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Selby Local Development Framework

Phase 1 – Option Testing and Forecasting

September 2009

JACOBS Consultancy

DOCUMENT CONTROL SHEET BPP 04 F8

Client:	Selby District Council		
Project:	Selby Local Development Framework	Job No:	B1368600
Document Title:	Phase 1 – Option Testing and Forecasting		

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DATE **21/09/2009**	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
Document Status:	**Draft**			

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DATE **28/09/2009**	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
Document Status:	**Draft 2**			

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DATE **16/10/2009**	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
Document Status:	**Final**			

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Document Status:				

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1 INTRODUCTION

1.1 Background

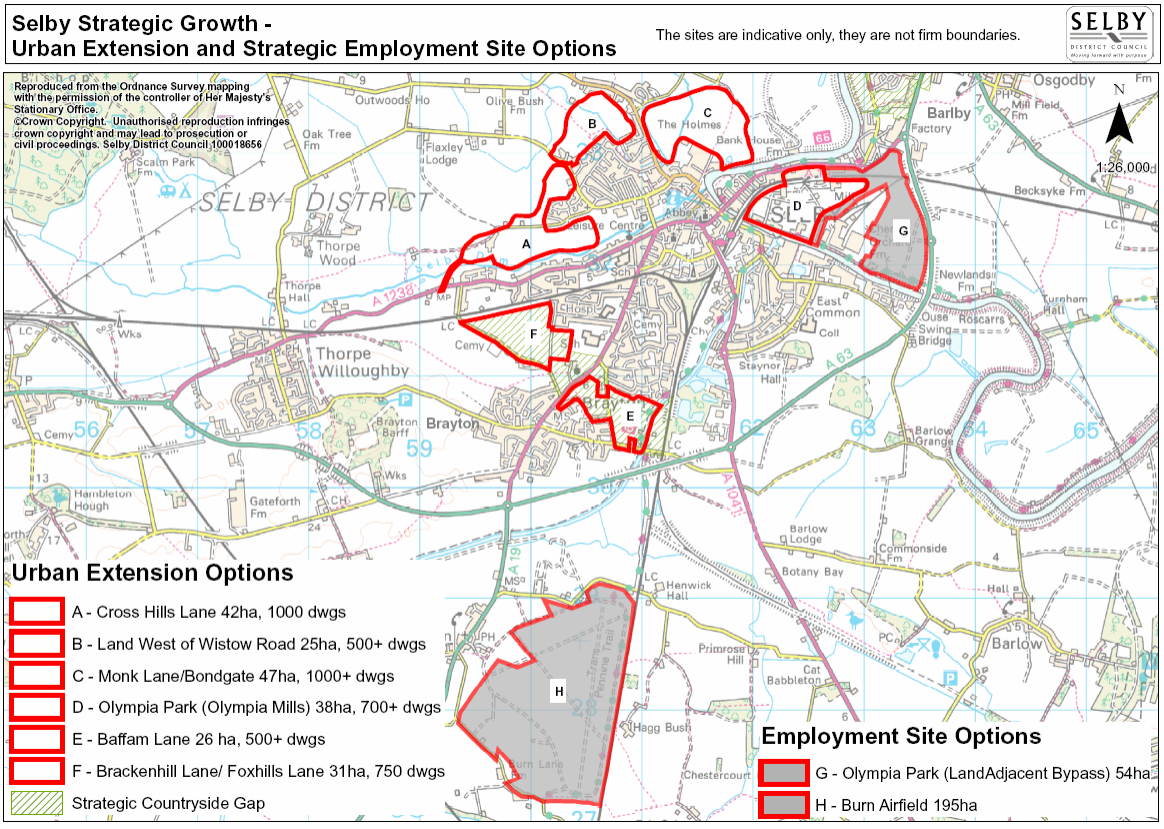
Jacobs Consultancy was commissioned in 2008 by North Yorkshire County Council and Selby District Council (SDC) to construct a traffic model of Selby and its surroundings. This model is now being used to assess the impact on the Selby road network of strategic developments that have been detailed within SDC's emerging Core Strategy for the Local Development Framework (LDF).

The assessment of the strategic developments is to be carried out in two phases. Phase 1 examines the impact on the road network of each individual site in isolation. This will result in the selection of preferred options which will be tested together in Phase 2 of the work. This report details only the methodology and results of Phase 1 testing.

1.2 Development sites

Within the emerging Core Strategy for the Selby LDF a total of six strategic housing developments and two strategic employment sites have been identified. These are shown in Figure 1 below.

Figure 1 Selby development sites



Subsequent investigations have determined that sites B and C are no longer under consideration. The maximum number of dwellings on each remaining site and the maximum employment area has also been finalised and has been used to inform this

option assessment. The remaining six development sites are listed in Table 1 below along with their maximum number of dwellings / employment areas.

Table 1 Maximum number of dwellings per housing site and maximum area of employment sites

Site	Dwellings / Area
Site A	1000 dwellings
Site D	800 dwellings
Site E	650 dwellings
Site F	750 dwellings
Site G	50 ha
Site H	50 ha

Following discussions with SDC employment sites G and H have two proposed development mixes to be tested over the same site area. This is to reflect the uncertainty regarding the final scope of these sites. These scenarios are detailed later within this report and bring the total number of tests undertaken as part of this report to eight; four housing sites and two employment sites with two different land use scenarios.

1.3 Purpose of report

The purpose of this report is to provide a detailed report of the impact of each of the development options on the Selby road network. The impact of each option on the operation of key junctions in the network and upon journey times is examined. A comparative study between options and a base model is used to provide findings and recommendations that can be used to select the preferred options to take forward to Phase 2 testing.

The structure of the remainder of this document is as follows:

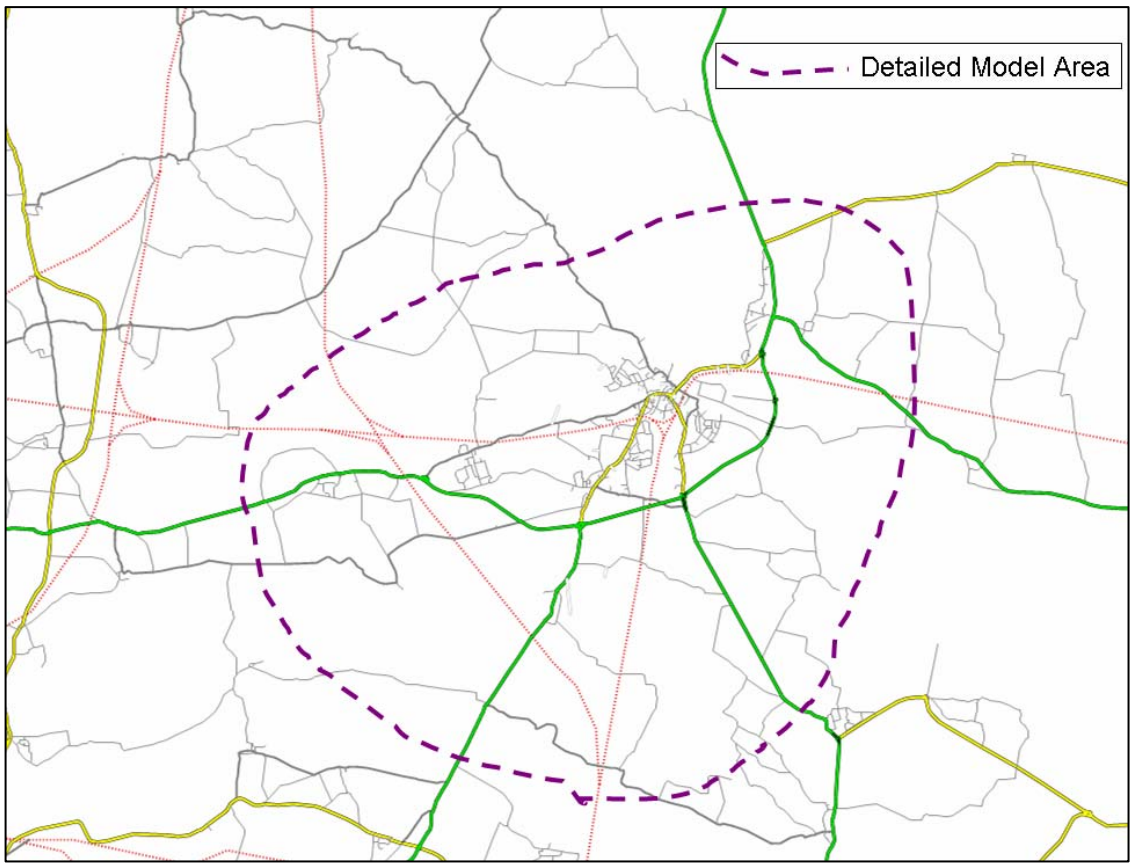
- Methodology
- Results
- Conclusions

2 METHODOLOGY

2.1 VISUM modelling

The Selby VISUM model was completed in 2008 and forms the basis for the option testing. The base model is a PM (1700 – 1800) weekday (Mon – Fri) time scenario and the base year is 2008. The model extent is sufficient to analyse the impacts of developments within Selby town as well as on all radials to the bypass and beyond.

Figure 2 Detailed model area



The model is currently a highway only assignment and as detailed below, there are five user classes in the model:

- UC1 Business and Education
- UC2 Employers Business
- UC3 Other Car
- UC4 Light Goods Vehicles (LGVs)
- UC5 Heavy Goods Vehicles (HGVs)

More details on the model can be found in *Selby Transport Model Local Validation Report*, Jacobs Consultancy, September 2008.

2.2 Trip generation

Using the information included within Table 1, the number of trips generated by the individual sites was estimated using trips rates calculated from the TRICS database. TRICS is a national database which challenges and validates assumptions about the transport impacts of new developments. It is the national standard system of trip generation and analysis in the UK and is used as an integral and essential part of the Transport Assessment process. The data base contains transport generation data for a wide variety of development types and allows users to interrogate trip rates for sites which meet their own compatibility criteria.

For these investigations the TRICS best practice guidelines were followed to select the most appropriate surveys form which to calculate the trip rate.

2.2.1 Housing

The average trip rates per dwelling calculated for housing developments are given in Table 2 below along with total trips from each site. The trip rates are for 1700 – 1800, which corresponds to the PM peak time period in the Selby VISUM model.

Table 2 Trips generated by housing developments

Site	Dwellings	Trip rate IN	Trip rate OUT	Trips IN	Trips OUT	Trips TOTAL
A	1000	0.382	0.205	382	205	587
D	800	0.382	0.205	306	164	470
E	650	0.382	0.205	248	133	382
F	750	0.382	0.205	287	154	440

2.2.2 Employment

As previously identified, the two employment sites were tested with two different land use scenarios to reflect the uncertainty regarding the the future scope of the sites. These scenarios are as follows:

- Employment Scenario 1: 75% B2/B8, 12.5% B1 office, and 12.5% high values uses (e.g. car showrooms, hotel, public house, health and fitness)
- Employment Scenario 2: 50% B2/B8, 25% B1 office, and 25% high values uses (e.g. car showrooms, hotel, public house, health and fitness)

Each site had an area of 50 hectares for both employment scenarios. The site area allocated to B1, B2 and B8 was calculated from the percentage splits given above with an even split between B2 and B8 (i.e. for employment scenario 2, 12.5 ha B2 and 12.5 ha B8).

It was not appropriate to split the high value land use area in the same manner, as the high value land uses would occupy vastly different site areas (e.g. a pub compared to a leisure centre). Therefore the remaining site area in each employment scenario was split according to the ratio of the 85th percentile Gross Floor Area (GFA) of the total available surveys of that high value land use in the TRICS database. GFA was used as site area was not given in the TRICS database for all of the high value land use types.

A constant factor of 0.4 was used to convert site areas to GFAs based upon previous Highways Agency work. GFAs were required to calculate the trip rates from the TRICS database. The trip rates and trips calculated for each employment site is given in

Table 3 overleaf. The trip rates are for 1700 – 1800, which corresponds to the PM peak time period in the Selby VISUM model.

Table 3 Trips generated by employment developments

Site	TCPA class	Description	Site Area (ha)	GFA (m^2)	Trip rate IN*	Trip rate OUT*	Trips IN	Trips OUT	Trips TOTAL
G1/H1	B1	Office	6.3	25,000	0.124	1.209	31	302	333
	B2	Industrial estate	18.8	75,000	0.087	0.289	65	217	282
	B8	Warehouse	18.8	75,000	0.074	0.109	56	82	137
	A4	Pub	0.3	1,278	3.110	2.258	40	29	69
	C1	Hotel	2.4	9,565	0.276	0.273	26	26	53
	D2	Leisure centre	2.4	9,627	29.79	22.94	72	55	127
	sui generis	Car showroom	1.1	4,530	14.62	41.04	17	46	63
						TOTAL	**306**	**757**	**1064**
G2/H2	B1	Office	12.5	50,000	0.124	1.209	62	605	667
	B2	Industrial estate	12.5	50,000	0.087	0.289	44	145	188
	B8	Warehouse	12.5	50,000	0.074	0.109	37	55	92
	A4	Pub	0.6	2,555	3.110	2.258	79	58	137
	C1	Hotel	4.8	19,130	0.276	0.273	53	52	105
	D2	Leisure centre	4.8	19,254	29.79	22.94	143	110	254
	sui generis	Car showroom	2.3	9,061	14.62	41.04	33	93	126
						TOTAL	**451**	**1117**	**1568**

* trip rate per $100m^2$ GFA except for D2 and sui generis where trip rate is per ha of site area

It can be seen from the information above that Employment Scenario 2 produces almost 50% more trips than Employment Scenario 1 due to the greater proportion of the site given over to high end uses.

