Harborough District Council

Local Development Framework Transport Study

Addendum Report

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November 2009

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1 Introduction

Arup have been commissioned by Harborough District Council to undertake a Strategic Transport Assessment of alternative options for the distribution of development in the Leicester Urban Fringe. Various options for the distribution of development are being considered for the emerging Local Development Framework Core Strategy. The current study will form part of the evidence base which informs the selection of a preferred option by the Council.

The current commission is an addendum study to a previous investigation completed by Arup in May 2009 for Harborough District Council and Oadby & Wigston Borough Council. This earlier commission examined the potential collective transport implications arising from development under each authority's respective Local Development Frameworks. The methodology and assumptions used in the current study are consistent with those used during the May 2009 study.

This report sets out the findings of the addendum study, which is based on four tests undertaken using the Central Leicestershire Traffic Model (CLTM). These have been used to inform an assessment of the potential scale of transport impacts of which could result from alternative development scenarios within the eastern Leicester Urban Fringe area. The tests examine alternative distributions for development within Harborough District which could be delivered under two of Harborough District Council's Local Development Framework Core Strategy options, namely:

- **Option 3:** 2420 dwellings (65%) at Leicester PUA, 1300 (35%) at Market Harborough, elsewhere affordable housing only (where local need is demonstrated).; and
- **Option 5:** 1305 dwellings (35%) at Leicester PUA, 1305 (35%) at Market Harborough and 1120 (30%) in remainder of District.

The tests inform a high level assessment of the impact of different overall levels of development. The tests have also been structured so as to inform an assessment of the potential implications of higher development distributions to the north or south of the A47, (which bisects the Leicester Urban Fringe Area within Harborough District).

2 Potential locations for development

A plan showing the study area is provided in Figure 1. The study area is delineated by the green highlighted 'Areas of Search' used to make working assumptions about the location of potential development within the study area. Traffic from these Areas of Search was assigned and distributed to the highway network in accordance with the existing traffic patterns (based on data from the corresponding CLTM zone).

The potential development sites considered within the study area are taken from the latest Strategic Housing Land Availability Assessment (SHLAA) information available to the study. This assessment, undertaken by Harborough District Council, considers the potential suitability of sites within the District for housing development. An extract of this database for the Urban Fringe Area is provided in Table 2.

The total number of potentially deliverable dwellings across all the potential development sites significantly exceeds the level of development required to be delivered by either of the two Core Strategy options. Development has therefore been assumed to be located within each of the areas of search (shown in Figure 1) up to the total level required. The basis of this allocation is the primary differential between the four tests undertaken in this study using the CLTM.

3 Key Assumptions & Tests

All assumptions in the current study regarding land uses, trip generation, distribution, mode share and accessibility to public transport for alternative development sites are carried forward from the May 2009 study (which should be referenced and read in conjunction with the report for the current study).

In order to ensure a robust assessment, the development in the remainder of Harborough District is assumed to occur up to the total level required by the East Midlands Regional Plan (March 2009) and is assumed to be located in the Areas of Search on the same basis as that used in the previous May 2009 study.

For comparative purposes it is assumed that the equivalent amount of employment land to be developed is allocated within Harborough District as that used in the previous studies for the assessment of transport impact on the PUA. In aggregate this amounts to nearly 21 Ha's employment distributed between Market Harborough and Lutterworth. The previous study identified that this level of employment development had the potential to generate significant local impacts and impacts on the M1 junction 20 and subsequently various alternative distributions of a total of 16.3 Ha's were assessed and found to generate less severe impacts. Nevertheless, in order to enable parity of assessment between the previous assessments of the Leicester PUA and to ensure robustness the higher level of employment was retained for the purposes of the current tests.

Similarly the same development levels and distribution of development as used previously for Oadby and Wigston Borough are also carried forward, in which 2250 dwellings (of which 1043 are assumed new) and 8.3Has of employment are delivered by 2026.

Table 1 summarises the total amount of housing development in Harborough District and Oadby & Wigston Borough which has been tested. This is based on the levels of development set out in the East Midlands Regional Plan Proposed Changes July 2008 document, which is slightly higher than that set out in the published Regional Plan. However, to ensure that the output of work undertaken during the current study is comparable with that undertaken during the previous study, the higher levels of development are retained. Policy 13a of the Regional Plan sets out that Local Authorities can test higher levels of development through their development plan documents.

Table 1: Development levels

	Proposed Changes to Regional Plan					Amount built / committed	Remaining to be allocated
	2001-2006 (per annum)	2006-2011 (per annum)	2011-2916 (per annum)	2016-2026 (per annum)	2001-2026 Total		
Region Total	18,655	21,105	22,055	21,865	527,725		
Leicester and Leicestershire HMA Total	3,230	4,060	4,050	4,030	97,000		
Harborough	340	440	380	300	8,800	5058	3742
Oadby and Wigston	90	90	90	90	2250	1207	1043

The CLTM available to the study is a 2016 AM peak future year model which Leicestershire County Council (in partnership with Leicester City Council) have developed to include all known committed development. This is used as a reference case in the study, against which the impacts of the further development are tested. It is assumed that all the built and committed development detailed in Table 1 is already included in the growth assumptions of the model and therefore only the remaining allocation levels are tested as additional development.

All testing has assumed 2026 levels of LDF development, but no further background growth beyond the 2016 reference case is applied and no interim development levels have been assumed.

3.1 Tests

The following summarises the key assumptions for each of the four tests undertaken using the CLTM.

3.1.1 Test 1

This test assumes 1300 new dwellings over the plan period to the HDC Urban Fringe in accordance with the Strategic Priorities and Public Transport accessibility scoring framework used in the previous study (as set out in Section 4). This equated to approximately 75% of dwellings being allocated to the A6 corridor and the remaining to the A47 corridor or north of the A47.

3.1.2 Test 2

This test assumes 2500 new dwellings over the plan period to the HDC Urban Fringe with a nominal 75% allocated to the A47 corridor and north of the A47 and the remaining 25% to the south (A6 Corridor). Development is allocated within these constraints based on the Strategic Priorities and Public Transport accessibility scoring framework used in the previous study.

3.1.3 Test 3

This test assumes 2500 dwellings over the plan period to the HDC Urban Fringe with all of these within the A47 corridor or to the north of the A47. Development is allocated within this constraint based on the Strategic Priorities and Public Transport accessibility scoring framework used in the previous study.

3.1.4 Test 4

This test assumes 1300 dwellings over the plan period to the HDC Urban Fringe with a nominal 75% allocated to the A47 corridor and north of the A47 and the remaining 25% to the south (A6 Corridor). Development is allocated within these constraints based on the Strategic Priorities and Public Transport accessibility scoring framework used in the previous study.

4 Strategic Priorities and Development Area Specific Scoring Framework

In common with the previous transport study an initial 'strategic' prioritisation of sites was undertaken, followed by a more detailed ranking based on public transport accessibility.

4.1 Strategic Assessment Framework

The first level of 'strategic' assessment undertaken is based on the development area locations. This uses a hierarchy ranging from the most desirable development location in terms of transport (a substantially previously developed site near an established public transport corridor or interchange within the Leicester Principal Urban Area), through to the least desirable (a location being removed from any significant established urban development on previously undeveloped land which is removed from an established public transport corridor). The hierarchy used is based on Policy 3 (Concentrating Development in Urban Areas) of the East Midlands Regional Plan Proposed Changes July 2008.

In total 12 hierarchical categories of development area were identified as set out in Table 3. Each potential development area considered in the study was classified on the basis of this hierarchy, resulting in a grouping of locations which reflected a 'top-down' policy lead approach.

Although each development area was assessed in further detail to determine relevant localised factors which would make one particular development area more suitable than another, this basic hierarchical priority was retained.

4.2 Development Area Specific Assessment Criteria

Potential development areas within each of the hierarchical categories remain varied in character and desirability for development in terms of transport impact. In order to take account of this, specific criteria are required so that the level of existing public transport service provision, road safety, air quality and congestion impacts can be considered at a more focused level commensurate with a specific assessment of transport issues.

Application of the specific criteria as a sub-set (subordinate) ensures that the overall priorities identified using the strategic assessment cannot be changed. This principle of staged assessment is considered appropriate and robust because adverse impacts can often be mitigated.

4.2.1 Public Transport

A scoring framework has been developed to assess the level of existing public transport service and accessibility which a potential development area benefits from. This was applied so as to rank an area with high levels of public transport accessibility as a more attractive area for development than one with lower levels of accessibility. Basing this assessment on existing service levels and patterns was considered appropriate in order to ensure development areas are integrated with existing provision. This approach can be expected to strengthen the economic viability of existing services and to help generate a critical mass of usage. In turn this is likely to assist with triggering further service quality enhancements that are beneficial to the wider community. The specific criteria developed to assess public transport are set out in Table 4.

4.2.2 Traffic Impact & Congestion

The potential impact of vehicular traffic from various development sites has been assessed by using Leicestershire County Council's Central Leicestershire Traffic Model (CLTM) which fully covers the Leicester Principal Urban Area (PUA).

4.2.3 Road Safety

Accident data was obtained from Leicestershire County Council (cluster sites and high priority routes) and plotted into a GIS system. Problem locations were identified from this exercise and compared to predicted areas of traffic generation as a result of potential new development areas. This exercise provided the opportunity to reallocate potential development areas so as to avoid exacerbating existing accident hot spots.

5 General Observations

The higher level of development in the PUA area proposed under Options 3 and 5 increases pressure on A6 and/or A47 corridors comparative to scenarios tested in previous work (which allocated the bulk of development to Market Harborough or other areas of Harborough District).

Nevertheless the impact in these corridors appears to be restricted. This is partly due to the existing significant congestion and traffic delays on these corridors. These conditions are expected to continue to be experienced in the 2016 future year reference case which the development scenarios have been compared against. One of the key results of this is that further development as tested in the current study causes a 'ripple' effect of delays across the PUA highway network. Whilst individually these impacts are of a relatively low level (with individual locations typically experiencing significantly less than a 10 second increased delay) the accumulative impact is more significant. The location of the more significant highway impacts is broadly consistent with the previous scenario testing:

- The A6 corridor in the vicinity of and on the approach to the outer ring
- The city centre southern side;
- The B582 circulatory route; and
- The outer ring in the vicinity of Fosse Park and Grove Triangle

Impacts in these areas are typically slightly increased as a result of higher development levels in the PUA proposed under Options 3 & 5 compared to the other Core Strategy Options. At a strategic level these key impact areas are less influenced by alternative distributions of development within Harborough District's PUA area than by the total level of development across both districts. Furthermore the performance of these areas in the future, even without the proposed levels of additional development, is likely to remain relatively congested.

