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Bristol Clean Zone

Bristol City Council

Distribution and Equalities Impact Analysis

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Bristol Clean Zone

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Jacobs Consultancy Ltd.

1 The Square, Temple Quay
2nd Floor
Bristol, BS1 6DG
United Kingdom
T +44 (0)117 910 2580
F +44 (0)117 910 2581
www.jacobs.com

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Contents

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1. Introduction

Poor air quality is the largest known environmental risk to public health in the UK[1]. Investing in cleaner air and doing more to tackle air pollution are priorities for the EU and UK governments, as well as for Bristol City Council (BCC). BCC has monitored and endeavoured to address air quality in Bristol for decade, and declared their first Air Quality Management Area in 2001. Despite this, Bristol has ongoing exceedances of the legal limits for Nitrogen Dioxide (NO_2) and these are predicted to continue until 2025 without intervention.

In 2017 the government published a UK Air Quality Plan for Nitrogen Dioxide[2] setting out how compliance with the EU Limit Value for annual mean NO2 will be reached across the UK in the shortest possible time. Due to forecast air quality exceedances, BCC, along with 27 other Local Authorities, was directed by Minister Therese Coffey (Defra) and Minister Jesse Norman (DfT) in 2017 to produce a Clean Air Plan (CAP). The Plan must set out how BCC will achieve sufficient air quality improvements in the shortest possible time. In line with Government guidance BCC is considering implementation of a Clean Air Zone (CAZ), including both charging and non-charging measures, in order to achieve sufficient improvement in air quality and public health.

Jacobs has been commissioned by BCC to produce an Outline Business Case (OBC) for the delivery of the CAP; a package of measures which will bring about compliance with the Limit Value for annual mean NO2 in the shortest time possible in Bristol. The OBC assesses the shortlist of options set out in the Strategic Outline Case[3], and proposes a preferred option including details of delivery. The OBC forms a bid to central government for funding to implement the CAP.

This Distributional and Equalities Impact Analysis Report is written to support the OBC and outlines the overarching framework and detailed analysis that underpins the assessment of the potential differential impacts of the Bristol Clean Air Plan on relevant socio-economic groups. It presents the key assumptions, approach and structure of the impact analysis, leading to an identification of particular distributional and equality issues and concerns that are addressed in the Economic Case of the OBC. Within this context, this report should be reviewed alongside the Economic Case presented in the OBC.

1.1   Purpose of the Impact

The UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations (Defra/DfT July 2017) acknowledges that air quality issues, and NO_2 exceedances in particular, are highly localised. As such it is recommended that any interventions proposed to improve air quality should attempt to minimise their impact on local groups and businesses, especially vulnerable socio-economic groups. In line with JAQU's Options Appraisal Guidance (2017), the key local groups and businesses of interest are:

- Low income households;
- Children and young people;
- Elderly residents;
- Residents suffering from illness and disability;
- Female residents;
- Residents from ethnic minority groups; and
- Businesses, including small and medium enterprises (SMEs) and taxi/private hire firms.

The purpose of the report is to identify any positive or negative impacts of the proposed scheme on these interest groups. The social groups listed above (i.e. the first six groups listed) are included in the assessment to fulfil BCC's statutory obligations under the Equality Act 2010. They include people with protected

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[1] Public Health England (2014) Estimating local mortality burdens associated with particular air pollution.
    https://www.gov.uk/government/publications/estimating-local-mortality-burdens-associated-with-particulate-air-pollution
[2] https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017
[3] Bristol City Council Clean Air Plan: Strategic Outline Case, April 2018
    (https://www.cleanairforbristol.org/wp-content/uploads/2018/05/Strategic-Outline-Case_BCC_Final_05.04.18.pdf)

characteristics who may have less ability to adapt to the interventions proposed as part of the Bristol CAP. The businesses referred to in the list above are included in the assessment as the charging CAZ element of the Bristol CAP will produce direct costs to businesses. It may not be possible for some SME's to absorb these additional costs, meaning specific consideration of distributional impacts on these business groups is also required.

Establishing the specific impacts of the scheme on the groups listed above will help determine whether the scheme unduly advantages or disadvantages a particular group.

1.2 Report Structure

Within this context, the report is structured as follows:

- Chapter 2 presents the assessment methodology, drawing on JAQU's Options Appraisal Guidance, which in turn is informed by DfT's WebTAG unit A4-2 'Distributional Impact Appraisal'.

- Chapter 3 presents the screening stage of assessment, providing additional detail on the types of socio-economic groups and impact variables considered in the assessment.

- Chapter 4 outlines the socio-economic context in BCC, which establishes the prevailing conditions within which socio-economic groupings and potential impacts can be assessed.

- Chapter 5 presents the distributional and equalities impact analysis.

- Chapter 6 summarises the key findings of the assessment.

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2. Methodology

2.1 Approach

In accordance with JAQU's Options Appraisal Guidance and WebTAG unit A4-2, a three-step approach has been used for the distributional impact appraisal. These three steps involve:

- Step One - Screening: At this stage, the variety of impacts that the policy might have is considered and particular impacts are prioritised for further analysis so that only the most relevant indicators for the scheme are appraised to ensure proportionality.

- Step Two - Assessment: At this stage, information is collected on the geographical area likely to be affected by the policy and how different social and business groups are distributed within that geographical area.

- Step Three - Appraisal: At this stage, an assessment is made as to the extent of the impact of the policy on the social groups identified.

Many different methods including quantitative analysis of statistics and modelling outputs, spatial analysis of geographical datasets and qualitative appraisal drawing on available information and research is acceptable according to TAG guidance. JAQU guidance however, notes that 'light touch' appraisal is sufficient on some occasions, rather than the detailed guidance of TAG A4-2. This report will determine the impacts likely to be associated with the CAZ and what analysis would be best suited to investigating these impacts, depending on the data available and how sensitive the issue is to the CAZ project in Bristol.

2.2 Identification of Study Area

A layered approach to identifying the study area for the assessment was adopted. This reflects the potential variation in spatial extent of any impacts that materialise. An immediate study area was defined as BCC's local authority area. A wider study area was also defined, covering BCC and the other administrative areas forming the West of England sub-region (i.e. Bath & North East Somerset, South Gloucestershire and North Somerset). The study areas are outlined in Figure 2.1. The majority of the analysis presented in this report focuses on the BCC area but uses the appropriate study area definition based on the socio-economic group and impact variable being considered.

2.3 Distributional Impact Assessment Criteria

In order to understand whether or not a particular group is being unduly disadvantaged by the proposed option, it is necessary to understand whether impacts are disproportionate. To investigate whether impacts are disproportionate, it is necessary to obtain an understanding of how impacts are occurring, whether they are acceptable or whether the option should be altered or mitigated. The following scale is used as a guide to determine the scale and extent of an impact.

Note that the assessment scoring outlined in Table 2.2 is undertaken relative to population sizes, comparing the proportion of net winners or losers in each socio-economic quintile to that socio-economic quintile's share of population in BCC.

A larger score (of "✓✓✓" or xxx") is indicative of impacts falling disproportionately on a particular quintile relative to that quintile's population share across BCC as a whole. So if 20% of an impact falls on socio-economic quintile x, but socio-economic quintile x only form 10% of the study area population, a large assessment score will be recorded.
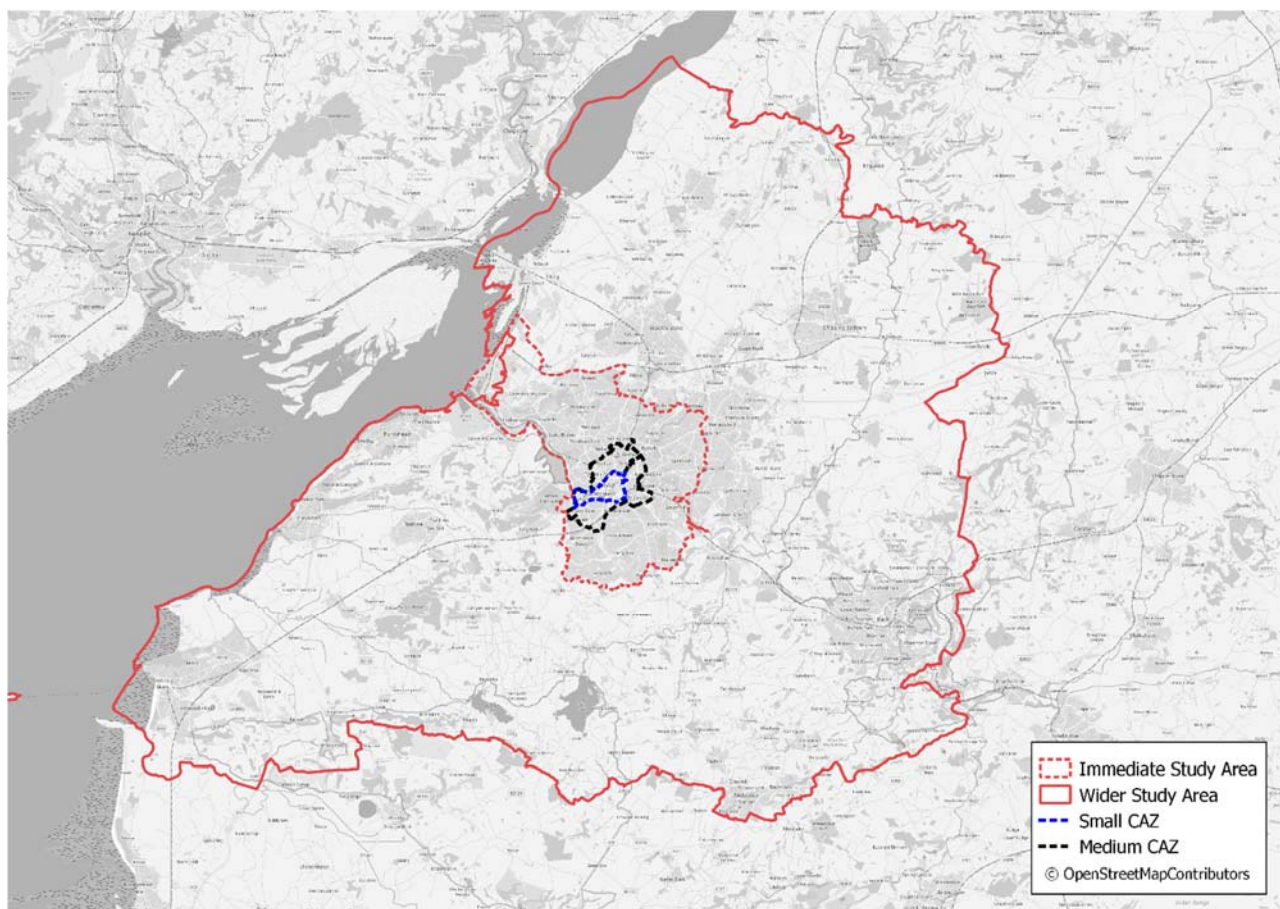
Figure 2.1. Study Area

