Commercialising Connected and Automated Mobility

Blythe & Rural Automated Vehicles Operations (BRAVO)

APPENDICES

InnovateUK Project No. 10088448
Mass Transit Feasibility Study 2
November 2024

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Appendix A

A.1 Policy & Regulatory Context

The following chapter will discuss relevant national, regional and local policy, along with relevant regulations. These are discussed to illustrate the considerations that for any CAM deployment.

A.2 National Policy

Decarbonising transport: a better, greener Britain[1]

The 'Decarbonising transport: a better, greener Britain' white paper was published by the UK government in 2021. The white paper states that the transport sector is responsible for around a third of the UK's greenhouse gas emissions, and reducing those emissions is key to meeting the national net-zero emissions target by 2050.

Measures outlined in the white paper include the promotion of the use of zero-emission vehicles, improving public transport networks, alongside supporting the development of new electricity technologies for vehicles.

The government committed in the white paper to embed transport decarbonisation in spatial planning and across transport policymaking, alongside highlighting the need for collaboration between government, industry and consumers to achieve the goal of transport decarbonisation.

Deployment of CAM solutions will support decarbonisation by potentially improving the availability, reliability and frequency of public transport. This will make public transport a more viable option verses private vehicle usage.

Future of Mobility: Urban Strategy[2]

The 'Future of mobility: urban strategy' was published in March 2019 and outlines the government's approach to maximising the benefits from transport innovation in cities and towns. It sets out the principles that will guide government's response to emerging transport technologies and business models.

The strategy also contains details of the next steps for the government's Future of mobility grand challenge.

Alongside the strategy, the Department for Transport (DfT) has published the summary of responses to its Future of mobility call for evidence.

This proposal supports this policy by investigating the potential to deploy a CAM service along a known corridor and compare it to alternative transport plans. This give a realistic comparison and highlights area where further research is needed

National Planning Practice Guidance (NPPG)[3]

The NPPG, or National Planning Practice Guidance, outlines the purpose of Transport Statements and sets out what should be included in them, for developments that generate a high quantity of traffic movement. According to the National Planning Practice Guidance, a Transport Statement should also consider:

- Information about the proposal and its layout;
- Information about neighbouring uses, character and amenity, alongside functional classification of the nearby road network;
- Existing public transport provision;
- A description of travel characteristics of the proposed development, including movements across all modes of transport which would result from the proposal going ahead; and
- Data relating to the current traffic flows on links/at junctions within the study area, and identification of critical links and junctions on the road network.

National Planning Policy Framework (NPPF)[4]

The National Planning Policy Framework (NPPF) sets out the government planning policies for England and how they should be applied. It provides a framework which locally prepared plans for all developments can be produced.

All developments which generate significant amounts of movement should be supported by a Transport Statement (TS) or Transport Assessment (TA). These

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf

[2] https://assets.publishing.service.gov.uk/media/5dcd8417ed915d071ca239e9/future-of-mobility-strategy.pdf

[3] https://www.gov.uk/government/collections/planning-practice-guidance

[4] National Planning Policy Framework (publishing.service.gov.uk)

documents set out potential transport impacts and implications on the network of developments.

In line with the NPPF guidance, all developments should:

- Promote sustainable transport modes where possible;
- Provide a safe and suitable access to the site for all users;
- Present a design of streets, parking areas and other transport elements to the associated standards to reflect current national guidance; and
- Assess any significant impacts from the development on the transport network so that they can be cost effectively mitigated to an acceptable degree.

Developments should only be refused on 'highway grounds' if there would be an unacceptable impact on highway safety, or the residual impacts on the road network would be severe.

The work in this report has followed the recommendations in both the NPPG and NPPF.

Connected and Automated Vehicle Policy

The UK government has developed opportunities for the development of Connected and Automated Mobility vehicles (CAM) primarily through the Centre for Connected and Autonomous Vehicles (CCAV), but also through projects that predate CCAV. These projects were documented in UK Connected & Autonomous Vehicle Research & Development Projects 2018[5], published in September 2018. In the same year, the Automated and Electric Vehicles Act 2018[6] was passed into UK law and set out the initial legal framework for the use of CAM services in the UK. The following is an illustrative selection of examples where research has developed into policy/legislation.

Connected and automated vehicles: process for assuring safety and security (CAVPASS)[7]

The programme was launched in 2019 in response to the Law Commissions' first consultation paper on safety, which was part of their multi-year review of legislation and self-driving vehicles and continues with their current review into remote driving.

The objectives of CAVPASS are to:

develop technical standards and regulations to ensure the safe and secure trialling, adoption and ongoing roadworthiness of self-driving vehicles

develop processes to authorise a vehicle, thereby permitting the vehicle to drive itself, and ongoing requirements to maintain the validity of this authorisation

develop and/or adapt rules on the safe use of self-driving vehicles, such as through the Highway Code, driver, vehicle and service licencing, and insurance

ensure the government has the skills, capabilities, and access to assets to deliver safe and secure use of self-driving vehicles

support safe trialling of prototype self-driving vehicles on our roads and ensure the UK is industry's trialling destination of choice, building on the Code of Practice: automated vehicle trialling

design and implement processes to ensure that self-driving vehicles have resilience and can respond to cyber-attacks, and that the data they hold is secure.

The CAM solution being considered in this report has been reviewed and found to be comply with cyber security standards. This supports the goal of CAVPASS

Code of Practice: automated vehicle trialling[8]

The code of practice is primarily intended to be used by organisations or individuals planning to trial or pilot automated vehicle technologies and services. The code is also useful to inform local authorities and others on engaging in trials.

The code aims to:

- support and promote the safe trialling and use of automated vehicle technologies and services on public roads or in other public places in the UK and build public confidence in automated vehicle technologies and services
- support cooperation between trialling organisations and those responsible for the management of traffic, infrastructure, law enforcement, and other areas to support maximum road safety

[5] https://assets.publishing.service.gov.uk/media/5b8d327840f0b67daf8069fd/ccav-research-and-development-projects.pdf

[6] https://www.legislation.gov.uk/ukpga/2018/18/contents/enacted

[7] Connected and automated vehicles: process for assuring safety and security (CAVPASS) - GOV.UK (www.gov.uk)

[8] https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling

- encourage sharing of information to help uphold and develop the highest standards of safety in the UK and internationally

If the service being analysed in this report were go to trial stages, the code of practice would be adhered to closely.

The Highway Code[9]

From the 1st July 2022, the Highway Code added a section to the Introduction that discusses Self-Driving Vehicles. This section specifically refers to

"Vehicles [that] are capable of safely driving themselves when the self-driving function is correctly turned on and the driver follows the manufacturer's instructions. While the vehicle is driving itself, you do not need to monitor it."

It can be inferred from the above, the section is only discussing Level 4 and Level 5 autonomy and clearly states that the operator of such a vehicle must be prepared to take control when requested by the vehicle.

Additionally, in February 2023 the Law Commission issued advice to the UK government on Remote Driving[10] advising that operating a vehicle with a remote driver must be within line-of-sight. If the remote driver is beyond line-of-sight, there must be a safety driver in the vehicle. However, this advice does not affect a vehicle where a person cannot take direct control of vehicle manoeuvres and only advises the vehicle to perform a manoeuvre.

Connected & Automated Mobility 2025: Realising the benefits of self-driving vehicles in the UK[11]

This document, published in August 2022, sets out the UK government's goals and the potential benefits of the CAM industry. It covers all of the Law Commission's recommendations for legislation to allow the safe deployment and operation of CAM vehicles on UK roads.

It also discusses the societal and economic benefits of making the UK a driving force in the development and deployment of the CAM industry.

The King's Speech 2024[12]

On 17th July 2024 at the State Opening of Parliament, His Royal Highness King Charles III gave the King's Speech. Unlike the previous year's speech, automated vehicles were not mentioned but the Better Buses Bill and Digital Information and Smart Data Bill are tangentially related.

One of the goals of the Better Buses Bill outlines supporting public ownership of bus companies which could include a contingent of automated vehicles.

The Digital Information and Smart Data Bill intend to allow for Smart Data platforms to allow customer data to be shared securely with authorised third-party providers. This type of platform may form a key component of issuing and verifying tickets to use a vehicle without a person onboard.

The King's Speech 2023[13]

On 7th November 2023 at the State Opening of Parliament, His Royal Highness King Charles III gave the King's Speech. In this speech was the Automated Vehicles Bill with the scope of:

Set a rigorous safety framework for self-driving vehicles:

- Aims to set the threshold for self-driving vehicles in law.
- Hold companies firmly accountable once vehicles are on roads.
- Investigate and learn from incidents.
- Digitalise Traffic Regulation Orders.
- Ensure clear legal liability:
- Create new organisations responsible for self-driving.
- Protect users from being unfairly held accountable.
- Protect the Consumer:
- Clamp down on misleading marketing.

[9]https://www.gov.uk/browse/driving/highway-code-road-safety

[10]https://www.lawcom.gov.uk/remote-driving-robust-regulation-needed-before-technology-is-seen-on-uk-roads-concludes-government-commissioned-review/#:~:text=The%20Commission%20concludes%20in%20its,if%20companies%20obtain%20special%20permissions.

[11]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1099173/cam-2025-realising-benefits-self-driving-vehicles.pdf

[12]FINAL - 17/07/24 King's Speech 2024 background briefing final GOV.uk.docx (publishing.service.gov.uk)

[13]https://www.gov.uk/government/publications/the-kings-speech-2023-background-briefing-notes

A.3 Regional Policy

Reimagining transport in the West Midlands: Local Transport Plan 5 (LTP5)[14]

The West Midlands Local Transport Plan 5, dubbed 'Reimagining transport in the West Midlands', has been approved by the WMCA board in February 2023 and can be found within its board papers. The document is based around the 'Six big moves' which are detailed areas of thematic policy for the whole region. These are detailed and explained in Figure 2

LTP5 proposes a high quality integrated public transport system and complementary shared mobility services to help achieve a 45-minute region and 15-minute neighbourhoods without the need to use a car. This means anywhere would be accessible within the WMCA region within 45 minutes, and all essential amenities will be within 15 minutes' walk for local residents.

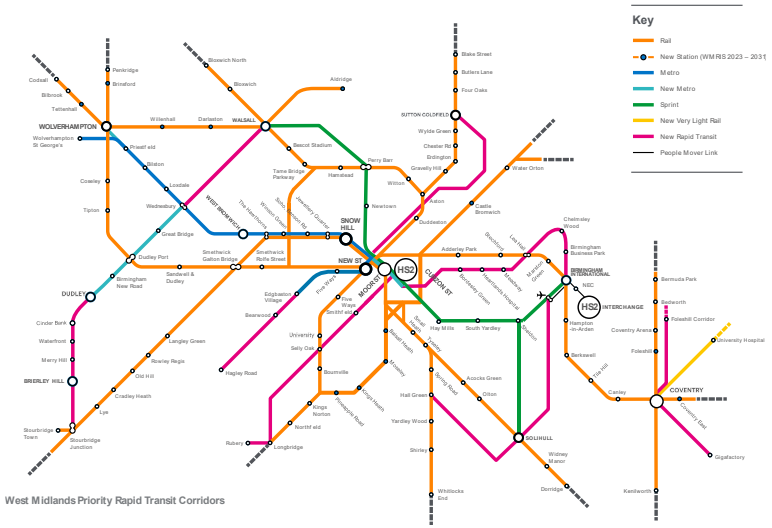


Figure 1 West Midlands Priority Rapid Transit Corridors

The proposal would support the LTP5 goals by providing a link between the businesses and growing populations of Blythe Valley Park and surrounding areas and the hub area, shown in Figure 1 The hub includes, the NEC, Resort World, Birmingham Airport, Birmingham International rail station and HS2 Interchange station.

Behaviour change

- This policy sets out the need to tackle the high level of car dependency in the West Midlands, and the danger of not meeting the core goals of the LTP if the big move is not met.
- The vision is that wherever you live in the West Midlands, you do not need to own a car to live a full life.

Accessible and inclusive places

- This policy sets out the vision of creating more accessible places where people don't require a car to live a good life.
- This includes the introduction of more careful placemaking with accessibility in mind.

Safe, efficient and reliable network

- This policy sets out the vision to develop and manage the highway network in the region in a way that improves reliability, and better supports travel by sustainable modes.

Walk, wheel, cycle and scoot

- This policy sets out that people should be able to walk, wheel, cycle or scoot when and where they want, with safety and convenience in mind.
- The aim is for half of the trips in the West Midlands to be made by active modes by 2030.

Public transport and shared mobility

- The ambition of the policy is to deliver a high-quality and affordable public transport system (including fixed services and DRT), branded as a single system.
- This policy will deliver on the West Midlands' ambition for a 45-minute region and 15-minute neighbourhoods.

Green transport revolution

- According to this policy, the whole transport system (including its infrastructure) should have a significantly lessened effect on the environment. For example, by installing new EVCI infrastructure.

Figure 2 The 6 big moves for the West Midlands

[14] https://www.tfwm.org.uk/who-we-are/our-strategy/local-transport-plan/

Midlands Connect Strategic Transport Plan[15]

The Midlands Connect Strategic Transport Plan acts as the statutory STP for the Midlands Connect area, of which the West Midlands is contained. It was published in 2022 (five years after their initial one was published in 2017) and sets out three 'Grand challenges' as well as three priorities. These are shown in Figure 3 and Table 1 respectively.

This proposal would support this plan by allowing residents to link into the wider Midlands network and beyond.

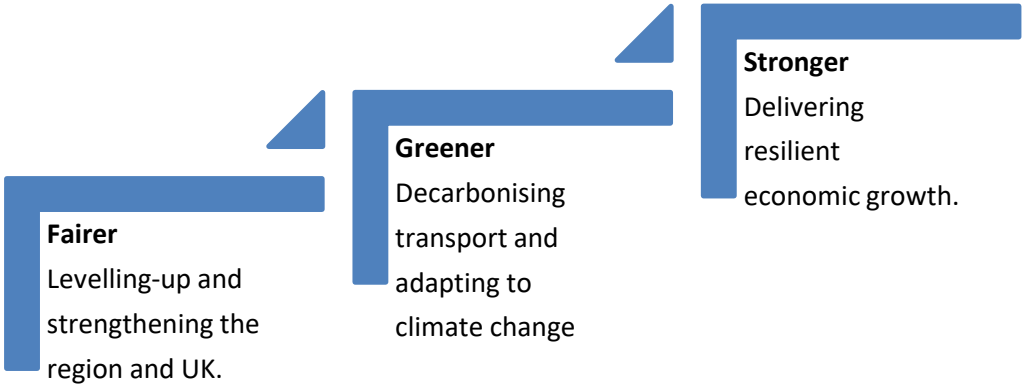


Figure 3 Midlands Connect Grand Challenges

Mode	Description	Example Priorities
Rail	Encouraging more people to use the rail network, including by taking forward the Midlands Engine Rail programme which includes a series of improvements to the network across the region.	Establishing a direct rail service between Coventry, Leicester and Nottingham Acceleration of Midlands Rail Hub schemes at Kings Norton and Snow Hill
Road	Looking into investing in roads in a sustainable way, reducing congestion-related emissions and improving the infrastructure road users need to travel via alternative modes such as bus or alternatively fuelled vehicles.	Improvements to the A46, A5 and A50/A500. Enhancing access to important junctions on M1, M6 and M5.
Innovation	Working to secure a future where digital technologies make roads more efficient, alongside public charging points becoming available more widely as well as developing new innovative mobility solutions to connect isolated communities.	Supporting the roll-out of public EV chargers across the Midlands. Creating a network resilience map to understand how transport, tech and energy generation interventions can work together to address climate change.

Table 1 Midlands Connect Three Priorities

West Midlands Bus Service Improvement Plan[16]

The West Midlands Bus Service Improvement Plan (BSIP) was originally published in November 2021 and revised in June 2024. It envisions a world-class integrated, reliable, zero emission public transport system providing inclusive travel across the West Midlands. The vision for BSIP is set out in Figure 4.

Part of the plan includes the introduction of an additional 106km of bus lanes across the region and the development of a wider bus priority programme ready for delivery beyond 2025. The BSIP program includes the Sprint service that connects Birmingham International, Solihull, Birmingham and Walsall. The proposed route would allow customers from Blythe Valley Park to transfer to the Sprint service to any of the connected locations.

[15] https://www.midlandsconnect.uk/media/1864/summary-document-midlands-connect.pdf

[16] https://www.tfwm.org.uk/who-we-are/what-we-do/bus-services/west-midlands-bus-service-improvement-plan/

Fewer private car journeys by making bus the mode of choice and creating better access to jobs and long-term change.

Evolve a network to support the 24/7 thriving economy, connecting people to new and developing destinations and attractions.

Fully integrated bus network including local demand responsive and rapid transit services supporting rail, coach and Metro interchange as one network.

Simple, convenient and easy to use payment options, including full capping, providing a network which is value for money and affordable for customers.

Younger people supported by discounted travel, as well as addressing barriers for excluded groups.

Accountable network performance management – tackling issues causing congestion and reliability problems.

World-leading customer information utilising 5G and all available technologies and platforms.

Creating a safe, secure and accessible mode for all and tackling long held barriers and perceptions.

UK leading low emission bus fleet with zero emission corridors serving areas most affected by poor air quality.

Figure 4 West Midlands BSIP objectives

A.4 Local Policy

Solihull Connected Transport Strategy (2023)[17]

The Solihull Connected Transport Strategy 2023 identifies how those within the borough travel, and sets out the changes that should be made in the coming years to achieve four key objectives:

- To make the transport network accessible to all people;
- To help the economy grow in a way that is equal and fair for everyone;
- To be safe and secure for all users; and
- Transport will contribute to improving the quality of life in our borough.
- Within the Council Plan itself, there are nine key things to do which these objectives underline:
- Being part of revitalising our towns and local centres;
- Being part of bringing forward UK Central and maximising the opportunities from the new HS2 railway line and Birmingham Interchange railway station;
- Providing access to areas of new housing;
- Enhancing the natural environment;
- Improving air quality;
- Reducing net carbon emissions;
- Improving life chances in our most disadvantaged communities by improving access; and
- Enabling our communities to thrive.

[17]https://www.solihull.gov.uk/sites/default/files/2023-03-13 Solihull Connected 2023 - Transport Strategy.pdf

Solihull Local Plan (2013)[18]

The Solihull Local Plan (2011-2028) is the statutory development plan for the borough of Solihull. It's responsible for setting out the long-term vision for how its towns, villages and countryside will be developed and how they will change over the plan period above.

By 2028, the vision for Solihull is to build on its reputation as an 'aspirational' place to live, learn, work and play. It would like to maintain its strong links with Birmingham, alongside Warwickshire to the south and Coventry to the east – where the potential for 'managed growth within the M42 Economic Gateway' is unlocked.

Transport-wise, it is said that it is crucial that there is easy access to services and facilities such as 'jobs, education, fresh food retailers and open space' by all transport modes, be it active or public. Proposed housing development should be:

- Within an 800m walk distance of a primary school, doctor surgery and food shop; and
- Within a 400m walk distance of a bus stop served by high frequency bus services; and/or
- Within an 800m walk distance of a rail station providing high frequency services (3tph in each direction during peak periods).

Solihull Local Plan Review (May 2021)[19]

On the 13th May 2021, SMBC submitted an updated Local Plan to the Secretary of State through the Planning Inspectorate so that it can be independently examined. The plan sets out updated growth and development proposals for the Borough out to 2036 responding to the opportunities provided by HS2 as well as wider challenges of accommodating economic growth and housing needs within the plan area.

The latest update to this process was on March 16th, 2023, when the examination was paused while pending updates to the NPPF are made.

A.5 Strategic Developments

Midlands Future Mobility (MFM)[20]

Midlands Future Mobility is a major CAM testbed based in the West Midlands and covers over 200 miles of public roads. The testbed includes installed CCTV, weather stations, communications units, and accurate GPS roadside units (RSU) either at fixed locations or as part of mobile units that can be configured and deployed as required.

The testbed is a member of the CAM Testbed UK administered by ZENZIC. The intention of CAM Testbed UK is to develop programmes, ensure cooperation between the testbeds and help grow the CAM supply chain.

Other members of CAM Testbed UK are:

- AssuredCAV,
- ConVEx
- Millbrook-Culham
- Smart Mobility Living Lab London

UK Central Hub[21]

Supported by Solihull Metropolitan Borough Council (SMBC) and the West Midlands Combined Authority (WMCA) as a critical catalyst for growth, ensuring that ambitions for the area is fully realised by coordinating investment plans and growth opportunities.

The UK Central Hub main aim is to unlock potential using a set of place-making principles to deliver a comprehensive Hub Growth and Infrastructure Plan (HGIP).

UK Central Hub is a large-scale project and investment opportunity comprising of the following developments:

- Arden Cross
- Birmingham International Station
- Electricity Supply
- NEC/Airport Connectivity and Parking Strategy

Arden Cross[22]

[18] https://www.solihull.gov.uk/Planning-and-building-control/Solihull-local-plan

[19] https://www.solihull.gov.uk/Planning-and-building-control/Local-Plan-Review

[20] https://midlandsfuturemobility.co.uk/

[21] https://www.investinukcentral.com/projects/the-hub/

[22] https://www.investinukcentral.com/projects/the-hub/#hs2

Solihull Council and HS2 are working together to fund, design and build additional elements at the HS2 Interchange Station site at The Hub, known as Arden Cross.

