Coventry Local Air Quality Plan

E3 - Distributional Impact Assessment

Coventry City Council

February 2019

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Document history

Revision	Purpose description	Origin-ated	Checked	Reviewed	Author-ised	Date
Rev 1.0	For Issue	KB	TD/NA	LS	APT	08/02/19

Client signoff

Client	Coventry City Council
Project	Coventry Local Air Quality Plan
Job number	
Client signature / date	

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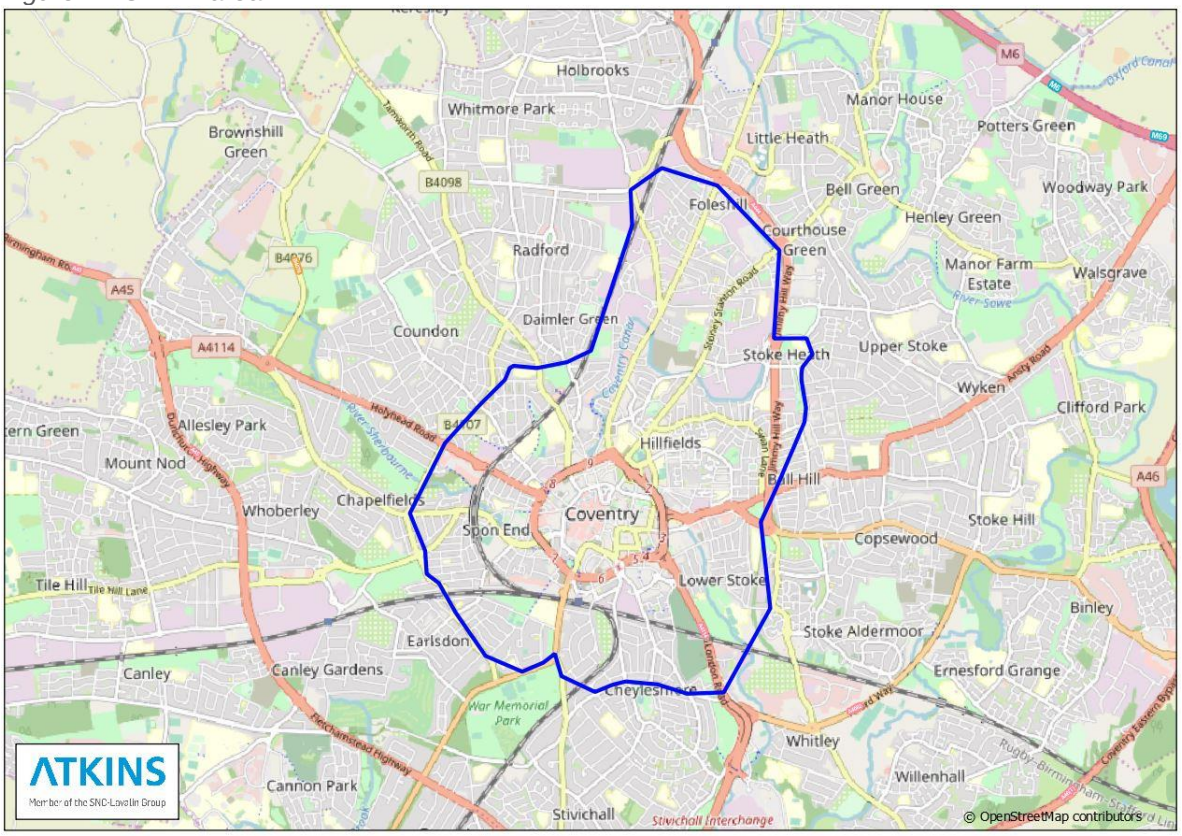
Introduction

This report covers the Distributional Impact Assessment for Options DS2 and DS12a.

Executive Summary

This report details the findings of a Distributional Impact (DI) Appraisal undertaken for the proposed Options DS2 and DS12a of the Coventry Clean Air Zone scheme, designed to help Coventry reduce air quality emissions and thereby achieving compliance with the NO_2 legal limits for roadside emissions. DS2, which is the benchmark scenario, consists of a Clean Air Zone around Coventry (CAZ D) which charges non-compliant vehicles (vehicles that do not meet with set emission standards) within a boundary surrounding Coventry City Centre, as displayed in the below image.

Figure 1 - CAZ D area



DS12a consists of the measures presented in Table 1-1, which is presented below.

Table 1-1 - Measures included within Option DS12a

Measure
City wide traffic signal technology upgrade and additional VMS
Taxi licence changes to improve fleet emissions
Support for taxi drivers to encourage upgrade of vehicles
Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes
Travel planning package city wide
High quality cycle infrastructure along 4 routes
Capacity improvements at Spon End
Redesign of Ring Road J7
Facilitate/encourage upgrade of private and public fleet vehicles
Closure of Coundon Road level crossing
Removal of signals at Holyhead Road/Barras Lane
HGV ban on Holyhead Road between railway line and J8
Peak time restrictions on Holyhead Road (inbound AM, outbound PM)

Distributional impacts consider the variance of transport intervention impacts across different social groups. The analysis of DIs is mandatory in the appraisal process and undertaken in accordance with WebTAG guidance Unit A4.2 and JAQU guidance for Distributional and Equalities Impact Analysis. Both beneficial and /or adverse DIs of transport interventions are considered, along with the identification of social groups likely to be affected.

A summary of the overall impact of the options on the indicators are displayed below:

Table 1-2 - Overall Impact of each of the indicators assessed

	Overall Impact	
Indicator	**DS2**	**DS12a**
Accessibility	0	0
Severance	0	0
Nosie	0	0
Air Quality	✓✓	✓
User Benefits	××	✓✓
Affordability	××	✓✓

Key:

- large beneficial (✓✓✓)
- moderate beneficial (✓✓)
- slight beneficial (✓)
- neutral (*0*)
- slight adverse (×)
- moderate adverse (××)
- large adverse (×××)

1. Introduction

This report details the findings of a Distributional Impact (DI) Appraisal undertaken for the proposed Clean Air Zone (CAZ) D scheme for Coventry City Centre, which would impact those using non-compliant vehicles, as defined in Table 1-1. This is named option DS2 and forms the benchmark scenario.

This report will also consider the impact on various measures which include: City wide traffic signal technology upgrade and additional VMS; Taxi licence changes to improve fleet emissions; Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes; Travel planning package city wide; High quality cycle infrastructure along 4 routes; Capacity improvements at Spon End; Closure of Coundon Road level crossing to improve air quality standards within Coventry. This is called option DS12a.

Option DS2 requires the charging of non-compliant vehicles for driving within the CAZ D as shown in

Figure 2. All vehicles who do not comply with the standards set will be charged for driving within the area. This will include Taxis, Coaches, buses and private cars.

The information below shows the minimum emission standards to be exempt for charging within the CAZ.

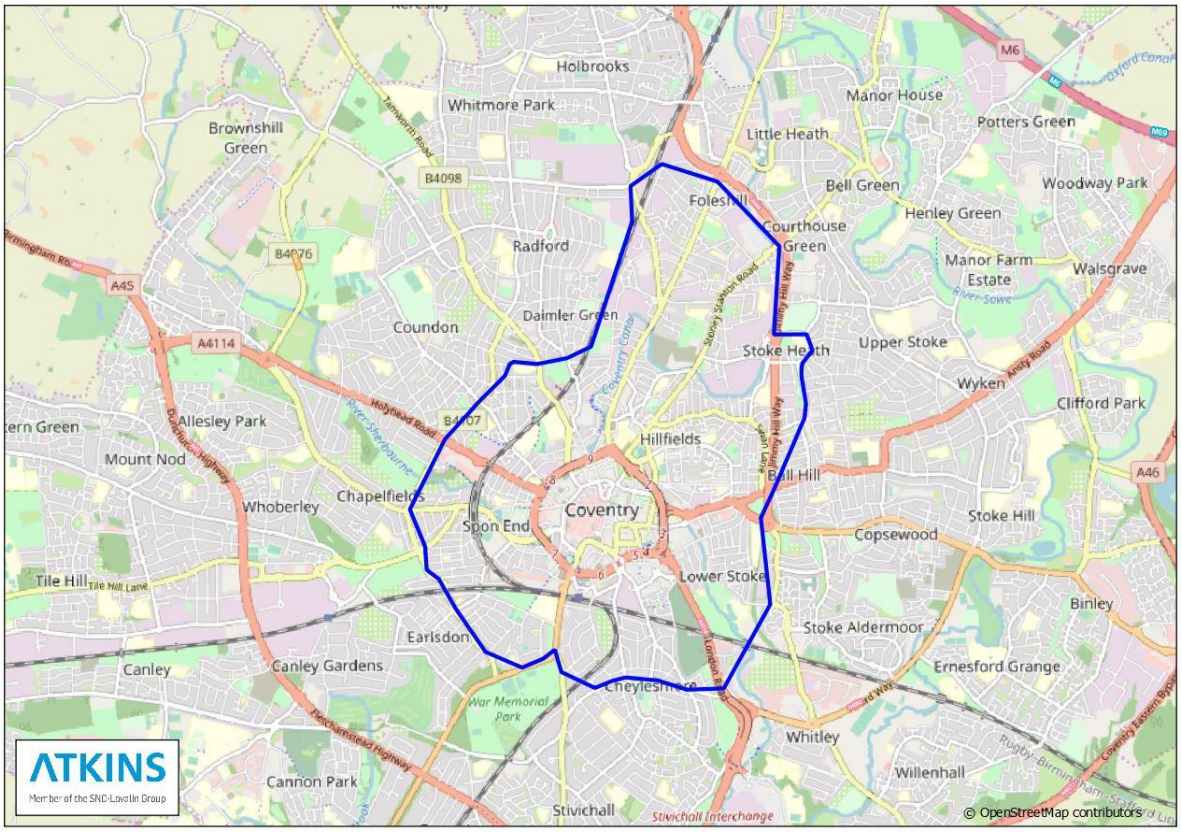
Table 1-1 - Clean Air Zone Exempt Vehicles

Clean air zones: exempt vehicles

Most clean air zones are expected to exclude or charge vehicles that fail to meet the emission standards below. However, there are likely to be exceptions, particularly for the zero emission zones being planned by London and Oxford.

Vehicle type	Min. emission standard to be exempt
Motorbikes	Euro 3 (all models registered since Jul 2007)
Cars & small vans	**Petrol** Euro 4 (Jan 2006) **Diesel** Euro 6 (Sep 2015)
Vans & minibuses	**Petrol** Euro 4 (Jan 2007) **Diesel** Euro 6 (Sep 2016)
Lorries	Euro VI (Jan 2014)
Coaches and buses	Euro VI (Jan 2014)
Historic vehicle	More than 40 years old

Figure 2 Extent of proposed Clean Air Zone within Coventry



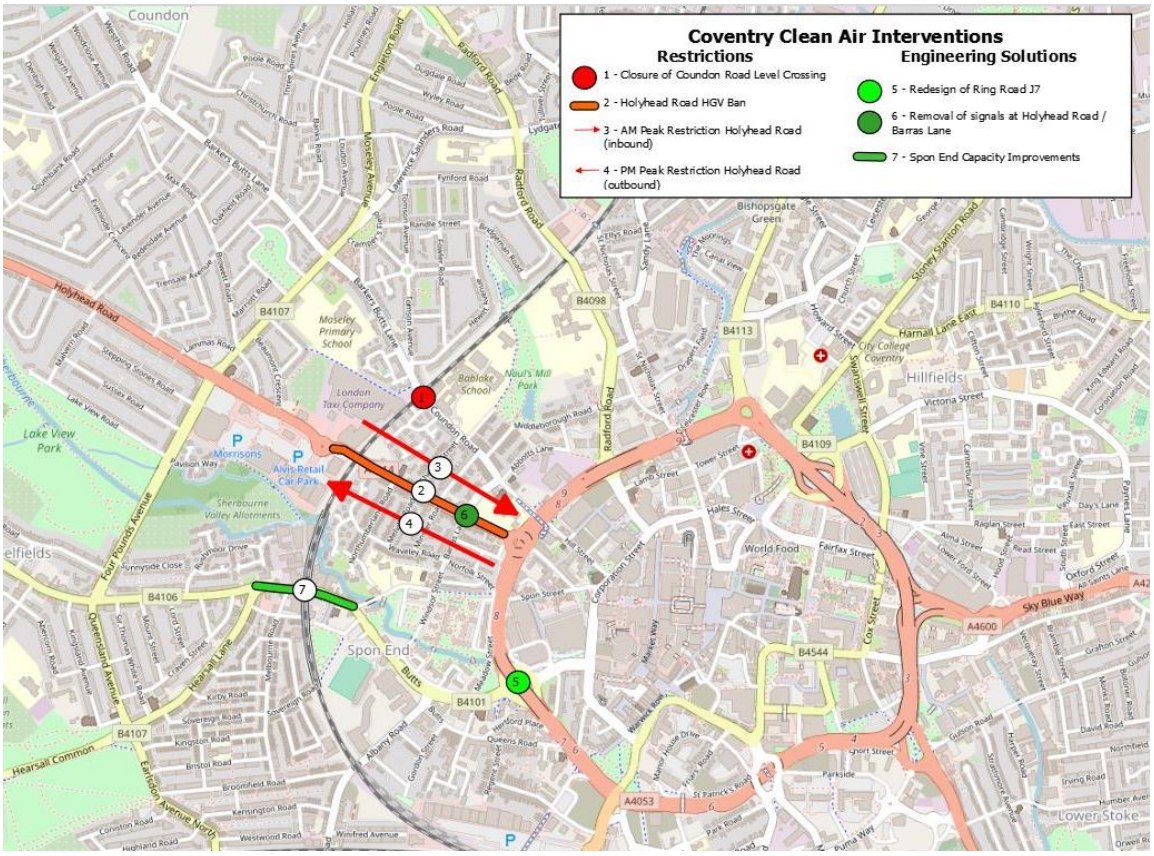
DS12a consists of a package of measures which have been identified as the most effective overall in achieving compliance with the NO_2 legal limits for roadside emissions. The list of measures is listed in the below table:

Table 1-2 - Measures included within DS12a

Measure
City wide traffic signal technology upgrade and additional VMS to facilitate dynamic traffic management
Taxi licence changes to improve fleet emissions
Support for taxi drivers to encourage upgrade of vehicles
Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes
Travel planning package city wide
High quality cycle infrastructure along 4 routes
Capacity improvements at Spon End
Redesign of Ring Road J7
Closure of Coundon Road level crossing
Removal of signals at Holyhead Road/Barras Lane
Facilitate/encourage upgrade of private and public fleet vehicles
HGV ban on Holyhead Road between railway line and J8
Peak time restrictions on Holyhead Road (inbound AM, outbound PM)

Measures that have been assigned to a specific location, such as the restrictions on Holyhead Road, have been mapped in Figure *3* displays how a large number of the interventions occur to the west of Coventry City Centre. The figure also displays whether the implemented solution to improve air quality is through a restriction / closure (red) or engineering improvement / redesign (green).

Figure 3 - Map displaying interventions for DS12a package



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Whilst carrying out the screening each of the measures will be appraised separately to understand the individual impacts caused by the separate measures included within DS12a. However, an overall assessment of the aggregated measures will form the appraisal.

Distributional impacts consider the variance of transport intervention impacts across different social groups. The analysis of DIs is mandatory in the appraisal process and undertaken in accordance with WebTAG guidance Unit A4.2 and JAQU guidance for Distributional and Equalities Impact Analysis. Both beneficial and /or adverse DIs of transport interventions are considered, along with the identification of social groups likely to be affected.

1.1. DI Process

The eight indicators considered within the DI appraisal are:

- User Benefits;
- Air Quality;
- Noise;
- Personal Security;
- Severance;
- Accessibility;
- Personal Affordability; and
- Accidents.

The DI process involves three stages: Screening; DI Assessment; and Appraisal of Impacts, as outlined below. Supporting socio-demographic mapping for the study area has been included within Appendix A.1.

Table 1-3 - DI Process

Step		Description	Output
Screening	1	Identification of likely impacts for each indicator	Screening Proforma
Full appraisal	2	Assessment: • Confirmation of the area impacted by the transport intervention (impact area) • Identification of social groups in the impact area (such as transport users, people living in those areas affected by the scheme) • Identification of amenities in the impact area	DIs social groups statistics and amenities affected within the impact area
	3	Appraisal of impacts: • Core analysis of the impacts (including providing an assessment score for each indicator based on a seven-point scale – large beneficial to large adverse) • large beneficial (✓✓✓) • moderate beneficial (✓✓) • slight beneficial (✓) • neutral (*0*) • slight adverse (×) • moderate adverse (××) • large adverse (×××)	Appraisal tables

2. Outcome of Screening and Approach to Detailed Appraisal

Phase one of the DI process involved the completion of a screening proforma, based upon qualitative judgement of the likely impacts of the scheme on each of the eight indicators. This full screening is included in Appendix A.2.

The outcome of this screening process identified that User Benefits, Affordability, Air Quality, Accessibility, Noise and Severance should be appraised in detail to determine the effect that options DS2 and DS12a will have on the population. These detailed appraisals are included in the next section.

For the Severance and Noise assessment, the distribution of traffic on the network as a result of each option has been assessed. Air Quality data has been modelled by determining the change in emissions by Lower Super Output Area (LSOA). For User Benefits and Affordability, there will be an appraisal using TUBA, the Department for Transport's (DfT) Transport User Benefit Appraisal software. Affordability will also take into consideration the charging of vehicles within the CAZ.

3. Appraisal

3.1. Accessibility

Accessibility impacts consider changes in services, routings or timings of current public transport services within the impact area. Whilst public transport is not a main part of the scheme, there may be indirect impacts due to the re-routing of traffic around the measures, however, this is expected to be minimal. This is due to the assumption that most buses will either be retrofitted to become compliant or will incur the charge, rather than rerouting to avoid the charge.

3.1.1. Screening

3.1.1.1. Comments

Option DS2 (CAZ D) may indirectly impact accessibility. While this impact is expected to be minimal, due to the assumption that most buses will choose to pay/upgrade rather than re-route. JAQU guidance requires that accessibility is screened in for further appraisal. Hence, the schemes impact on this indicator requires further assessment

Similarly, Option DS12a may have indirect impacts on accessibility as result of improvements to traffic flow and restrictions on traffic using certain corridors. However, the closing of the level crossing can impact on accessibility due to bus services needing to be re-routed to alternative routes. Hence, the schemes impact on this indicator requires further assessment.

3.1.1.2. Outcome

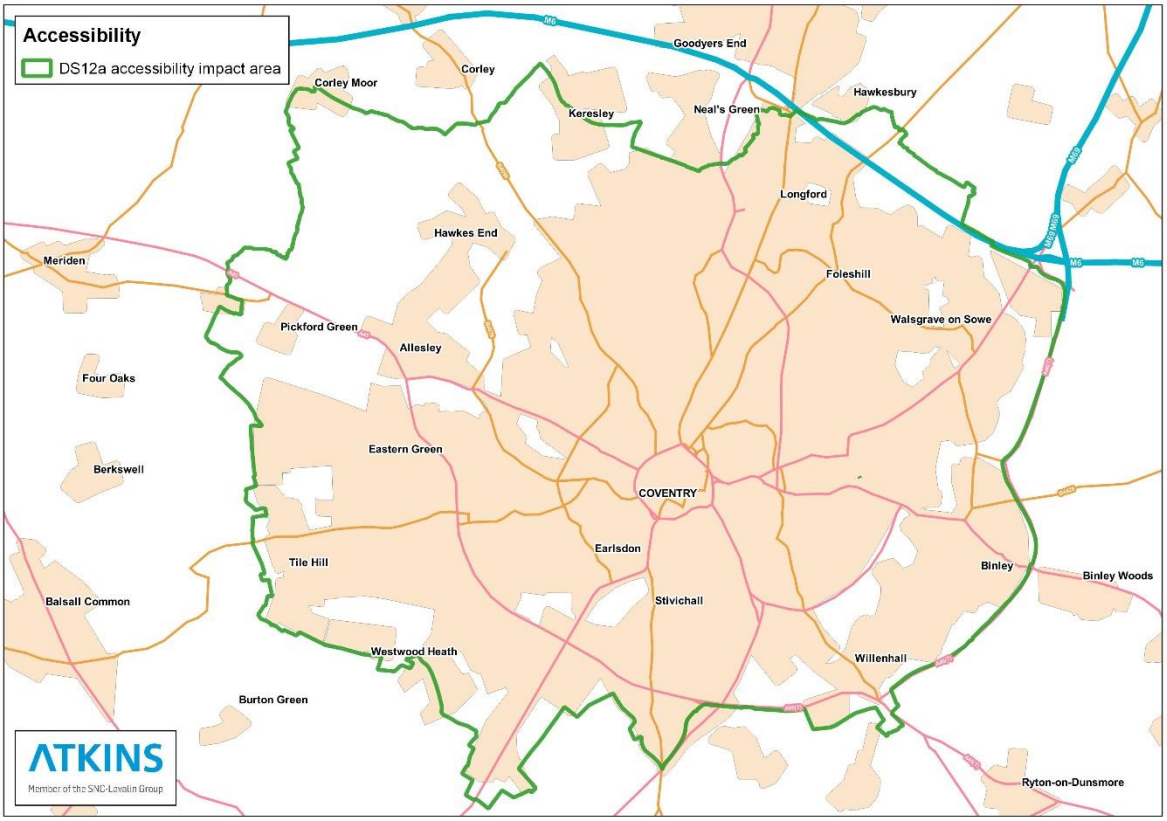
The result of the screening is the requirement to **Continue to Full DI Appraisal**, the impact on sensitive receptors will need to be examined.

3.1.2. Assessment

3.1.2.1. Step 2a: Confirmation of Impacted Area

The impact area covered in this appraisal has included consideration of changes to timings of current public transport through and within Coventry, which may result in changes to accessibility, as a result of the introduction of Options DS2 and DS12a. The impact area for option DS12a is shown in Figure 4.

Figure 4 Accessibility impact area for option DS12a



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3.1.2.2. Step 2b: Identification of Social Groups in Impact Area

Table 3-1 – Proportion of the groups in the impact area

Vulnerable Group	England	DS2 (CAZ D)	DS12a
Over 65	17.0%	9.0%	13.3%
Children (People Aged Under 16)	19.0%	19.4%	19.6%
No Car Households	25.6%	40.3%	32.2%
20% Highest Level of Illness and Disability	20.0%	48.6%	38.0%
Women	50.6%	49.5%	49.5%
Black and Minority Ethnic (BME)	14.0%	25.8%	26.1%
20% most income deprived LSOAs	20.0%	27.1%	29.7%

3.1.2.3. Step 2c: Identification of Amenities in Impact Area

There are many schools in Coventry, as well as several other amenities such as shopping centres in the centre of Coventry which may attract a range of people. The Coventry and Warwickshire Hospital is within the CAZ D boundary.

3.1.3. Appraisal

3.1.3.1. DS2

Within the Clean Air Zone (CAZ) there are a number of areas with high proportions of no car households, illness and disability and black and minority ethnic compared to the average across England and Wales. There are no known changes to public transport facilities or timings due to the introduction of a charging CAZ D. It is assumed that if there are any changes to public transport as a result of the CAZ D these will be kept to a minimum, not impacting upon the vulnerable groups within Coventry and therefore having little impact on accessibility for these groups.

3.1.3.2. DS12a

Measures within option DS12a include traffic restriction and capacity improvements. These measures are expected to have very little impact on accessibility as there is unlikely to be any significant impacts on public transport facilities and hence minimal impact on accessibility.

The closure of the level crossing on Coundon Road is one of the measures that could have an impact on accessibility. There is one bus route that runs down Barker's Butt Lane and Coundon Road (where the level crossing is closing), with a number of bus stops along this road. Currently the bus will be re-routed along Holyhead road and therefore, people using this service may be affected. This may particularly affect those without access to a car and those with disability and health issues. Holyhead road is close to Barker's Butt Lane/ Coundon Road and it is likely some people will need to walk further to access a bus to get to amenities. However, the exact extent of the re-routing as a result of this measure is unknown at this stage.

3.1.3.3. Outcome of Accessibility Appraisal and Qualitative Comment

3.1.3.3.1. Outcome DS2

There is expected to be minimal impact to accessibility due to option DS2, as there are no planned changes to public transport provisions. Therefore, the overall impact of the scheme on accessibility is **neutral**.

3.1.3.3.2. Outcome DS12a

There is expected to be minimal impact to accessibility due to option DS12a. There may be small impacts in accessibility due to the re-routing of a bus service that could affect access to services, however, this is expected to be a small proportion of the population and the movement the re-routing is not considered significant. The overall impact of the scheme on accessibility is **neutral.**

3.2. Severance

3.2.1. Screening

3.2.1.1. Comments

Option DS2 does not include any changes to road crossing provisions, or road corridor alignment. However, there could be a change in traffic flow or speeds of greater than 10% due to the redistribution of traffic as a result of the Clean Air Zone.

Option DS12a may also cause a change in traffic flow or speeds of greater than 10% due to traffic diverting as a result of the closure of the level crossing and peak time restrictions on Holyhead Road. In addition, the redistribution of HGVs due to the HGV ban on Holyhead Road may cause a change in traffic flow or speeds of greater than 10%. Furthermore, there are capacity improvements at Spon End which, dependent on the exact nature of the improvements, may change the road corridor and thereby change the perception of severance.

3.2.1.2. Outcome

Continue to Full DI Appraisal, the impact on sensitive receptors will need to be examined.

3.2.2. Assessment

3.2.2.1. Step 2a: Confirmation of Impacted Area

The DfT's WebTAG (Transport Analysis Guidance) DI guidance (Unit A4.2) recommends the impact area for severance to include any location with physical changes in road alignment or where links on the road network will experience significant changes in traffic flows and or speeds (>10%). This assessment is qualitative and has been based on an examination of changes in traffic flow (24-hour AADT) in the impact area for both options to maintain a proportionate assessment.

3.2.2.2. Step 2b: Identification of Social Groups in Impact Area

Group	England	DS2	DS12a
Elderly (over 65)	17.0	9.0%	12.4%
Children (under 16)	19.0%	19.4%	18.4%
No Car Households	25.6%	40.3%	34.8%
20% Highest Level of Illness and Disability	20.0%	48.6%	37.36%

3.2.2.3. Step 2c: Identification of Amenities in Impact Area

There are many schools in Coventry, as well as several other amenities such as shopping centres in the centre of Coventry which may attract a range of people. The Coventry and Warwickshire Hospital is within the centre of Coventry.

3.2.3. Appraisal

3.2.3.1. Option DS2

Whilst there will be no changes to road crossing provision or road corridors as a result of CAZ D, the impact of the redirection of traffic may impact on speeds and traffic flow. The impact of option DS2 on traffic flows on local roads is shown in Figure 5.

The majority of roads which have a change in traffic flow within the CAZ D boundary, including sections of the ring road, Swan Lane and Quarryfield Lane, are expected to see a reduction in traffic flow. Outside of the CAZ D boundary, there are roads which are expected to have an increase in

traffic flow, such as Beechwood Avenue and Kingsbury Road. This may be due to non-compliant vehicles diverting to avoid the charging zone or travellers changing mode of transport.

Figure 5 Change in traffic flow and the location of schools and care homes in the area

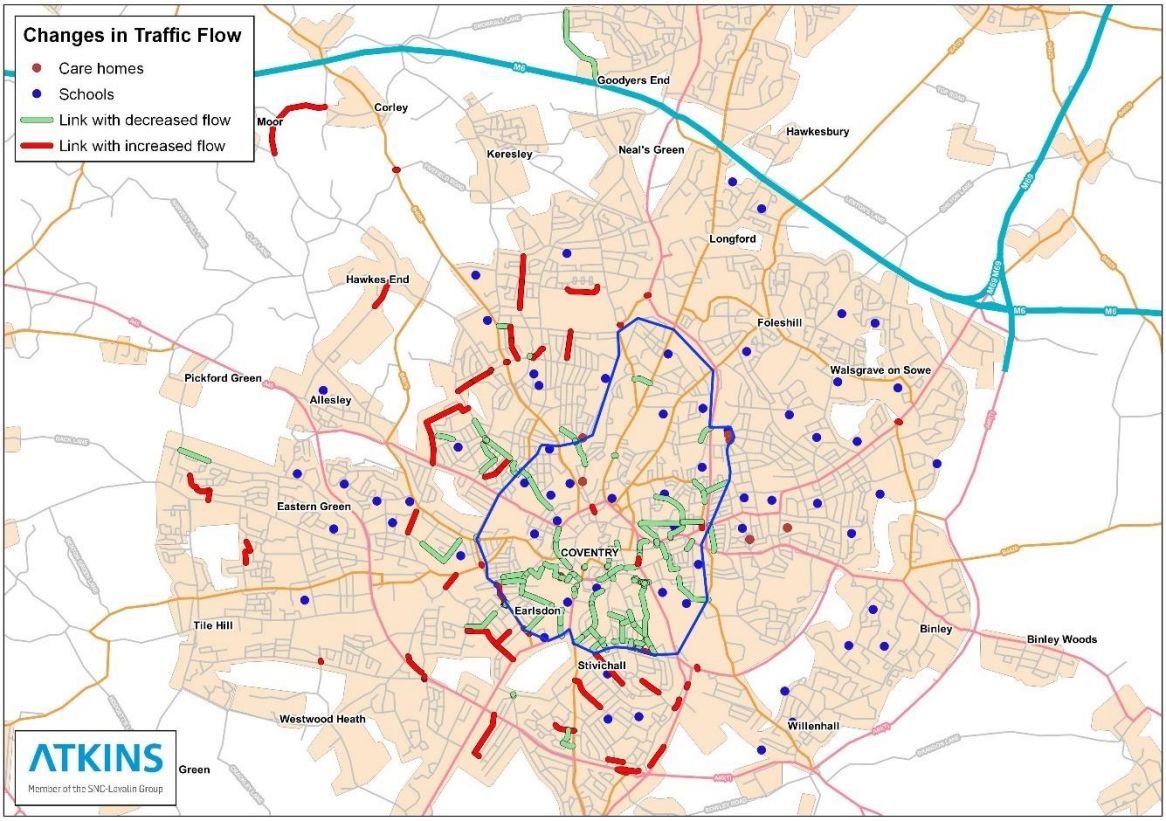

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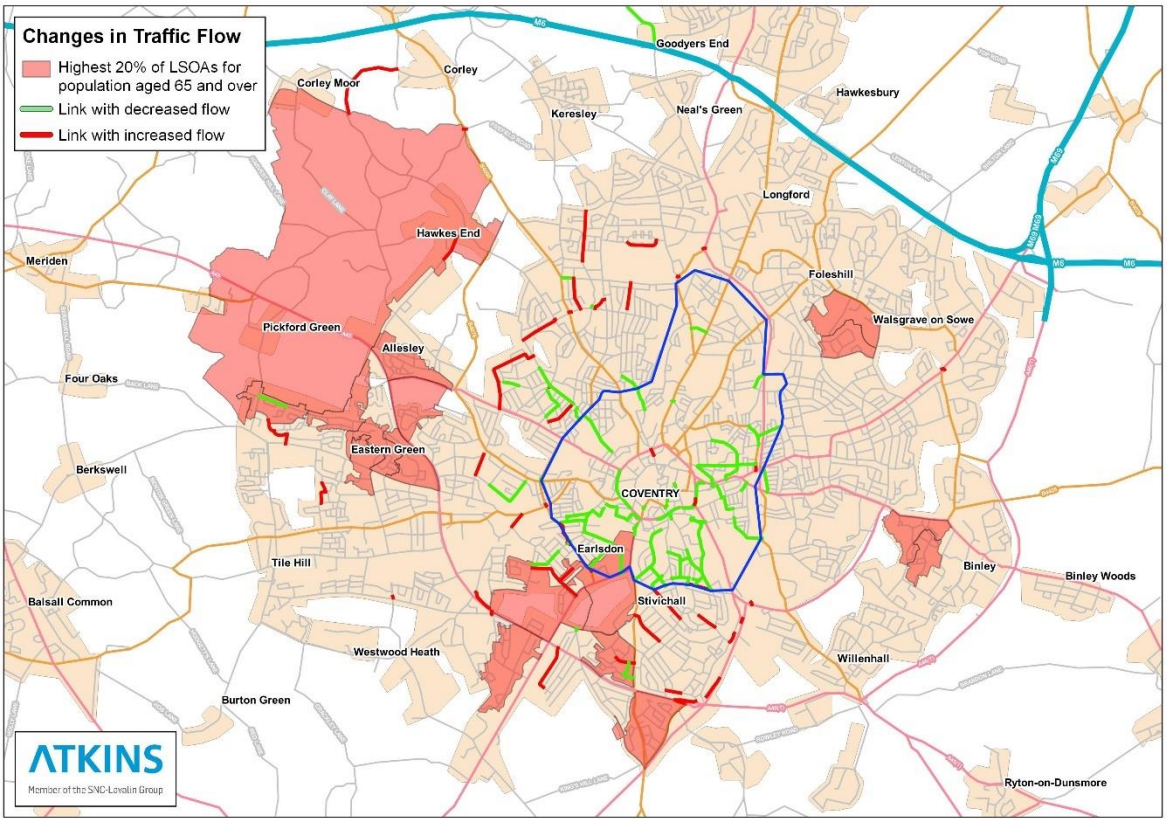
Figure ***6***, Figure 7 and Figure 8 show the links which are expected to have a change in traffic flow of greater than 10% due to the implementation of the CAZ D and the LSOAs with high proportions of vulnerable receptors.

