5.1.1 Low Income Households

Figures 4.1 and 4.2 indicate that the most acute concentrations of low income households are located in the outskirts of the city, in particular southern Bristol and towards Avonmouth. Figures 5.1 and 5.2 demonstrate that the receptors across the whole network generally report a decline in NO_2 concentrations, with a number of routes showing slight worsening, in particular around the edge of the Small CAZ area. However, they do show some slight worsening of air quality on outer urban routes, some in the areas of lower income.

Table 5.1 presents the appraisal matrix for the combination of low-income household grouping and air quality impact variable in Bristol City Council. It demonstrates that beneficial impacts accrue across all low-income groups, with significantly greater proportions of low-income households (i.e. those in areas that are most income deprived) benefitting relative to this group's share of the overall population in the Bristol City Council area.

Table 5.1a: Air Quality Impacts on Low Income Households – Medium area CAZ D

		Income Deprivation Quintiles					
		0-20% (most deprived)	20-40%	40-60%	60-80%	80-100% (least deprived)	Total
A	No. of people with improved air quality	46,824	72,258	29,657	49,928	48,775	247,442
B	No. of people with reduced air quality	8,083	6,917	4,247	1,473	9,398	30,118
C	No. of net winners [A - B]	38,741	65,341	25,410	48,455	39,377	217,324
D	Total no. of winners across all groups [Sum of C]						217,324
E	Net winners in each areas as % of total [C/D]	17.8%	30.1%	11.7%	22.3%	18.1%	100.0%
F	Share of population in immediate study area	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
G	Assessment for immediate study area	✓	✓✓✓	✓✓	✓✓	✓✓	

Table 5.1b: Air Quality Impacts on Low Income Households – Small area car diesel ban

		Income Deprivation Quintiles					
		0-20% (most deprived)	20-40%	40-60%	60-80%	80-100% (least deprived)	Total
A	No. of people with improved air quality	50,097	70,180	29,787	47,567	53,661	251,292
B	No. of people with reduced air quality	3,370	8,995	2,756	3,834	3,230	22,185
C	No. of net winners [A - B]	46,727	61,185	27,031	43,733	50,431	229,107
D	Total no. of winners across all groups [Sum of C]						229,107
E	Net winners in each areas as % of total [C/D]	20.4%	26.7%	11.8%	19.1%	22.0%	100.0%
F	Share of population in immediate study area	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
G	Assessment for immediate study area	✓	✓✓	✓	✓✓	✓✓	

5.1.2 Children

Figure 4.3 demonstrates that the distribution of children and young people in BCC is similar to the distribution of low-income households, with specific concentrations on the western and southern periphery of the built-up area. As a result, cross-referencing this distribution with the change in air quality concentrations in Figures 4.1 and 4.2 reveals similar distributional impacts as reported for low-income households, i.e. air quality is expected to improve for children in all communities.

Table 5.2 presents the appraisal matrix for the children grouping and air quality impact variable combination. It demonstrates that beneficial impacts accrue across all children, with greater proportion of children benefitting in areas where there are fewer children.

Table 5.2a: Air Quality Impacts on Children – Medium area CAZ D

		Children Quintiles					Total
		0-20% (fewest children)	20-40%	40-60%	60-80%	80-100% (most children)	
A	No. of children with improved air quality	7,489	8,798	7,948	8,926	10,889	44,050
B	No. of children with reduced air quality	458	732	256	2,098	2,639	6,183
C	No. of net winners [A - B]	7,031	8,066	7,692	6,828	8,250	37,867
D	Total no. of winners across all groups [Sum of C]						37,867
E	Net winners in each areas as % of total [C/D]	18.6%	21.3%	20.3%	18.0%	21.8%	100.0%
F	Share of population in BCC	35.9%	25.6%	10.3%	14.8%	13.4%	100.0%
G	Assessment for BCC	✓	✓	✓✓✓	✓✓	✓✓✓	

Table 5.2b: Air Quality Impacts on Children – Small area car diesel ban

		Children Quintiles					Total
		0-20% (fewest children)	20-40%	40-60%	60-80%	80-100% (most children)	
A	No. of children with improved air quality	7,147	8,713	7,590	10,585	11,270	45,305
B	No. of children with reduced air quality	614	611	358	763	1,820	4,166
C	No. of net winners [A - B]	6,533	8,102	7,232	9,822	9,450	41,139
D	Total no. of winners across all groups [Sum of C]						41,139
E	Net winners in each areas as % of total [C/D]	15.9%	19.7%	17.6%	23.9%	23.0%	100.0%
F	Share of population in B&NES	35.9%	25.6%	10.3%	14.8%	13.4%	100.0%
G	Assessment for B&NES	✓	✓	✓✓✓	✓✓✓	✓✓✓	

5.1.3 The Elderly

Figure 4.3 demonstrates that the distribution of elderly residents in BCC differs from the distribution of low-income households and children, with a concentration of communities with a high proportion of elderly residents on the northern boundary of the urban area plus some pockets in central Bristol, within the proposed CAZ boundary. Cross-referencing this distribution with the change in air quality concentrations depicted in Figures 5.1 and 5.2 suggests that air quality improvements are expected for elderly residents in all communities in the immediate study area.

Table 5.3 presents the appraisal matrix for the elderly resident grouping and air quality impact variable combination. It demonstrates that beneficial impacts accrue across all elderly residents, with significantly greater proportion of elderly residents benefitting in areas where there is a smaller proportion of elderly residents.

