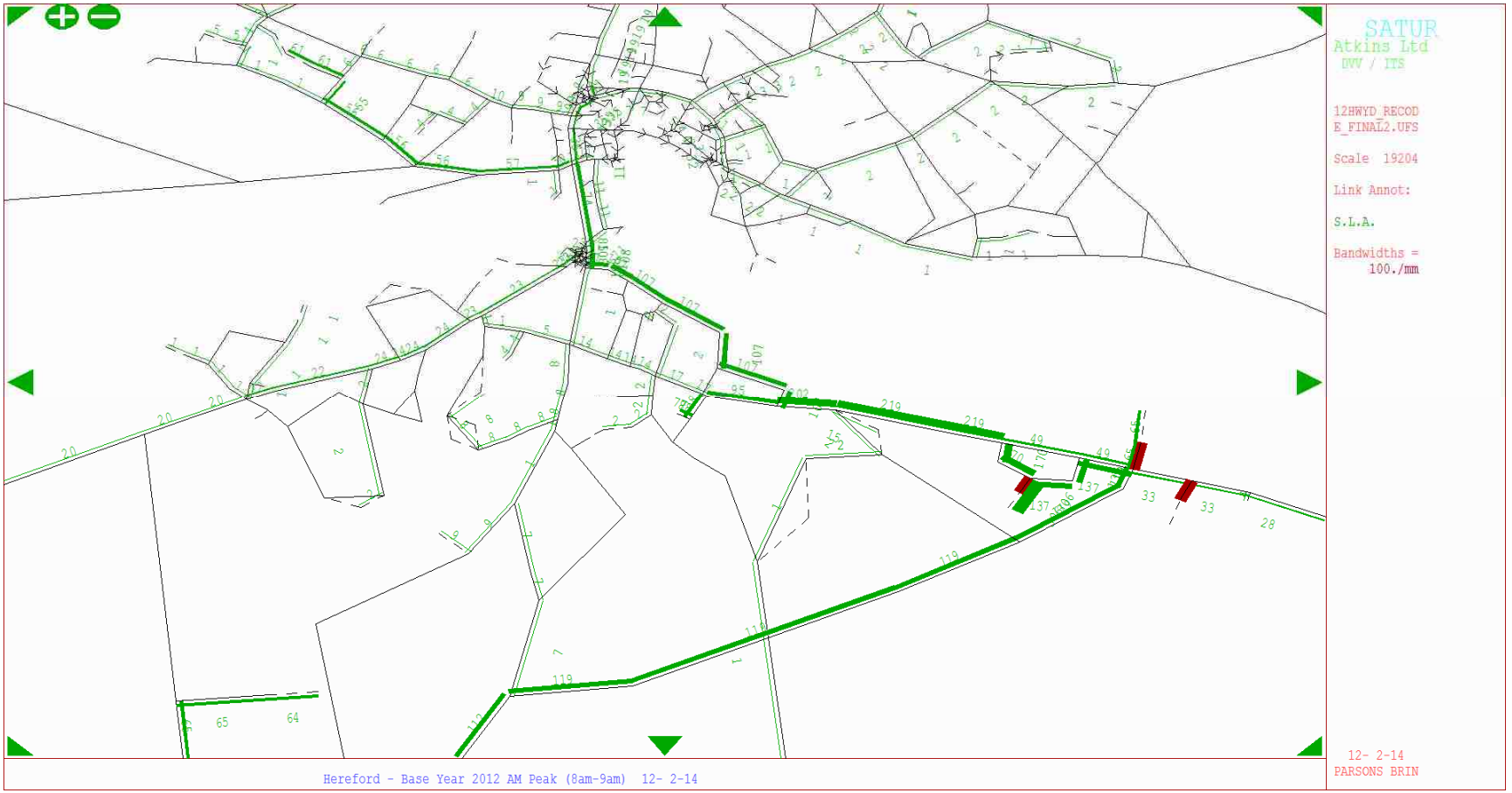

Figure 5.1 Select Link Analysis – UC1 trips (PCUS) TO HEZ in the AM Peak (08:00-09:00)