Figure 6 Links with a change in traffic flow and 20% highest proportion of over 65s as compared to the average in England and Wales, by LSOA for DS2.



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There are areas with high proportions of elderly people surrounding the CAZ D, as shown in Figure ***6***. In these areas, there are links which are expected to have a reduction in traffic flow, for example Belvedere Road and Davenport Road. There is an increase in traffic flow on Browns Lane and Earlsdon Avenue South where there are high proportions of elderly people. Increases in traffic flow may increase the perception of severance as the roads become busier and may act as a barrier to those crossing the road.

Figure 7 Links with a change in traffic flow and 20% highest proportions of disability as compared to the average in England and Wales, by LSOA for DS2

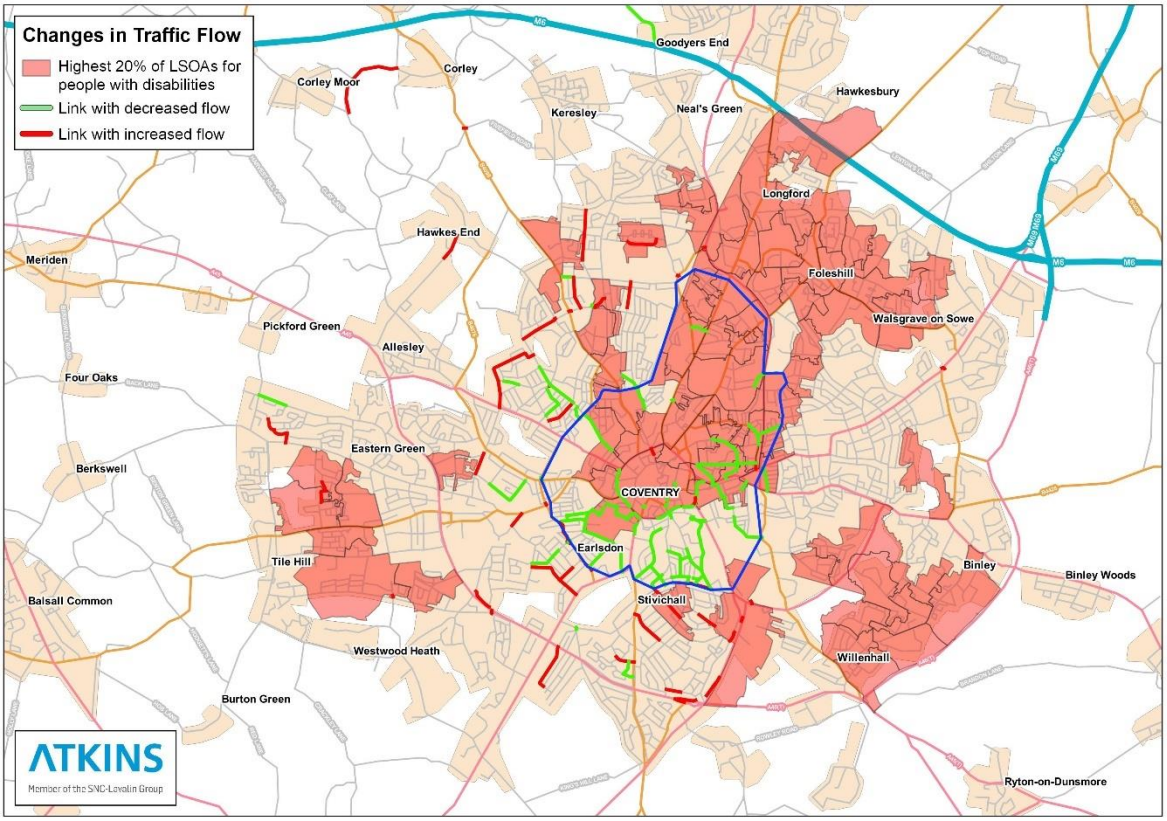

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Figure 7 shows that there are large areas with the highest 20% levels of illness and disability within and surrounding the CAZ D. Some links within these areas have an increase in traffic flow of greater than 10%, such as Bishop Street, Ulverscroft Road and Empire Road. There is a reduction in traffic flow on other links where there are high levels of disability, these include sections of the ring road, Raglan Street and Swan Lane.

Figure 8 Links with a change in traffic flow and the 20% highest proportions of Children as compared to the average in England and Wales, by LSOA for DS2

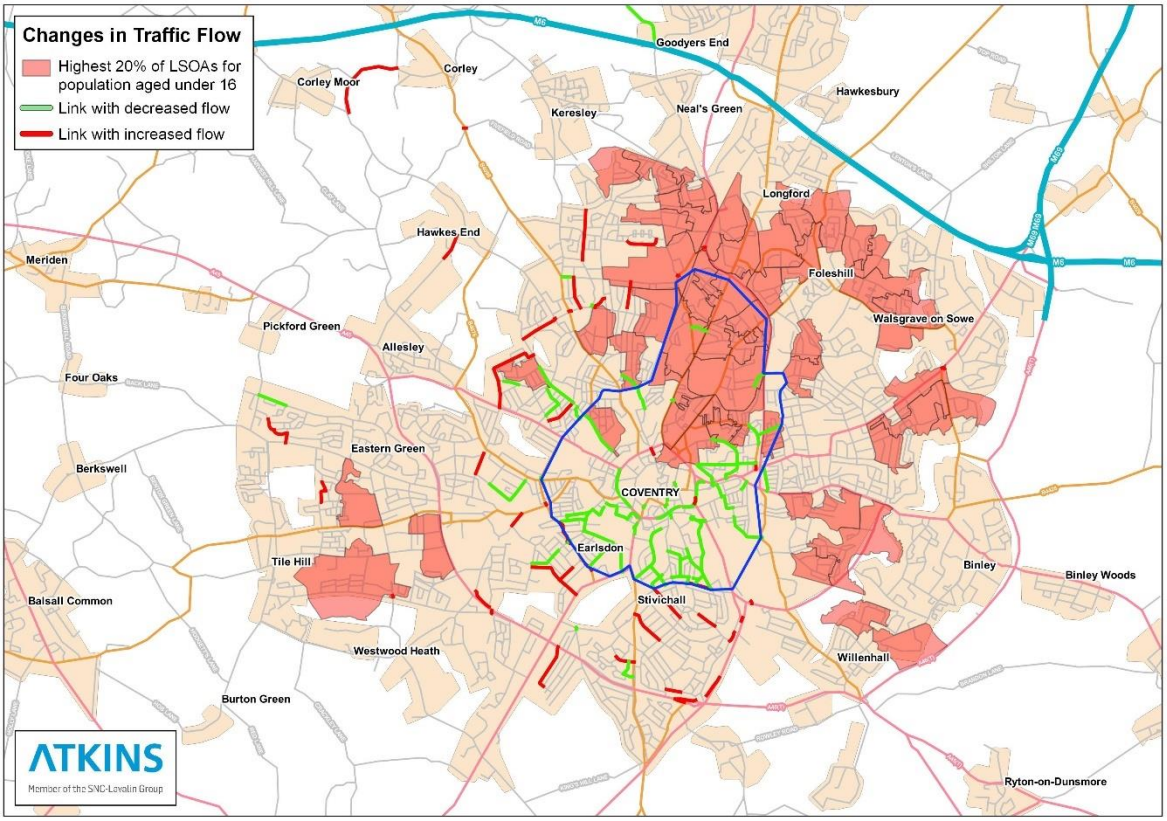

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Figure 8 shows that there are some links which have a change in traffic flow of greater than 10% within LSOAs with high proportions of children. These include Three Spires Junction and Catesby Road, which are expected to have an increase in traffic flow, and Livingstone Road, Waterman Road and Cheveral Avenue, which are expected to have a decrease in traffic flow.

Figure 9 Links with a change in traffic flow due and the 20% highest proportion of no car households as compared to the average in England and Wales, by LSOA for DS2

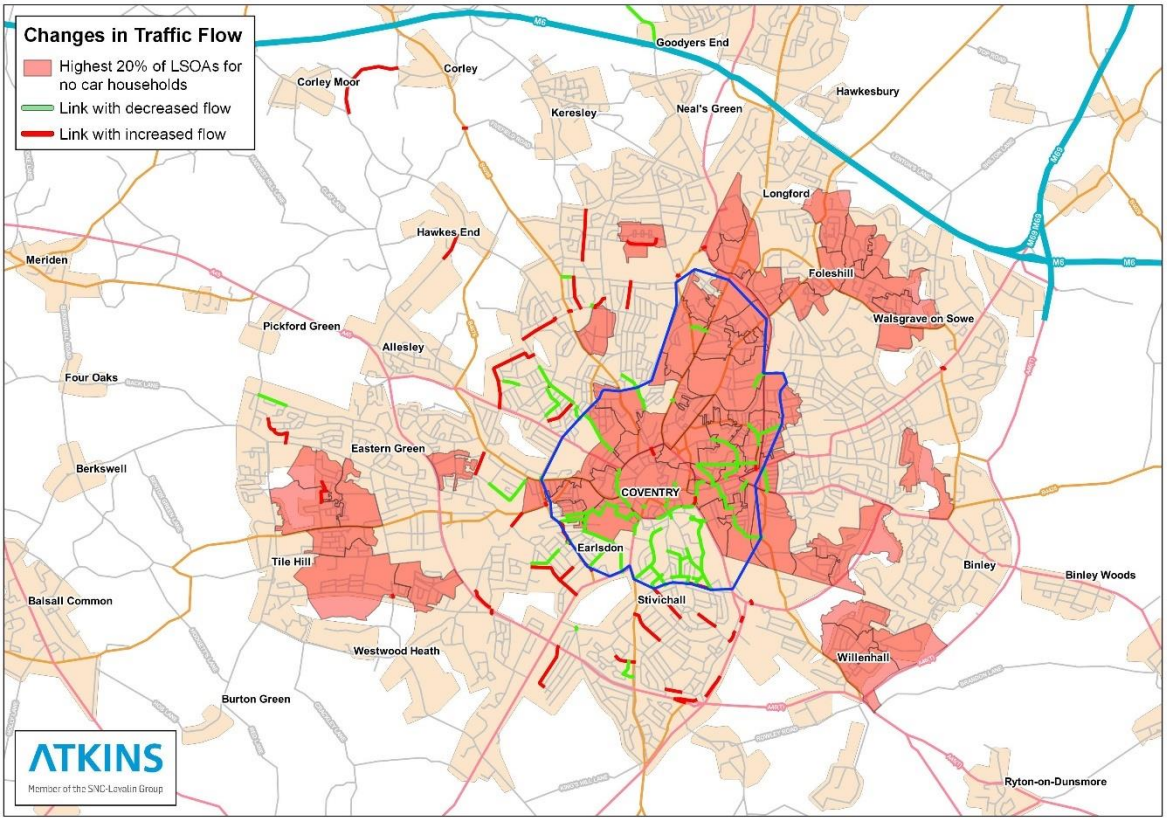

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Figure 9 shows that there are links with a greater than 10% change in traffic flow within LSOAs that have high proportions of no car households in Coventry. Sections of the Ringway, Raglan Street and Swan Lane are expected to have a decrease in traffic flow and Empire Road and Aldrich Avenue have an increase in traffic flow, for example. However, many roads within the CAZ with high proportions of no car households have a reduction in traffic flow.

3.2.3.2. Option DS12a

Option DS12a measures include improvements to Spon End which may result in the widening of the corridor and therefore an increased perception of severance. No other measures change pedestrian crossings or road corridors; however, restrictions and redirection of traffic may change traffic flow and speeds as a result of some of the measures and therefore further examination into where there are changes in traffic flow as a result of option DS12a is presented below.

Figure 10 Links with a change in traffic flow and the location of schools and care homes

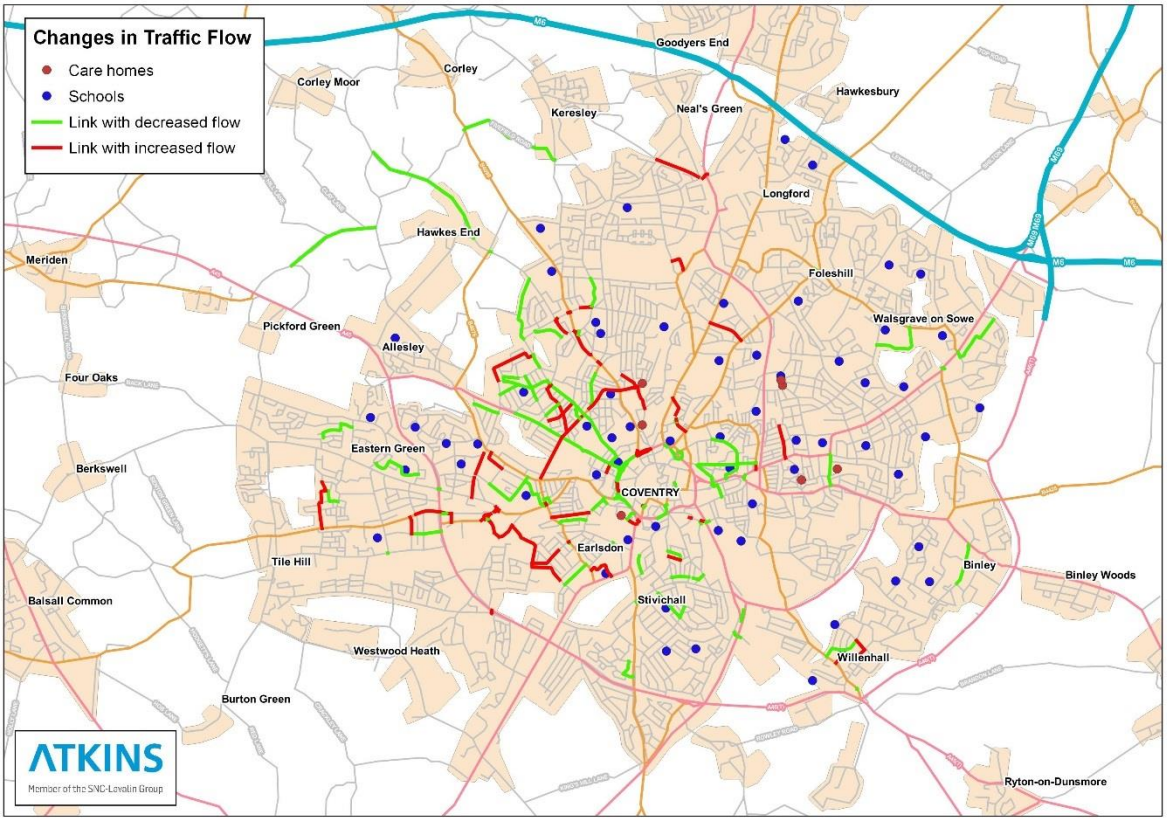

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Figure 10 shows the changes in traffic flows as result of implementing the DS12a interventions. Given the application of restrictions, Holyhead Road and Coundon Road experience reduced traffic with alternative routes to these roads such as Four Pounds Ave and Moseley Ave experiencing increases in traffic due to diversions.

Schools and care homes (which are more susceptible to severance due to the presence of children and elderly) are located on roads with a decrease or with no change in traffic flow. Areas where schools are located on links with a decrease in traffic flow, perception of severance may reduce as it is perceived easier to cross the road.

Figure 11 Links with a change in traffic flow and the 20% highest proportion of over 65-year olds as compared to the average in England and Wales, by LSOA for DS12a

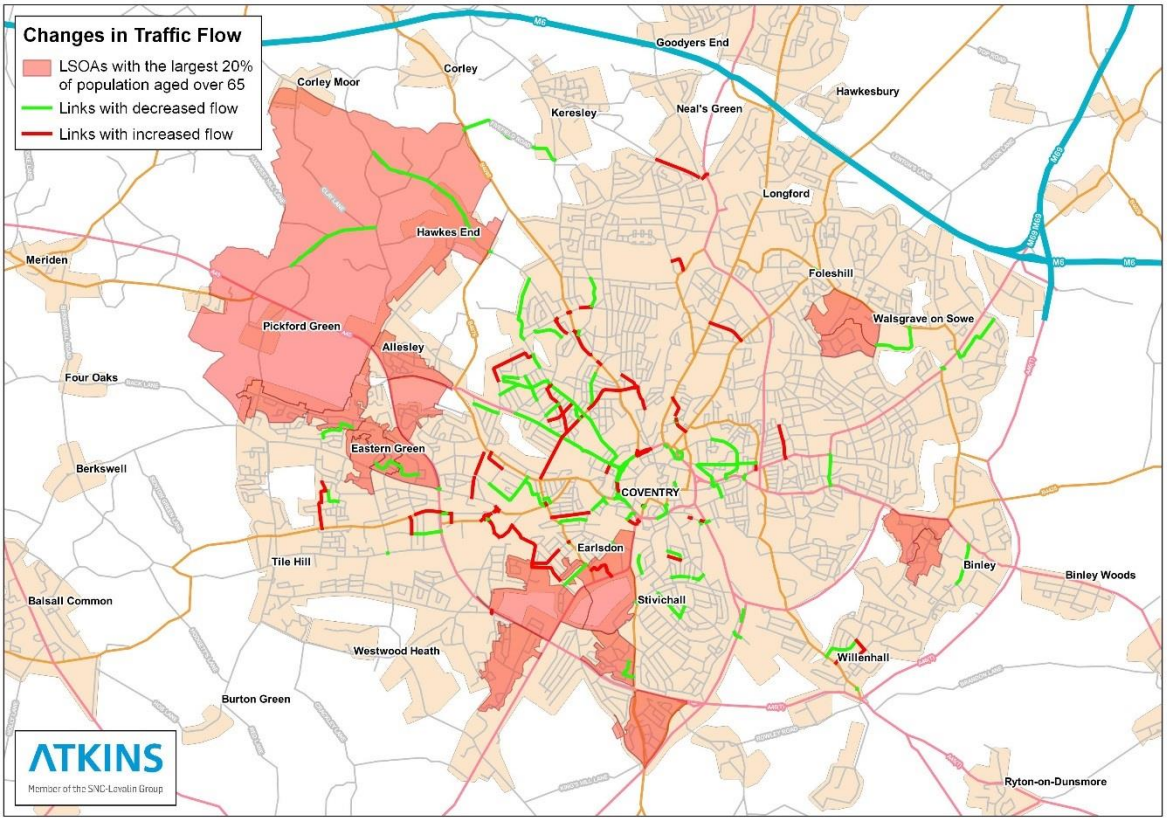

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Figure 11 shows the LSOAs with a high proportion of elderly people as compared to the average in England and Wales. Some links within these areas experience significant changes in traffic levels, almost all exclusively see reductions in traffic flows. Therefore, there could be a slight improvement in the perception of severance.

Figure 12 Links with a change in traffic flow and the 20% highest proportions of under 16-year olds as compared to the average in England and Wales, by LSOA for DS12a

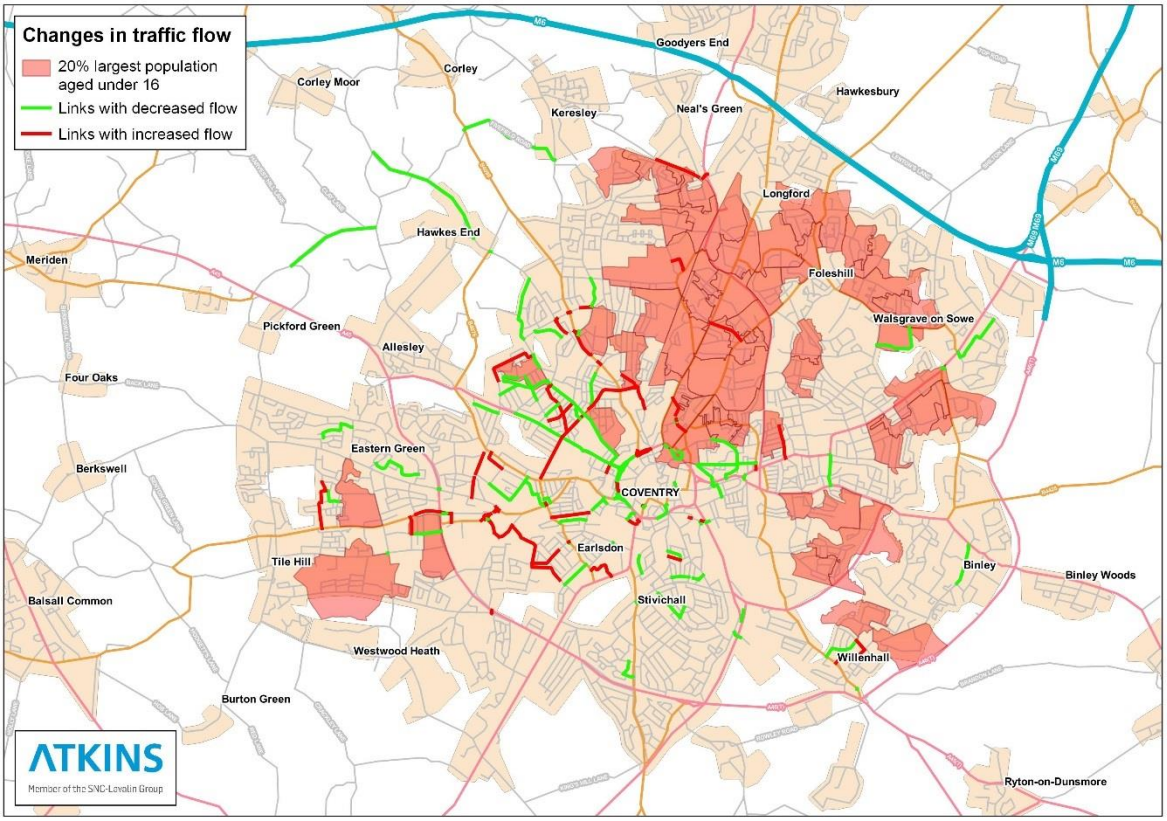

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Figure 12 shows LSOAs with a high proportion of Children. Road links to the north of the city tend to see increases in traffic level and therefore potentially increased severance. However, LSOAs in other areas of the city contain links that experience reduced traffic.

Figure 13 Links with a change in traffic flow and the 20% highest proportion of no car households as compared to the average in England and Wales, by LSOA for DS12a

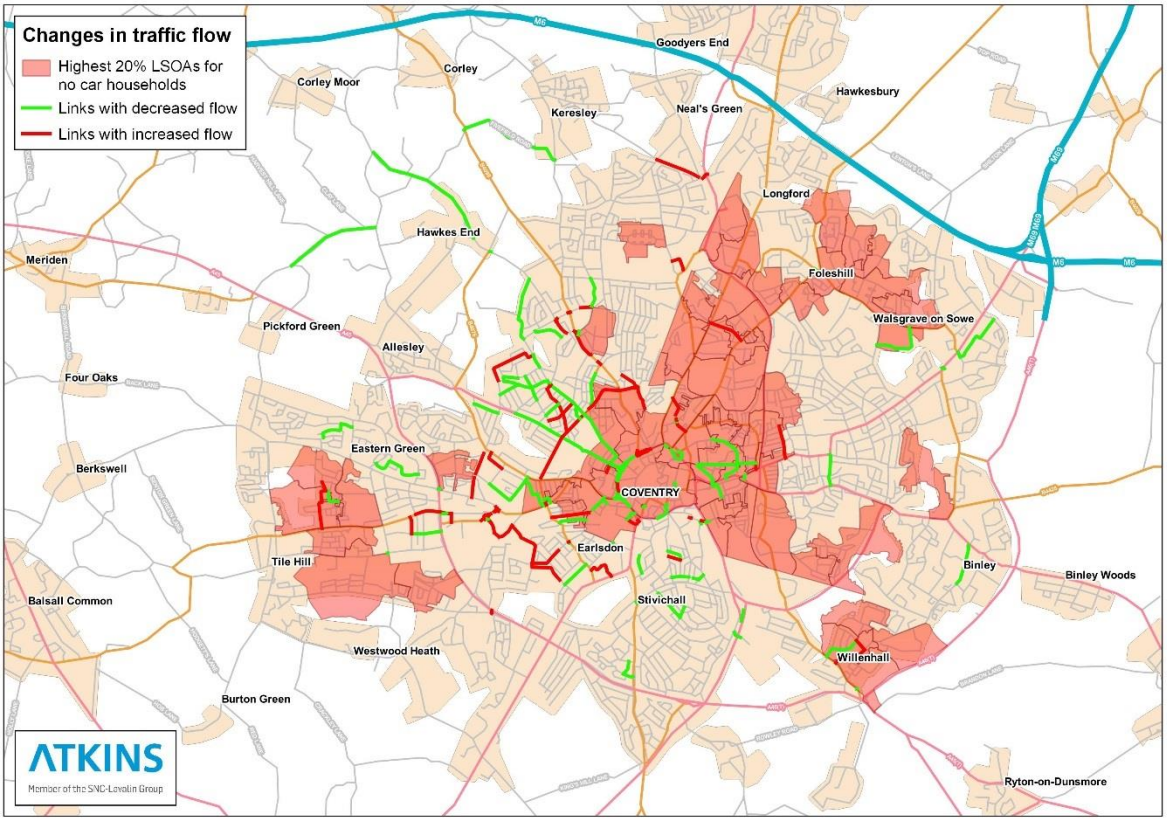

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Figure 13 shows LSOAs with the 20% highest proportion of no car households. Most of these areas tend to be located to the north of Coventry City Centre. The map shows that within the LSOAs with high levels of households without a car, there are road links with both increases and decreases in traffic flow. It appears there is a number of links that will experience a decrease in traffic flow, but the difference is small. Hence, the effect is considered to be neutral.

Figure 14 Links with a change in traffic flow and the 20% highest proportions of people unable to work through illness or disability as compared to the average in England and Wales, by LSOA for DS12a

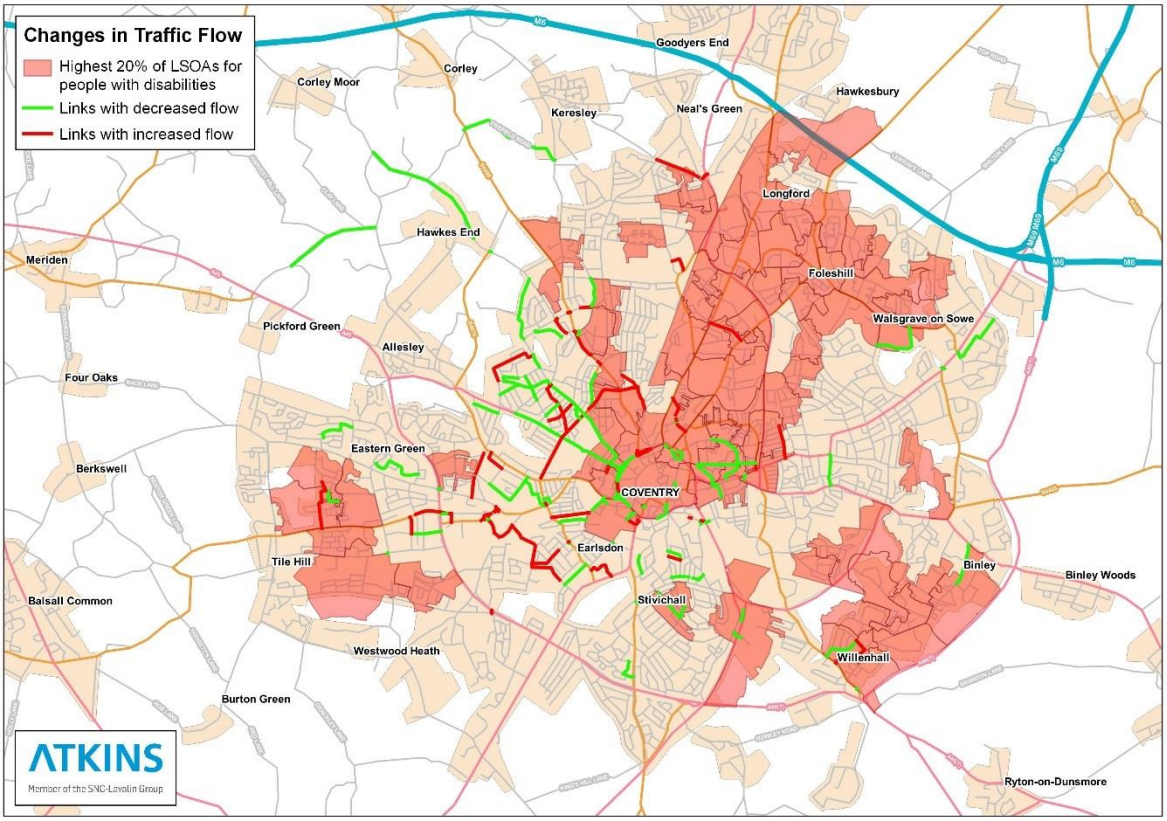

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Figure 14 shows LSOAs with high proportions of people who are unable to work through illness or disability. Having a disability can affect mobility and therefore make it harder to cross the road and therefore people with a disability can be more susceptible to changes in traffic levels. The map shows that within these LSOAs, there are road links with both increases and decreases in traffic as result it is likely the effect on severance will be neutral.

