

BIRMINGHAM CITY COUNCIL

CABINET

MONDAY, 10 SEPTEMBER 2018 AT 14:30 HOURS
IN SPECIAL MEETING - COMMITTEE ROOM 6, COUNCIL HOUSE,
VICTORIA SQUARE, BIRMINGHAM B1 1BB, [VENUE ADDRESS]

A G E N D A

1 NOTICE OF RECORDING/WEBCAST

The Chairman to advise/meeting to note that this meeting will be webcast for live or subsequent broadcast via the Council's Internet site (www.civico.net/birmingham) and that members of the press/public may record and take photographs except where there are confidential or exempt items.

2 DECLARATIONS OF INTERESTS

Members are reminded that they must declare all relevant pecuniary and non pecuniary interests arising from any business to be discussed at this meeting. If a disclosable pecuniary interest is declared a Member must not speak or take part in that agenda item. Any declarations will be recorded in the minutes of the meeting.

3 APOLOGIES

To receive any apologies.

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**4 TACKLING AIR QUALITY IN BIRMINGHAM - CLEAN AIR ZONE –
SUBMISSION OF BUSINESS CASE TO GOVERNMENT**

Report of the Corporate Director, Economy.

5 OTHER URGENT BUSINESS

To consider any items of business by reason of special circumstances (to be specified) that in the opinion of the Chairman are matters of urgency.

BIRMINGHAM CITY COUNCIL

PUBLIC REPORT

Report to:

Report of:

Date of Decision:

SUBJECT:

Cabinet

Corporate Director of Economy

10th September 2018

BIRMINGHAM CLEAN AIR ZONE SUBMISSION OF

PREFERRED OPTION BUSINESS CASE TO

GOVERNMENT

Key Decision: Yes

If not in the Forward Plan:

(please "X" box)

Relevant Cabinet Member(s)

or Relevant Executive

Member:

Relevant O&S Chair:

005425/2018

Chief Executive approved

O&S Chair approved

Councillor Waseem Zaffar – Transport and Environment

Wards affected:

ALL

1. Purpose of report:

- 1.1 To provide an overview of the consultation responses received on the Clean Air Zone (CAZ) proposal.
- 1.2 To set out how the consultation responses received have been considered and how these have been taken into account within the Preferred Clean Air Zone Option including a proposed package of mitigation measures;
- 1.3 To seek approval of the Preferred Clean Air Zone Option as detailed in Section 5.
- 1.4 To seek approval to submit the Preferred Clean Air Zone Option Business Case to Government, including a funding request for both the required infrastructure and the support measures to mitigate the social and economic impact. A submission to Government is required to satisfy the requirements of the Ministerial Direction issued in December 2017, so far as the Council is able.
- 1.5 To set out the next steps for the implementation of the proposed scheme.

2 Decision(s) recommended:

That Cabinet:

- 2.1 Notes the Consultation Report at Appendix 2 which provides an analysis of the public consultation response.
- 2.2 Approves the Preferred Clean Air Zone Option Business Case and proposed package of mitigation measures to reduce the social and economic impact of the scheme as detailed in Appendix 1 of this report.
- 2.3 Notes that the Council has made a demonstrable and meaningful response to the public consultation when defining these mitigation measures.
- 2.4 Approves the submission of the Preferred Clean Air Zone Option Business Case to Government ahead of the 15 September 2018 deadline to satisfy the Ministerial Direction issued in December 2017.
- 2.5 Notes that a Procurement Strategy for the Clean Air Zone will be the subject of a later report.
- 2.6 Notes that a further report will be presented to Cabinet to seek authority to implement the Clean Air Zone in accordance with the Council's Gateway and Related Financial Approval framework.

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3 Consultation

3.1 Internal

3.1.1 This report has been discussed in detail with the Leader, Deputy Leader and the Executive Management Team. Opposition leaders were engaged during the consultation period. A presentation was given to the Sustainability and Transport Overview & Scrutiny Committee on 2 August 2018 regarding the proposals, with a further briefing in respect of this report provided to the Chair.

3.1.2 In respect of the Clean Air Zone briefings have been delivered to all ward councillors, key political party groups and the relevant Council directors. Officers from City Finance, Procurement and Legal & Democratic Services have been involved in the preparation of this report.

3.2 External

3.2.1 The Council undertook a statutory public consultation on the Clean Air Zone proposals from 4 July to the 17 August 2018, with key stakeholder groups engaged. Further details are provided in Section 5 of this report and the Consultation Report (Appendix 2).

4 Compliance Issues:

4.1 Are the recommended decisions consistent with the Council's policies, plans and strategies?

4.1.1 The implementation of the Clean Air Zone programme will achieve outcomes and allow benefits to be realised, which are consistent with the following outcomes as set out in the Council Plan 2018-2020:

- Outcome 1 – Birmingham is an entrepreneurial city in which to learn, work and invest in;
- Outcome 2 – Birmingham is an aspirational city to grow up in;
- Outcome 3 - Birmingham is a fulfilling city to age well in;
- Outcome 4 – Birmingham is a great city to live in.

4.1.2 Improving air quality as soon as possible, consistent with other statutory responsibilities is a key ambition of the Birmingham Health and Wellbeing Strategy and supports the delivery of policies included in the 'Birmingham Connected Transport White Paper', which in turn, supports delivery of the adopted Birmingham Development Plan and Movement for Growth

4.1.3 The Health and Social Care Act 2012 requires Local Authorities in England to have a Health and Wellbeing Board (HWBB). A key responsibility of the HWBB is to develop a Health and Wellbeing Strategy (HWBS). Improving air quality is a key ambition of the Birmingham Health and Wellbeing Strategy.

4.2 Financial Implications

4.2.1 Whilst the approval of this report does not have any direct financial implications, the financial information set out below is included for reference as there are potential financial implications for future years in relation to ongoing operational costs. As stated in Section 2 further approvals to implement the scheme will be made in a subsequent

report(s) in accordance with the Council's Gateway and Related Financial Approval Framework.

- 4.2.2 The CAZ programme will be funded via a capital funding grant which is expected to be awarded to the Council by Government. This grant will be a Section 31 unconditional grant and will be for the total cost of the project. It is not anticipated that there will be any capital funding implications for the Council for the implementation of this programme.
- 4.2.3 The estimated capital and revenue expenditure (summarised below) have been calculated using the Government's 'Green Book' as guidance/reference material. All currently estimated capital and revenue expenditure includes an optimism bias, as per the 'Green Book' guidance. In addition to this, a suitable contingency has been incorporated into all estimates in order to mitigate the risk to the Council, reducing the likelihood of exposure due to an underestimation and subsequent cost overrun. The cost estimate will be refined as the programme proceeds and a finalised estimate of capital cost requirements and estimated revenue income and expenditure will be provided in subsequent reports.
- 4.2.4 The capital funding from Government has been divided into two funding streams (1) the Implementation Fund and (2) the Clean Air Fund.
- 4.2.5 The Implementation Fund will provide funding for the Council to implement the physical scheme, i.e. the CAZ signing and Automatic Number Plate Recognition (ANPR) camera networks and the 'back office' charging system. The Clean Air Fund will provide the funds required by the Council to implement a package of mitigation measures; the measures that are proposed to be implemented by the Council to mitigate the impact to the most significantly affected socio-economic groups, as per the consultation response (Appendix 2). The table below provides an overview of the capital which is currently estimated to be required from each funding stream.

Table 1.0 – Estimate of capital funding required from the Implementation Fund

Funding Profile	2018/2019	2019/2020	Later years	Total
Implementation Fund	£0	£20.767m	£3.625m	£24.392m
Clean Air Fund	£16.166m	£14.857m	£5.182m	£36.205m

- 4.2.6 Productive, ongoing dialogue with the Government's Joint Air Quality Unit (JAQU) has continued to take place as the proposals have developed. In the event that Government reject the Council's proposal and in the unlikely event that the scheme does not proceed, the developmental funding which has been granted thus far (c. £1.124m) will not be repayable to Government. Approval to apply for and accept developmental funding was given in the Cabinet report "Updated Transportation & Highways Funding Strategy 2017/18 to 2022/23 Programme Definition Document" which was approved on the 16th of May 2017.
- 4.2.7 A number of highways assets will be introduced as a result of the implementation of this proposed scheme. As such there will be revenue expenditure required for the maintenance of these assets, together with ongoing operational costs of the CAZ system. Further detail will be provided in subsequent reports to Cabinet. Table 2.0 shows the currently estimated annual revenue expenditure for this scheme, as detailed in Appendix 1.

Table 2.0 Estimate of the revenue expenditure of the scheme

Ops and Maint. Cost Profile	2018/2019	2019/2020	Later years	Total
Totals	£0	£0	£7.311m	£7.311m

4.2.8 A revenue income will be generated by the implementation of this scheme. This will be broken into two revenue streams; (1) CAZ generated (2) non-CAZ generated. The CAZ generated income will come from the charges which the drivers of non-compliant vehicles will pay and the Penalty Charge Notices (PCN's) which will be issued for failure to pay. The non-CAZ generated income will come from the conversion of Council managed on-street parking spaces which are currently free to use, into parking spaces for which a charge will apply; it is estimated that there are around 6,000 spaces which will be converted. The table below provides an overview of the income which is currently estimated for each revenue stream. It should be noted that the below values are subject to refinement based on final charging proposals. They should therefore be taken as indicative only until the time at which Cabinet approval is sought to implement the scheme.

Table 3.0 Estimate of the revenue income of the scheme (all costs are £m)

Calendar Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
CAZ Revenue (£m)	43.67	41.30	35.72	29.93	23.91	17.62	14.71	11.67	8.49	5.17	232.2
Non-CAZ revenue (£m)	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	28.4
Totals	46.51	44.14	38.56	32.77	26.75	20.46	17.55	14.51	11.3	8.01	260.59

4.2.9 The CAZ generated income will first be used to cover the costs of running the CAZ. The Transport Act 2000 requires any excess revenue that may arise to be re-invested to facilitate the achievement of local transport policies: the money would be invested in transport infrastructure measures to benefit the public and improve air quality. Similarly the revenue which is non-CAZ generated will be used for the operation and maintenance of the assets from which the revenue is generated and any surplus will again be used for future transport and air quality improvement schemes.

4.2.10 Potential Financial Penalties:

4.2.10.1 The European Commission has referred the United Kingdom to the European Court of Justice (ECJ) for failing to meet its legal obligation to secure compliance with the agreed air quality limit values, and for failing to take the appropriate measures to keep exceedance periods as short as possible. The ECJ found that the UK has not presented credible, effective and timely measures to reduce air pollution, as required under EU law. As such, if the UK continues to fail to comply post January 2020, the ECJ could impose periodic, or lump sum penalties on the UK. The value of such penalties is not currently known, however it is expected that such penalties will be substantial. The penalties would, in the first instance, be imposed upon the UK Government; however, Part 2 of the Localism Act 2011 empowers the Government to require the offending Local Authorities to contribute to the penalty.

4.2.10.2 Any relevant effects of the decision to trigger article 50 of the Lisbon Treaty resulting in the UK renouncing its membership of the EU are as yet unclear. However the Council has been advised that decision making should continue unless and until there is a clear indication at national level to the contrary. It is considered more likely than not that the above legal responsibilities will continue in substantially similar form beyond March 2019 and the National Air Quality Plan does not suggest otherwise

4.3 Legal Implications

4.3.1 The full extent of the legal implications are detailed in the Cabinet Report (*Tackling Air Quality in Birmingham – Clean Air Zone*) approved on the 26th June 2018; The relevant regulation, legislation, directives are listed below:

- The Ambient Air Quality and Cleaner Air for Europe Directive 2008
- The Environment Act 1995
- Air Quality Standard Regulation 2010
- The Localism Act 2011
- Birmingham City Council Air Quality Direction 2017
- Transport Act 2000
- Town and Country Planning Act 1990
- Highways Act 1980
- Road Traffic Regulation Act 1984
- Traffic Management Act 2004
- Countryside and Rights of Way Act 2000
- Ministerial Direction (Issued 19th December 2017)

4.4 Public Sector Equality Duty

4.4.1 The Council has a statutory equality duty to ensure that no dis-benefits are introduced to any of the socio-economic groups in Birmingham. The CAZ programme is likely to have an impact on a variety of aspects, including the health and well-being and financial capacity of those working in, living in and visiting the city. Air quality and traffic modelling shows that the overall impact to the traffic network will be positive in terms of air quality. As such, a Distributional Analysis has been undertaken to screen for impacts on individuals and businesses. As detailed later this, together with the consultation responses, is being used to ensure the anticipated impacts of the scheme are understood and the Council can develop and implement the appropriate mitigation measures.

4.4.2 A separate Equality Impact Analysis has also been undertaken for this report, ref "EQUA79 Birmingham Clean Air Zone" and is provided at Appendix 4

5. Relevant background/chronology of key events:

5.1.1 The Preferred Clean Air Zone Option Business Case specifies that Birmingham should implement a Class D Clean Air Zone plus additional measures:

- A charging CAZ, operating within the A4540 Middleway ring road (excluding the ring road itself), such that non-compliant vehicles (i.e. buses, coaches, taxis, heavy goods vehicles, light goods vehicles and private cars) would be charged to enter the CAZ.
- Additional on-street parking controls.
- Network changes including on Suffolk Street Queensway / Paradise Circus and on Dartmouth Middleway.

5.1.2 These proposals will be supported by a package of measures to mitigate the impact on individuals and businesses who are considered least likely to be able to adapt easily to the changes required by the Clean Air Zone. This has been developed in response to the feedback received during the consultation.

5.2 Overview of consultation process

5.2.1 The consultation was launched on Wednesday 4th July 2018 and ran for 6 weeks until

Friday 17th August 2018.

5.2.2 The aim of the consultation process was to seek feedback from individuals and organisations on the proposals for a Class D Clean Air Zone for Birmingham. Specifically to:

- Gather feedback and thoughts on all aspects of the CAZ proposals (including the principle of the proposals);
- Develop a better understanding of the impact that the proposals would have on individuals and organisations;
- Identify what support/mitigation is needed for particular groups of people/organisations; and
- Seek suggestions for any further measures which may not have been considered.

5.3 **Publicising the consultation**

5.3.1 A press release and media briefing were held to coincide with the publication of Cabinet decision papers on 19 June.

5.3.2 The Council, along with its partners, used a number of different channels of communication to spread the word about the CAZ consultation. This included:

- Existing stakeholder and community networks;
- Existing email and other electronic communications (corporate BCC, departmental and schools);
- Public drop-in sessions;
- Roadside signage on approach to the CAZ area
- Radio and press advertising
- Public transport user messages, e.g. on bus stops
- Printed flyers delivered to all residential and commercial properties in and near to the proposed CAZ
- Traditional media
- Social media activity including Facebook and Twitter; and
- Stakeholder events.

5.3.3 Whilst engaging with businesses and organisations the Council also encouraged them to raise awareness of the Clean Air Zone with their clients, suppliers and other business contacts

5.4 **Response channels**

5.4.1 All publicity directed citizens to www.birmingham.gov.uk/caz, from where they were sent to the Be Heard website where separate surveys for individual citizens and for businesses/organisations were available. Between 1 July and 17 August there were 46,241 unique visitors to the Birmingham City Council Clean Air Zone page.

5.4.1.1 The following documents were available to view or download on the Be Heard site:

- Consultation Summary Document
- Air Quality Modelling Report
- Transport Modelling Forecasting Report
- Additional Measures - CAZ Feasibility Report

- Frequently Asked Questions
- Acronyms and Abbreviations
- Clean Air Zone Briefing Presentation
- Printable posters (colour and black & white)

5.4.2 Respondents were asked to submit their feedback about the proposals through the online questionnaire. It included closed questions and open questions providing the opportunity for respondents to give additional comments. Where contact was made through a channel other than Be Heard, people were encouraged to also complete the questionnaire online or on paper, if they were able to. However, some businesses felt that the questionnaire was not suitable for their organisation and submitted a response via email to the Clean Air mailbox.

5.4.3 For those people who did not wish to or were not able to respond to the questionnaire online, paper copies and consultation summary documents were available in all 37 libraries across Birmingham. In addition to this, technical documents were available at the Library of Birmingham and available upon request for those who could not access the document online. Paper copies of the questionnaire were also sent in the post to individuals upon request.

5.4.4 A face to face drop-in session for Councillors was held alongside a Full Council meeting on the 10 July with a presentation and materials pack available for Ward Forums on request.

5.5 **Email correspondence**

5.5.1 All email correspondence sent via cleanair@birmingham.gov.uk was logged, acknowledged and responded to where relevant and appropriate. Emails from 275 citizens relating to the Clean Air Zone were logged.

5.5.2 **Dedicated phone line**

5.5.3 A dedicated phone line was available throughout the consultation during office hours, with a voicemail available outside of these times. 80 calls were received, logged in the correspondence log and dealt with accordingly.

5.6 **Public drop-in sessions**

5.6.1 Twelve face to face public drop-in sessions were held. The events were held in multiple locations across Birmingham, as shown below. The events attracted different levels of interest, with an average of 33 attendees per event.

5.6.2 In addition, two lunchtime drop-in events for Birmingham City Council staff were held, at Woodcock Street and Lancaster Circus.

5.7 **Stakeholder Communication**

5.7.1 Four stakeholder seminars were held within the city centre for organisations and businesses wishing to find out more information about the proposals and to feedback their concerns, comments and ideas. An invitation email was sent using the existing BCC corporate and departmental databases to approximately 26,000 businesses and organisations inviting them to register interest in the stakeholder seminars. The sessions each ran for three and a half hours and included a presentation, Q&A, and an interactive group session.

