Environment and Transport Commissioning Framework

Charnwood Borough Council Local Plan: Option Testing (No Mitigation)

Final Report

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Model Version:	LLITM Standard Unconstrained v1.8
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Whilst the modelling work outlined in this report has been carried out using the Leicester and Leicestershire Integrated Transport Model (LLITM), its findings and any conclusions do not necessarily represent the views of Leicestershire County Council as the Highway Authority.

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1. Introduction

1.1. Background

1.1.1. The Charnwood Local Plan 2011 to 2028 Core Strategy was adopted in November 2015. Following the publication of the plan, work has commenced on the production of a new Local Plan which will cover an extended period up to 2036. This plan will provide a development strategy for housing and employment in the Borough which reflects the most up to date evidence of the need for houses and jobs and supports the overarching strategy provided by the Leicester and Leicestershire Strategic Growth Plan.

1.1.2. The Leicester and Leicestershire Housing and Economic Development Needs Assessment, published in January 2017, provides the most up to date information on housing and employment needs across Leicester and Leicestershire. It shows an increased housing requirement for the Borough of 994 dwellings per annum (dpa) to 2036, an increase of 174 dwellings from the 820 dpa contained in the Core Strategy.

1.1.3. The proposed changes to the National Planning Policy Framework (NPPF) include a standardised methodology for determining Local Housing Need. The draft methodology suggests a need for 1,045 dpa for Charnwood so would also represent an increase to the housing requirement for the Borough above that currently planned for in the Core Strategy.

1.1.4. Charnwood Borough Council (CBC) is proceeding on the basis that the HEDNA figure of 994 dwellings represents the most up to date evidence of objectively assessed need to form the basis of establishing a housing requirement for the Borough.

1.1.5. In developing their Local Plan, CBC is seeking to identify an appropriate strategy for development in the Borough. As part of the evidence for this choice, a number of reasonable alternative options are being explored to ensure that the chosen strategy is fully justified and can be considered “sound”.

1.1.6. The options which have been identified seek to test different patterns of development including focusing development in urban areas, more dispersed patterns of development and inclusion of a new settlement. All options have different benefits and dis-benefits in terms of sustainability objectives, delivery and responding to the Strategic Growth Plan and the Council’s vision which will be considered alongside the results of the transport modelling and range of other evidence to identify a preferred strategy for the Borough.

1.1.7. One of the fundamental elements requiring consideration when developing a Local Plan, are the implications for accessibility and the transport network in particular.

Evidence is required to assess the associated implications for both, existing and new users, and the emergence of a suitable mitigation strategy.

1.1.8. CBC has approached Leicestershire County Council (LCC) to undertake a 'high level' highway impact appraisal of seven potential Local Plan options across the Borough and adjoining Local Authority areas.

1.1.9. It should be noted that the results presented here will be used to inform discussions around potential mitigation strategies, and further modelling will be undertaken in due course to test such strategies.

1.1.10. The study will apply the recently built Leicester and Leicestershire Integrated Transport Model Standard Unconstrained v1.8 (LLITM Standard Un1.8) meaning that 'committed' future developments and infrastructure are included as part of the forecasting.

1.2. Study Aim

1.2.1. Charnwood Borough Council has seven development strategy options that they require modelling in order to identify the potential highway impacts of each of the options.

1.2.2. The intention is to use 2016 and 2036 model forecast years output to assist in narrowing down the number of options whilst informing CBC of where any subsequent mitigation strategies may be required.

1.3. Model Overview

1.3.1. Due to the high level nature of this commission only the highway component of LLITM Standard Unconstrained v1.8 has been extracted and used for this commission.

1.3.2. The model covers Leicestershire in detail with a decreasing level of coverage with distance from the county boundary.

1.3.3. The base year of the model is 2014 with full forecasts being available every five years from 2016 to 2051. For this project, modelled years of 2016 and 2036 have been used.

2. Model Validation

2.1. Overview

2.1.1. LLITM Standard is a strategic model which validates well to Government WebTAG guidance over the wider area. Despite this, and as WebTAG makes clear, it is necessary to review model validation in the context of the specific project being undertaken to ensure its suitability. Invariably this may require some further model calibration.

2.1.2. LCC have undertaken a review and applied some minor re-calibration to the LLITM Standard (Unconstrained version) 2014 highway base year to ensure its suitability for this commission.

2.1.3. Sections 3.2 and 3.3 summarise the final validation statistics.

2.2. Link Flow Validation

2.2.1. WebTAG compliance for traffic flows is governed by meeting the following acceptability rules in at least 85% of cases:

- Individual flows within 100 veh/hour of counts for flows less than 700 veh/hour
- Individual flows within 15% of counts for flows from 700 to 2,700 veh/hour; or
- Individual flows within 400 veh/hour of counts for flows more than 2,700 veh/hour; and
- GEH values of <5 for individual flows.

2.2.2. A local area review of the 2014 base year highway model for AM and PM Peak hours is shown in Figure 2-1 and Figure 2-2 where:

- PASS
- FAIL (Model over assigning)
- FAIL (Model under-assigning)

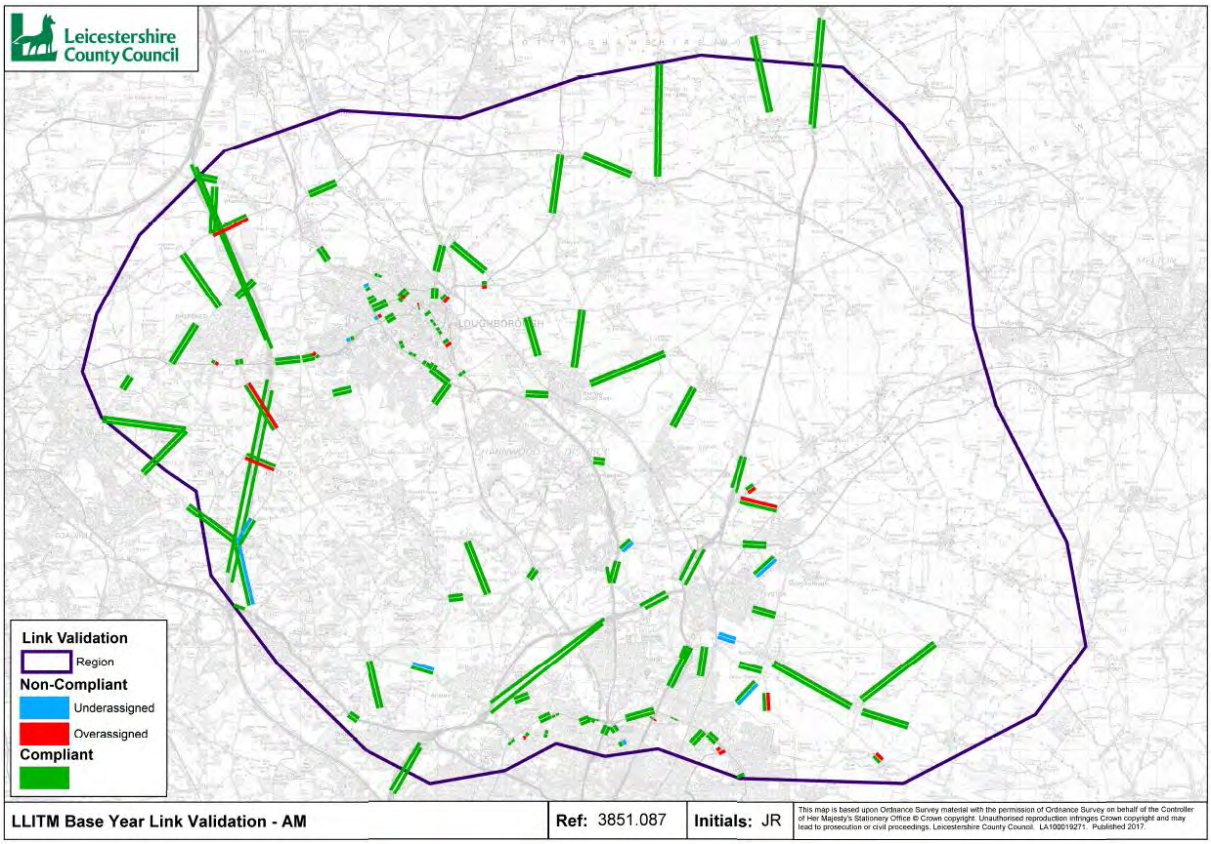

Figure 2-1: 2014 Base Year Link Flow Validation, AM Peak

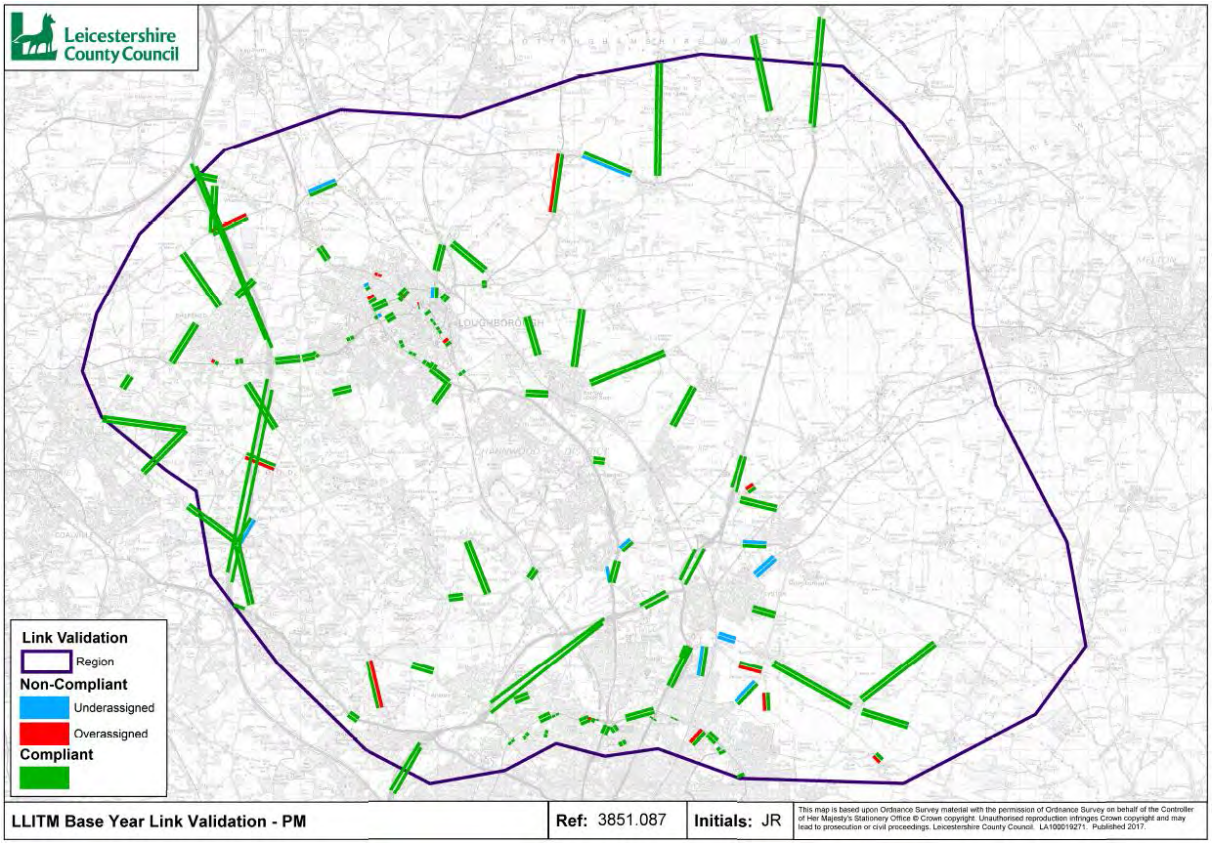

Figure 2-2: 2014 Base Year Link Flow Validation, PM Peak

2.2.3. Table 2-1 shows how LLITM performs with respect to WebTAG guidance on modelled versus observed link flows in the Charnwood area.

2.2.4. In the AM Peak hour 86% of links pass with 85% passing for the PM.

	AM	PM
No. Links	187	185
% Links	86%	85%

Table 2-1: Link Validation in the Charnwood Area – WebTAG Compliant Links

2.2.5. The link validation within the area of influence is good and implies the model to be fit for purpose for this 'high level' appraisal.

2.3. Journey Time Route Validation

2.3.1. WebTAG compliance for modelled journey times is governed by meeting the following acceptability rules in at least 85% of cases:

- Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)

2.3.2. Figure 2-3 shows the LLITM journey time validation routes for the Charnwood option testing Area of Influence.

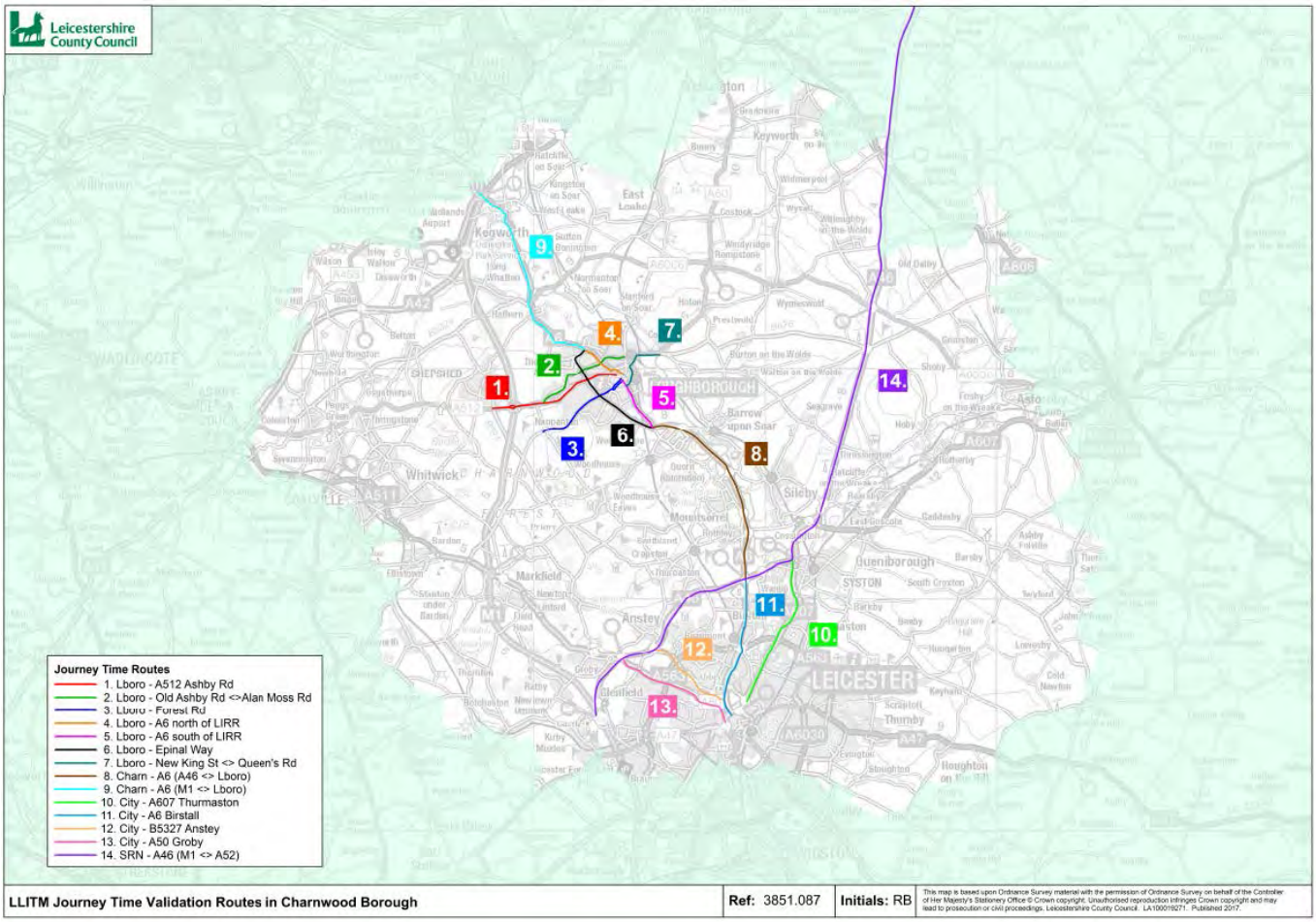

Figure 2-3: 2014 Base Year Journey Time Validation Routes

2.3.3. The route by route breakdown of model performance versus observation is detailed in Appendix A. In summary, for the AM Peak hour, 93% (26 of 28) of journey routes meet the WebTAG acceptability guidelines with 82% (23 of 28) passing for its PM Peak equivalent. Although the PM Peak model falls outside of the 85% WebTAG threshold, closer inspection of the validation shows a very marginal failure of 2 seconds on one of the routes. Given the 'high level' nature of this appraisal it is considered that this level of non-compliance is negligible and sufficiently close to

pass. This would mean that the acceptability guidelines are met with 86% (24 of 28) of routes meeting the criterion.

2.3.4. The journey time validation within the area of influence is good and implies the model to be fit for purpose for this 'high level' appraisal.

2.4. Model Suitability

2.4.1. The model has been successfully validated against WebTAG criteria in terms of observed versus modelled flows and journey times. A sufficient level of compliance has been achieved meaning that the model is fit for the purposes of this commission.

3. Methodology

3.1. Background Development Included in the 2036 Core Scenario

3.1.1. The project proposal provided details of assumed background planning assumptions included in the 2036 LLITM Core scenario for client approval and was based on information previously supplied by CBC the summer 2015 as part of general LLITM development.

3.1.2. After review by the client a number of changes were incorporated to reflect more recent updates to the Charnwood planning assumptions involving an increase in assumed housing growth to 2031.

3.1.3. The housing growth adjustments were comprised of a net uplift in minor residential developments across the Borough together with a downward revision to planning trajectories for its 3 Strategic Urban Extension's (SUE's).

3.1.4. The uplift in minor residential developments is summarised in Figure 3-1 below. Although there is a net increase of 400 additional dwellings it is worth noting that there are reductions as well as increases to previous assumptions.

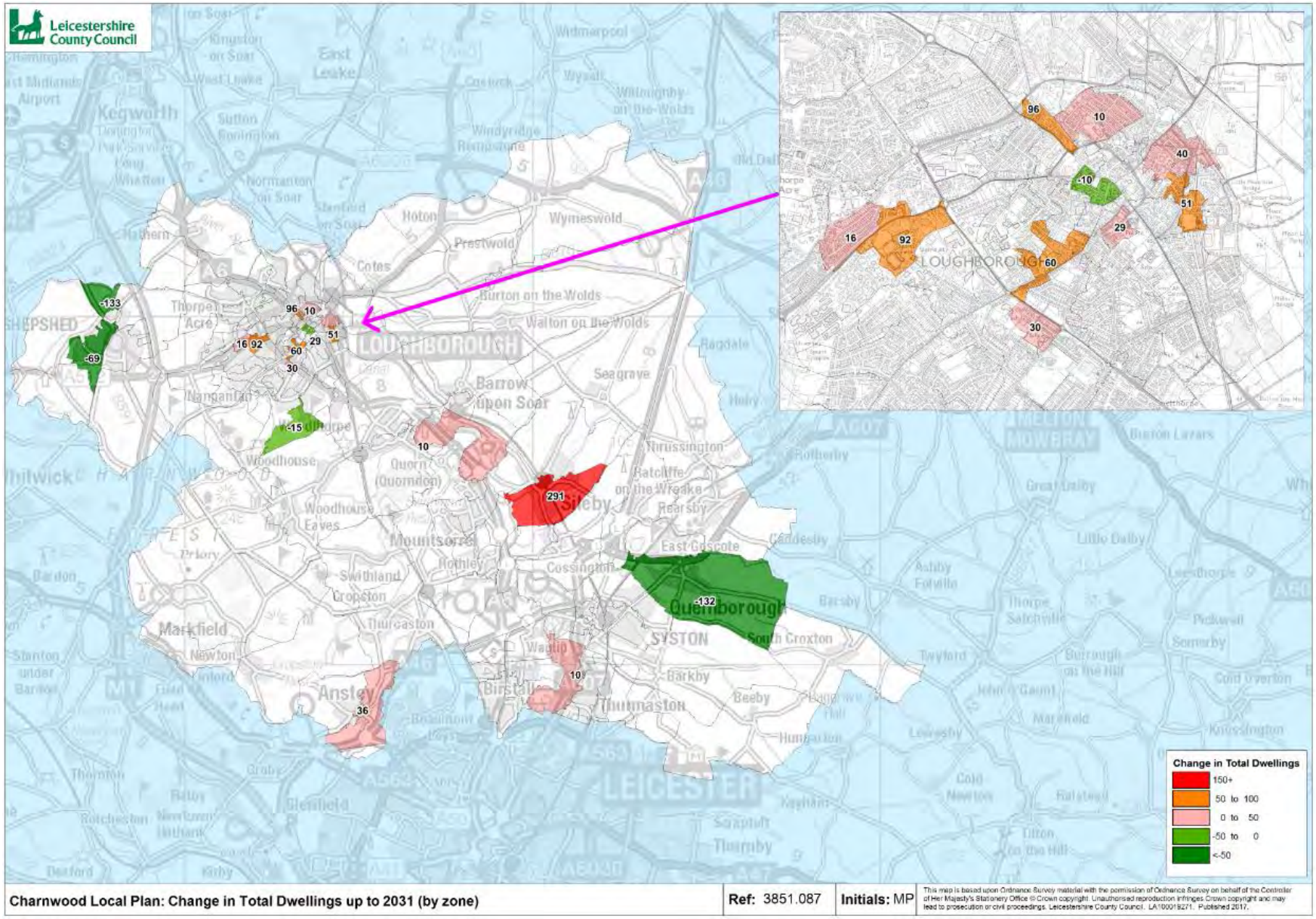

Figure 3-1: Change in Total Dwellings to LLITM Zones for Minor Residential Developments

3.1.5. In terms of the SUE planning trajectories Table 3-1 details the amendments made to the model culminating in a net 1,320 reduction in 'built-out' dwellings by 2036.

SUE	Modelled	Projected	Difference
Broadnook	1,500	1,650	150
North-East of Leicester	4,500	3,720	-780
West of Loughborough	3,200	2,510	-690
Total	**9,200**	**7,880**	**-1,320**

Table 3-1: Updated Build-Out Trajectories for Charnwood SUEs by 2036

3.1.6. Although there has been a net reduction in the assumed number of SUE dwellings in-situ by 2036, a review of the trip rates supplied as part of their respective planning applications reveals the LLITM model to be under estimating the number of associated trips.

3.1.7. In this context it was deemed appropriate to align the SUE trip ends with their approved Transport Assessments[1] in LLITM model forecasts. This has resulted in an additional number of SUE trips (Table 3-2) being assigned in the LLITM model despite a reduction in actual dwellings.

SUE	Trips			
	AM In	AM Out	PM In	PM Out
Broadnook	446	512	575	214
North-East of Leicester	349	207	306	300
West of Loughborough	311	98	116	238
Total	***1,106***	***817***	***997***	***752***

Table 3-2: 2036 additional SUE Trips due to application of TA Trip Rates

3.1.8. In terms of the minor uplift, trip rates from LLITM Lite (see section 3.2 for further discussion of trip rates used) were applied to convert the adjustment to dwellings into associated highway trips. The 2036 Core scenario was then amended to add/subtract trips from the relevant LLITM zone resulting in a net increase of 400 dwellings equating to the trip additions of Table 3-3.

	Trips			
	AM In	AM Out	PM In	PM Out
+400 Dwellings	57	164	164	57

Table 3-3: Trips Added to 2036 Core Matrices for Minor Residential Development Amendments

[1] Transport Assessment trip rates are typically higher than the trip rates generated within the LLITM Trip End model. This is because LLITM trip rates are based on NTEM 24hour rates whereas TA rates tend to utilise peak hour TRICs rates.

3.2. Development of Option Testing Demand

3.2.1. Charnwood BC presented seven development options for modelling. Of the seven options modelled, four represent 'low growth' scenarios (8,100 dwellings), and a further three represent 'high growth' scenarios (15,700 dwellings).

3.2.2. Table 3-4 lists the options modelled, and details the quantities of dwellings located in key areas of interest such as Loughborough, Shepshed, the 'Leicester Urban Area' (i.e. Birstall, Thurcaston, Thurmaston, Syston) and the Cotes New Settlement.

Option	Title	Growth	Dwellings					
			Lboro	Shep	LUA	Cotes	Other	Total
1	Urban Concentration A	Low	4,000	500	3,000	0	600	8,100
2	Urban Concentration B	Low	800	2,200	3,000	0	2,100	8,100
3	Dispersed Settlement Hierarchy	Low	2,000	2,200	1,000	0	2,900	8,100
4	Urban Concentration & New Settlement	Low	2,000	1,500	2,500	1,000	1,100	8,100
5	Urban Concentration	High	5,150	2,650	3,300	0	4,600	15,700
6	Dispersed Settlement Hierarchy	High	4,600	2,500	3,300	0	5,300	15,700
7	Urban Concentration & New Settlement	High	3,300	2,600	3,900	1,500	4,400	15,700

Table 3-4: Development Options (supplied by Charnwood BC)

3.2.3. The composition, including the location of each constituent part, was defined by the client for each of the seven development options to be tested.

3.2.4. As part of this process, and particularly for the larger component developments, further client liaison was undertaken to identify their 'realistic' access points onto the highway network.

3.2.5. This information was then applied to the model by allocating the various development demand components to specific LLITM zones which, themselves, were loaded to the highway network at the identified access points.

3.2.6. The allocation of this demand to LLITM zones has involved the application of generic trip rates obtained from our LLITM Lite model to convert dwellings into trips. These trip rates are shown in Table 3-5 and have been agreed with the client for this commission.

	Generation	Attraction
AM Peak	0.410	0.142
PM Peak	0.142	0.410

Table 3-5: LLITM Lite Trip Rates

3.2.7. Having identified the likely number of trips being generated and attracted from/to these developments it was necessary to apply each with a suitable trip distribution. This was undertaken as follows:

- For those areas having a modest increase in housing any additional trips were added to existing LLITM zones, and hence, exploit the existing zonal trip distribution.

- Dwellings in Loughborough (South & South-West), Syston (East), Anstey, Shepshed, and Thurcaston were added across fifteen new development zones[2]. The trips generated from these dwellings utilised the trip distribution of a suitable adjacent parent zone (i.e. predominantly residential land use).

- For dwellings in the Cotes new settlement, itself remote from any nearby residential zones, it was necessary to generate a 'bespoke' trip distribution using LLITM Lite's inbuilt gravity model.

[2] The allocation of new LLITM zones to larger developments permits a greater understanding of their specific traffic movements in any subsequent analysis. This is likely to be of use to the client.

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3.3. Area of Influence

3.3.1. In order to gauge how a particular option performs over the wider area it is useful to identify its Area of Influence (AoI) within which network statistics can be extracted and reported. Such information can then be used as a useful comparator between options.

3.3.2. To speed up the process of compiling such statistics by option a pragmatic approach involving the identification of a single AoI based on the client's high growth Option 7 has been adopted.

3.3.3. This has been achieved by considering forecast LLITM peak hour flow differences in excess of +/- 5% between 2036 'with' and 'without' the Option 7 developments.

3.3.4. Figure 3-2 and Figure 3-3 show the highlighted links from the AM and PM Peak hour output from which the AoI has emerged.

3.3.5. The AoI captures Charnwood plus a 5km buffer surrounding the District boundary. This encompasses key areas of interest for stakeholders such as the North of Leicester City and parts of South Nottinghamshire.

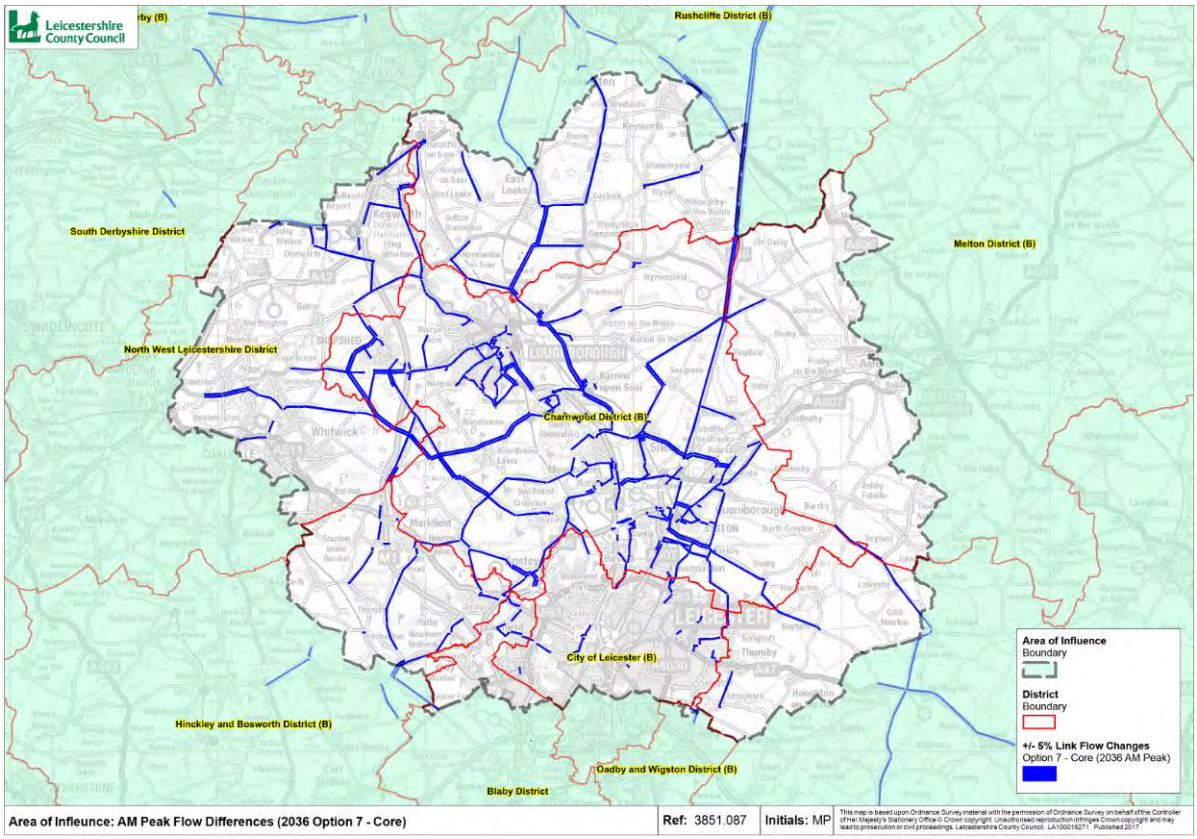


Figure 3-2: Area of Influence, AM Peak

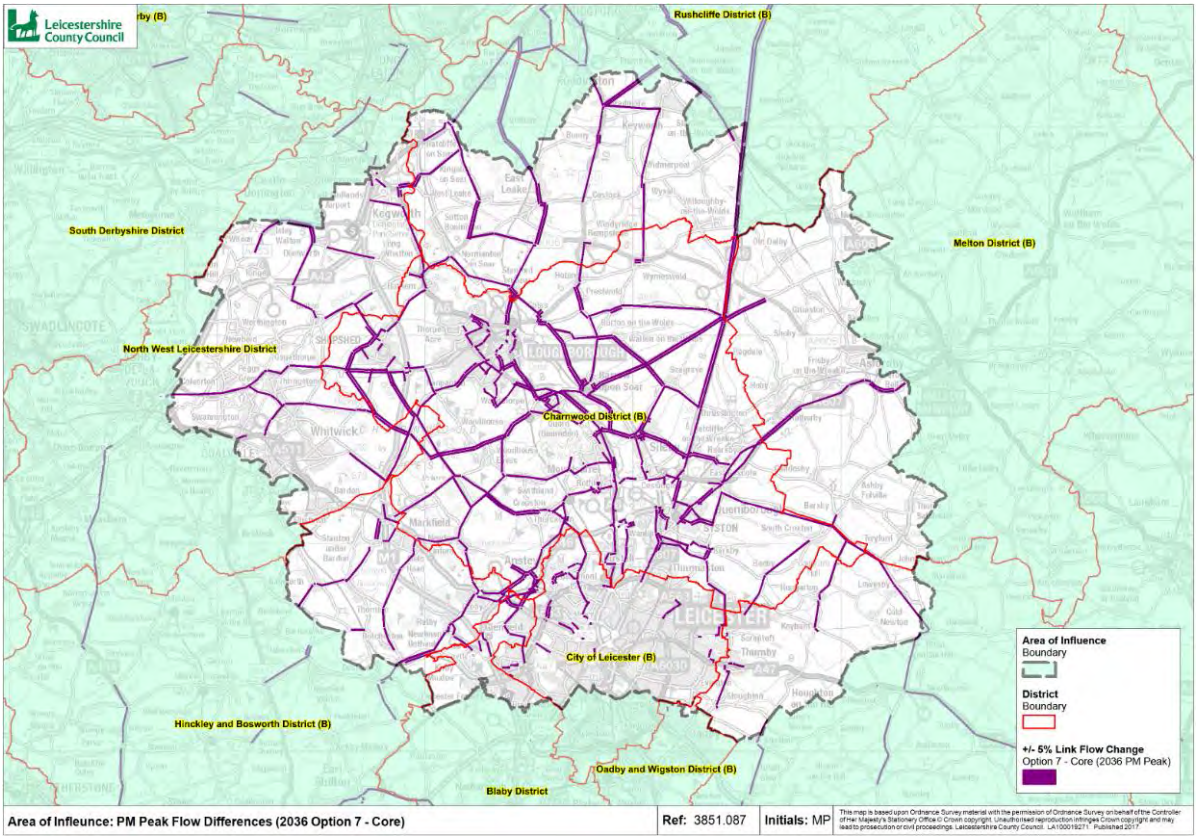


Figure 3-3: Area of Influence, PM Peak

3.4. Presentation of Modelling Output

3.4.1. Due to the amount of modelled output contained in this report the analysis and presentation of these results is split between Chapters 5 to 13.

3.4.2. Chapter 5 deals with a review and comparison of option performance over the identified Area of Influence and has ranked each under five specific congestion criteria in an effort to provide the client with potential 'winners and losers'.[3] It also provides an overview of all junctions impacted by the option modelling, and offers some commentary on consistently impacted areas of the network across the area of influence.

3.4.3. Chapter 6 provides an indication of the effects of background growth, in terms of flow differences, on the local area between 2016 and 2036. It also summarises the distribution of congested junctions in the 2036 Core scenario.

3.4.4. Each of chapters 7 through 13 provides comprehensive modelling outputs of the seven options. The following output is reported by option within the Area of Influence:

- Link flow difference plots (pcus[4]) – 2036 Option minus 2036 Core. Flow differences between -20 and +20 pcus have been excluded, as this level of impact is deemed minimal to network performance.

- Link delay difference plots (seconds) - 2036 Option minus 2036 Core. Delay differences between -10 and +10 seconds have been excluded from the mapping due to the minimal significance of this level of link delay change.

- Junction analysis plots – these plots capture two different metrics in order to assess junction performance across nodes (proxy for junctions):

    - Volume/capacity ranges: This metric highlights nodes where the volume/capacity value for the junction increases significantly between Core and Option scenarios. Nodes are mapped which increase to either a congested (85-100%) or heavily congested (>100%) category.[5]

[3] The network summary statistics used to construct this ranking table are included in Appendix D.
[4] In LLITM traffic flow is expressed in passenger car units per hour (pcus/hr). The concept of the pcu is used to convert different vehicle types into a standard passenger car unit for ease and accuracy of assessment.
[5] The mapping has excluded any node which, even if it increases into a higher volume/capacity category, has increased by <5 %. This is because a node could increase from 84 (approaching congestion) to 86 (congested), but in reality this would not represent a significant change in junction operation, rather a minor change which happens to cross over the category boundary.

  - Delay per pcu – This metric has been introduced to further categorise those junctions already heavily congested (v/c > 100%) in the core scenario by highlighting any significant, associated delay increases (> 10 seconds per pcu). The implication here is that a 'significant' option induced worsening of any such junctions, characterised by a large increase in delay, would not be flagged up again as the v/c metric is already in the 'most congested' category.

- Select link analysis (pcus) – showing development-only traffic flows from the larger component developments of each option. As with the flow difference plots, values between -20 and +20 pcus are not mapped. This is useful for considering mitigation measures as it shows the number and routing of trips through the network to/from these larger developments.

- Matrix Sectoring (pcus)- shows the change between core and option demand and permits the analysis of trip movements between sectors based on the client's request to understand option induced changes in trip movements between urban centres (see Figure 3-4 for sector mapping). Any sector-to-sector movements of <10 trips are excluded from the matrix.

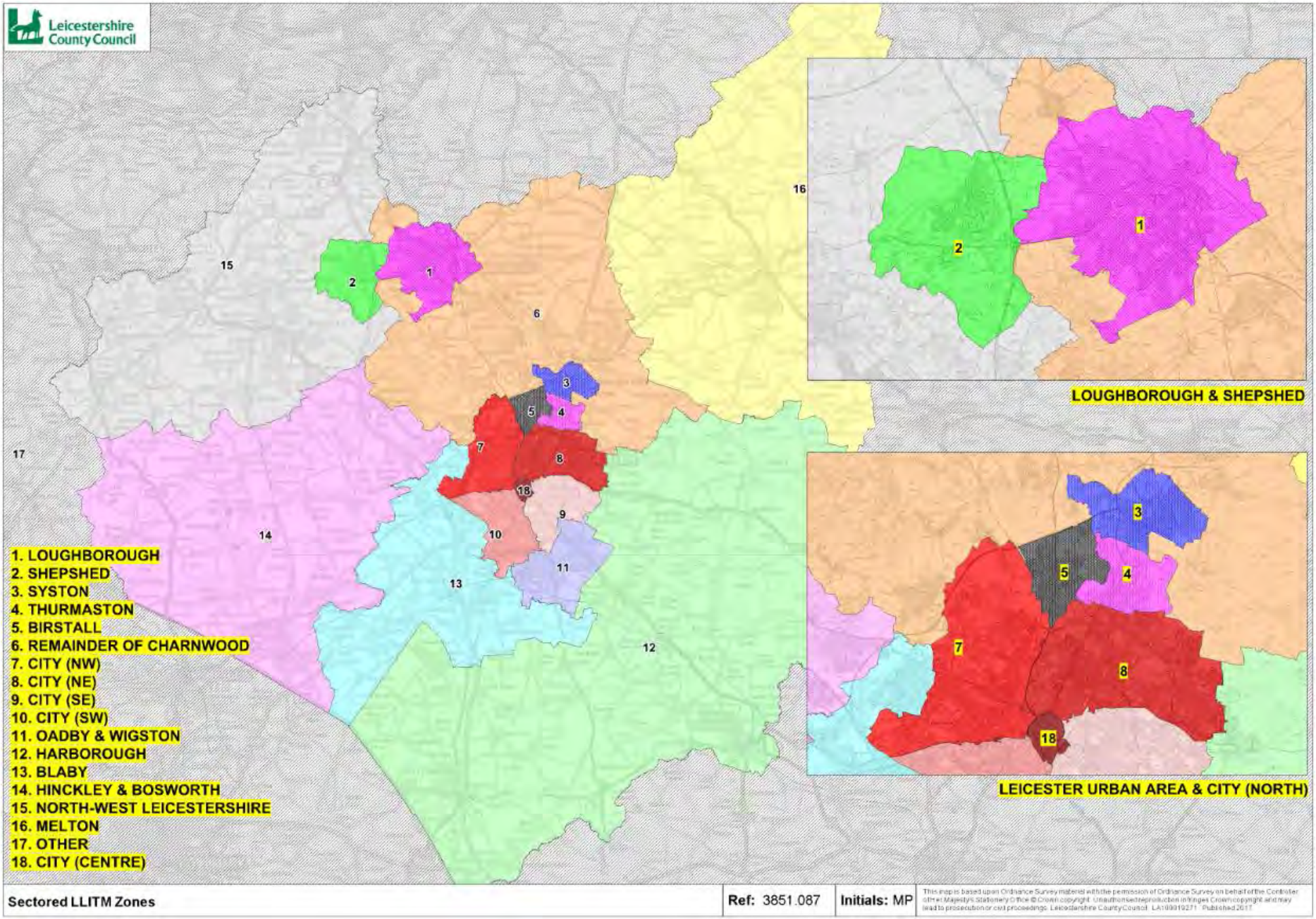


Figure 3-4: Sectored LLITM Zones

4. Results: Summary

4.1. Appraisal Summary of Options across the Area of Influence

4.1.1. In an effort to provide insight into the emerging forecast performance of the seven development options it is useful to contrast and compare each against relevant, measurable congestion metrics to assist in the identification of a preferred development strategy.

4.1.2. This approach lends itself to the adoption of an informal scoring exercise in which 'high level' option sifting can be measured.

4.1.3. The following five metrics, involving the change in each when compared to the 'without option', have been used to measure option performance:

- Over Capacity Queues (pcu.hrs)
- Total Travel Time (pcu.hrs)
- % of Traffic in Severe Congested Conditions
- Total PCU Delay per Km (sec/Km)
- No. Additional Congested Junctions

4.1.4. Although each of the five metrics is capturing a form of network performance it is worth noting that the number of additional congested junctions, and the more detailed analysis contained in each option, will provide an additional tool for identifying potential mitigation measures and hence their costs.

4.1.5. This is also relevant with respect to comparisons between the client's low and high growth options involving the addition of 8,100 (Options 1 to 4) and 15,700 (Options 5 to 7) dwellings respectively. Not surprisingly, congestion statistics are going to be worse when comparing low and high growth together. However, the potential for higher growth options being able to fund larger mitigation could have its merits.

4.1.6. The detail of the five metrics used is contained in Appendix D but the summary results, in the form of a scoring matrix based on a ranking process, is shown in Table 4-1 below.

Opt	High / Low Growth	Over-Capacity Queues (pcu.hrs)	Total Travel Time (pcu.hrs)	% Traffic in Severe Congested Conditions	Delay per Km (s/Km)	Increase in Congested Junctions	Average Rank	Overall Rank
1	Low	*4*	*4*	*4*	*4*	*4*	***4.0***	***4***
2	Low	1	1	2	2	1	**1.4**	**1**
3	Low	2	2	1	1	2	**1.6**	**2**
4	Low	3	3	3	3	3	**3.0**	**3**
5	High	7	6	5	7	5	**6.0**	**6**
6	High	6	5	7	6	6	**6.0**	**6**
7	High	5	7	6	5	6	**5.8**	**5**

Table 4-1: Option Scoring Matrix based on Ranking of Congestion Metrics

4.1.7. This chapter will assess the merits of the low growth options in isolation, before considering the additional impacts added to the network through the high growth options.

4.2. Low Growth Analysis

4.2.1. For the low growth scenarios, Option 2 (Urban Concentration B) is marginally the better performer with top ranking for three of the five metrics and second ranking for the remaining two categories meaning it is likely to have the lowest impact on congestion and highway performance.

4.2.2. Option 3 (Dispersed Settlement Hierarchy) also scores well with top ranking for two of the five metrics and second ranking for the remaining three categories. There appears to be very little to choose between Options 2 and 3.

4.2.3. By contrast the evidence suggests Option 1 (Urban Concentration A) and Option 4 (Urban Concentration with New Settlement) have larger congestion implications and score less favourably.

4.2.4. An indication of the reasons behind the relative success of Options 2 and 3 with respect to the other low growth options is provided by consideration of the location and number of junctions under 'option induced' stress shown below in Figure 4-1(and further detailed in Appendix B).

4.2.5. It is revealing that Option 2 is characterised by less 'option induced' over capacity junctions than the other three low growth options – 38 compared with 48 (Option3), 51 (Option 4) and 54 (Option 1).

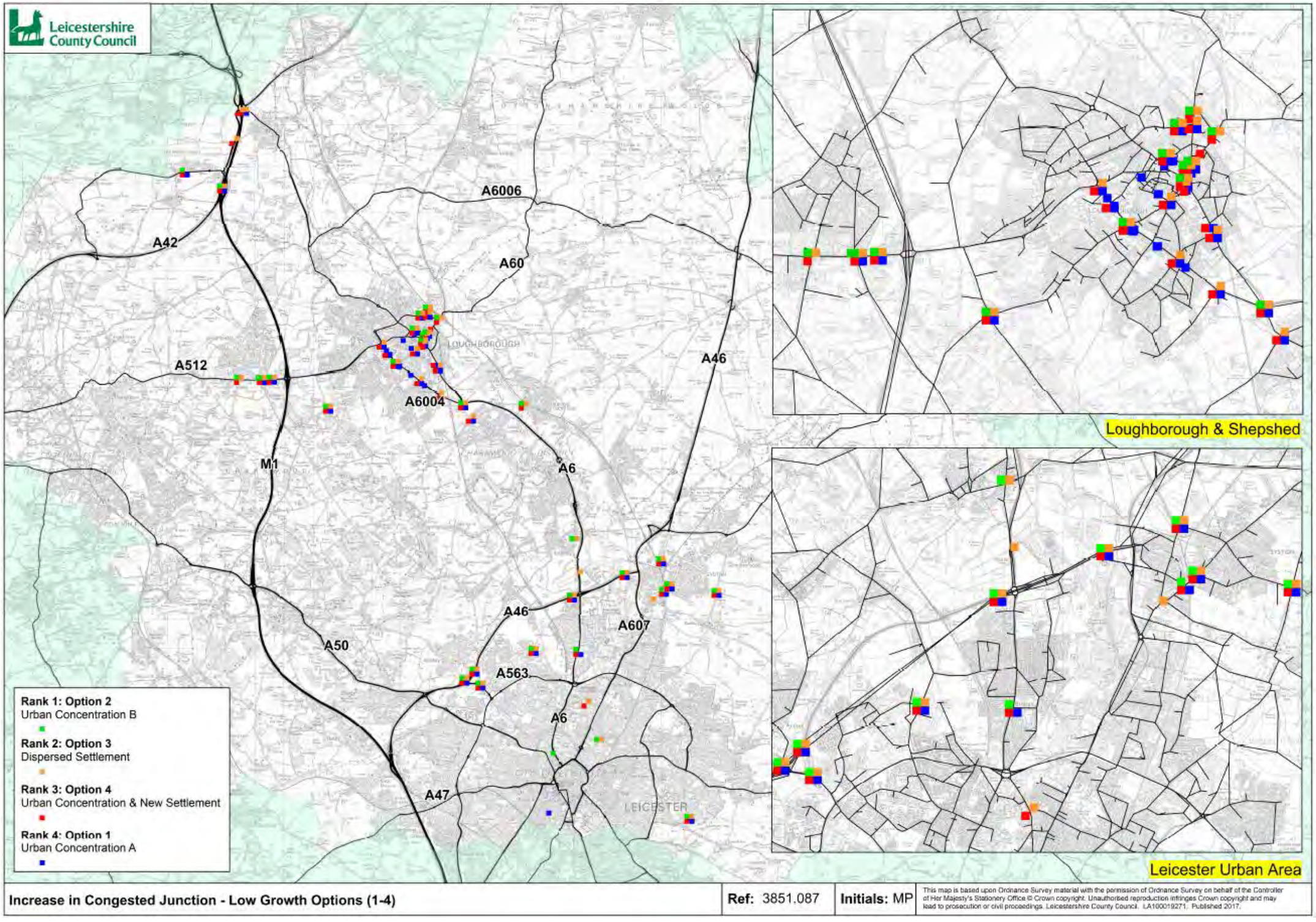


Figure 4-1: Junctions with Significant Increase in Congestion, Low Growth Options

4.2.6. Visually, attention is drawn to a number of known congestion hotspots which help to explain some of the modelled results:

- Loughborough
  - Epinal Way
  - Snells Nook/Nanpantan Rd
  - A6 corridor through the town
  - A60 corridor
  - Belton Road and the Loughborough Eastern Gateway
- Shepshed, A512 between Charnwood Rd and M1 J23
- A46 Leicester Western Bypass
- Melton Rd, Syston
- Anstey Lane, Leicester[6]
- M1 between J23a and J24

4.2.7. In analysing the low growth output it has become apparent that some junctions are consistently showing signs of breakdown across one or more options. A further refinement to the sifting process has been undertaken in which consideration is given to the 'worst junctions' (based on the 50 highest 'option induced', flow weighted delay increases) across all four low growth options.[7]

4.2.8. The ranking has been undertaken across the combined low growth options (1 to 4) to identify the junctions depicted in Figure 4-2 (AM Peak) and Figure 4-3 (PM Peak). These are then listed in Table 4-2 for reference.[8]

4.2.9. A more refined explanation of the forecast option testing results is contained below in which the narrative brings together other evidence to explain what is causing the congestion highlights from the sifting process above.

[6] The Growth Housing Fund (GHF) scheme along Anstey Lane, between the A46 and Bennion Rd, was not included in this modelling.
[7] The metric takes the delay per PCU increase across the junction from Core to Option, and multiplies by the Option flow through the junction.
[8] Appendix C also features a more detailed table showing values for flows, delay per PCU, volume/capacity, and flow-weighted delays for the flagged junctions, with differences between Core and Options scenarios.

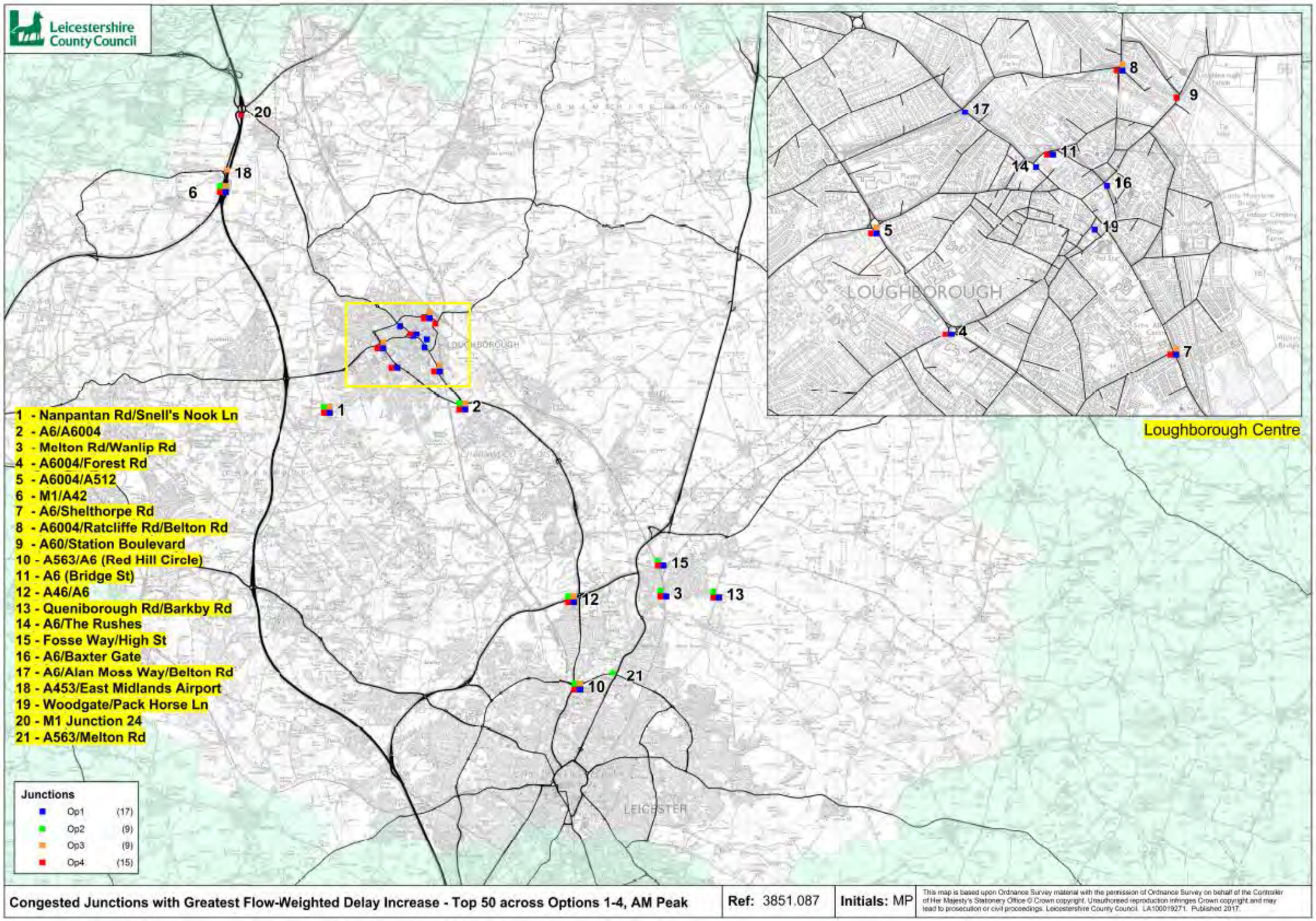


Figure 4-2: Junctions Displaying Top 50 Flow-Weighted Delay Increases across Low Growth Options, AM Peak

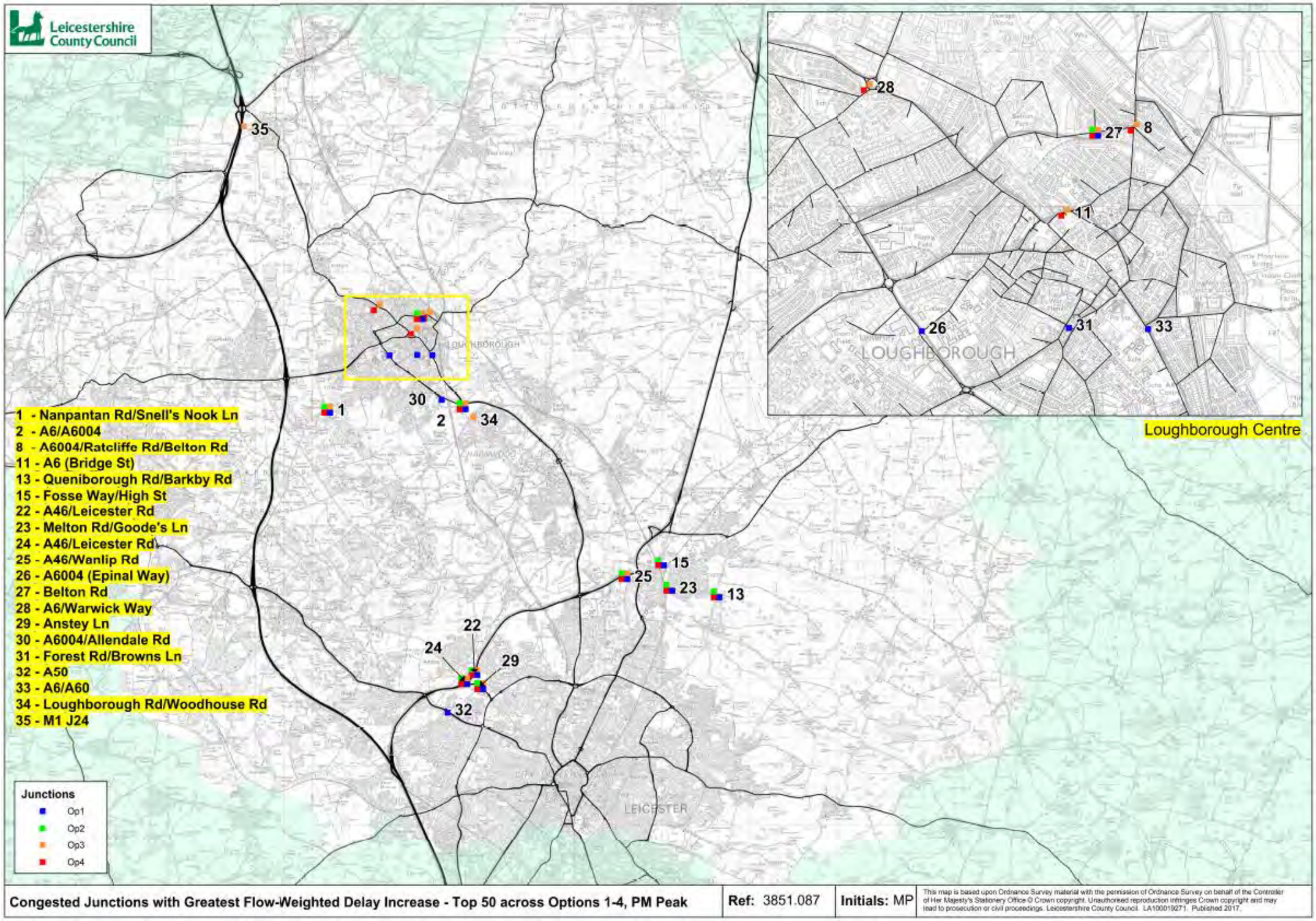


Figure 4-3: Junctions Displaying Top 50 Flow-Weighted Delay Increases across Low Growth Options, PM Peak

Map ID	Node	Description	AM - Top 50 Rank				PM - Top 50 Rank				Occurences		
			1	2	3	4	1	2	3	4	AM	PM	Both
1	60198	Nanpantan Rd/Snell's Nook Ln	1	20	7	8	2	32	13	10	4	4	8
2	60362	A6/A6004	2	19	4	9	15	19	16	14	4	4	8
3	78892	Melton Rd/Wanlip Rd	3	5		6					3	0	3
4	60922	A6004/Forest Rd	10			32					2	0	2
5	7323	A6004/Forest Rd	11		28	29					3	0	3
6	50523	M1/A42	14	12	15	16					4	0	4
7	60126	A6/Shelthorpe Rd	13		21	30					3	0	3
8	60099	A6004/Ratcliffe Rd/Belton Rd	17		39	41			37	43	3	2	5
9	69941	A60/Station Boulevard				18					1	0	1
10	1720	A563/A6 (Red Hill Circle)	22	23	48	40					4	0	4
11	73778	A6 (Bridge St)	24			50			40	33	2	2	4
12	1607	A46/A6	25	35	43	38					4	0	4
13	2508	Queniborough Rd/Barkby Rd	27	26		33	21	22		23	3	3	6
14	60062	A6/The Rushes	31								1	0	1
15	2280	Fosse Way/High St	36	34		42	35	34		42	3	3	6
16	61020	A6/Baxter Gate	37								1	0	1
17	60148	A6/Alan Moss Way/Belton Rd	44								1	0	1
18	50492	A453/East Midlands Airport			45						1	0	1
19	61009	Woodgate/Pack Horse Ln	46								1	0	1
20	50543	M1 Junction 24 (NB)				47					1	0	1
21	2011	A563/Melton Rd		49							1	0	1
22	9715	A46/Leicester Rd					1	4	9	3	0	4	4
23	7041	Melton Rd/Goode's Ln					6	5		8	0	3	3
24	9631	A46/Leicester Rd					7	11	18	12	0	4	4
25	2047	A46/Wanlip Rd					17	20	29	26	0	4	4
26	65067	A6004 (Epinal Way)					24				0	1	1
27	78902	Belton Rd					47	28	27	25	0	4	4
28	7337	A6/Warwick Way							45	30	0	2	2
29	9385	Anstey Ln					38	31	41	39	0	4	4
30	60123	A6004/Allendale Rd					36				0	1	1
31	61000	Forest Rd/Browns Ln					44				0	1	1
32	76061	A50					46				0	1	1
33	60085	A6/A60					48				0	1	1
34	60195	Loughborough Rd/Woodhouse Rd							49		0	1	1
35	59986	M1 Junction 24 (SB)							50		0	1	1
		Total	17	9	9	15	15	10	12	13	21	20	35

Table 4-2: Summary Table of Top 50 Flow-Weighted Delay Increases across Low Growth Options

4.2.10. In total, for the 50 highest flow-weighted delay increases across the four options, 21 junctions were flagged in the AM Peak and 20 in the PM Peak. This reflects the fact that a number of junctions suffer intense flow-weighted delay increases across multiple options.

4.2.11. The 'Total' row at the foot of Table 4-2 demonstrates that Option 1 has the greatest percentage of flagged junctions in both the AM Peak (34%) and PM Peak (30%) periods.

Loughborough & Shepshed

4.2.12. Given Loughborough's current congestion issues, it is not surprising to forecast a future intensification of matters in 2036 from 'background' growth alone, as depicted in Figure 4-4 below. This is despite the inclusion of committed schemes such as, the A512, Ashby Rd to A6, Derby Rd link associated with the West of Loughborough development.

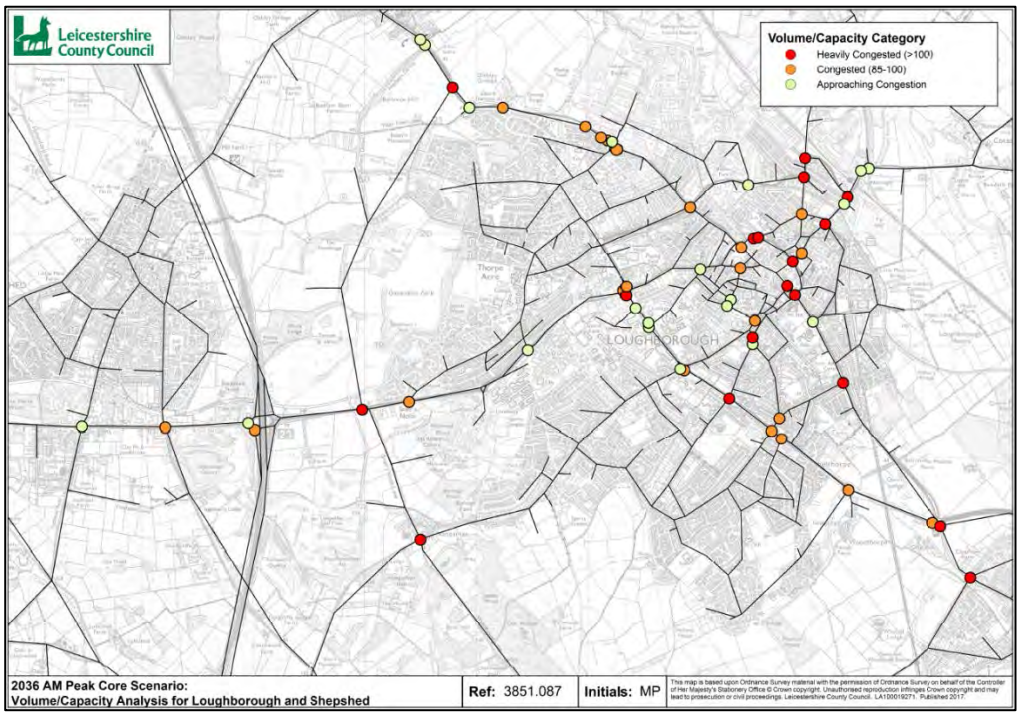


Figure 4-4: Loughborough and Shepshed Junction Performance, 2036 AM Peak Core Scenario

4.2.13. Against this backdrop Figure 4-1 indicates how 'congestion sensitive' the immediate Loughborough area is to the inclusion of additional housing epitomised by the more 'Loughborough-centric' Options 1, 3 and 4.

4.2.14. For example, the Epinal Way/Terry Yardley Way stretch of the A6004 is forecast to experience a significant deterioration in performance for most of its junctions in Option 1, accompanied by a slightly less pronounced, yet still noteworthy, worsening in Options 3 and 4.

4.2.15. Of particular relevance here is the pattern of trip distribution to/from the larger sites, such as the Loughborough South/South West development (Figure 4-5) in which there is a significant interaction within Loughborough itself, the villages off the A6, Quorn-Mountsorrel bypass and north Leicester.

4.2.16. The implication here is that the movement of these development trips is largely reliant on the already congested Loughborough network and hence the inferior highway performance.

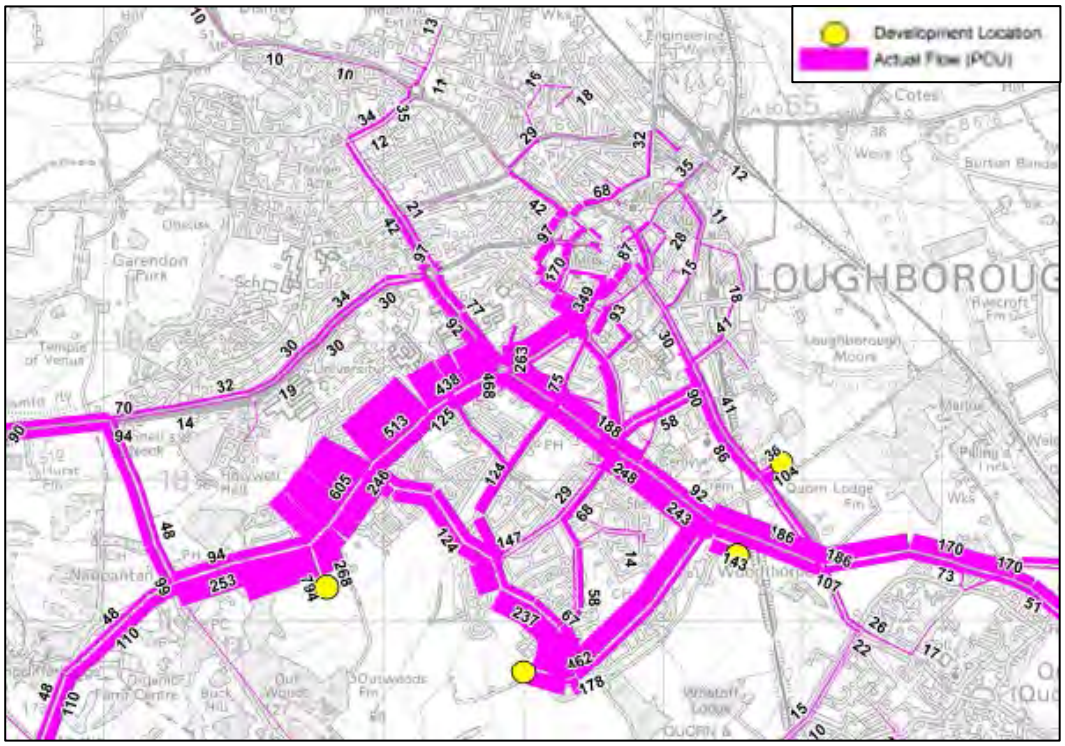


Figure 4-5: Trip Routeing to/from Loughborough South/South-West Developments, 2036 Option 1 AM Peak

4.2.17. By comparison, Option 2 (the number one ranked option) has the least amount of development earmarked for Loughborough; 800 dwellings, compared with 2000-4000 for the remaining three low growth options. As a consequence, it shows a pointedly reduced breakdown in junction performance in the town.

4.2.18. Instead, Option 2 has more of a development bias towards Shepshed which is less congested than Loughborough, other than a number of A512 junctions on the approach to M1 Junction 23.

4.2.19. The reason why a development shift from Loughborough towards Shepshed might be easing highway congestion is implied by considering the 'with/without' Option 2 development flow impact shown in Figure 4-6 below.

4.2.20. It can be seen that, for the 2036 AM Peak hour, there is an increase in flows exiting Shepshed on the less congested minor roads to the north and south as follows:

- North – via Hallamford Rd and Ashby Rd
- South – via the B591; Iveshead Rd; Charley Rd

4.2.21. There is a minor decrease in flows along the M1 southbound (~80 pcus), between M1 J23a and J23; this however is then offset by trips joining the M1 southbound from the A512. It suggests some longer distance trips may reroute as a result of extra trips loading onto the M1 at Junction 23.

4.2.22. A discussion on the sectoral movements of trips to/from Shepshed and Loughborough follows and will help to explain the patterns of movement.

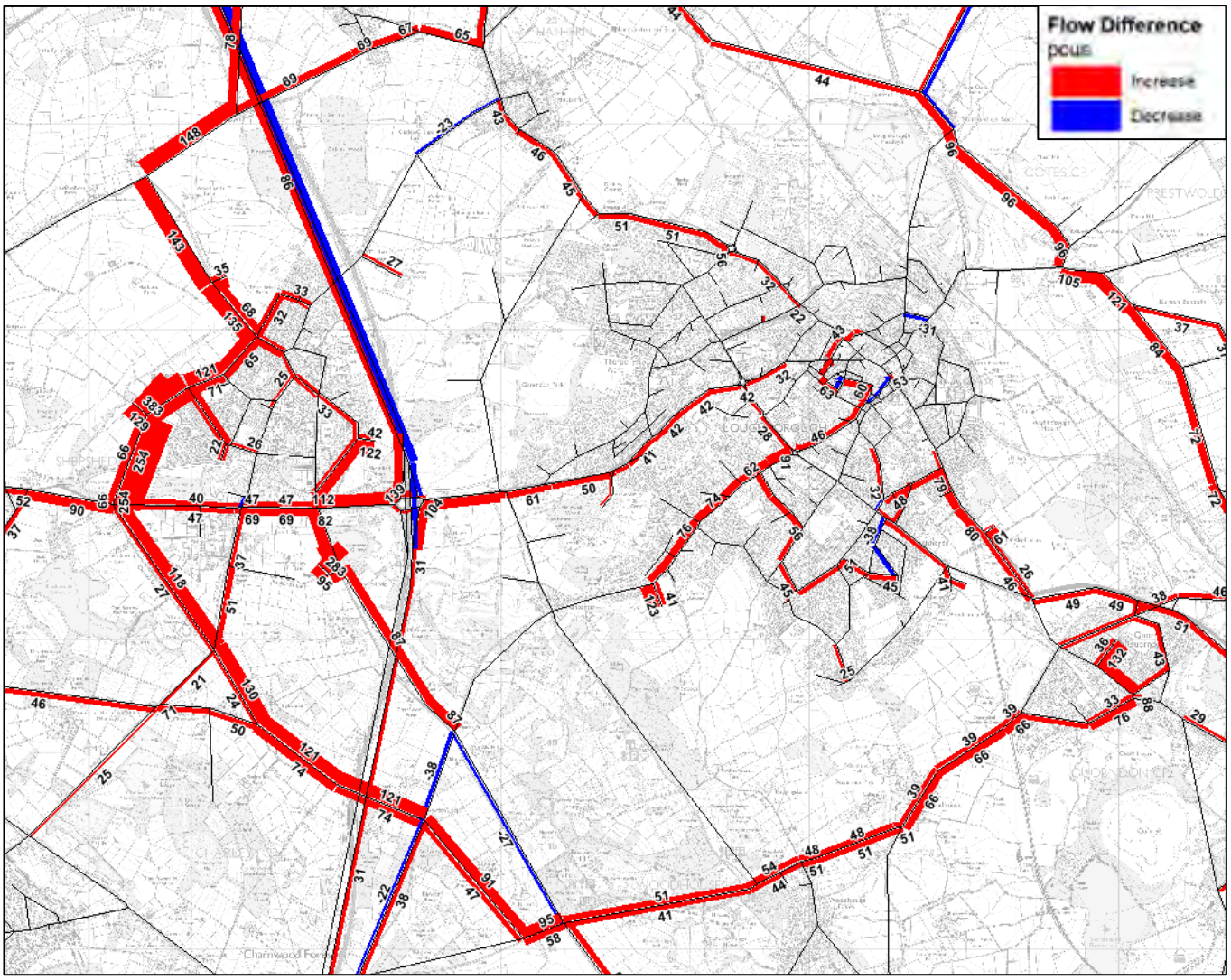


Figure 4-6: Flow Difference Plot in Loughborough/Shepshed, Option 2 AM Peak

4.2.23. By way of contrast, and in an effort to further explain the application of the more detailed 'option specific' output contained in sections 7 to 13, a comparison of the 'worst' versus 'best' scored low growth options from Table 4-1 has been undertaken.

4.2.24. Figure 4-7 and Figure 4-8 show a comparison of the significant (>100 pcu's) differences in sectoral trip movements between 'with'/'without' Option 1 (Urban Concentration A) and Option 2 (Urban Concentration B) respectively. This information has been extracted from Table 6-4 and Table 7-4.

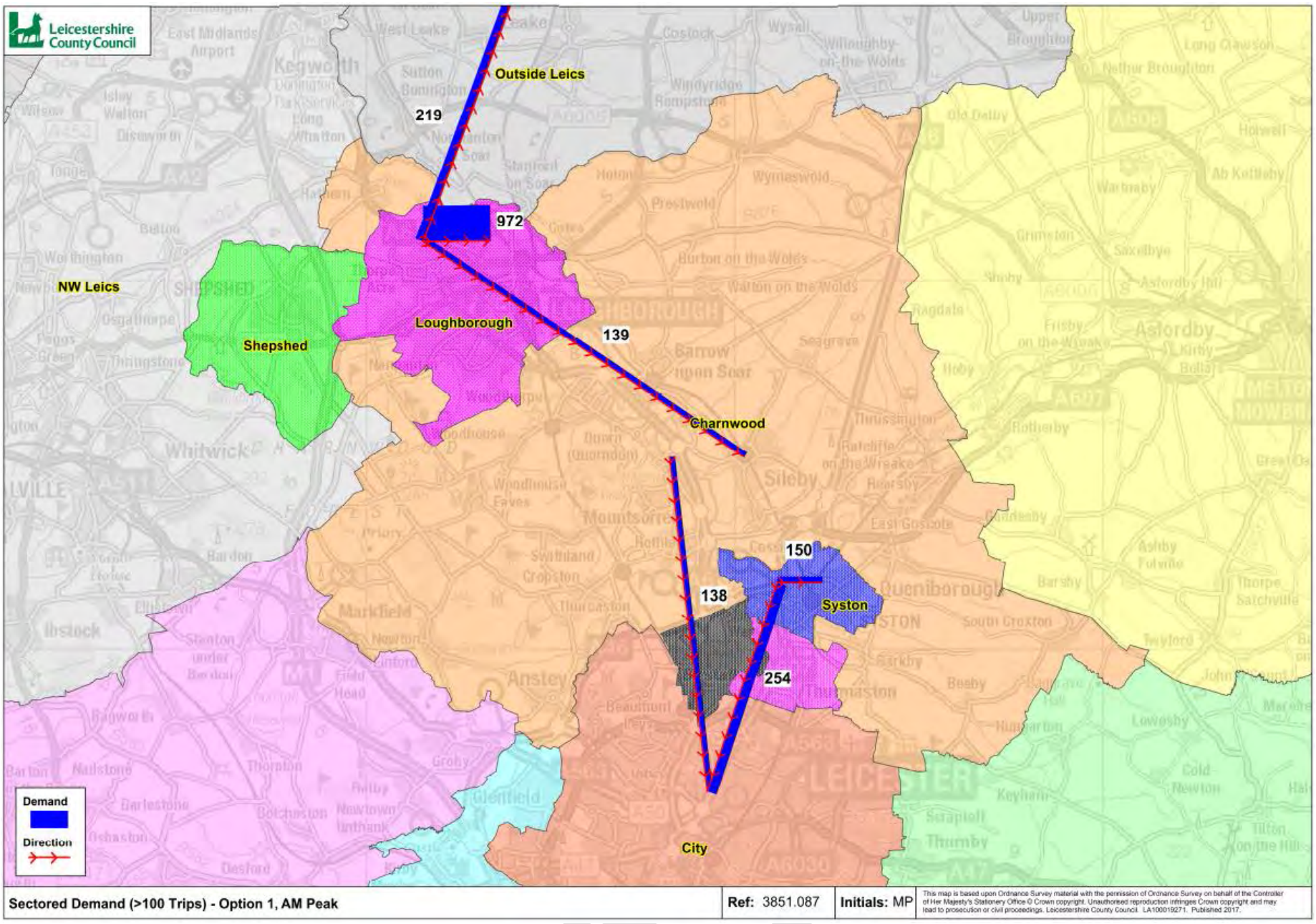


Figure 4-7: Sectored Demand – Option 1, AM Peak

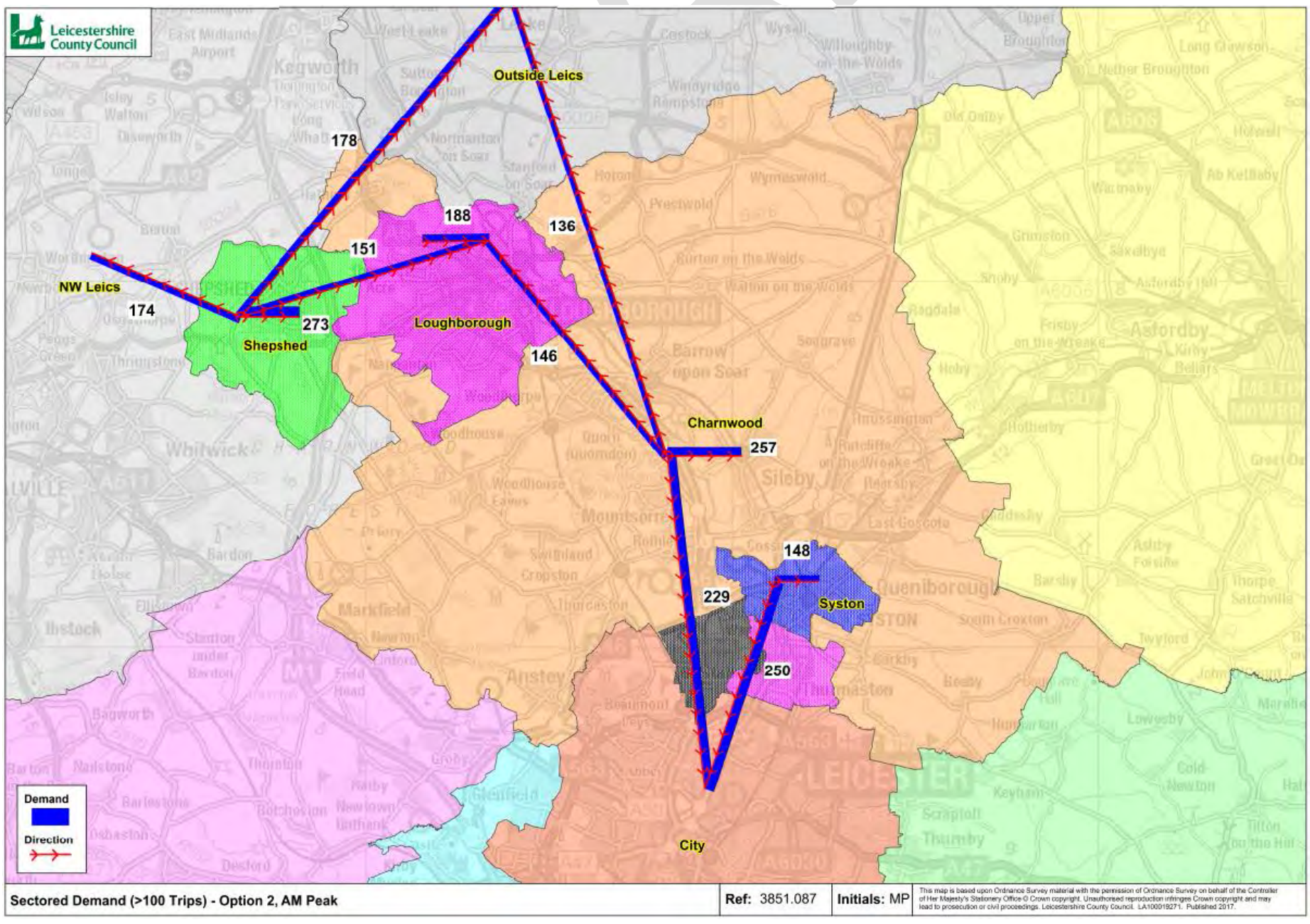


Figure 4-8: Sectored Demand – Option 2, AM Peak

4.2.25. The mapping of these sectoral differences highlights the following:

- The somewhat high containment of new, internal Loughborough trips within the town for Option 1.
- The more 'dormitory town' nature of Shepshed associated with Option 2.