3.2.3.3. Outcome and Qualitative Comment

Table 3-2 - Overall Outcome

Group	DS2	DS12a
Elderly (Over 65)	0	✓
Children (under 16)	0	✓
No Car Households	✓	0
20% Highest Level of disability	✓	0

3.2.3.3.1. DS2 Outcome

There are few areas with large proportions of over 65-year olds which live within the CAZ D area. There are also not many areas where there are expected to be significant changes in traffic flow with high proportions of elderly people. Therefore, there is a neutral impact on this vulnerable group.

There is a large area within the CAZ D with the high proportions of disability and illness claimants and no car households compared to England and Wales. There are also several roads which are expected to have decreased traffic flow due to option DS2 in these areas. There are few roads which have an increase in traffic in areas where there are high proportions of people with a disability or no car households. Therefore, there is a slight beneficial impact to severance for these vulnerable groups. There are a number of areas with a high proportion of children within the CAZ D. However, in these areas there are few road links with significant changes in traffic flow. Therefore, the overall impact for this vulnerable group is neutral.

Consideration has been made to the fact that decreasing traffic flow on links which are heavily congested can increase the average speed. Due to the nature of the improvements within the CAZ D and no specific changes to pedestrian crossing facilities. Hence, the overall impact of option DS2 to severance is **neutral.**

3.2.3.3.2. DS12a Outcome

There are several roads which have decreased flow in areas where there are high proportions of elderly and children and on key routes to schools, hence there is a slight beneficial impact on severance for these groups. There are some links with increased traffic flow and others with decreased in areas where there are high proportions of no car households and disability. Hence the impact to these groups is neutral. However, on links with a decrease in traffic flow it is important to consider that this can increase the average speed along the road therefore increasing the perception of severance.

Whilst there is widening of the carriageway due to the Spon End capacity improvements, there are deemed to be no significant changes to pedestrian crossing facilities and road corridors as a result of the scheme that will significantly affect the overall score of severance. Therefore, the overall impact of DS12a to severance is **neutral**.

3.3. Security

3.3.1. Screening

Comments

Option DS2 scheme does not include any changes to public transport facilities, so there are no expected impacts on users' perceptions of personal security.

Option DS12a does not consider any specific changes to public transport facilities. However, as part of the closure of Coundon Road Level Crossing, consideration needs to be made if cycle and pedestrian traffic is to be diverted through a tunnel under the railway to the south of the level crossing, as currently there is a choice whether to use the level crossing or underpass. The current tunnel provides a poor environment and has areas that can be hidden from view when approaching, therefore this could have an impact on perception of personal security. If pedestrian and cycle traffic is to be diverted to the underpass it is assumed that improvements will be made to make the tunnel more pleasant for potential vulnerable users, but it is likely when approaching that a significant proportion will remain hidden. However, this assessment considers that pedestrian and cycle traffic will still have the option of the level crossing or the underpass, therefore, personal security for DS12a will not be further assessed.

Outcome

No further appraisal at this time, the impacts of this scheme on security are expected to be negligible, so do not require further appraisal.

3.4. Accidents

3.4.1. Screening

Comments

Both options consider traffic restriction measures. Restrictions within Coventry City Centre and/or on certain roads should reduce the number of vehicles in the area and therefore may have a potential beneficial impact on accidents. For DS2, traffic may also reroute to avoid the CAZ D area, with a further potential modest impact on accidents. For DS12a, a number of the various measures may have some potential impact on accidents.

All re-designed highway infrastructure, such as the closure of the Coundon Level Crossing and the improvement schemes at Spon End and Junction 7 of the ring road, will be subject to a full Road Safety Audit process as these schemes move through the design process. The closure of the level crossing will have potential safety benefits for the rail network, as Network Rail's national policy is to close as many level crossings as possible to minimise the risk of collision between road vehicles and trains by reducing the opportunities for such collisions to happen.

Outcome

No further appraisal at this time both scheme options may lead to a slight difference in the frequency and severity of collisions, due to rerouting and/or capacity improvements. However, this is expected to be a minor impact of the measure and further investigation is not to be carried out at this stage.

3.5. Air Quality

3.5.1. Screening

Comments

The aim of the scheme is to improve air quality within Coventry City Centre. Option DS2 entails charging non-compliant vehicles for driving within the CAZ boundary and this should cause the redistribution the traffic, shift to other modes of transport (such as public transport) or upgrading of vehicles to lower emission vehicles, which all have an impact on air quality. Option DS12a has a range of measures which could create mode shift (by the upgrade of cycle infrastructure), redistribution of traffic due to road restrictions and retrofitting buses and taxis which should help improve air quality levels.

Outcome

Continue to Full DI Appraisal, the impact on sensitive receptors will need to be examined.

3.5.2. Assessment

3.5.2.1. Step 2a: Confirmation of Impacted Area

The DI guidance (TAG Unit A4.2) outlines that air quality impacts are likely to occur where an intervention results in changes to traffic flows or speeds, or where the physical gap between people and traffic is altered. The impact area is the same for option DS2 and DS12a.

WebTAG Unit A4.2.3 defines the air quality impact area as a 200m buffer of the scheme and/or where there are any indirect impacts on the transport network. In this instance, air quality data has been assessed from the air quality modelling team, which shows the change in emissions by LSOA.

3.5.2.2. Step 2b: Identification of Social Groups in Impact Area

Group	England	Air Quality Study Area (DS2 and DS12a)
Quintile 1 (most deprived)	N/A	27.1%
Quintile 2	N/A	20.7%
Quintile 3	N/A	26.0%
Quintile 4	N/A	15.8%
Quintile 5 (least deprived)	N/A	10.4%
Children (under 16)	19.0%	24.3%

3.5.2.3. Step 2c: Identification of Amenities in Impact Area

There are many schools in Coventry as well as several other amenities such as shopping centres in the centre of Coventry which may attract a range of people.

3.5.3. Appraisal

In order to show how the change in emissions have been distributed, the change in emissions have been mapped over the LSOAs where there are high proportions of income deprived residents and children. The mapping also shows where the greatest changes in emissions is going to be in the affected area.

The change in emissions, by LSOA, due to option DS2 are shown in Figure 15 to Figure 20 and for option DS12a in Figure 21 to Figure 26.

These are overlaid with the most deprived LSOAs, LSOAs with the highest proportion of children and the location of schools in the area. There are no LSOAs which are expected to have a significant increase in emissions due to either scheme options.

3.5.3.1. Option DS2

Figure 15 Reduction in emissions for option DS2 and 20% most income deprived LSOAs as compared to the average in England and Wales intersection

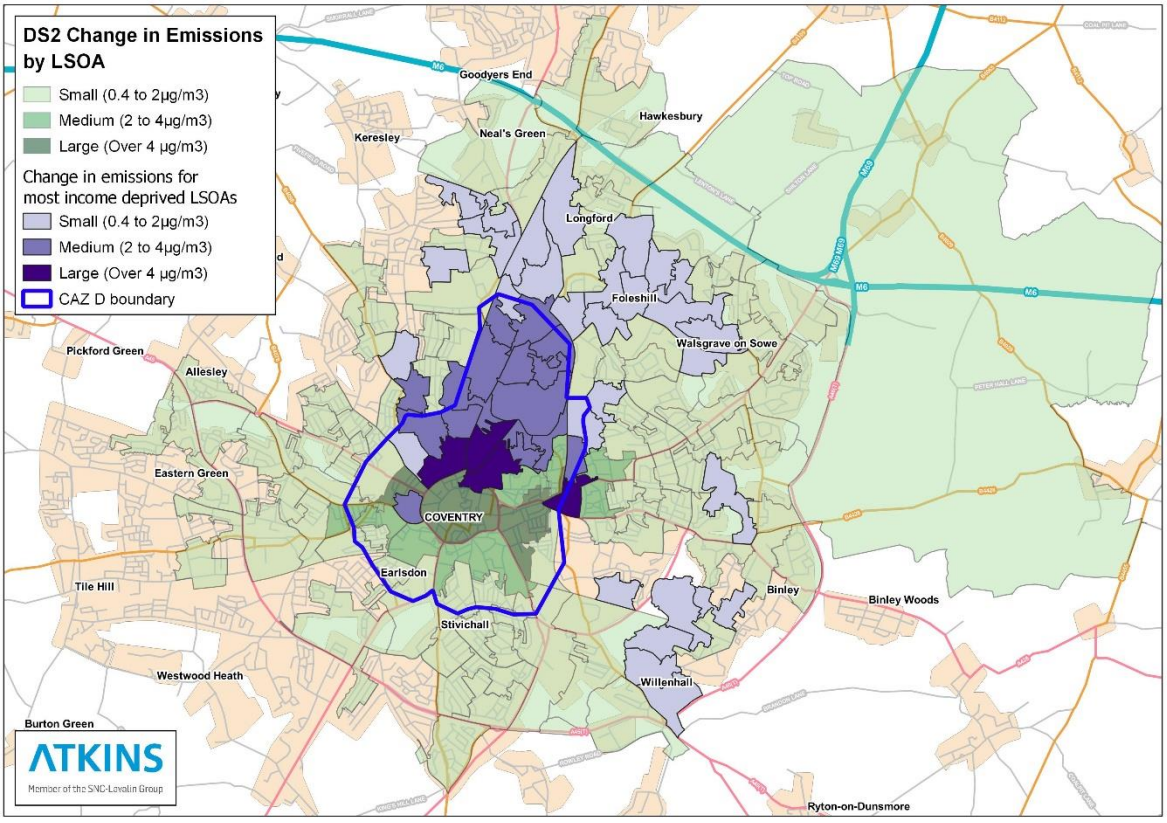

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Figure 16 Percentage reduction in emissions of greater than 5% for option DS2 and intersection with 20% most income deprived LSOAs as compared to the average in England and Wales

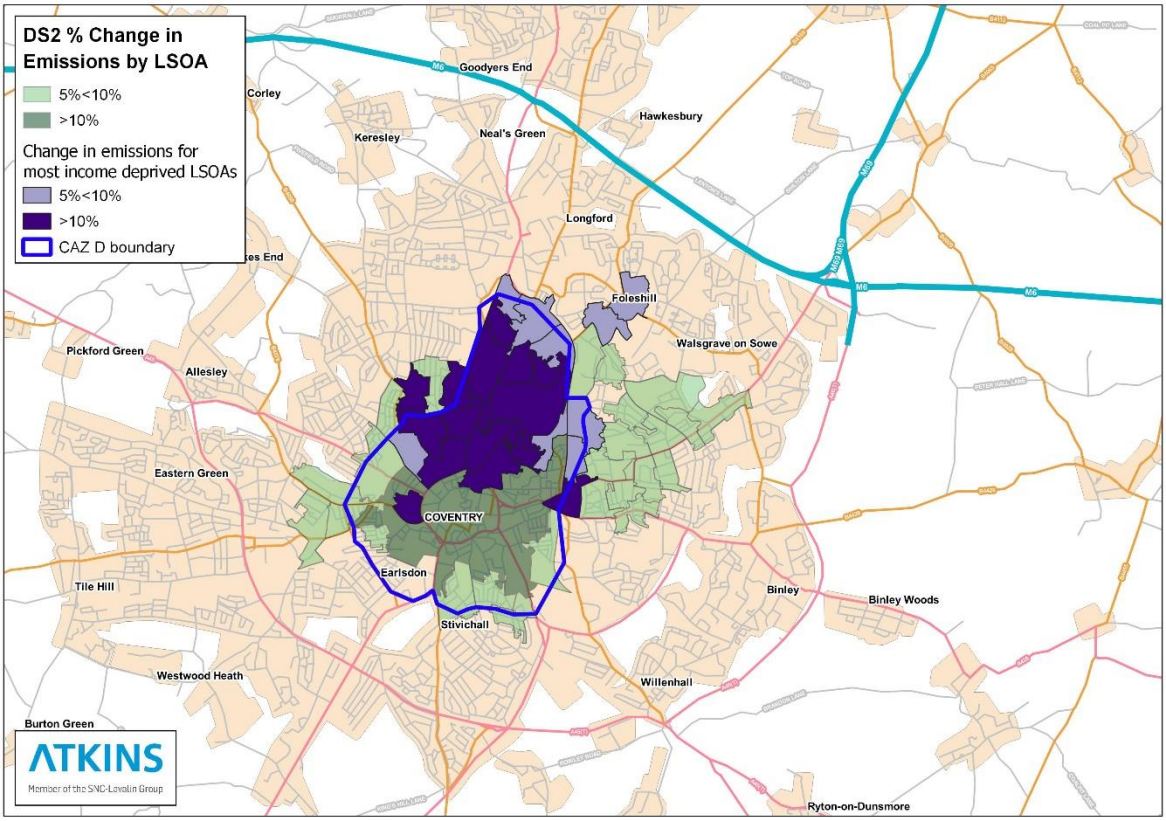

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Figure 15 shows that there are some areas that are in the 20% most income deprived LSOAs nationally which are expected to have large reductions in emissions in the centre of Coventry. There are also areas within the most income deprived LSOAs which are expected to have medium and small reductions in emissions due to the scheme within and surrounding the CAZ D.

There is a large area north of Coventry, with the 20% most income deprived LSOAs, which is expected to have 10% or greater reduction in emissions. There are also the most income deprived LSOAs which are expected to have between 5% and 10% reduction in emissions, both within and surrounding the CAZ D, as shown in Figure 16.

Figure 17 Reduction in emissions for Option DS2 and intersection with the highest proportions of children as compared to the average in England and Wales, by LSOA

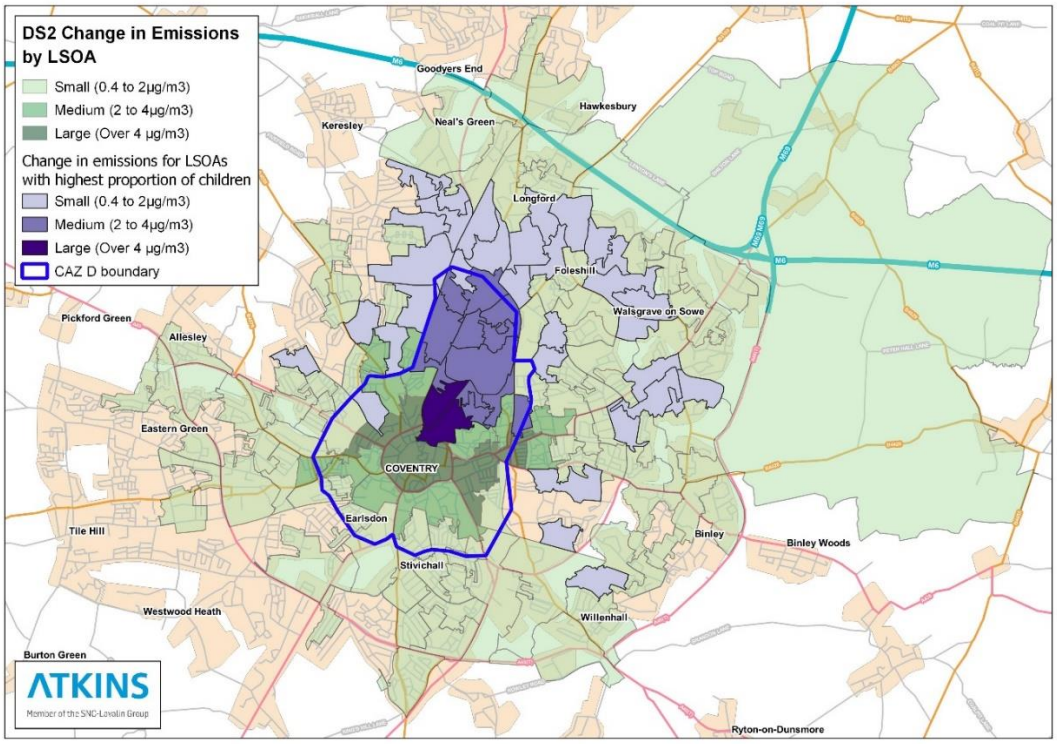

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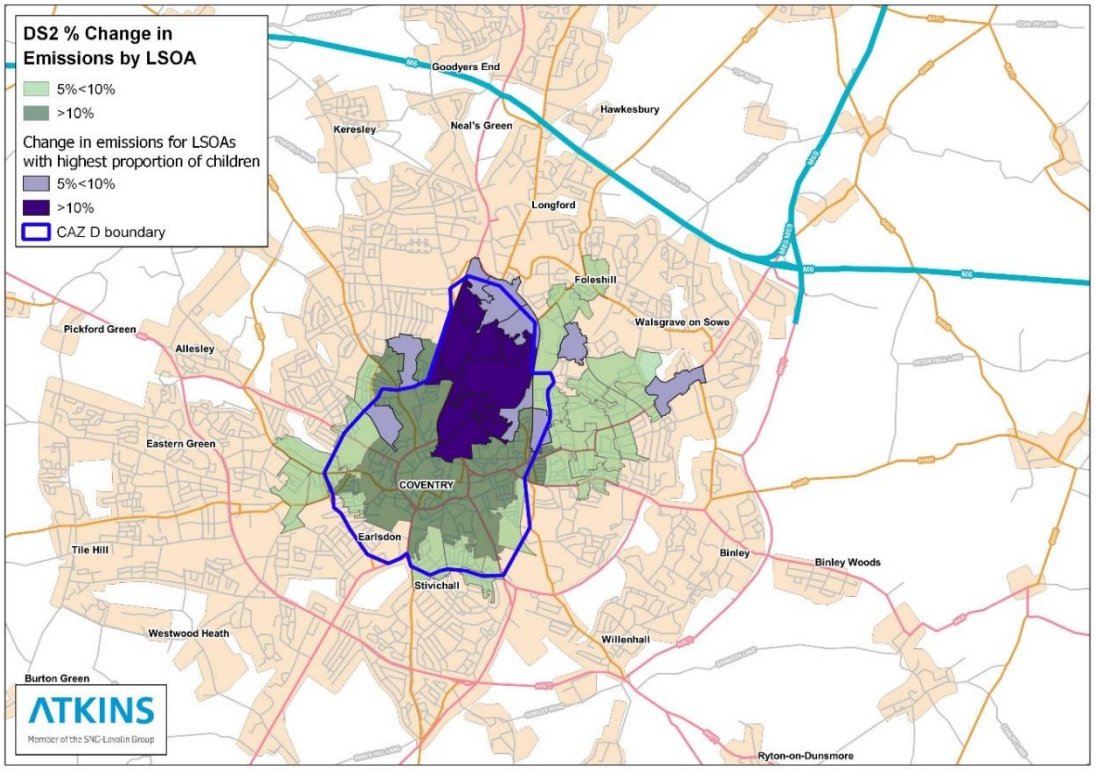
Figure 18 Percentage reduction in emissions of greater than 5% for option DS2 and intersection with the highest proportions of children as compared to the average in England and Wales, by LSOA



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There are areas within the centre of Coventry which have a high proportion of children (within the 20% highest in England and Wales) and are also expected to have a large reduction in emissions, as shown in Figure 17. There are also areas to the north of Coventry city centre, within and surrounding the CAZ boundary, which have the 20% highest proportion of children which also have medium and small reductions in emissions.

There are LSOAs within the CAZ D boundary which have the 20% highest proportion of children as compared to the average England and Wales and are also expected to have a greater than 10%, or 5%-10% reduction in emissions, as shown in Figure 18.

Figure 19 Absolute reduction in emissions by LSOA and the locations of schools in the area

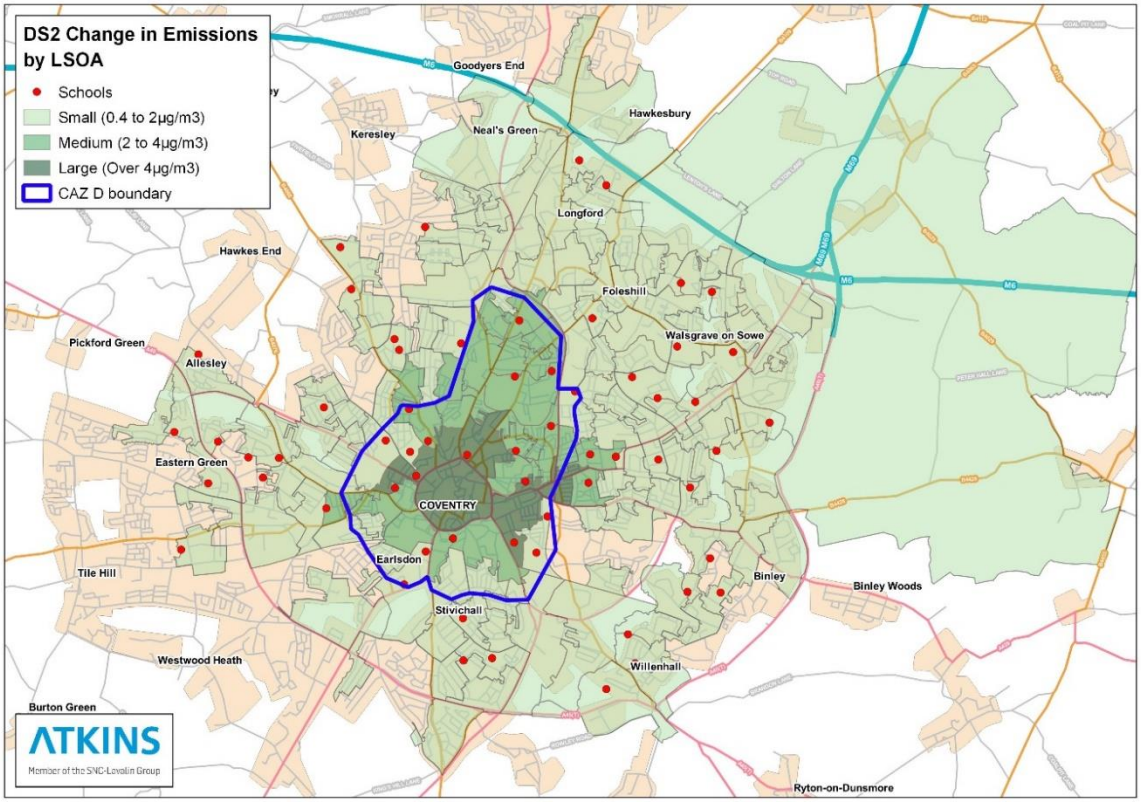

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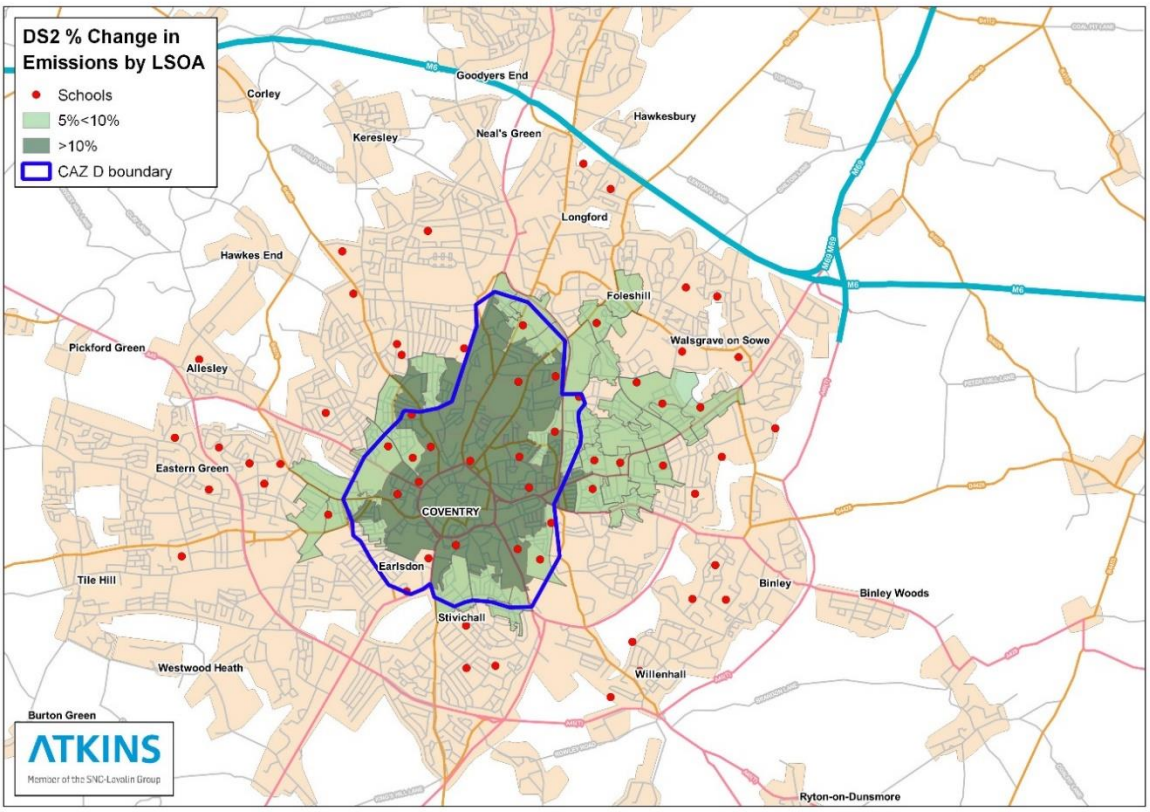
Figure 20 Percentage reduction in emissions of 5% or greater and the location of schools in the area



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There are many schools in Coventry, both inside and surrounding the Clean Air Zone boundary which are within LSOAs which are expected to have small, medium and large reductions in emissions and a greater than 5% reduction in emissions due to the scheme, which is shown in Figure 19 and Figure 20.

Table 3-3 has used the change in emissions by LSOA to determine the proportion of the population experiencing changes in emissions and comparing that to the overall population in each of the income quintiles within the assessment area. The table also shows the proportions of the populations in each income quintile receiving small, medium and large decreases in emissions.

Table 3-3 - Impact Appraisal Table for option DS2

		Quintile					LSOA with Top 20% Children	Total
		1	2	3	4	5		
Population Experiencing Decreased Emissions	No.	90129	59737	75225	27953	14607	82530	267651
	%	33.7%	22.3%	28.1%	10.4%	5.5%	30.8%	-
Population Receiving Increased Emissions	No.	0	0	0	0	0	0	0
	%	N/A	N/A	N/A	N/A	N/A	N/A	-
Population Receiving an No Change in Emissions	No.	17114	15228	16879	20016	16023	11950	85260
	%	20.1%	17.9%	19.8%	23.5%	18.8%	14.0%	-
Number of Net Winners		90129	59737	75225	27953	14607	82530	267651
Net winners in each LSOA area as a % of total LSOA population		30.6%	21.4%	26.3%	12.9%	8.8%	27.0%	-
LSOA population as a proportion of of whole study area		30.4%	21.2%	26.1%	13.6%	8.7%	26.8%	-
Non-weighted assessment		✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
% of decreased emissions which are small		47.2%	65.1%	56.5%	60.1%	47.7%	59.6%	55.2%

% of decreased emissions which are medium	29.3%	11.8%	11.9%	0.0%	0.0%	24.1%	14.6%
% of decreased emissions which are large	7.5%	2.8%	13.2%	0.0%	0.0%	3.7%	6.3%

There are no LSOAs which are expected to have an increase in emissions due to DS2 and few that will have an imperceptible change as shown in Table 3-3. Hence, there are only small differences between the percentage of net winners and the share of LSOAs for each group. However, the weighting of the reduction in emissions will also qualitatively inform the assessment of this air quality appraisal. Therefore, there may be a greater beneficial impact to income quintiles 1, 2 and 3 and children, since there are LSOAs within the 20% highest proportion of children nationally and LSOAs in income quintiles 1, 2 and 3 (the most income deprived) which have medium and large reductions in emissions due to DS2.

