

Technical note

Project:	Birmingham Bus Stop Consolidation	To:	Matthew Till / Danny Gouveia
Subject:	8A / 8C Draft Report	From:	Andy Clark / Anna Little / Tim Colles
Date:	15 th June 2017	cc:	Adrian Taylor

1. Introduction

Atkins has been commissioned by National Express West Midlands to undertake a study investigating the scope for bus stops on several routes in Birmingham to be rationalised. This is in response to growing concern from National Express West Midlands and Transport for West Midlands (TfWM) regarding increasingly long and unreliable bus journeys in the West Midlands.

National Express West Midlands is part of the West Midlands Bus Alliance, consisting of representatives from the region’s bus operators, the West Midlands Combined Authority, council highways and transportation departments, Local Enterprise Partnerships, the Safer Travel Partnership, councillors and Transport Focus.

The Alliance Board Members are responsible for identifying what the region’s buses need to deliver and then putting policies and funding streams in place for this to be achieved. In March 2016, the board identified seven key actions which it will work together to deliver by 2020, as outlined in Figure 1.

Figure 1. Key Targets for West Midlands Bus Alliance



The potential impacts on these key targets are considered later in this technical note, with specific focus on punctuality (aiming to reduce delay minutes).

This technical note sets out the results from Atkins’ analysis of Routes 8A and 8C. The results of the assessments of other routes are outlined in subsequent technical notes.

The route is circular, with 8A denoting buses traversing the route in the anti-clockwise direction and 8C denoting buses in the clockwise direction. The route serves the inner suburbs of the city and provides interchange with the key Birmingham radial corridors. The daytime frequency is five buses per hour (BPH), with buses taking approximately 70-80 minutes to complete the route. Timetabled journey times vary considerably through the day, reflecting both congestion in the city and differing dwell times in response to demand.

Following this introduction, the technical note outlines the:

- Data Sources (**Section Two**);

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- Methodology (**Section Three**);
- Key Findings (**Section Four**); and
- Summary (**Section Five**).

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2. Data Sources

Table 1 outlines the data that has been used to inform this commission. The data has been provided by a combination of Transport for West Midlands (TfWM), the Department for Transport (DfT) and National Express West Midlands. Atkins has combined the data from all three sources to derive a database of information for each route, which includes information around the provision of infrastructure at each stop, levels of usage and the distance between stops.

With regard to usage, there are two key sources of data, both provided by National Express West Midlands:

- Proportion of buses calling at stops: The data shows indicative percentages of the proportion of buses stopping at each bus stop. At a high level, this helps to determine which are the most heavily used stops on the route, but the obvious shortcoming is that it is not possible to determine from this data how many boarders / alighters there are when a vehicle does stop; and
- Boarders by fare stage: The data shows the numbers of boarders by fare stage, which Atkins has used in combination with the proportion of buses calling to build up an understanding of the relative level of usage.

Table 1. Summary of Data and Sources

Data Type	Transport for West Midlands (TfWM)	Department for Transport (DfT)	National Express West Midlands
Stop name	✓		
ATCO (unique code)	✓		
Infrastructure type (whether the stop has a shelter or flag pole)	✓		
RTPI (Y / N)	✓		
Timing point (Y / N)	✓		
Services calling	✓		
Easting / northing		✓	
Distance between adjacent stops			✓
Proportion of buses calling			✓
Boarders by fare stage			✓

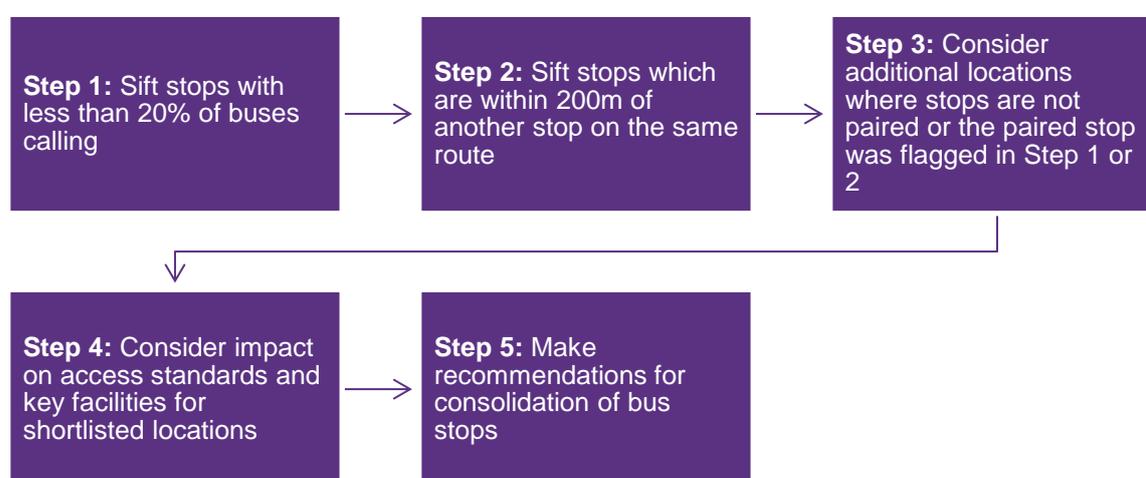
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3. Methodology

Atkins has undertaken a sifting process based on the information outlined in the database. There are several credible approaches which could be taken to determine the optimum stops for removal, but through discussion with National Express West Midlands and TfWM, Atkins has agreed a five-step process. Further details on these steps are now provided. A summary is provided in Figure 2.

Steps 1 and 2 are first applied to the route in one direction, with the same steps then repeated for stops in the opposite direction. Step 3 then considers instances where the stop was flagged in one direction but not the other and issues around an imbalance of stops between the two directions.

Figure 2. Summary of Methodology



Step 1: Sift stops with less than 20% of buses calling

Atkins has first sifted out the stops where less than 20% of buses are calling (Step 1a). This level of usage indicates that the stop is lightly used and hence should be considered as part of any future rationalisation process. A high level sift (Step 1b) of the shortlisted locations has then been carried out to determine whether there are any clear reasons why it may not be appropriate to remove the stop. This takes account of the spacing between stops, the routes served (whether served by the 8 only or the 8 and other routes) and location relative to any local facilities or transport interchanges such as railway stations. This also takes account of any operational need for the stop to remain. For example, on Route 8, through discussion with National Express West Midlands, it has been agreed that some stops in the Saltley area, while lightly used, are required to be retained because future HS2 works will lead to service diversions in the area.

Step 2: Sift stops which are within 200m of another stop on the same route

The second sift entails identifying those stops which are within 200m of another stop on the same route (in the same direction). The figure of 200m has been chosen as, in broad terms, closer spacing suggests there may be some duplication of coverage in terms of the West Midlands Combined Authority Bus Service Access Standards (**see Appendix A**), which state that for residential areas, the maximum desirable walking distance to bus services in continuously built-up areas is 400m during the hours of 07:00 to 19:00 on Monday to Saturday and 700m at other times. Step 2a relates to this first sift.

The output of Step 2a is a list of bus stops that are within 200m of another stop on the same route in the same direction. An assessment has then been made (Step 2b), considering the same factors as per Step 1b, to determine which of the two stops would be more suitable for removal. In some instances, there may be three or more consecutive stops with distances of less than 200m, and in these situations, Atkins has considered how the stops could best be rationalised to provide more even spacing.

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Step 3: Consider additional locations where stops are not paired or where the paired stop was identified in Step 1 or Step 2

In some cases, there may be an imbalance of stops in one direction relative to the other, which may be a function of the highway layout (for example, a one-way system or proximity to a major junction) or a function of the specific location relative to key attractors. Step 3a in the technical process has entailed Atkins considering any locations not flagged by either Step 1 or Step 2 where some rationalisation of stops may be appropriate because of the imbalance of stops in one direction relative to the other.

Finally, as Step 3b, there may be some instances where the gap between stops in one direction is slightly below 200m whilst it is slightly above 200m in the opposite direction. In this instance, it would be prudent to consider the opportunity to rationalise the stops in both directions rather than suggesting rationalisation in one direction but not the other. Another such instance relates to the proportion of buses calling. The level of usage may be below the 20% threshold in one direction (and hence would be flagged up in Step 1) but above 20% in the above direction. Again, in this instance, it is prudent to consider the pair of stops for rationalisation.

Note that the methodology assumes that a bus stop needs to be flagged in either Step 1, Step 2 or Step 3 to be considered for removal in Step 4. A bus stop therefore does not need to satisfy all criterion.

Step 4: Consider impact on access standards and key facilities for shortlisted locations

Having used Steps 1-3 to derive a shortlist of locations for potential rationalisation, Atkins has then considered the impact on both the West Midlands Combined Authority Bus Service Access Standards and the accessibility to key facilities, focussing on education and health facilities.

Step 5: Make recommendations for consolidation of bus stops

Finally, taking on board the outcomes of Steps 1 to 4, Atkins has made recommendations to National Express West Midlands around the locations where consolidation may be appropriate.

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4. Key Findings

The findings for Routes 8A and 8C are now outlined.

Mapping Outputs

To support the sifting process, elements of the database have been developed into mapping outputs. These maps have been placed in **Appendix B**. For Routes 8A and 8C, the maps are as follows:

- **Map A:** Showing the proportion of buses calling. Red shading of a stop denotes less than 20% of buses calling. These maps have been used to inform Step 1 of the process;
- **Map B:** Showing distances (metres) between stops. Stops that are within 200m of another stop in the same direction are shown in red, with all other stops shown in green. These maps have been used to inform Step 2 of the process;
- **Map C:** Showing the infrastructure type (whether a pole or a shelter is provided);
- **Map D:** Showing whether the stop is a timing point;
- **Map E:** Showing the services calling at the bus stop (whether the stop is served by the 8A / 8C only or additional services); and
- **Map F:** Showing the location of bus stops relative to schools¹, GP surgeries² and hospitals³. Note that this has been based upon data provided by the DfT.

Tabulated Outputs

Tabulated outputs are now provided to show how the database has been used to derive a shortlist of locations for consolidation.

Step 1: Sift stops with less than 20% of buses calling

Table 2 outlines the stops on the 8A and 8C that have been shortlisted based on less than 20% of buses calling.

The sift (Step 1a) gives rise to five stops on the 8A and two stops on the 8C. Having undertaken further analysis on these locations (Step 1b), Atkins has recommended that only one stop (Ladywood Middleway, Ledsam Street) is considered later in the process, as there are reasons why the remainder of the stops should be retained. These reasons are outlined in Table 2.

Step 2: Sift stops which are within 200m of another stop on the same route

Table 3 outlines the stops on the 8A and 8C that have been shortlisted based on a bus stop being within 200m of another stop on the same route in the same direction (Step 2a).

Note that Table 3 lists all the stops based on this criterion and hence it includes the stops either side of the 200m distance threshold. For example, if Stop B is 200m downstream of Stop A, then the table lists both Stop A and Stop B. In some cases, there are more than two consecutive stops. Solid black lines in Table 3 have been used to highlight the consecutive stops.

¹ Schools in England dataset, Department for Education, last updated 9 March 2017 (downloaded May 2017)

² Details of GPs, GP Practices, Nurses and Pharmacies dataset from Organisation Data Services, published by NHS Digital, available from data.gov.uk (downloaded May 2017)

³ Hospitals dataset, published by NHS Choices, available from data.gov.uk (downloaded May 2017)

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In order to provide a shortlist of locations for detailed assessment under Step 4, a column in Table 3 identifies the suggested stop(s) for removal. This is based on a range of factors, but typically centres on the spacing that remains if a given stop is removed. In some cases, Stop A may be served by Route 8 only whereas Stop B is served by multiple routes. In such instances, the decision has been made, unless specific operational reasons are known, to suggest that Stop A is removed. The specific reasons for choosing one stop over another are outlined in the right-most column of Table 3.

Step 3: Consider additional locations where stops are not paired or where the paired stop was identified in Step 1 or Step 2

Finally, Atkins has undertaken a process to identify any additional locations. The results are outlined in Table 4, with the right-most column providing justification. The table shows that of the eight stops, most were identified as a result of the stop in the opposite direction being flagged in either Step 1 or Step 2.

Table 2. <20% of buses calling (Step 1)

Stop Name (Yellow = 8A, Blue = 8C)	ATCO	Proceed to Step 4?	Suggested Removal?
SALTLEY ROAD, Heartlands Parkway/Nechells Place	43000243103	No	Interchange with several other routes is provided at this stop. The route west of this location has recently been rationalised with services no longer routing via Bloomsbury Street and Cromwell Street
GOODRICK WAY	43002500401	No	As above, the route is already being rationalised in this area with a shorter route now provided
ROCKY LANE, Cheston Rd/Aston/William Henry St	43000250202	No	If this stop were removed, the distance between adjacent stops would be approximately 700m, in an area where few other bus services operate
LEE BANK MIDDLEWAY, Lee Crescent	43000213702	No	If this stop were removed, the distance between adjacent stops would be approximately 700m. In addition, this stop serves the James Brindley School and the Park Central Residential Area. No other buses serve this area and hence removal is unlikely to be appropriate
BORDESLEY GREEN RD, Burbidge Rd	43000237602	No	Despite being lightly used, serves Adderley Park Railway Station and therefore provides useful interchange between different modes
GOLDEN HILLOCK RD, Small Heath Station	43000226302	No	Despite being lightly used, serves Small Heath Railway Station and therefore provides useful interchange between different modes
LADYWOOD MIDDLEWAY, Ledsam Street	43000288201	Yes	Subject to mapping against the access standards and further interrogation of key facilities

Table 3. Stops within 200m of another stop (Step 2)