2.3 Matrix forecasting

To determine and compare the impact of options on Selby's highway network it was agreed that tests should be undertaken in the forecast year 2026 as thus represents the end of the LDF plan period. This assessment has required the base model matrices to be factored up from 2008 to 2026. Growth factors were calculated using a combination of the Department for Transport accepted Trip End Model Presentation pROgram (TEMPRO) and National Road Traffic Forecast (NRTF). TEMPRO growth factors were used for internal to internal trips within the Selby district TEMPRO zone for users classes 1, 2 and 3 (see section 2.1 for definition). NRTF factors were used for internal to internal trips within the Selby district TEMPRO zone for user classes 4 and 5 (see section 2.1 for definition), and for all other trips in the matrices. Growth factors from TEMPRO could only be used for user classes 1, 2 and 3 as they are car trips, TEMPRO does not calculate growth factors for LGVs or HGVs.

The base scenario matrices for 2026 have then been calculated using the following growth factors given in Table 4.

Table 4 Growth factors used to produce 2026 base matrices

	UC1	UC2	UC3	UC4	UC5
Internal to internal	1.125*	1.149*	1.212*	1.468	1.372
All other trips	1.211	1.211	1.211	1.468	1.372

* growth factor calculated by TEMPRO

In order to avoid double counting of trips the TEMPRO planning data must be adjusted for each of the option tests. The TEMPRO planning data was reduced by the appropriate number of dwellings or number of employees depending on the option to be tested. The number of employees was estimated during the trip generation process using the TRICS database. This was done by calculating an average employee per GFA ratio using the same site surveys that produced the trip rates. The adjusted planning data in TEMPRO produced the following growth factors.

Table 5 Adjusted TEMPRO growth factors

Site	UC1	UC2	UC3
Base	1.125	1.149	1.212
A	1.112	1.146	1.198
D	1.114	1.147	1.200
E	1.116	1.147	1.203
F	1.115	1.147	1.201
G1 / H1	1.079	1.063	1.163
G2 / H2	1.067	1.041	1.151

The other growth factors remained the same for all of the option testing.

2.4 Trip distribution

The matrix forecasting process factored up the 2008 base matrices to 2026 with the appropriate adjustment in growth for each scenario. The development trips were then added to the appropriate growthed matrix in the form of point zones. Each development required a trip distribution which was obtained by the use of parent zones. A parent zone was selected for each site which had similar land use and was located close to the site. The development trips were allocated to a user class in the same ratio as the parent zone and then distributed with the same user class distribution. The parent zones used for distribution are given in Table 6 below.

Table 6 Parent zones used for trip distribution for each development site

Site	Parent Zone	Description
A	260	Residential area bounded by Flaxley Street and Charles Street
D	230	Residential area of Barlby Road
E	130	Residential area either side of Parkways, east of A19 Doncaster Road
F	100	Residential area north of Green Lane, west of A19 Doncaster Road
G/H	175	Point zone representing industrial area on East Common Lane

A total of 9 points zones were created to represent the development sites. Sites A, D, and G had two point zones to simulate two separate loading points of trips onto the existing road network. Where a site had two loading points equal number of trips with

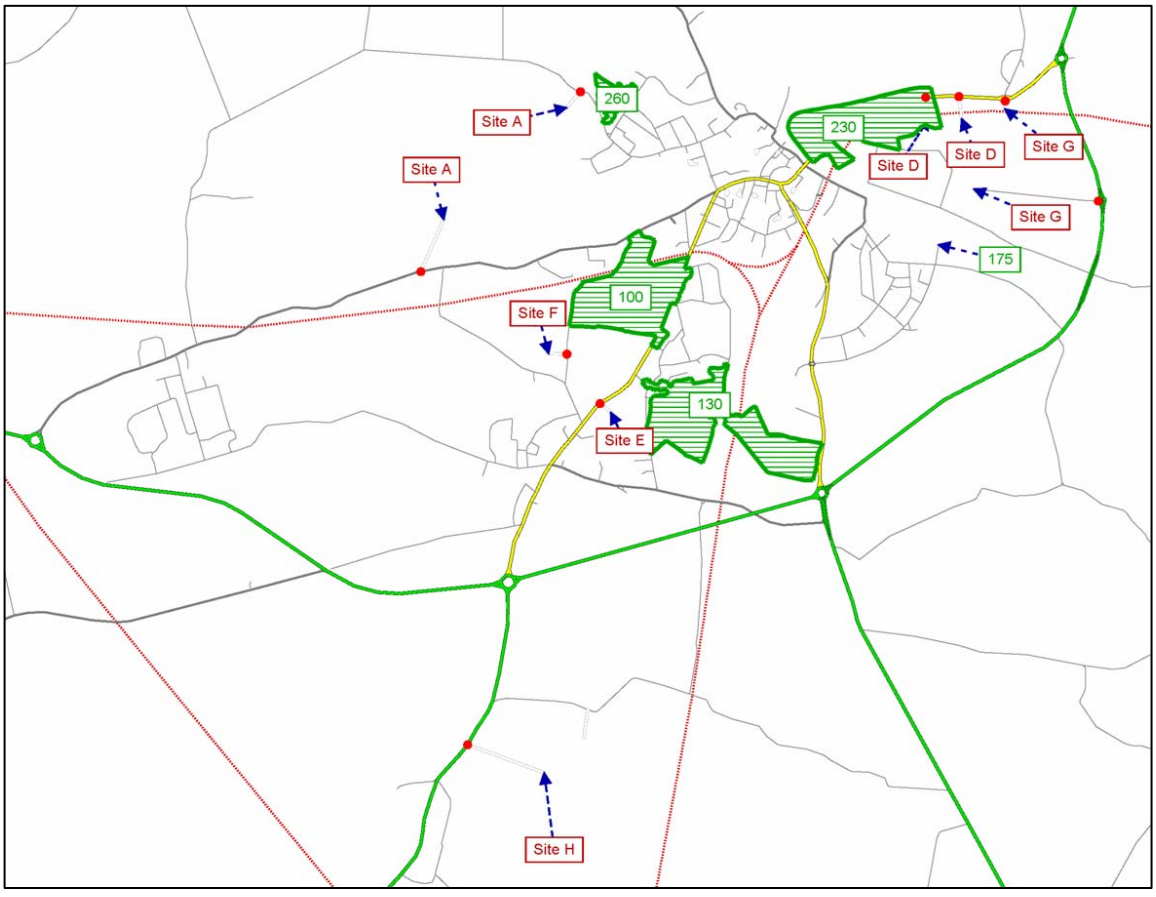
the same distribution were loaded at each point. At this stage of assessment there was no modelling of any internal development site road network. The loading point(s) for each development site is given in Table 7 below.