Table 5.3a: Air Quality Impacts on the Elderly – Medium area CAZ D

		Elderly Resident Quintiles					Total
		0-20% (fewest elderly residents)	20-40%	40-60%	60-80%	80-100% (most elderly residents)	
A	No. of elderly residents with improved air quality	7,037	5,565	8,622	5,023	4,426	30,673
B	No. of elderly people with improved air quality	252	1,306	1,597	624	687	4,466
C	No. of net winners [A - B]	6,785	4,259	7,025	4,399	3,739	26,207
D	Total no. of winners across all groups [Sum of C]						26,207
E	Net winners in each areas as % of total [C/D]	25.9%	16.3%	26.8%	16.8%	14.3%	100.0%
F	Share of population in BCC	25.6%	26.9%	13.6%	16.9%	17.0%	100.0%
G	Assessment for BCC	✓✓	✓	✓✓✓	✓✓	✓	

Table 5.3b: Air Quality Impacts on the Elderly – Small area car diesel ban

		Elderly Resident Quintiles					Total
		0-20% (fewest elderly residents)	20-40%	40-60%	60-80%	80-100% (most elderly residents)	
A	No. of elderly residents with improved air quality	6,111	6,727	9,689	4,806	5,217	32,550
B	No. of elderly people with improved air quality	948	239	289	841	0	2,317
C	No. of net winners [A - B]	5,163	6,488	9,400	3,965	5,217	30,233
D	Total no. of winners across all groups [Sum of C]						30,233
E	Net winners in each areas as % of total [C/D]	17.1%	21.5%	31.1%	13.1%	17.3%	100.0%
F	Share of population in BCC	25.6%	26.9%	13.6%	16.9%	17.0%	100.0%
G	Assessment for BCC	✓	✓	✓✓✓	✓	✓✓	

5.2 Accessibility

Trip matrices from GBATS4 have been interrogated to identify the propensity for movements in, out and through the Small and Medium CAZ areas. This has focused on baseline trip situations, because baseline trips give a better indication of the prior potential. Behavioural response rates suggest that some 40% of non-compliant trips could be cancelled, diverted or switched mode. These responses could lead to adverse accessibility impacts for all households, irrespective of their relative level of income deprivation, though there is clearly greater scope for hardship for income deprived areas. The distributional assessment is concerned with identifying the potential for trip patterns to be disrupted, that can be well-related demographic information such as low income households and population demographic. Underlying accessibility issues could be compounded for low-income groups, where there is an established lower propensity for motor vehicle ownership (see Table 3.1).Trips have therefore been cross-referenced with demographic data to 'distribute' the potential impacts across the populations.

Trips have been identified from the baseline model for AM peak movements across the CAZ boundaries into the CAZ area (ostensibly towards and to the city centre, but also encompassing trips that pass through the area in the baseline situation). The reverse has been identified for the PM peak; trips from the CAZ areas (again encompassing trips that are passing through the area. Within this interrogation, trips by non-compliant vehicles have been isolated for the illustration; thus for trips crossing the Medium CAZ boundary, trips by non-compliant petrol and diesel powered vehicles have been identified; across the Small CAZ boundary, trips by diesel cars have been identified.

5.2.1 Low Income Households

Table 5.5 identifies the number of people living in areas that generate journeys to/from the Medium CAZ area, where the numbers of trips by non-compliant vehicles are greater or lower than the average proportions of non-compliant vehicles making trips in the study area. Table 5.6 shows similar figures for the Small CAZ area.

Table 5.5: People in Low Income households – use of non-compliant vehicles to access Medium CAZ area

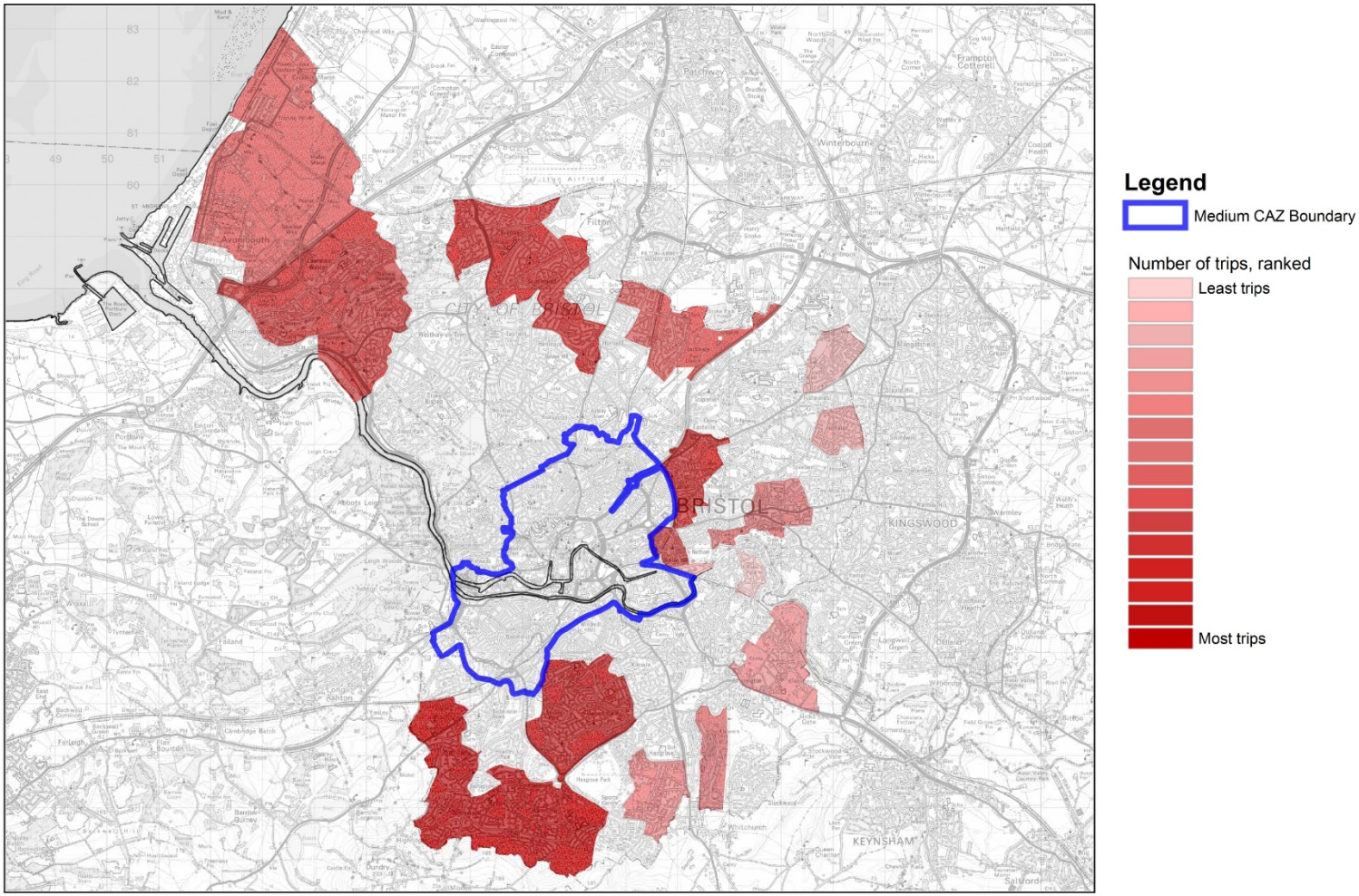
	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Income Deprivation Quintiles					Total
		0-20% (most deprived)	20-40%	40-60%	60-80%	80-100% (least deprived)	
A	AM peak – into CAZ in the AM peak	49,808	44,112	24,036	26,160	35,161	179,277
B	Share of total	27.8%	24.6%	13.4%	14.6%	19.6%	100.0%
C	Share of population in BCC	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
D	Distributional assessment for AM peak	-	✓	x	✓	x	
E	PM peak – out of CAZ in the PM peak	67,547	72,823	37,639	35,227	42,901	256,137
F	Share of total	26.4%	28.4%	14.7%	13.8%	16.7%	100.0%
G	Share of population in BCC	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
H	Distributional assessment for PM peak	✓	xx	xx	✓✓	✓	