Discussion with Leicester City Council and Leicestershire County Council Highways Officers during the study inception stage highlighted particular concern regarding the potential impact of additional development on the north eastern quadrant of the Leicester Outer Ring Road. A summary of impacts on all potential key junctions which might be directly impacted by the new development for this area and the south eastern quadrant of the PUA is included in Appendix 1. This highlights some flow increases, which were investigated further by examining the change in turning flows at effected junctions in the north eastern quadrant. The scale of demand flow increase arising from the proposed level of development in Harborough District and Oadby and Wigston Borough do not appear likely to cause significant impacts which could not be, at least in part, mitigated through localised improvement schemes (such as signal re-phasing, improved signal technology and controllers etc). However, it should be noted that the assessment undertaken has not included development assumptions for the Charnwood PUA area. These are understood to be significant and can be expected to add additional pressure to these junctions. Physical junction capacity mitigation opportunities are limited and the collective impact of all development in the PUA on this area merits further investigation, which it is understood is being undertaken by the local highway authorities.

The impact on total delay across all nodes of the modelled network (which represent junctions within a modelled network which covers the whole of the Leicester PUA highway network up to and including Loughborough) varies by less than 1% between all comparable development scenarios tested in this and the previous study. Nevertheless the higher range of impact is generated by scenarios which allocate the highest levels of development in the PUA.

The overall proposed approach to mitigation should remain the same as that set out in Section 9 of the previous report with a specific focus on:

- Smarter Choices and Travel Planning techniques to reduce the demand for car borne trips;

- Concentrating development and associated infrastructure investment where it can utilise existing public transport facilities and improve these in away which provides a wider benefit to the area and other transport users;
- Seeking to coordinate development gain to deliver strategically valuable improvements across the PUA area. These can in turn maximise the scope for mode shift and manage congestion impacts of existing trips and traffic behaviour in a way which can release capacity to support the accommodation of development growth.

Within the Harborough PUA area there are significant opportunities to deliver development off the A47 or A6 corridors. Within the Harborough PUA area the A6 corridor is typically better served by public transport and benefits from good linkages to Leicester Station. Public transport within the vicinity of A47 corridor is more focused within the residential areas to the north (Scraptoft area). Arguably there are greater opportunities to improve public transport accessibility directly along the A47 corridor than the A6 corridor as the A6 corridor is currently well served by a high frequency of buses. However, strategic improvements to existing bus interchange capacity and quality within the city centre, improved quality of services, improved circulating bus service provision and provision of strategic park & ride facilities on either corridor could equally benefit new development and provide significant wider benefits (which will in turn provide opportunities for mode shift which can allow new development traffic to be more readily accommodated).

Whilst the A6 corridor does benefit from an existing high frequency of buses, these services can be congested in the peak periods. Currently the ability to effectively increase service frequencies and to a lesser extent vehicle sizes is limited by poor interchange quality and capacity in the city centre. To realise a meaningful step change in provision which could underpin a strong SMARTER choices approach to the delivery of the new development in the A6 corridor measures to address both the capacity of services and the city centre interchange constraints would need to be explored. Such improvements would enable higher levels of sustainable travel behaviour (both from development in the PUA and in Market Harborough) to be accommodated, however, there will remain a residual level of private car trips which need to be accommodated without causing further significant constraints on public transport services using the same corridor. In conjunction with an investigation of the impact of development across the whole PUA a study of potential of a Park & Ride site would need to be undertaken. Such a facility would have potential to remove some existing traffic from the corridor as well as some development related traffic originating in Market Harborough or beyond. Further discussions with relevant highway authorities and detailed feasibility study would determine whether a Park & Ride would be financially feasible and whether land within Harborough District (potentially in conjunction with the development of a specific site) should be allocated to this use.

Major strategic public transport projects (Park & Ride, whole corridor improvements and major interchange improvements) are extremely costly both in terms of initial capital outlay and in ongoing revenue support. Revenue support for such projects is often required until sufficient commercial demand is established. Such schemes may not be economically sustainably or deliverable purely on the back of individual developments of the scale considered in the LDF options and set out in the SHLAA. It is likely that a coordination of resources drawn from multiple developments, Local Transport Plan, other local funding and potentially regional or national grants would be required to bring forward such mitigation.

6 Test Specific Observations

6.1 Test 1

Development in this test is first allocated to strategically high priority areas of search first, which are predominately in the Scraptoft area and directly off the A47. This area forms the highest strategic priority area because it falls within the Principal Urban Area (PUA) as defined by the East Midlands Regional Plan. However, the total capacity of these high strategic priority sites is limited. Based on the ranking system established in the previous report, the availability of key bus services to Leicester rail station and a relatively high frequency of existing bus services the next best locations for development on previously undeveloped land lie on the A6 corridor, principally in the Great Glen / Stretton Hall / Spring Hill Farm area. This area lies adjacent to the PUA. In this test some 75% of the total allocation of 1300 units is allocated to the A6 corridor. Resulting traffic impacts are only marginally worse than previously tested scenarios in which total new housing in Harborough's PUA area is restricted to some 624 units (plus committed development). This principally appears to be a function of the A6 remaining a key access corridor to the city, whether the development is allocated on the periphery of the PUA or further along the A6 at Market Harborough. Nevertheless, the higher level of allocation close the PUA results in some increased impacts in the PUA, which due to displacement effects are experienced at a low level across the south / eastern area of the PUA. These appear to arise from higher occurrences of longer distance eastern, western and northern trips to/from new development which would route more directly through the PUA, rather than the less congested non-urban routes which avoid it which would represent more attractive route choices should development be located at Market Harborough.

6.2 Tests 2 & 3

Both these tests allocate a significantly higher proportion of development to the PUA area as opposed to other areas of Harborough District. The wider impact on the highway network of the PUA is correspondingly higher with total junction delays across the network increasing by similar amounts in both tests. Both tests show increased impacts in the north eastern area of the PUA (broadly the quadrant between the A6 northern corridor and the A47 eastern corridor from the city centre). When combined with the impacts of the likely levels of the development proposed in the Charnwood PUA area this is likely to exacerbate existing congestion issues on outer ring road corridor and may require costly physical mitigation works. This issue is understood to be being investigated further by the City and County Councils.

The number of individual junctions impacted by more than 10s increase delay in the network also correspondingly increases. Compared to previously tested scenarios which allocate less new development in Harborough's PUA area and more in Market Harborough both these tests perform worse, generating approximately 1% higher total delays at junctions in the PUA network (without mitigation). Physical mitigation opportunities are substantially similar to those for alternative levels of development (as discussed above), however, the higher total level of development may afford greater funding opportunities to secure funding to support strategically valuable schemes such as Park and Ride or wider public transport improvements.

6.3 Test 4

This test is similar to Test 1 (delivering a total of 1300 new housing units) but effectively reverses the distribution of housing with approximately 75% of the new development being allocated directly on to or north of the A47 corridor. In terms of total network impact on the PUA junctions this performs worse than if development is more focused on the A6 corridor. Furthermore the 'ripple' effect of junctions with more than 10s increase delay is more widely experienced across the north eastern area of the Leicester PUA. When combined with the impacts of the likely levels of the development proposed in the Charnwood PUA area this is

likely to exacerbate existing congestion issues on outer ring road corridor and may require physical mitigation works. This issue is understood to be being investigated further by the City and County Councils.

6.4 Model Outputs

Various screen shots from the modelling undertaken and illustrative data is provided in Appendices 1-3.

7 Conclusions

The higher levels of development in the PUA represented by Options 3 and 5 will have a higher direct adverse impact on the operation of the PUA highway network than the levels represented by other options. Lower levels of development in the PUA are likely to result in higher allocations in Market Harborough which, albeit at a lower level, will continue to generate traffic on the A6 corridor to / from the PUA.

There are a number of opportunities to locate development off or to the north of the A47 corridor which are consistent with the development of strategically high priority sites (previously developed land and land which is well served by existing public transport). There does not appear to be a sufficiently large enough supply of such land to accommodate all of the higher level of development being considered under Options 3 and 5.

The north eastern quadrant of the Leicester PUA and the highway network serving it (in particular the outer ring road and roads immediately serving it) are more greatly impacted by scenarios where the bulk of development is located to the north of the A47. The impacts and development generating the new traffic in these scenarios are more widely spread, making the delivery of mitigation strategies for multiple sites more challenging. Furthermore, the same areas of impact are understood to be directly effected by the proposed significant level of development within the Charnwood area of the PUA.

Locating the greater balance of development off the A6 corridor provides greater opportunities to utilise and build on existing high frequency bus services which in turn can provide a direct link to rail services. This can assist in providing a sound basis for the development of sustainable travel habits (provided developments are delivered in manor which supports SMARTER choices).

Opportunities to mitigate traffic impacts through physical highway capacity enhancement are limited and restricted to localised improvements which might be required to directly enable access to a particular development site. Such impacts and mitigation will need to be assessed on a site by site basis as development applications come forward and individual Transport Assessments are undertaken.

In all cases any development in the PUA area should be underpinned by rigorous sustainable transport measures and tied to a coordinated delivery of SMARTER travel choices, including enhanced public transport service frequency and capacity. Existing constraints on the effectiveness of public transport in the A6 corridor will need to tackled (both in terms of service capacity and the capacity of interchange facilities within the city centre). Funding from development in the Harborough PUA area should be sought to contribute towards a strategic solution which seeks to address these impacts.

Despite rigorous promotion of sustainable transport some residual private vehicle impacts from the housing development is inevitable. This will be challenging to accommodate and further mitigation and strategic solutions which remove traffic from the A6 (and potentially the A47) corridors should be sought. Park and Ride, particularly off the A6 corridor may provide a suitable mitigation measure, however, further work will be required to confirm the financial feasibility of such a facility and the scale of development contribution which might be required to support it. Additionally funding to secure improved public transport on circulating routes around the city to link key facilities and radial routes (thus allowing interchange between services without entering the city centre) should also be sought.