Table 7 Location of loading points

Site	Loading point(s)
Site A	Leeds Road, west of Sandhill Lane junction, and Flaxley Lane, north of Deeping Way junction
Site D	Two loading points on Barlby Road between Olympia Crescent and A19 / Barlby Road roundabout
Site E	Doncaster Road, between Baffam Lane and Fox Hill Lane
Site F	Foxhill Lane, between Brackenhill Lane and Green Lane
Site G	New arm on A19 / Barlby Road roundabout, and A63 at Potters roundabout
Site H	A19, between Burn village and Common Lane

The location of the point zones, loading points and parent zones used for trip distribution are shown in Figure 3 below.

Figure 3 Location development zones, loading points and parent zones



2.5 Network changes

To allow for the development trips to be loaded onto the network, links were created that connected the development point zone to the relevant loading point in the network. The loading points had been suggested by SDC and agreed by the Highway Authority. Where the trips joined the network an uncontrolled node was used.

Sites D and E required some minor changes to the network. Site D required Recreation Road to be closed and Site E required closure of the northern side of Baffam Lane.

Site G required an additional arm to be added to the A19 Barlby Road roundabout for access to the site.

2.6 Option testing

2.6.1 Junction assessment

The eight development scenarios and the do minimum base scenario were individually tested using the Selby VISUM model. The flows and turning movements from each of these models were exported to junction modelling software for detailed junction analysis. Arcady software was used to assess the roundabouts and LINSIG software to assess the signalised junctions. The junctions selected for analysis are listed below along with four level crossings which were analysed within the VISUM model.

Roundabouts

1. A63 / A19 North
2. A19 / Barlby Road / Site G access
3. A63 / Site G access
4. A63 / A1041 Bawtry Road
5. A1041 Bawtry Road / Abbotts Road
6. A63 / A19 Doncaster Road
7. A63 / Leeds Road

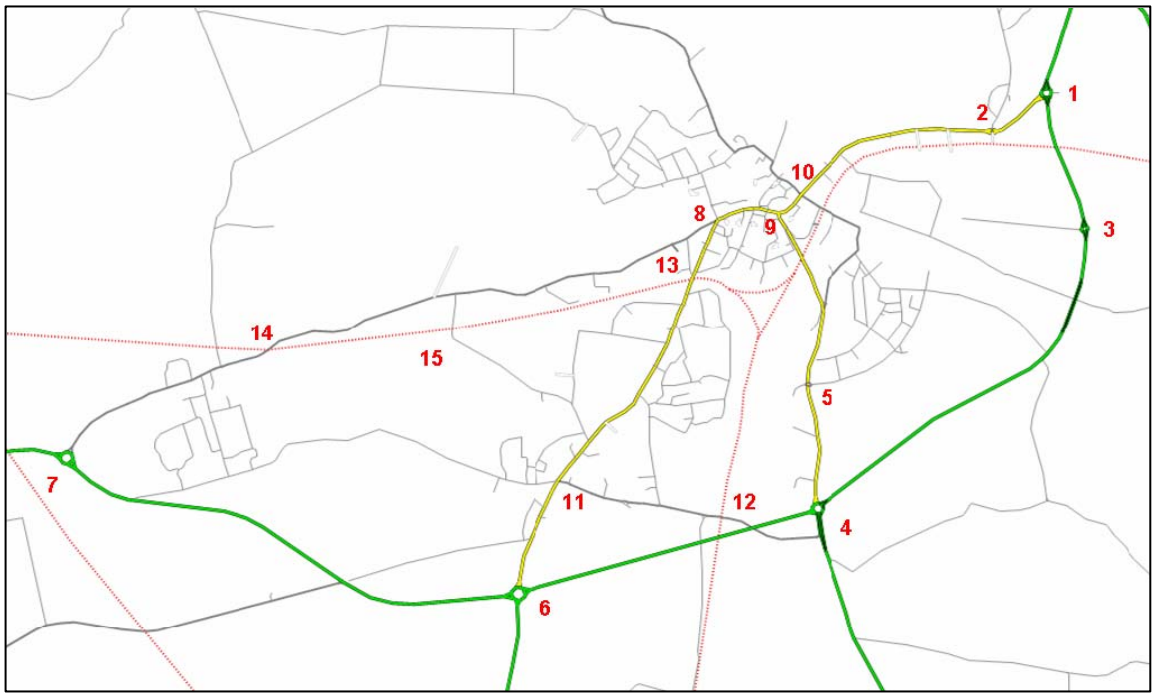
Signals

8. Gowthorpe / Scott Road / Brook Street
9. The Crescent / Park Street
10. Barlby Road / Ousegate / New Street / Water Hill Lane
11. Doncaster Road / Brayton Lane / Barff Lane

Level Crossings

12. Brayton Lane
13. Doncaster Road
14. Leeds Road
15. Sandhill Lane

Figure 4 Key roundabout and signalised junctions selected for assessment



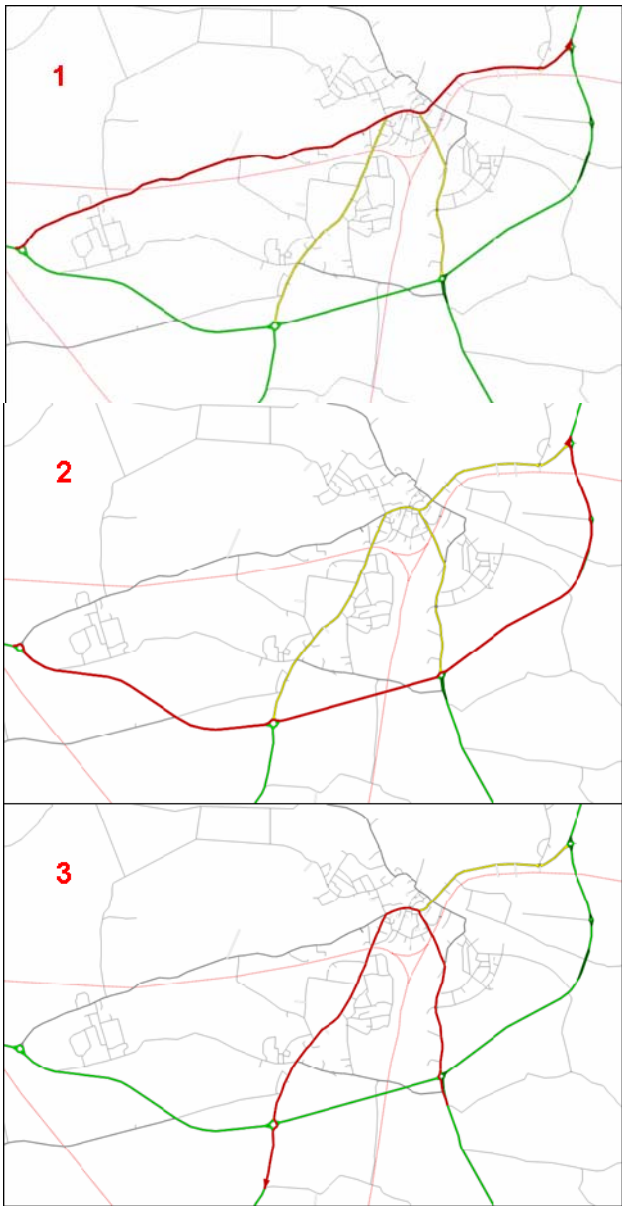
2.6.2 Journey times

Three journey routes were selected for assessment. These were the same as those used in the model validation process. The routes were:

1. A63 Hambleton Rail Bridge – Leeds Road – Gowthorpe - Barlby Road – A63 Hull Road/A19 Barlby By-Pass Junction
2. A63 Hambleton Rail Bridge – A63 Selby By-Pass - A63 Hull Road/A19 Barlby By-Pass Junction
3. A19 Doncaster Road/ Common Lane Junction – A19 Brook Street – Gowthorpe – A1041 Bawtry Road – A1041 Bawtry Road/ Thief Lane Junction

All journey routes selected are bi directional, given a total of six journey times per scenario for comparison. The journey routes are highlighted in red within Figure 5 below.

Figure 5 Journey routes selected for assessment



3 RESULTS

3.1 Introduction

This chapter provides the results of the option testing. The impact of each development option on key junctions and journey routes has been assessed and a comparative study between the results undertaken. A summary of the findings from the option testing is given for junction and journey times followed by a detailed description of traffic behaviour in each development option.

The comparative studies consider the impacts of the housing and employment developments separately.

In should be noted that each option has been tested in isolation and that at this stage the potential cumulative impact has not been assessed.

3.2 Junction assessment

3.2.1 Housing

Roundabouts

The results of the Arcady testing for key roundabout junctions are given in Table 8. The junctions were also analysed under 2008 base conditions and these results are included. The results presented show the maximum Ratio of Flow to Capacity (RFC) on any arm of the roundabout during the analysis period, i.e. PM peak 1700 – 1800. The maximum RFC for each junction is highlighted in **bold**.

Table 8 Maximum RFCs of roundabouts for housing developments

No.	Roundabout	2008 Base	2026 Base	Site A	Site D	Site E	Site F
1	A63 / A19 North	0.404	0.502	0.512	**0.641**	0.509	0.504
2	A19 / Barlby Rd / Site G	0.519	0.573	0.579	**0.64**	0.566	0.596
3	A63 / Site G	0.327	0.44	0.467	**0.547**	0.45	0.443
4	A63 / A1041 Bawtry Rd	0.486	0.625	0.626	0.603	0.626	**0.636**
5	A1041 Bawtry Rd / Abbotts Rd	0.66	0.717	0.699	0.697	**0.769**	0.719
6	A63 / A19 Doncaster Rd	0.296	0.373	0.377	**0.387**	0.373	0.378
7	A63 / Leeds Rd	0.245	0.302	0.305	0.301	**0.353**	0.302

The results show that all of the roundabouts operate within capacity for all options tested. A roundabout can be considered to be operating with a very low likelihood of delays or queues occurring if the RFC is less than 0.85. The highest RFC is 0.769 which occurs at A1041 Bawtry Road / Abbotts Road during testing of Site E. This junction produces the highest RFCs for all options yet it is unlikely that any significant queues or delays will occur.

Site A produces that highest number of housing trips yet has the least impact of all the housing options on the roundabouts as it does not result in the largest RFC for any junction. This is due to the location of Site A in to the north of the town centre which is further away from the roundabouts than all of the other sites. Trips from Site A are well

distributed by the time they reach the roundabouts which results in a series of RFCs that are not much different from the base case for all junctions.

Site D produces the highest RFCs for the three roundabouts in the north east of the model (i.e. A63 bypass and Barlby Road) which reflects the proximity of the development to the bypass.

Signals

The results of the LINSIG testing for key signalised junctions are given in Table 9. The results presented show the maximum Ratio of Flow to Capacity (RFC) on any arm of the junction during the analysis period, i.e. PM peak 1700 – 1800. RFCs between 0.85 and 1 are shown in orange, and RFCs greater than 1 in red. As above the maximum RFC for each junction is highlighted in **bold**.

Table 9 Maximum RFCs of signalised junction for housing developments

No.	Junction	2008 Base	2026 Base	Site A	Site D	Site E	Site F
8	Gowthorpe / Scott Rd / Brook St	0.872	1.036	**1.182**	1.000	1.112	1.105
9	The Crescent / Park St	0.683	0.794	0.856	0.812	**0.876**	0.825
10	Barlby Rd / Ousegate / New St / Water Hill Ln	0.865	0.988	**1.122**	1.023	1.011	1.012
11	Doncaster Rd / Brayton Ln / Barff Ln	0.556	0.684	0.699	0.646	**0.953**	0.752

The results show that the signalised junctions at Gowthorpe / Scott Road / Brook Street and Barlby Road / Ousegate / New Street / Water Hill Lane operate over capacity (RFC greater than 1) for all of the housing development options tested. The junction of The Crescent / Park Street operates under capacity but close to the RFC threshold value of 0.85 for all options. The remaining junction, Doncaster Road / Brayton Lane / Barff Lane, operates under capacity but the RFC is very close to 1 for Site E which loads development trips onto the network close to that junction.

Level crossings

The results of the level crossing analysis are given in Table 10. The results presented show the percentage change in total vehicle delay at the crossings compared to the 2026 Base model. All level crossings were modelled as being down for 15 minutes in the hour. Total delay reductions greater than 5% are shown in green and journey time increases greater than 5% are shown in red.

Table 10 Total delay at level crossings for housing developments compared to 2026 Base model

No.	Level crossing	2026 Base (hr)	Site A	Site D	Site E	Site F
12	Brayton Lane	3.5	2%	0%	-8%	18%
13	Doncaster Road	14.4	-1%	-17%	18%	33%
14	Leeds Road	2.4	16%	3%	1%	9%
15	Sandhill Lane	0.1	199%	2%	77%	285%

The level crossing with the greatest delay is Doncaster Road. Site D reduces delays at this level crossing by 17% and is the only option that produces a reduction in delays over all four level crossings. This is due to the site's proximity to the Barlby Road and Bawtry Road which ensures that traffic can have access without the need to pass through level crossings. The option that produces the greatest increase in total delay was Site F. It is situated between Leeds Road and Doncaster Road and thus it is difficult to for traffic to access the site without passing through a level crossing. Sandhill Lane produces large percentage increases for Site A, E and F but has very low overall delay in each scenario due to the lack of vehicles using this route in the model.

3.2.2 Employment

Roundabouts

The results of the Arcady testing for key roundabout junctions are given in Table 11. The junctions were also analysed under 2008 base conditions and these results are included. The results presented show the maximum Ratio of Flow to Capacity (RFC) on any arm of the roundabout during the analysis period, i.e. PM peak 1700 – 1800. The maximum RFC for each junction is highlighted in **bold**.