Table 5.6: People in Low Income households – use of non-compliant vehicles to access Small CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Income Deprivation Quintiles					Total
		0-20% (most deprived)	20-40%	40-60%	60-80%	80-100% (least deprived)	
A	AM peak – into CAZ in the AM peak	29,198	49,119	18,046	21,276	22,809	140,448
B	Share of total	20.8%	35.0%	12.8%	15.1%	16.2%	100.0%
C	Share of population in BCC	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
D	Distributional assessment for AM peak	✓✓✓	xxx	x	✓	✓	
E	PM peak – out of CAZ in the PM peak	62,497	71,695	33,153	54,929	37,976	260,250
F	Share of total	24.0%	27.5%	12.7%	21.1%	14.6%	100.0%
G	Share of population in BCC	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
H	Distributional assessment for PM peak	✓✓	x	x	xx	✓	

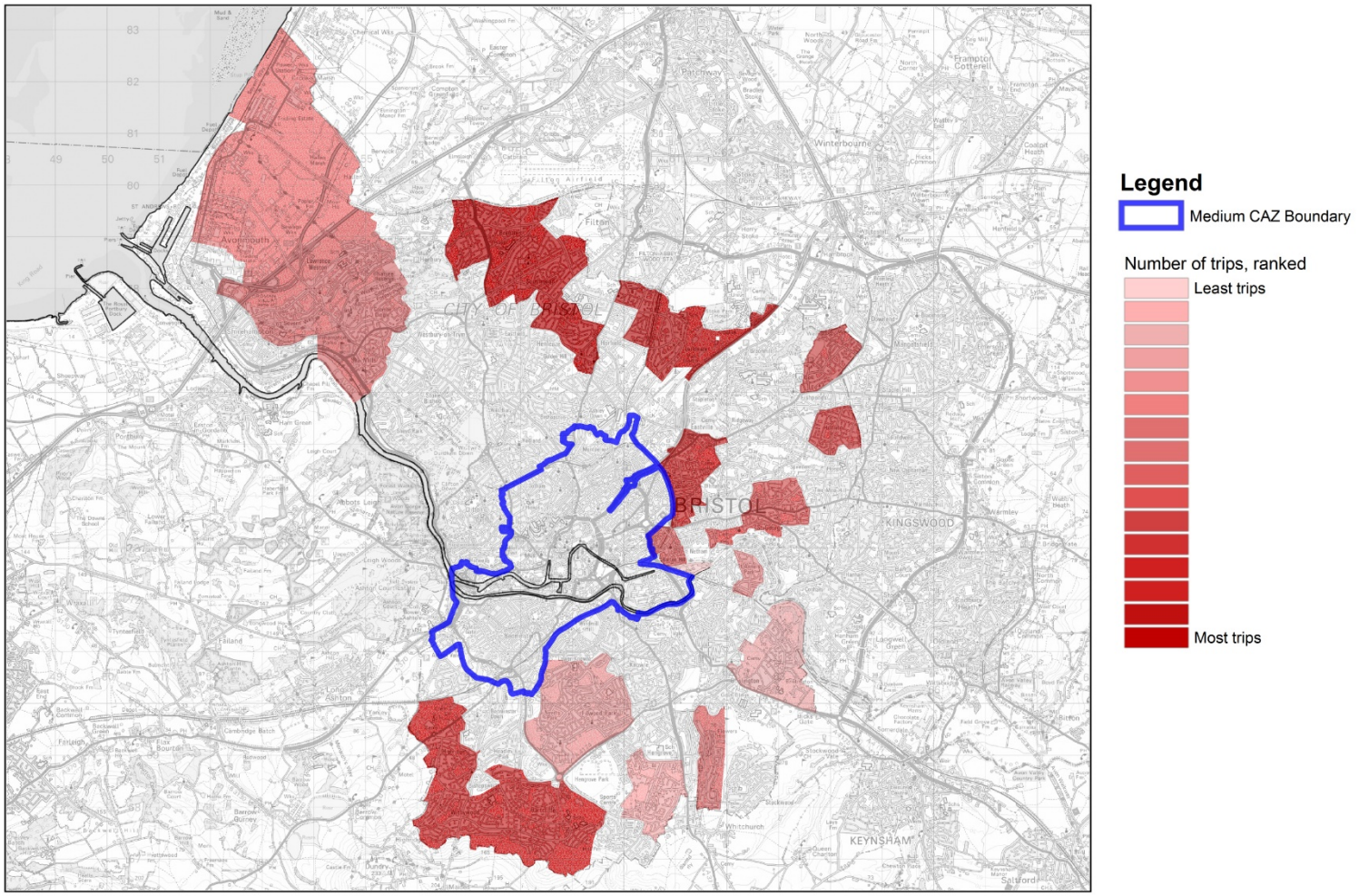
Note that the assessment scoring in the tables considers the share of population directly, and as such is looking at propensity to impact on journey choices, rather than specifically identifying winners and losers. The assessment score is related to the difference between the distribution of propensity and the distribution of the population of income deprivation as a whole. It should also be noted that the assessment is a relative comparison. Therefore, a score of "xxx" only highlights that the most income deprived are impacted the most in comparison to the rest of the group.