4.2.26. Significantly from a sustainability perspective, and despite the weaker highway performance of Option 1 compared to Option 2, Option 1 actually has greater potential for public transport and active mode mitigation due to its success in containing a sizeable number of new trips within the Loughborough urban area.

Syston

4.2.27. One of the other areas of Charnwood identified for potential high levels of development is Syston, particularly with one large site to the southeast of the current settlement.

4.2.28. In the 2036 Core scenarios, there is a reasonable level of congestion in this area; in the AM Peak, Melton Road, A607, 'Hobby Horse' junction all show junctions either approaching congestion (v/c 75-85%) or congested (v/c 85-100%). However, there are no junctions in this area forecast to be severely congested (v/c >100%).

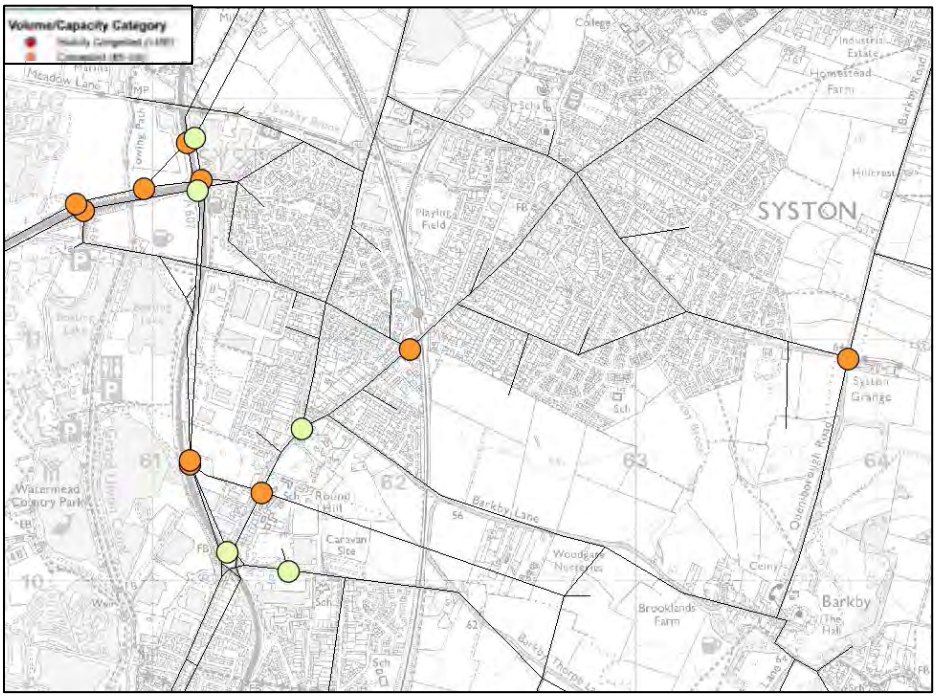


Figure 4-9: Syston Junction Performance, 2036 AM Peak Core Scenario

4.2.29. In Options 1, 2 and 4, there is a similar level of development earmarked for Syston (~1500-1750 dwellings). Figure 4-10 shows the select link plot from a large proportion of this proposed development (approx. ~1100 dwellings) for Option 1 (AM Peak).

4.2.30. This demonstrates that trips to/from the development site utilise a number of routing options of which those via Queniborough Road and Melton Road are most attractive.

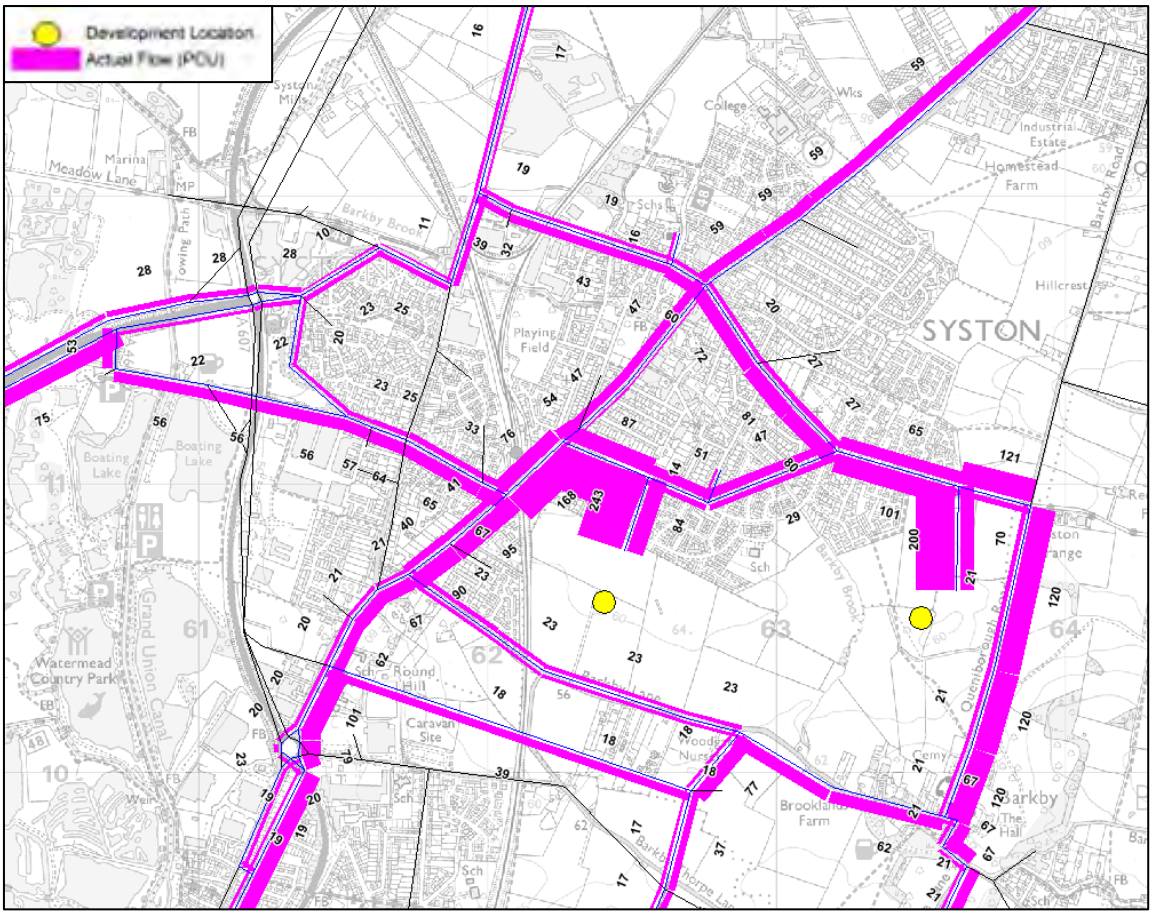


Figure 4-10: Trip Routeing to/from Syston Developments, 2036 Option 1 AM Peak

4.2.31. Consideration of these forecast development routes and the 'already congested' junctions depicted in Figure 4-9, show where these additional trips are forecast to impact already congested junctions.

4.2.32. The impact of the Option 1 development on 2036 AM traffic flows in the Syston area is shown in Figure 4-11 and captures the 'Option 1 induced' highway link flow differences.

4.2.33. It is notable that the Melton Road corridor experiences a reduction in flow inbound north of Goodes Lane as does the Fosse Way outbound. This is a legacy of increased junction delay in the area associated with the Syston development.

4.2.34. When exploring potential mitigation measures it is worthy of note that approximately 20% of the Option 1 Syston development is seeking access within the Leicester City urban area.

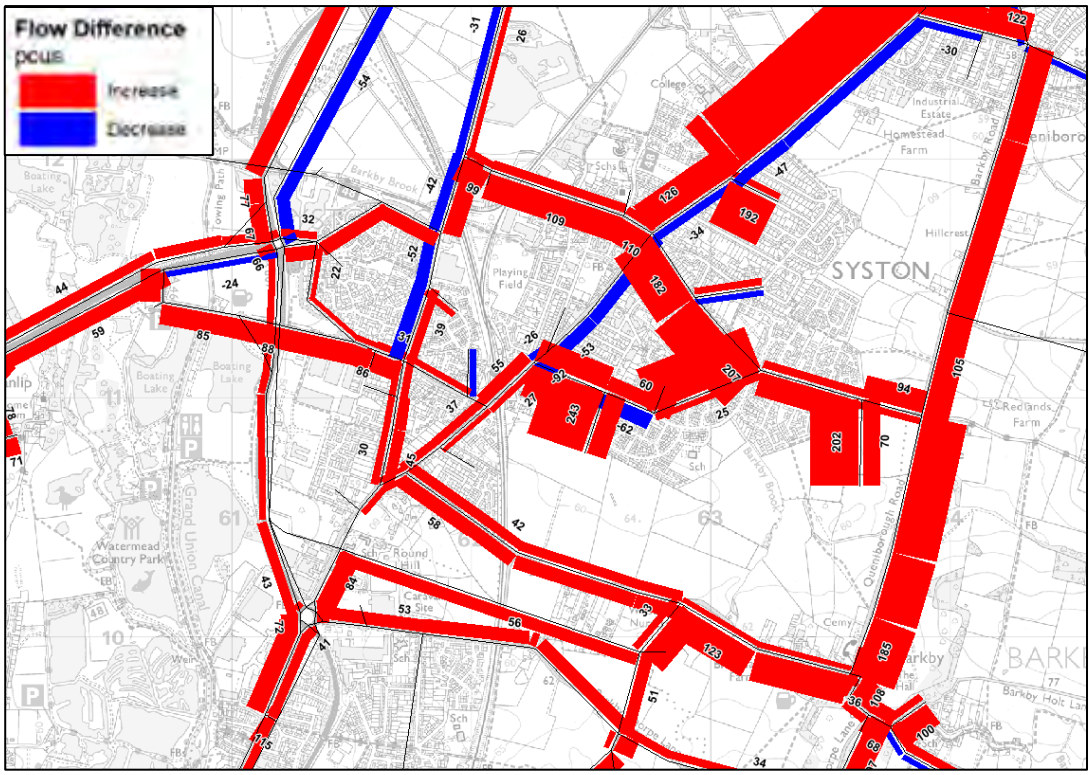


Figure 4-11: Flow Difference Plot in Syston, Option 1 AM Peak

4.2.35. The result of this extra development-induced flow on roads such as Queniborough Road and Melton Road is to prompt additional delay pressures onto a number of junctions in this area. Figure 4-2 shows significant flow-weighted delay increases at three junctions in this area in the AM Peak; Melton Road/Wanlip Road, Queniborough Road/Barkby Road, and Fosse Way/High Street. A similar pattern emerges in the PM Peak as depicted in Figure 4-3.

4.2.36. The Queniborough Road/Barkby Road junction is shown to incur an increased link flow, which is driven by a higher, development induced right-turn from Barkby Road onto Queniborough Road as shown in Figure 4-10. The Fosse Way/High Street junction also sees a similar, yet slightly less pronounced, pattern. Both are signalised junctions that could potentially be mitigated through revised signal timing plans (along with some capacity improvements).

4.2.37. The Melton Road/Wanlip Road mini-roundabout is already congested in the 2036 Core scenario without any option based development. The modelling indicates this junction will not be able to accommodate the additional development traffic without mitigation.

4.2.38. Unlike the three other low growth options, Option 3 (dispersed settlement) has a reduced development quantum (~635 dwellings) in Syston which is not forecast to induce any significant, additional congestion impacts in its vicinity.

4.2.39. The flow difference plot for Option 3 (Figure 4-12) shows some additional flow in the area, but at a reduced level to the other three options.

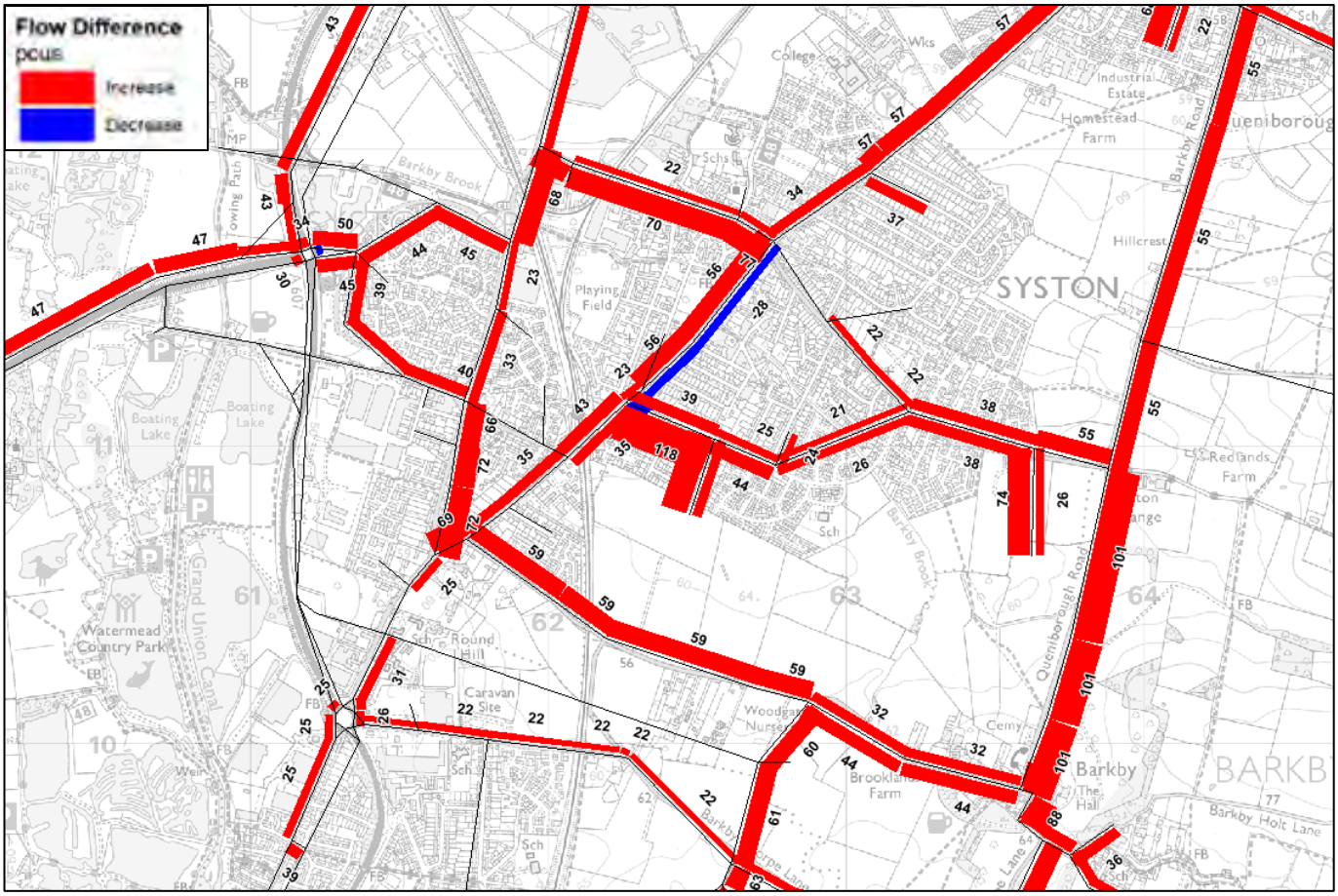


Figure 4-12: Flow Difference Plot in Syston, Option 3 AM Peak

4.2.40. Although the dispersed settlement Option 3 results in reduced congestion impacts in areas such as Syston, its more rural development location is likely to be challenging when considering the implementation of an effective public transport mitigation strategy.

4.3. High Growth Analysis

4.3.1. There is very little forecast difference in scores between any of the three high growth options tested with Option 7 (Urban Concentration and New Settlement) marginally the top performer (Table 4-1).

4.3.2. In part this is likely to be a legacy of the similarities in the specific allocation of dwellings between the three high growth options. This is shown in Figure 4-13 and highlights very little difference in their quantum and identities.

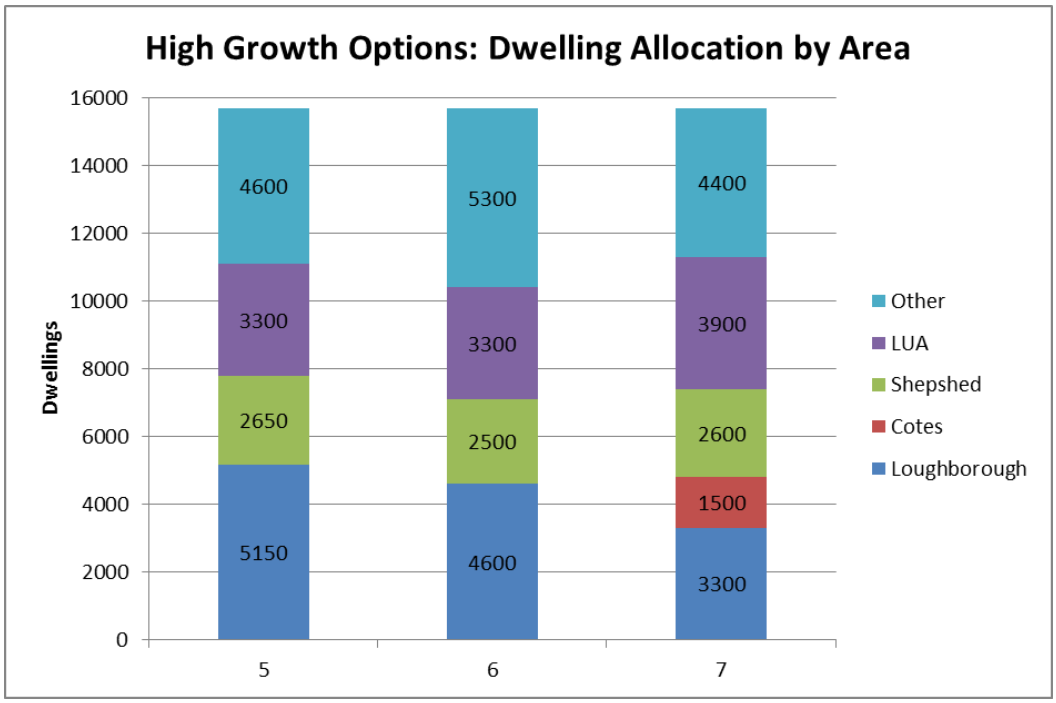


Figure 4-13: High Growth Option: Dwelling Allocation by Area

4.3.3. The main points to consider with regards to the allocation of dwellings are:

- For Options 5 and 6 Shepshed and the LUA have almost the same development allocated across options. The main difference relates to the allocation of development between Loughborough and the rest of Charnwood District with Option 5 being biased to the former and Option 6 to the latter.

- Option 7 is the least intensive with regards to development in Loughborough; the Cotes new settlement (1,500 dwellings), and Thurcaston in the Leicester Urban Area (600 dwellings) subsumes this development difference.

4.3.4. The similarities in the high growth options is reflected in the junctions incurring a significant increase in congestion as depicted in Figure 4-14 below.

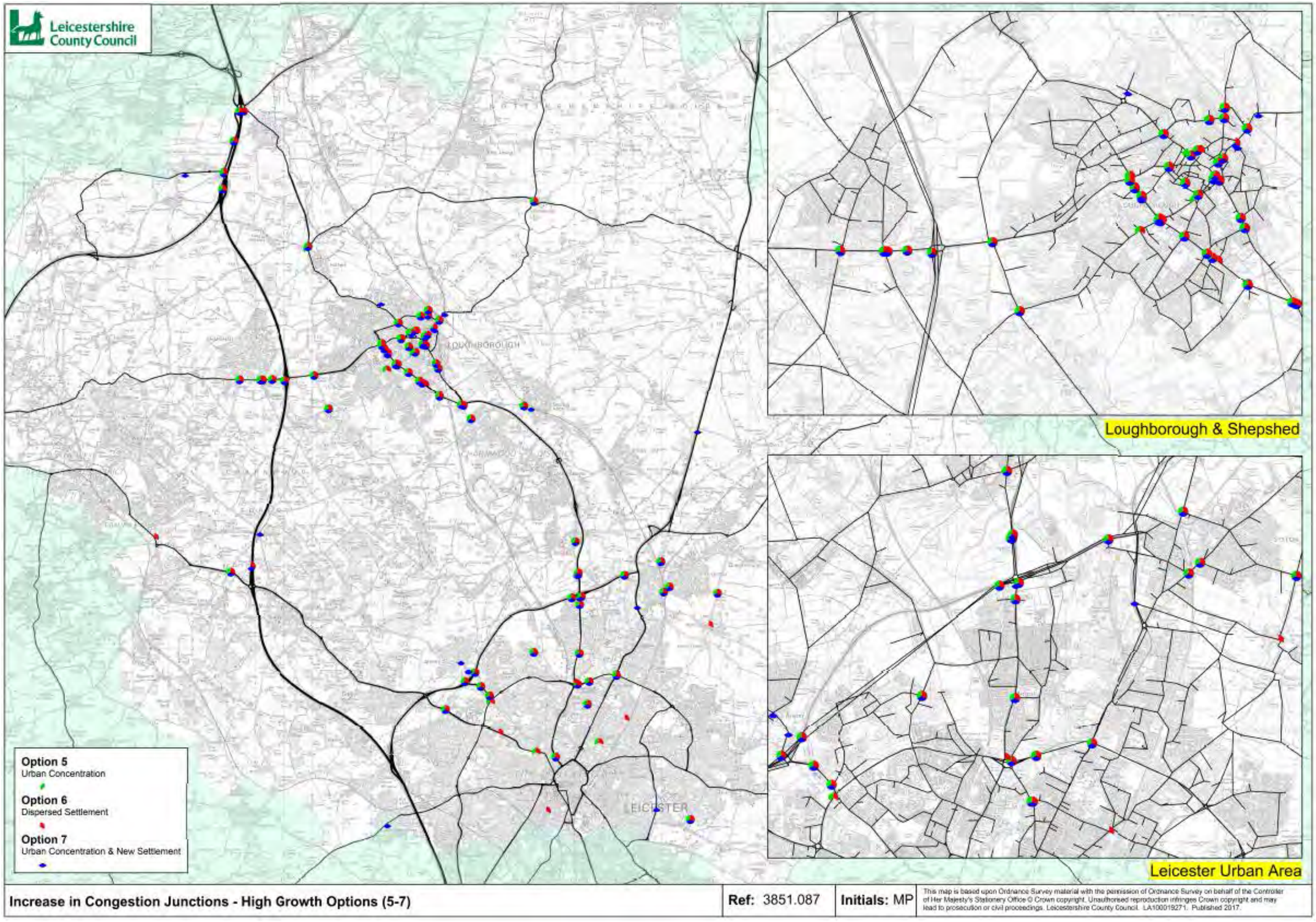


Figure 4-14: Junctions with Significant Increase in Congestion, High Growth Options

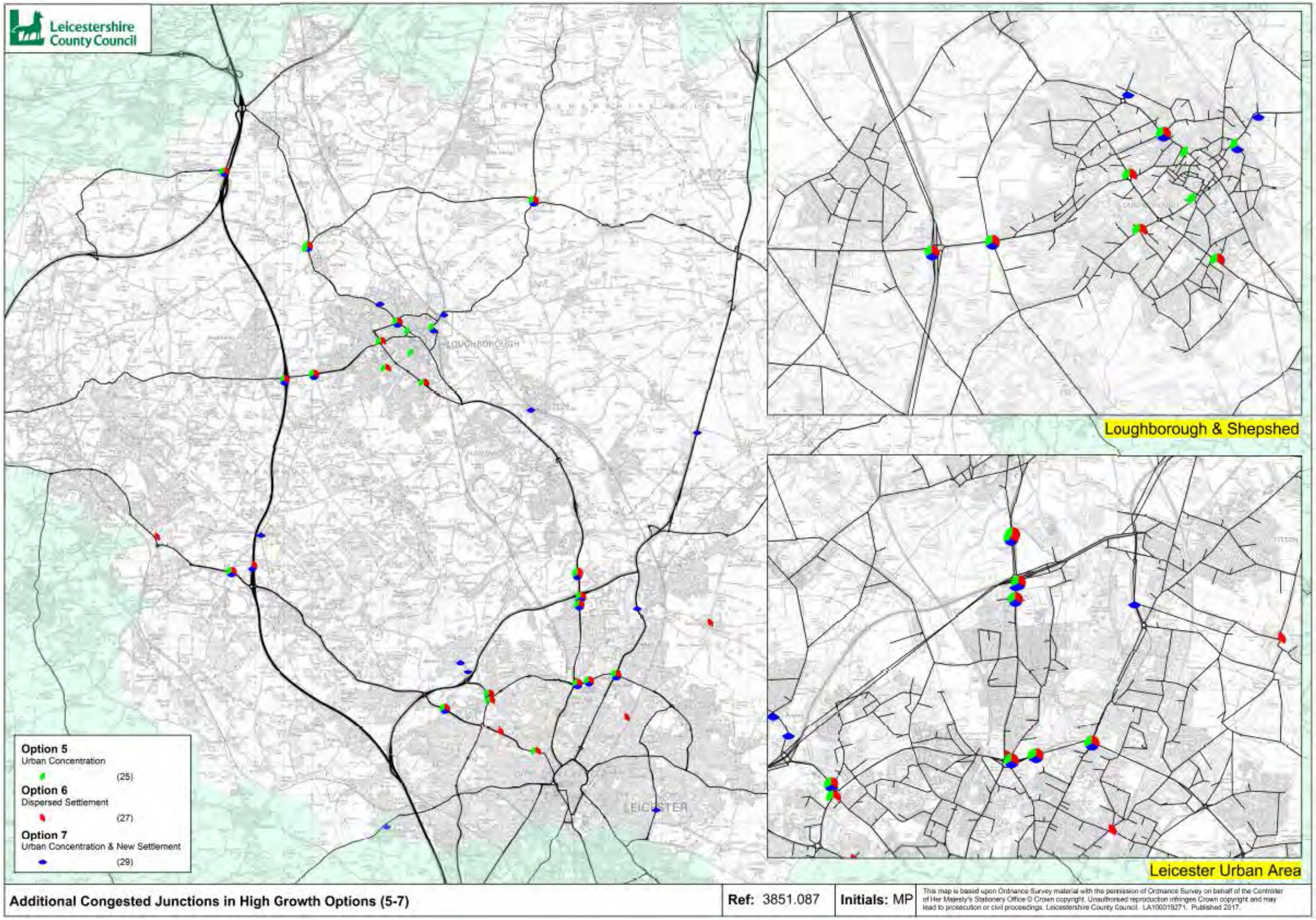


Figure 4-15: Additional Junctions with Significant Increase in Congestion, High Growth Options Only

4.3.5. Approximately 70% of those junctions experiencing a 'development induced', significant increase in congestion are common to all three of the high growth options.

4.3.6. Figure 4-15 identifies those additional junctions flagged between low and high growth options (i.e. it removes any junction which was already identified in the low growth analysis).

4.3.7. Particular additional congestion is found on key routes in and around South Charnwood and Leicester City including the following junctions:

- A6 A46/A6 and Redhill Circle
- A5630 (Anstey Ln) Bennion Rd[9] and A563 (ODDR)
- A563 (ODDR) Troon Way
- A50 Gynsill Lane/County Hall
- A511 B591 ('Flying Horse')

4.3.8. As discussed previously there are synergies between the high growth options leading to similarities in their congestion characteristics. It is therefore more valuable to highlight the minor differences between the modelled results:

4.3.9. Option 5 (green) flags a number of additional congested junctions in central Loughborough and reflects its greater emphasis on development intensity in this area.

4.3.10. Option 7 flags the following junctions unique to its constitution:

- A60 on the approach to Loughborough Station and Bridge St/Barrow Rd possibly induced from the Cotes new settlement, and

- A number of extra junctions in the Leicester Urban Area, particularly in Anstey, possibly induced from the Thurcaston and Anstey developments.

4.3.11. The select link analysis plots for Option 7 provide further evidence. Below, the AM Peak Cotes (Figure 4-16) and PM Peak Thurcaston (Figure 4-17) development trips are displayed.

[9] Note that the successful Growth Housing Fund (GHF) scheme from the A46 to Bennion Rd was not included in this assessment.

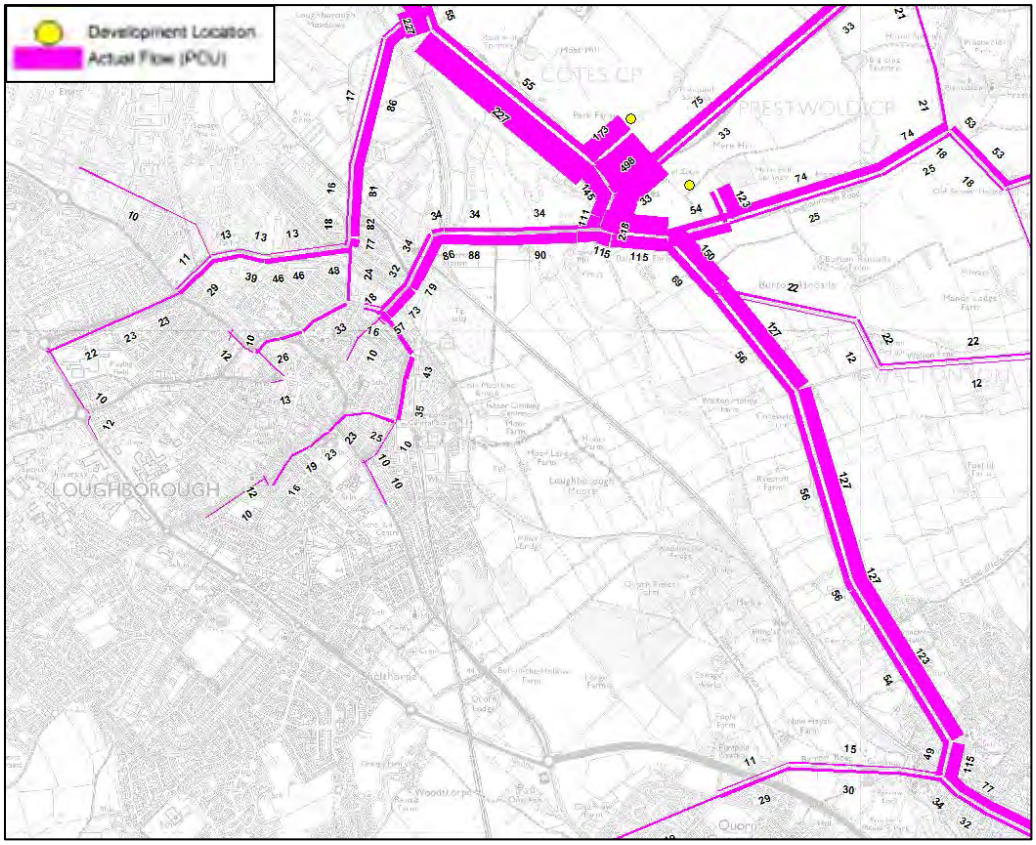


Figure 4-16: Trip Routeing to/from Cotes New Settlement Development, 2036 Option 7 AM Peak

4.3.12. The Cotes new settlement development (1,500 dwellings) trips show a large proportion of outbound trips (~20%) travelling southbound along Cotes Road and routing through Barrow-upon-Soar in the AM Peak. This is potentially a result of trips avoiding heading southbound via Loughborough and the A6 due to the highly congested nature of Loughborough as previously discussed. Trips instead join the A6 at the Mountsorrel junction (via Slash Lane/Sileby Road).[10] The outcome of this routeing is that the Bridge Street/High Street junction incurs additional congestion in Option 7.

4.3.13. The other junction of interest, which deteriorates as a result of Option 7, occurs along the A60 on the approach to Loughborough Station. The select link analysis plot shows approximately 15% of outbound trips utilising the A60 westbound through this junction.

[10] The Slash Lane area of Charnwood often suffers with localised flooding issues and this part of the network is therefore not particularly resilient, especially in periods of wet weather. When this road is closed due to flooding, the trips from the proposed development in Cotes using this route would have to find an alternative path, and thus add further pressures onto other parts of the highway network.

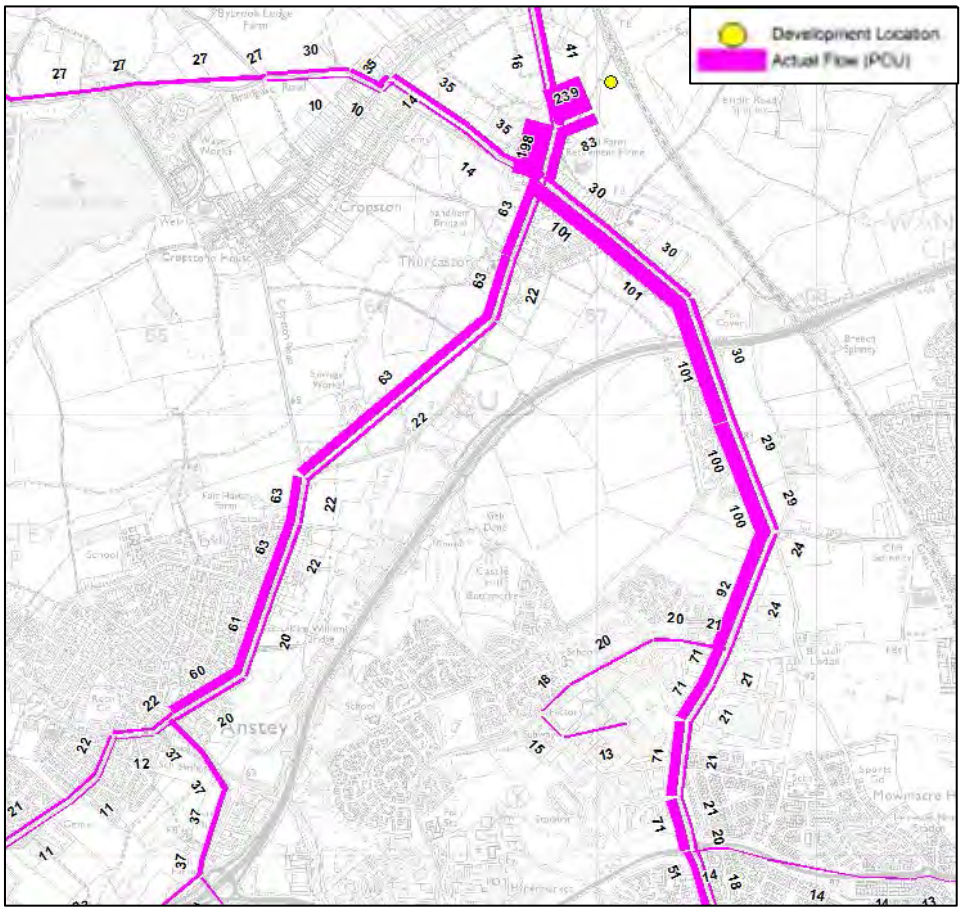


Figure 4-17: Trip Routeing to/from Thurcaston Development, 2036 Option 7 PM Peak

4.3.14. The Thurcaston development (600 dwellings) appears to induce significant additional congestion deterioration in the Anstey area in the PM Peak. The Nook and the Leicester Road/Gorse Hill junctions both incur congestion intensification.

4.3.15. As displayed in the select link analysis plot of development trips, approximately 25% of inbound trips to the Thurcaston settlement pass through the Nook junction in Anstey.

4.4. Junctions Affected in all 7 Options

4.4.1. There are a total of 21 junctions which are negatively impacted in every option modelled (in terms of option-induced over-capacity performance).[11]

4.4.2. Figure 4-18 shows the location of all of the junctions which are consistently flagged in every option and is likely to be a useful tool in identifying appropriate highway mitigation.

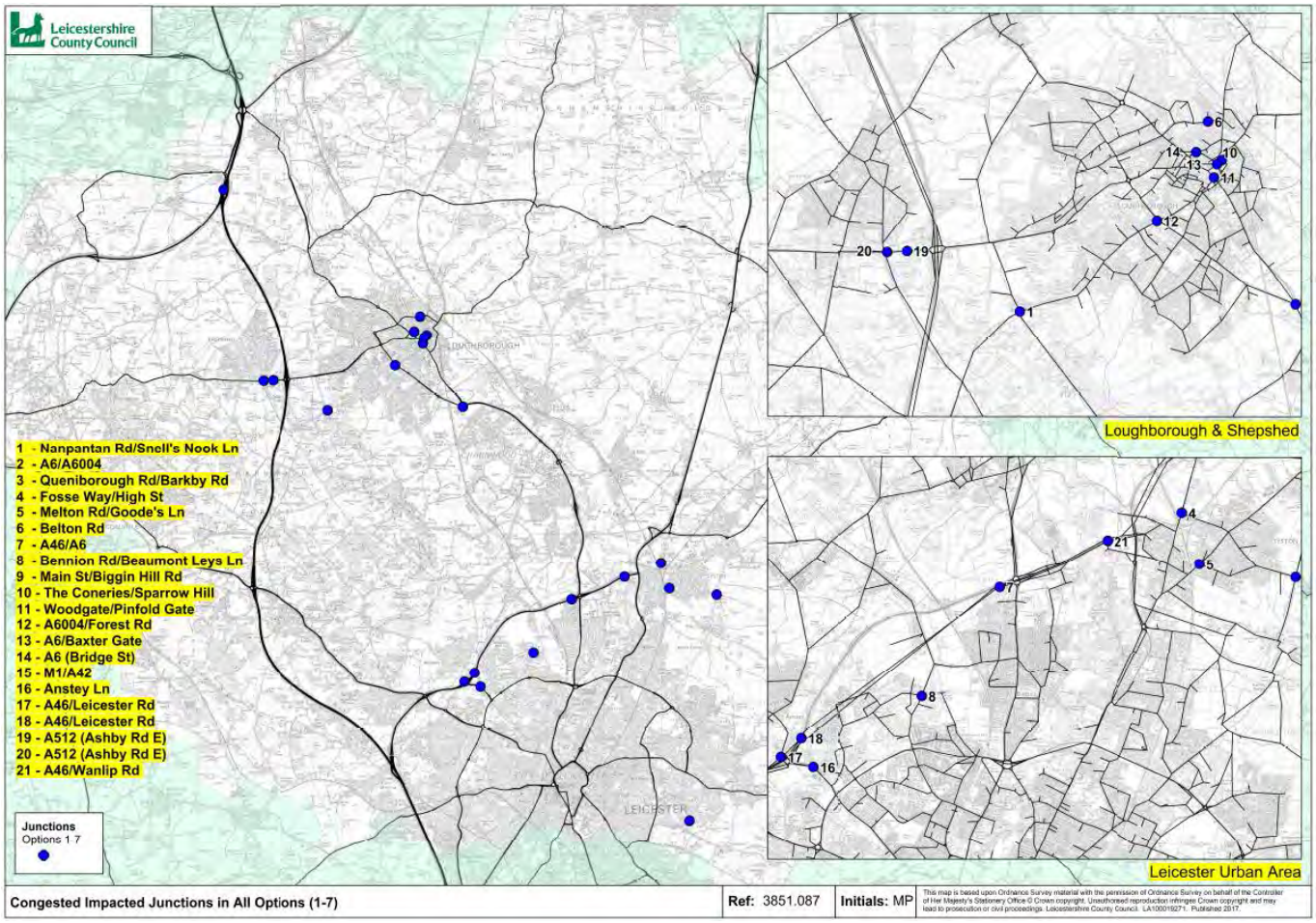


Figure 4-18: Junctions which Incur Significant Congestion Deterioration in Every Modelled Option

4.4.3. For example, the Nanpantan Road/Snell's Nook Lane junction (labelled number 1 on Figure 4-18) is flagged up whenever there is any option development within its vicinity and is a legacy of its strategic importance in providing access towards M1 J23 together with Coalville, Leicester and nearby villages via the local road network.

[11] Appendix B presents an overview of all junctions flagged in the junction impact analysis, and details the number of times a junction is impacted across the options. This is useful by way of an overview, as immediately attention can be drawn to a number of junctions which are consistently affected across the options. Full mapping of this junction analysis is provided in the individual option analysis sections (see chapters 7-13).

4.4.4. Consideration of the flow differences (Figure 4-19) and select link analysis plot (Figure 4-20) gives a useful insight into this effect. By using Option 3 (PM Peak) characterised by its dispersal of development and lower emphasis on Loughborough, it might be expected to have little impact on this junction.

4.4.5. In many ways this is borne out by the forecast, with the most noteworthy flow change occurring on the Nanpantan Road eastbound arm away from the junction (+68 PCUs) despite the additional demand to/from the nearby Loughborough South/South West development.

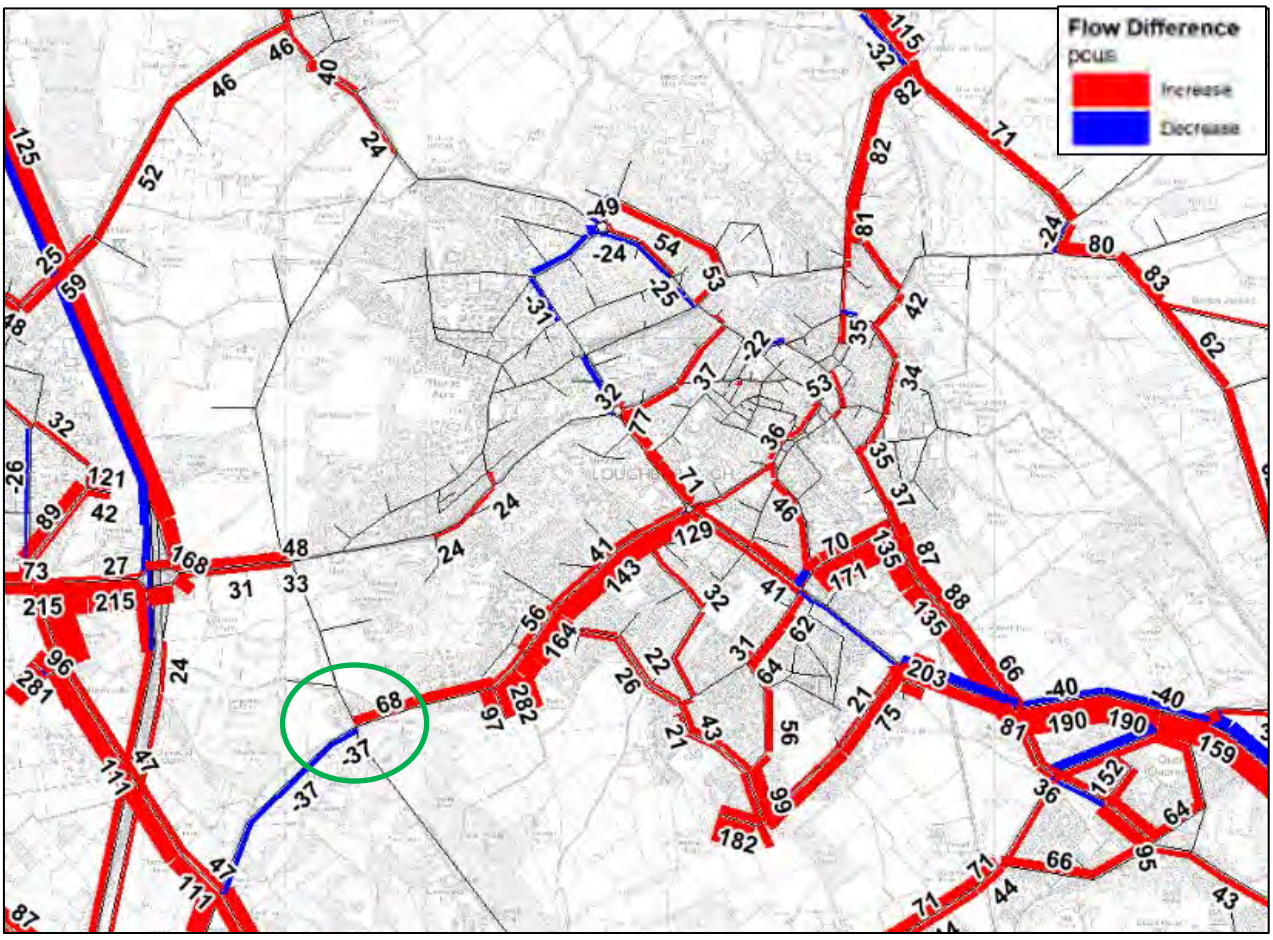


Figure 4-19: Flow Difference Plot Loughborough, Option 3 minus Core, PM Peak

4.4.6. Despite this fairly modest change in junction demand there is a seemingly disproportionate increase in associated delay per pcu (effectively delay per vehicle) of 50 seconds (Figure 4-21). This occurs because the junction is already heavily congested in the Core scenario (see Figure 4-4) and hence, very delay-sensitive to any flow changes.

4.4.7. Figure 4-21 also shows the increase in 'option induced' delay per pcu at the Nanpantan Rd/Snells Nook Lane for each option and time period.

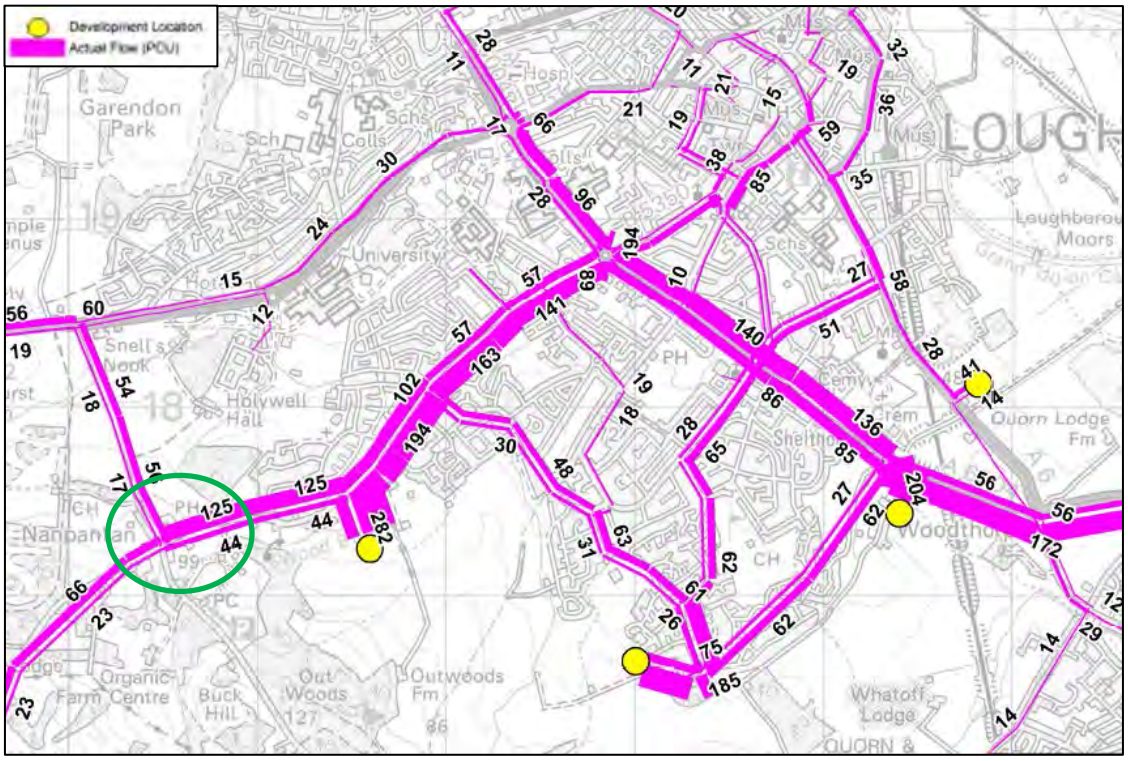


Figure 4-20: Select Link Analysis Loughborough, Option 3, PM Peak

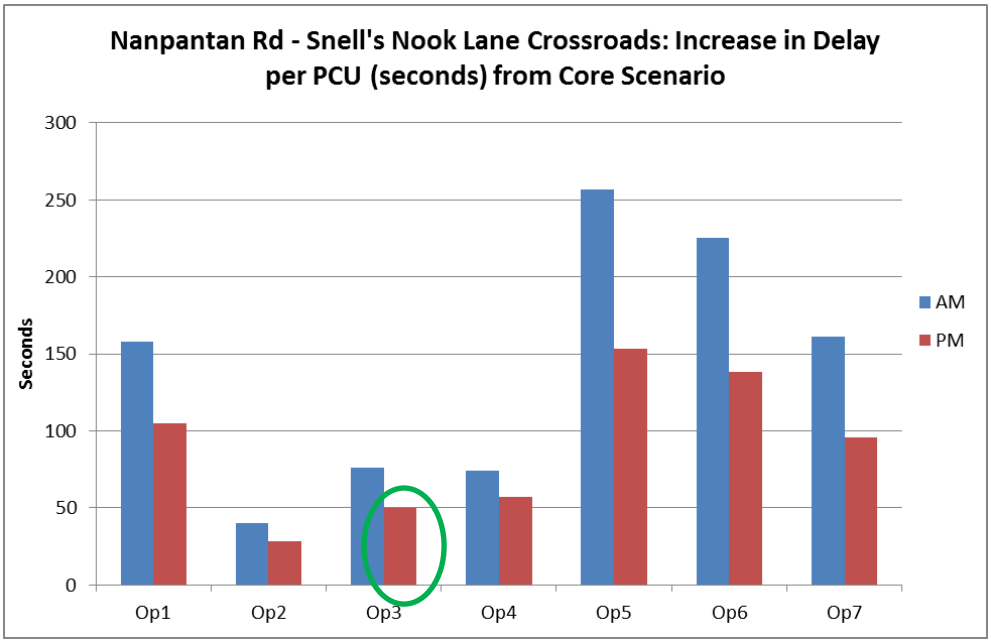


Figure 4-21: Delay per PCU Increase at Snell's Nook Crossroads in All Options

4.4.8. The implication of this forecast is that the junction is over capacity and struggles to accommodate any additional trips. Because of the close proximity of the 'new' development, any related trips effectively displace existing, longer distance' trips onto more circuitous routes. This basic principle applies to all of the options and reflects how drivers re-route in response to the build-up of congestion.

5. Results: Background Growth and Core Analysis

5.1. Background Growth in Traffic Flow (2016-2036)

5.1.1. In the work undertaken here LLITM forecasts a 13% growth in peak hour background traffic between 2016 and 2036.

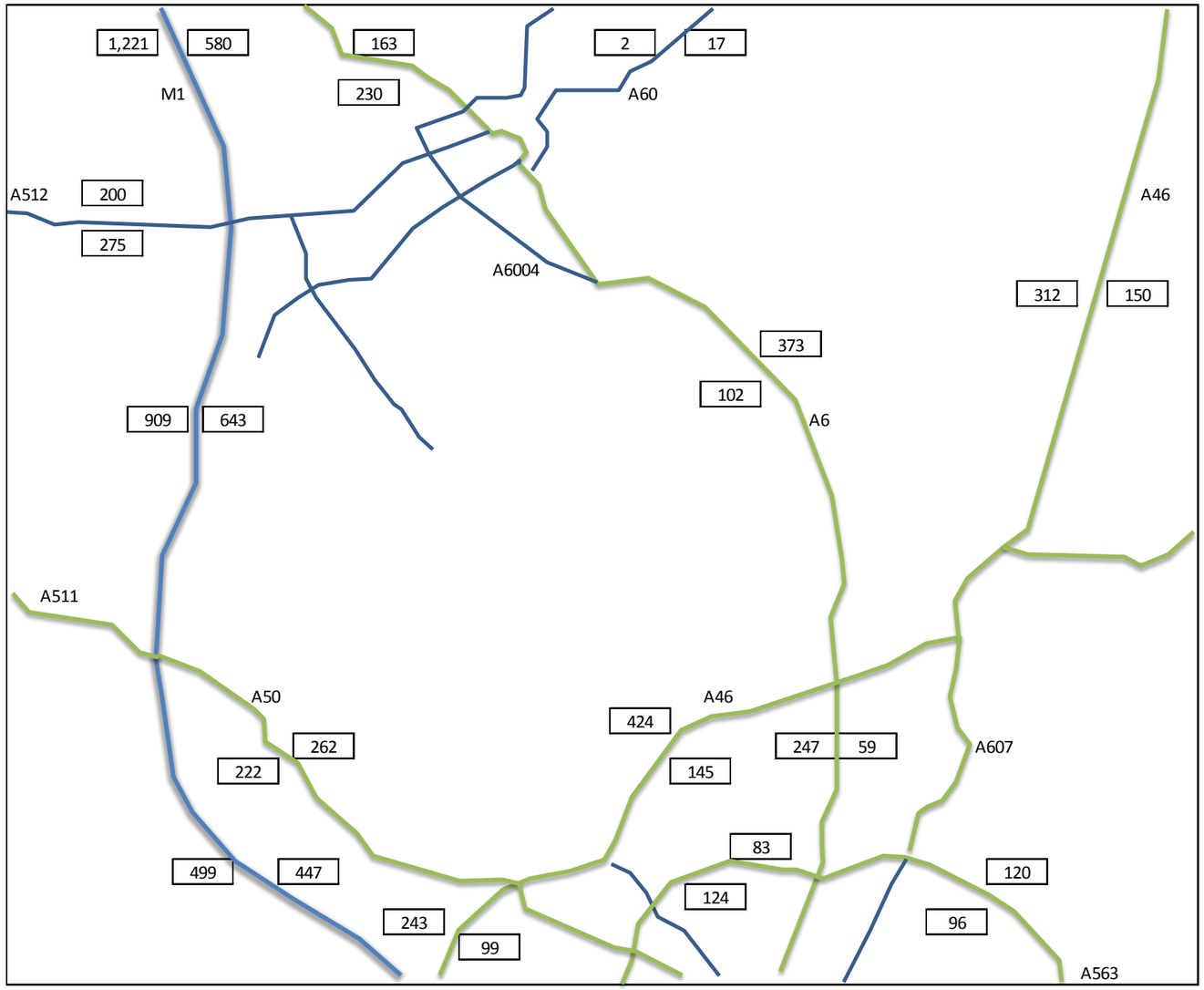
5.1.2. Maps are provided to highlight the forecast background traffic growth (pcus) between 2016 and 2036 for the AM and PM peak hours. Figure 5-1 and Figure 5-2 show schematic diagrams of the motorways and main A-roads of interest in the AOI.

5.2. 2036 Core – Junction Analysis

5.2.1. Figure 5-3 and Figure 5-4 show junctions having at least one turning movement either approaching congestion, or at/over-capacity in the 2036 Core (AM and PM peak periods).

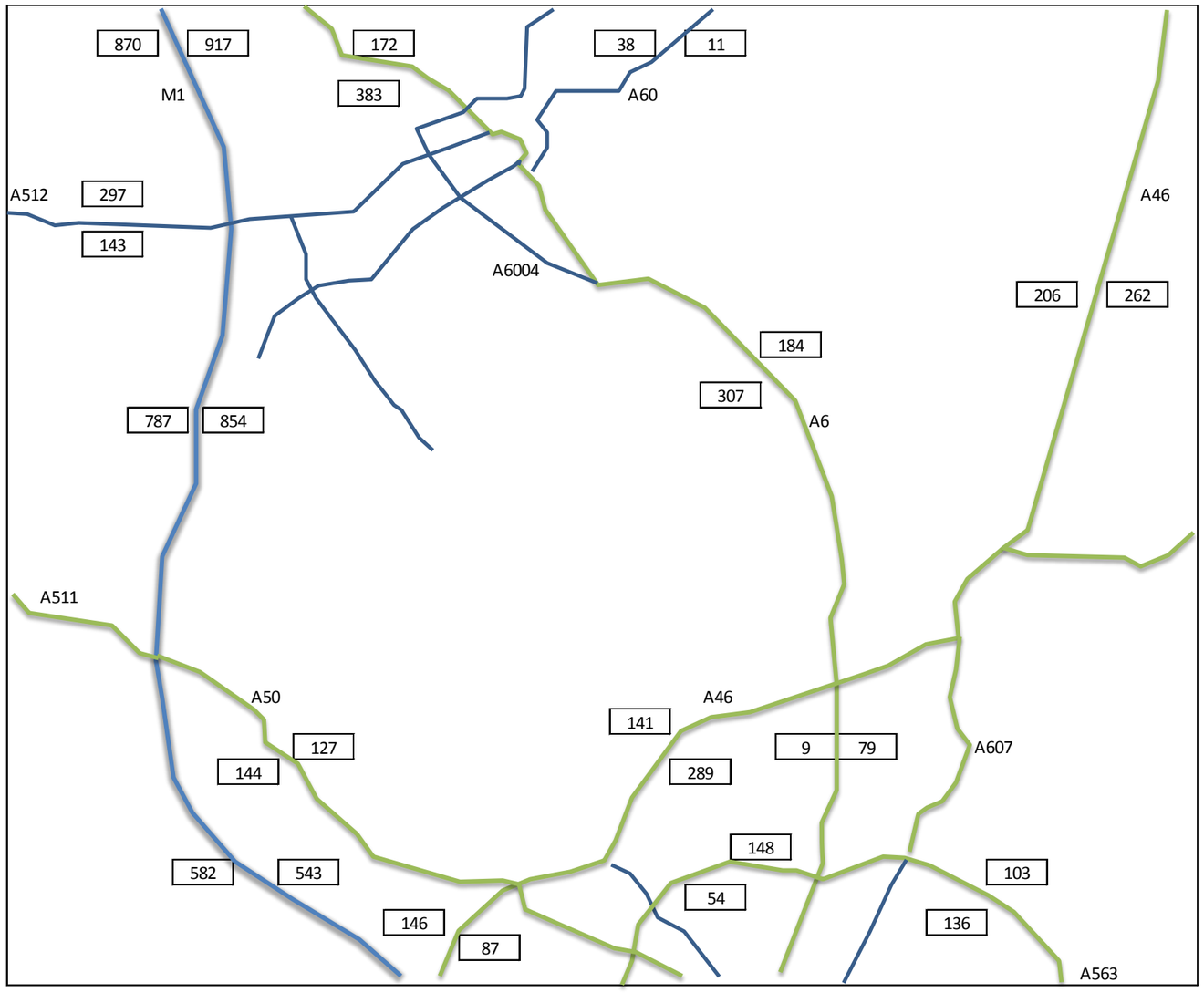
5.2.2. The measure of junction performance is expressed by the volume/capacity (v/c) metric, with three levels of congestion identified:

- Approaching congestion – v/c 75-85%
- Congested – v/c 85-100%
- Heavily congested – v/c >100%



ID	Desc	Dir	Anode	Bnode	AM_Flow 2016	AM_Flow 2036	AM_Flow Diff
1	M1 (J23-J23a)	North	60455	69989	4847.32	6068.04	1220.72
		South	59999	60456	5411.65	5991.24	579.59
2	M1 (J22-J23)	North	49998	60449	4695.51	5604.76	909.25
		South	60450	69990	5045.75	5688.98	643.23
3	M1 (J21-J22)	North	9255	40464	4164.58	4663.31	498.73
		South	40465	49999	4593.58	5041.01	447.43
4	A46 (M1 - Groby)	East	39987	9318	3040.48	3283.36	242.88
		West	9319	39988	3656.52	3756.01	99.49
5	A46 (Anstey - Birstall)	East	69967	1613	3249.82	3674.21	424.39
		West	1607	69969	3725.15	3869.84	144.69
6	A46 (Seagrave - Six Hills)	North	2450	71704	1728.4	2040.84	312.44
		South	71704	2450	2092.91	2243.15	150.24
7	A6 (Hathern - Loughborough)	North	60354	60365	579.3	809.31	230.01
		South	60365	60354	440.06	603.38	163.32
8	A6 (Loughborough - A46)	North	69954	60335	1479.76	1581.39	101.63
		South	60335	69954	1393.04	1766.22	373.18
9	A6 (Birstall - City)	North	2964	1777	747.34	994.34	247
		South	1777	2964	1156.79	1215.61	58.82
10	A512 (Shepshed - M1)	East	60523	60328	812.44	1012.35	199.91
		West	60328	60523	539.34	814.5	275.16
11	A50 (M1 - City)	North	73205	40191	1422.72	1684.25	261.53
		South	40191	73205	1561.75	1784.17	222.42
12	A60 (Loughborough - Cotes)	North	7207	60020	330.29	332.76	2.47
		South	60020	7207	437.08	453.79	16.71
13	A563 (Krefeld Way)	East	2773	1094	1082.59	1166.03	83.44
		West	1094	2773	1219.38	1343.34	123.96
14	A563 (Troon Way)	East	9830	2085	1196.56	1316.42	119.86
		West	2085	9830	1439.77	1535.58	95.81

Figure 5-1: Schematic of Key Roads Showing Forecast Background Traffic Growth – 2036 minus 2016 (AM Peak)



ID	Desc	Dir	Anode	Bnode	PM_Flow 2016	PM_Flow 2036	PM_Flow Diff
1	M1 (J23-J23a)	North	60455	69989	5102.85	5973.1	870.25
		South	59999	60456	4852.36	5768.9	916.54
2	M1 (J22-J23)	North	49998	60449	4931.58	5719.06	787.48
		South	60450	69990	4550.76	5404.68	853.92
3	M1 (J21-J22)	North	9255	40464	4594.13	5176.53	582.4
		South	40465	49999	4211.94	4754.75	542.81
4	A46 (M1 - Groby)	East	39987	9318	3614.75	3760.99	146.24
		West	9319	39988	2924.08	3010.93	86.85
5	A46 (Anstey - Birstall)	East	69967	1613	3748.93	3889.44	140.51
		West	1607	69969	3068.61	3357.43	288.82
6	A46 (Seagrave - Six Hills)	North	2450	71704	2229.84	2435.85	206.01
		South	71704	2450	1734.87	1996.72	261.85
7	A6 (Hathern - Loughborough)	North	60354	60365	418.65	801.27	382.62
		South	60365	60354	597.29	768.87	171.58
8	A6 (Loughborough - A46)	North	69954	60335	1356.12	1662.95	306.83
		South	60335	69954	1568.81	1753.28	184.47
9	A6 (Birstall - City)	North	2964	1777	1009.91	1018.99	9.08
		South	1777	2964	1080.47	1159	78.53
10	A512 (Shepshed - M1)	East	60523	60328	612.87	910.08	297.21
		West	60328	60523	741.34	884.61	143.27
11	A50 (M1 - City)	North	73205	40191	1704.94	1832.04	127.1
		South	40191	73205	1450.16	1594.13	143.97
12	A60 (Loughborough - Cotes)	North	7207	60020	474.25	512.61	38.36
		South	60020	7207	287.32	297.91	10.59
13	A563 (Krefeld Way)	East	2773	1094	1048.36	1196.2	147.84
		West	1094	2773	1082.11	1135.67	53.56
14	A563 (Troon Way)	East	9830	2085	1175.32	1278.67	103.35
		West	2085	9830	1219.83	1356.16	136.33

Figure 5-2: Schematic of Key Roads Showing Forecast Background Traffic Growth – 2036 minus 2016 (PM Peak)

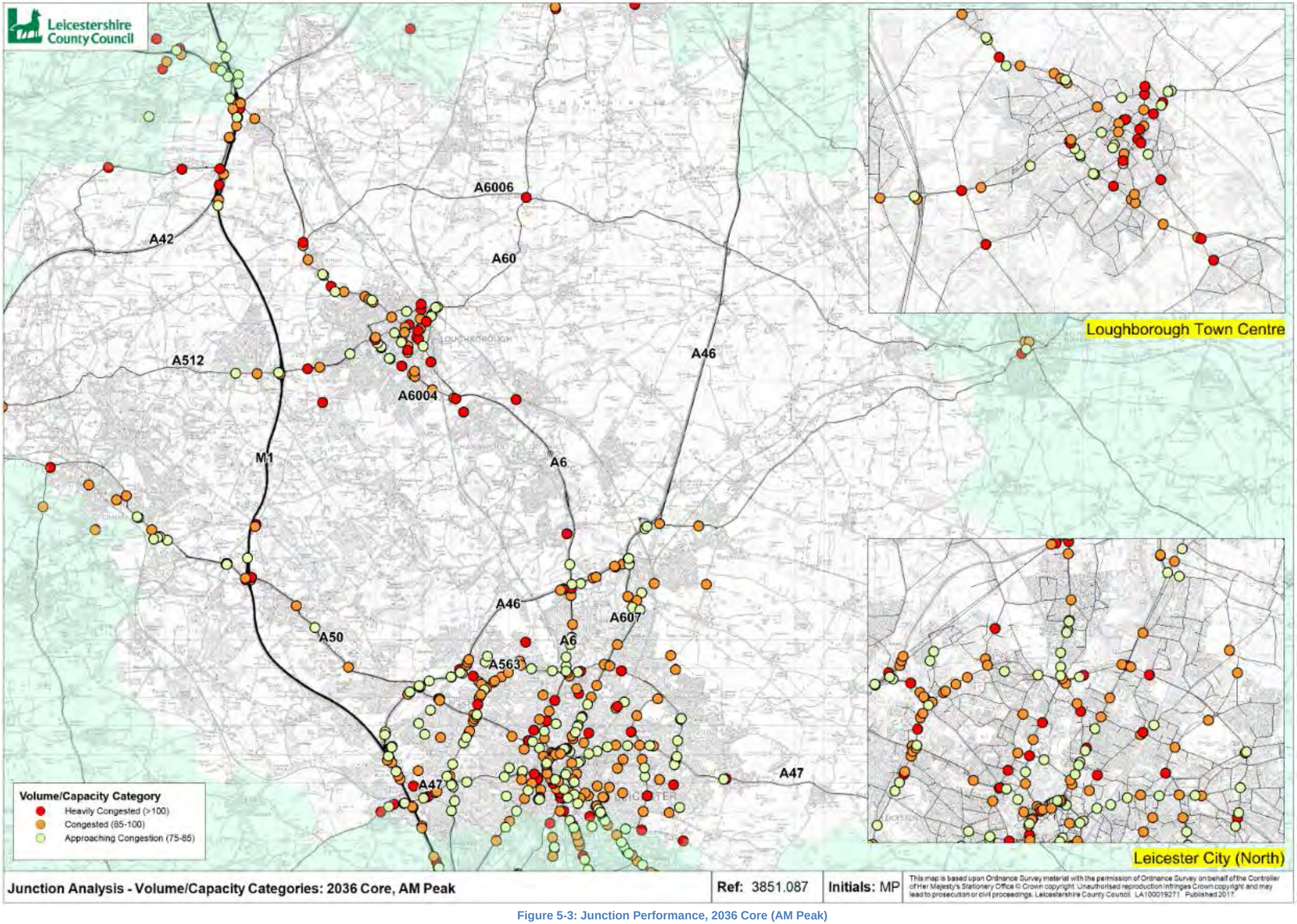


Figure 5-3: Junction Performance, 2036 Core (AM Peak)

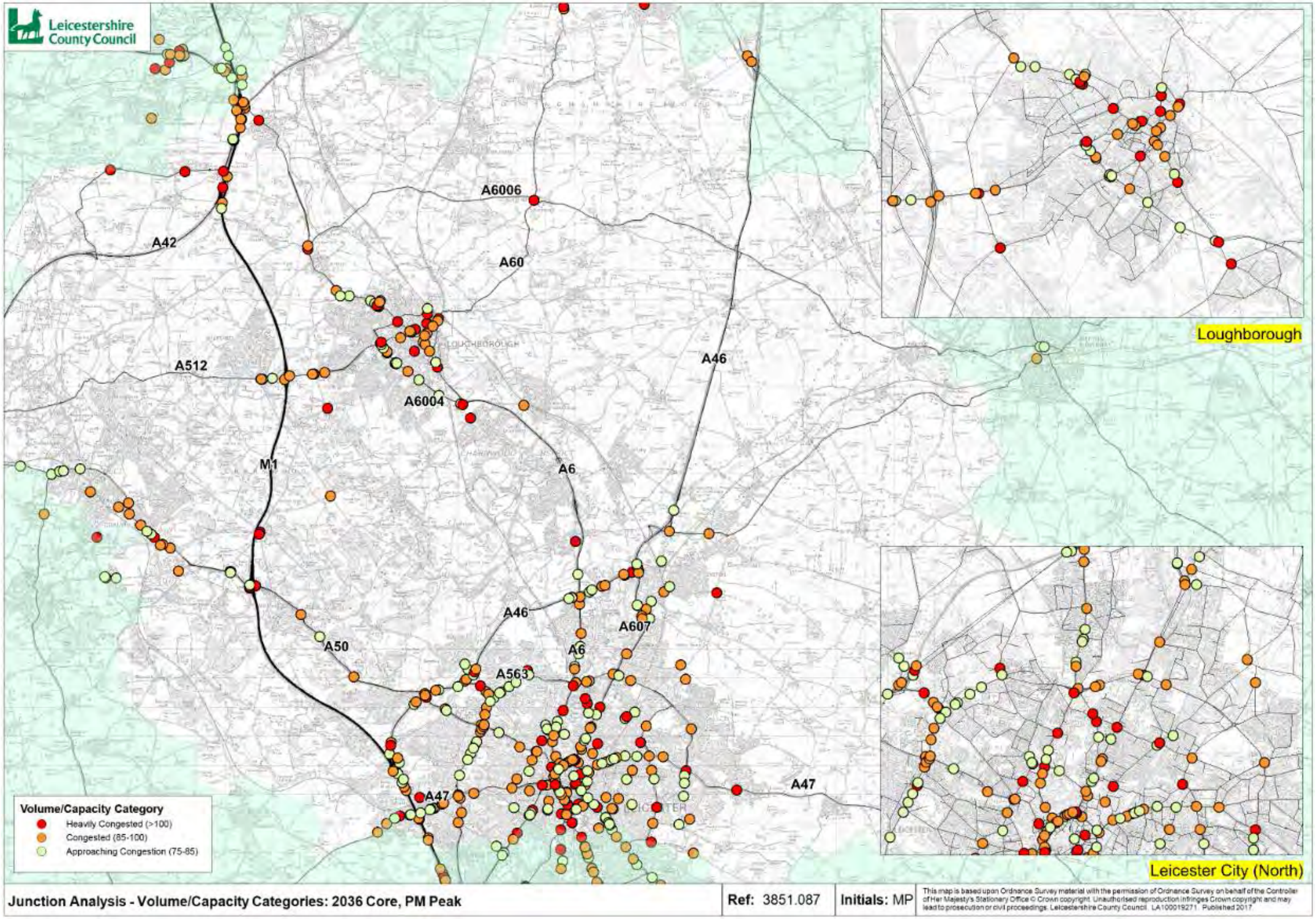


Figure 5-4: Junction Performance, 2036 Core (PM Peak)

6. Results: Option 1 – Urban Concentration A (Low Growth)

6.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,000	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	4,000	Mix of sites includes at least one large site (3,000 south west of Loughborough)
Shepshed	500	Large and medium sites west of Shepshed and mix of small and medium sized sites in and around the town.
Anstey	100	A mix of small and medium sized sites, total of 600 homes at the Service Centres
Barrow Upon Soar	100	
Mountsorrel	100	
Quorn	100	
Rothley	100	
Sileby	100	
Total	**8,100**	

Table 6-1: Option 1 Development Assumptions (provided by Charnwood Borough Council)

6.1.1. The above assumptions were assigned to loading points as per Figure 6-1.

6.2. Modelling Outputs

6.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 6-2, Figure 6-3)
- Delay Difference Plots (Figure 6-4, Figure 6-5
- Junction Analysis (Figure 6-6, Figure 6-7, Table 6-2, Table 6-3)
- Select Link Analysis
    - Loughborough (Figure 6-8, Figure 6-9)
    - Shepshed (Figure 6-10, Figure 6-11)
    - Syston (Figure 6-12,Figure 6-13)
- Matrix Sectoring (Table 6-4, Table 6-5)

ZONAL LOADING

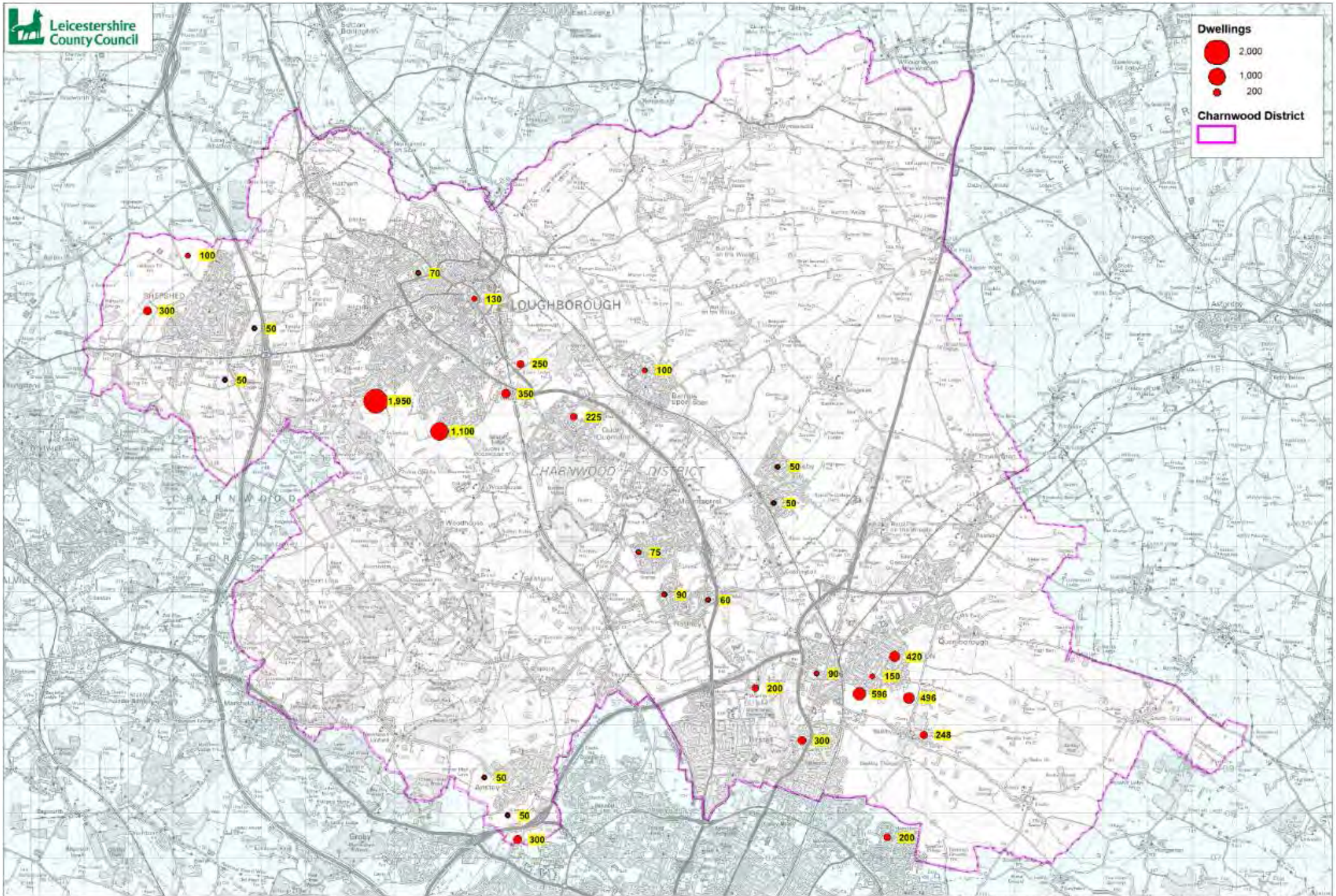


Figure 6-1: Spatial Dwelling Distribution of Modelled Scenario, Option 1

Project Reference: 3851.087

FLOW DIFFERENCE

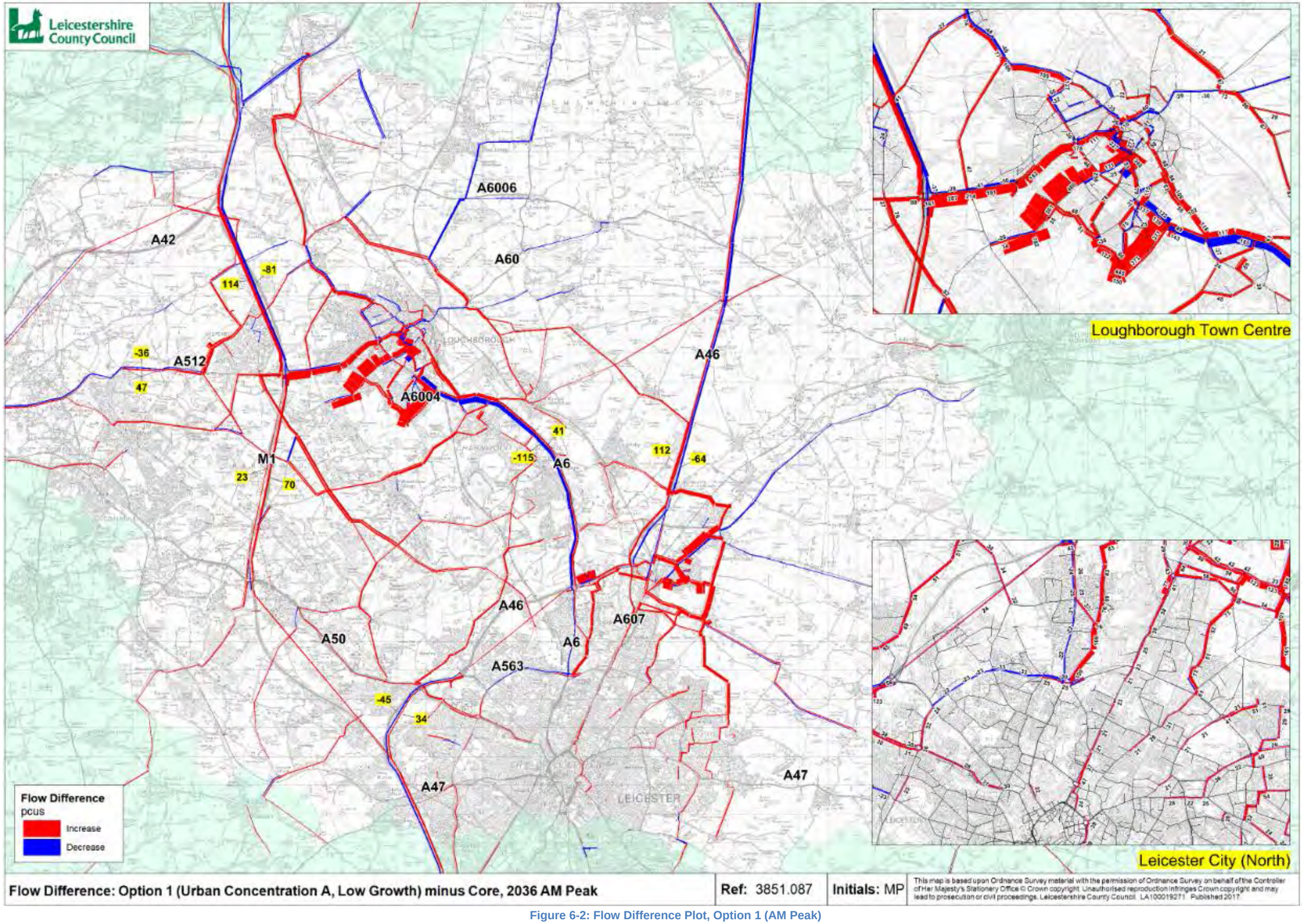


Figure 6-2: Flow Difference Plot, Option 1 (AM Peak)