Table 2.2. Distributional Impact Assessment Criteria

	Assessment	Impact Description
✔✔✔	Large beneficial	Beneficial and the population impacted is significantly greater than the proportion of the group in the total population
✔✔	Moderate beneficial	Beneficial and the population impacted is broadly in line with the proportion of the group in the total population
✔	Slight beneficial	Beneficial and the population impacted is smaller than the proportion of the group in the total population
-	Neutral	There are no significant benefits or disbenefits experienced by the group for the specified impact
✖	Slight adverse	Adverse and the population impacted is smaller than the proportion of the population of the group in the total population
✖✖	Moderate adverse	Adverse and the population impacted is broadly in line with the proportion of the population of the group in the total population
✖✖✖	Large adverse	Adverse and the population impacted is significantly greater than the proportion of the group in the total population

2.4   Appraisal Methodology

In line with JAQU's Options Appraisal Guidance, three core distributional impact variables have been identified as most relevant to the Bristol CAP proposals; these are:

- Air Quality: The primary objective and critical success factor of the scheme is to improve air quality by ensuring compliance with NO_2 limit values and objectives. Therefore, the differential impacts of changes in air quality spatially and across socio-economic groups is an essential element of analysis.

- Accessibility: The charging CAZ element of the scheme could induce changes in travel patterns and behaviours by imposing a charge on non-compliant vehicles. As such, it is necessary to establish whether changes in accessibility will disproportionately affect the socio-economic groups of interest.

- Affordability: The charging CAZ element of the scheme will impose direct costs on local people and businesses who use non-compliant vehicles. As such, it is necessary to establish whether changes in accessibility will disproportionately affect the socio-economic groups of interest.

2.4.1   Method of Assessing Air Quality

Within the OBC the economic analysis of air quality impacts has been undertaken following the Damage Cost Approach. This approach applies damage costs to changes in emissions data to monetise the impact of air quality improvements. For consistency, the distributional analysis pivots from the same approach, utilising changes in emissions data (as forecast at monitoring locations across the study area) to determine where air quality impacts would be most significant. This information was then overlaid on the spatial distribution of socio-economic groups to determine the variance in air quality impacts.

2.4.2   Method of Assessing Accessibility

Distributional impacts associated with changes in accessibility were assessed using qualitative and quantitative components. From a qualitative perspective, a mapping exercise that highlighted the spatial distribution of relevant socio-economic groups was undertaken, to highlight key corridors and arterial routes for the socio-economic groups of interest.

From a quantitative perspective, information from the GBATS4 traffic model were utilised, to determine trips between combinations of Lower Super Output Areas (LSOAs[4]) that cross-reference with the Small and Medium CAZ areas. Further cross-referencing with the qualitative mapping exercise allows for illustration of impacts between LSOAs with high concentrations of particular socio-economic groups and key trip destinations.

2.4.3   Method of Assessing Affordability

A similar approach to the accessibility assessment was adopted for assessing affordability. The model figures, particularly focused on areas of highest income deprivation and CAZ areas, were distributed across LSOAs with high concentrations of particular socio-economic groups based on the mapping exercise described above.

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[4] LSOAs are geographical areas that are used to report small area data.

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3. Screening

3.1 Screening for Distributional Impacts

As set out in Section 2.4, JAQU's Options Appraisal Guidance (2017) states that as a minimum, the following impacts should be investigated:

- Air Quality: Changes in the ambient concentrations of air pollutants that will affect the health of local people.

- Affordability: Changes in the costs of individuals or businesses using their vehicles or public transport.

- Accessibility: Changes to the ability and ease of individuals or businesses to get to places of work, social networks and public amenities.

3.2 Relevant Grouping Variables

The Guidance also outlines the interaction between impact variables and socio-economic groups (replicated in Table 3.1). The matrix overleaf provides an indication of how the impact variables and socio-economic groups can be grouped. It outlines the basis for understanding which impacts should be appraised for each socio-economic group.

Table 3.1: Impact categories in scope for each social or business group

Social or Business Group	Air Quality	Accessibility	Affordability	Justification for Screening
Deprivation / income	X	X	X	Low income households may be less able to adapt to the impacts of the Bristol CAP. They may be less able to afford to replace vehicles, thus limiting their accessibility and connectivity. Further, low-income households are less likely to own motor vehicles, so any existing accessibility issues are likely to be exacerbated[5]. A higher concentration of non-compliant vehicles in low-income neighbourhoods may also impose localised air quality issues.
Children	X	X		Children and young people may be more vulnerable to the health impacts of air pollution[6]. Further, children require access to a range of key amenities (e.g. schools), so any change in accessibility could hinder their ability to reach such facilities.
The Elderly	X	X		Elderly people require access to a range of key amenities (e.g. health facilities), so any change in accessibility could hinder their ability to reach such facilities. Further, there is evidence to suggest that the elderly are disproportionately affected by the public health impacts of air pollution[7].
Disabled People		X		Disabled people are likely to have concerns over access to a range of key amenities (e.g. health facilities), so any change in accessibility could hinder their ability to reach such facilities.

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[5] Census 2011 Table DC6403EW suggests 20% of residents aged 16-64 in BCC have no access to a motor vehicle, but 35% of such residents ranked in the lowest social grades (i.e. grade D and E) do not have access to a car. Social grade is a proxy for income deprivation. Therefore residents in income deprived areas are nearly twice as likely not to have access to a motor vehicle

[6] World Health Organization (2013) *Review of evidence on health aspects of air pollution – REVIHAAP Project: final technical report.* http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/2013/review-of-evidence-on-health-aspects-of-air-pollution-revihaap-project-final-technical-report

[7] Simoni et al., Adverse effects of outdoor pollution in the elderly, Journal of Thoracic Disease, January 2015 (URL:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4311079/)

Social or Business Group	Air Quality	Accessibility	Affordability	Justification for Screening
Women		X		Females may be less likely to have access to a car[8] and are therefore more reliant on public transport. Any change in accessibility associated with the proposed scheme could further reduce their connectivity.
Ethnic Minorities		X		Ethnic minority groups may be less likely to have access to a car[9] and are therefore more reliant on public transport. Any change in accessibility associated with the proposed scheme could further reduce their connectivity.
Businesses - SMEs			X	SMEs may struggle to absorb the direct costs (e.g. CAZ charge) associated with implementing the scheme
Businesses – LGVs/HGVs			X	LGVs and HGVs represent a significant number of business trips. Owners of non-compliant LGVs and HGVs may struggle to absorb the direct costs (e.g. CAZ charge) associated with implementing the scheme
Businesses - Taxis			X	Taxis may struggle to absorb the direct costs (e.g. CAZ charge) associated with implementing the scheme

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[8] Census 2011 Table DC4109EW1a suggests 57% of people residing in households without access to a car in BCC are female. Females form 50% of the BCC population. Therefore, women are more likely to lack access to a car relative to men.

[9] Census Table DC4203EW indicates that 20% of residents in 'white' households do not have access to a motor vehicle. In comparison, 33% of residents in ethnic minority households do not have access to a motor vehicle. Therefore, ethnic minorities are more likely to not have access to a motor vehicle relative to the white population.

4. Socio-economic Context

4.1 Social Groups and Demographics

4.1.1 Population Size

The population of BCC was estimated at 459,252 in 2017 (ONS Population Estimates). The city centre core, which is the proposed location of the charging CAZ element of the CAP, is the most densely populated region within the local authority area. Based on 2011 Census data, the three most densely populated lower super output areas (LSOAs) in BCC are located within the city centre core and will be directly affected by implementation of the CAZ.

4.1.2 Low Income Households

The distribution of low income groups in BCC was determined through analysis of the 2015 Indices of Multiple Deprivation's (IMD) 'Income Domain'. The IMD ranks LSOA areas in terms of levels of income, measured by the number of people that are out-of-work and those that are in work but who have low earnings. The income domain therefore acts as a suitable proxy for defining low-income groups.

Figures 4.1 and 4.2 map the distribution of low income LSOAs, and by proxy, low income households across BCC. Figure 4.1 provides the distribution of income deprivation within the wider study area. Figure 4.2 provides a comparison of national levels of income deprivation. Both figures demonstrate that the communities north west of the CAZ (including Clifton) is among the most affluent locations, both in the context of the wider study area and nationally.

However, the analysis also shows that a number of neighbourhoods in central Bristol are amongst the most income deprived areas both regionally and nationally. At a national level, communities in Lawrence Weston and Henbury, north of the city centre, Easton and Lawrence Hill to the East, and numerous communities on the southern edge of Bristol City are within the lowest quintile for income deprivation, indicating that these communities are amongst the 20% most income deprived nationally. Some of the most deprived neighbourhoods are located within the Medium CAZ boundary. Within this context, this means that some neighbourhoods with a high proportion of low-income households could be directly affected by the CAZ.