Figures 5.1-5.4 show interrogation of baseline (2021) trip matrices for trips across the Small and Medium CAZ boundaries. This identifies the key locations across the city where areas of lower income generate the most trips across CAZ boundaries. Figure 5.1 shows the number of trips (ranked) made by non-complaint cars to Medium CAZ in AM peak, with Figure 5.2 showing similar information for the reverse trips in PM peak. Figures 5.3 and 5.4 show corresponding information for the Small CAZ (respectively).



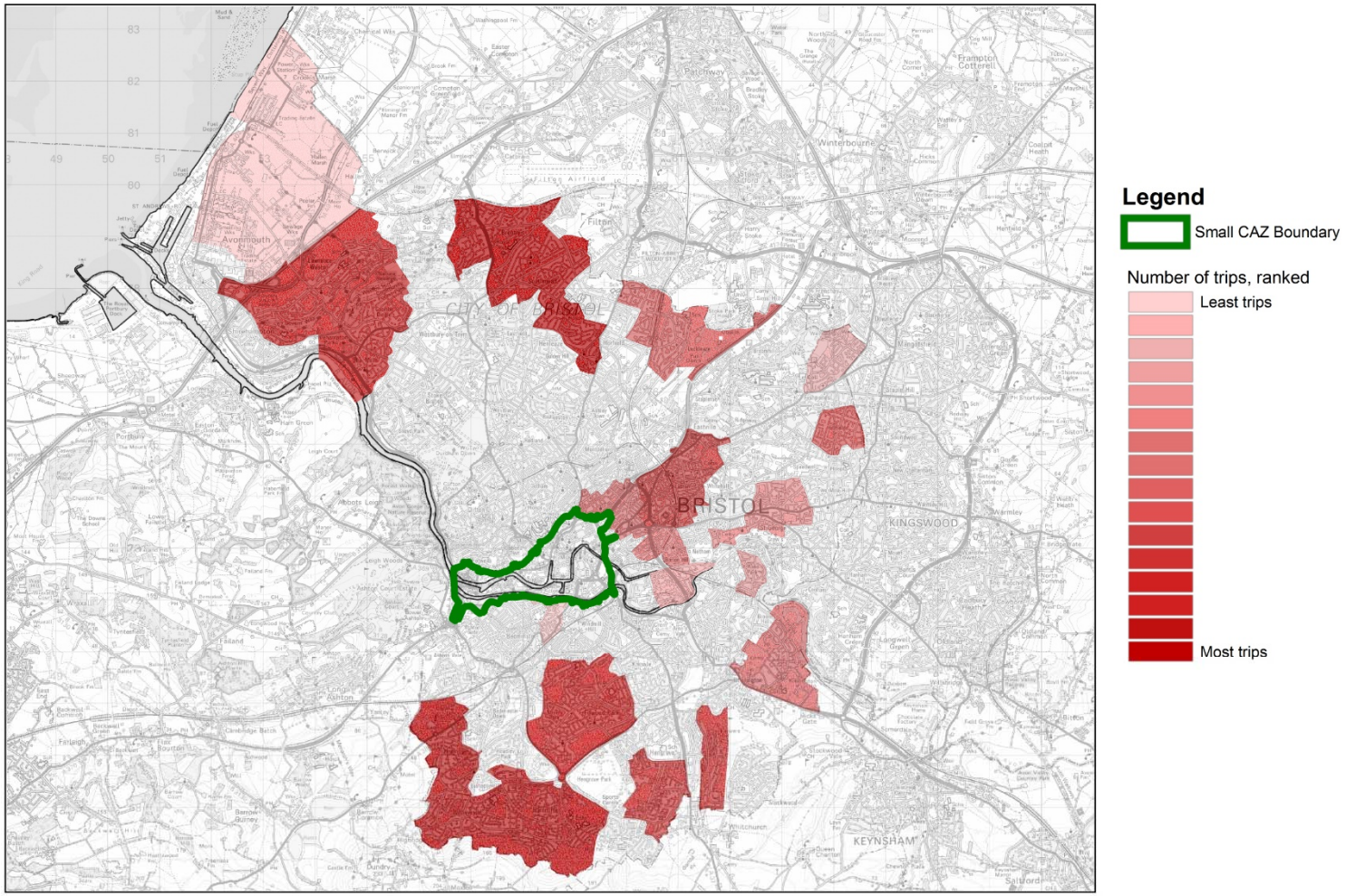
Low Income Areas: number of trips (ranked) made by non-compliant cars to Medium CAZ in the AM Peak

Figure 5.1: Low income areas – number of trips (ranked) made by non-complaint cars to Medium CAZ in AM peak