Stop Name (Yellow = 8A, Blue = 8C)	ATCO	Proceed to Step 4?	Suggested Removal?
ADDERLEY RD, Saltley/The Gate	43000240401	No	Both stops to be retained given future HS2 construction works in this area
HIGH STREET, Saltley Trading Estate	43000243203	No	
CLIFFORD STREET, Lozells School	43000272102	Yes	Remove ATCO xx102 given interchange with other routes at ATCO xx103
WHEELER ST, Holte Sch/Gerrard St/Lozells	43000272203	No	
GERRARD STREET, Lozells Street	43000272302	No	Remove ATCO xx402 given spacing between three consecutive stops
NURSERY RD, Burbury Street	43000272402	Yes	
NURSERY RD, Church Street	43000272501	No	
WARSTONE LANE, Birmingham Mint/Carver	43000282902	No	Remove ATCO xx603
ICKNIELD ST, Spring Hill Island/Camden St	43000283603	Yes	
LADYWOOD MIDDLEWAY, Ladywood Social	43000288102	No	Remove ATCO xx001 given spacing between three consecutive stops and only Route 8 services at ATCO xx001
LADYWOOD MIDDLEWAY, Morville St	43000301001	Yes	
LADYWOOD MIDDLEWAY, Friston Avenue	43000300502	No	
HIGHGATE RD, Queen Street/Sparkbrook	43000221009	Yes	Remove ATCO xx009 given preference to remove stop prior to signals
WALFORD RD, Stratford Rd	43000221506	No	
GOLDEN HILLOCK RD, Coventry Rd/Muntz	43002303001	No	Remove ATCO xx505 given spacing between three consecutive stops
MUNTZ STREET, Coventry Rd/Small Heath	43002302505	Yes	
MUNTZ STREET, Baker Street	43000231502	No	
VICTORIA STREET, Bordesley Green	43002304004	Yes	Remove ATCO xx004 given preference to remove stop prior to signals
BORDESLEY GREEN RD, Bordesley Green	43002304501	No	
ADDERLEY RD, Saltley/The Gate	43000240402	No	Stop to be retained given future HS2 construction works in this area
ASH RD, Hall Rd	43000240202	No	Remove ATCO xx202 given spacing between two consecutive stops
ASH RD, Arden Rd	43002400502	No	
BORDESLEY GREEN RD, Burbidge Rd	43000237601	No	Remove ATCO xx601 (ATCO xx601 and xx501 currently 100m apart)
BORDESLEY GREEN RD, Ronald Road	43000237501	Yes	
BORDESLEY GREEN RD, Bordesley Green	43002304502	Yes	Remove ATCO xx502 given preference to remove stop prior to signals
VICTORIA STREET, Bordesley Green	43002304003	No	
MUNTZ STREET, Baker Street	43000231501	No	Remove ATCO xx504 and ATCO xx905 given spacing between consecutive stops
MUNTZ STREET, Coventry Rd/Small Heath	43002302504	Yes	
GOLDEN HILLOCK RD, Coventry Rd/Muntz	43002303002	No	
GOLDEN HILLOCK RD, Wordsworth Rd/Waverley	43000233905	Yes	
GOLDEN HILLOCK RD, Waverley Rd	43000231201	No	
BELGRAVE RD, Barrow Walk	43000212302	No	Remove ATCO xx501 given preference to remove stop prior to any signals
BELGRAVE RD, Pershore Road	43000213501	Yes	
NURSERY RD, Church Street	43000272502	No	Remove ATCO xx301 given spacing between consecutive stops
NURSERY RD, Burbury Street	43000272401	No	
GERRARD STREET, Lozells Street	43000272301	Yes	
GERRARD STREET, Holte Sch/Wheeler	43002720002	No	
HIGH STREET, Saltley Trading Estate	43000243204	No	Stop to be retained given future HS2 construction works in this area

Table 4. Additional locations (Step 3)

Stop Name (Yellow = 8A, Blue = 8C)	ATCO	Proceed to Step 4?	Supporting Comment
LADYWOOD MIDDLEWAY, Ledsam Street	43000288202	Yes	Stop in opposite direction flagged in Step 1
BELGRAVE RD, Pershore Road	43000213502	Yes	Stop in opposite direction flagged in Step 1
BORDESLEY GREEN RD, Ronald Road	43000237502	Yes*	Shortlisted in opposite direction in Step 2. *Consider combining two stops at this location
BORDESLEY GREEN RD, Burbidge Rd	43000237602	Yes*	
ADDERLEY RD, Crawford Street	43000238901	Yes	Additional location – served by 8C but not 8A
WALFORD RD, Stratford Rd	43000221505	Yes	Shortlisted in opposite direction in Step 2
ICKNIELD ST, Spring Hill Island/Camden St	43000283604	Yes	Shortlisted in opposite direction in Step 2
CLIFFORD STREET, Lozells School	43000272101	Yes	Shortlisted in opposite direction in Step 2

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Step 4: Consider impact on access standards and key facilities for shortlisted locations

The shortlisted locations from Steps 1, 2 and 3 are outlined in Table 5.

For each location, Atkins has then undertaken a process of considering whether removing the stop will have an impact on the West Midlands Combined Authority Bus Access Standards. Through agreement with National Express West Midlands and TfWM, Atkins has mapped the impact of removing the bus stop using ArcGIS software. Note that this analysis is based on the highway network only⁴ and hence in a situation where the access standard (by highway) is no longer being met, it is necessary to consider whether footways may mean that the access standard is in fact being met. The results of the analysis are outlined in Figure 5 onwards.

Note that rather than considering each stop in isolation, Atkins has mapped the entirety of the impact of all stops in Table 5 being removed. Figures 5 onwards show that in virtually all cases, there has been very little impact on the access standards, with the density of bus stops on other routes meaning that even once a Route 8A / 8C stop is removed, adjacent residential areas are still within 400m of another bus stop, which means that the access standard is still being met. The one exception to this, where it appears that the access standard is no longer being met, is highlighted in Map 009 (Figure 13). Figure 13 shows that with removal of two stops on Ladywood Middleway (Ledsam Street), a stretch of Rodney Close is no longer meeting the access standard, which means that it is no longer within 400m by highway of another bus stop. However, further interrogation of the layout in Rodney Close shows that a footpath (see Figure 3) provides access to the (retained) stops on Ladywood Middleway (Icknield Street). For this reason, it is reasonable to conclude that the changes outlined in Table 5 do not have any adverse impact in regard to the access standards.

Figure 3. Rodney Close – Footway Access to Ladywood Middleway (Icknield Street)



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⁴ <https://www.ordnancesurvey.co.uk/business-and-government/products/meridian2.html>

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Finally, for the shortlisted locations outlined in Table 5, Atkins has made an assessment to determine whether removal of the stop will have an implication in regard to access to key facilities, focussing on schools, hospitals and GP surgeries. This assessment uses Map F in **Appendix A**.

The assessment has shown that the proposed stops for removal are not adversely impacting accessibility to key facilities. Even with removal of some stops, the spacing of stops remains relatively dense and therefore key facilities are still adequately served. An overview map of the proposed consolidation, alongside the key facilities, is shown in Figure 16.

Step 5: Make recommendations for consolidation of bus stops

On the basis of the analysis presented to date, Atkins recommends that the full list of stops in Table 5 is considered by National Express West Midlands for rationalisation.

A reasonable working assumption⁵ is that removal of one stop can save of the order of 30 seconds, given the need for the bus to decelerate / accelerate and the dwell time associated with passengers boarding and alighting. Clearly the exact extent of the saving will be dependent upon local conditions, including the ability for the bus to merge back into general traffic.

With 10-12 stops being removed in both directions, it is therefore reasonable to assume that approximately five minutes could be saved on the journey time in both directions, which may enable a reduction in the peak vehicle requirement (PVR) for National Express West Midlands. Reducing the number of stops is also expected to lead to an increase in punctuality, which was one of the stated targets of the West Midlands Bus Alliance.

⁵ Working assumption for National Express West Midlands

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Table 5. List of Locations for Assessment in Step 4

Stop Name	ATCO	Identified in:	Access Standard Met based on proposal?	Access to Key Facilities Maintained?
CLIFFORD STREET, Lozells School	43000272102	Step 2 (<200m spacing)	✓ (Figure 5)	✓ (See Figure 15 for all)
NURSERY RD, Burbury Street	43000272402	Step 2 (<200m spacing)	✓ (Figure 5)	✓
ICKNIELD ST, Spring Hill Island/Camden St	43000283603	Step 2 (<200m spacing)	✓ (Figure 14)	✓
LADYWOOD MIDDLEWAY, Ledsam Street	43000288202	Step 3 (additional)	✓ (Figure 13)	✓
LADYWOOD MIDDLEWAY, Morville St	43000301001	Step 2 (<200m spacing)	✓ (Figure 12)	✓
BELGRAVE RD, Pershore Road	43000213502	Step 3 (additional)	✓ (Figure 11)	✓
HIGHGATE RD, Queen Street/Sparkbrook	43000221009	Step 2 (<200m spacing)	✓ (Figure 10)	✓
MUNTZ STREET, Coventry Rd/Small Heath	43002302505	Step 2 (<200m spacing)	✓ (Figure 9)	✓
VICTORIA STREET, Bordesley Green	43002304004	Step 2 (<200m spacing)	✓ (Figure 8)	✓
BORDESLEY GREEN RD, Ronald Road	New	Step 2 (<200m spacing)	✓ (Figure 7)	✓
ADDERLEY RD, Crawford Street	43000238901	Step 3 (additional)	✓ (Figure 6)	✓
ASH RD, Hall Rd	43000240202	Step 2 (<200m spacing)	✓ (Figure 6)	✓
BORDESLEY GREEN RD, Ronald Road	43000237501	Step 2 (<200m spacing)	✓ (Figure 7)	✓
BORDESLEY GREEN RD, Bordesley Green	43002304502	Step 2 (<200m spacing)	✓ (Figure 8)	✓
MUNTZ STREET, Coventry Rd/Small Heath	43002302504	Step 2 (<200m spacing)	✓ (Figure 9)	✓
GOLDEN HILLOCK RD, Wordsworth Rd/Waverley	43000233905	Step 2 (<200m spacing)	✓ (Figure 9)	✓
WALFORD RD, Stratford Rd	43000221505	Step 3 (additional)	✓ (Figure 10)	✓
BELGRAVE RD, Pershore Road	43000213501	Step 2 (<200m spacing)	✓ (Figure 11)	✓
LADYWOOD MIDDLEWAY, Ledsam Street	43000288201	Step 1 (<20% usage)	✓ (Figure 13)	✓
ICKNIELD ST, Spring Hill Island/Camden St	43000283604	Step 3 (additional)	✓ (Figure 14)	✓
GERRARD STREET, Lozells Street	43000272301	Step 2 (<200m spacing)	✓ (Figure 5)	✓
CLIFFORD STREET, Lozells School	43000272101	Step 3 (additional)	✓ (Figure 5)	✓

Figure 4. Proposed Rationalisation (Overview)