5.8 **Taxi /Private Hire events**

5.8.1 Five events specifically for taxis and private hire drivers were held by the licencing team for taxi drivers to come and talk to Council officers about its Clean Air Zone proposals and to find out what specific concerns were for taxi drivers. An invitation was sent by the licencing team to the taxi reps, inviting their members to any of the five events.

5.9 **Key strategic stakeholder meetings**

5.9.1 In addition to the public drop-in sessions and stakeholder seminars various stakeholders were engaged through private briefings and third-party events including:

- Retail Business Improvement District
- Greater Birmingham Chambers of Commerce
- Freight and Transport Association (FTA)
- Full Council Meeting
- Solihull Council
- West Midlands Bus Operators Panel
- West Midlands Bus Alliance Board
- Central Mosque
- Northfield Ward Meeting
- Sandwell Council
- Hammersons
- Taxi Trade Liaison Meeting
- Motorcycle Action Group
- Showmen's Guild
- RMT Union
- Citizen UK

5.10 **Key themes Emerging from Analysis of Comments Received (from both individuals and organisations)**

5.10.1 In total some 10,392 individuals responded to the consultation, along with 386 organisations and businesses. In addition, 394 responses to a petition organised by the Motorcycle Action Group were received (included at section 5.3 in the consultation analysis report which is attached at Appendix 2).

5.10.2 This is believed to be the highest level of response that has been received to any consultation the Council has ever undertaken. The consultation response was not only large in terms of number of responses but also raised a substantial number of issues. The analysis undertaken has identified the key themes which were raised and these are summarised below.

5.10.3 At the time of writing this report, all of the responses from the consultation have been analysed and considered sufficiently in order to enable a proper view to be taken in the preparation of the Preferred Option Business Case. More detailed responses to specific issues will take slightly longer to consider. It is proposed that engagement continues

with key stakeholders on the proposals as the Council progresses towards implementation.

5.10.4 Opinions were divided on the overall impact of the proposed CAZ, with support from individuals and businesses for the health benefits, but concerns about the impact on themselves and their families, Birmingham as a city, and particularly on businesses in Birmingham.

Table 4.0 Respondents' views on the impact of the proposed CAZ

Individuals	Organisations
25% of individuals said it would be positive for themselves and their family, with 53% saying it would be negative whilst	13% stated that the CAZ would have a positive impact on their organisation, with 74% saying it would have a negative impact.
13% of individuals said it would be positive for businesses in Birmingham and 73% said negative.	11% of organisations said it would be positive for businesses in Birmingham and 77% said negative.
32% felt it would be positive for Birmingham as a city and 53% felt the impact would be negative.	29% felt it would be positive for Birmingham as a city and 50% felt the impact would be negative

5.10.5 Analysis of the comments received shows that the main areas of support were for improvements in air quality and health, better public transport and an improved feel to the city centre.

5.10.6 The main areas of concern voiced were around residents and commuters experiencing financial difficulties, creating difficulties for businesses, the CAZ leading to financial inequality, increased pollution elsewhere and therefore no positive impact on air pollution or health and increased public transport costs.

5.10.7 There were some calls for the Council to consider non-charging alternatives to a Clean Air Zone. The Council's detailed assessment of the air quality measures that are required has rejected out any options that did not include a charging element as this would require major modal shift and significant investment in transport infrastructure upgrades. Moreover, it would not be possible to implement these as to achieve compliance with NO2 limits in the shortest possible time, consistent with other statutory and other responsibilities.

5.10.8 There was some support for the CAZ location outlined the proposals, with others asking for it to cover a larger area. Some suggested the zone should be smaller, only covering the inner ring road or excluding certain areas, such as the Jewellery Quarter, industrial areas and the A38.

5.10.9 There were also concerns that pollution would merely be displaced elsewhere in the city, and perhaps even to areas which were more residential in nature, so that the health benefits for those living and working in the CAZ would be balanced out – and even outweighed – by those living in areas which may see increased traffic and congestion. However, it is considered that air quality improvements will still be delivered across a much wider area as the compliant vehicles travelling into the charging zone will pass through the communities around the charging boundary and across the wider area.

5.10.10 There were a number of suggestions for additional actions to improve air quality including:

- Further improve public transport (including developing the rail networks and extending the tram system)
- Improve the cycle network
- Improve the road system to aid traffic flow
- Introduce more green spaces
- Create a Park & Ride system
- Introduce travel passes
- Address roadworks issues
- Promote walking and increase pedestrianisation
- More charging points for electric cars

5.11 **Impacts on Individuals, Organisations and Businesses**

5.11.1 Many respondents voiced concerns about pace and scale of change required; the impact on individuals, families and business through financial hardship, job losses and increased congestion; and pollution in areas surrounding the CAZ.

5.11.2 Respondents asked for extra support for a number of groups. The main suggestions were:

- Visitors to and staff at Birmingham Children's Hospital
- People with disabilities and their carers
- Those living within the CAZ being made exempt or receiving discounts
- Financial support for those on low incomes
- Small businesses within the CAZ
- Commuters and those working within the CAZ
- Taxi and private hire vehicle drivers

5.11.3 The types of support suggested for these groups included:

- General financial support.
- Introduction of a vehicle trade-in scheme.
- Phased introduction/more time before charging begins.
- Subsidised bus travel and/or bus passes.
- Discount or exemption from paying the charge.

5.11.4 Some people felt that no support should be available for any groups.

5.12 **Impact of the consultation responses on the shaping of the Preferred Clean Air Zone Option Business Case**

5.12.1 The background to the problem of air quality in Birmingham and the development of the Clean Air Zone proposals was detailed in the report to Cabinet dated 26th June 2018. The work undertaken on the feasibility study set out that implementing a Class D CAZ together with additional measures, including parking measures and network changes, was the preferred option in order to reasonably meet the legal requirement to deliver

compliance in the shortest possible time, consistent with other duties and responsibilities.

5.12.2 Annual mean NO₂ concentrations remain consistently above the legal thresholds following the implementation of various restriction and complementary measures in Birmingham. There is a need to bring about a significant and rapid shift in local behaviours in the city.

5.12.3 Further modelling undertaken since June indicates that with a CAZ D within the Ring Road, plus additional measures, NO_x compliance will be achieved at all but one location by 2021. Suffolk Street Queensway is forecast to achieve compliance by 2022. The Council is continuing to collaborate with JAQU to consider options which could bring forward compliance from 2022 at this location, or at the very least reduce exposure pending compliance. This work is ongoing and will be reported back to Cabinet in due course.

5.12.4 The consultation presented a series of questions to the public on the proposals for a Clean Air Zone in Birmingham. It is not considered that there are realistic options to change the location/area of the zone or the class of CAZ proposed without reducing the ability of the Council to achieve compliance in the shortest possible time. The key changes now being made to the preferred option are the mitigation measures and exemptions package to support those identified as being disproportionately negatively impacted by the proposals.

5.12.5 To support the Preferred Clean Air Zone Option Business Case, the Council has undertaken a Distributional Analysis to identify how the impacts of a proposed CAZ would be distributed across Birmingham's diverse population and business communities. These impacts will include health benefits as well as financial impacts. The responses from the consultation have been used to supplement the Distributional Analysis and finalise the Council's proposals.

5.12.6 It is proposed that mitigations will be in the form of exemptions and sunset periods, or in the form of funded support, to be secured from the Government's Clean Air Fund (CAF) which are being included as part of the Business Case.

5.13 Integration of exemptions and mitigation measures

5.13.1 The exemption and mitigation measures are designed to minimise the negative impacts on individuals and businesses as identified by the Distributional Analysis and through the consultation. As such, there is expected to be significant overlap between the groups targeted by the exemptions and those eligible for financial support. Details of how exemptions are integrated into the implementation plan of other mitigation measures are covered in detail in the Clean Air Fund proposal. However, each follows a general approach, which applies in all cases:

- Receiving support through one of the mitigation measures proposed would not affect an individual's/organisation's eligibility for an exemption and vice versa.
- Funded support mitigation measures will be extended through to early 2021. This allows affected individuals/organisations to continue to use their vehicle during the exemption period and still access the funded mitigation measure if available at the end of the exemption period.
- Those that are eligible for funded mitigation measures but are not eligible for exemptions can receive the mitigation packages/funding to coincide with the implementation date of the CAZ.

5.14 Exemptions and Discounts

5.14.1 The National Clean Air Zone Framework, sets out a number of standard exemptions from Clean Air Zone emission requirements. These include vehicles with a historic tax class (built on or before 31 December 1977) and military vehicles which are exempt from charges by virtue of Section 349 of Armed Forces Act 2006. Vehicles within the disabled passenger vehicle tax class will also be exempt from paying a charge.

5.14.2 The exemptions and mitigation packages set out in the tables below have been determined locally with input from the consultation analysis. At this stage they are proposed to be available for one year from implementation. However, this is subject to further review before the Full Business Case so as to ensure that the impact of the exemptions has been accurately estimated.

Exemption	Target Group	Target fleet	Geographical Scope	Description
HGVs and coaches registered to addresses in CAZ	CAZ businesses	HGVs and coaches	Birmingham	HGVs and coaches registered within the CAZ will be exempt from the CAZ charge. Max 2 vehicles per company. This is not limited to SMEs.
HGVs with existing finance agreements	Birmingham businesses	HGVs	Birmingham	HGVs registered in the Birmingham City Council area, travelling to the CAZ, with an existing finance agreement beyond 2020 will be exempt from the CAZ charge.
SME Vans	CAZ businesses (SMEs)	Vans	Within CAZ	Vans registered to SMEs within the CAZ will be exempt from the CAZ charge. Max 2 vehicles per company.
Vans with existing finance agreements	Birmingham businesses	Vans	Birmingham	Vans registered within the Birmingham City Council area, travelling to the CAZ, with an existing finance agreement beyond 2020 will be exempt from the CAZ charge.
Cars and vans of CAZ residents	CAZ residents	Private cars/vans	Within CAZ	All private car and van owners who are residents of the CAZ, as defined by DfT registration information, will be exempt from the CAZ charge.

Income deprived working within the CAZ	Income deprived	Private cars/vans	West Midlands	Income deprived residents of the West Midland Combined Authority area whose usual place of work is in the CAZ area will be exempt from the CAZ charge.
Key workers working within the CAZ	Key workers (Emergency Services, education, armed forces, NHS)	Private cars/vans	West Midlands	Key workers and volunteers living in the West Midlands Combined Authority area whose usual place of work or volunteering is in the CAZ area will be exempt from the CAZ charge.
Hospital and GP visits	Hospital patients and visitors	Private cars/vans	All	Visitors to selected hospitals, GP centres and care homes will be exempt from paying the CAZ charge.
Community and school transport	Section 19 transport providers	Vans/ minibuses	All	Vehicles that serve the community and are classified as Section 19 operators will be exempt from the CAZ charge.

5.14.3 In addition to the exemptions above it is also proposed that emergency services vehicles, show vehicles and motorcycles are exempted from the CAZ charges.

5.14.4 Exemptions will continue to be kept under review to ensure they are appropriate and do not affect the Council's ability to achieve compliance.

5.15 Proposed Clean Air Fund measures to support individuals and businesses

5.15.1 In order to secure funding from the Government's Clean Air Fund the Council must robustly evidence the need for funding by clearly setting out the negative impacts of the local plan on individuals and businesses and establish how the proposals for the Clean Air Fund minimise these impacts.

5.15.2 This includes providing a clear rationale for the intervention by providing a robust distributional analysis of the negative impact of local plans on individuals and businesses, following the options appraisal guidance. The consultation responses are being used to refine the proposals in discussion with JAQU.

Mitigation measure	Target group	Target fleet	Geographical Scope	Description
Mobility credit	Low-income living or working within the CAZ	Private car/van	West Midlands Metropolitan Area	Mobility credit of £1000 offered to low income non-compliant car owners living or working

				within the CAZ to be supplied on a SWIFT card with no expiration for use.
Scrapage scheme or mobility credit	CAZ residents and low-income group	Private car/van	West Midlands Metropolitan Area	Enhanced measure targeted at CAZ residents and low-income households that regularly travel to the CAZ. With evidence of scrapping a non-compliant car the target group will receive either: £2,000 cash payment toward the purchase of a compliant vehicle. £2,000 mobility credit. Credit to be supplied on a SWIFT card with no expiration for use.
Taxi operational support package or LPG retrofit scheme	Taxi drivers with non-compliant Hackney carriages	Hackney carriages	Birmingham	Birmingham Licensed Taxi drivers with non-compliant Hackney Carriages will be offered support payments to be paid toward the purchase or lease of a ULEV vehicle. This is forecast as £5,000 over 4 years. Alternatively, the target group can choose to receive support (£5,000) for an LPG retrofit of their current vehicle, this includes those who must first purchase an eligible LTI TX4 Hackney Carriage vehicle before carrying out the retrofit.
Council taxi leasing scheme			Birmingham	Birmingham City Council to purchase 50 ULEV taxis to lease out to most vulnerable drivers.
Free Van miles on BCC charging network	Birmingham businesses	Vans	Birmingham	Drivers of electric vans registered in the Birmingham City Council area can register to receive free credit on Birmingham's

				public charging network.
HGV and Coach compliance fund	Businesses	HGV, Coaches and LGVs/Vans	West Midlands Metropolitan Area	HGV and Coach fleet operators within the West Midlands Combined Authority area will be able to apply for either: a cash payment towards retrofit technology that will make their vehicles compliant. money towards the purchase/lease of a new or second-hand compliant vehicle. Applications will be judged against criteria designed to target impacted groups.
Resident parking scheme	Residents living near the CAZ	N/A	Areas close to the CAZ boundary	Implementation of residents parking schemes to prevent displacement parking at the edge of the CAZ.

5.15.3 Additionally it is proposed to fund a package of behaviour change and marketing campaigns to educate different user groups on journey planning, Delivery Service Plans and on the benefits of ULEVs to support non-compliant vehicle owners.

5.16 **Birmingham City Council Fleets**

5.16.1 There is no direct financial impact of the CAZ on the Council owned fleet. A Green Fleet review was carried out in 2015 that identified an ageing Council owned fleet with low mileage, where Waste Management owned the majority of the Council fleet. The report recommended cycles for vehicle replacement aligned to vehicle age and service delivery requirements, and which bring about more efficient and economic fleet utilisation.

5.16.2 Fleet replacement strategies have been developed across all service areas. In addition, Corporate Procurement Services have developed a vehicle 'hire and lease' framework to enable easy vehicle replacement with flexibility for service needs and cost efficiencies.

5.16.3 The Waste Management fleet replacement strategy, as a major long term strategy, is set to be presented to Cabinet this October for approval. Work continues to ensure that Council fleet vehicles operating within the CAZ area are prioritised, to ensure they meet the CAZ standards.

5.17 **CAZ Charges**

5.17.1 As set out in the report to Cabinet on 26th June, charges from London were used as indications of the potential level of charge that may be payable. Within the

questionnaire, respondents were asked to comment on proposed charges. The council is considering the feedback on pricing and has commissioned a piece of work to refine and finalise charges.

5.17.2 This is being undertaken alongside work with other Clean Air Zone cities outside of London to look at adopting consistent charging structures where possible. This has been a key issue raised through the consultations in each city.

5.17.3 Birmingham's CAZ charges will be confirmed at a later date.

5.18 The Brum Breathes Air Quality programme and Longer Term Strategy

5.18.1 As noted in the report to Cabinet in June, a wider programme of works is already ongoing to improve Birmingham's air quality. However, it is acknowledged that this will need to be expanded to maximise the impacts of the Clean Air Zone and these measures.

- Changes to the licensing arrangements – requirements for the Council licensed taxi fleet will be in line with the CAZ standards as a minimum by December 2019.
- Tyseley Energy Park – on site hydrogen production, testing use of renewable energy to ascertain commercial of refuelling facilities for hydrogen buses and market take up of zero emission vehicles.
- Hydrogen buses – up to 22 hydrogen buses to be procured by the Council and deployed in 2019.
- LPG taxi retrofit programme – 65 taxis have been retrofitted to LPG, trialling a new low emission technology solution.
- Electric vehicle chargepoint network – s£2.92 million secured from the Office for Low Emission Vehicles to support implementation of a city level electric vehicle chargepoint network, to include 197 charging points for taxis and a public accessible network for fast and rapid charging. Implementation is anticipated to start from in 2018, with initial focus on the taxi charging infrastructure and renewal of current public charge point network.
- Clean bus vehicle technology – Transport for West Midlands (TfWM) have secured £3m, matched by £2.9m from bus operators to enable 364 buses to be retrofitted with kits that tackle exhaust emissions and ensure that buses entering the CAZ meet the standards.
- Reviewing of corporate staff policies.
- Supporting the expansion of Car Clubs across the city.

5.18.2 The Clean Air Zone is part of a longer term strategy to address air quality and to continue to raise awareness of the impacts of poor air quality on health. The Council will be consulting on a Birmingham Air Quality Strategy later in the year which will set out the wider action the Council and its partners need to take to achieve further improvements.

5.18.3 There will also need to be further collaborative action across the West Midlands, and the opportunity for funding for further measures will need to be explored with the West Midlands Combined Authority and Government. These could include:

- Support and funding for a wider West Midlands Network Resilience Travel Demand Programme which brings about behaviour change to create more sustainable journeys. Funding to the city region level ensures a co-ordinated approach across a broader geography for many origins and destinations. This will include reduced fare ticketing packages, contactless ticketing and improved information.

- Continued investment in bus priority measures for a set of core bus network corridors agreed between the Bus Alliance partners of the Council, TfWM and bus operators.
- Further investment in high quality cycling schemes and measures.