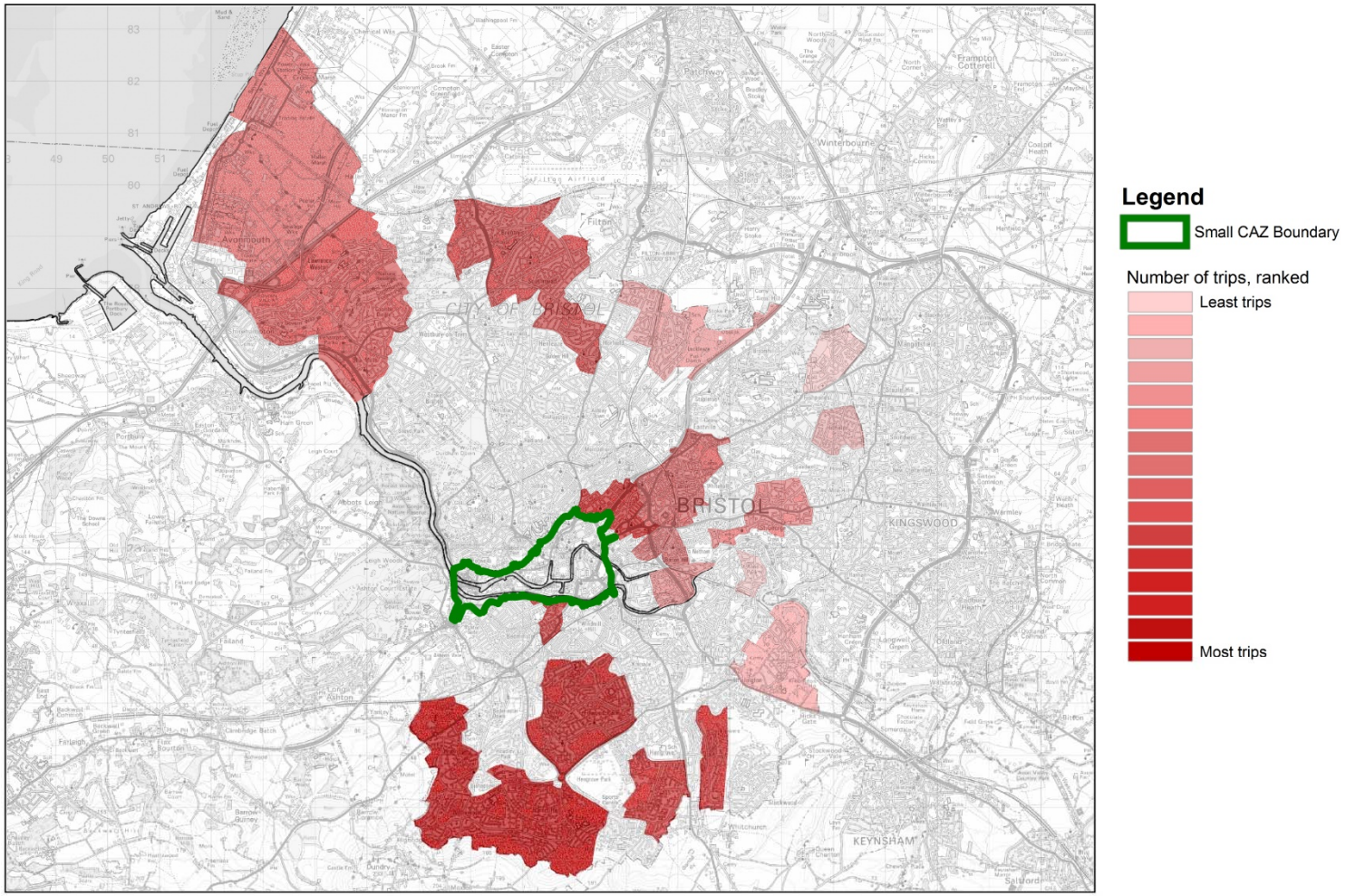
Low Income Areas: number of trips (ranked) made by non-compliant cars from Medium CAZ in the PM Peak

Figure 5.2: Low income areas – number of trips (ranked) made by non-complaint cars from Medium CAZ in PM peak



Low Income Areas: number of trips (ranked) made by non-compliant cars to Small CAZ in the AM Peak

Figure 5.3: Low income areas – number of trips (ranked) made by non-complaint cars to Small CAZ in AM peak



Low Income Areas: number of trips (ranked) made by non-compliant cars from Small CAZ in the PM Peak

Figure 5.4: Low income areas – number of trips (ranked) made by non-complaint cars from Small CAZ in PM peak

5.2.2 Children

Table 5.7 identifies the number of children living in areas that generate journeys to/from the Medium CAZ area, where the numbers of trips by non-compliant vehicles are greater or lower than the average proportions of non-compliant vehicles making trips in the study area. Table 5.8 shows similar figures for the Small CAZ area.

Table 5.7: Impacts on children – use of non-compliant vehicles to access Medium CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Children Quintiles					Total
		1 (least children)	2	3	4	5 (most children)	
A	AM peak – into CAZ in the AM peak	4,343	5,122	5,359	6,027	12,496	33,347
B	Share of total	13.0%	15.4%	16.1%	18.1%	37.5%	100.0%
C	Share of population in BCC	12.2%	15.2%	15.4%	22.1%	35.2%	100.0%
D	Distributional assessment for AM peak	x	-	x	✓✓	x	
E	PM peak – out of CAZ in the PM peak	6,098	7,231	8,246	10,589	15,868	48,032
F	Share of total	12.7%	15.1%	17.2%	22.0%	33.0%	100.0%
G	Share of population in BCC	12.2%	15.2%	15.4%	22.1%	35.2%	100.0%
H	Distributional assessment for PM peak	x	-	x	-	✓	