4.1.3 Children

Figure 4.3 presents the distribution of children across BCC and demonstrates that there are a number of areas with a high concentration of children in the immediate study area. These areas are spread out in both north, east and south of the CAZ boundaries. The communities covered by the proposed CAZ itself have a low concentration of children. Those that do exist are concentrated at the east edges of Medium CAZ area. Nevertheless, some of the facilities used and relied on by children on the outskirts of Bristol City may be located in the city centre core or children may need to pass through the CAZ to access these facilities (locations of these facilities are considered later in this chapter). Hence, imposition of a CAZ in the central area could inhibit accessibility for children living further out.

4.1.4 Elderly People

Figure 4.4 presents the distribution of elderly people (aged over 65) across Bristol City Council shows that the immediate study area is home to a large elderly population. The elderly population is primarily concentrated on the peripheral areas of Bristol City, outside of the proposed CAZ boundary. The elderly people living in these communities will be directly impacted by any change in accessibility or air quality generated by the proposed scheme. At the same time, where key amenities used by elderly people are located within or on the opposite side of the city centre, imposition of a CAZ in the central area could inhibit accessibility to these amenities for residents living further out in BCC (locations of these facilities are considered later in this chapter).

4.1.5   Disabled People

Figure 4.5 presents the distribution of disability deprivation across BCC, measured using the 'Health and disability domain' (IMD, 2015). This indicates the number of residents with work-limiting morbidity and disability, based on the number receiving benefits due to inability to work through ill health. The map indicates that communities with a high disability ratio are located throughout the immediate study area have are particularly concentrated in east of central Bristol and on the southern periphery. The population who are disabilities in central Bristol may suffer from reduced accessibility with the imposition of the proposed CAZ scheme. Further, residents with disabilities located on the southern periphery (and elsewhere) could suffer from reduced access to the central area with a CAZ in place.

4.1.6   Women

Figure 4.6 provides the distribution of females across BCC and demonstrates that females are disproportionately located on the periphery of Bristol City. Central areas are home to communities with a relatively low proportion of women. Females in the central and peripheral areas may be impacted by the scheme, if the scheme acts to reduce accessibility to any key trip destinations in the city centre core or that involve passing through the CAZ.

4.1.7   Ethnic Minorities

Figure 4.7 provides the distribution of ethnic minorities across BCC and demonstrates that a considerable proportion of people with ethnic minority backgrounds are residing at within the medium CAZ boundary.
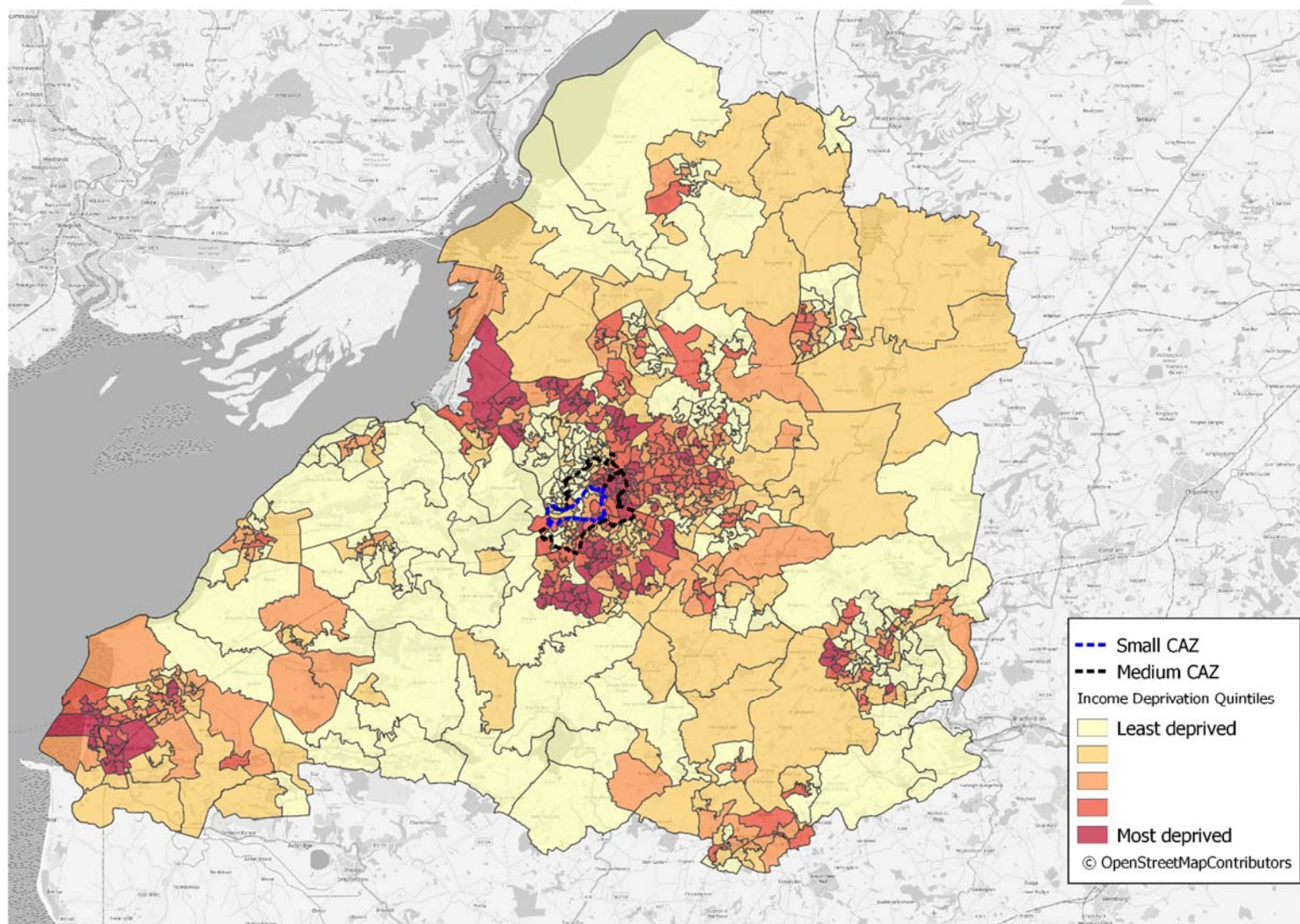
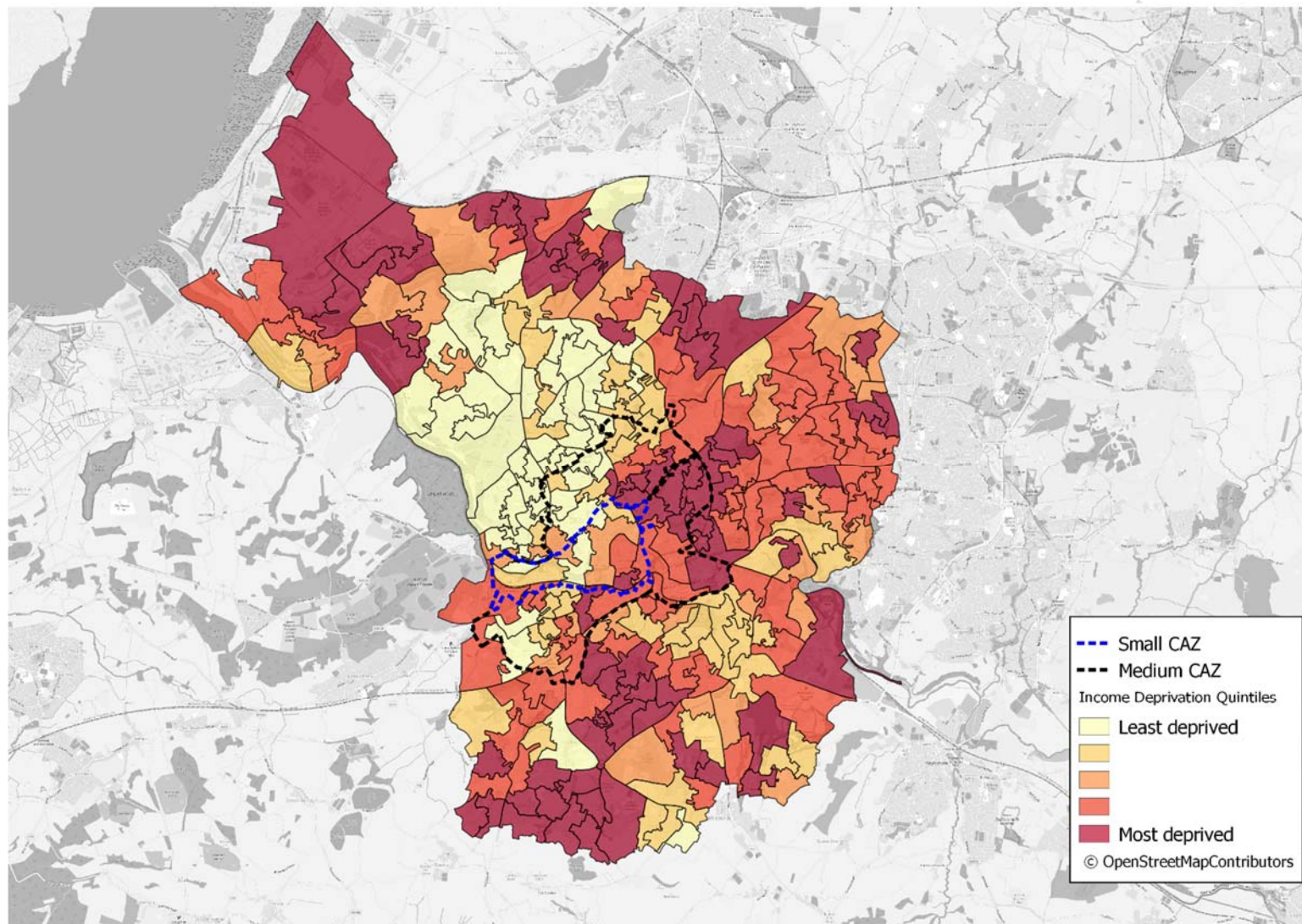**Figure 4.1: Concentration of Low Income Households in Wider Study Area**