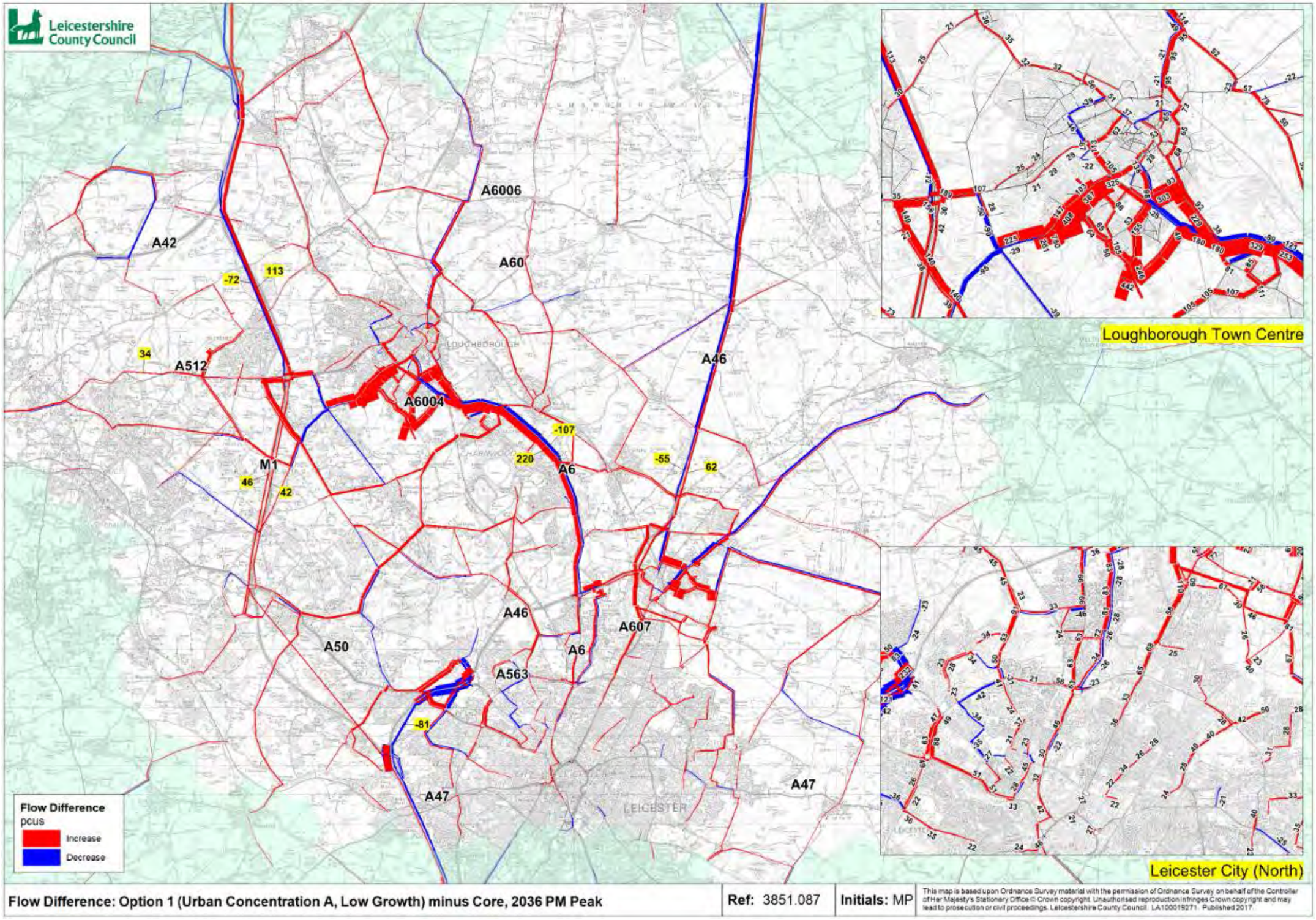


Figure 6-3: Flow Difference Plot, Option 1 (PM Peak)

Project Reference: 3851.087

DELAY DIFFERENCE

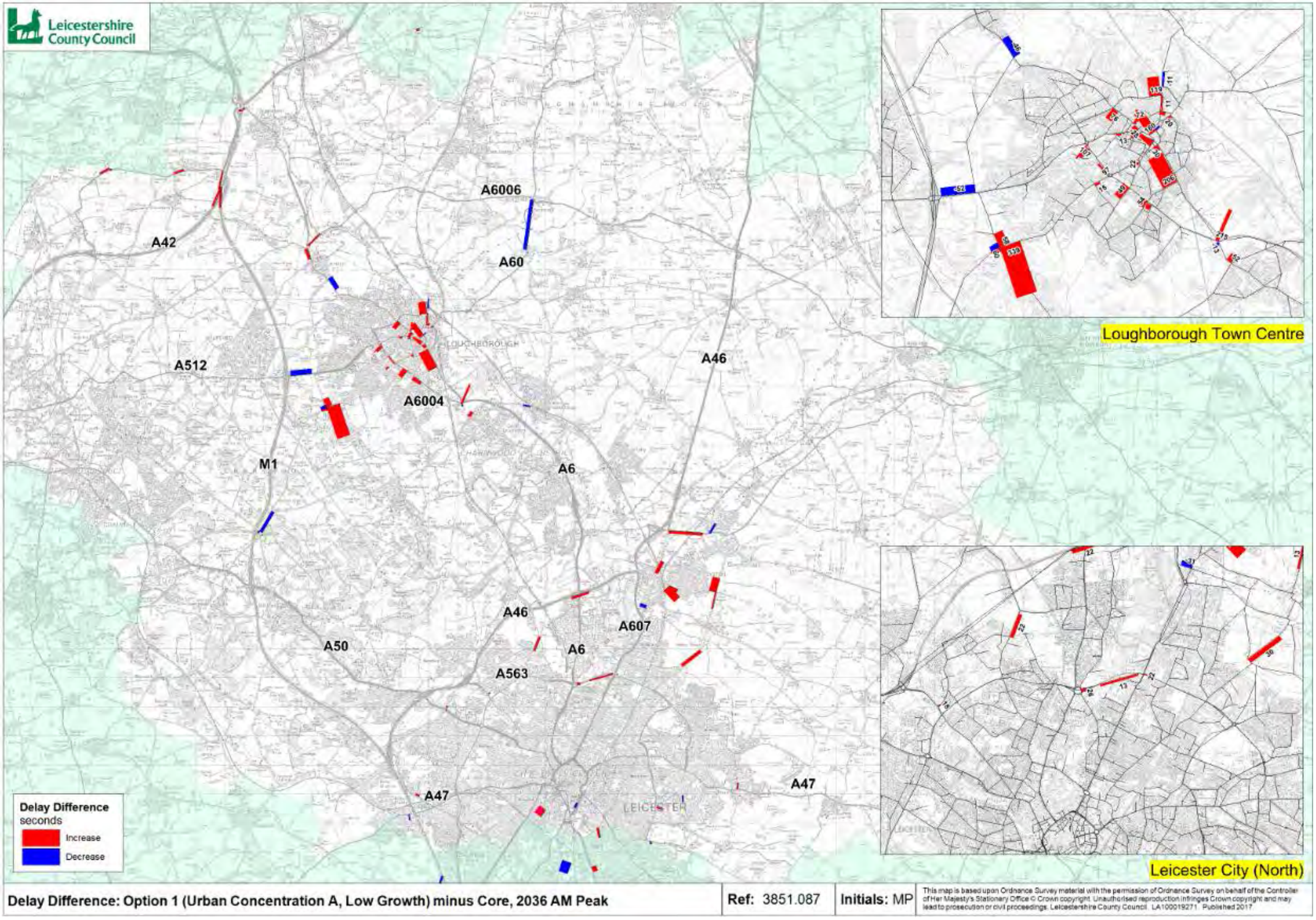


Figure 6-4: Delay Difference Plot, Option 1 (AM Peak)

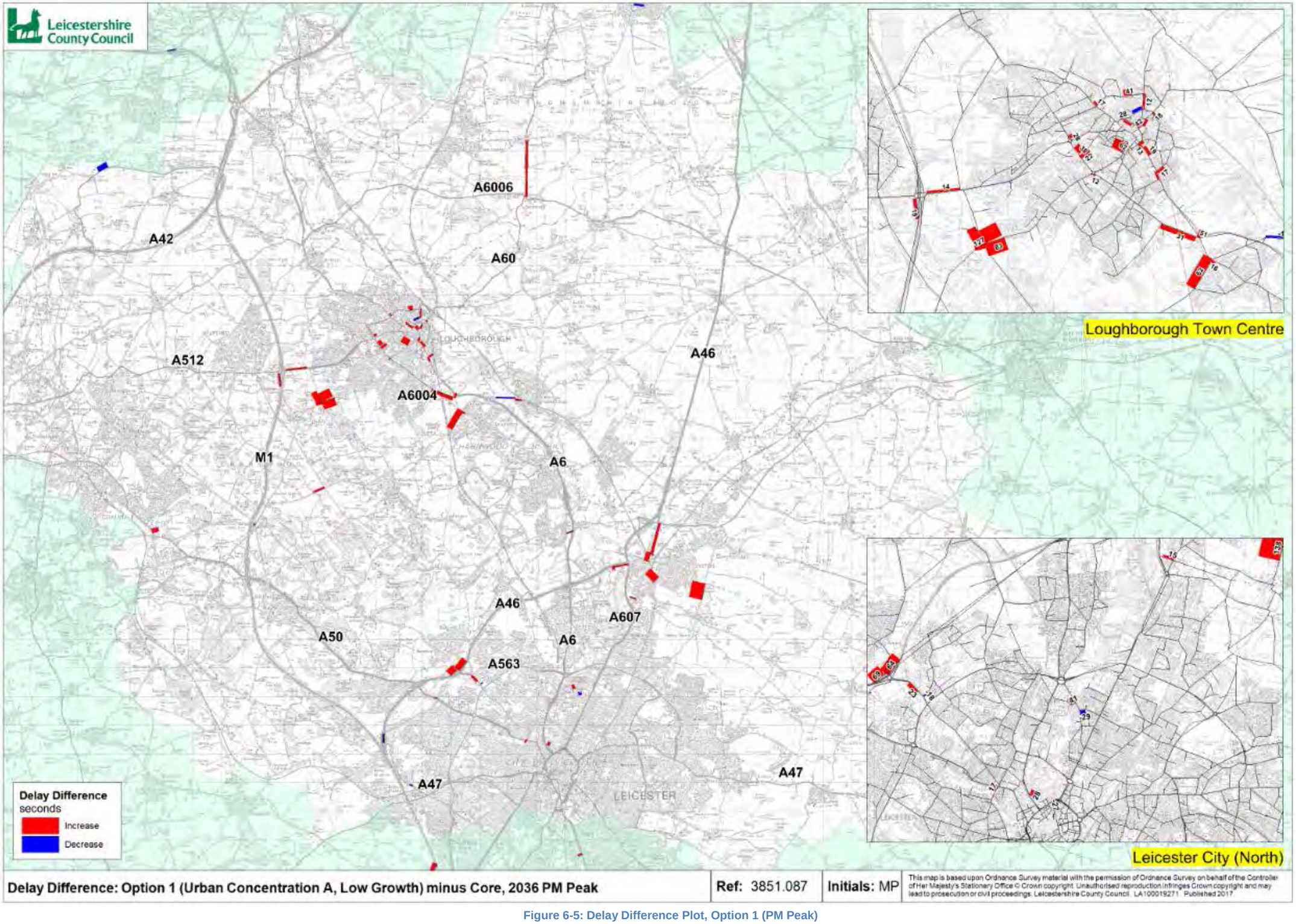


Figure 6-5: Delay Difference Plot, Option 1 (PM Peak)

JUNCTION PERFORMANCE

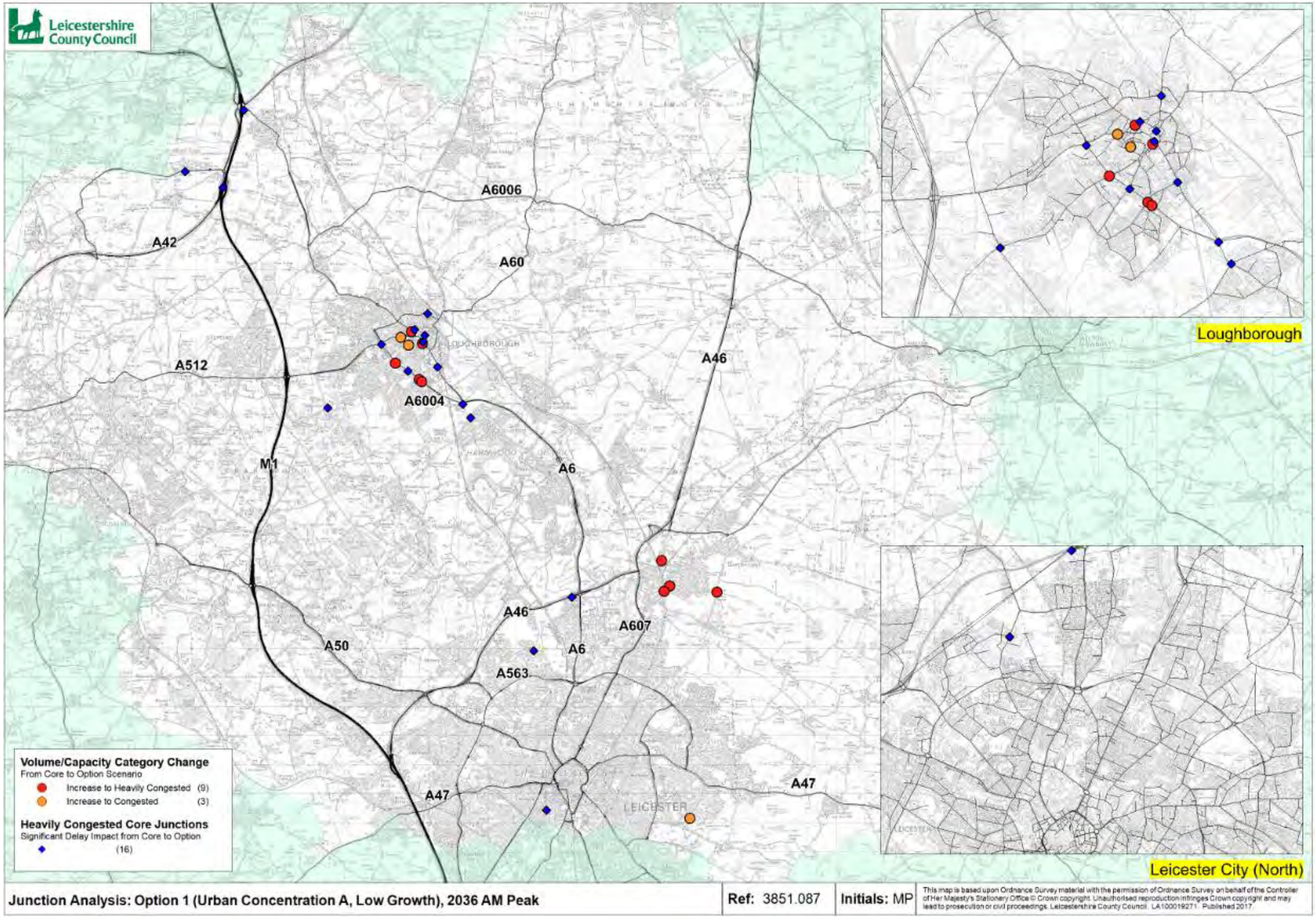


Figure 6-6: Junction Analysis, Option 1 (AM Peak)

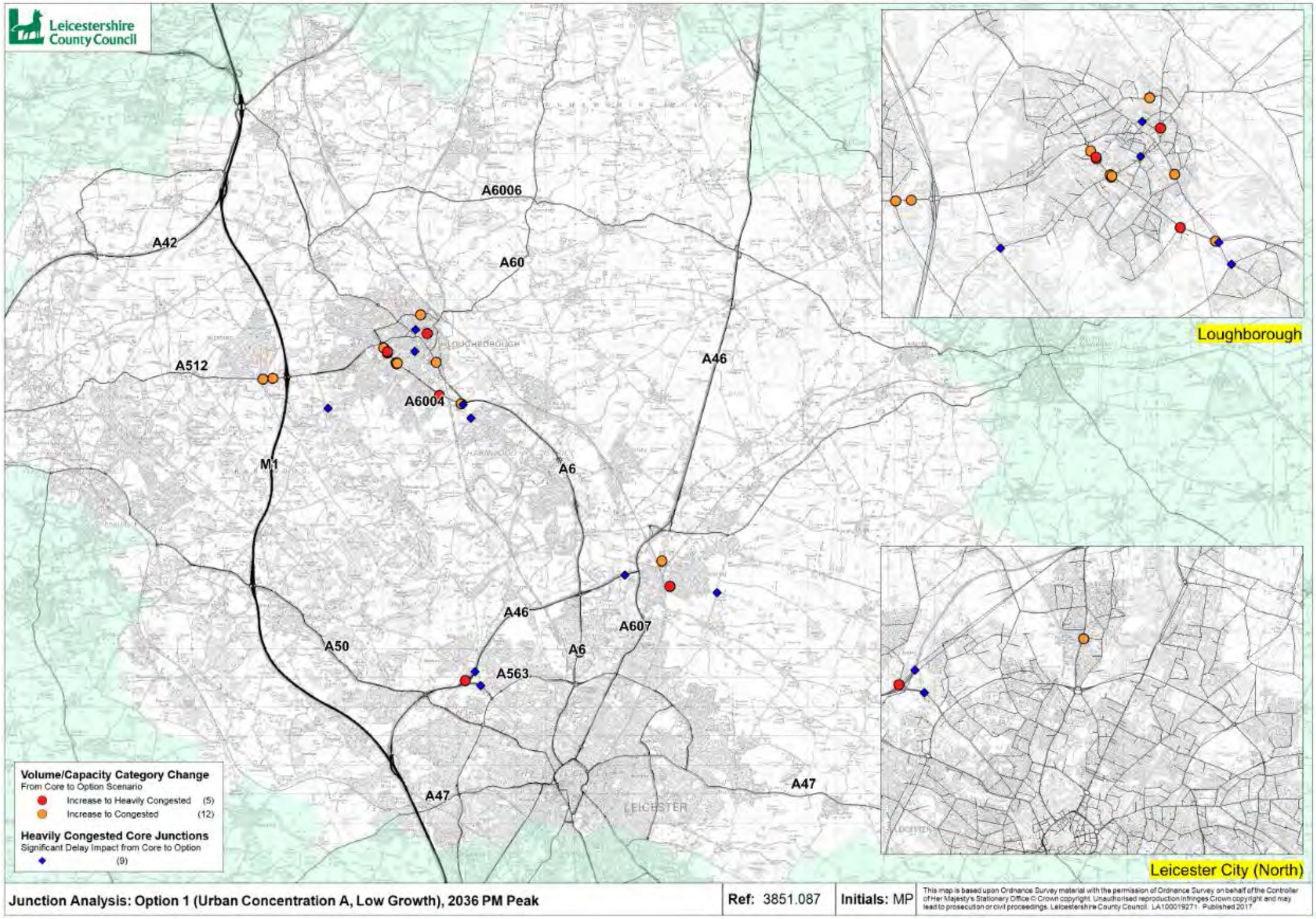


Figure 6-7: Junction Analysis, Option 1 (PM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_am	co_am_desc	36_opt1_am	o1_am_desc	core del	opt1 del	diff del
2412	Main St/Biggin Hill Rd	City (SE)	City (SE)	82	Approaching Congestion	89	Congested			
7304	Frederick St/Arthur St	Loughborough	Loughborough	81	Approaching Congestion	89	Congested			
60002	A6004 (Ling Rd)	Loughborough	Loughborough	95	Congested	101	Heavily Congested			
60062	A6/The Rushes	Loughborough	Loughborough	90	Congested	101	Heavily Congested			
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	Loughborough	89	Congested	101	Heavily Congested			
60922	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	103	Heavily Congested			
61009	Woodgate/Pack Horse Ln	Loughborough	Loughborough	15	Uncongested	100	Heavily Congested			
65071	A512/Radmoor Rd	Loughborough	Loughborough	84	Approaching Congestion	91	Congested			
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	86	Congested	103	Heavily Congested			
2280	Fosse Way/High St	Syston	Syston	64	Uncongested	103	Heavily Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	50	Uncongested	100	Heavily Congested			
78892	Melton Rd/Wanlip Rd	Syston	Syston	98	Congested	104	Heavily Congested			
1607	A46/A6	Birstall	Birstall	102	Heavily Congested	103	Heavily Congested	54	69	15
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	City (NW)	101	Heavily Congested	102	Heavily Congested	46	61	15
1318	Upperton Rd/Watkin Rd	City (SW)	City (SW)	148	Heavily Congested	152	Heavily Congested	142	153	11
7323	A6004/Forest Rd	Loughborough	Loughborough	102	Heavily Congested	106	Heavily Congested	82	143	61
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	101	Heavily Congested	107	Heavily Congested	82	117	35
60108	Woodgate/Pinfold Gate	Loughborough	Loughborough	105	Heavily Congested	110	Heavily Congested	157	244	88
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	102	Heavily Congested	114	Heavily Congested	53	94	40
60186	A6004/Beacon Rd	Loughborough	Loughborough	100	Heavily Congested	101	Heavily Congested	28	39	11
61020	A6/Baxter Gate	Loughborough	Loughborough	103	Heavily Congested	110	Heavily Congested	60	94	34
73778	A6 (Bridge St)	Loughborough	Loughborough	100	Heavily Congested	105	Heavily Congested	38	77	39
50312	East Midlands Airport	NW Leics	EMA	101	Heavily Congested	101	Heavily Congested	46	59	13
50523	M1/A42	NW Leics	EMA (M1)	105	Heavily Congested	105	Heavily Congested	54	71	17
50543	M1 Junction 24	NW Leics	M1 J24	102	Heavily Congested	104	Heavily Congested	50	60	11
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	101	Heavily Congested	49	61	12
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	106	Heavily Congested	115	Heavily Congested	208	366	158
60362	A6/A6004	Rem. Charnwood	Quorn	106	Heavily Congested	114	Heavily Congested	54	112	59

Table 6-2: Junction Analysis, Option 1 (AM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_pm	co_pm_desc	36_opt1_pm	o1_pm_desc	core del	opt1 del	diff del
1748	A6/School Ln	Birstall	Birstall	83	Approaching Congestion	92	Congested			
60098	The Coneries/Sparrow Hill	Loughborough	Loughborough	90	Congested	100	Heavily Congested			
60538	A6/Beeches Rd	Loughborough	Loughborough	80	Approaching Congestion	90	Congested			
60916	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	90	Congested			
60918	A6004/Forest Rd	Loughborough	Loughborough	84	Approaching Congestion	90	Congested			
60920	A6004/Forest Rd	Loughborough	Loughborough	84	Approaching Congestion	93	Congested			
65066	A6004/University Rd	Loughborough	Loughborough	80	Approaching Congestion	87	Congested			
65067	A6004 (Epinal Way)	Loughborough	Loughborough	92	Congested	100	Heavily Congested			
65070	A6004/Radmoor Rd	Loughborough	Loughborough	81	Approaching Congestion	88	Congested			
78902	Belton Rd	Loughborough	Loughborough	44	Uncongested	97	Congested			
9631	A46/Leicester Rd	Rem. Charnwood	Anstey	90	Congested	103	Heavily Congested			
60123	A6004/Allendale Rd	Rem. Charnwood	Woodthorpe	84	Approaching Congestion	100	Heavily Congested			
74116	A6004 (Terry Yardley Way)	Rem. Charnwood	Quorn	84	Approaching Congestion	95	Congested			
7306	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	85	Congested			
76150	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	85	Congested			
2280	Fosse Way/High St	Syston	Syston	83	Approaching Congestion	96	Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	77	Approaching Congestion	102	Heavily Congested			
61000	Forest Rd/Browns Ln	Loughborough	Loughborough	100	Heavily Congested	103	Heavily Congested	47	67	21
65097	A6 (Fennel St)/Bridge St	Loughborough	Loughborough	101	Heavily Congested	102	Heavily Congested	74	85	11
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	100	Heavily Congested	103	Heavily Congested	88	149	62
9385	Anstey Ln	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	50	13
9715	A46/Leicester Rd	Rem. Charnwood	Anstey	101	Heavily Congested	103	Heavily Congested	37	81	44
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	101	Heavily Congested	48	68	20
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	104	Heavily Congested	105	Heavily Congested	175	280	105
60362	A6/A6004	Rem. Charnwood	Quorn	101	Heavily Congested	103	Heavily Congested	26	38	13
2047	A46/Wanlip Rd	Syston	Syston	101	Heavily Congested	101	Heavily Congested	33	50	17

Table 6-3: Junction Analysis, Option 1 (PM Peak)

SELECT LINK ANALYSIS

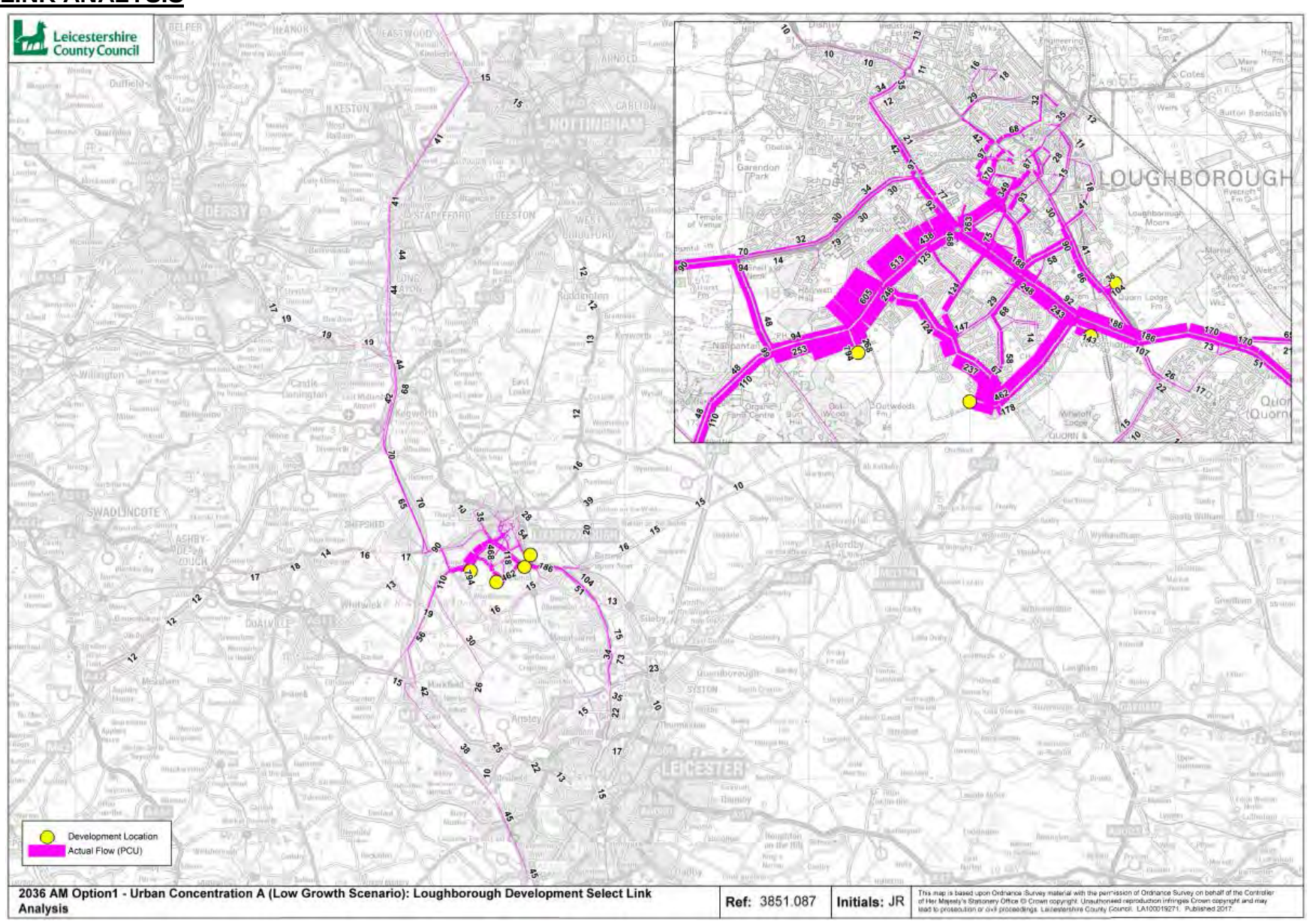


Figure 6-8: Select Link Analysis, Option 1 - Loughborough Development (AM Peak)

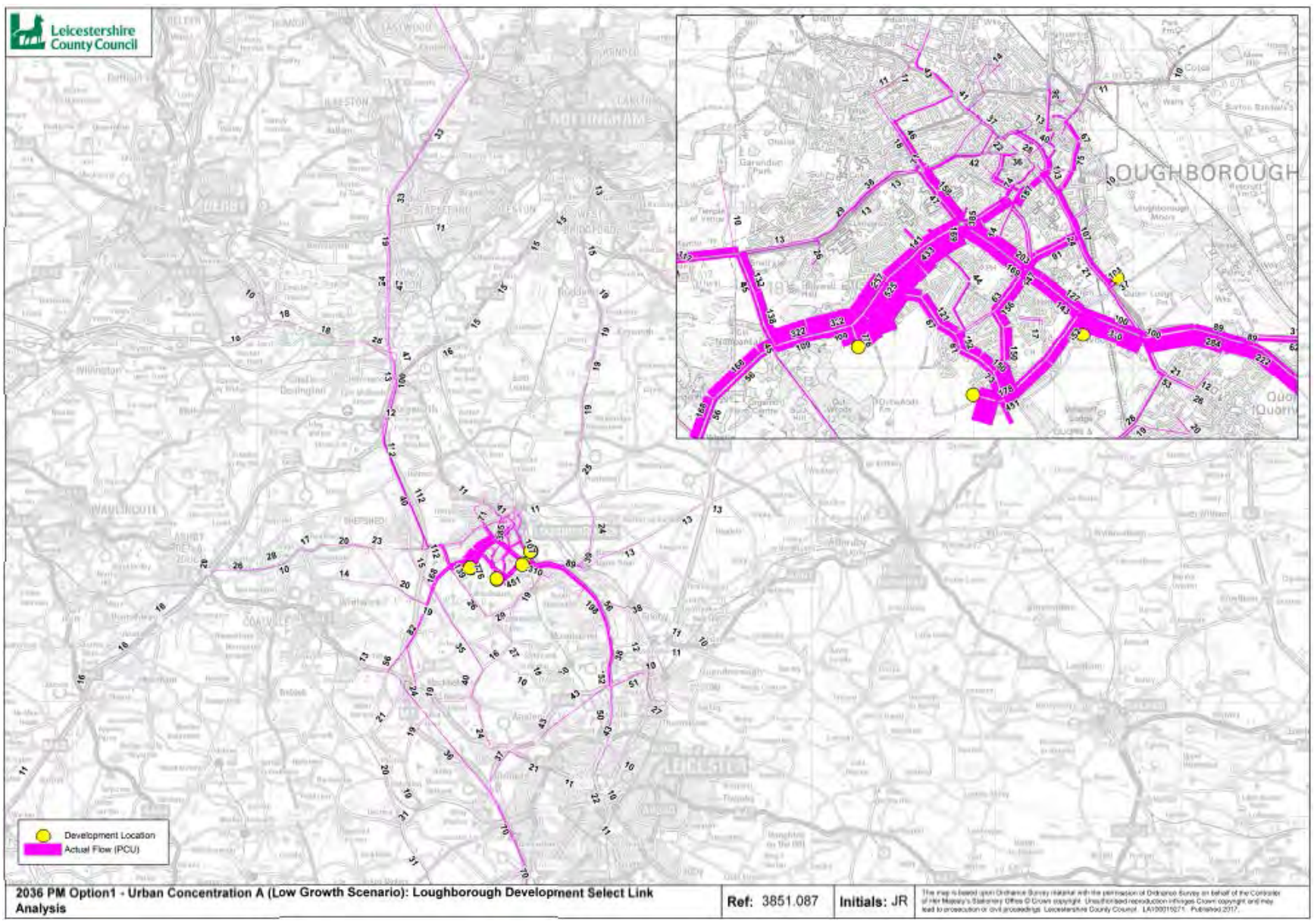


Figure 6-9: Select Link Analysis, Option 1 - Loughborough Development (PM Peak)

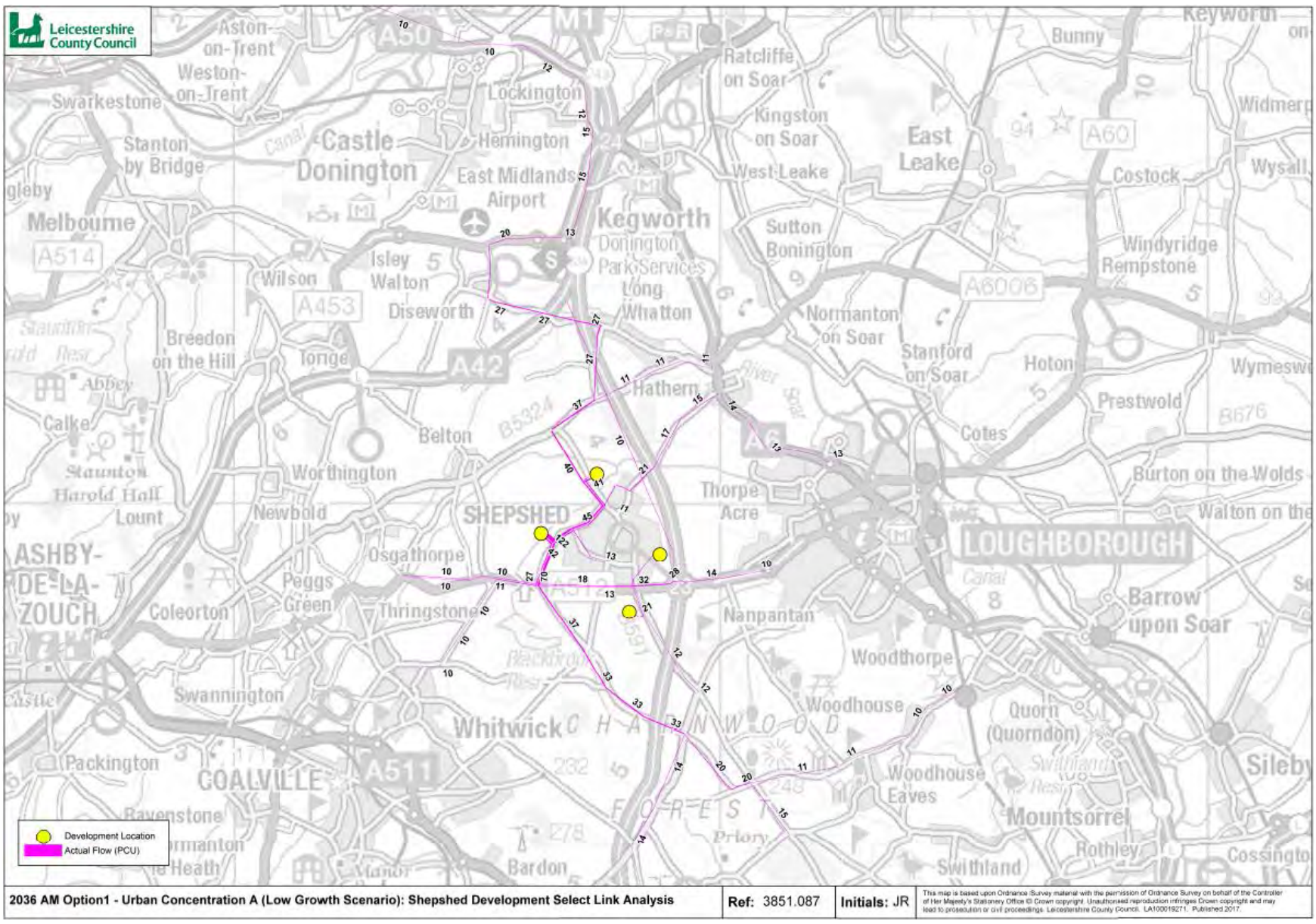


Figure 6-10: Select Link Analysis, Option 1 - Shepshed Development (AM Peak)

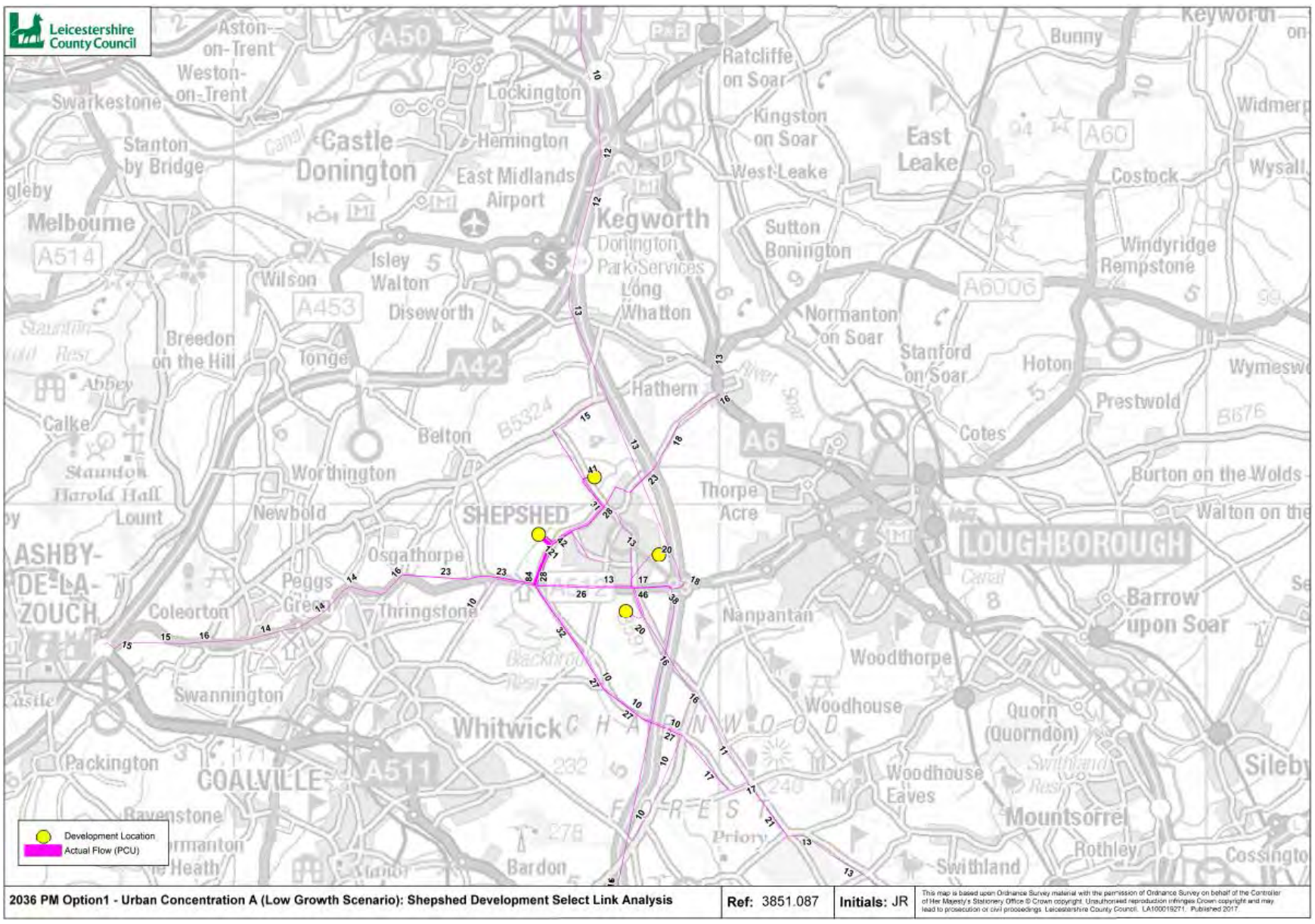


Figure 6-11: Select Link Analysis, Option 1 - Shepshed Development (PM Peak)

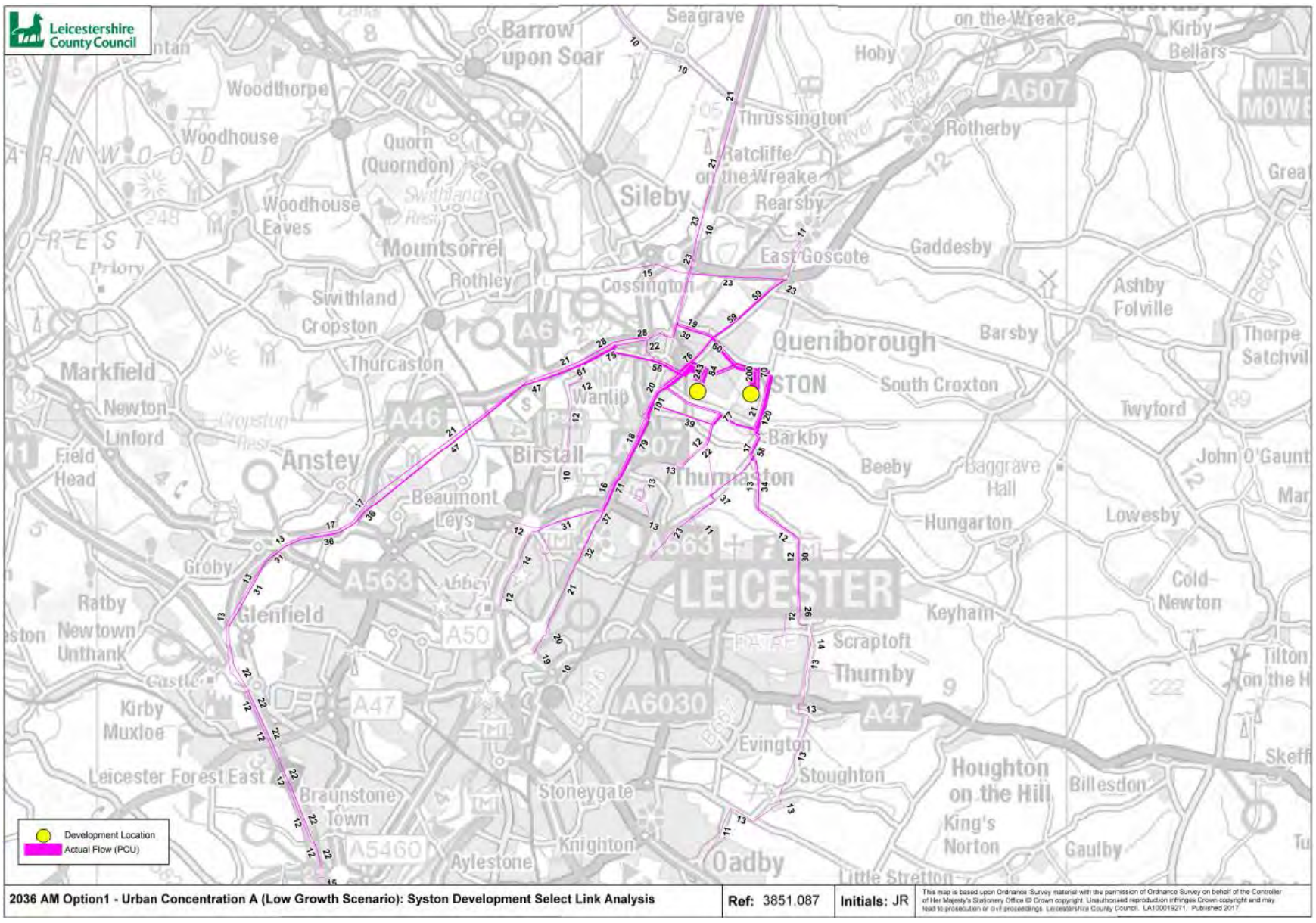


Figure 6-12: Select Link Analysis, Option 1 - Syston Development (AM Peak)

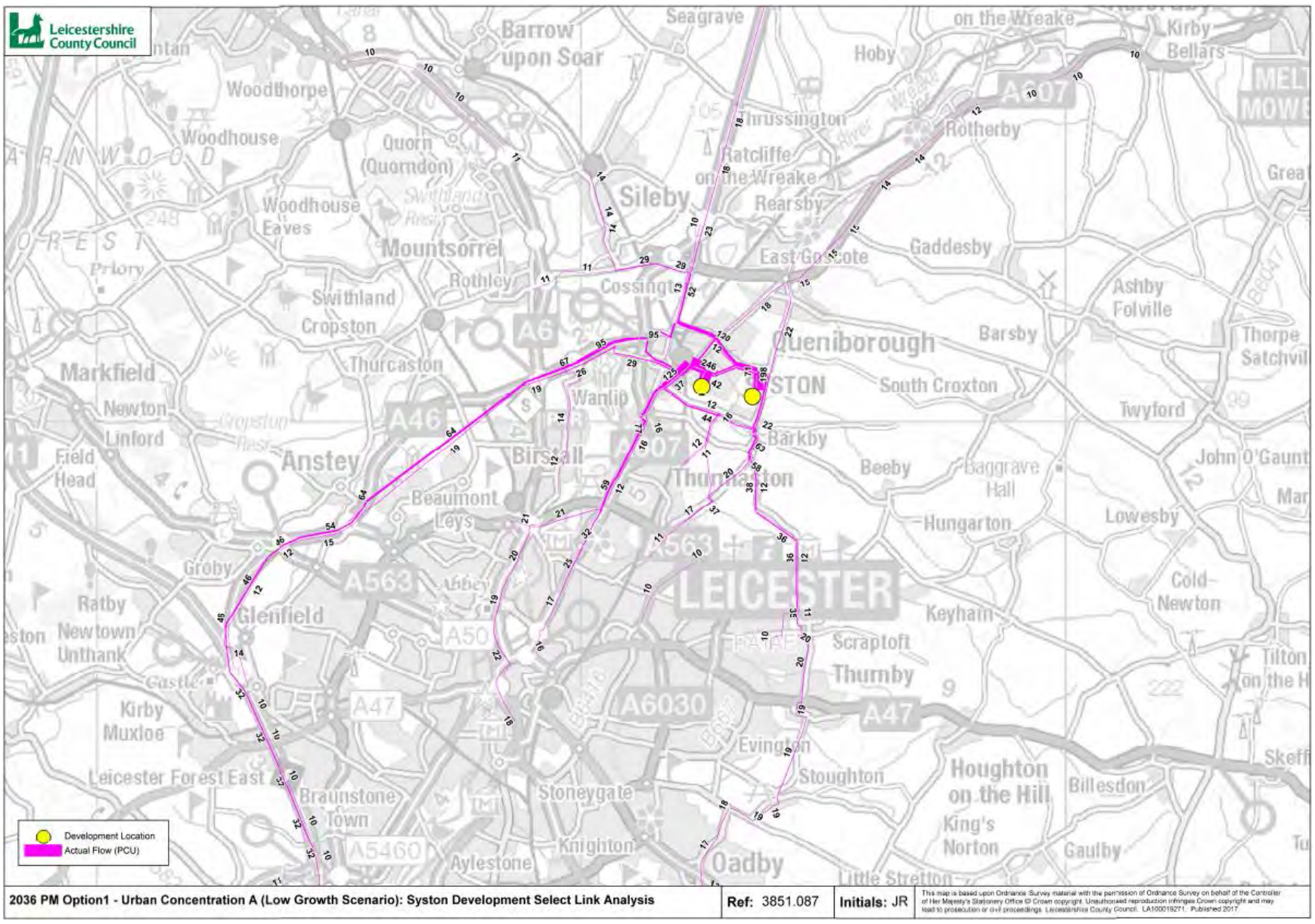


Figure 6-13: Select Link Analysis, Option 1 - Syston Development (PM Peak)

MATRIX SECTORING

Op1 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	972	37	12			139	27	19	13	13		10		29	21	80	19	219
Shepshed	20	76				17										58		56
Syston	20		150	58		87	51	138	27	14	23	22		30	14		14	54
Thurmaston			23	12		12	10	19										13
Birstall			10		14													
Rem. Charnwood	25		41		10	91	49	25	18	25	21		15	52	25	33	28	85
City (NW)																		
City (NE)			18															
City (SE)			14															
City (SW)																		
City (Centre)																		
Oadby																		
Harborough																		
Blaby																		
Hinckley																		
NW Leics																		
Melton																		
Other																		

Table 6-4: Highlight Matrix of all Sectored Trips, Option 1 AM Peak minus Core AM Peak (>10 Trips only)

Op1 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	737	14	24			35												
Shepshed	33	61																
Syston	17		150	22	12	31		19										
Thurmaston	13		37	14														
Birstall			13															
Rem. Charnwood	143		81			39												
City (NW)	28		38			40												
City (NE)	37		90	13	13	22												
City (SE)	23		25			16												
City (SW)	14		31			18												
City (Centre)	15		29			21												
Oadby			27															
Harborough	38		12			14												
Blaby	33	11	35			49												
Hinckley	20		14			22												
NW Leics	85	51				36												
Melton	16		26			22												
Other	304	66	70	16		114												

Table 6-5: Highlight Matrix of all Sectored Trips, Option 1 PM Peak minus Core PM Peak (>10 Trips only)

7. Results: Option 2 – Urban Concentration B (Low Growth)

7.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,000	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	800	A mix of small and medium sized sites in and around the town.
Shepshed	2,200	Majority of available sites (total 2,686) including large and medium sites west of Shepshed and mix of small and medium sized sites in and around the town.
Anstey	400	A mix of small and medium sized sites, total of 2,100 in the Service Centres.
Barrow Upon Soar	400	
Mountsorrel	100	
Quorn	400	
Rothley	400	
Sileby	400	
Total	**8,100**	

Table 7-1: Option 2 Development Assumptions (provided by Charnwood Borough Council)

7.1.1. The above assumptions were assigned to loading points as per Figure 7-1.

7.2. Modelling Outputs

7.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 7-2, Figure 7-3)
- Delay Difference Plots (Figure 7-4, Figure 7-5)
- Junction Analysis (Figure 7-6, Figure 7-7, Table 7-2, Table 7-3)
- Select Link Analysis
    - Loughborough (Figure 7-8, Figure 7-9)
    - Shepshed (Figure 7-10, Figure 7-11)
    - Syston (Figure 7-12, Figure 7-13)
- Matrix Sectoring (Table 7-4, Table 7-5)

ZONAL LOADING

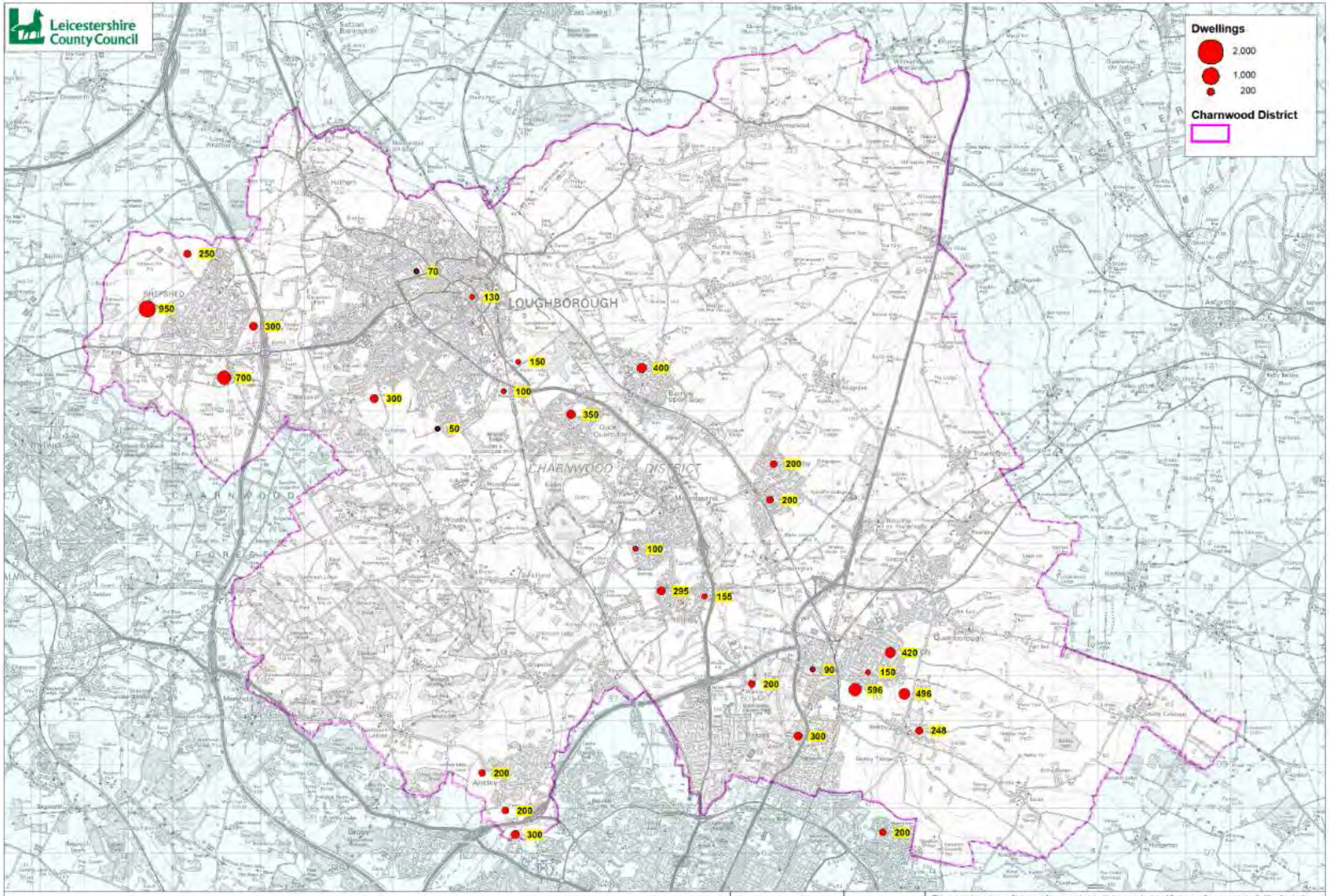


Figure 7-1: Spatial Dwelling Distribution of Modelled Scenario, Option 2

FLOW DIFFERENCE

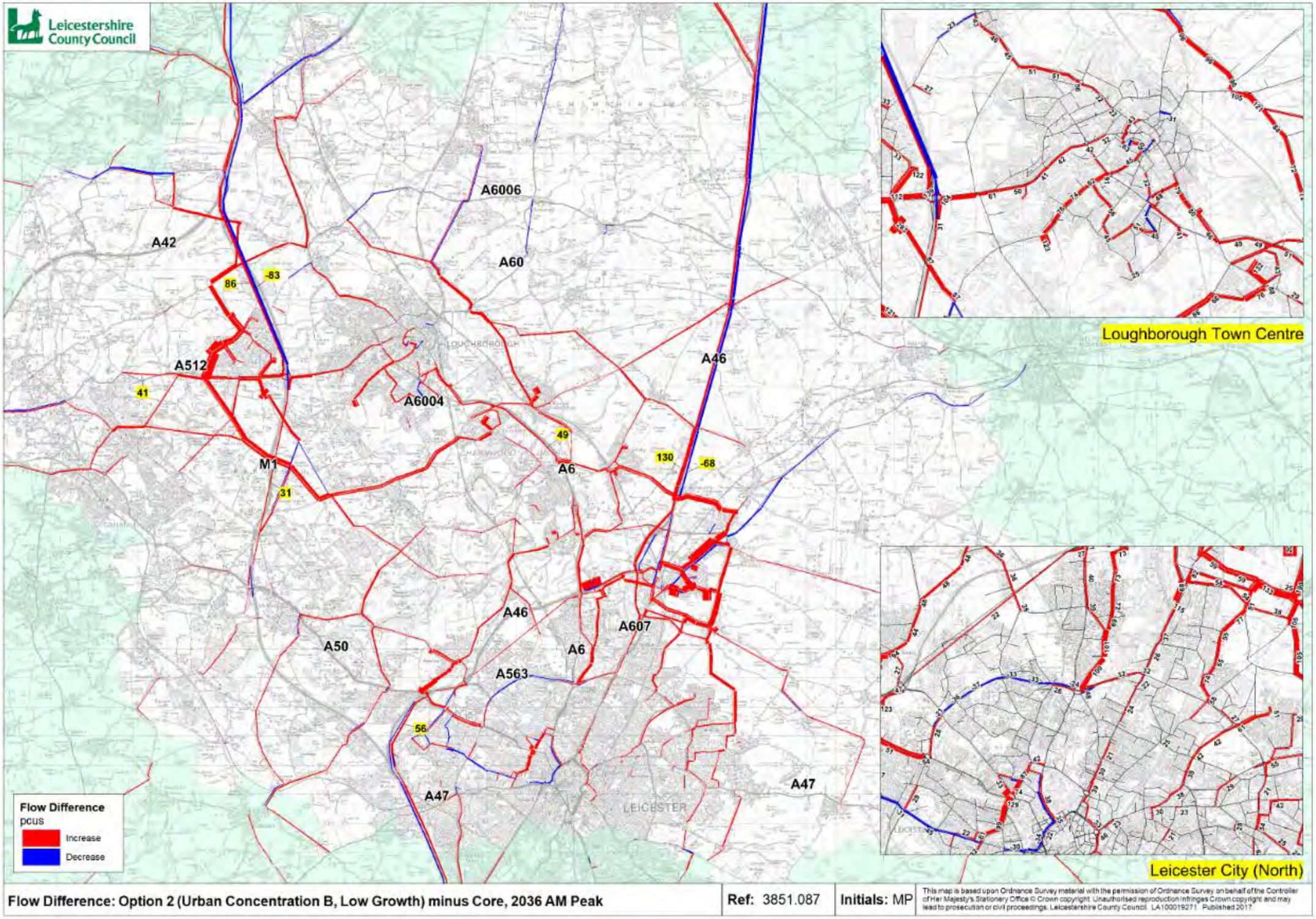


Figure 7-2: Flow Difference Plot, Option 2 (AM Peak)

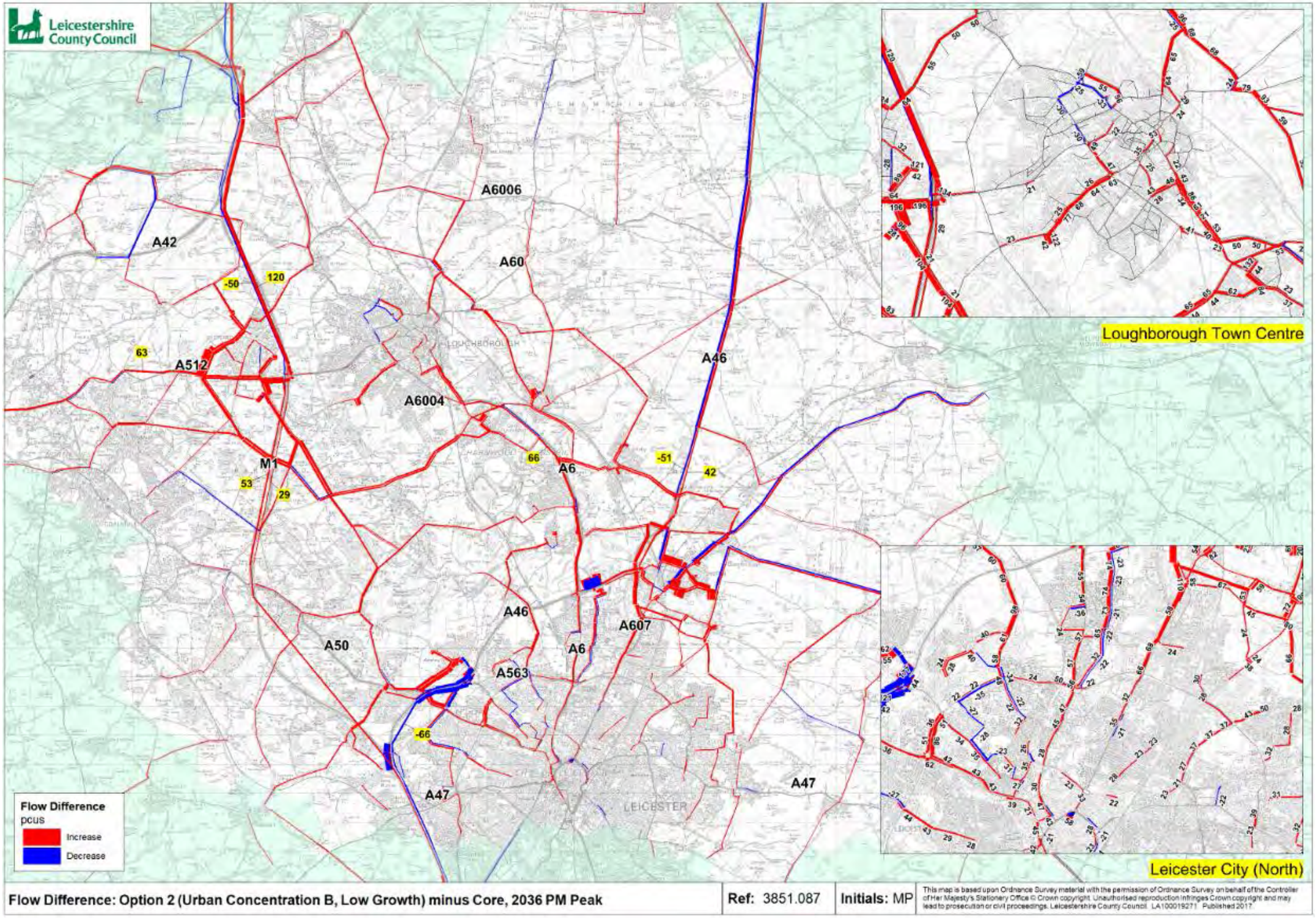


Figure 7-3: Flow Difference Plot, Option 2 (PM Peak)

DELAY DIFFERENCE

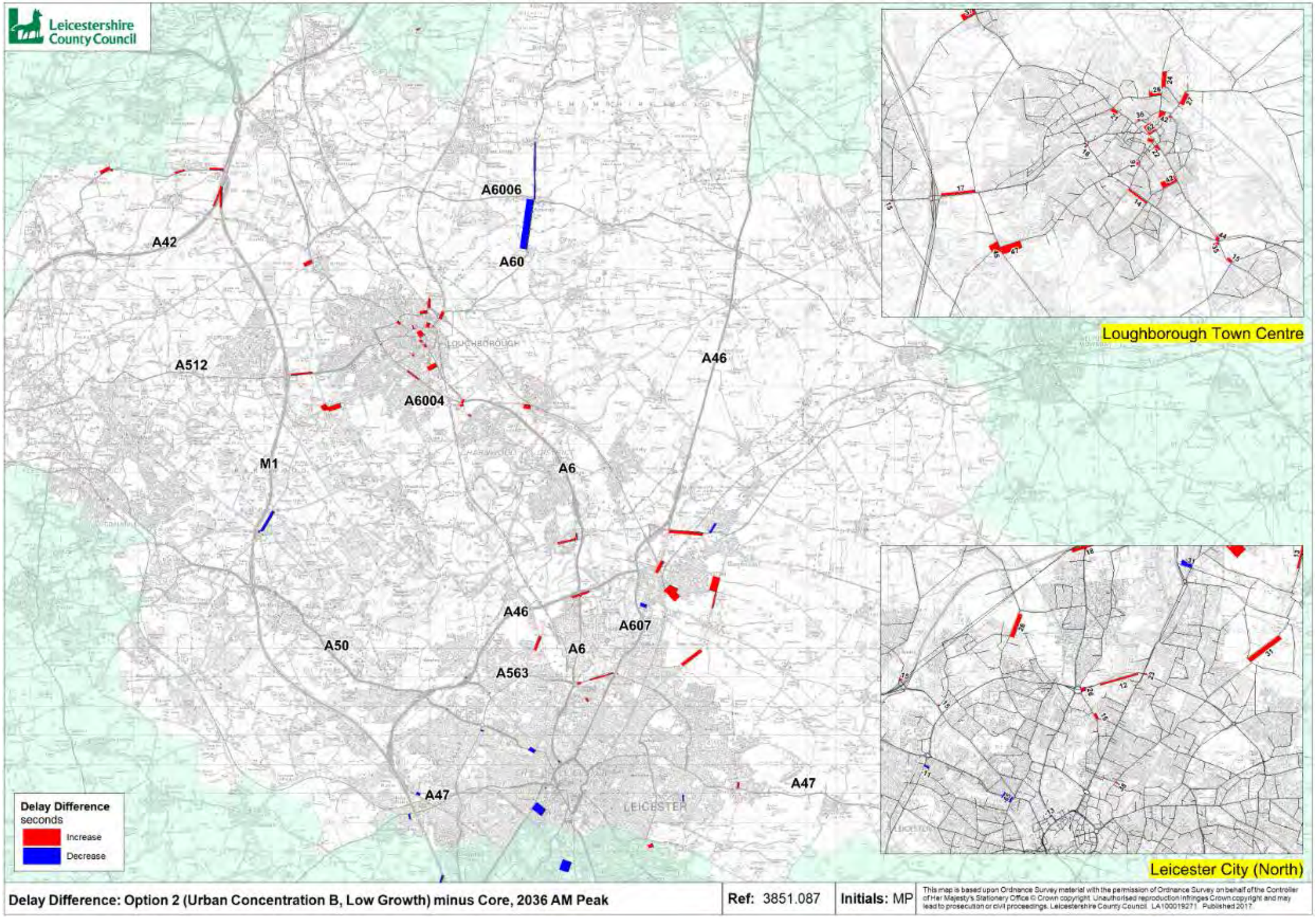


Figure 7-4: Delay Difference Plot, Option 2 (AM Peak)

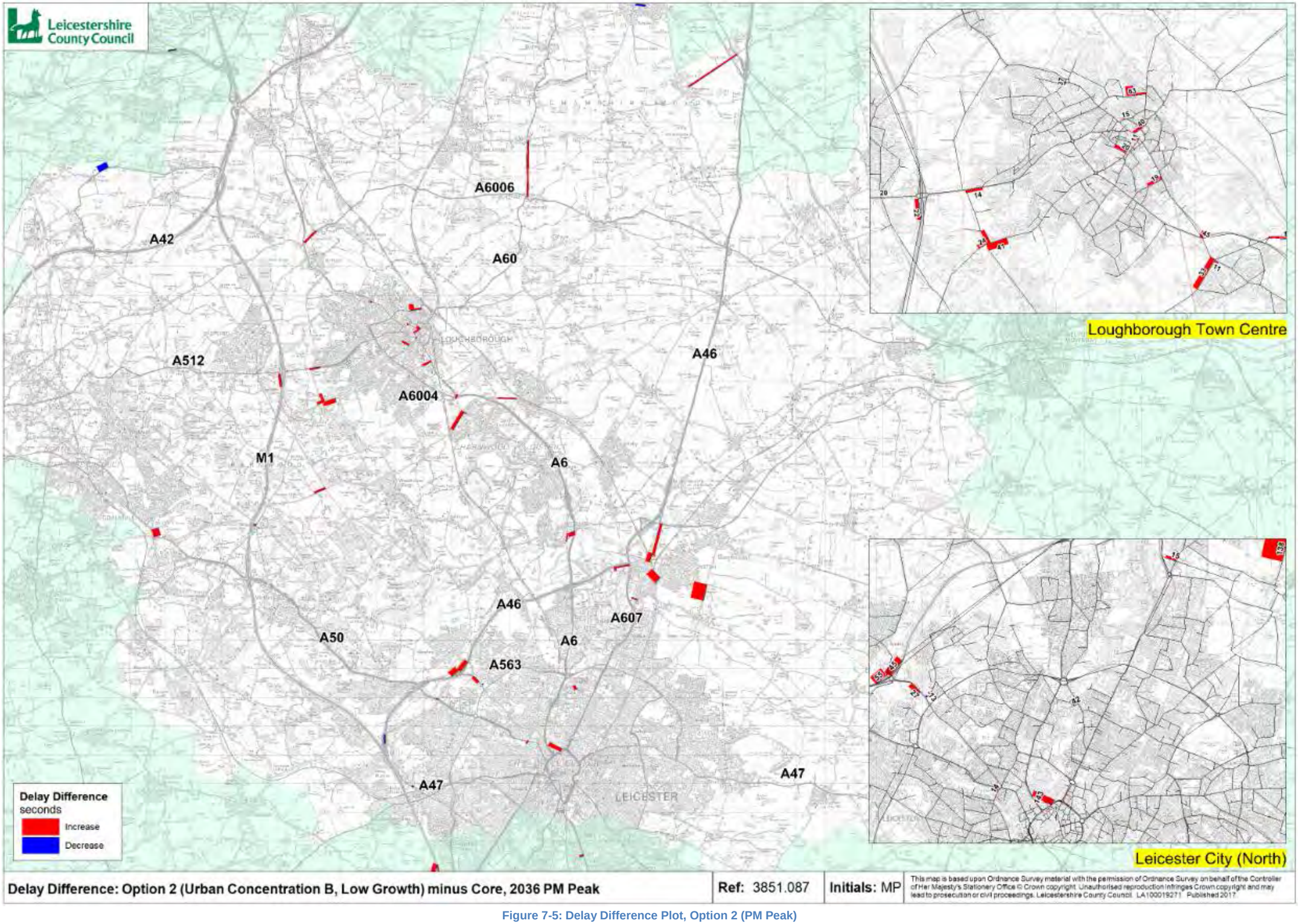


Figure 7-5: Delay Difference Plot, Option 2 (PM Peak)

Project Reference: 3851.087

ZONAL LOADING

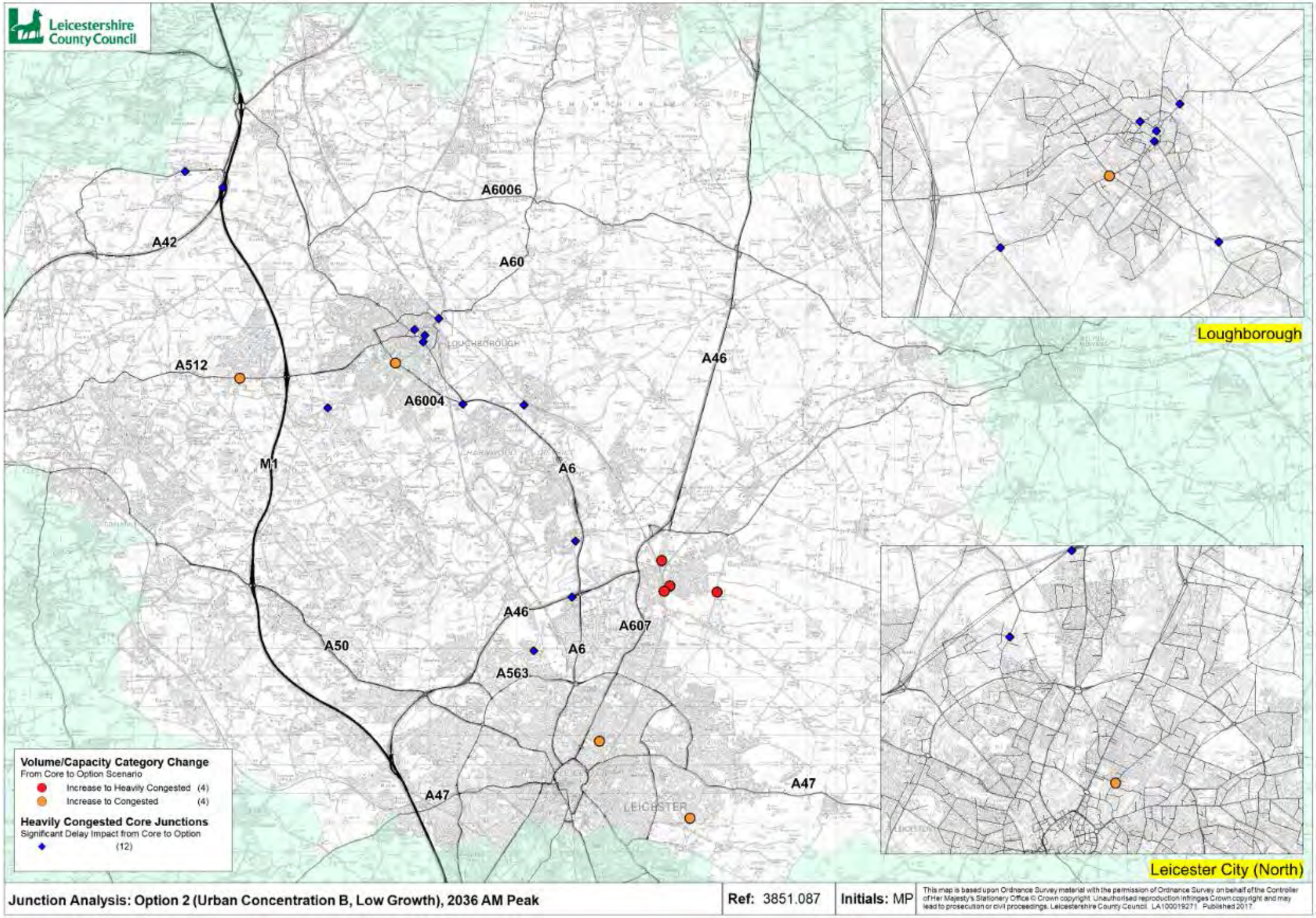


Figure 7-6: Junction Analysis, Option 2 (AM Peak)