Table 11 Maximum RFCs of roundabouts for employment developments

No.	Roundabout	2008 Base	2026 Base	Site G1	Site G2	Site H1	Site H2
1	A63 / A19 North	0.404	0.502	0.553	**0.562**	0.518	0.524
2	A19 / Barlby Rd / Site G	0.519	0.573	0.661	**0.725**	0.516	0.512
3	A63 / Site G	0.327	0.44	0.596	**0.636**	0.461	0.503
4	A63 / A1041 Bawtry Rd	0.486	0.625	0.619	0.616	0.706	**0.736**
5	A1041 Bawtry Rd / Abbotts Rd	0.66	0.717	0.679	0.687	**0.796**	0.788
6	A63 / A19 Doncaster Rd	0.296	0.373	0.384	0.399	0.572	**0.683**
7	A63 / Leeds Rd	0.245	0.302	0.296	0.295	0.331	**0.349**

The results show that all of the roundabouts operate within capacity for all options tested. Site G produces the highest RFCs for the three roundabouts in the north east of the model (i.e. A63 bypass and Barlby Road) which reflects the proximity of the development to the bypass. Site H produces the highest RFCs for the remaining roundabouts due it's location to the south of Selby. The highest RFC for each scenario occurs at A1041 Bawtry Road / Abbotts Road and the lowest RFC for each scenario occurs at A63 / Leeds Road.

Signals

The results of the LINSIG testing for key signalised junctions are given in Table 12 below. The results presented show the maximum Ratio of Flow to Capacity (RFC) on any arm of the junction during the analysis period, i.e. PM peak 1700 – 1800. RFCs between 0.85 and 1 are shown in orange, and RFCs greater than 1 in red. As above the maximum RFC for each junction is highlighted in **bold**.

Table 12 Maximum RFCs of signalised junction for employment developments

No.	Junction	2008 Base	2026 Base	Site G1	Site G2	Site H1	Site H2
8	Gowthorpe / Scott Rd / Brook St	0.872	1.036	1.083	1.116	1.127	**1.210**
9	The Crescent / Park St	0.683	0.794	0.853	**0.858**	0.844	0.851
10	Barlby Rd / Ousegate / New St / Water Hill Ln	0.865	0.988	1.130	**1.255**	0.997	1.048
11	Doncaster Rd / Brayton Ln / Barff Ln	0.556	0.684	0.690	0.716	0.927	**1.063**

The results show that the signalised junction at Gowthorpe / Scott Road / Brook Street operates over capacity (RFC greater than 1) for all of the employment development options tested. The junction at Barlby Road / Ousegate / New Street / Water Hill Lane operates over capacity in three of the modelling scenarios, and the RFC is just under 1 for Site H1 (0.997). The signalised junction at Doncaster Road / Brayton Lane / Barff Lane operates under capacity for both Site G options. The development trips in the Site H scenarios result in the RFC rising and the junction is over capacity for Site H2 and over the RFC threshold of 0.85 for Site H1.

Level crossings

The results of the level crossing analysis are given in Table 13. The results presented show the percentage change in total vehicle delay at the crossings compared to the 2026 Base model. All level crossings were modelled as being down for 15 minutes in the hour. Total delay reductions greater than 5% are shown in green and journey time increases greater than 5% are shown in red.

Table 13 Total delay at level crossings for employment developments compared to 2026 Base model

No.	Level crossing	2026 Base (hr)	Site G1	Site G2	Site H1	Site H2
12	Brayton Lane	3.5	5%	7%	12%	18%
13	Doncaster Road	14.4	-9%	-3%	30%	49%
14	Leeds Road	2.4	8%	12%	14%	14%
15	Sandhill Lane	0.1	-3%	-4%	63%	102%

Site H produces increases in delays at all of the level crossings analysed. The greatest increase in delays is at the Doncaster Road level crossing with an increase of 49% for Site H2. Site H can in theory be accessed avoiding the level crossings but the delays are not large enough to encourage mass rerouting. Site G produces slight reduction in delays at the Doncaster Road level crossing reflecting a shift of traffic to the bypass thus avoiding the level crossing. Sandhill Lane produces large percentage increases for Site H but has very low overall delay in each scenario due to the lack of vehicles using this route in the model.

3.3 Journey times

3.3.1 Housing

The time taken for each user class to travel in each direction along the routes outlined in Section 2.6.2 was extracted directly from the VISUM model for each user class. UC1 – 4 (cars and LGVs) produced the same journey times for all options, UC5 (HGVs) only produced different journey times on route 2, along the Selby bypass. To simplify the analysis only the journey times for UC1 – 4 are compared for each option. The journey times are compared to those for the 2026 Base model and the percentage differences are given in Table 14. Journey time reductions greater than 5% are shown in green and journey time increases greater than 5% are shown in red.

Table 14 Journey times for housing developments compared to 2026 Base, user classes 1 – 4

Route No	Direction	2026 Base (s)	Site A	Site D	Site E	Site F
1	Eastbound	922	7%	7%	1%	5%
1	Westbound	1020	18%	-8%	13%	21%
2	Eastbound	465	0%	2%	0%	0%
2	Westbound	498	1%	8%	1%	0%
3	Eastbound	797	2%	-4%	9%	4%
3	Westbound	708	3%	-4%	7%	4%

The results show that there are only three journey routes that show a reduction in journey times from the 2026 Base. All of these occur when modelling Site D which is attributable to its location close to the bypass thus reducing trips through the town centre yet increasing them westbound on the bypass.

The largest increases in journey times on the bypass occur when modelling Site D and Site E has the greatest impact on the southern radial routes. Sites A, E and F produce increases in Route 1 westbound journey times reflecting the congestion at the town centre signalised junctions and the lack of route choice for both development and non development trips.

3.3.2 Employment

As for the journey time analysis for housing developments, only journey times for UC1 – 4 have been analysed for employment development scenarios. The journey times are compared to those for the 2026 Base model and the percentage differences are given in Table 15. Journey time reductions greater than 5% are shown in green and journey time increases greater than 5% are shown in red.

Table 15 Journey times for employment developments compared to 2026 Base, user classes 1 – 4

Route No	Direction	2026 Base (s)	Site G1	Site G2	Site H1	Site H2
1	Eastbound	922	4%	18%	5%	6%
1	Westbound	1020	-8%	6%	5%	-2%
2	Eastbound	465	3%	5%	4%	8%
2	Westbound	498	12%	17%	3%	6%
3	Eastbound	797	0%	4%	80%	88%
3	Westbound	708	0%	3%	8%	16%

The largest increase in journey times occur on Route 3 eastbound when modelling Site H. The majority of these increases occur at the start of the route at the A63 / A19 Doncaster Road roundabout. Arcady results given in Table 11 have shown that while the RFC of this junction increases relative to the base it still operates within capacity. The strategic modelling software package, VISUM, does not have a roundabout model and thus a series of give ways are used to code these junctions. This is a reasonable approach but it will tend to over estimate delays at increased flows. The increase in delays on Route 3 eastbound ignoring the roundabout are actually around 25%. Site H has the greatest impact on Route 3 given its location south of the A63 bypass.