3.5.3.2. Option DS12a

Figure 21 Reduction in emissions with 20% most income deprived LSOAs in England and Wales intersection

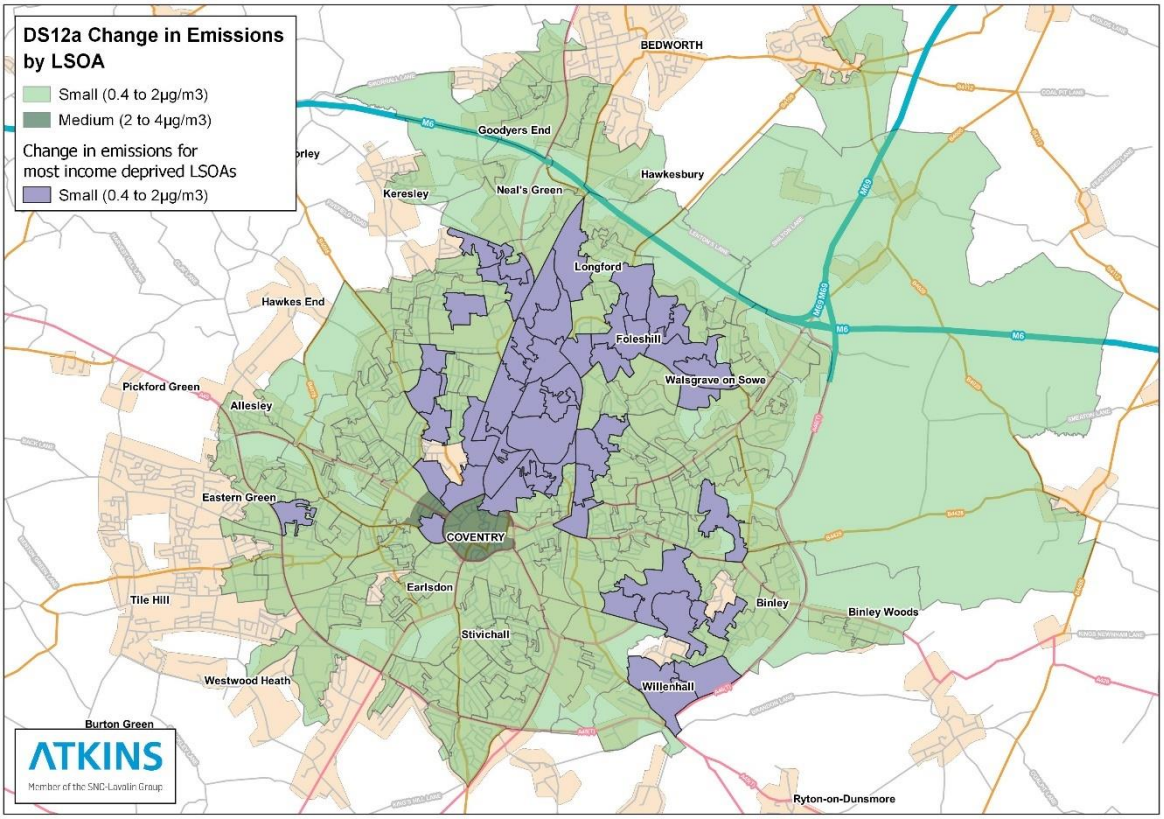

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Figure 22 Percentage reduction in emissions of greater than 5% for and intersection with 20% most income deprived LSOAs compared to the average in England and Wales

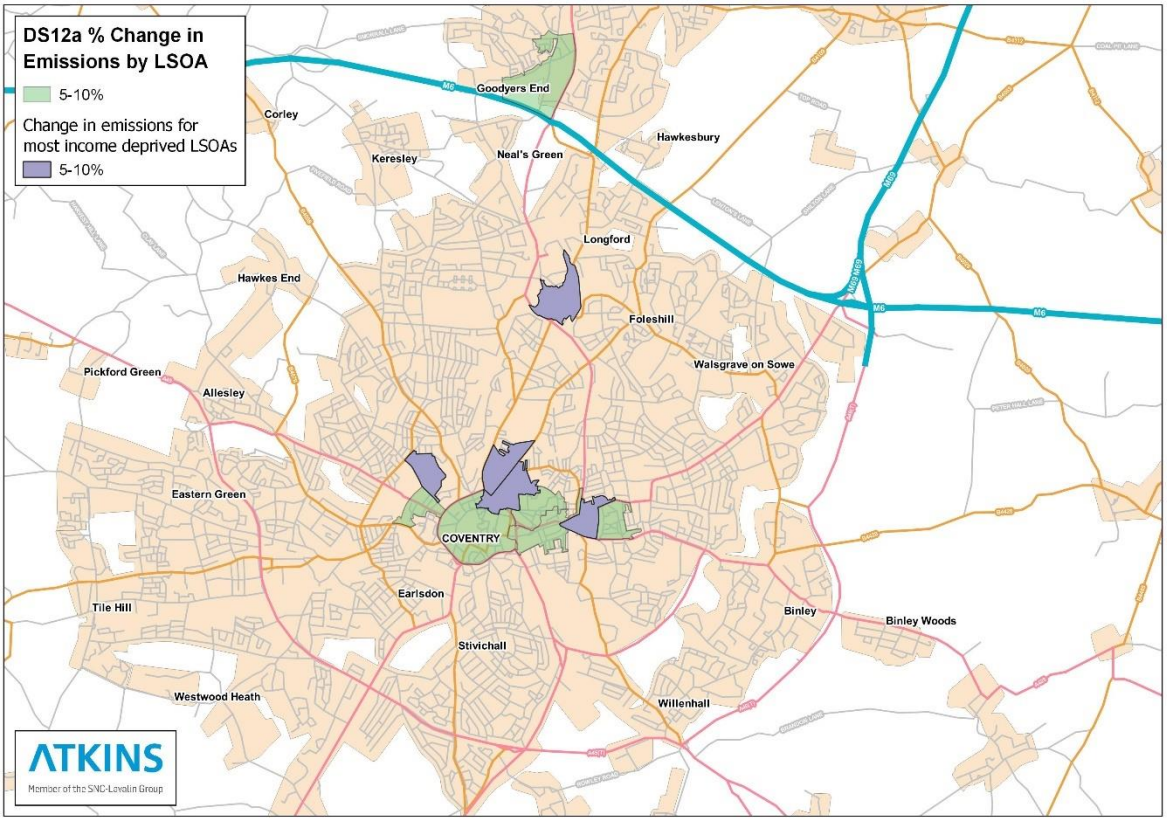

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Figure 21 shows that there are areas within the 20% most income deprived LSOAs in England and Wales which are expected to have small reductions in emissions in the northern part of Coventry. There are no areas within the 20% most income deprived LSOAs which are expected to have medium or large reductions in emissions due to option DS12a.

There are small areas in north Coventry, with the 20% most income deprived LSOAs, which are expected to have between 5% and 10% reduction in emissions due to option DS12a, as shown in Figure 22. There are no areas which are expected to have greater than 10% reduction in emissions.

Figure 23 Reduction in emissions and highest proportions of children compared to the average in England and Wales by LSOA intersection

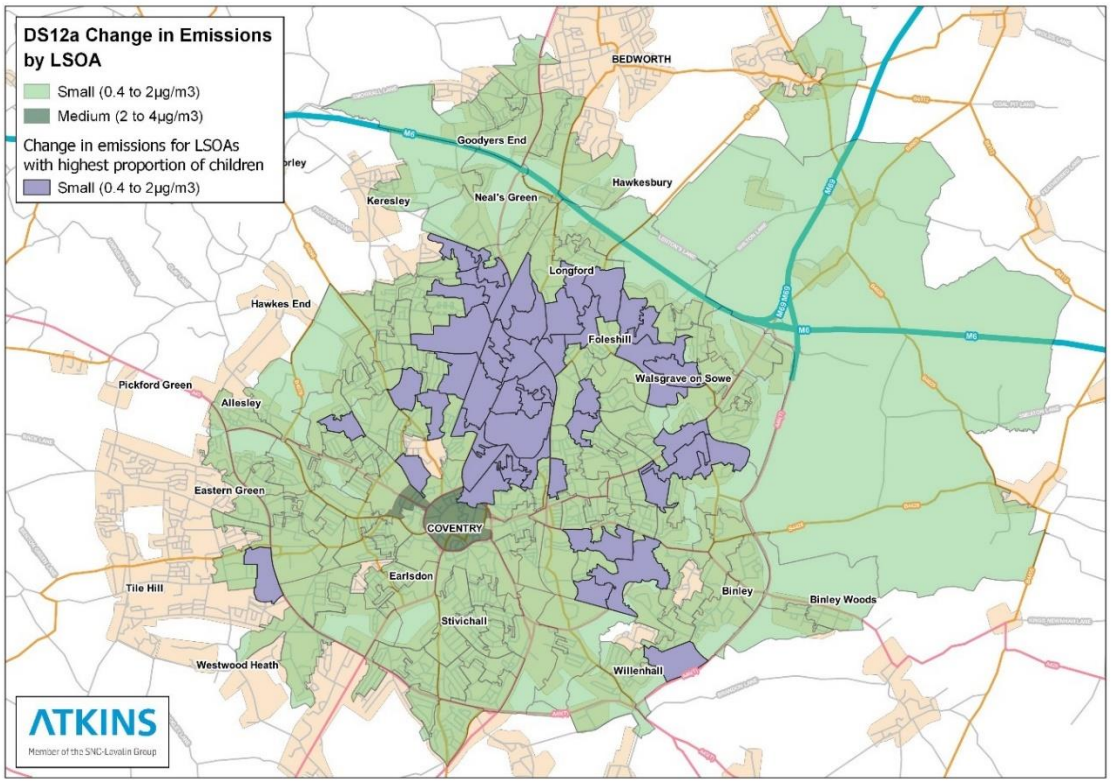

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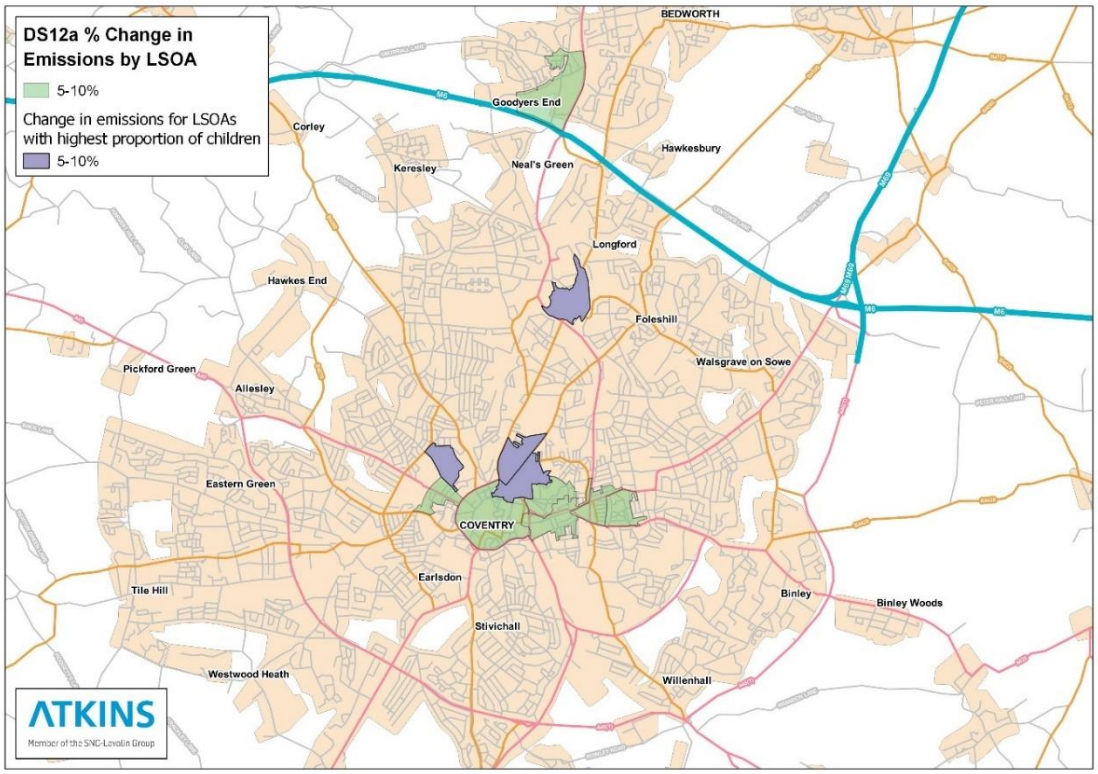
Figure 24 Percentage reduction in emissions of greater than 5% and highest proportions of children compared to the average in England and Wales by LSOA intersection



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There are LSOAs in the northern part of Coventry which have the 20% highest proportion of children in England and Wales and are also expected to have a small reduction in emissions, as shown in Figure 23. There are no areas which have the 20% highest proportion of children which are expected to have medium or large reductions in emissions due to option DS12a.

There are few LSOAs in and around Coventry which have high proportions of Children (20% highest proportion of children in England and Wales) and are also expected to have between 5% and 10% reduction in emissions. There are no LSOAs which are expected to have greater than 10% reduction in emissions due to option DS12a, as shown in Figure 24.

Figure 25 Absolute reduction in emissions by LSOA and the locations of schools in the area

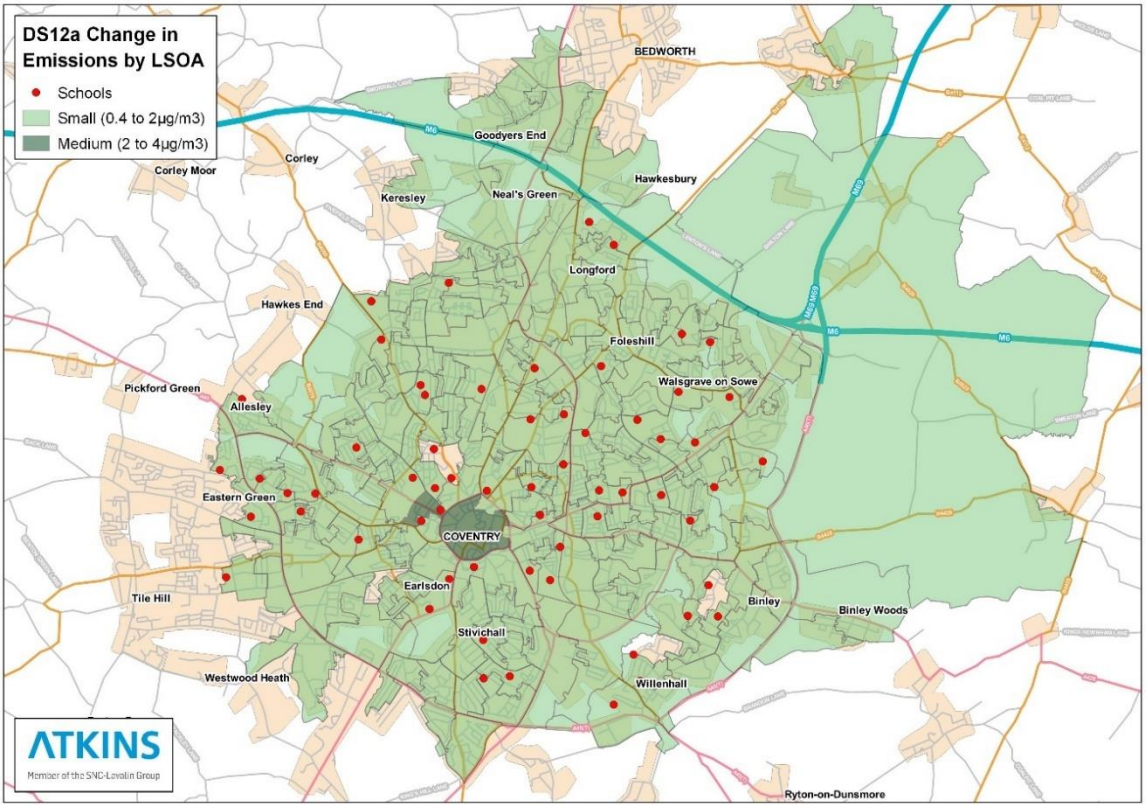

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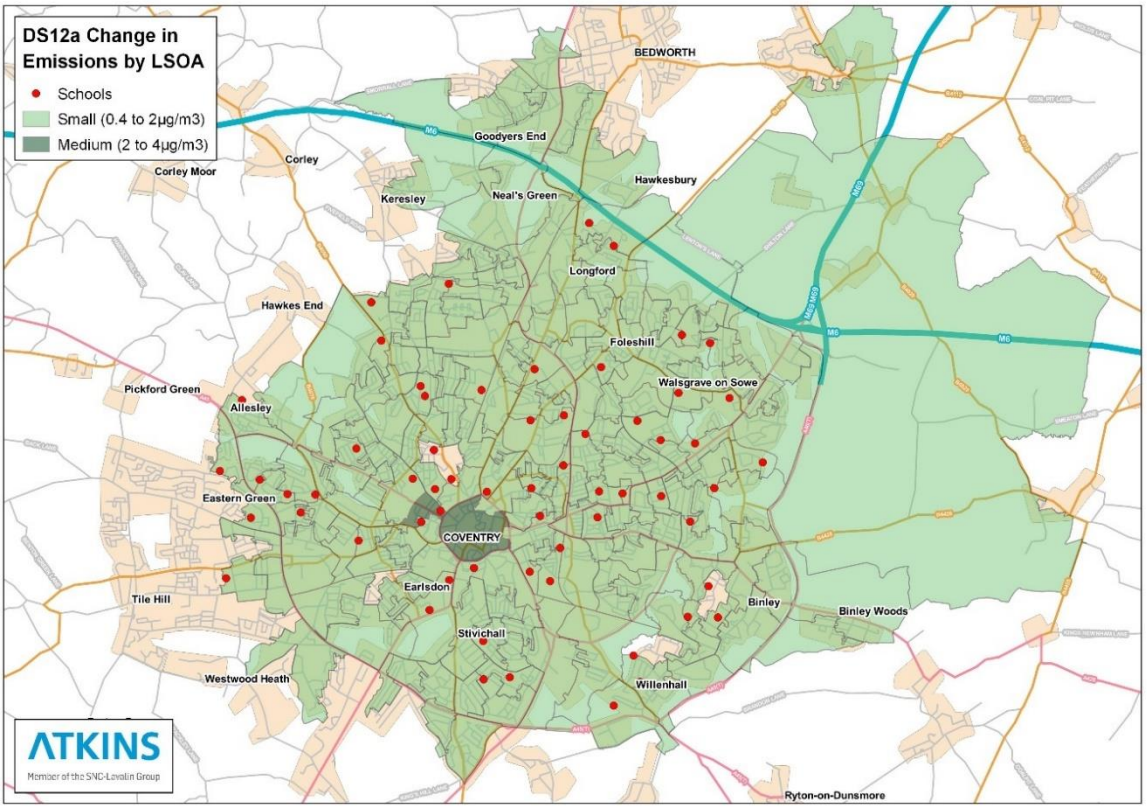
Figure 26 Percentage reduction in emissions of 5% or greater and the location of schools in the area



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There are many schools in Coventry which are within LSOAs which are expected to have small reductions in emissions. There is only one school which is within an LSOA which is expected to have a medium reduction in emissions and there are no LSOAs with large reductions in emissions due to DS12a, as shown in Figure 25.

There are few schools towards the centre of Coventry which are within LSOAs which have between a 5% and 10% reduction in emissions and there are no LSOAs which have a greater than 10% reduction in emissions. This is shown in Figure 26.

The below table has used the change in emissions by LSOA to determine the proportion of the population receiving changes in emissions and comparing that to the overall population in the each of the income quintiles within the assessment area. The table also shows the proportions of the populations in each income quintile receiving small, medium and large decreases in emissions.

Table 3-4 - Impact Appraisal Table for option DS12a

		Quintile					LSOA with Top 20% Children	Total
		1	2	3	4	5		
Population Receiving Decreased Emissions	No.	93414	75109	90067	46467	19032	85998	324089
	%	28.8%	23.2%	27.8%	14.3%	5.9%	26.5%	-
Population Receiving Increased Emissions	No.	0	0	0	0	0	0	0
	%	N/A	N/A	N/A	N/A	N/A	N/A	-
Population Receiving No Change in Emissions	No.	13829	6970	12958	16055	22003	0	71815
	%	19.3%	9.7%	18.0%	22.4%	30.6%	0.0%	-
Number of Net Winners		93414	75109	90067	46467	19032	85998	324089
Net winners in each LSOA area as a % of total LSOA population		28.8%	23.2%	27.8%	14.3%	5.9%	26.5%	-
Proportion of population within study area		27.1%	20.7%	26.0%	15.8%	10.4%	24.3%	-
Assessment		✓	✓	✓	✓	✓	✓	✓
% of decreased emissions which are small		87.1%	89.0%	82.3%	74.3%	46.4%	100.0%	80.0%

% of decreased emissions which are medium	0.0%	2.5%	5.1%	0.0%	0.0%	0.0%	1.9%
% of decreased emissions which are large	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

There are no LSOAs which are expected to have an increase in emissions due to option DS12a and a small proportion of imperceptible changes to emissions as shown in Table 3-4. Hence, there are small differences between the percentage of net winners and the share of LSOAs for each group. There is also no LSOAs which have a large decrease in emissions and there is only a small proportion of the population which reside where there are medium reductions in emissions.

3.5.3.3. Outcome and Qualitative Comment

Table 3-5 - Outcome of the air quality assessment

Vulnerable Group	DS2	DS12a
Quintile 1 (most deprived)	✓✓	✓
Quintile 2	✓✓	✓
Quintile 3	✓✓	✓
Quintile 4	✓✓	✓
Quintile 5 (least deprived)	✓✓	✓
Children (under 16)	✓✓	✓
Overall	✓✓	✓

There is only 1 LSOA with an increase in emissions for option DS2 (although this increase is imperceptible) and none for option DS12a. While most of the changes to emissions for option DS2 are small (0.4-2µgm^{-3}), there are some LSOAs with medium (2-4µgm^{-3}) and large (Over 4µgm^{-3}) changes in emissions for income quintiles 1, 2 and 3 and for LSOAs with the 20% highest proportions of children. There are only small or imperceptible changes in emissions for income quintiles 4 and 5. For option DS12a there is a small proportion of the population in income quintiles 2 and 3 which have a medium reduction in emissions, but all other changes for all groups are small or imperceptible. While for both options the percentage of net winners are consistent with the proportions of LSOAs in the study area for each group, the weighting of the change in emissions will be considered qualitatively.

For option DS2, it is important to note, there are significant proportions of the population in income quintiles 1, 2 and 3 and LSOAs with the highest proportion of children which have medium and large reductions in emissions. However, Income quintiles 4 and 5 (least income deprived) only receive small and imperceptible reductions in emissions.

There are small proportions of the population which reside in areas which have a medium reduction in emissions for option DS12a, but all other changes are small or imperceptible. Hence there is a slight beneficial impact to air quality for each income group and for children.

Therefore, the overall impact to air quality for option DS2 is **moderate beneficial** and for option DS12a **slight beneficial**.

3.6. Noise

3.6.1. Screening

Comments

Option DS2 could reduce the amount of traffic in the CAZ due to people avoiding the charging area. Therefore, there is a potential impact on noise, which requires further appraisal.

Option DS12a is also likely to cause changes in noise due to the redistribution of traffic as a result of the measures. This will be particularly the case around Holyhead Road and Coundon Road with the restrictions that are to be implemented.

Outcome

Continue to Full DI Appraisal, the impact of noise on vulnerable receptors will need to be examined.

3.6.2. Assessment

3.6.2.1. Step 2a: Confirmation of Impacted Area

The WebTAG guidance on DI assessment (Unit A4.2) outlines that noise impacts are likely to occur where an intervention results in changes to traffic flows or speeds, or where the physical gap between people and traffic is altered. Due to a full noise assessment not being carried out the assessment undertaken in this distributional impact appraisal is a qualitative assessment based on the changes in traffic flow (of greater than 10%) on a link by link basis within the study area. The assessment is based on understanding the impacts of the change in traffic flow on the vulnerable populations within the impact area.

3.6.2.2. Step 2b: Identification of Social Groups in Impact Area

Table 3-6 - Proportions of vulnerable and income groups in the impact area

Income Group	England	DS2	DS12a
Quintile 1 (most deprived)	N/A	37.2%	28.1%
Quintile 2	N/A	24.1%	17.3%
Quintile 3	N/A	33.7%	31.5%
Quintile 4	N/A	3.9%	18.2%
Quintile 5 (least deprived)	N/A	1.2%	4.9%
Vulnerable Group	**England**	**DS2**	**DS12a**
Children (under 16)	19.0%	19.4%	18.4%

3.6.2.3. Step 2c: Identification of Amenities in Impact Area

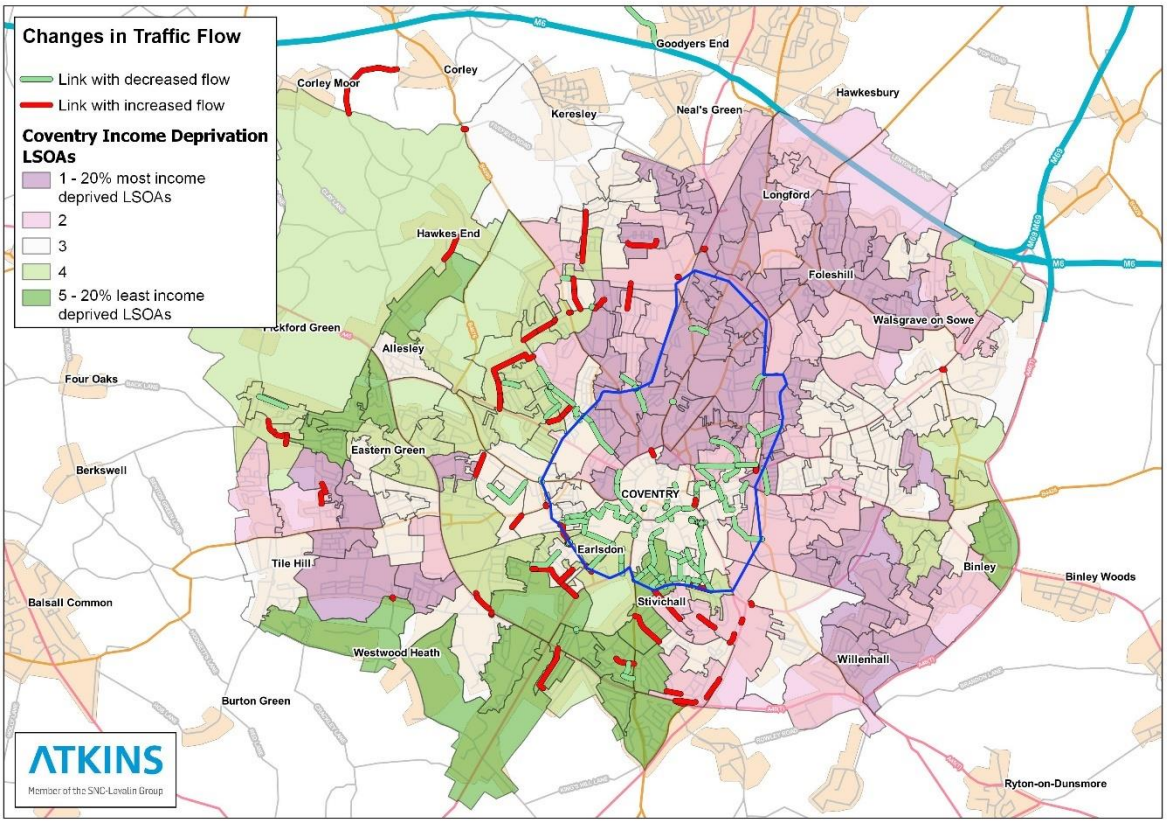
There are many schools in Coventry as well as several other amenities such as shopping centres in the centre of Coventry which may attract a range of people.

3.6.3. Appraisal

3.6.3.1. Option DS2 (CAZ D)

Figure 27 and Figure 28 show the links which are expected to have a change in traffic flow of greater than 10% due to the implementation of the CAZ D as well as the proportions of income groups and high proportions of children.

Figure 27 Links with a change in traffic flow and LSOA income deprivation quintiles.



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There are LSOAs with the 20% most income deprived quintiles within and surrounding the CAZ D, as shown in Figure 27. In these areas there are links which are expected to have a reduction in traffic flow, for example Sandy Lane and Heath Road. There is an increase in traffic flow on some roads, including Everdon Road and Aldrich Avenue, where there are high proportions of income deprivation.

Figure 28 Links with a change in traffic flow and 20% highest proportions of children compared to the average in England and Wales, by LSOA

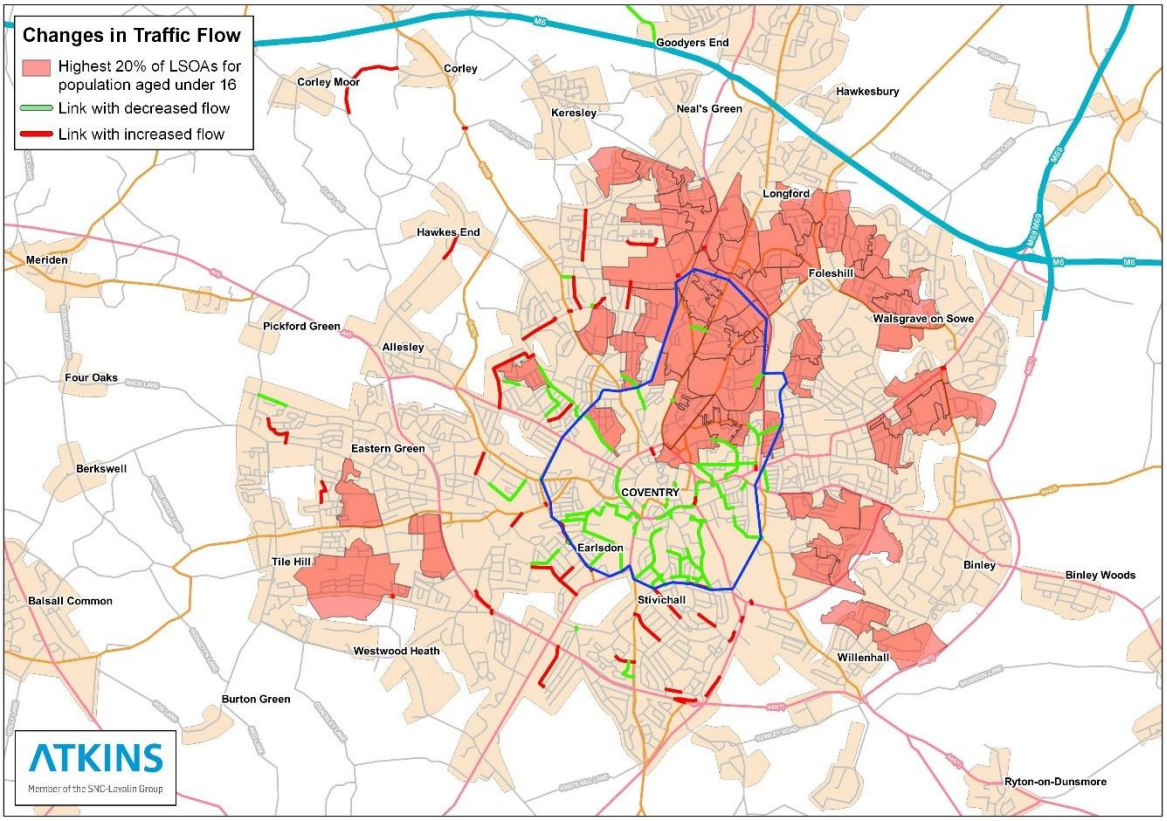

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Figure 28 shows that there are some links which have a change in traffic flow of greater than 10% which are within an LSOA with high proportions of children. These includes Three Spires Junction and Catesby Road, which has an increase in traffic flow of greater than 10%, and Livingstone Road, Waterman Road and Cheveral Avenue, which have a decrease in traffic flow of greater than 10%.

3.6.3.2. Option DS12a

Noise has been assessed by using traffic flow to determine where there might be areas with high levels of traffic flow and consequent increases in noise levels. In most cases reduced traffic flow will lead to reduced noise levels. An exception to this is if congestion is heavy meaning that cars are travelling at low speeds. Reducing congestion would lead to cars travelling quicker which would cause also increase noise levels. However, as a full noise assessment has not been carried out, this assessment has used traffic flow.