This will support Solihull's growth agenda and create a new, sustainable mixed-use destination with HS2 at its heart, incorporating additional public transport connectivity and making better use of land for quality development to support the delivery of thousands of new jobs and homes.

Arden Cross will be a global destination for innovation, business, commerce, learning and living, across more than 140 hectares (346 acres). It will help the Midlands and the entire country compete on the international stage by increasing the amount of high value products, jobs, and skills we create and share with the world.

Birmingham International Station[23]

An integrated transport exchange bringing together existing rail, future high-speed rail, trams, buses, rapid transit, private vehicles, taxis, bicycles, and an automated people mover is planned. This will link seamlessly to Birmingham Airport and the forthcoming HS2 Interchange Station.

It is anticipated that the redevelopment of Birmingham International Station and the improvements to local and regional transport connectivity will bring an additional 200,000 commuters to within a 45-minute commute of The Hub by public transport.

The station concept of the redeveloped station is being taken to the next stage of detailed design.

Electricity Supply[24]

Key stakeholders from the public and private sectors are brought together to look at sustainable ways to meet the expected demand for power across The UK Central Hub, above and beyond the demand generated by HS2 alone.

NEC/Airport Connectivity and Parking Strategy[25]

Alongside new and improved public transport, is coordinating improvements to the local and strategic highway network.

It is also bringing together major stakeholders like the Airport and the NEC to make best use of the 40,000+ existing car parking spaces across The Hub and ensure that future provision factors in changing patterns of car use and ownership.

There is the potential for parts of the car park and other areas of the NEC's estate to become a major redevelopment.

A.6 Regulatory compliance

This section summarises matters relating to existing and forth-coming regulation, as well as expected future consideration and requirements. This report only considered on-road CAM deployments as they are the most up to date regulations. Further studies will be needed to understand the regulatory compliance on segregated routes.

A.6.1 Regulations

The Automated and Electric Vehicles Act 2018 (AEVA)[26] is the first piece of legislation to provide specific provision for "automated vehicles" (also commonly referred to as self-driving vehicles or autonomous vehicles). AEVA includes a definition of an automated vehicle, which is a vehicle that, in some circumstances or situations, is capable of safely driving itself without the need for monitoring or control by an individual. Part 1 of AEVA focuses on insurance and creates a new liability scheme for insurers and owners in relation to self-driving vehicles. The purpose of Part 1 is primarily to:

a) create requirements for insurance of self-driving vehicles
b) ensure that victims of a crash involving a self-driving vehicle are compensated quickly, addressing a concern that if a self-driving vehicle did not have a driver, then it may be unclear from whom the victim should seek redress.

Following the implementation of AEVA, the UK government has approved the United Nations Economic Committee for Europe's (UNECE) Automated Lane Keeping System

[23] https://www.investinukcentral.com/projects/the-hub/#birmingham-international

[24] https://www.investinukcentral.com/projects/the-hub/#electricity-supply

[25] https://www.investinukcentral.com/projects/the-hub/#connectivity

[26] Automated and Electric Vehicles Act 2018 (legislation.gov.uk)

(ALKS) Regulation[27], and this came into force in January 2021. ALKS is the first internationally approved system designed to control the movement of a vehicle for an extended period without further driver command.

In January 2022, the Law Commission for England and Wales published a joint report with recommendations for a new legal framework for self-driving vehicles. Before these recommendations could be enacted, the UK government took the following measures in the interim:

- Launched the Connected and Automated Vehicle Process for Assuring Safety and Security (CAVPASS). The programme aims to develop a comprehensive safety and security assurance process for self-driving vehicles.
- Updated the Highway Code . In July 2022, the UK government made changes to the Highway Code by introducing a new section relating to the safe use of self-driving vehicles. This new section stipulates that if the vehicle is driving itself, you are not responsible for how it drives, and you do not need to pay attention to the road. However, you must follow the manufacturer's instructions about when it is appropriate to engage the self-driving function.
- Issued new codes of practice. The UK government in 2022 published two new codes of practices for testing self-driving vehicles. The codes provide guidance on trialling automated vehicle technologies on public roads or in other public places in the UK. They also make recommendations on how to maintain safety and minimise potential risks.

A.7 The Law Commission

In January 2022, the Law Commission for England and Wales and the Scottish Law Commission (the "Law Commissions") published a joint report that made recommendations for the safe and responsible introduction of self-driving vehicles. The Law Commissions' report, builds on the reforms introduced by the Automated and Electric Vehicles Act 2018 and makes 75 recommendations which, taken together, set out a new legal and regulatory framework for self-driving vehicles. Key recommendations made by the Law Commissions include:

A.7.1 Introduce a new Automated Vehicles Act

This would specifically regulate vehicles that can drive themselves, drawing a clear distinction between features which just assist drivers, such as adaptive cruise control, and those that are self-driving.

A.7.2 Vehicle Approval & Oversight

A two-stage approval and authorisation process building on current international and domestic technical vehicle approval schemes and adding a new second stage to authorise vehicles for use as self-driving on UK roads.

A.7.3 A new system of legal accountability

Once a vehicle is authorised by a regulatory agency as having "self-driving features", and a self-driving feature is engaged, the following would apply:

- The person in the driving seat would no longer be a driver but a "user-in-charge." A user-in-charge would not be prosecuted for offences which arise directly from the driving task.
- The company or body that had the vehicle authorised, known as an Authorised Self-Driving Entity (ASDE), would have primary responsibility for the vehicle if it drove in a way which would be criminal (e.g., it does not comply with health & safety laws) or unsafe if performed by a human driver
- For vehicles authorised to drive themselves without anyone in the driver seat, occupants of the vehicle would simply be passengers. Instead of having a user-in-charge, a licensed operator would be responsible for overseeing the journey. There would also be requirements for passenger services to be accessible, especially to older and disabled people.

A.8 Automated Vehicles Act 2024[28]

Following the recommendations made by the Law Commission, the Automated Vehicles Act 2024 was enacted on the 20th May 2024. The act sets out the framework in seven parts:

1. Establishing a regulatory scheme for automated vehicles which allows companies to register an ASDE and no user in charge (NUiC) vehicles along with the information needed and powers for investigation/sanctions by the regulatory body.
2. The criminal liability of a vehicle with a user in charge (UiC).

[27] E/ECE/TRANS/505/Rev.3/Add.151 (unece.org)

[28] Automated Vehicles Act 2024 (legislation.gov.uk)

3. Policing and investigations compliance following an incident involving a CAM vehicle.
4. Marketing restrictions on the capability of a vehicle as to not mislead the end user.
5. Permits for automated passengers services including taxi, private hire and bus for permitted areas.
6. Adaptation of existing regimes, particularly type approval and the digitalisation of traffic regulation orders
7. General provision around the application of data protection legislation, Crown application, the procedure for making regulations under the Act, and extent.

This regulation shows guidance for the further development of CAM vehicles and services. This will allow manufactures and operators to ensure these services and vehicles are to a standard that is safe for public use and not contravening UK law.

At the time of writing, secondary legislation to support the Automated Vehicles Act 2024 are being created and argued in the courts. This work will need to be completed before the Automated Vehicles Act 2024 can be enforced and will give more detailed guidance to allow organisations and companies to operate CAM services in the UK. When this work will be completed us currently unknown.