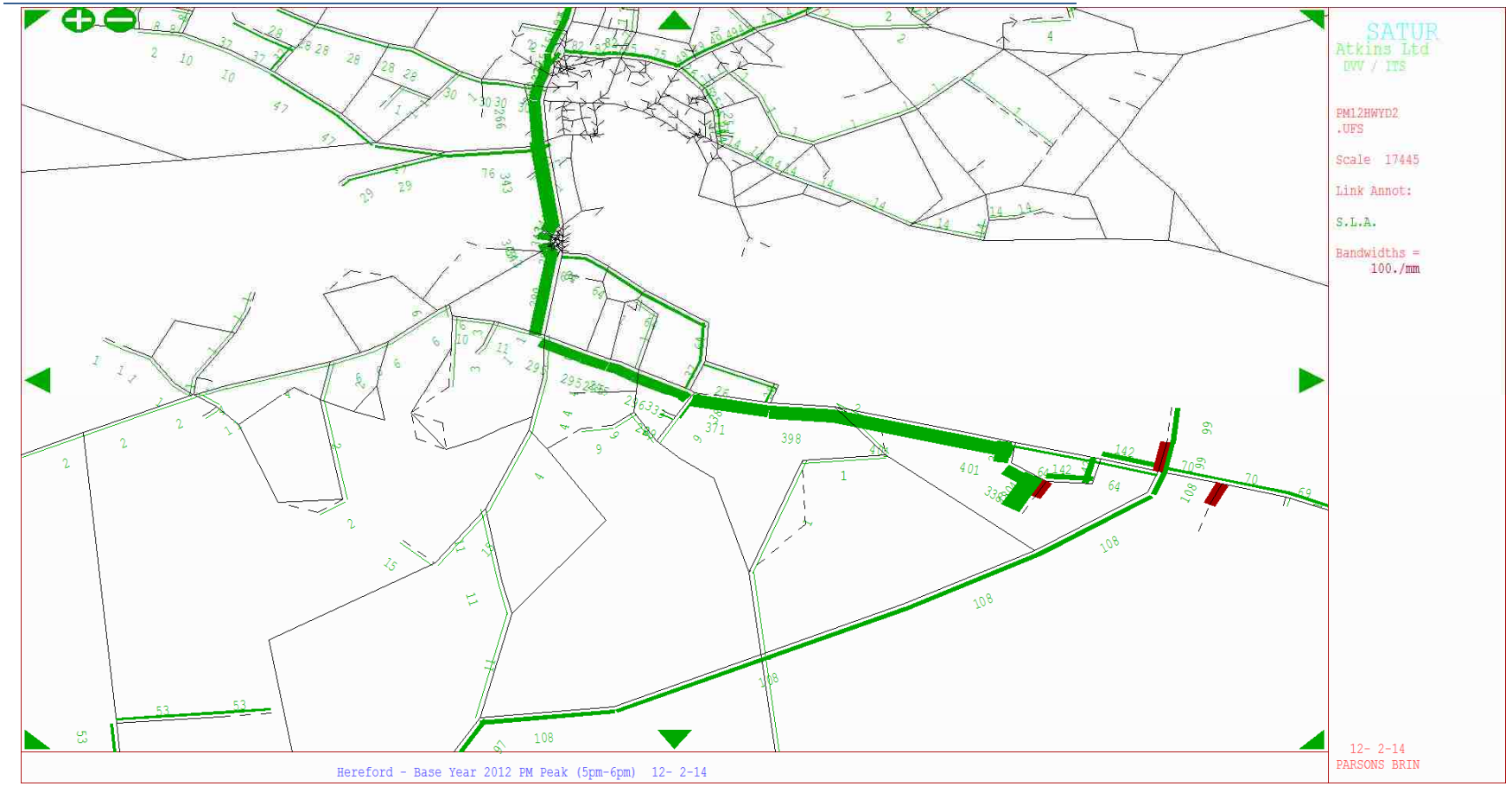

Figure 5.2 Select Link Analysis – UC1 trips (PCUs) FROM HEZ in the PM Peak (17:00-18:00)