Figure 29 Links with a change in traffic flow and quintiles of income deprivation across England and Wales for LSOAs

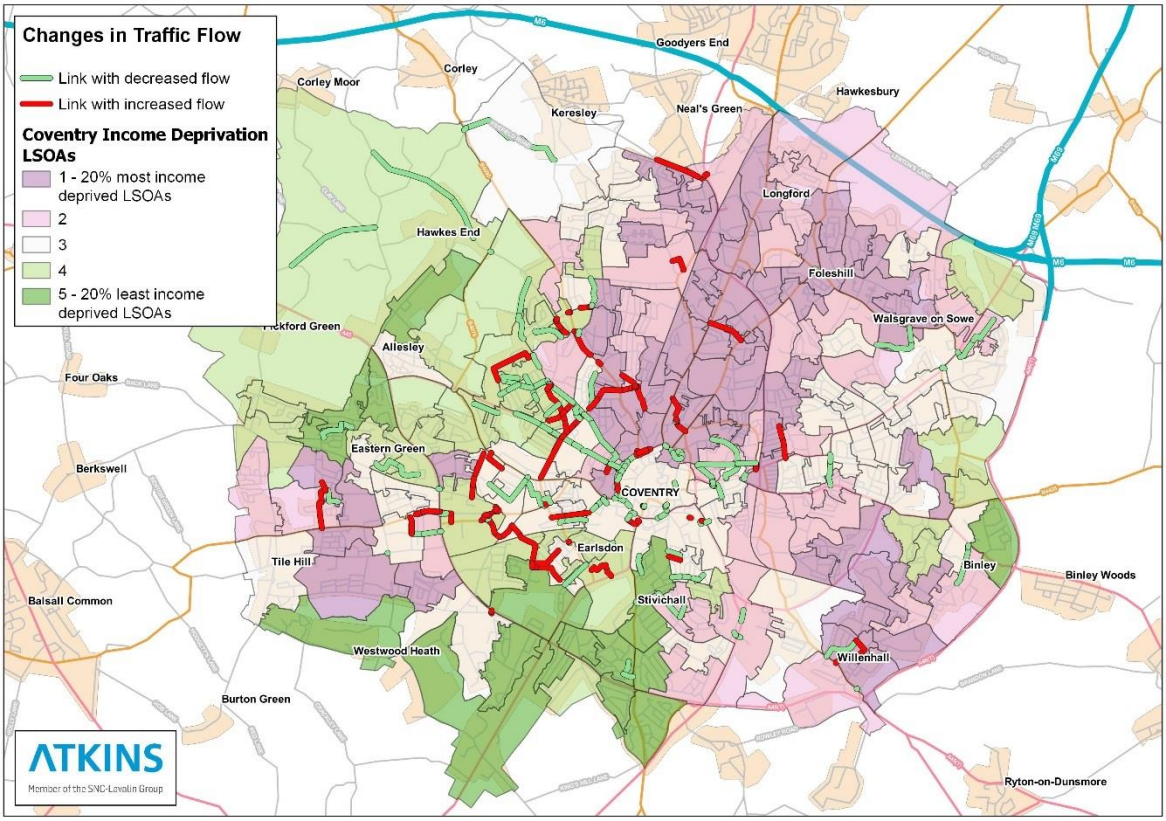

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Figure 29 shows where traffic flow changes of 10% or more occur as a result of implementing the DS12a package. These are displayed within respective LSOAs which have been classified by income quintiles for England and Wales.

As most of the major interventions occur to the west of the city centre, the largest changes in traffic occur in these areas. The west of Coventry has a large number of LSOAs within the least deprived income quintiles and consequently, has most of the large changes in traffic flow. The largest decreases in noise pollution are likely to occur on Holyhead Road due to the banning of HGVs and on Coundon Road due to the closure of the level crossing. Both roads are in the least income deprived areas.

There are also changes of both magnitudes in traffic flow around the Ring Road. This area is generally within some of the most income deprived quintiles but has some changes in traffic flow and therefore, possibly noise. To the north east of the city centre, there is a large number of LSOAs that are among the most income deprived in England and Wales. While there are only a small number links with changes in traffic flow here, most of these changes are increases and hence, noise is likely to increase as result. As people with most income deprived areas are more susceptible to noise pollution, there is likely to be a small negative effect on the lowest quintiles.

Figure 30 Links with a change in traffic flow and 20% highest proportions of children compared to the average in England and Wales, by LSOA

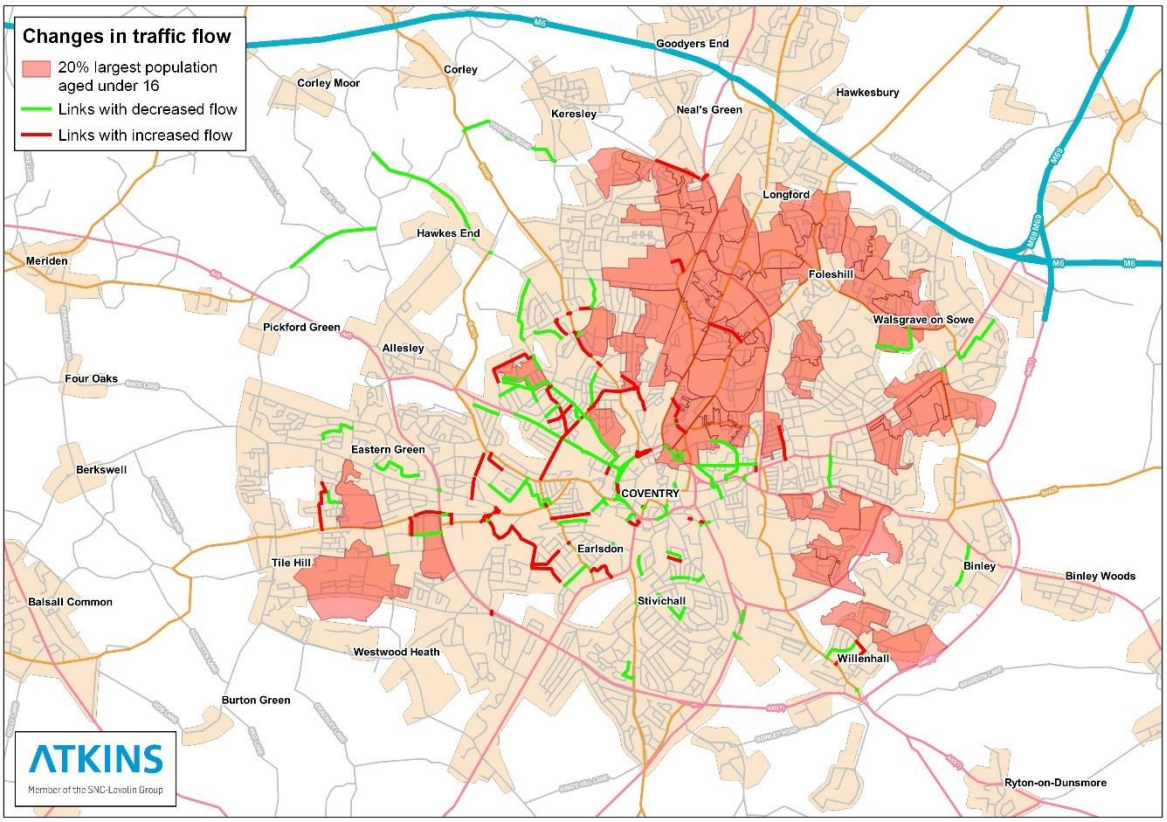

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Figure 30 shows the same map used for severance to identify whether areas with high numbers of children are forecast to experience changes in noise. It will be assumed that as with severance the overall effect on LOSAs containing high numbers of children will be broadly neutral. However, many schools experience reduced noise levels.

3.6.3.3. Outcome and Qualitative Comment

Table 3-7 - Outcome of the noise assessment

Group	DS2	DS12a
Quintile 1 (most deprived)	✓	×
Quintile 2	0	0
Quintile 3	✓	0
Quintile 4	×	0
Quintile 5 (least deprived)	0	0
Children (under 16)	0	✓
Overall	**0**	**0**

Option DS2

There is a slight beneficial impact to income quintiles 1 and 3, a slight adverse impact to income quintile 4 and a neutral impact for income quintile 2 and for children. It is important to consider the changes in traffic flow and whether this can have a significant impact on noise, it is determined in this assessment that whilst there are going to be areas with high proportions of vulnerable populations with increased noise levels, there are also areas with decreased noise levels. Hence, the overall impact of option DS2 to noise is **neutral.**

Option DS12a

The impacts on Children has been ranked as slightly beneficial due to reductions in traffic occurring close by to schools as demonstrated in section 3.2 while appraising severance.

Overall, there is likely to be a small overall decrease in noise pollution across Coventry but as these benefits mainly accrue in the least income deprived areas and do not overly affect potentially susceptible people significantly, the overall impact of the DS12a scheme is likely to be **neutral** with regards to noise.

3.7. User Benefits

3.7.1. Screening

Comments

For option DS2, there may be an impact on vehicle operating costs for private transport users and businesses due to re-routing around the CAZ. This may particularly impact low income households who are more likely to have an older car that produces higher emissions. Furthermore, re-routing or changing mode because of the CAZ may increase time to reach destinations. However, because of charging within Coventry, there may be less traffic and consequently quicker journey times.

For option DS12a, some of the restriction measures may cause re-routing or modal shift as a result causing changes in time and cost. Furthermore, capacity improvements and improvements in cycling and walking facilities may result in time and vehicle operating cost benefits.

Outcomes

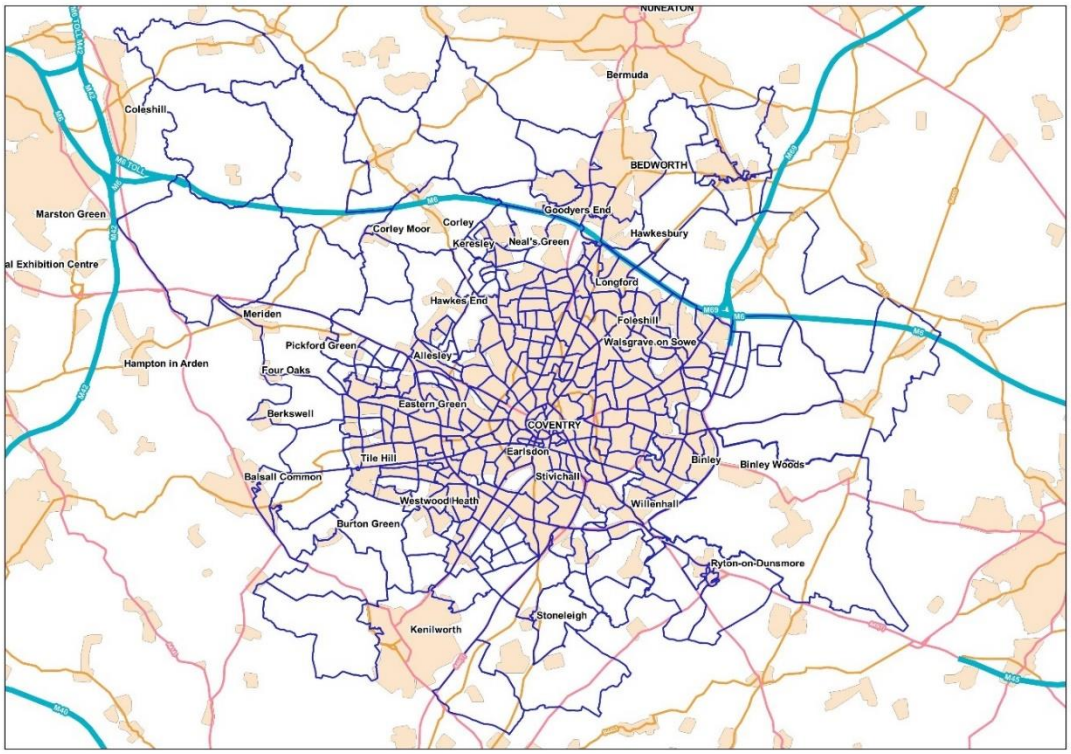
Continue to Full DI Appraisal, the impact on vulnerable receptors will need to be examined.

3.7.2. Assessment

3.7.2.1. Step 2a: Confirmation of Impacted Area

The user benefits have been determined by using vehicle operating costs, public transport costs and toll charges (i.e. the CAZ charge) as well as any changes in time. Only internal to internal trips within a 'core' assessment area are used as shown in Figure 31. The 'core' assessment area is determined as Coventry and the surrounding area in order to capture any benefits or disbenefits for individuals living within Coventry and the surrounding area. The distribution of benefits for those trips originating within the CAZ D area are not included in this assessment, due to intrazonal CAZ charging not being included within the modelling. Therefore, assessing these results would not show representational user benefits for those living within the CAZ D. These benefits have been calculated using 10-year appraisal TUBA outputs, which in turn take data from the model. The assessment has been carried out on 'leisure and commuting' trips.

Figure 31 'Core Modelled Area' for the purposes of the DI assessment



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3.7.2.2. Step 2b: Identification of Social Groups in Impact Area

Table 3-8 - Proportions of each income group within the core modelled area

Income Group	DS2	DS12a
Quintile 1 (most deprived)	19.2%	25.2%
Quintile 2	22.0%	21.2%
Quintile 3	25.2%	25.3%
Quintile 4	20.0%	17.0%
Quintile 5 (least deprived)	13.5%	11.4%

3.7.3. Appraisal

3.7.3.1. DS2 (Leisure and Commuting trips)

Table 3-8 shows the benefits and disbenefits accumulated for time, vehicle operating costs, public transport costs and the CAZ D charge. The disbenefits are likely to be associated with the CAZ D charge and time disbenefits due to re-routing. An overall assessment has been calculated based on whether there are overall benefits or disbenefits and then comparing the proportion of benefits/disbenefits to the overall proportion of the population in that income quintile.

Table 3-9 - Overall user benefits impacts across the income quintiles for Option DS2

Option	Income Quintile					Total
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	
Total population in the assessment area	57,073	65,449	74,954	59,451	40,020	296,947
Proportion of total population in each quintile in the assessment area	19.2%	22.0%	25.2%	20.0%	13.5%	-
Sum of disbenefits	-£16,128,718	-£18,470,302	-£18,662,044	-£12,391,206	-£11,564,684	-£77,216,953
Proportion of disbenefits for each income quintile	20.9%	23.9%	24.2%	16.0%	15.0%	-
Overall sum of benefits and disbenefits for leisure and commuting users	-£16,128,718	-£18,470,302	-£18,662,044	-£12,391,206	-£11,564,684	-£77,216,953

Assessment	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse

The overall impacts for DS2 are dominated by the CAZ D charge and therefore, there are adverse user benefit impacts across all income quintile. Whilst the overall impacts across each of the income quintiles are distributed evenly. There is a consideration to the most income deprived areas which will be more impacted due to the charge.

3.7.3.2. DS12a (Leisure and commuting trips)

Table 3-9 shows the benefits and disbenefits accumulated for time, vehicle operating costs and public transport costs. The benefits are likely to be from time and vehicle operating cost savings from decongestion. The disbenefits are likely to come from time and vehicle operating cost increases due to re-routing. An overall assessment has been calculated by understanding whether there are overall benefits or disbenefits and then comparing the proportion of benefits/disbenefits to the overall proportion of the population in that income quintile.

Table 3-10 - Overall user benefit impacts across the income quintiles for Option DS12a

Option	Income Quintile					Total
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	
Total population in the assessment area	92,150	77,604	92,529	62,226	41,600	366,109
Proportion of population in each quintile in the assessment area	25.2%	21.2%	25.3%	17.0%	11.4%	-
Sum of benefits	£4,506,614	£2,741,161	£2,974,695	£1,225,126	£889,147	£12,336,743
Proportion of benefits for each income quintile	36.5%	22.2%	24.1%	9.9%	7.2%	-
Sum of disbenefits	-£244,526	-£139,697	-£1,049,216	-£699,882	-£118,792	-£2,252,113
Proportion of disbenefits for each income quintile	10.9%	6.2%	46.6%	31.1%	5.3%	-
Overall sum of benefits and disbenefits for leisure and commuting users	£4,262,089	£2,601,465	£1,925,478	£525,244	£770,355	£10,084,631
Assessment	Large Beneficial	Moderate Beneficial	Moderate Beneficial	Slight Beneficial	Moderate Beneficial	Moderate Beneficial

Key to individual assessment of each Income quintile

Beneficial and 5% greater (or more) than the proportion of the group in the total population	***Large Beneficial***
Beneficial and in line (+/-5%) with the proportion of the group in the total population	***Moderate Beneficial***
Beneficial and 5% smaller (or less) than the proportion of the group in the total population	***Slight Beneficial***
There are no user benefits or disbenefits experienced by the group	***Neutral***
A disbenefit which is 5% smaller (or less) than the proportion of the group in the total population	***Slight Adverse***
A disbenefit which is in line (+/-5%) with the proportion of the group in the total population	***Moderate Adverse***
A disbenefit which is 5% greater (or more) than the proportion of the group in the total population	***Large Adverse***

3.7.3.3. Outcome and Qualitative Comment

Table 3-11 - Overall assessment

Vulnerable Group	DS2	DS12a
Quintile 1 (most deprived)	××	✓✓✓
Quintile 2	××	✓✓
Quintile 3	××	✓✓
Quintile 4	××	✓
Quintile 5 (least deprived)	××	✓✓
Overall	××	✓✓

Option DS2 has moderate adverse affordability impacts across all income quintiles. Hence, the overall assessment is **moderate adverse**. The main disbenefits are likely to come from the charge due to the CAZ D, re-routing or public transport costs to avoid being charged. There may be some slight user benefits for those living within CAZ D and travelling within CAZ D due to the reduction in traffic and consequent decongestion benefits.

Currently intrazonal movements have not been included within the modelling. Therefore, the distribution of benefits for trips originating in zones within the CAZ D have not been included as part of this assessment. If there was charge for movements within the CAZ D there is likely to be disbenefits in this area which aren't reflected in this analysis.

Option DS12a has a large beneficial impact for the most income deprived quintile, moderate beneficial impacts for quintiles 2,3 and 5 (the least income deprived) and slight beneficial impact for income quintile 4. Therefore, the overall impact is **moderate beneficial**. These benefits are likely to be time savings and vehicle operating cost savings both fuels and non-fuel due to decongestion as a result of the measures.

3.8. Affordability

3.8.1. Screening

3.8.1.1. Comments

Charges for high emission vehicles will have an impact on vehicle operating costs for private transport users. This may particularly impact low income households who are more likely to have an older car that produce higher emissions.

The re-routing caused by restrictions in both Options DS2 and DS12a may have impact on vehicle operating costs as vehicles may have to travel longer to reach their destination. Furthermore, any mode shift from Public Transport or to avoid restrictions or charges may have an impact on affordability. Any reduction in congestion due to restrictions may have a positive impact on vehicle operating costs.

3.8.1.2. Outcome

Continue to Full DI Appraisal, the impact on vulnerable receptors will need to be examined.

3.8.2. Assessment

3.8.2.1. Step 2a: Confirmation of Impacted Area

This affordability assessment is based on the charges (public transport and tolls (i.e. the charge)) and the vehicle operating costs (VOC). The appraisal has been carried out assessing 'leisure and commuting' trips and 'business' trips separately. Business trips have included HGV, LGV and private trips for businesses. Only internal to internal trips within a 'core' assessment area (show in Figure 31) are used and are calculated using 10-year appraisal TUBA outputs, which in turn take data from the model. This assessment area has been defined as described in the user benefits section. For option DS2, the origin zones within CAZ D have been removed, as a charge has not been included within the modelling for intrazonal movements within CAZ D and may not provide an accurate representation of personal affordability for those living within the area.

3.8.2.2. Step 2b: Identification of Social Groups in Impact Area

Table 3-12 - Proportions of social groups in the impact area

Group	DS2	DS12a
Quintile 1 (most deprived)	19.2%	23.2%
Quintile 2	22.0%	20.6%
Quintile 3	25.2%	24.5%
Quintile 4	20.0%	16.7%
Quintile 5 (least deprived)	13.5%	14.9%

3.8.2.3. Step 2c: Identification of Social Groups in Impact Area

There are many schools and care homes in Coventry as well as several other amenities such as shopping centres in the centre of Coventry which may attract a range of people.

3.8.3. Appraisal

3.8.3.1. Option DS2 (Leisure and Commuting Trips)

The below table shows the disbenefits accumulated for vehicle operating costs, public transport costs and the CAZ charge. Since intrazonal CAZ charging has not been included within the modelling, the distribution of benefits for those trips originating within the CAZ D area are not included in this assessment. An overall assessment has been calculated by understanding whether there are overall benefits or disbenefits and then comparing the proportion of benefits/disbenefits to the overall proportion of the population in that income quintile.

Table 3-13 - Total affordability impacts across all income quintiles

	Income Quintile					Total
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	
Total population in the assessment area	57,073	65,449	74,954	59,451	40,020	296,947
Proportion of population in each quintile in the assessment area	19.2%	22.0%	25.2%	20.0%	13.5%	-
Sum of disbenefits	-£16,710,576	-£18,877,966	-£18,876,253	-£12,376,097	-£11,487,741	-£78,328,634
Proportion of disbenefits for each income quintile	21.3%	24.1%	24.1%	15.8%	14.7%	-
Overall sum of benefits and disbenefits for leisure and commuting users	-£16,710,576	-£18,877,966	-£18,876,253	-£12,376,097	-£11,487,741	-£78,328,634
Assessment	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse

The overall impacts for DS2 are dominated by the CAZ D charge and therefore, there are adverse affordability impacts across all income quintiles. Whilst the overall impacts across each of the income quintiles are distributed evenly, there is a consideration to the most income deprived areas which will be more impacted due to the charge.

Figure 32 shows the distribution of disbenefits across the model by origin zones, the largest disbenefits are for those living in areas just outside of the CAZ D boundary and there are fewer disbenefits for those living further outside of the boundary. Figure 33 shows the impacts for those living outside the CAZ D boundary within the most income deprived quintiles, many of these areas are just outside of the CAZ boundary and therefore have a larger affordability impact than some of the other areas.

Figure 32 Commuting and Leisure affordability impacts by origin zones across the impact area for Option DS2, in intervals of £100,000

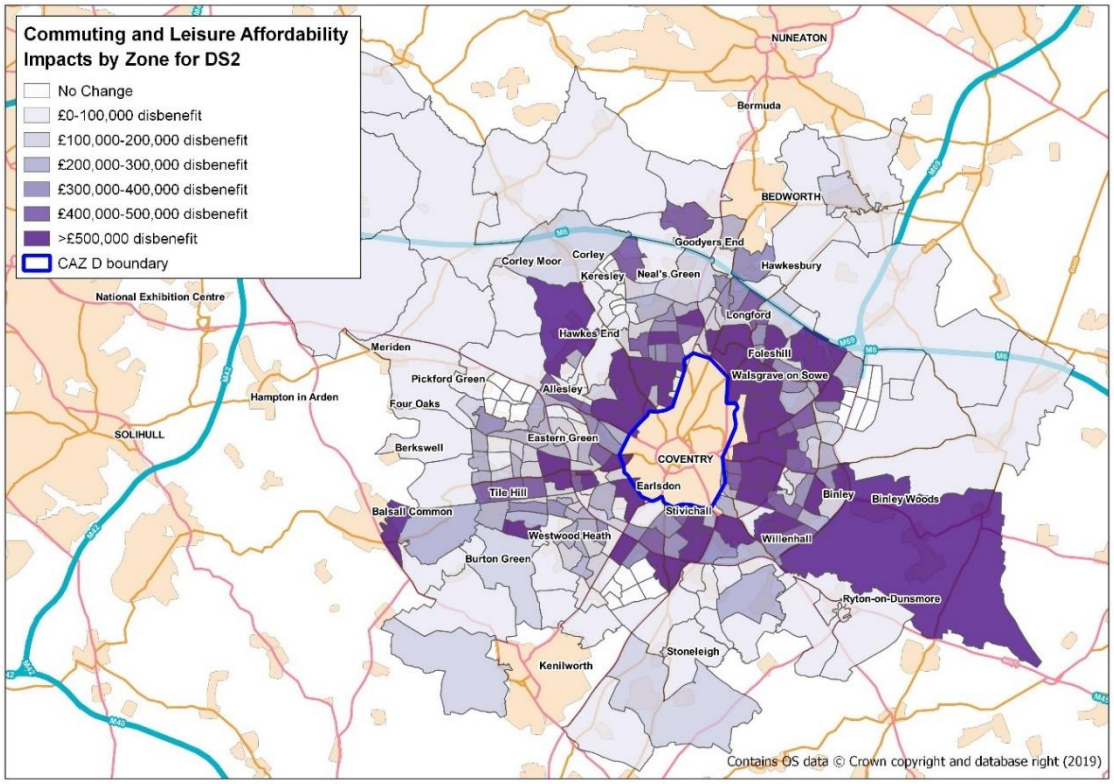

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Figure 33 Commuting and Leisure affordability impacts for the most income deprived LSOAs by origin zone for option DS2, in intervals of £100,000

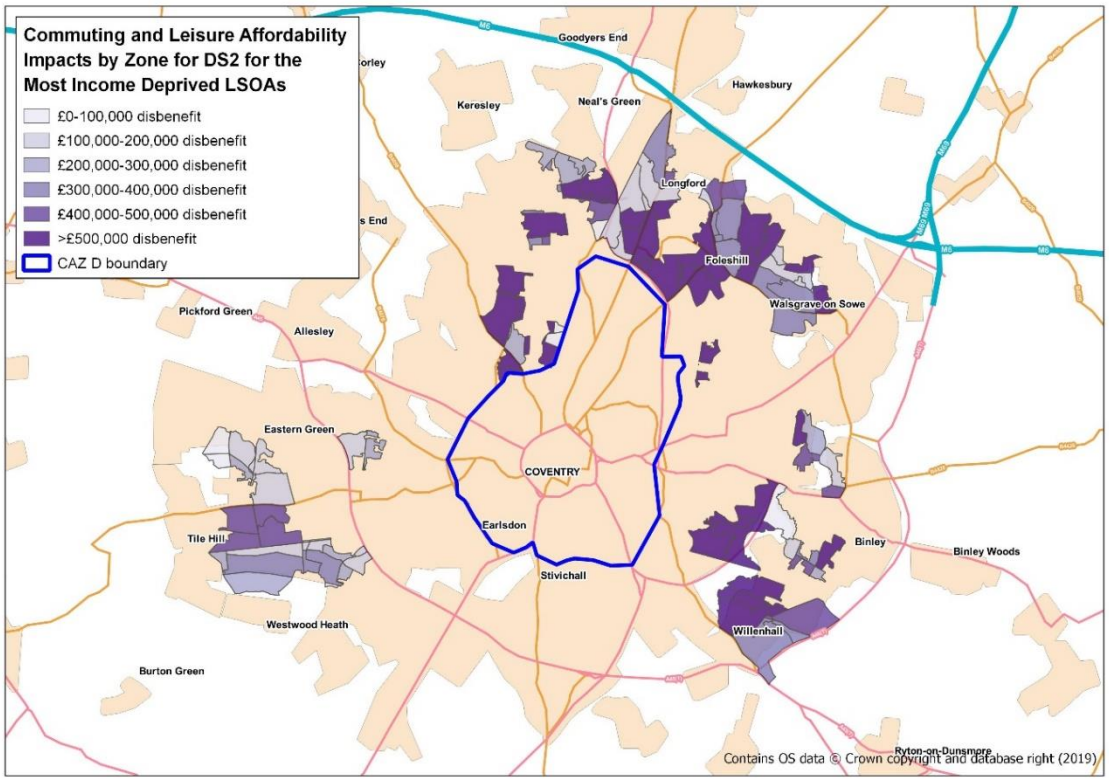

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Figure 34 Map showing the distribution of non-compliant trips in the assessment area

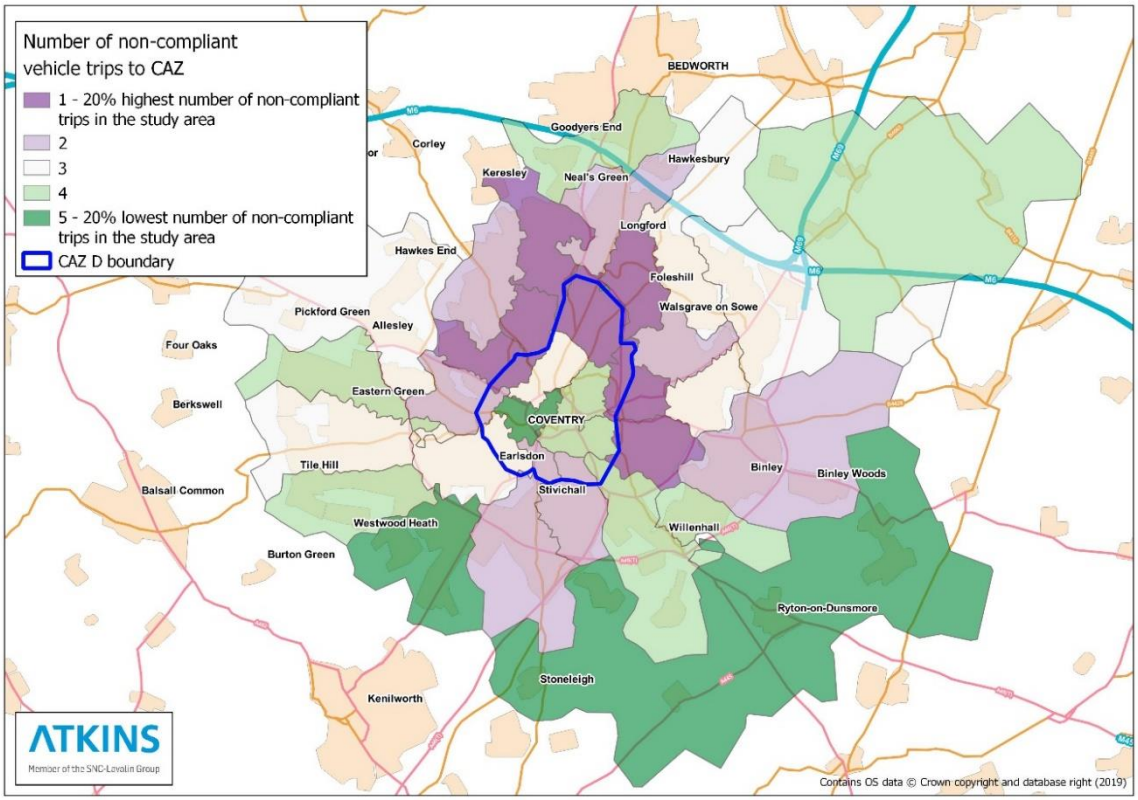

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Figure 35 20% highest proportion of non-compliant trips and most income deprived areas

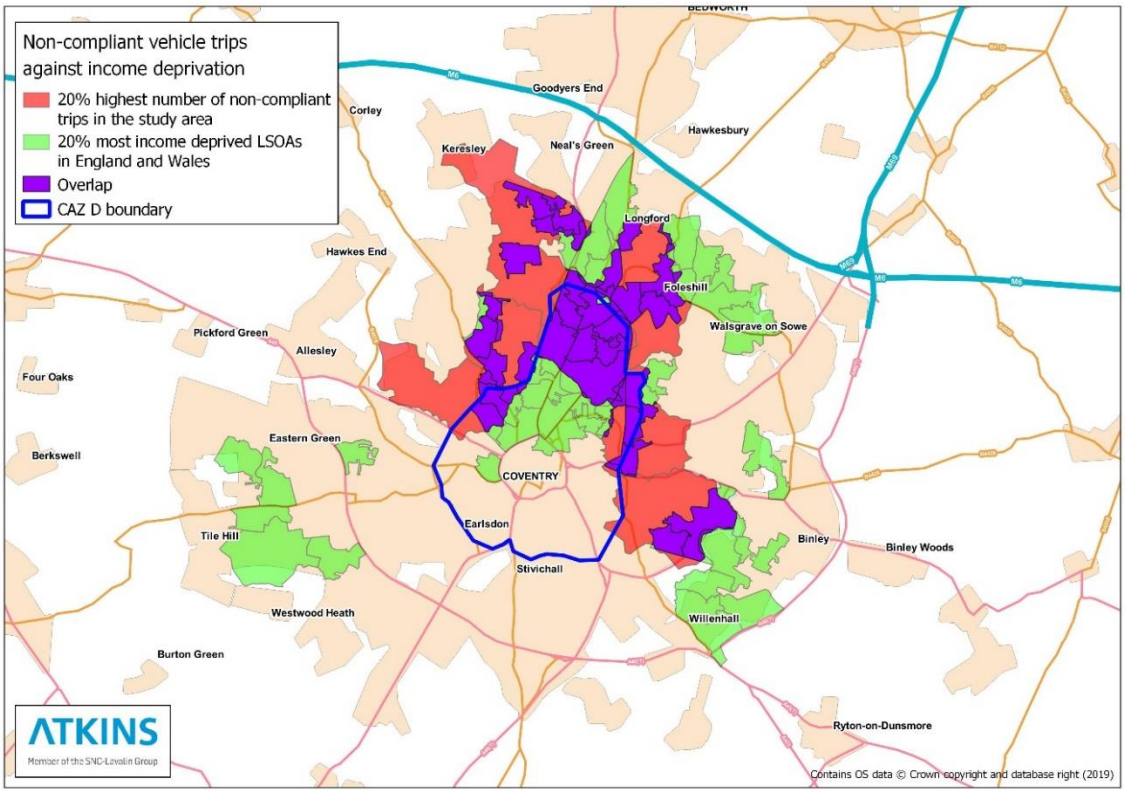

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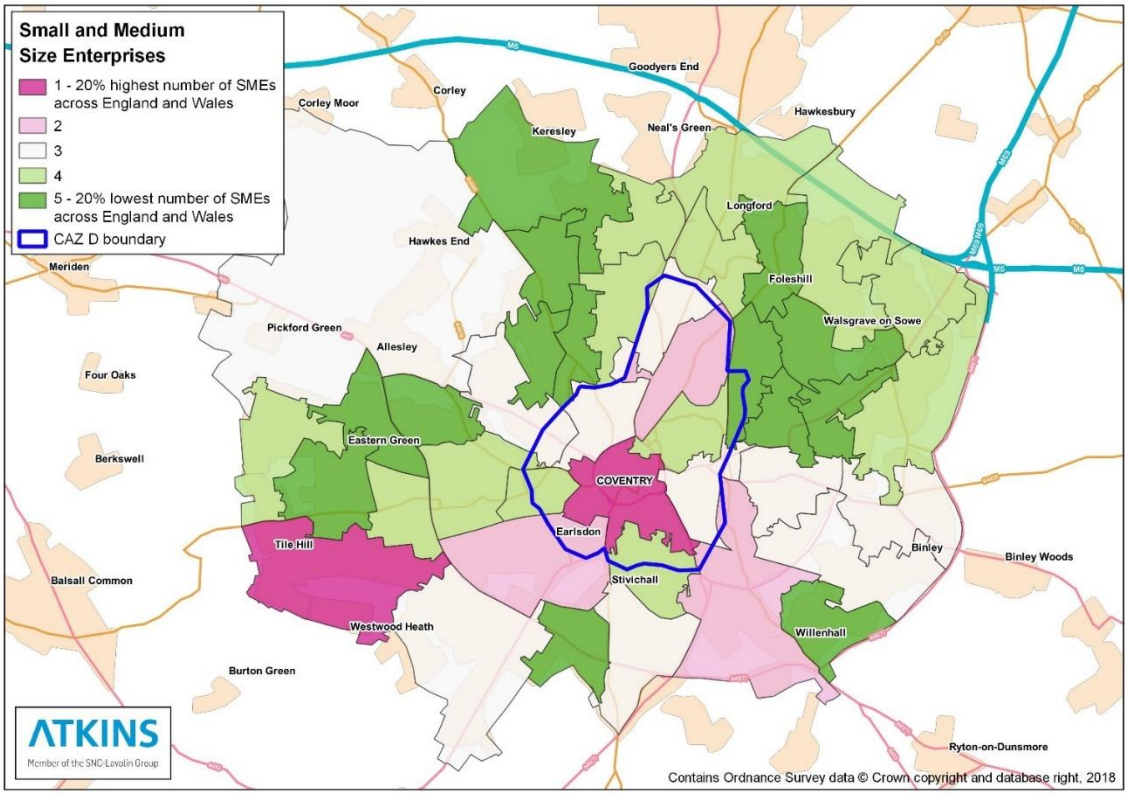
Figure 34 and Figure 35 show that there are a high number of non-compliant trips originating to the north of the CAZ D boundary and just outside the boundary, this is where there are areas with a high proportion of those within the most income deprived quintiles. These income groups may not have the means to afford a vehicle upgrade or to pay the CAZ charge. Therefore, this may have an adverse impact on personal affordability for these income groups.