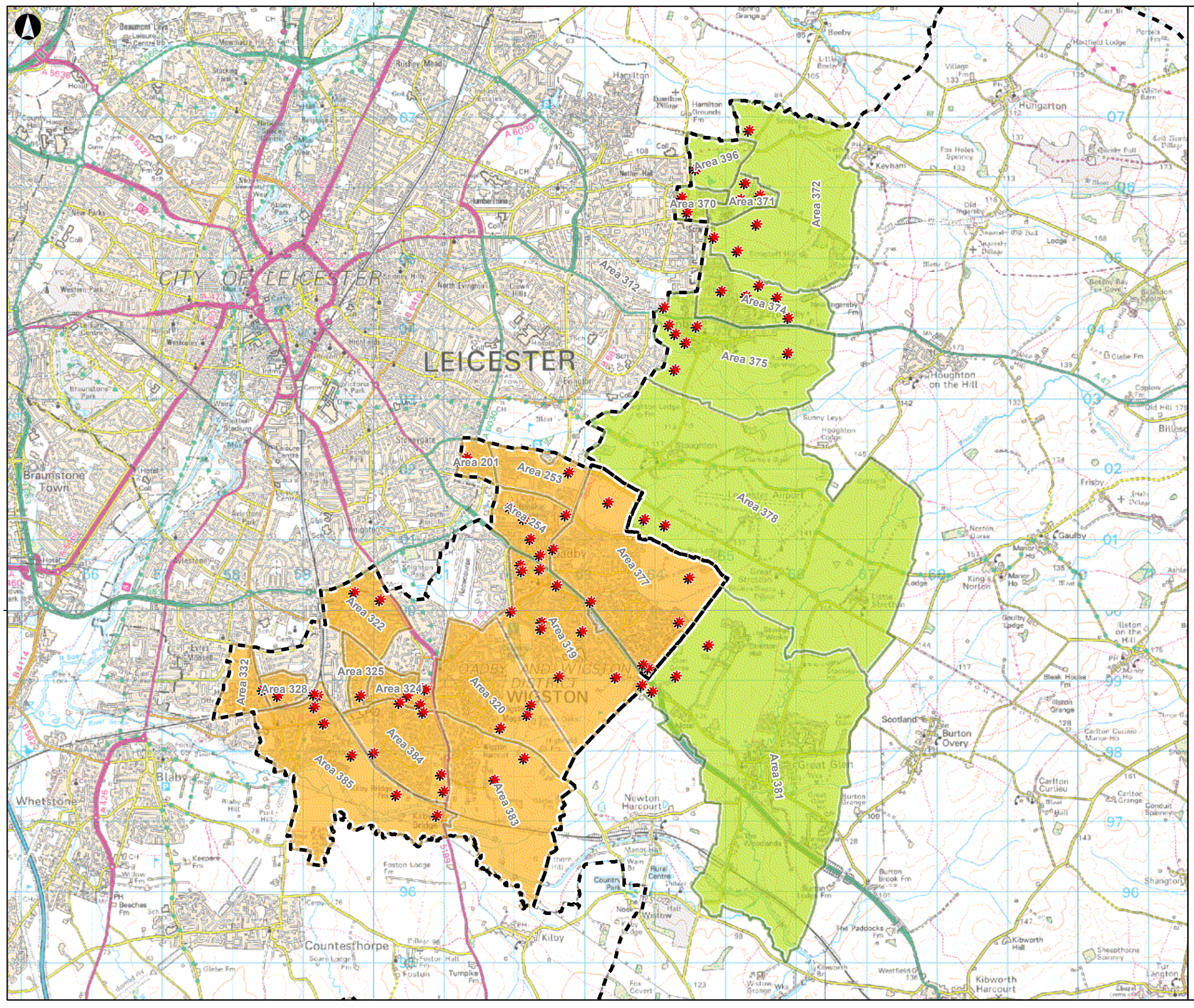
Many of the transport solutions and development mitigation will need to delivered in a coordinated and strategic manor to ensure best effect and ongoing sustainability. The development of LTP3 for both and County and City will provide a suitable opportunity consolidate various impact studies and identify a coordinated mitigation strategy which addresses the collective impact of all development in the PUA.

Figure 1- Study Area, Areas of Search and Potential development areas

460000

470000

300000



Legend

- Potential Site Centroids
- District Boundary

Areas of Search

- Harborough District
- Oadby and Wigston District

Issue	Date	By	Chkd	Appd
P1	05-10-2009	IDR	MW	

Metres

0 700 1,400 2,800

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Client

Harborough District Council

Job Title

Local Development Framework Evidence Base Assessment of Highways and Transportation Implications

Drawing Title

Potential Sites by Area of Search

Scale at A3

1:50,000

Drawing Status

Draft

Job No	Drawing No	Issue
210444	3	P1

oFileLocation

Table 2 - SHLAA sites in Harborough District Leicester Urban Fringe

Site Ref	Site Name	Settlement	Gross Site Size (hectares)	Net Site Size (hectares)	Density	Gross Potential (dwellings)	Gross to Net Ratio	Net Potential (dwellings)
UF01	Land south of the A47 Uppingham Road	Bushby	48.4	48.4	40	1936	50%	968
UF02	Land south off Covert Lane and east of Station Lane	Scraptoft	31.3	31.3	40	1252	62.50%	782
UF03	Land off Station Lane	Scraptoft	5.53	5.44	40	217	62.50%	136
UF04	Land at Stretton Hall	Great Glen	121	121	30	3630	50%	1815
UF05	Land to the south of Uppingham Road	Thurnby	4.94	4.34	40	173	62.50%	108
UF06	Land rear of 32-50 Dalby Avenue	Bushby	2.55	2.55	40	102	62.50%	63
UF07	Land north of Covert Lane	Scraptoft	5.5	5.28	40	211	62.50%	132
UF08	Land off Covert Lane	Scraptoft	20.1	20.1	40	804	62.50%	502
UF09	Land north of Covert Lane Scraptoft Campus	Scraptoft	7.14	7.14	40	285	62.50%	178
UF11	Land at Spring Hill Farm, London Road	Glen Rise	33	33	40	1320	62.50%	825
UF12	Land at Thurnby Nurseries	Thurnby	18	16.06	40	642	62.50%	401
UF13	Land rear of 1-3 Grange Park	Thurnby	3.3	2.24	40	89	62.50%	56
UF14	Land north of A47	Bushby	6.5	6.5	40	260	62.50%	162
UF15	Land at Thurnby Playing Fields	Thurnby	0.98	0.98	40	39	82.50%	32
UF16	Lodge Farm	Scraptoft	7.26	7.26	40	290	62.50%	181
UF24	The Cuttings (T/8)	Thurnby	0.55	0.37	40	14	100%	14
UF26	Land at Wintersdale Road/Thurnby Hill	Thurnby	1.2	0.89	40	35	82.50%	29
UF27	Land south of the A6 at the Oadby Boundary	Glen Rise	5.18	5.18	40	207	62.50%	129
UF30	Land off Scraptoft Rise	Scraptoft	3.7	2.4	40	96	62.50%	60
UF31	Land at Nether Hall Farm	Scraptoft	5.8	5.8	40	232	62.50%	145
UF33	Land at Hamilton Lane	Scraptoft	6.6	6.6	40	264	62.50%	165
UF35	Land northwest of The Mount	Scraptoft	7.5	7.5	40	300	62.50%	187
UF36	Land rear of Wadkins Way	Bushby	9.6	9.6	40	384	62.50%	240
UF37	Land rear of Devenports Hill	Bushby	4.9	4.9	40	196	62.50%	122
UF40	Land at Stoughton Road	Thurnby	26.2	25.14	40	1005	62.50%	628
UF42	Land off Gartree Road	n/a	13.98	13.98	30	419	62.50%	261
UF46	Land off Gartree Road west	n/a	10.3	10.3	30	309	62.50%	193
UF47	Land east of Stoughton Road	Thurnby	13.7	13.7	40	548	62.50%	342
UF48	Land east of Stoughton Road	Thurnby	12.7	12.7	40	508	62.50%	317

Table 3 - Strategic Assessment Framework

Highest priority → Lowest Priority							
	Hierarchy of Development Area	Sites within or adjacent to the Leicester Principal Urban Area[4]		Sites within or adjacent to Sub-Regional Centres (ie Market Harborough)[1]		Sites within rural areas (ie elsewhere within the District)[1]	
		close to existing established public transport corridors or public transport interchanges	Substantially delivered on previously developed land	close to existing established public transport corridors or public transport interchanges	Substantially delivered on previously developed land	close to existing established public transport corridors or public transport interchanges	Substantially delivered on previously developed land
	1	✓	✓				
	2	✓					
	3		✓				
	4	Within PUA but not near PT hub/corridor or on previously developed land					
	5			✓	✓		
	6			✓			
	7				✓		
	8			Within SRC but not near PT hub/corridor or on previously developed land			
	9					✓	✓
	10					✓	
	11						✓
	12					Within Rural area but not near PT hub/corridor or on previously developed land	
Lowest Priority							

[4] Based on hierarchy set out in Proposed Changes to RSS8 Policy 3, Concentrating Development in Urban Areas, published in July 2008

Table 4 - Public Transport Assessment Criteria

Bus Services:

Existing bus service levels were assessed for potential development areas to provide a total maximum 'score' of 30. The highlighted green band of service provision indicates that which has been considered 'good'. A bus service was considered to serve a site if it passed within approximately 200m of a site boundary. This distance made some allowance for any walk distance which might be required to cross the site to reach the site boundary.

Service frequency/Service period	Mon-Fri daytime	Mon-Fri Evenings	Sat day	Sat eve	Sun Day	Sun Eve	Total Score
Less than hourly	0	0	0	0	0	0	0
greater than hourly	1	1	1	1	1	1	6
better than 2 per hour	1	1	1	1	1	1	6
better than 4 per hour	1	1	1	1	1	1	6
better than 6 per hour	1	1	1	1	1	1	6
better than 8 per hour	1	1	1	1	1	1	6
Total	5	5	5	5	5	5	30

Rail Services:

Accessibility to rail services were assessed similarly to bus services with a potential development site being scored for each criteria met. The total maximum overall Public Transport score was 60, of which rail could provide 30. Potential development areas were ranked by the score, enabling areas with existing high accessibility to be prioritised above those with low accessibility for the purposes of developing testing scenarios.