Appendix B

B.1 Work Package Links

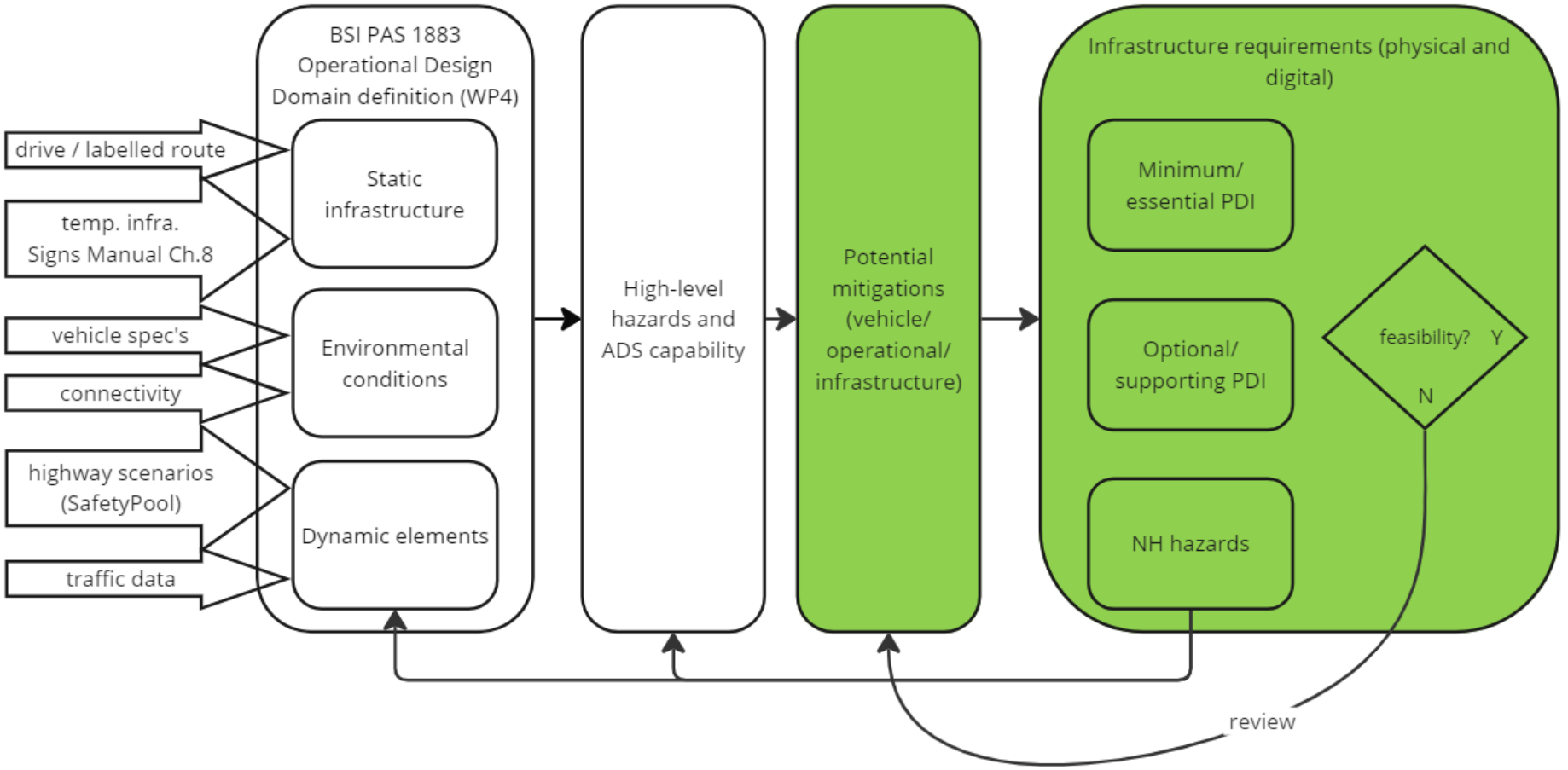


Figure 5 WP 4-5-6 links

B.2 Infrastructure Categories

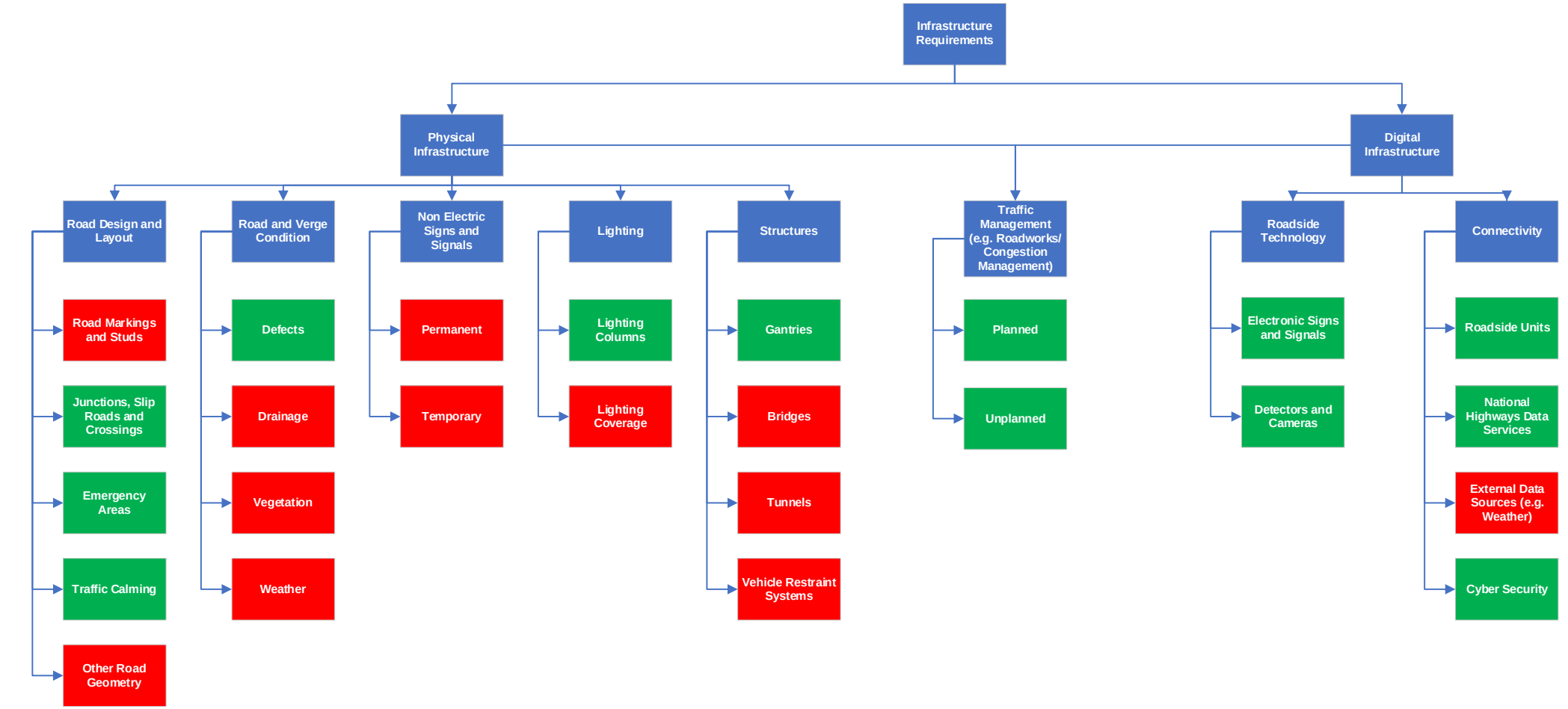


Figure 6 Infrastructure categories

Appendix C

C.1 Trunk route Simulation Visualisation

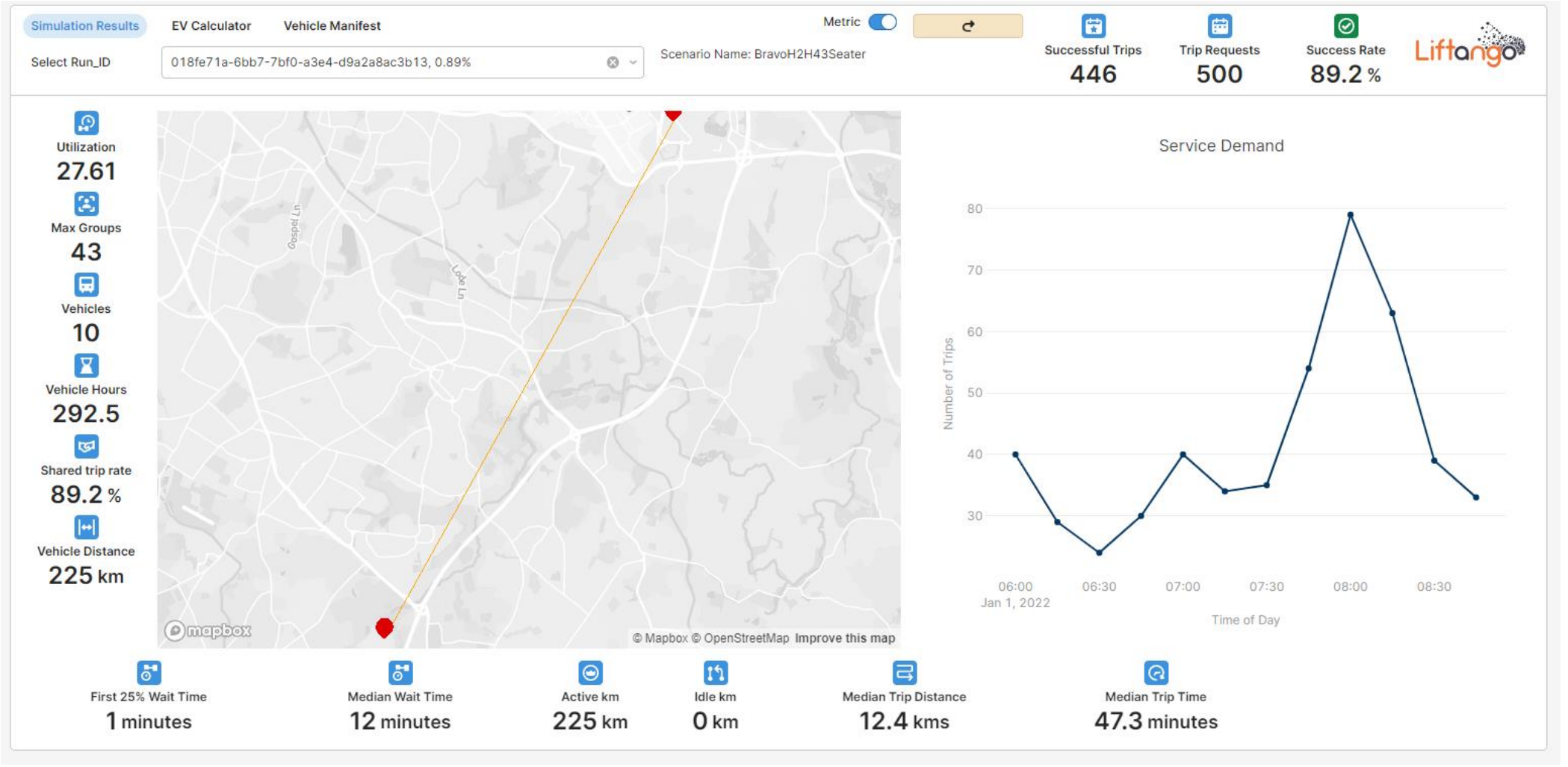


Figure 7 Simulation result visualisation

C.2 Feeder Service Simulation Visualisation

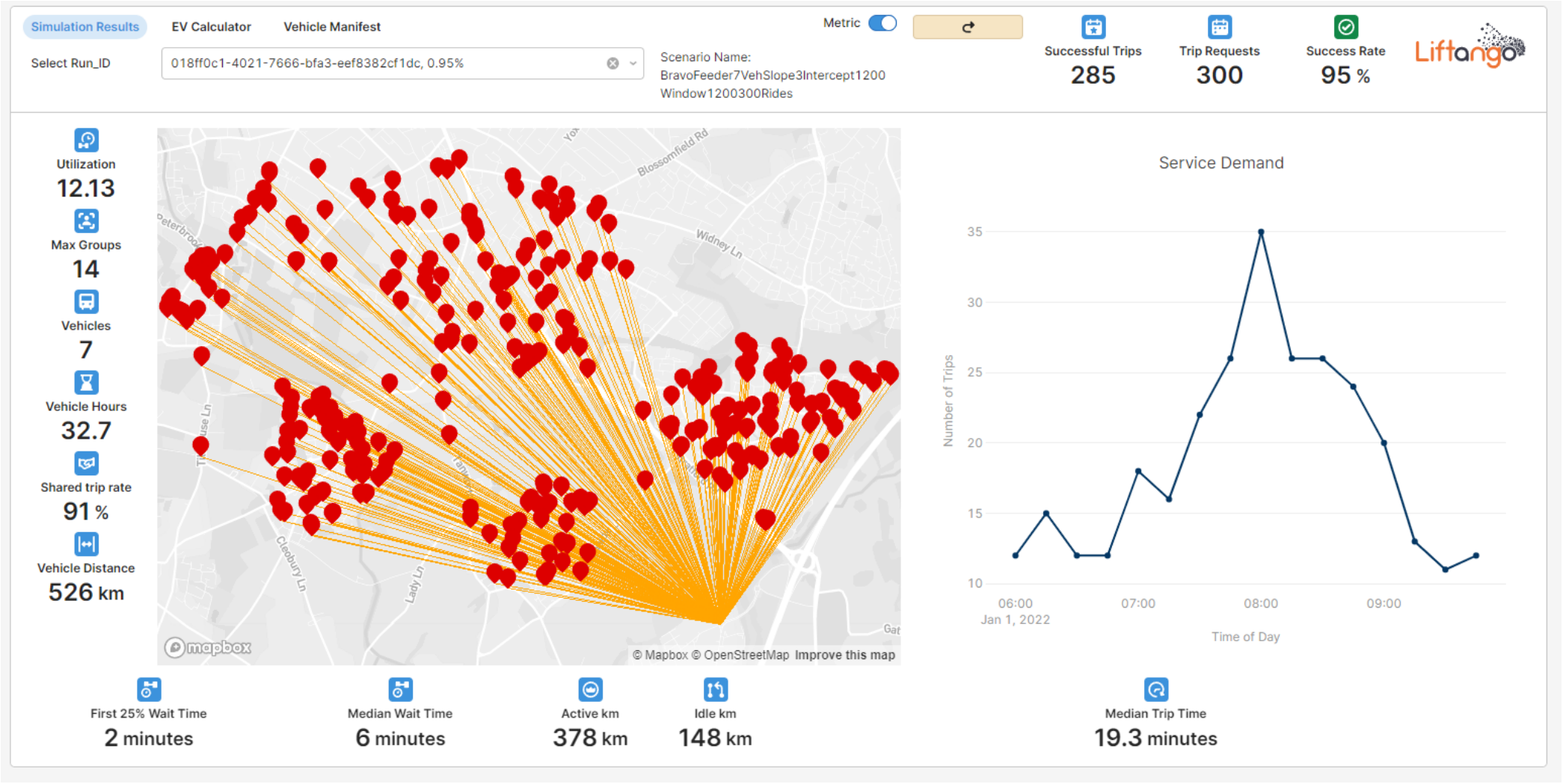


Figure 8 Feeder service simulation result visualisation

C.3 Flexi Feeder Service Simulation Visualisation

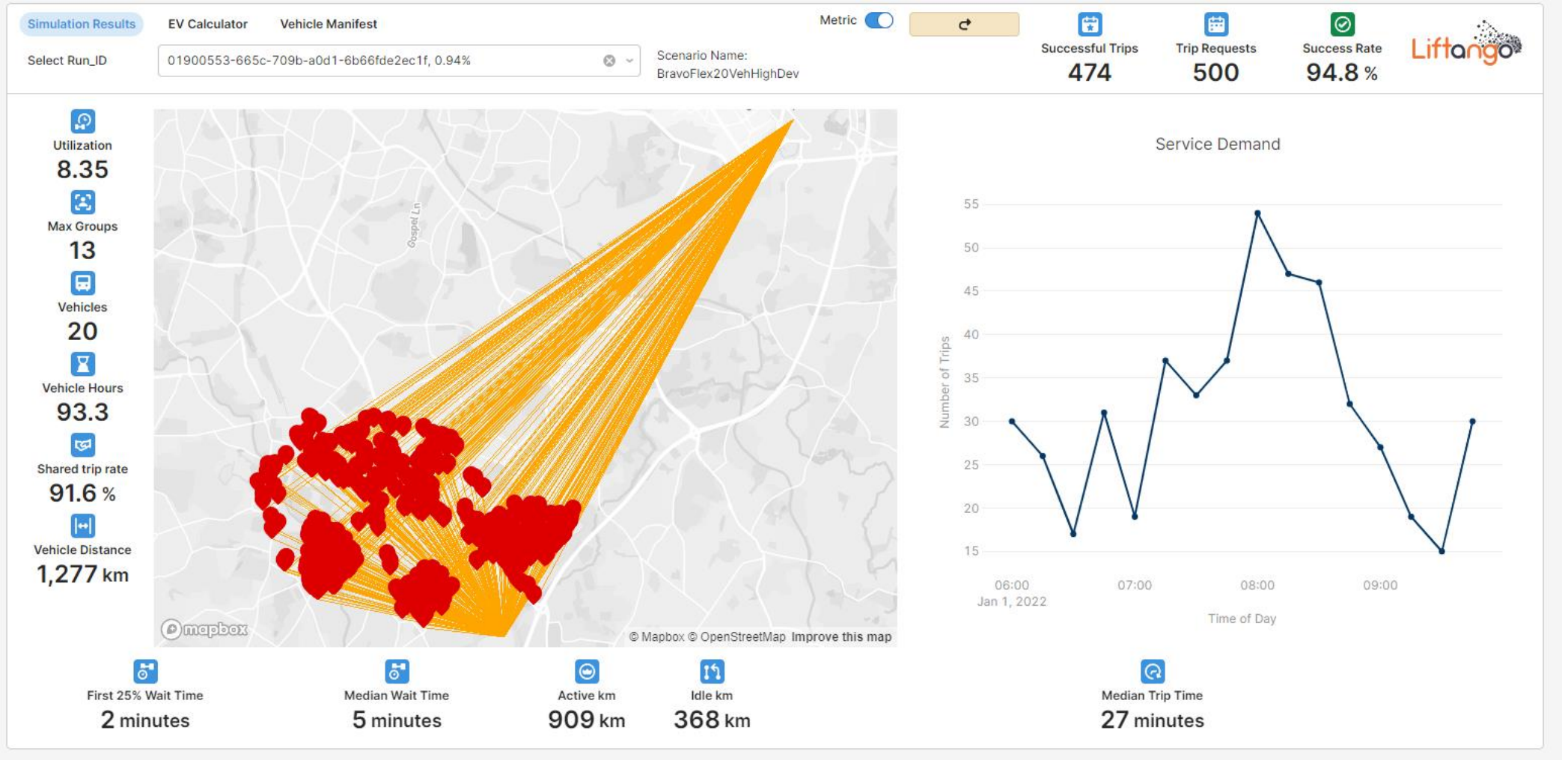


Figure 9 Flexi feeder service simulation result visualisation

Appendix D

D.1 Network Rail MND Origin - Destination Visualisations

% Distribution LSOA Origins to Blythe Valley LSOA Zone.
(distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday AM peak - 0700-0959
(Sept-Nov23)

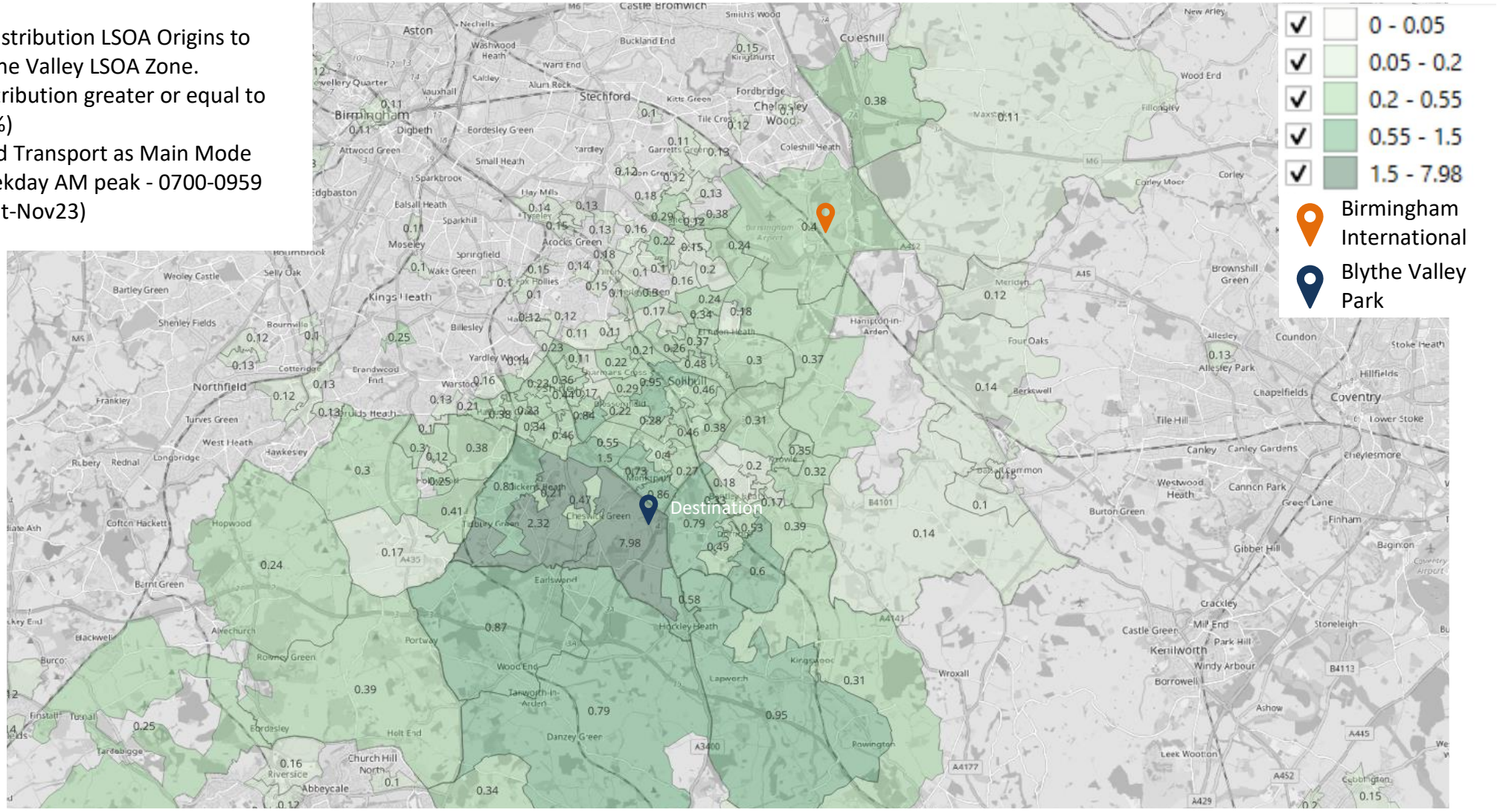


Figure 10 Origin to BVP Weekday AM Peak

% Distribution LSOA Origins to Blythe Valley LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday PM peak – 1600-1859
(Sept-Nov23)

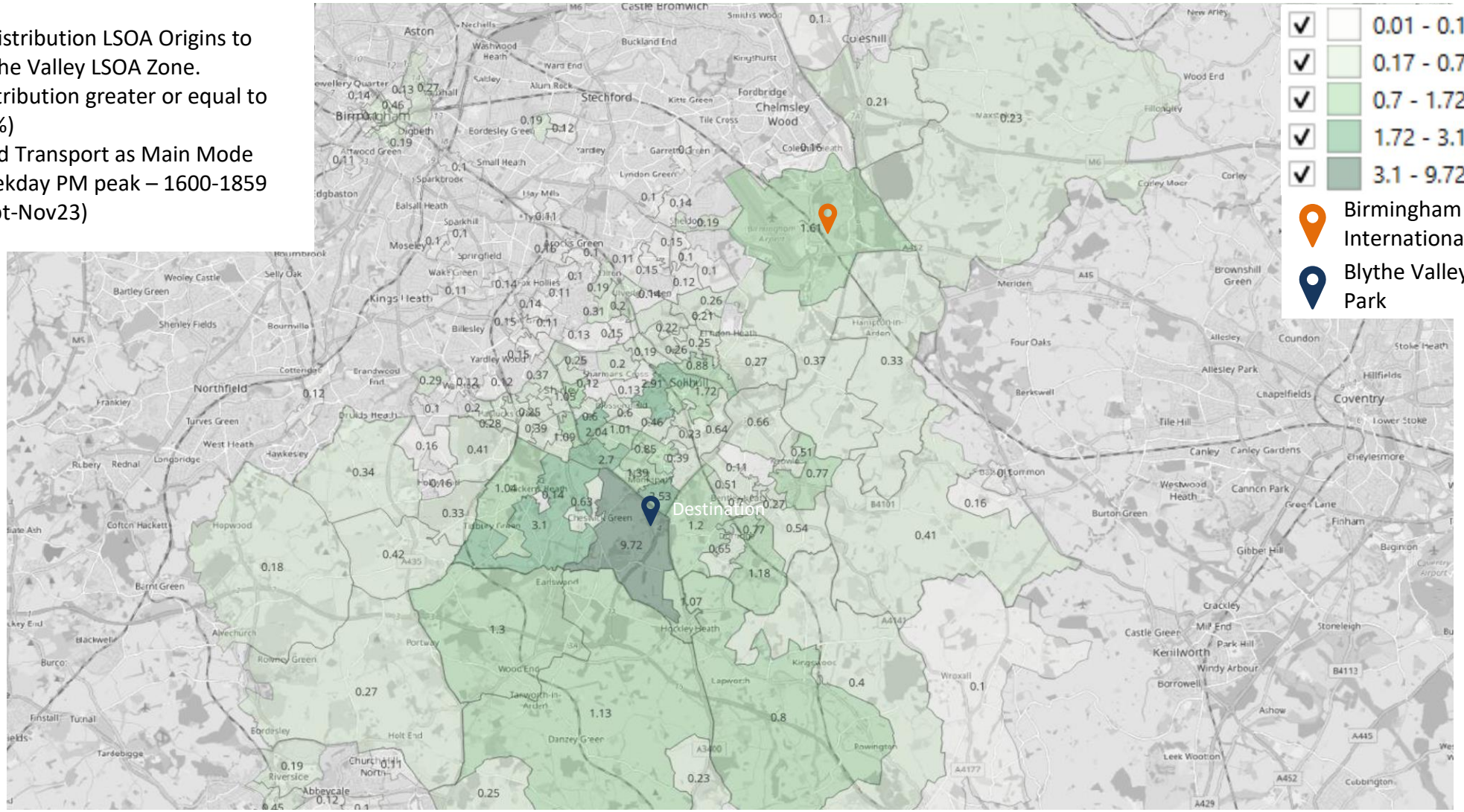


Figure 11 Origin to BVP Weekday PM Peak

% Distribution LSOA Origins to Blythe Valley LSOA Zone.
(distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday Off peak
(Sept-Nov23)

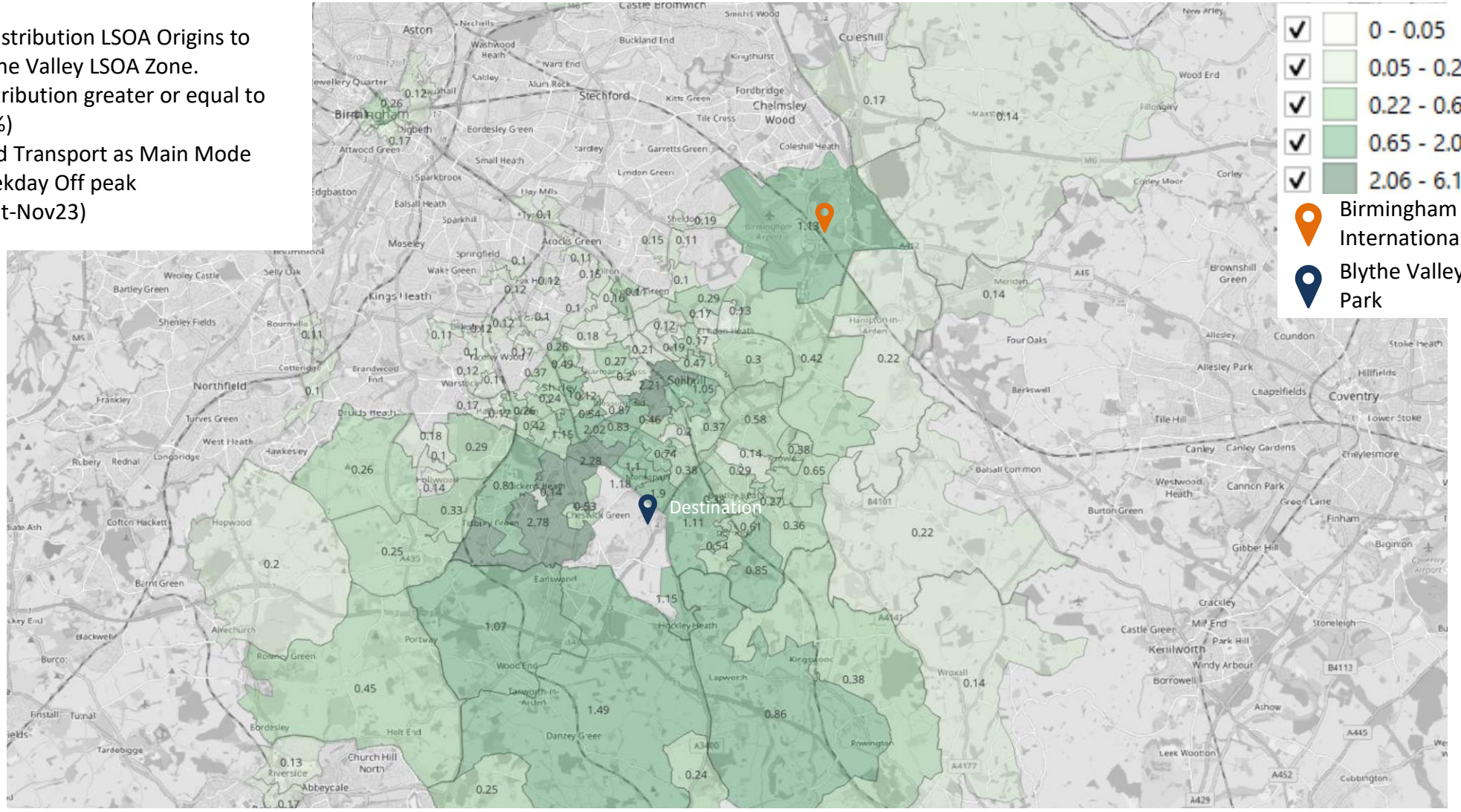


Figure 12 Origin to BVP Weekday Off Peak

% Distribution LSOA Destinations from Blythe Valley LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday AM peak -0700-0959
(Sept-Nov23)

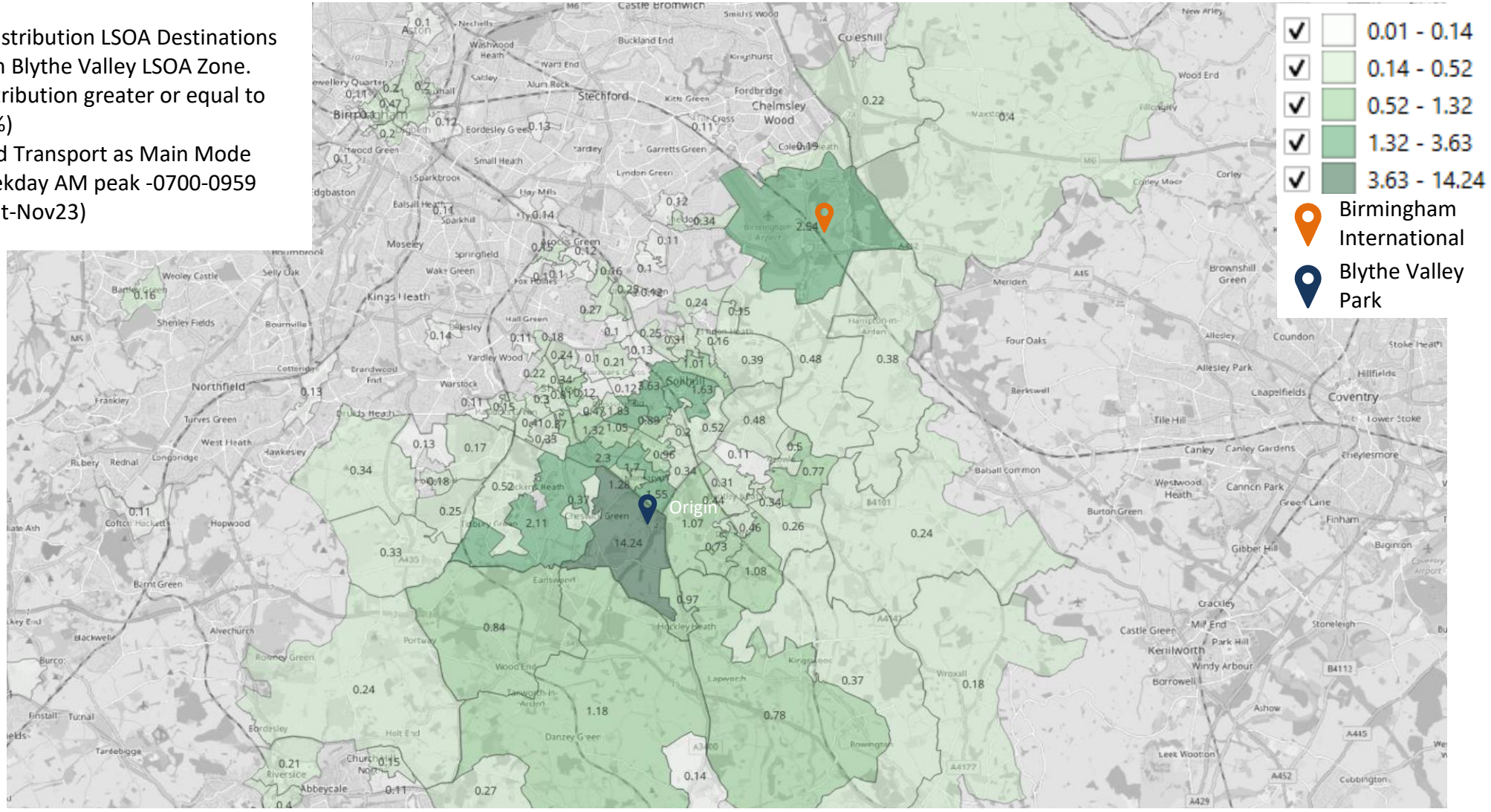


Figure 13 Destinations from BVP Weekday AM Peak

% Distribution LSOA Destinations from Blythe Valley LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday PM peak – 1600-1859
(Sept-Nov23)