Journey times on the bypass (Route 2) increase for all employment sites. The greatest journey time increases on the bypass occur westbound when modelling Site G. Site G has the effect of moving vehicles from Doncaster Road and Bawtry Road onto the bypass.

Site G2 also produces the greatest increase in journey times for Route 1. This is due to the site's access point on Barlby Road creating additional delays.

3.4 Site A

3.4.1 Description

Site A is the largest of all the housing developments with 1,000 dwellings and thus produces the greatest number of trips, 537 in the PM peak period. The site is located to the north west of the town centre and is accessed from Leeds Road and Flaxley Road.

3.4.2 Flows

The impact of this development is to produce an additional (compared to 2026 Base) 200 total trips on Leeds Road from the site access to the town centre and an additional 200 total trips on Flaxley Road and Water Hill Lane. The distribution of development trips is mainly to the north west and north east of the town centre, this has the effect of diverting more vehicles onto the bypass to access the town from Denison Road.

3.4.3 Junctions

Site A operates with the signalised junctions at Gowthorpe / Scott Road / Brook Street and Barlby Road / Ousegate / New Street / Water Hill Lane over capacity. Development trips from the Leeds Road access affect the former and development trips from Flaxley Road affect the latter. Delays also increase at the level crossing on Leeds Road.

3.4.4 Journey times

Site A increases the time taken to complete Route 1 in a westbound direction and this is attributable to the development trips travelling from the through the town centre to enter the site via Leeds Road. Other increases in time occur on Route 3 but this is only caused by the development traffic in the town centre, i.e. along Gowthorpe. Site A has little effect on the rest of this route.

3.4.5 Feasibility

The location of Site A has the potential to cause traffic congestion in the town centre and will require modification of the signalised junctions along Gowthorpe to Barlby Road to accommodate the additional flow. Traffic from the north east may avoid entering the town via Barlby Road due to this increased congestion.

3.5 Site D

3.5.1 Description

Site D is the second largest of all the housing developments with 800 dwellings and produces 470 trips in the PM peak period. The site is located to the east of the town centre and is accessed from two points along Barlby Road.

3.5.2 Flows

The impact of this development is to produce an additional 400 trips on Barlby Road in the vicinity of the site access points. This has the effect of forcing around 200 vehicles from the north east onto the bypass away from Barlby Road. This also reduces southbound flows on Doncaster Road as vehicles use the bypass instead. In this option Recreation Road has been closed to through traffic and this increases traffic flow on Dennison Road and Hull Road. The distribution of development trips is quite evenly spread across Selby town, with further trips coming from the north east on the A19.

3.5.3 Junctions

Site D operates with the signalised junctions at Gowthorpe / Scott Road / Brook Street and Barlby Road / Ousegate / New Street / Water Hill Lane over capacity. Development trips from Barlby Road access points affect these junctions. The reduction in flows on Doncaster Road means that delays at the level crossing are also reduced.

3.5.4 Journey times

Site D increases the time taken to travel eastbound on Route 1 due to the development access points on Barlby Road which forces more traffic onto the bypass and thus increases Route 2 journey times in both directions. Journey times on Route 3 are reduced as more vehicles are using the bypass to avoid the town centre.

3.5.5 Feasibility

The location of Site D has the potential to cause traffic congestion in the town centre and will require modification of the signalised junctions along Gowthorpe to Barlby Road to accommodate the additional flow. However its proximity to the bypass results in reduced vehicles on Doncaster Road and Bawtry Road and large reduction in delays at Doncaster Road level crossing.

3.6 Site E

3.6.1 Description

Site E is the smallest of all the housing developments with 650 dwellings and produces 382 trips in the PM peak period. The site is located to the south of the town centre and is accessed from one point on Doncaster Road.

3.6.2 Flows

The impact of this development is to produce an additional 400 trips on Doncaster Road and an additional 300 on the western end of Brayton Lane. This is attributable to the location of the development attracting trips to that vicinity and the effect of closing Baffam Lane to through traffic between Doncaster Road and Brayton Lane. Traffic that normally used Baffam Lane is now forced to go through the Doncaster Road / Brayton Lane / Barff Lane junction. The distribution of development trips is split between trips to Selby town and to the west along the bypass and beyond. This distribution provides an additional 100 trips on the bypass between Leeds Road and Doncaster Road junctions.

3.6.3 Junctions

Site E operates with the signalised junctions at Gowthorpe / Scott Road / Brook Street and Barlby Road / Ousegate / New Street / Water Hill Lane over capacity. This is due to development trips accessing from Gowthorpe and other vehicles using Bawtry Road that would normally have used Baffam Lane. The junction of Doncaster Road / Brayton Lane / Barff Lane operates just under capacity but well above the acceptable threshold limit of 0.85. Again this is due to the Baffam Lane closure which also increases delays at Doncaster Road level crossing but reduces them at Brayton Lane level crossing.

3.6.4 Journey times

Site E increases the time taken to travel both directions on Route 3 due to the development access points on Doncaster Road and the closure of Baffam Lane which forces more traffic onto both Doncaster Road and Bawtry Road.

3.6.5 Feasibility

The location of Site E has the potential to cause traffic congestion in the town centre and will require modification of the signalised junctions along Gowthorpe to Barlby Road to accommodate the additional flow. The closure of Baffam Lane puts the junction of junction of Doncaster Road / Brayton Lane / Barff Lane close to capacity and increases the journey time on the two key southern radials into Selby.

3.7 Site F

3.7.1 Description

Site F is the second smallest of all the housing developments with 750 dwellings and produces 440 trips in the PM peak period. The site is located to the south west of the town centre and is accessed from one point on Foxhill Lane.

3.7.2 Flows

The impact of this development is to produce an additional 150 vehicles using the northern end of Doncaster Road and an additional 90 vehicles using Brayton Lane. Development trips accounts for nearly all of these additional trips. The trip distribution is very evenly spread across Selby and for this reason it does not appear that there is much switching of routes to avoid development traffic.

3.7.3 Junctions

Site F operates with the signalised junctions at Gowthorpe / Scott Road / Brook Street and Barlby Road / Ousegate / New Street / Water Hill Lane over capacity. Development trips towards Barlby Road affect these junctions. The development trip distribution causes large increases at the level crossing points on Doncaster Road and Brayton Lane.

3.7.4 Journey times

Site F has no impact on Route 2 journey times. It does increase journey times on both Routes 1 and 3. The increases are of the same proportion in each direction reflecting the even distribution through the town centre.

3.7.5 Feasibility

The location of Site F has the potential to cause traffic congestion in the town centre and will require modification of the signalised junctions along Gowthorpe to Barlby Road to accommodate the additional flow. The location of Site F results in the greatest increase in delays at the three level crossings analysed. There is also the potential for development trips to use the level crossing on Sandhill Lane.