Proximity of Rail services	Score
Rail Station within easy walking (800m)	10
Rail Station within easy cycling (3000m)	10
Rail Station directly accessible via existing bus route/service (not requiring interchange between bus services)	10
Rail Station not readily accessible by sustainable transport	0

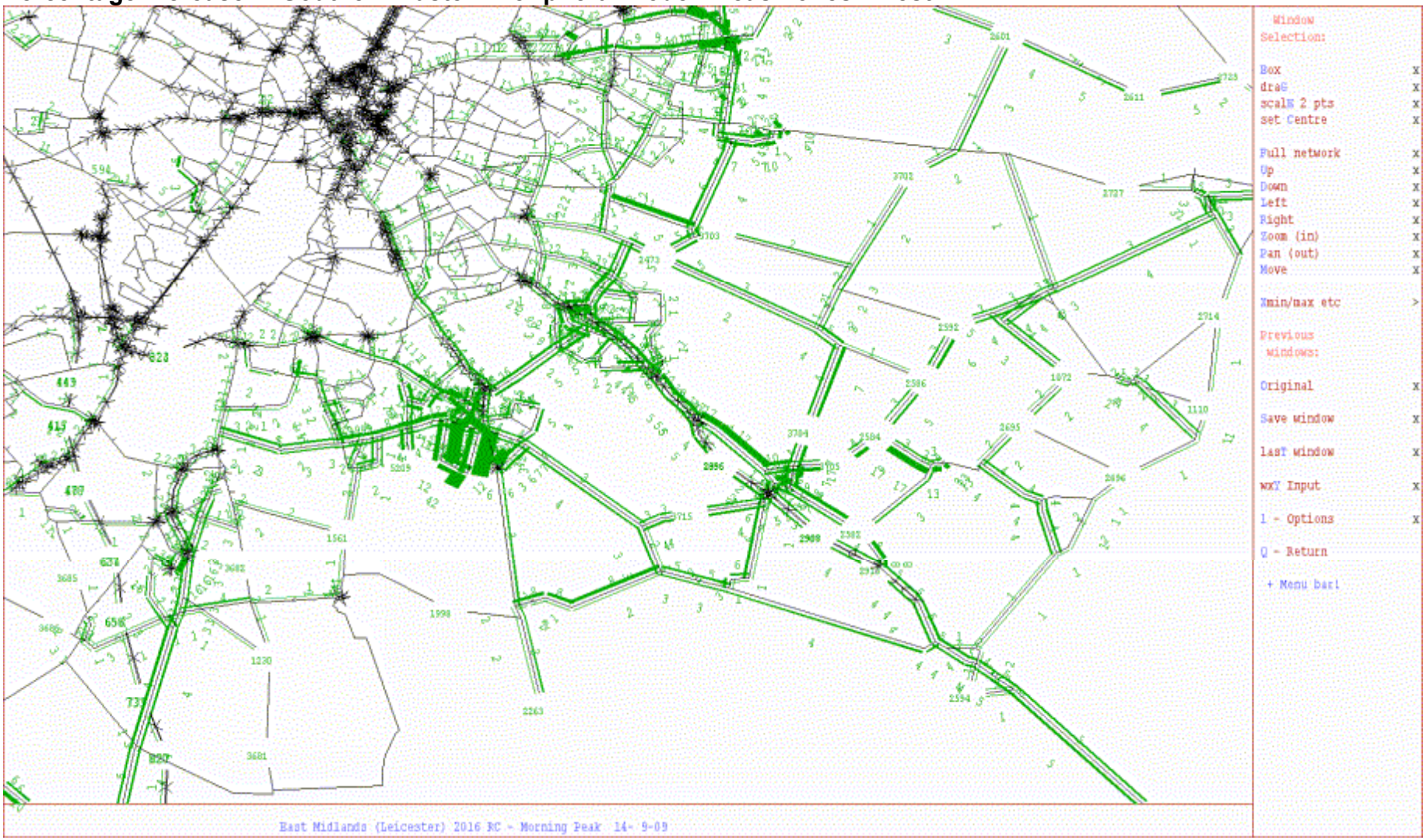
A1 Appendix 1 – Key Junction Impacts

							Test 1		Test 2		Test3		Test 4	
Junction Code	Junction	Junction Type	Grid Reference (OS Sheet 140)	Central Node	Link	Road	% Flow Increase	Scenario flow on link/PCU	% Flow Increase	Scenario flow on link/PCU	% Flow Increase	Scenario flow on link/PCU	% Flow Increase	Scenario flow on link/PCU
A	A6-A426	Signalised	571002	3545	1119-3545	A426(N)entry	0.50	3.28	0.26	1.69	0.27	1.79	0.53	3.46
					3545-1119	A426(N)exit	1.42	5.84	1.26	5.23	1.27	5.23	1.34	5.53
					3545-3546	A563(E)exit	1.21	15.15	1.26	15.80	1.22	15.29	1.26	15.64
					3547-3545	A563(E)entry	0.33	5.97	0.47	8.58	0.50	9.14	0.45	8.22
					1112-3545	A426(S)entry	0.74	7.45	0.67	6.70	0.66	6.64	0.71	7.09
					3545-1112	A426(S)exit	0.38	3.38	0.17	1.47	0.17	1.50	0.39	3.45
					3545-1115	A563(W)exit	0.26	5.90	0.39	8.74	0.41	9.29	0.36	8.12
					1116-3545	A563(W)entry	0.97	14.56	1.01	15.14	0.98	14.63	1.01	14.96
B	A563-B5366	Roundabout	582003	1395	1382-1387	B5366 entry	0.17	0.91	0.21	1.15	0.29	1.54	0.21	1.10
					1431-3206	A563 entry	0.13	0.84	0.51	3.38	0.56	3.71	0.45	3.00
					1408-1389	B5418 Stonesby Av. Entry	0.81	4.58	0.84	4.76	0.82	4.69	0.82	4.65
					1385-1380	B5366 Saffron Lane (S) entry	0.01	0.04	0.01	0.05	0.01	0.05	0.01	0.05
					1366-1373	A563 (W) Glenhills Way entry	1.66	20.35	1.72	21.01	1.66	20.46	1.70	20.87
					1370-1378	Wigston Lane entry	1.77	2.83	1.74	2.78	1.76	2.79	1.71	2.69
C	A563-A5199	Signalised	600006	1953	1933-1953	A5199(N) Welford Road entry	4.82	26.82	4.37	24.27	4.34	24.20	4.84	26.98
					8539-1953	A563(E) Palmerston Way	1.59	13.96	1.81	15.86	1.91	16.72	1.91	16.82
					8541-1953	A5199(S) Leicester Road	0.90	9.93	0.92	10.25	0.92	10.19	0.91	10.10
					1942-1953	A563(W) Asquith Way	0.16	0.83	0.46	2.39	0.38	1.94	0.32	1.65
D	A563-A6	Roundabout	615013	2195	2190-2203	A6(N) London Road	0.26	2.10	0.75	6.09	0.88	7.10	0.64	5.17
					2232-2206	A6(S) Leicester Road	1.81	22.11	1.92	23.30	1.82	22.01	1.80	21.73
					2180-2195	A563 Palmerston Road	0.30	1.88	0.60	3.68	0.52	3.22	0.46	2.84
E	A6-A6030	Signalised	607023	2058	2023-2058	A6(N)London Road	0.48	1.48	0.58	1.79	0.58	1.82	0.48	1.49
					2087-2058	A6030(E)Stoughton Road	0.20	1.36	0.33	2.28	0.33	2.21	0.24	1.62
					3231-2058	A6030(S)London Road	1.04	8.85	1.03	8.93	1.05	8.88	0.97	8.21
					2019-2058	Knighton Road	0.25	1.18	0.72	3.46	0.72	3.44	0.31	1.45
F	A6-B568	Roundabout	600032	1959	1955-1959	A6(N) London Road	0.85	7.75	0.95	8.66	0.92	8.49	1.02	9.33
					1963-1961	B6416(E) Mayfield Road	0.20	1.37	0.92	6.34	1.20	8.21	0.30	2.11
					1967-1960	A6(S) London Road	0.87	6.00	0.86	5.93	0.85	5.86	0.76	5.22
					1957-1956	B568(W) Victoria Park Road	0.25	1.09	0.25	1.10	0.24	1.08	0.25	1.08
G	A5199-B582	Roundabout	608993	2076	2073-2081	A5199(N) Leicester Road	4.87	44.59	4.40	40.34	4.39	40.35	4.89	44.76
					2098-2080	B582 Oadby Road	4.30	40.25	4.14	38.80	4.15	38.84	4.31	39.87
					3131-2077	A5199(S) Welford Road	2.36	18.14	2.36	18.12	2.37	18.04	2.37	18.21
					2065-2076	B5418 Wakes Road	6.20	35.87	6.18	35.82	6.19	35.82	6.19	35.73
H	A426-Leicester Road	Roundabout	567982	1043	1044-1043	A426 Leicester Road	1.25	19.32	1.00	15.45	1.01	15.66	1.24	19.12
					1053-1046	Leicester Road	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					3726-1036	A426 Blaby By-pass	1.98	16.36	1.86	15.37	1.84	15.22	1.91	15.79
I	A5460-A47	Signals	579044	1291	1284-1291	Tudor Road	0.09	0.41	0.08	0.35	0.08	0.34	0.09	0.40
					1297-1289	A47 St. Augustine Road	0.04	0.12	0.24	0.76	0.32	1.02	0.22	0.69
					1289-1291	A5460 Narbrough Road	0.06	0.02	0.16	0.05	0.16	0.05	0.12	0.04
					3657-1291	A47 King Richards Road	0.49	3.57	0.48	3.51	0.48	3.50	0.36	2.54
J	A5460	Signals	575034	1221	8293-1221	A5460(N) Narborough Road	0.08	0.34	0.07	0.28	0.07	0.28	0.08	0.33
					8295-1221	Upperton Road	0.06	0.48	0.07	0.57	0.07	0.60	0.07	0.53
					8297-1221	A5460(S) Narborough Road	0.09	1.17	0.08	1.06	0.09	1.06	0.09	1.18
					1162-1221	Upperton Road (W)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K	A5460	Signals	565019	1009	3729-1015	A5460(N) Narborough Road	0.58	8.89	0.33	5.04	0.33	5.02	0.59	8.87
					2868-1011	Braunstone Lane (E)	0.04	0.15	0.13	0.54	0.12	0.49	0.11	0.48
					977-2860	A5460(S) Narborough Road	0.93	12.55	0.83	11.11	0.85	11.44	0.73	9.93
					994-2654	Braunstone Lane (W)	0.34	0.81	0.21	0.51	0.22	0.52	0.35	0.79
L	A4560-B4114	Roundabout	555005	697	642-689	A4560(E)	0.04	0.63	0.04	0.64	0.03	0.55	0.03	0.56
					698-707	Minor unnamed road	0.37	0.98	0.22	0.58	0.23	0.59	0.38	0.98
					721-716	A4560(N) Narborough Road	0.50	7.79	0.27	4.18	0.26	4.13	0.53	8.08
					735-713	Fosse Park Avenue	0.05	0.31	0.04	0.24	0.04	0.24	0.05	0.31
					677-702	B4114	2.00	14.40	1.76	12.75	1.81	13.11	1.61	11.81