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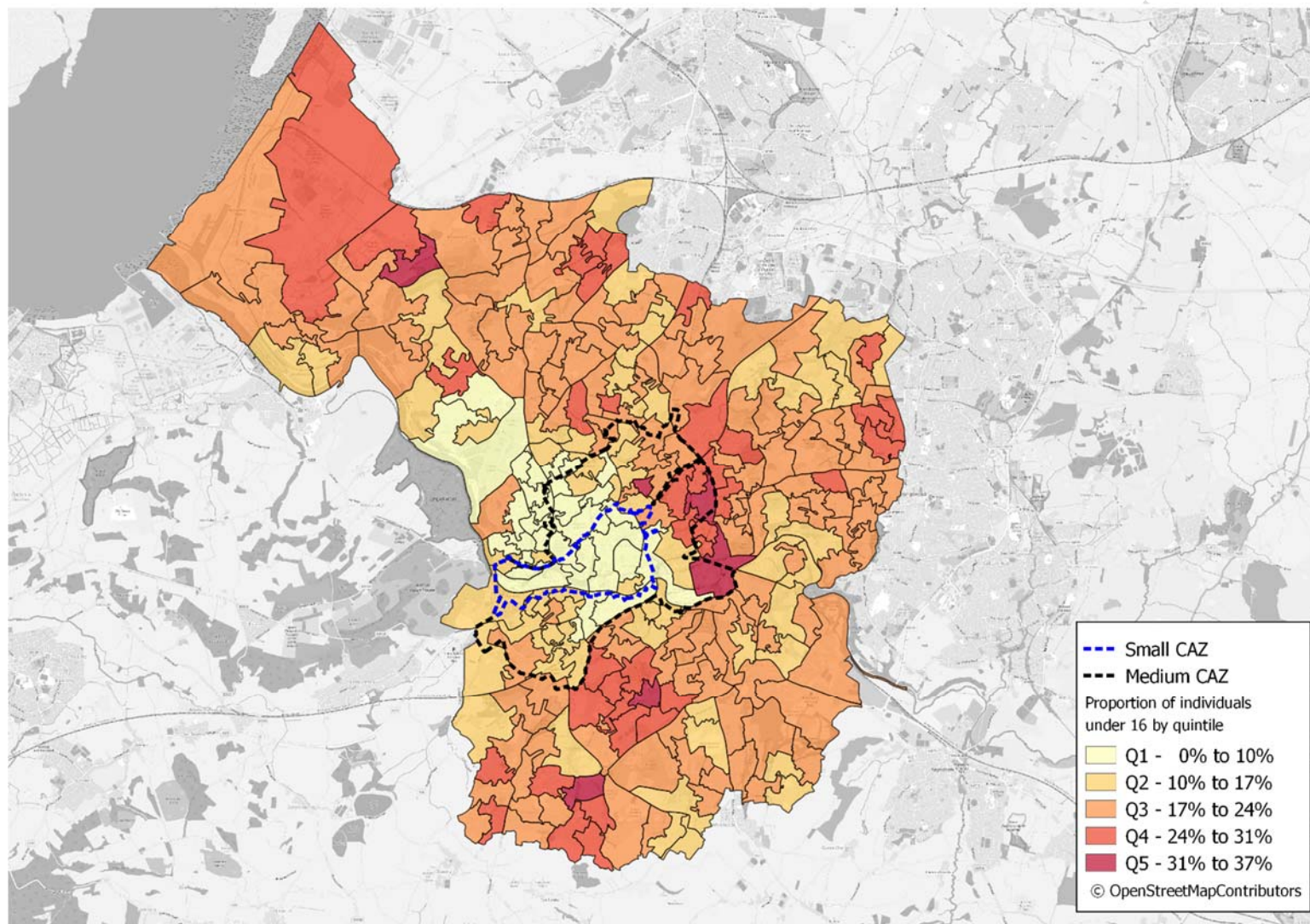**Figure 4.2: Concentration of Low Income Households in BCC Relative to National Benchmarks**

Figure 4.3: Concentration of Children in BCC

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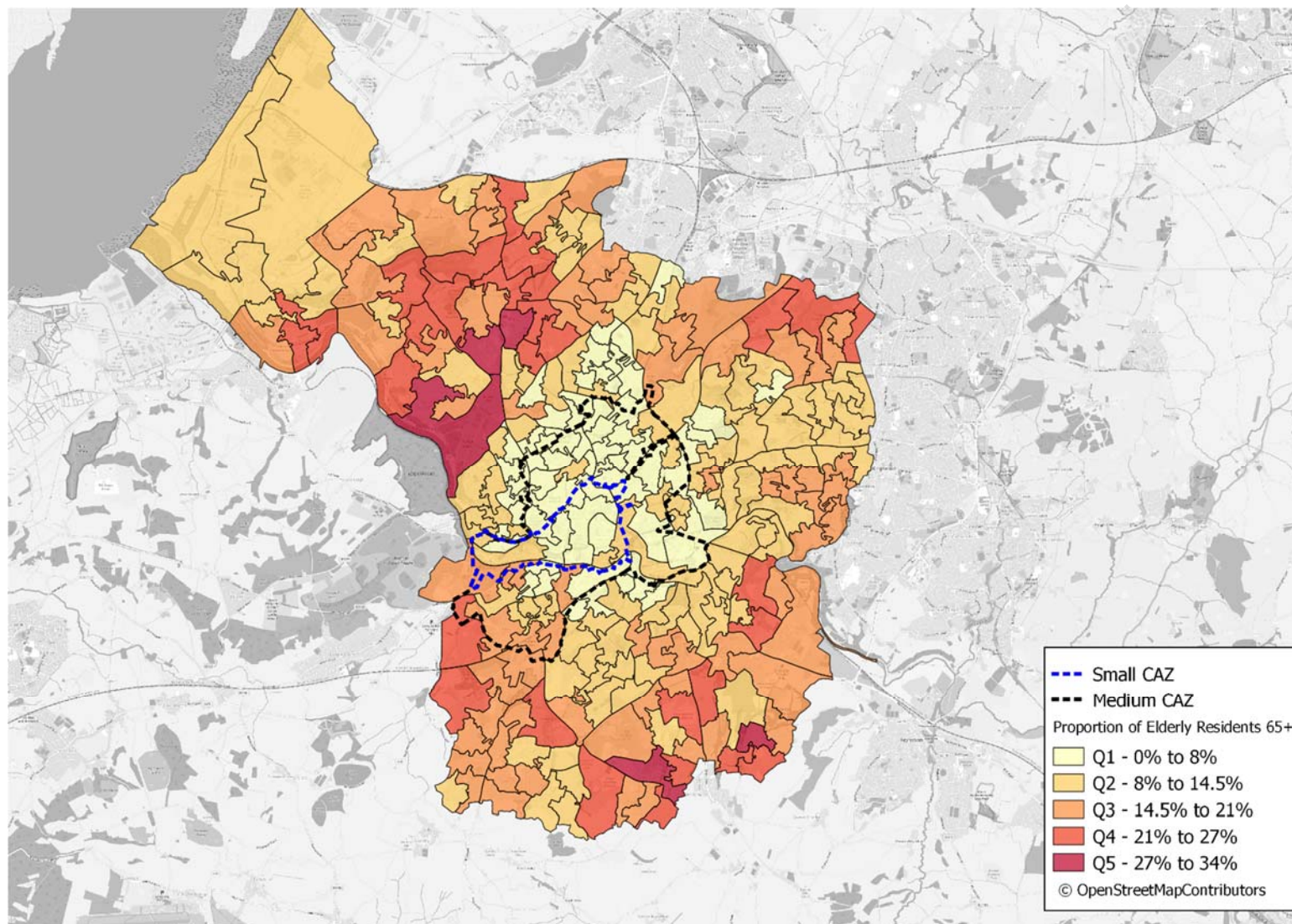

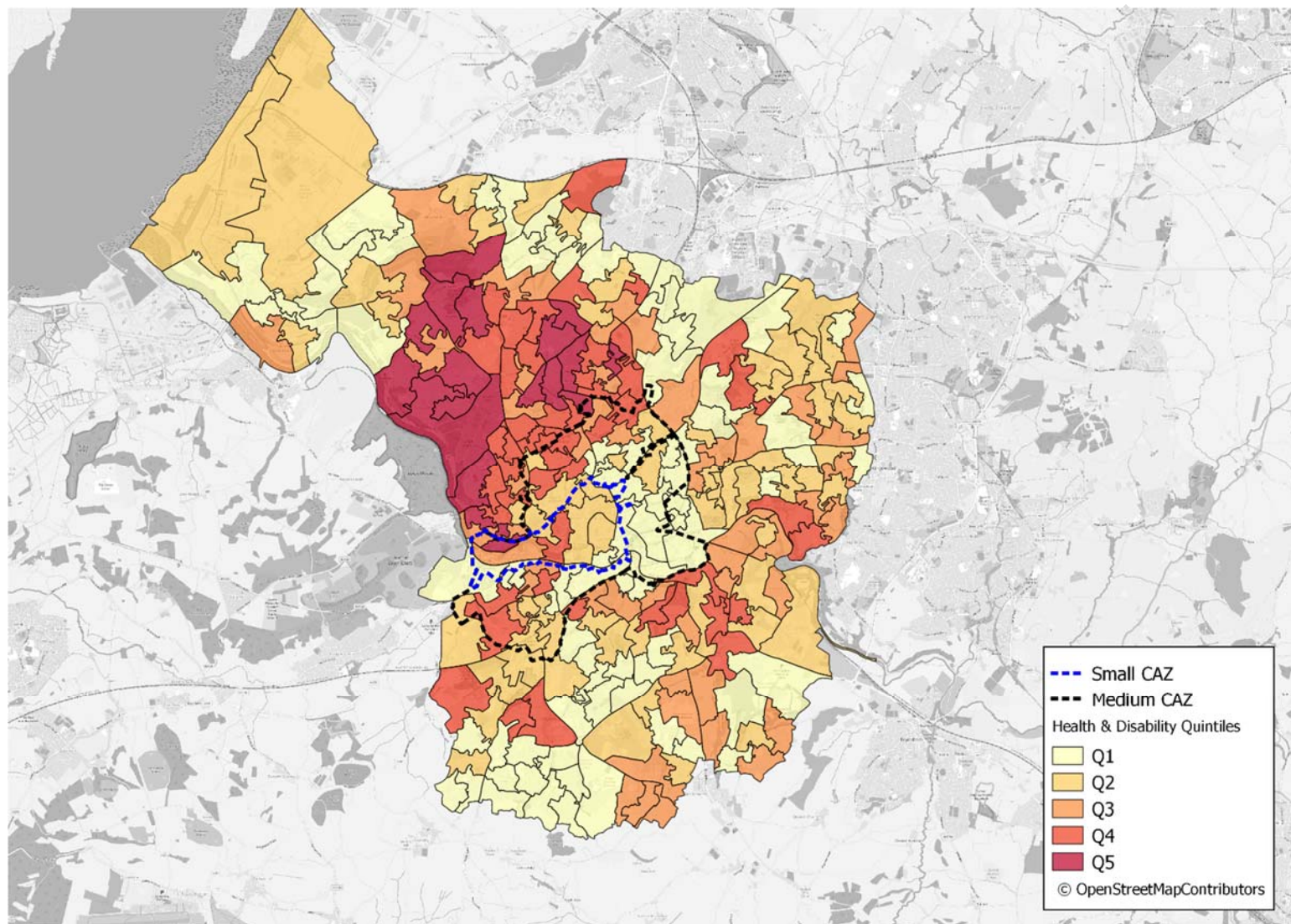**Figure 4.4: Concentration of Elderly People in BCC**