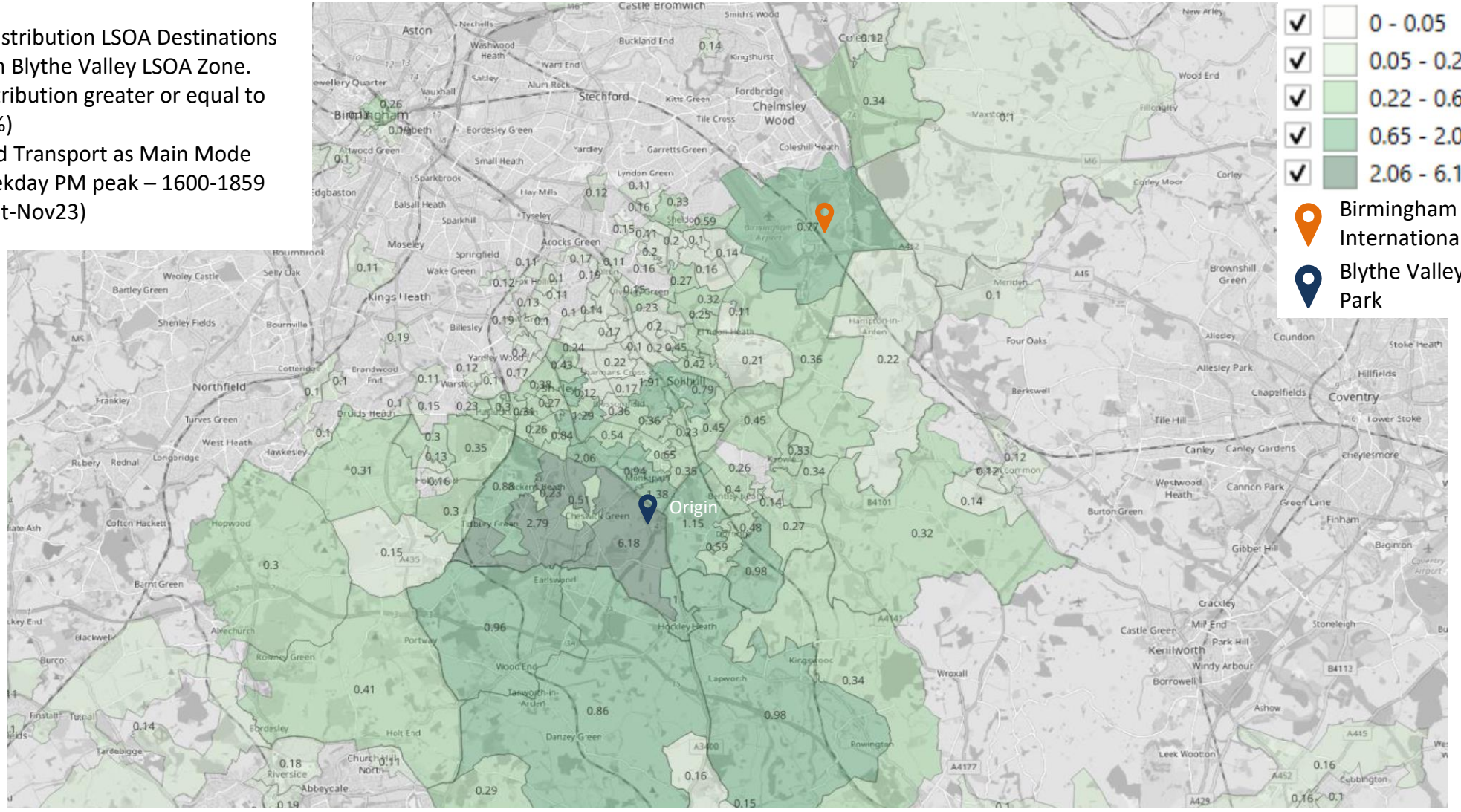


Figure 14 Destinations from BVP Weekday PM Peak

% Distribution LSOA Destinations from Blythe Valley LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday Off Peak
(Sept-Nov23)

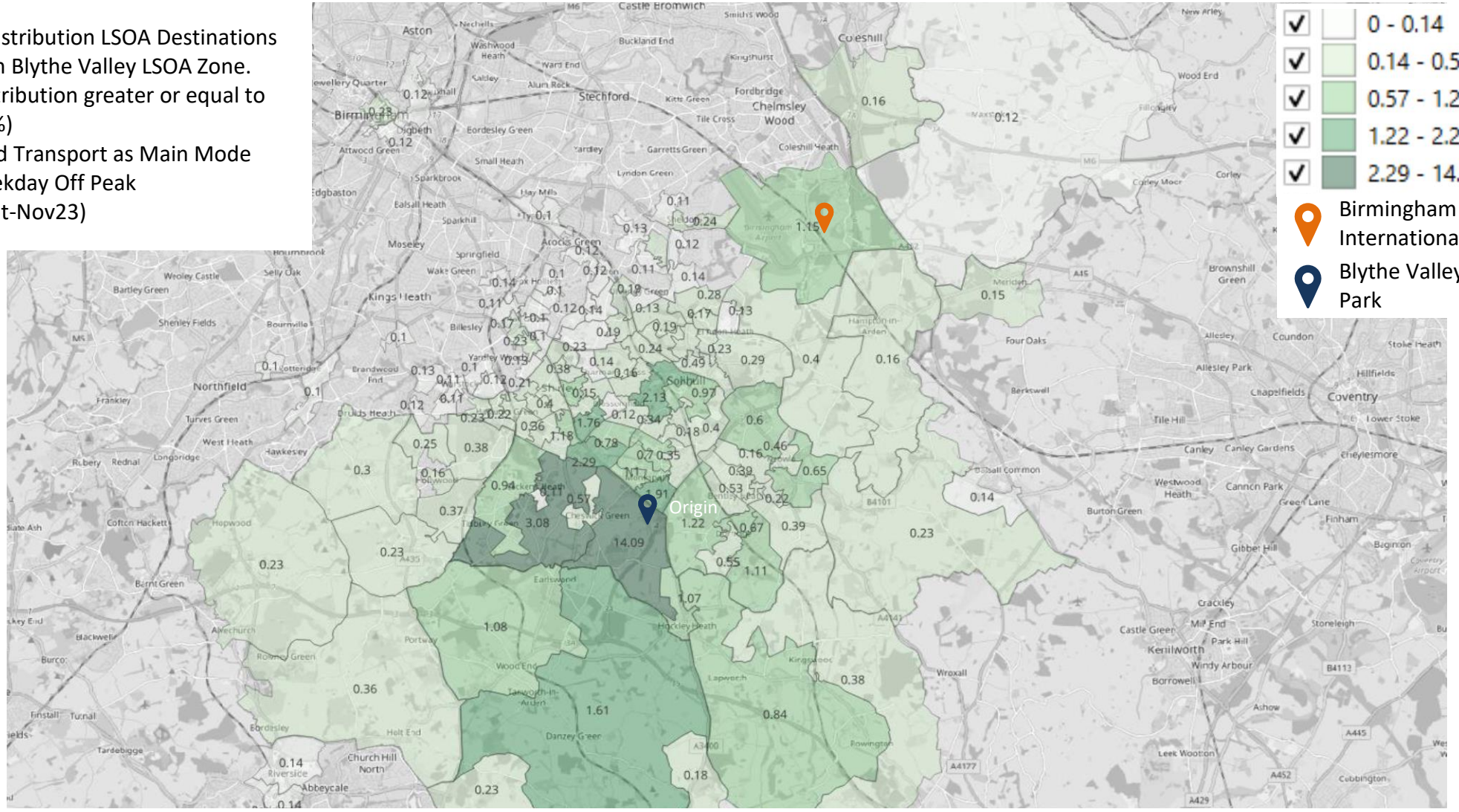


Figure 15 Destinations from BVP Weekday Off Peak

% Distribution LSOA Origins to Blythe Valley LSOA Zone.
(distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend AM peak – 0700-0959
(Sept Nov23)

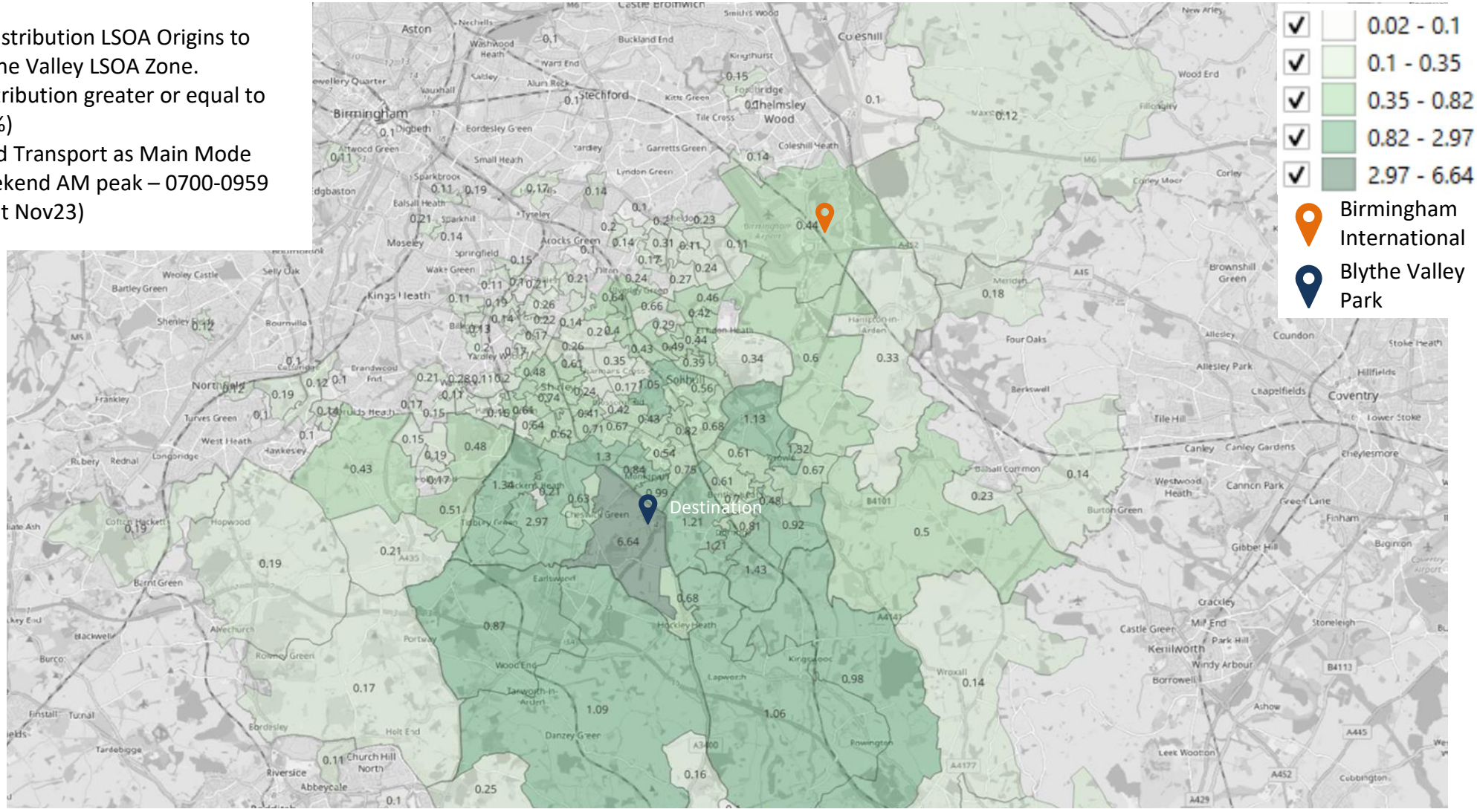


Figure 16 Origins to BVP Weekend AM Peak

% Distribution LSOA Origins to Blythe Valley LSOA Zone.
(distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend PM peak – 1600-1859
(Sept Nov23)

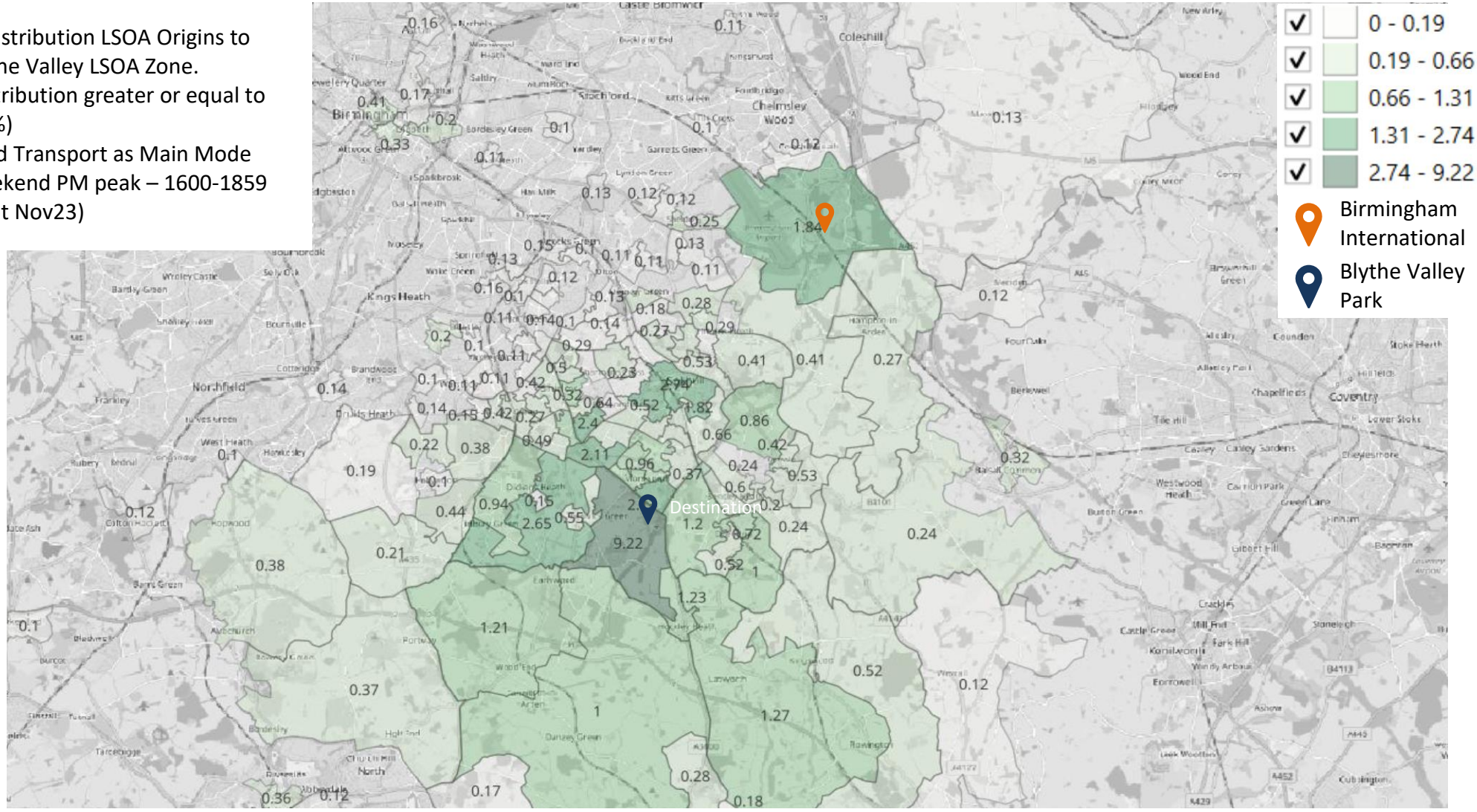


Figure 17 Origins to BVP Weekend PM Peak

% Distribution LSOA Origins to Blythe Valley LSOA Zone.
(distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend Off peak
(Sept Nov23)

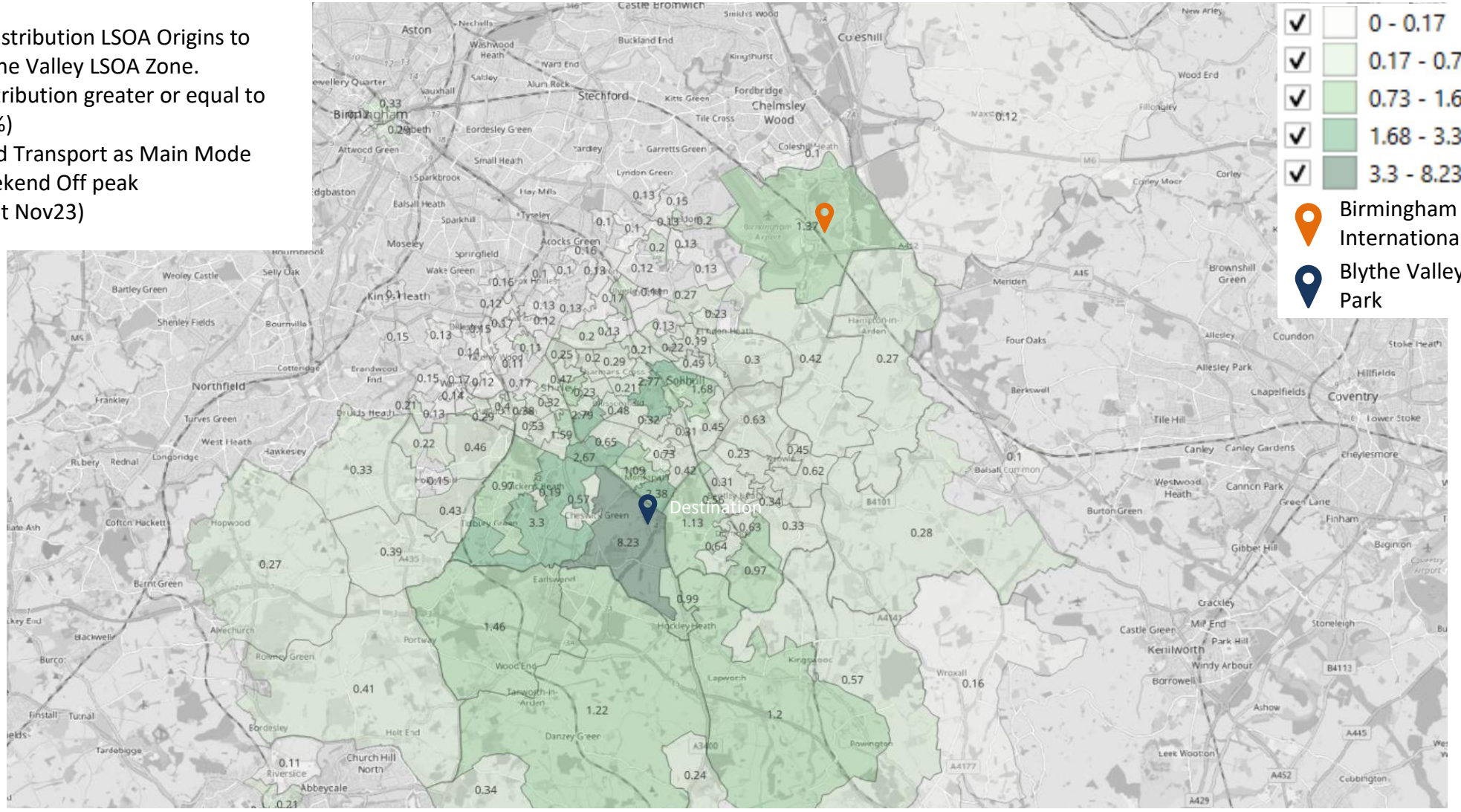


Figure 18 Origins to BVP Weekend Off Peak

% Distribution LSOA Destinations from Blythe Valley LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend AM peak – 0700-0959
(Sept Nov23)

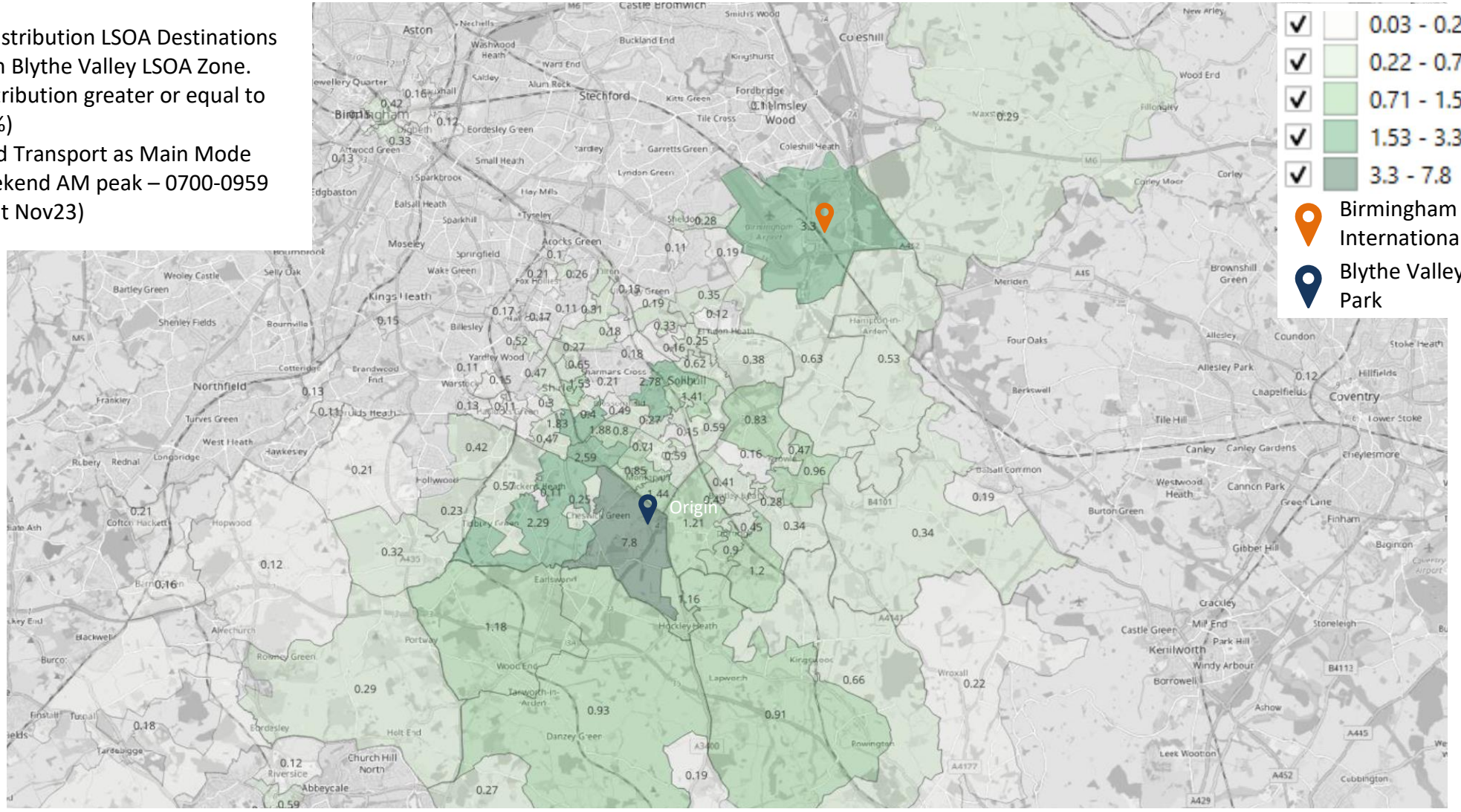


Figure 19 Destinations from BVP Weekend AM Peak

% Distribution LSOA Destinations from Blythe Valley LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend PM peak – 1600-1859
(Sept Nov23)