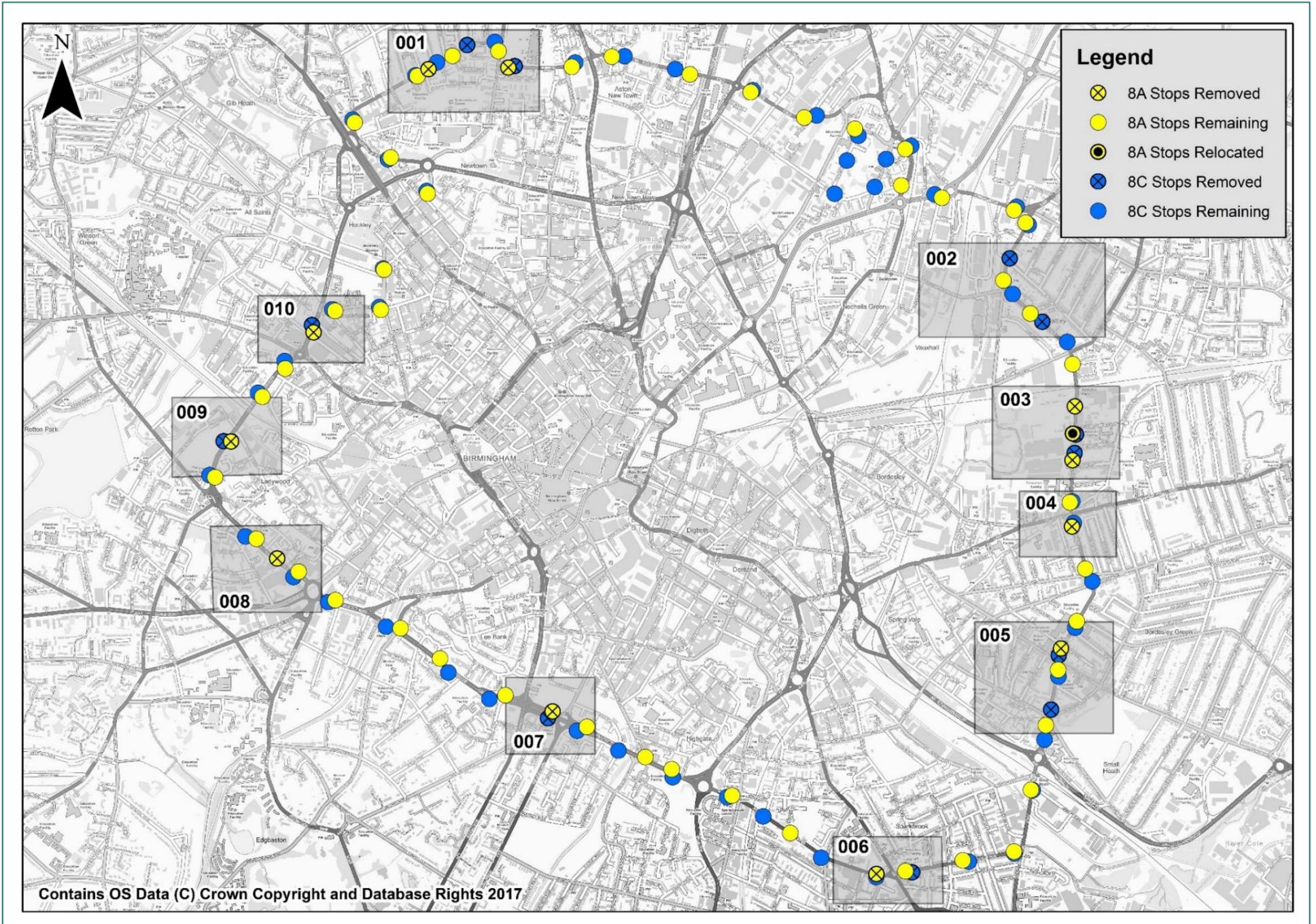


Figure 5. Supporting Map - 001

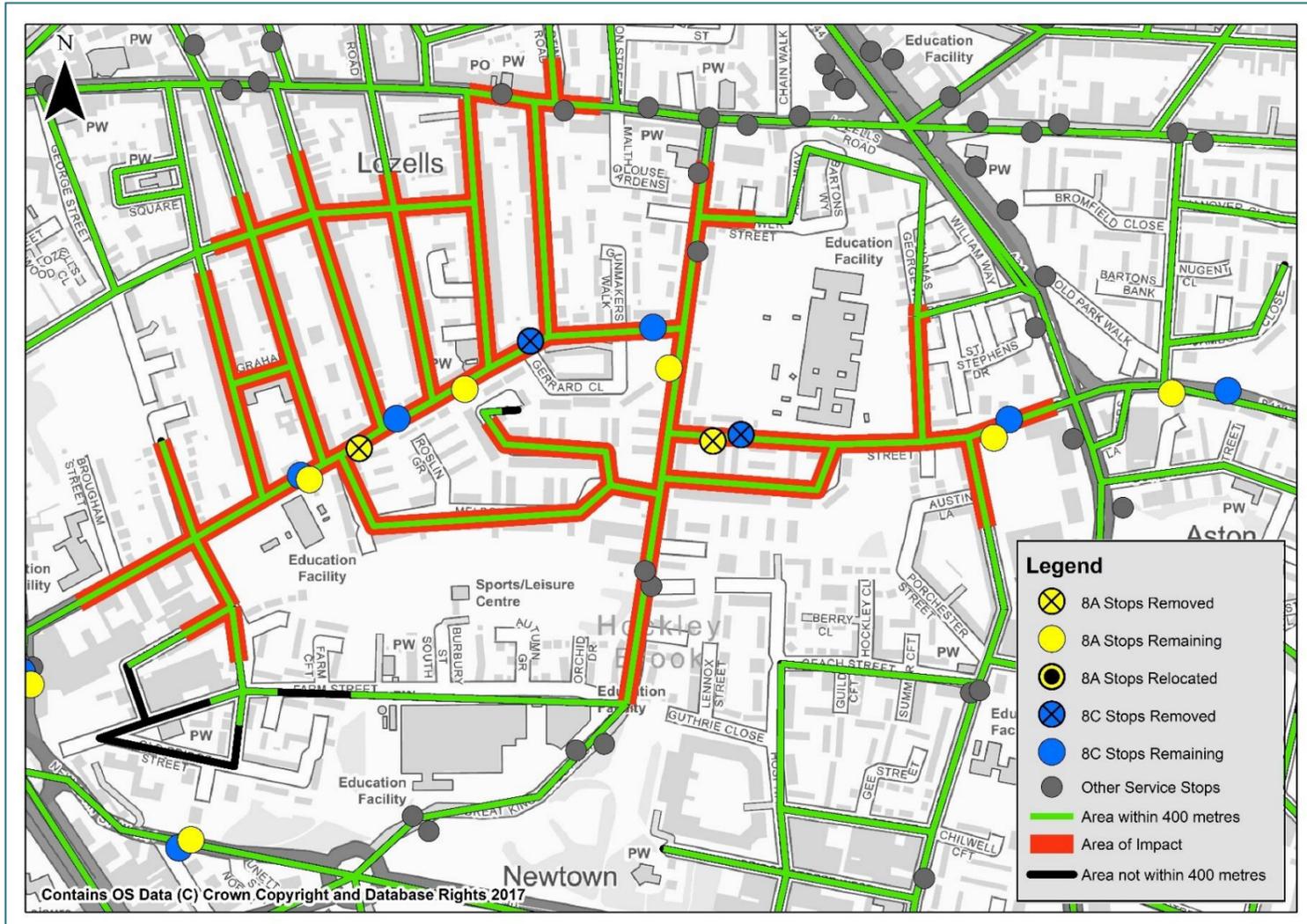


Figure 6. Supporting Map - 002

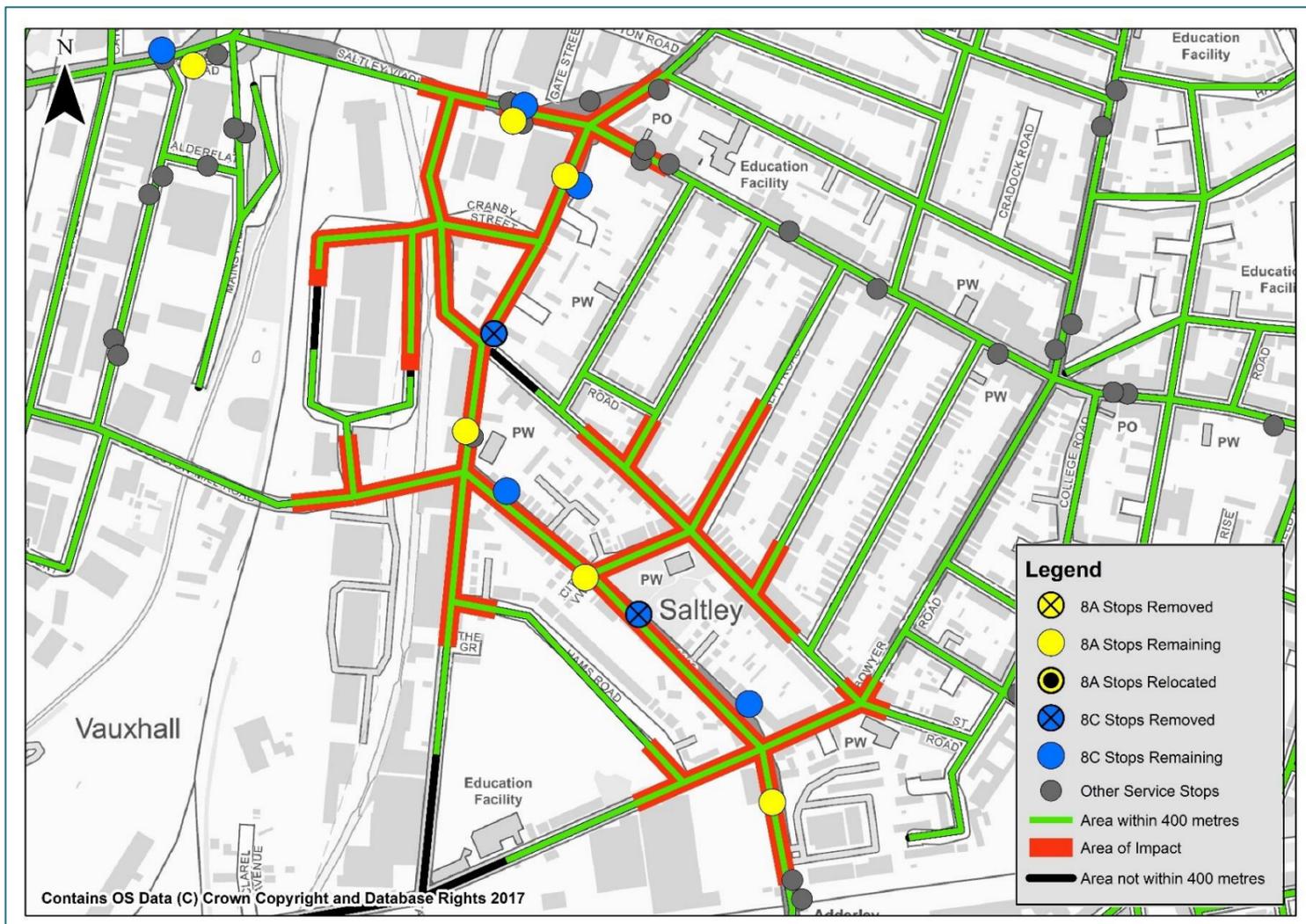


Figure 7. Supporting Map - 003

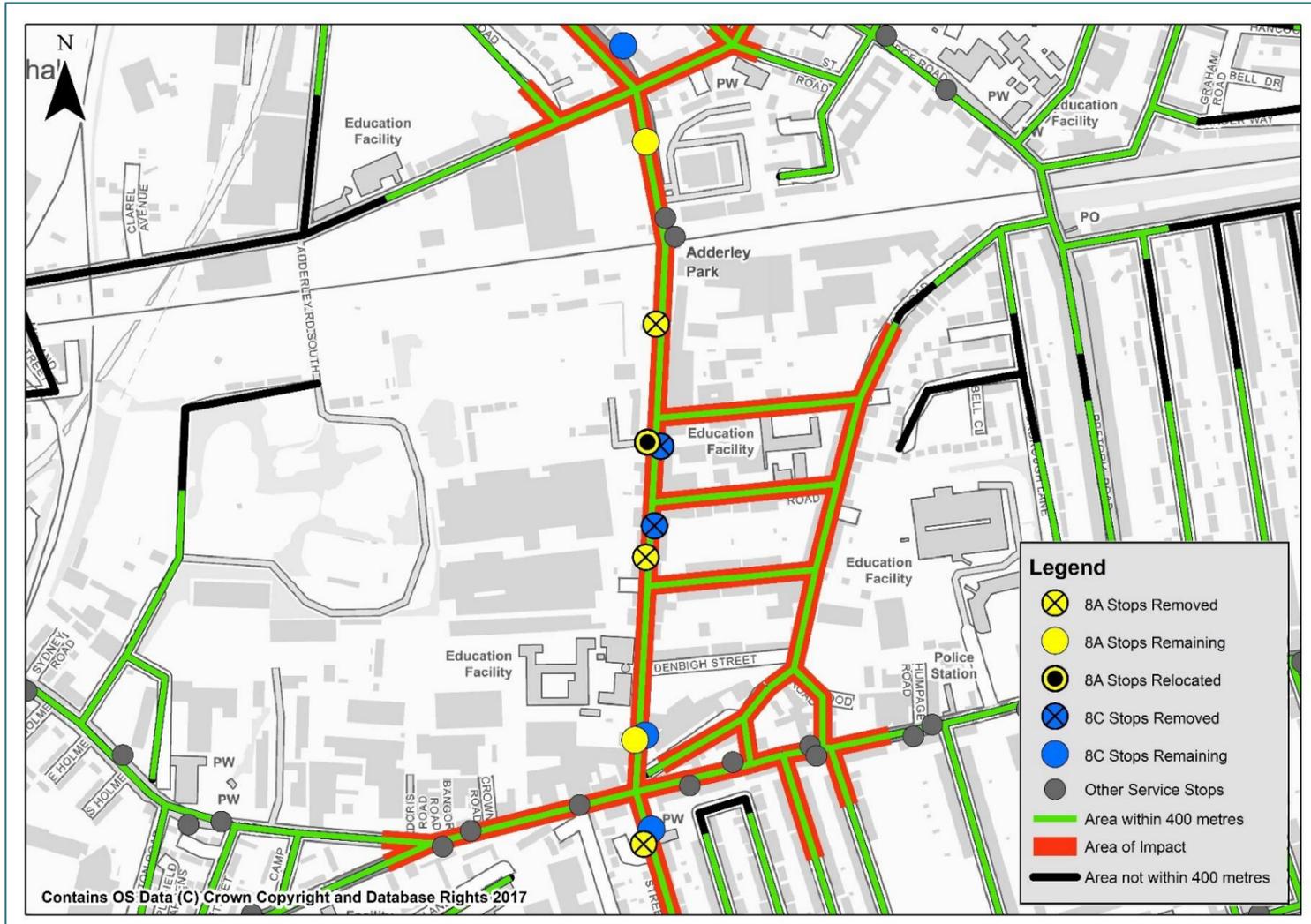


Figure 8. Supporting Map - 004

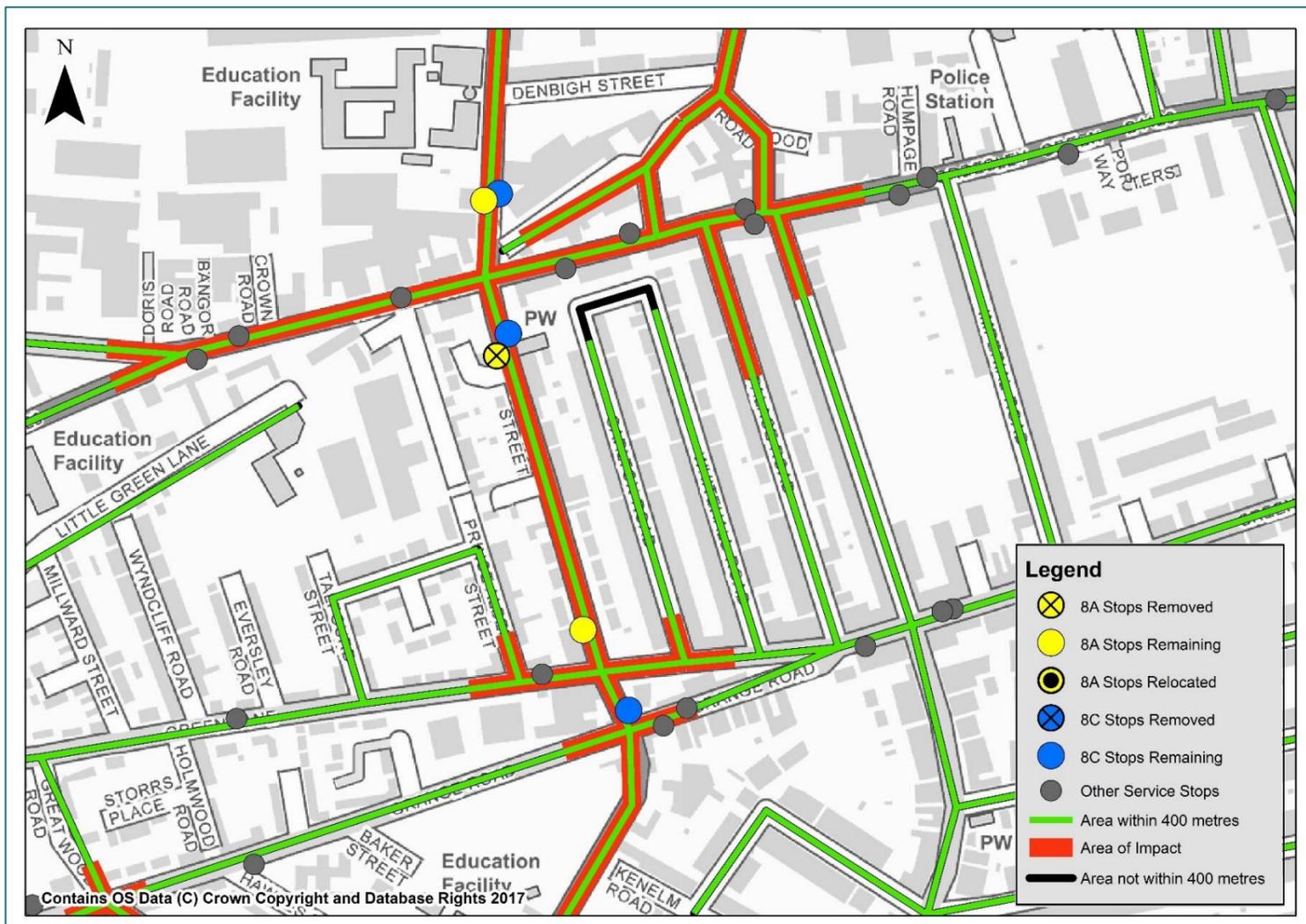


Figure 9. Supporting Map - 005

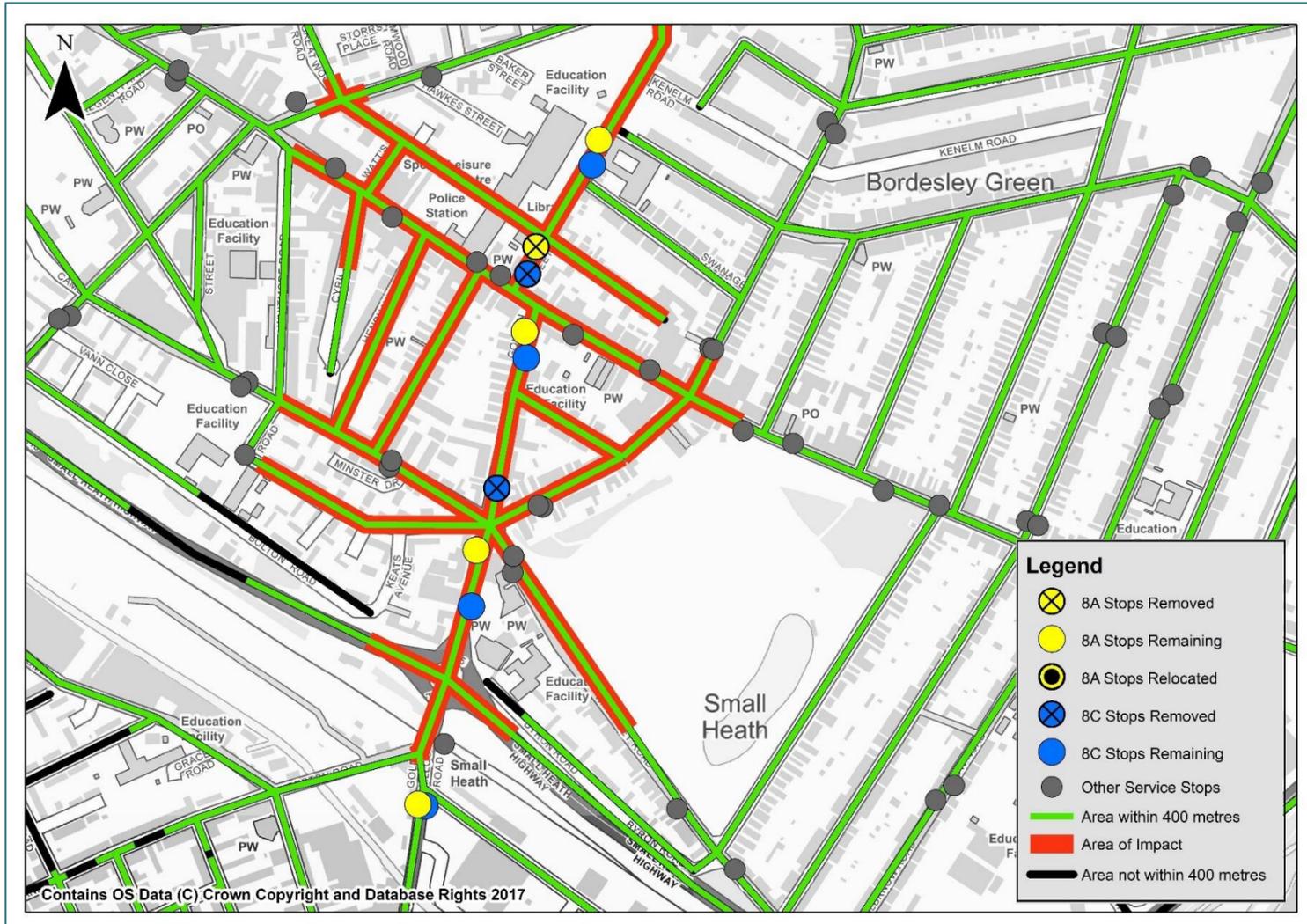


Figure 10. Supporting Map - 006

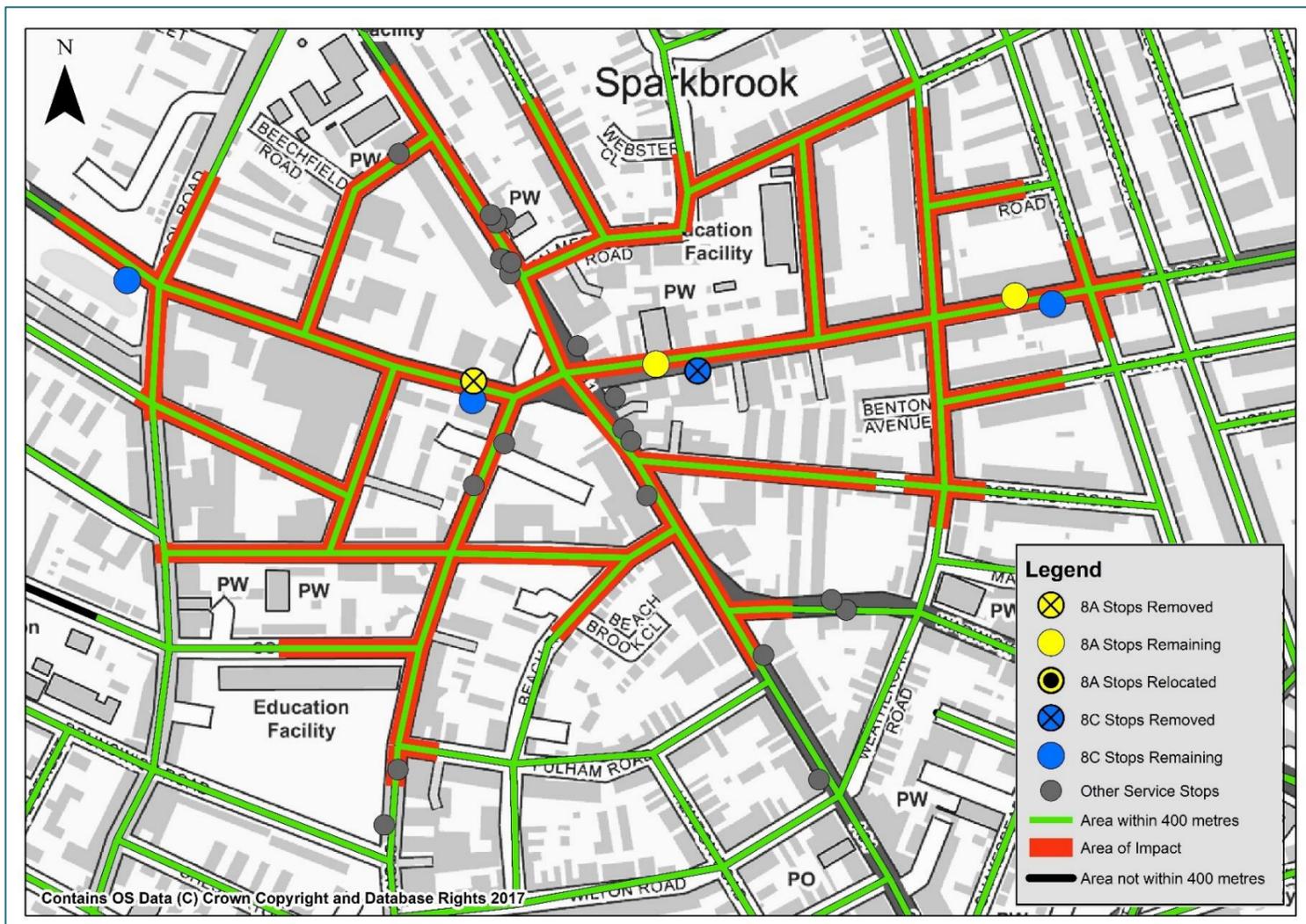


Figure 11. Supporting Map - 007

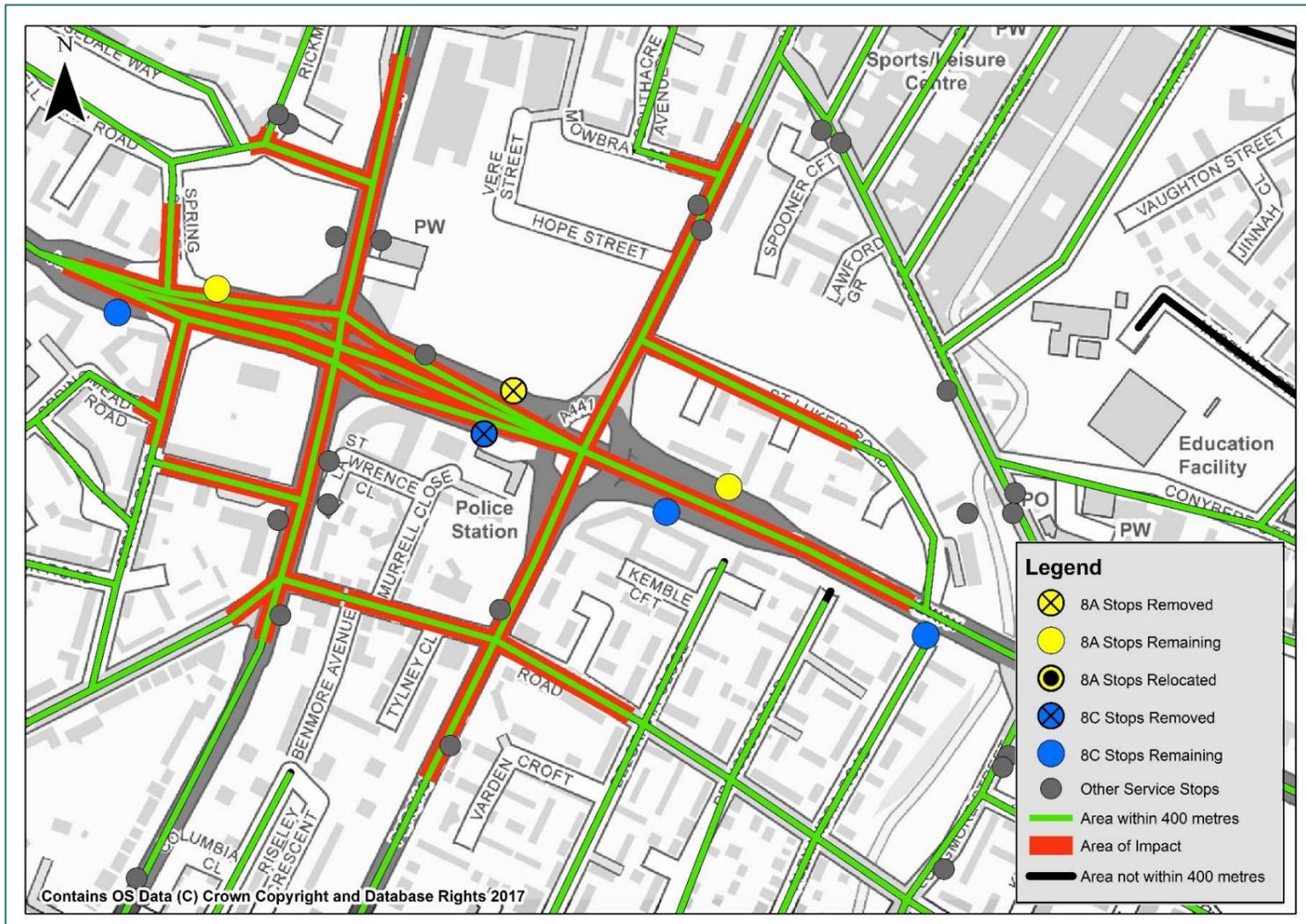


Figure 12. Supporting Map - 008

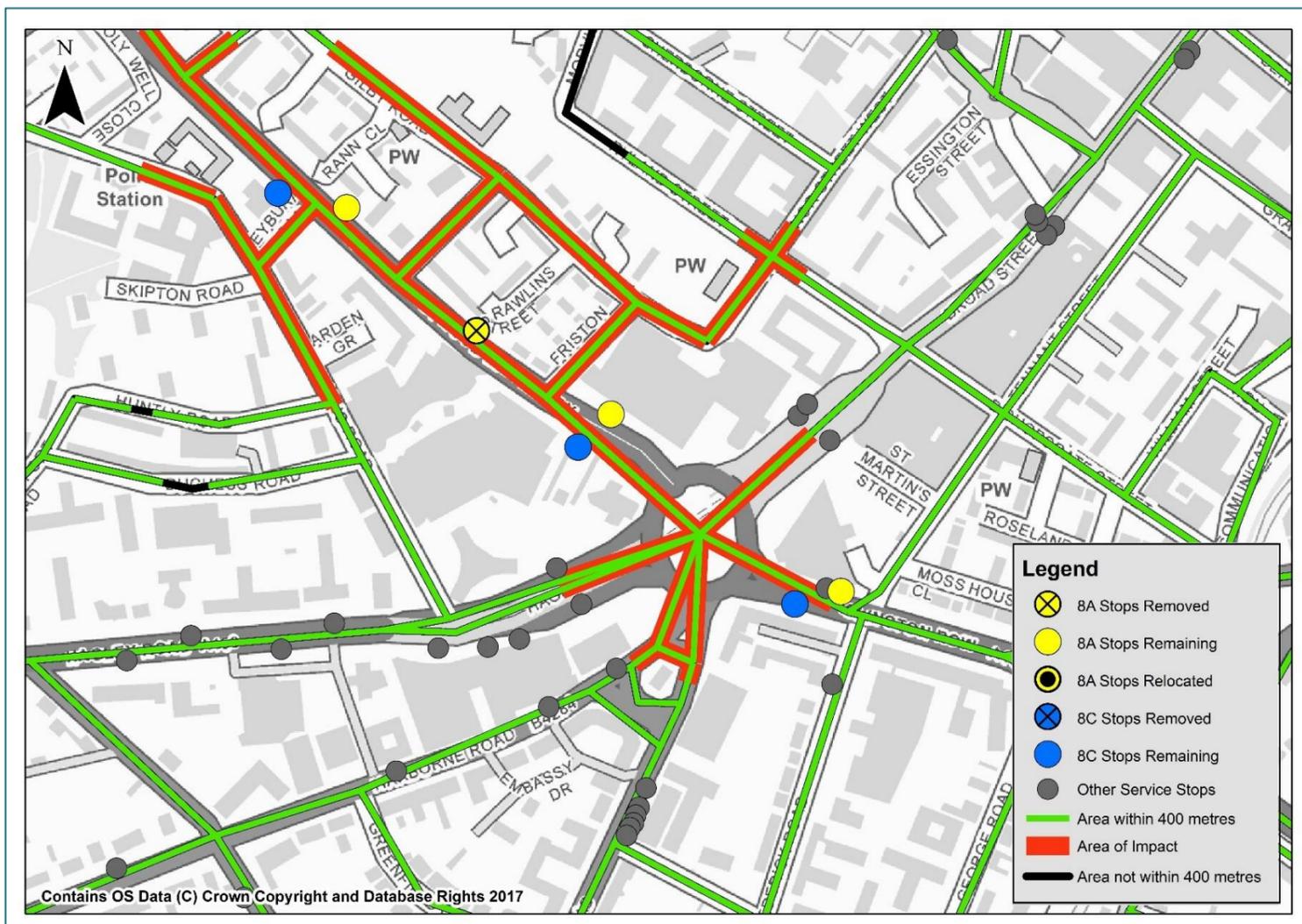


Figure 13. Supporting Map - 009

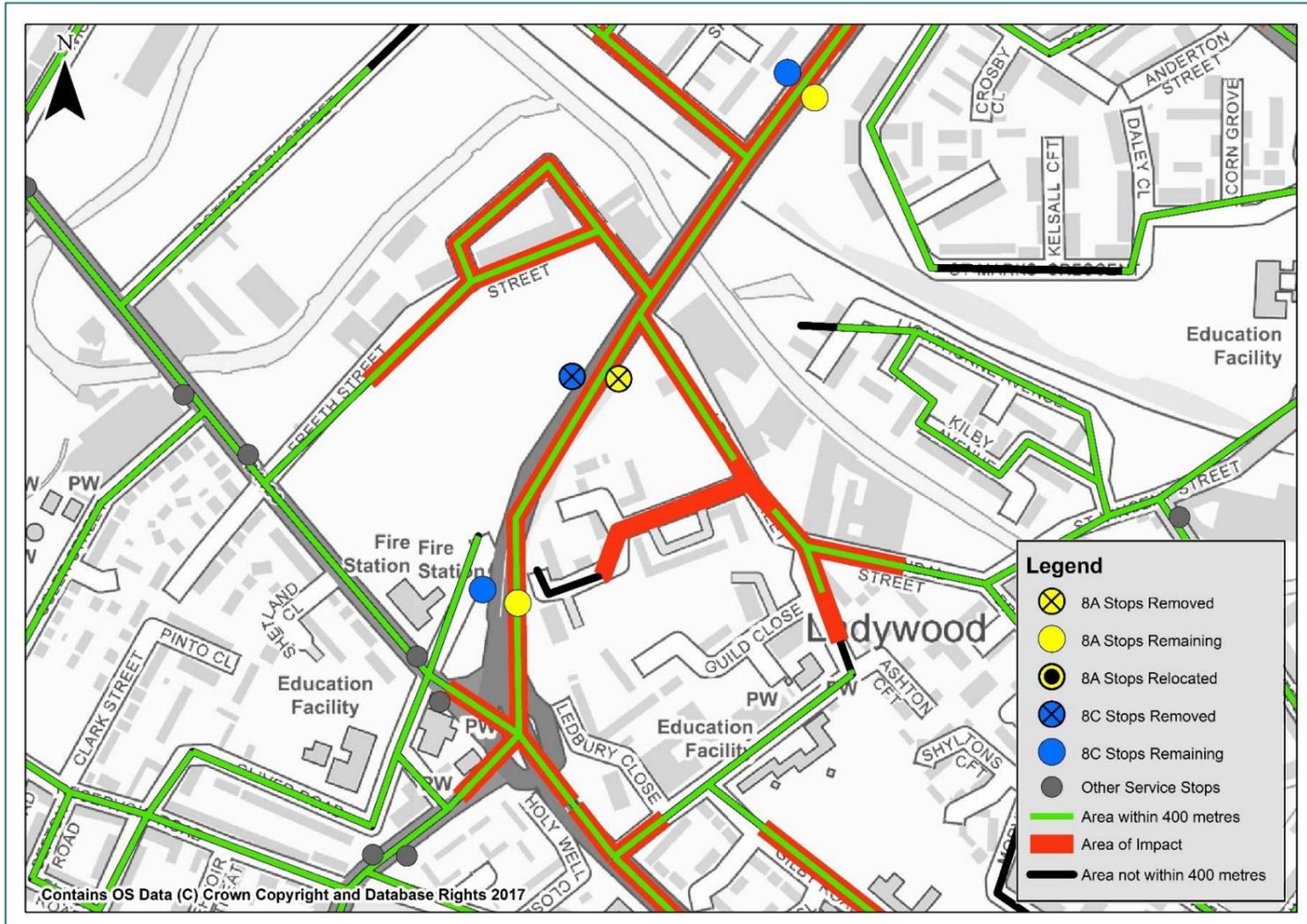


Figure 14. Supporting Map - 010