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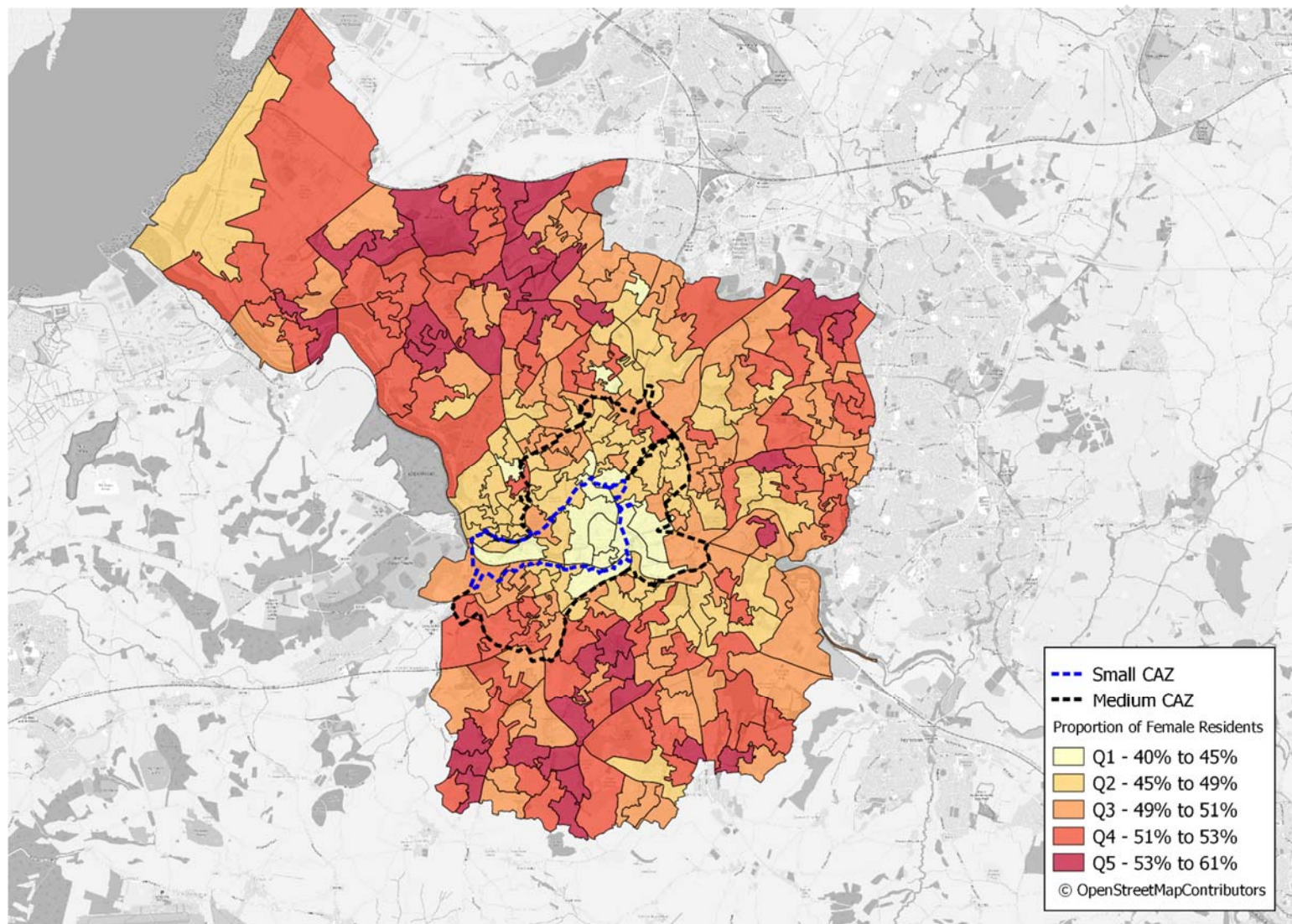**Figure 4.5: Concentration of Disabled People in BCC Relative to National Benchmarks**

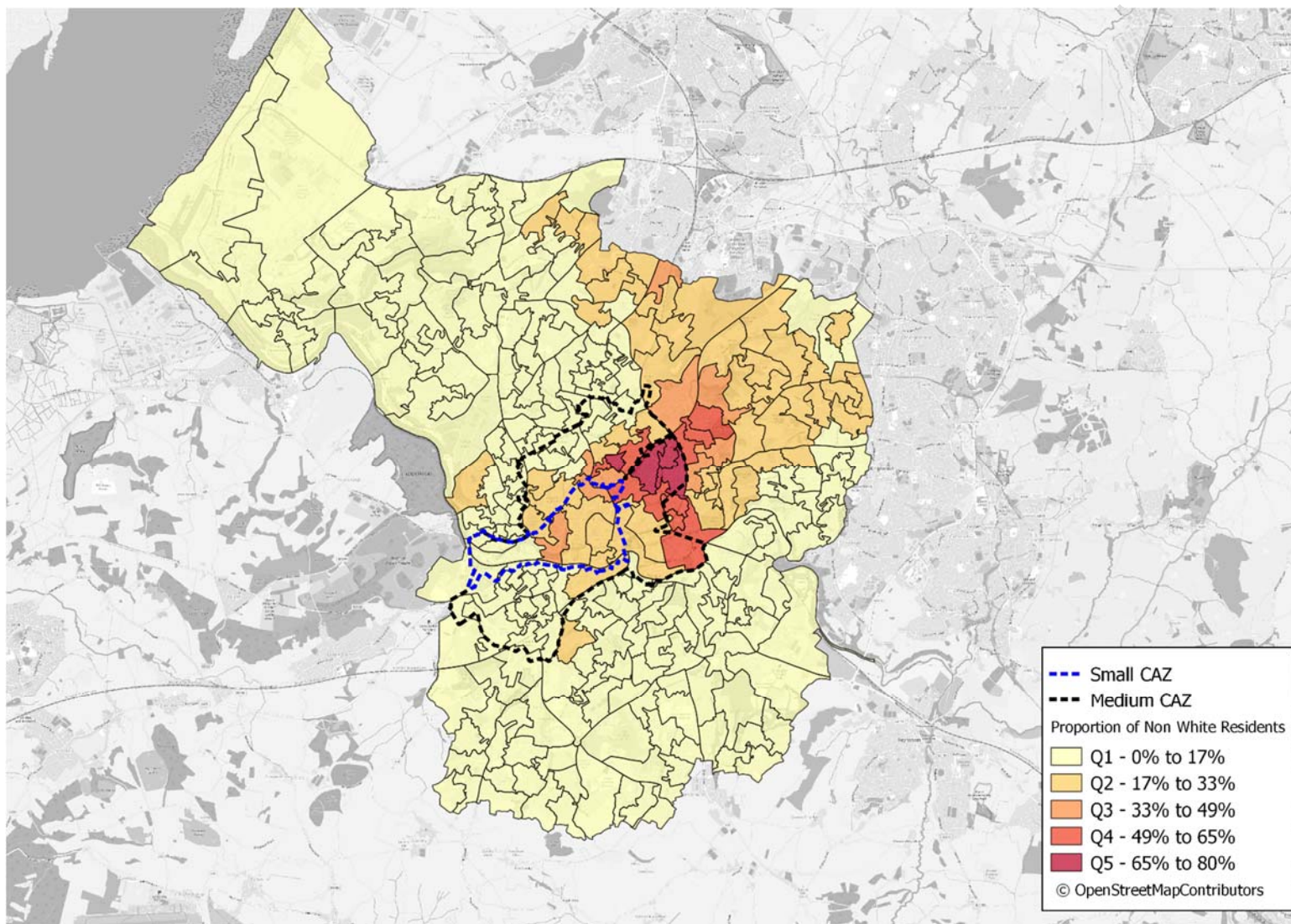**Figure 4.6: Concentration of Women in BCC**

Figure 4.7: Concentration of Ethnic Minorities in BCC

4.2 Economy

4.2.1 Employment and businesses

Bristol is a major economic hub within the West of England, acting as a key centre for employment and economic activity. Table 4.1 illustrates the sectoral profile of employment for Bristol and the focused geographic scales, compared to national benchmarks. The analysis reveals that within the small CAZ boundary the main industries of employment are business services (industrial sectors: J, K, L, M, and N). A larger proportion of individuals ,63%, are employed within these industries in the small CAZ boundary relative to the medium CAZ boundary (45%), Bristol local authority area (35%) and nationally (28%). These sectors tend to make a significant contribution to economic output and value added, as well as offering competitive salaries. As has been mentioned previously, the small CAZ boundary includes Bristol City Centre which is where the majority of business services jobs are located.