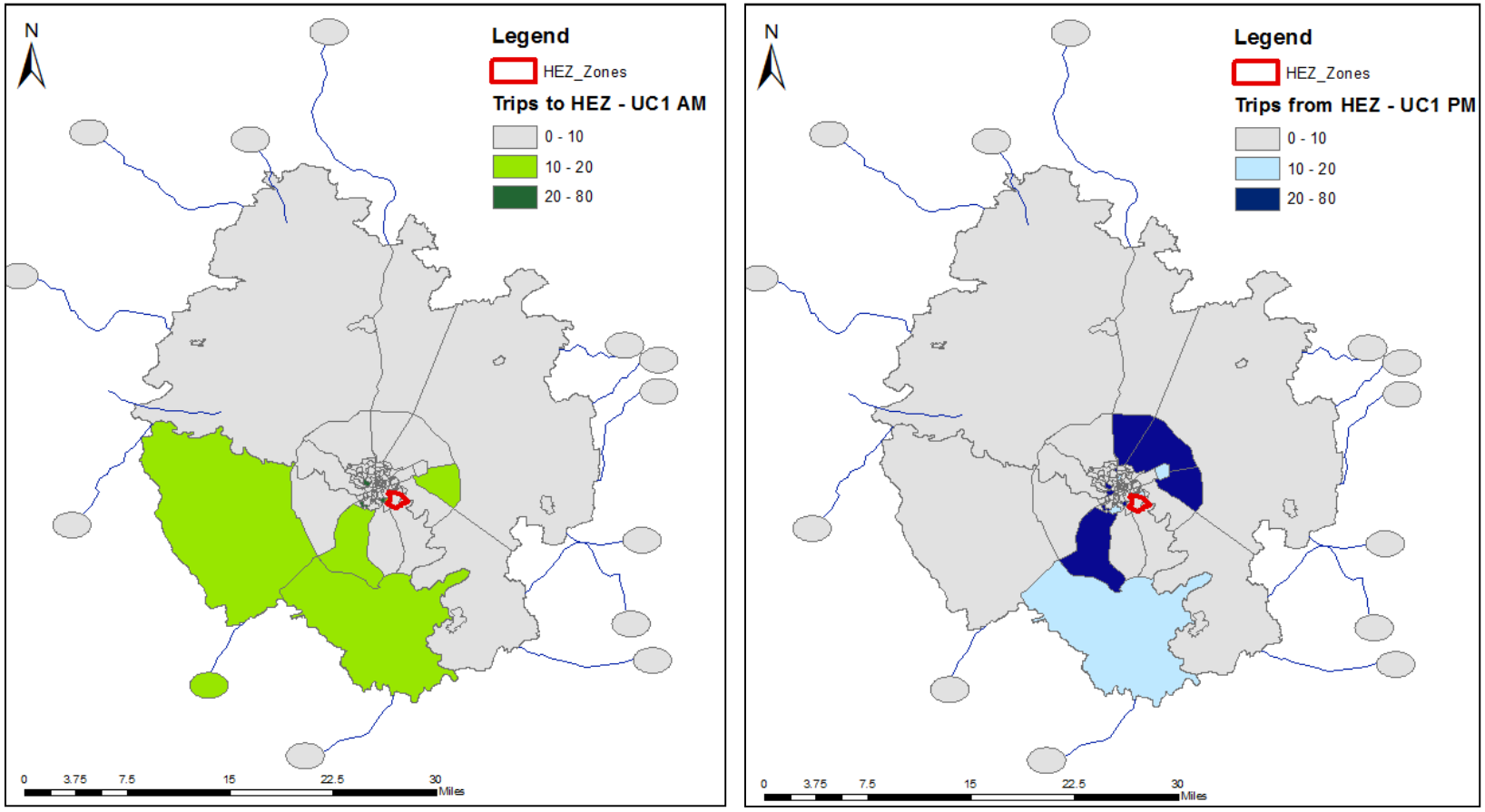

Figure 5.3 Trip distribution – UC1 Journey to Work TO HEZ AM (Left) and FROM HEZ PM (Right)

5.3.2 The trip length distribution in the SATURN model was checked against the trip length distribution for Hereford in the 2001 Census. The results are shown in Table 5.2 and show that the SATURN model may be underestimating short trips of less than 5km and overestimating mid-range trips between 20 to 30km. The overestimate of mid-range trips is partly caused by the method of calculating the trip length distribution, which used zone centres rather than link lengths, and as such leads to over-reporting of trips on the edge of the model area (i.e. 20 to 30km) and under-reporting of longer trips (i.e. 60 to 80km).

5.3.3 The overall impact of the differences in trips of less than 5km will be to underestimate the impact of the Connect 2 scheme, as the assessment is based on the number of short distance trips in the area. As such, our estimates should be seen as conservative and the actual impact may be larger, albeit to a modest level.

Table 5.2 Trip length distribution

Distance (km)		SATURN 2012 AM UC1	Census2001	Diff
>=	<			
0	2	25%	32%	-7%
2	5	25%	39%	-15%
5	10	8%	7%	2%
10	20	11%	8%	2%
20	30	21%	5%	17%
30	40	7%	2%	5%
40	60	2%	2%	0%
60	80	0%	5%	-4%

5.3.4 The trip distribution in SATURN estimates that the majority of trips to HEZ would use Hinton Road rather than Holme Lacy Road. While some rat-running may occur on this route, this was not felt to be realistic by the project team and stakeholders based on local knowledge of the area. An initial check of the SATURN model for Hinton Road and Holme Lacy Road did not uncover any significant errors with the network coding. However, comparison of the model to 2012 traffic survey flows revealed that link flows on Hinton Road EB were approximately 100 PCUs higher in the model than the surveys in both the AM and PM peaks. Link flows Holme Lacy Road EB were approximately 100 PCUs lower in the model than the surveys in both the AM and PM peaks. Link flows for other links including WB on Hinton Road and Holme Lacy Road were similar in the model and surveys.

5.3.5 The difference between the model link flows and survey flows, combined with local knowledge from stakeholders, strongly indicates that the SATURN model does not correctly distribute trips to/from HEZ between Hinton Road and Holme Lacy Road. As such, the trip distribution from SATURN was updated to reflect the survey data by re-routing approximately 100 PCUs from Hinton Road to Holme Lacy Road.

5.3.6 The resulting distributions can be seen in Figures 5.4 and 5.5, and Tables 5.3 and 5.4. The numbers represent the percentage of trips to/from HEZ that can be expected to use a particular link. For example, if 100 additional trips travel to HEZ in the AM Peak, there is estimated to be 4 additional trips EB on Hinton Road. Note that in the AM Peak, only 32% of vehicles accessing HEZ are estimated to use the A49 junctions identified in this study. The majority of trips have origins/destinations in Lower Bullingham and do not use the A49 or use other routes such as the B3499 RAR.