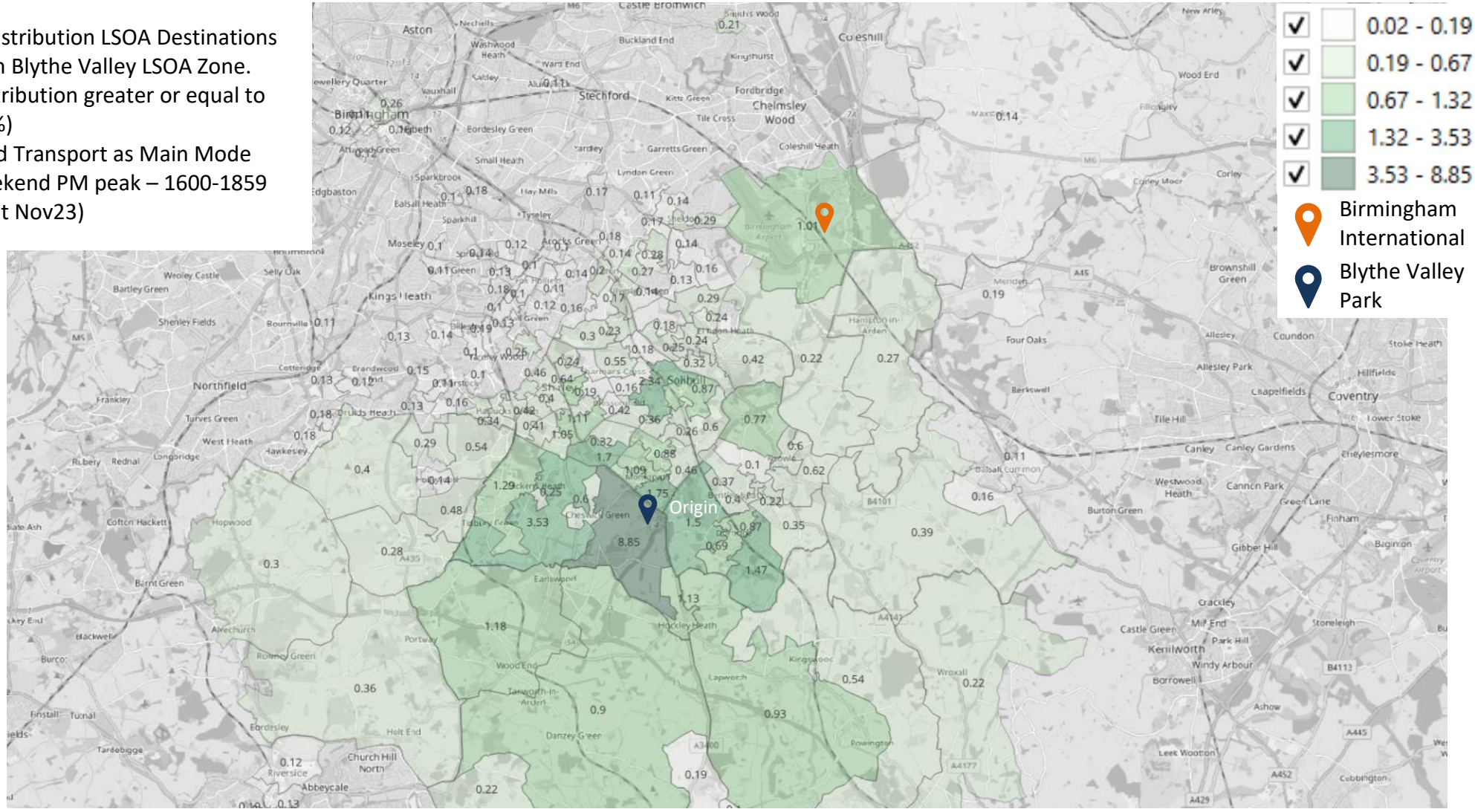


Figure 20 Destinations from BVP Weekend PM Peak

% Distribution LSOA Destinations from Blythe Valley LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend Off peak
(Sept Nov23)

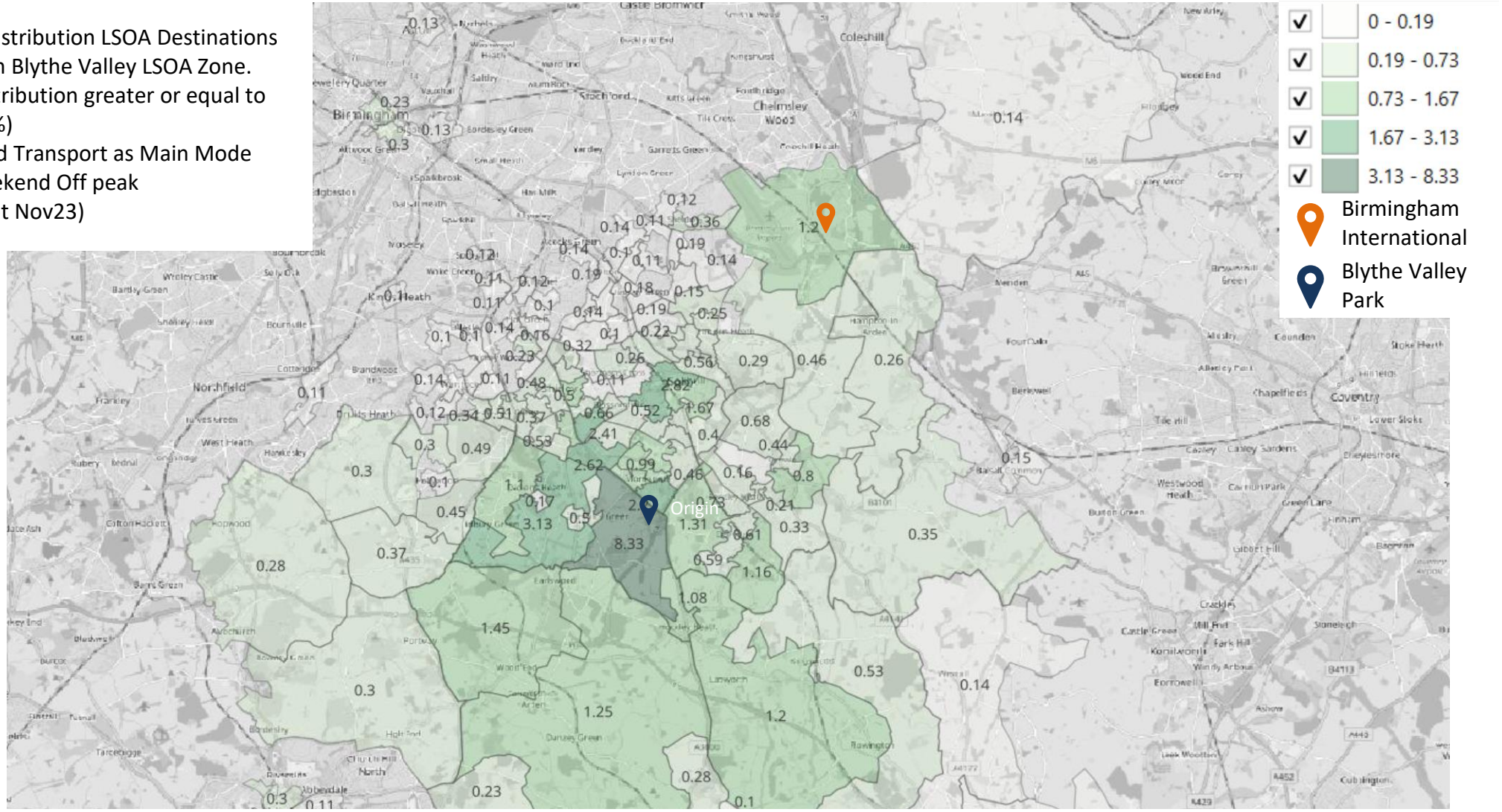
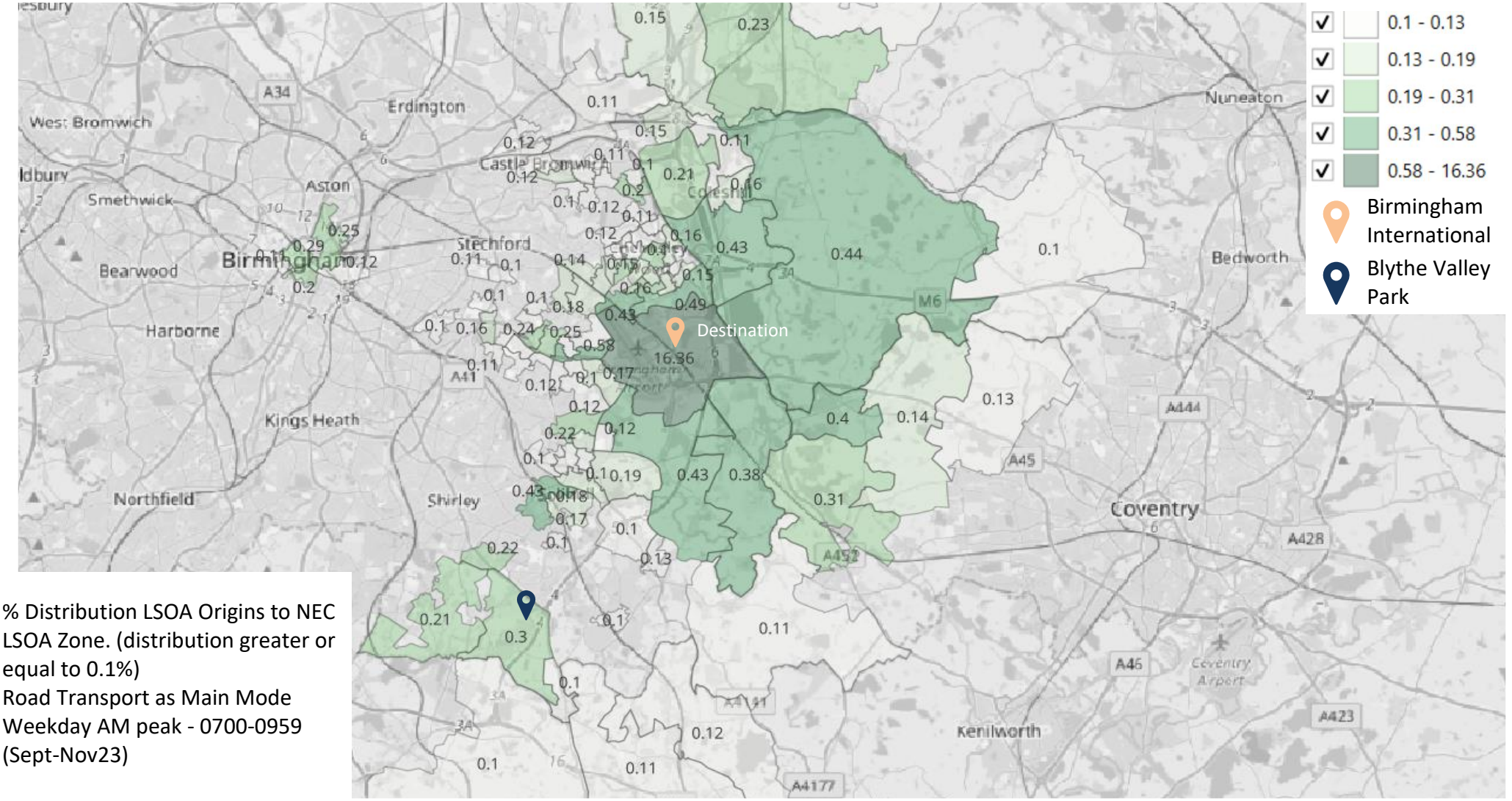
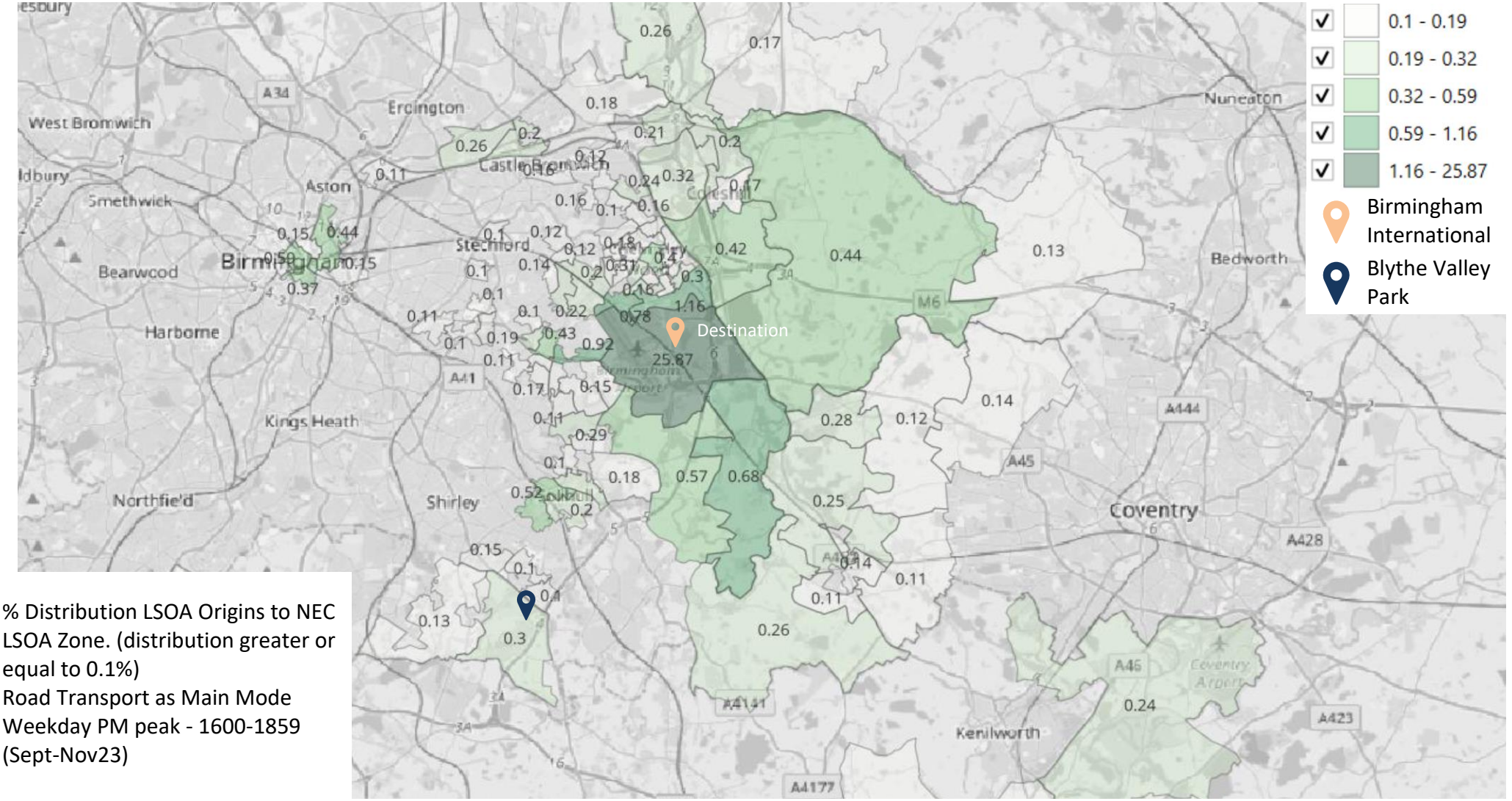


Figure 21 Destinations from BVP Weekend Off Peak



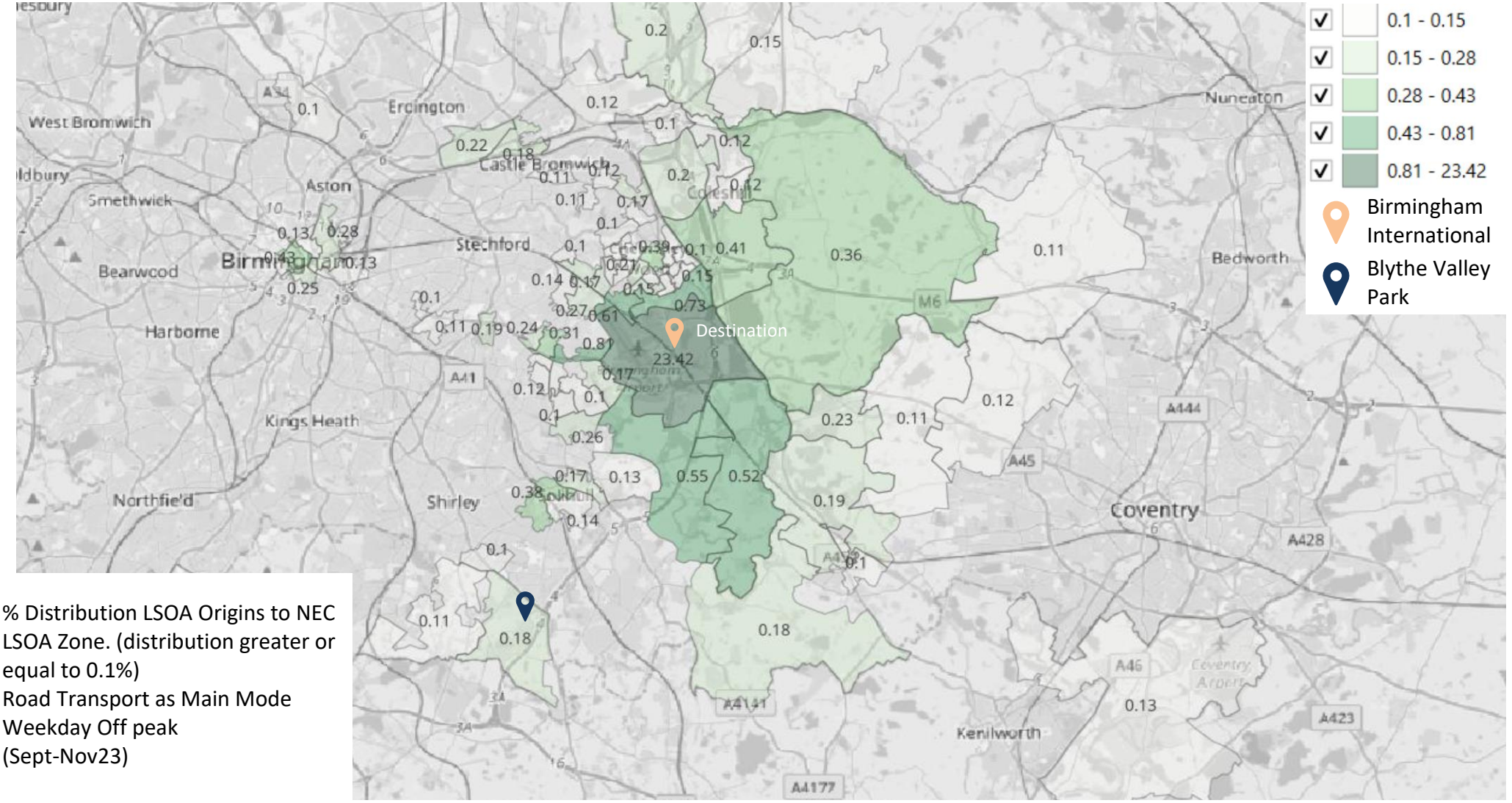
% Distribution LSOA Origins to NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday AM peak - 0700-0959 (Sept-Nov23)