Table 4.1 Proportion of individuals in industrial sectors by context area

Industrial Sectors	Small CAZ	Medium CAZ	Bristol	England
Agriculture, forestry & fishing (A)	0%	0%	0%	1%
Mining, quarrying & utilities (B,D and E)	1%	2%	1%	1%
Manufacturing (C)	1%	2%	4%	8%
Construction (F)	1%	2%	4%	5%
Motor trades (Part G)	0%	1%	2%	2%
Wholesale (Part G)	0%	2%	4%	4%
Retail (Part G)	7%	7%	8%	9%
Transport & storage (inc postal) (H)	1%	3%	4%	5%
Accommodation & food services (I)	9%	8%	7%	7%
Information & communication (J)	10%	7%	6%	4%
Financial & insurance (K)	14%	10%	7%	4%
Property (L)	1%	1%	1%	2%
Professional, scientific & technical (M)	19%	15%	11%	9%
Business administration & support services (N)	17%	12%	10%	9%
Public administration & defence (O)	10%	7%	4%	4%
Education (P)	2%	7%	9%	9%
Health (Q)	3%	10%	15%	13%
Arts, entertainment, recreation & other services (R,S,T and U)	4%	4%	4%	5%

Over 4,400 and 4,600 individuals are employed within the tourism and retail sectors respectively within the small CAZ boundary. The number of employees in these sectors increases to over 11,000 in the retail sector and nearly 18,000 individuals in the tourism sector across the medium CAZ boundary. At a spatially disaggregated level, more than 50% of all retail employment in Bristol is located within the medium CAZ boundary (less than half of which is also found in the small CAZ boundary). Around 40% of all tourism jobs in Bristol are also located within the medium CAZ boundary (only a quarter of which are also included in the small CAZ boundary). Figure 4.8 illustrates the concentrations of retail businesses across Bristol.

Business count data from NOMIS provides an insight into the number and size of businesses in a given context area. Businesses are classified into various sizes based on the number of employees within that business. Table 4.2 presents the distribution of businesses by type across Bristol. This illustrates that micro-businesses make up a significant proportion (81%) of the market structure within the local authority, whilst small and

medium businesses (SMEs) account for 18% of all businesses within Bristol, and that micro and small businesses account for 96.3% of the business within Bristol. Between 3,000 and 7,400 businesses are located within the small and medium CAZ boundaries respectively. These figures suggest that 13% of all Bristol businesses will be located within the small boundary and one-third will be located within the medium boundary.

Table 4.2 Business types within Bristol

Context Area	Business Type				Total
	Micro (0 to 9)	Small (10 to 49)	Medium-sized (50 to 249)	Large (250+)	
Bristol LA	18,025	3,320	700	125	22,170
Small CAZ area	2,210	675	145	35	3,065
Medium CAZ area	5,985	1,075	245	55	7,360

Hence, irrespective of the geographic scale, micro businesses make up the largest proportion of businesses. Further, combining micro and SME businesses reveals that around 99% of all businesses located within across the local authority and within small and medium boundaries employ fewer than 50 employees. Therefore, there is limited differentiation between the geographic scales from a business size perspective. That said, there are nearly 60% fewer micro businesses and SMEs within the small CAZ boundary relative to the medium CAZ area.

4.2.2 Transport

Based on Census 2011 data, the most common mode of travel to work in Bristol is via private car. Almost 120,000 journeys to work within Bristol are undertaken as car driver or passenger, equivalent to 59% of commuting journeys. For people who live and work in Bristol, this proportion is lower, albeit still almost 48%. For jobs within the Medium CAZ boundary, around 50% of commuting trips are by cars, though this proportion falls to around 19% for those who both live and work in the CAZ area. There are fewer jobs within the Small CAZ area (75,000 compared to 113,000), and the mode split is less orientated towards cars for jobs in the area (44% commute by car), though an even lower proportion commute by car if they live and work in the area (7%).

It is also worth noting that the wider region provides significant numbers of employees that support the economy in Bristol, in particular Bath & North East Somerset (8,400 commuters), South Gloucestershire (34,600) and North Somerset (17,500). In most cases, car drivers represent the bulk of mode share for employees travelling into Central Bristol from these neighbouring districts. Within this context, there is significant potential for accessibility and affordability to be compromised by the implementation of the CAZ, for both local residents and employees in the wider region that fall within Bristol's labour supply catchment.

4.2.2.1 Vehicles

Figure 4.8 indicates that non-compliant vehicles and diesel vehicles are concentrated in the most deprived communities in Bristol. Cross-referencing those communities that fall within the two most income deprived quintiles with vehicle registration data reveals that there are large numbers of vehicles registered to properties in low-income areas that use diesel fuel and/or fail to meet current air quality standards within the small and medium CAZ areas. Some 16,000 non-compliant cars and LGVs registered in low-income areas within the medium CAZ boundary, as well as 13,000 diesel vehicles. Further, there are more than 350 non-compliant cars and LGVs registered in low-income areas within the small CAZ boundary, as well as more than 300 diesel vehicles. These could be vulnerable to any future charge or punitive action against non-compliant vehicles within the medium or small boundary.
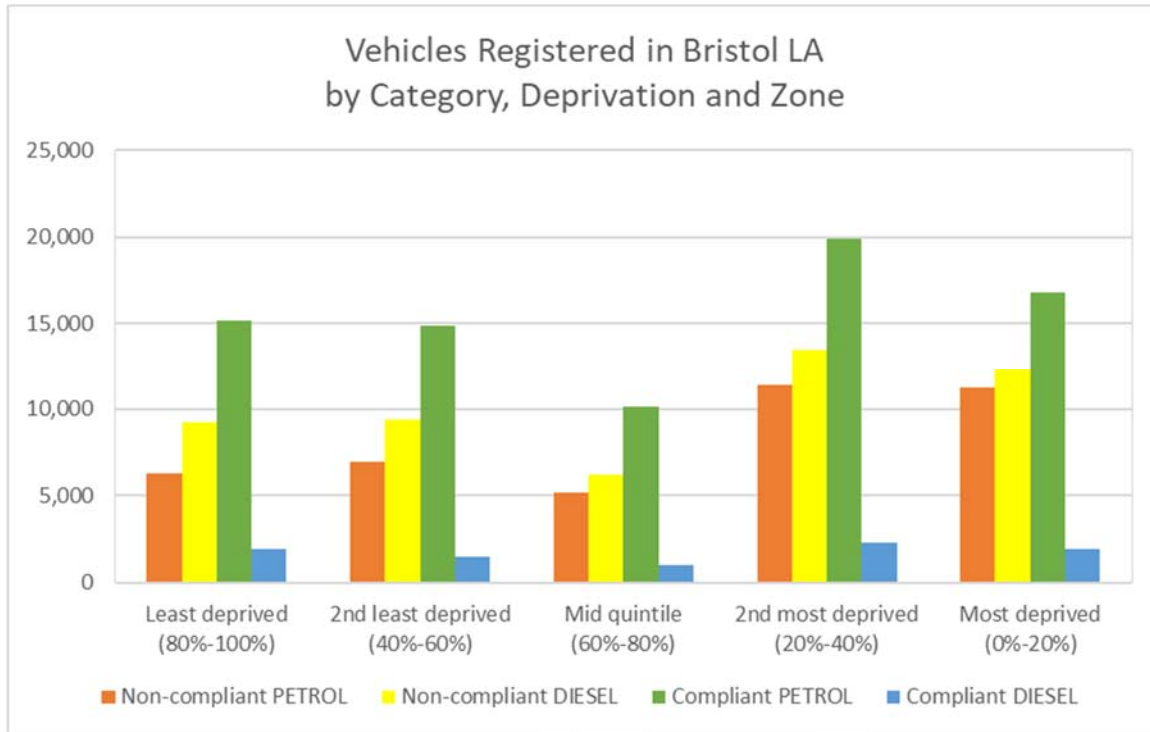
Figure 4.8: Vehicles registered in Bristol