3.8.3.2. Option DS2 (Business Trips)

Figure 36 shows the distribution of micro, small and medium enterprises (SMEs) there are a high proportion of SMEs around Tile Hill and within Coventry City Centre. It is likely there will be adverse impacts to businesses residing within the city centre as they will be forced to pay the charge or upgrade to compliant vehicles in order to travel into and within the city, where the business is based. Furthermore, any businesses based outside of the city which want to travel within the city will have adverse affordability impacts as they will have to pay the charge or upgrade non-compliant vehicles.

Figure 36 Quintiles showing the distribution of micro, small and medium businesses within Coventry, by MSOA and the location of the CAZ D



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3.8.3.3. Option DS12a (Leisure and Commuting trips)

Table 3-14 shows the benefits and disbenefits accumulated for vehicle operating costs and public transport costs. An overall assessment has been calculated by understanding whether there are overall benefits or disbenefits and then comparing the proportion of benefits/disbenefits to the overall proportion of the population in that income quintile. For option DS12a there could be benefits associated with decongestion due to restrictions on certain routes and disbenefits due to re-routing traffic as a result of the restrictions.

Table 3-14 - Total affordability impacts across all income quintiles

	Income Quintile					Total
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	
Total population in the assessment area	92,150	77,604	92,529	62,226	41,600	366,109
Proportion of total population in each group in the assessment area	25.2%	21.2%	25.3%	17.0%	11.4%	-
Sum of benefits	£1,366,199	£974,820	£1,198,974	£550,181	£525,879	£4,616,053
Proportion of benefits for each income quintile	29.6%	21.1%	26.0%	11.9%	11.4%	-
Sum of disbenefits	-£45,028	-£44,841	-£ 46,915	-£86,939	-£15,635	-£ 239,358
Proportion of disbenefits for each income quintile	18.8%	18.7%	19.6%	36.3%	6.5%	-
Overall sum of benefits and disbenefits for leisure and commuting users	£1,321,171	£929,979	£1,152,058	£463,242	£510,244	£4,376,694
Assessment	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Slight Beneficial	Moderate Beneficial	Moderate Beneficial

The disbenefits associated with Option DS12a are likely to be associated with increases in vehicle operating costs which could be due to re-routing to avoid the peak time restrictions at Holyhead Road. However, the disbenefits are small compared to the benefits. The benefits could be associated with vehicle operating costs savings due to decongestion due capacity improvements, traffic management and mode shift due to improved cycling infrastructure.

Figure 37 and Figure 38 shows the distribution of benefits and disbenefits across the model by origin zones, the largest benefits are for those surrounding the centre of Coventry. There are disbenefits for those living to the north-west of Coventry and to the north of Holyhead Road. Figure 41 shows the impacts for those living within the most income deprived quintiles, many of these areas show benefits due to option DS12a, other than an area to the north of Holyhead Road. This may be due to vehicles rerouting and therefore increased vehicle operating costs due to the peak hour restrictions.

Figure 37 Commuting and Leisure affordability impacts by origin zones across the impact area for Option DS12a, in intervals of £10,000

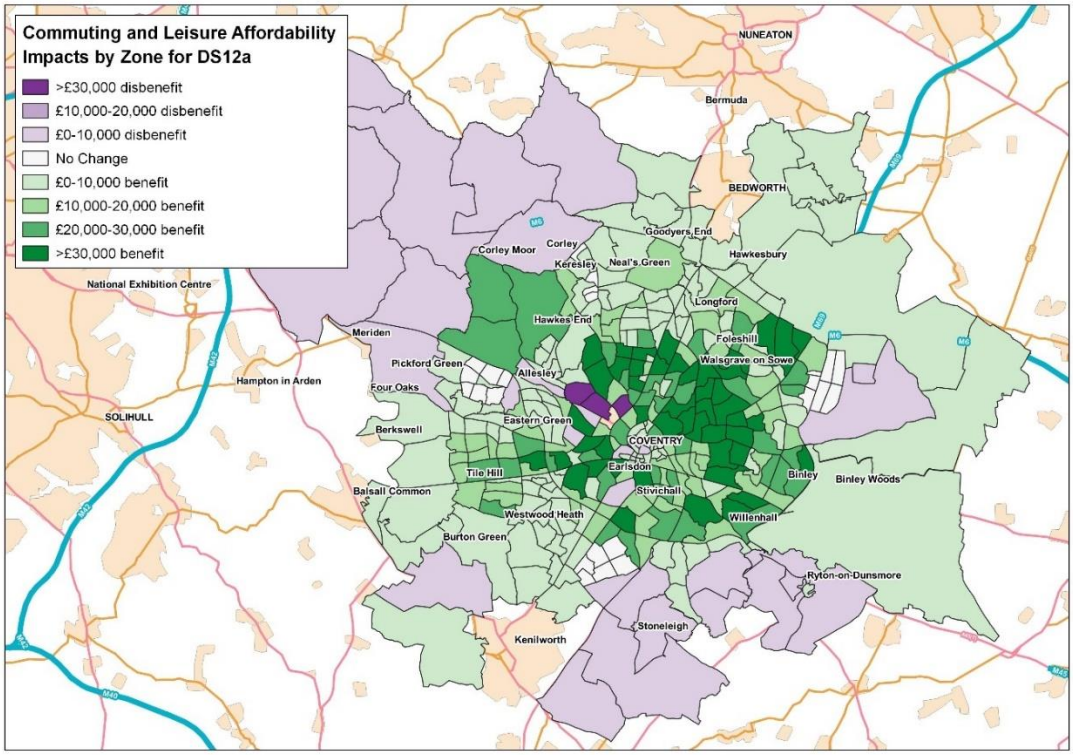

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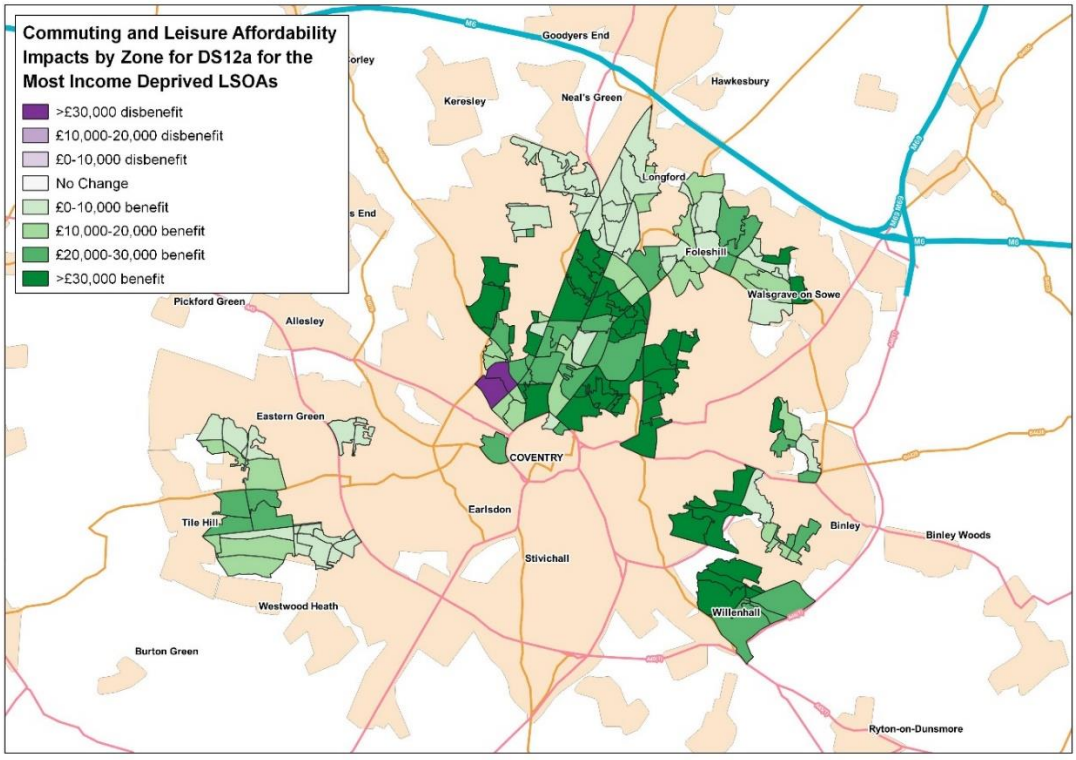
Figure 38 Commuting and Leisure affordability impacts for the most income deprived LSOAs by origin for option DS12a, in intervals of £10,000



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3.8.3.4. Option DS12a (Business trips)

Considering the distribution of the affordability impact of businesses, it is noted that some of the measures included within DS12a will have an adverse impact on businesses. These include peak time restrictions on Holyhead Road at J8 and a HGV ban on Holyhead Road between the railway bridge and Junction 8 on the Ring Road. These measures are likely to adversely impact on businesses who use Holyhead road to travel into and from Coventry city centre. This would consequently cause traffic to divert around, impacting on costs to the business due to increase in time to travel and increased vehicle operating costs, as shown in Figure 42. There are a high number of SMEs based within the city centre area, which may also use Holyhead Road to travel to and from the City Centre. The restrictions on Holyhead Road are likely to have costs on the business due to increase in time to re-route and vehicle operating costs.

Figure 42 shows there are also business affordability benefits in areas, including near Tile Hill where there is a high proportion of SMEs. This is likely to be as a result of the traffic management, capacity improvements and upgrades included within the DS12a measures causing affordability benefits for businesses due to quicker travel times and consequent lower vehicle operating costs due to reduced engine idling as a result of less congestion. This is likely to outweigh the disbenefits for the Holyhead Road mitigations and therefore the overall outcome is **slight beneficial**.

Figure 39 Business affordability impacts by origin zone across the impact area for option DS12a, in intervals of £10,000

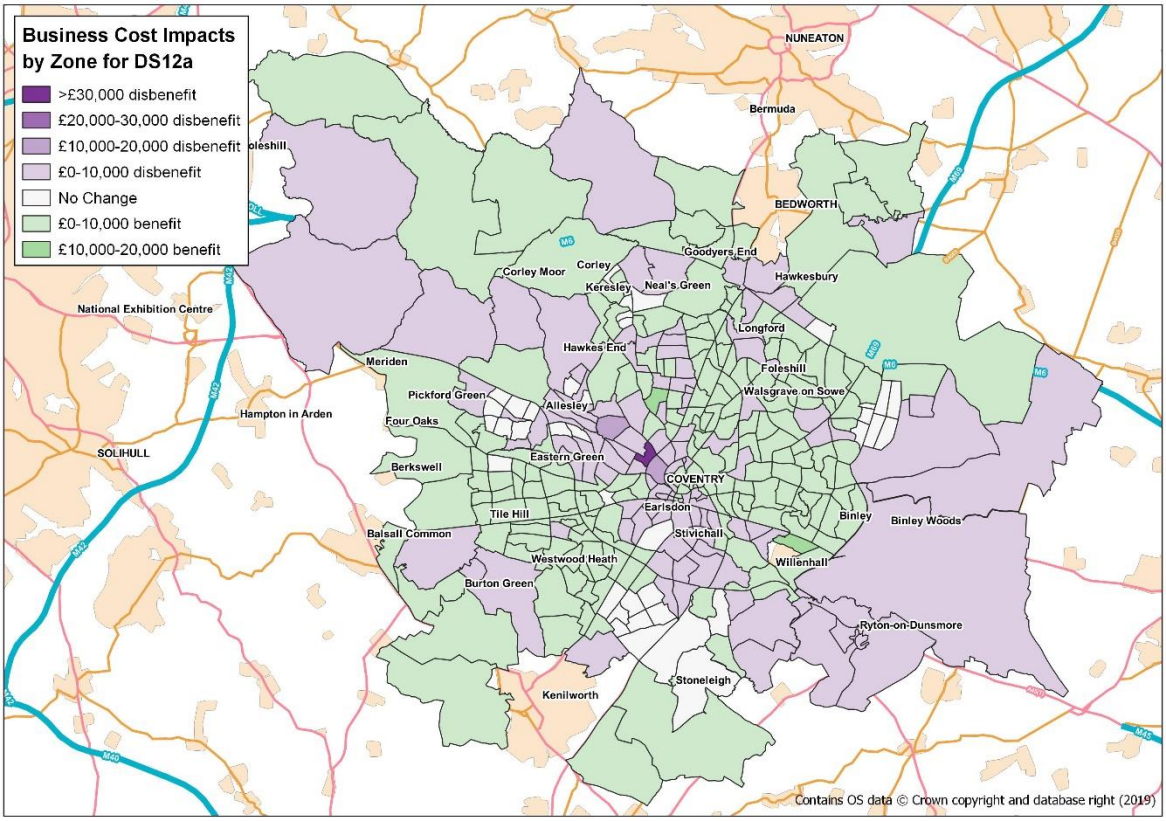

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Table 3-15 - Key to individual assessment of each Income quintile

Beneficial and 5% greater (or more) than the proportion of the group in the total population	***Large Beneficial***
Beneficial and in line (+/-5%) with the proportion of the group in the total population	***Moderate Beneficial***
Beneficial and 5% smaller (or less) than the proportion of the group in the total population	***Slight Beneficial***
There are no user benefits or disbenefits experienced by the group	***Neutral***
A disbenefit which is 5% smaller (or less) than the proportion of the group in the total population	***Slight Adverse***
A disbenefit which is in line (+/-5%) with the proportion of the group in the total population	***Moderate Adverse***
A disbenefit which is 5% greater (or more) than the proportion of the group in the total population	***Large Adverse***

3.8.3.4.1. Outcome and Qualitative Comment

Table 3-16 - Overall affordability impacts for each income quintile

Vulnerable Group	DS2	DS12a
Quintile 1 (most deprived)	××	✓✓
Quintile 2	××	✓✓
Quintile 3	××	✓✓
Quintile 4	××	✓
Quintile 5 (least deprived)	××	✓✓
Overall	××	✓✓

Option DS2 has moderate adverse affordability impacts for all income quintiles. Therefore, the overall impact is **moderate adverse**. For option DS2 it is important to consider the impact charging non-compliant private vehicles may have on those living within and around Coventry. There are a high proportion of the most income deprived quintiles within assessment area including the CAZ (46.4% of the area is in income quintiles 1 and 2) and therefore, may be most affected by paying a charge, the cost of upgrading a vehicle and cost of shifting to public transport.

Option DS12a has beneficial impacts across all income quintiles, there are moderate beneficial impacts for income quintiles 1 (the most income deprived) to 3, and income quintile 5 (the least income deprived). Therefore, the overall impact is **moderate beneficial,** as there are likely to be vehicle operating cost savings (fuel and non-fuel) due to decongestion. There are no charging measures included within DS12a, therefore, it is expected that the main affordability impacts will be on vehicle operating costs and mode shift to public transport. Furthermore, while encouraging cycling through improved infrastructure has no specific impact on affordability, it is important to consider the initial cost of purchasing a bike for those who are the most income deprived.

3.9. Summary

Table 3-17 - Option DS2 Distribution of measures across income quintiles

	Distributional impact of income deprivation					Are the impacts evenly distributed?	Key impacts – Qualitative statements
	0-20%	20-40%	40-60%	60-80%	80-100%		
Accessibility	**0**	**0**	**0**	**0**	**0**	**Yes**	There are not expected to be any significant impacts on accessibility.
Air Quality	✓✓	✓✓	✓✓	✓✓	✓✓	**Yes**	There are positive reductions in air quality emissions across all areas and income deprivations.
Noise	✓	**0**	✓	×	**0**	**No**	There are slight beneficial impacts for the most income deprived quintile as there is expected to be significant decreases in traffic flow.
User Benefits	××	××	××	××	××	**Yes**	There are expected to be moderate adverse impacts across all income quintiles for user benefits.
Affordability	××	××	××	××	××	**Yes**	There are expected to be moderate adverse affordability impacts for all income quintiles.

Table 3-18 - Option DS12a Distribution of measures across income quintiles

	Distributional impact of income deprivation					Are the impacts evenly distributed?	Key impacts – Qualitative statements
	0-20%	20-40%	40-60%	60-80%	80-100%		
Accessibility	**0**	**0**	**0**	**0**	**0**	**Yes**	There are not expected to be any significant impacts on accessibility.
Air Quality	✓	✓	✓	✓	✓	**Yes**	There are positive reductions in air quality emissions across all areas and income deprivations.
Noise	×	**0**	**0**	**0**	**0**	**No**	There are expected to be some increases in traffic flow for the most income deprived quintile but not significant impacts for all other quintiles.
User Benefits	✓✓✓	✓✓	✓✓	✓	✓✓	**No**	There are expected to be beneficial impacts across all quintiles, with large beneficial impacts in the most deprived income quintile.
Affordability	✓✓	✓✓	✓✓	✓	✓✓	**No**	There are expected to be moderate beneficial impacts across the most deprived income quintile.

Table 3-19 - Overall impact for each indicator for options DS2 and DS12a

	Overall Impact	
Indicator	**DS2**	**DS12a**
Accessibility	0	0
Severance	0	0
Noise	0	0
Air Quality	✓✓	✓
User Benefits	××	✓✓
Affordability	××	✓✓

Appendices

A.1. Socio-Demographic Mapping

The figures in this Appendix map each of the key impact groups identified in the JAQU Options Appraisal guidance for the study area, showing their location in relation to the proposed Clean Air Zone D boundary. Each of the indicators, over 65 years old, under 16 years old, income deprivation, ethnicity, LGV proportions and SME proportions are ranked into quintiles nationally dependent on the proportion of the population of that group within the LSOA or MSOA. This then shows which areas have high proportions of these indicators within them. Quintile 1 will have the highest proportion of the respective vulnerable group because it will sit within the highest 20% nationally of that proportion of vulnerable group. The below maps show the make-up of the area, where there are high proportions of any specific groups and where they are in relation to the proposed Clean Air Zone. This highlights any specific areas where there may be a high proportion of more than one vulnerable group and helps inform the assessment and appraisal.

Figure 40 Quintiles showing the proportion of population over 65 years old compared to the average in England and Wales, by LSOA and the location of the CAZ D

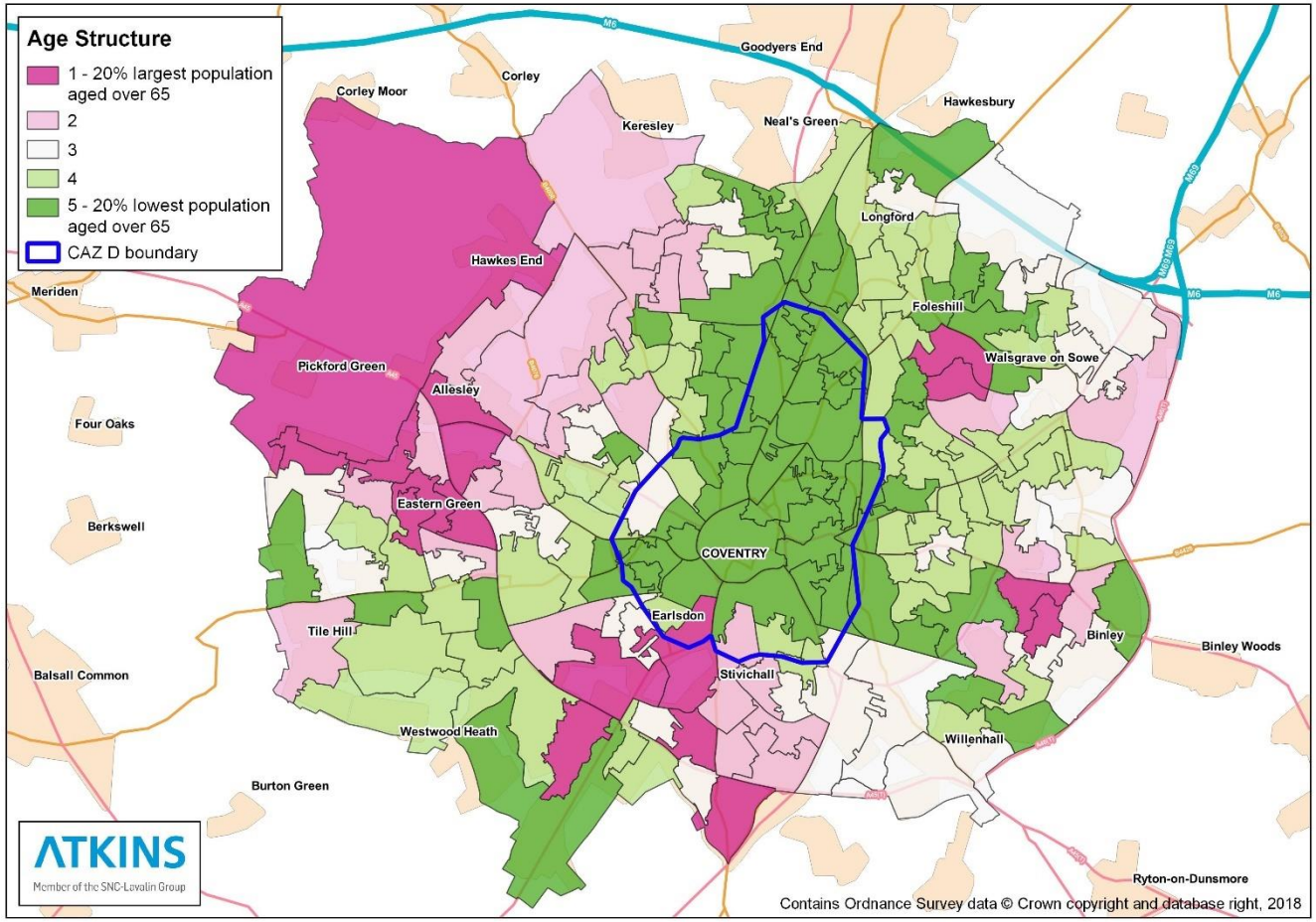

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Figure 40 shows that there is a low proportion of elderly people living within the CAZ boundary. However, there is an area with the 20% highest proportion of elderly people in England and Wales to the north-west of the CAZ. Elderly people living in this area may travel to the centre of Coventry to access amenities, such as retail centres.

Figure 41 Quintiles showing the proportion of population under 16 years old compared to the average in England and Wales, by LSOA and the location of the CAZ D

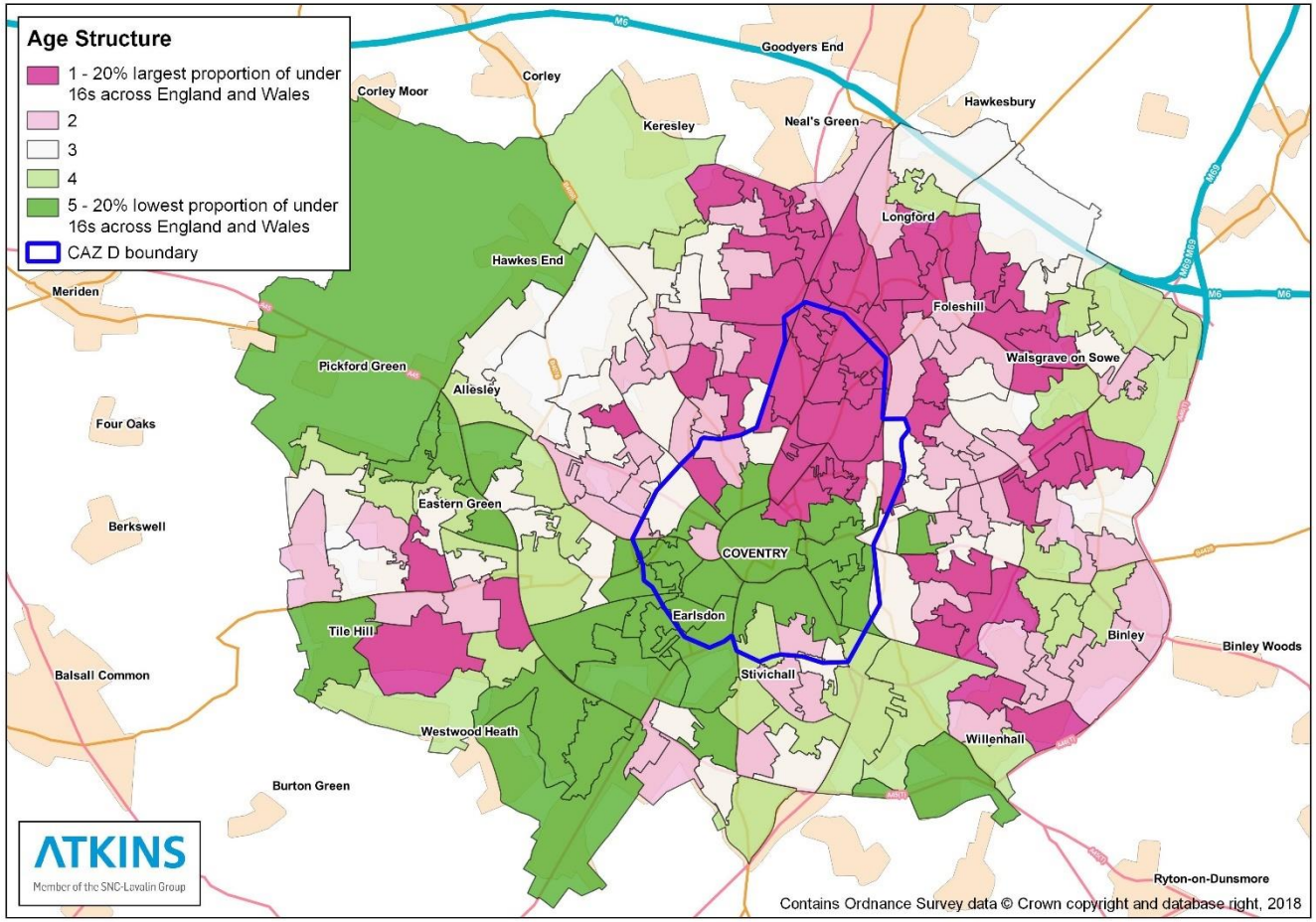

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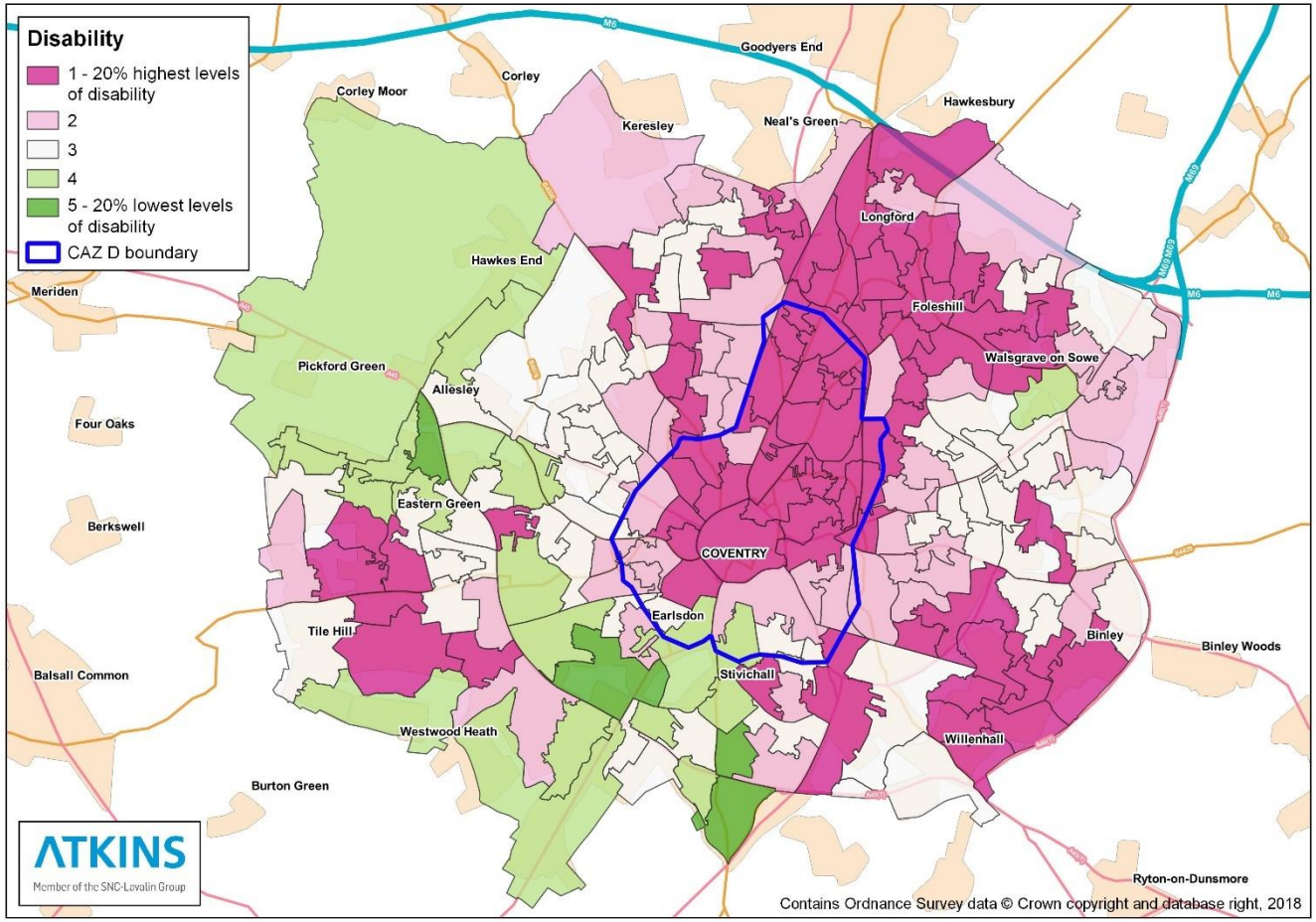
Figure 41 shows that there is an area with the highest 20% proportion of children for England and Wales to the north of Coventry city centre, both within and outside of the CAZ. These children may travel within the CAZ to access schools and other amenities.