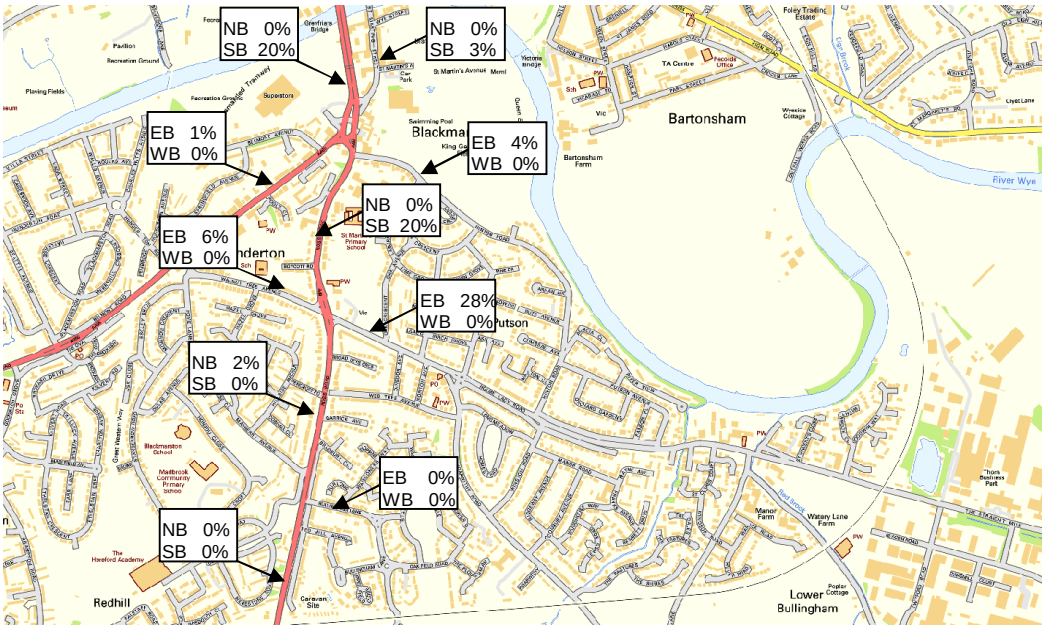

Figure 5.4 UC1 Trip Distribution AM Peak_To HEZ (08:00-09:00) *(Contains Ordnance Survey data © Crown copyright and database right 2014)*

Table 5.3 UC1 Trip Distribution AM Peak_To HEZ (08:00-09:00)

A49 Belmont Roundabout		NB	EB	SB	WB
A	A49 (N)	0%		20%	
B	St Martin's Street	0%		3%	
C	Hinton Road		4%		0%
D	A49 (S)	0%		20%	
E	A465 Belmont Road		1%		0%

A49 j/w Holme Lacy Rd		NB	EB	SB	WB
A	A49 (N)	0%		20%	
B	Holme Lacy Rd		28%		0%
C	A49 (S)	2%		0%	
D	Walnut Tree Ave		6%		0%

A49 j/w Bullingham Lane		NB	EB	SB	WB
A	A49 (N)	0%		0%	
B	Bullingham Lane				
C	A49 (S)	0%		0%	

A49 Rotherwas Access Rd		NB	EB	SB	WB
A	A49 (N)	0%		2%	
B	Rotherwas Access Road		32%		0%
C	A49 (S)	30%		0%	

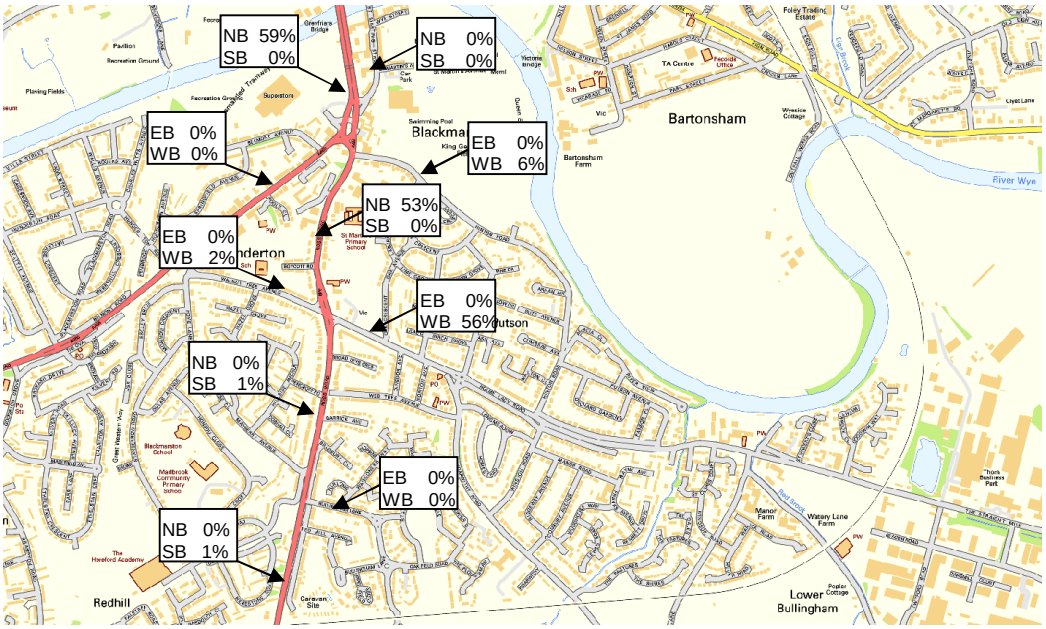

Figure 5.5 UC1 Trip Distribution PM Peak_From HEZ (17:00-18:00) *(Contains Ordnance Survey data © Crown copyright and database right 2014)*

Table 5.4 UC1 Trip Distribution PM Peak_From HEZ (17:00-18:00)

A49 Belmont Roundabout		NB	EB	SB	WB
A	A49 (N)	59%		0%	
B	St Martins Street	0%		0%	
C	Hinton Road		0%		6%
D	A49 (S)	53%		0%	
E	A465 Belmont Road		0%		0%

A49 j/w Holme Lacy Rd		NB	EB	SB	WB
A	A49 (N)	53%		0%	
B	Holme Lacy Rd		0%		56%
C	A49 (S)	0%		1%	
D	Walnut Tree Ave		0%		2%

A49 j/w Bullingham Lane		NB	EB	SB	WB
A	A49 (N)	0%		1%	
B	Bullingham Lane		0%		0%
C	A49 (S)	0%		1%	

A49 Rotherwas Access Rd		NB	EB	SB	WB
A	A49 (N)	2%		0%	
B	Rotherwas Access Road		0%		19%
C	A49 (S)	0%		17%	

5.4 TRANSYT models

5.4.1 In order to test the impact of the various interventions the use of the existing TRANSYT models was explored.

5.4.2 The TRANSYT models indicated that whilst it would be possible to achieve higher entry flows into the junctions, this traffic would not have space to queue, which in turn causes the junctions to lock up in the model. This locking up of the junction in the model means that the actual impact of the schemes could not be reliably assessed.