Businesses are heavily reliant on use of LGVs and HGVs for their day-to-day operations. Figure 4.9 shows the concentrations of LGV-reliant business across Bristol, highlighting the CAZ boundaries. The number of LGVs registered within an LSOA is reflective of certain types of business activity occurring within it (e.g. tradespeople, courier services, sole-proprietors). LGV registration data reveals that 86% of LGVs that are registered within the small CAZ boundary are non-compliant with regulations. Whilst 88% of those in the medium CAZ and 90% of those registered in Bristol are non-compliant.
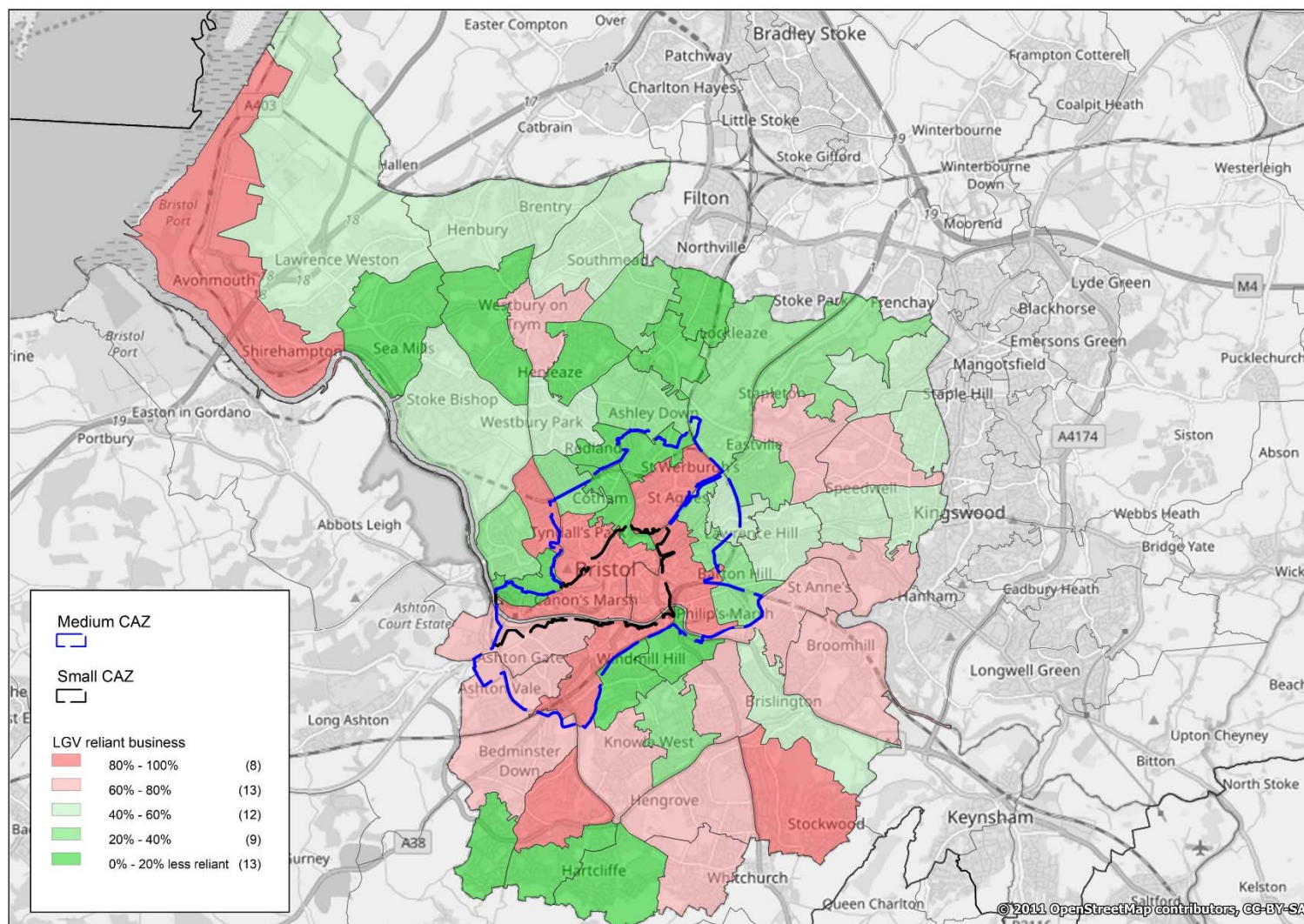
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Figure 4.8: LGV reliant businesses across Bristol
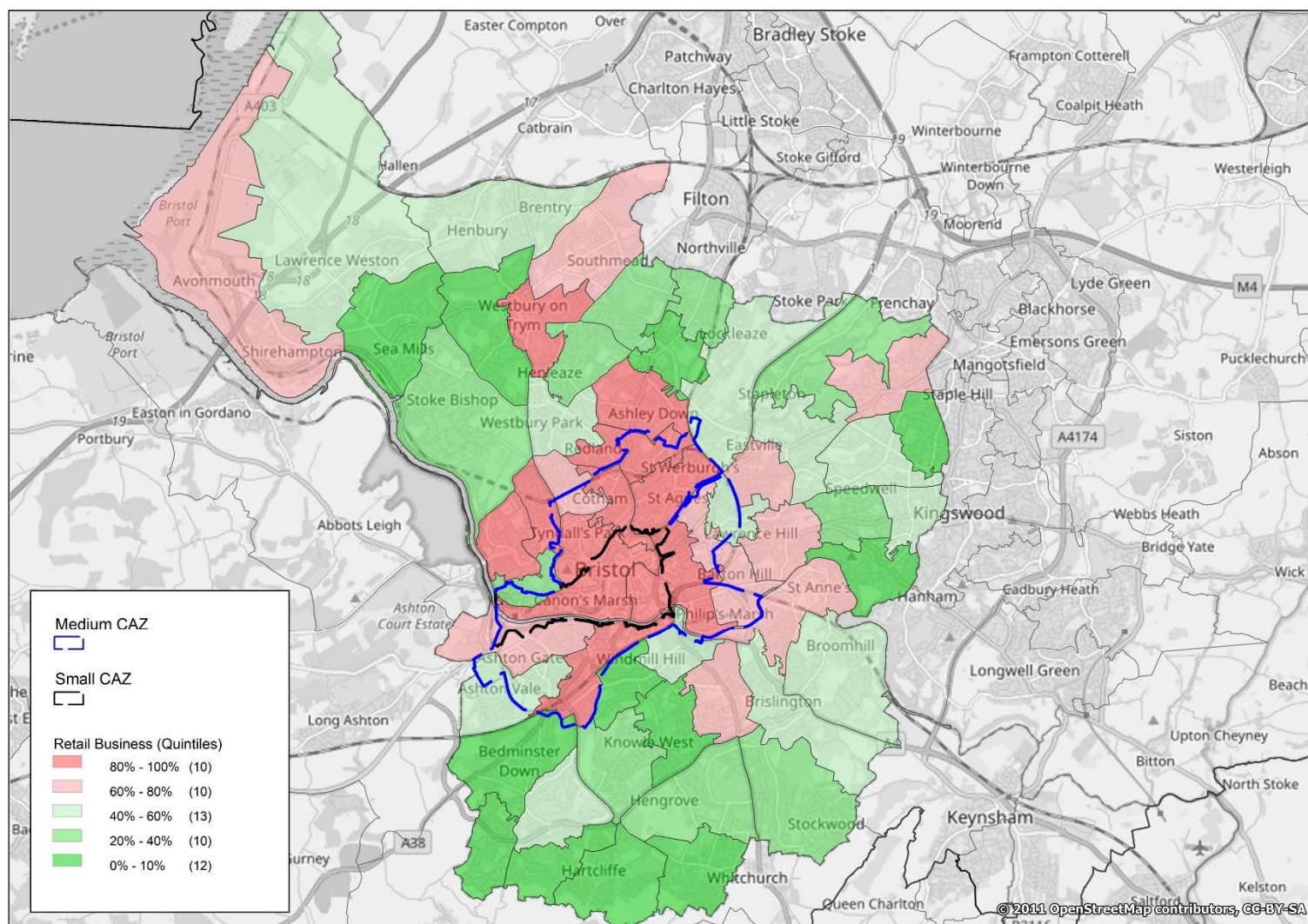
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Figure 4.9: Retail businesses across Bristol

4.3   Key Facilities and Social Infrastructure

Figure 4.10 highlights the location of the Small and Medium CAZ boundaries in central Bristol. This demonstrates that the city centre, with its extensive amenities and retail and employment core, is located within the proposed CAZ boundaries. In addition, routes through the city centre are utilised for journeys to other parts of the city. As such, all trips made using non-compliant vehicles to this area, and some beyond it, are likely to be affected by imposition of the CAP.
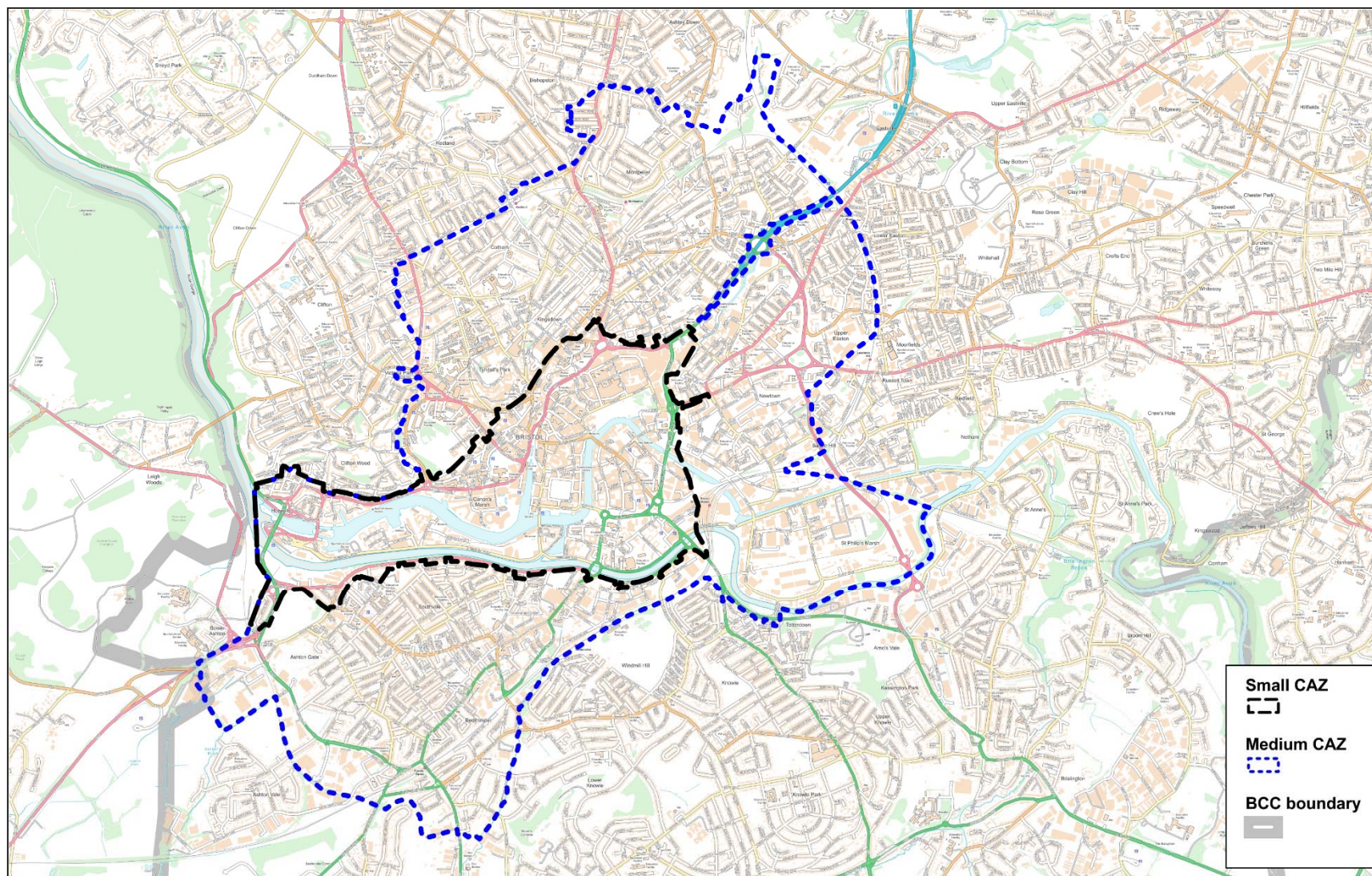
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Figure 4.10: Bristol City Centre and CAZ boundaries