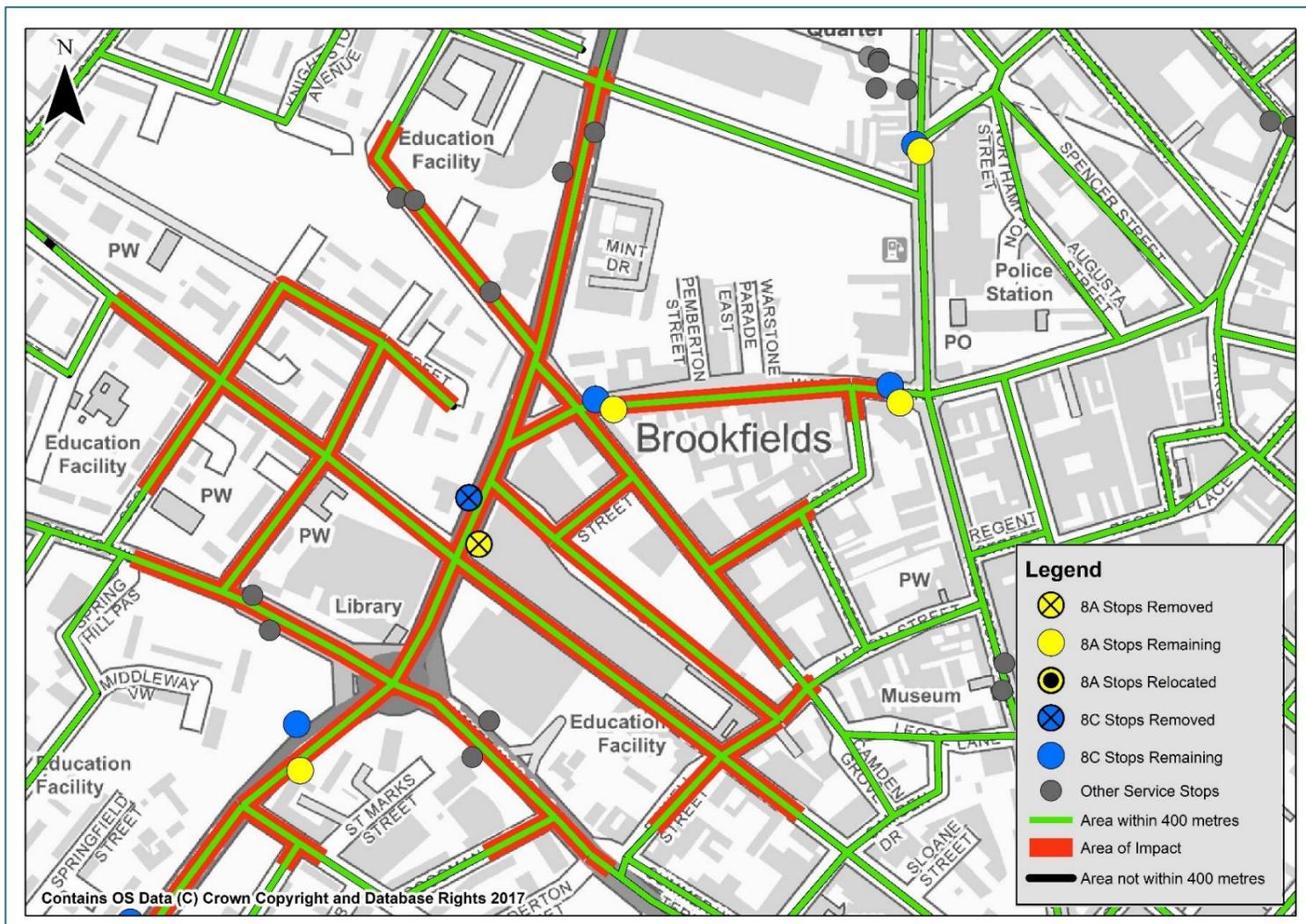
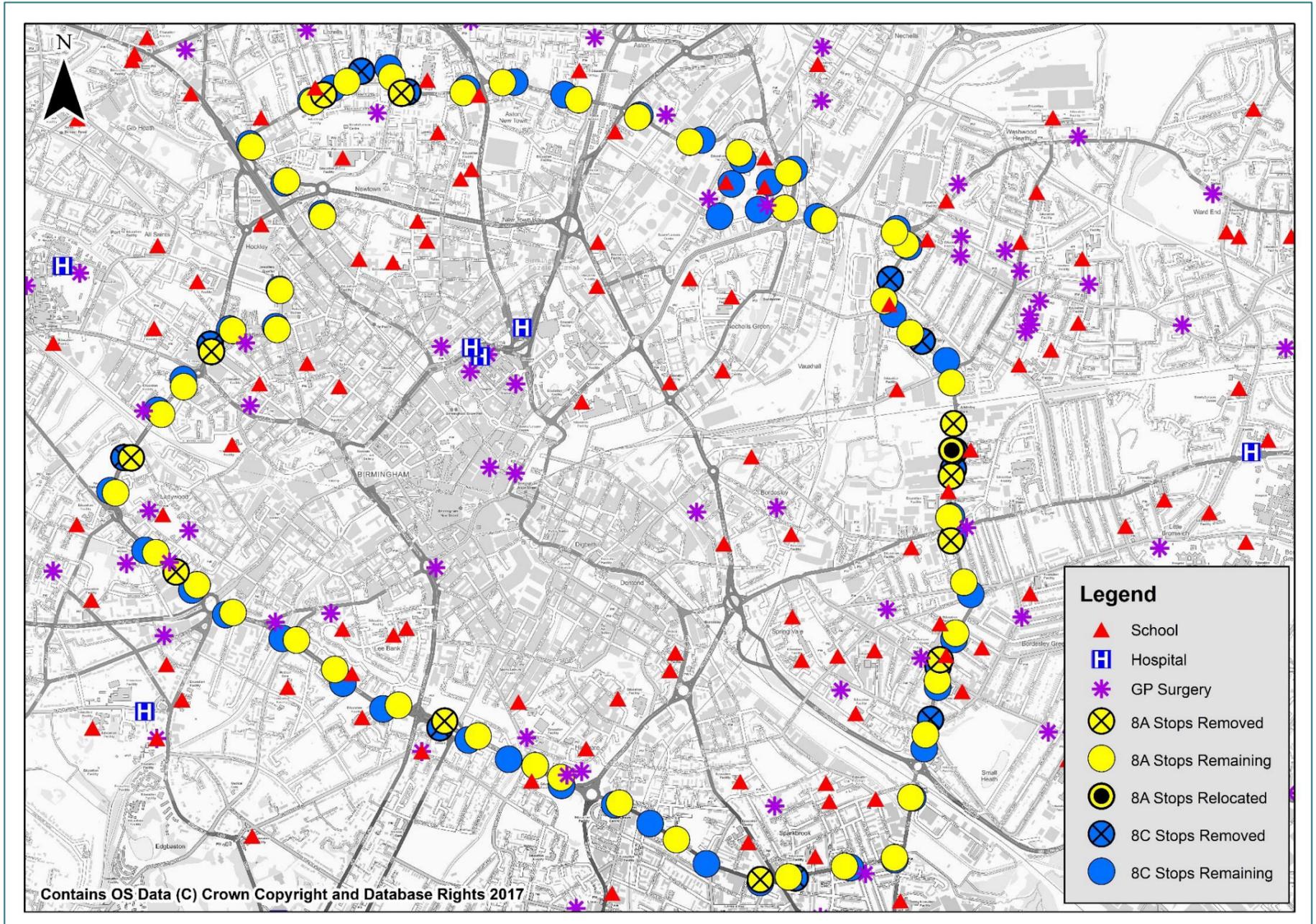


Figure 15. Proposed Rationalisation alongside Key Facilities



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5. Summary

Atkins was commissioned by National Express West Midlands to undertake a study investigating the scope for bus stops on several routes in Birmingham to be rationalised. This was in response to growing concern from National Express West Midlands and TfWM regarding increasingly long and unreliable bus journeys in the West Midlands.

There are several credible approaches which could be taken to determine the optimum stops for removal, but through discussion with National Express West Midlands and TfWM, Atkins has agreed a five-step process. This process has been informed by data provided by a combination of TfWM, the DfT and National Express West Midlands.

The focus of this commission has been on Route 8, which is a circular route, with 8A denoting buses traversing the route in the anti-clockwise direction and 8C denoting buses in the clockwise direction. The route serves the inner suburbs of the city and provides interchange with the key Birmingham radial corridors. The daytime frequency is five buses per hour (BPH), with buses taking approximately 70-80 minutes to complete the route. Timetabled journey times vary considerably through the day, reflecting both congestion in the city and differing dwell times in response to demand.