5.4.3 The impact of the junction schemes could be further investigated with an extension to the VISSIM model currently under development by the Highways Agency. The VISSIM model will be more sophisticated than the TRANSYT models and is better suited to modelling complex and linked junctions.

6 POTENTIAL DEVELOPMENT SIZE

6.1.1 The analysis in Section 2 shows that there is little potential for peak spreading from 08:00-09:00 to 07:00-08:00 as the latter period already experiences similar levels of congestion to the main peak.

6.1.2 Both the Connect 2 scheme and Travel Plan are likely to unlock development at the site in addition to that within the LDO. The development trips unlocked are shown in Table 6.1. As previously noted, the SATURN model may be underestimating short trips of less than 5km, which means that the figures below are a conservative estimate and the actual impact may be larger, albeit at a modest level.

Table 6.1 Development trips unlocked

Scheme	Development trips unlocked	
	AM	PM
Connect 2	15	22
Travel Plan	40	59
TOTAL	**55**	**81**

6.1.3 Using the same ratio of B1 Office, B1C Light Industry, B2 General Industrial and B8 Warehouse as the development aspirations for the site (24%/24%/51%/1%), these trips would result in the total additional development size shown below (Table 6.2), based on the development trips unlocked in the AM peak.

Table 6.2 Potential additional development size (Connect 2 and Travel Plan)

Land Use	Potential additional development (sqm)				
	B1	B1C	B2	B8	Total
Connect 2	579	579	1,230	24	**2,411**
Travel Plan	1,543	1,543	3,279	64	**6,429**
TOTAL	2,122	2,122	4,508	88	**8,840**

6.1.4 It is understood that the Highways Agency have already permitted additional trips from the pre-EZ outline application, reflecting an acceptable level of congestion on the A49. Details of these additional trips are contained in the HEZ Local Development Order (LDO), adopted April 2013. Using the same ratio of development (24%/24%/51%/1%), these trips would result in the total additional development size shown below (Table 6.3).

Table 6.3 Potential additional development (HA Limit)

Land Use	Potential additional development (sqm)				
	B1	B1C	B2	B8	Total
LDO Limit (REZ TA Trip Rate)	9,914	9,914	21,067	413	**41,307**

6.1.5 Table 6.4 shows the development aspiration at the site until 2018, which amounts to 110,000 sq m of floor space.

Table 6.4 Development aspiration to 2018

Land Use	Potential additional development (sqm)				
	B1	B1C	B2	B8	Total
2012-14	4,000	6,000	4,500	500	15,000
2015-16	17,000	17,000	49,000	1,000	84,000
2017-18	5,000	3,000	3,000	-	11,000
TOTAL	**26,000**	**26,000**	**56,500**	**1,500**	**110,000**

6.1.6 Table 6.5 shows that the Connect 2 scheme and Travel Plan added to the LDO Limit, results in a total of 50,147 sqm of development. This is a 59,853 sqm shortfall compared to the development aspirations for the site to 2018. Consequently further measures such as the A49 junction improvements are likely to be needed to unlock the full development aspirations for the site in the period to 2018. Figure 6.1 shows that more substantive transport capacity improvements, such as that delivered by the South Wye Transport Package and Hereford Transport Strategy contained within the Local Development Framework, are required beyond 2018 and are the subject of bids to the Local Growth Fund.

Table 6.5 Shortfall

Land Use	Potential additional development (sqm)				
	B1	B1C	B2	B8	Total
Connect 2 and Travel Plan	2,122	2,122	4,508	88	**8,840**
LDO Limit (REZ TA Trip Rate)	9,914	9,914	21,067	413	**41,307**
TOTAL	**12,036**	**12,036**	**25,575**	**501**	**50,147**
Development Aspiration	26,000	26,000	56,500	1,500	110,000
SHORTFALL	**13,964**	**13,964**	**30,925**	**999**	**59,853**