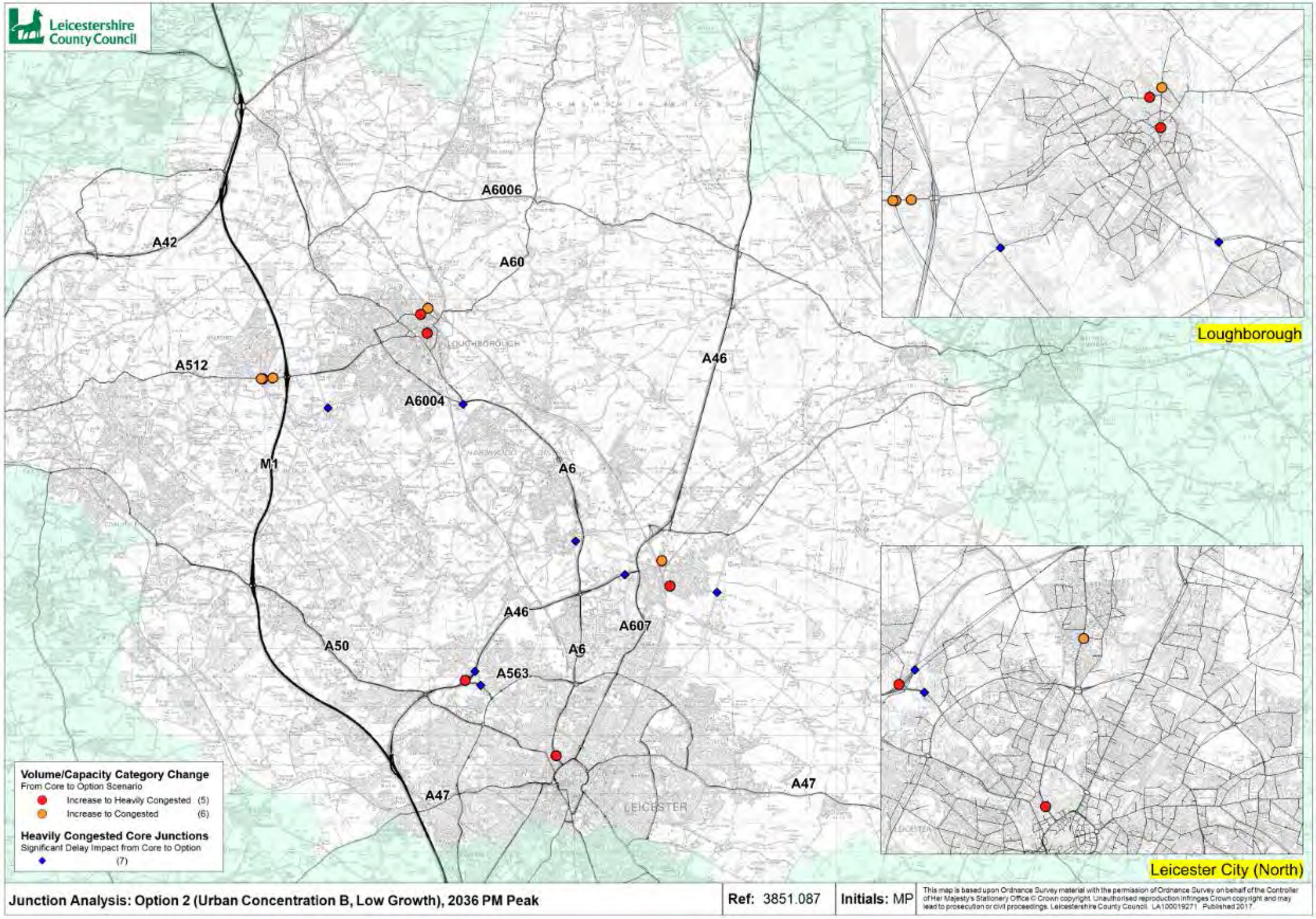


Figure 7-7: Junction Analysis, Option 2 (PM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_am	co_am_desc	36_opt2_am	o2_am_desc	core del	opt2 del	diff del
3259	Catherine St/Brandon St	City (NE)	City (NE)	57	Uncongested	98	Congested			
2412	Main St/Biggin Hill Rd	City (SE)	City (SE)	82	Approaching Congestion	88	Congested			
60922	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	91	Congested			
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	86	Congested	103	Heavily Congested			
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	Shepshed	77	Approaching Congestion	88	Congested			
2280	Fosse Way/High St	Syston	Syston	64	Uncongested	103	Heavily Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	50	Uncongested	100	Heavily Congested			
78892	Melton Rd/Wanlip Rd	Syston	Syston	98	Congested	104	Heavily Congested			
1607	A46/A6	Birstall	Birstall	102	Heavily Congested	103	Heavily Congested	54	66	12
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	City (NW)	101	Heavily Congested	102	Heavily Congested	46	63	17
60108	Woodgate/Pinfold Gate	Loughborough	Loughborough	105	Heavily Congested	108	Heavily Congested	157	187	30
61020	A6/Baxter Gate	Loughborough	Loughborough	103	Heavily Congested	107	Heavily Congested	60	74	14
69941	A60/Station Boulevard	Loughborough	Loughborough	107	Heavily Congested	108	Heavily Congested	137	155	17
73778	A6 (Bridge St)	Loughborough	Loughborough	100	Heavily Congested	103	Heavily Congested	38	56	17
50312	East Midlands Airport	NW Leics	EMA	101	Heavily Congested	101	Heavily Congested	46	57	12
50523	M1/A42	NW Leics	EMA (M1)	105	Heavily Congested	106	Heavily Congested	54	72	18
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	101	Heavily Congested	101	Heavily Congested	92	104	11
60044	Barrow Rd/Bridge St	Rem. Charnwood	Barrow	101	Heavily Congested	103	Heavily Congested	70	91	21
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	106	Heavily Congested	107	Heavily Congested	208	247	40
60362	A6/A6004	Rem. Charnwood	Quorn	106	Heavily Congested	109	Heavily Congested	54	68	15

Table 7-2: Junction Analysis, Option 2 (AM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_pm	co_pm_desc	36_opt2_pm	o2_pm_desc	core del	opt2 del	diff del
1748	A6/School Ln	Birstall	Birstall	83	Approaching Congestion	91	Congested			
1428	A6 (St Margaret's Way)	City (NE)	City (NE)	90	Congested	106	Heavily Congested			
60098	The Coneries/Sparrow Hill	Loughborough	Loughborough	90	Congested	100	Heavily Congested			
78902	Belton Rd	Loughborough	Loughborough	44	Uncongested	100	Heavily Congested			
78903	A6004/Gordon Rd	Loughborough	Loughborough	79	Approaching Congestion	85	Congested			
9631	A46/Leicester Rd	Rem. Charnwood	Anstey	90	Congested	102	Heavily Congested			
7306	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	88	Congested			
76036	A512/Leicester Rd	Shepshed	Shepshed	81	Approaching Congestion	87	Congested			
76150	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	88	Congested			
2280	Fosse Way/High St	Syston	Syston	83	Approaching Congestion	96	Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	77	Approaching Congestion	103	Heavily Congested			
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	100	Heavily Congested	101	Heavily Congested	86	99	13
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	100	Heavily Congested	103	Heavily Congested	88	149	62
9385	Anstey Ln	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	53	16
9715	A46/Leicester Rd	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	69	32
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	104	Heavily Congested	105	Heavily Congested	175	203	28
60362	A6/A6004	Rem. Charnwood	Quorn	101	Heavily Congested	103	Heavily Congested	26	39	13
2047	A46/Wanlip Rd	Syston	Syston	101	Heavily Congested	102	Heavily Congested	33	49	16

Table 7-3: Junction Analysis, Option 2 (PM Peak)

SELECT LINK ANALYSIS

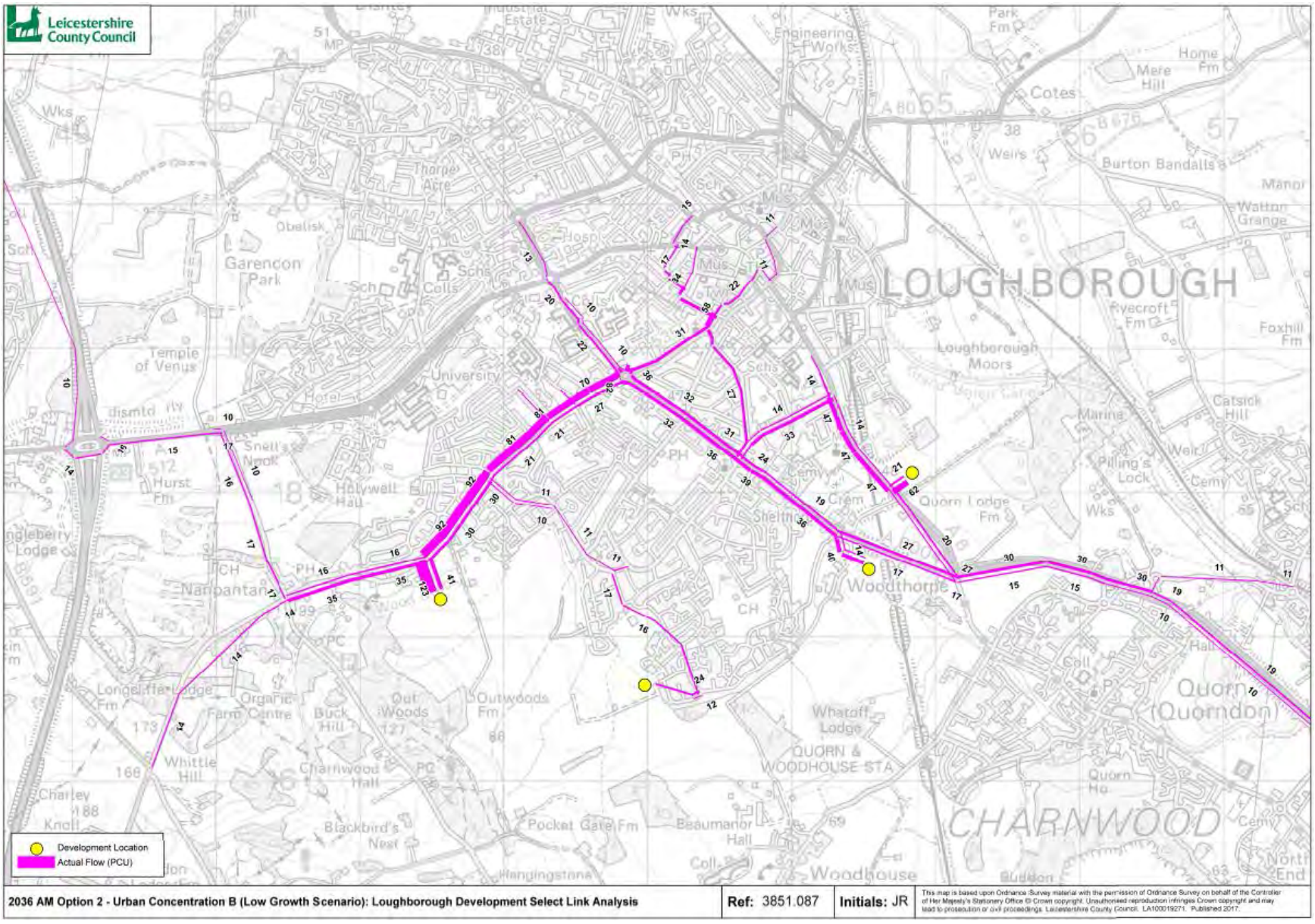


Figure 7-8: Select Link Analysis, Option 2 - Loughborough Development (AM Peak)

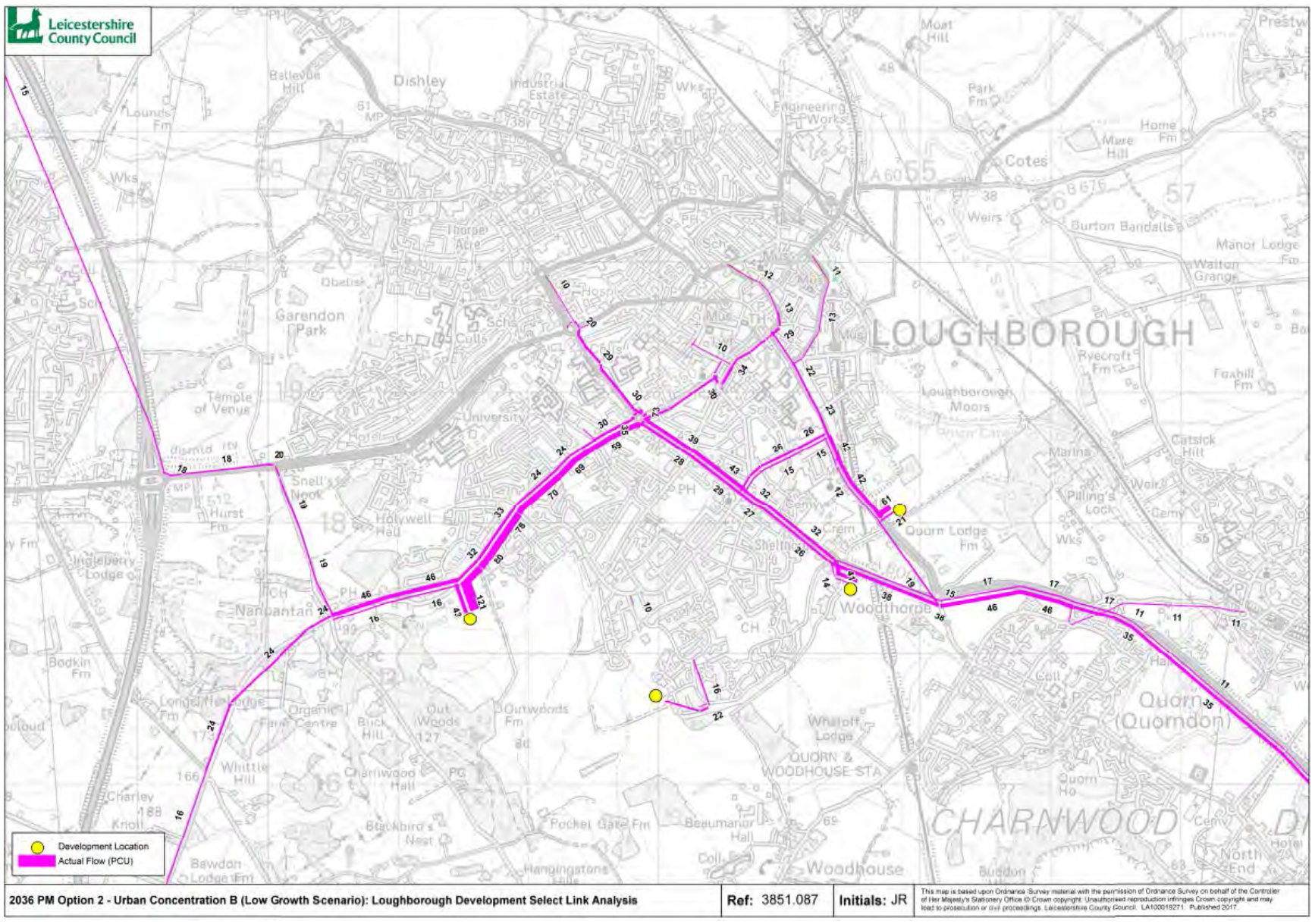


Figure 7-9: Select Link Analysis, Option 2 - Loughborough Development (PM Peak)

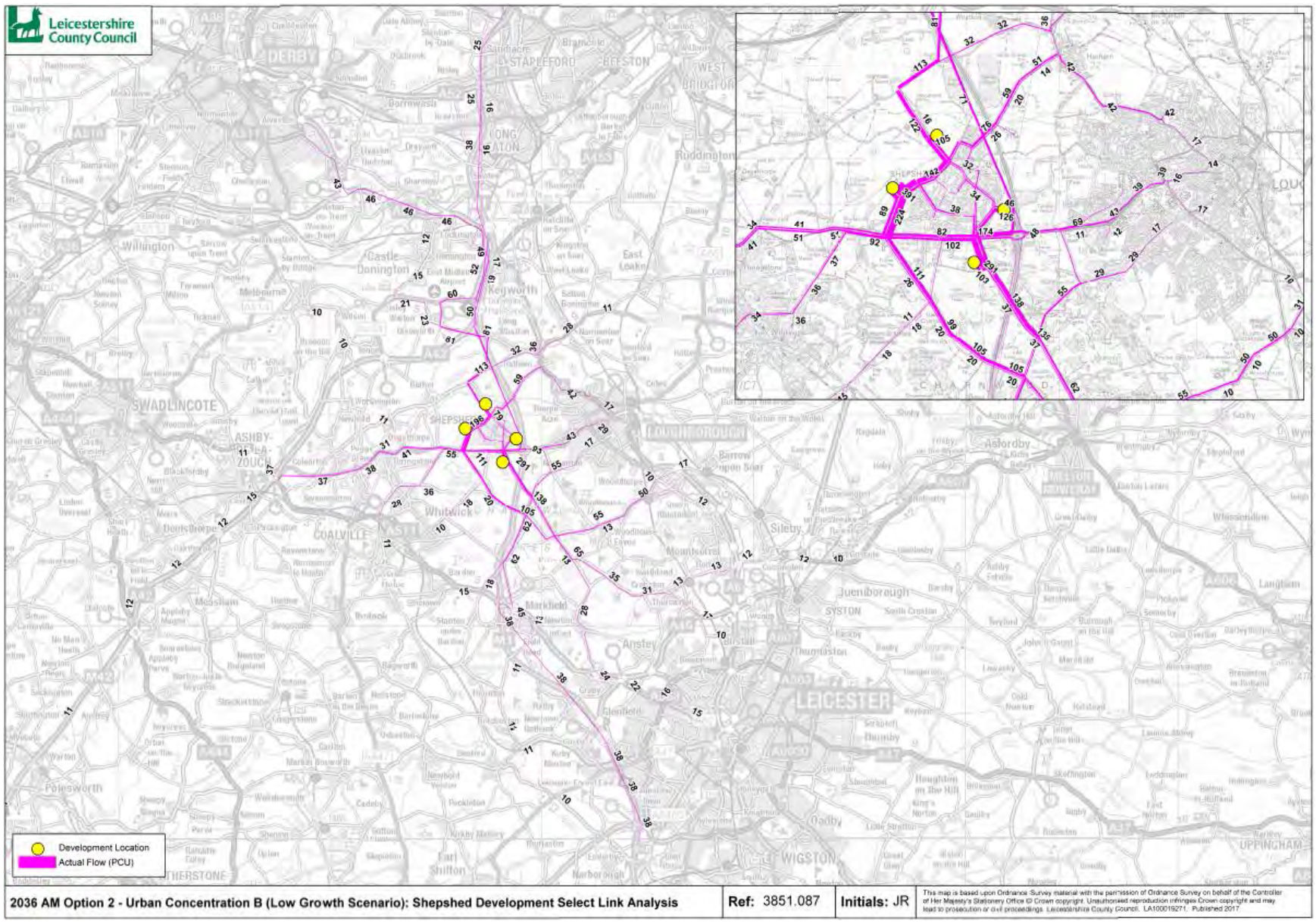


Figure 7-10: Select Link Analysis, Option 2 - Shepshed Development (AM Peak)

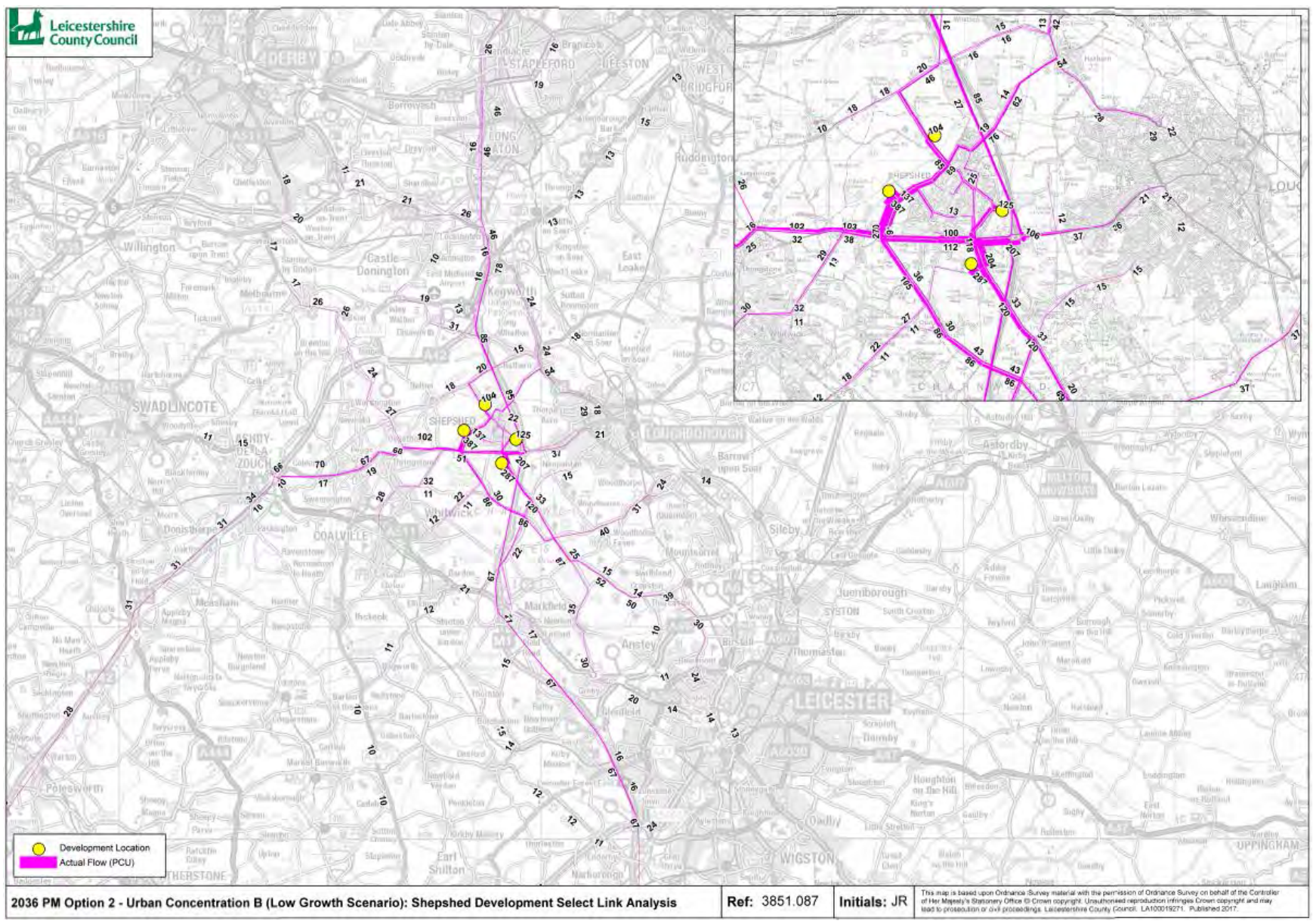


Figure 7-11: Select Link Analysis, Option 2 - Shepshed Development (PM Peak)

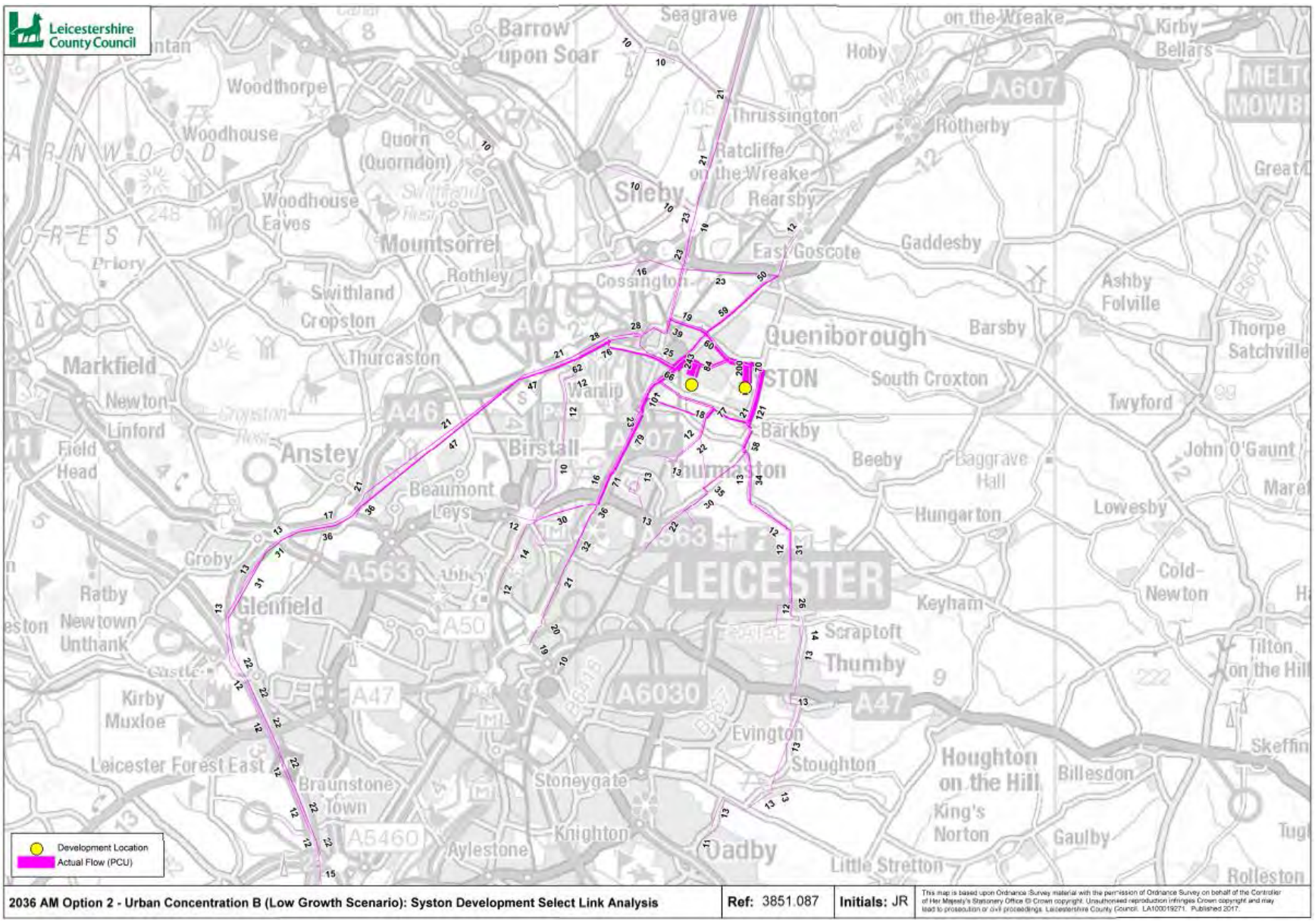


Figure 7-12: Select Link Analysis, Option 2 - Syston Development (AM Peak)

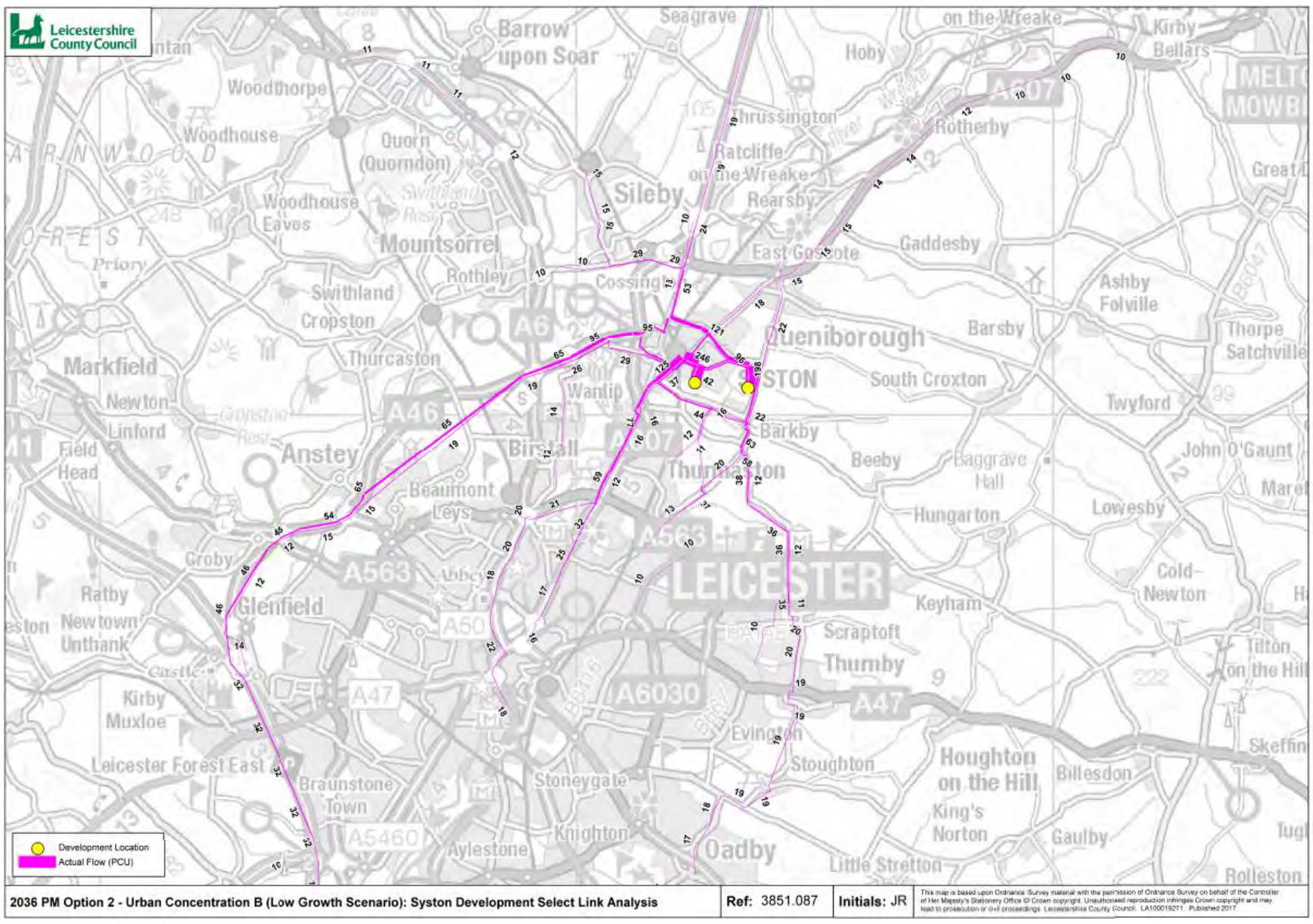


Figure 7-13: Select Link Analysis, Option 2 - Syston Development (PM Peak)

MATRIX SECTORING

Op2 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	188	17				34										23		79
Shepshed	151	273				74	11	13						29	21	174		178
Syston	23		148	58		90	50	136	27	14	23	22		30	14	7	14	54
Thurmaston			22	12		13		18										13
Birstall					14	14												
Rem. Charnwood	146	17	53	12	18	257	78	44	29	42	35	11	25	79	39	50	48	136
City (NW)						10												
City (NE)			18															
City (SE)			13															
City (SW)																		
City (Centre)																		
Oadby																		
Harborough																		
Blaby																		
Hinckley																		
NW Leics		27																
Melton																		
Other		18																

Table 7-4: Highlight Matrix of all Sectored Trips, Option 2 AM Peak minus Core AM Peak (>10 Trips only)

Op2 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	107	77	26			135												
Shepshed	16	245				15										26		33
Syston			148	22	12	46		18										
Thurmaston			37	15		12												
Birstall			13			17												
Rem. Charnwood	36	58	85		10	199	12											
City (NW)		14	38			67												
City (NE)		18	89	13	13	46												
City (SE)			25			29												
City (SW)			31			32												
City (Centre)			28			35												
Oadby			27															
Harborough			12			24												
Blaby		44	34			75												
Hinckley		30	14			32												
NW Leics	17	178				54												
Melton			24			42												
Other	90	225	68	15		181												

Table 7-5: Highlight Matrix of all Sectored Trips, Option 2 PM Peak minus Core PM Peak (>10 Trips only)

8. Results: Option 3 – Dispersed Settlement Hierarchy Distribution (Low Growth)

8.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	1,000	Mix of sites
Loughborough	2,000	Mix of sites including one large site (1,100 south of Loughborough)
Shepshed	2,200	Large and medium sites west of Shepshed and mix of small and medium sized sites in and around the town.
Anstey	300	A mix of small and medium sized sites, total of 1,600 homes at the Service Centres
Barrow Upon Soar	300	
Mountsorrel	100	
Quorn	300	
Rothley	300	
Sileby	300	
Barkby	100	A mix of small and medium sized sites, total of 1,400
Burton on the Wolds	100	
Cossington	100	
East Goscote	100	
Hathern	100	
Newtown Linford	100	
Queniborough	100	
Rearsby	100	
Seagrave	100	
Swithland	0	
Thrussington	100	
Thurcaston	100	
Woodhouse Eaves	100	
Wymeswold	100	
Total	**8,100**	

Table 8-1: Option 3 Development Assumptions (provided by Charnwood Borough Council)

8.1.1. The above assumptions were assigned to loading points as per Figure 8-1.

8.2. Modelling Outputs

8.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 8-2, Figure 8-3)
- Delay Difference Plots (Figure 8-4, Figure 8-5)
- Junction Analysis (Figure 8-6, Figure 8-7, Table 8-2, Table 8-3)
- Select Link Analysis
    - Loughborough (Figure 8-8, Figure 8-9)
    - Shepshed (Figure 8-10, Figure 8-11)
    - Syston (Figure 8-12, Figure 8-13)
- Matrix Sectoring (Table 8-4, Table 8-5)

ZONAL LOADING

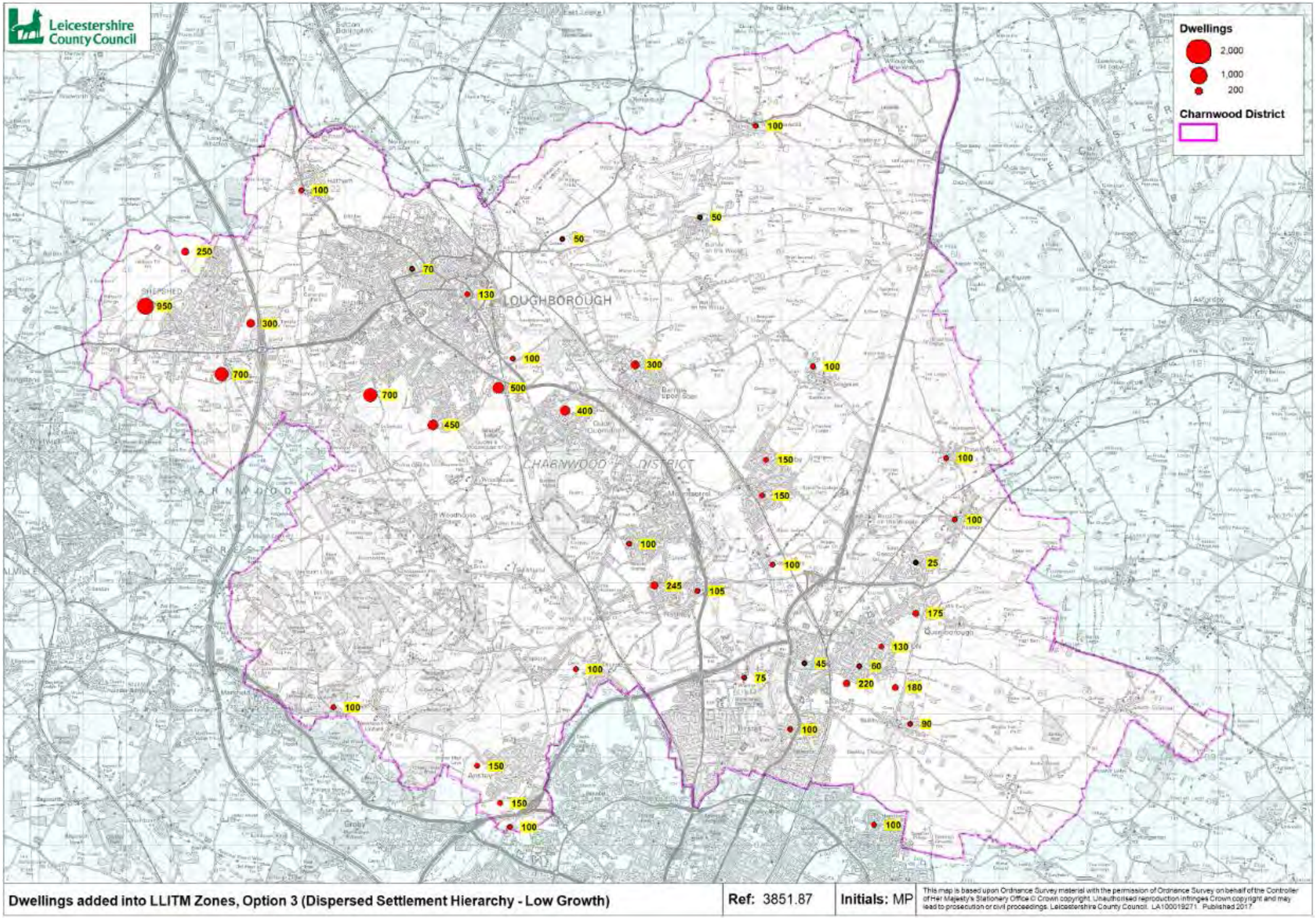


Figure 8-1: Spatial Dwelling Distribution of Modelled Scenario, Option 3

Project Reference: 3851.087

FLOW DIFFERENCE

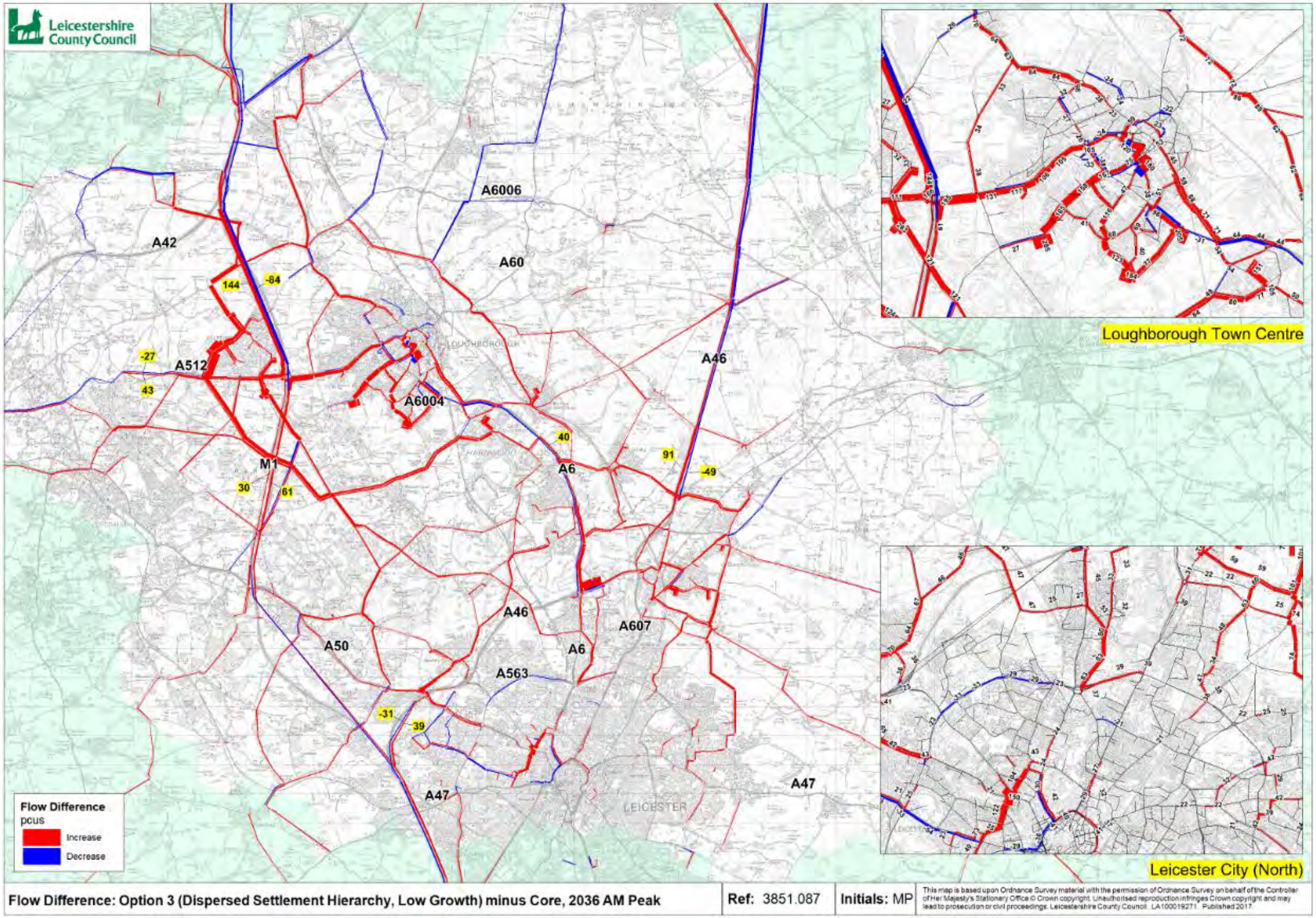


Figure 8-2: Flow Difference Plot, Option 3 (AM Peak)

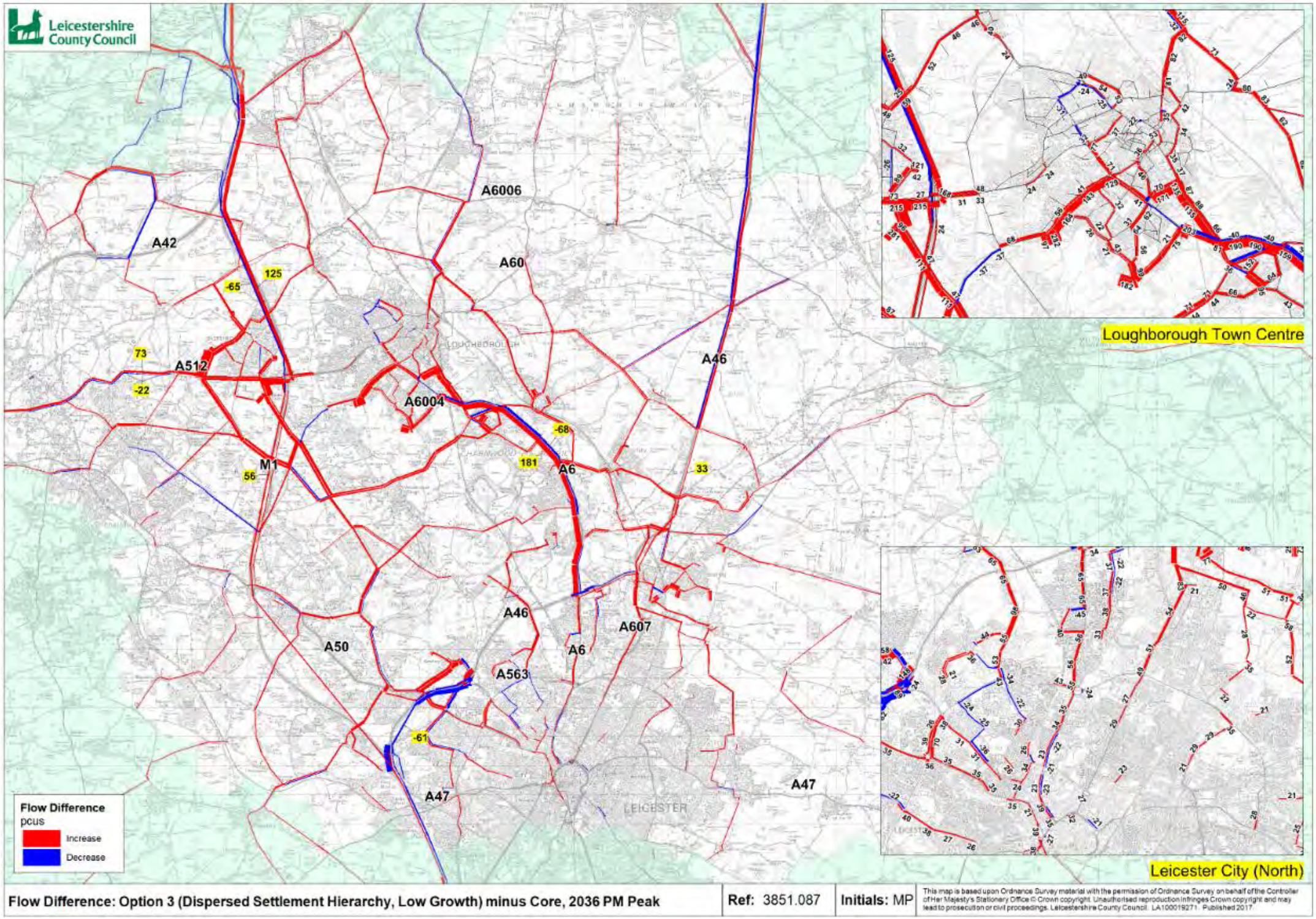


Figure 8-3: Flow Difference Plot, Option 3 (PM Peak)

DELAY DIFFERENCE

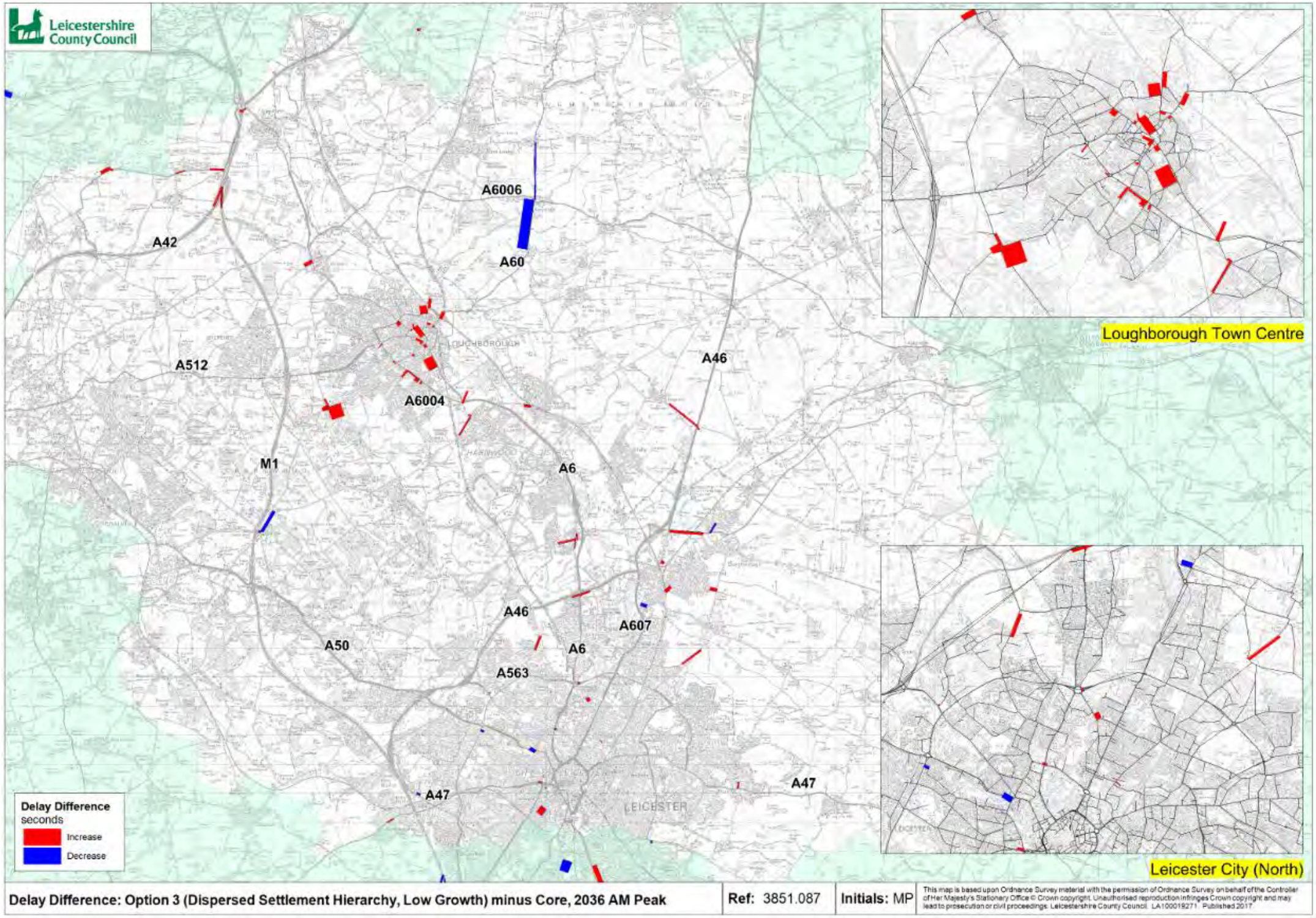


Figure 8-4: Delay Difference Plot, Option 3 (AM Peak)

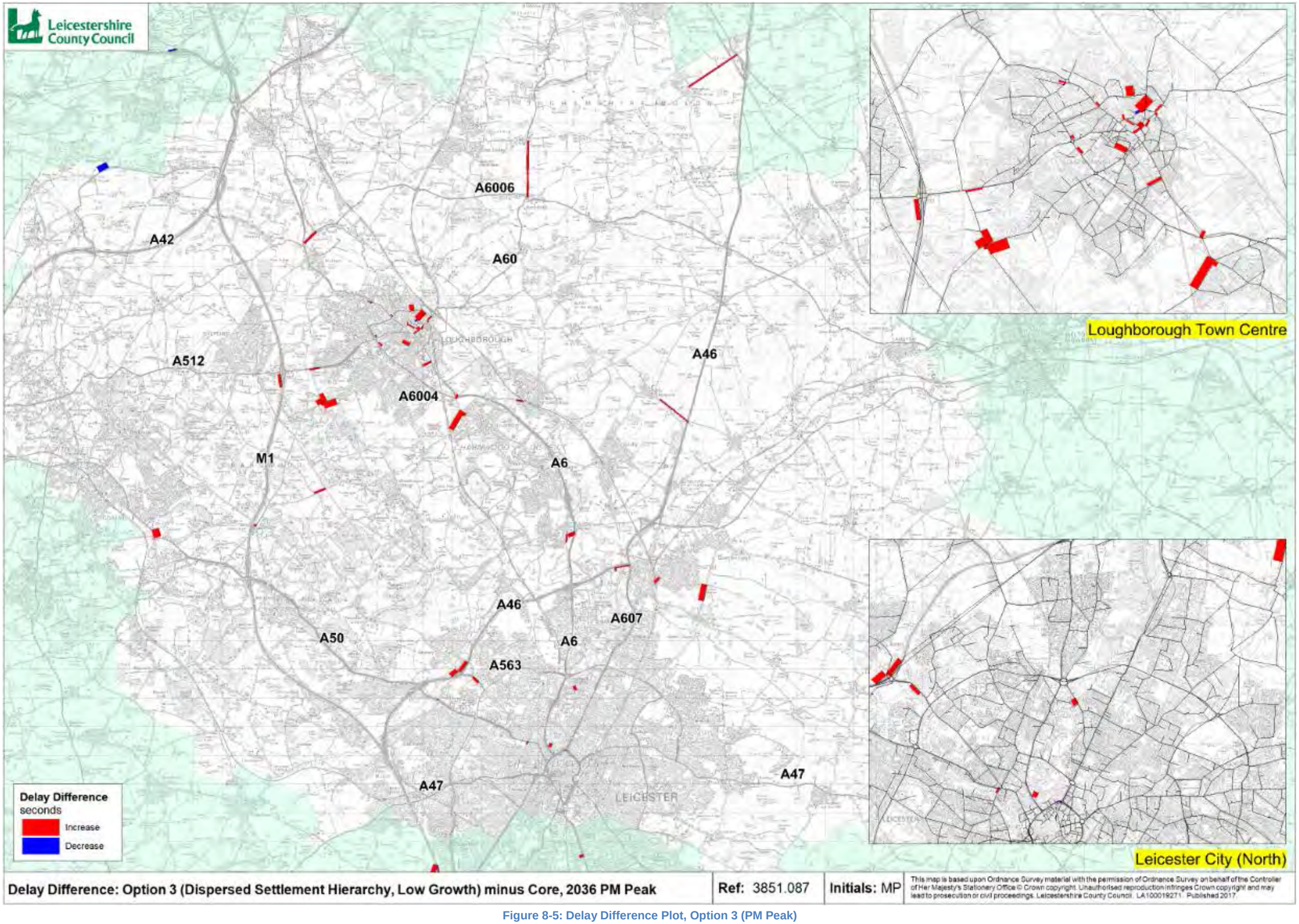


Figure 8-5: Delay Difference Plot, Option 3 (PM Peak)

JUNCTION PERFORMANCE

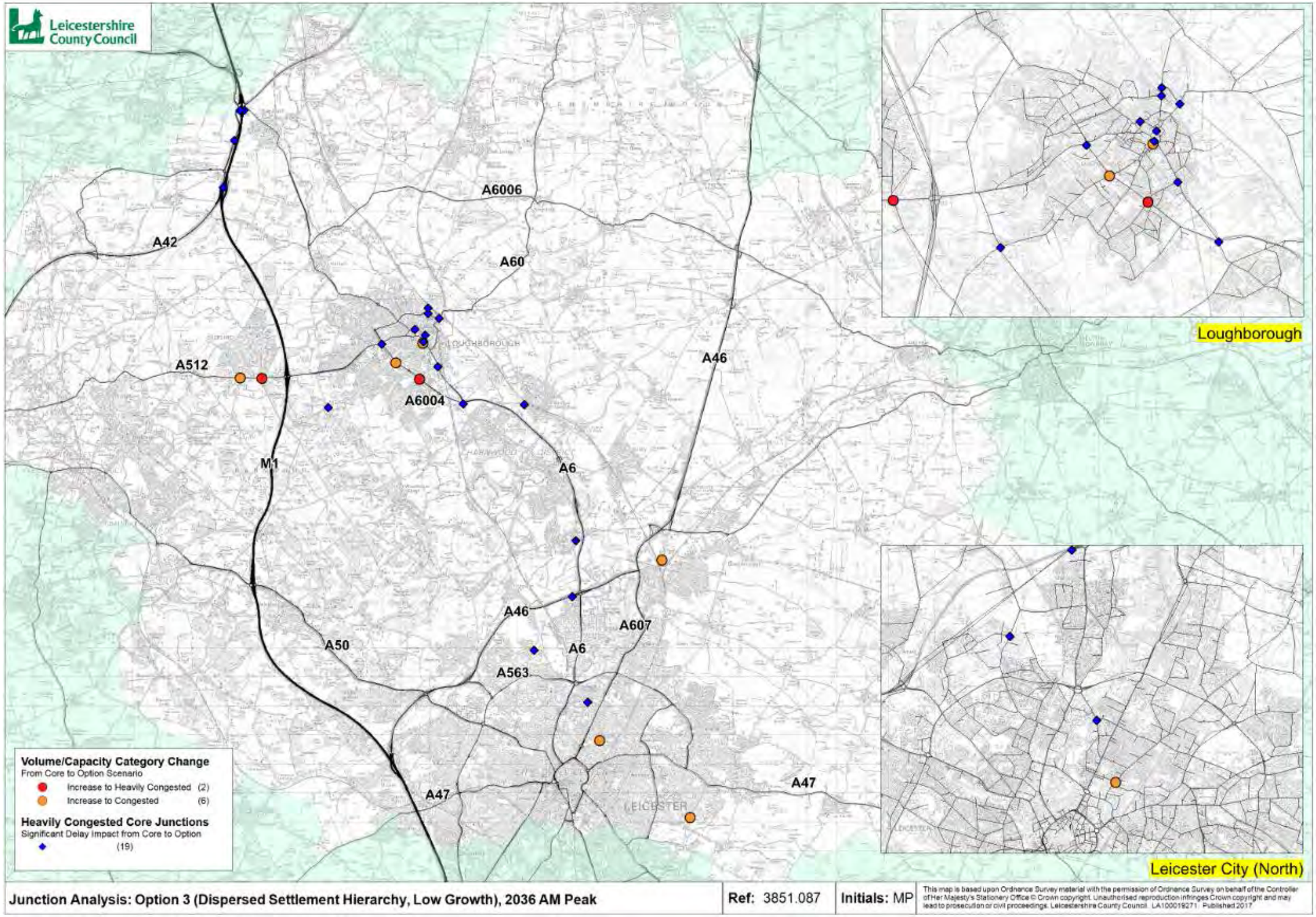


Figure 8-6: Junction Analysis, Option 3 (AM Peak)

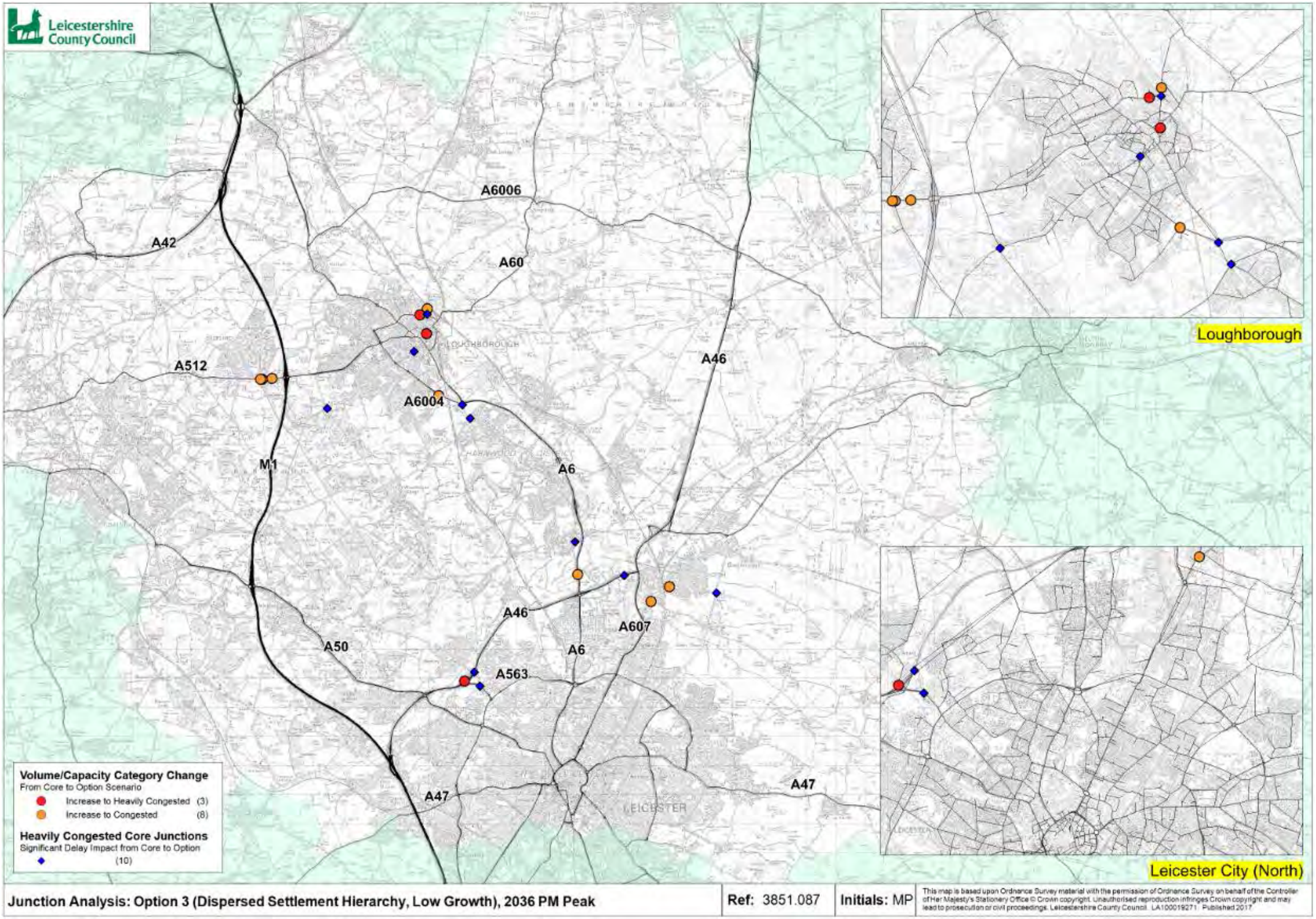


Figure 8-7: Junction Analysis, Option 3 (PM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_am	co_am_desc	36_opt3_am	o3_am_desc	core del	opt3 del	diff del
3259	Catherine St/Brandon St	City (NE)	City (NE)	57	Uncongested	98	Congested			
2412	Main St/Biggin Hill Rd	City (SE)	City (SE)	82	Approaching Congestion	88	Congested			
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	Loughborough	89	Congested	101	Heavily Congested			
60922	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	97	Congested			
61009	Woodgate/Pack Horse Ln	Loughborough	Loughborough	15	Uncongested	86	Congested			
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	Shepshed	77	Approaching Congestion	88	Congested			
60095	A512/Ingleberry Rd	Shepshed	Shepshed	95	Congested	101	Heavily Congested			
2280	Fosse Way/High St	Syston	Syston	64	Uncongested	89	Congested			
1607	A46/A6	Birstall	Birstall	102	Heavily Congested	103	Heavily Congested	54	65	11
2751	Loughborough Rd/Checketts Rd	City (NE)	City (NE)	101	Heavily Congested	101	Heavily Congested	56	71	15
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	City (NW)	101	Heavily Congested	102	Heavily Congested	46	61	15
7323	A6004/Forest Rd	Loughborough	Loughborough	102	Heavily Congested	104	Heavily Congested	82	112	30
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	101	Heavily Congested	104	Heavily Congested	82	104	22
60108	Woodgate/Pinfold Gate	Loughborough	Loughborough	105	Heavily Congested	110	Heavily Congested	157	223	66
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	102	Heavily Congested	109	Heavily Congested	53	77	23
61020	A6/Baxter Gate	Loughborough	Loughborough	103	Heavily Congested	110	Heavily Congested	60	87	27
69941	A60/Station Boulevard	Loughborough	Loughborough	107	Heavily Congested	108	Heavily Congested	137	157	19
73778	A6 (Bridge St)	Loughborough	Loughborough	100	Heavily Congested	103	Heavily Congested	38	63	25
78903	A6004/Gordon Rd	Loughborough	Loughborough	103	Heavily Congested	104	Heavily Congested	88	99	11
50523	M1/A42	NW Leics	EMA (M1)	105	Heavily Congested	106	Heavily Congested	54	71	17
50543	M1 Junction 24	NW Leics	M1 J24	102	Heavily Congested	104	Heavily Congested	50	60	11
50544	M1 Junction 24	NW Leics	M1 J24	104	Heavily Congested	104	Heavily Congested	144	157	13
76088	A453/Ashby Rd	NW Leics	Kegworth	109	Heavily Congested	109	Heavily Congested	132	151	18
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	101	Heavily Congested	101	Heavily Congested	92	104	12
60044	Barrow Rd/Bridge St	Rem. Charnwood	Barrow	101	Heavily Congested	102	Heavily Congested	70	85	14
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	106	Heavily Congested	109	Heavily Congested	208	284	76
60362	A6/A6004	Rem. Charnwood	Quorn	106	Heavily Congested	111	Heavily Congested	54	89	35

Table 8-2: Junction Analysis, Option 3 (AM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_pm	co_pm_desc	36_opt3_pm	o3_pm_desc	core del	opt3 del	diff del
60098	The Coneries/Sparrow Hill	Loughborough	Loughborough	90	Congested	100	Heavily Congested			
78902	Belton Rd	Loughborough	Loughborough	44	Uncongested	100	Heavily Congested			
78903	A6004/Gordon Rd	Loughborough	Loughborough	79	Approaching Congestion	86	Congested			
9631	A46/Leicester Rd	Rem. Charnwood	Anstey	90	Congested	101	Heavily Congested			
60123	A6004/Allendale Rd	Rem. Charnwood	Woodthorpe	84	Approaching Congestion	94	Congested			
73890	A6/Broadnook	Rem. Charnwood	Broadnook	79	Approaching Congestion	91	Congested			
7306	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	89	Congested			
76036	A512/Leicester Rd	Shepshed	Shepshed	81	Approaching Congestion	87	Congested			
76150	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	89	Congested			
2227	Melton Rd/Fosse Way	Syston	Syston	80	Approaching Congestion	91	Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	77	Approaching Congestion	94	Congested			
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	103	Heavily Congested	103	Heavily Congested	104	121	17
61000	Forest Rd/Browns Ln	Loughborough	Loughborough	100	Heavily Congested	102	Heavily Congested	47	58	11
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	100	Heavily Congested	101	Heavily Congested	86	100	14
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	100	Heavily Congested	102	Heavily Congested	88	116	28
9385	Anstey Ln	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	49	12
9715	A46/Leicester Rd	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	60	24
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	101	Heavily Congested	48	66	18
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	104	Heavily Congested	106	Heavily Congested	175	225	50
60362	A6/A6004	Rem. Charnwood	Quorn	101	Heavily Congested	103	Heavily Congested	26	39	13
2047	A46/Wanlip Rd	Syston	Syston	101	Heavily Congested	101	Heavily Congested	33	45	12

Table 8-3: Junction Analysis, Option 3 (PM Peak)

SELECT LINK ANALYSIS

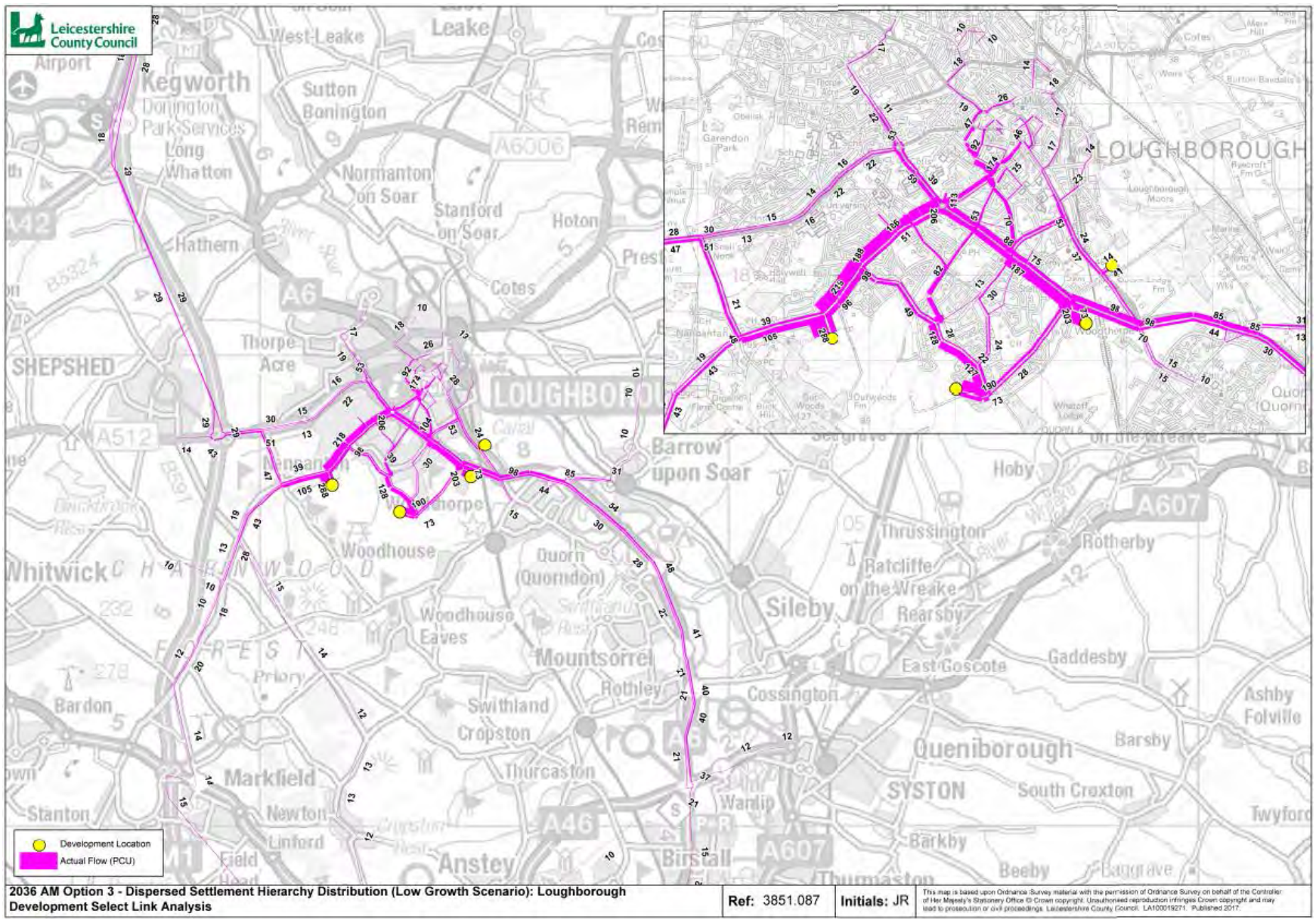


Figure 8-8: Select Link Analysis, Option 3 - Loughborough Development (AM Peak)

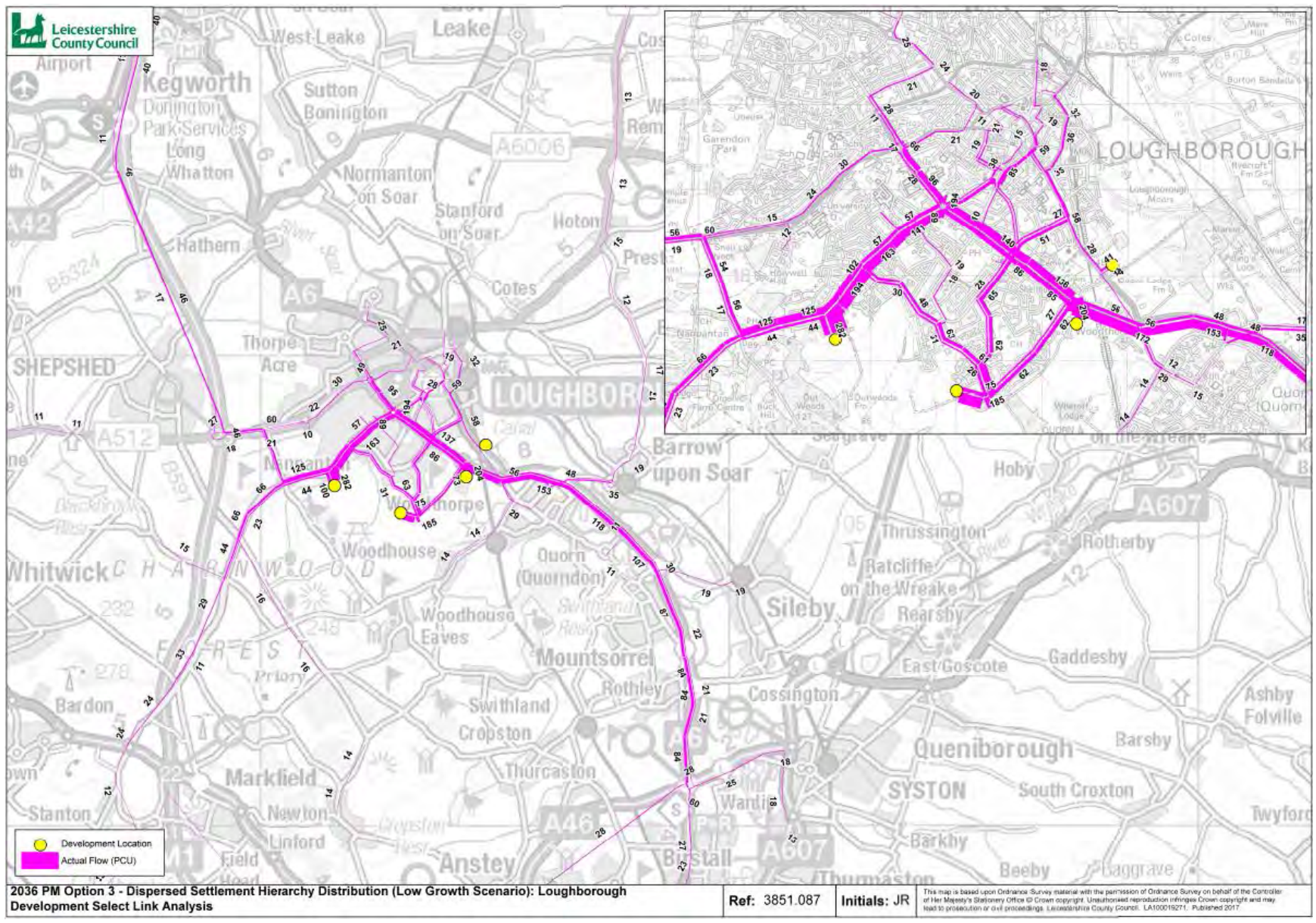


Figure 8-9: Select Link Analysis, Option 3 - Loughborough Development (PM Peak)

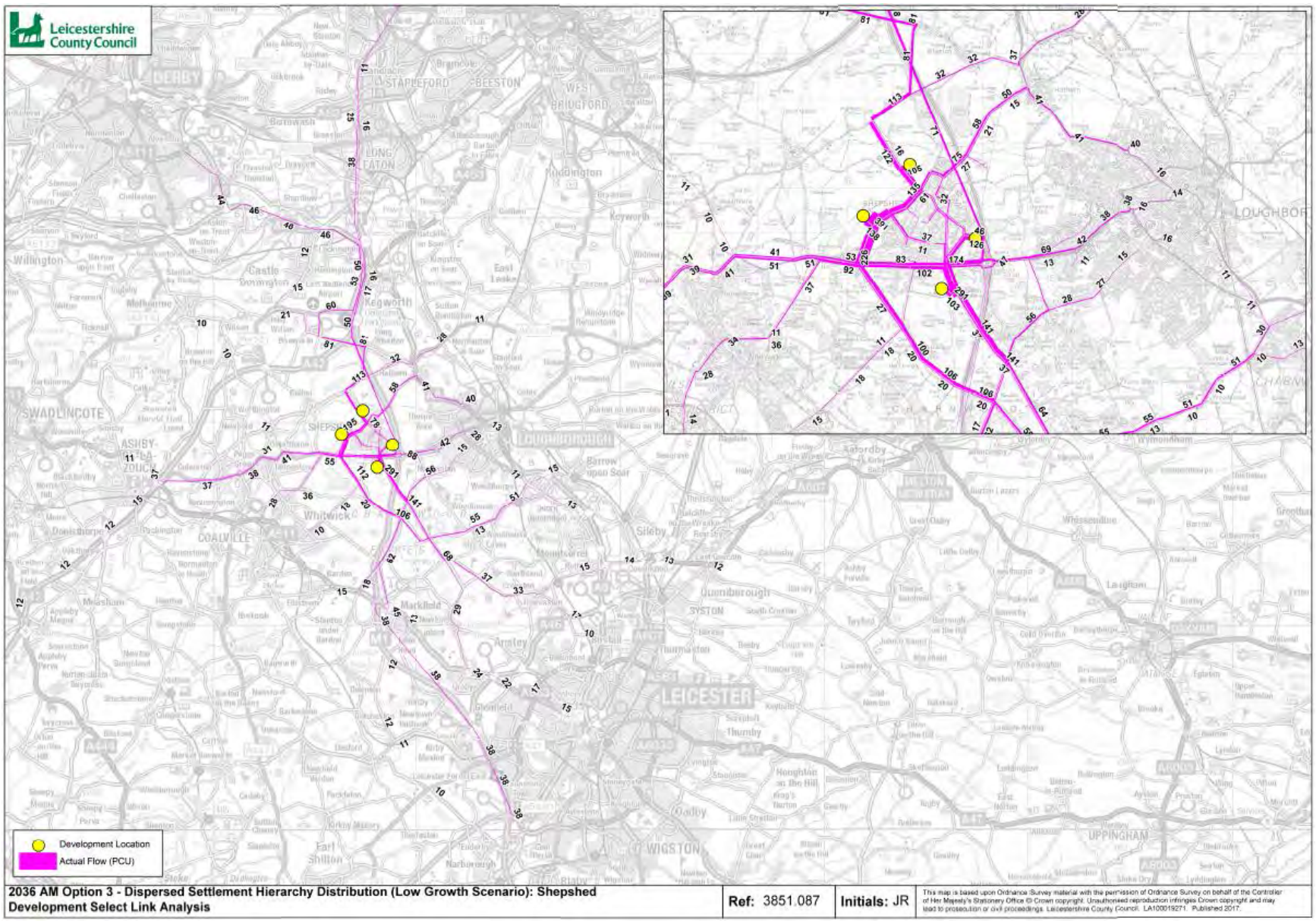


Figure 8-10: Select Link Analysis, Option 3 - Shepshed Development (AM Peak)

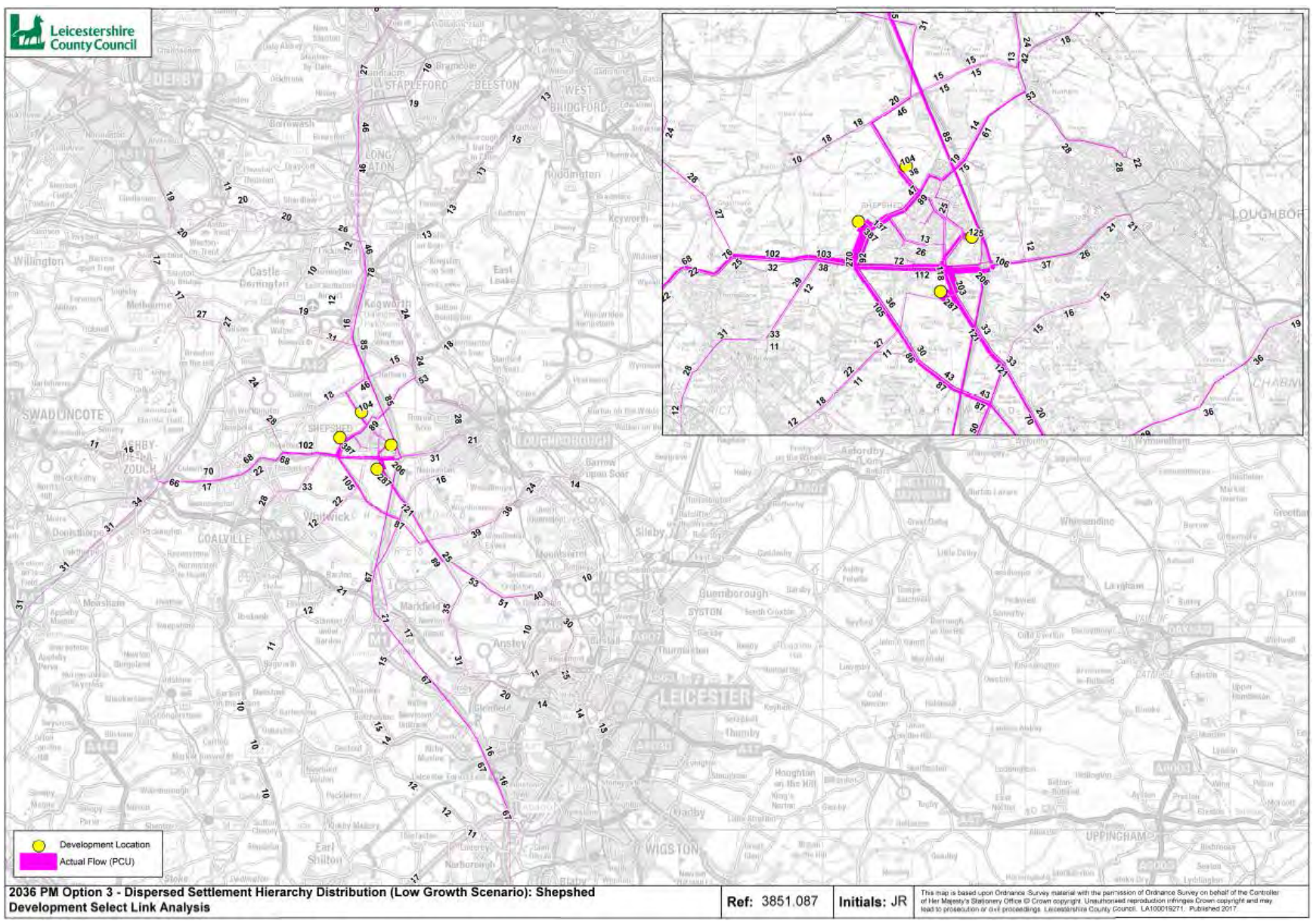


Figure 8-11: Select Link Analysis, Option 3 - Shepshed Development (PM Peak)