5.19 **Next Steps**

5.19.1 Subject to Cabinet approval the Council will submit its Preferred Option Business Case to the Government by 15th September 2018 which it considers satisfies the requirement of the Ministerial Direction issued in December 2017 in all of the circumstances. It is important that the Council now provides the clearest possible message around the proposed introduction of a Clean Air Zone so that individuals and businesses can start to consider and make the necessary changes.

5.19.2 Given the scale of the response to the consultation, the Council will continue to work with JAQU to finalise the details in the Business Case. It is fully acknowledged that this is an extremely challenging and complex process which will have significant impacts on the city, and which will require constant monitoring and review.

5.19.3 Whilst a CAZ D plus additional measures continues to be the preferred option, the Council has been advised that it is critical to understand and react to all consultation responses, and for the final scheme to be informed by those responses.

5.19.4 The Council is committed to reviewing the measures proposed (including the timescales and nature of that process) to ensure that it continues to take every rational and reasonable step to secure compliance in the shortest possible time.

5.19.5 Engagement with stakeholders and the public will continue as the scheme proceeds towards implementation, particularly regarding measures to mitigate the impacts.

5.19.6 A key area for further development relates to the implementation stage, particularly the Government's preferred approach regarding the operation of the back office system for Clean Air Zones nationally and to finalise the procurement strategy.

5.19.7 The Council will also re-run its transport and air quality models to ensure that they reflect the latest position assumptions including the impact of changes due to the proposed mitigations. The impact of these measures on the date of compliance is not considered a concern for a number of reasons:

- The measures are designed to help individuals and organisations switch to cleaner compliant vehicles earlier than they normally would, so it is not envisaged that any measure would delay compliance.
- For commercial fleets, especially in the case of taxis and HGVs, it is assumed that the vast majority would switch their vehicle as a result of the CAZ irrespective of any mitigation measures. Therefore, the measures should not impact the rate of compliance but instead make it financially easier for those who are most likely to struggle to switch their vehicles
- For private individuals, the measures are designed to deter non-compliant vehicles from entering the CAZ and so are not considered to prevent compliance in any form.

5.19.8 Key Milestones for CAZ implementation are:

- Approval of the Procurement Strategy – October 2018;
- Funding Approval – late 2018
- Scheme delivery – Winter 2018 – September 2019;
- Testing/Commissioning – September 2019 – December 2019;

- CAZ 'Go Live' – January 2020

5.19.9 A subsequent report will seek approval for the Procurement Strategy and approval to commence with the required procurement activities.

6. **Evaluation of alternative option(s):**

6.1 Alternative options including a do nothing option have been considered, however, this would not meet the legal requirements of the ministerial direction to achieve compliance in the shortest possible time.

6.2 The Council could have chosen to undertake a two stage consultation on a Clean Air Zone; however, this would have delayed the submission of the Preferred Clean Air Zone Option Business Case. This would be contrary to the Secretary of State's direction and has therefore not been pursued.

6.3 Either of the alternative options above may lead to:

- failure to achieve compliance with air quality standards as defined in EU directives, which have also been incorporated into national legislation. This could result in significant infringement fines being passed down to the local authority by the government utilising the Localism Act
- the Government imposing a solution on the city
- failure to improve air quality and the risk of failing to deliver the public health benefits in terms of reductions in deaths and ill health associated with poor air quality.

6.4 Failing to take any action towards achieving compliance would leave the Council at risk of legal challenge, not only for a failure to comply with its statutory duty to comply with the Ministerial direction, but also its obligation under air quality legislation to achieve compliance with legal NO₂ limits in the shortest possible time.

7. **Reasons for Decision(s):**

7.1 To enable progress with the Clean Air zone in line with the requirements being set by Government including submission of the Business Case.

7.2 Failing to take any action towards achieving compliance would leave the City Council totally exposed to legal challenge, not only for a failure to comply with its statutory duty to comply with the Ministerial direction, but also its obligation under air quality legislation to achieve compliance with legal NO₂ limits in the shortest possible time.

Signatures	Date
Councillor Waseem Zaffar Cabinet Member for Transport and Environment
Waheed Nazir Corporate Director Economy

List of Background Documents used to compile this Report:

- “Birmingham Connected White Paper”: Birmingham City Council, November 2014
- “West Midlands Integrated Transport Authority Strategic Transport Plan: ‘Movement for Growth’”: report to Cabinet Member for Development, Transport and the Economy jointly with Deputy Chief Executive, 15th October 2015
- Clean Air Zone Framework - Principles for setting up Clean Air Zones in England. Defra & DfT 2017
- UK plan for tackling roadside nitrogen dioxide concentrations, Defra, 2017
- The Impact of Poor Air Quality on Health in Birmingham, Overview & Scrutiny Committee, September 2017
- Tackling Air Quality in Birmingham, Cabinet Report, June 2017

List of Appendices accompanying this Report (if any):

- Appendix 1 – Clean Air Zone Preferred Option Business Case
- Appendix 2 – Clean Air Zone Consultation Analysis Report
- Appendix 3 - Matrix, consultation response and proposed mitigating measures
- Appendix 4 – Equality Analysis (EQUA79)
- Appendix 5 – Ministerial Direction

PROTOCOL PUBLIC SECTOR EQUALITY DUTY

- 1 The public sector equality duty drives the need for equality assessments (Initial and Full). An initial assessment should, be prepared from the outset based upon available knowledge and information.
- 2 If there is no adverse impact then that fact should be stated within the Report section 4.4 and the initial assessment document appended to the Report duly signed and dated. A summary of the statutory duty is annexed to this Protocol and should be referred to in section 4.4 of executive reports for decision and then attached in an appendix; the term 'adverse impact' refers to any decision-making by the Council which can be judged as likely to be contrary in whole or in part to the equality duty.
- 3 A full assessment should be prepared where necessary and consultation should then take place.
- 4 Consultation should address any possible adverse impact upon service users, providers and those within the scope of the report; questions need to assist to identify adverse impact which might be contrary to the equality duty and engage all such persons in a dialogue which might identify ways in which any adverse impact might be avoided or, if avoidance is not possible, reduced.
- 5 Responses to the consultation should be analysed in order to identify:
 - (a) whether there is adverse impact upon persons within the protected categories
 - (b) what is the nature of this adverse impact
 - (c) whether the adverse impact can be avoided and at what cost – and if not –
 - (d) what mitigating actions can be taken and at what cost
- 6 The impact assessment carried out at the outset will need to be amended to have due regard to the matters in (4) above.
- 7 Where there is adverse impact the final Report should contain:
 - a summary of the adverse impact and any possible mitigating actions (in section 4.4 or an appendix if necessary)
 - the full equality impact assessment (as an appendix)
 - the equality duty (as an appendix).

Equality Act 2010

The Executive must have due regard to the public sector equality duty when considering Council reports for decision.

The public sector equality duty is as follows:

- 1 The Council must, in the exercise of its functions, have due regard to the need to:
 - (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by the Equality Act;
 - (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it;
 - (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it.
- 2 Having due regard to the need to advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:
 - (a) remove or minimise disadvantages suffered by persons who share a relevant protected characteristic that are connected to that characteristic;
 - (b) take steps to meet the needs of persons who share a relevant protected characteristic that are different from the needs of persons who do not share it;
 - (c) encourage persons who share a relevant protected characteristic to participate in public life or in any other activity in which participation by such persons is disproportionately low.
- 3 The steps involved in meeting the needs of disabled persons that are different from the needs of persons who are not disabled include, in particular, steps to take account of disabled persons' disabilities.
- 4 Having due regard to the need to foster good relations between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:
 - (a) tackle prejudice, and
 - (b) promote understanding.
- 5 The relevant protected characteristics are:
 - (a) marriage & civil partnership
 - (b) age
 - (c) disability
 - (d) gender reassignment
 - (e) pregnancy and maternity
 - (f) race
 - (g) religion or belief

- (h) sex
- (i) sexual orientation

To be submitted for Government review

Birmingham Clean Air Zone



Title	Birmingham Clean Air Zone Preferred Option Business Case (POBC)
Date	Version 05/09/2018

Rev	Originator	Approved	Date
1	Vinny Naga		07/06/18
2	Tom Kavanagh		06/07/18
3	Cameron McGlennon		05/09/18

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1 Strategic Case

1.1 Introduction

This Case sets out the reassessed case for change and the preferred way forward in terms of spending objectives and short-listed options, in light of additional baseline traffic and air quality modelling. In accordance with the JAQUs guidance this Strategic Case considers the following:

- An outline of the strategic context, in particular the European, national and local policies which either influence or will be impacted by the project
- Local traffic and air quality modelling for the project's counterfactual case, using the agreed target determination values
- Updated position regarding the project's case for change (including the logic map), spending objectives and critical success factors
- Project's short-listed options which are appraised in detail in the Economic Case – see section 2
- Early views of the project's benefits, risks, constraints and dependencies
- Plans for stakeholder engagement.

1.1.1 Organisational Overview

Birmingham City Council (BCC) is the largest urban local authority in the UK and the largest council in Europe with 120 councillors representing 40 wards. It has a population of over 1 million residents spread over an area of approximately 26,777 hectares (103 square miles). It has a population density of 36.5 persons per hectare, which makes it the most densely populated of the West Midlands local authorities.

The city has a very complex road network with about a dozen major radial roads and two ring roads traversing the city. In addition, there are three heavily trafficked motorways, M5, M6 and M42 forming a box around the city with a section of the A38M running through the city.

BCC declared itself an Air Quality Management Area in respect of Nitrogen Dioxide (NO₂) in 2010. The Council has recognized the importance of environmental health on its residents for many years. The commitment to improving the environment for all residents is encapsulated within its strategic and community plans.

1.1.2 Policy Context

Growing concern regarding air quality and health related problems have motivated legislative bodies at all levels to implement air quality standards to be achieved through actions and policies which must be transversal and aligned across institutions. This case presents the key policy drivers which will inform the development of the project. It is worth noting that some of these policies will also impact the project.

1.1.3 European Context

In 2008 the EU issued the ambient air quality and clean air for Europe Directive, which set out emissions limits which member states must comply with. The European Union standards have been evolving since 1990 through 6 standard levels (from EURO 1 to EURO 6) having reduced the limit standards of some pollutants up to 96% from the release of EURO 1, thanks to technology advancements. European emission limits are associated to *Carbon Monoxide*, *Hydrocarbons*, *Particulate Matter*, and lately more focused on *Oxides of Nitrogen* concentrations. Many European Countries are struggling to reach the objectives set by the EU, including the UK, finding major difficulties alongside some of the busiest roads.

1.1.4 National Context

Air quality legislation was first introduced in the late 1990s as part of the **Environmental Act (1995)**, in which was defined the concept of local air quality management. In 2007, DEFRA published the **Air Quality Strategy** which sets the national objectives for further improving air quality and how they would be achieved. Related to the Air Quality Strategy, the UK set its own **Air Quality Standards Regulations in 2010** which limit the concentrations of NO₂ for being harmful for the environment and having serious health implications. The concentration limits are aligned with the World Health Organization guidelines:

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- Hourly mean limit value not exceeded more than 18 times in a calendar year: 200 $\mu\text{g}/\text{m}^3$
- Annual mean limit value: 40 $\mu\text{g}/\text{m}^3$.

To tackle roadside NO₂ concentrations, DEFRA proposed in 2017 a series of measures which were related to current infrastructure management and supply, the implementation of new technologies and incentives. These included:

- *Charging measures*: creation of Clean Air Zones. 5 cities excluding London have been required to implement a CAZ, one of them being Birmingham.
- *Infrastructure measures*: investment in national and local road network to relieve congestion, improve safety and promote sustainable modes of transportation.
- *Vehicles and technologies*: Investment in low and ultra-low emission busses and retrofit technology schemes aimed to the oldest vehicles.
- *Programmes and incentives*: promoting fuel efficient driving styles, encouraging the use of alternative fuels, grants towards purchase of new ultra-low-emissions vehicle (ULEV) and tax incentives for ULEVs.

1.1.5 Regional and Local Context

For the West Midlands region, air quality issues are addressed at two different levels.

At a *metropolitan level*, in 2016, the West Midlands Combined Authority (WMCA) launched the **WMCA Strategic Transport Plan** 'Movement for growth' to support the improvement of the transport system, economic growth and regeneration, and environment and social inclusion. In relation to environment implications, the WMCA aims to improve air quality, reducing carbon emissions and improving road safety. The objectives of this Plan are aligned with the European Union emission limits and the national levels for NO_x. Specific measures include the improvement of public transport services, transport capacity, parking management to support intramodality and ULEV promotion and the associated infrastructure and facilities.

The **Low Emissions Towns and Cities Programme** (LETCP) was born as a partnership between seven West Midlands local authorities with the objective of producing various regional strategies to improve air quality, with a view to meeting national air quality objectives. The outcomes are a Low Emissions Strategy focused on **Low Emission Zones** (LEZ) which discourage the most polluting vehicles to access defined boundaries and a Good Practice Guidance on Planning and Procurement.

At a *local level*, Birmingham City Council key outcomes are related to the implementation of the Clean Air Zone Programme and allow benefits to be realised. These are consistent with four out of five of the outcomes in the City Councils plan 2018-2020:

- Outcome 1 – Birmingham is an entrepreneurial city in which to learn, work and invest in;
- Outcome 2 – Birmingham is an aspirational city to grow up in;
- Outcome 3 - Birmingham is a fulfilling city to age well in;
- Outcome 4 – Birmingham is a great city to live in.

Improving air quality as soon as possible, consistent with other statutory responsibilities is a key ambition of the Birmingham Health and Wellbeing Strategy and supports the delivery of policies included in the 'Birmingham Connected Transport White Paper', which in turn, supports delivery of the adopted Birmingham Development Plan and Movement for Growth. The Health and Social Care Act 2012 requires Local Authorities in England to have a Health and Wellbeing Board (HWBB). A key responsibility of the HWBB is to develop a Health and Wellbeing Strategy (HWBS). Improving air quality is a key ambition of the Birmingham Health and Wellbeing Strategy

Air quality competences are transferred to local authorities through the Localism Act (2011). The City Council is responsible for assessing whether air quality standards and objectives are achieved locally and identify those spots where pollutants exceed the maximum levels. To comply with the legislation, the City Council must:

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- Designate an Air **Quality Management Area** (AQMA) to monitor air pollution and to predict how it will change in the next few years.
- Prepare an Air **Quality Action Plan** (AQAP), proposing measures to improve air quality in the area ensuring the compliance of National Air Quality Objectives. The measures outlined in Birmingham are maximising national levers, promoting local policies and programmes, developing local infrastructure and promoting positive behaviour change through organisational actions.

In parallel with the AQAP, in the context of growth and development of the city, the Council is working towards the **Birmingham Development Plan** (BDP). In line with the general vision of the Council, this plan seeks to define a sustainable way of growth to meet the needs of its population and strengthening its global competitiveness comprising the period from 2011 to 2031. The global objectives are to design sustainable environments to ensure high-quality of life, build around a diverse base of economic base of economic activities supported by a skilled workforce and enhance the cultural heritage of the city.

Improving air quality is set as one of the main actions to meet the goals of the Plan.

Also, the **Big City Plan** is focused on the transformation of the city covering every aspect of the built environment. One of the objectives is to ensure construction companies are keeping emissions to a minimum and that they deliver sustainable developments aligned with the sustainable growth planned in the BDP. Currently, the **Snow Hill Development** is identified as one of the City's most valuable assets creating thousands of new jobs and becoming a principle transport hub. However, the adjacent highway network is constrained by the current level of traffic and is at risk of affecting the development of the area. By implementing LEZ or CAZ frameworks, it is expected to improve the air quality in the area and increase the capacity of the network, enabling the growth and supporting a healthy environment in the district.

As a result of these plans, some of the policies regarding the development of the city have air quality as key consideration and are supported by local programmes and initiatives:

- **Brum Breathes** – Tackling Air Quality in Birmingham. This programme is committed to improve the quality of life and well-being in the city, tackling health inequalities and increasing life expectancy by making people aware of the air quality issues and building sustainable environments.
- **Birmingham Connected** (Moving Our City Forward). It is focused on the development of a mass transit network, the establishment of Green Travel Districts and the promotion of a city Centre Low Emissions Zone. Since its implementation the major improvements include the redevelopment of the New Street Station, the extension of the metro through the city centre, the implementation of bus priority measures, cycling network, speed limits and the improvement of congestion hotspots.

1.2 Clean Air Zone

Moving forward on the process to meet the objectives set across institutions within the shortest time possible and in the context of Birmingham's future growth, makes it necessary to address the challenge by implementing more restrictive and concise measures. The BDP forecasts an increase of 30,000 people living in the city centre and 51,000 new jobs, leading to an increase of 30% trips to and within the city centre by 2031. According to the National Air Quality Plan, 5 cities were identified to require urgent action in terms of air quality, Birmingham being one of them, and a Clean Air Zone Framework has been proposed to the local authorities.

A Clean Air Zone (CAZ) defines an area where targeted action is taken to improve air quality and resources are prioritised in a way that delivers improved health benefits and supports economic growth and the low-emission economy. A charging system is defined according to the vehicle emission standards to enter the CAZ area. Compliant vehicles will not be subject to charge.

The main objectives are to modify the vehicle type profile in the city of Birmingham, encouraging people to buy compliant vehicles and drive a modal shift diverting demand to public transport or other sustainable modes as an alternative of a charging CAZ.

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The expected outcome is to reduce NO₂ levels below the standards within the shortest possible time and accelerating the transition to a low emission economy. Revenues from the Birmingham CAZ will be a source of investment to enhance the development of the city towards a more sustainable environment and will help decoupling growth and pollution.