Table 5.8: Impacts on children – use of non-compliant vehicles to access Small CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Children Quintiles					Total
		1 (least children)	2	3	4	5 (most children)	
A	AM peak – into CAZ in the AM peak	3,711	3,807	5,001	7,302	6,197	26,018
B	Share of total	14.3%	14.6%	19.2%	28.1%	23.8%	100.0%
C	Share of population in BCC	12.2%	15.2%	15.4%	22.1%	35.2%	100.0%
D	Distributional assessment for AM peak	x	✓	xx	xx	✓✓✓	
E	PM peak – out of CAZ in the PM peak	6,533	8,550	8,785	7,821	17,159	48,848
F	Share of total	13.4%	17.5%	18.0%	16.0%	35.1%	100.0%
G	Share of population in BCC	12.2%	15.2%	15.4%	22.1%	35.2%	100.0%
H	Distributional assessment for PM peak	x	x	xx	✓✓	-	

Note that the assessment scoring in the tables considers the share of population directly, and as such is looking at propensity to impact on journey choices, rather than specifically identifying winners and losers. The assessment score is related to the difference between the distribution of propensity and the distribution of the population of income deprivation as a whole. It should also be noted that the assessment is a relative comparison. Therefore, a score of "xxx" only highlights that the most income deprived are impacted the most in comparison to the rest of the group. Note that, in this and the remaining tables in section 4:

✓ = proportion of affected group less than proportion in population overall

- = proportion of affected group similar proportion to population overall

X = proportion of affected group greater than proportion in population overall

5.2.3 Elderly People

Table 5.9 identifies the number of elderly people living in areas that generate journeys to/from the Medium CAZ area, where the numbers of trips by non-compliant vehicles are greater or lower than the average proportions of non-compliant vehicles making trips in the study area. Table 5.10 shows similar figures for the Small CAZ area.

Table 5.9: Impacts on elderly people – use of non-compliant vehicles to access Medium CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Elderly people Quintiles					Total
		1 (least elderly people)	2	3	4	5 (most elderly people)	
A	AM peak – into CAZ in the AM peak	5,025	4,731	5,850	4,603	2,227	22,436
B	Share of total	22.4%	21.1%	26.1%	20.5%	9.9%	100.0%
C	Share of population in BCC	17.7%	25.8%	24.3%	19.0%	13.3%	100.0%
D	Distributional assessment for AM peak	xx	✓✓	x	x	✓✓	
E	PM peak – out of CAZ in the PM peak	4,755	10,063	8,272	5,949	4,928	33,967
F	Share of total	14.0%	29.6%	24.4%	17.5%	14.5%	100.0%
G	Share of population in BCC	17.7%	25.8%	24.3%	19.0%	13.3%	100.0%
H	Distributional assessment for PM peak	✓	xx	-	✓	x	

Table 5.10: Impacts on elderly people– use of non-compliant vehicles to access Small CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Elderly people Quintiles					Total
		1 (least elderly people)	2	3	4	5 (most elderly people)	
A	AM peak – into CAZ in the AM peak	2,333	4,518	6,149	4,109	2,376	19,485
B	Share of total	12.0%	23.2%	31.6%	21.1%	12.2%	100.0%
C	Share of population in BCC	17.7%	25.8%	24.3%	19.0%	13.3%	100.0%
D	Distributional assessment for AM peak	✓	✓	xx	x	✓	
E	PM peak – out of CAZ in the PM peak	6,552	8,098	7,936	7,376	3,065	33,027
F	Share of total	19.8%	24.5%	24.0%	22.3%	9.3%	100.0%
G	Share of population in BCC	17.7%	25.8%	24.3%	19.0%	13.3%	100.0%
H	Distributional assessment for PM peak	x	✓	-	xx	✓✓	

Note that the assessment scoring in the tables considers the share of population directly, and as such is looking at propensity to impact on journey choices, rather than specifically identifying winners and losers. The assessment score is related to the difference between the distribution of propensity and the distribution of the population of income deprivation as a whole. It should also be noted that the assessment is a relative comparison. Therefore, a score of "xxx" only highlights that the most income deprived are impacted the most in comparison to the rest of the group.

5.2.4 Disabled People

Table 5.11 identifies the number of disabled people people living in areas that generate journeys to/from the Medium CAZ area, where the numbers of trips by non-compliant vehicles are greater or lower than the average proportions of non-compliant vehicles making trips in the study area. Table 5.12 shows similar figures for the Small CAZ area.

Table 5.11: Impacts on disabled people – use of non-compliant vehicles to access Medium CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Disabled people Quintiles					Total
		1 (least disabled people)	2	3	4	5 (most disabled people)	
A	AM peak – into CAZ in the AM peak	4,865	2,512	5,713	6,930	9,273	29,293
B	Share of total	16.6%	8.6%	19.5%	23.7%	31.7%	100.0%
C	Share of population in BCC	12.9%	12.3%	20.0%	22.8%	32.1%	100.0%
D	Distributional assessment for AM peak	xx	✓✓	✓	x	✓	
E	PM peak – out of CAZ in the PM peak	5,461	4,687	8,186	9,380	15,558	43,272
F	Share of total	12.6%	10.8%	18.9%	21.7%	36.0%	100.0%
G	Share of population in BCC	12.9%	12.3%	20.0%	22.8%	32.1%	100.0%
H	Distributional assessment for PM peak	-	✓	✓	✓	xx	

Table 5.12: Impacts on disabled people– use of non-compliant vehicles to access Small CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Disabled people Quintiles					Total
		1 (least disabled people)	2	3	4	5 (most disabled people)	
A	AM peak – into CAZ in the AM peak	2,683	3,126	4,303	5,249	9,053	24,414
B	Share of total	11.0%	12.8%	17.6%	21.5%	37.1%	100.0%
C	Share of population in BCC	12.9%	12.3%	20.0%	22.8%	32.1%	100.0%
D	Distributional assessment for AM peak	✓	x	✓✓	✓	xx	
E	PM peak – out of CAZ in the PM peak	5,461	6,245	7,649	9,638	14,607	43,600
F	Share of total	12.5%	14.3%	17.5%	22.1%	33.5%	100.0%
G	Share of population in BCC	12.9%	12.3%	20.0%	22.8%	32.1%	100.0%
H	Distributional assessment for PM peak	✓	x	✓	✓	x	

Note that the assessment scoring in the tables considers the share of population directly, and as such is looking at propensity to impact on journey choices, rather than specifically identifying winners and losers. The assessment score is related to the difference between the distribution of propensity and the distribution of the population of income deprivation as a whole. It should also be noted that the assessment is a relative comparison. Therefore, a score of "xxx" only highlights that the most income deprived are impacted the most in comparison to the rest of the group.