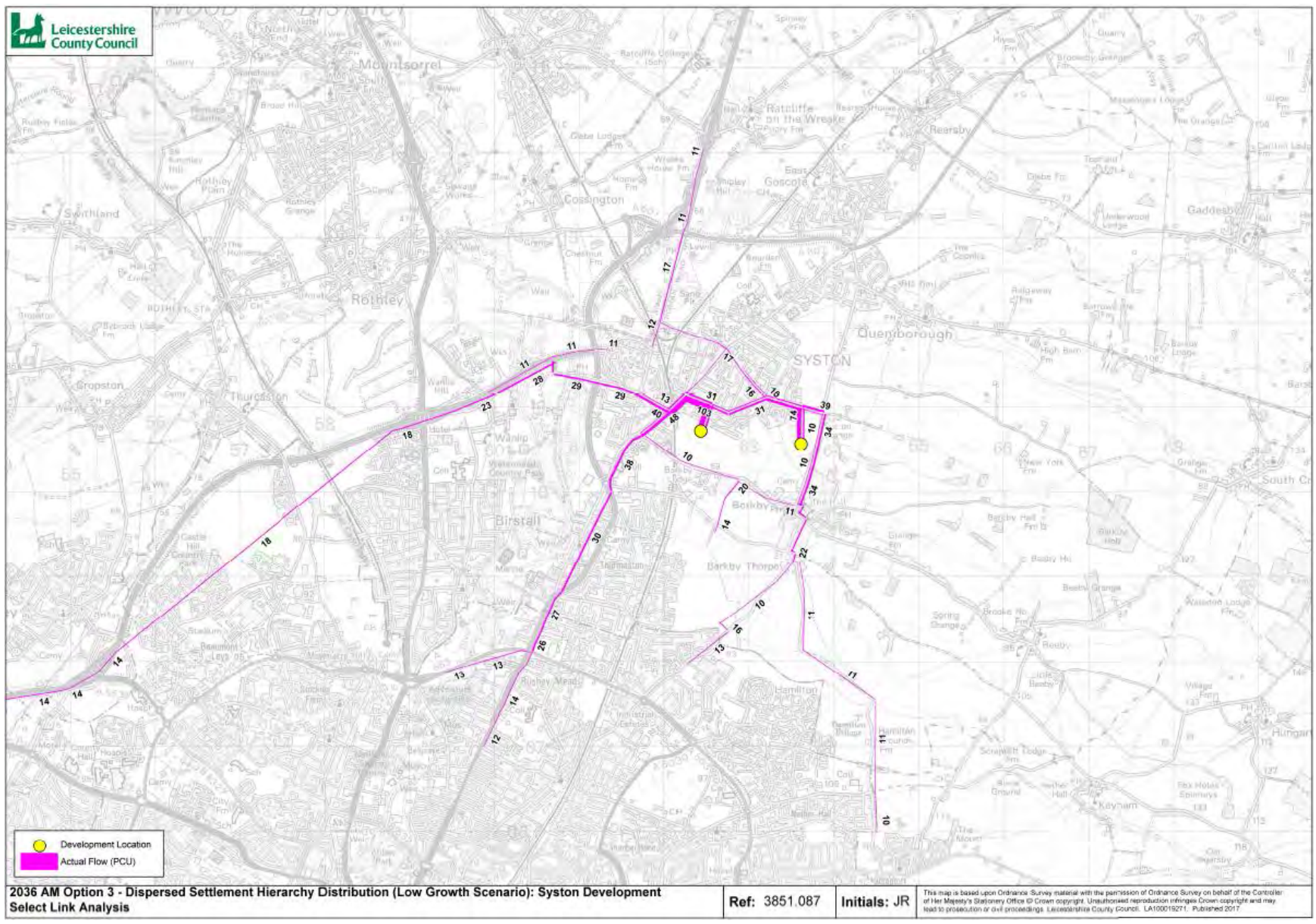


Figure 8-12: Select Link Analysis, Option 3 - Syston Development (AM Peak)

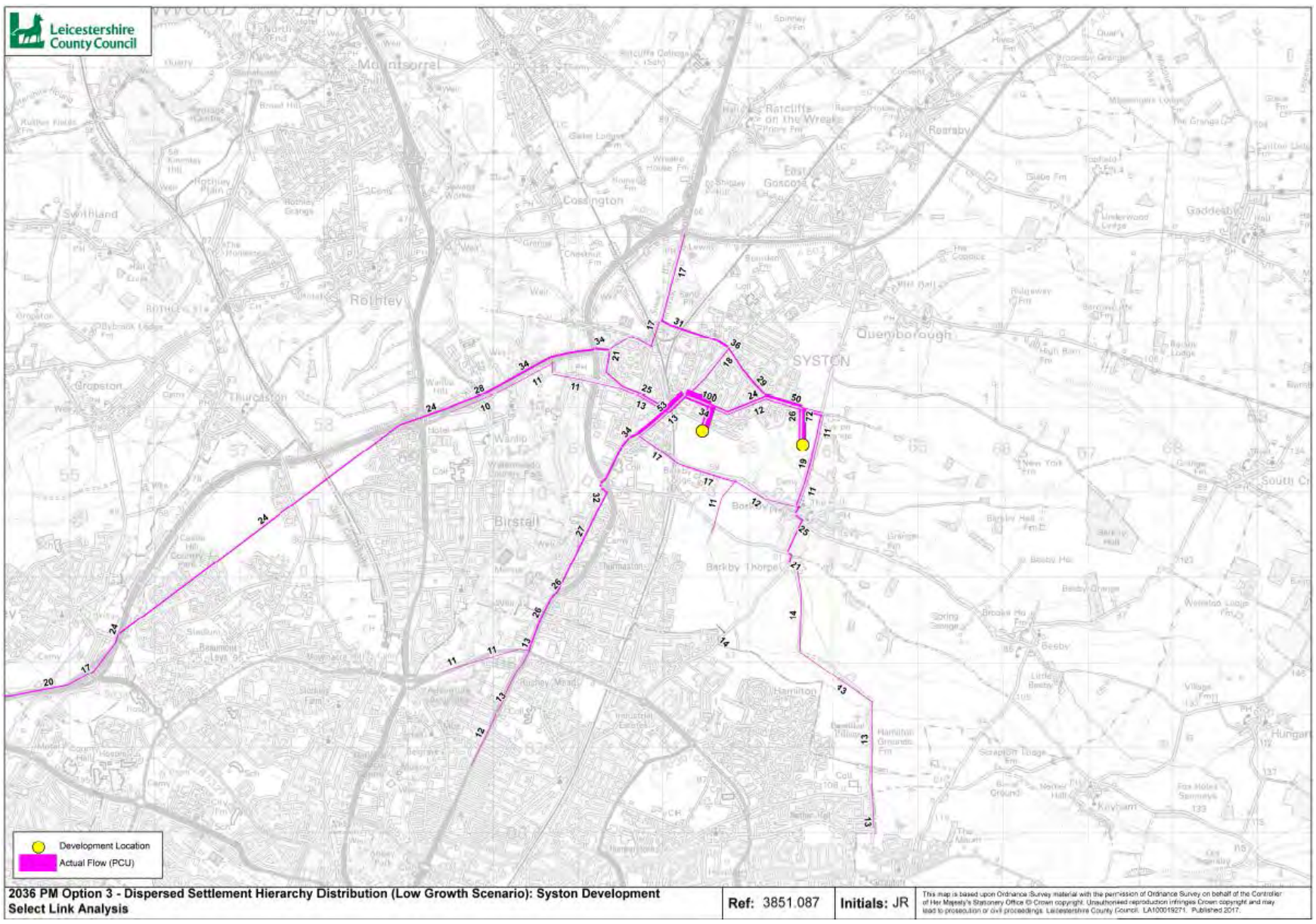


Figure 8-13: Select Link Analysis, Option 3 - Syston Development (PM Peak)

MATRIX SECTORING

Op3 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	461	26				84	14	12						17	14	45	12	134
Shepshed	141	271				76	11	14						30	22	177		180
Syston			50	20		35	19	51	10					11				22
Thurmaston																		
Birstall																		
Rem. Charnwood	159	20	51	20	18	306	78	72	38	39	32	13	26	76	36	59	65	162
City (NW)																		
City (NE)																		
City (SE)																		
City (SW)																		
City (Centre)																		
Oadby																		
Harborough																		
Blaby																		
Hinckley																		
NW Leics		25																
Melton																		
Other		15																

Table 8-4: Highlight Matrix of all Sectored Trips, Option 3 AM Peak minus Core AM Peak (>10 Trips only)

Op3 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	319	75				147												
Shepshed	23	242				17										23		31
Syston			48			44												
Thurmaston			12			14												
Birstall						17												
Rem. Charnwood	90	58	35			231												
City (NW)	14	15	13			70												
City (NE)	19	18	31			62												
City (SE)	12					36												
City (SW)			12			34												
City (Centre)			10			35												
Oadby			10			13												
Harborough	18					26												
Blaby	20	44	13			74												
Hinckley	11	30				32												
NW Leics	41	178				67												
Melton						61												
Other	167	226	27			224												

Table 8-5: Highlight Matrix of all Sectored Trips, Option 3 PM Peak minus Core PM Peak (>10 Trips only)

9. Results: Option 4 – Urban Concentration and New Settlement (Low Growth)

9.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	2,500	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	2,000	Mix of sites including one large site (1,000 south west of Loughborough – part of site promoted)
Shepshed	1,500	Large and medium sites west of Shepshed and mix of small and medium sized sites in and around the town.
Anstey	200	A mix of small and medium sized sites, a total of 1,100 homes at the Service Centres
Barrow Upon Soar	200	
Mountsorrel	100	
Quorn	200	
Rothley	200	
Sileby	200	
Cotes New Settlement	1,000	
Total	**8,100**	

Table 9-1: Option 4 Development Assumptions (provided by Charnwood Borough Council)

9.1.1. The above assumptions were assigned to loading points as per Figure 9-1.

9.2. Modelling Outputs

9.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 9-2, Figure 9-3)
- Delay Difference Plots (Figure 9-4, Figure 9-5)
- Junction Analysis (Figure 9-6, Figure 9-7, Table 9-2, Table 9-3)
- Select Link Analysis
  - Cotes (Figure 9-8, Figure 9-9)
  - Loughborough (Figure 9-10, Figure 9-11)
  - Shepshed (Figure 9-12, Figure 9-13)
  - Syston (Figure 9-14, Figure 9-15)
- Matrix Sectoring (Table 9-4, Table 9-5)

Project Reference: 3851.087

ZONAL LOADING

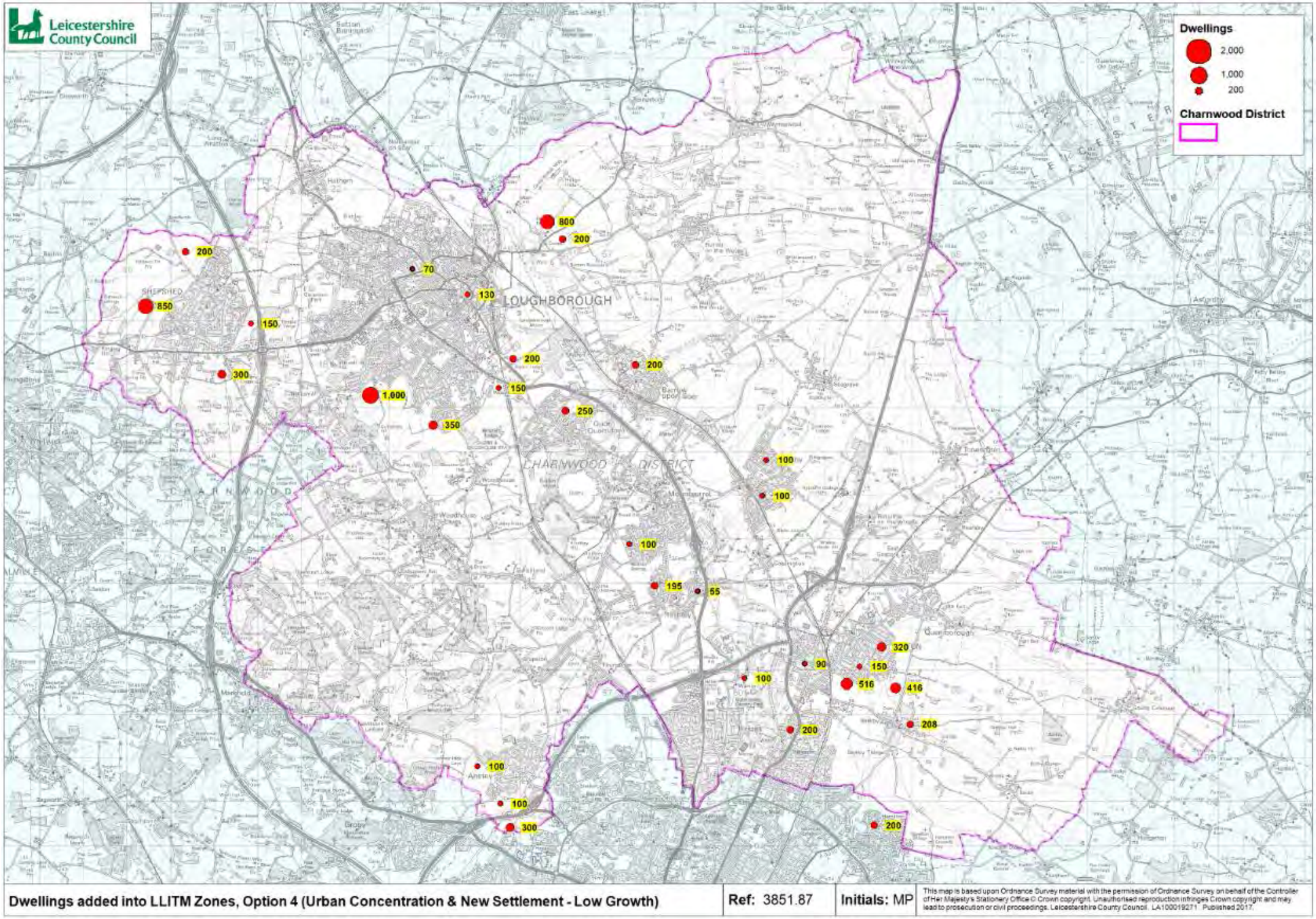


Figure 9-1: Spatial Dwelling Distribution of Modelled Scenario, Option 4

FLOW DIFFERENCE

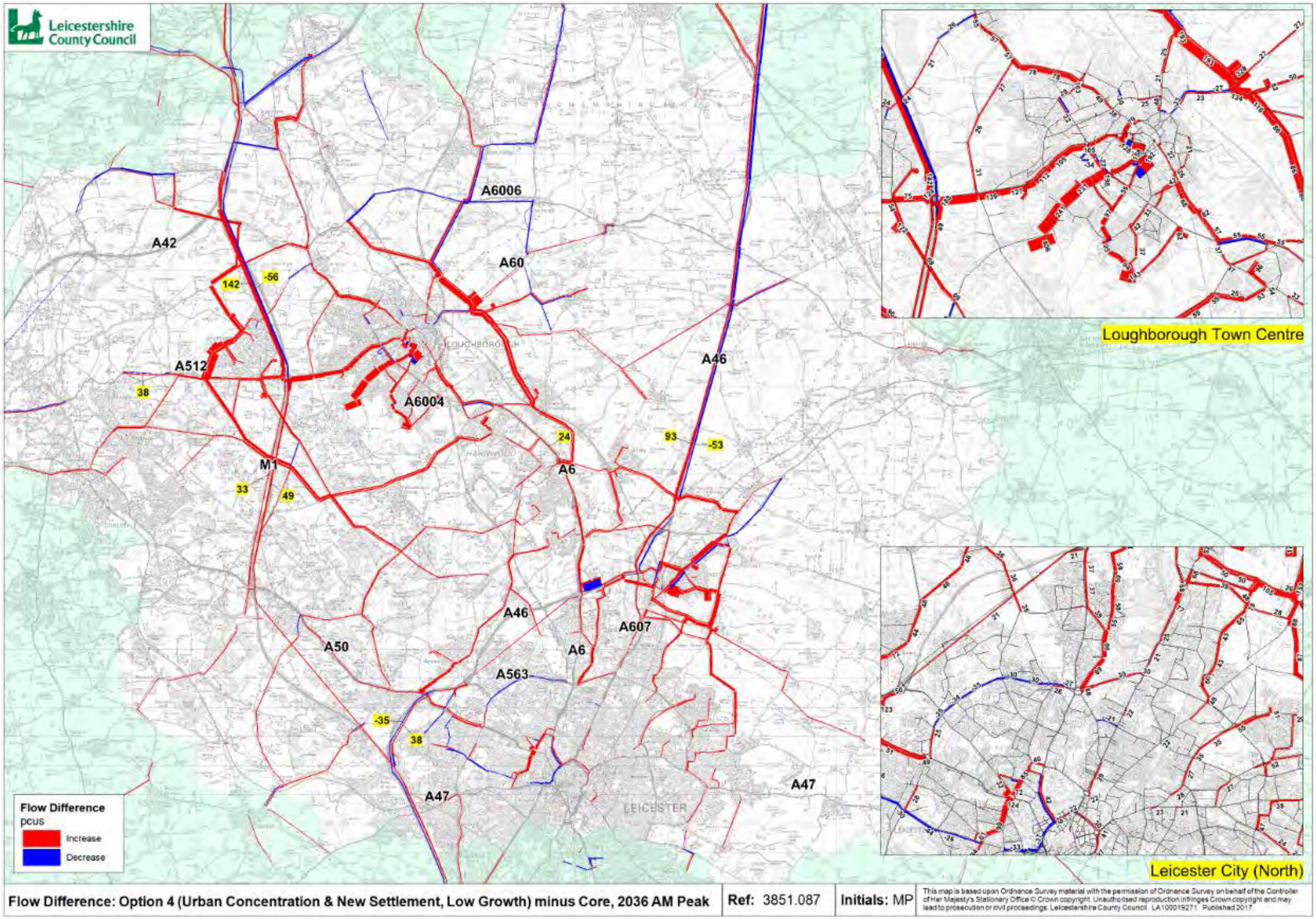


Figure 9-2: Flow Difference Plot, Option 4 (AM Peak)

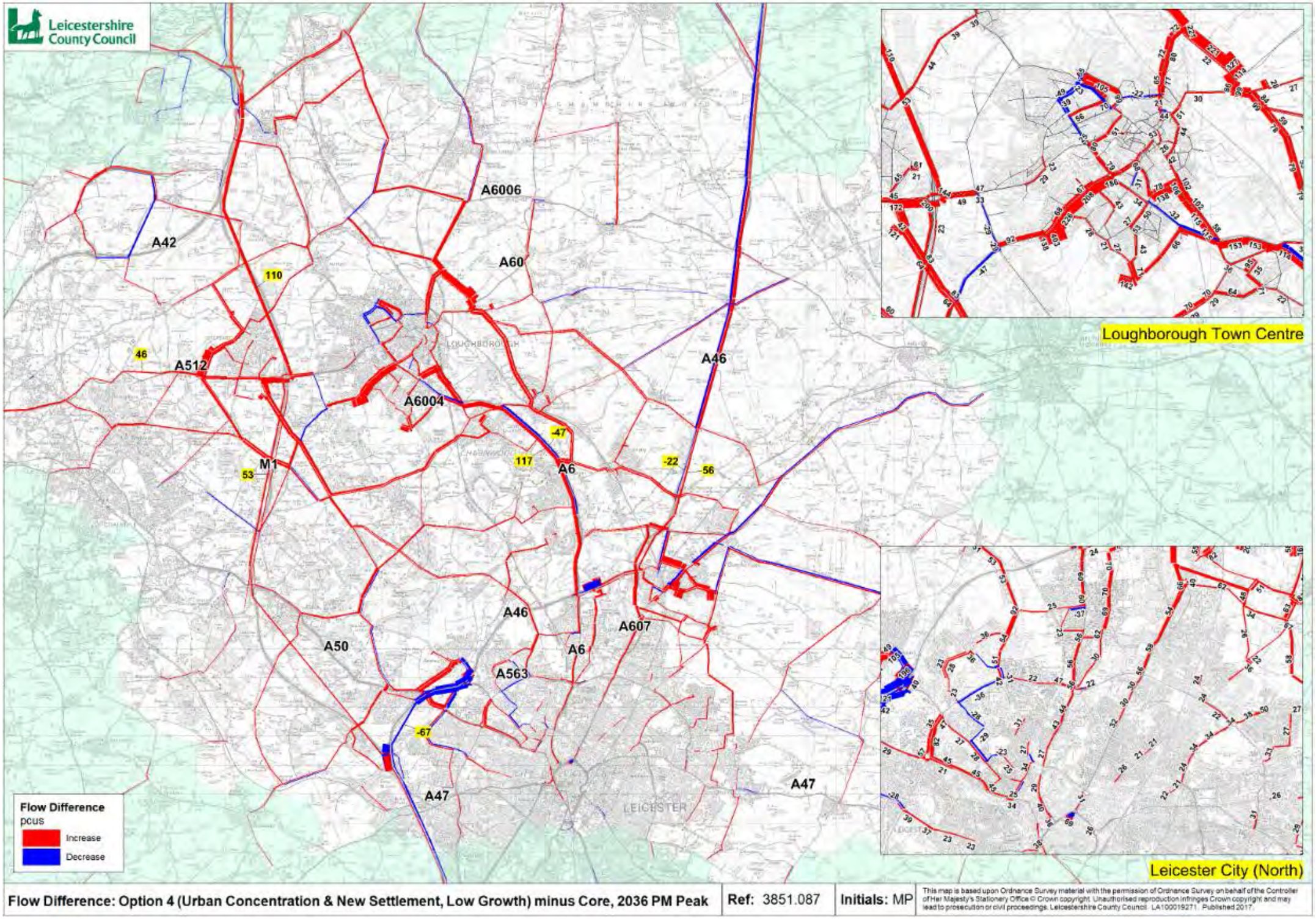


Figure 9-3: Flow Difference Plot, Option 4 (PM Peak)

DELAY DIFFERENCE

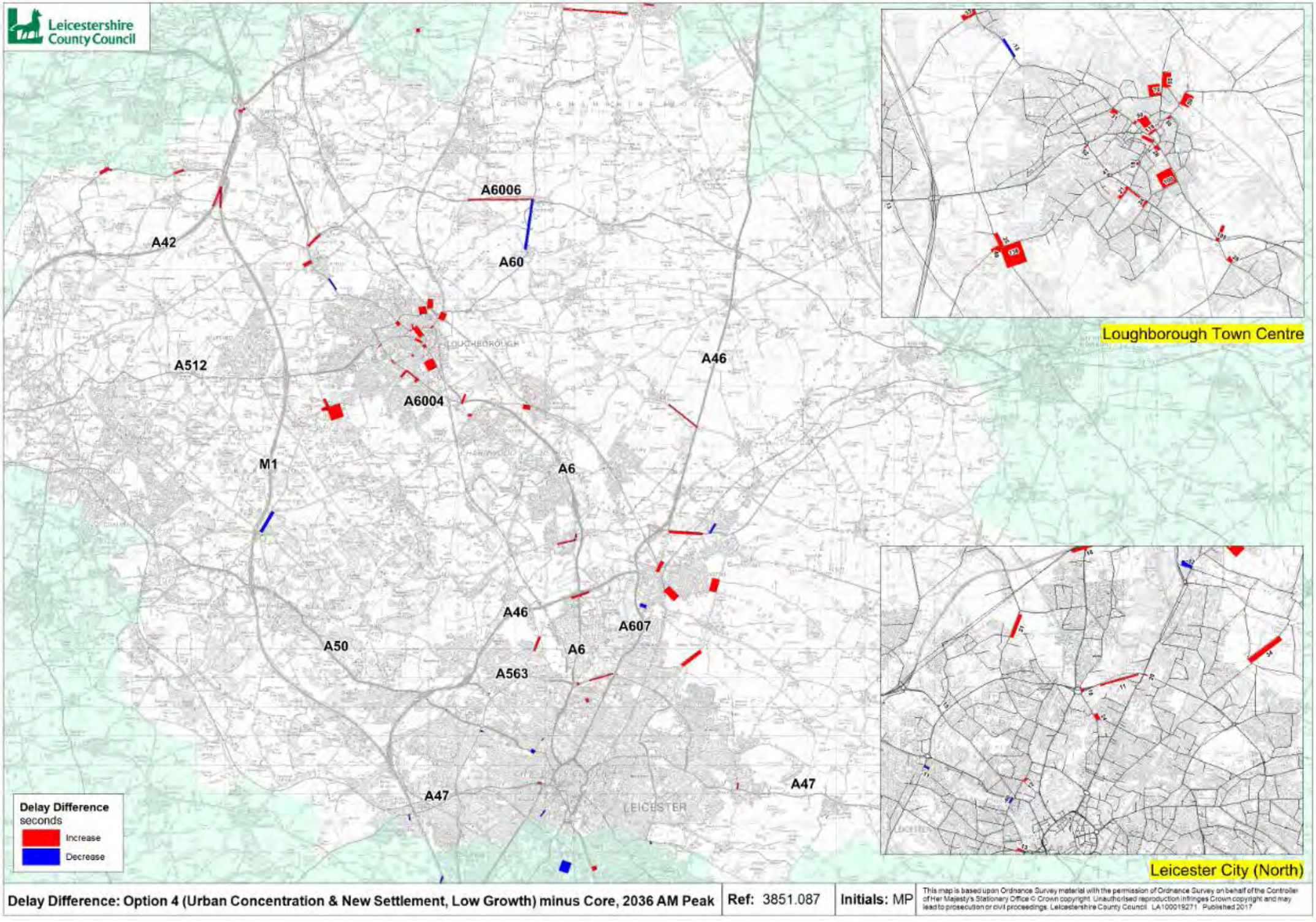


Figure 9-4: Delay Difference Plot, Option 4 (AM Peak)

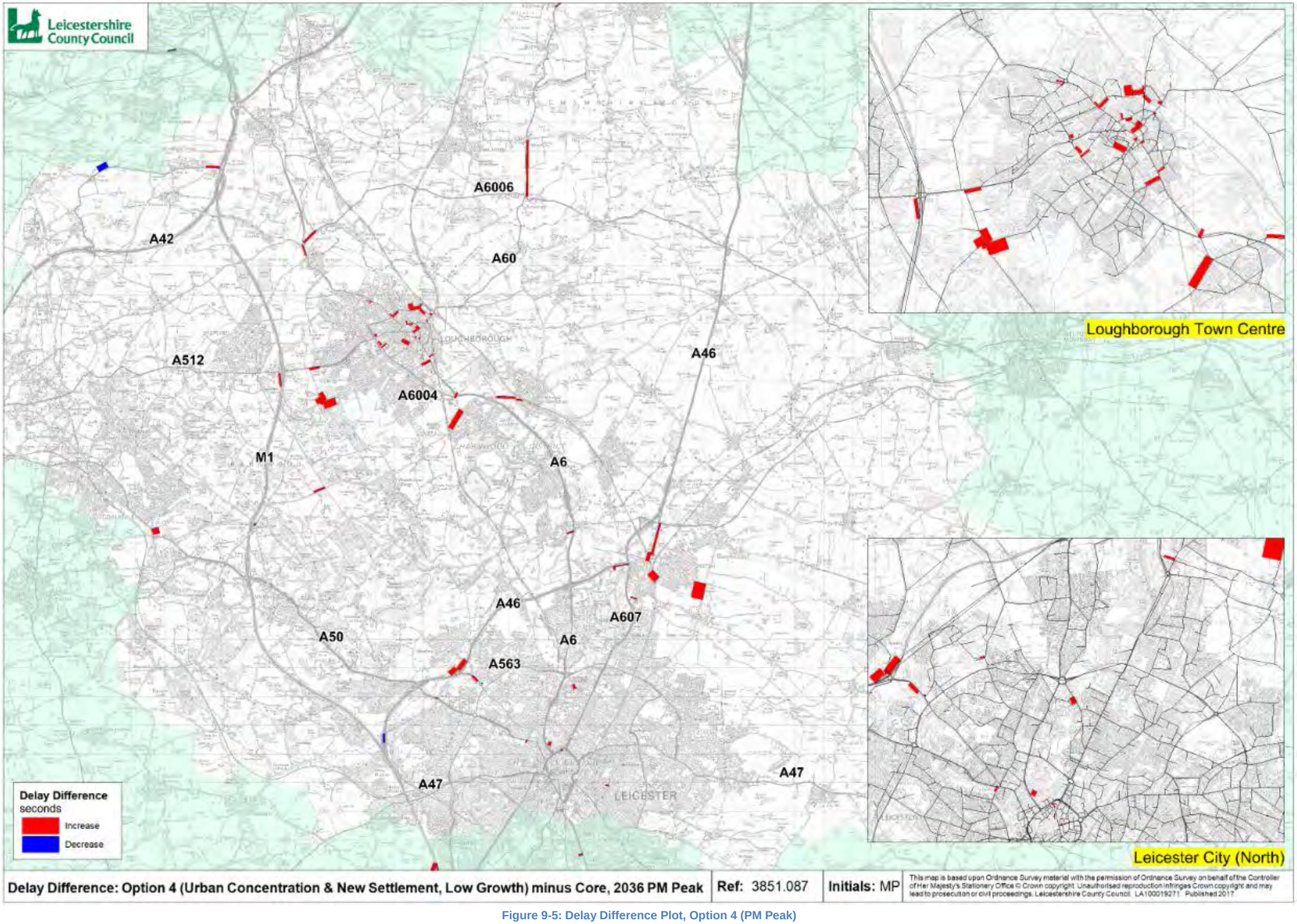


Figure 9-5: Delay Difference Plot, Option 4 (PM Peak)

JUNCTION PERFORMANCE

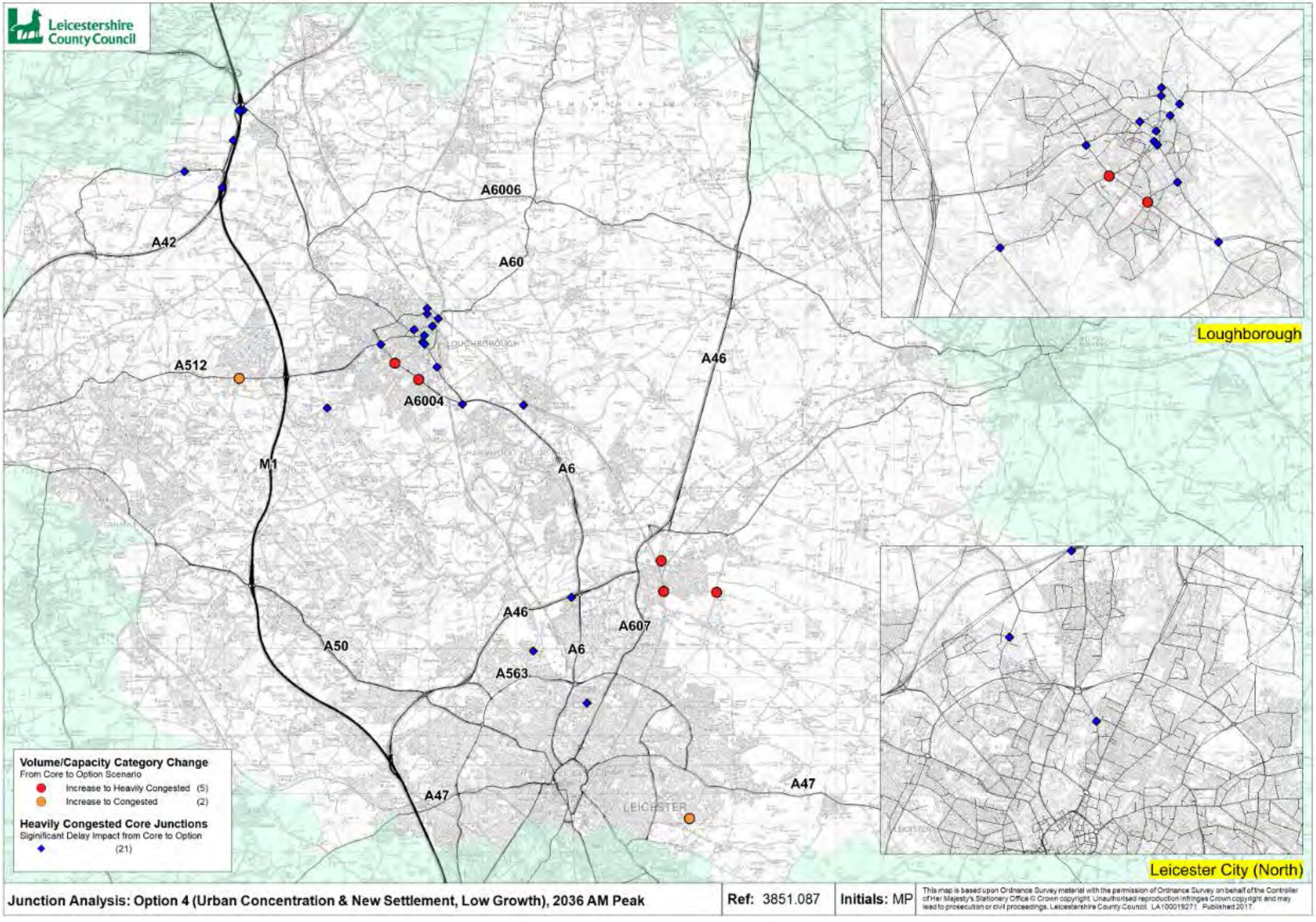


Figure 9-6: Junction Analysis, Option 4 (AM Peak)

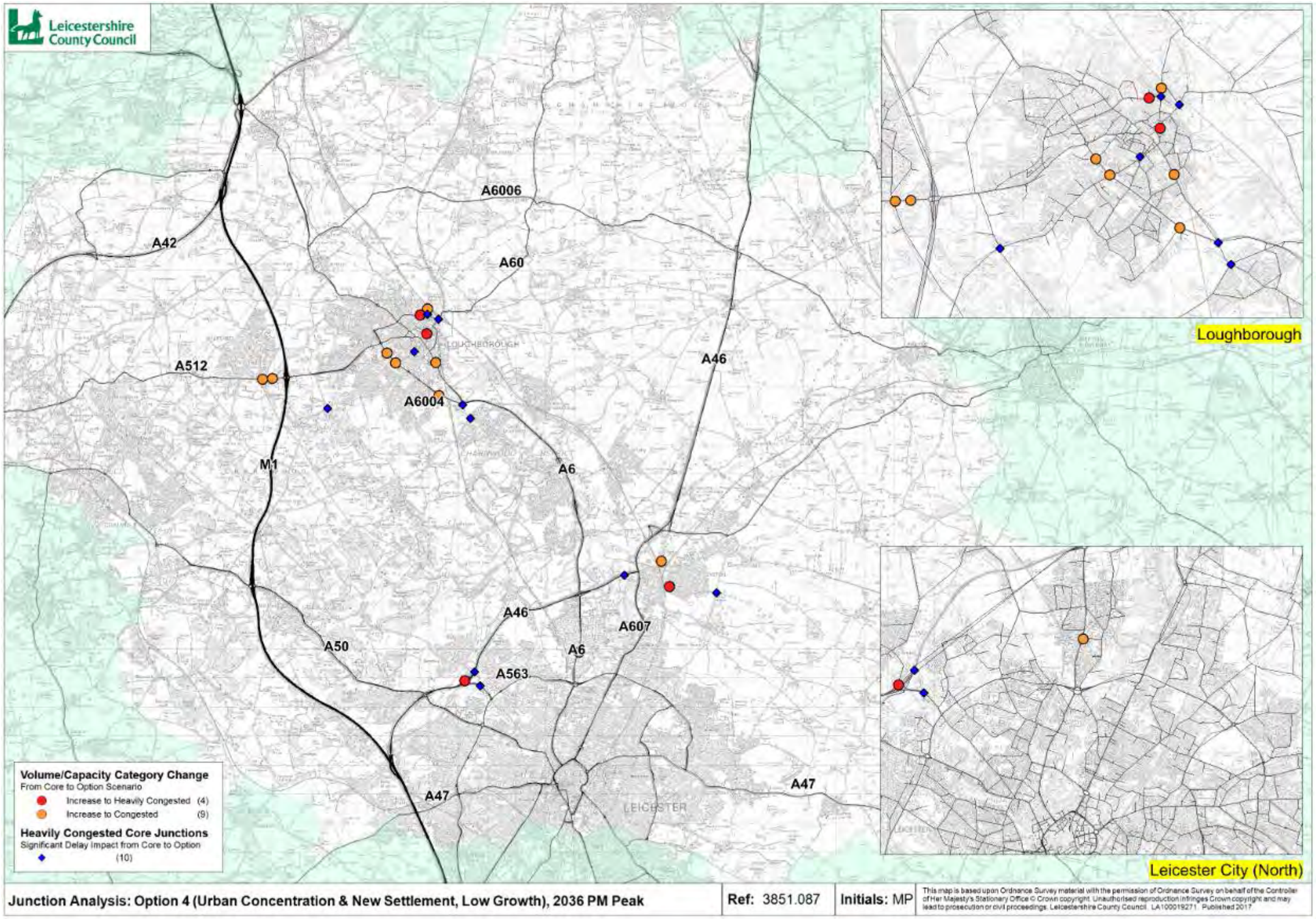


Figure 9-7: Junction Analysis, Option 4 (PM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_am	co_am_desc	36_opt4_am	o4_am_desc	core del	opt4 del	diff del
2412	Main St/Biggin Hill Rd	City (SE)	City (SE)	82	Approaching Congestion	88	Congested			
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	Loughborough	89	Congested	100	Heavily Congested			
60922	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	100	Heavily Congested			
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	86	Congested	102	Heavily Congested			
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	Shepshed	77	Approaching Congestion	85	Congested			
2280	Fosse Way/High St	Syston	Syston	64	Uncongested	102	Heavily Congested			
78892	Melton Rd/Wanlip Rd	Syston	Syston	98	Congested	106	Heavily Congested			
1607	A46/A6	Birstall	Birstall	102	Heavily Congested	103	Heavily Congested	54	66	12
2751	Loughborough Rd/Checketts Rd	City (NE)	City (NE)	101	Heavily Congested	101	Heavily Congested	56	68	12
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	City (NW)	101	Heavily Congested	102	Heavily Congested	46	60	14
7323	A6004/Forest Rd	Loughborough	Loughborough	102	Heavily Congested	104	Heavily Congested	82	112	30
60057	A6/Southfield Rd	Loughborough	Loughborough	104	Heavily Congested	105	Heavily Congested	90	102	12
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	101	Heavily Congested	104	Heavily Congested	82	102	19
60108	Woodgate/Pinfold Gate	Loughborough	Loughborough	105	Heavily Congested	110	Heavily Congested	157	223	67
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	102	Heavily Congested	108	Heavily Congested	53	74	20
60135	A60 Nottingham Rd/Queen's Rd	Loughborough	Loughborough	100	Heavily Congested	102	Heavily Congested	77	91	14
61020	A6/Baxter Gate	Loughborough	Loughborough	103	Heavily Congested	110	Heavily Congested	60	87	27
69941	A60/Station Boulevard	Loughborough	Loughborough	107	Heavily Congested	109	Heavily Congested	137	178	40
73778	A6 (Bridge St)	Loughborough	Loughborough	100	Heavily Congested	103	Heavily Congested	38	62	24
78903	A6004/Gordon Rd	Loughborough	Loughborough	103	Heavily Congested	106	Heavily Congested	88	109	22
50312	East Midlands Airport	NW Leics	EMA	101	Heavily Congested	101	Heavily Congested	46	58	12
50523	M1/A42	NW Leics	EMA (M1)	105	Heavily Congested	106	Heavily Congested	54	71	16
50543	M1 Junction 24	NW Leics	M1 J24	102	Heavily Congested	104	Heavily Congested	50	66	16
50544	M1 Junction 24	NW Leics	M1 J24	104	Heavily Congested	104	Heavily Congested	144	155	11
76088	A453/Ashby Rd	NW Leics	Kegworth	109	Heavily Congested	109	Heavily Congested	132	144	12
60044	Barrow Rd/Bridge St	Rem. Charnwood	Barrow	101	Heavily Congested	103	Heavily Congested	70	94	23
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	106	Heavily Congested	109	Heavily Congested	208	282	74
60362	A6/A6004	Rem. Charnwood	Quorn	106	Heavily Congested	111	Heavily Congested	54	82	28

Table 9-2: Junction Analysis, Option 4 (AM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_pm	co_pm_desc	36_opt4_pm	o4_pm_desc	core del	opt4 del	diff del
1748	A6/School Ln	Birstall	Birstall	83	Approaching Congestion	91	Congested			
60098	The Coneries/Sparrow Hill	Loughborough	Loughborough	90	Congested	100	Heavily Congested			
60538	A6/Beeches Rd	Loughborough	Loughborough	80	Approaching Congestion	87	Congested			
60916	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	89	Congested			
65070	A6004/Radmoor Rd	Loughborough	Loughborough	81	Approaching Congestion	87	Congested			
78902	Belton Rd	Loughborough	Loughborough	44	Uncongested	100	Heavily Congested			
78903	A6004/Gordon Rd	Loughborough	Loughborough	79	Approaching Congestion	89	Congested			
9631	A46/Leicester Rd	Rem. Charnwood	Anstey	90	Congested	102	Heavily Congested			
60123	A6004/Allendale Rd	Rem. Charnwood	Woodthorpe	84	Approaching Congestion	90	Congested			
7306	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	87	Congested			
76150	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	87	Congested			
2280	Fosse Way/High St	Syston	Syston	83	Approaching Congestion	94	Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	77	Approaching Congestion	102	Heavily Congested			
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	103	Heavily Congested	103	Heavily Congested	104	115	12
61000	Forest Rd/Browns Ln	Loughborough	Loughborough	100	Heavily Congested	102	Heavily Congested	47	59	12
69941	A60/Station Boulevard	Loughborough	Loughborough	100	Heavily Congested	101	Heavily Congested	60	72	12
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	100	Heavily Congested	103	Heavily Congested	88	143	55
9385	Anstey Ln	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	50	13
9715	A46/Leicester Rd	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	69	32
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	101	Heavily Congested	48	63	15
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	104	Heavily Congested	106	Heavily Congested	175	232	57
60362	A6/A6004	Rem. Charnwood	Quorn	101	Heavily Congested	103	Heavily Congested	26	42	16
2047	A46/Wanlip Rd	Syston	Syston	101	Heavily Congested	101	Heavily Congested	33	46	13

Table 9-3: Junction Analysis, Option 4 (PM Peak)

SELECT LINK ANALYSIS

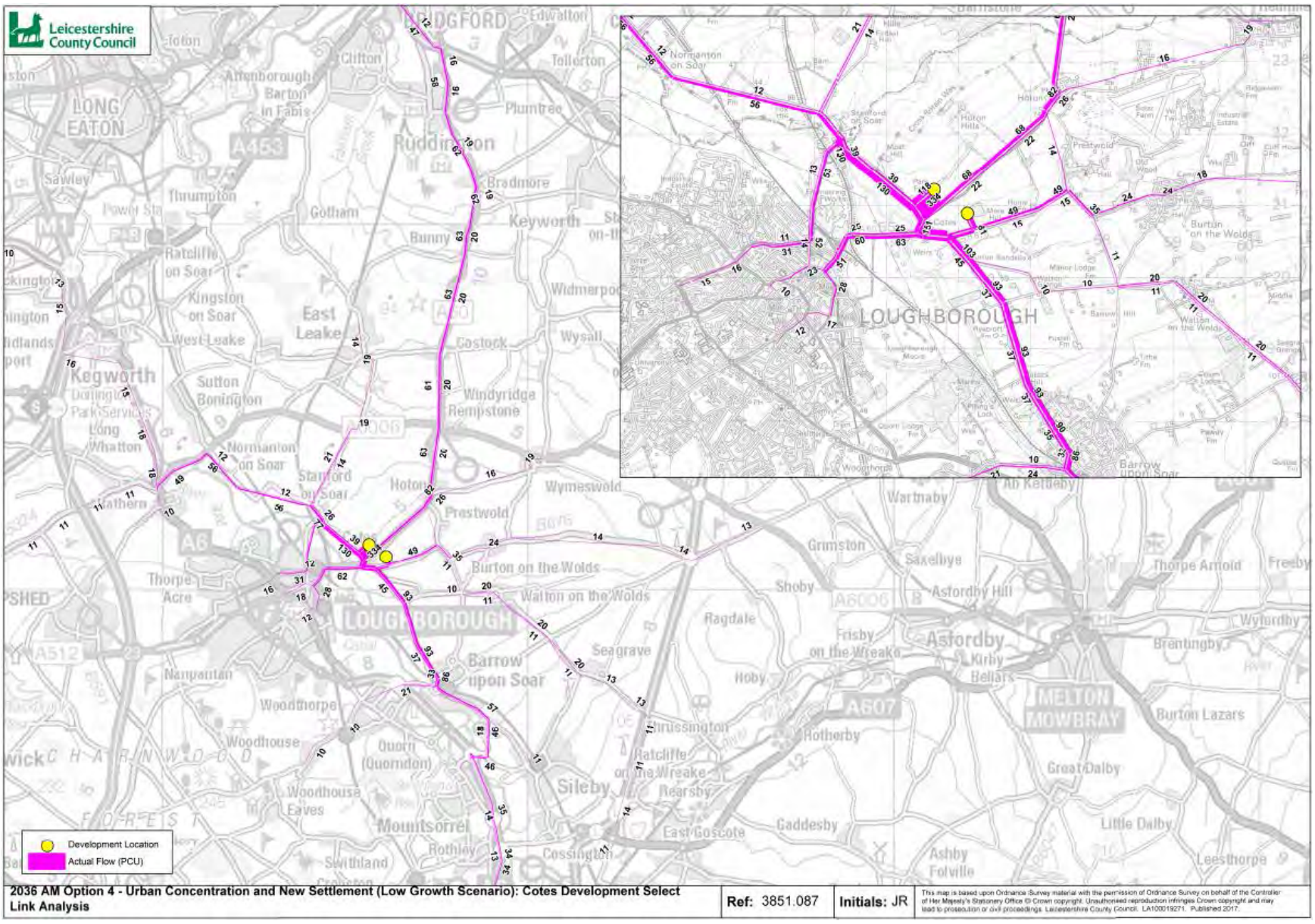


Figure 9-8: Select Link Analysis, Option 4 - Cotes Development (AM Peak)

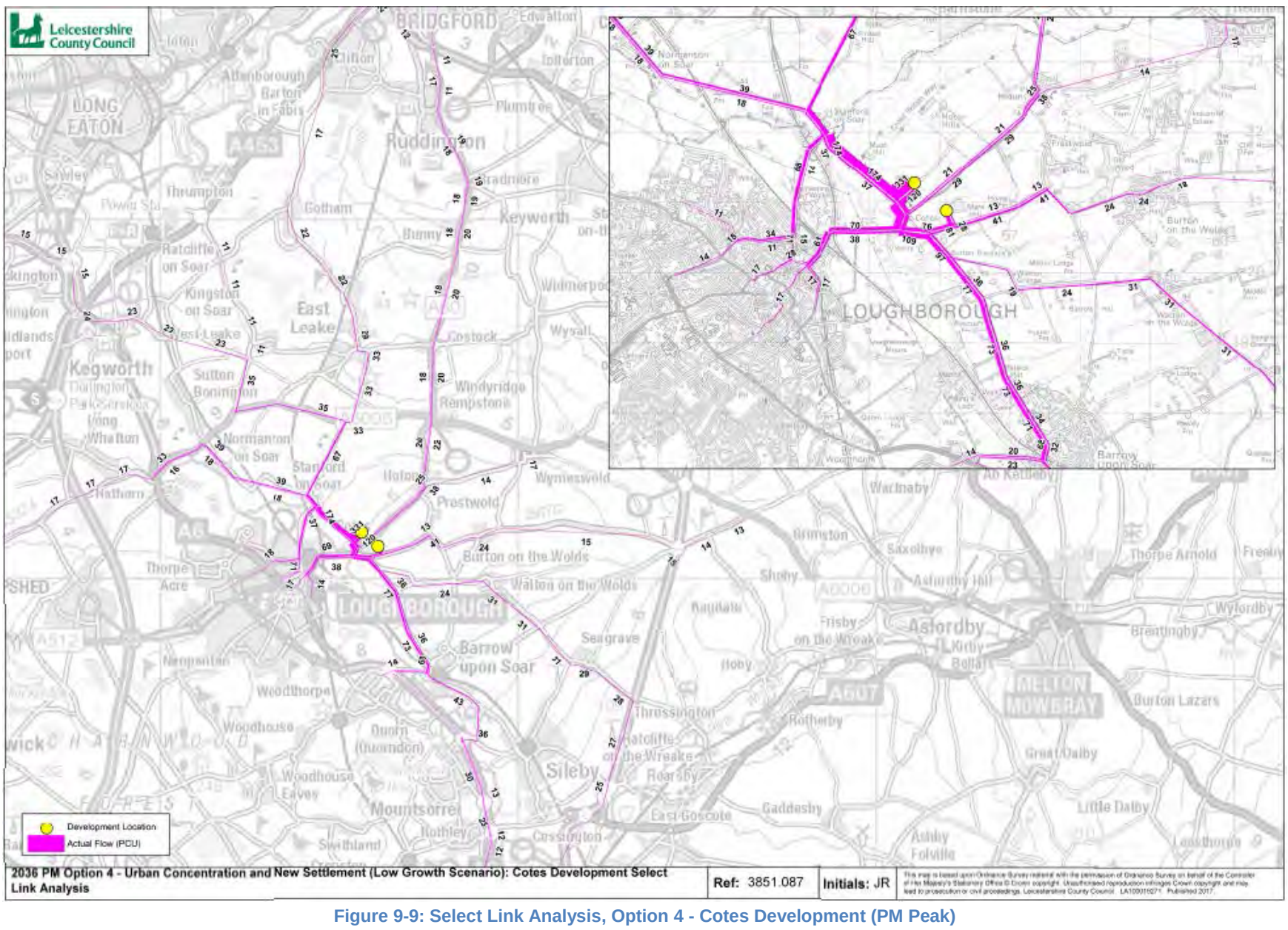


Figure 9-9: Select Link Analysis, Option 4 - Cotes Development (PM Peak)

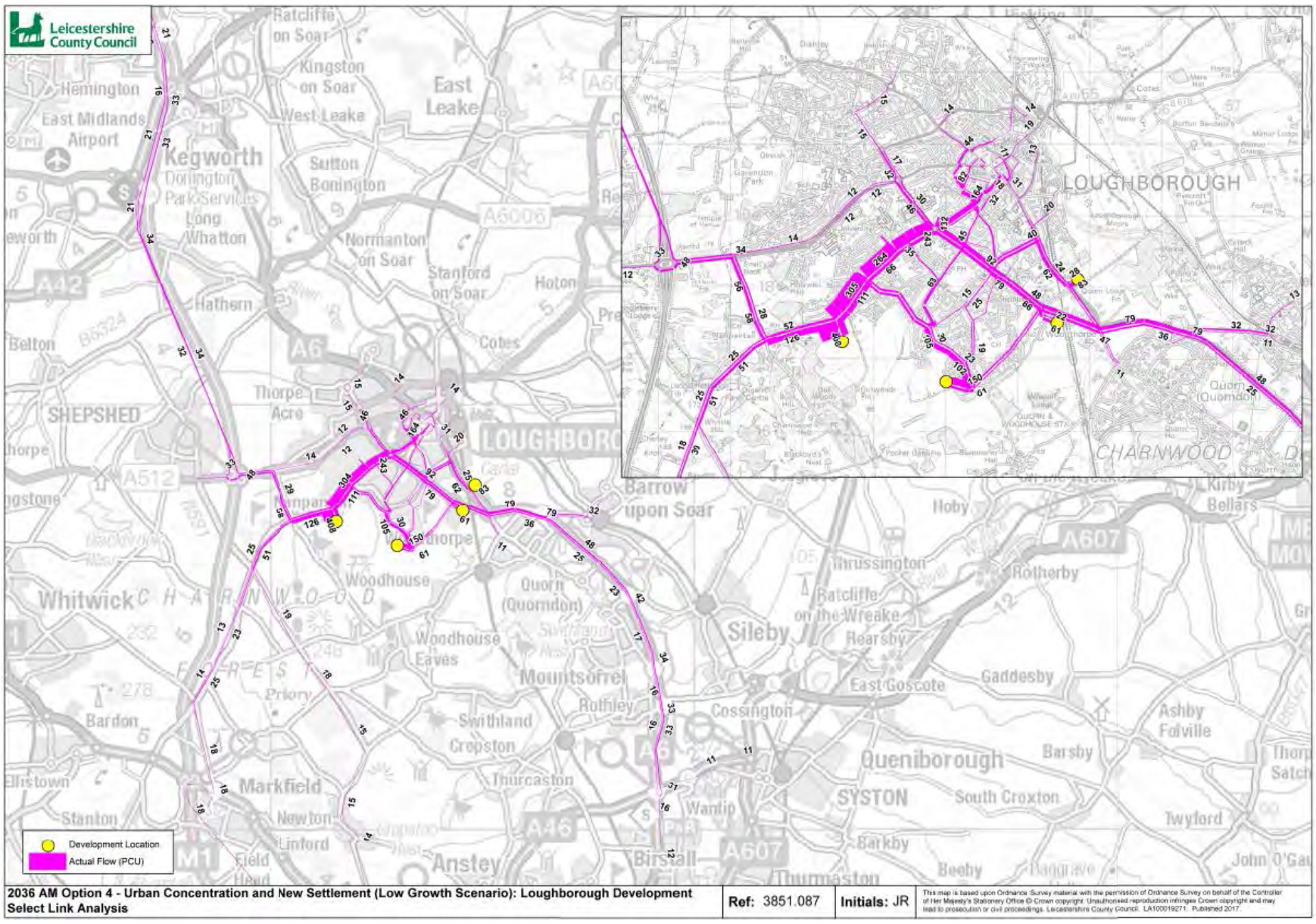


Figure 9-10: Select Link Analysis, Option 4 - Loughborough Development (AM Peak)

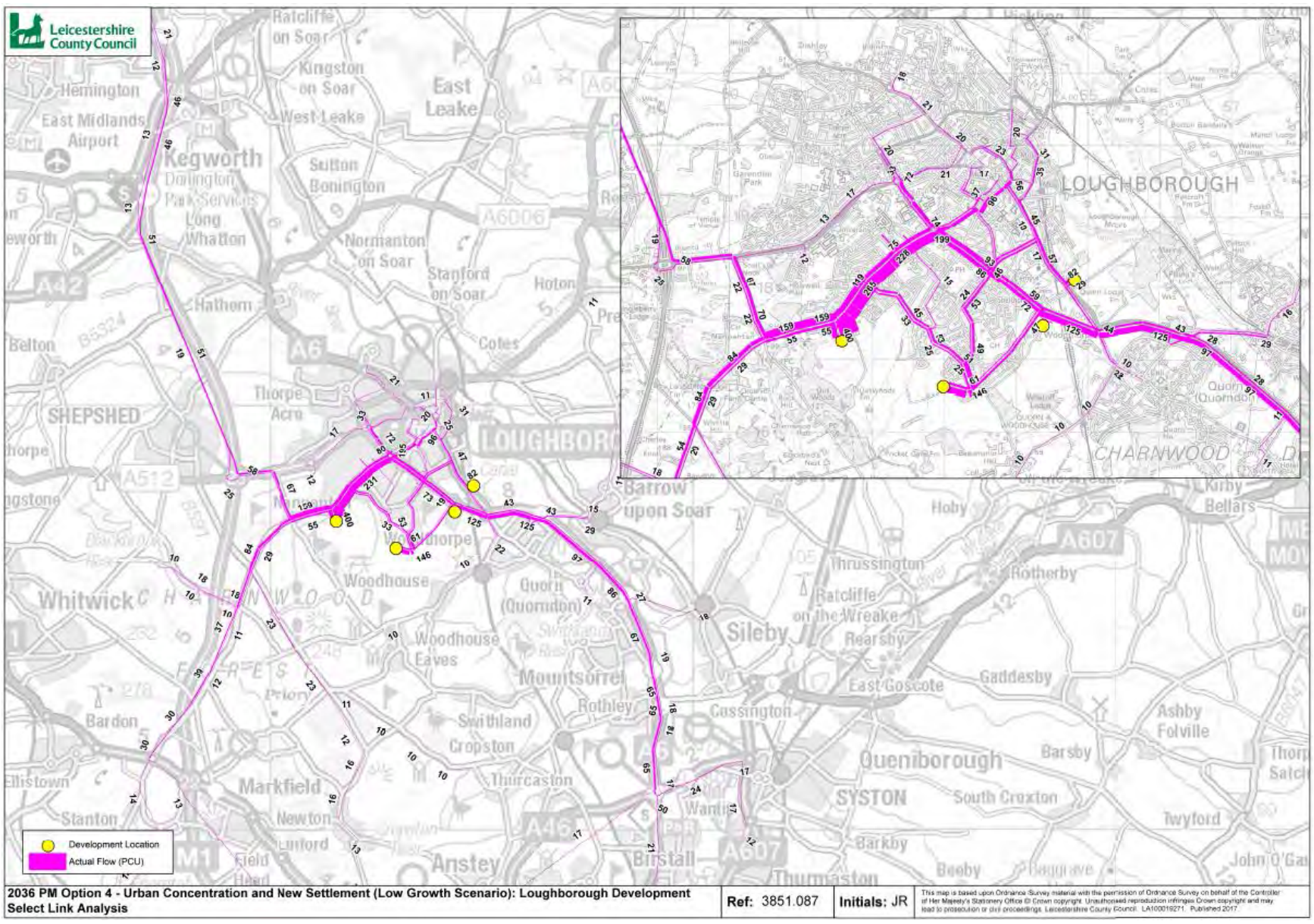


Figure 9-11: Select Link Analysis, Option 4 - Loughborough Development (PM Peak)

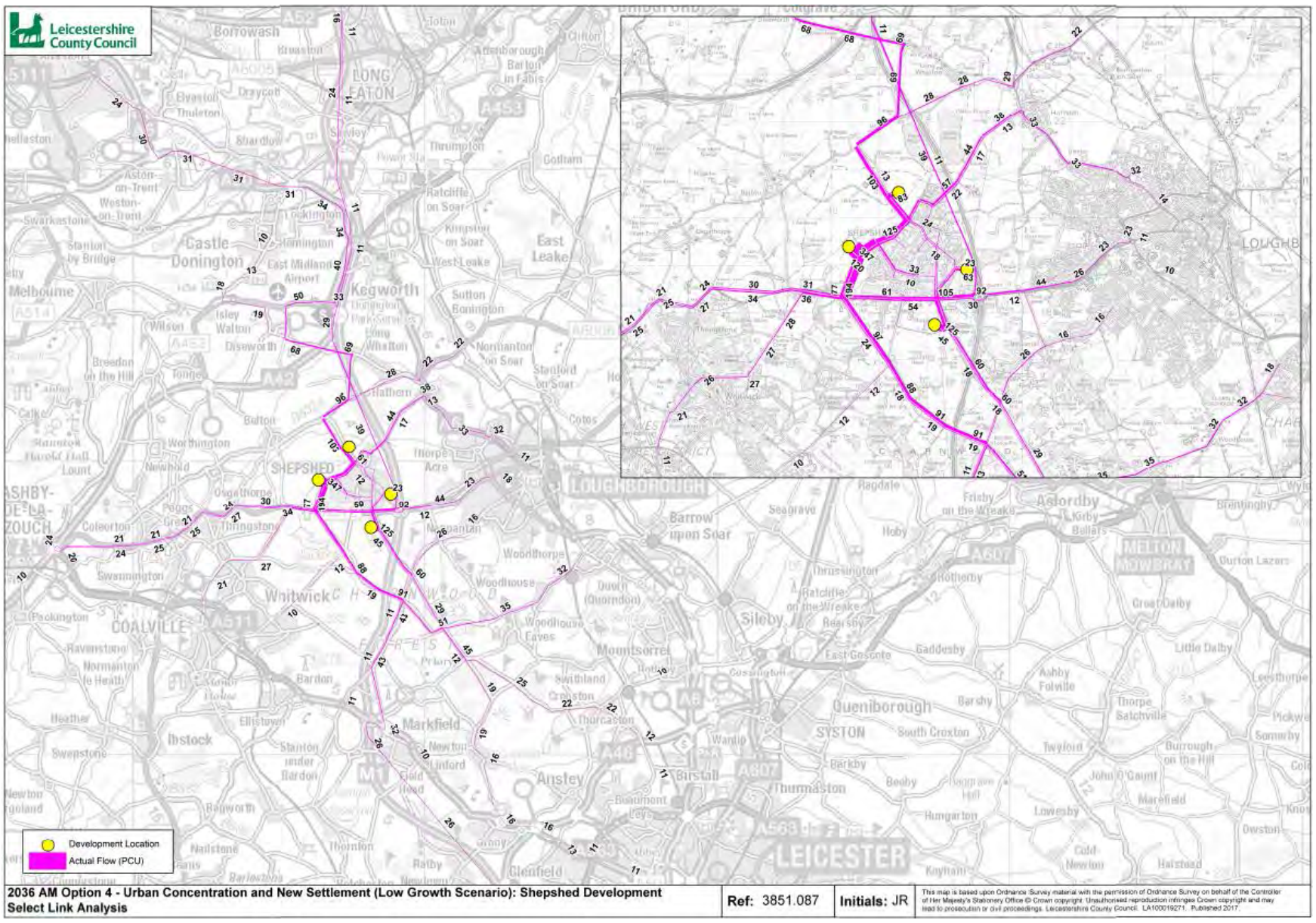


Figure 9-12: Select Link Analysis, Option 4 - Shepshed Development (AM Peak)

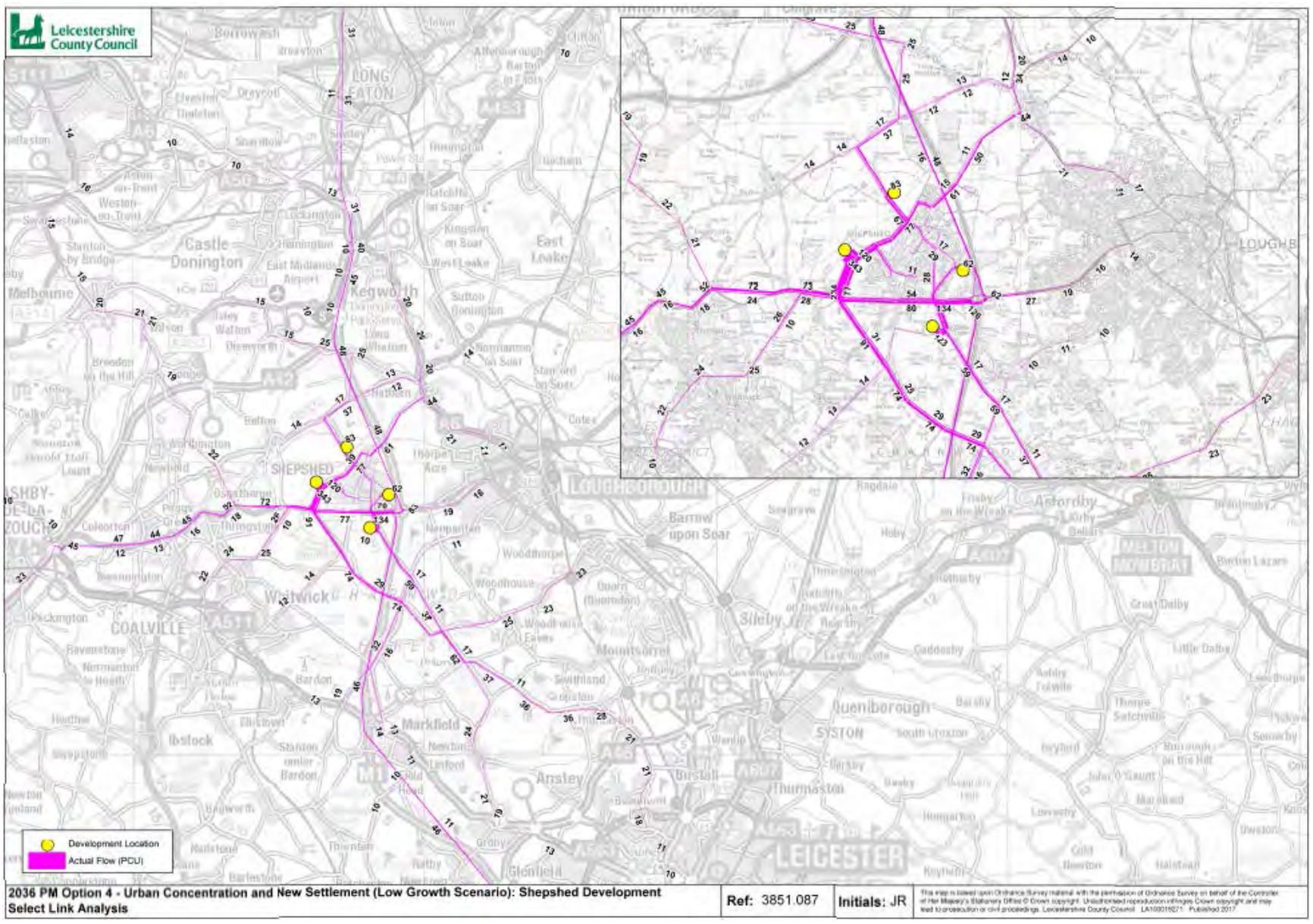


Figure 9-13: Select Link Analysis, Option 4 - Shepshed Development (PM Peak)

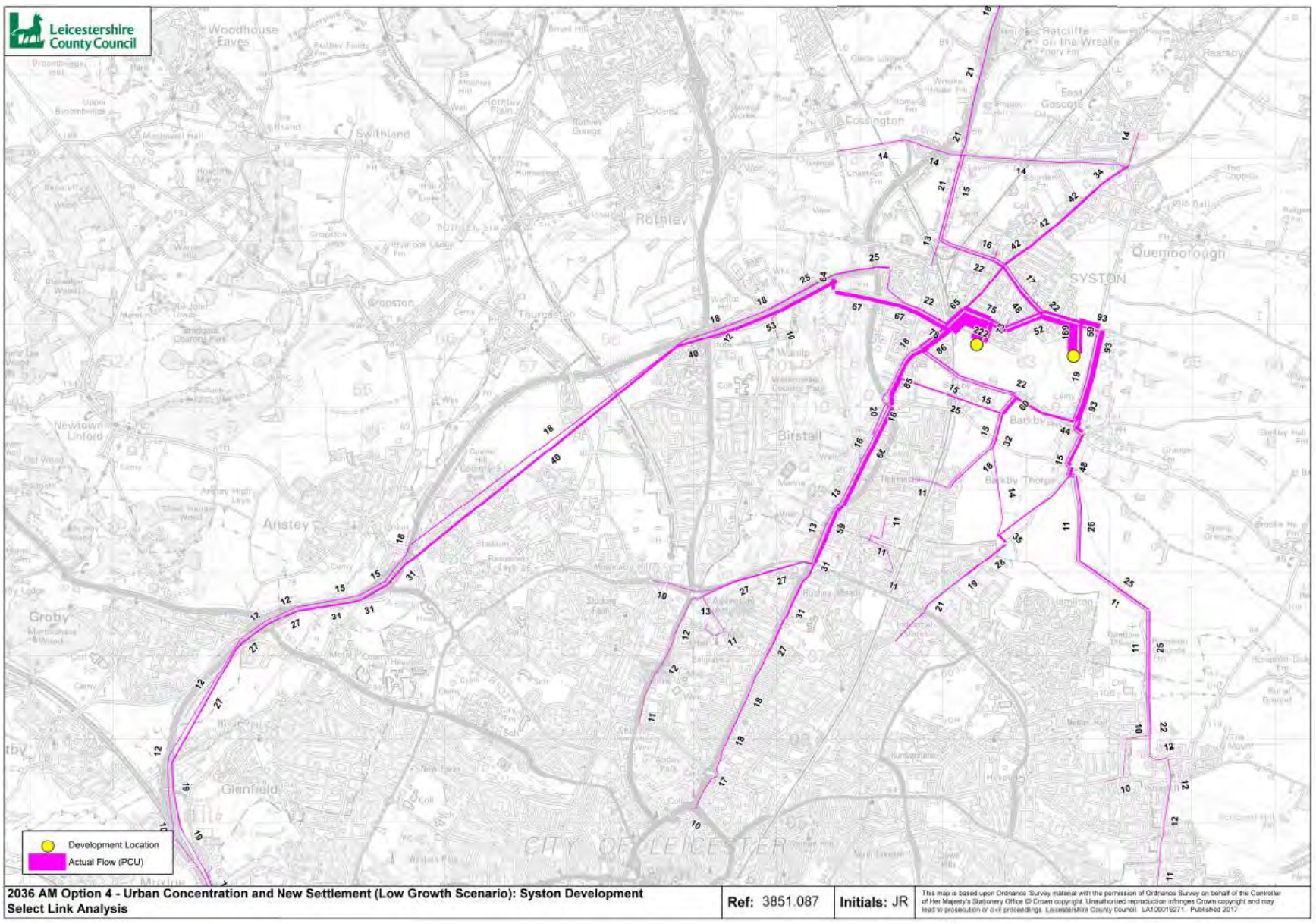


Figure 9-14: Select Link Analysis, Option 4 - Syston Development (AM Peak)

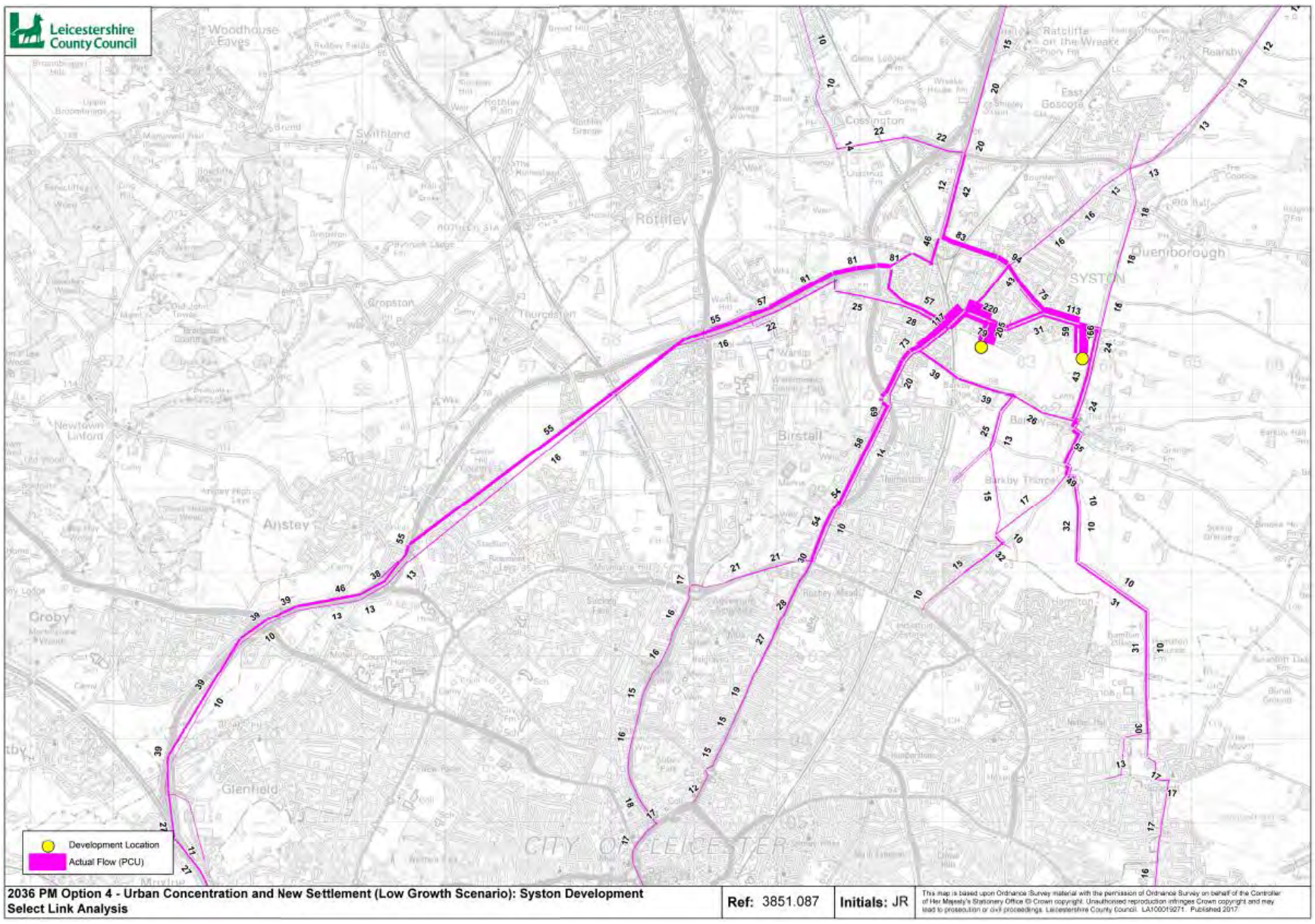


Figure 9-15: Select Link Analysis, Option 4 - Syston Development (PM Peak)

MATRIX SECTORING

Op4 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	480	24				112	13							15	13	42	11	124
Shepshed	97	189				54								21	15	130		126
Syston	18		127	49		77	44	119	23	12	20	18		26	12		12	45
Thurmaston			17					12										
Birstall																		
Rem. Charnwood	198	21	48	12	15	238	67	41	25	32	27		18	64	32	60	46	219
City (NW)						10												
City (NE)			17															
City (SE)			11															
City (SW)																		
City (Centre)																		
Oadby																		
Harborough																		
Blaby																		
Hinckley																		
NW Leics		20																
Melton																		
Other		12																

Table 9-4: Highlight Matrix of all Sectored Trips, Option 4 AM Peak minus Core AM Peak (>10 Trips only)

Op4 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	347	52	21			216												
Shepshed	22	168				18										19		22
Syston			127	16		42		18										
Thurmaston			31			10												
Birstall						15												
Rem. Charnwood	125	41	72			184	11											21
City (NW)	13	10	33			58												
City (NE)	17	13	77			39												
City (SE)	11		21			22												
City (SW)			27			25												
City (Centre)			24			27												
Oadby			23															
Harborough	20					17												
Blaby	16	31	29			59												
Hinckley	11	21	12			27												
NW Leics	40	128				64												
Melton			21			41												
Other	157	156	58	11		234												

Table 9-5: Highlight Matrix of all Sectored Trips, Option 4 PM Peak minus Core PM Peak (>10 Trips only)

10.Results: Option 5 – Urban Concentration (High Growth)

10.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,300	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	5,150	Majority of available sites (total 5,154) includes large sites South and South West of Loughborough
Shepshed	2,650	Majority of available sites (total 2,686) including large site west of Shepshed.
Anstey	950	Majority of available sites, a total of 4,600 homes at the Service Centres
Barrow Upon Soar	950	
Mountsorrel	100	
Quorn	700	
Rothley	850	
Sileby	950	
Markfield	200	
Total	**15,700**	

Table 10-1: Option 5 Development Assumptions (provided by Charnwood Borough Council)

10.1.1. The above assumptions were assigned to loading points as per Figure 10-1.

10.2. Modelling Outputs

10.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 10-2, Figure 10-3)
- Delay Difference Plots (Figure 10-4, Figure 10-5)
- Junction Analysis (Figure 10-6, Figure 10-7, Table 10-2, Table 10-3)
- Select Link Analysis
  - Loughborough (Figure 10-8, Figure 10-9)
  - Shepshed (Figure 10-10, Figure 10-11)
  - Syston (Figure 10-12, Figure 10-13)
- Matrix Sectoring (Table 10-4, Table 10-5)