1.3 Assessment of Baseline Air Quality

1.3.1 Drivers for Developing a Robust Baseline

Air quality is a term used to describe the air that we breathe, and the level of pollutant concentrations that are considered to be reasonably 'safe' from a health perspective¹. The main pollutants of concern in the UK are nitrogen dioxide (NO₂) and fine particulate matter (PM). Specific health impacts for these pollutants reported in the literature² are summarised as follows:

- NO₂: At high concentrations, NO₂ causes inflammation of the airways. Long-term exposure is associated with an increase in symptoms of bronchitis in asthmatic children and reduced lung development and function
- PM: Long-term exposure contributes to the risk of developing cardiovascular and respiratory diseases, including lung cancer. Research shows that PM₁₀ particles with a diameter of 10 microns and smaller (PM₁₀) are likely to be inhaled deep into the respiratory tract. The health impacts of particles with a diameter of 2.5 microns or smaller (PM_{2.5}) are especially significant as smaller particles can penetrate even deeper.

Preliminary work undertaken in 2015 as part of the West Midlands (LETCP) Programme³ provided estimates of the current impacts of NO₂ pollution on Birmingham City Centre and the wider West Midlands Conurbation⁴. Table 1.1 presents the 2011 and 2018 estimates of deaths per year that are attributable to NO₂ pollution. In 2011, it was estimated that 906 deaths in the West Midlands Metropolitan Districts were attributable to NO₂ pollution, including 371 in Birmingham. Section 4.4 – "Health impacts associated with air pollution", of the West Midlands Low Emission Zones: Technical Feasibility Study⁴, provides details of the approach adopted to estimate deaths attributable to NO₂ pollution.

The data forecasts that, under the counterfactual case, the number of deaths attributable to NO₂ pollution would reduce notably across all West Midlands Metropolitan Districts by 2018. That said, the forecasts demonstrate that between 2011 and 2018 the number of deaths attributable to NO₂ pollution would reduce at a slower rate in Birmingham compared to the wider West Midlands Metropolitan area.

¹ It can also relate to impacts on eco-systems, but this is beyond the scope of this Preferred Option Business Case.

² [Ambient \(Outdoor\) Air Quality and Health Fact Sheet](#), World Health Organisation (2016). Accessed February 2018.

³ [West Midlands Low Emissions Towns and Cities \(LETCP\)](#) Programme. Accessed February 2018.

⁴ HYPERLINK "https://go.walsall.gov.uk/Portals/0/Uploads/PollutionControl/west_midlands_letcp_low_emission_zones_-_technical_feasibility_study_wp2_economic_and_health_impacts-2.pdf" [West Midlands Low Emission Zones: Technical Feasibility Study. Economic and Health Impacts of Air Pollution Reductions](#). Ricardo-AEA. February 2015. Accessed February 2018.

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Table 1.1 Numbers of Deaths, Asthmatic Children with Bronchitic Symptoms and Respiratory Hospital Admissions Attributable to NO₂ Pollution: 2011 and 2018 estimates

Local Authority	Deaths per year attributable to NO ₂ pollution: 2011	Deaths per year attributable to NO ₂ pollution: 2018
Birmingham	371	175
Coventry	70	21
Dudley	72	21
Sandwell	147	71
Solihull	62	24
Walsall	107	43
Wolverhampton	78	29
West Midlands Metropolitan Districts	907	384

Table 1.2 presents the estimated burden on local mortality attributable to man-made particulate air pollution for 2011 and 2018. In particular, it presents the annual numbers of attributable deaths to PM_{2.5} air pollution. Section 4.4 – “Health impacts associated with air pollution”, of the West Midlands Low Emission Zones: Technical Feasibility Study⁴, provides details of the approach adopted to estimate deaths attributable to PM_{2.5} pollution. It is estimated that there were 1,359 deaths attributable to particulate air pollution in 2011 in the West Midlands Metropolitan Authorities, including 486 in Birmingham. The counterfactual case forecasts indicate that the number of deaths attributable to PM_{2.5} air pollution would only reduce marginally across all West Midlands Metropolitan Districts by 2018. It is worth noting that the rate of reduction of deaths attributable to PM_{2.5} air pollution between 2011 and 2018 is considerably lower than that forecast for deaths attributable to NO₂ pollution across all seven local authority areas.

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Table 1.2 Local Mortality Burden Associated with Particulate Air Pollution in West Midlands Local Authorities

Local Authority	Annual Deaths Per Year Attributable to PM _{2.5} Particulate Air Pollution: 2011	Annual Deaths Per Year Attributable to PM _{2.5} Particulate Air Pollution: 2018
Birmingham	486	441
Coventry	156	142
Dudley	158	142
Sandwell	178	161
Solihull	103	94
Walsall	147	133
Wolverhampton	131	118
West Midlands Metropolitan Districts	1,359	1,231

The preliminary assessments undertaken as part of the West Midlands (LET) Programme also estimate other indicators including:

- Asthmatic children with bronchitic symptoms attributable to NO₂,
- Respiratory hospital admissions attributable to NO₂ pollution and
- Life years lost per year attributable to PM_{2.5} air pollution

These indicators for the seven West Midlands Metropolitan Districts are presented in the Birmingham Clean Air Zone Feasibility Study: Air Quality Modelling Report.

Review of Birmingham specific data presented in Table 1.1 and 1.2 indicates that in 2011, 857 deaths annually were attributable to NO₂ and PM_{2.5} air pollution in the City. The data suggests that annual deaths attributable to NO₂ and PM_{2.5} air pollution in Birmingham would reduce to 616 by 2018. Department for Transport's WebTAG Data book June 2018 version 1.10.1 presents estimates for average (economic) value of prevention per fatality by element of cost. In particular, Table A 4.1.1 estimates the economic costs per fatality (including lost output and human costs, excluding medical costs) at £1,547,190 in 2010 prices and 2010 values. Applying this ready reckoner to deaths annually attributable to NO₂ and PM_{2.5} air pollution suggests that the economic implications of air quality in Birmingham was at least £1.3 billion (in 2010 prices) in 2011. The same approach suggests that air pollution driven economic implications in Birmingham would reduce to £0.95 billion (in 2010 prices) by 2018.

Despite the forecast reduction between 2011 and 2018, the fatalities attributable to poor air quality and subsequent economic costs, when measured in terms of monetised value of deaths annually attributable to NO₂ and PM_{2.5} air pollution, remains considerably high in Birmingham. Such evidence, along with the City's policy ambition summarised earlier in the Strategic Case and the regulatory requirements outlined below, act as the key drivers for developing a robust baseline position for the City's air quality.

Driven by such public health priorities, the Air Quality (Standards) Regulations 2010 set legal limits (called 'limit values') for concentrations of pollutants in outdoor air. These are based on the EU Air Quality Limit Values⁵. The UK government is currently responsible to the EU for ensuring that it complies with the

⁵ Taken from: ec.europa.eu/environment/air/quality/standards.htm. Accessed February 2018.

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provisions of the EU Air Quality Directives⁶, which are legally binding. However, under the Localism Act (2011), the UK government has discretionary powers to pass on any fines (or a proportion) to local authorities.

The UK government is currently in negotiations with the EU over breaching Limit Values for NO₂ and PM₁₀. On the UK government's behalf, the Department for Transport (DfT) and Department for Environment Food and Rural Affairs (DEFRA) are responsible to ensure that the UK meets the EU Air Quality Limit Values. The UK makes use of DEFRA's Pollution Climate Mapping (PCM) model, in addition to monitoring, as its approved means of reporting air quality information to assess legal compliance across the different zones. To model air quality, Birmingham City Council use the Airviro modelling software produced by the Swedish Meteorological and Hydrological Institute (SMHI) and Apertum. Further details regarding Airviro and its alignment with PCM are presented in the Birmingham Clean Air Zone Feasibility Study: Air Quality Modelling Report.

The legal limits for pollutants of most concern for the West Midlands Urban Area (including Birmingham) along with the 2016 compliance assessment are shown in Table 1.3.

⁶ [Ambient Air Quality Directive 2008/50/EC](#) and [Directive 2004/107/EC](#). Accessed February 2018.

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Table 1.3 Legal Limits for Pollutants of Most Concern in the West Midlands Urban Area, Including Birmingham

Pollutant	Concentration (limit value) $\mu\text{g m}^{-3}$	Averaging Period	Target and Limit Values	Number of permitted exceedances each year	Compliance assessment for 2016 in the West Midlands Urban Area (Including Birmingham) ⁷
PM _{2.5}	25 ⁸	1 year	Target value came into force on 1 January 2010 Limit value came into force on 1 January 2015	n/a	Compliant
PM ₁₀	50	24 hours	Limit value came into force on 1 January 2005 (time extension granted to June 2011)	35	Compliant ⁹
	40	1 year	Limit value came into force on 1 January 2005	n/a	Compliant
NO ₂	200	1 hour	Limit value came into force on 1 January 2010	18	Compliant
	40	1 year	Limit value came into force on 1 January 2010	n/a	Non-Compliant

In 2015/16, most of the 43 air quality reporting zones were in exceedance of the statutory annual mean limit value for NO₂ emissions in the UK, including the Birmingham urban area. This NO₂ emissions non-compliance also drives the need for robust baselining, development of interventions and ongoing monitoring for air quality in Birmingham.

1.3.2 Air Quality Baseline: Traffic modelling inputs

Developing a robust air quality baseline requires a series of sequential steps, including modelling of the City's road network, not least to calculate the emissions from traffic into NO₂ concentrations. The traffic modelling was undertaken using a variety data sources, research and existing modelling platforms to fully comply with DEFRA's Joint Air Quality Unit (JAQU) guidance. The road network modelled is outlined in Figure 1.1. Further details regarding the modelling approach and tools adopted are presented in the Birmingham Clean Air Zone Feasibility Study: Transport Modelling Report and summarised in the Birmingham Clean Air Zone Feasibility Study: Air Quality Modelling Report.

⁷ [Air Pollution in the UK 2016. DEFRA \(2016\)](#). Accessed February 2018.

⁸ An obligation to reduce exposure to concentrations of fine particles also came into force from 2015.

⁹ Following the subtraction of natural sources in accordance with the directive

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The primary purpose of the transport modelling is to estimate traffic for the base year and develop reference case and intervention case forecasts, which ultimately feed into air quality modelling. Traffic forecasting utilised the 2016 base year Birmingham City Council's SATURN model, which was calibrated against 2016 traffic data. The 2016 model results were audited by JAQU in August 2017 and approved for use within subsequent calculations.

The analysis of the 2020 reference case (the do-minimum scenario) involved an evaluation of how base year traffic flows would change by 2020 in the absence of any interventions. That said, the modelling of this scenario included a consideration of approved changes to the local road network, demographic and development implications, regional traffic growth and changes to the traffic fleet.

Table 1.4 presents a summary comparison between 2016 base traffic estimates and the 2020 do-minimum scenario forecasts. The table highlights that the growth rate of car / taxi traffic in Birmingham City Centre between 2016 and 2020 is forecast to be considerably higher than that estimated for the rest of the City or the wider West Midlands. The data also indicates that LGV traffic across all geographies analysed is forecast to grow by more than 10% between 2016 and 2020. Lastly, the modelling results indicate that HGV based traffic growth would be highest in Birmingham City Centre.

Table 1.4 BCC Traffic Growth 2016 to 2020

Sector	AM Peak			Inter Peak			PM Peak		
	Car/ Taxi	LGV	HGV	Car/ Taxi	LGV	HGV	Car/ Taxi	LGV	HGV
City Centre	7.9%	10.8%	3.5%	8.0%	10.8%	3.6%	7.4%	10.8%	3.6%
Rest of Birmingham	3.7%	10.7%	3.2%	3.7%	10.7%	3.1%	3.7%	10.7%	3.1%
Birmingham (Total)	4.2%	10.7%	3.2%	4.2%	10.7%	3.2%	4.1%	10.7%	3.2%
Rest of West Midlands	4.4%	10.6%	2.9%	5.3%	10.7%	2.9%	4.6%	10.8%	3.0%
Total	4.3%	10.7%	3.0%	4.7%	10.7%	3.0%	4.4%	10.7%	3.0%

Such traffic modelling results have been adopted as a key input for developing air quality baseline for the City.

1.3.3 Air Quality Baseline: 2016 baseline

Whilst utilising the traffic modelling and other inputs, air quality modelling requires to follow the process of target determination which has been specified by the JAQU. Further details of the air quality modelling approach and key inputs, which follow the target determination process, are presented in the Birmingham Clean Air Zone Feasibility Study: Air Quality Modelling Report. This section summarises the 2016 baseline results generated using Birmingham City Council's Airviro model, which includes a total of 124 receptors that have been included to represent the PCM road links. A further 54 sites have been included to represent local hotspots beyond the PCM network.

Birmingham is currently compliant with legal limits for PM. However, further reductions are needed (especially to PM_{2.5} levels) to protect human health. Annual average PM₁₀ and PM_{2.5} concentrations are well within the legal limit values of 40 and 25 µg/m³ respectively. Although compliance has officially been achieved, by reducing PM concentrations even more, the health benefits will be even greater.

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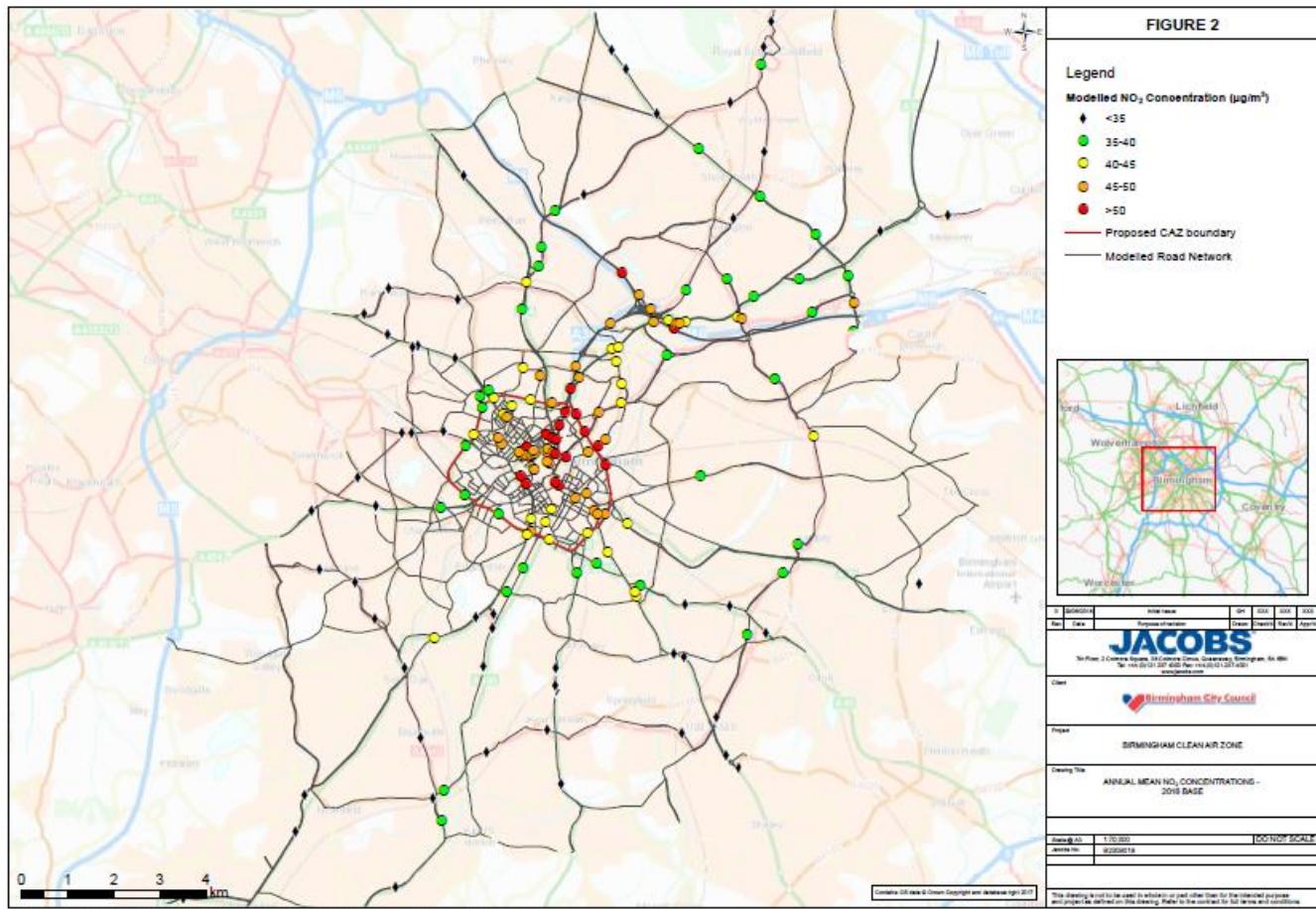
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Birmingham City Council believes that even with compliance with the legal limit there will remain a health burden i.e. there is no recognised safe limit for PM at this point in time.

In contrast, annual average NO₂ concentrations still exceed the legal limit on several road links in and around Birmingham City Centre. Meeting the NO₂ legal limit poses a huge challenge for many cities in the UK and across Europe. One of the key reasons why ambient levels of NO₂ remain higher than had been previously expected is the driving conditions in urban areas and concerns over the performance of the more recent Euro emissions standards for some diesel vehicles (see Appendix A of the Birmingham Clean Air Zone Feasibility Study: Air Quality Modelling Report for more information on Euro standards). In general, Euro standards have failed to reduce oxides of nitrogen (NO_x)¹⁰ emissions from light-duty diesel vehicles (e.g. cars and vans), despite tightening emissions standards for NO_x. However, Euro VI (for heavy vehicles) is performing well and the standard for light vehicles is still bringing about a significant reduction, albeit not as much as it should.