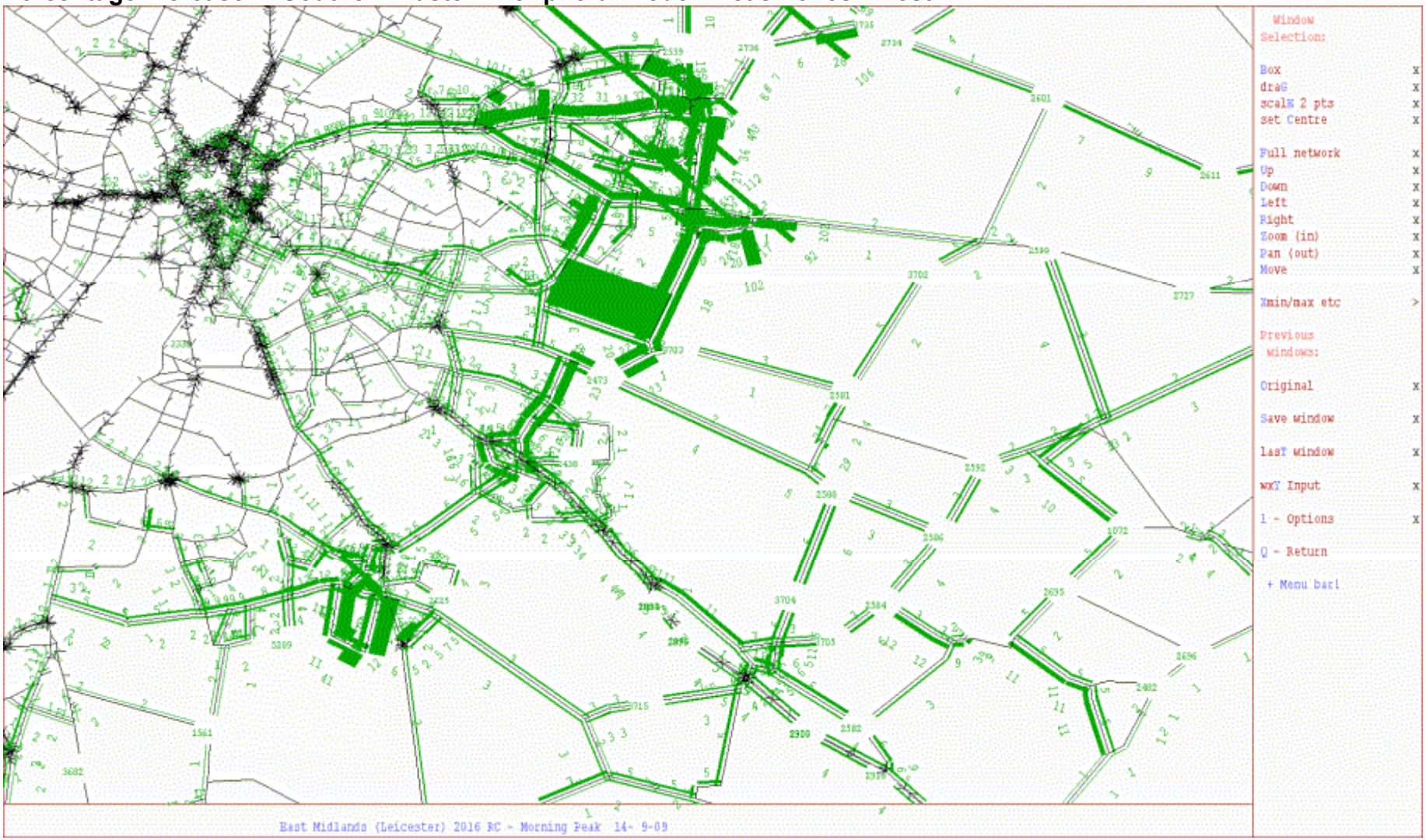
							Test 1		Test 2		Test 3		Test 4	
Junction Code	Junction	Junction Type	Grid Reference (OS Sheet 140)	Central Node	Link	Road	% Flow Increase	Scenario flow on link/PCU	% Flow Increase	Scenario flow on link/PCU	% Flow Increase	Scenario flow on link/PCU	% Flow Increase	Scenario flow on link/PCU
M	A563-B4114	Grade Sep	553001	662	685-672	B4114 Narborough Rd (N)	0.93	8.35	0.42	3.78	0.41	3.70	0.93	8.19
					730-2943	A563 Soar Valley Way (E)	0.25	5.80	0.37	8.54	0.39	9.09	0.35	7.92
					637-2942	B4114 Narborough Rd (S)	0.97	28.01	0.85	24.41	0.85	24.53	0.89	25.29
					618-633	A563 Soar Valley Way (W)	0.51	14.06	0.43	11.95	0.41	11.52	0.53	14.72
N	B4114-B582	Roundabout	549987	517	628-529	B4114 St. Johns (N)	0.66	11.46	0.28	4.96	0.31	5.49	0.68	11.79
					536-523	B582 Enderby Road (E)	0.45	5.86	0.43	5.57	0.43	5.60	0.43	5.60
					8105-517	B4114 Leicester Road (S)	1.81	32.94	1.56	28.46	1.57	28.61	1.66	30.22
					2947-522	B582 Blaby Road (W)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O	B5336-B582	Roundabout	586983	1522	3140-1522	B5366 Saffron Road (N)	4.84	31.56	4.73	30.82	4.72	30.82	4.78	31.14
					1538-1522	B582 Blaby Road (E)	2.33	24.41	2.28	23.92	2.28	23.89	2.29	23.93
					3141-1522	B582 Blaby Road (W)	4.86	25.91	4.89	26.13	4.80	25.73	4.87	25.90
P	B5418/Western Avenue	Priority Junction	595556	1895	3128-1895	B5418 Aylestone Lane (W)	3.78	27.44	3.72	26.88	3.64	26.40	3.70	26.87
					8495-1895	B5418 Aylestone Lane (E)	1.06	7.07	1.09	7.26	1.07	7.09	1.07	7.07
					8493-1895	Western Avenue	0.49	1.39	0.67	1.90	0.51	1.45	0.52	1.44
Q	A5199/B582	Signalised	608985	2079	2075-2079	A5199 Bull Head Street (N)	2.89	21.16	1.96	14.36	1.87	13.73	2.74	20.04
					2169-2079	Newton Lane	3.72	16.27	3.56	15.42	3.33	14.22	3.49	14.82
					2112-2079	A5199 Welford Lane (S)	1.26	13.75	1.26	13.80	1.26	13.78	1.26	13.80
					2064-2079	B582 Moat Street	5.30	16.34	4.85	15.07	4.55	14.47	4.94	15.54
R	B667/A6	Signalised	625005	2356	3118-2359	B667 New Street (N)	6.13	29.32	13.67	59.32	16.05	67.29	10.16	46.10
					2364-2356	A6 Harborough Rd	3.59	45.83	2.80	35.82	1.62	20.81	2.22	28.42
					2361-2356	B582 New Street (S)	3.50	9.94	5.65	15.67	6.18	17.28	3.54	10.06
					2306-2359	A6 Harborough Rd	10.22	53.10	7.00	37.85	0.71	3.87	4.28	22.72
S	New Street/London Road	Priority	625003	2361	2356-2361	B582 New Street	9.85	21.77	26.57	48.63	27.09	47.50	21.06	42.22
					2395-2361	B5403 London Road	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
					3119-2361	B582 Leicester Road Racecourse	3.25	18.27	4.30	23.87	4.53	25.11	3.24	18.15
T	A47/B667	Priority	635042	2469	3055-2469	A47 Uppingham Road (W)	1.61	6.28	18.27	70.90	18.15	69.29	13.32	52.56
					2485-2469	A47 Uppingham Road (E)	0.41	3.46	4.41	37.36	4.88	42.01	1.98	16.71
					2458-2469	B667 Spencefield Street	3.22	3.85	30.71	29.27	30.80	29.23	5.76	6.58
U	A563/A47	Signalised	627048	2391	2393-2391	A563 Colchester Road (N)	0.86	14.28	2.80	46.24	2.82	46.36	2.60	43.48
					3055-2391	A47 Uppingham Road (E)	0.13	0.81	2.23	14.15	2.17	14.11	1.88	11.66
					2386-2391	Goodwood Road (S)	2.37	14.50	6.06	37.58	6.55	40.26	3.50	21.25
					8737-2391	A47 Uppingham Road (W)	1.59	2.26	16.89	24.35	16.35	23.25	8.89	12.61
V	A563/Scraptoft Lane	Signalised	628054	2401	2409-2401	A563 Hungarton Boulevard (N)	0.62	6.67	4.67	50.04	6.26	67.40	3.20	34.74
					2429-2401	Scraptoft Lane (E)	1.40	18.08	3.23	42.35	4.23	54.39	1.58	21.17
					3053-2401	A563 Colchester Road (S)	1.84	12.95	3.62	26.06	3.84	27.65	2.24	15.63
					2374-2401	Scraptoft Lane (W)	8.85	23.84	33.53	86.60	54.13	137.65	15.88	41.71
W	A563/Scraptoft Lane	Signalised	620053	2287	2289-2287	Scraptoft Lane	0.83	5.75	3.25	22.40	4.56	30.91	1.11	7.79
					2352-2287	A563 Uppingham Road	0.08	0.35	1.54	6.77	1.50	6.77	1.54	6.77
					2275-2287	A563 Uppingham Road	3.48	9.03	24.01	61.51	39.56	99.94	10.80	28.45
X	A47/A6030	Signalised	615053	2219	2216-2219	A6030 The Portwey (N)	0.77	2.06	0.48	1.34	0.47	1.29	0.56	1.48
					8701-2219	A47 Uppingham Road (E)	0.50	6.02	2.39	28.61	3.10	37.04	1.16	14.12
					2670-2219	A6030 The Portwey (S)	0.15	0.17	0.13	0.16	0.11	0.13	0.13	0.15
					3042-2219	A47 Uppingham Road (W)	1.74	8.63	12.03	59.58	19.89	97.58	5.31	26.80
Y	A47/A594	Signalised Gyratory	59404	1872	1843-1861	St. Matthews Way (N)	0.32	7.17	1.68	37.71	2.81	62.78	0.84	18.87
					3197-1874	A47 Humberstone Road (E)	0.31	5.83	1.52	28.53	2.06	38.41	0.74	14.00
					1862-1857	St. Matthews Way (S)	0.43	5.76	1.22	16.18	2.01	26.65	0.54	7.16
					1839-1848	A47 Humberstone Road (W)	0.36	0.62	1.74	2.98	1.89	3.25	0.85	1.47
Z	A6/A594	Signalised	592040	3158	1785-1802	A594 London Road (N)	0.31	6.87	0.33	7.35	0.35	7.66	0.32	7.12
					1831-3155	A6 London Road (SE)	0.40	5.60	0.82	11.54	0.84	11.78	0.51	7.18
					1799-1806	A594 Waterloo Way (SW)	0.73	2.02	2.93	8.08	5.08	13.97	1.19	3.33