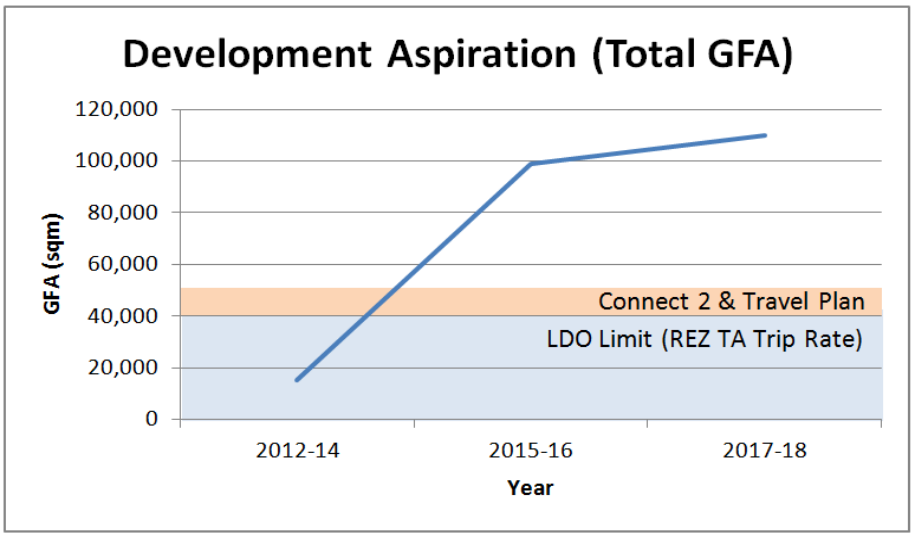

Figure 6.1 Development aspiration vs unlocked development

6.1.7 In terms of job creation, the 2013 Travel Plan results show that 25.5% of respondents drive to work in the AM peak. Therefore, 1 AM Peak car trip is equal to approximately 4 jobs. There could be an additional 55 AM Peak trips unlocked by the Connect 2 scheme, Travel Plan and 221 additional trips (HEZ arrivals) already permitted in the LDO, resulting in 276 additional trips or approximately 1,104 jobs, depending on the exact mix of land uses. These job creation figures should be treated as indicative only.

7 CONCLUSIONS & RECOMMENDATIONS

7.1 Main Assessment

7.1.1 Parsons Brinckerhoff was commissioned by Herefordshire Council to estimate the size of potential development that could be unlocked at the Hereford Enterprise Zone (HEZ), whilst managing the impact on the A49.

7.1.2 The analysis in Section 2 shows that there is little potential for peak spreading from 08:00-09:00 to 07:00-08:00 as the latter period already experiences similar levels of congestion to the main peak.

7.1.3 Both the Connect 2 scheme and Travel Plan are likely to unlock development at the site. The development trips unlocked are shown in Table 7.1. The figures below are a conservative estimate and the actual impact may be larger, albeit at a modest level.

Table 7.1 Development trips unlocked by Connect 2 and Travel Plan

Scheme	Development trips unlocked	
	AM	PM
Connect 2	15	22
Travel Plan	40	59
TOTAL	**55**	**81**

7.1.4 Using the same ratio of B1 Office, B1C Light Industry, B2 General Industrial and B8 Warehouse as the development aspirations for the site (24/24/51/1), these trips would result in the total additional development size shown below.

Table 7.2 Shortfall

Land Use	Potential additional development (sqm)				
	B1	B1C	B2	B8	Total
Connect 2 and Travel Plan	2,122	2,122	4,508	88	**8,840**
LDO Limit (REZ TA Trip Rate)	9,914	9,914	21,067	413	**41,307**
TOTAL	**12,036**	**12,036**	**25,575**	**501**	**50,147**
Development Aspiration	26,000	26,000	56,500	1,500	110,000
SHORTFALL	**13,964**	**13,964**	**30,925**	**999**	**59,853**

7.1.5 The Connect 2 scheme and Travel Plan, added to the LDO Limit, results in a total of 50,147 sqm of development. This is a 59,853 sqm shortfall compared to the development aspirations for the site to 2018. Consequently further measures such as the A49 junction improvements are likely to be needed to unlock the full development aspirations for the site in the period to 2018. Figure 6.1 shows that more substantive transport capacity improvements, such as that delivered by the South Wye Transport Package and Hereford Transport Strategy contained within the Local Development Framework, are required beyond 2018 and are the subject of bids to the Local Growth Fund.

7.1.6 In terms of job creation, the 2013 Travel Plan results show that 25.5% of respondents drive to work in the AM peak. Therefore, 1 AM Peak trip is equal to approximately 4 jobs. There could be an additional 55 AM Peak trips unlocked by the Connect 2 scheme, Travel Plan and 221 additional trips already permitted by the HA, resulting in 276 additional trips or approximately 1,104 jobs, depending on the exact mix of land uses. These job creation figures should be treated as indicative only.

7.2 Recommendations

- The development of the Enterprise Zone should proceed to the LDO Limit. If practicable, the LDO Limit should be increased to take account of the trips unlocked by the Connect 2 scheme and Travel Plan.
- The impacts of the three A49 junction schemes should be tested further with an extension to the VISSIM model currently under development by the Highway's Agency. The HA Pinch Point Programme is also likely to have improved conditions on the A49, which should help accommodate further development trips at HEZ. The impact of these schemes should also be tested with the extended VISSIM model.
- The existing Rotherwas Travel Plan should be revitalised and promoted to achieve the target trip reduction figures.
- The impacts of future development should be monitored by placing permanent traffic counters on access roads such as Chapel Road and Netherwood Roads. These count sites should be used to monitor development against the LDO Limit and could support the case that further development could be accommodated at the site.

7.3 Indicative Assessments

7.3.1 Analysis of the potential 100 space Park & Cycle scheme at Chapel Road shows that this is only likely to reduce traffic flow on the A49 NB by between 5 and 25 pcus, depending on the mode shift assumptions made.

7.3.2 Installation of a bus gate on Holme Lacy Road was investigated and found to result in a significant increase in traffic flow on the A49 as a result of diverting trips, and is not recommended.

7.3.3 These assessments could be revisited once the results from updated traffic surveys measuring the impact of the temporary closure of Holme Lacy Road in February /March 2014 are available.