Whilst air quality remains a problem across Birmingham and the wider West Midlands conurbation, there are areas of the city centre where the problem is more pronounced than others. The 2016 baseline position for Birmingham is clearly illustrated in Figure 1.1.

Figure 1.1 - Air quality baseline – 2016 baseline



¹⁰ Vehicle emissions are measured in terms of total NO_x. NO_x is made up of nitrogen oxide (NO) and NO₂, although the NO is subsequently converted into additional NO₂ by interaction with ozone in the atmosphere – this reaction being dependent on the availability of ozone.

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Figure 1.1 highlights that most exceedances in Birmingham in 2016 were within and around the City Centre, bounded by the ring road. Figure 1.1 also identifies some significant exceedances on the A38 approaching the City Centre. Other locations of significant exceedances are identified on the M6 in the northern part of Birmingham. Figure 1.1 also highlights some exceedances on the A47 approaching the M6.

1.3.4 Air Quality Baseline: 2020 baseline

Following a similar approach as identified for 2016 baseline analysis, this section summarises the 2020 baseline results generated using Birmingham City Council's Airviro model. Again, a total of 124 receptors have been included to represent the PCM road links. A further 54 sites were selected to represent local hotspots beyond the PCM network.

A summary of the Airviro results for 2020 baseline is presented in Table 1.5, and the full results for each of the 178 locations are presented in the Birmingham Clean Air Zone Feasibility Study: Air Quality Modelling Report. The analysis indicates that 15 PCM sites are estimated to exceed the statutory annual mean limit value for NO₂ emissions in 2020. A further 26 local network sites, not identified on the PCM network, are also estimated to exceed the statutory NO₂ emissions limits in 2020.

Table 1.5 - Summary of Local and PCM Modelling Results

Site Type	Number of sites > 40 µg/m ³	Maximum NO ₂ Concentration µg/m ³
PCM sites (PCM output)	11	50.5
PCM sites (Airviro output)	15	48.8
Local network sites (Airviro output)	26	49.4

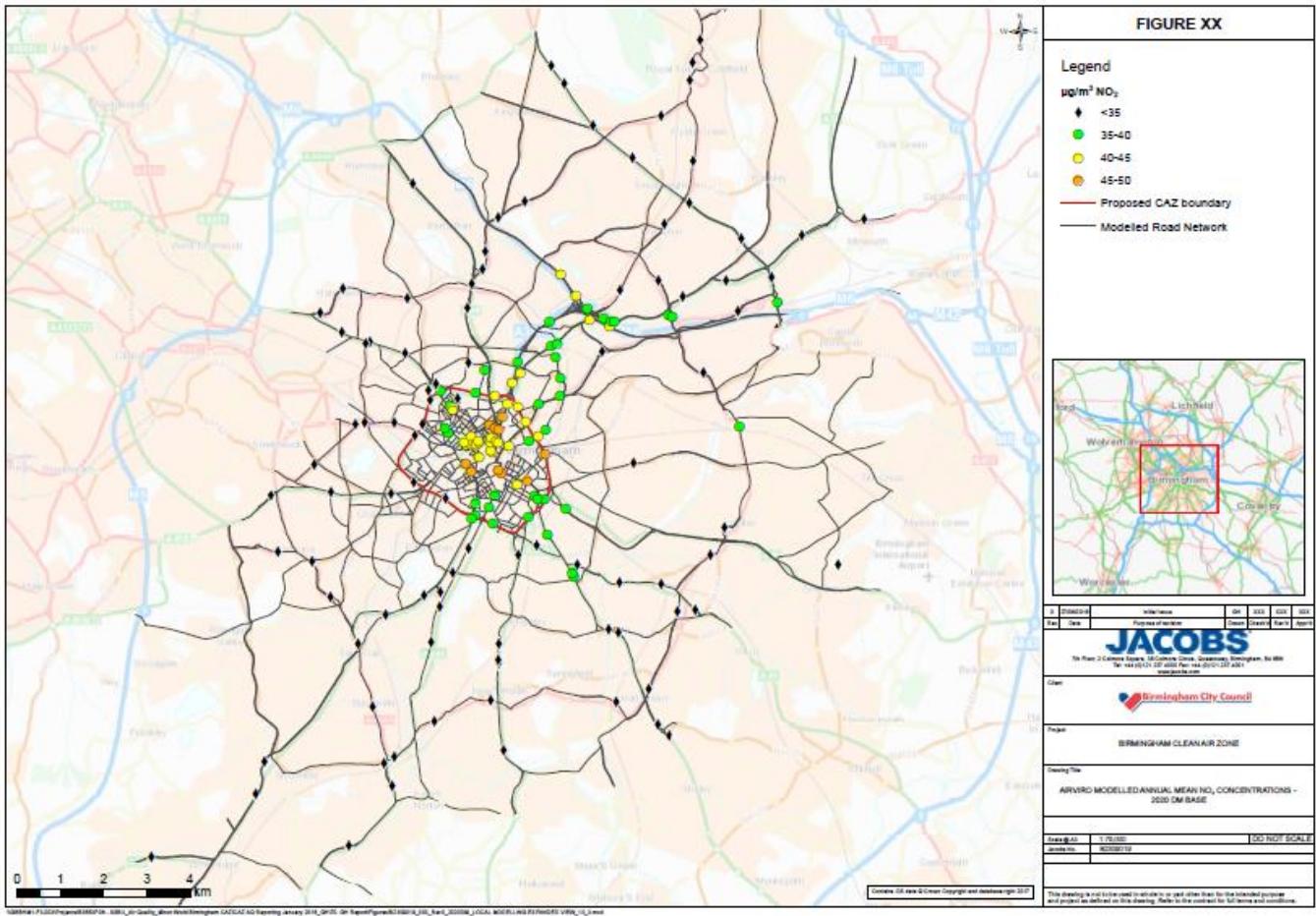
The 2020 baseline position is clearly presented in Figure 1.2. A comparison between 2016 and 2020 baseline indicates that Birmingham's air quality is expected to improve, although further and more urgent action will be required. Like the improvement across the wider City, the proportion of Birmingham City Centre where annual average NO₂ concentrations exceed the legal limit is expected to decrease by 2020, due to anticipated reductions in background concentrations, ongoing upgrade of the local vehicle fleet and other local interventions. However, modelling indicates that, if nothing further is done, concentrations will continue to exceed the limit on some major roads in and around the City Centre, including the A38, A38M, A4400, A452 and A4540.

In particular, as with the 2016 analysis, the 2020 baseline highlights that most locations of exceedances are forecast to be within the City Centre, bounded by the ring road. Outside this area, highlighted with a redline boundary in Figure 1.2, other notable exceedances are located on A38 approaching the City Centre and the M6 in the north of the City. Such locational specific analysis forms part of key evidence for identifying the boundary of Birmingham's Clean Air Zone and any additional measures.

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Figure 1.2 - Air quality baseline – 2020 baseline



1.3.5 Air Quality Baseline: Specific sources of exceedance

Nitrogen oxides is a generic term which includes both NO and NO₂. According to the National Atmospheric Emissions Inventory (NAEI) estimates, around a third of the UK NO_x emissions in 2015 arose from road transport, most of which came from diesel vehicles (NAEI, 2017).¹¹ Some disparities exist due to the increase in the proportion of NO_x emitted directly as NO₂ (also known as primary NO₂) from the exhausts of modern diesel vehicles, as a result of emission control systems that aim to reduce total NO_x and particulate matter emissions.

The starting point of establishing a robust baseline regarding Birmingham's air quality in relation to NO₂ emissions is to establish the specific sources of exceedances. The majority of this pollution is typically associated with combustion emissions, including from road transport, rail, aircrafts, industry and domestic activities.

An assessment of NO_x emissions, which are a combination of nitrogen oxide (NO) and NO₂, was undertaken for Birmingham. The findings were presented across the following two key categories:

- Road NO_x: NO_x emissions resulting from road traffic
- Background NO_x: NO_x emissions made up of a contribution of remote road traffic emissions and other sources including industrial, domestic, air transport and rail transport.

This assessment highlights that road traffic (Road NO_x) in Birmingham is the predominant source of total oxides of nitrogen in the City. The assessment also confirms that remote road traffic emissions are a significant proportion of the Background NO_x. The findings of this assessment across a number of key

¹¹ NAEI, Air Quality Pollutant Inventories for England, Scotland, Wales, and Northern Ireland: 1990-2015 (August 2017)

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locations is summarised in the table below. The data below highlights that road based NOx in Birmingham, which includes Road NOx and remote traffic emissions in Background NOx, is considerably higher than the national average estimated in NAEI assessment.

Table 1.6 - Road NOx and Background NOx for key locations in Birmingham: 2020 estimates

Receptor	Position	Easting	Northing	Census ID	Road	2020 Modelled Road NOx µg/m3	2020 Modelled Background NOx µg/m3
PCM_0	Inside Ring Road	406752	286515	81490	A4400 Suffolk St. Queensway	49.2	44.5
PCM_2	Inside Ring Road	407477	287785	56394	A38 Corporation St.	48.5	40.8
PCM_6	Outside Ring Road	408473	286918	27736	A4540 Watery Lane Middleway	53.6	37.9
Non_PCM_10	Inside Ring Road	407458	286475	N/A	Moat Lane	47.5	43.8

The analysis summarised in Table 1.6 highlights the need to focus effort on reducing Road NO_x and background NO_x resulting from remote traffic. These emissions are dependent on the type of vehicle both in terms of size and age. A breakdown of vehicle emissions or 'source apportionment' was undertaken for 2020 baseline at a number of specific receptor points in and around Birmingham City Centre, the key location of exceedances, to provide specific information on the emission sources.

The respective source apportionments indicate significant contributions from a number of vehicle classes as summarised in Table 1.7. The table highlights that in 2020 diesel cars will be the single largest contributor of NO₂ emissions at most locations in and around the City Centre. Diesel LGVs and Rigid HGVs are also envisaged to be notable contributors of NO₂ emissions. In certain locations, buses and coaches are forecast to be the key driver of NO₂ emissions. Petrol cars, petrol LGVs and Arctic HGVs are forecast to be amongst the smallest contributors of NO₂ emissions across in and around the City Centre. Such analysis provides evidence around vehicle categories which would need to be considered for Clean Air Zone interventions.

Table 1.7 - Road NOx and Background NOx for key locations in Birmingham: 2020 estimates

Vehicle Type	A38 (Between Children's Hospital and Dartmouth Circus)	Suffolk St Queensway (Near Bank st)	A4100 Digbeth	A540 Lawley Middleway - Garrison Circus
Diesel Cars	54%	53%	25%	42%
Petrol Cars	6%	6%	3%	5%
Buses/Coaches	3%	0%	49%	0%
Artic HGVs	2%	2%	2%	4%
Rigid HGVs	13%	14%	13%	28%
Diesel LGVs	22%	25%	8%	21%
Petrol LGVs	0%	0%	0%	0%

1.4 Case for Change

1.4.1 Public health and regulatory context

Humans can be adversely affected by exposure to air pollutants in ambient air. As such the real driver for tackling pollution is the benefit to public health. It is also a social justice issue for more vulnerable people as well as a health and environmental concern, particularly given the exposure of poor air quality on disadvantaged communities and social infrastructure such as schools, hospitals and care homes. NO₂ and PM, the two pollutants identified earlier in this document, are primary causes of air quality related public health concerns in Birmingham and other major cities across the UK.

Over the years the European Union and the UK Government have developed an extensive body of legislation which establishes health based limits for a number of pollutants present in the air. These limits apply over differing periods of time because the observed health impacts associated with the various pollutants occur over different exposure times. Part IV of the Environment Act (1995) and resultant initial Air Quality Strategy, in the late 1990s, introduced the concept of Local Air Quality Management (LAQM) in the UK. It was expected that the forthcoming vehicle emissions standards for road vehicles and industrial permitting would deliver, if not all, then the majority of the air quality improvements needed to meet legislation.

Birmingham inability to meet the legislation, lead to the whole of Birmingham being declared an Air Quality Management Area (AQMA) for nitrogen dioxide in January 2003. Pursuant to the AQMA declaration Environmental Health led on the development and publication of an Air Quality Area Plan (AQAP) in 2006, which was updated in 2011. The original plan focused on a wide selection of actions, which were narrowed down to be more targeted for the 2011 plan.

In 2010, the Air Quality (Standards) Regulations 2010 set legal limits (called 'limit values') for concentrations of pollutants in outdoor air. These are based on the EU Air Quality Limit Values¹². The UK continues to fail to meet air quality limit values for nitrogen dioxide set at an annual mean limit value of 40 µg/m³. This was to have been achieved by 2015 following an extension from the original deadline of 2010. Currently, the UK continues to have significant exceedances of the annual mean legal limit for NO₂ and the EU has indeed started infraction proceedings in the European Courts of Justice where as a result fines may be imposed.

1.4.2 Drivers for change in Birmingham

Poor air quality in Birmingham is acknowledged as a major public health burden and Public Health England suggest that it is the fourth largest risk to public health, behind cancer, obesity and cardiovascular disease. It is estimated that poor air quality was responsible for around 900 premature deaths a year in Birmingham and in excess of 2,000 attributable deaths across the West Midlands per year (based on 2011 estimates). This results in a significant economic cost burden on the City and the wider region.

The Council is responsible for ambient air quality and cleaner air under the Air Standard Regulations. The Council undertook an Air Quality Survey in March 2017. Among the 1,104 responses to the survey:

- 87% thought air quality is a 'serious issue' to be tackled now
- 88% said air quality has a very serious impact on health
- 67% said air quality is an important consideration when making travel choices.

The top three contributors to air pollution were considered by respondents to be (1) congestion, (2) vehicles idling in queues and (3) lorries, vans, and diesel cars. As with the wider UK, the two pollutants of most concern in Birmingham are nitrogen dioxide and fine airborne particulate matter. Both pollutants contribute to the health burden.

The air quality baseline analysis presented in the earlier section highlights that NO₂ emissions exceedances in parts of the City are in excess of 20% of the legal limits. Meeting the NO₂ legal limit poses a huge challenge for many cities in the UK. Birmingham is no different in this aspect. Although Birmingham's air

¹² Taken from: ec.europa.eu/environment/air/quality/standards.htm. Accessed February 2018.

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quality is forecast to improve by 2020 under the counterfactual case, the predicted reductions in pollution concentrations of NO₂ are not forecast to reduce rapidly enough to achieve compliance levels.

Failure to reduce the NO₂ emissions (and PM) will continue to expose the City to significant economic cost burden associated with public health on the City, which were estimated at nearly £1 billion for 2018. Equally, failing to take action towards achieving nitrogen dioxide compliance could lead to legislative issues for the Council. In particular, the City Council would be exposed to legal challenge for a failure to meet its statutory duty to comply with the Ministerial direction. Furthermore, the legal challenges could also relate to its obligation under air quality legislation to achieve compliance with legal NO₂ limits in the shortest possible time.

This NO₂ compliance in the shortest possible time in Birmingham would need to be taken forward as the project's primary spending objective. In addition, the other public health driven economic and legislative drivers outline the wider rationale for intervention in Birmingham.

1.4.3 Need for targeted action

As summarised above, lack of action to achieve compliance would result in public health driven economic and regulatory implications for Birmingham City Council. The air quality baseline analysis outlined earlier in this document highlights road traffic as a primary source of harmful emissions in the city, with diesel vehicles, including private cars, taxis, buses, LGVs and HGVs, as the most significant contributors to nitrogen dioxide emissions.

The Government issued the UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations in July 2017 which identified Birmingham as one of the areas experiencing the greatest problem with nitrogen dioxide exceedances. The Government's Plan requires the Council to deliver the best Clean Air Zone option to achieve statutory nitrogen dioxide limit values within the shortest possible time.

The 2016 and 2020 air quality baseline assessments highlight that most locations of exceedances are forecast to be within the City Centre, bounded by the ring road. Outside this area, other notable exceedances are located on A38 approaching the City Centre. This drives the need for CAZ around the City Centre, which is bounded by the A4540 Ring Road. In particular, a CAZ defined by the ring road would not only tackle exceedances within the City Centre, it would also indirectly mitigate the other notable exceedances located on A38 approaching the City Centre.

The air quality baseline analysis also identifies that there are notable exceedances on the M6 in the north of the City. Considering the classification and management of this motorway asset, Birmingham City Council will not be able to tackle these exceedances. It is understood that Highways England are addressing such exceedances as part of their national plan.

Considering the source apportionment analysis, a CAZ around the city centre would need to consider restrictions or charges for all vehicle categories, including private cars. Furthermore, considering that the annual mean NO₂ concentrations remain above the legal thresholds consistently following the implementation of various restriction and complementary measures in Birmingham, there is a need to bring about a significant shift in local behaviours in the City. The ongoing stated preference analysis being undertaken highlight the need for a charging CAZ to achieve such behavioural change.

That said, early modelling undertaken as part of the development of the project's Strategic Outline Case clearly highlights that achievement of the required improvement in air quality is unlikely to be feasible in Birmingham if only charging options are considered. This drives the need for inclusion of additional measures.

1.4.4 Other key considerations

Given its statutory equality duty, Birmingham City Council wants to ensure that compliance of NO₂ emissions will not create any significant dis-benefits to disadvantaged groups. In particular, depending on the preferred option for a Clean Air Zone, there could be some impacts on people on lower incomes and those in minority ethnic communities that need to be recognised and mitigated where possible, in order to avoid any particular group being disproportionately affected.

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There might also be an impact on local small and medium sized enterprises who employ Birmingham residents. Any scheme-specific equalities issues will be identified as part of the Integrated Impact Assessment and measures would be designed to reduce any negative impacts as far as possible.