Figure 22 Origin to NEC Weekday AM Peak



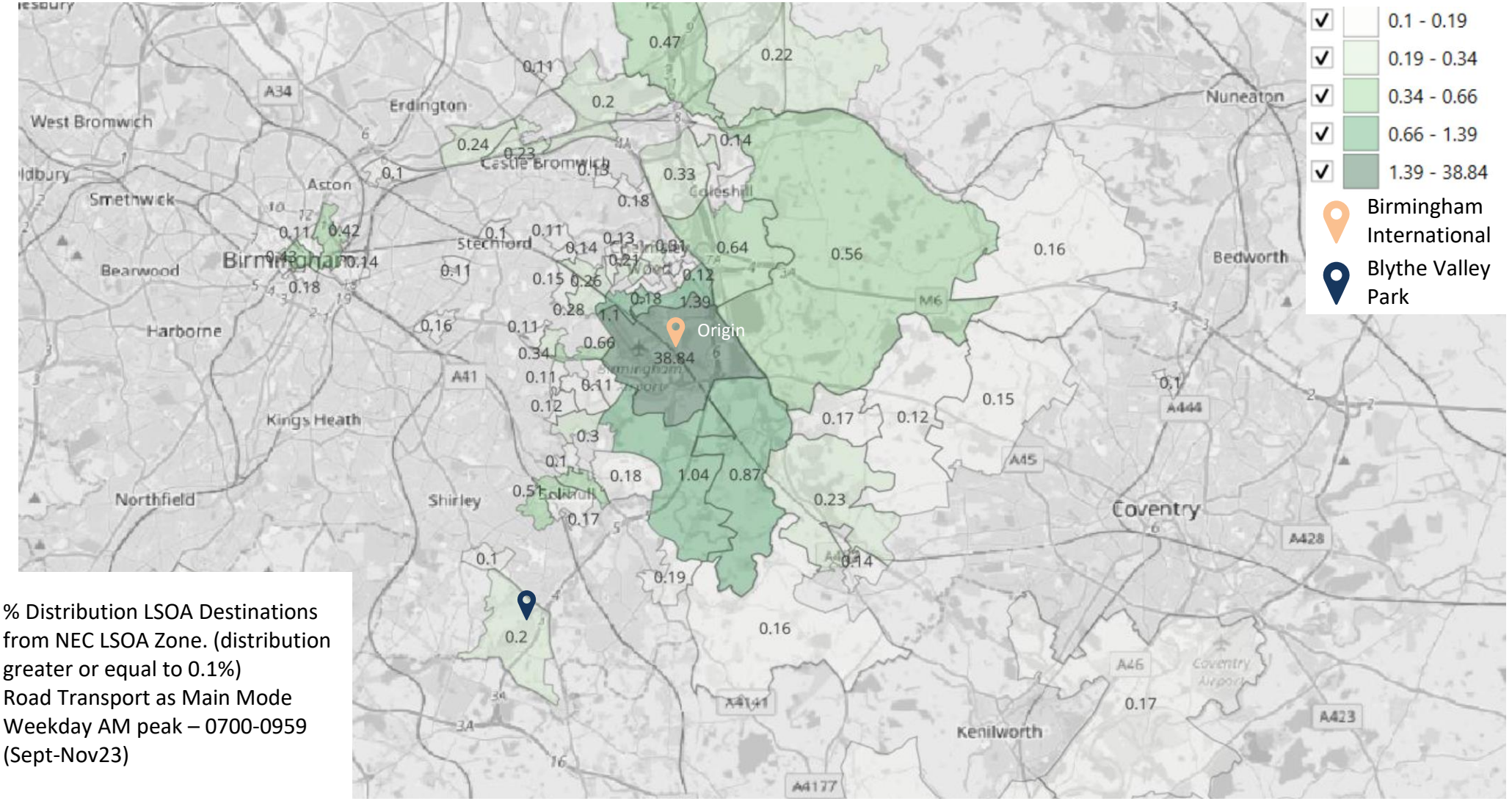
% Distribution LSOA Origins to NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday PM peak - 1600-1859 (Sept-Nov23)

Figure 23 Origin to NEC Weekday PM Peak



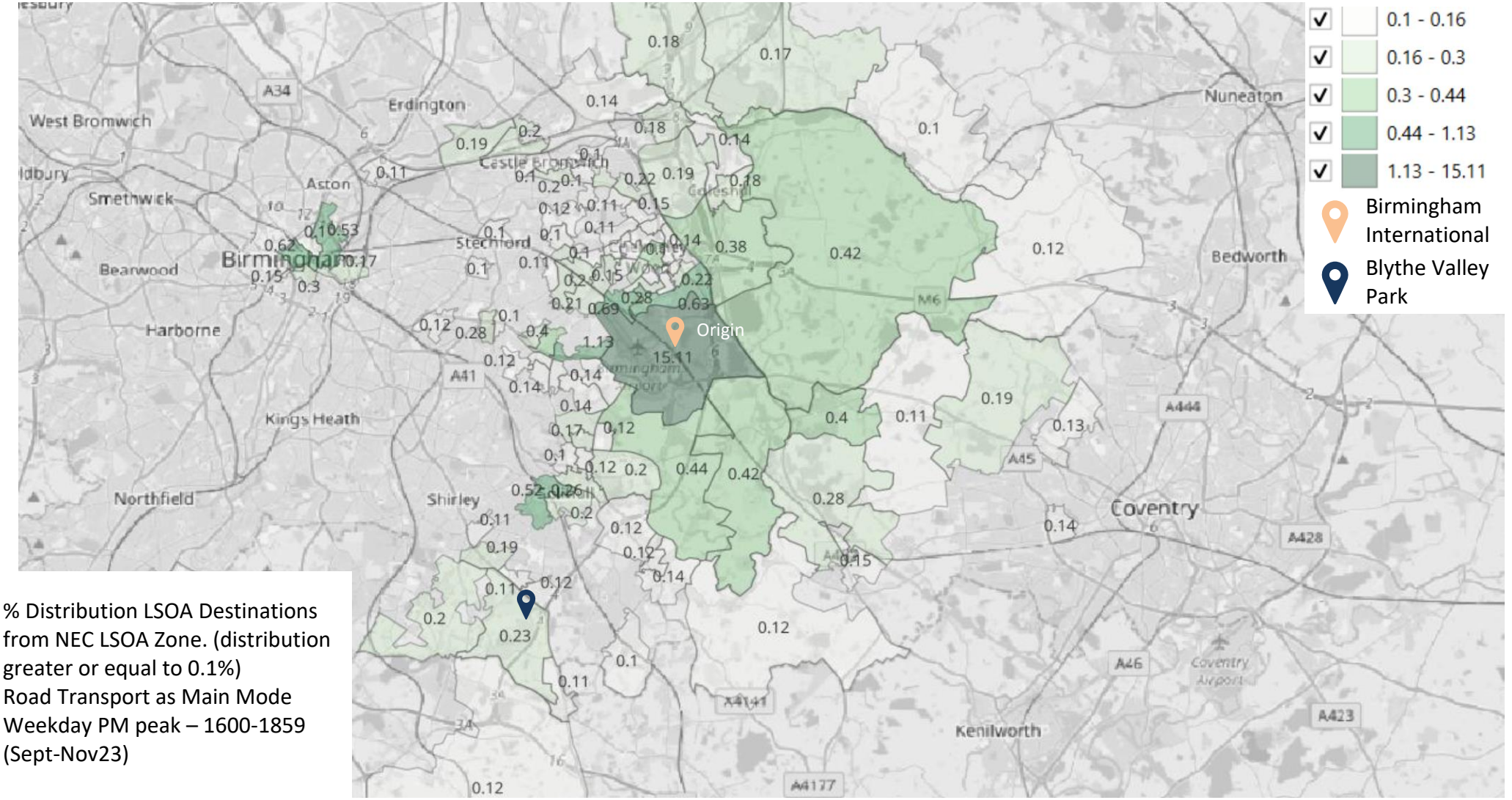
% Distribution LSOA Origins to NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday Off peak
(Sept-Nov23)

Figure 24 Origin to NEC Weekday Off Peak



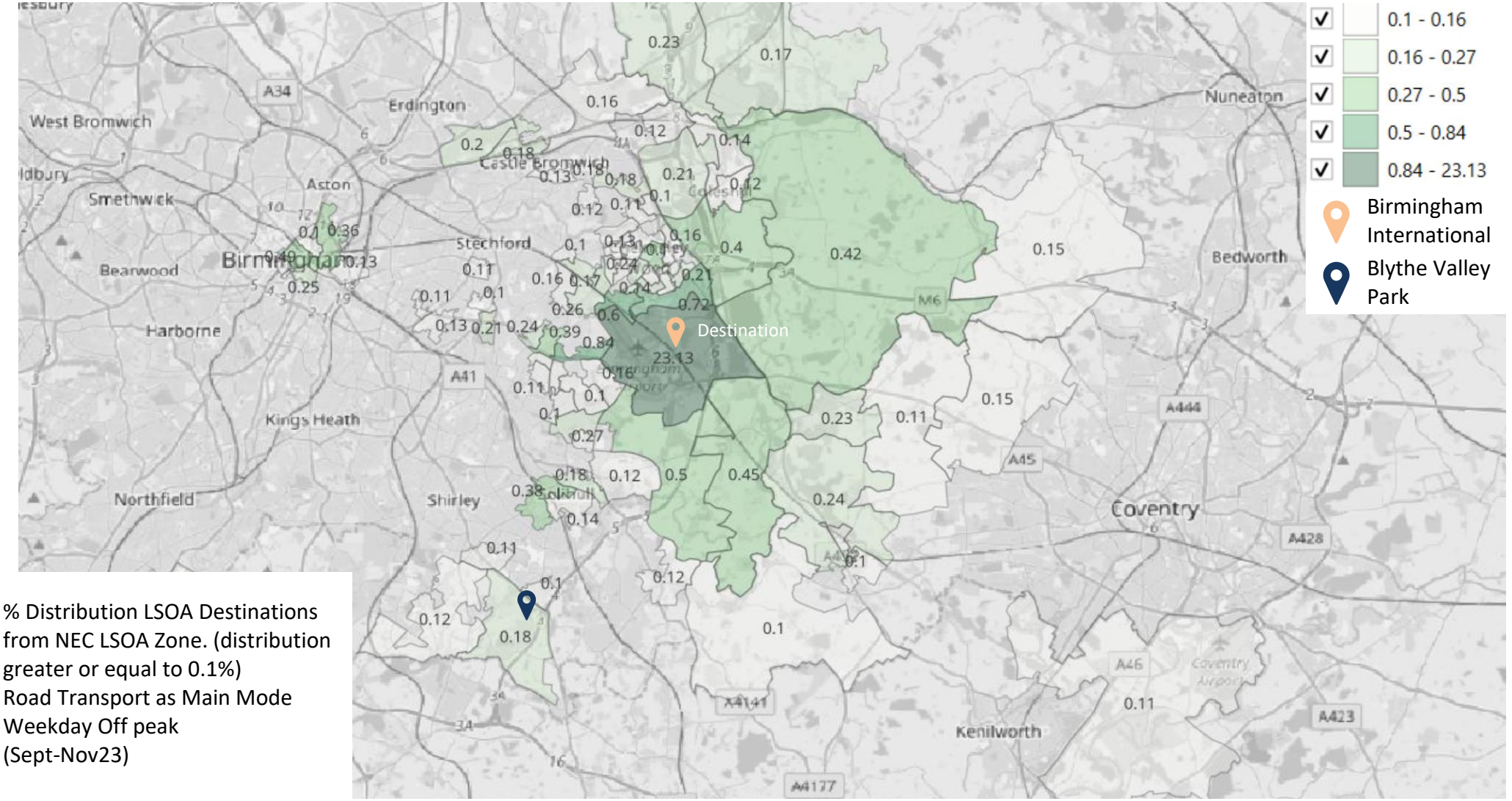
% Distribution LSOA Destinations from NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday AM peak – 0700-0959
(Sept-Nov23)

Figure 25 Destination from NEC Weekday AM Peak



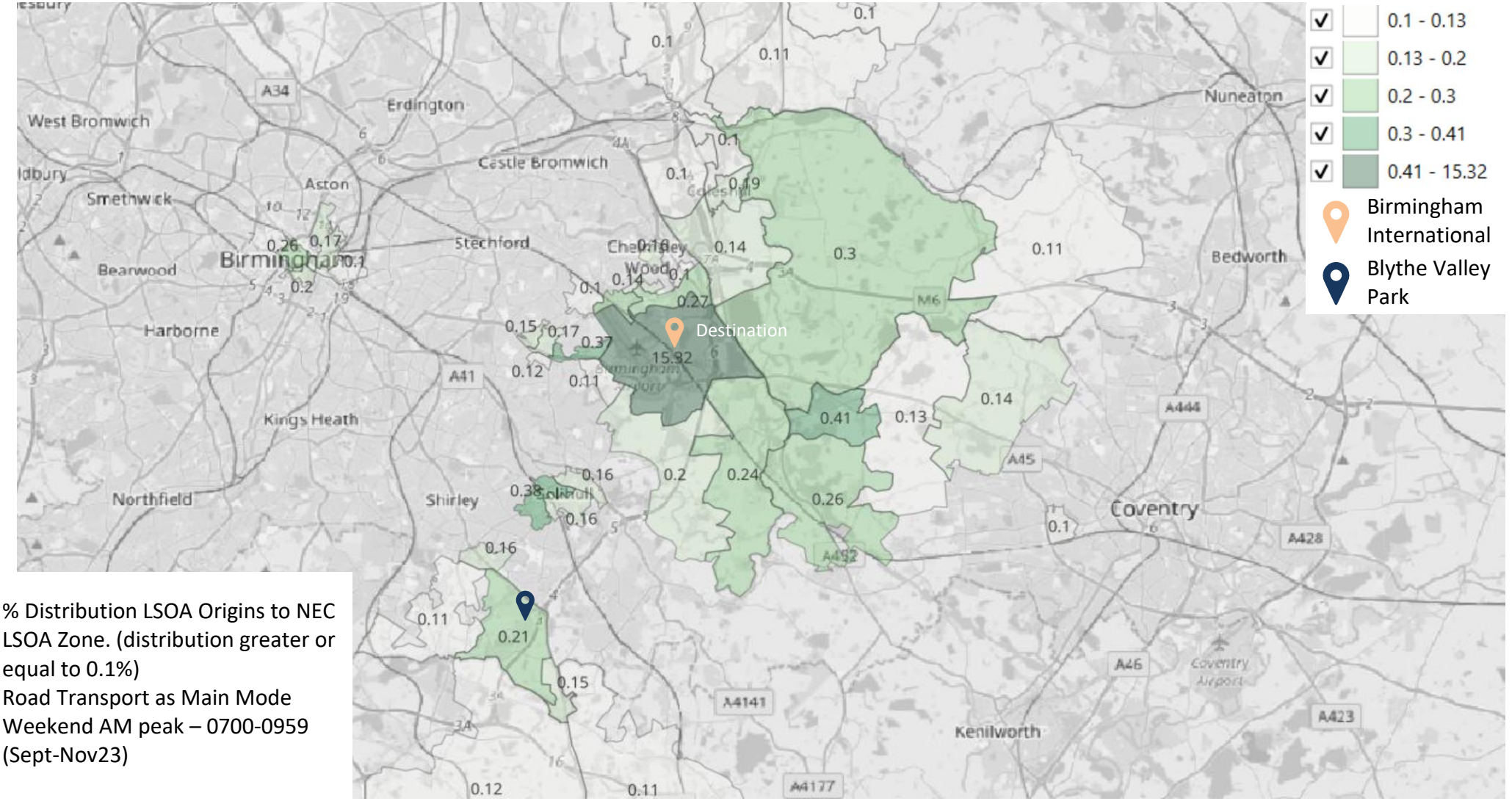
% Distribution LSOA Destinations from NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday PM peak – 1600-1859 (Sept-Nov23)

Figure 26 Destination from NEC Weekday PM Peak



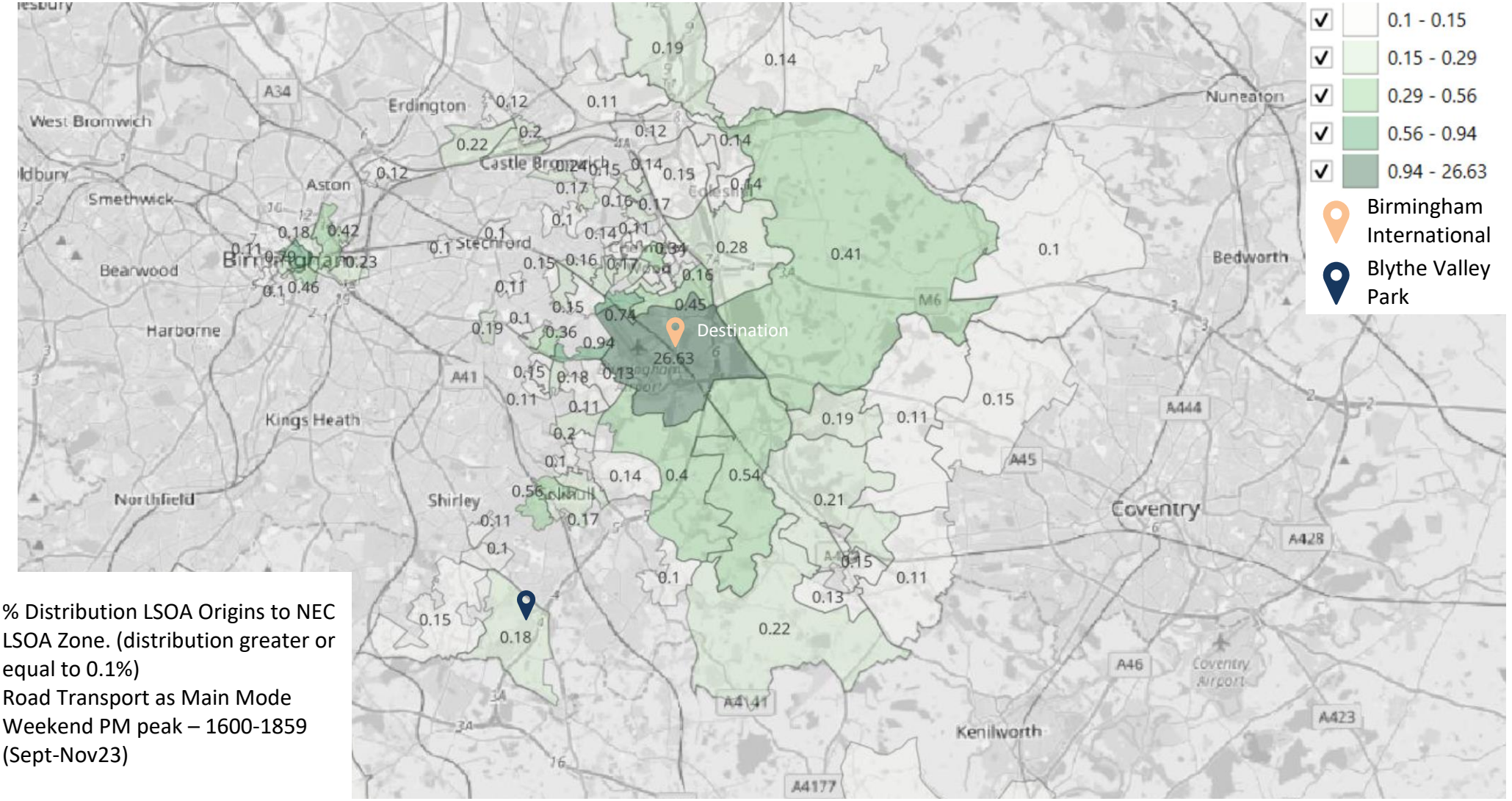
% Distribution LSOA Destinations from NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekday Off peak
(Sept-Nov23)