ZONAL LOADING

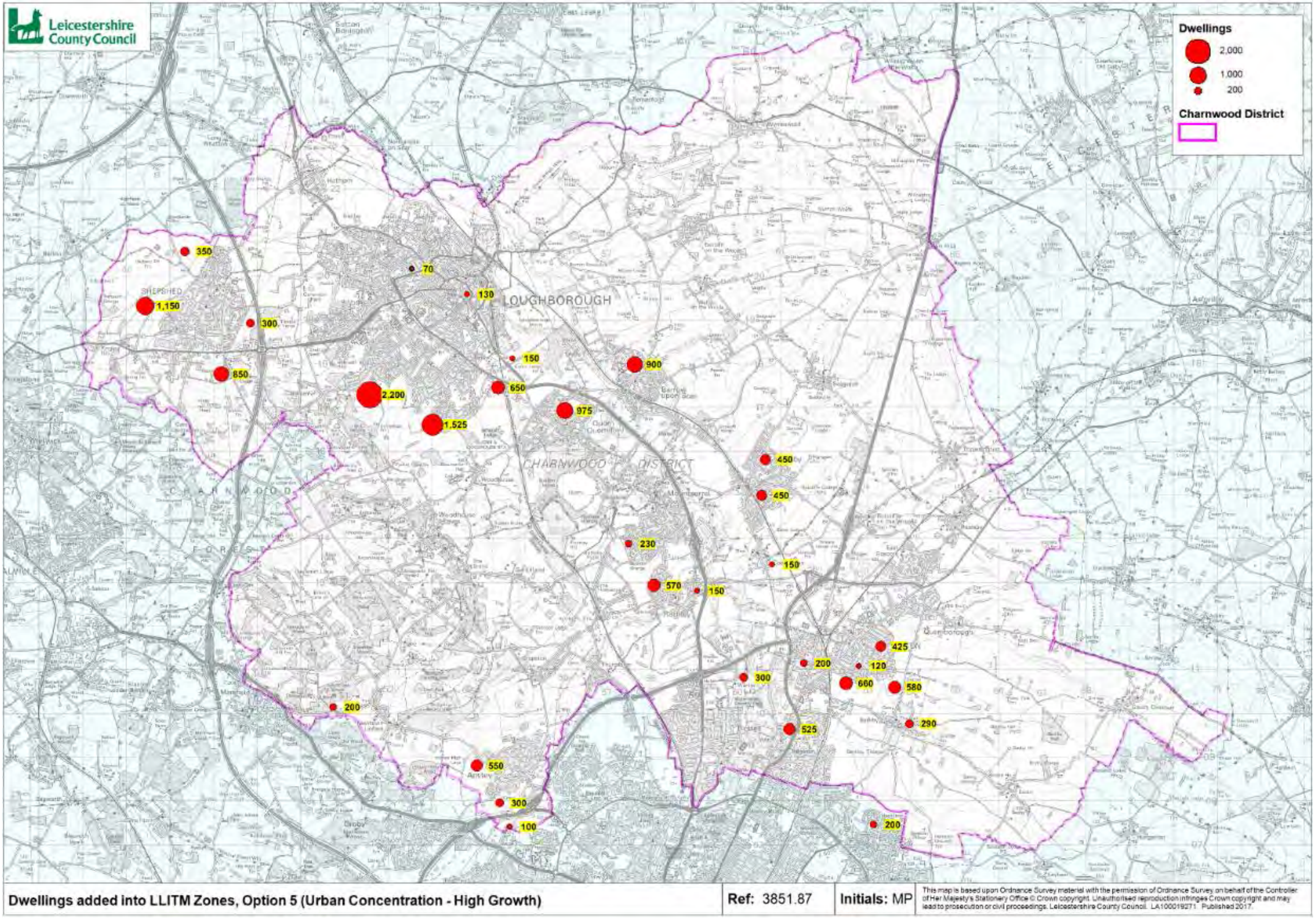


Figure 10-1: Spatial Dwelling Distribution of Modelled Scenario, Option 5

FLOW DIFFERENCE

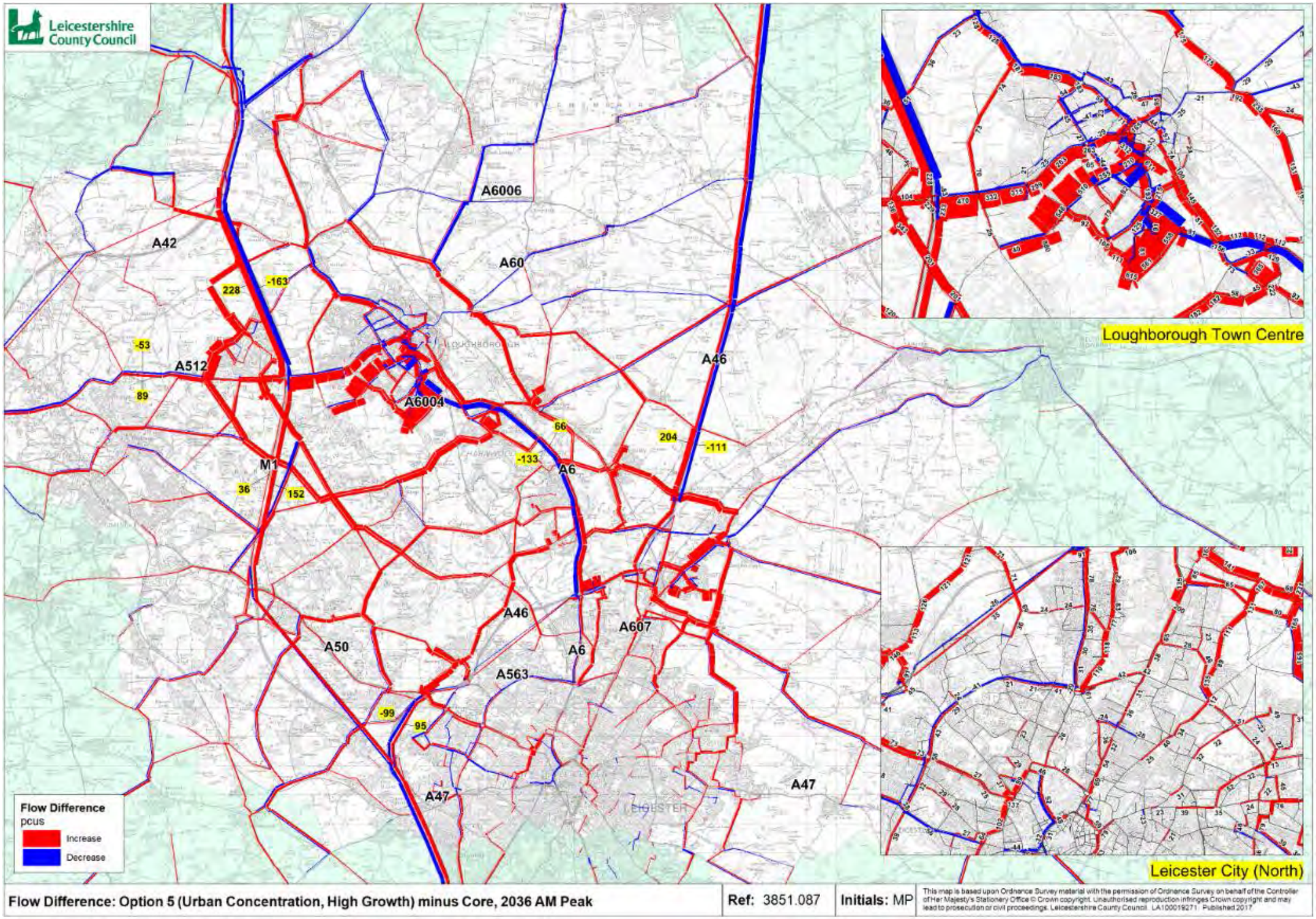


Figure 10-2: Flow Difference Plot, Option 5 (AM Peak)

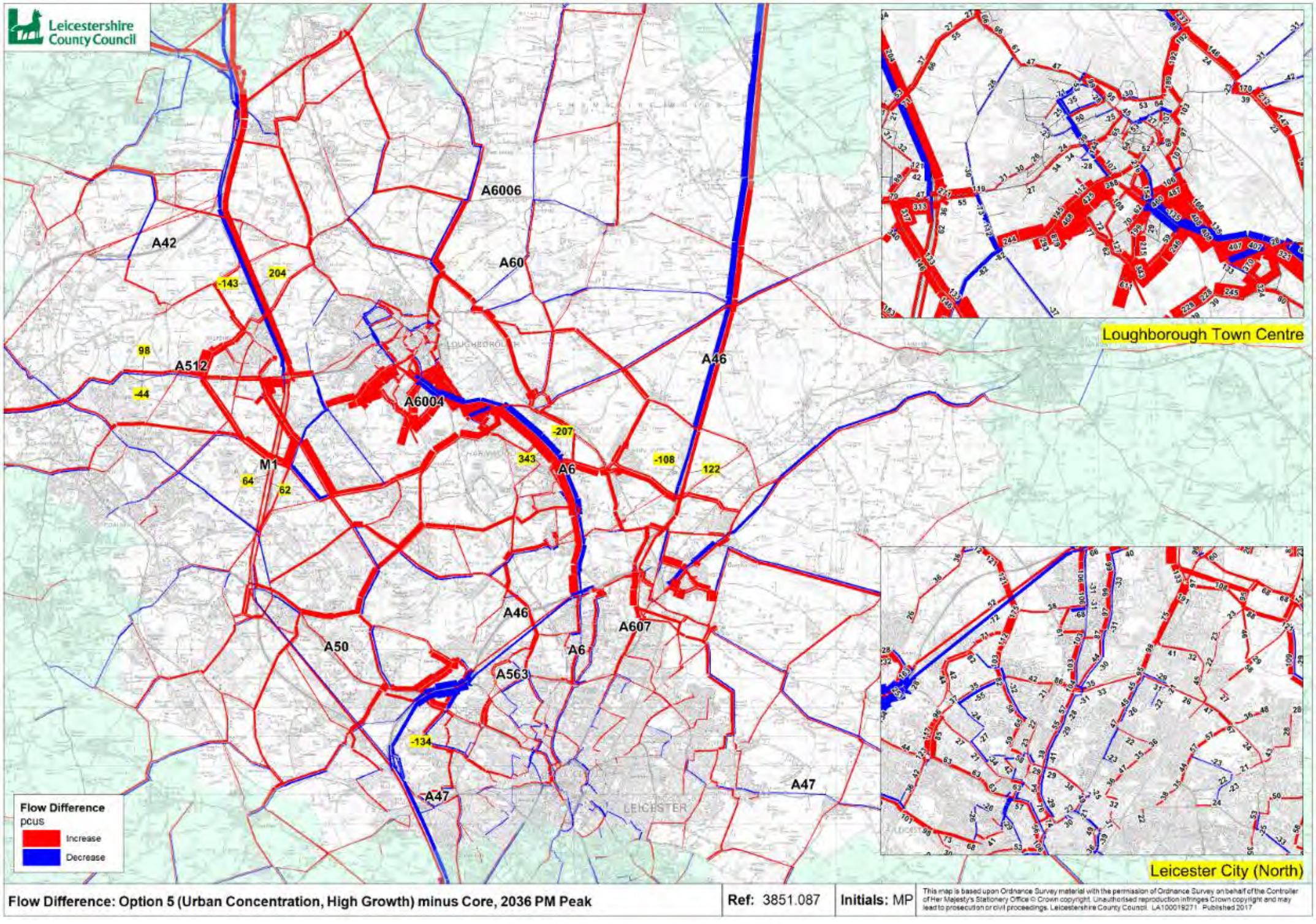


Figure 10-3: Flow Difference Plot, Option 5 (PM Peak)

Project Reference: 3851.087

DELAY DIFFERENCE

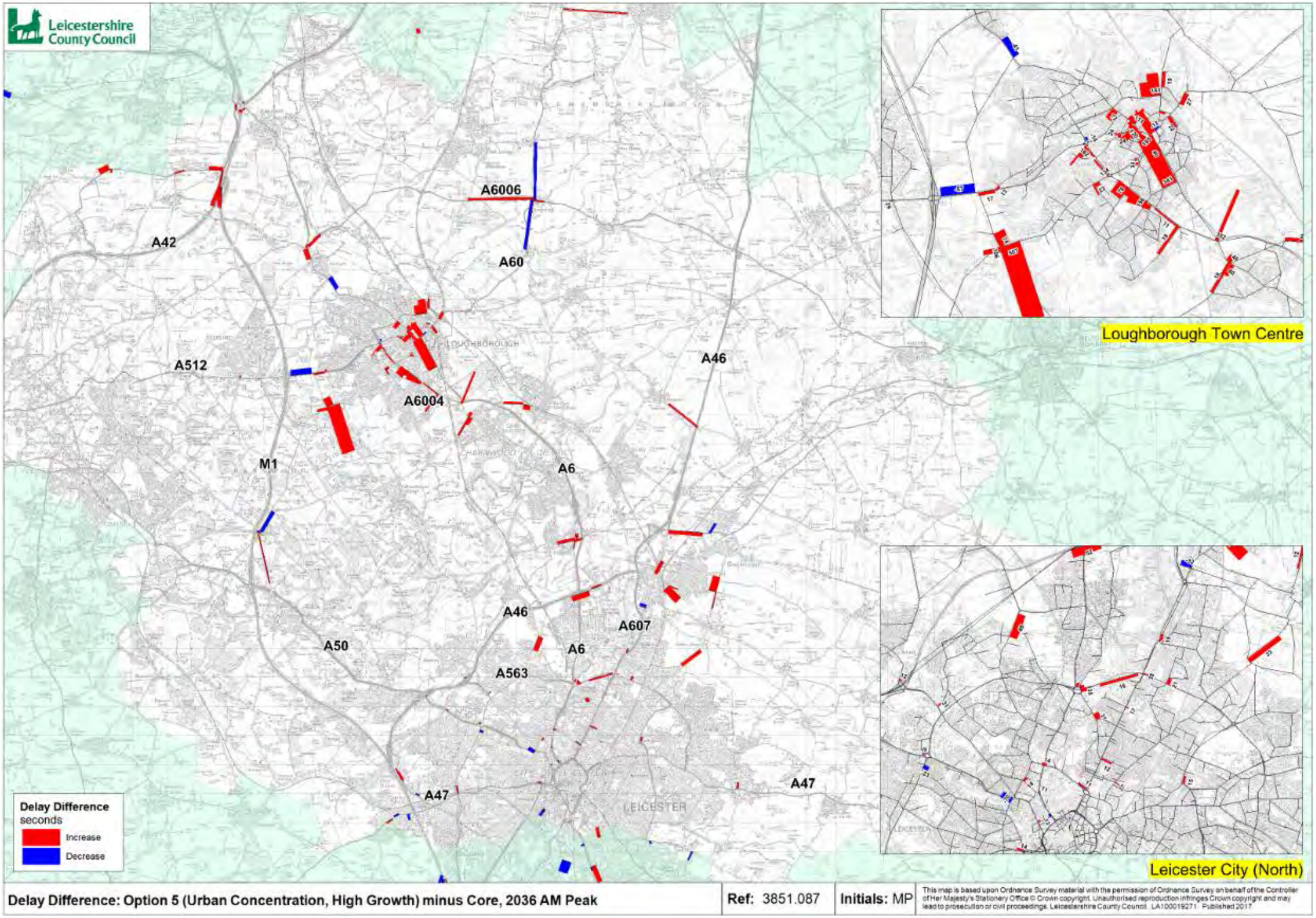


Figure 10-4: Delay Difference Plot, Option 5 (AM Peak)

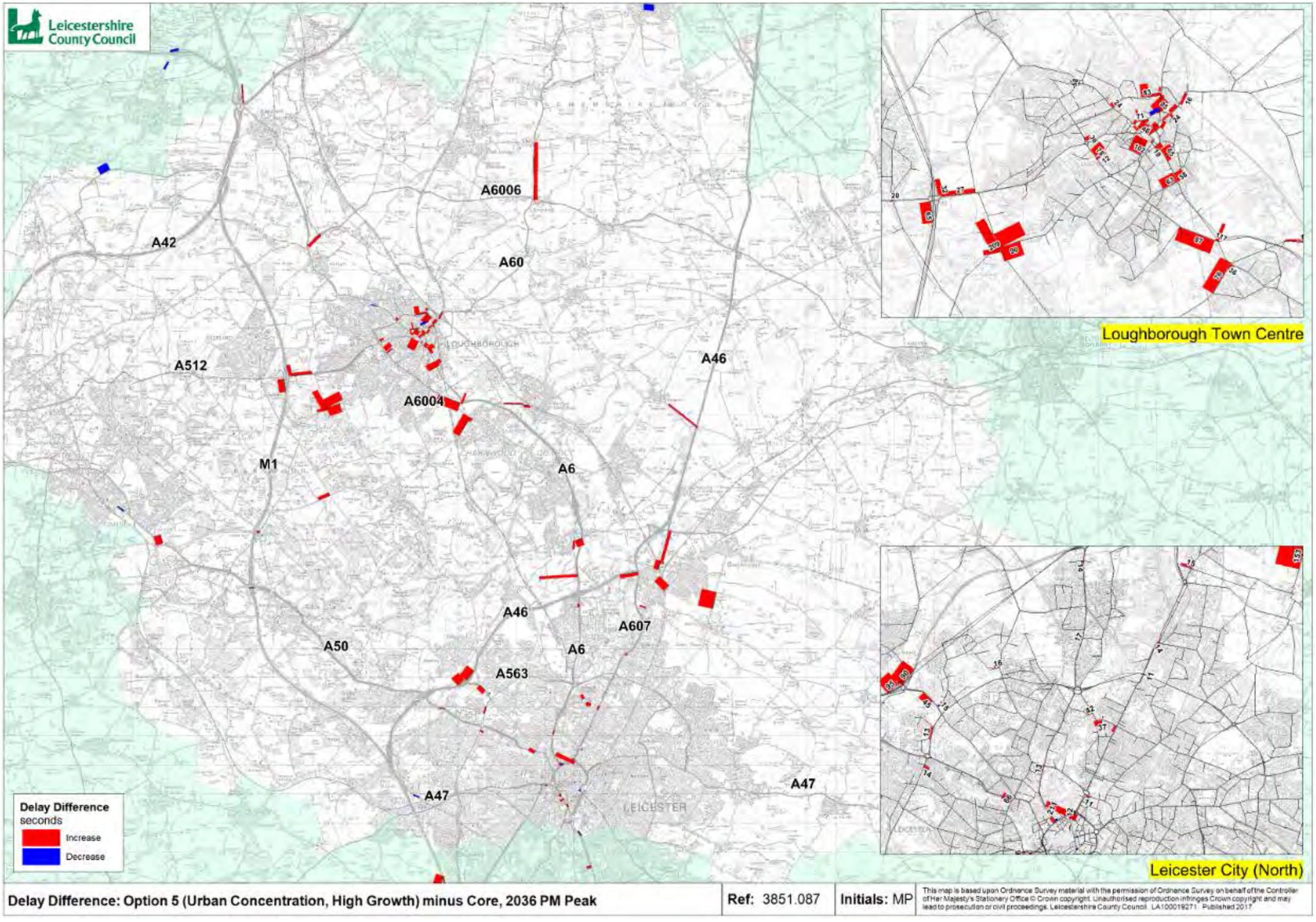


Figure 10-5: Delay Difference Plot, Option 5 (PM Peak)

JUNCTION PERFORMANCE

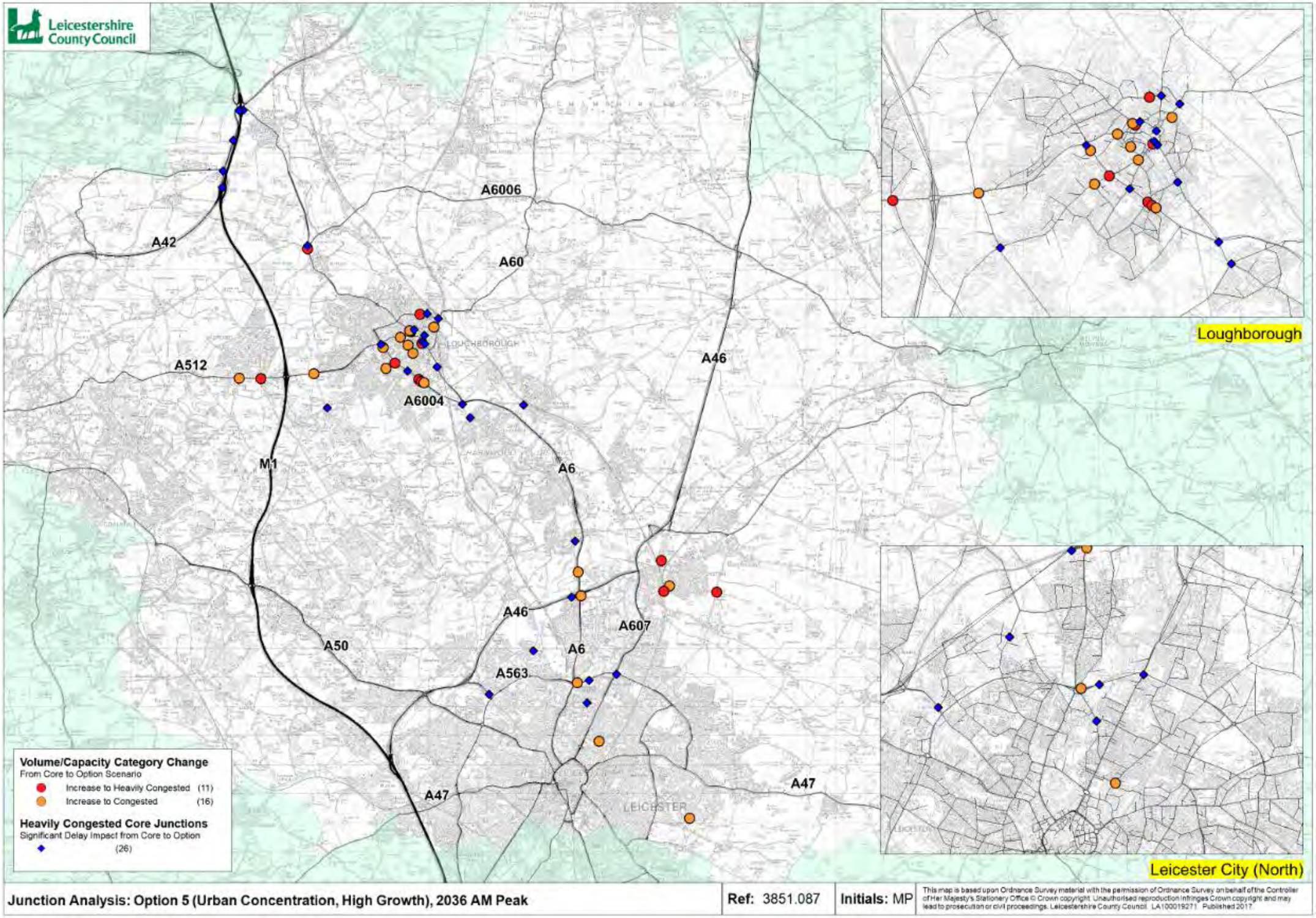


Figure 10-6: Junction Analysis, Option 5 (AM Peak)

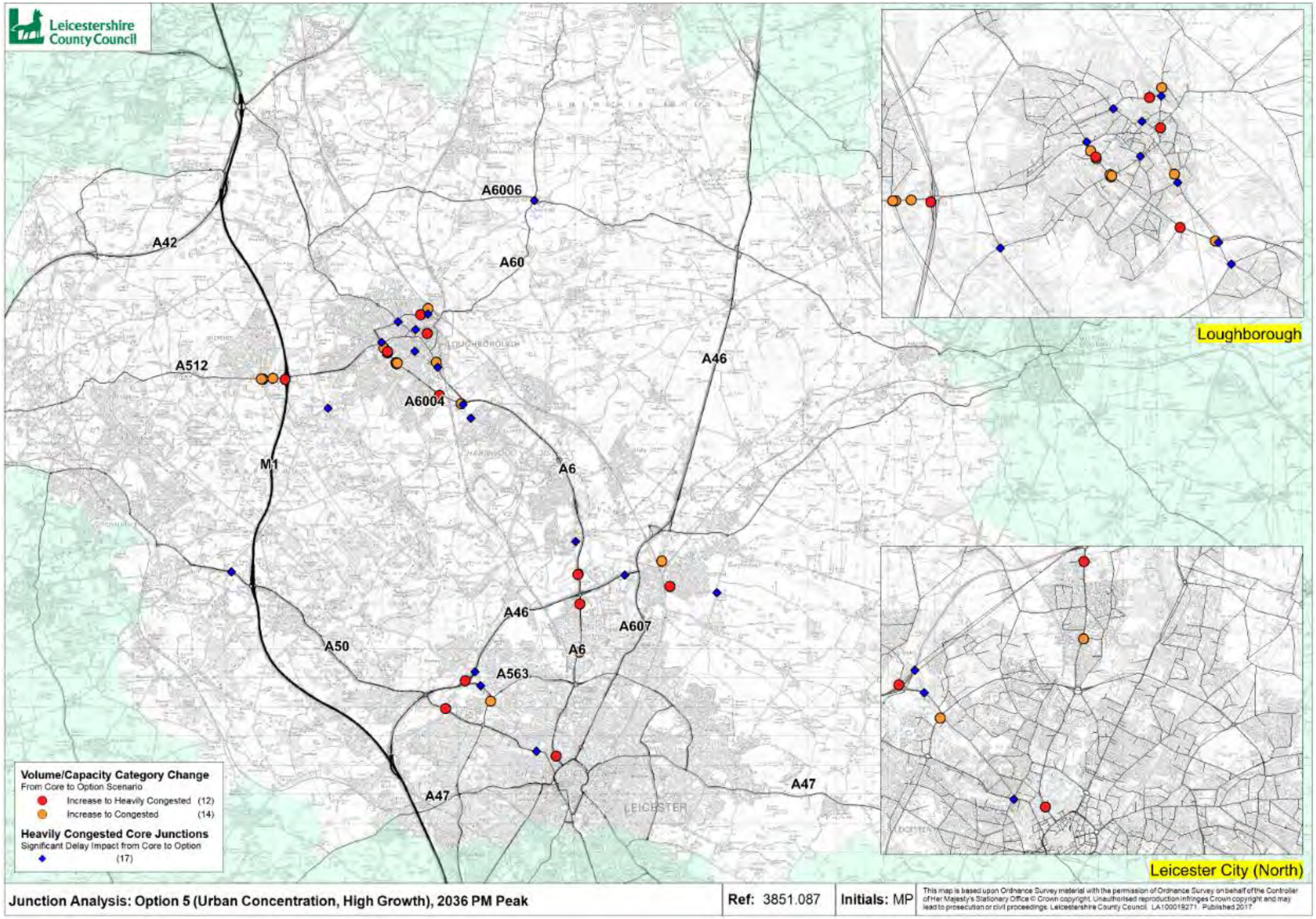


Figure 10-7: Junction Analysis, Option 5 (PM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_am	co_am_desc	36_opt5_am	o5_am_desc	core del	opt5 del	diff del
1778	A46/A6	Birstall	Birstall	39	Uncongested	92	Congested			
1706	Red Hill Circle	City (NE)	City (NE)	73	Uncongested	96	Congested			
3259	Catherine St/Brandon St	City (NE)	City (NE)	57	Uncongested	97	Congested			
2412	Main St/Biggin Hill Rd	City (SE)	City (SE)	82	Approaching Congestion	91	Congested			
7304	Frederick St/Arthur St	Loughborough	Loughborough	81	Approaching Congestion	92	Congested			
7405	A6/Broad St	Loughborough	Loughborough	70	Uncongested	91	Congested			
60002	A6004 (Ling Rd)	Loughborough	Loughborough	95	Congested	107	Heavily Congested			
60048	A6004/Woodthorpe Rd	Loughborough	Loughborough	73	Uncongested	90	Congested			
60062	A6/The Rushes	Loughborough	Loughborough	90	Congested	105	Heavily Congested			
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	Loughborough	89	Congested	106	Heavily Congested			
60145	Forest Rd/Park Rd	Loughborough	Loughborough	50	Uncongested	88	Congested			
60922	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	105	Heavily Congested			
61009	Woodgate/Pack Horse Ln	Loughborough	Loughborough	15	Uncongested	106	Heavily Congested			
65018	Forest Rd/Outwoods Dr	Loughborough	Loughborough	63	Uncongested	88	Congested			
65066	A6004/University Rd	Loughborough	Loughborough	76	Approaching Congestion	91	Congested			
65071	A512/Radmoor Rd	Loughborough	Loughborough	84	Approaching Congestion	94	Congested			
73775	Queen's Rd/Salisbury St	Loughborough	Loughborough	29	Uncongested	87	Congested			
78902	Belton Rd	Loughborough	Loughborough	48	Uncongested	101	Heavily Congested			
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	86	Congested	103	Heavily Congested			
60358	A512/Snell's Nook Ln	Rem. Charnwood	Nanpantan	70	Uncongested	93	Congested			
60402	A6/Whatton Rd	Rem. Charnwood	Hathern	94	Congested	100	Heavily Congested			
73889	A6/Broadnook	Rem. Charnwood	Broadnook	84	Approaching Congestion	91	Congested			
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	Shepshed	77	Approaching Congestion	90	Congested			
60095	A512/Ingleberry Rd	Shepshed	Shepshed	95	Congested	103	Heavily Congested			
2280	Fosse Way/High St	Syston	Syston	64	Uncongested	103	Heavily Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	50	Uncongested	92	Congested			
78892	Melton Rd/Wanlip Rd	Syston	Syston	98	Congested	104	Heavily Congested			
1607	A46/A6	Birstall	Birstall	102	Heavily Congested	104	Heavily Congested	54	88	34
2011	A563/A607	City (NE)	City (NE)	101	Heavily Congested	103	Heavily Congested	79	91	12
2751	Loughborough Rd/Checketts Rd	City (NE)	City (NE)	101	Heavily Congested	101	Heavily Congested	56	69	14
9734	Watermead Way	City (NE)	City (NE)	101	Heavily Congested	102	Heavily Congested	29	40	11
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	City (NW)	101	Heavily Congested	104	Heavily Congested	46	79	33
9845	Anstey Ln/Bennion Rd	City (NW)	City (NW)	104	Heavily Congested	105	Heavily Congested	69	80	12
7323	A6004/Forest Rd	Loughborough	Loughborough	102	Heavily Congested	108	Heavily Congested	82	173	91
60057	A6/Southfield Rd	Loughborough	Loughborough	104	Heavily Congested	106	Heavily Congested	90	101	11
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	101	Heavily Congested	108	Heavily Congested	82	121	38
60108	Woodgate/Pinfold Gate	Loughborough	Loughborough	105	Heavily Congested	107	Heavily Congested	157	248	91
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	102	Heavily Congested	119	Heavily Congested	53	119	66
60186	A6004/Beacon Rd	Loughborough	Loughborough	100	Heavily Congested	102	Heavily Congested	28	44	17
61020	A6/Baxter Gate	Loughborough	Loughborough	103	Heavily Congested	108	Heavily Congested	60	92	32
69941	A60/Station Boulevard	Loughborough	Loughborough	107	Heavily Congested	107	Heavily Congested	137	154	17
73778	A6 (Bridge St)	Loughborough	Loughborough	100	Heavily Congested	104	Heavily Congested	38	77	39
50492	A453 (EMA Junction)	NW Leics	EMA	105	Heavily Congested	106	Heavily Congested	132	151	19
50523	M1/A42	NW Leics	EMA (M1)	105	Heavily Congested	107	Heavily Congested	54	90	36
50543	M1 Junction 24	NW Leics	M1 J24	102	Heavily Congested	104	Heavily Congested	50	64	14
50544	M1 Junction 24	NW Leics	M1 J24	104	Heavily Congested	104	Heavily Congested	144	155	11
76088	A453/Ashby Rd	NW Leics	Kegworth	109	Heavily Congested	108	Heavily Congested	132	158	26
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	101	Heavily Congested	101	Heavily Congested	92	113	21
60044	Barrow Rd/Bridge St	Rem. Charnwood	Barrow	101	Heavily Congested	103	Heavily Congested	70	102	31
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	100	Heavily Congested	49	77	27
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	106	Heavily Congested	120	Heavily Congested	208	465	257
60253	A6/Zouch Rd	Rem. Charnwood	Hathern	100	Heavily Congested	101	Heavily Congested	63	76	14
60362	A6/A6004	Rem. Charnwood	Quorn	106	Heavily Congested	118	Heavily Congested	54	147	93

Table 10-2: Junction Analysis, Option 5 (AM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_pm	co_pm_desc	36_opt5_pm	o5_pm_desc	core del	opt5 del	diff del
1748	A6/School Ln	Birstall	Birstall	83	Approaching Congestion	95	Congested			
7402	A6/Birstall Meadow Rd	Birstall	Birstall	93	Congested	100	Heavily Congested			
76061	A50/Gynsill Lane	Blaby	Glenfield	97	Congested	103	Heavily Congested			
1428	A6 (St Margaret's Way)	City (NE)	City (NE)	90	Congested	110	Heavily Congested			
9859	A563 (Glenfrith Way)	City (NW)	City (NW)	82	Approaching Congestion	88	Congested			
60098	The Coneries/Sparrow Hill	Loughborough	Loughborough	90	Congested	101	Heavily Congested			
60538	A6/Beeches Rd	Loughborough	Loughborough	80	Approaching Congestion	94	Congested			
60916	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	90	Congested			
60918	A6004/Forest Rd	Loughborough	Loughborough	84	Approaching Congestion	91	Congested			
60920	A6004/Forest Rd	Loughborough	Loughborough	84	Approaching Congestion	92	Congested			
65066	A6004/University Rd	Loughborough	Loughborough	80	Approaching Congestion	89	Congested			
65067	A6004 (Epinal Way)	Loughborough	Loughborough	92	Congested	102	Heavily Congested			
65070	A6004/Radmoor Rd	Loughborough	Loughborough	81	Approaching Congestion	88	Congested			
78902	Belton Rd	Loughborough	Loughborough	44	Uncongested	101	Heavily Congested			
78903	A6004/Gordon Rd	Loughborough	Loughborough	79	Approaching Congestion	95	Congested			
9631	A46/Leicester Rd	Rem. Charnwood	Anstey	90	Congested	103	Heavily Congested			
60123	A6004/Allendale Rd	Rem. Charnwood	Woodthorpe	84	Approaching Congestion	101	Heavily Congested			
73890	A6/Broadnook	Rem. Charnwood	Broadnook	79	Approaching Congestion	100	Heavily Congested			
73891	A6/Broadnook	Rem. Charnwood	Broadnook	21	Uncongested	116	Heavily Congested			
74116	A6004 (Terry Yardley Way)	Rem. Charnwood	Quorn	84	Approaching Congestion	91	Congested			
7306	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	95	Congested			
60454	M1 Junction 23	Shepshed	Shepshed	87	Congested	101	Heavily Congested			
76036	A512/Leicester Rd	Shepshed	Shepshed	81	Approaching Congestion	87	Congested			
76150	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	95	Congested			
2280	Fosse Way/High St	Syston	Syston	83	Approaching Congestion	97	Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	77	Approaching Congestion	102	Heavily Congested			
9007	A50/Fosse Rd N	City (NW)	City (NW)	101	Heavily Congested	102	Heavily Congested	36	51	15
49975	A511/Copt Oak Rd	Hinckley	Stanton-u-Bardon	100	Heavily Congested	101	Heavily Congested	46	60	14
7317	A512/A6004	Loughborough	Loughborough	101	Heavily Congested	102	Heavily Congested	56	67	11
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	103	Heavily Congested	103	Heavily Congested	104	120	17
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	101	Heavily Congested	101	Heavily Congested	31	48	17
60148	A6/A6004 (Alan Moss/Belton Rd)	Loughborough	Loughborough	100	Heavily Congested	101	Heavily Congested	67	79	12
61000	Forest Rd/Browns Ln	Loughborough	Loughborough	100	Heavily Congested	104	Heavily Congested	47	78	31
65097	A6 (Fennel St)/Bridge St	Loughborough	Loughborough	101	Heavily Congested	103	Heavily Congested	74	89	15
76923	A60/A6006	Other	Rempstone	101	Heavily Congested	101	Heavily Congested	117	129	12
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	100	Heavily Congested	101	Heavily Congested	86	111	25
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	100	Heavily Congested	103	Heavily Congested	88	156	68
9385	Anstey Ln	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	63	26
9715	A46/Leicester Rd	Rem. Charnwood	Anstey	101	Heavily Congested	103	Heavily Congested	37	102	65
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	101	Heavily Congested	48	69	21
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	104	Heavily Congested	105	Heavily Congested	175	328	153
60362	A6/A6004	Rem. Charnwood	Quorn	101	Heavily Congested	105	Heavily Congested	26	54	28
2047	A46/Wanlip Rd	Syston	Syston	101	Heavily Congested	102	Heavily Congested	33	66	33

Table 10-3: Junction Analysis, Option 5 (PM Peak)

SELECT LINK ANALYSIS

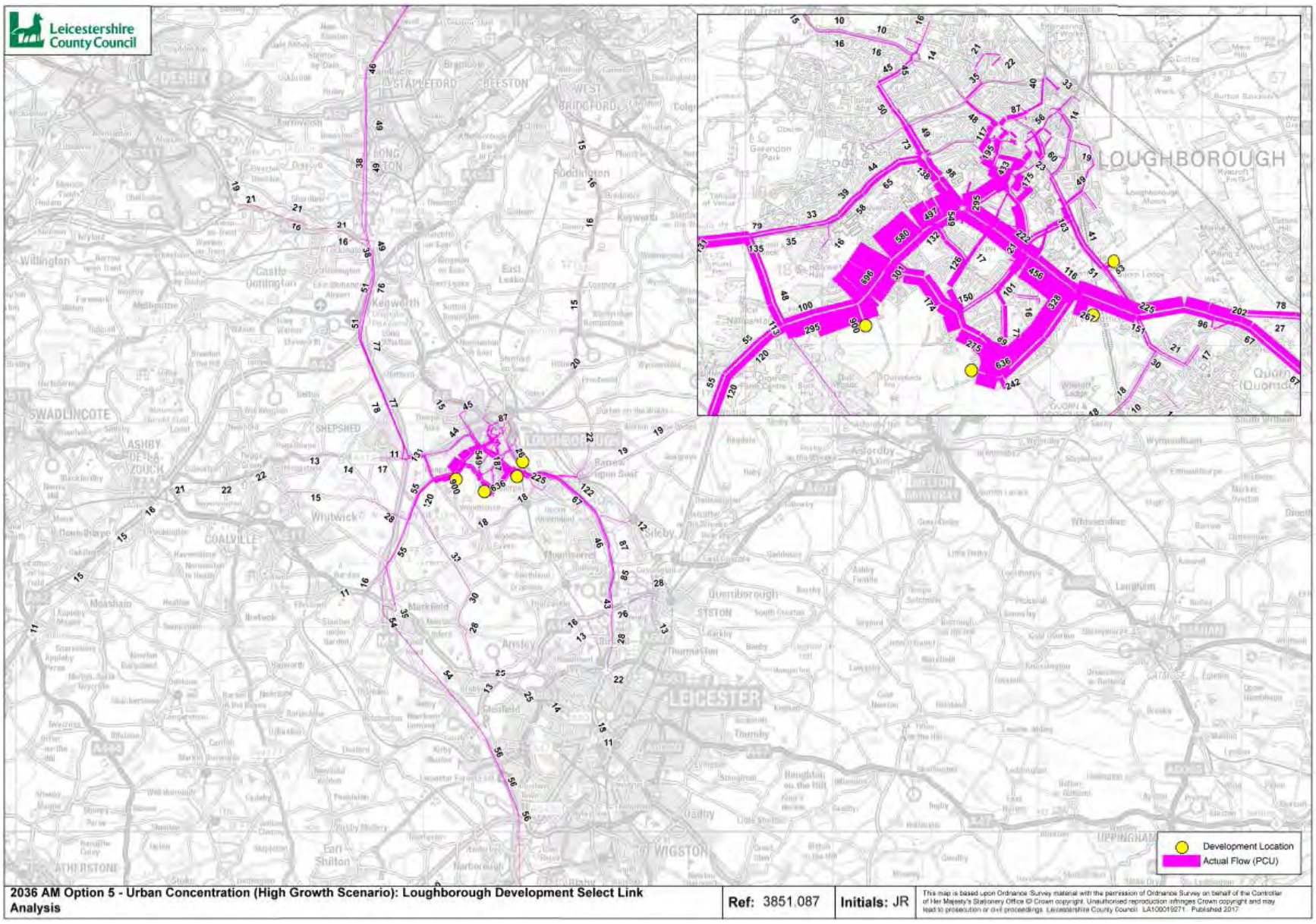


Figure 10-8: Select Link Analysis, Option 5 - Loughborough Development (AM Peak)

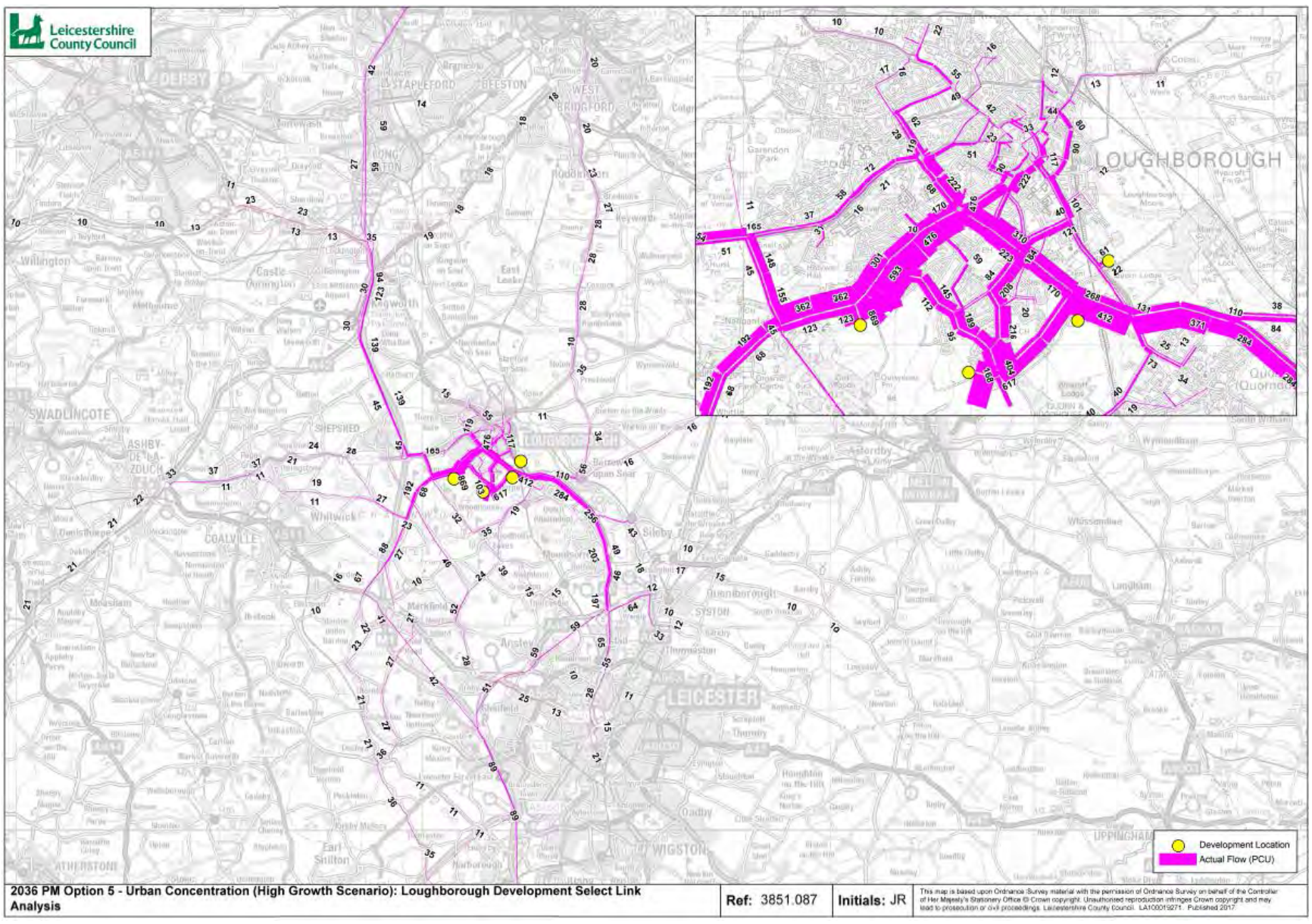


Figure 10-9: Select Link Analysis, Option 5 - Loughborough Development (PM Peak)

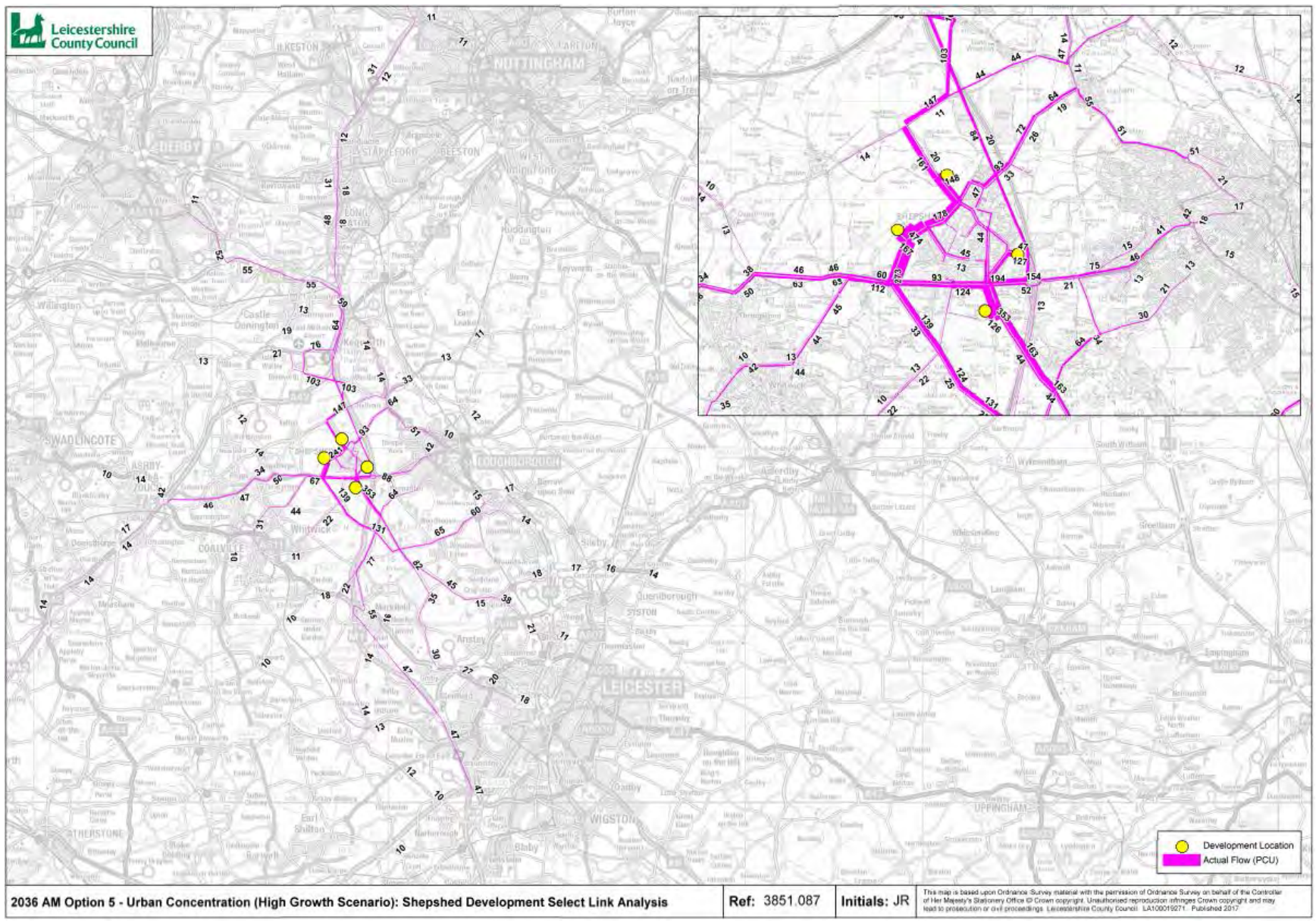


Figure 10-10: Select Link Analysis, Option 5 - Shepshed Development (AM Peak)

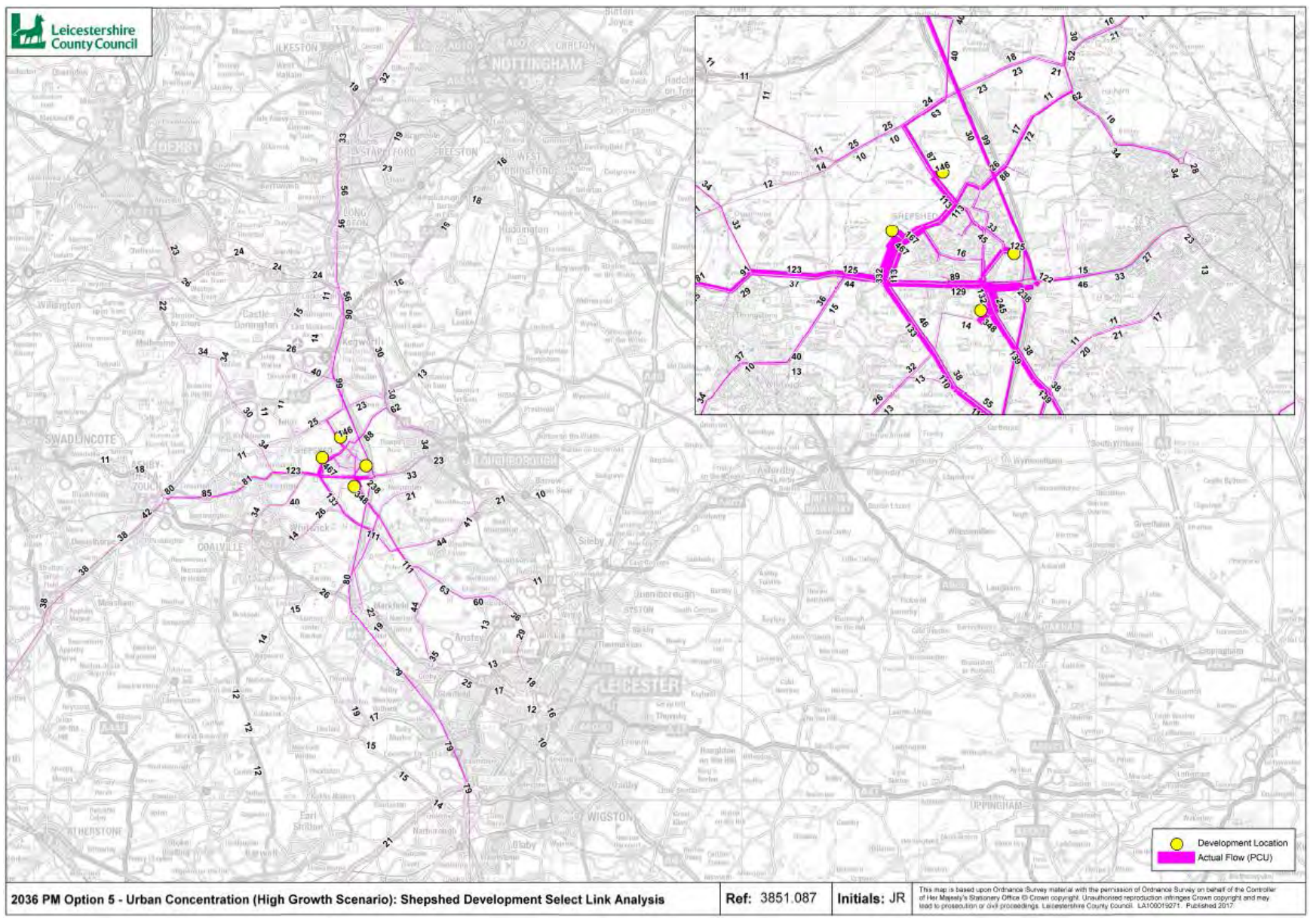


Figure 10-11: Select Link Analysis, Option 5 - Shepshed Development (PM Peak)

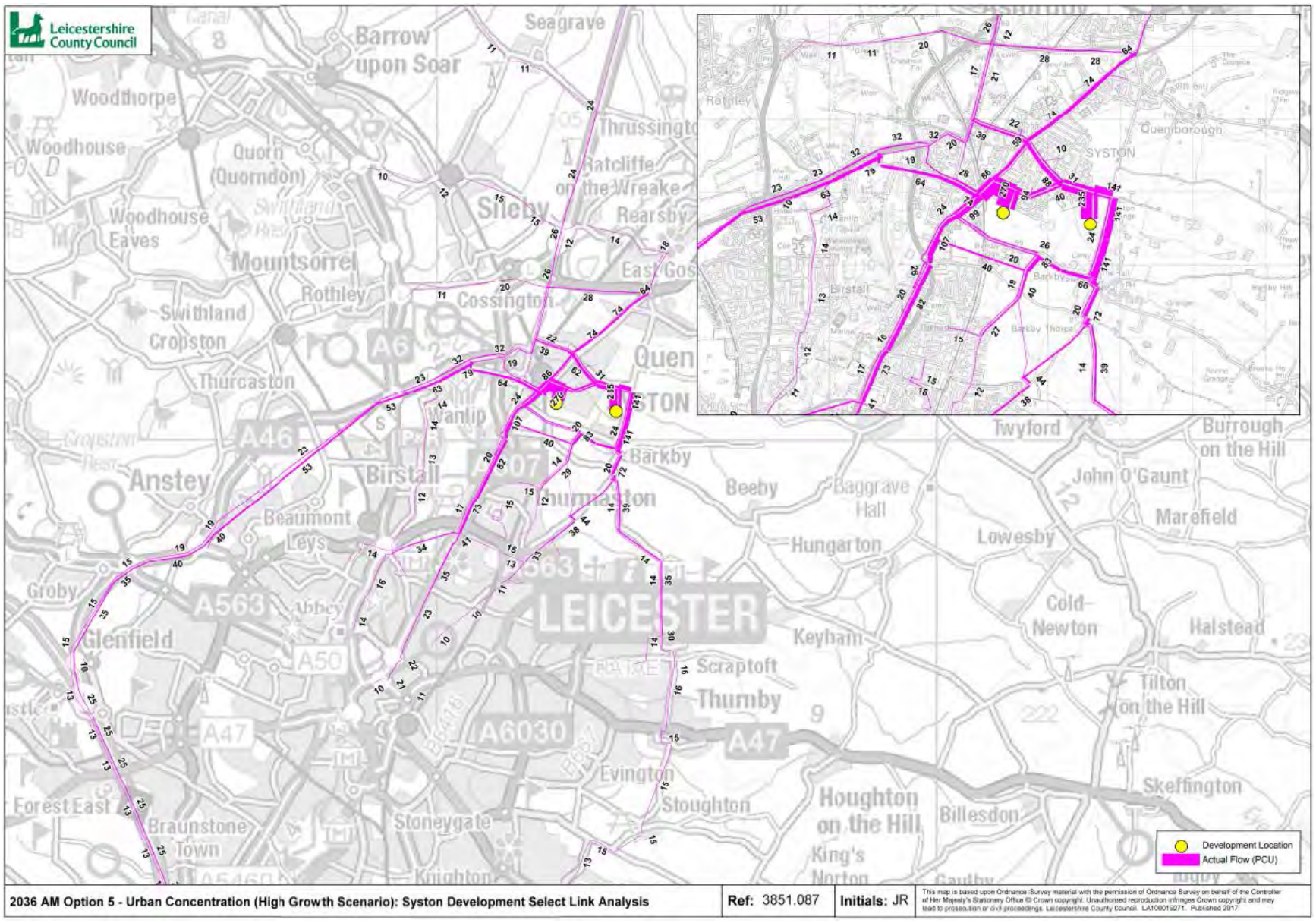


Figure 10-12: Select Link Analysis, Option 5 - Syston Development (AM Peak)

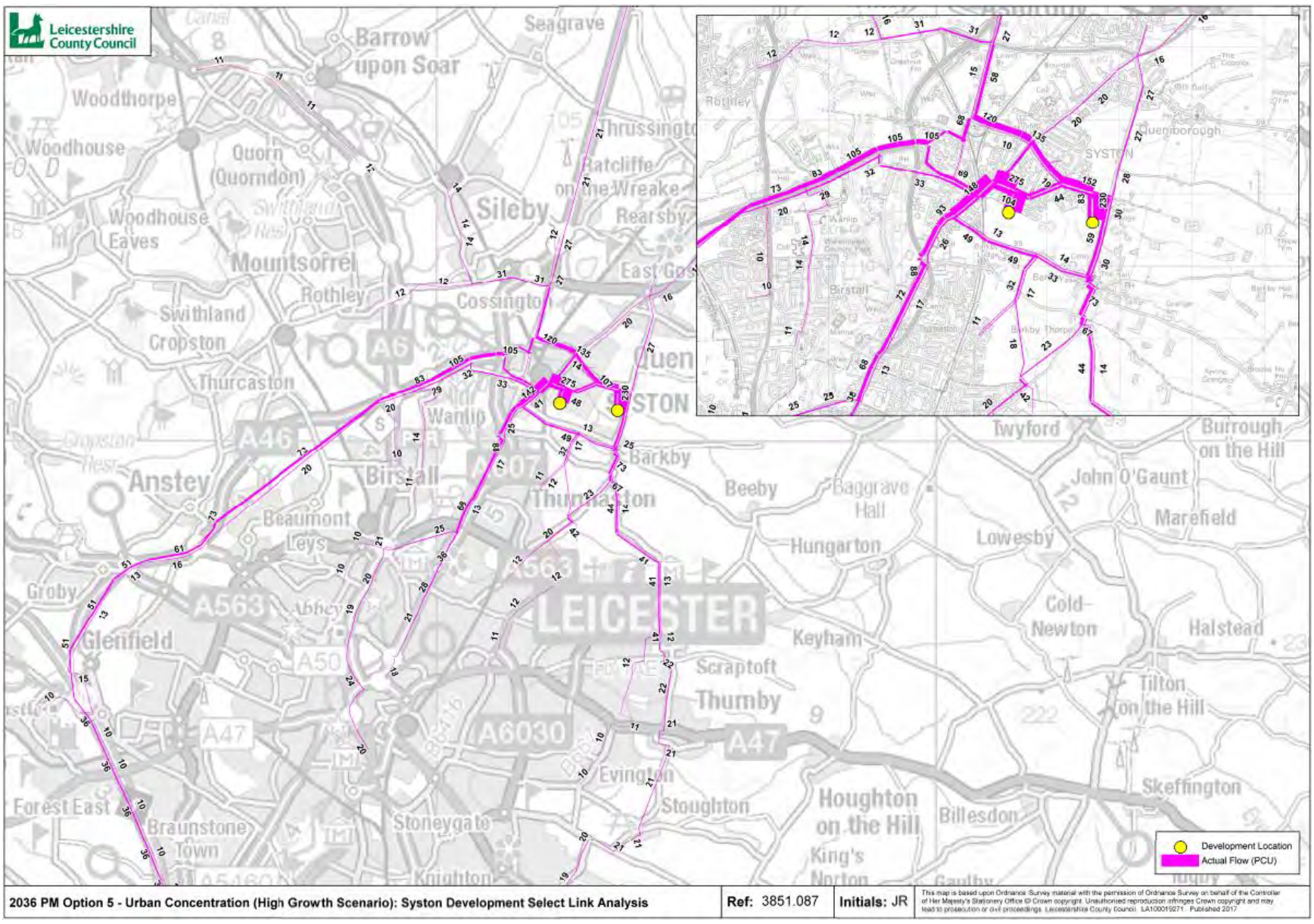


Figure 10-13: Select Link Analysis, Option 5 - Syston Development (PM Peak)

MATRIX SECTORING

Op5 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	1,052	54	15			192	34	25	17	18	12	14	12	39	30	109	27	334
Shepshed	139	324				82	13	16						37	27	223		238
Syston	18		163	67	11	98	58	150	32	17	26	25		36	17		16	69
Thurmaston			33	25		20	17	34	11					16				25
Birstall			13	11	20	19		13										11
Rem. Charnwood	240	28	83	26	35	557	130	99	58	76	61	21	52	139	68	122	93	322
City (NW)																		
City (NE)			14															
City (SE)			12															
City (SW)																		
City (Centre)																		
Oadby																		
Harborough																		
Blaby																		
Hinckley																		
NW Leics		19																
Melton																		
Other																		

Table 10-4: Highlight Matrix of all Sectored Trips, Option 5 AM Peak minus Core AM Peak (>10 Trips only)

Op5 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	757	80	23			267												
Shepshed	48	284				26										19		23
Syston	21		159	32	15	72		14										
Thurmaston	16		42	28		22												
Birstall	11		15			32												
Rem. Charnwood	212	62	92	14	14	414	13											
City (NW)	35	17	43	11		115												
City (NE)	46	21	98	24	18	95												
City (SE)	29		29			57												
City (SW)	18		36			60												
City (Centre)	18		32			62												
Oadby			31			19												
Harborough	47	10	14			49												
Blaby	44	53	40	12		130												
Hinckley	26	36	17			60												
NW Leics	108	217	11			132												
Melton	22		27			81												
Other	436	290	88	30	14	427												

Table 10-5: Highlight Matrix of all Sectored Trips, Option 5 PM Peak minus Core PM Peak (>10 Trips only)

11. Results: Option 6 – Dispersed Settlement Hierarchy Distribution (High Growth)

11.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,300	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	4,600	Majority of available sites (total 5,154) includes large sites South and South West of Loughborough
Shepshed	2,500	Majority of available sites (total 2,686) including large site west of Shepshed.
Anstey	600	A mix of small and medium sized sites, total of 3,100 homes at the Service Centres
Barrow Upon Soar	600	
Mountsorrel	100	
Quorn	600	
Rothley	600	
Sileby	600	
Barkby	200	A mix of small and medium sized sites, total of 2,200
Burton on the Wolds	200	
Cossington	200	
East Goscote	200	
Hathern	100	
Newtown Linford	200	
Queniborough	200	
Rearsby	200	
Seagrave	100	
Swithland	0	
Thrussington	100	
Thurcaston	200	
Woodhouse Eaves	100	
Wymeswold	200	
Total	**15,700**	

Table 11-1: Option 6 Development Assumptions (provided by Charnwood Borough Council)

11.1.1. The above assumptions were assigned to loading points as per Figure 11-1.

11.2. Modelling Outputs

11.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 11-2, Figure 11-3)

- Delay Difference Plots (Figure 11-4, Figure 11-5)
- Junction Analysis (Figure 11-6, Figure 11-7, Table 11-2, Table 11-3)
- Select Link Analysis
    - Loughborough (Figure 11-8, Figure 11-9)
    - Shepshed (Figure 11-10, Figure 11-11)
    - Syston (Figure 11-12, Figure 11-13)
- Matrix Sectoring (Table 11-4, Table 11-5)

ZONAL LOADING

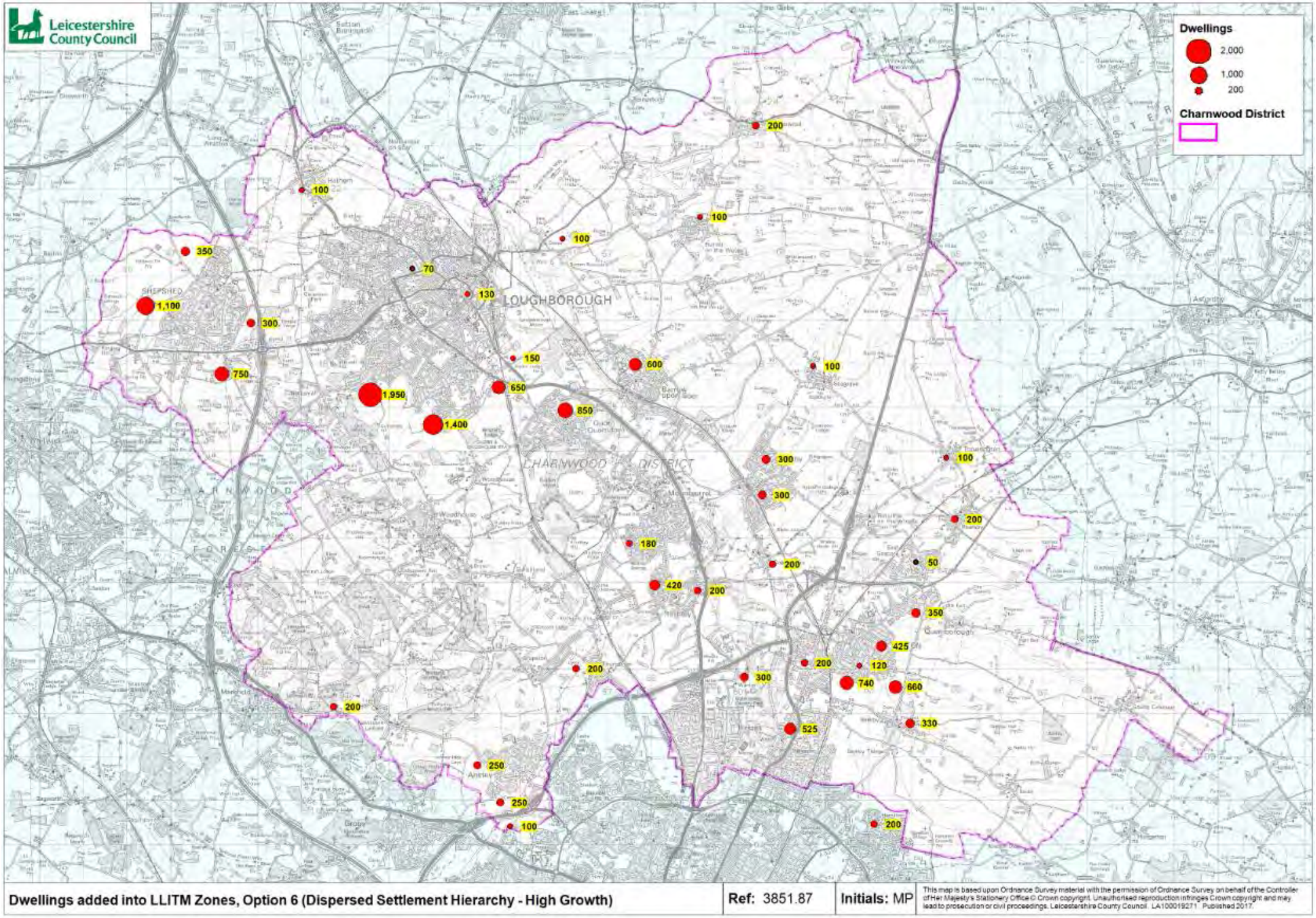


Figure 11-1: Spatial Dwelling Distribution of Modelled Scenario, Option 6

Project Reference: 3851.087

FLOW DIFFERENCE

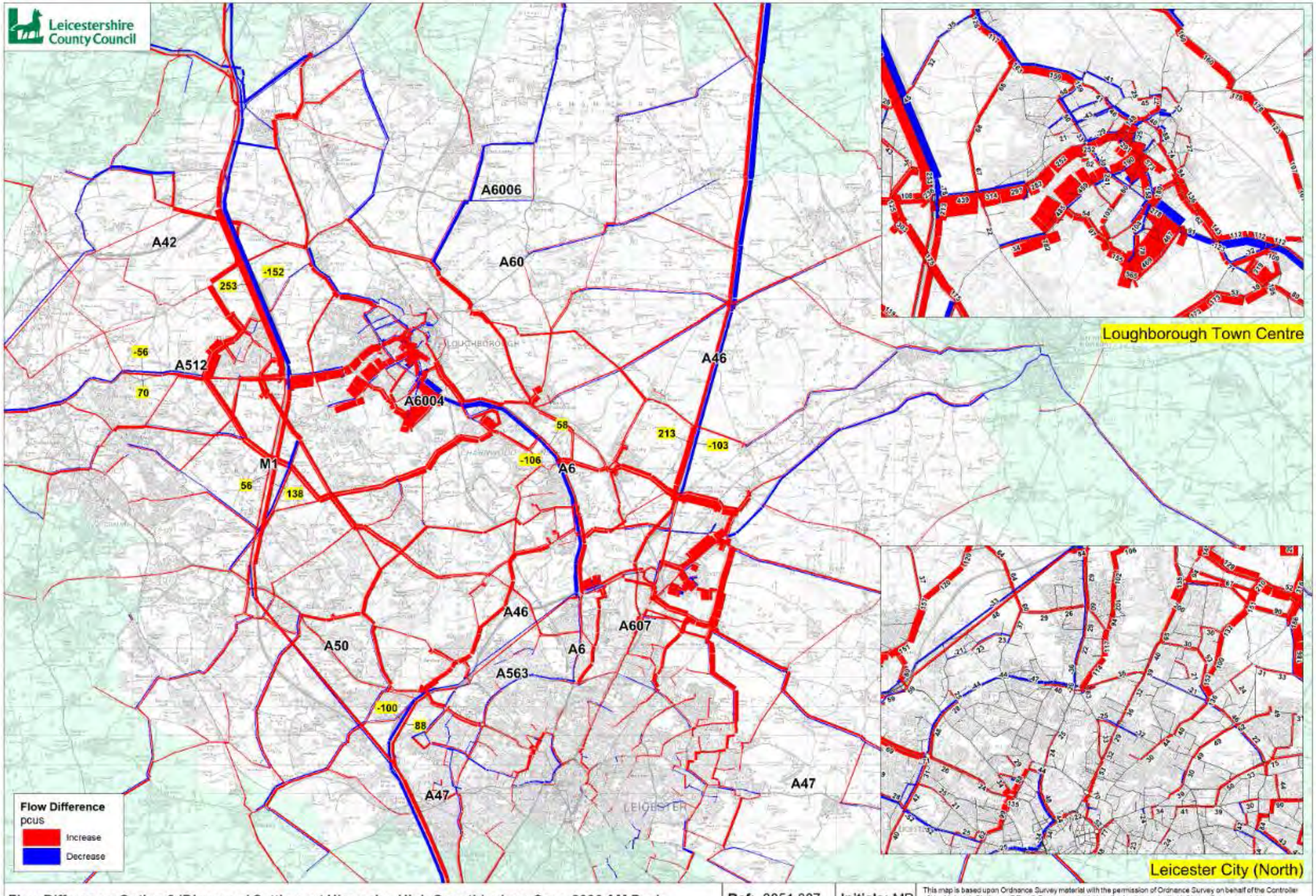


Figure 11-2: Flow Difference Plot, Option 6 (AM Peak)

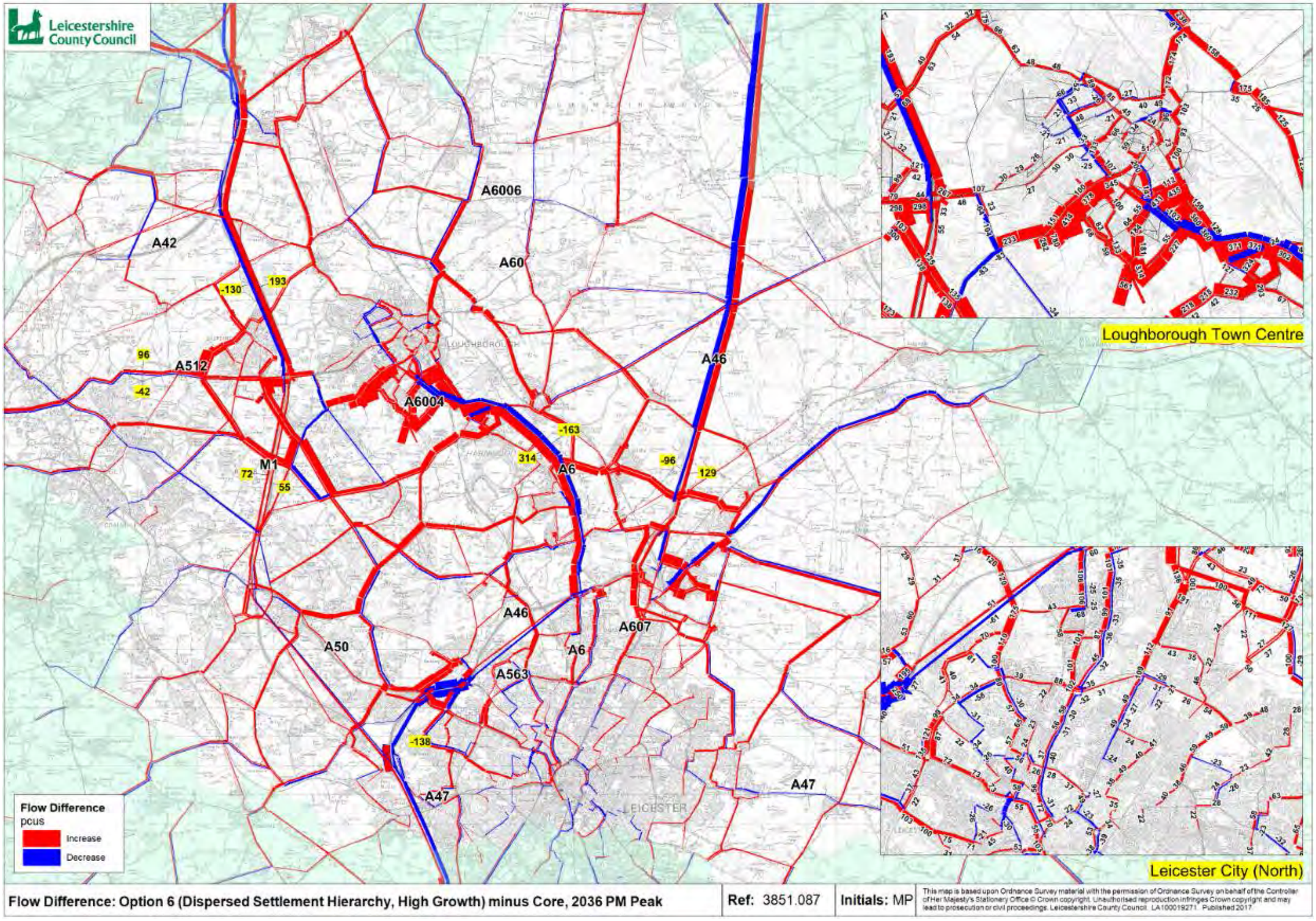


Figure 11-3: Flow Difference Plot, Option 6 (PM Peak

Project Reference: 3851.087

DELAY DIFFERENCE

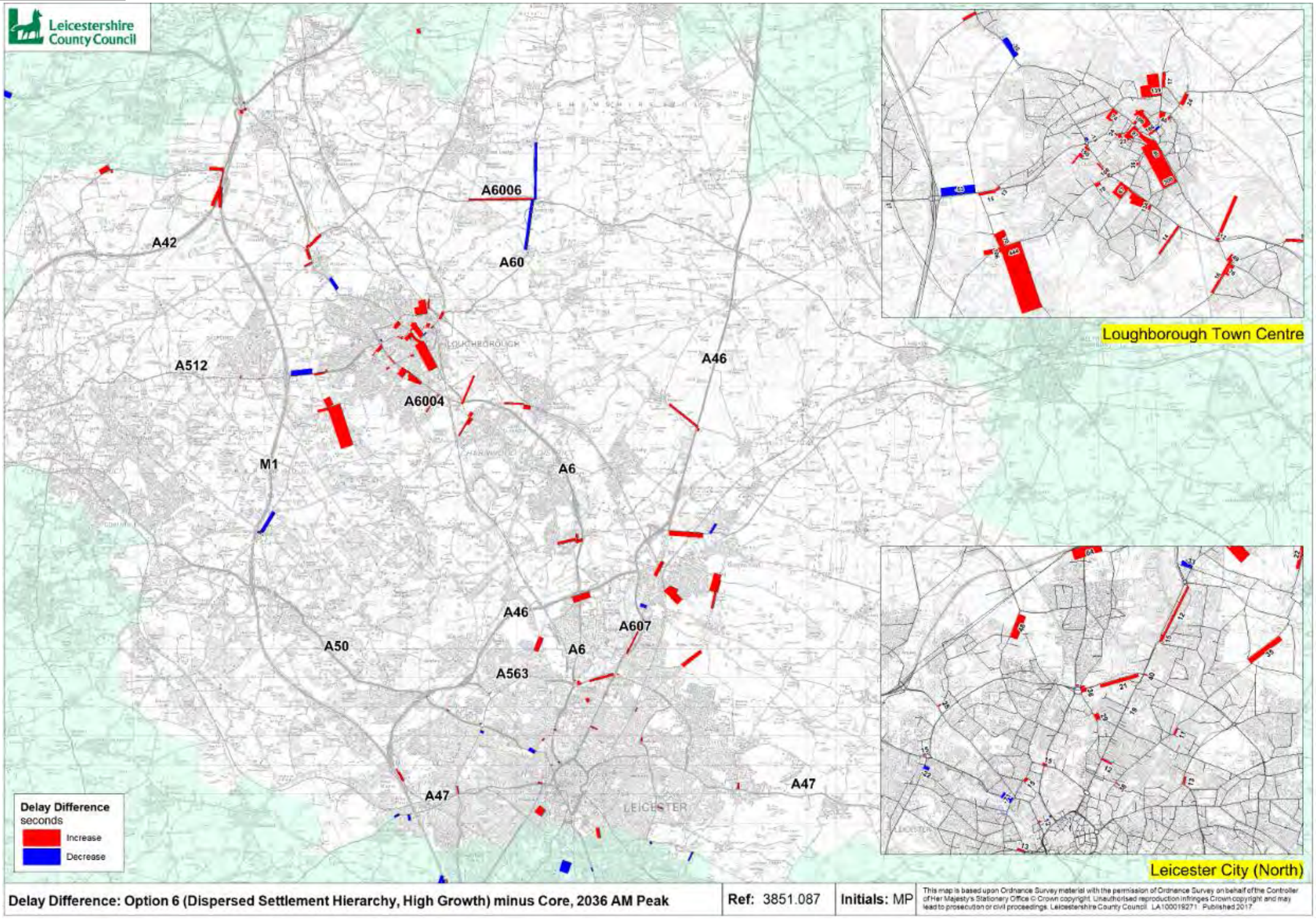


Figure 11-4: Delay Difference Plot, Option 6 (AM Peak)

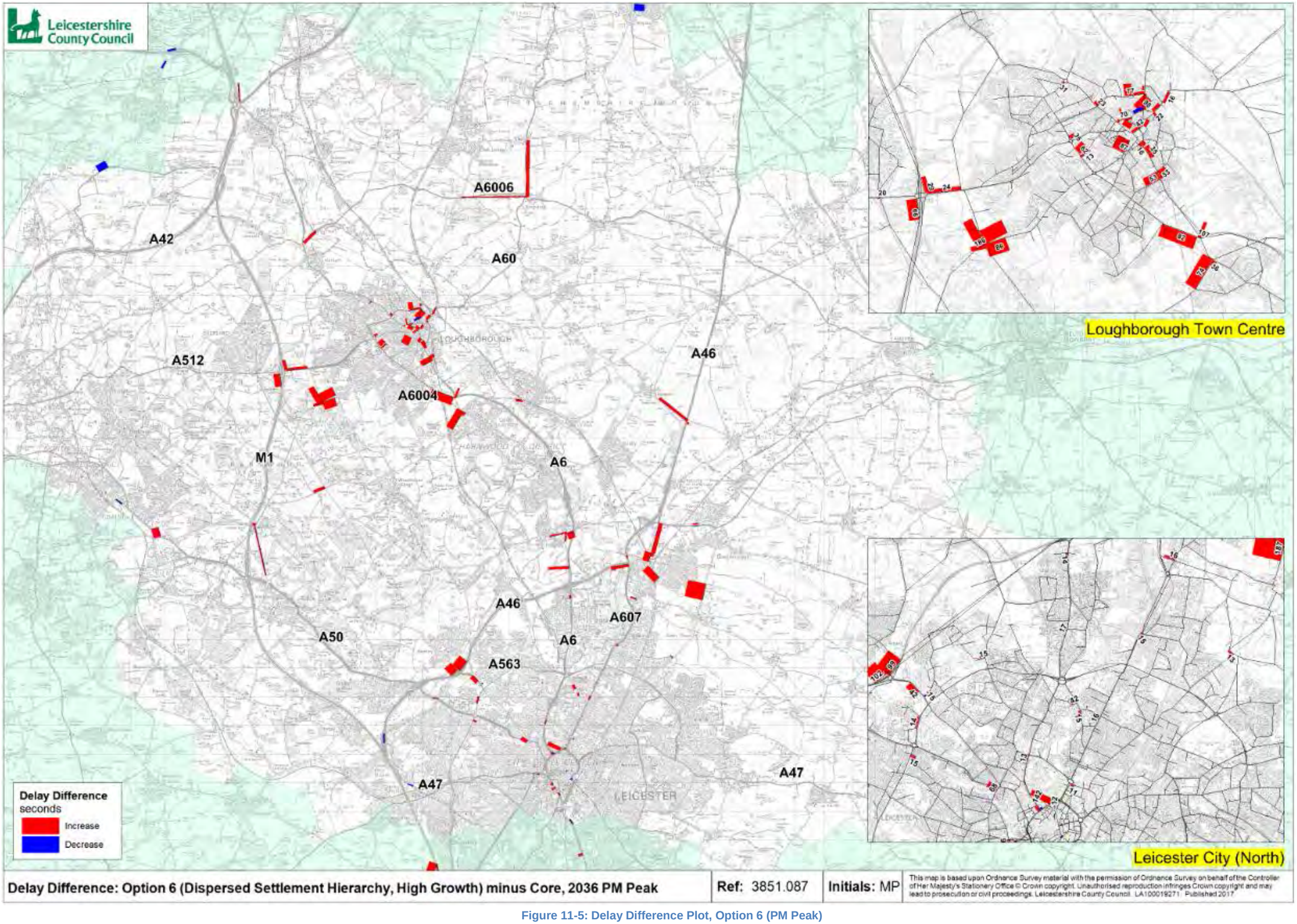


Figure 11-5: Delay Difference Plot, Option 6 (PM Peak)