As identified earlier, Birmingham has strong growth forecasts. A significant proportion of the City's growth is envisaged to be delivered around the city centre. This growth is currently constrained by the current capacity of the city's transport infrastructure in the short to medium term. Within this context, the Council expect that the emerging CAZ will act as an enabler of development and growth in the city centre. In particular, a city centre based CAZ can facilitate capacity on the city centre's road network, which can unlock development and growth locally. Whilst enabling such developments, such as the mixed-use plans for Snowhill Station and surrounding areas, the Council will need to ensure that their transport demand is multi-modal and any vehicle based demand is met through modern fleet of low-emission vehicles.

The above outlines the project's case for change, to achieve compliance with legal limits of NO₂ emissions and outlines the potential for Birmingham to further improve air quality. This rationale for intervention drives the development of the project's spending objectives and critical success factors, which act as key inputs for short-listing the options for detailed economic appraisal. That said, whilst determining the preferred option for the project, the Council will ensure that the identified air quality exceedances are not displaced elsewhere in the City.

The project's logic map which captures its core aspects of case for change is presented in the Table 1.8.

Table 1.8 - Logic Map of Birmingham CAZ and Additional Measures

Inputs	Outputs	Outcomes	Impacts
Implementation Fund	Clean Air Zone (geography and price structure by vehicle category)	Change in journey characteristics: journeys made in less polluting vehicles, cancelled or diverted journeys	Improved air quality
Clean Air Fund	Infrastructure to monitor and enforce the Clean Air Zone	Increased mode share of public transport	Increased physical activity
Other local funding	Additional measures	Increased mode share of active travel modes	Improved human health
Local Plan		Changes to vehicle fleet	Loss of some economic activity (supply side effects)
Equality Duty		Cost of compliance	Enable economic growth in the City Centre
		Behaviour change	

Inputs	Outputs	Outcomes	Impacts
		<p>Reduction in local NO₂ concentrations</p> <p>'Neutralised' negative impacts on SMEs / micro businesses and disadvantaged groups</p> <p>Additional capacity on the network in the City Centre</p>	

1.5 Scheme Objectives and Success Factors

Underpinned by the rationale for intervention outlined as part of the assessment of Case for Change, BCC have defined its spending objectives to shape a clear way forward. The spending objectives will also allow Birmingham to deliver the outcomes sought by the national Air Quality Plan and support the wider policies set out in the Birmingham Development Plan, Clean Air Zone Framework and Brum Breathes.

Following the identification of spending objectives, JAQU's Options Appraisal Package guidance requires determination of Critical Success Factors (CSFs). The guidance states that a list of CSFs is required to conduct a high-level comparative assessment of the options. This process is considered to result in a shortlist of options which are envisaged to be appraised in greater detail as part of the development of the Full Business Case.

Building on the above context, this section presents the project's spending objectives and CSFs.

1.5.1 Spending Objectives

Following JAQU's guidance the spending objectives are presented across two categories: primary objectives and secondary objectives. Birmingham City Council's primary spending objective for Birmingham is to:

- **SO1 Compliance** - Deliver a scheme that leads to compliance with NO₂ concentration limits¹³ in the shortest possible time.

Birmingham City Council also has a series of supplementary spending objective that support solutions:

¹³ The NO₂ annual mean value may not exceed 40 micrograms per cubic metre (µg/m³) as defined in the air quality directive (2008/EC/50) and as reported in Air Pollution in the UK report.

- **SO2 Value for money** - Demonstrate value for money for Birmingham City Council and, where central government funding is required, for the Government.
- **SO3 Evidence based** - Are driven by need, are based on real-time local evidence of air quality, emission sources, and levels of air pollution in Birmingham or in specific pollution hotspots, and where necessary the potential benefits and impacts are capable of being modelled.
- **SO4 Fair and proportionate** - Are targeted to minimise the impacts on local residents and businesses, including on disadvantaged groups, such that:
 - there are no unintended consequences,
 - ordinary working families who bought diesel vehicles in good faith are not unfairly penalised,
 - support is made available to owners of affected vehicles where access restrictions or charging prevents certain vehicles from using particular roads at particular times, and
- **SO5 Transition to Low Emission and healthier economy** - Contribute to, and not compromise, Birmingham City Council's ambition to half the level of all pollutants by 2030 whilst supporting Birmingham's growth and accelerating the transition to a low emission economy, and creating a healthy place to live, visit and work.

1.5.2 Critical Success Factors

JAQU's Options Appraisal Package guidance also suggests that local authorities need to identify two types of CSFs: primary CSF and secondary CSF. The project's CSFs, which were defined as part of the Strategic Outline Case (SOC) for shortlisting the options, and their relationship with the above-mentioned spending objectives is summarised below. Further details regarding the CSFs and their relationship with the spending objectives are set out in Appendix B1.

JAQU require that local authorities appraise their options against one primary (pass/fail) CSF and any options which do not meet this CSF should be rejected. Building on the guidance provided in the Options Appraisal Package document, the primary CSF for the Plan is:

- CSF1 Compliance: Deliver a scheme that leads to compliance with NO2 concentration limits (annual mean NO2 concentration of 40 $\mu\text{g}/\text{m}^2$) in the shortest possible time. This CSF directly supports Spending Objective SO1.

JAQU's Options Appraisal Package guidance highlights that there is a need to define other secondary CSFs to further differentiate amongst options. In particular, options that meet the primary CSF are required to be considered against the secondary CSFs. A number of secondary CSFs were defined against which options have been assessed, these are:

- CSF2 Value for money: This CSF considers the full range of costs and benefits to society of the proposed option (such as the health benefits of improved air quality and the costs to the public in complying with a measure) rather than just looking at the financial impacts to determine if the measure is viable within an economic context. This CSF directly contributes to Spending Objective SO2.
- CSF3 Evidence based: This CSF considers to what extent, the case for an option is based on real-time local evidence of air quality, emission sources, and levels of air pollution in Birmingham or in specific pollution hotspots, and (where applicable) the potential benefits and impacts are capable of being modelled. This CSF directly contributes to Spending Objective SO3.
- CSF4 Distributional impacts: This CSF considers the potential impacts on key groups of the proposed option, in order to determine whether there is likely to be a disproportionate impact on one or more particular groups. This CSF directly contributes to Spending Objective SO4.
- CSF5 Strategic and wider air quality fit: This CSF considers how the proposed option interacts with other local policies already in place, in particular the transitioning to a low emission and healthier economy by 2030. This CSF directly contributes to Spending Objective SO5.
- CSF6 Supply side capacity and capability: This CSF considers whether or not there is sufficient commercial capacity or capability in the supply chain to successfully deliver the proposed option

and whether or not this is available. This CSF reflects the considerations made in the Commercial Case.

- **CSF7 Affordability:** This CSF considers if the option can be delivered given the potential resources available (for example staffing levels) and management structures in place as outlined in the management case. This CSF reflects the considerations made in the Financial Case.
- **CSF8 Achievability:** This CSF considers if the option can be delivered given the potential resources available (for example staffing levels) and management structures in place as outlined in the management case. This CSF reflects the considerations made in the Commercial and Management Cases.

1.6 Optioneering

1.6.1 Developing and shortlisting CAZ options and additional measures

Driven by the project's spending objectives a long-list of CAZ options were identified. The initial CAZ optioneering took place based on sifting using the primary and secondary Critical Success Factors. The results qualitative and quantitative analysis was used to determine the shortlist of CAZ options. More detail of the long to shortlist sifting can be found in Appendix A1, Table 6.1.

1.6.2 Selection of CAZ D Inner Ring Road

As identified earlier in this document, early modelling undertaken as part of the development of the project's Strategic Outline Case clearly indicated that achievement of the required improvement in air quality is unlikely to be feasible in Birmingham if only CAZ charging options are considered. In particular, the modelling indicated that under the counterfactual case, where no CAZ is imposed, nearly 207,000 vehicles will enter the area bounded by inner ring road on a daily basis in 2020. This area, within and around the City Centre, includes most locations of NO₂ exceedances in the City. It requires targeted action not least because some 57,400 non-compliant vehicles are forecast to enter this area every day by 2020, resulting in more than 40 locations of NO₂ exceedances.

Modelling for a CAZ C for inner ring road indicated a marginal reduction in the number of vehicles entering the proposed charging zone by 2020 every day. In addition, the introduction of CAZ C for inner ring road, is forecast to reduce the number of non-compliant vehicles entering the proposed charging zone by more than 16,000 vehicles daily by 2020. Despite such forecasts the modelling estimates that there will be 19 locations of NO₂ exceedances in 2020. A CAZ C option for inner ring road achieves the NO₂ emission compliance level across all exceedance locations much after 2022. Based on this analysis, CAZ C for the inner ring road was discounted from the optioneering process.

Considering the results for CAZ C for the inner ring road, CAZ A and CAZ B options for the inner ring road were also discounted, as they would not be able to achieve compliance at the earliest possible time.

Modelling for a CAZ D for inner ring road indicated a notable reduction in the number of vehicles entering the proposed charging zone by 2020 every day, when compared to the counterfactual case. In addition, the introduction of CAZ D for inner ring road, is forecast to reduce the number of non-compliant vehicles entering the proposed charging zone by more than 50,000 vehicles daily by 2020, when compared to the counterfactual case. Despite such forecasts the modelling estimates that there will be 12 locations of NO_x exceedances in 2020. A CAZ D option for inner ring road is estimated to achieve the NO₂ emission compliance level across all exceedance locations post 2022.

The transport and air quality modelling results for the reference case, CAZ C for inner ring road and CAZ D for inner ring road options are summarised in

Table 1.9 - Modelling results for Counterfactual Case, CAZ C and CAZ D inner ring road options

CAZ Option	Geography	Total vehicles entering CAZ (2020)	No of non-compliant vehicles entering CAZ (2020)	Percentage of vehicles entering CAZ, which are non-compliant (2020)	No of location of exceedances (2020)
No CAZ – counterfactual case	Inner Ring Road	206,900	57,400	27.7%	41
CAZ C	Inner Ring Road	205,100	41,300	20.1%	19
CAZ D	Inner Ring Road	190,900	6,500	3.4%	12

Although the CAZ charging options for outer ring road failed to meet the requirements of the primary Critical Success Factor due to significant deliverability risks related to physical implementation and enforcement, initial transport modelling was undertaken for a CAZ D outer ring road option to assess its ability to reduce the number of non-compliant vehicles beyond those delivered by CAZ D inner ring road option discussed above.

This analysis indicated that a CAZ D for the outer ring road would result in some 197,500 vehicles entering the charging zone, of which some 16,800 vehicles would be non-compliant. Furthermore, the analysis indicated that the number of non-compliant vehicles entering the area bounded by the inner ring road, the location of most NO₂ exceedances in Birmingham, CAZ D outer ring road option is only marginally lower than those forecast for the CAZ D inner ring road option. This demonstrates the diminishing returns for expanding the CAZ boundary in terms of reducing the number of non-compliant vehicles, a key driver for NO₂ emissions in Birmingham.

Based on these results, it was concluded that the performance of the CAZ D outer ring road option would only be marginally better than that of the CAZ D inner ring road option in terms of reducing NO₂ emissions. This marginal change was considered not to be sufficient enough to ensure that NO₂ compliance in Birmingham would be achieved earlier if CAZ D outer ring road option was delivered rather than the CAZ D inner ring road options. Considering the diminishing returns to limit non-compliant vehicles from approach locations of exceedances and its inability to provide any improvements in regarding NO₂ compliance, CAZ D outer ring road was again discounted from the optioneering process.

1.6.3 CAZ D Inner Ring Road Price Sensitivities

Based on the analysis summarised in the section above, options which integrate CAZ D inner ring road option was considered to be an appropriate way forward. That said, some additional price sensitivity analysis was undertaken to determine the appropriate level of charging. Lower levels of charges, compared to the proposed rates, were deemed inappropriate as they continued to encourage significant volume of non-compliant traffic into the charging zone. Furthermore, transport modelling results indicated that significantly higher charges, compared to the proposed rates, still resulted in large volume of traffic, including a notable number of non-compliant vehicles. These traffic modelling results for various price sensitivities are summarised in

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Table 1.10 - Modelling results for Counterfactual Case, CAZ C and CAZ D inner ring road options

CAZ Option	Geography	Price Sensitivities (as discussed with TOM)	Total vehicles entering CAZ (2020)	No of non- compliant vehicles entering CAZ (2020)	Percentage of vehicles entering CAZ, which are non- compliant (2020)
CAZ D	Inner Ring Road	Ultra-high – 200% of proposed charges	TBC	TBC	TBC
CAZ D	Inner Ring Road	High – proposed charges	190,900	6,500	3.4%
CAZ D	Inner Ring Road	Medium – 50% of proposed charges	193,800	17,200	8.9%
CAZ D	Inner Ring Road	Low – 25% of proposed charges	196,800	23,800	12.1%

Achieving compliance for NO₂ emissions requires significant reduction in traffic volume in the zone, not just a reduction in the number of non-compliant vehicles entering the zone. As summarised in

Table 1.10, there is only marginal difference in traffic volume between the high (proposed charges) and ultra-high (200% of proposed charges) CAZ D inner ring road options. Considering the diminishing returns to reduce number of vehicles entering the zone by significantly increasing the charges and the inability of increased charges to provide any improvements in regarding NO_x compliance, CAZ D inner ring road ultra-high charges option was discounted from the optioneering process.

1.6.4 Need for additional measures

The above analysis demonstrates that CAZ D inner ring road high charges (proposed) option was considered to be the appropriate way forward. That said, the option is estimated to achieve the NO₂ emission compliance level across all exceedance locations post 2022. Within this context, there was a need to identify a long-list of complementary additional measures.

In order to identify the additional measures that could be considered in conjunction with a CAZ to achieve compliance, a desk top study has been undertaken to review existing evidence on local, regional and national measures to improve air quality. In addition, Birmingham City Council, Transport for West Midlands and key local stakeholders were consulted to identify further measures to take through an initial sifting process. This generated a longlist of 104 potential options. The longlist of additional measures is set out in Table 1 (p3-26) of the "Birmingham Clean Air Zone Feasibility Additional Measures Study".

The long-list of additional measures (104 in total) went through a three-phased short-listing process. Phase 1 involved assessing a longlist of additional measures against some high-level criteria to eliminate those that clearly do not contribute to the Critical Success Factors. A total of 31 options were identified within the context of contributing to the primary objective.

Phase 2 involved developing and applying a Multi Criteria Analysis (MCA) framework to rigorously appraise each option taken forward from Phase 1 to identify those that should be taken forward for further development. This involved assessing each option against multiple criteria and scoring each measure. A total of 18 options were recommended for further development and assessment in Phase 3. In addition, a further 14 additional measures have been identified that have the potential to contribute to further improving air quality post 2020 in support of the wider spending objectives and local air quality policy.

Following the completion of Phase 3 assessment, a shortlist of 11 additional measures / packages of measures were taken forward for quantitative traffic and air dispersion modelling. The results of this modelling were analysed to determine the package of additional measures, which includes:

- All BCC controlled parking which is currently free will have a charge applied.
- Banning traffic travelling northbound on Suffolk Street Queensway (A38) that exits onto Paradise Circus to then access Sandpits Parade and southbound traffic from Paradise Circus accessing the A38.
- Close Lister Street and Great Lister Street at the junction with Dartmouth Middleway.

The above mentioned additional measures are deliverable by 2020. Additional measures which can be delivered in 2021 and 2022, are presented in Appendix 1C. The modelling results indicate that a CAZ D inner ring road plus additional measures option indicates that NO₂ compliance will be achieved at all but one location by 2021. However Suffolk Street Queensway is forecast to achieve compliance by 2022. BCC will continue working on to see if compliance can be achieved before 2022 at this one location.

1.6.5 Need for further mitigation measures and exemptions

Responding to the initial distributional impacts assessment of CAZ D inner ring road option a long list of mitigation measures was developed. These were appraised against primary and secondary CSF to determine a short-list, including:

- Mobility Package for low income individuals comprising of mobility credit offered in form of SWIFT travel card
- Scrappage scheme for low income individuals comprising of cash payment toward the purchase of a compliant car or mobility credit offered in form of SWIFT travel card

- Hackney carriage support package comprising of support payments to be paid towards operational expenses of ULEV vehicles and support for an LPG retrofit
- Council hackney carriage leasing scheme comprising of 50 ULEV taxis purchased by BCC through public procurement tender and leased to the drivers who are most vulnerable
- 'Free miles' for ULEV LGVs comprising of £750 credit for ULEV van drivers to spend on BCC public charging network
- HGV & Coach compliance fund which would fund installation of retrofit solutions or upfront / lease costs of a compliant vehicle
- Marketing and educational campaign to provide information on the CAZ and reach out to groups eligible for support through mitigation measures.

On a similar note, community groups that would be negatively impacted by a CAZ D inner ring road option were identified and a long list of exemption categories were identified. This was then used to inform an initial sifting of the longlist to remove those measures which would impact the compliance date, relative to a scenario where there were no exemptions. The increased number of trips, in AADT terms, was estimated for each of the twelve exemptions on the longlist. The next level of sifting was to eliminate areas of overlap between the different exemption options to ensure the most efficient package is created.

The proposed exemptions include the following categories: CAZ HGVs and coaches; HGVs with existing finance agreements; SME Vans; Vans with existing finance agreements; CAZ residents; Income deprived working within the CAZ; Key workers working within the CAZ; Hospital and GP visits; Faith groups; Community and school transport

Further details of the options development and short-listing process is summarised in the Economic Case.