A2 Appendix 2 – Model Outputs

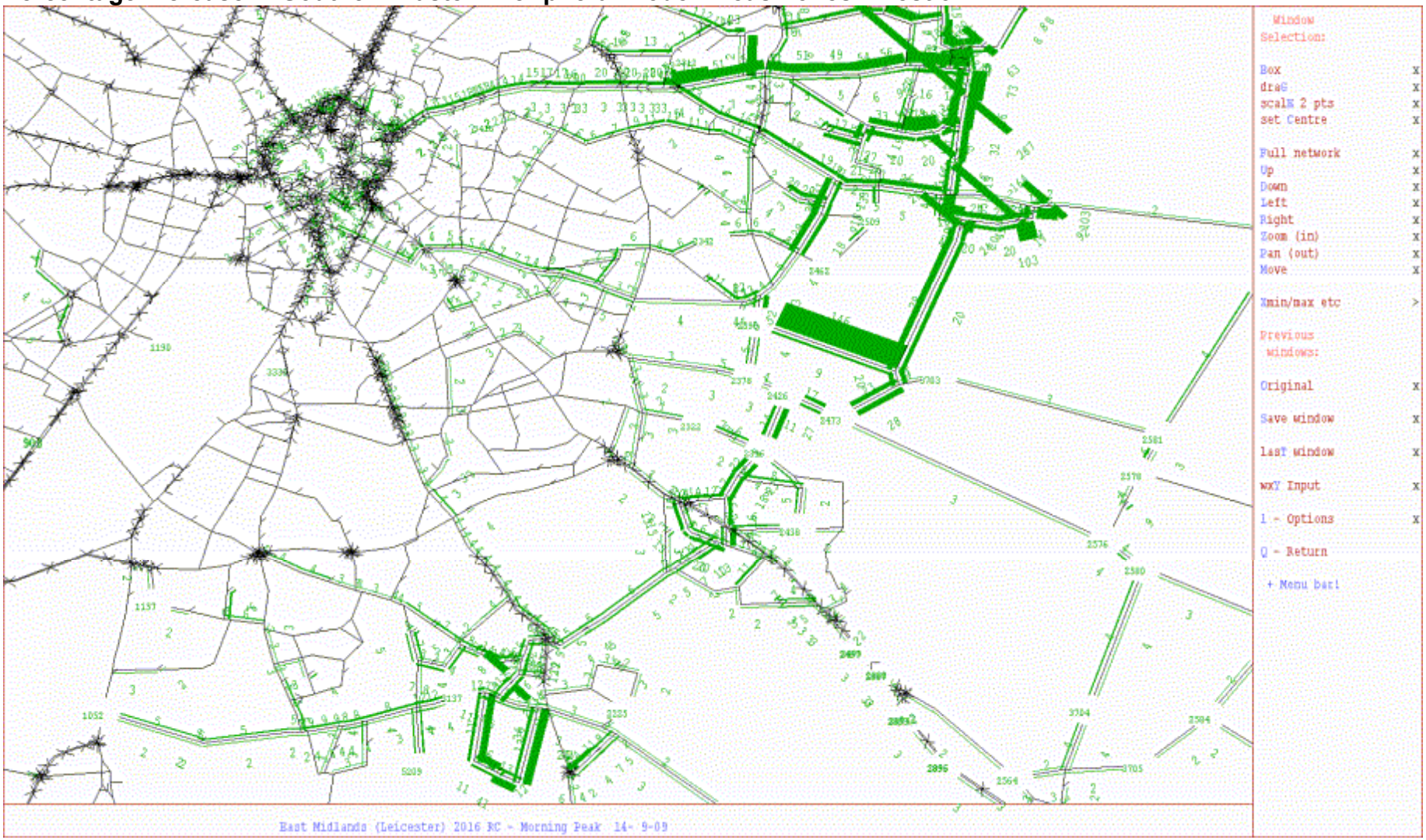
Percentage Increase in Southern/Eastern Peripheral Model Areas/Zones – Test 1



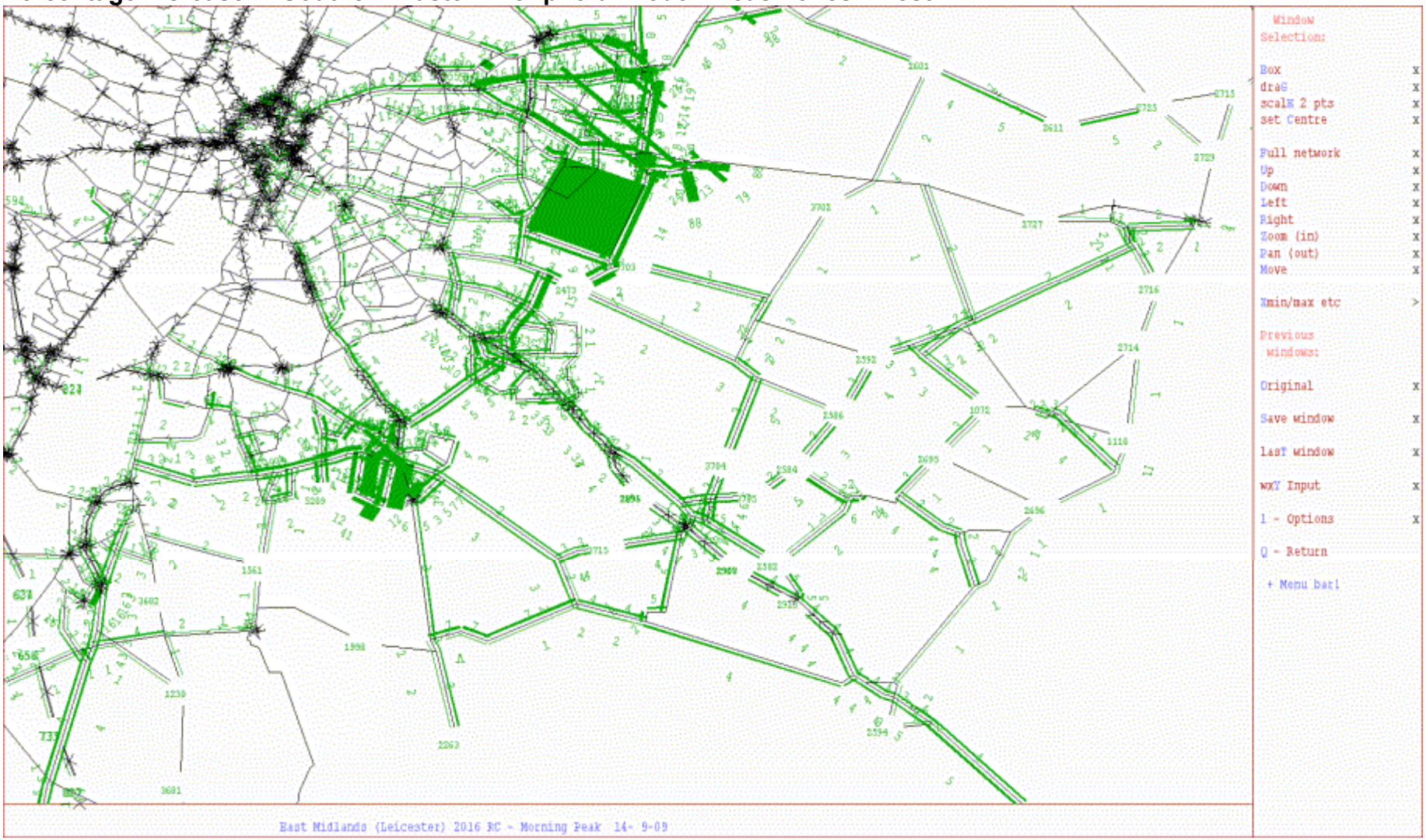
Percentage Increase in Southern/Eastern Peripheral Model Areas/Zones – Test 2