JUNCTION PERFORMANCE

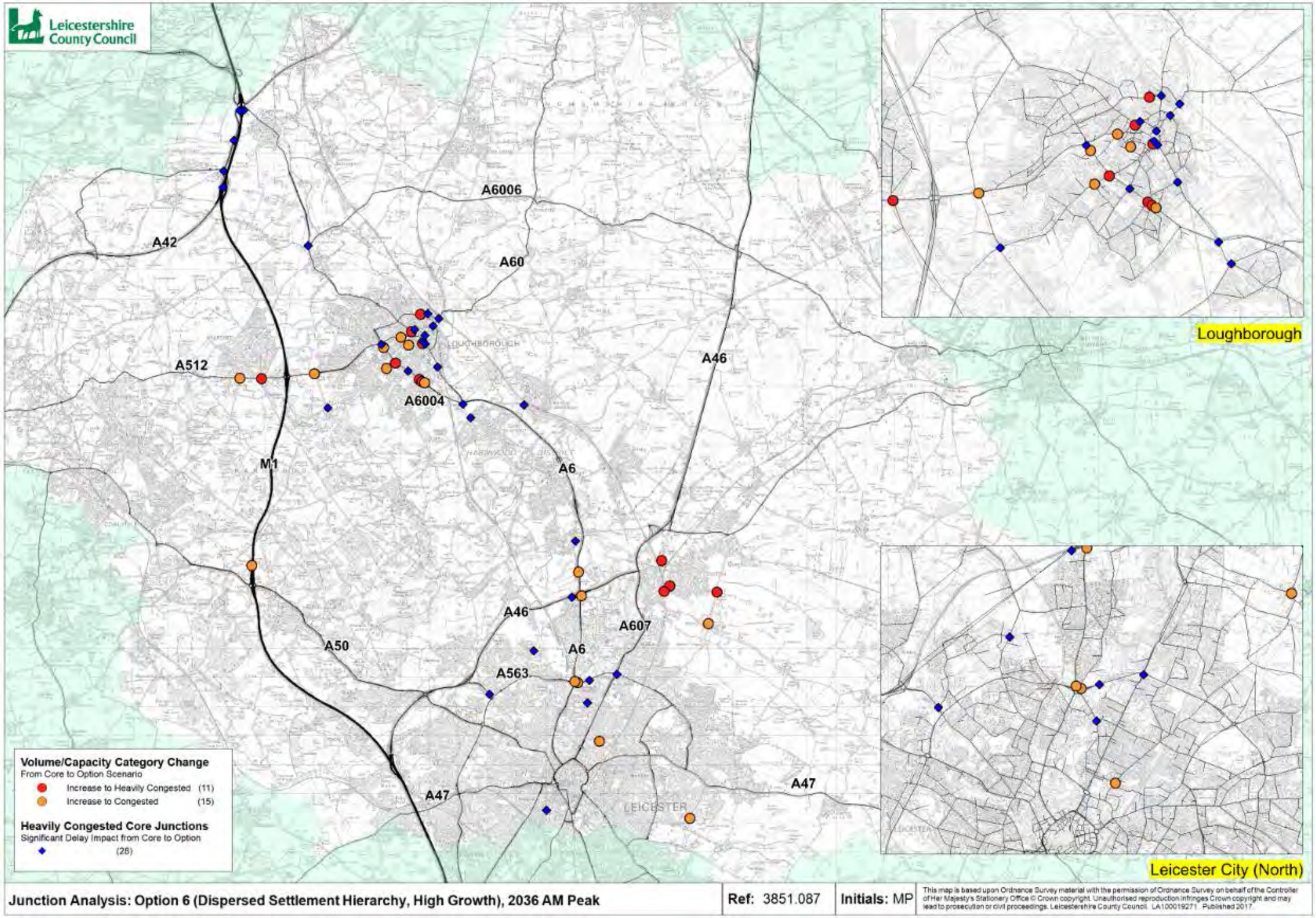


Figure 11-6: Junction Analysis, Option 6 (AM Peak)

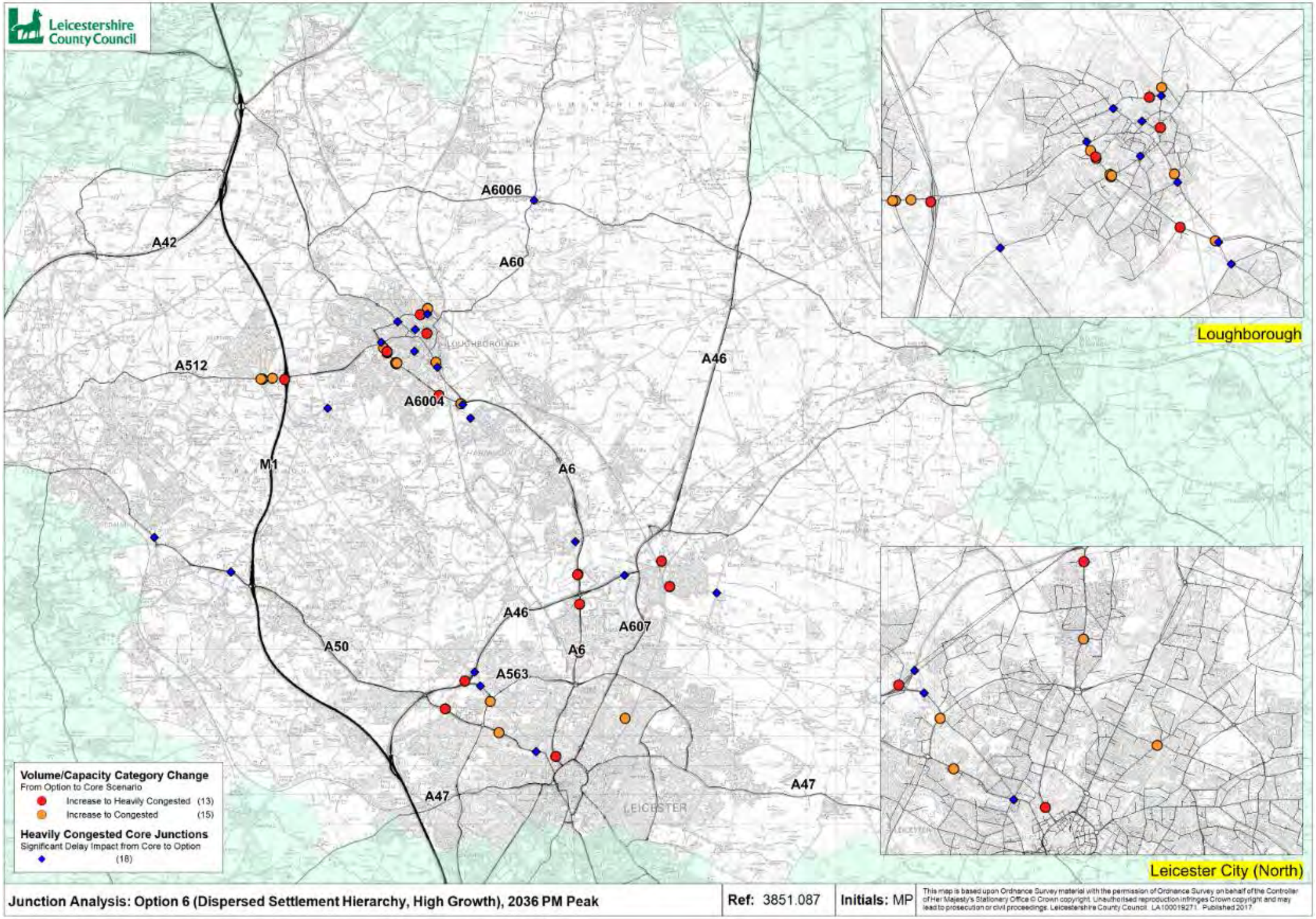


Figure 11-7: Junction Analysis, Option 6 (PM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_am	co_am_desc	36_opt6_am	o6_am_desc	core del	opt6 del	diff del
1778	A46/A6	Birstall	Birstall	39	Uncongested	92	Congested			
1651	Red Hill Circle	City (NE)	City (NE)	41	Uncongested	92	Congested			
1706	Red Hill Circle	City (NE)	City (NE)	73	Uncongested	97	Congested			
3259	Catherine St/Brandon St	City (NE)	City (NE)	57	Uncongested	98	Congested			
2412	Main St/Biggin Hill Rd	City (SE)	City (SE)	82	Approaching Congestion	91	Congested			
40470	M1 Junction 22	Hinckley	M1 J22	81	Approaching Congestion	87	Congested			
7304	Frederick St/Arthur St	Loughborough	Loughborough	81	Approaching Congestion	91	Congested			
60002	A6004 (Ling Rd)	Loughborough	Loughborough	95	Congested	106	Heavily Congested			
60048	A6004/Woodthorpe Rd	Loughborough	Loughborough	73	Uncongested	88	Congested			
60062	A6/The Rushes	Loughborough	Loughborough	90	Congested	105	Heavily Congested			
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	Loughborough	89	Congested	104	Heavily Congested			
60922	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	103	Heavily Congested			
61009	Woodgate/Pack Horse Ln	Loughborough	Loughborough	15	Uncongested	103	Heavily Congested			
65018	Forest Rd/Outwoods Dr	Loughborough	Loughborough	63	Uncongested	86	Congested			
65066	A6004/University Rd	Loughborough	Loughborough	76	Approaching Congestion	89	Congested			
65071	A512/Radmoor Rd	Loughborough	Loughborough	84	Approaching Congestion	94	Congested			
78902	Belton Rd	Loughborough	Loughborough	48	Uncongested	100	Heavily Congested			
2477	Queniborough Rd/Main St	Rem. Charnwood	Barkby	49	Uncongested	88	Congested			
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	86	Congested	104	Heavily Congested			
60358	A512/Snell's Nook Ln	Rem. Charnwood	Nanpantan	70	Uncongested	92	Congested			
73889	A6/Broadnook	Rem. Charnwood	Broadnook	84	Approaching Congestion	92	Congested			
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	Shepshed	77	Approaching Congestion	89	Congested			
60095	A512/Ingleberry Rd	Shepshed	Shepshed	95	Congested	102	Heavily Congested			
2280	Fosse Way/High St	Syston	Syston	64	Uncongested	104	Heavily Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	50	Uncongested	101	Heavily Congested			
78892	Melton Rd/Wanlip Rd	Syston	Syston	98	Congested	104	Heavily Congested			
1607	A46/A6	Birstall	Birstall	102	Heavily Congested	105	Heavily Congested	54	96	42
2011	A563/A607	City (NE)	City (NE)	101	Heavily Congested	103	Heavily Congested	79	92	13
2751	Loughborough Rd/Checketts Rd	City (NE)	City (NE)	101	Heavily Congested	101	Heavily Congested	56	68	13
9734	Watermead Way	City (NE)	City (NE)	101	Heavily Congested	103	Heavily Congested	29	42	13
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	City (NW)	101	Heavily Congested	104	Heavily Congested	46	79	33
9845	Anstey Ln/Bennion Rd	City (NW)	City (NW)	104	Heavily Congested	105	Heavily Congested	69	79	11
1318	Upperton Rd/Watkin Rd	City (SW)	City (SW)	148	Heavily Congested	152	Heavily Congested	142	154	11
7323	A6004/Forest Rd	Loughborough	Loughborough	102	Heavily Congested	107	Heavily Congested	82	165	83
60057	A6/Southfield Rd	Loughborough	Loughborough	104	Heavily Congested	106	Heavily Congested	90	101	11
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	101	Heavily Congested	108	Heavily Congested	82	124	42
60108	Woodgate/Pinfold Gate	Loughborough	Loughborough	105	Heavily Congested	108	Heavily Congested	157	246	90
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	102	Heavily Congested	117	Heavily Congested	53	111	58
60135	A60 Nottingham Rd/Queen's Rd	Loughborough	Loughborough	100	Heavily Congested	102	Heavily Congested	77	90	13
60186	A6004/Beacon Rd	Loughborough	Loughborough	100	Heavily Congested	101	Heavily Congested	28	43	15
61020	A6/Baxter Gate	Loughborough	Loughborough	103	Heavily Congested	109	Heavily Congested	60	95	35
69941	A60/Station Boulevard	Loughborough	Loughborough	107	Heavily Congested	108	Heavily Congested	137	152	14
73778	A6 (Bridge St)	Loughborough	Loughborough	100	Heavily Congested	105	Heavily Congested	38	77	39
50492	A453 (EMA Junction)	NW Leics	EMA	105	Heavily Congested	106	Heavily Congested	132	149	17
50523	M1/A42	NW Leics	EMA (M1)	105	Heavily Congested	107	Heavily Congested	54	87	32
50543	M1 Junction 24	NW Leics	M1 J24	102	Heavily Congested	105	Heavily Congested	50	74	24
50544	M1 Junction 24	NW Leics	M1 J24	104	Heavily Congested	104	Heavily Congested	144	164	21
76088	A453/Ashby Rd	NW Leics	Kegworth	109	Heavily Congested	110	Heavily Congested	132	159	27
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	101	Heavily Congested	101	Heavily Congested	92	115	22
60044	Barrow Rd/Bridge St	Rem. Charnwood	Barrow	101	Heavily Congested	103	Heavily Congested	70	96	26
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	100	Heavily Congested	49	76	27
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	106	Heavily Congested	118	Heavily Congested	208	433	225
60253	A6/Zouch Rd	Rem. Charnwood	Hathern	100	Heavily Congested	101	Heavily Congested	63	76	13
60362	A6/A6004	Rem. Charnwood	Quorn	106	Heavily Congested	116	Heavily Congested	54	136	83

Table 11-2: Junction Analysis, Option 6 (AM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_pm	co_pm_desc	36_opt6_pm	o6_pm_desc	core del	opt6 del	diff del
1748	A6/School Ln	Birstall	Birstall	83	Approaching Congestion	95	Congested			
7402	A6/Birstall Meadow Rd	Birstall	Birstall	93	Congested	100	Heavily Congested			
76061	A50/Gynsill Lane	Blaby	Glenfield	97	Congested	103	Heavily Congested			
1428	A6 (St Margaret's Way)	City (NE)	City (NE)	90	Congested	106	Heavily Congested			
2055	Catherine St/Gipsy Ln	City (NE)	City (NE)	82	Approaching Congestion	88	Congested			
9859	A563 (Glenfrith Way)	City (NW)	City (NW)	82	Approaching Congestion	88	Congested			
9953	A50/Heathley Park Drive	City (NW)	City (NW)	84	Approaching Congestion	90	Congested			
60098	The Coneries/Sparrow Hill	Loughborough	Loughborough	90	Congested	100	Heavily Congested			
60538	A6/Beeches Rd	Loughborough	Loughborough	80	Approaching Congestion	94	Congested			
60916	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	90	Congested			
60918	A6004/Forest Rd	Loughborough	Loughborough	84	Approaching Congestion	90	Congested			
60920	A6004/Forest Rd	Loughborough	Loughborough	84	Approaching Congestion	91	Congested			
65066	A6004/University Rd	Loughborough	Loughborough	80	Approaching Congestion	88	Congested			
65067	A6004 (Epinal Way)	Loughborough	Loughborough	92	Congested	101	Heavily Congested			
65070	A6004/Radmoor Rd	Loughborough	Loughborough	81	Approaching Congestion	88	Congested			
78902	Belton Rd	Loughborough	Loughborough	44	Uncongested	101	Heavily Congested			
78903	A6004/Gordon Rd	Loughborough	Loughborough	79	Approaching Congestion	94	Congested			
9631	A46/Leicester Rd	Rem. Charnwood	Anstey	90	Congested	103	Heavily Congested			
60123	A6004/Allendale Rd	Rem. Charnwood	Woodthorpe	84	Approaching Congestion	101	Heavily Congested			
73890	A6/Broadnook	Rem. Charnwood	Broadnook	79	Approaching Congestion	100	Heavily Congested			
73891	A6/Broadnook	Rem. Charnwood	Broadnook	21	Uncongested	106	Heavily Congested			
74116	A6004 (Terry Yardley Way)	Rem. Charnwood	Quorn	84	Approaching Congestion	92	Congested			
7306	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	94	Congested			
60454	M1 Junction 23	Shepshed	Shepshed	87	Congested	101	Heavily Congested			
76036	A512/Leicester Rd	Shepshed	Shepshed	81	Approaching Congestion	87	Congested			
76150	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	94	Congested			
2280	Fosse Way/High St	Syston	Syston	83	Approaching Congestion	100	Heavily Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	77	Approaching Congestion	102	Heavily Congested			
9007	A50/Fosse Rd N	City (NW)	City (NW)	101	Heavily Congested	102	Heavily Congested	36	51	15
49975	A511/Copt Oak Rd	Hinckley	Stanton-u-Bardon	100	Heavily Congested	101	Heavily Congested	46	59	13
7317	A512/A6004	Loughborough	Loughborough	101	Heavily Congested	102	Heavily Congested	56	67	11
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	103	Heavily Congested	103	Heavily Congested	104	121	18
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	101	Heavily Congested	101	Heavily Congested	31	46	15
60148	A6/A6004 (Alan Moss/Belton Rd)	Loughborough	Loughborough	100	Heavily Congested	101	Heavily Congested	67	79	12
61000	Forest Rd/Browns Ln	Loughborough	Loughborough	100	Heavily Congested	103	Heavily Congested	47	73	26
65097	A6 (Fennel St)/Bridge St	Loughborough	Loughborough	101	Heavily Congested	103	Heavily Congested	74	85	11
55053	A511 (Bardon Rd Quarry)	NW Leics	Bardon	102	Heavily Congested	107	Heavily Congested	22	33	11
76923	A60/A6006	Other	Rempstone	101	Heavily Congested	101	Heavily Congested	117	130	13
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	100	Heavily Congested	102	Heavily Congested	86	108	22
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	100	Heavily Congested	103	Heavily Congested	88	167	80
9385	Anstey Ln	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	61	24
9715	A46/Leicester Rd	Rem. Charnwood	Anstey	101	Heavily Congested	104	Heavily Congested	37	108	71
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	101	Heavily Congested	48	69	21
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	104	Heavily Congested	105	Heavily Congested	175	313	138
60362	A6/A6004	Rem. Charnwood	Quorn	101	Heavily Congested	104	Heavily Congested	26	52	26
2047	A46/Wanlip Rd	Syston	Syston	101	Heavily Congested	102	Heavily Congested	33	64	31

Table 11-3: Junction Analysis, Option 6 (PM Peak)

SELECT LINK ANALYSIS

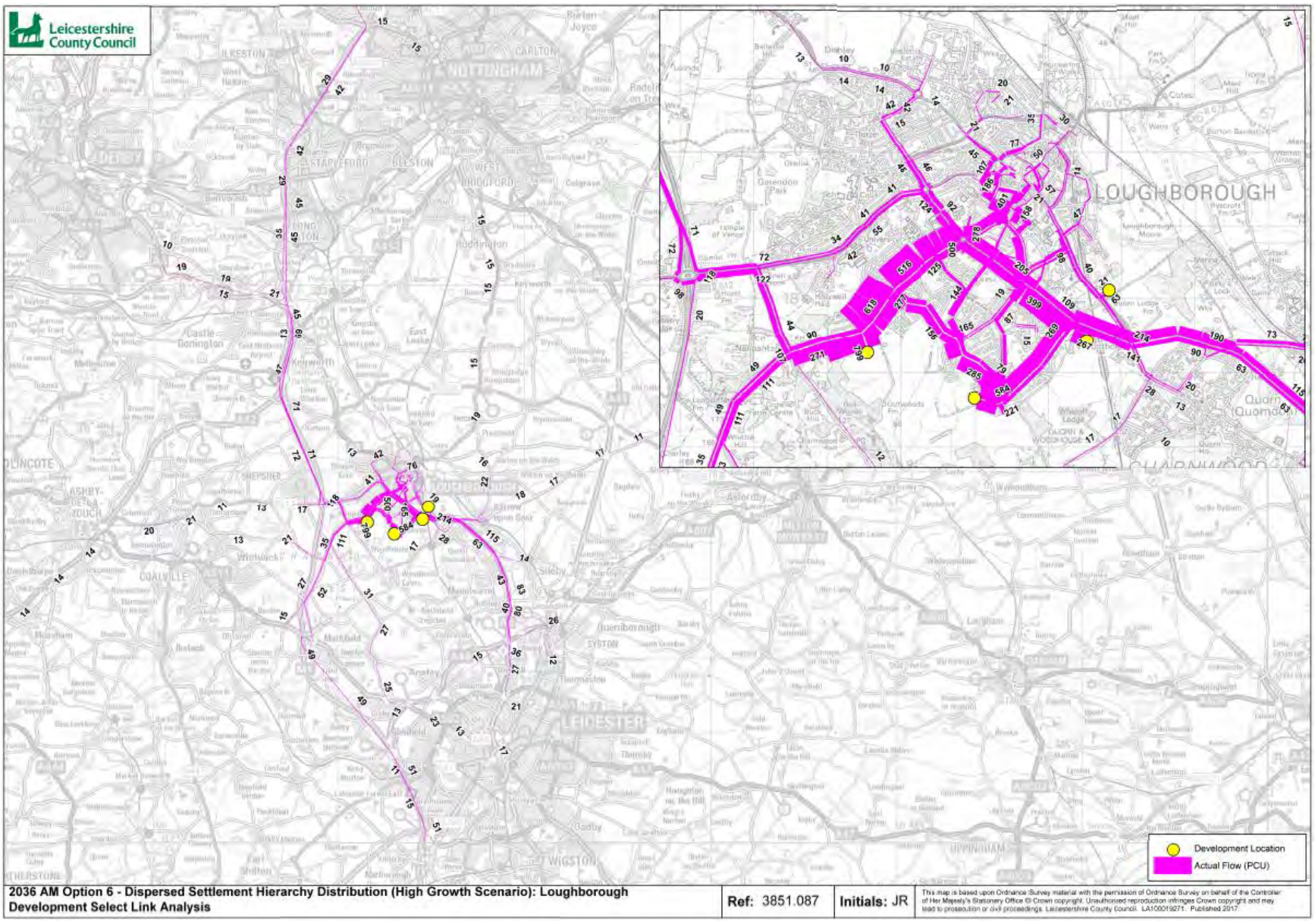


Figure 11-8: Select Link Analysis, Option 6 - Loughborough Development (AM Peak)

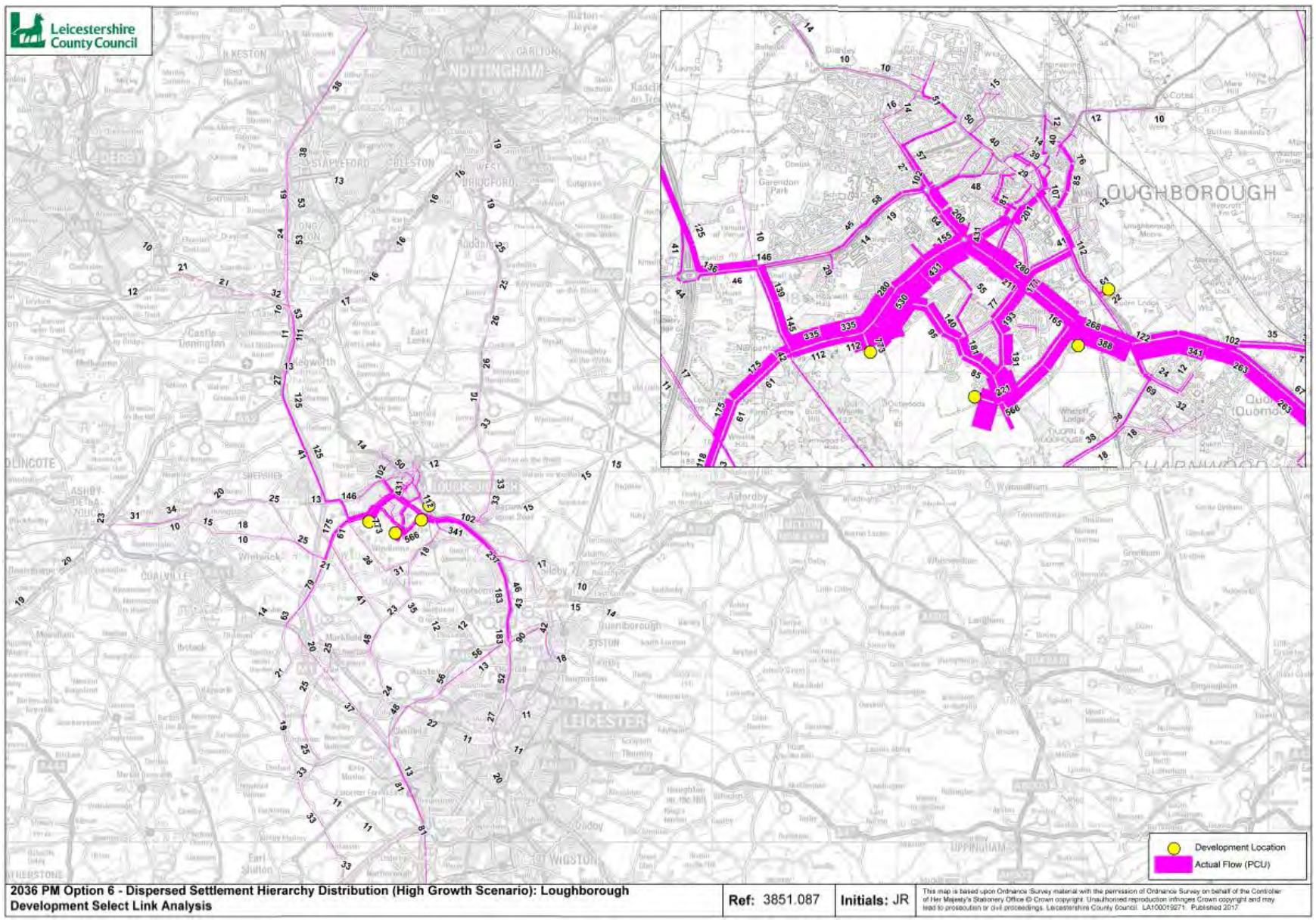


Figure 11-9: Select Link Analysis, Option 6 - Loughborough Development (PM Peak)

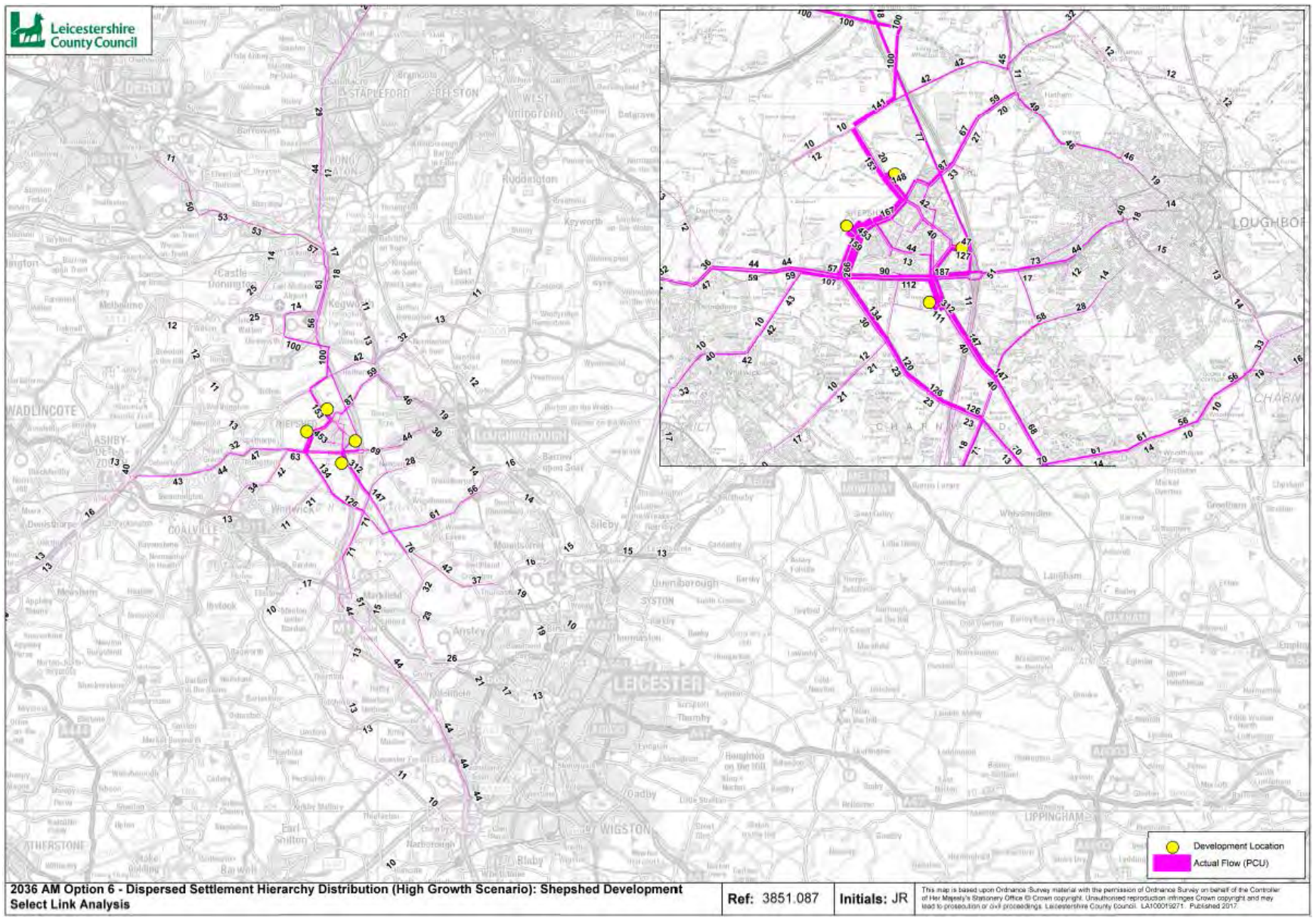


Figure 11-10: Select Link Analysis, Option 6 - Shepshed Development (AM Peak)

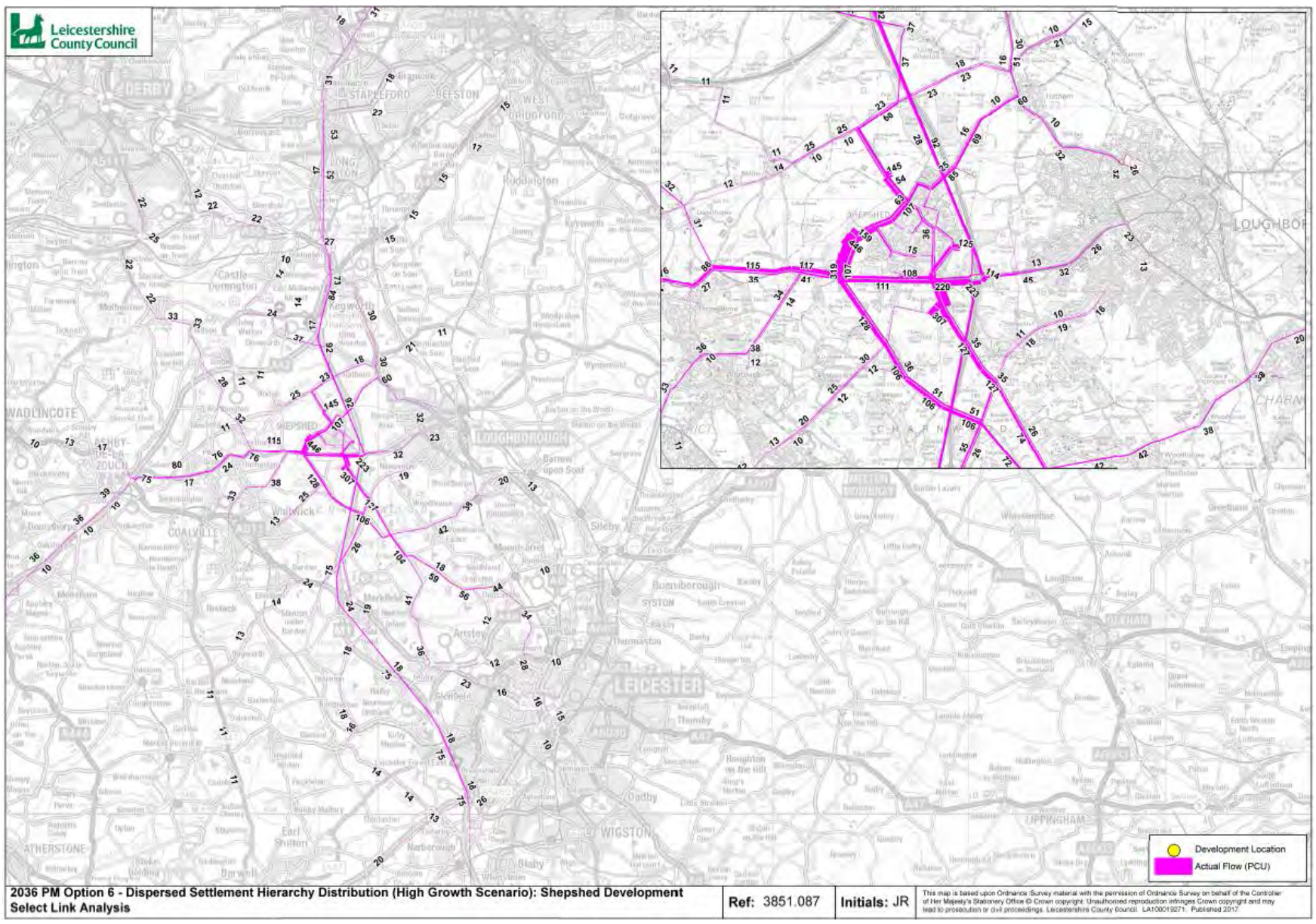


Figure 11-11: Select Link Analysis, Option 6 - Shepshed Development (PM Peak)

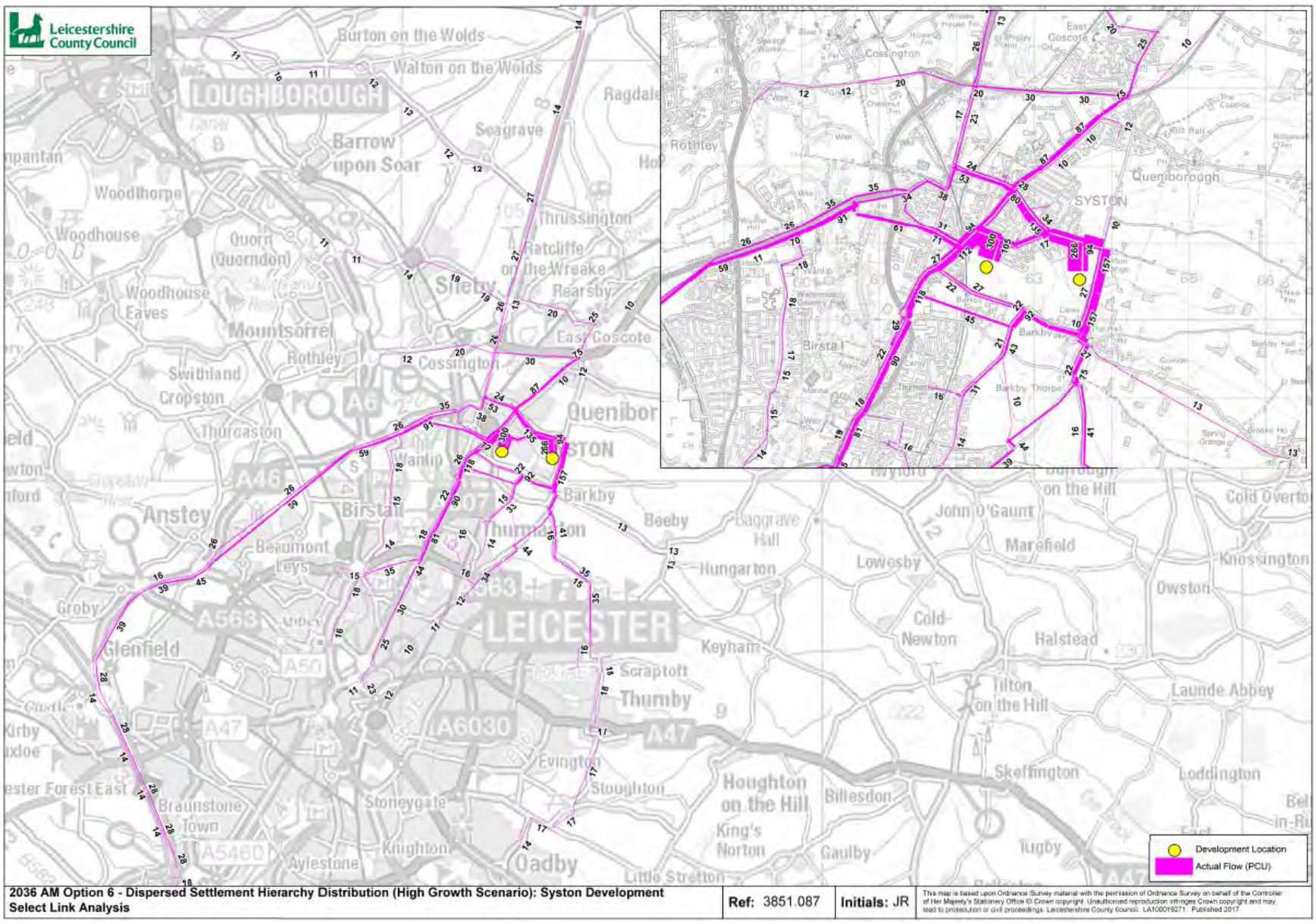


Figure 11-12: Select Link Analysis, Option 6 - Syston Development (AM Peak)

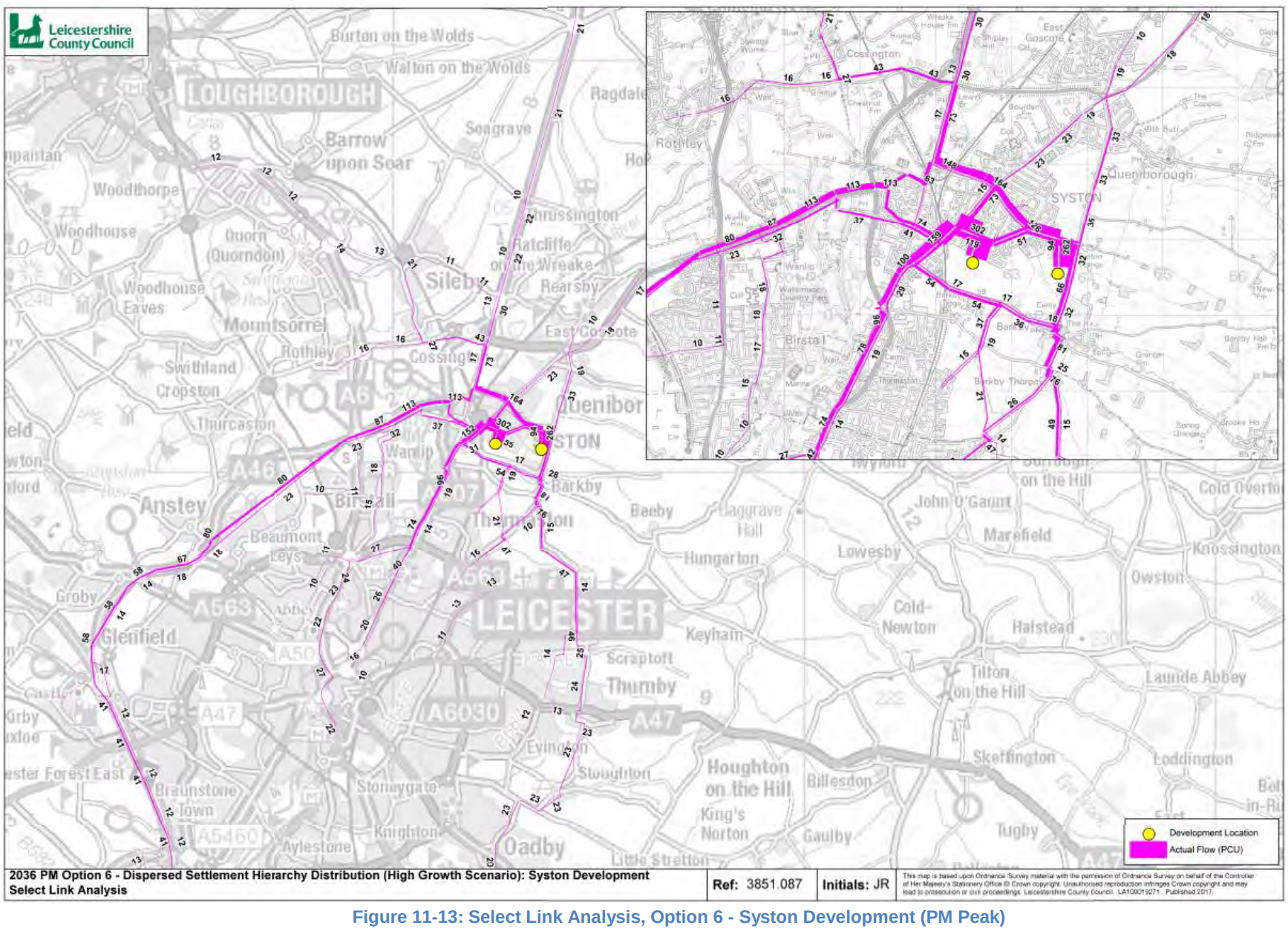


Figure 11-13: Select Link Analysis, Option 6 - Syston Development (PM Peak)

MATRIX SECTORING

Op6 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	960	50	13			184	31	22	16	16	11	13	11	36	28	103	24	314
Shepshed	130	306				81	12	15						35	26	212		225
Syston	21		172	70	11	113	63	161	34	18	28	26		39	18		17	74
Thurmaston			31	23		24	17	32	11					16				25
Birstall			13	10	20	19		12										11
Rem. Charnwood	272	29	108	38	35	566	133	126	70	70	56	25	53	139	67	117	112	338
City (NW)																		
City (NE)			14															
City (SE)			12															
City (SW)																		
City (Centre)																		
Oadby																		
Harborough																		
Blaby																		
Hinckley																		
NW Leics		19																
Melton																		
Other																		

Table 11-4: Highlight Matrix of all Sectored Trips, Option 6 AM Peak minus Core AM Peak (>10 Trips only)

Op6 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	693	74	26			268												
Shepshed	44	268				26										19		22
Syston	19		170	32	15	88		14										
Thurmaston	14		44	27		28												
Birstall	10		16			33												
Rem. Charnwood	200	61	109	18	15	423	13											
City (NW)	31	16	46	11		122												
City (NE)	41	19	104	23	17	111												
City (SE)	26		31			69												
City (SW)	16		39			63												
City (Centre)	16		34			62												
Oadby			33			24												
Harborough	43		15			51												
Blaby	41	50	43	12		134												
Hinckley	24	34	18			61												
NW Leics	100	205	12			135												
Melton	19		28			103												
Other	405	274	94	30	14	460												

Table 11-5: Highlight Matrix of all Sectored Trips, Option 6 PM Peak minus Core PM Peak (>10 Trips only)

12. Results: Option 7 – Urban Concentration and New Settlement (High Growth)

12.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,900	Majority of available sites (total 3,346) including a large site at Syston (1,200 homes, south of Syston) and plus a large site at Thurcaston (600 homes north east of Thurcaston)
Loughborough	3,300	Majority of available sites (total 5,154) includes large sites at South (1,000) and South West of Loughborough (1,500)
Shepshed	2,600	Majority of available sites (total 2,686) including large site west of Shepshed.
Anstey	950	A mix of small and medium sized sites, a total of 4,400 homes at the Service Centres
Barrow Upon Soar	900	
Mountsorrel	100	
Quorn	700	
Rothley	850	
Sileby	900	
Cotes New Settlement	1,500	
Total	**15,700**	

Table 12-1: Option 7 Development Assumptions (provided by Charnwood Borough Council)

12.1.1. The above assumptions were assigned to loading points as per Figure 12-1.

12.2. Modelling Outputs

12.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 12-2, Figure 12-3)
- Delay Difference Plots (Figure 12-4, Figure 12-5)
- Junction Analysis (Figure 12-6, Figure 12-7, Table 12-2, Table 12-3)
- Select Link Analysis:
  - Cotes (Figure 12-8, Figure 12-9)
  - Loughborough (Figure 12-10, Figure 12-11)
  - Shepshed (Figure 12-12, Figure 12-13)
  - Syston (Figure 12-14, Figure 12-15)
  - Thurcaston (Figure 12-16, Figure 12-17)
- Matrix Sectoring (Table 12-4, Table 12-5)

Project Reference: 3851.087

ZONAL LOADING

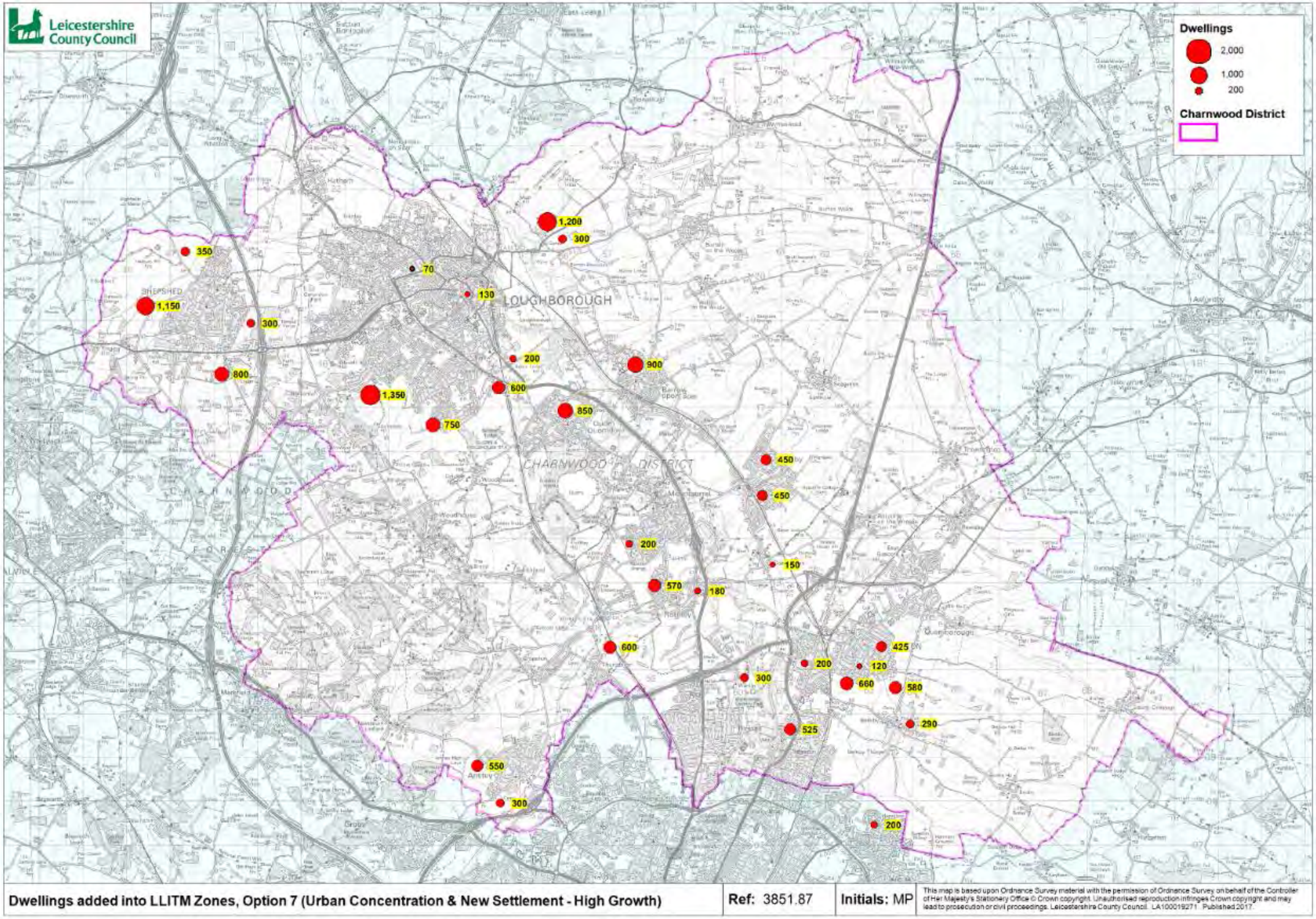


Figure 12-1: Spatial Dwelling Distribution of Modelled Scenario, Option 7

FLOW DIFFERENCE

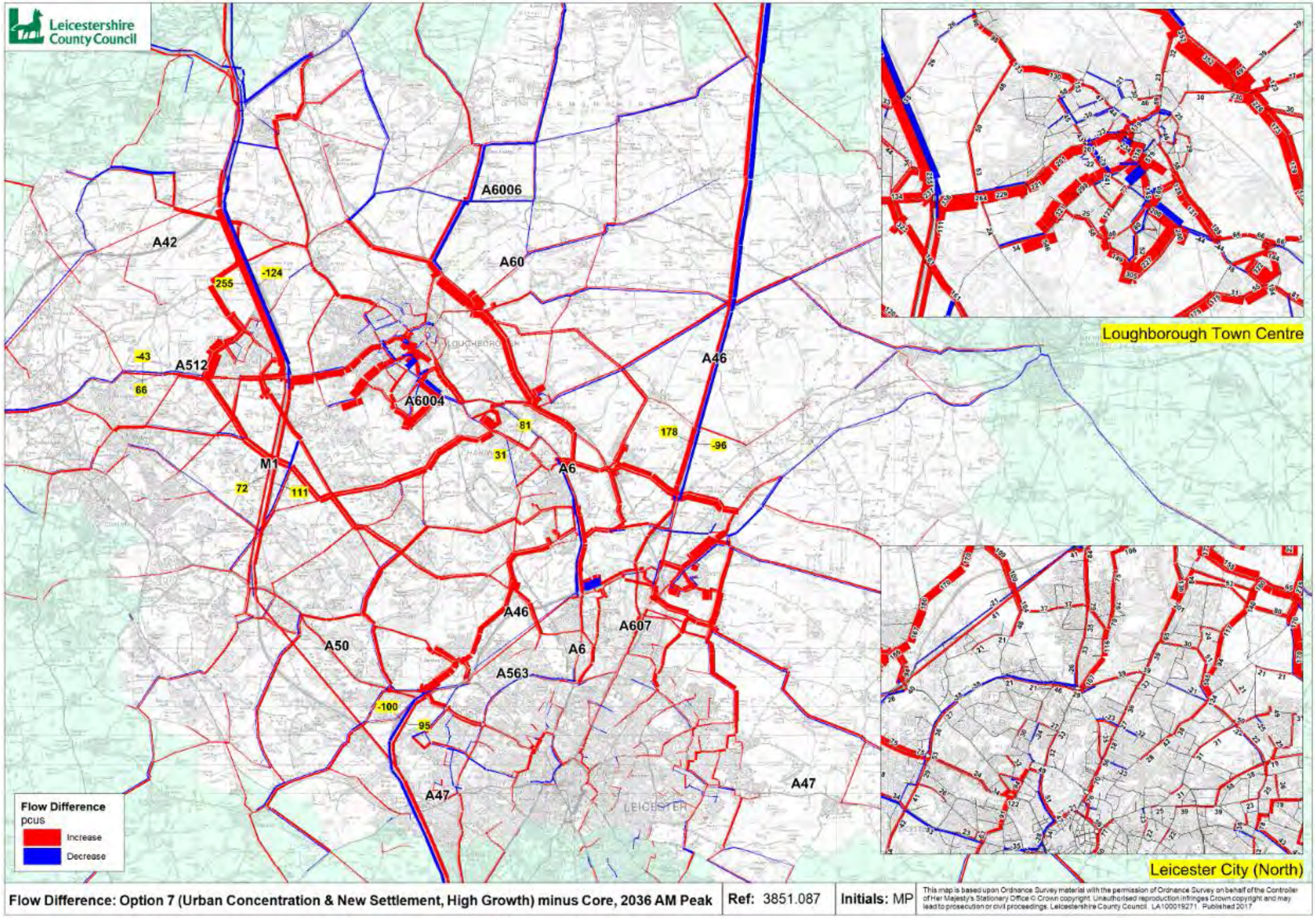


Figure 12-2: Flow Difference Plot, Option 7 (AM Peak)

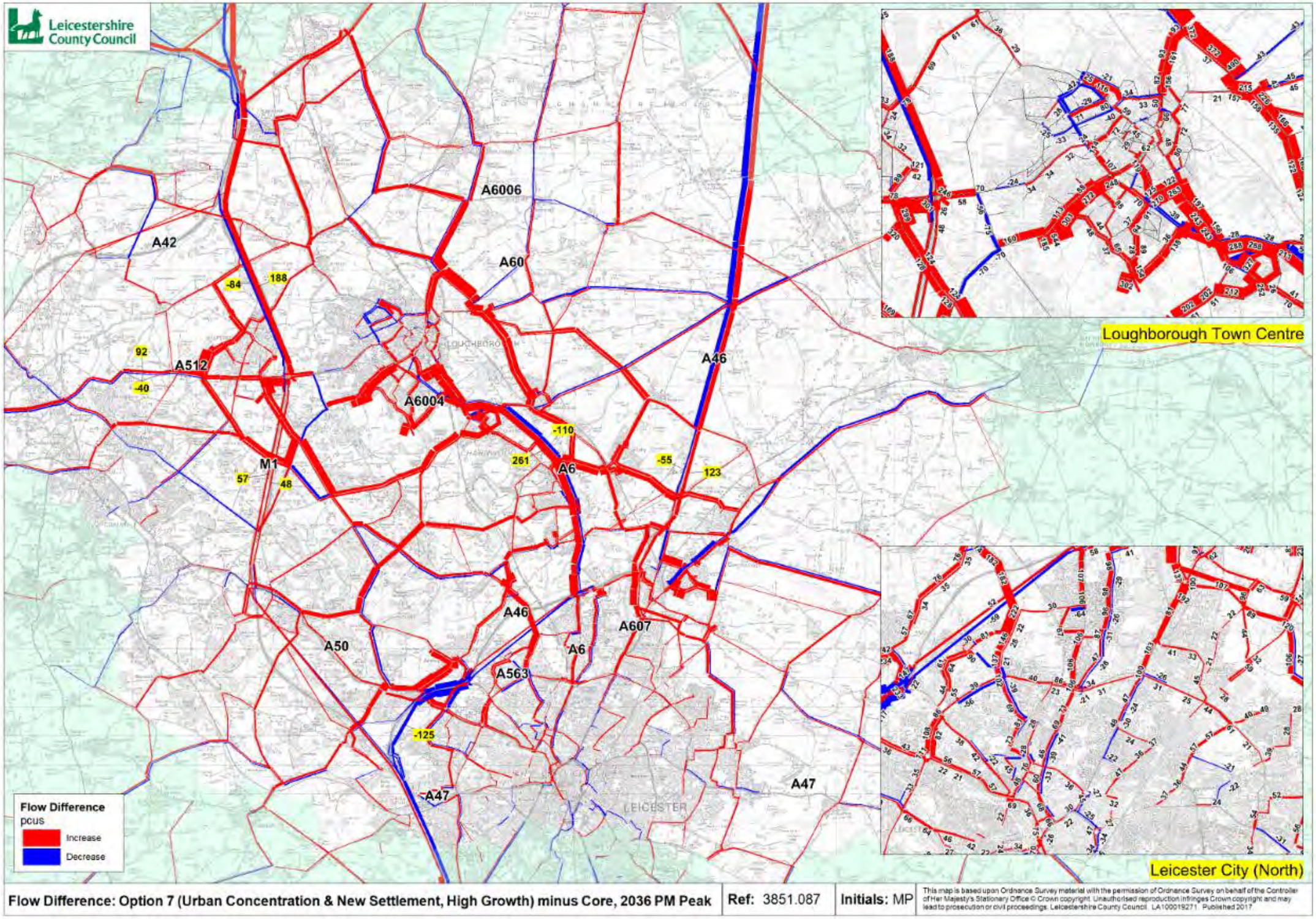


Figure 12-3: Flow Difference Plot, Option 7 (PM Peak)

Project Reference: 3851.087

DELAY DIFFERENCE

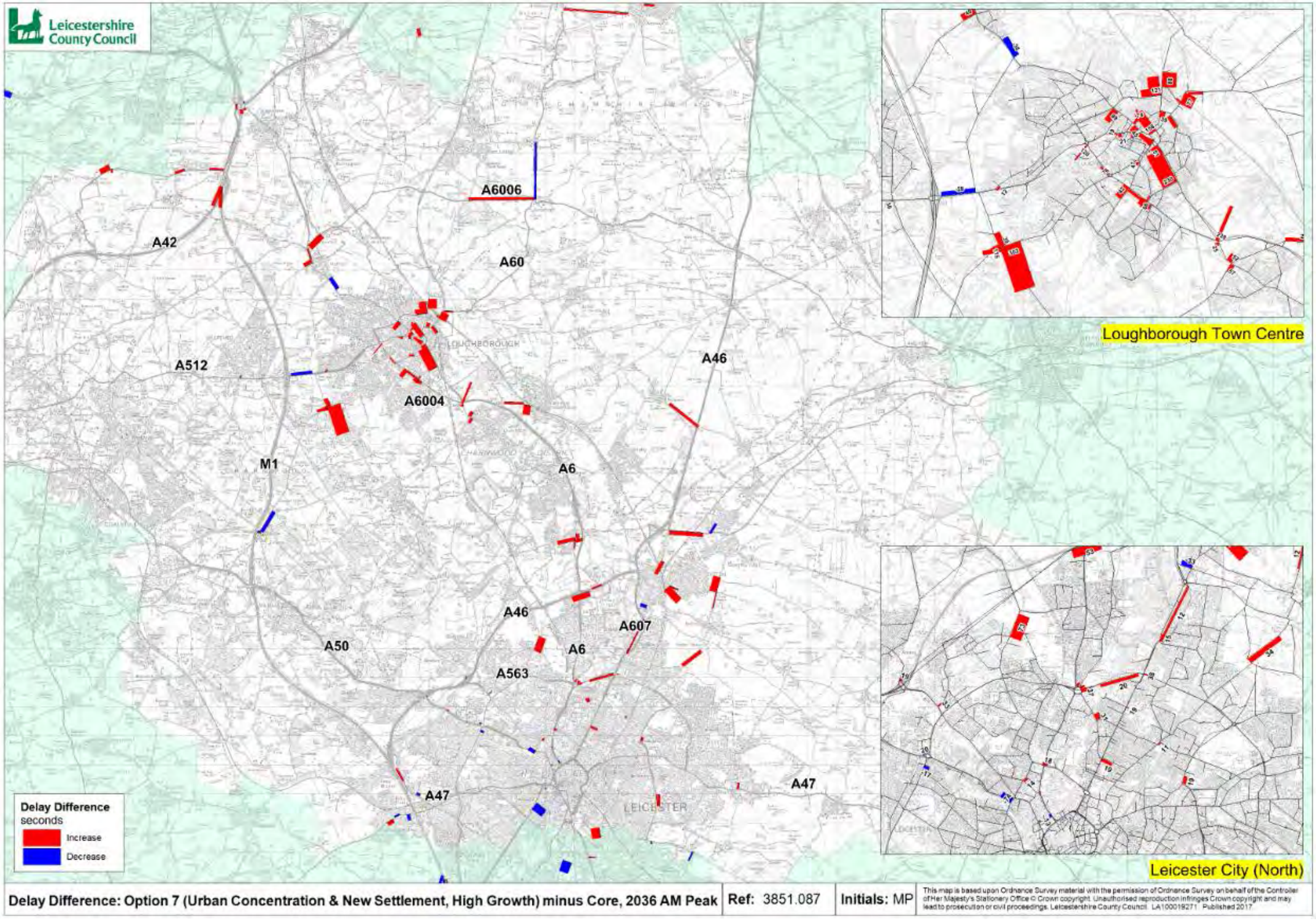


Figure 12-4: Delay Difference Plot, Option 7 (AM Peak)

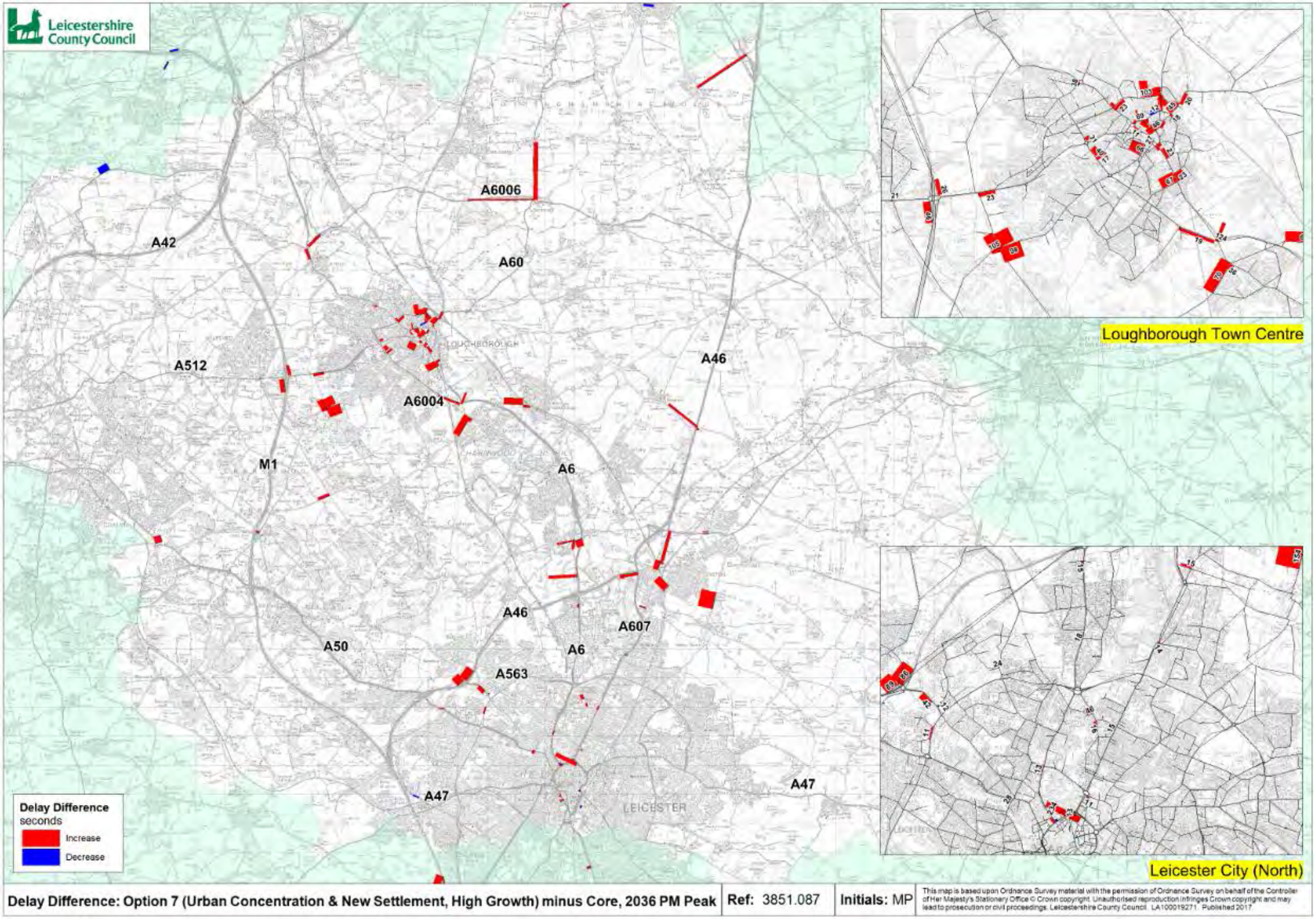


Figure 12-5: Delay Difference Plot, Option 7 (PM Peak)

JUNCTION PERFORMANCE

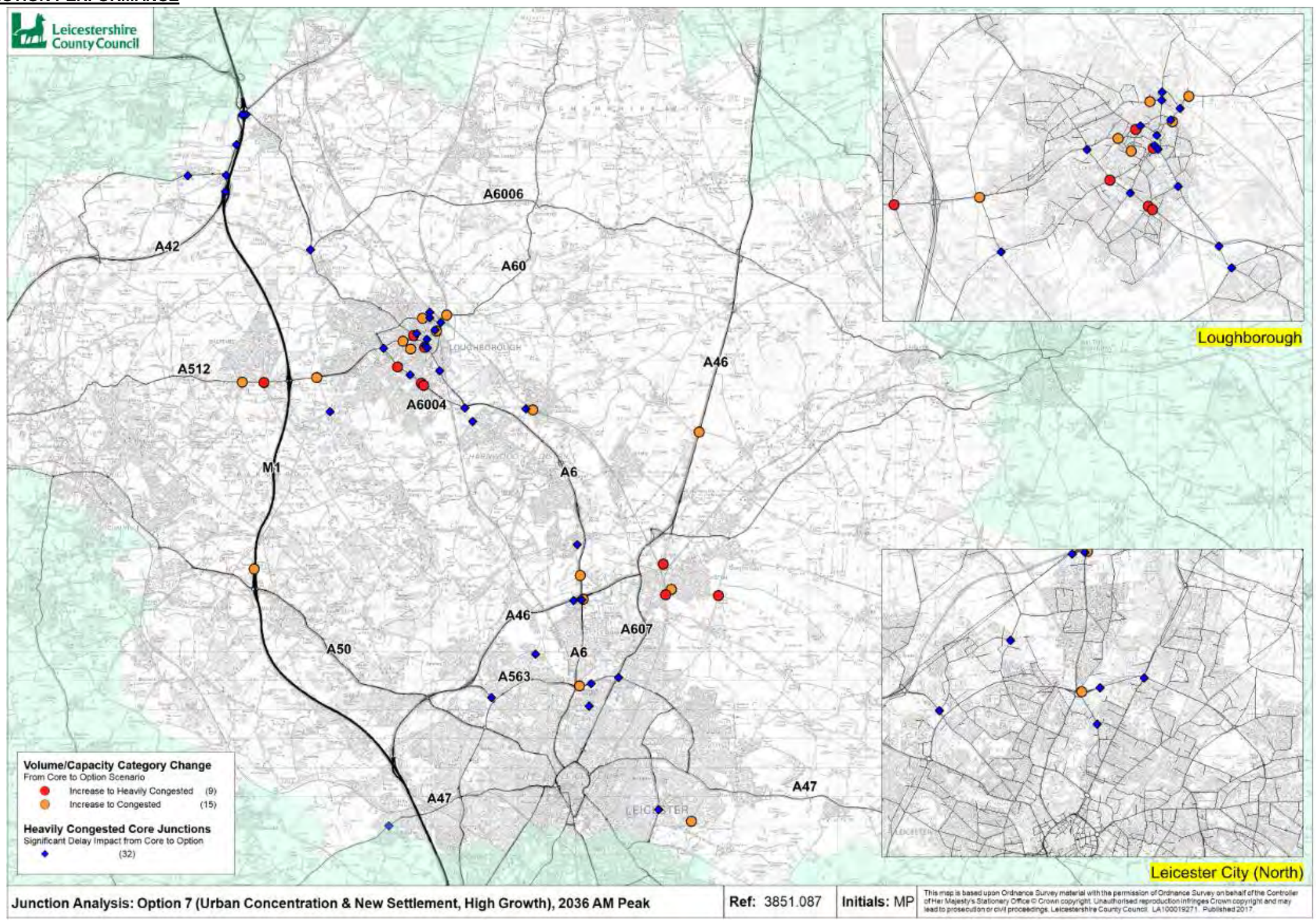


Figure 12-6: Junction Analysis, Option 7 (AM Peak)

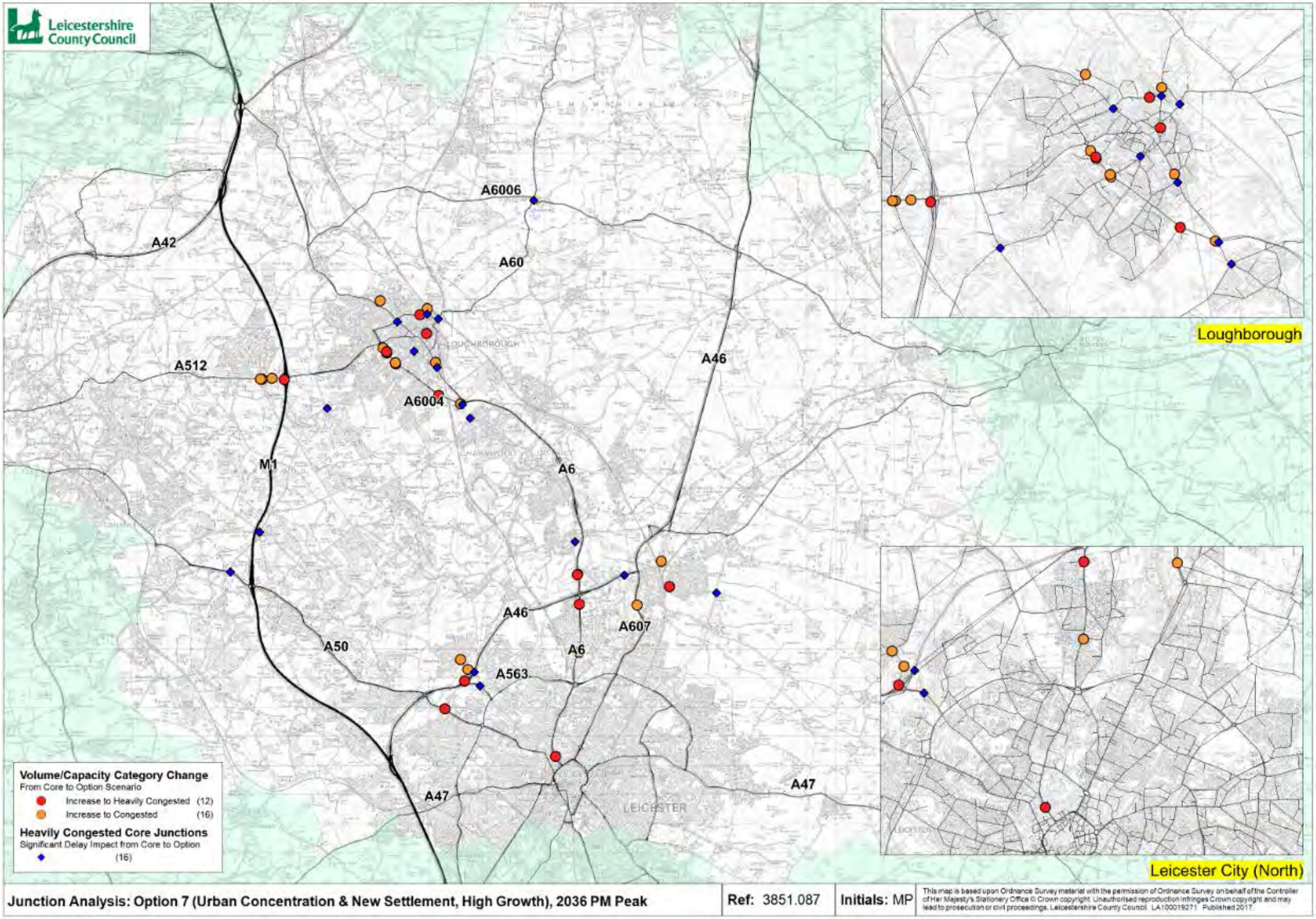


Figure 12-7: Junction Analysis, Option 7 (PM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_am	co_am_desc	36_opt7_am	o7_am_desc	core del	opt7 del	diff del
1778	A46/A6	Birstall	Birstall	39	Uncongested	94	Congested			
1706	Red Hill Circle	City (NE)	City (NE)	73	Uncongested	97	Congested			
2412	Main St/Biggin Hill Rd	City (SE)	City (SE)	82	Approaching Congestion	91	Congested			
40470	M1 Junction 22	Hinckley	M1 J22	81	Approaching Congestion	87	Congested			
7304	Frederick St/Arthur St	Loughborough	Loughborough	81	Approaching Congestion	90	Congested			
60002	A6004 (Ling Rd)	Loughborough	Loughborough	95	Congested	102	Heavily Congested			
60062	A6/The Rushes	Loughborough	Loughborough	90	Congested	101	Heavily Congested			
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	Loughborough	89	Congested	101	Heavily Congested			
60289	A60/Brush	Loughborough	Loughborough	79	Approaching Congestion	94	Congested			
60922	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	102	Heavily Congested			
61009	Woodgate/Pack Horse Ln	Loughborough	Loughborough	15	Uncongested	101	Heavily Congested			
65071	A512/Radmoor Rd	Loughborough	Loughborough	84	Approaching Congestion	93	Congested			
73775	Queen's Rd/Salisbury St	Loughborough	Loughborough	29	Uncongested	89	Congested			
78902	Belton Rd	Loughborough	Loughborough	48	Uncongested	97	Congested			
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	86	Congested	102	Heavily Congested			
60115	Bridge St/High St	Rem. Charnwood	Barrow	55	Uncongested	87	Congested			
60252	A46/Seagrave Rd	Rem. Charnwood	Seagrave	72	Uncongested	85	Congested			
60358	A512/Snell's Nook Ln	Rem. Charnwood	Nanpantan	70	Uncongested	87	Congested			
73889	A6/Broadnook	Rem. Charnwood	Broadnook	84	Approaching Congestion	94	Congested			
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	Shepshed	77	Approaching Congestion	89	Congested			
60095	A512/Ingleberry Rd	Shepshed	Shepshed	95	Congested	103	Heavily Congested			
2280	Fosse Way/High St	Syston	Syston	64	Uncongested	103	Heavily Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	50	Uncongested	96	Congested			
78892	Melton Rd/Wanlip Rd	Syston	Syston	98	Congested	104	Heavily Congested			
1607	A46/A6	Birstall	Birstall	102	Heavily Congested	104	Heavily Congested	54	89	35
1753	A46/A6	Birstall	Birstall	101	Heavily Congested	101	Heavily Congested	45	56	11
73335	A47/Warren Ln	Blaby	LFE	100	Heavily Congested	101	Heavily Congested	26	50	24
2011	A563/A607	City (NE)	City (NE)	101	Heavily Congested	103	Heavily Congested	79	92	13
2751	Loughborough Rd/Checketts Rd	City (NE)	City (NE)	101	Heavily Congested	101	Heavily Congested	56	70	14
9734	Watermead Way	City (NE)	City (NE)	101	Heavily Congested	102	Heavily Congested	29	42	13
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	City (NW)	101	Heavily Congested	105	Heavily Congested	46	95	49
9845	Anstey Ln/Bennion Rd	City (NW)	City (NW)	104	Heavily Congested	105	Heavily Congested	69	81	13
2268	Wakerley Rd/Ethel Rd	City (SE)	City (SE)	102	Heavily Congested	102	Heavily Congested	68	79	11
7323	A6004/Forest Rd	Loughborough	Loughborough	102	Heavily Congested	106	Heavily Congested	82	149	67
60057	A6/Southfield Rd	Loughborough	Loughborough	104	Heavily Congested	107	Heavily Congested	90	109	19
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	101	Heavily Congested	107	Heavily Congested	82	120	37
60108	Woodgate/Pinfold Gate	Loughborough	Loughborough	105	Heavily Congested	110	Heavily Congested	157	247	90
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	102	Heavily Congested	114	Heavily Congested	53	97	44
60135	A60 Nottingham Rd/Queen's Rd	Loughborough	Loughborough	100	Heavily Congested	102	Heavily Congested	77	92	14
60186	A6004/Beacon Rd	Loughborough	Loughborough	100	Heavily Congested	102	Heavily Congested	28	43	15
61020	A6/Baxter Gate	Loughborough	Loughborough	103	Heavily Congested	109	Heavily Congested	60	94	34
69941	A60/Station Boulevard	Loughborough	Loughborough	107	Heavily Congested	110	Heavily Congested	137	188	51
73778	A6 (Bridge St)	Loughborough	Loughborough	100	Heavily Congested	105	Heavily Congested	38	77	39
78903	A6004/Gordon Rd	Loughborough	Loughborough	103	Heavily Congested	108	Heavily Congested	88	123	35
50312	East Midlands Airport	NW Leics	EMA	101	Heavily Congested	101	Heavily Congested	46	62	17
50492	A453 (EMA Junction)	NW Leics	EMA	105	Heavily Congested	106	Heavily Congested	132	145	13
50523	M1/A42	NW Leics	EMA (M1)	105	Heavily Congested	107	Heavily Congested	54	85	30
50543	M1 Junction 24	NW Leics	M1 J24	102	Heavily Congested	105	Heavily Congested	50	69	19
50544	M1 Junction 24	NW Leics	M1 J24	104	Heavily Congested	104	Heavily Congested	144	166	22
76088	A453/Ashby Rd	NW Leics	Kegworth	109	Heavily Congested	109	Heavily Congested	132	158	26
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	101	Heavily Congested	101	Heavily Congested	92	118	26
60044	Barrow Rd/Bridge St	Rem. Charnwood	Barrow	101	Heavily Congested	106	Heavily Congested	70	128	58
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	101	Heavily Congested	49	72	23
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	106	Heavily Congested	114	Heavily Congested	208	368	161
60253	A6/Zouch Rd	Rem. Charnwood	Hathern	100	Heavily Congested	103	Heavily Congested	63	84	22
60362	A6/A6004	Rem. Charnwood	Quorn	106	Heavily Congested	114	Heavily Congested	54	116	63