1.7 Shortlisted options

Following the process summarised above, four options were short-listed for detailed economic appraisal. Building on the baseline evidence base and short-listing process, all shortlisted options include a charging based CAZ for entering the City Centre, bounded by A4540 Ring Road (inner ring road).

The three shortlisted options are:

- **Option 1 - CAZ D inner ring road:** non-compliant class D vehicles (i.e. buses, coaches, taxis, heavy goods vehicles, light goods vehicles and private cars) would be charged to enter the CAZ
- **Option 2 - CAZ D plus additional measures package:**
 - All on-street free parking in CAZ becomes paid for.
 - Banning traffic travelling northbound on Suffolk Street Queensway (A38) that exits onto Paradise Circus to then access Sandpits Parade and southbound traffic from Paradise Circus accessing the A38.
 - Close Lister Street and Great Lister Street at the junction with Dartmouth Middleway.
- **Option 3 - CAZ D plus additional measures, mitigation measures and exemptions package:**
 - Same package of additional measures as identified for Option 2
 - Mitigation measures including a Mobility package for low income individuals, Scrappage scheme for low income individuals, Hackney carriage support package, Council hackney carriage leasing scheme, 'Free miles' for ULEV LGVs, HGV & Coach compliance fund, and Marketing and educational campaign.
 - Exemptions for CAZ HGVs and coaches; HGVs with existing finance agreements; SME Vans; Vans with existing finance agreements; CAZ residents; Income deprived working within the CAZ; Key workers working within the CAZ; Hospital and GP visits; Faith groups; and Community and school transport.

The three short-listed options have been appraised in detail in the Economic Case.

1.8 Benefits, Risks, Constraints and Inter-Dependencies

1.8.1 Benefits

The implementation of a CAZ and additional measures in Birmingham presents an opportunity to deliver a wide range of benefits. JAQU has provided guidance and supporting data to ensure consistent assessment of quantified and non-quantified impacts of the project.

Core benefits of the project relate to the *Public Health and the environment* due to the reduction of NO₂ and other pollutants.

- Reduced impacts on human health measured through reduction in health expenditure (hospital admissions, mortality impacts and chronic bronchitis impacts)
- Increased productivity which is evaluated through work absenteeism caused by ill-health
- Reduced damage on built environment (residential dwellings and historical and cultural buildings) measured by the surface cleaning costs and amenity costs.
- Reduced impact on ecosystems (nature conservation and green spaces within the boundary)
- Reduced emissions having an impact on climate change.

Other benefits reflect the improvement of the *use and performance of the transport network*:

- Impact on journey times for both private and public transport due to reduction of traffic load and consequently more reliable over-ground PT services.
- Increased travel by sustainable modes such as walking, cycling and public transport as an alternative to CAZ charges.
- Reduced operating costs due to traffic congestion mitigation.
- Reduction in accident rates on road.

Further benefits generated by *potential revenue streams* will include:

- Reinvestment in local transport policies which aim to improve air quality and support the delivery of the ambitions of the Plan.

The above presents an overview of the project's impacts. A detailed assessment of the projects options' economic impact is presented in the Economic Case.

1.8.2 Risks

The key risks are associated to social acceptance, economic and human resources and traffic and emission impacts.

- The level of acceptance within the population which can be translated into dissatisfaction around the charging scheme. Health and environmental benefits should be the main discussion around the CAZ in the Communication Plans and programmes to get recognition from stakeholders and citizens.
- Disproportional penalization to vulnerable groups in the society by geographical location, scale and structure of vehicle compliance standards.
- The transition from diesel vehicles (which produce high levels of NO₂) to petrol vehicles to be compliant with the CAZ framework could lead to increase the levels of carbon dioxide.
- The potential impacts on the network, displacing traffic going to or through the city centre and re-routing and consequently displacing negative outcomes to other areas of the city.

- The availability of economic and human resources is also key to fund and run the implementation of the CAZ and the posterior management, monitoring and enforcement of the required initiatives.
- Severity on the impact of economic activity in the city centre, where significant proportion of jobs are located and the ability to mitigate.

1.8.3 Constraints and inter-dependencies

The most significant constraint on the Plan is to meet the national air quality standards in the shortest time possible. The priority in the optioneering and appraisal process is the capacity to deliver the expected outcome in a quicker way rather than in a cheaper way. This time constraint is dependent on many factors at a national, regional and local level which contribute to lead the change towards a more sustainable and clean environment. These factors can be governmental institutions, local entities and public and private companies which through their programmes and policies, projects and transparency processes can make the progress effective.

The reduction of NO₂ emissions is achieved by transforming the road vehicles fleet structure to be compliant with the emission standards. The success on influencing users to uptake cleaner vehicles is highly related to the availability of new vehicles in the market (private companies producing Low Emission Vehicles), the provision of the appropriate infrastructure and facilities to support this type of vehicles, and promotional programmes and incentives to buy low emission vehicle (LEV).

To improve the performance of the implementation and operation there is also a great dependency on those organizations that own data which are key to understand the CAZ operation and the regional air quality challenge, such as data bases provided by taxi levy, transport operators, national data base of vehicle compliance and monitoring data. Operating the CAZ at a local level or from a central operations centre might have influence in the way data is effectively transferred.

Furthermore, CAZ is not the only measure which contributes towards the achievement of the objectives. It is the sum of actions, plans and specific projects and developments which are responsible for enhancing sustainable and healthy environments. Birmingham is currently growing support by a group of connectivity packages such as Snowhill Development and HS2 arriving to the city. Both are working together with relevant authorities to maintain air quality, especially where construction or operations may have significant air quality effects such as air quality management areas or zones with plans or measures directed at compliance with national standards. Then, the delivery of these schemes will be crucial to improve the air quality.

1.8.4 Stakeholder Engagement

The Council has identified a preferred plan for implementation of a Clean Air Zone and a key part of that will be consultation with residents, businesses and other stakeholders. Whilst the legislation does not prescribe the consultation requirements, the Council has sought Counsel's advice on the approach for the CAZ consultation process.

There is a high prospect of challenge with regard to any action the Council decides to take, from either environmental interest groups who do not consider that the proposals go far enough or / and from specific individuals or groups that may be especially adversely affected by the proposals.

Travel patterns and behaviours continue to be a key part of the challenge in tackling air quality and we need to continue to encourage the use of more efficient forms of transport and where possible reduce the overall demand for travel.

The Council has undertaken a six-week consultation process on the preferred option.

The consultation analysis has been carried out, but due to the high level of responses (11,000) due care and consideration needs to be taken to understand concerns and advice in order to provide a meaningful response to the findings. Therefore further work is currently being undertaken to model mitigation measures and subsequent traffic modelling changes.



2 Economic Case

2.1 Introduction

This document sets out the economic case for the preferred option and the appraisal undertaken for two shortlisted Clean Air Zone (CAZ) options addressing NO₂ exceedances in Birmingham to identify a preferred option as outlined in the strategic case.

The shortlisted options appraised are:

- CAZ D – non-compliant class D vehicles (buses, coaches, taxis, heavy goods vehicles, light goods vehicles and private cars) must pay the charge;
- CAZ D plus the same additional measures outlined above (CAZ D+).
- All BCC controlled free parking in the CAZ becomes charged.
- Banning traffic travelling northbound on Suffolk Street Queensway (A38) that exits onto Paradise Circus to then access Sandpits Parade and southbound traffic from Paradise Circus accessing the A38.
- The closure Lister Street and Great Lister Street at the junction with Dartmouth Middleway. This allows more green time on the A4540.

The Do Minimum used for comparison recognises changes in exogenous factors, such as fleet composition, and assumes no new local or national policies are implemented targeting air quality.

A cost-benefit analysis has been undertaken based on four distinct, but related, assessments:

- Costs to BCC – associated with setting up and operating a CAZ and additional measures;
- Costs to transport users – associated with complying with the CAZ
- Health and environmental benefits –from the reduction in NO₂, PM and CO₂ emissions generated for each option.
- Distributional impact assessment – analysis, following JAQU guidance, of the potential distributional and equality impacts on different groups.

The economic assessment in this Economic Case has been conducted in accordance with JAQU guidance. Impacts are presented as a central case for the comparison between options, however sensitivity tests for the preferred option are also presented.

2.1.1 Summary of Findings

Both of the options deliver substantial benefits in terms of reduced emissions, many of which have been monetised. In addition, a CAZ will lead to non-monetised impacts in the form of:

- Reduced material damage (particularly to historical and cultural buildings).
- A positive effect on nature conservation/green sites within the CAZ boundaries.
- A positive effect on climate change through reduced greenhouse gas (GHG) emissions, measured in CO₂ equivalent tonnes.

The monetised value of environmental benefits for each option over the appraisal period is presented in **Error! Reference source not found.** However, the damage cost estimates from DEFRA do not account for all the improved health outcomes associated with improved air quality and behavioural changes associated with the CAZ. For example, they do not account for the impact of NO₂ on hospital admissions and therefore morbidity impacts are potentially underestimated.

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Table 2.1 Total health and environmental benefits of reduced NO₂ and PM₁₀ emissions and CO₂ (£m, 2018 discounted prices)

Pollutant	CAZ D	CAZ D+
NO₂ and PM₁₀	£ 25	£ 38
CO₂	£ 6	£ 6
Total	£ 31	£ 44

Traffic and Air Quality modelling indicate that air quality compliance, defined as all receptors forecast to measure an annual average NO₂ level below 40 µg/m³, is not achieved in 2020 by either of the modelled options. The traffic modelling does show that the introduction of Additional Measures reduces the cordon crossing AADT by 1.5%, which will result in increased progress toward air quality compliance.

As behaviour changes are influenced by price, as clearly indicated by modelling outputs of various price scenarios, it is assumed that the option with the largest impact on user costs will achieve compliance with air quality limits in the shortest timeframe. The UK Air Quality Plans note that the government will require local plans to be developed and implemented to at a pace where air quality limits are achieved within the shortest possible time¹⁴. Therefore, the highest feasible charge¹⁵ level that was tested has been identified as the preferred option.

Air quality modelling of the CAZ D+ additional measures with high charge scenario forecasts that compliance will be achieved in 2021, apart from one location that BCC will continue working on to see if compliance can be achieved before 2022.

For both schemes, the environmental benefits are outweighed by dis-benefits accruing to transport users due to the scheme's introduction. Accordingly, each of the schemes results in a negative present value of benefits (PVB).

The present value of costs (PVC), represented as costs negative for both schemes as the revenues generated from the CAZ charges are not included in the appraisal as they are transfer payments. Table 2.2 summarises the position for each option over the 10-year appraisal period.

¹⁴ UK plan for tackling nitrogen dioxide concentrations, July, 2017.

¹⁵ High charge levels were set to be equal to charge levels proposed in London's Ultra Low Emission Zone.

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Table 2.2 Net Present Value presented for each option (£m 2018 discounted prices, central values)

Analysis of Monetised Costs and Benefits (AMCB)	CAZ D	CAZ D+
Benefits - health and environmental	£25	£38
Benefits - reduced CO2 emissions	£6	£6
Benefits to transport users - changes in journey time and vehicle operating costs	£23	£11
Cost to Transport Users - Parking charges	£ -	-£48
Cost to Transport Users - upgrading	-£66	-£54
Cost to Transport Users - welfare (trips foregone)	-£21	-£47
Private Sector Benefits - Parking revenues	£ -	£28
Present Value of Benefits (PVB)	-£33	-£66
Costs to BCC	-£76	-£76
Revenues from Parking Charges	£ -	£20
Present Value of Costs (PVC)	-£76	-£56
Net Present Value (NPV)	-£109	-£122
% of GVA	-0.03%	-0.04%

Overall, the net position across the options ranges from a NPV of -£109m (CAZ D) to -£122m (CAZ D+). Evaluating these impacts as a proportion of the Birmingham economy shows that they are less than 0.05%, equating to the CAZ D+ foregoing 11 weeks of growth, over the 10-year appraisal period.

2.2 CAZ Optioneering

As part of the Strategic Outline Case (SOC), a longlist of options that are likely to be effective in countering the specific sources of NO₂ exceedances in Birmingham were considered and assessed against a set of Critical Success Factors (CSFs).

2.2.1 Critical Success Factors

Please refer to section 1.5.2 of the strategic Case for full details of the primary and secondary critical success factors.

Scheme option appraisal

Shortlisting of CAZ options

To begin the longlisting process, a long-list of CAZ options was identified. These include nine CAZ variants.

- 4 charging CAZ options (class A, B, C and D);
- 4 packages of options, with additional measures considered in conjunction with a CAZ scheme (class A, B, C and D);
- A non-charging CAZ with a package of measures.

In order to gauge the primary CSF's relation to the longlisted options traffic and air quality modelling was undertaken on CAZ C and CAZ D options to determine their relative position to achieving compliance. These model runs demonstrated that implementation of a charging 'class C' or 'class D' Clean Air Zone, would be insufficient to achieve air quality compliance in 2020. As CAZ D has great impacts on traffic due to including the car vehicle class, it will achieve compliance in the shortest possible time and was brought forward.

Although a CAZ 'A' and CAZ 'B' scheme have not been explicitly modelled, it is clear that if a 'class C' or 'class D' CAZ would be insufficient to ensure compliance, then a CAZ 'A' or CAZ 'B' scheme would also be insufficient.

Under a CAZ C scheme, exceedances are still predicted to occur on the A38 and the ring road. It is estimated that additional reductions of up to 11% and 31% would be required, outside and inside the CAZ, respectively, to achieve compliance. Even if all vehicles restricted by category C enter the zone had a compliant engine, the levels of NO₂ would still be non-compliant. This reflects the fact that over 80% of the vehicles entering the CAZ area are private cars (or private hire vehicles) and these are not restricted by a CAZ C scheme.

Under a CAZ D scheme (where non-compliant cars are subject to charging), concentrations of NO₂ reduce by an additional 1.8 µg/m³ inside the CAZ, beyond the CAZ C scenario. There are still places, however, where the legal limits are predicted to be exceeded on the A38 and ring road. It is estimated that additional reductions of up to 9% and 19% are required, outside and inside the CAZ, respectively, to remove these exceedances in the schemes opening year.

In conclusion, the modelling conducted forecasts that neither a 'class C' nor a 'class D' CAZ alone will achieve compliance with the NO₂ concentration limits in all locations in Birmingham by 2020. The modelling does show that a CAZ D results in the largest improvement in air quality, indicating that a CAZ D scheme will achieve compliance in the shortest time possible. Consequently, the short-listed proposed CAZ schemes assessed in this economic case are the CAZ D scheme and the CAZ D scheme plus additional measures.

Full details of the method, data, and models used by BCC to estimate the impact of CAZ options on vehicle emissions and resulting concentrations of NO₂ are set out in the Transport Modelling Forecasting Report. The air quality report provides a summary of where additional reductions in emissions from road traffic would be required to achieve compliance. More detail of the long to shortlist sifting can be found in Appendix B1.

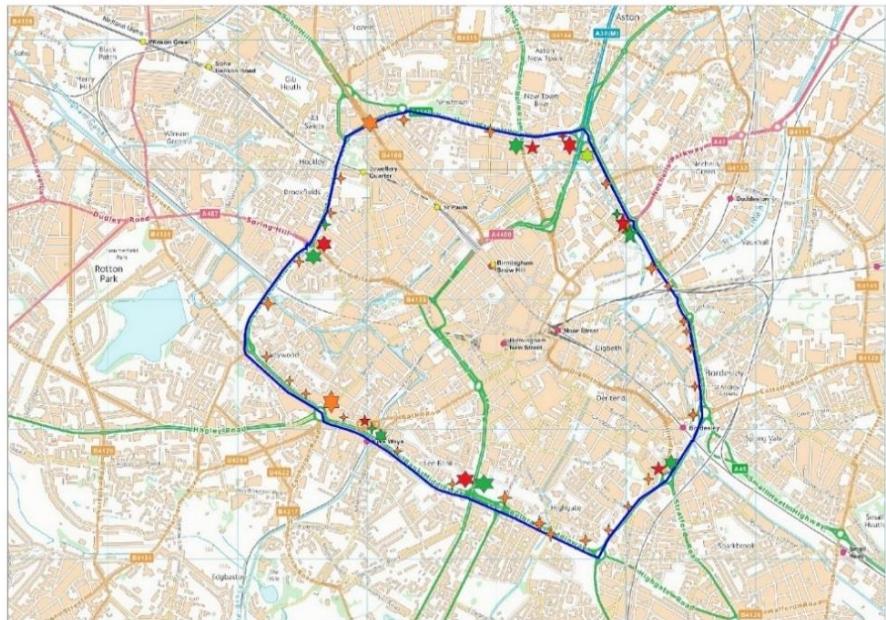
2.2.2 Proposed CAZ Boundary

The area for the CAZ cordon is proposed to be the area within the A4540 Ring Road around the city centre. A zone boundary at the ring road would provide a sensible and logical decision point for traffic to avoid the CAZ by using the ring road as the alternative route. The location of the proposed CAZ is shown in Figure 2.1

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Figure 2.1 Proposed CAZ boundary



As per section 1.7 of the strategic case, it was concluded that the performance of the CAZ D outer ring road option would only be marginally better than that of the CAZ D inner ring road option in terms of reducing NOx emissions.

2.2.3 Additional Measure Optioneering

In order to identify the additional measures that could be considered in conjunction with a CAZ to achieve compliance, a desktop study has been undertaken reviewing existing evidence on local, regional and national measures to improve air quality. In addition, BCC, Transport for West Midlands and key experts from the Birmingham CAZ work stream were consulted to identify further measures to take through an initial sifting process. This generated a longlist of 104 potential options. The longlist of additional measures is set out in Table 1 (p3-26) of the "Birmingham Clean Air Zone Feasibility Additional Measures Study".