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5.   Distributional and Equalities Impact Analysis

5.1   Air Quality

Figures 5.1 and 5.2 present the change in NO_2 concentrations forecast in 2021 at relevant receptors, for the Medium area CAZ D and Small area car diesel ban options for Bristol. The figures indicate that air quality should improve across the city, with some locations where improvements are slightly greater than others. Interrogation of the data in more detail indicates some links that exhibit minor worsening of air quality, though this is not explicitly shown in these figures.

Hence, NO_2 concentrations are basically predicted to remain unchanged or fall. Compliance is achieved in all locations, with further details available in OBC-11 'AQ3 Air Quality Modelling Report' within Appendix D of this OBC.

Hence, the CAP is forecast to contribute almost entirely positive impacts within Bristol from an air quality perspective, and these are likely to be felt most strongly in those communities that lie alongside the key arterial routes and within central Bristol.
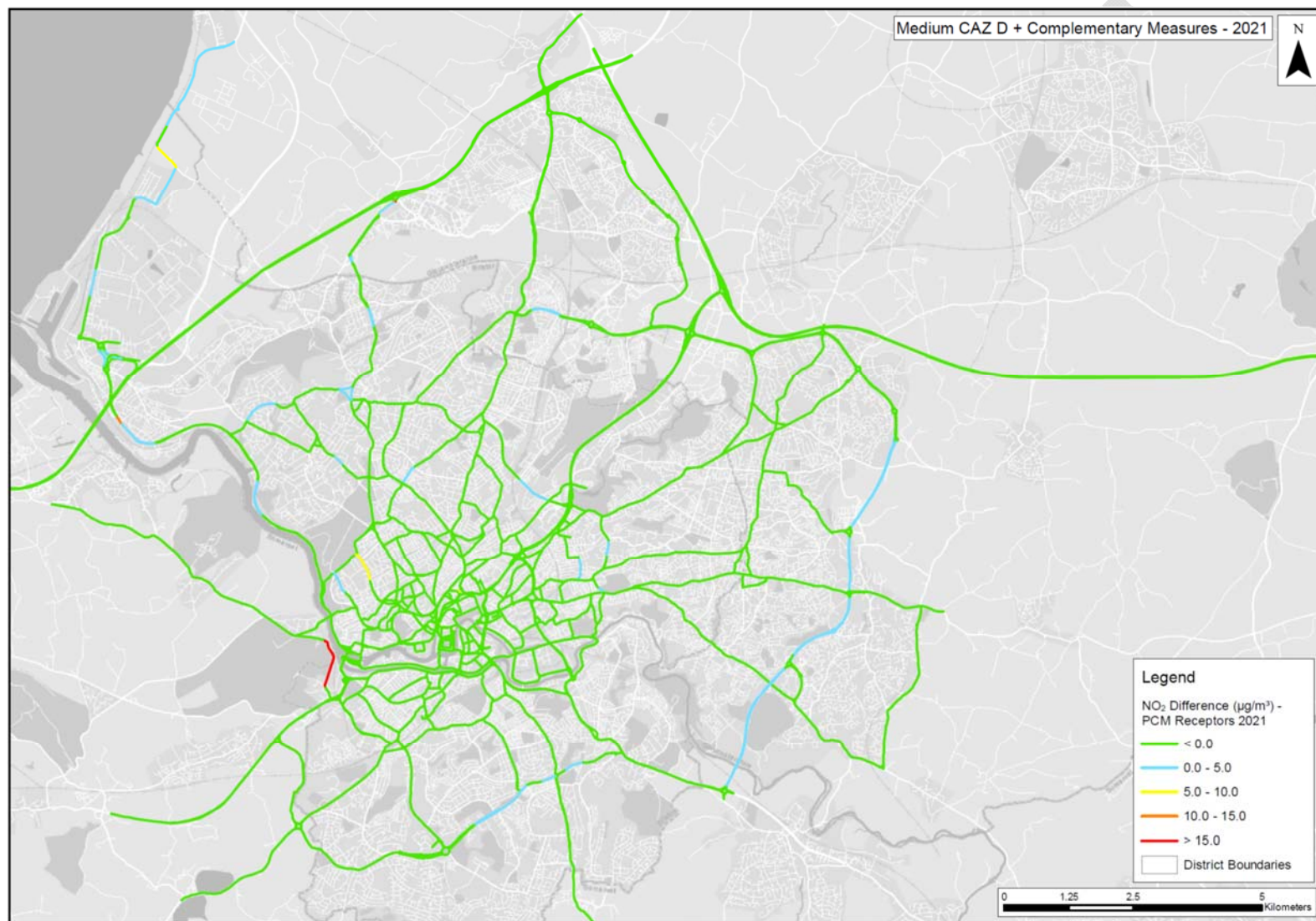
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Figure 5.1: Change in NO2 Concentrations based on PCM Receptors (Medium area CAZ D 2021)

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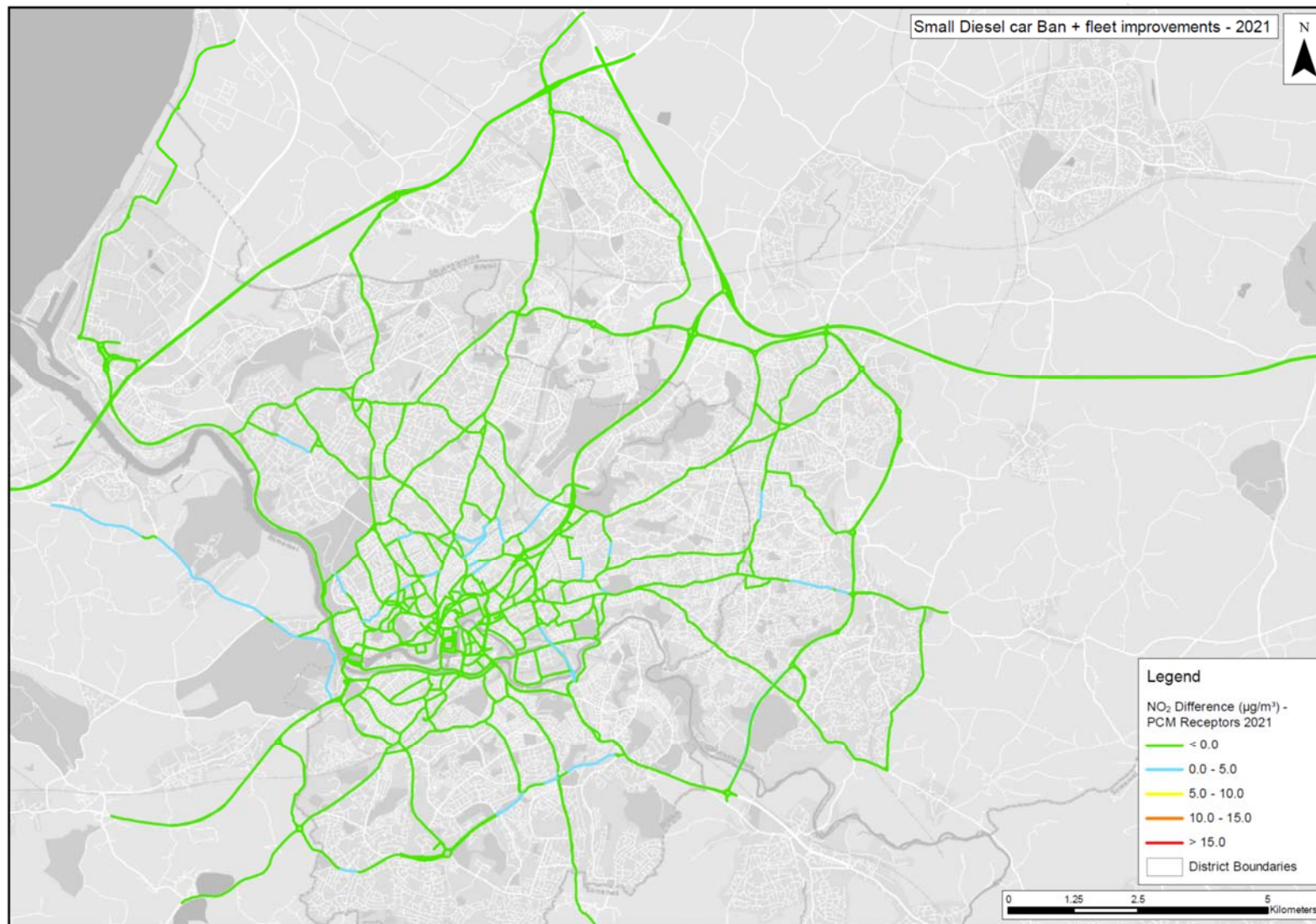
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Figure 5.2: Change in NO2 Concentrations based on PCM Receptors (Small area car diesel ban, 2021)

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