Table 12-2: Junction Analysis, Option 7 (AM Peak)

Bnode	Junction	Sector	Area	Volume/Capacity (%)				Delay per PCU (secs)		
				36_core_pm	co_pm_desc	36_opt7_pm	o7_pm_desc	core del	opt7 del	diff del
1748	A6/School Ln	Birstall	Birstall	83	Approaching Congestion	95	Congested			
7402	A6/Birstall Meadow Rd	Birstall	Birstall	93	Congested	100	Heavily Congested			
76061	A50/Gynsill Lane	Blaby	Glenfield	97	Congested	103	Heavily Congested			
1428	A6 (St Margaret's Way)	City (NE)	City (NE)	90	Congested	111	Heavily Congested			
60098	The Coneries/Sparrow Hill	Loughborough	Loughborough	90	Congested	101	Heavily Congested			
60538	A6/Beeches Rd	Loughborough	Loughborough	80	Approaching Congestion	92	Congested			
60916	A6004/Forest Rd	Loughborough	Loughborough	83	Approaching Congestion	90	Congested			
60920	A6004/Forest Rd	Loughborough	Loughborough	84	Approaching Congestion	92	Congested			
65066	A6004/University Rd	Loughborough	Loughborough	80	Approaching Congestion	87	Congested			
65067	A6004 (Epinal Way)	Loughborough	Loughborough	92	Congested	100	Heavily Congested			
65070	A6004/Radmoor Rd	Loughborough	Loughborough	81	Approaching Congestion	88	Congested			
69936	Bishop Meadow Rd/Weldon Rd	Loughborough	Loughborough	82	Approaching Congestion	88	Congested			
78902	Belton Rd	Loughborough	Loughborough	44	Uncongested	102	Heavily Congested			
78903	A6004/Gordon Rd	Loughborough	Loughborough	79	Approaching Congestion	98	Congested			
9631	A46/Leicester Rd	Rem. Charnwood	Anstey	90	Congested	102	Heavily Congested			
9660	Leicester Rd	Rem. Charnwood	Anstey	79	Approaching Congestion	85	Congested			
60123	A6004/Allendale Rd	Rem. Charnwood	Woodthorpe	84	Approaching Congestion	100	Heavily Congested			
72051	The Nook	Rem. Charnwood	Anstey	74	Uncongested	87	Congested			
73890	A6/Broadnook	Rem. Charnwood	Broadnook	79	Approaching Congestion	100	Heavily Congested			
73891	A6/Broadnook	Rem. Charnwood	Broadnook	21	Uncongested	110	Heavily Congested			
74116	A6004 (Terry Yardley Way)	Rem. Charnwood	Quorn	84	Approaching Congestion	92	Congested			
7306	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	94	Congested			
60454	M1 Junction 23	Shepshed	Shepshed	87	Congested	100	Heavily Congested			
76036	A512/Leicester Rd	Shepshed	Shepshed	81	Approaching Congestion	87	Congested			
76150	A512 (Ashby Rd E)	Shepshed	Shepshed	77	Approaching Congestion	94	Congested			
2280	Fosse Way/High St	Syston	Syston	83	Approaching Congestion	97	Congested			
7041	Melton Rd/Goode's Ln	Syston	Syston	77	Approaching Congestion	102	Heavily Congested			
76033	A607	Thurmaston	Thurmaston	83	Approaching Congestion	89	Congested			
49975	A511/Copt Oak Rd	Hinckley	Stanton-u-Bardon	100	Heavily Congested	101	Heavily Congested	46	61	15
60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	103	Heavily Congested	103	Heavily Congested	104	124	20
60126	A6/Shelthorpe Rd	Loughborough	Loughborough	101	Heavily Congested	101	Heavily Congested	31	50	19
60148	A6/A6004 (Alan Moss/Belton Rd)	Loughborough	Loughborough	100	Heavily Congested	101	Heavily Congested	67	81	14
61000	Forest Rd/Browns Ln	Loughborough	Loughborough	100	Heavily Congested	102	Heavily Congested	47	67	20
69941	A60/Station Boulevard	Loughborough	Loughborough	100	Heavily Congested	101	Heavily Congested	60	85	25
50304	Copt Oak Rd/Warren Hills Rd	NW Leics	Copt Oak	101	Heavily Congested	101	Heavily Congested	58	69	11
76923	A60/A6006	Other	Rempstone	101	Heavily Congested	102	Heavily Congested	117	132	16
1669	A6/Hallfields Ln/Cossington Ln	Rem. Charnwood	Rothley	100	Heavily Congested	102	Heavily Congested	86	114	28
2508	Queniborough Rd/Barkby Rd	Rem. Charnwood	Queniborough	100	Heavily Congested	103	Heavily Congested	88	155	68
9385	Anstey Ln	Rem. Charnwood	Anstey	101	Heavily Congested	102	Heavily Congested	37	61	24
9715	A46/Leicester Rd	Rem. Charnwood	Anstey	101	Heavily Congested	103	Heavily Congested	37	100	63
60195	Loughborough Rd/Woodhouse Rd	Rem. Charnwood	Quorn	101	Heavily Congested	101	Heavily Congested	48	68	20
60198	Nanpantan Rd/Snell's Nook Ln	Rem. Charnwood	Nanpantan	104	Heavily Congested	106	Heavily Congested	175	271	96
60362	A6/A6004	Rem. Charnwood	Quorn	101	Heavily Congested	105	Heavily Congested	26	58	32
2047	A46/Wanlip Rd	Syston	Syston	101	Heavily Congested	102	Heavily Congested	33	65	32

Table 12-3: Junction Analysis, Option 7 (PM Peak)

SELECT LINK ANALYSIS

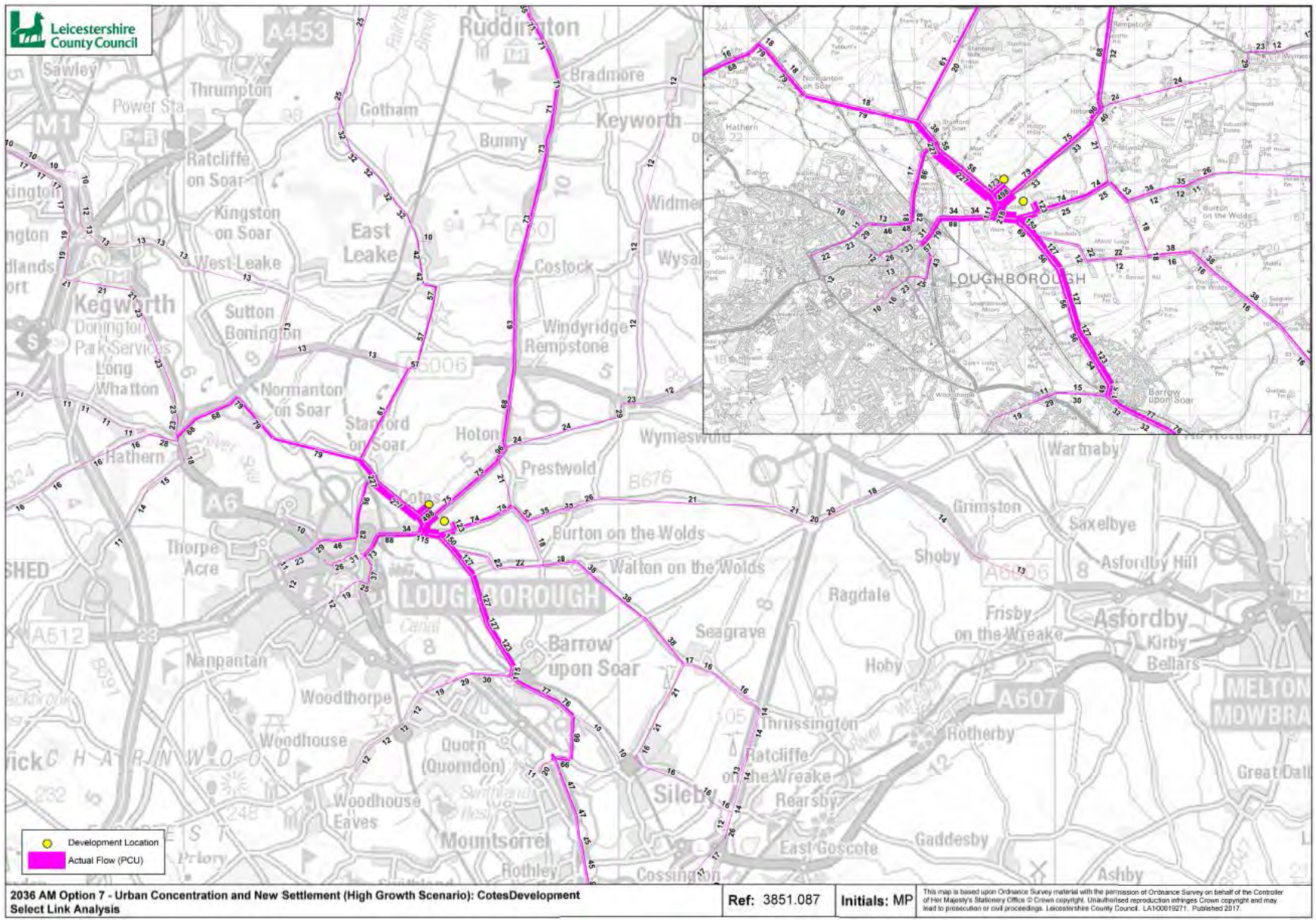


Figure 12-8: Select Link Analysis, Option 7 - Cotes Development (AM Peak)

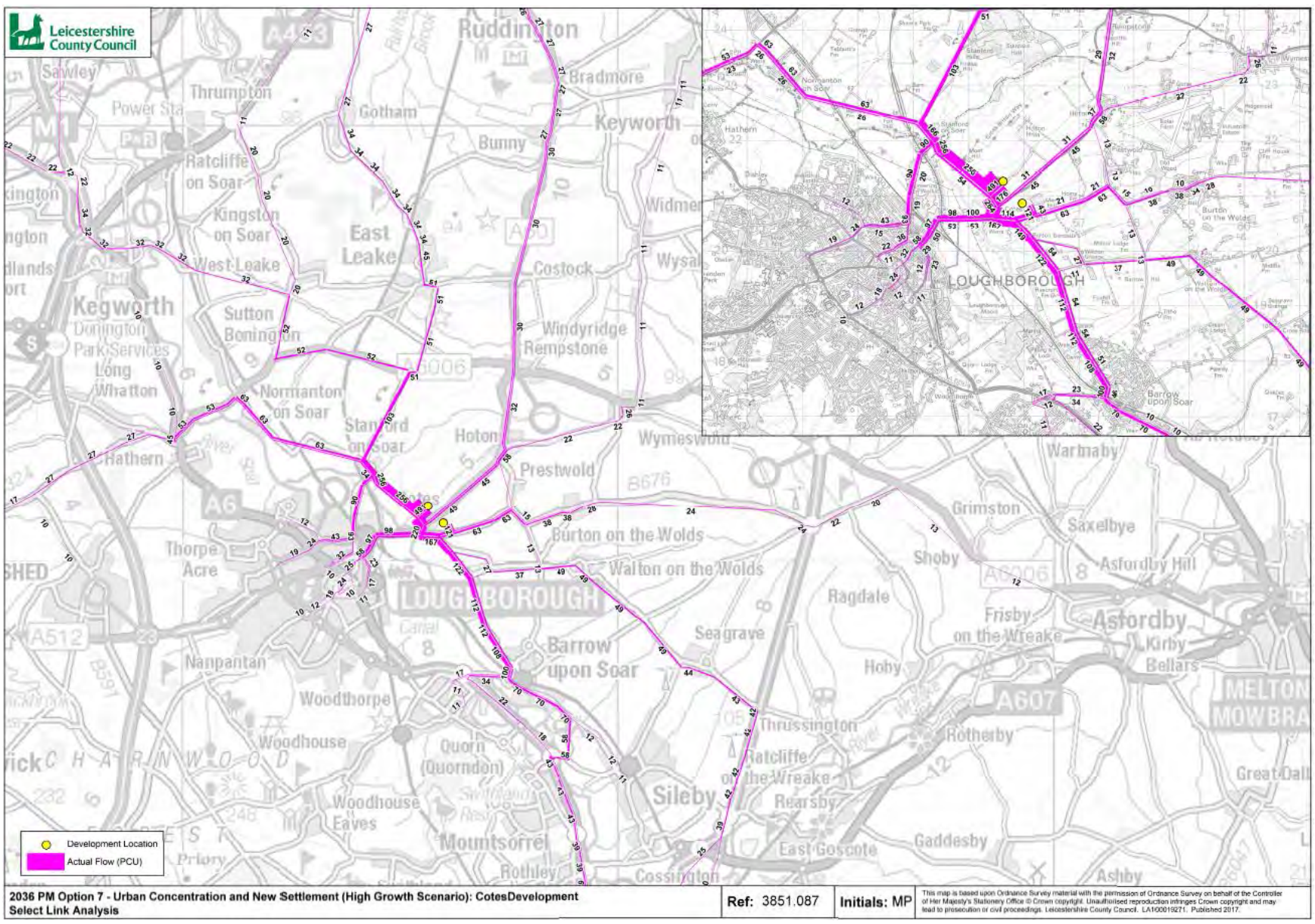


Figure 12-9: Select Link Analysis, Option 7 – Cotes Development (PM Peak)

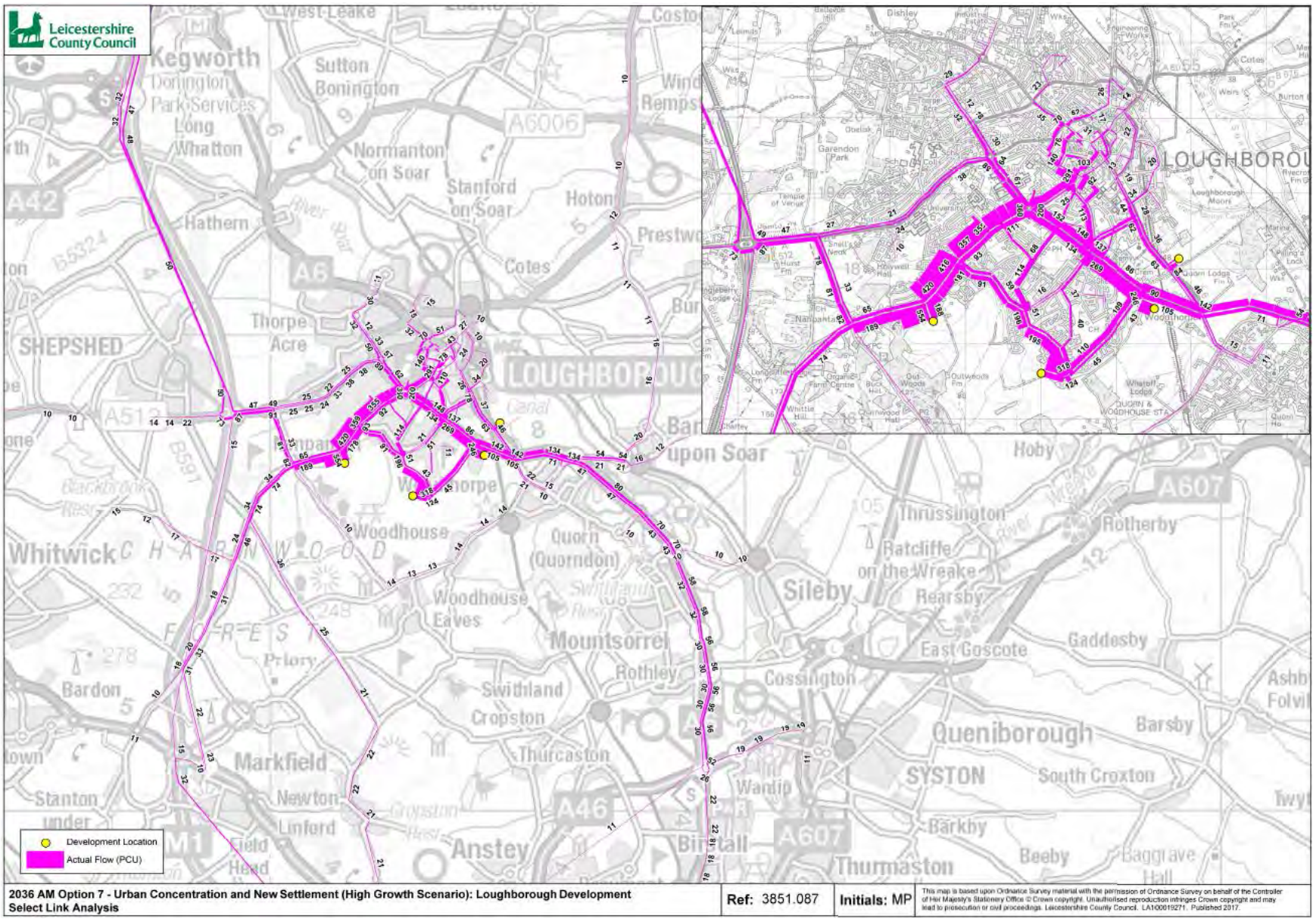


Figure 12-10: Select Link Analysis, Option 7 - Loughborough Development (AM Peak)

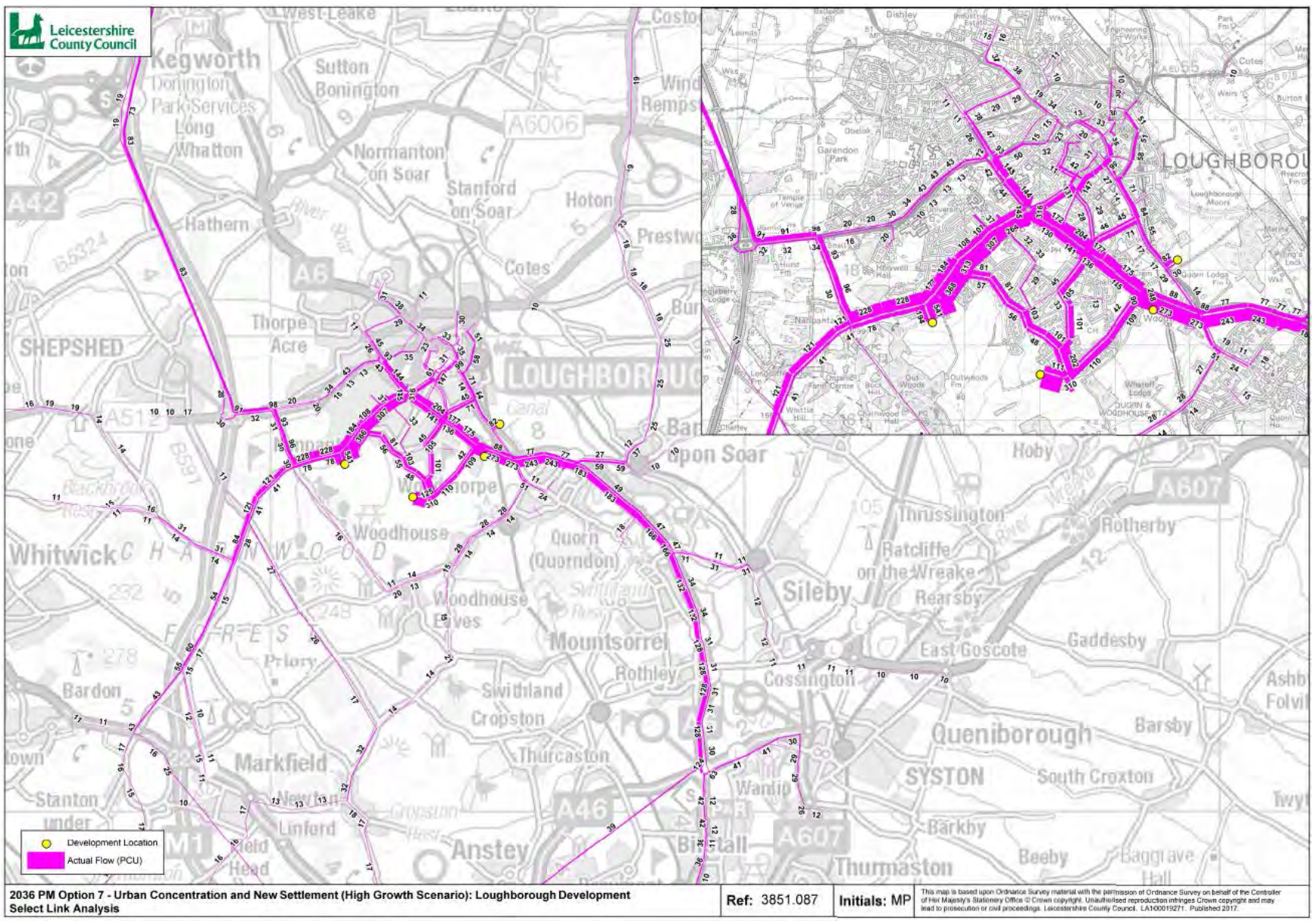


Figure 12-11: Select Link Analysis, Option 7 - Loughborough Development (PM Peak)

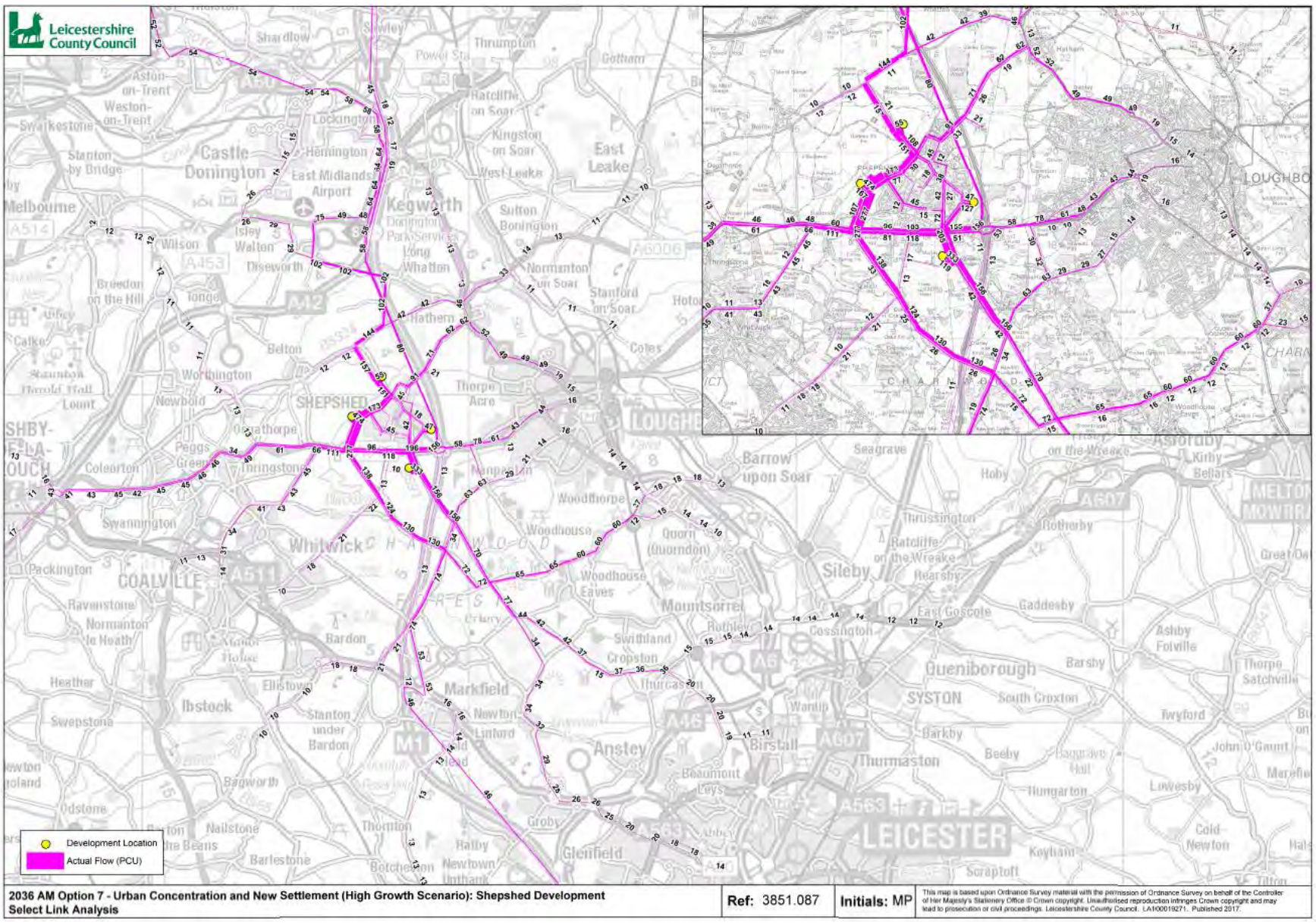


Figure 12-12: Select Link Analysis, Option 7 - Shepshed Development (AM Peak)

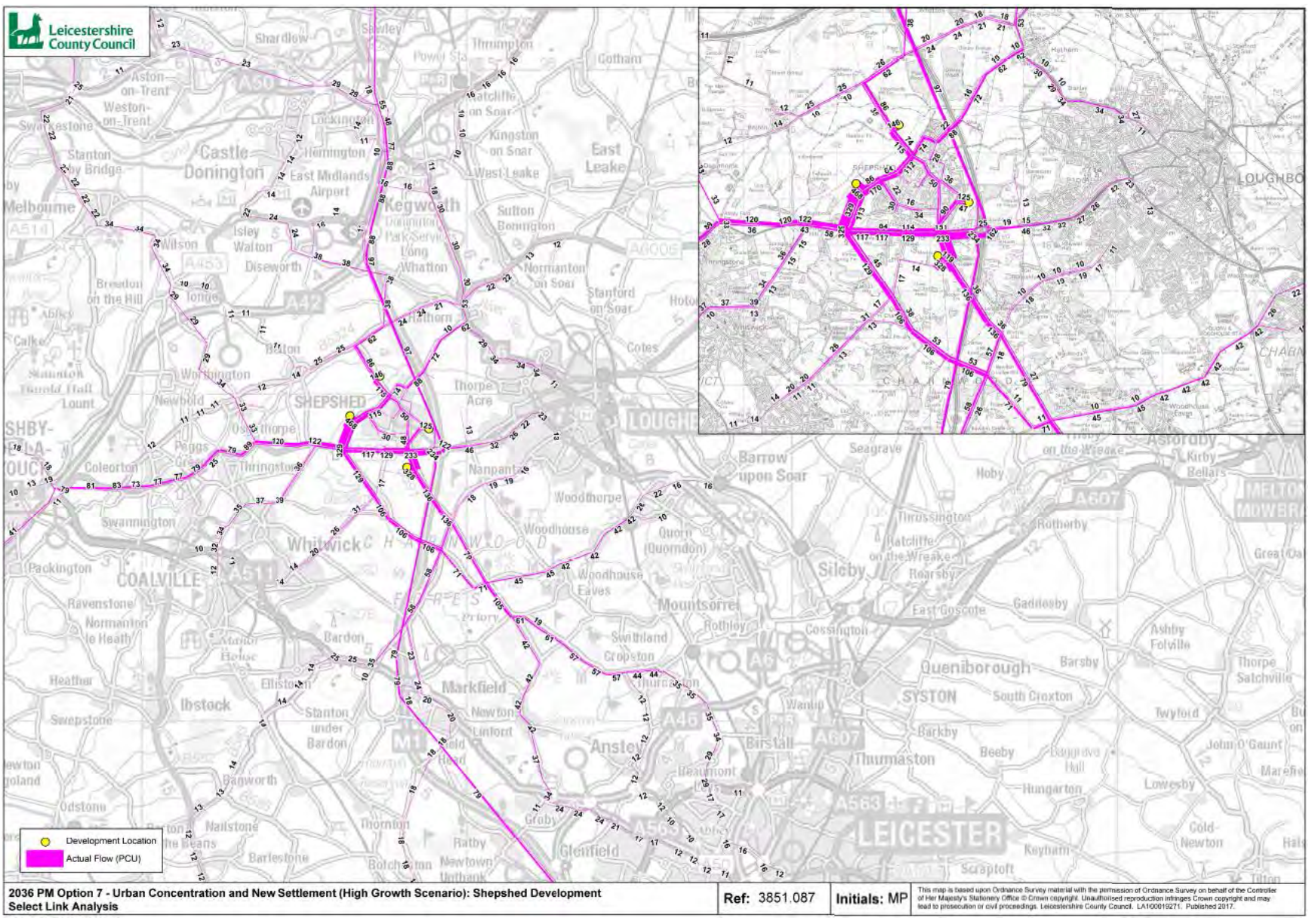


Figure 12-13: Select Link Analysis, Option 7 - Shepshed Development (PM Peak)

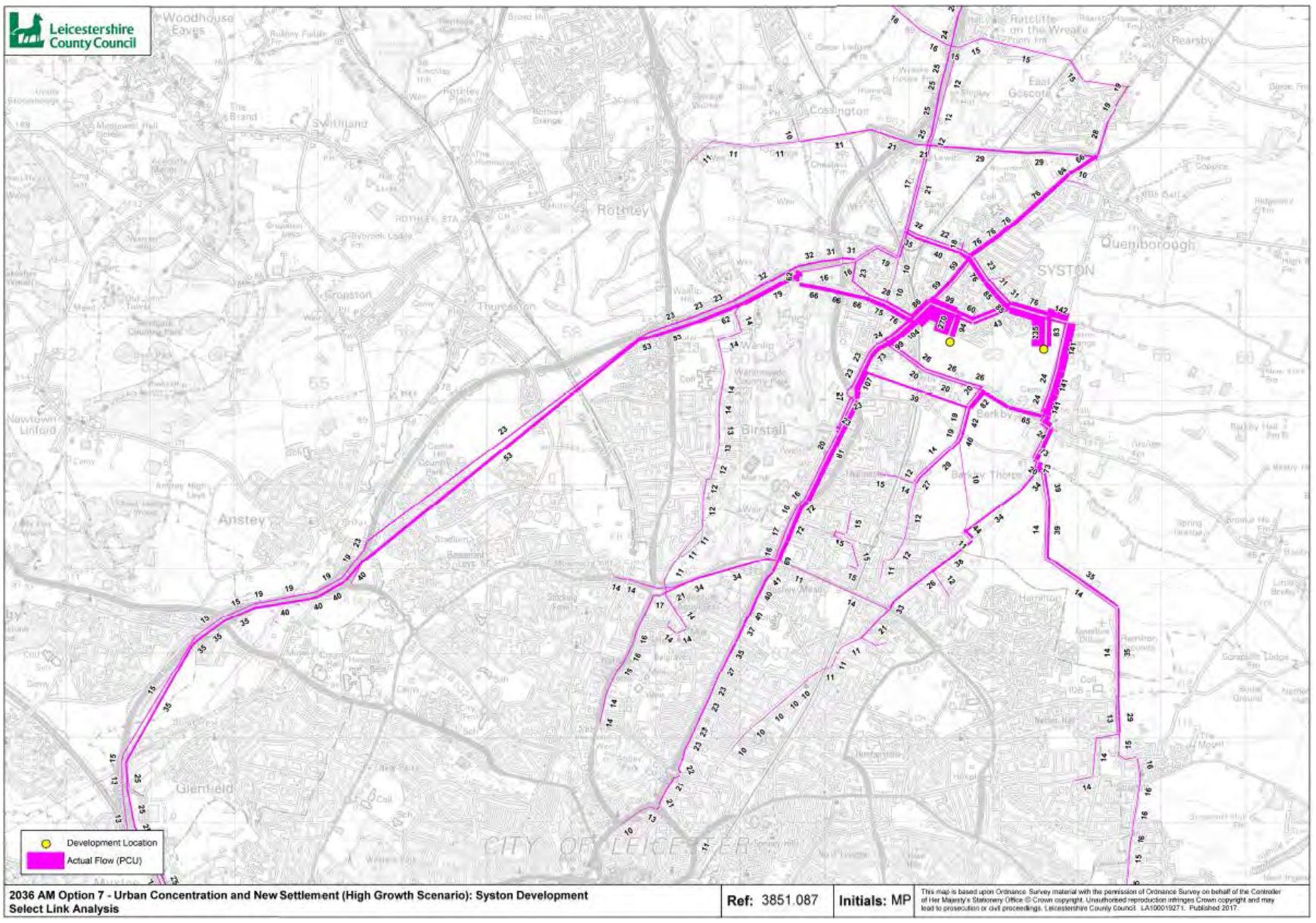


Figure 12-14: Select Link Analysis, Option 7 - Syston Development (AM Peak)

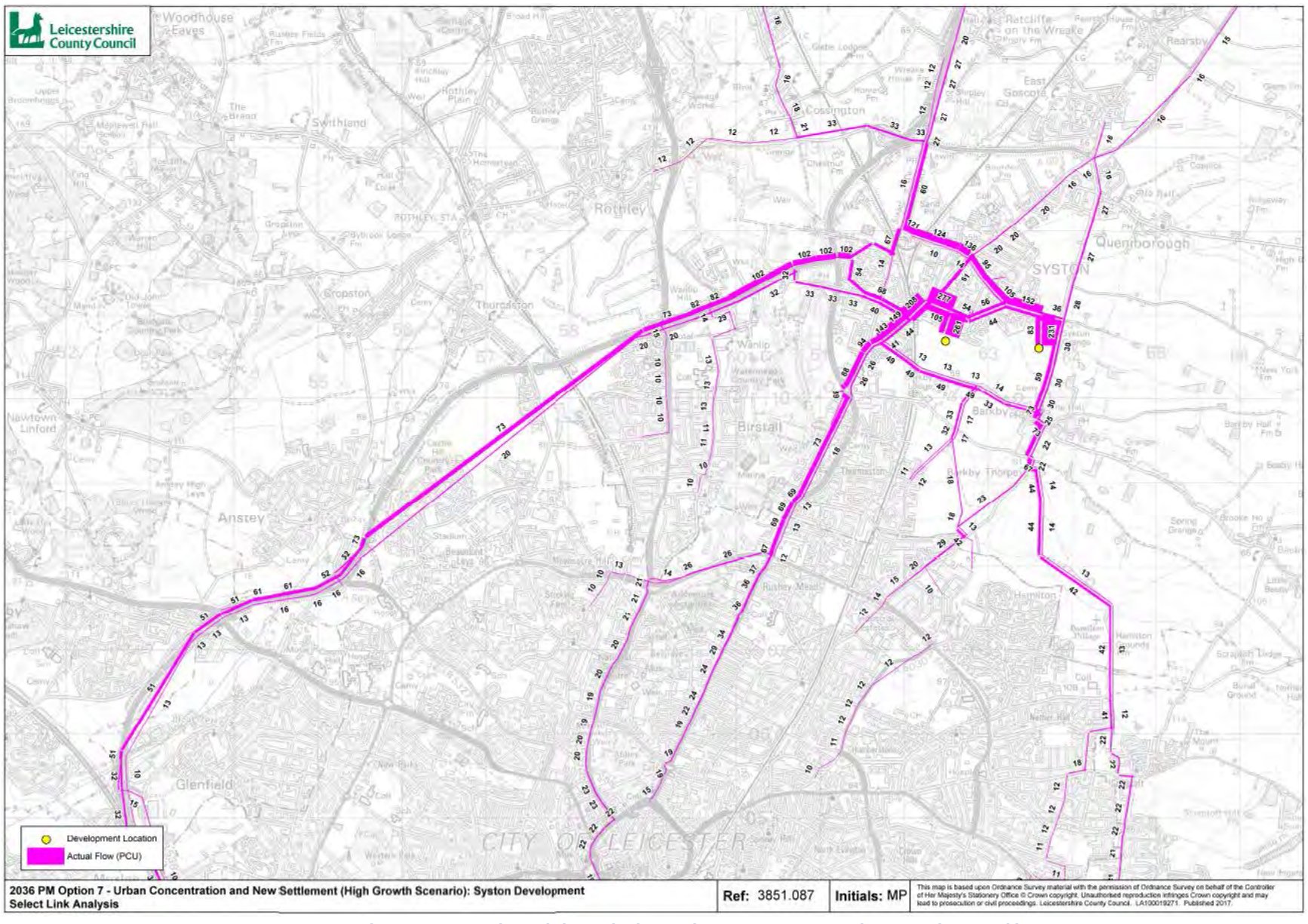


Figure 12-15: Select Link Analysis, Option 7 - Syston Development (PM Peak)

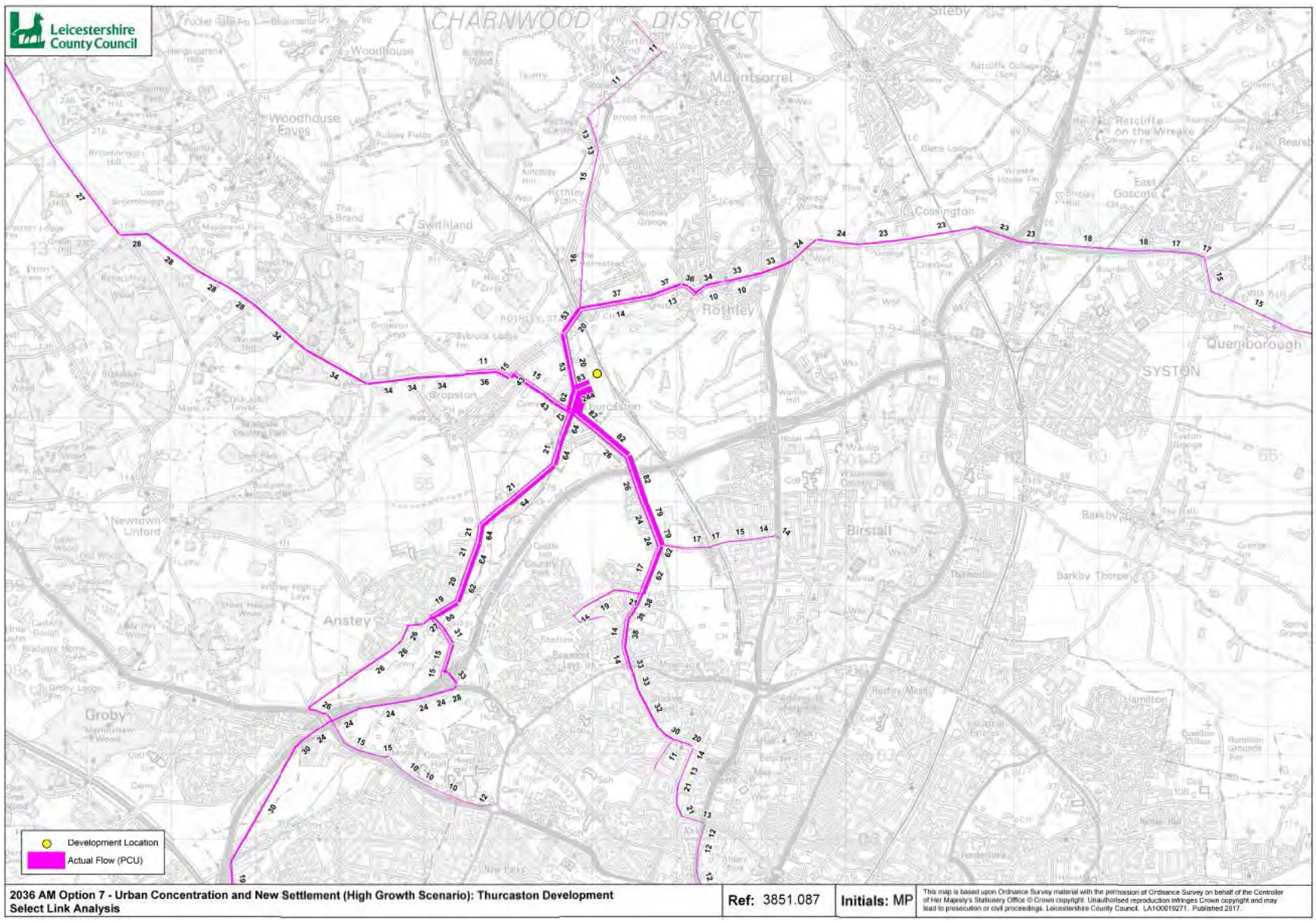


Figure 12-16: Select Link Analysis, Option 7 - Thurcaston Development (AM Peak)

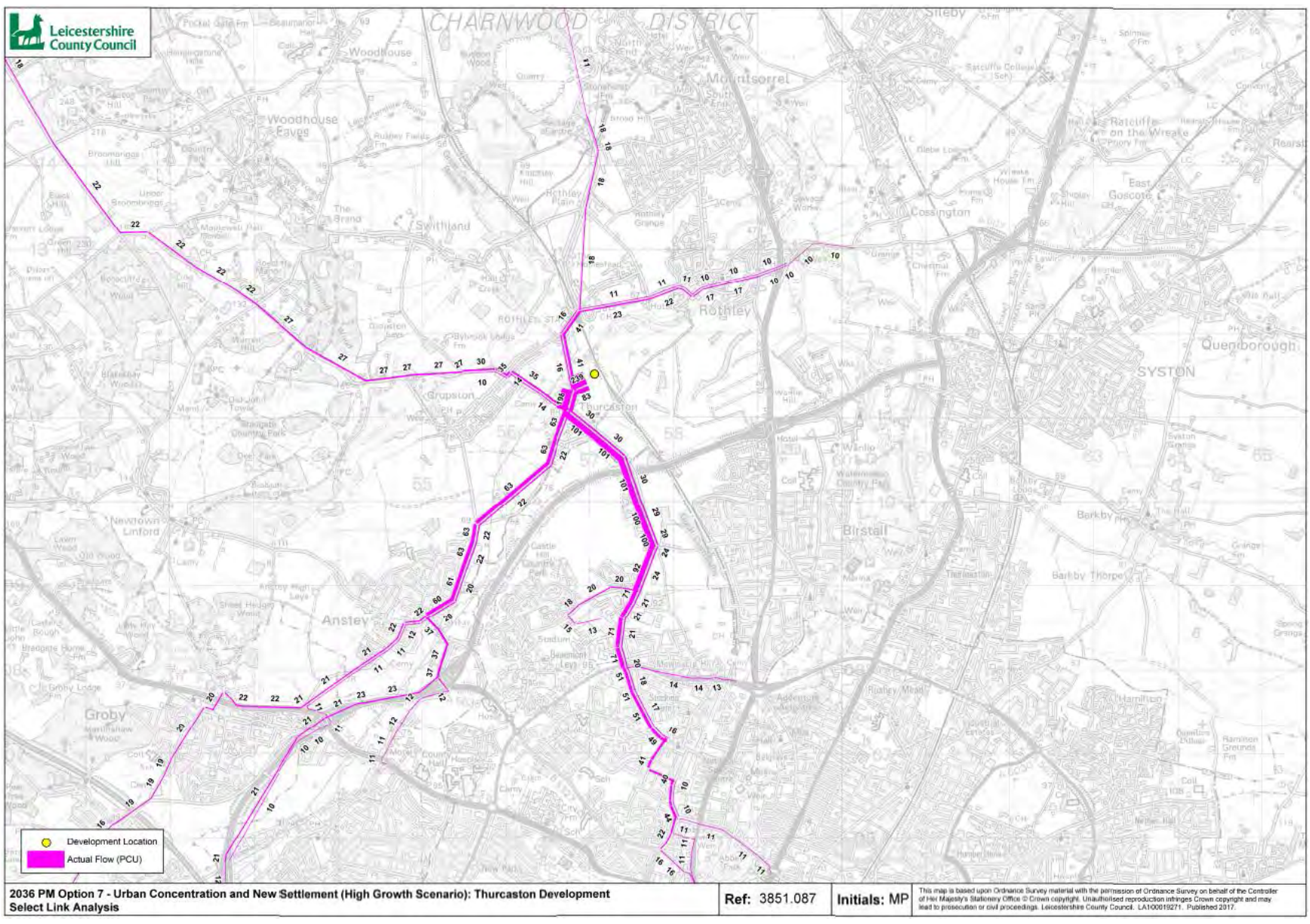


Figure 12-17: Select Link Analysis, Option 7 - Thurcaston Development (PM Peak)

MATRIX SECTORING

Op7 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	680	39	10	11		182	21	15	11	11				26	22	77	19	237
Shepshed	148	320				86	12	15						35	26	216		227
Syston	21		162	68	11	103	57	149	31	17	26	24		35	17		16	68
Thurmaston	21		36	34	10	61	70	46	15	15	11		12	44	10	17		46
Birstall			13	13	20	22		13										10
Rem. Charnwood	431	38	90	55	37	662	118	104	60	72	56	20	50	124	61	137	106	478
City (NW)				11														
City (NE)			15															
City (SE)			12															
City (SW)																		
City (Centre)																		
Oadby																		
Harborough																		
Blaby																		
Hinckley																		
NW Leics		23																
Melton																		
Other																		

Table 12-4: Highlight Matrix of all Sectored Trips, Option 7 AM Peak minus Core AM Peak (>10 Trips only)

Op7 - Core	Loughborough	Shepshed	Syston	Thurmaston	Birstall	Rem. Charnwood	City (NW)	City (NE)	City (SE)	City (SW)	City (Centre)	Oadby	Harborough	Blaby	Hinckley	NW Leics	Melton	Other
Loughborough	467	79	25	24		457												
Shepshed	35	282				36										22		27
Syston	14		160	37	16	81		14										
Thurmaston	13		44	36		43	12											
Birstall			15	12		37												
Rem. Charnwood	220	67	95	45	17	536	13											35
City (NW)	21	16	42	60		107												
City (NE)	28	20	98	39	18	99												
City (SE)	18		29	15		56												
City (SW)	12		36	17		57												
City (Centre)	11		32	16		55												
Oadby			31	10		19												
Harborough	31		14	12		47												
Blaby	31	51	39	47		115												
Hinckley	18	35	17	10		51												
NW Leics	73	213	12	17		156												
Melton	15		27			96												
Other	307	281	87	45	13	562												

Table 12-5: Highlight Matrix of all Sectored Trips, Option 7 PM Peak minus Core PM Peak (>10 Trips only)

13. APPENDICES

13.1. APPENDIX A: Journey Time Route Validation

		AM Peak			PM Peak		
Location	**Route**	**Abs.**	**%**	**Pass**	**Abs.**	**%**	**Pass**
Loughborough	A512 Ashby Road Eastbound	-00:44	-6.1%	✓	-01:07	-9.8%	✓
Loughborough	A512 Ashby Road Westbound	00:21	3.6%	✓	-01:01	-8.0%	✓
Loughborough	Old Ashby Road / Alan Moss Road Eastbound	00:57	10.7%	✓	-01:17	-10.6%	✓
Loughborough	Old Ashby Road / Alan Moss Road Westbound	-00:20	-3.6%	✓	02:13	26.4%	×
Loughborough	Forest Road Eastbound	-01:32	-14.6%	✓	00:49	11.5%	✓
Loughborough	Forest Road Westbound	00:18	4.1%	✓	-00:25	-4.4%	✓
Loughborough	A6 north of Inner Relief Road Northbound	00:34	12.5%	✓	-00:45	-12.9%	✓
Loughborough	A6 north of Inner Relief Road Southbound	00:38	11.8%	✓	00:52	17.6%	✓
Loughborough	A6 south of Inner Relief Road Northbound	-00:37	-10.0%	✓	00:05	2.1%	✓
Loughborough	A6 south of Inner Relief Road Southbound	00:03	1.5%	✓	00:01	0.5%	✓
Loughborough	A6004 Epinal Way Northbound	-01:26	-12.9%	✓	00:16	2.8%	✓
Loughborough	A6004 Epinal Way Southbound	00:50	9.4%	✓	-00:31	-5.0%	✓
Loughborough	New King Street / Queen's Road Eastbound	00:41	15.0%	✓	01:40	33.5%	×
Loughborough	New King Street / Queen's Road Westbound	01:32	24.6%	×	00:28	8.6%	✓
Charnwood	A6 (A46 to Loughborough) Northbound	-00:06	-1.7%	✓	00:19	5.5%	✓
Charnwood	A6 (A46 to Loughborough) Southbound	-00:11	-3.0%	✓	00:19	5.8%	✓
Charnwood	A6 (Loughborough to M1) Northbound	-00:06	-0.8%	✓	-02:45	-15.5%	×
Charnwood	A6 (Loughborough to M1) Southbound	00:14	2.0%	✓	00:19	3.0%	✓
North Leicestershire				**94%**			**83%**

		AM Peak			PM Peak		
Location	**Route**	**Abs.**	**%**	**Pass**	**Abs.**	**%**	**Pass**
Leicester City	A607 Thurmaston Inbound	01:33	11.6%	✓	00:37	4.8%	✓
Leicester City	A607 Thurmaston Outbound	00:57	8.1%	✓	-00:13	-1.5%	✓
Leicester City	A6 Birstall Inbound	-00:31	-3.4%	✓	01:01	8.8%	✓
Leicester City	A6 Birstall Outbound	00:10	1.5%	✓	00:22	2.8%	✓
Leicester City	B5327 Anstey Inbound	-01:31	-14.8%	✓	01:02	16.3%	×
Leicester City	B5327 Anstey Outbound	00:23	6.1%	✓	-00.26	-5.5%	✓
Leicester City	A50 Groby Inbound	-04:46	-31.2%	×	-01:33	-13.4%	✓
Leicester City	A50 Groby Outbound	01:12	14.4%	✓	-02:00	-16.4%	×
Leicester City				**88%**			**75%**

		AM Peak			PM Peak		
Location	**Route**	**Abs.**	**%**	**Pass**	**Abs.**	**%**	**Pass**
SRN	A46 (M1 to A52) Northbound	01:29	5.9%	✓	02:02	7.1%	✓
SRN	A46 (M1 to A52) Southbound	02:48	10.2%	✓	02:47	11.5%	✓
Leicester City				**100%**			**100%**

Table 13-1: Journey Time Validation Statistics

Leicestershire County Council

13.2. APPENDIX B: Overview of 'Option-Induced' Congested Junctions

ID	Node	Junction	Area	Sector	Op1	Op2	Op3	Op4	Op5	Op6	Op7	Total	High Growth Only?
1	60198	Nanpantan Rd/Snell's Nook Ln	Nanpantan	Rem. Charnwood	Y	Y	Y	Y	Y	Y	Y	7	
2	60362	A6/A6004	Quorn	Rem. Charnwood	Y	Y	Y	Y	Y	Y	Y	7	
3	2508	Queniborough Rd/Barkby Rd	Queniborough	Rem. Charnwood	Y	Y	Y	Y	Y	Y	Y	7	
4	2280	Fosse Way/High St	Syston	Syston	Y	Y	Y	Y	Y	Y	Y	7	
5	7041	Melton Rd/Goode's Ln	Syston	Syston	Y	Y	Y	Y	Y	Y	Y	7	
6	78902	Belton Rd	Loughborough	Loughborough	Y	Y	Y	Y	Y	Y	Y	7	
7	1607	A46/A6	Birstall	Birstall	Y	Y	Y	Y	Y	Y	Y	7	
8	1226	Bennion Rd/Beaumont Leys Ln	City (NW)	City (NW)	Y	Y	Y	Y	Y	Y	Y	7	
9	2412	Main St/Biggin Hill Rd	City (SE)	City (SE)	Y	Y	Y	Y	Y	Y	Y	7	
10	60098	The Coneries/Sparrow Hill	Loughborough	Loughborough	Y	Y	Y	Y	Y	Y	Y	7	
11	60108	Woodgate/Pinfold Gate	Loughborough	Loughborough	Y	Y	Y	Y	Y	Y	Y	7	
12	60922	A6004/Forest Rd	Loughborough	Loughborough	Y	Y	Y	Y	Y	Y	Y	7	
13	61020	A6/Baxter Gate	Loughborough	Loughborough	Y	Y	Y	Y	Y	Y	Y	7	
14	73778	A6 (Bridge St)	Loughborough	Loughborough	Y	Y	Y	Y	Y	Y	Y	7	
15	50523	M1/A42	EMA (M1)	NW Leics	Y	Y	Y	Y	Y	Y	Y	7	
16	9385	Anstey Ln	Anstey	Rem. Charnwood	Y	Y	Y	Y	Y	Y	Y	7	
17	9631	A46/Leicester Rd	Anstey	Rem. Charnwood	Y	Y	Y	Y	Y	Y	Y	7	
18	9715	A46/Leicester Rd	Anstey	Rem. Charnwood	Y	Y	Y	Y	Y	Y	Y	7	
19	7306	A512 (Ashby Rd E)	Shepshed	Shepshed	Y	Y	Y	Y	Y	Y	Y	7	
20	76150	A512 (Ashby Rd E)	Shepshed	Shepshed	Y	Y	Y	Y	Y	Y	Y	7	
21	2047	A46/Wanlip Rd	Syston	Syston	Y	Y	Y	Y	Y	Y	Y	7	
22	60099	A6004/Ratcliffe Rd/Belton Rd	Loughborough	Loughborough	Y		Y	Y	Y	Y	Y	6	
23	60195	Loughborough Rd/Woodhouse Rd	Quorn	Rem. Charnwood	Y		Y	Y	Y	Y	Y	6	
24	60126	A6/Shelthorpe Rd	Loughborough	Loughborough	Y		Y	Y	Y	Y	Y	6	
25	78903	A6004/Gordon Rd	Loughborough	Loughborough		Y	Y	Y	Y	Y	Y	6	
26	69941	A60/Station Boulevard	Loughborough	Loughborough		Y	Y	Y	Y	Y	Y	6	
27	1748	A6/School Ln	Birstall	Birstall	Y	Y		Y	Y	Y	Y	6	
28	7323	A6004/Forest Rd	Loughborough	Loughborough	Y		Y	Y	Y	Y	Y	6	
29	60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	Loughborough	Y		Y	Y	Y	Y	Y	6	
30	61000	Forest Rd/Browns Ln	Loughborough	Loughborough	Y		Y	Y	Y	Y	Y	6	
31	50543	M1 Junction 24	M1 J24	NW Leics	Y		Y	Y	Y	Y	Y	6	
32	60044	Barrow Rd/Bridge St	Barrow	Rem. Charnwood		Y	Y	Y	Y	Y	Y	6	
33	60123	A6004/Allendale Rd	Woodthorpe	Rem. Charnwood	Y		Y	Y	Y	Y	Y	6	
34	60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	Shepshed		Y	Y	Y	Y	Y	Y	6	
35	78892	Melton Rd/Wanlip Rd	Syston	Syston	Y	Y		Y	Y	Y	Y	6	
36	1669	A6/Hallfields Ln/Cossington Ln	Rothley	Rem. Charnwood		Y	Y		Y	Y	Y	5	
37	2751	Loughborough Rd/Checketts Rd	City (NE)	City (NE)			Y	Y	Y	Y	Y	5	
38	60538	A6/Beeches Rd	Loughborough	Loughborough	Y			Y	Y	Y	Y	5	
39	60916	A6004/Forest Rd	Loughborough	Loughborough	Y			Y	Y	Y	Y	5	
40	61009	Woodgate/Pack Horse Ln	Loughborough	Loughborough	Y		Y		Y	Y	Y	5	
41	65070	A6004/Radmoor Rd	Loughborough	Loughborough	Y			Y	Y	Y	Y	5	
42	50544	M1 Junction 24	M1 J24	NW Leics			Y	Y	Y	Y	Y	5	
43	76088	A453/Ashby Rd	Kegworth	NW Leics			Y	Y	Y	Y	Y	5	
44	76036	A512/Leicester Rd	Shepshed	Shepshed		Y	Y		Y	Y	Y	5	
45	65066	A6004/University Rd	Loughborough	Loughborough	Y				Y	Y	Y	4	
46	1428	A6 (St Margaret's Way)	City (NE)	City (NE)		Y			Y	Y	Y	4	
47	3259	Catherine St/Brandon St	City (NE)	City (NE)		Y	Y		Y	Y		4	
48	7304	Frederick St/Arthur St	Loughborough	Loughborough	Y				Y	Y	Y	4	
49	60002	A6004 (Ling Rd)	Loughborough	Loughborough	Y				Y	Y	Y	4	
50	60057	A6/Southfield Rd	Loughborough	Loughborough				Y	Y	Y	Y	4	
51	60062	A6/The Rushes	Loughborough	Loughborough	Y				Y	Y	Y	4	
52	60186	A6004/Beacon Rd	Loughborough	Loughborough	Y				Y	Y	Y	4	
53	60920	A6004/Forest Rd	Loughborough	Loughborough	Y				Y	Y	Y	4	
54	65067	A6004 (Epinal Way)	Loughborough	Loughborough	Y				Y	Y	Y	4	
55	65071	A512/Radmoor Rd	Loughborough	Loughborough	Y				Y	Y	Y	4	
56	50312	East Midlands Airport	EMA	NW Leics	Y	Y		Y			Y	4	
57	73890	A6/Broadnook	Broadnook	Rem. Charnwood			Y		Y	Y	Y	4	
58	74116	A6004 (Terry Yardley Way)	Quorn	Rem. Charnwood	Y				Y	Y	Y	4	
59	60095	A512/Ingleberry Rd	Shepshed	Shepshed			Y		Y	Y	Y	4	
60	1778	A46/A6	Birstall	Birstall					Y	Y	Y	3	Y
61	7402	A6/Birstall Meadow Rd	Birstall	Birstall					Y	Y	Y	3	Y
62	76061	A50/Gynsill Lane	Glenfield	Blaby					Y	Y	Y	3	Y
63	1706	Red Hill Circle	City (NE)	City (NE)					Y	Y	Y	3	Y
64	2011	A563/A607	City (NE)	City (NE)					Y	Y	Y	3	Y
65	9734	Watermead Way	City (NE)	City (NE)					Y	Y	Y	3	Y
66	9845	Anstey Ln/Bennion Rd	City (NW)	City (NW)					Y	Y	Y	3	Y
67	49975	A511/Copt Oak Rd	Stanton-u-Bardon	Hinckley					Y	Y	Y	3	Y
68	60135	A60 Nottingham Rd/Queen's Rd	Loughborough	Loughborough				Y		Y	Y	3	
69	60148	A6/A6004 (Alan Moss/Belton Rd)	Loughborough	Loughborough					Y	Y	Y	3	Y
70	60918	A6004/Forest Rd	Loughborough	Loughborough	Y				Y	Y		3	
71	65097	A6 (Fennel St)/Bridge St	Loughborough	Loughborough	Y				Y	Y		3	
72	50492	A453 (EMA Junction)	EMA	NW Leics					Y	Y	Y	3	Y
73	76923	A60/A6006	Rempstone	Other					Y	Y	Y	3	Y
74	60253	A6/Zouch Rd	Hathern	Rem. Charnwood					Y	Y	Y	3	Y
75	60358	A512/Snell's Nook Ln	Nanpantan	Rem. Charnwood					Y	Y	Y	3	Y
76	73889	A6/Broadnook	Broadnook	Rem. Charnwood					Y	Y	Y	3	Y
77	73891	A6/Broadnook	Broadnook	Rem. Charnwood					Y	Y	Y	3	Y
78	60454	M1 Junction 23	Shepshed	Shepshed					Y	Y	Y	3	Y

ID	Node	Junction	Area	Sector	Op1	Op2	Op3	Op4	Op5	Op6	Op7	Total	High Growth Only?
79	9007	A50/Fosse Rd N	City (NW)	City (NW)					Y	Y		2	Y
80	9859	A563 (Glenfrith Way)	City (NW)	City (NW)					Y	Y		2	Y
81	1318	Upperton Rd/Watkin Rd	City (SW)	City (SW)	Y					Y		2	
82	40470	M1 Junction 22	M1 J22	Hinckley						Y	Y	2	Y
83	7317	A512/A6004	Loughborough	Loughborough					Y	Y		2	Y
84	60048	A6004/Woodthorpe Rd	Loughborough	Loughborough					Y	Y		2	Y
85	65018	Forest Rd/Outwoods Dr	Loughborough	Loughborough					Y	Y		2	Y
86	73775	Queen's Rd/Salisbury St	Loughborough	Loughborough					Y		Y	2	Y
87	1753	A46/A6	Birstall	Birstall							Y	1	Y
88	73335	A47/Warren Ln	LFE	Blaby							Y	1	Y
89	1651	Red Hill Circle	City (NE)	City (NE)						Y		1	Y
90	2055	Catherine St/Gipsy Ln	City (NE)	City (NE)						Y		1	Y
91	9953	A50/Heathley Park Drive	City (NW)	City (NW)						Y		1	Y
92	2268	Wakerley Rd/Ethel Rd	City (SE)	City (SE)							Y	1	Y
93	7405	A6/Broad St	Loughborough	Loughborough					Y			1	Y
94	60145	Forest Rd/Park Rd	Loughborough	Loughborough					Y			1	Y
95	60289	A60/Brush	Loughborough	Loughborough							Y	1	Y
96	69936	Bishop Meadow Rd/Weldon Rd	Loughborough	Loughborough							Y	1	Y
97	50304	Copt Oak Rd/Warren Hills Rd	Copt Oak	NW Leics							Y	1	Y
98	55053	A511 (Bardon Rd Quarry)	Bardon	NW Leics						Y		1	Y
99	2477	Queniborough Rd/Main St	Barkby	Rem. Charnwood						Y		1	Y
100	9660	Leicester Rd	Anstey	Rem. Charnwood							Y	1	Y
101	60115	Bridge St/High St	Barrow	Rem. Charnwood							Y	1	Y
102	60252	A46/Seagrave Rd	Seagrave	Rem. Charnwood							Y	1	Y
103	60402	A6/Whatton Rd	Hathern	Rem. Charnwood					Y			1	Y
104	72051	The Nook	Anstey	Rem. Charnwood							Y	1	Y
105	2227	Melton Rd/Fosse Way	Syston	Syston			Y					1	
106	76033	A607	Thurmaston	Thurmaston							Y	1	Y

Table 13-2: Overview of Development Affected Junctions by Option

Leicestershire County Council

13.3. APPENDIX C: Overview of Top 50 'Option-Induced' Flow-Weight Delay Increases

Options 1-4 (Low Growth) – AM Peak

Node	Description	Core Flow (pcus)	Core Delay / PCU (secs)	Core FLWDel	Core MaxVC	Option	Op Flow (pcus)	Op Delay / PCU (secs)	Op FLWDel	Op MaxVC	Diff Flow (pcus)	Diff Delay / PCU (secs)	Diff FLWDel	Diff MaxVC	Rank
60198	Nanpantan Rd/Snell's Nook Ln	1,543	209	321,742	106	1	1,579	378	596,877	115	37	169	275,136	9	1
60362	A6/A6004	4,316	54	231,141	106	1	4,317	114	490,552	114	1	60	259,411	7	2
78892	Melton Rd/Wanlip Rd	2,045	21	42,098	98	1	2,109	96	203,203	104	64	76	161,105	6	3
60362	A6/A6004	4,316	54	231,141	106	3	4,378	89	391,679	111	62	36	160,538	5	4
78892	Melton Rd/Wanlip Rd	2,045	21	42,098	98	2	2,105	96	202,436	104	60	76	160,338	6	5
78892	Melton Rd/Wanlip Rd	2,045	21	42,098	98	4	2,140	90	192,172	106	96	69	150,074	7	6
60198	Nanpantan Rd/Snell's Nook Ln	1,543	209	321,742	106	3	1,576	288	454,159	109	34	80	132,417	3	7
60198	Nanpantan Rd/Snell's Nook Ln	1,543	209	321,742	106	4	1,572	286	449,544	109	29	77	127,802	3	8
60362	A6/A6004	4,316	54	231,141	106	4	4,382	82	358,753	111	66	28	127,612	4	9
60922	A6004/Forest Rd	1,769	19	33,769	83	1	2,060	77	159,007	103	291	58	125,238	20	10
7323	A6004/Forest Rd	1,579	82	129,259	102	1	1,735	145	251,466	106	156	63	122,206	4	11
50523	M1/A42	6,138	54	334,060	105	2	6,232	72	450,743	106	94	18	116,683	1	12
60126	A6/Shelthorpe Rd	2,366	54	126,598	102	1	2,570	94	241,066	114	205	40	114,469	12	13
50523	M1/A42	6,138	54	334,060	105	1	6,217	72	444,950	105	80	17	110,890	1	14
50523	M1/A42	6,138	54	334,060	105	3	6,223	71	444,481	106	86	17	110,421	1	15
50523	M1/A42	6,138	54	334,060	105	4	6,222	71	441,182	106	85	16	107,122	1	16
60099	A6004/Ratcliffe Rd/Belton Rd	2,121	82	174,575	101	1	2,174	117	254,223	107	53	35	79,648	6	17
69941	A60/Station Boulevard	1,859	138	255,644	107	4	1,856	179	332,037	109	-3	41	76,393	3	18
60362	A6/A6004	4,316	54	231,141	106	2	4,404	68	300,901	109	88	15	69,760	2	19
60198	Nanpantan Rd/Snell's Nook Ln	1,543	209	321,742	106	2	1,564	249	389,749	107	22	41	68,008	1	20
60126	A6/Shelthorpe Rd	2,366	54	126,598	102	3	2,516	77	193,674	109	150	23	67,076	7	21
1720	A563/A6 (Red Hill Circle)	2,894	41	117,712	99	1	2,917	62	181,225	101	23	21	63,513	2	22
1720	A563/A6 (Red Hill Circle)	2,894	41	117,712	99	2	2,920	62	181,065	101	26	21	63,354	2	23
73778	A6 (Bridge St)	1,547	38	59,104	100	1	1,585	77	122,407	105	38	39	63,303	4	24
1607	A46/A6	3,927	54	211,892	102	1	3,982	69	273,549	103	55	15	61,657	1	25
2508	Queniborough Rd/Barkby Rd	932	57	52,770	86	2	1,149	99	113,935	103	217	43	61,165	17	26
2508	Queniborough Rd/Barkby Rd	932	57	52,770	86	1	1,144	99	113,586	103	212	43	60,815	17	27
7323	A6004/Forest Rd	1,579	82	129,259	102	3	1,682	112	189,115	104	103	31	59,855	2	28
7323	A6004/Forest Rd	1,579	82	129,259	102	4	1,675	112	187,997	104	96	30	58,738	2	29
60126	A6/Shelthorpe Rd	2,366	54	126,598	102	4	2,502	74	184,478	108	136	20	57,880	6	30
60062	A6/The Rushes	1,821	29	52,275	90	1	1,865	58	107,262	101	44	29	54,987	11	31
60922	A6004/Forest Rd	1,769	19	33,769	83	4	1,967	45	87,595	100	198	25	53,825	16	32
2508	Queniborough Rd/Barkby Rd	932	57	52,770	86	4	1,106	96	105,757	102	174	39	52,987	17	33
2280	Fosse Way/High St	1,180	29	33,717	64	2	1,271	67	85,241	103	91	39	51,524	39	34
1607	A46/A6	3,927	54	211,892	102	2	3,975	66	263,328	103	48	12	51,436	1	35
2280	Fosse Way/High St	1,180	29	33,717	64	1	1,263	66	83,896	103	83	38	50,178	39	36
61020	A6/Baxter Gate	1,291	60	77,126	103	1	1,337	95	126,394	110	46	35	49,267	7	37
1607	A46/A6	3,927	54	211,892	102	4	3,972	66	260,992	103	46	12	49,100	1	38
60099	A6004/Ratcliffe Rd/Belton Rd	2,121	82	174,575	101	3	2,140	104	223,300	104	19	22	48,725	3	39
1720	A563/A6 (Red Hill Circle)	2,894	41	117,712	99	4	2,915	57	165,006	101	22	16	47,295	1	40
60099	A6004/Ratcliffe Rd/Belton Rd	2,121	82	174,575	101	4	2,177	102	221,221	104	56	19	46,647	3	41
2280	Fosse Way/High St	1,180	29	33,717	64	4	1,270	62	78,901	102	90	34	45,184	38	42
1607	A46/A6	3,927	54	211,892	102	3	3,965	65	257,020	103	38	11	45,128	1	43
60148	A6/Alan Moss Way/Belton Rd	2,321	50	116,253	98	1	2,314	70	160,871	101	-7	19	44,618	3	44
50492	A453/East Midlands Airport	3,806	134	510,176	105	3	3,824	145	552,639	105	17	10	42,463	1	45
61009	Woodgate/Pack Horse Ln	493	1	360	15	1	466	92	42,818	100	-27	91	42,458	85	46
50543	M1 Junction 24	2,645	50	131,357	102	4	2,633	66	173,536	104	-11	16	42,179	2	47
1720	A563/A6 (Red Hill Circle)	2,894	41	117,712	99	3	2,922	54	158,992	101	28	14	41,280	1	48
2011	A563/Melton Road	5,124	79	403,810	101	2	5,178	86	443,926	103	54	7	40,116	1	49
73778	A6 (Bridge St)	1,547	38	59,104	100	4	1,595	62	99,069	103	48	24	39,965	3	50

Table 13-3: Flow, Delay and VC Details for Top 50 Flow-Weighted Delay Increases between Core and Low Growth Options, AM Peak

Leicestershire County Council

Options 1-4 (Low Growth) – PM Peak

Node	Description	Core Flow (pcus)	Core Delay / PCU (secs)	Core FLWDel	Core MaxVC	Option	Op Flow (pcus)	Op Delay / PCU (secs)	Op FLWDel	Op MaxVC	Diff Flow (pcus)	Diff Delay / PCU (secs)	Diff FLWDel	Diff MaxVC	Rank
9715	A46/Leicester Rd	3,910	37	144,011	101	1	3,937	82	323,126	103	27	45	179,115	2	1
60198	Nanpantan Rd/Snell's Nook Ln	1,471	178	262,353	104	1	1,458	293	427,924	105	-13	115	165,571	1	2
9715	A46/Leicester Rd	3,910	37	144,011	101	4	3,944	69	272,515	102	34	32	128,504	2	3
9715	A46/Leicester Rd	3,910	37	144,011	101	2	3,950	69	272,362	102	40	32	128,351	2	4
7041	Melton Rd/Goode's Ln	1,930	9	16,602	77	2	2,151	67	144,837	103	220	59	128,235	25	5
7041	Melton Rd/Goode's Ln	1,930	9	16,602	77	1	2,145	67	143,250	102	215	58	126,648	25	6
9631	A46/Leicester Rd	3,038	7	22,399	90	1	3,169	42	133,049	103	131	35	110,650	13	7
7041	Melton Rd/Goode's Ln	1,930	9	16,602	77	4	2,138	58	123,099	102	208	49	106,497	25	8
9715	A46/Leicester Rd	3,910	37	144,011	101	3	3,968	60	239,933	102	58	24	95,922	2	9
60198	Nanpantan Rd/Snell's Nook Ln	1,471	178	262,353	104	4	1,482	239	353,935	106	11	60	91,582	2	10
9631	A46/Leicester Rd	3,038	7	22,399	90	2	3,169	35	109,519	102	131	27	87,120	12	11
9631	A46/Leicester Rd	3,038	7	22,399	90	4	3,162	34	107,252	102	124	27	84,854	12	12
60198	Nanpantan Rd/Snell's Nook Ln	1,471	178	262,353	104	3	1,486	231	343,205	106	15	53	80,852	2	13
60362	A6/A6004	4,402	26	113,431	101	4	4,599	42	193,607	103	198	16	80,176	2	14
60362	A6/A6004	4,402	26	113,431	101	1	4,734	39	182,708	103	333	13	69,277	1	15
60362	A6/A6004	4,402	26	113,431	101	3	4,627	39	181,908	103	225	14	68,477	2	16
2047	A46/Wanlip Rd	3,844	33	126,872	101	1	3,895	50	194,780	101	51	17	67,907	1	17
9631	A46/Leicester Rd	3,038	7	22,399	90	3	3,157	29	90,297	101	119	21	67,898	11	18
60362	A6/A6004	4,402	26	113,431	101	2	4,513	39	177,542	103	111	14	64,112	2	19
2047	A46/Wanlip Rd	3,844	33	126,872	101	2	3,893	49	189,860	102	49	16	62,988	1	20
2508	Queniborough Rd/Barkby Rd	806	88	70,537	100	1	871	152	132,680	103	66	65	62,142	3	21
2508	Queniborough Rd/Barkby Rd	806	88	70,537	100	2	869	153	132,571	103	63	65	62,033	3	22
2508	Queniborough Rd/Barkby Rd	806	88	70,537	100	4	864	145	125,484	103	59	58	54,947	3	23
65067	A6004 (Epinal Way)	2,410	21	50,070	92	1	2,524	41	104,252	100	114	21	54,182	8	24
78902	Belton Rd	1,536	2	3,027	44	4	1,530	36	54,808	100	-6	34	51,781	56	25
2047	A46/Wanlip Rd	3,844	33	126,872	101	4	3,883	46	177,556	101	39	13	50,683	0	26
78902	Belton Rd	1,536	2	3,027	44	3	1,542	35	53,473	100	6	33	50,446	56	27
78902	Belton Rd	1,536	2	3,027	44	2	1,531	34	52,704	100	-5	32	49,678	56	28
2047	A46/Wanlip Rd	3,844	33	126,872	101	3	3,885	45	175,961	101	41	12	49,089	0	29
7337	A6/Warwick Way	1,533	35	53,928	97	4	1,461	69	101,555	101	-72	34	47,628	4	30
9385	Anstey Ln	2,907	38	109,391	101	2	2,908	54	155,889	102	1	16	46,498	1	31
60198	Nanpantan Rd/Snell's Nook Ln	1,471	178	262,353	104	2	1,481	208	307,436	105	10	29	45,083	1	32
73778	A6 (Bridge St)	1,980	27	53,118	98	4	1,979	50	97,995	101	0	23	44,877	3	33
2280	Fosse Way/High St	1,207	38	45,826	83	2	1,321	68	90,486	96	114	31	44,660	13	34
2280	Fosse Way/High St	1,207	38	45,826	83	1	1,322	68	90,027	96	115	30	44,201	13	35
60123	A6004/Allendale Rd	2,884	15	43,503	84	1	3,069	28	85,731	100	186	13	42,228	16	36
60099	A6004/Ratcliffe Rd/Belton Rd	2,001	104	208,448	103	3	2,045	122	249,165	103	44	18	40,716	0	37
9385	Anstey Ln	2,907	38	109,391	101	1	2,912	51	148,273	102	4	13	38,882	1	38
9385	Anstey Ln	2,907	38	109,391	101	4	2,912	51	147,379	102	4	13	37,988	1	39
73778	A6 (Bridge St)	1,980	27	53,118	98	3	1,964	46	91,098	101	-15	20	37,980	3	40
9385	Anstey Ln	2,907	38	109,391	101	3	2,906	50	146,232	102	-2	13	36,841	1	41
2280	Fosse Way/High St	1,207	38	45,826	83	4	1,320	62	82,277	94	113	24	36,451	11	42
60099	A6004/Ratcliffe Rd/Belton Rd	2,001	104	208,448	103	4	2,078	117	243,119	103	78	13	34,671	0	43
61000	Forest Rd/Browns Ln	1,478	47	69,329	100	1	1,534	68	103,747	103	55	21	34,418	2	44
7337	A6/Warwick Way	1,533	35	53,928	97	3	1,465	60	87,748	101	-68	25	33,820	4	45
76061	A50	2,136	27	57,643	97	1	2,309	40	91,270	101	173	13	33,627	4	46
78902	Belton Rd	1,536	2	3,027	44	1	1,553	23	36,159	97	16	21	33,132	53	47
60085	A6/A60	1,887	36	67,464	98	1	1,966	51	100,524	100	80	15	33,060	2	48
60195	Loughborough Rd/Woodhouse Rd	1,509	48	72,730	101	3	1,568	66	104,107	101	58	18	31,377	0	49
59986	M1 Junction 24 (SB)	7,906	34	272,426	90	3	8,033	38	303,157	92	127	3	30,732	1	50

Table 13-4: Flow, Delay and VC Details for Top 50 Flow-Weighted Delay Increases between Core and Low Growth Options, PM Peak

13.4. APPENDIX D: Summary Statistic Option Comparison

Period	*Core*	Difference between Option and Core (Over-Capacity Queues, pcu.hrs)						
		Op1	Op2	Op3	Op4	Op5	Op6	Op7
Combined AM + PM	*1,582*	+644	+430	+439	+545	+1,296	+1,211	+1,149
Combined Rank		4	1	2	3	7	6	5

Table 13-5: Summary Statistics showing Change in Over-Capacity Queues (pcu.hrs) between Core and Options

Period	*Core*	Difference between Option and Core (Total Travel Time, pcu.hrs)						
		Op1	Op2	Op3	Op4	Op5	Op6	Op7
Combined AM + PM	*66,911*	+2,228	+1,985	+1,986	+2,213	+4,346	+4,294	+4,396
Combined Rank		4	1	2	3	6	5	7

Table 13-6: Summary Statistics showing Change in Total Travel Time (pcu.hrs) between Core and Options

Period	*Core*	Difference between Option and Core (Traffic in Severe Congested Conditions, %)						
		Op1	Op2	Op3	Op4	Op5	Op6	Op7
Combined AM + PM	*0.86%*	+0.35%	+0.31%	+0.28%	+0.32%	+0.47%	+0.57%	+0.55%
Combined Rank		4	2	1	3	5	7	6

Table 13-7: Summary Statistics showing Change in Total Travel Distance (pcu.kms) between Core and Options

Period	*Core*	Difference between Option and Core (Total PCU Delay/km, s/km)						
		Op1	Op2	Op3	Op4	Op5	Op6	Op7
Combined AM + PM	27.33	+1.33	+1.01	+0.98	+1.16	+2.47	+2.37	+2.35
Combined Rank		4	2	1	3	7	6	5

Table 13-8: Summary Statistics showing Change in Total PCU Delay per km (s/km) between Core and Options

Period	*Core*	Difference between Option and Core (Increase in Congested Junctions)						
		Op1	Op2	Op3	Op4	Op5	Op6	Op7
Combined AM + PM	*518*	+54	+38	+48	+51	+96	+100	+100
Combined Rank		4	1	2	3	5	6	6

Table 13-9: Summary Statistics showing Increase in Number of Congested Junctions between Core and Options

14.Contact Details

We trust that our report meets your expectations and look forward to working with you again soon.

If you have any questions please do not hesitate to contact:

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