APPENDIX A – SCHEME LIST

Table A.1 List of schemes not considered during this study as full SATURN model and/or further information is required for a robust assessment

Scheme Type	Details
Behaviour Change	City-wide travel plans (workplace, school and targeted / personalised)
	City-wide travel plans (workplace, school and targeted / personalised)
Connect 2 Schemes	Newmarket St / Blueschool St pedestrian / cyclist initiatives with ESGLR
	Kilvert Rd - Usk Close / Escley Dr cycle link Newton Farm
	Destination Hereford - Belmont Abbey - Hunderton cycleway SE Hereford
	Kings Acre Rd - Barton Rd cycleway
	Eign Rd - Ledbury Rd link
	Greenway - Lower Bullingham (off street Goodwin Wy - Greenway)
Hereford Active Travel Schemes	HATS - A3 Rotherwas- Holme Lacy feasibility report (off street Rotherwas IE)
	HATS - B1 Grafton Depot (A49 Grafton Depot-Bullingham Lane) (P&C)
	HATS - B7 Riverside School- GWW to Belmont Avenue (off street)
	HATS - B8 ASDA riverside path realignment (off street riverside Asda - St Martins St)
	HATS - C2 City Core including High Town, St Owen's St, Offa St (on street plus Commercial St ped area)
	HATS - D4 The Straight Mile (Twyford Rd-Fir Tree Lane) (on street Holme Lacy Rd)
	Destination Hereford - Victoria Pk to Overbury Rd
Highway Link Capacity	Edgar Street Grid Link Road
Highways Agency Pinch Point Programme	HA PPP - A49/A465 Asda
	HA PPP - A49/A438 Newmarket Street
	HA PPP - A49/A4103 Roman Road
Proposed	Public transport serving HEZ, Lower Bullingham and Belmont
Proposed	Scoot
Proposed	A49 Red Route
A49 Corridor Capacity	Newtown Road
	Eign Street
	Barton Road
	Belmont Road
	St Martins St
	Roman Road
Proposed	Car Park charges increase 10% over rate of inflation year on year
Proposed	Southern Link Road A49 to B4349 Clehonger Road
Proposed	Wye Link Road

APPENDIX B – INDICATIVE ASSESSMENTS

B INDICATIVE ASSESSMENTS

B.1 Introduction

B.1.1 In addition to the main assessment HC instructed PB to provide an indicative assessment of a potential bus gate at Holme Lacy Road and a new Park & Cycle facility at Chapel Road. These estimates do not form part of the main assessment, but could be used by Herefordshire Council to decide whether to undertake a more complete assessment of these schemes at a later date. These assessments could be revisited once the results from updated traffic surveys measuring the impact of the temporary closure of Holme Lacy Road in February/March 2014 are available.

B.2 Holme Lacy Road Bus Gate

B.2.1 The potential impact of installing a bus gate on Holme Lacy Road under the railway bridge was investigated (see Figure B.1). The bus gate would block this link to all traffic except for buses and non-motorised users. It is assumed that Watery Lane would also be blocked to prevent rat-running on this obvious diversion route.

Figure B.1 Bus Gate Location *(Contains Ordnance Survey data © Crown copyright and database right 2014)*

B.2.2 The Select Link Analysis tool in SATURN was used to identify trips using this section of Holme Lacy Road. The impact of these trips was then re-assigned to identify the impact on the four junctions shown below in Table B.1. The impacts of mode shift and demand side impacts as a result of the bus gate were not considered. The tables show the change in traffic flows in PCUs for the AM Peak 08:00-09:00.

Table B.1 Potential Impacts of Holme Lacy Road Bus Gate

A49 Belmont Roundabout			Destination A	B	C	D
Origin	A	A49 (N)		-168	168	
	B	Hinton Road	-20			
	C	A49 (S)	20			
	D	A465 Belmont Road				

A49 j/w Holme Lacy Rd			Destination A	B	C	D
Origin	A	A49 (N)		-2	170	
	B	Holme Lacy Rd	-92		171	-34
	C	A49 (S)	112	130		34
	D	Walnut Tree Ave		-27	27	

A49 j/w Bullingham Lane			Destination A	B	C
Origin	A	A49 (N)			233
	B	Bullingham Lane			29
	C	A49 (S)	276	19	

A49 Rotherwas Access Rd			Destination A	B	C
Origin	A	A49 (N)		233	
	B	Rotherwas Access Road	296		
	C	A49 (S)			

B.2.3 The results for each junction are summarised below:

- A49 Belmont Roundabout – The overall level of traffic on the roundabout would not change significantly. However, approx 168 PCUs would shift from turning left to Hinton Road, to continuing straight ahead southbound on the A49.
- A49 j/w Holme Lacy Road – The overall level of traffic through the junction would increase by approx 489 PCUs. This is a result of trips between Lower Bullingham and HEZ, and North Hereford and HEZ diverting to use the A49 and Rotherwas Access Road.
- A49 j/w Bullingham Lane – The overall level of traffic through the junction would increase by approx 557 PCUs as a result of diverting trips.
- Rotherwas Access Road – The overall level of traffic through the junction would increase by approx 529 PCUs as a result of diverting trips.

B.2.4 The results show that installing a bus gate on Holme Lacy Road would cause a significant number of additional trips (approx 500 PCUs in the AM Peak) to divert and use the A49 and

the key junctions, which would increase congestion and journey times along this stretch. The results for the PM Peak would be of a similar magnitude.