Having undertaken the five step process, Atkins has recommended a list of stops (10-12 stops per direction) which could be removed / relocated in the future. A reasonable working assumption is that removal of one stop can save of the order of 30 seconds, given the need for the bus to decelerate / accelerate and the dwell time associated with passengers boarding and alighting. On the basis of 10-12 stops being removed in both directions, it is reasonable to assume that approximately five minutes could be saved on the journey time in both directions, which may enable a reduction in the peak vehicle requirement (PVR) for National Express West Midlands. Reducing the number of stops is also expected to lead to an increase in punctuality, which was one of the stated targets of the West Midlands Bus Alliance.

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Appendix A. West Midlands Combined Authority Bus Service Access Standards

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West Midlands Combined Authority Bus Service Access Standards

Accessibility to the bus network

- 1.1 Residential Areas – The maximum desirable walking distance to bus services in continuously built-up areas is 400 metres during the hours of 07.00 to 19.00 on Monday to Saturday and 700 metres at other times. Wherever possible the services should provide links to local centres (post office, shops, services etc) and to interchanges with the public transport network.
- 1.2 The above distances are reduced in areas of severe gradients or where a high proportion of elderly people or people with mobility difficulties reside.
- 1.3 In lower density built-up areas the maximum desirable walking distance at all times is 700 metres, and in rural areas 1.5km.
- 1.4 Hospitals – minimum standards of service calculated according to total trips per annum using all modes of transport, to individual sites.
- 1.5 Major Urban Centres – bus access arrangements should be equivalent to or better than those provided for car users.
- 1.6 Suburban District Shopping Centres – to be served as closely as road layout will allow during main shop opening periods.
- 1.7 Places of Entertainment and Recreation – attractions be within 400/700 metres of a bus service during the hours of opening. Where this is not met, a special service with partnership funding will be considered.
- 1.8 Normal bus access standards will apply in Midland Metro and Bus Rapid Transit corridors unless adapted to reflect agreed local circumstances in relation to the provision of these rapid transit modes.

Frequency

- 2.1 Mondays to Saturdays - Minimum standard frequency for:
 - (a) Continuously built up areas: between 07.00 and 19.00 is two journeys per hour.
 - (b) Low density residential areas: between 07.00 and 19.00 is one journey per hour.
 - (c) Rural areas: between 07.00 and 19.00 is one journey per hour.

Technical note

- 2.2 Sundays – One journey per hour in continuously built up areas between noon and 19.00 hours, and subject to demand at other times, and elsewhere. As funding allows, this will be increased to a half hour frequency in continuously built-up areas between 10.00 and 18.00 hours.
- 2.3 Bank Holidays – As Sunday Services, excluding Christmas Day and Boxing Day. Special arrangements will apply for Boxing Day and New Year's Day.

Value for money requirements

- 3.1 Research will identify demand for services which are deemed to be socially necessary.
- 3.2 Services are categorised in the following order of priority, to be provided subject to available finance.
 - 1. Journeys to work
 - 2. Shopping and medical journeys
 - 3. Sundays and Bank Holidays
 - 4. Evenings
 - 5. Town and City Centre distributor services
 - 6. Night Services
- 3.3 Specific Journey Requirements – per trip
 - (a) 8 people or less: no service
 - (b) 8 – 10 people: feeder facility considered
 - (c) more than 10 people: through facility considered
- 3.4 Regular Journey Requirements – per hour
 - (d) 8 people or less: no service
 - (e) 8 – 10 people: feeder facility considered
 - (f) more than 10 people: minimum hourly service

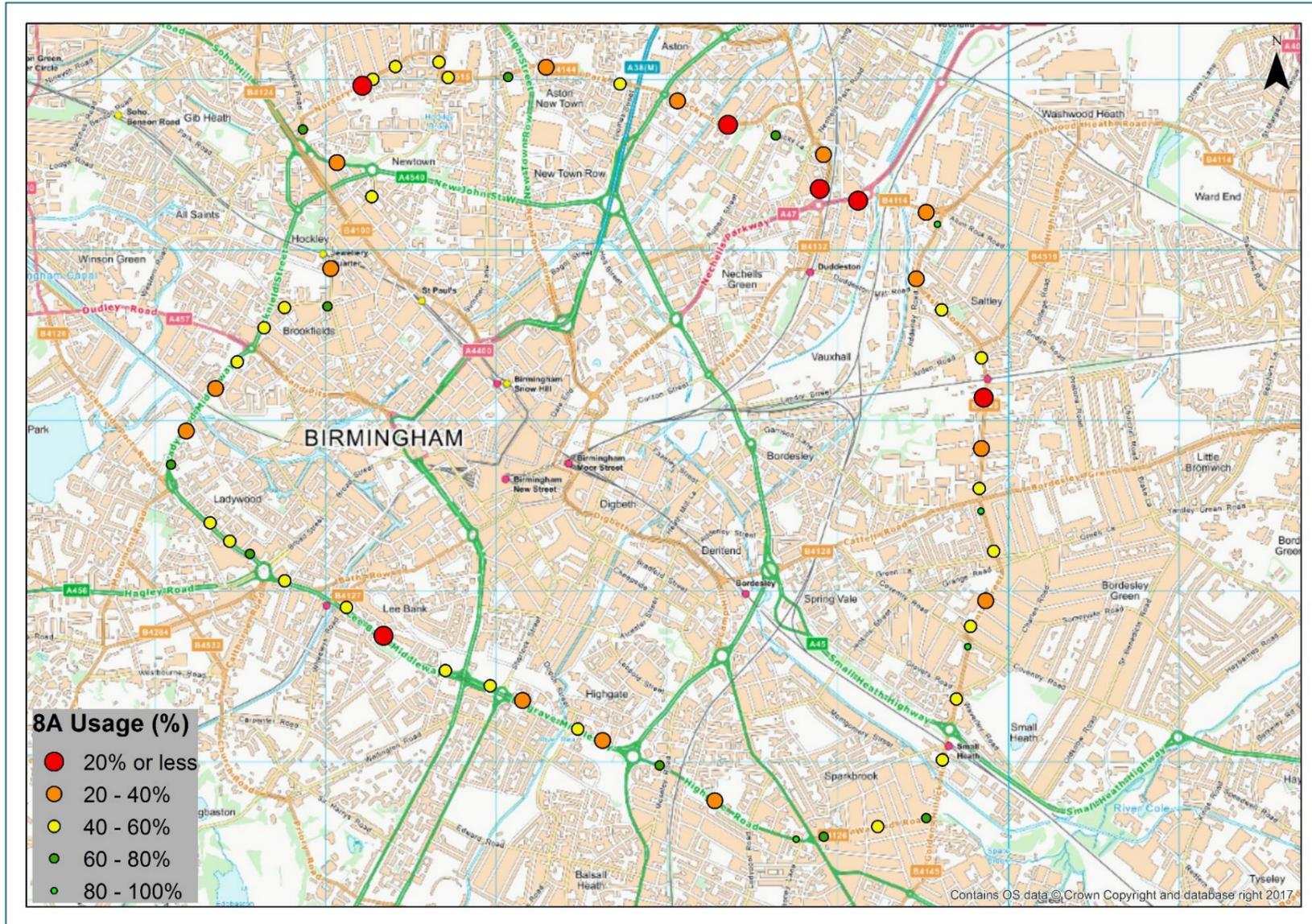
Technical note

Appendix B. Supporting Mapping for Routes 8A / 8C

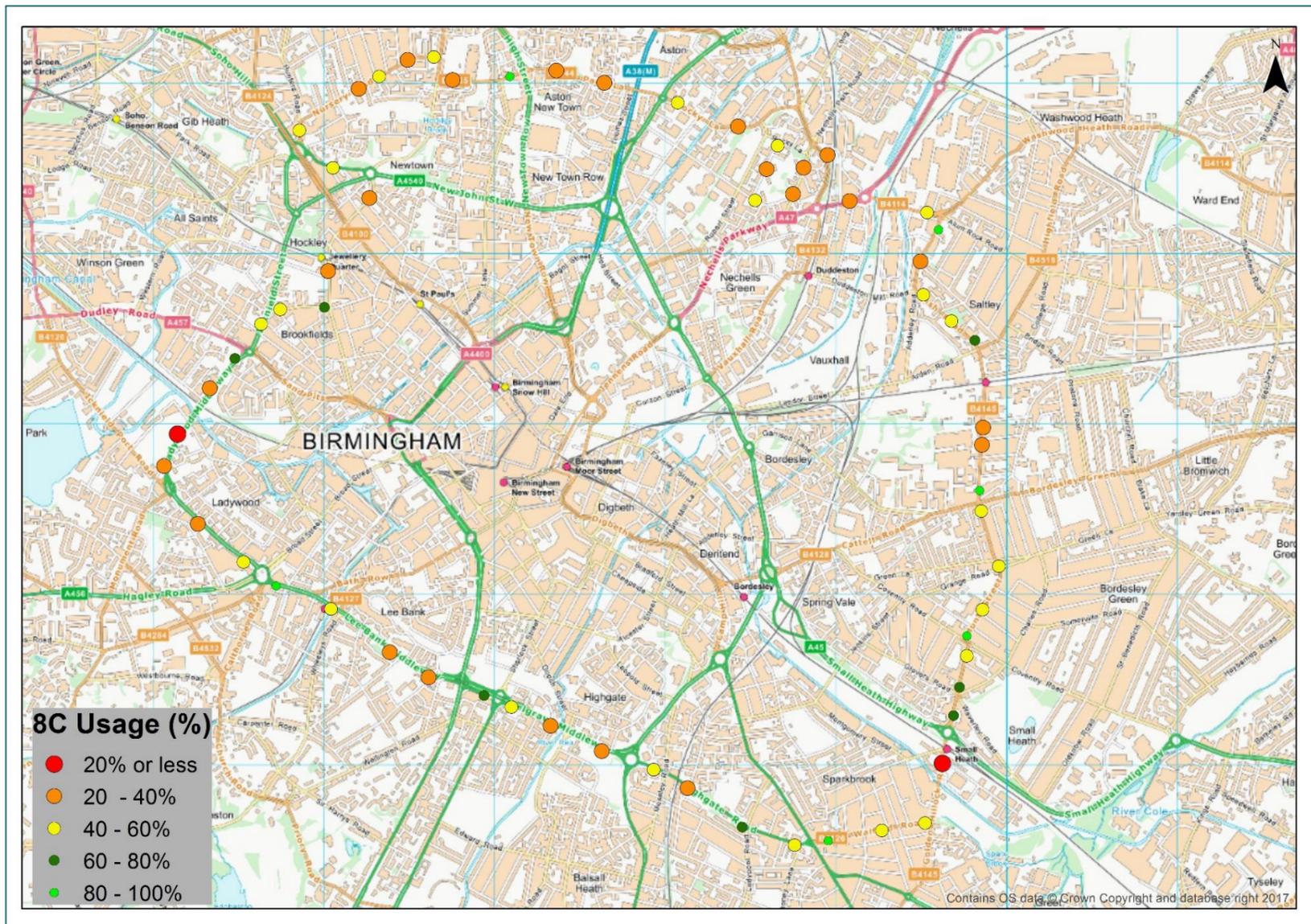
- **Map A:** Showing the proportion of buses calling. Red shading of a stop denotes less than 20% of buses calling. These maps have been used to inform Step 1 of the process;
- **Map B:** Showing distances (metres) between stops. Stops that are within 200m of another stop in the same direction are shown in red, with all other stops shown in green. These maps have been used to inform Step 2 of the process;
- **Map C:** Showing the infrastructure type (whether a pole or a shelter is provided);
- **Map D:** Showing whether the stop is a timing point;
- **Map E:** Showing the services calling at the bus stop (whether the stop is served by the 8A / 8C only or additional services); and
- **Map F:** Showing the location of bus stops relative to schools, GP surgeries and hospitals. Note that this has been based upon the DfT layer.

Note these maps currently show the old layout for Route 8C in the Nechells Green area. To be updated.

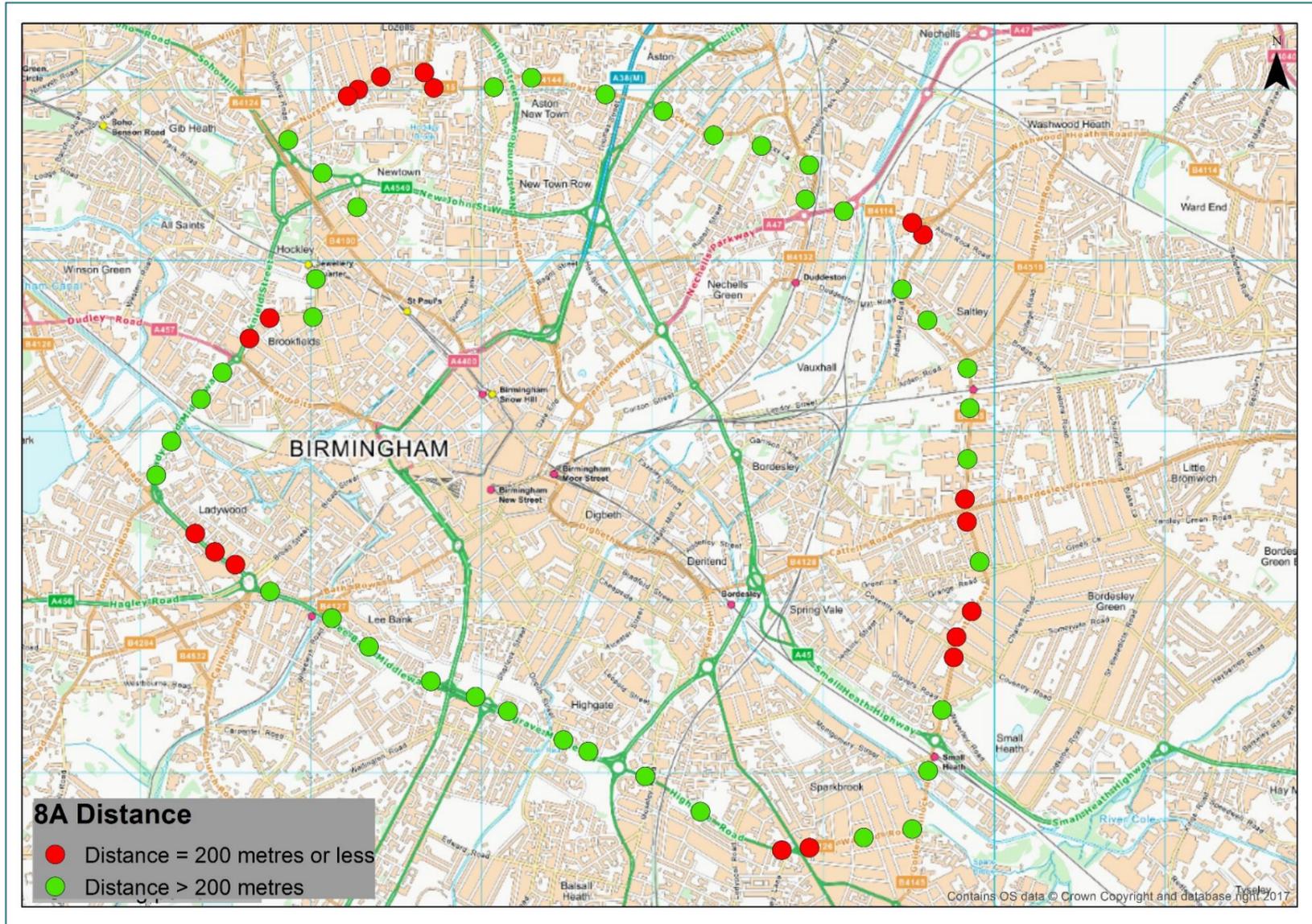
Map A (Proportion of Buses Calling) – 8A