Figure 27 Destination from NEC Weekday Off Peak



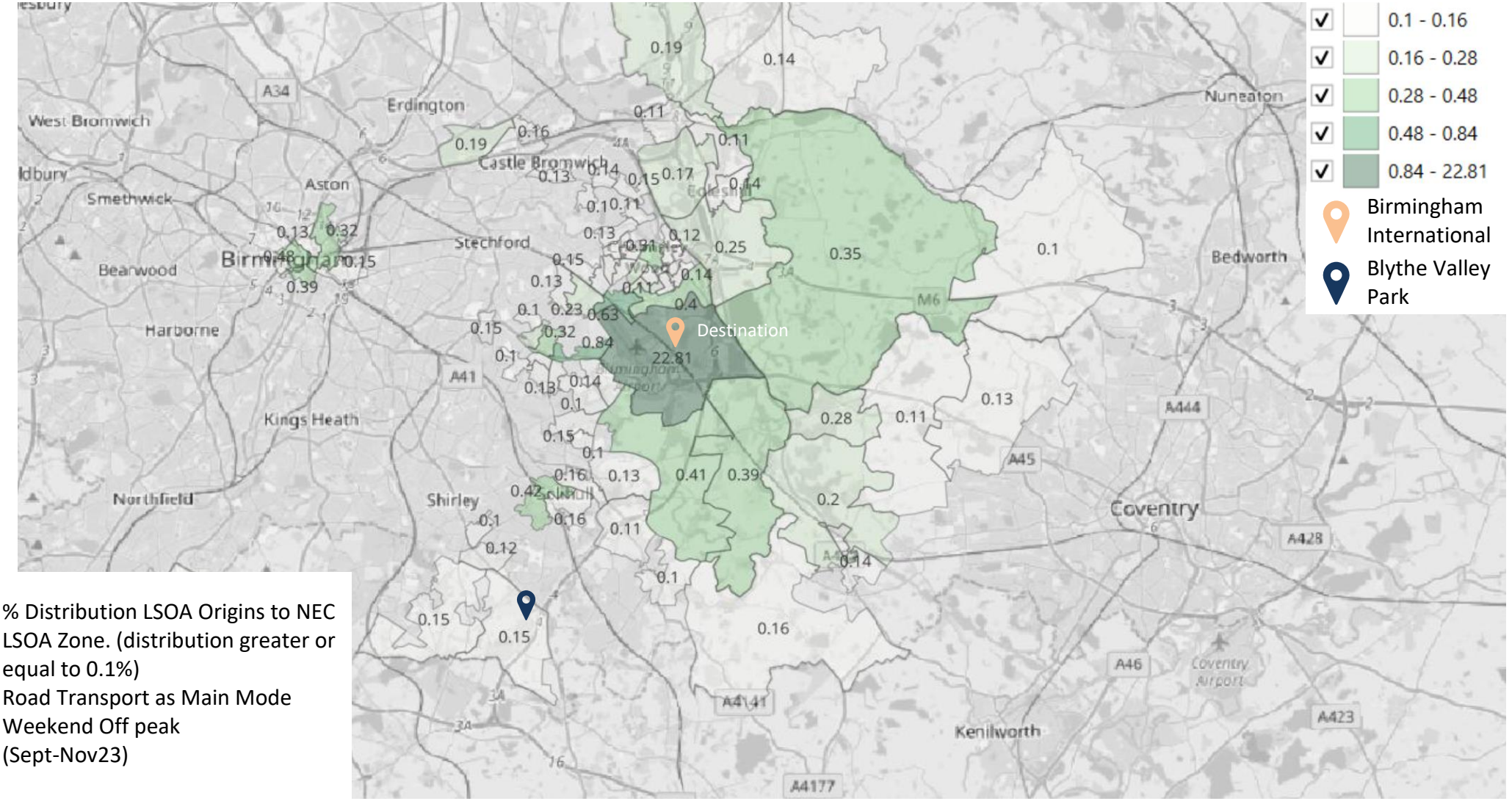
% Distribution LSOA Origins to NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend AM peak – 0700-0959 (Sept-Nov23)

Figure 28 Origin to NEC Weekend AM Peak



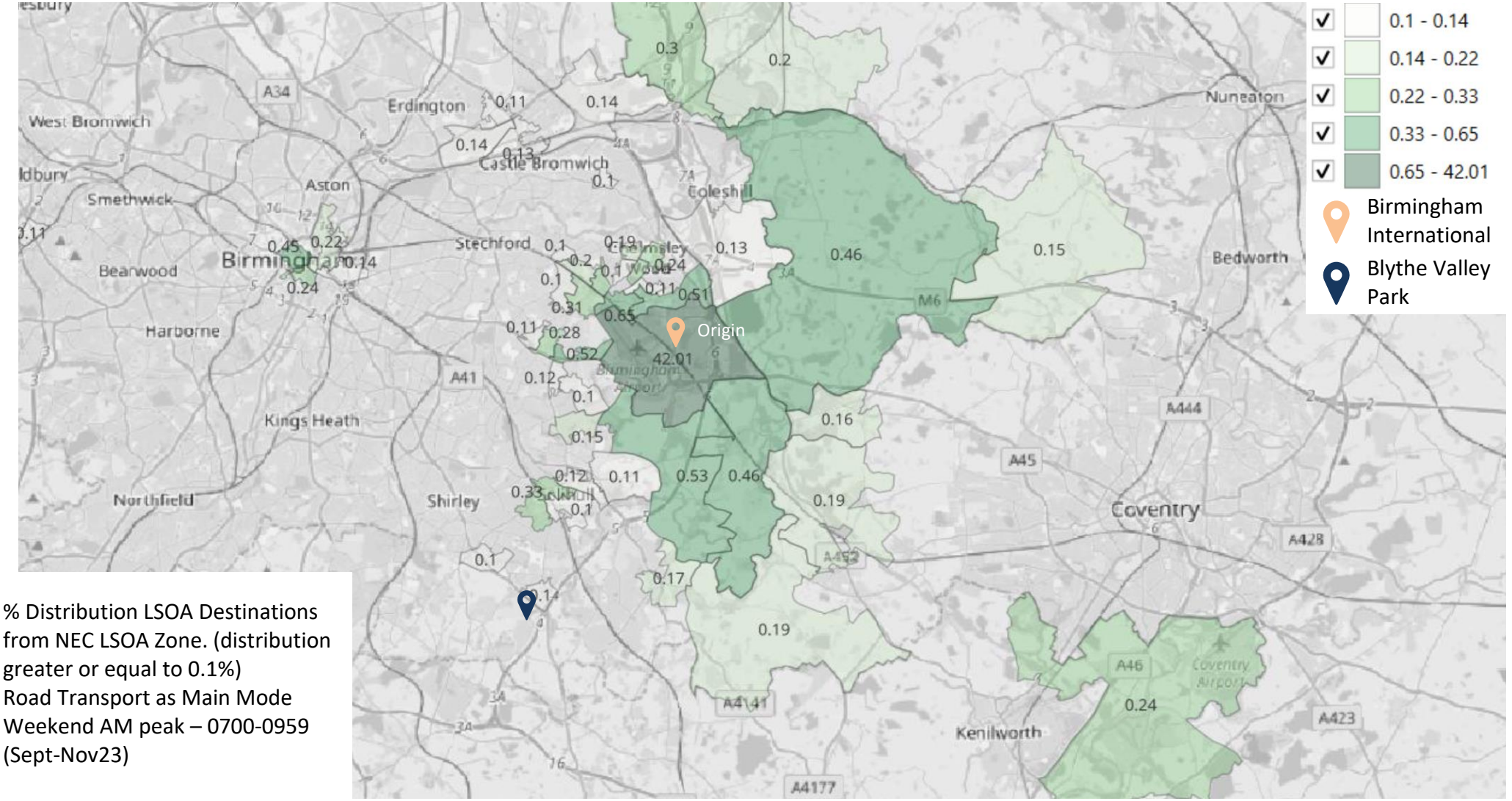
% Distribution LSOA Origins to NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend PM peak – 1600-1859 (Sept-Nov23)

Figure 29 Origin to NEC Weekend PM Peak



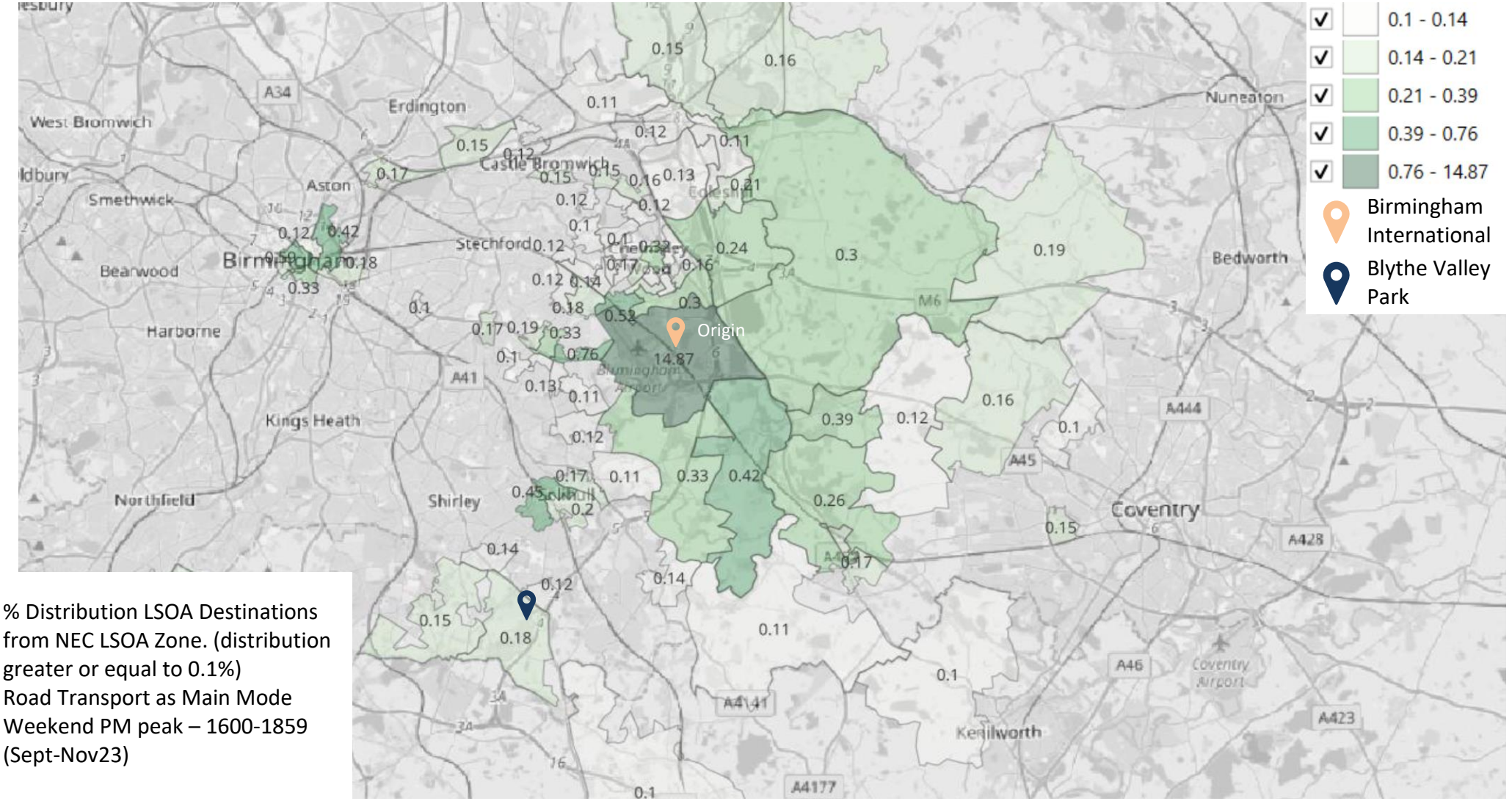
% Distribution LSOA Origins to NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend Off peak
(Sept-Nov23)

Figure 30 Origin to NEC Weekend Off Peak



% Distribution LSOA Destinations from NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend AM peak – 0700-0959 (Sept-Nov23)

Figure 31 Destination from NEC Weekend AM Peak



% Distribution LSOA Destinations from NEC LSOA Zone. (distribution greater or equal to 0.1%)
Road Transport as Main Mode
Weekend PM peak – 1600-1859 (Sept-Nov23)

Figure 32 Destination from NEC Weekend PM Peak

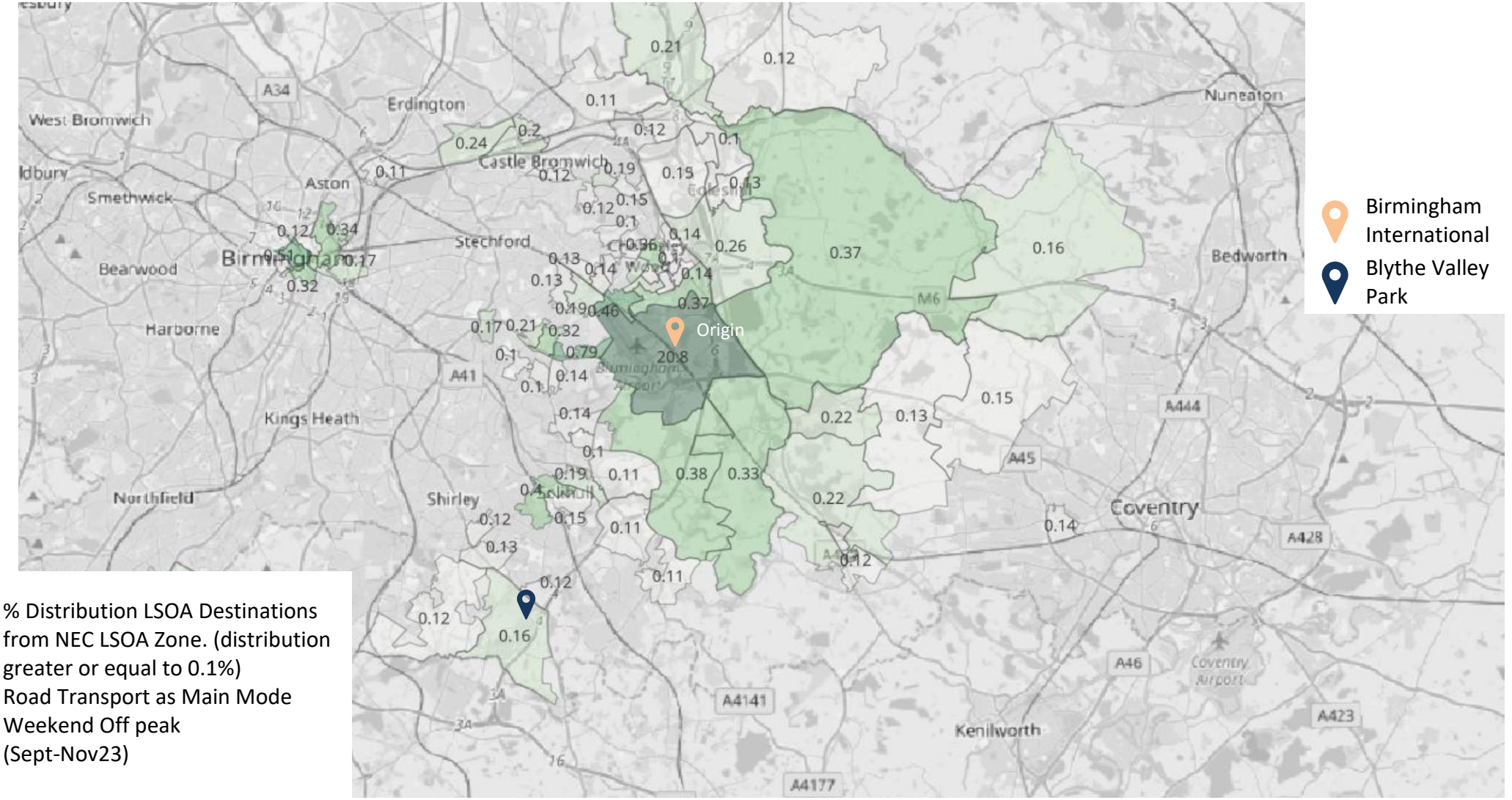


Figure 33 Destination from NEC Weekend Off Peak

D.2 PRISM Sources and Validation

Source	Year	Type	Vehicle splits	Number of counts used in PRISM 5.0
AECOM	2016	ATC	Car, LGV, HGV	1
AECOM	2016	ATC	Total	3
CASM	2013	Turning count	Car, LGV, HGV	2
CASM	2013	ATC	Car, LGV, HGV	6
MRTM	2015	ATC	Car, LGV, HGV	51
Spectrum	2011	ATC	Total	1
Spectrum	2012	ATC	Total	1
Spectrum	2013	ATC	Total	36
Spectrum	2013	ATC	Lights & Heavies	1
Spectrum	2014	ATC	Total	182
Spectrum	2014	ATC	Lights & Heavies	1
Spectrum	2015	ATC	Total	384
Spectrum	2015	ATC	Lights & Heavies	1
Spectrum	2016	ATC	Total	220
Spectrum	2016	ATC	Lights & Heavies	1
Spectrum	2017	ATC	Total	3
Spectrum	2017	ATC	Lights & Heavies	1
Streetwise	2017	ATC	Lights & Heavies	96
Tracsis	2017	ATC	Car, LGV, HGV	80
Walsall Council	2016	ANPR	Total	10
WebTRIS	2016	MIDAS	Lights & Heavies	161
Total				**1242**

Table 3 PRISM Data Sources

Time period	Count	Percentage of counts passing TAG Car	TAG Total	Adjusted TAG Car	Adjusted TAG Total
AM	2400	83%	79%	86%	83%
IP	2400	88%	85%	92%	89%
PM	2400	82%	80%	86%	84%

Table 2 PRISM Assignment validation – final matrix – counts used in matrix estimation