B.2.5 This measure would significantly decrease the potential size of development that could be accommodated at the Enterprise Zone and as such is not recommended.

B.3 Chapel Road Park & Cycle

B.3.1 The potential impact of a 100 space Park & Cycle facility at Chapel Road was investigated. Figure B.2 shows the location of the facility, the Connect 2 scheme, and the SATURN zones north of the river within 4km of the Park & Cycle facility.

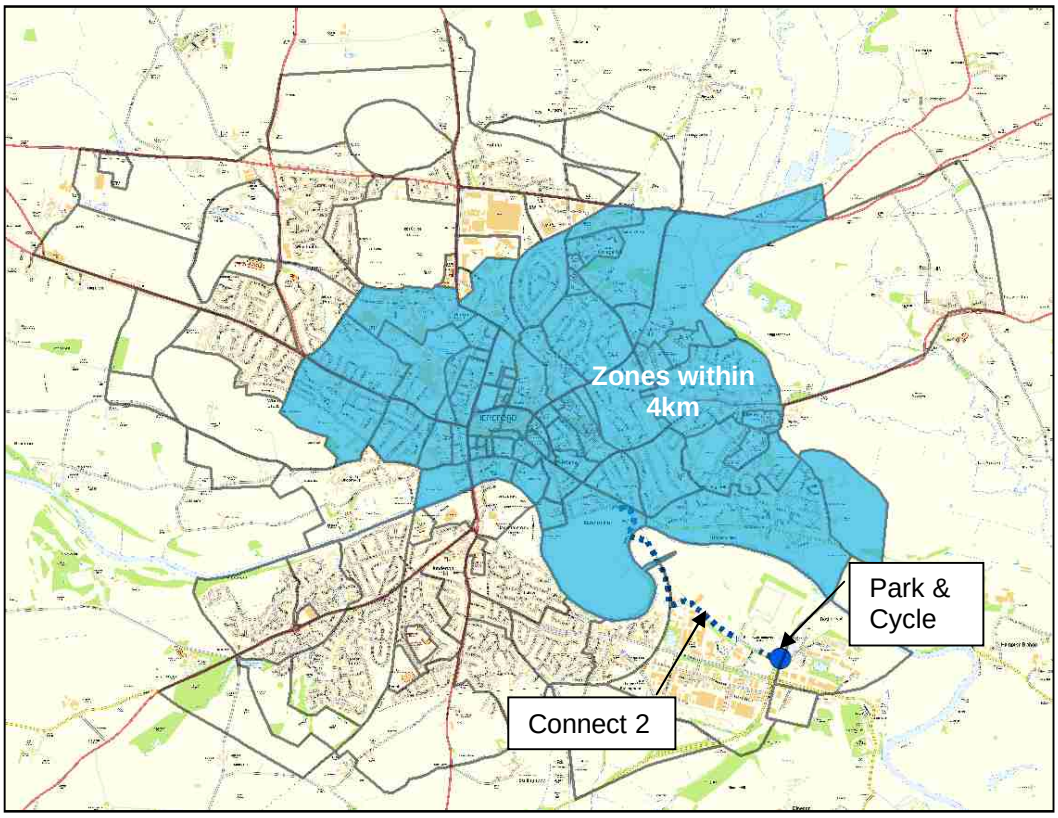

Figure B.2 Chapel Road Park & Cycle Impacts *(Contains Ordnance Survey data © Crown copyright and database right 2014)*

B.3.2 To calculate the potential impact of the facility we considered the origins of potential users and the distance to their destination. The two main origins for potential users were from the east via the B4399 and from the south via the A49. In terms of destinations, all zones north of the river within 4km of the Park & Cycle facility were considered. Whilst 5km is the widely accepted comfortable cycling distance, this is the distance on the ground, whereas the zones were selected as a straight line distance. In addition, the benefits of using the facility compared to driving are likely to reduce the distance people are willing to cycle to potential destinations.

B.3.3 The Select Link Analysis tool in SATURN was used to identify trips accessing these zones. There were no trips accessing these zones from the B4399 RAR, and 245 PCUs from the A49 south of the Rotherwas Access Road. This includes all user classes and journey purposes, including LGVs and HGVs, not all of which could potentially use the new facility. It

should be noted that only 3.6 PCUs accessed zones north of the river and within 2km of the Park & Cycle facility from the A49 south of the Rotherwas Access Road.

B.3.4 Table B.2 shows the potential reduction in PCUs on the A49 north of the B4399 as a result of the new facility and various mode shift assumptions. There is little evidence or research into the impact of Park & Cycle schemes on traffic impacts, but the impacts can be expected to be towards the lower end of the scale.

Table B.2 Potential Impacts of Park & Cycle at Chapel Road in the AM Peak

Shift to Park & Cycle	Reduction in traffic on A49 NB (PCUs)
2%	4.9
5%	12.3
10%	24.6

B.3.5 Based on this initial assessment, a Park & Cycle facility at Chapel Road may have a slight beneficial impact on traffic flows on the A49 and the Council may wish to investigate this further. Based on the indicative assessment, a 100 space facility may result in over-provision of parking spaces. Provision of more Park & Cycle spaces further west near the railway line would reduce the walk/cycle distance to the centre of Hereford and increase the range of potential destinations, which may result in greater benefits for the A49.

APPENDIX C – FLOW DIAGRAMS

APPENDIX D – WALKING & CYCLING SCHEMES

APPENDIX E – TRICS DATA