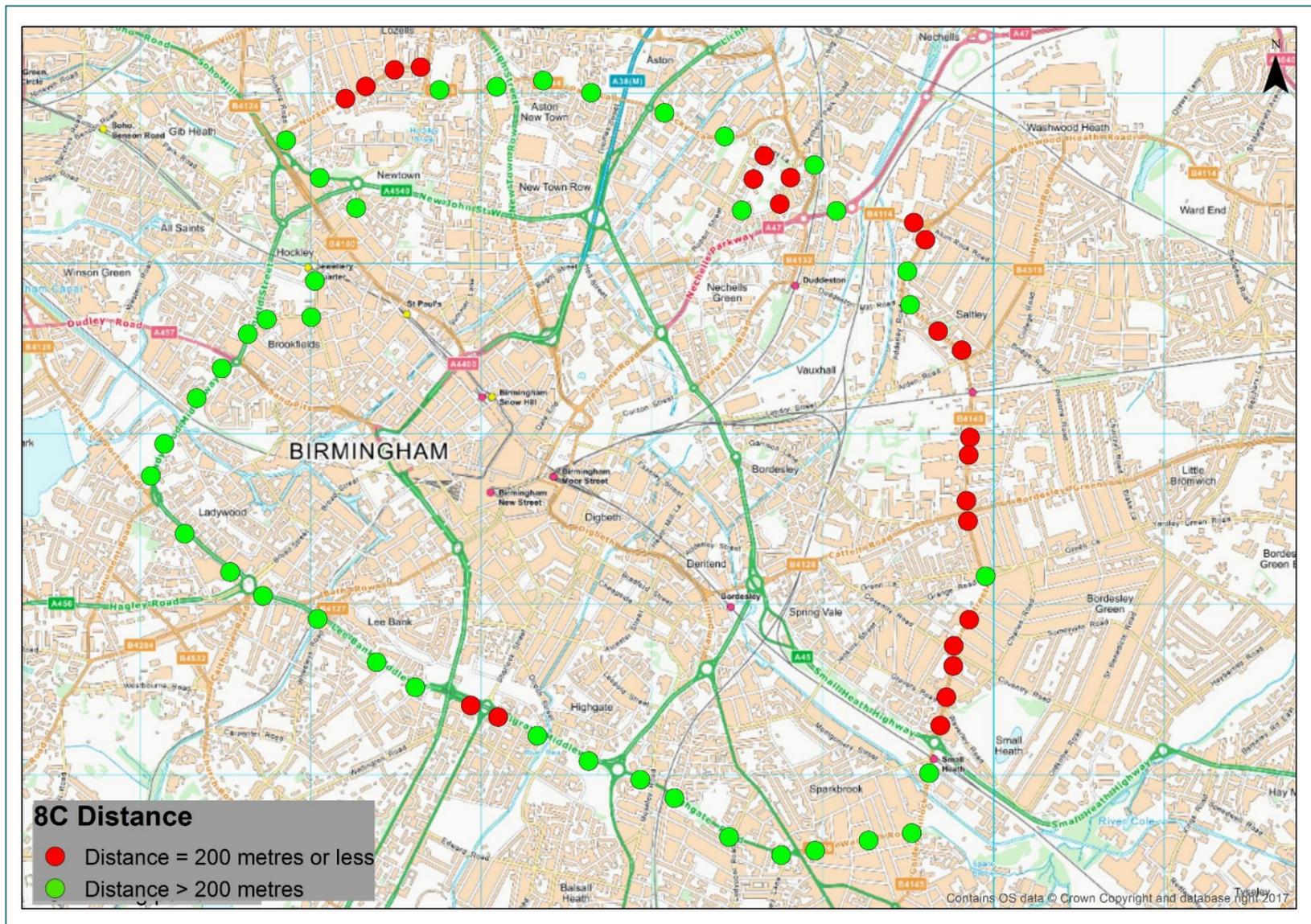
Map A (Proportion of Buses Calling) – 8C