3.8 Site G1 / G2

3.8.1 Description

Site G is located to the north east of the town centre with access points onto Barlby Road and the A63 Selby bypass. Site G1 produces 1,064 trips and Site G2 produces 1,568 trips in the PM peak period.

3.8.2 Flows

The impact of these developments is to produce an additional 550 (G2) and 400 (G1) total trips on the bypass from Barlby Road roundabout past the site access to East Common Lane. The majority of this increase is due to development trips accessing the site but there is some transfer of trips from Doncaster Road and Bawtry Road to the bypass. This transfer can be attributed to vehicles avoiding a more congested town centre. This also accounts for an increase in vehicles using Wistow Road to access the town from the north (300 trips for G2, 200 for G1), thus avoiding Barlby Road and the Barlby Road / Ousegate / New Street / Water Hill Lane signalised junction.

3.8.3 Junctions

Site G1 and Site G2 both operate with the signalised junctions at Gowthorpe / Scott Road / Brook Street and Barlby Road / Ousegate / New Street / Water Hill Lane over capacity. This is due to development trips accessing the site via Barlby Road causing additional flow to pass through the town centre and cause congestion. The transfer of trips from Doncaster Road to the bypass cause overall delays to fall at the Doncaster Road level crossing.

3.8.4 Journey times

Site G1 and Site G2 both increase journey times in each direction for Route 2. The westbound journey time increases are greater than those eastbound which can be attributed to the time of day modelled resulting in more vehicles leaving the site than entering it. The largest increase is produced by Site G2 for Route 1 westbound which reflects the increased congestion in the town centre due to the distrbution of development trips. Site G1 has no impact on Route 3 travel times whereas they increase in both directions with Site G2.

3.8.5 Feasibility

The location of Site G has the potential to cause traffic congestion in the town centre and will require modification of the signalised junctions along Gowthorpe to Barlby Road to accommodate the additional flow. As with housing Site D its proximity to the bypass results in reduced vehicles on Doncaster Road and Bawtry Road and reduction in delays at Doncaster Road level crossing.

3.9 Site H1 / H2

3.9.1 Description

Site H is located to the south of the bypass on the Burn Airfield site. It has been modelled with one access onto the A19 south of the junction with Common Lane. Site H1 produces 1,064 trips and Site H2 produces 1,568 trips in the PM peak period.

3.9.2 Flows

The impact of these developments is to produce additional trips on Doncaster Road, and the bypass. Total flow on Doncaster Road in the vicinity of the A63 bypass roundabout increases by 580 (H2) and 380 (H1). Total flow on the bypass from Doncaster Road to Barlby Road increases by 440 (H2) and 270 (H1). Flows increase on Bawtry Road due to development trips using it as an alternative route to the town centre. Flows on Barlby Road reduce in both scenarios reflecting the increased use of the bypass to access the development. Long range trips from the south which access Selby via the A19 and Doncaster Road are now doing so via the A63 and Leeds Road to avoid the development trips on the A19.

3.9.3 Junctions

Site H1 and Site H2 both operate with the signalised junction at Gowthorpe / Scott Road / Brook Street over capacity. This is due to the increase of flows on Doncaster Road. The signalised junction at Barlby Road / Ousegate / New Street / Water Hill Lane is pushed close to capacity by Site H1 and over capacity by Site H2. The signalised junction at Doncaster Road / Brayton Lane / Barff Lane operates over capacity when Site H2 is modelled. There are large increases in delays at the Doncaster Road level crossing.

3.9.4 Journey times

Site H1 and Site H2 produce increases in journey times for all routes except Route 1 westbound which shows a small reduction when Site H2 is modelled. The largest increases in journey times are on Route 3 eastbound caused by the number of development trips heading north on Doncaster Road. Journey times also increase in the other direction on Route 3 with twice the increase for Site H2 compared to Site H2. Journey times on the bypass, Route 2, show similar increases in both directions.

3.9.5 Feasibility

The location of Site H has the potential to cause traffic congestion in both the town centre and along Doncaster Road and will require modification of the signalised junctions along Gowthorpe to Barlby Road and at Doncaster Road / Brayton Lane / Barff Lane to accommodate the additional flow.

4 CONCLUSIONS

4.1 Housing

When tested in isolation all the housing developments tested resulted in the signalised junctions at Gowthorpe / Scott Road / Brook Street and at Barlby Road / Ousegate / New Street / Water Hill Lane in Selby town centre operating over capacity. Modifications are required to the town centre traffic management to cope with the additional trips any of the housing developments will bring.

The roundabouts tested all coped comfortably with the additional trips provided by the developments. There is therefore scope to attempt to divert traffic from the congested town centre to make more use of the bypass. In almost all of the scenarios tested development traffic accessed the sites via the town centre rather than the bypass.

Only Site D resulted in a reduction in overall delays at the four level crossings analysed. Any potential change to the down time of these crossings is therefore a key factor to consider when choosing the preferred option.

4.2 Employment

When tested in isolation all the employment developments tested resulted in the signalised junction at Gowthorpe / Scott Road / Brook Street in Selby town centre operating over capacity. The signalised junction at Barlby Road / Ousegate / New Street / Water Hill Lane operated over capacity for all developments apart from Site H1. Modifications are required to the town centre traffic management to cope with the additional trips the employment developments will bring.

The roundabouts tested all coped comfortably with the additional trips provided by the developments. There is therefore scope to attempt to divert traffic from the congested town centre to make more use of the bypass.

Only Site G1 resulted in a reduction in overall delays at the four level crossings analysed. In contrast Sites H1 and H2 resulted in increases in overall delays of 25% and 39% at the three level crossings. Any potential increase to the down time of these crossings will affect the suitability of Site H as the location to site employment development.

4.3 Phase 2 Testing

Phase 2 of the Option Testing will entail more detailed assessment of two preferred options, one housing and one employment, tested together as opposed to the isolated analysis carried out in this study.

The employment sites produce a higher number of trips than the housing sites and thus it may be a logical step to choose the preferred employment site before the housing site. The analysis presented above would suggest that a combination of Site G for employment and Site D for housing would be the choice with the least impact on traffic in Selby. However as both sites are located beside each other, the traffic impacts on the town centre junctions and bypass roundabouts may well be more severe than anticipated. In this case selection of another housing site to combine with Site G would provide a more widespread impact across the model.

Whichever options are taken forward for Phase 2 testing it has been shown that there is the need for network improvements to increase capacity at junctions in the town centre if the developments are to be built to the size and with the land use splits specified in this report.

APPENDIX A FLOW DIAGRAMS

APPENDIX B TRIP DISTRIBUTION FROM NEW DEVELOPMENTS

APPENDIX C DIFFERENCE NETWORKS

APPENDIX D JUNCTION ANALYSIS - ROUNDABOUTS

APPENDIX E JUNCTION ANALYSIS – SIGNALS

APPENDIX F TRIP GENERATION