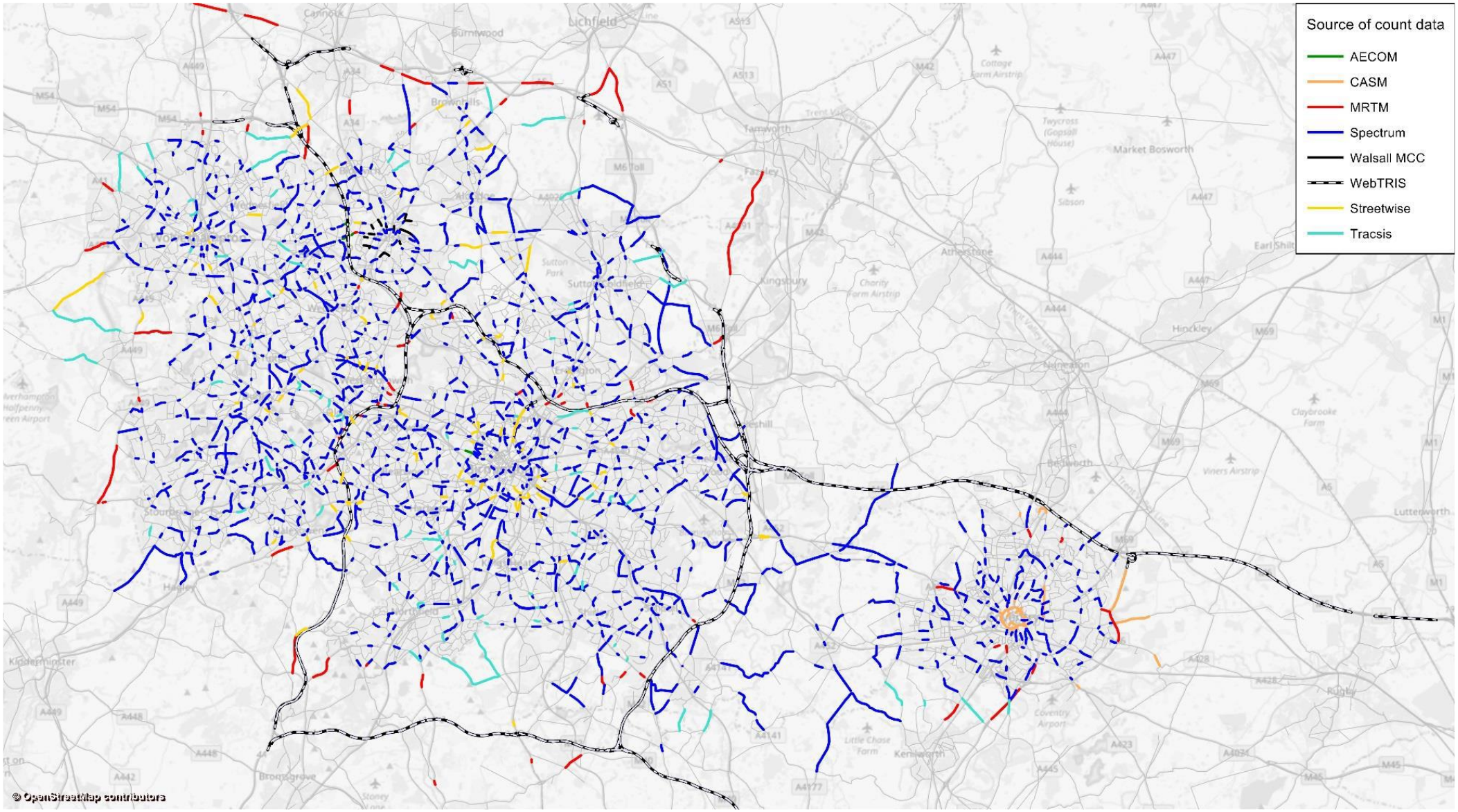


Figure 34 PRISM Available Traffic Counts by Source

D.3 Employee Survey Demographics and Locations

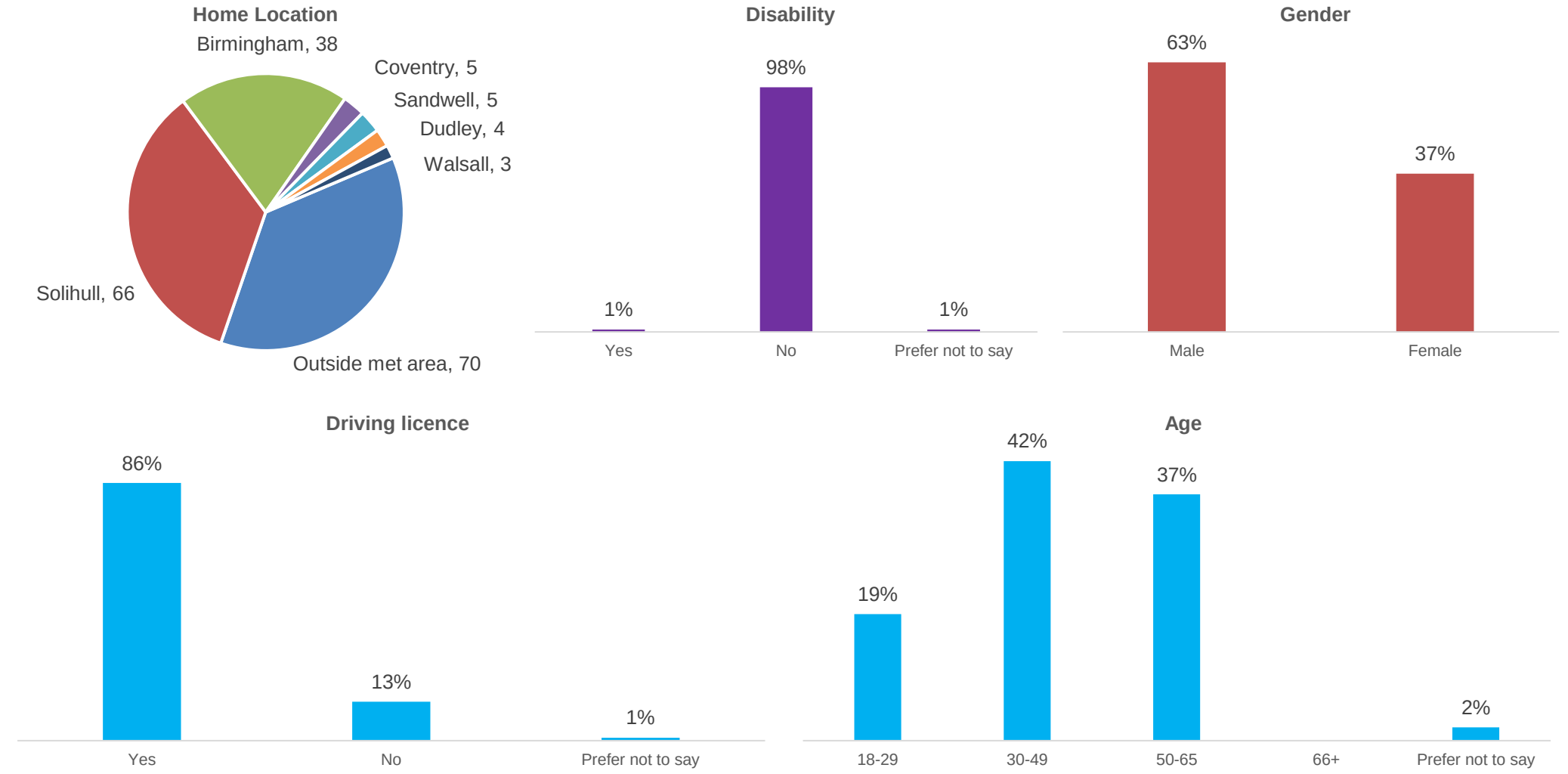


Figure 35 Demographics of Employee Survey Respondents

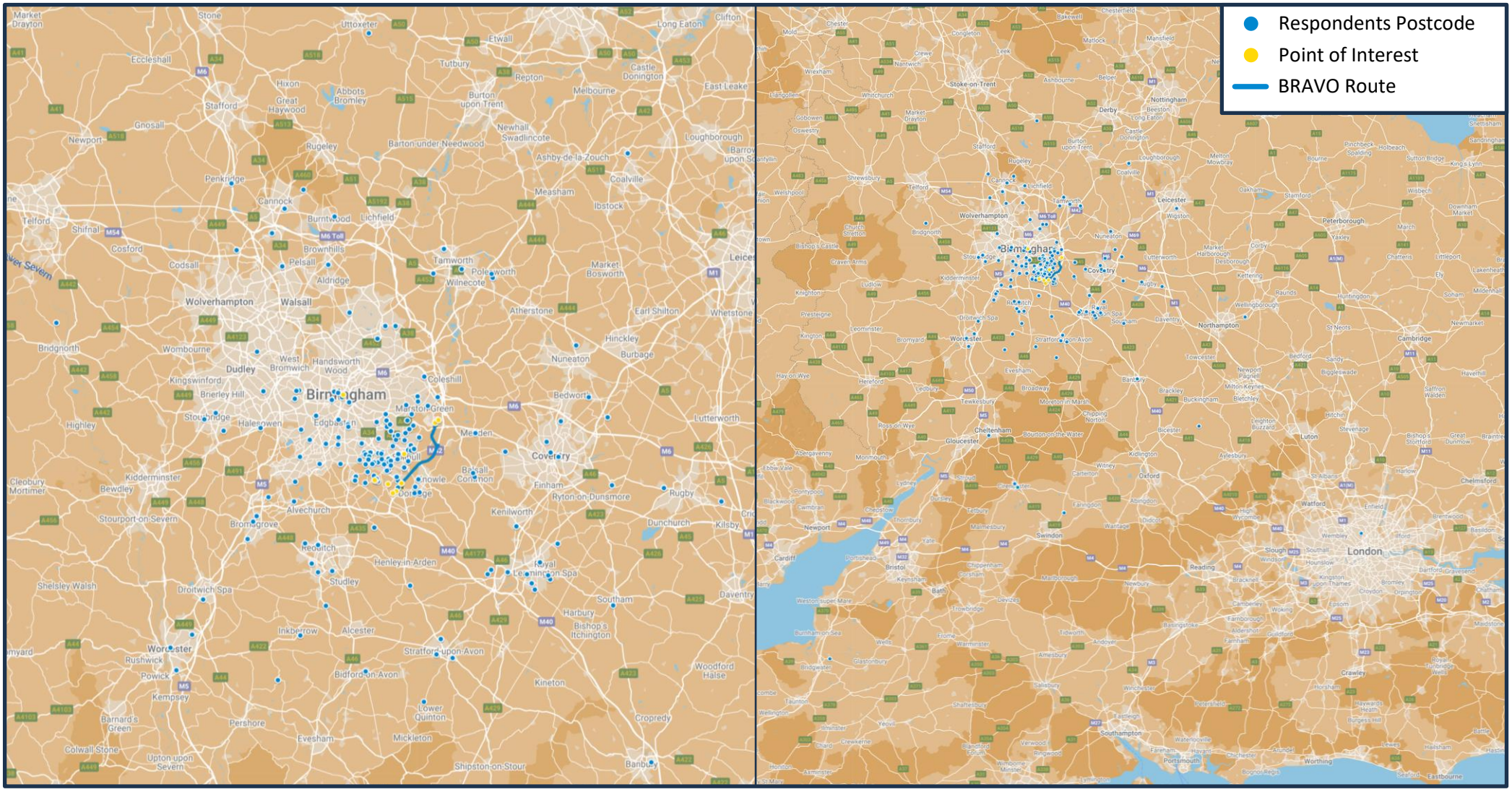


Figure 36 Approximate Home Locations of Employee Survey Respondents

D.4 Resident Survey Demographics and Locations

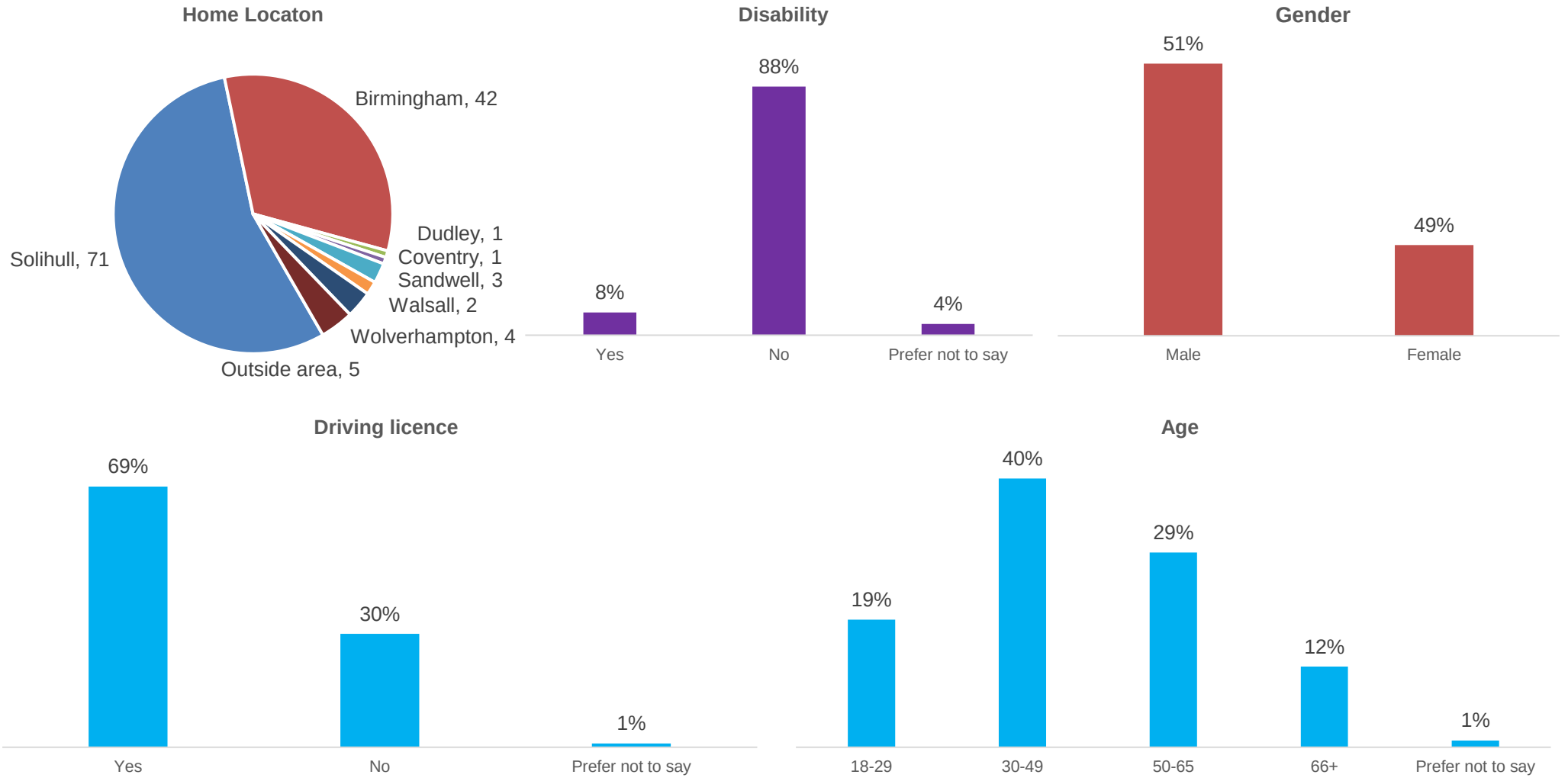


Figure 37 Demographics of Resident Survey Respondents

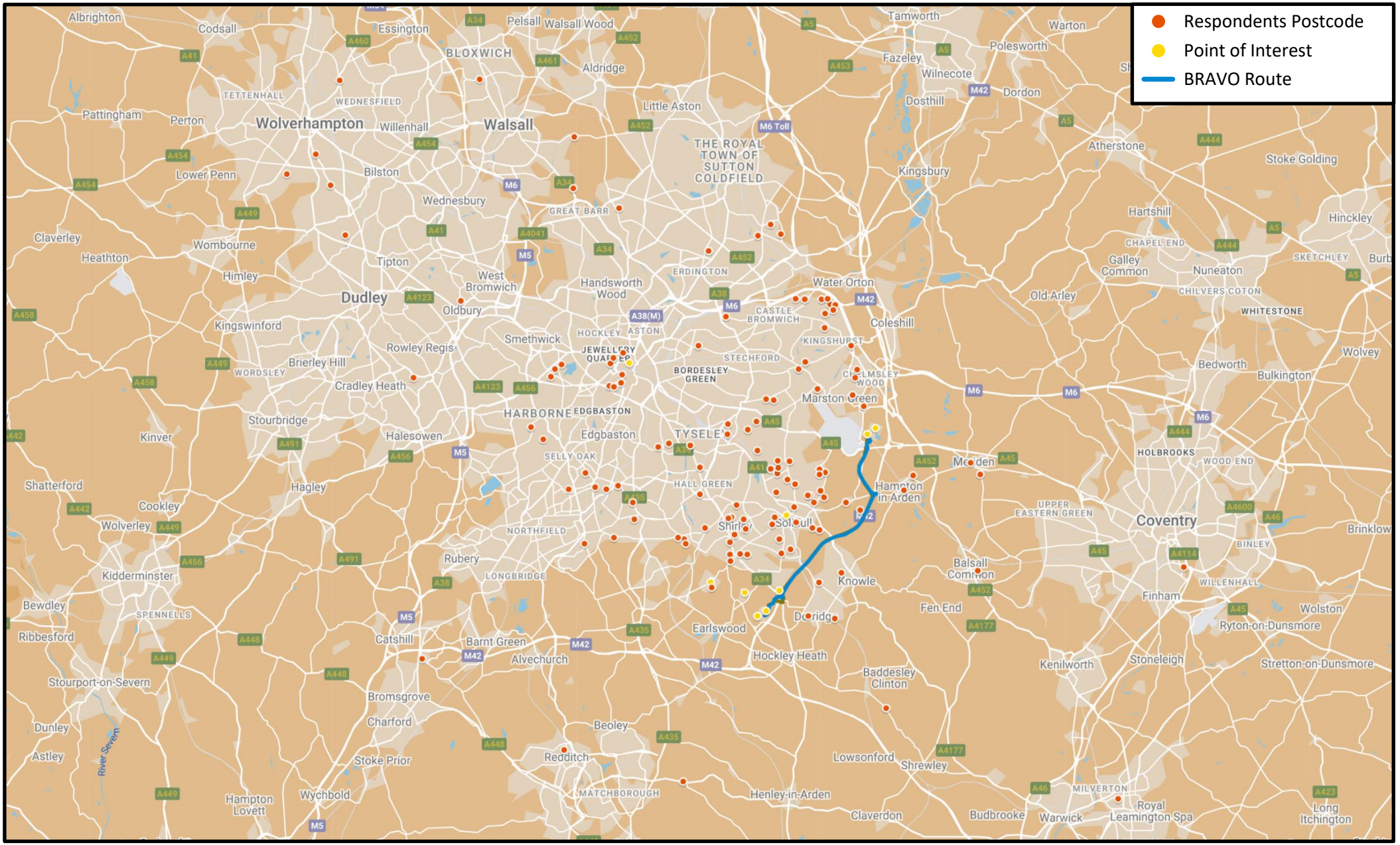
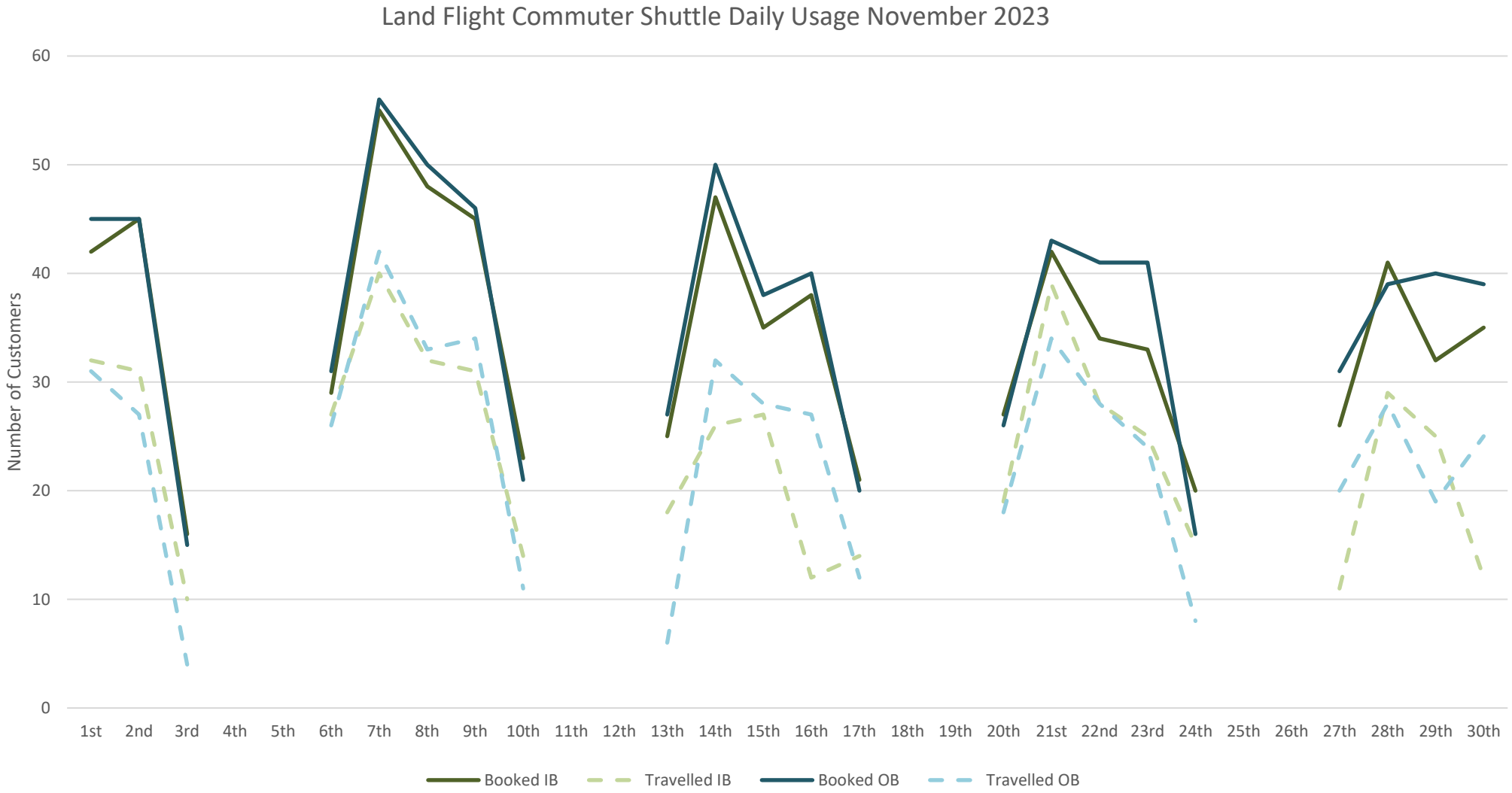


Figure 38 Approximate Home Locations of Resident Survey Respondents

D.5 LandFlight Daily Usage



Graph 1 Daily Land Flight Bookings and Travellers for November 2023

D.6 Breakdown of the cost assessment outputs

Model	Annual Operating Cost (OPEX)	Vehicle Capacity & Count	Fare & Daily Cost	Daily Km & Demand Projections	Cost Per Person Per Day
BVP Staff Shuttle (Traditional Model 0A)	£1,797,114	10 vehicles, each with 13 seats	£3.00 fare per passenger £680.72/day per vehicle	Total Daily Trips: 312 31 trips/vehicle 4 trips/hour	£15.78
BVP Staff Bus (Traditional Model 0B)	£2,062,003	10 vehicles, each with 43 seats	£3.00 fare per passenger £781.06/day per vehicle	Total Daily Trips: 1,032 103 trips/vehicle 13 trips/hour	£5.47
Trunk Route (Shuttle, AV Operational Model 1A)	£3,275,824	10 vehicles, each with 13 seats	£3.00 fare per passenger £1,240.84/day per vehicle	Total Daily Trips: 312 31 trips/vehicle 4 trips/hour	£28.77
Trunk Route (Bus, AV Operational Model 1B)	£3,516,003	10 vehicles, each with 43 seats	£3.00 fare per passenger £1,331.82/day per vehicle	Total Daily Trips: 1,032 103 trips/vehicle 13 trips/hour	£9.33
Peak Feeder (AV Operational Model 2)	£2,951,259	7 vehicles, each with 13 seats	£3.00 fare per passenger £1,597.00/day per vehicle	Total Daily Trips: 273 39 trips/vehicle 5 trips/hour	£29.62
Peak Flexi (AV Operational Model 3)	£4,442,215	15 vehicles, each with 14 seats	£5.00 fare per passenger £1,121.77/day per vehicle	Total Daily Trips: 693 46 trips/vehicle 6 trips/hour	£17.56

Table 4 Cost assessment outputs breakdown

D.7 Breakdown of the cost assessment outputs (alternative)

Model	Annual Operating Cost (OPEX)	Vehicle Capacity & Count	Fare & Daily Cost	Daily Km & Demand Projections	Cost Per Person Per Day
BVP Staff Shuttle	£20,075,372	120 vehicles each with 13 seats	£3.00 fare per passenger £449.72/day per vehicle	Total Daily Trips: 7020 59 trips/vehicle 7 trips/hour	£7.83
BVP Staff Bus	£27,096,770	120 vehicles each with 43 seats	£3.00 fare per passenger £607.01/day per vehicle	Total Daily Trips: 15,480 129 trips/vehicle 16 trips/hour	£4.80
Trunk Route AV Shuttle	£21,053,002	120 vehicles each with 13 seats	£3.00 fare per passenger £471.62/day per vehicle	Total Daily Trips: 6240 52 trips/vehicle 7 trips/hour	£9.24
Trunk Route AV Bus	£27,620,744	120 vehicles each with 43 seats	£3.00 fare per passenger £618.74/day per vehicle	Total Daily Trips: 15,480 129 trips/vehicle 16 trips/hour	£4.89
Peak Feeder AV	£26,493,934	120 vehicles each with 13 seats	£3.00 fare per passenger £593.50/day per vehicle	Total Daily Trips: 7020 59 trips/vehicle 7 trips/hour	£10.34
Peak Flexi AV	£33,918,269	120 vehicles each with 13 seats	£3.00 fare per passenger £759.82/day per vehicle	Total Daily Trips: 7800 65 trips/vehicle 8 trips/hour	£11.91

Table 5 Alternative cost assessment outputs breakdown