5.2.5 Women

Table 5.13 identifies the number of women living in areas that generate journeys to/from the Medium CAZ area, where the numbers of trips by non-compliant vehicles are greater or lower than the average proportions of non-compliant vehicles making trips in the study area. Table 5.14 shows similar figures for the Small CAZ area.

Table 5.13: Impacts on women – use of non-compliant vehicles to access Medium CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Women Quintiles					Total
		1 (least women)	2	3	4	5 (most women)	
A	AM peak – into CAZ in the AM peak	16,504	10,824	11,943	13,885	17,574	70,730
B	Share of total	23.3%	15.3%	16.9%	19.6%	24.8%	100.0%
C	Share of population in BCC	30.4%	15.5%	17.3%	15.5%	21.3%	100.0%
D	Distributional assessment for AM peak	✓✓✓	-	✓	xx	x	
E	PM peak – out of CAZ in the PM peak	40,153	20,286	20,900	22,437	26,925	130,701
F	Share of total	30.7%	15.5%	16.0%	17.2%	20.6%	100.0%
G	Share of population in BCC	30.4%	15.5%	17.3%	15.5%	21.3%	100.0%
H	Distributional assessment for PM peak	-	-	✓	x	✓	

Table 5.14: Impacts on women – use of non-compliant vehicles to access Small CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Women Quintiles					Total
		1 (least women)	2	3	4	5 (most women)	
A	AM peak – into CAZ in the AM peak	2,333	4,518	6,149	4,109	2,376	19,485
B	Share of total	12.0%	23.2%	31.6%	21.1%	12.2%	100.0%
C	Share of population in BCC	30.4%	15.5%	17.3%	15.5%	21.3%	100.0%
D	Distributional assessment for AM peak	✓✓✓	xxx	xxx	xxx	✓✓✓	
E	PM peak – out of CAZ in the PM peak	6,552	8,098	7,936	7,376	3,065	33,027
F	Share of total	19.8%	24.5%	24.0%	22.3%	9.3%	100.0%
G	Share of population in BCC	30.4%	15.5%	17.3%	15.5%	21.3%	100.0%
H	Distributional assessment for PM peak	✓✓✓	xxx	xxx	xxx	✓✓✓	

Note that the assessment scoring in the tables considers the share of population directly, and as such is looking at propensity to impact on journey choices, rather than specifically identifying winners and losers. The assessment score is related to the difference between the distribution of propensity and the distribution of the population of income deprivation as a whole. It should also be noted that the assessment is a relative comparison. Therefore, a score of "xxx" only highlights that the most income deprived are impacted the most in comparison to the rest of the group.

5.2.6 Ethnic Minorities

Table 5.15 identifies the number of ethnic minority people living in areas that generate journeys to/from the Medium CAZ area, where the numbers of trips by non-compliant vehicles are greater or lower than the average proportions of non-compliant vehicles making trips in the study area. Table 5.16 shows similar figures for the Small CAZ area.

Table 5.15: Impacts on ethnic minorities – use of non-compliant vehicles to access Medium CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Ethnic minority Quintiles					Total
		1 (lowest pop ethnic minority)	2	3	4	5 (most pop ethnic minority)	
A	AM peak – into CAZ in the AM peak	52	183	1,864	5,273	22,626	29,998
B	Share of total	0.2%	0.6%	6.2%	17.6%	75.4%	100.0%
C	Share of population in BCC	0.2%	0.5%	6.2%	17.8%	75.2%	100.0%
D	Distributional assessment for AM peak	-	-	-	-	-	
E	PM peak – out of CAZ in the PM peak	116	212	2,664	6,639	26,824	36,455
F	Share of total	0.3%	0.6%	7.3%	18.2%	73.6%	100.0%
G	Share of population in BCC	0.2%	0.5%	6.2%	17.8%	75.2%	100.0%
H	Distributional assessment for PM peak	-	-	x	x	✓	

Table 5.16: Impacts on ethnic minorities – use of non-compliant vehicles to access Small CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Ethnic minority Quintiles					Total
		1 (lowest pop ethnic minority)	2	3	4	5 (most pop ethnic minority)	
A	AM peak – into CAZ in the AM peak	0	229	2,131	4,641	10,006	17,007
B	Share of total	0.0%	1.3%	12.5%	27.3%	58.8%	100.0%
C	Share of population in BCC	0.2%	0.5%	6.2%	17.8%	75.2%	100.0%
D	Distributional assessment for AM peak	-	x	xxx	xxx	✓✓✓	
E	PM peak – out of CAZ in the PM peak	168	310	2,936	6,990	28,905	39,309
F	Share of total	0.4%	0.8%	7.5%	17.8%	73.5%	100.0%
G	Share of population in BCC	0.2%	0.5%	6.2%	17.8%	75.2%	100.0%
H	Distributional assessment for PM peak	-	-	x	-	✓	

Note that the assessment scoring in the tables considers the share of population directly, and as such is looking at propensity to impact on journey choices, rather than specifically identifying winners and losers. The assessment score is related to the difference between the distribution of propensity and the distribution of the population of income deprivation as a whole. It should also be noted that the assessment is a relative comparison. Therefore, a score of "xxx" only highlights that the most income deprived are impacted the most in comparison to the rest of the group.