Figure 42 Quintiles showing the proportion of population unable to work through ill health compared to the average in England and Wales by LSOA and the location of the CAZ D



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There is a high proportion of people who are unable to work through ill health or a disability living within the CAZ boundary, as shown in Figure 42. This vulnerable group may need regular access to hospitals and health centres in the city.

Figure 43 Quintiles showing the proportion of non-white residents compared to the average in England and Wales by MSOA and the location of the CAZ D

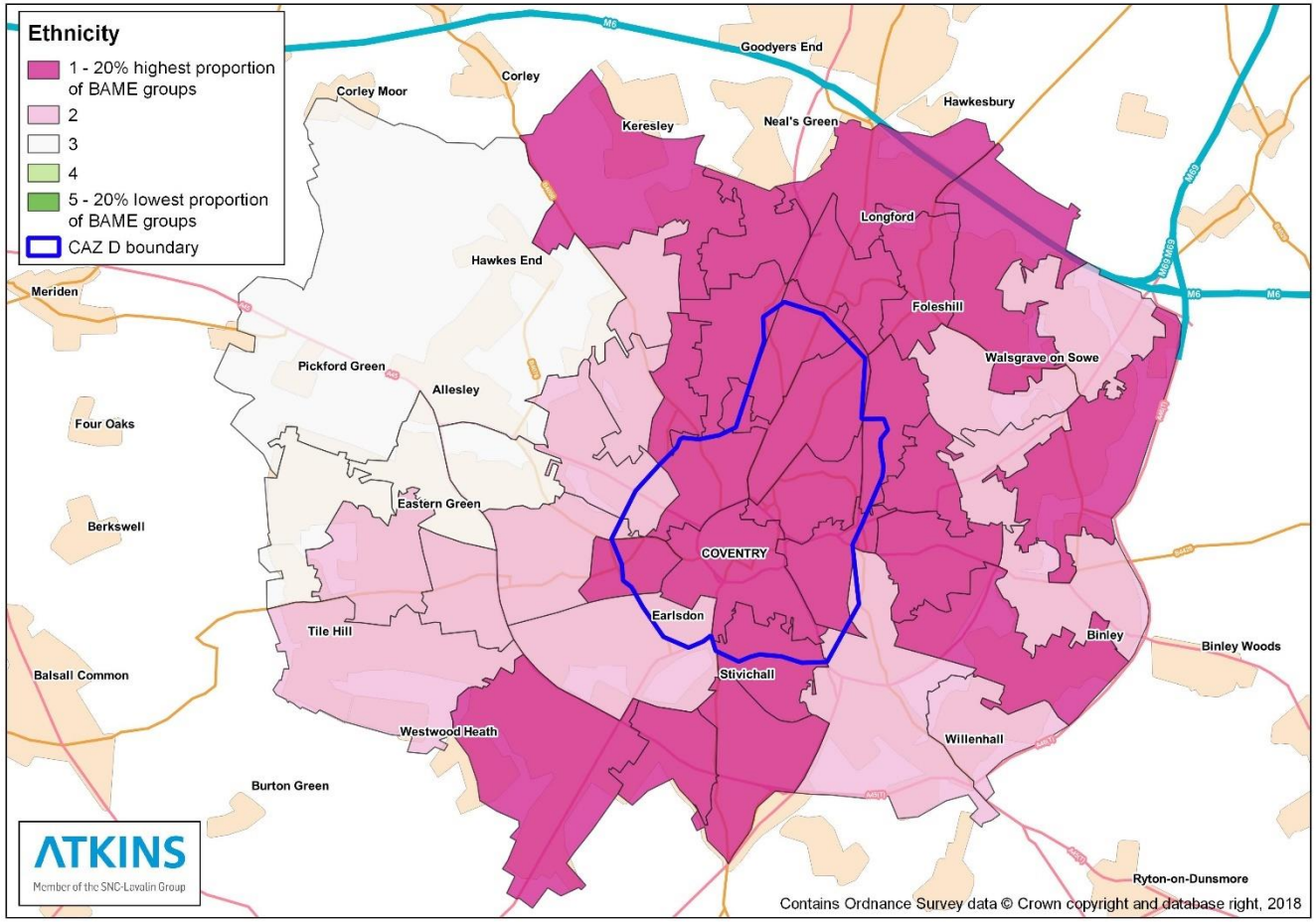

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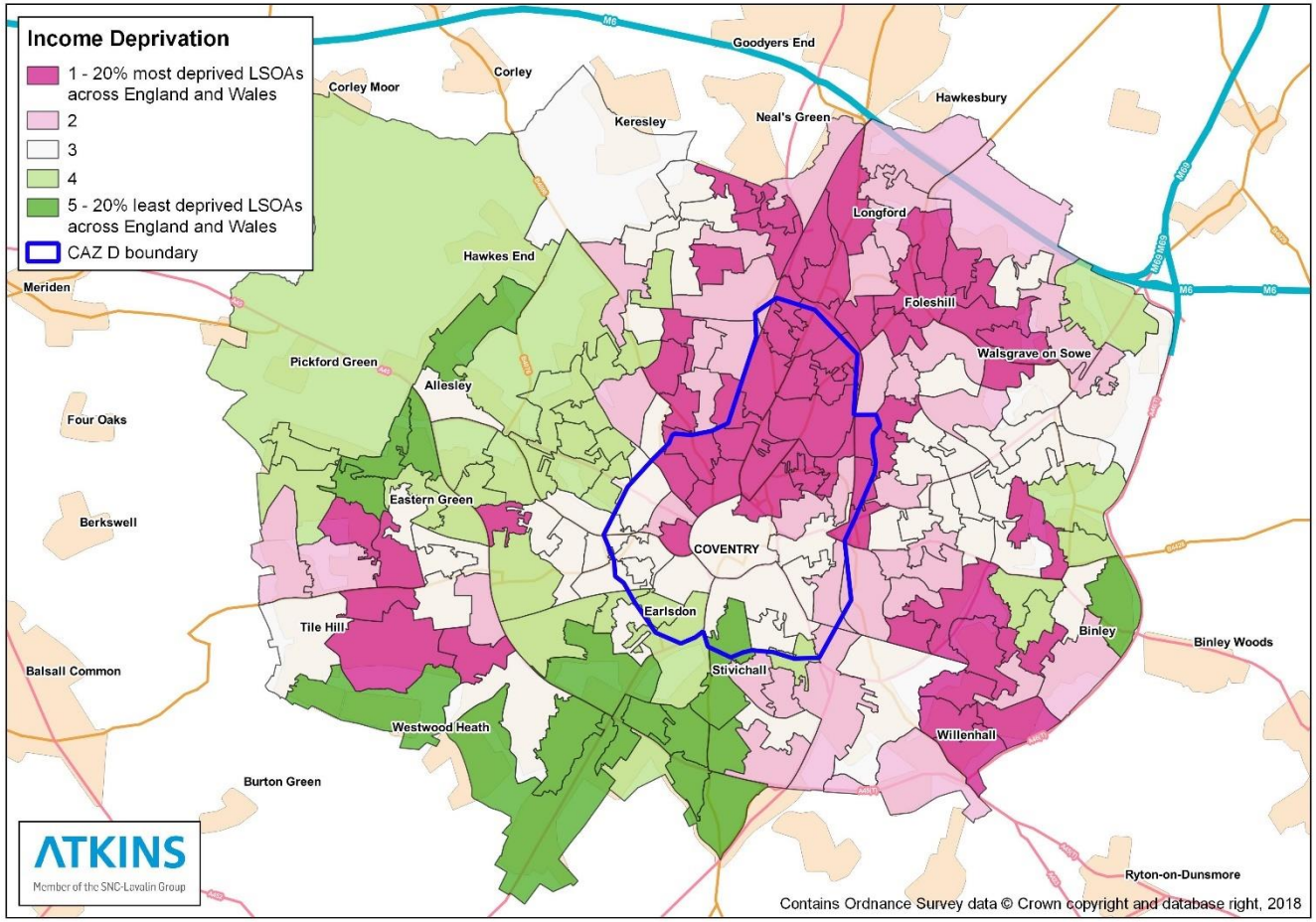
Figure 43 shows that there is a higher than average proportion of BME for all MSOAs within the CAZ. Care should be taken when looking at impacts of the scheme to this vulnerable group, due to the high proportions both within and surrounding the CAZ boundary.

Figure 44 Quintiles showing the proportion of income deprivation for England and Wales by LSOA and the location of the CAZ D



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There is an area with the highest 20% proportion of income deprived households within the Clean Air Zone, as shown in Figure 44. Income deprived residents are more likely to own older cars, which are more likely to be non-compliant. Hence, impacts of the scheme to this vulnerable group will require consideration. Figure 13 shows the distribution of income deprivation across Coventry.

Figure 45 Quintiles showing the proportion of income deprivation within Coventry by LSOA and the location of the CAZ D

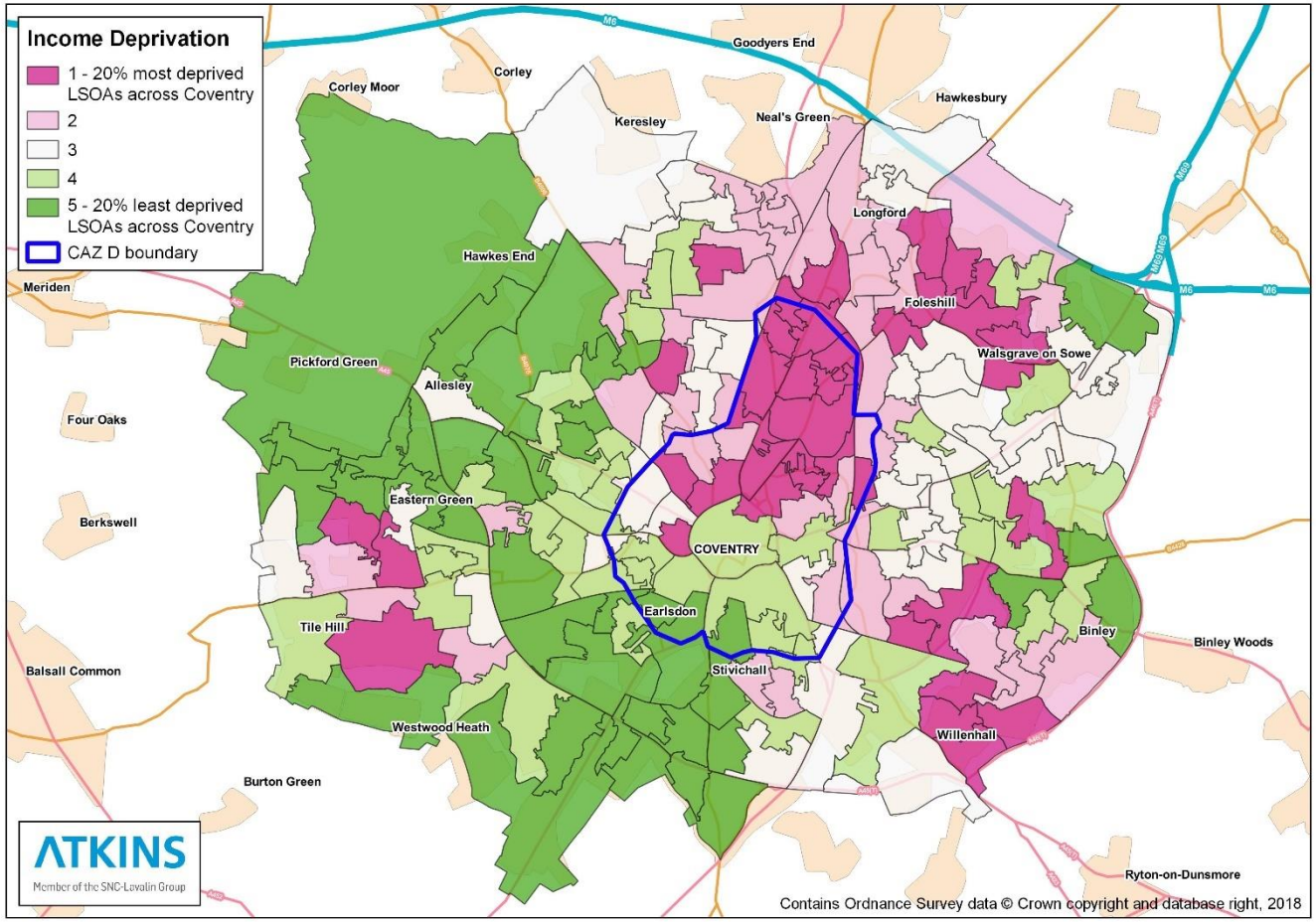

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Figure 46 Quintiles showing the distribution of LGVs within the study area by LSOA and the location of the CAZ D

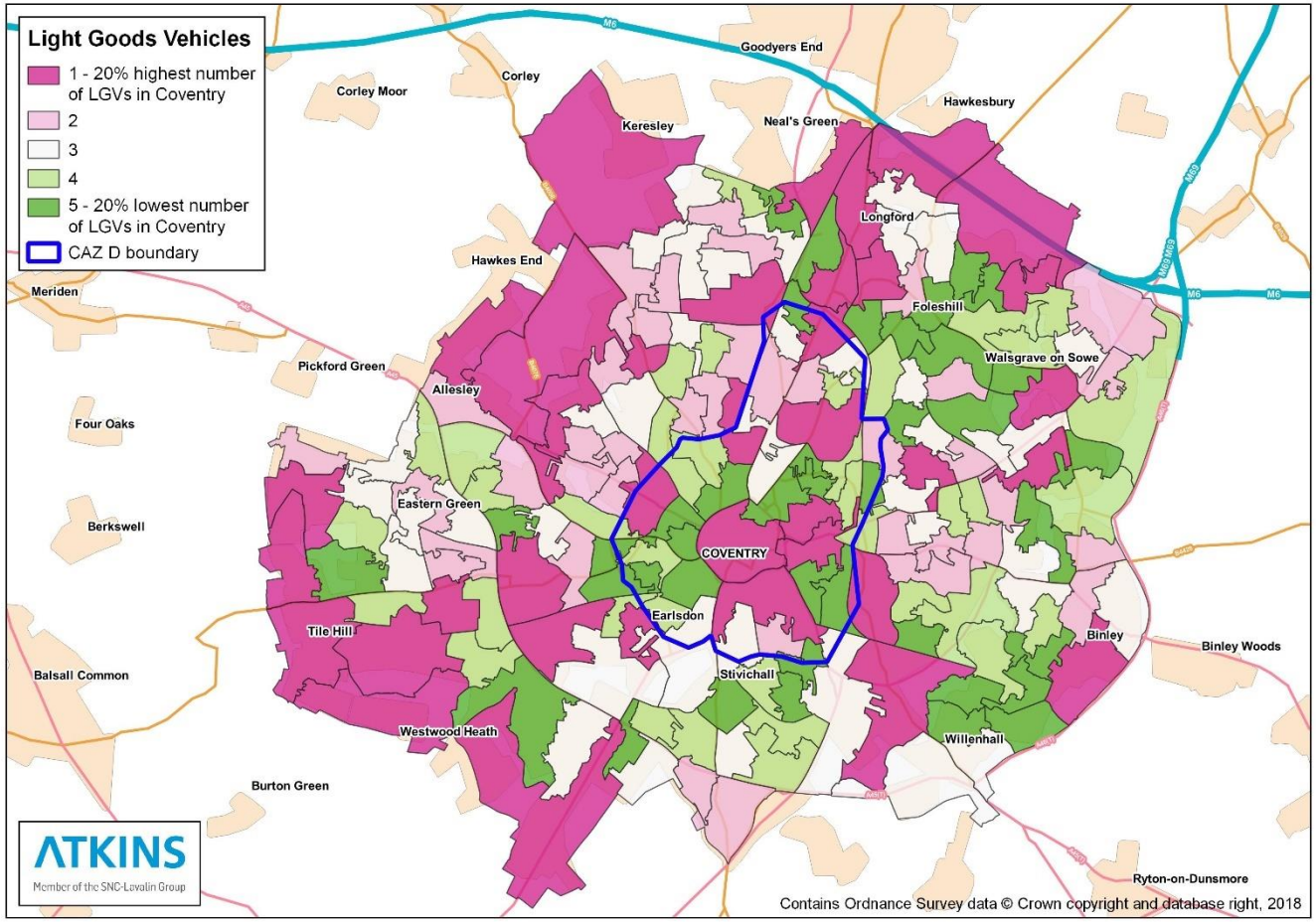

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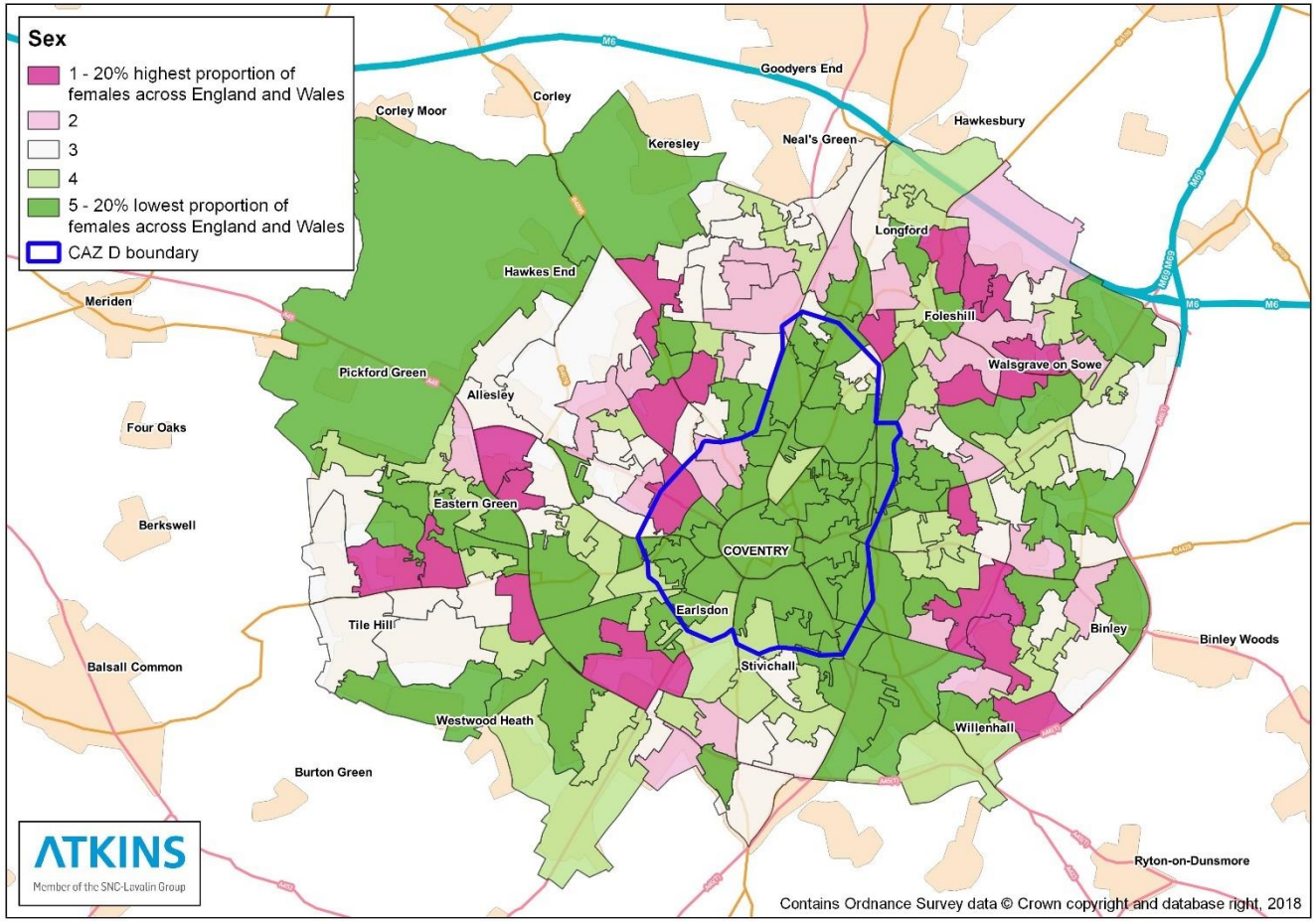
Figure 46 shows that the areas with the highest numbers of LGVs registered in Coventry are both within and just outside the CAZ. These vehicles could travel within the CAZ boundary for business purposes, although some of these LGVs may be registered to these locations but be in use elsewhere.

Figure 47 Quintiles showing the proportion of females for England and Wales, by LSOA and the location of the CAZ D



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There are low proportions of females within the CAZ boundary, compared to that of England and Wales. However, there are some LSOAs around the edge of the CAZ with the highest 20% proportion of females in England and Wales, as shown in Figure 47.

Figure 48 Quintiles showing the distribution of micro, small and medium businesses compared to the average across England and Wales, by MSOA and the location of the CAZ D

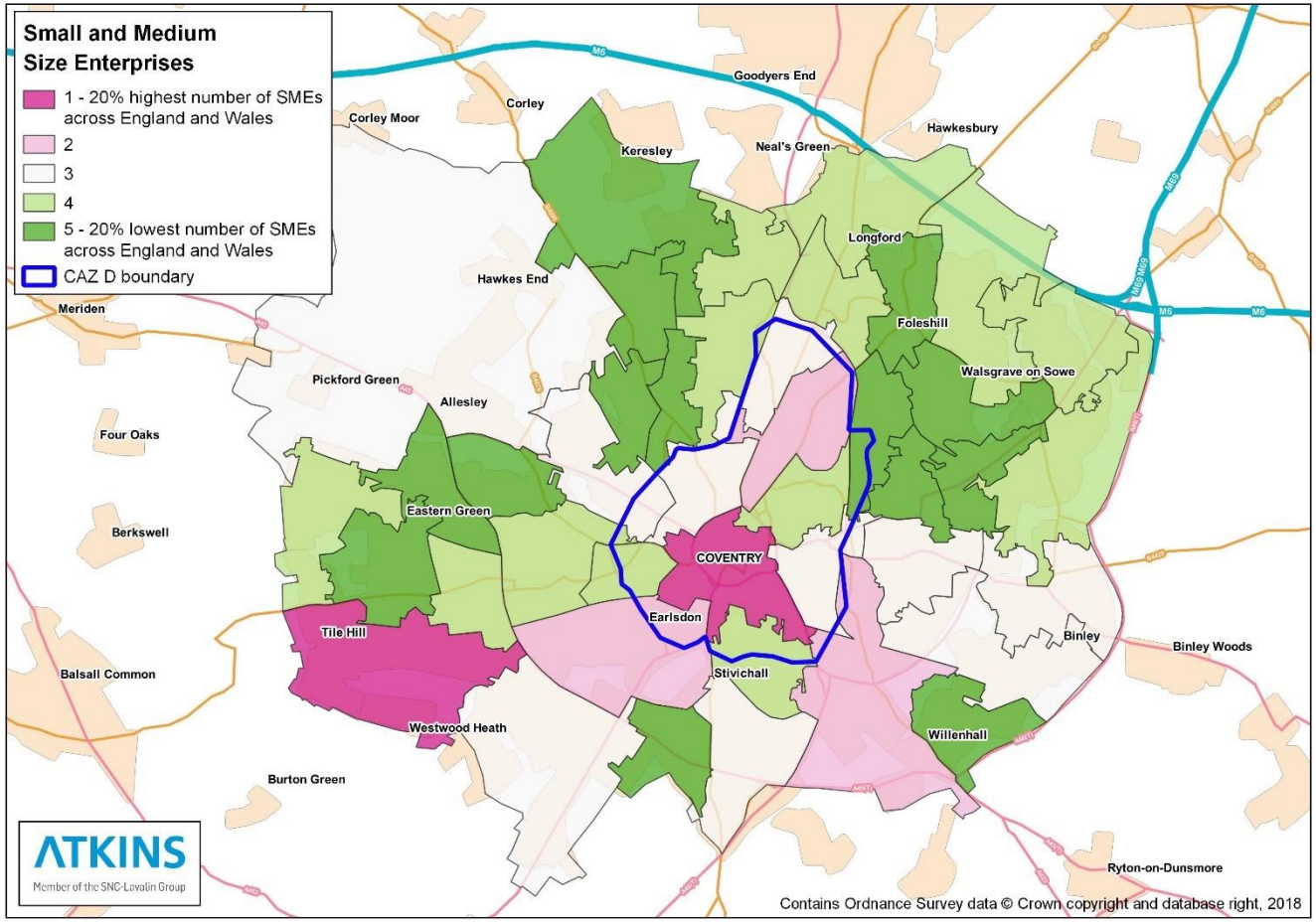

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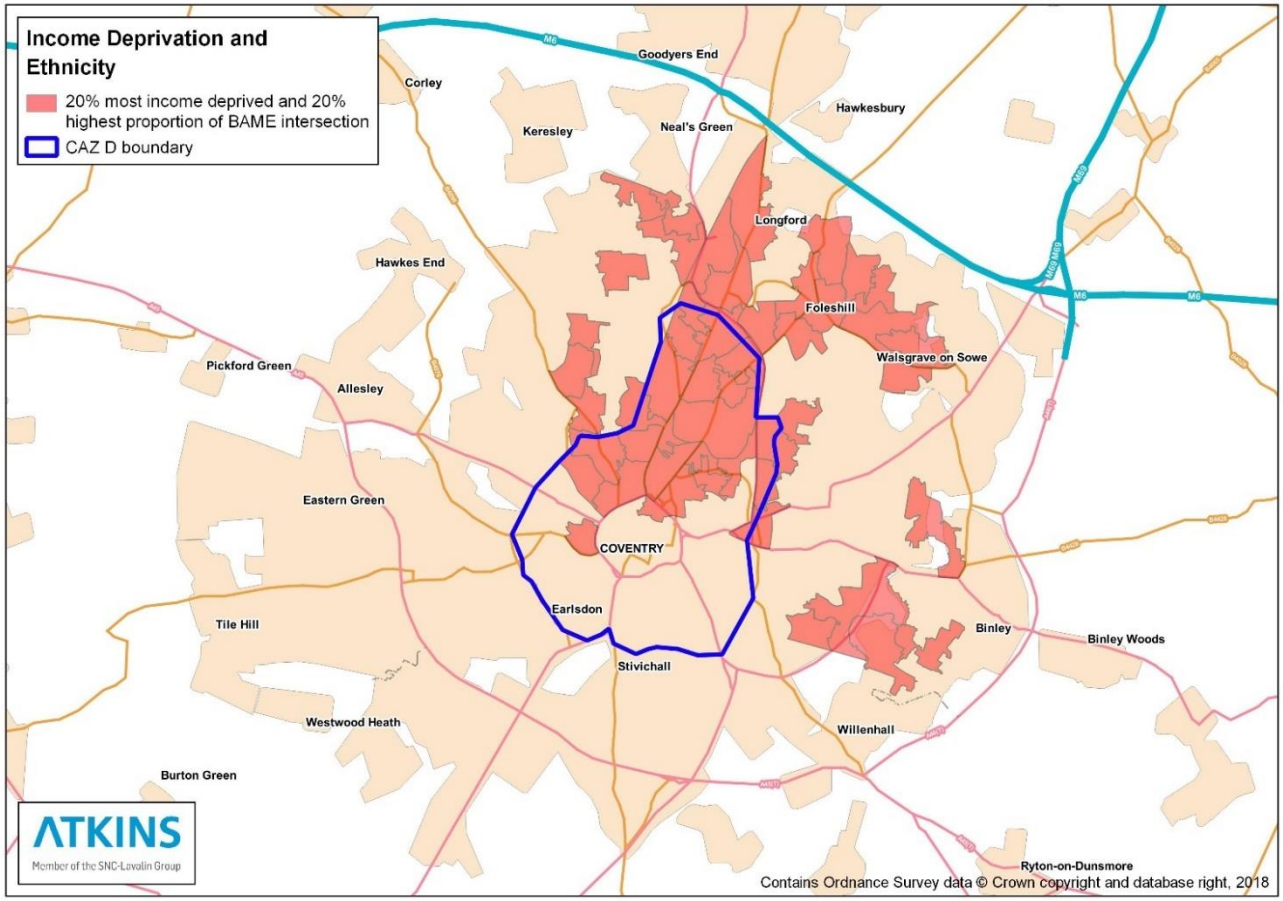
Figure 48 shows that the areas with the highest number of SMEs within the study area that are located both in the centre of Coventry and outside of the CAZ in more rural areas.