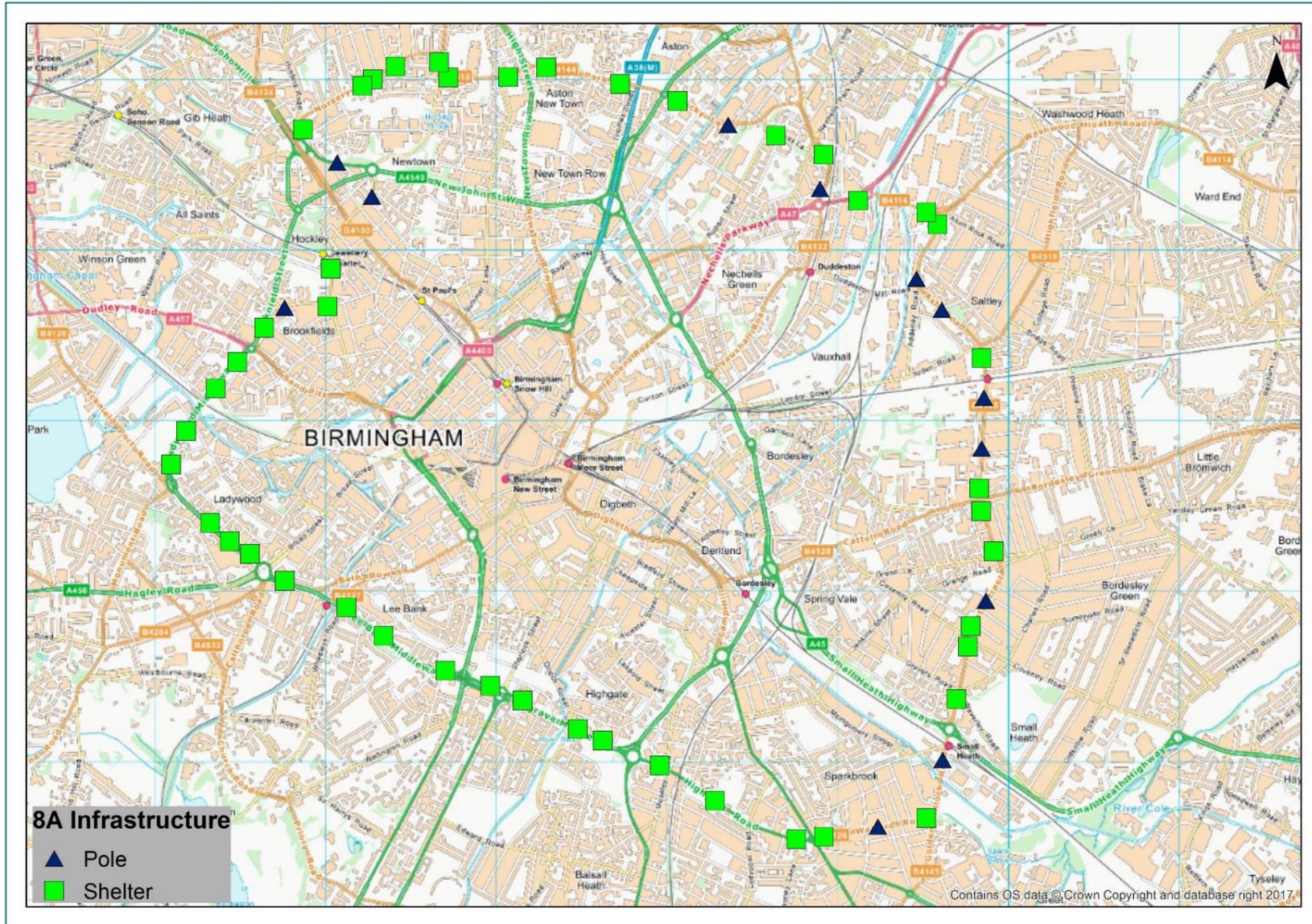
Map B (Distances between Stops) – 8A



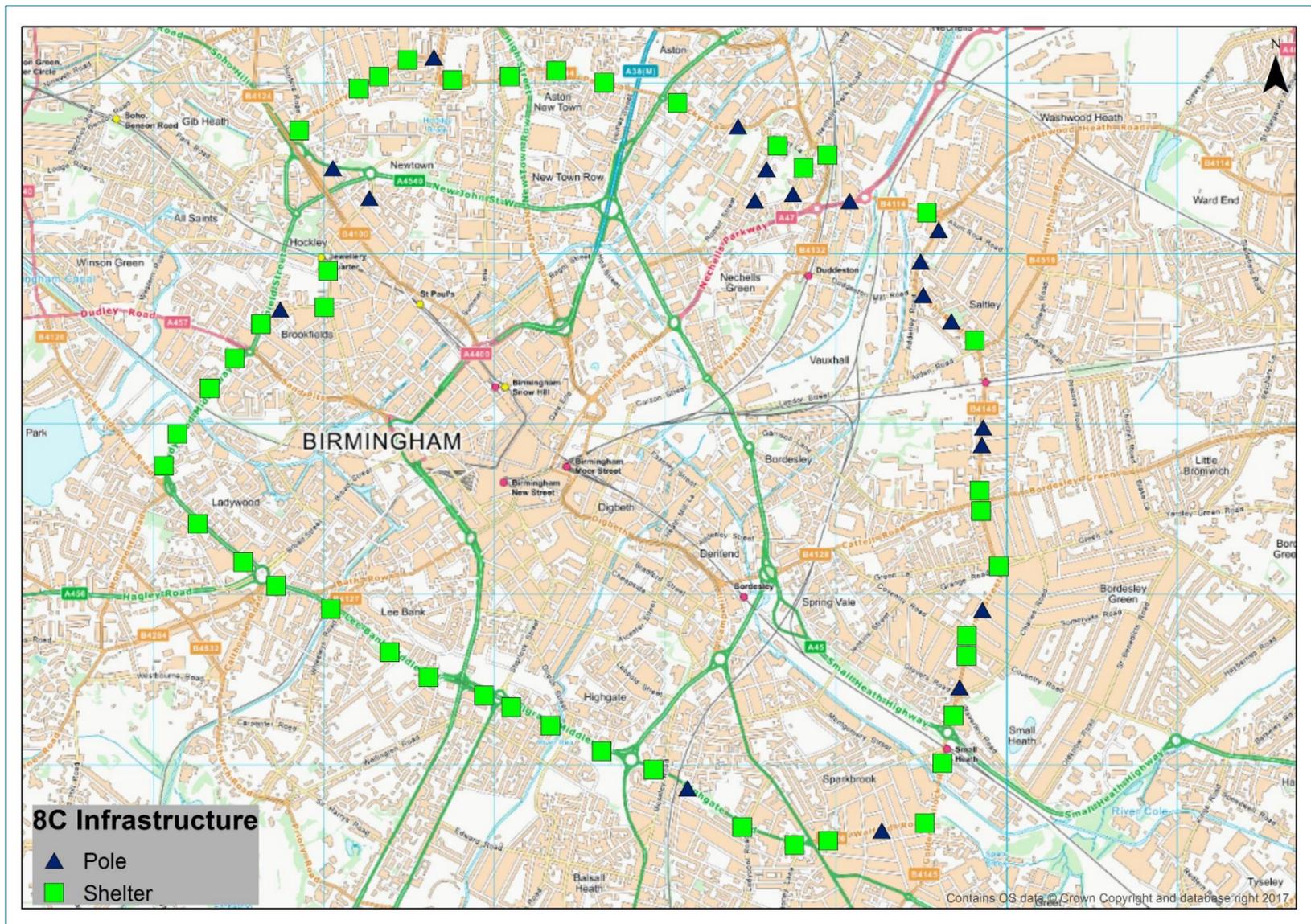
Map B (Distances between Stops) – 8C



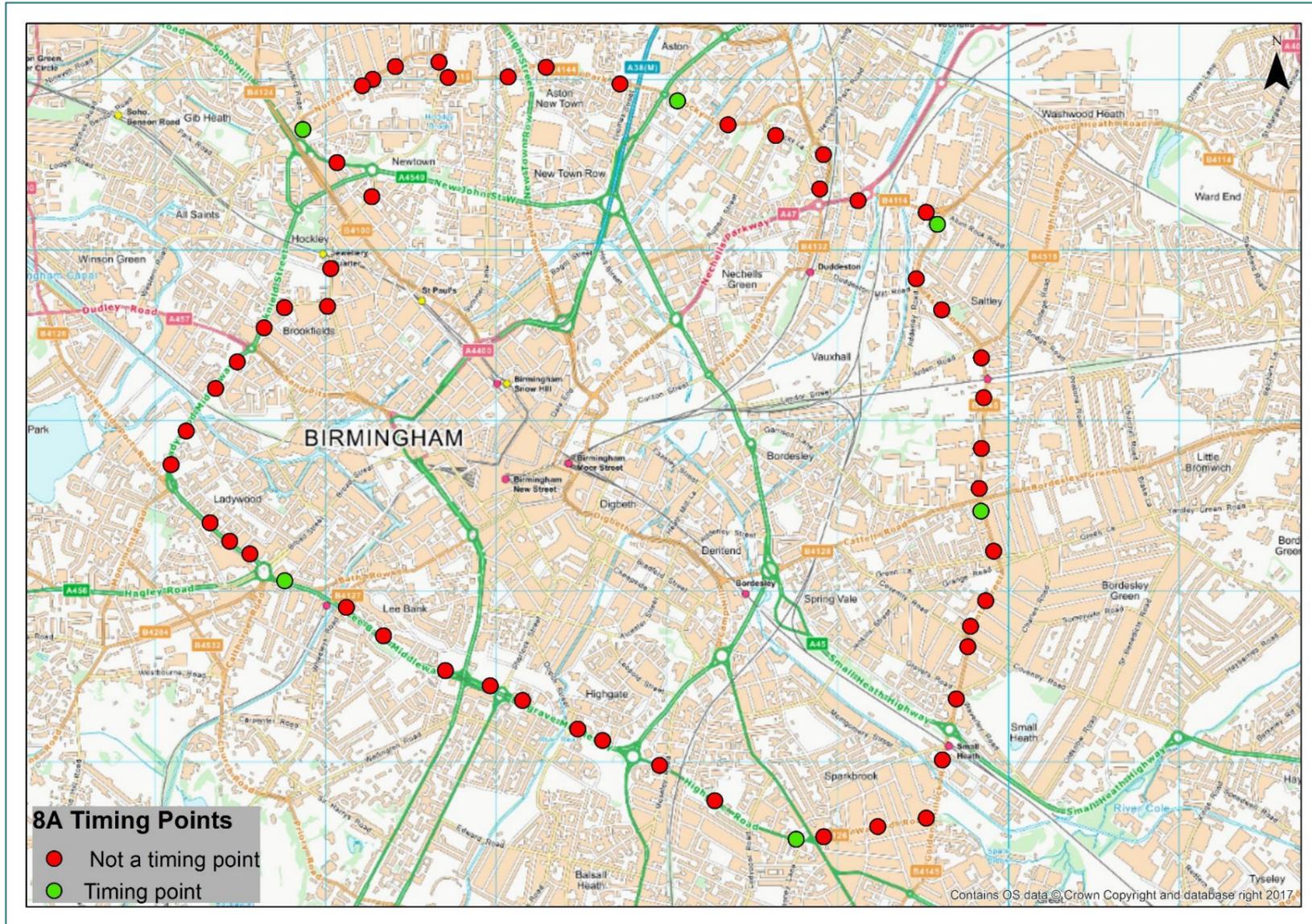
Map C (Infrastructure Type) – 8A



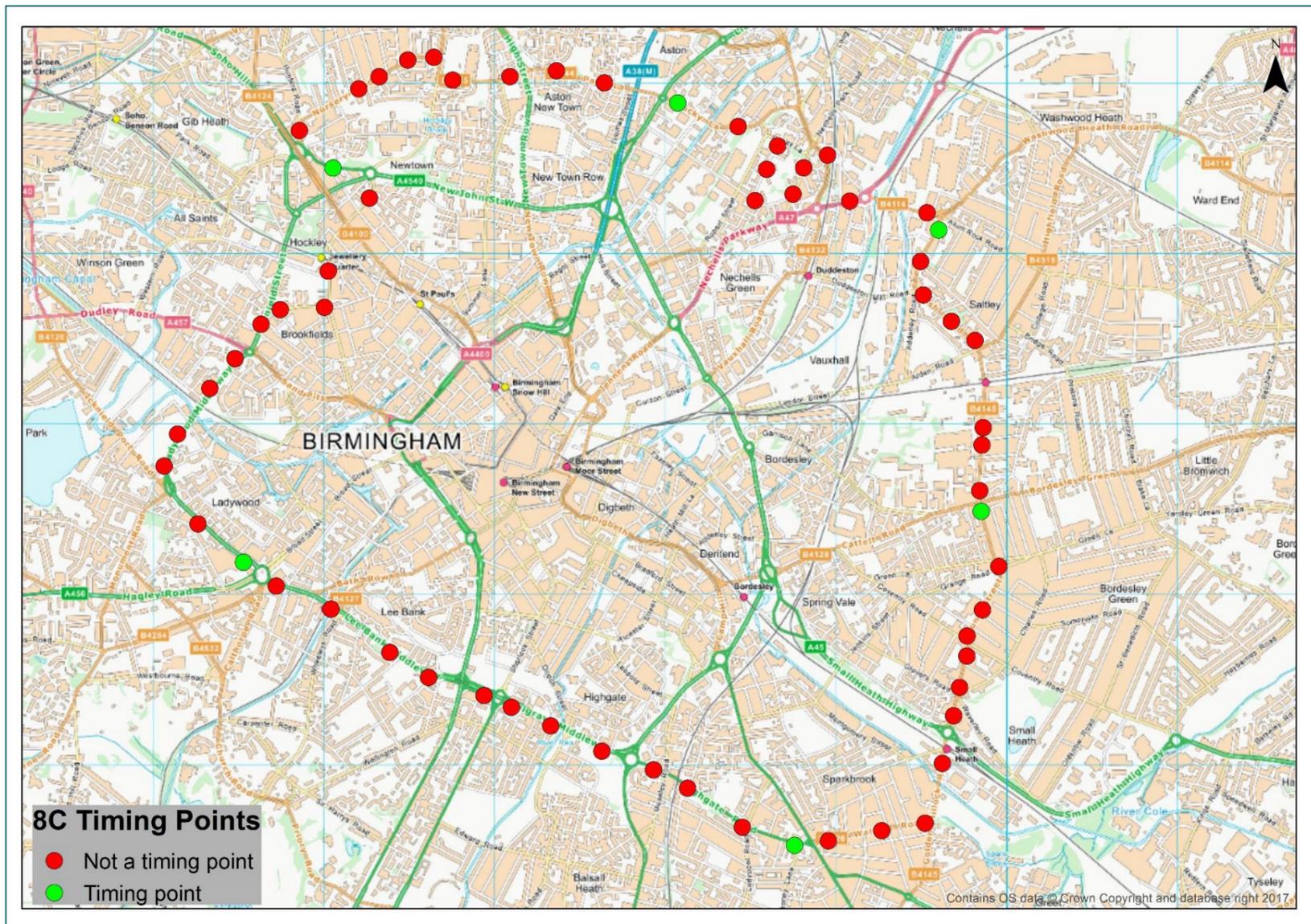
Map C (Infrastructure Type) – 8C



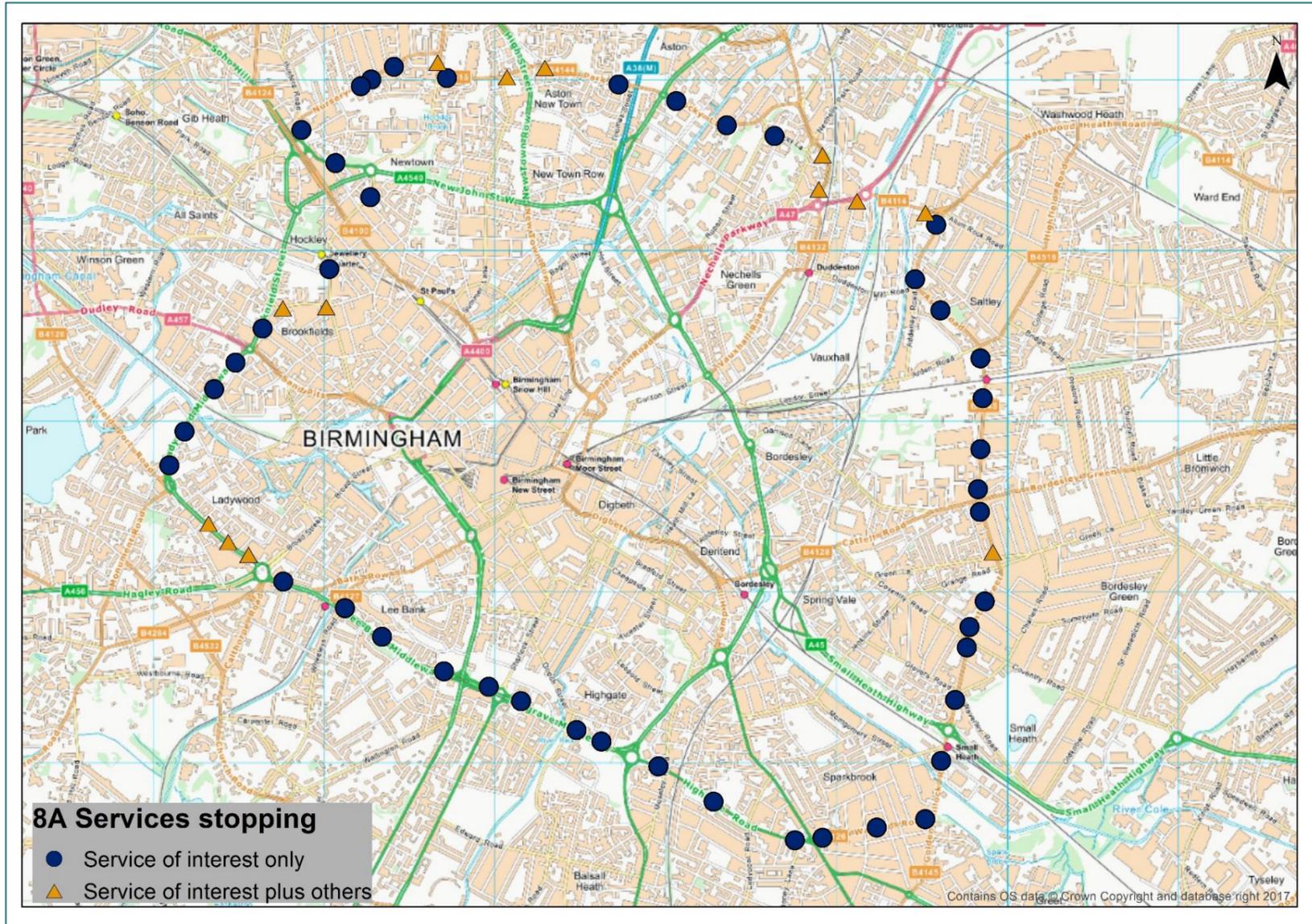
Map D (Timing Points) – 8A



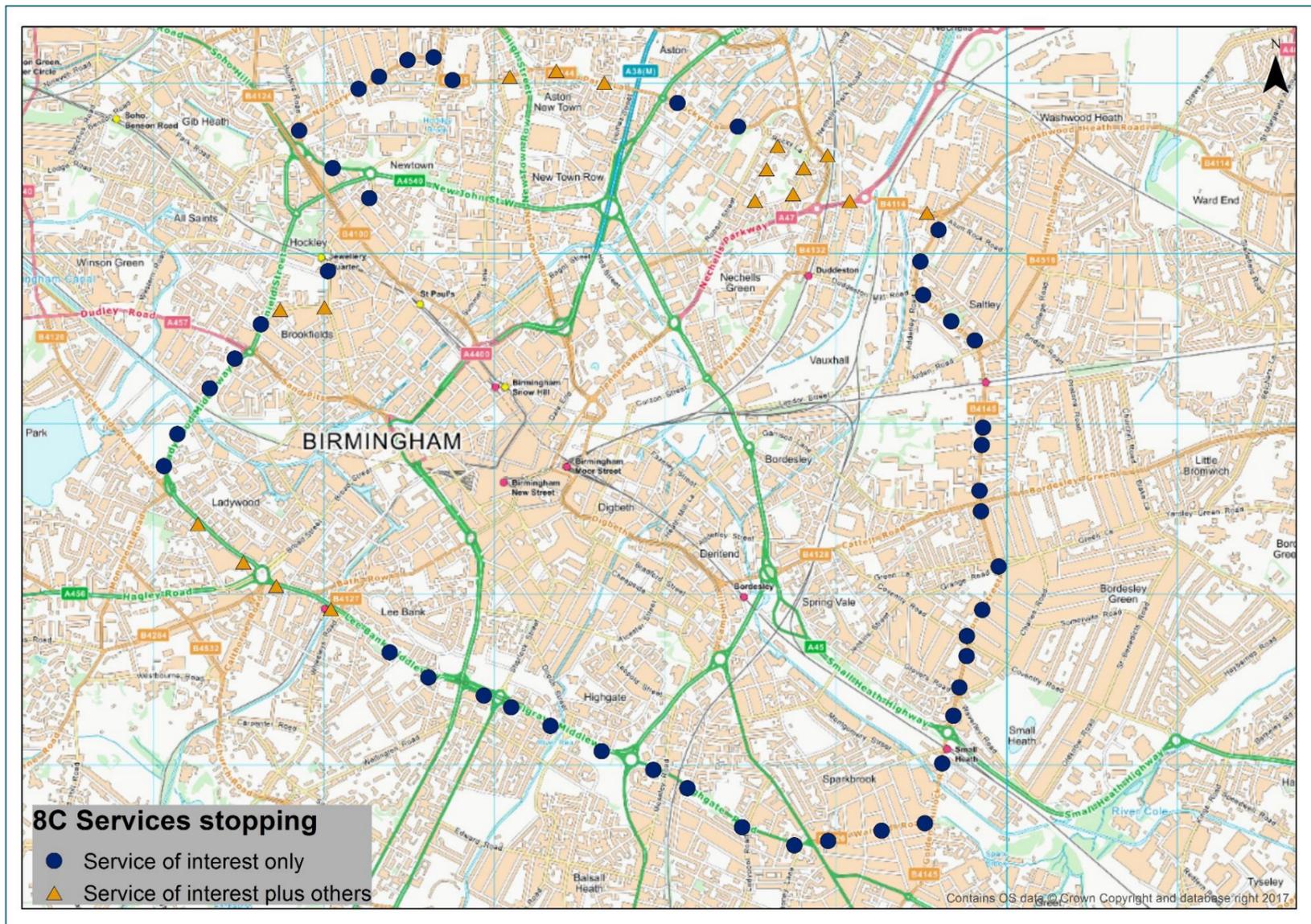
Map D (Timing Points) – 8C



Map E (Services Calling) – 8A



Map E (Services Calling) – 8C



Map F (Key Facilities) – 8A / 8C