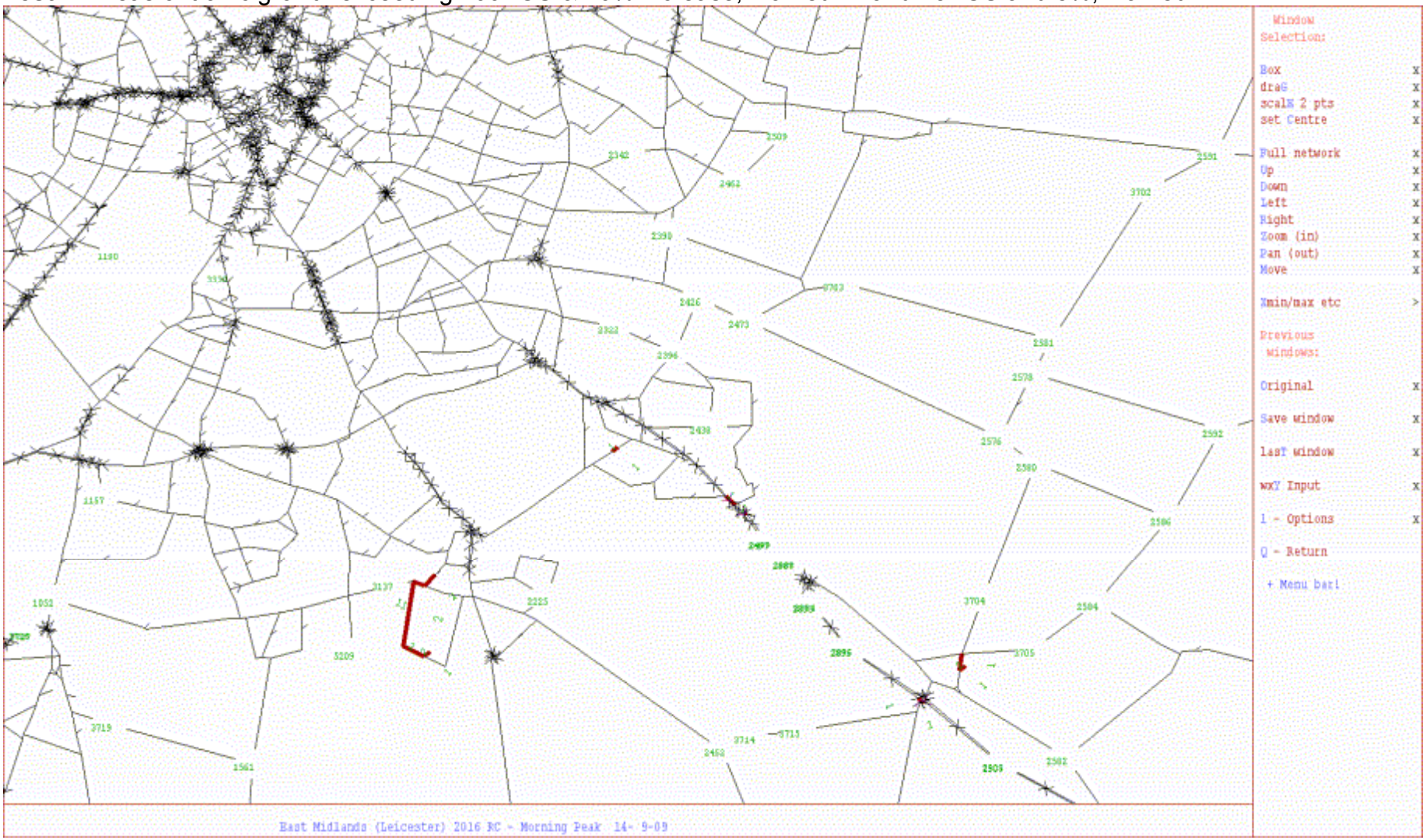
Percentage Increase in Southern/Eastern Peripheral Model Areas/Zones – Test 3



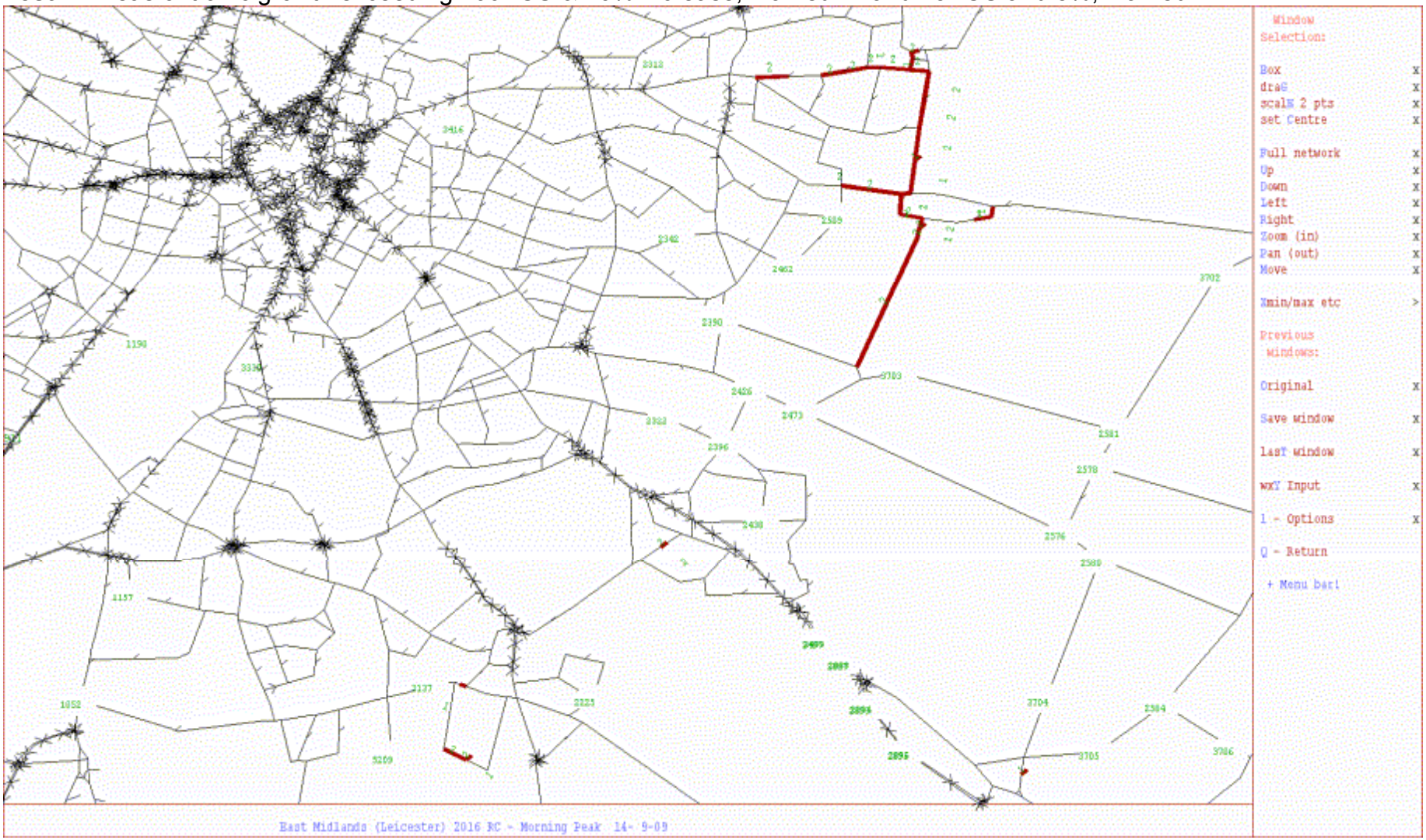
Percentage Increase in Southern/Eastern Peripheral Model Areas/Zones – Test 4



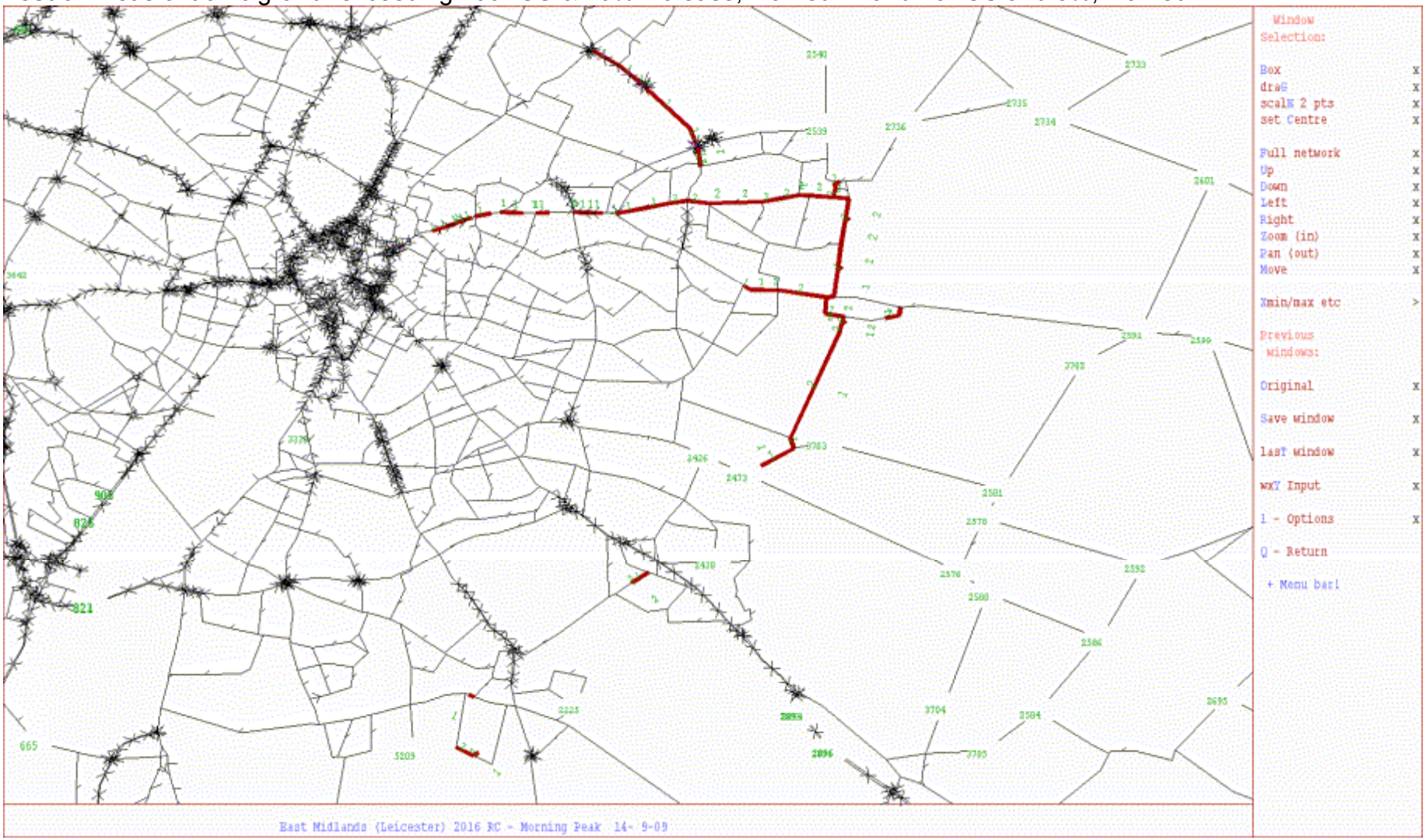
Test 1: Areas of traffic growth exceeding 100PCU & 10% increase, marked ‘2’ and 75PCU and 5%, marked ‘1’