The areas where there is a significant intersection between disadvantaged groups are illustrated in the following maps.

Figure 49 Intersection between 20% most income deprived 20% highest proportion BME (Black and Minority Ethnic) MSOAs in England and Wales



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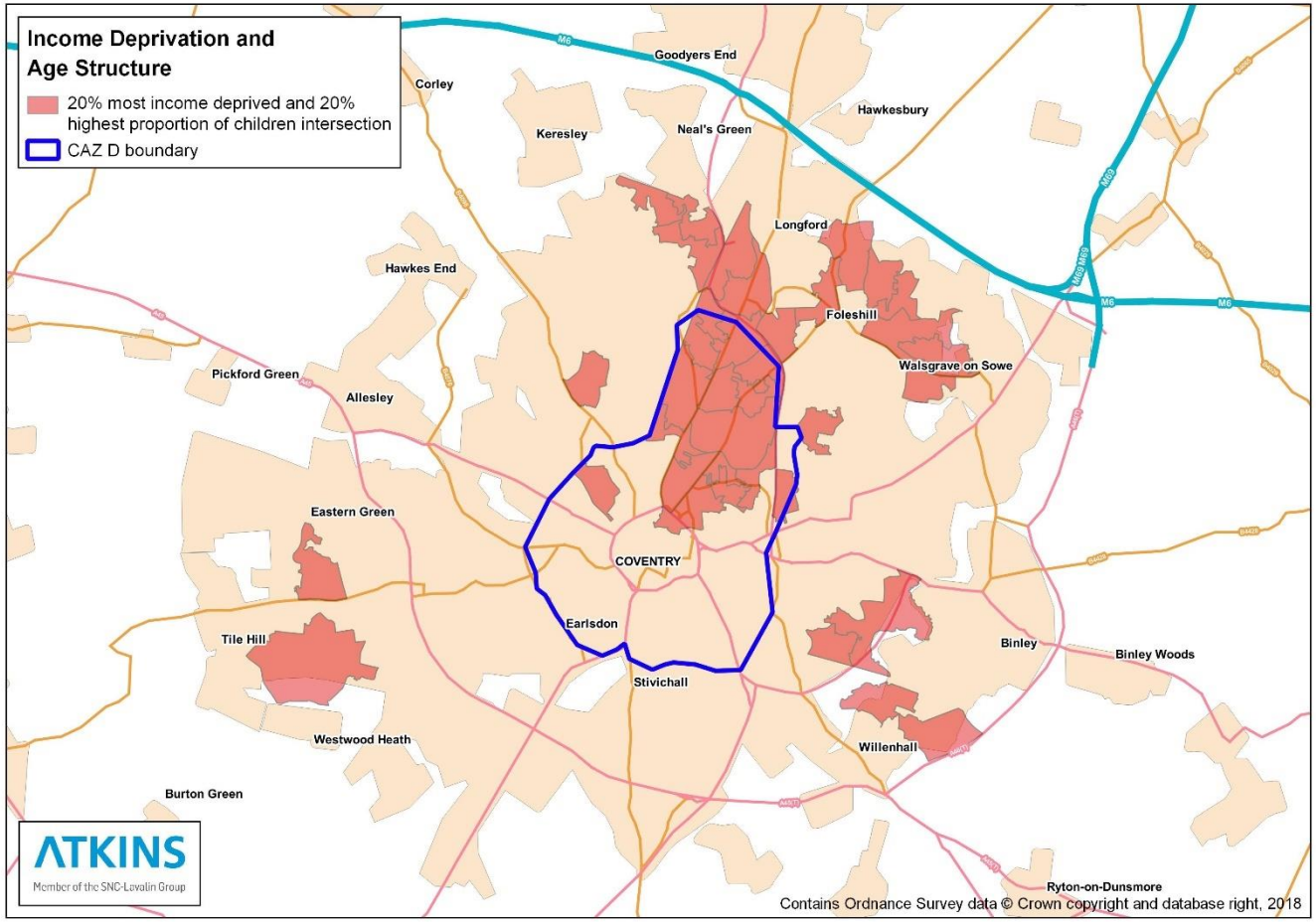
There are areas both within and surrounding the CAZ D with both high proportions of income deprived households and black and minority ethnic vulnerable groups, as shown in

Figure ***49***. There is a possibility that some of the populations in these LSOAs that are both from a minority ethnic group and low-income household. The impact of the scheme on populations in both these vulnerable groups may be more significant.

Figure 50 Intersection 20% most income deprived and 20% highest proportion of children by LSOA compared to the average in England and Wales



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There are areas both within and surrounding the CAZ D with both high proportions of income deprived households and under 16's, which can be seen in **Figure 50**. There is a possibility that some of the children in these LSOAs are also from a low-income household. The impact of the scheme on populations in both these vulnerable groups may be more significant than just the summation of the impact to each group separately.

Figure 51 Intersection 20% most income deprived and 20% highest proportion of people unable to work through illness or disability by LSOA compared to the average in England and Wales

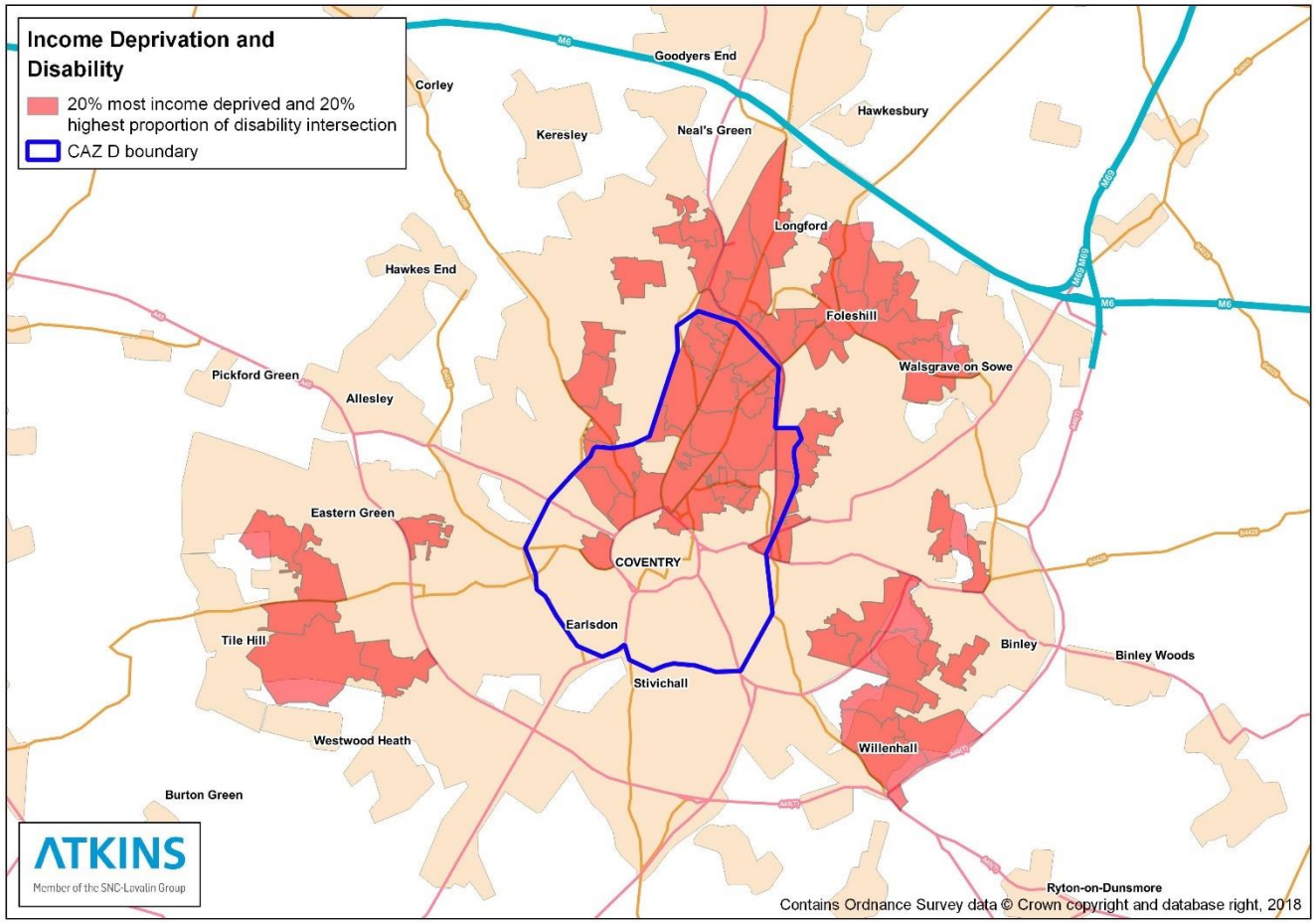

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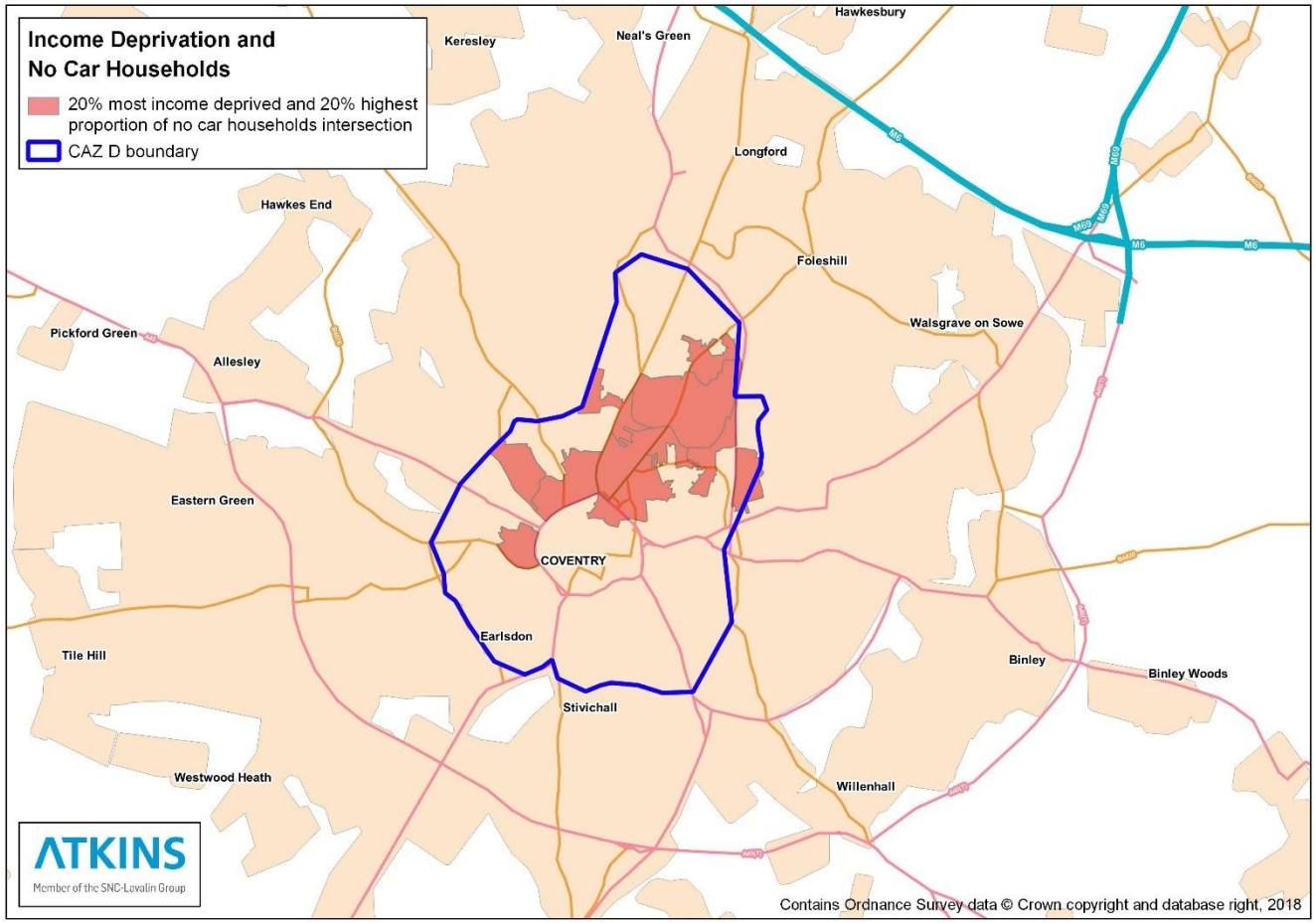
Figure 51 shows that there are areas both within and surrounding the CAZ D with both high proportions of income deprived households and disabled people. There is a possibility that some of the low-income households have an ill or disabled person residing there. The impact of the scheme on populations in both these vulnerable groups may be more significant than just the summation of the impact to each group separately.

Figure 52 Intersection 20% most income deprived and 20% highest proportion of no car households by LSOA compared to the average in England and Wales



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There are areas within the CAZ D with both high proportions of income deprived households and no car households, as shown in Figure 52. There is a possibility that some of the low-income households do not have access to a car. The impact of the scheme on populations in both these vulnerable groups may be more significant than just the summation of the impact to each group separately.

A.2. Distributional Impact Screening Proforma

ASSESSMENT OF DISTRIBUTIONAL IMPACTS (DIs) OF TRANSPORT INTERVENTIONS
Proforma for reporting conclusions of first screening stage (Step 1)

This form is intended for use by scheme promoters to capture the considerations, assessment and conclusions of the first screening stage of the DI analysis (Step 1). For a full description of Step 1 please see WebTAG guidance units A4.1 and A4.2. These initial screening tests are not intended to be onerous and should require no additional data collection or analysis. At this stage promoters are only expected to carry out a qualitative assessment, based on their professional judgement and that of the technical specialists responsible for undertaking assessment of noise, air quality, safety, security, severance, accessibility, personal affordability and user benefits.

Scheme name: Coventry Air Quality Local Plan Outline Business Case

Brief description of scheme:

In July 2017, the Government published the 'UK plan for tackling roadside NO_2 concentrations and Coventry was named as one of the 22 towns and cities in the UK where the NO_2 levels are forecast to exceed legal limits in 2020. The High Court has ordered the Government to achieve the legal limits in the shortest possible time. Coventry City Council (CCC) are required to produce an Outline Business Case (OBC) by the end of 2018 and a Full Business Case by the end of March 2019, for their proposed action plan(s).

Two options packages have been shortlisted to be considered at the OBC stage, DS2 and DS12a. DS2 is made up of a city wide charging CAZ D and DS12a is made up of the following options;

- City wide traffic signal technology upgrade and additional VMS;
- Taxi licence changes to improve fleet emissions;
- Support for taxi drivers to encourage upgrade of vehicles;
- Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes;
- Travel planning package city wide;
- High quality cycle infrastructure along 4 routes;
- Capacity improvements at Spon End;
- Redesign of Ring Road J7;
- Closure of Coundon Road level crossing;
- Removal of signals at Holyhead Road/Barras Lane;
- HGV ban on Holyhead Road between railway line and J8; and

- Peak time restrictions on Holyhead Road (inbound AM, outbound PM).

When undertaking screening for this project, it was decided to screen each potential intervention measure to understand the individual impacts caused by the separate measures included within DS12a.

Indicator	(a) Appraisal output criteria	Potential Intervention	(b) Potential impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
User benefits	• Changes in travel time • Changes in user charges, including fares, tariffs and tolls • Changes in vehicle operating costs met by the user (i.e. for private transport)	City wide traffic signal technology upgrade and additional VMS (particularly important for HR to enable	Yes	Could potentially lead to reduced congestion and improved journey times. If diversions are implemented to improve air quality this could potentially increase journey times.	Yes
		CAZ D City Wide	Yes	Charges for high emission vehicles will have an impact on vehicle operating costs for private transport users. This may particularly impact low income households who are more likely to have an older car that produce higher emissions.	Yes
		Taxi licence changes to improve fleet emissions	No	Assume that vehicles have similar performance to current vehicles and that any associated costs are not passed on to the user.	No
		Travel Planning (City Wide package)	No	Will not directly affect user benefits	No
		Support for taxi drivers to encourage upgrade of vehicles	No	Assume that vehicles have similar performance to current vehicles and that any associated costs are not passed on to the user.	No

		Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	No	Assume that vehicles have similar performance to current vehicles and that any associated costs are not passed on to the user.	No
		Capacity improvements at Spon End	Yes	Likely to reduce waiting time and congestion and as result improve user benefits	Yes
		Redesign of Ring Road J7	Yes	Likely to reduce waiting time and congestion and as result improve user benefits	Yes
		Removal of signals at Holyhead Road/Barras Lane	Yes	Likely to reduce waiting time and congestion and as result improve user benefits	Yes
		HGV ban on Holyhead Road between railway line and J8	Yes	Possibility of increased journey times and increased fuel costs due to diversion of HGVs away from Holyhead Road and decreased journey times for LGVs travelling on Holyhead Road.	Yes
		Closure of Coundon Road level crossing	Yes	Increased journey times and fuel costs for re-routing private vehicle users as result of closure of level crossing to private vehicles.	Yes
		High quality cycle infrastructure along 4 routes	No	Unlikely to have a significant effect on journey times or fuel costs	No
Noise	Changes in noise levels – move in line with traffic on roads	City wide traffic signal technology upgrade and additional VMS (particularly important for HR to enable	No	Unlikely to change traffic levels significantly to create a significant change in noise levels.	No
		CAZ D City Wide	Yes	Implementation of CAZ D could reduce the amount of traffic in the CAZ due to people avoiding the area, which has a potential impact on noise.	Yes
		Taxi licence changes to	Yes	Moving towards newer engines and electric and hybrid technology is likely to reduced noise emitted by a vehicle but these vehicles are likely	Yes

	improve fleet emissions		to be too widely spread across the city to make significant difference to noise levels	
	Travel Planning (City Wide package)	No	Unlikely to have a significant impact on noise levels.	No
	Support for taxi drivers to encourage upgrade of vehicles	Yes	Moving towards newer engines and electric and hybrid technology is likely to reduced noise emitted by a vehicle but these vehicles are likely to be too widely spread across the city to make significant difference to noise levels	yes
	Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	Yes	Moving towards newer engines and electric and hybrid technology is likely to reduced noise emitted by a vehicle but these vehicles are likely to be too widely spread across the city to make significant difference to noise levels. May be a significant reduction in noise around bus station in Coventry City Centre	Yes
	Capacity improvements at Spon End	Yes	Noise levels may change as a result of changes in traffic flow in the area	Yes
	Redesign of Ring Road J7	Yes	Noise levels may change as a result of changes in traffic flow in the area	Yes
	Removal of signals at Holyhead Road/Barras Lane	Yes	Noise levels may change as a result of changes in traffic flow in the area	Yes
	HGV ban on Holyhead Road between railway line and J8	Yes	Noise likely to be reduced on Holyhead Road but my increase in other areas depending on route taken by displaced HGVs.	Yes
	Closure of Coundon Road level crossing	Yes	Reduced noise levels around the level crossing and on Coundon Road but likely to lead to increased traffic levels on parallel routes and hence increased noise on these routes	Yes
	High quality cycle infrastructure along 4 routes	Yes	Potential for modal shift if cycling conditions are improved across the city which could have an impact on noise levels.	Yes

Air quality	Change in emissions	City wide traffic signal technology upgrade and additional VMS (particularly important for HR to enable	Yes	Potential reduction in waiting with engine idling and reduction in the need to accelerate after stopping.	Yes
		CAZ D City Wide	Yes	Implementation of a Clean Air Zone in the area is expected to reduce the amount of high emission vehicles in the area, hence impacting air quality.	Yes
		Taxi licence changes to improve fleet emissions	Yes	Reduced emissions from taxis and hence an affect on air quality in the area.	Yes
		Travel Planning (City Wide package)	Yes	Encouraging modal shift by targeting travel behaviour has the potential to improve air quality.	Yes
		Support for taxi drivers to encourage upgrade of vehicles	Yes	Potential to reduce taxi emissions. Extent of which emissions are reduced based on the amount of resources provided to taxi drivers and the uptake of such a scheme.	Yes
		Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	Yes	Improved engines will reduce emissions.	Yes
		Capacity improvements at Spon End	Yes	Potentially reduced idling of engines and reduced acceleration which will lead to reduced emissions if scheme reduces congestion	Yes
		Redesign of Ring Road J7	Yes	Potentially reduced idling of engines and reduced acceleration which will lead to reduced emissions if scheme reduces congestion	Yes
		Removal of signals at Holyhead Road/Barras Lane	Yes	Potentially reduced idling of engines and reduced acceleration which will lead to reduced emissions if scheme reduces congestion	Yes
		HGV ban on Holyhead Road	Yes	Potential for reduced emissions on Holyhead Road but depending on how vehicles divert,	Yes

		between railway line and J8		there is the potential for increased emissions in other areas of the city	
		Closure of Coundon Road level crossing	Yes	Improved air quality on Coundon Road and may encourage modal shift to buses and active modes of transport. The closing could also lead to increased traffic and hence, emissions on neighbouring and parallel routes due to traffic diversion	Yes
		High quality cycle infrastructure along 4 routes	Yes	Modal shift from private vehicles to cycling could reduce emissions.	Yes
Accidents	Changes in accident rates – move in line with traffic/speed on roads	City wide traffic signal technology upgrade and additional VMS (particularly important for HR to enable	No	Unlikely to have significant direct effects on traffic level / flows and hence is unlikely to affect accidents	No
		CAZ D City Wide	No	Implementation of a CAZ D is likely to impact the amount of traffic in the area. There is a potential impact to accidents, however this is not considered to be significant.	No.
		Taxi licence changes to improve fleet emissions	No	Measure will not affect traffic flow and therefore have no effect on accidents	No
		Travel Planning (City Wide package)	No	Potential to change accidents if mode is changed but hard to discern affects and likely to have negligible change on accidents	No
		Support for taxi drivers to encourage upgrade of vehicles	No	Measure will not affect traffic flow and therefore have no effect on accidents	No
		Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	No	Measure is not likely to affect traffic flow and therefore have no effect on accidents	No

		Capacity improvements at Spon End	No	Intervention targeting air quality, even though there could be changes in traffic flow there is unlikely to be a significant impact on accidents	No
		Redesign of Ring Road J7	No	Intervention targeting air quality, even though there could be changes in traffic flow there is unlikely to be a significant impact on accidents	No
		Removal of signals at Holyhead Road/Barras Lane	No	Intervention targeting air quality so unlikely to have a significant impact on accidents	No
		HGV ban on Holyhead Road between railway line and J8	No	This may have a result in a change in accident levels due to reduced HGVs, however, this is unlikely to be significant.	No
		Closure of Coundon Road level crossing	Yes	Could reduce any accidents around Coundon Road due to reduced traffic levels. Reduces interface with level crossing and hence the likeliness of an accident occurring on here.	No
		High quality cycle infrastructure along 4 routes	Yes	Potential increase change cycling levels and improve safety for cyclists on roads.	No
Security	Any change in public transport waiting/interchange facilities including pedestrian access expected to affect user perceptions of personal security.	City wide traffic signal technology upgrade and additional VMS (particularly important for HR to enable	No	Traffic signal upgrades are not expected to have an impact on security.	No
		CAZ D City Wide	No	A Clean Air Zone is not expected to have an impact on security.	No
		Taxi licence changes to improve fleet emissions	No	Changes to vehicles will not change passenger environment	No
		Travel Planning (City Wide package)	No	While travel planning may increase the use of public transport, this isn't expected to have an impact on security.	No
		Support for taxi drivers to encourage	No	Changes to vehicles are unlikely to change the passenger environment	No

		upgrade of vehicles			
		Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	No	Improvements to waiting facilities may improve security. However. there is unlikely to be significant changes in security as result of the improvements.	No
		Capacity improvements at Spon End	No	Improvements are mainly focused on highway improvements for vehicles and therefore changes for pedestrians and cyclists is likely to be minimal.	No
		Redesign of Ring Road J7	No	Improvements are mainly focused on highway improvements for vehicles and therefore changes for pedestrians and cyclists is likely to be minimal.	No
		Removal of signals at Holyhead Road/Barras Lane	No	Low emission taxis aren't expected to have an impact on user perceptions of personal security.	No
		HGV ban on Holyhead Road between railway line and J8	No	Improvements mainly focused on highway improvements for vehicles and therefore changes for pedestrians and cyclists is likely to be minimal	No
		Closure of Coundon Road level crossing	Yes	As part of the closure of the level crossin. cyclists and pedestrians are expected to make use of a tunnel running under the railway parallel. The scheme would include improvements to the tunnel, but issues would remain with the visibility around and within the tunnel.	No
		High quality cycle infrastructure along 4 routes	No	Potentially could lead to improvement in informal surveillance if more people cycle, however, this is unlikely to be significant.	No
Severance	Introduction or removal of barriers to pedestrian movement, either through changes to road crossing provision, or through	City wide traffic signal technology upgrade and additional VMS (particularly	Yes	Traffic signal interventions would not include any changes that would introduce or remove barriers or transport corridors. However, a change in traffic flow of greater that 10% could occur due to changing levels of traffic.	Yes

introduction of new public transport or road corridors.	important for HR to enable			
	CAZ D City Wide	Yes	Clean Air Zone interventions wouldn't include any changes that would introduce or remove barriers or transport corridors. However, a change in traffic flow of greater that 10% could occur due to changing levels of traffic.	Yes
	Taxi licence changes to improve fleet emissions	No	Changes to vehicles are not likely to affect severance	No
	Travel Planning (City Wide package)	No	There are no changes being implemented to pedestrian facilities, through either the introduction or removal of barriers to pedestrian movement.	No
	Support for taxi drivers to encourage upgrade of vehicles	No	Changes to vehicles are not likely to affect severance	No
	Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	No	Changes to vehicles are not likely to affect severance.	No
	Capacity improvements at Spon End	Yes	Extra capacity may encourage more people to use the route or change speeds at the junction.	Yes
	Redesign of Ring Road J7	Yes	Redesign could encourage more or less traffic to use the junction	Yes
	Removal of signals at Holyhead Road/Barras Lane	No	This may increase traffic speeds but is not likely to have a significant affect.	No
	HGV ban on Holyhead Road between railway line and J8	Yes	Potential to redistribute vehicles from one corridor to another. Hence, some roads may see significant reductions in traffic and others increases	Yes

		Peak time restrictions on Holyhead Road (inbound AM, outbound PM)	Yes	Potential to redistribute vehicles from one corridor to another. Hence, some roads may see significant reductions in traffic and others increases	Yes
		Closure of Coundon Road level crossing	Yes	Potential to redistribute vehicles from one corridor to another. Hence, some roads may see significant reductions in traffic and others increases	Yes
		High quality cycle infrastructure along 4 routes	No	Cycle infrastructure is not likely to have a significant impact on severance.	No
Accessibility	• Changes in routings or timings of current public transport services, any changes to public transport provision, including routing, frequencies, waiting facilities (bus stops / rail stations) and rolling stock, or any indirect impacts on accessibility to services (e.g. demolition & re-location of a school). • Accessibility impacts should consider changes in services, routings or timings of current public transport services within the impact area	City wide traffic signal technology upgrade and additional VMS (particularly important for HR to enable	No	This intervention will not affect public transportation	Yes
		CAZ D City Wide	No	This intervention will not affect public transportation	Yes
		Taxi licence changes to improve fleet emissions	No	This intervention will not affect public transportation	Yes
		Travel Planning (City Wide package)	No	This is unlikely to have a significant impact on accessibility.	Yes
		Support for taxi drivers to encourage upgrade of vehicles	No	This intervention will not affect public transportation	Yes
		Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	No	Changing vehicle engines will not change passenger facilities on bus.	Yes

		Capacity improvements at Spon End	No	This intervention will not affect public transportation	Yes
		Redesign of Ring Road J7	No	This intervention will not affect public transportation	Yes
		Removal of signals at Holyhead Road/Barras Lane	No	This intervention will not affect public transportation	Yes
		Peak time restrictions on Holyhead Road (inbound AM, outbound PM)	No	This intervention will not affect public transportation	Yes
		HGV ban on Holyhead Road between railway line and J8	No	This intervention will not affect public transportation	Yes
		Closure of Coundon Road level crossing	Yes	Potential to reduce accessibility for public transport and people taking public transport as bus routes may need to be diverted.	Yes
		High quality cycle infrastructure along 4 routes	No	This intervention will not affect public transportation	Yes
Affordability	In cases where the following charges would occur; Parking charges (including where changes in the allocation of free or reduced fee spaces may occur); Car fuel and non-fuel operating costs (where, for example, rerouting or changes in journey speeds and congestion occur resulting in changes in costs); Road user charges (including discounts and exemptions for different groups of travellers); Public transport fare changes (where, for example premium fares are set on new or existing modes or	City wide traffic signal technology upgrade and additional VMS (particularly important for HR to enable	Yes	Potential reduction in fuel costs due to less need to stop and accelerate.	Yes
		CAZ D City Wide	Yes	Charges for high emission vehicles will have an impact on vehicle operating costs for private transport users. This may particularly impact low income households who are more likely to have an older car that produce higher emissions.	Yes
		Taxi licence changes to improve fleet emissions	No	This is not expected to have a significant impact on personal security.	Yes

where multi-modal discounted travel tickets become available due to new ticketing technologies); or Public transport concession availability (where, for example concession arrangements vary as a result of a move in service provision from bus to light rail or heavy rail, where such concession entitlement is not maintained by the local authority).	Travel Planning (City Wide package)	No	This is not expected to have a significant impact on personal security.	Yes
	Support for taxi drivers to encourage upgrade of vehicles	No	This is not expected to have a significant impact on personal security.	Yes
	Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	No	This is not expected to have a significant impact on personal affordability.	Yes
	Capacity improvements at Spon End	Yes	Potential reduction in fuel costs due to less need to stop and accelerate.	Yes
	Redesign of Ring Road J7	Yes	Potential reduction in fuel costs due to less need to stop and accelerate.	Yes
	Removal of signals at Holyhead Road/Barras Lane	Yes	Potential reduction in fuel costs due to less need to stop and accelerate.	Yes
	HGV ban on Holyhead Road between railway line and J8	Yes	Potential for increased fuel costs due to having to take a longer route	Yes
	Peak time restrictions on Holyhead Road (inbound AM, outbound PM)	Yes	Potential for increased fuel costs due to having to take a longer route.	Yes
	Closure of Coundon Road level crossing	Yes	Potential for increased fuel costs due to having to take a longer route.	Yes
	High quality cycle infrastructure along 4 routes	Yes	Cost of bike may be prohibitive to people with lower income, however once a bike is purchased the marginal cost of a journey is close to zero (low maintenance costs) and hence may make travel more affordable	Yes

Indicator	Screening outcome -Further Appraisal Required	
	DS2	DS12a
User benefits	Yes	Yes
Noise	Yes	Yes
Air Quality	Yes	Yes
Accidents	No	No
Security	No	No
Severance	Yes	Yes
Accessibility	Yes	Yes
Affordability	Yes	Yes