5.3 Affordability

5.3.1 Low Income Households

Distributional assessment of affordability impacts are linked with accessibility impacts, in particular in comparison with income deprivation. Tables 5.5 and 5.6 (People in Low Income households – use of non-compliant vehicles) identify the number of people living in areas that generate journeys to/from the Medium CAZ and Small CAZ areas respectively, where the numbers of trips by non-compliant vehicles are greater or lower than the average proportions of non-compliant vehicles making trips in the study area. These tables provide a picture of the distributional assessment of the impacts of the CAP on affordability.

Table 5.5: People in Low Income households – use of non-compliant vehicles to access Medium CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Income Deprivation Quintiles					Total
		0-20% (most deprived)	20-40%	40-60%	60-80%	80-100% (least deprived)	
A	AM peak – into CAZ in the AM peak	49,808	44,112	24,036	26,160	35,161	179,277
B	Share of total	27.8%	24.6%	13.4%	14.6%	19.6%	100.0%
C	Share of population in BCC	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
D	Distributional assessment for AM peak	-	✓	x	✓	x	
E	PM peak – out of CAZ in the PM peak	67,547	72,823	37,639	35,227	42,901	256,137
F	Share of total	26.4%	28.4%	14.7%	13.8%	16.7%	100.0%
G	Share of population in BCC	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
H	Distributional assessment for PM peak	✓	xx	xx	✓✓	✓	

Table 5.6: People in Low Income households – use of non-compliant vehicles to access Small CAZ area

	People from areas where more trips are made into/out of CAZ in the AM/PM peaks using non-compliant vehicles than average	Income Deprivation Quintiles					Total
		0-20% (most deprived)	20-40%	40-60%	60-80%	80-100% (least deprived)	
A	AM peak – into CAZ in the AM peak	29,198	49,119	18,046	21,276	22,809	140,448
B	Share of total	20.8%	35.0%	12.8%	15.1%	16.2%	100.0%
C	Share of population in BCC	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
D	Distributional assessment for AM peak	✓✓✓	xxx	x	✓	✓	
E	PM peak – out of CAZ in the PM peak	62,497	71,695	33,153	54,929	37,976	260,250
F	Share of total	24.0%	27.5%	12.7%	21.1%	14.6%	100.0%
G	Share of population in BCC	27.1%	25.5%	11.7%	17.8%	17.9%	100.0%
H	Distributional assessment for PM peak	✓✓	x	x	xx	✓	

As well as trip-making and the potential need to make changes to journeys that could result in higher cost of travel, affordability impacts are also influenced by the ability of individuals and households to replace their vehicles or change travel patterns/behaviours. The average cost of replacing a car is estimated at almost £4,800 (see OBC-16 'Primary Behavioural Response Calculation Methodology' within Appendix E of this OBC for more details of this calculation). Whilst low income households may well spend far less replacing their vehicles, this cost represents a significant affordability issue for all households, but particularly for low-income households that have less capacity to replace non-compliant vehicles.

5.3.2 Businesses

Some businesses rely on LGVs and HGVs as part of their day-to-day operations (e.g. trades people). In light of the importance of LGVs and HGVs to business operation, the affordability impacts of the CAZ on use of LGVs and HGVs was assessed.

Figures 5.5-5.8 show interrogation of baseline (2021) trip matrices for trips across the Small and Medium CAZ boundaries by LGVs. These identify the key locations across the city where businesses reliant on LGVs generate the most trips across CAZ boundaries associated with LGV reliant businesses. Figure 5.5 shows the number of trips (ranked) made by non-complaint LGVs to Medium CAZ in AM peak, with Figure 5.6 showing similar information for the reverse trips in PM peak. Figures 5.7 and 5.8 show corresponding information for the Small CAZ (respectively).

Reflecting that retail businesses are the most reliant on HGVs entering the centre of the city, Figures 5.9-5.12 show interrogation of baseline (2021) trip matrices for trips across the Small and Medium CAZ boundaries by HGVs associated with retail business areas. These identify the key locations across the city where the most trips made by non-compliant HGVs are generated across CAZ boundaries. Figure 5.9 shows the number of trips (ranked) made by non-complaint HGVs to Medium CAZ in AM peak, with Figure 5.10 showing similar information for the reverse trips in PM peak. Figures 5.11 and 5.12 show corresponding information for the Small CAZ (respectively).

This analysis does not take implicitly into account the significant cost of replacing LGVs and HGVs, just illustrating the distribution of impacts across the study area. Note that the average cost of vehicle replacement is estimated to be around £5,900 for LGVs and in the range £18,000 to £24,500 for HGVs (see OBC-16 ‘Primary Behavioural Response Calculation Methodology’ within Appendix E of this OBC for details of this calculation). For small firms operating on small margins or with low turnover and for bigger firms with multiple non-compliant vehicles, these vehicle replacement costs could deter the purchase of compliant vehicles. This could result in such firms incurring the CAZ charge as their vehicles enter the areas, or firms avoiding the areas altogether. This could impact on business profitability and consumer choice.

5.3.3 Taxis

Assessment of transport user costs and benefits using TUBA indicate that transport user costs will increase for taxis. This impact is primarily driven by a significant increase in non-fuel vehicle operating costs, with journey times and fuel vehicle operating costs showing a marginal decreases. Non-fuel vehicle operating costs are expected to increase in response to increased distance related costs and vehicle capital costs associated with working vehicles. A net increase in transport user costs suggests that taxi firms operating will suffer from additional costs and affordability issues.

Further, the cost of replacing a taxi to one of compliant standard is also likely to add to affordability issues for taxi firms. Vehicle replacement costs may be prohibitive to taxi owners, leading to taxis either incurring the CAZ charge or avoiding the CAZ area altogether. If taxis stop entering the CAZ, this could lead to subsequent accessibility impacts for people that rely on taxi journeys to access key amenities and social infrastructure.