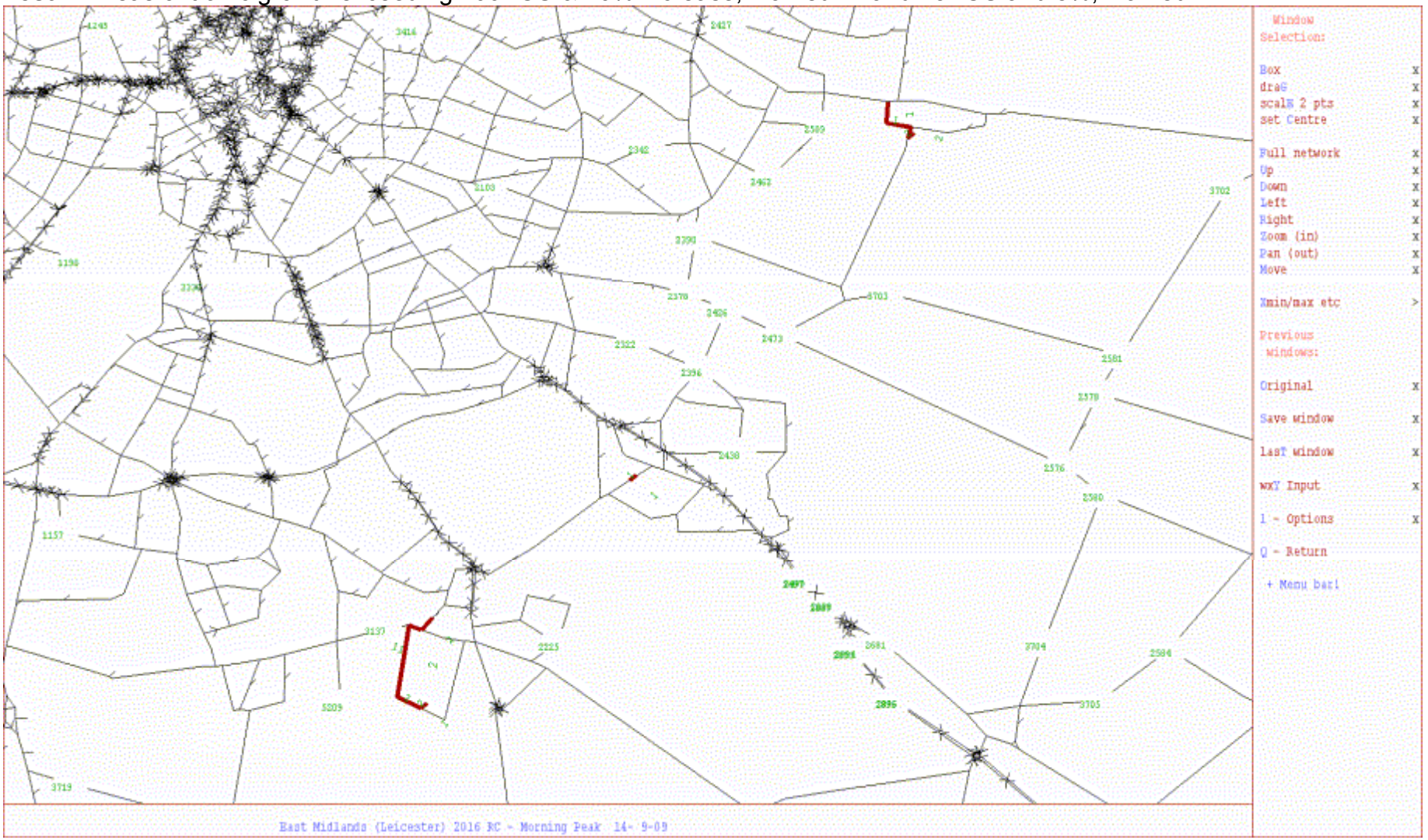
Test 2: Areas of traffic growth exceeding 100PCU & 10% increase, marked ‘2’ and 75PCU and 5%, marked ‘1’



Test 3: Areas of traffic growth exceeding 100PCU & 10% increase, marked ‘2’ and 75PCU and 5%, marked ‘1’



Test 4: Areas of traffic growth exceeding 100PCU & 10% increase, marked ‘2’ and 75PCU and 5%, marked ‘1’



A3 Appendix 3 – Housing Assumption by Test

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300000

CITY OF LEICESTER

LEICESTER

OADBY AND WIGSTON DISTRICT

HARBOROUGH DISTRICT

Area 396
16%
Area 370
Area 371
Area 372
Area 312
5%
Area 374
2%
Area 375
Area 378
0%
Area 201
Area 253
3%
Area 254
1%
Area 377
19%
0%
Area 322
Area 319
10%
0%
Area 325
2%
Area 324
48%
Area 320
0%
Area 332
Area 328
0%
6%
Area 384
6%
Area 385
6%
Area 383
77%
Area 381

Braunstone Town
Whetstone
Blaby
Countesthorpe
Kilby
Newton Harcourt
Wistow
Scotland
Burton Overy
Houghton on the Hill
Hungarton
Keyham
Gaulby
Kibworth Harcourt
Kibworth Beauchamp
Stoughton
Sunny Leys
Hamilton
Rushey Mead
Nether Hall
Humberstone
Evington
Stoneygate
Knighton
Abbey Park
New Parks
Western Park
Braunstone Park
Victoria Park
North Evington
Clown Hills
Crown Hills
Hamilton Grounds Fm
Fox Holes Spinney
Old Ingarsby
Ingarsby Old Hall
Ingarsby Oaks
Ingarsby Fm
Glebe Fm
Sunny Leys
Houghton Lodge
Stoughton Grange
Leicester Airport
Norton Corse
King's Norton
Manor Ho
Gaulby Lodge
Ilston on the Hill
Bleak House Fm
Ilston Grange
Carlton Curlieu
Carlton Curlieu Manor Ho
Burton Grange
Burton Lodge Fm
Burton Brook Fm
The Paddocks Fm
Kibworth Hall
Sheepthorns Spinney
Westfield
Foston
Foston Lodge Fm
Foston Hall
Turnpike Fm
Soar Lodge Fm
Kilby Grange
Fox Covert
Wistow Grange
Sports Centre
Flockney Grange
Wistow Hall
Rural Centre
Country Park
Manor Ho
Wain Br
Thorn Hill
Kespers Fm
Willow Fm
Beeches Fm
Blaby Hill
Port Hill
Whetstone Gorse
Aylestone
Grove Park
Braunstone Town
Leisure Centre
Football Stadium
Racecourse
Great Glen
Great Hill
Bolaby Bay Cov Covert
Frisby
Gaulby
Ilston on the Hill
Carlton Curlieu
Burton Overy
Kibworth Harcourt
Kibworth Beauchamp
Countesthorpe
Whetstone
Blaby
Braunstone Town
Leicester Airport

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Legend

District Boundary

Areas of Search

Harborough District

Oadby and Wigston District

Issue	Date	By	Chkd	Appd
P1	05-10-2009	IDR	MW	

Metres
0 700 1,400 2,800

ARUP

Arup Nottingham,
The Frontage, Queen Street, Nottingham, NG1 2BL

www.arup.com

Client

Harborough District Council

Job Title

Local Development Framework Evidence Base Assessment of Highways and Transportation Implications

Drawing Title

Housing Unit Assumptions by Area of Search for 'Test 1'

Scale at A3

1:50,000

Drawing Status

Draft

Job No	Drawing No	Issue
210444	Figure 1.1	P1

oFileLocation

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Legend

District Boundary

Areas of Search

Harborough District

Oadby and Wigston District

Issue	Date	By	Chkd	Appd
P1	01-02-08	TSS	RM	EP

Metres

0 700 1,400 2,800

ARUP

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Harborough District Council

Job Title

Local Development Framework Evidence Base Assessment of Highways and Transportation Implications

Drawing Title

Housing Unit Assumptions by Area of Search for 'Test 2'

Scale at A3

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Drawing Status

Draft

Job No	Drawing No	Issue
210444	Figure 1.2	P1

oFileLocation

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Area 312 1%
Area 201 0%
Area 253 3%
Area 254 1%
Area 322 0%
Area 325 0%
Area 324 2%
Area 328 0%
Area 332 0%
Area 385 6%
Area 384 6%
Area 383 6%
Area 320 48%
Area 319 10%
Area 377 19%
Area 375 22%
Area 374 20%
Area 396 8%
Area 370 8%
Area 371 8%
Area 372 41%
Area 378
Area 381

CITY OF LEICESTER
LEICESTER
HARBOROUGH DISTRICT
OADBY AND WIGSTON DISTRICT
WIGSTON

Legend

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District_Boundary

Areas of Search

Harborough District

Oadby and Wigston District

Issue	Date	By	Chkd	Appd
P1	05-10-2009	IDR	MW	

Metres
0 700 1,400 2,800

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Harborough District Council

Job Title

Local Development Framework Evidence Base Assessment of Highways and Transportation Implications

Drawing Title

Housing Unit Assumptions by Area of Search for 'Test 3'

Scale at A3

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Drawing Status

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Job No	Drawing No	Issue
210444	Figure 1.3	P1

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Area 312 2%

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Area 254 1%

Area 322 0%

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Area 324 2%

Area 328 0%

Area 332 0%

Area 384 6%

Area 385 6%

Area 383 6%

Area 320 48%

Area 319 10%

Area 377 19%

Area 396

Area 370 16%

Area 371 11%

Area 372

Area 374 5%

Area 375 41%

Area 378

Area 381 25%

CITY OF LEICESTER

LEICESTER

OADBY AND WIGSTON DISTRICT

WIGSTON

HARBOROUGH DISTRICT

Braunstone Town

Whetstone

Blaby

Countesthorpe

Kilby

Newton Harcourt

Houghton on the Hill

Hungarton

Keyham

Scotland

Burton Overy

Gaulby

Kibworth Harcourt

Legend

District Boundary

Areas of Search

Harborough District

Oadby and Wigston District

Issue	Date	By	Chkd	Appd
P1	05-10-09	IDR	MW	

Metres

0 700 1,400 2,800

ARUP

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The Frontage, Queen Street, Nottingham, NG1 2BL

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Client

Harborough District Council

Job Title

Local Development Framework Evidence Base Assessment of Highways and Transportation Implications

Drawing Title

Housing Unit Assumptions by Area of Search for 'Test 4'

Scale at A3

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Drawing Status

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Job No	Drawing No	Issue
210444	Figure 1.4	P1

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