2.2.3.1 Sifting

As explained Appendix 1A, the additional measures were sifted through 3 phases. Several different tests were run with these measures to select the package of additional measure options that would be shortlisted. Review determined that some measures would not be practical to implement by 2020, these were excluded prior to full modelling.

Through this process, a shortlist of 11 additional measures/packages of measures were taken forward for quantitative traffic and air dispersion modelling. The 11 additional measures reviewed as part of the shortlist were:

- Increase LPG refuelling for Hackney Carriages, the installation of rapid EV infrastructure for taxi and private hire vehicles, retrofitting of black taxis to LPG and zero emission buses/retrofitting of public transport fleet;
- Parking Strategy – remove free parking, parking charging and permits graded by vehicle standard or zone charges;
- Speed Enforcement – average speed enforcement along the A38 and near Dartmouth Circus to manage traffic and smooth flows;
- Speed reduction – reduce speed limits on certain routes and use variable speed limits

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- Public Transport Improvement Measures - Highway/infrastructure improvements to bus services to make them more viable and accessible to the public and increase bus priority schemes, restrict traffic on Moor Street Queensway to bus, taxi and cycle only and close Park Street to all traffic;
- Incentivise or subsidise sustainable travel by up to 50% to improve public transport patronage;
- Ban the route of traffic travelling northbound on Suffolk Street Queensway that exits onto Paradise Circus to then Access Sand pits parade;
- Ban the route of traffic travelling northbound on Suffolk Street Queensway that exits onto Paradise Circus and St Chads;
- Close junction on Dartmouth Middleway between Lister Street and Great Lister Street to avoid stop start traffic and reduce congestion;
- Re-signing and rerouting scheme for the A38 and banning all through traffic (and HGVs only) on the A38 around Paradise Circus diverting traffic to A4540;
- Enhanced bus partnership with the wider area of Birmingham.

The modelling results were analysed against to determine the optimal package, the 'POBC package,' which includes:

- All on-street free parking in CAZ becomes paid for.
- Banning traffic travelling northbound on Suffolk Street Queensway (A38) that exits onto Paradise Circus to then access Sandpits Parade and southbound traffic from Paradise Circus accessing the A38.
- Close Lister Street and Great Lister Street at the junction with Dartmouth Middleway.

The above mentioned additional measures are deliverable by 2020. Additional measures which can be delivered in 2021 and 2022, are presented in Appendix 1C. The modelling results indicate that a CAZ D inner ring road plus additional measures option indicates that NO₂ compliance will be achieved at all but one location by 2021. For this option, Suffolk Street Queensway is forecast to achieve compliance by 2022. BCC will continue working on to see if compliance can be achieved before 2022 at this location.

2.2.3.2 Shortlisted Options

The option identification and shortlisting process identified two potential CAZ schemes, summarised in **Error! Reference source not found.** This report presents the full costs and benefits of these options.

Table 2.3 Shortlisted Options

Option	Commentary
Class D Clean Air Zone (CAZ D)	A charging CAZ D Class D vehicles (buses, coaches, taxis, heavy goods vehicles, light goods vehicles and private cars) that do not meet Euro emission standards would be charged.
Class D Clean Air Zone plus Additional Measures (CAZ D+)	A charging CAZ D with additional measures

2.2.3.3 Cost-Benefit Analysis Framework

The cost-benefit analysis is based on four distinct, but related, assessments:

- Costs to BCC
- Costs to transport users.
- Health and environmental benefits
- Distributional impact assessment (DIA)

The Economic Case combines the results of the first three assessments to derive the Net Present Value (NPV) of the shortlisted options. The distributional impact assessment considers the impact on key groups to determine whether there is likely to be a disproportionate impact on one, or a number of, particular groups. NPV and DIA outputs are assessed in conjunction to determine the preferred option.

2.3 Key assumptions

The area for the CAZ cordon is assumed to be the area within the A4540 Ring Road, around the city centre. The opening year for the CAZ scenario is assumed to be 2020, the year for which traffic modelling has been conducted. The options have been appraised over the ten-year period from 2020 to 2029. Full details on the method, data sources and results of the traffic modelling is presented in the Transport Model Forecasting Report.

Traffic modelling of the shortlisted items was conducted for three different charging levels: low, medium and high. As modelling indicates that none of the options achieve compliance, the results presented here reflect the highest charge level as it is assumed to achieve compliance in the shortest possible time.

All figures presented are in 2018 prices and have been discounted to 2018 present value, unless noted otherwise. Additional assumptions underpinning the forecast impacts are presented in the economic assessment and are discussed in detail in the relevant appendices.

Uncertainties

The key uncertainties related to this assessment include the following.

- Behavioural responses are based on London data and though adjustments were made, these may differ from those of Birmingham drivers.
- Current trends in car purchasing behaviour are changing, with fewer diesel cars being bought and fewer cars being bought in general. Future purchasing patterns may differ from underlying assumptions.
- The emissions rates of vehicles in the real world may differ from those modelled.
- The exact number of vehicles impacted by the CAZ is not known due to gaps in existing ANPR data.

A sensitivity has been run through the economic modelling to analyse (4) above, and is presented in this economic case.

2.3.1 Costs to Birmingham City Council

Costs and revenues to BCC are presented in the Economic Case in market prices (including VAT). This is to maintain a consistent unit of account in market prices across all costs and benefits.

The optimism bias rates applied to implementation costs, 44% for road projects and 200% for IT projects, are the optimum bias levels that WebTAG recommends to apply at the Strategic Preferred Option Business Case stage. The WebTAG recommended optimum bias levels reduce for projects at Preferred Option Business Case stage. However, as a quantified risk assessment has not been performed, the SOBC

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recommended optimum bias levels have been maintained. When increased market sounding is received, these optimum bias levels will be reduced.

The WebTAG recommended optimum bias for road projects at POBC stage of 15% is applied to ANPR camera and sign maintenance costs as the cost build up for these is based on established practices and is building off of the Birmingham PFI agreement with Amey. This level of optimum bias was also applied to ongoing air quality monitoring and transaction fees as there is more certainty around these assumptions.

It has been agreed with JAQU that the optimum bias selected should reflect the figures recommended in the Green Book and reflect the stage of the business case. As the commercial case develops and cost elements are refined with better quality data, the optimum bias figure is expected to be revised downwards.

At this stage, risk has been excluded from the costs. It is intended that work will be undertaken to produce an updated quantified risk assessment/register.

Table 2.4 shows the impact to public funds with ongoing operation of the CAZ over the appraisal period.

Table 2.4 Costs to BCC (£m 2018 discounted values)

	CAZ D	CAZ D+
Implementation costs	22	24
Operation costs	53	-3
Revenue	-154	-176
Net Present Value of Costs	-77	-100

The implementation costs are expected to be £22m for the CAZ and £2m for the additional measures, with ongoing operation costs over the 10 year period of £53m. The inclusion of additional measures provides a further £13m in revenue over the appraisal period. This results in the CAZ D+ scheme providing a positive net present value of revenue of £100m compared to £77m for the CAZ D option.

It is anticipated that the revenue generated will be invested in initiatives to realise the vision set out in 'Movement for Growth' for a greatly improved transport system which supports economic growth and regeneration, social inclusion and improves air quality and the environment.

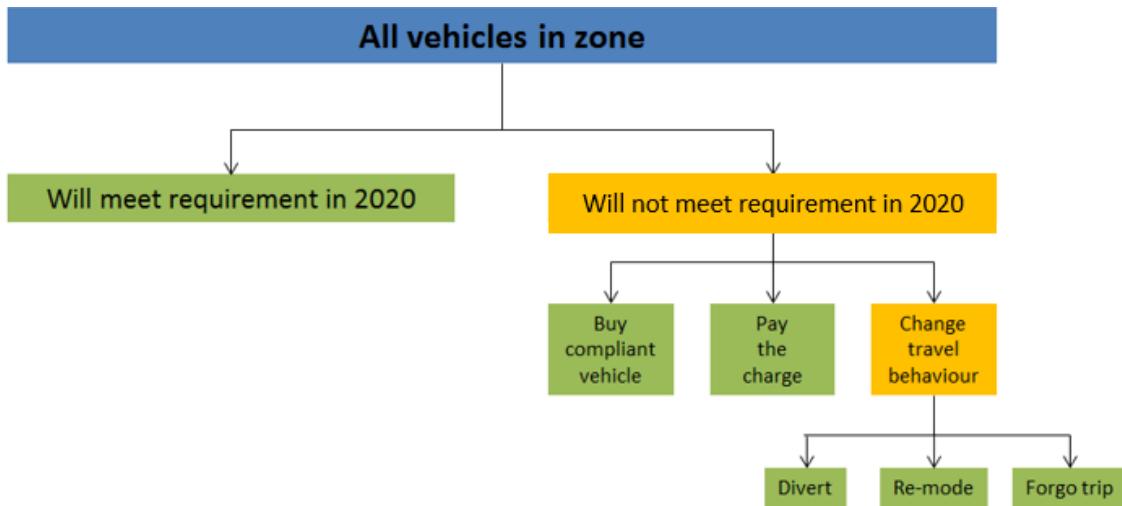
2.3.2 Costs to Transport Users

Non-compliant user options

The number of transport users that would already be compliant with the CAZ emission standards in 2020 was estimated using automatic number plate recognition (ANPR) surveys undertaken in 2016 and assuming a constant fleet age to update to 2020. This method forecasts that 73% of vehicles would be compliant with the CAZ emission standards by 2020.

The analysis of costs to transport users has therefore focused on the remaining 27% of users that are expected to be non-compliant in 2020. The nature and scale of the impacts on these transport users ultimately depends on the actions that users take to meet or avoid the CAZ standards. Figure 2.2 provides a schematic of the possible responses drivers may have to the CAZ vehicle standards.

Figure 2.2 Schematic of possible responses to CAZ



The proportion of non-compliant vehicles that choose different behavioural responses was estimated using stated preference survey data from the London Ultra Low Emission Zone expansion, with modifications to make it appropriate for use in the Birmingham context. More information on the behavioural assumptions is provided in the Economic Assessment Methodology Report and the Traffic Model Forecasting Report.

2.3.3 Impact of mode shift of public transportation

The behavioural model predicts that 2% of car user trips would be shifted to other modes. This category includes public transport as well as active modes. While capacity on local public transportation is currently constrained, we have not modelled the impacts of additional ridership due to mode shift. It is anticipated that the additional trips will be supported by the public transportation network. Work is being undertaken by TfWM to increase network capacity and the following schemes are under development.

By 2020

- Increased park and ride capacity for the West Midlands rail network: expansion at Tipton, Sandwell and Dudley, Whitlocks End and Longbridge.
- Metro tram extensions:
- Wolverhampton city centre
- Westside extension to Centenary Square
- Bus fleet environmental enhancements through retrofitting existing buses, new Euro VI buses and hydrogen powered buses.
- Core bus corridor and central Birmingham bus priority improvements including the Bartley Green - Harborne – Birmingham corridor

By 2022

- New suburban rail stations at Moseley, Kings Heath, Hazelwell, Darlaston and Willenhall
- Increased suburban rail capacity: 20,000 extra rail seats am peak into central Birmingham
- Metro tram extensions:
- Edgbaston Five Ways
- Birmingham Eastside
- Wednesbury – Brierley Hill extension Phase One to Dudley
- three new Bus Rapid Transit routes:

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- Birmingham – Perry Barr – Walsall
- Birmingham – Solihull/Birmingham Airport
- Birmingham – Langley/Peddimore – Sutton Coldfield

By 2026

- Metro tram extensions:
- Wednesbury – Brierley Hill extension Phase Two to Brierley Hill by 2023
- East Birmingham Solihull Extension by 2026
- Four further new Bus Rapid Transit routes:
- Birmingham – Halesowen
- Birmingham – Dudley
- Birmingham – Longbridge Hall Green – Solihull

2.3.4 Cost of upgrading to compliant vehicle

This Case uses the JAQU recommended consumer surplus approach to estimate the welfare loss to users who choose to change from their preferred non-compliant vehicle to a compliant vehicle in response to the CAZ. The cost to upgrade early is based on the difference in the value of depreciation between the baseline vehicle and the vehicle upgrade to in the CAZ scenario. This analysis assumed that:

- The vehicle owner would purchase a compliant vehicle in the do-minimum by the year 2029.
- Each owner would upgrade to the cheapest possible vehicle that is at least one Euro standard higher than their current vehicle.
- For buses, coaches, and taxis, retrofitting options exist and are assumed to be used for a portion of the fleet. Retrofitting is assumed for all buses and coaches, and the hackney carriages eligible for LPG retrofitting

There would also be a transaction cost to users for the effort required to find and purchase a new vehicle. This was estimated using JAQU's recommended methodology and has not included in these numbers due to its low value. However, this cost will be included when economic figures are updated with the next traffic model run.

Table 2.5 shows the number of vehicles predicted to be upgraded or retrofitted as a result of the scheme.

Table 2.5 Number of vehicles upgraded or retrofitted

	Cars	LGVs	HGVs	PHVs	Taxis (Hackney)	Buses	Coaches	Total
CAZ D	19,925	2,676	1,951	3,060	1,185	-	28	29,713
CAZ D +	17,853	2,575	1,936	3,060	1,185	-	28	27,526

The majority of vehicles that would upgrade as a result of the scheme are cars, with over 19,000 and 17,000 upgrading in the CAZ D and CAZ D+ schemes, respectively. PHVs make up the next largest group with 3,060 upgrading. LGVs make up the next largest group with around 2,600 upgrading. Over 1,900

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HGVs are expected to upgrade. Around 550 taxis are expected to be replaced with electric taxis, around 560 are expected to upgrade to Euro 6 diesel taxis, and 69 are expected to retrofit to LPG¹⁶.

It is assumed that by 2020 all buses serving the CAZ will be compliant through new vehicles (purchased through alternative funding), retrofits or fleet redistributions, thus no buses are estimated to upgrade due to the scheme.

The results presented in Table 2.6 show the cost of upgrading and retrofitting by vehicle type.

Table 2.6 Economic impact (consumer surplus) of upgrading or retrofitting vehicle by vehicle class (£m, 2018 discounted values)

	Cars	LGVs	HGVs	PHVs	Taxis (Hackney)	Buses	Coaches	Total
CAZ D	-£ 18	-£ 2	-£ 6	-£ 7	-£ 19	£ -	-£ 0.4	-£ 54.4
CAZ D+	-£ 20	-£ 2	-£ 8	-£ 7	-£ 19	£ -	-£ 0.4	-£ 56.4

The largest impact is to taxis, with a loss of £19m. This is mostly due to high cost of new electric taxis, and new diesel euro 6 taxis. This high price would be borne by a relatively small group. Cars have the second largest upgrade costs, at around £20m, this is due to the significant number of cars that would be upgraded over the scheme, 18,000-20,000. The impact on HGVs and LGVs is expected to be approximately £8m and £2m, respectively. The low upgrading cost borne by LGVs is explained by the relatively few LGV users who would choose to upgrade, according to behavioural modelling.

The total economic cost of upgrading to compliant vehicles is expected to be the highest in CAZ D, £54m. CAZ D+ has total economic cost of upgrading of £55m.

2.3.5 Impact of non-compliant vehicles moving to outside the CAZ

Users that travel into the CAZ upgrading to compliant second-hand vehicles will likely result in their non-compliant vehicles being sold on to individuals not impacted by the CAZ. Therefore, pollutants from these vehicles will continue to be emitted in areas external to the CAZ. As many cities are employing a CAZ to combat air pollution, it is likely that second hand non-compliant vehicles be purchased by those living in rural areas of the UK.

DfT analysis shows that 64% of car miles, 66% of LGV miles, and 88% of HGV miles travelled are on rural roads and motorways¹⁷. Air quality is a location-specific issue and concentrations in rural areas are unlikely to reach levels where impacts would be comparable to urban areas. Accordingly, increasing the proportion of older vehicles on extra-urban roads is unlikely to have a significant impact on local air quality.

Note on Taxis

Further work investigating the impact of the CAZ and licensing requirements brought in to support the CAZ has been done by Element Energy (EE). The analysis in this case takes the estimates from this report and monetises the expected cost to taxi operators based on the current scenario forecast. Our taxi analysis represents a scenario where there is no financial assistance to taxi operators provided as part of the CAZ. However, the EE analysis makes a few recommendations for mitigation efforts to lessen the cost to taxi operators. The mitigation measures, as described in the CAF Funding Paper are yet to be modelled.

¹⁶More detailed analysis on the impact of the CAZ on taxi operators has been undertaken in a separate report. The recommendations from this analysis is expected to inform the CAZ and taxi policy. See section for more information about the taxi analysis.

¹⁷https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/722302/road-traffic-estimates-in-great-britain-2017.pdf

2.3.6 Current analysis

The current analysis is based on the following assumptions.

- All taxis will upgrade to be compliant in 2020.
- The residual value of replaced taxis will be negligible, due to their age and the introduction of stricter CAZ / licensing requirements in most areas.
- The full up-front cost of purchasing the new vehicle is attributed as the cost to taxi operators (this is a 'conservative' approach that likely overestimates the full impact to taxi operators).

2.3.7 Costs of paying charges

User charges would be collected on a daily basis from all non-compliant vehicles that enter the CAZ. The charges are assumed to be incurred in each year of the appraisal. It was further assumed that the non-compliant fleet will continue to upgrade to newer, compliant vehicles at the same rate as predicted by the modelling for the Do Minimum scenario. Thus, the costs of user charges will decrease over time, as fewer vehicles will pay the charge due to increasing rates of compliance.

Forecast revenue for both shortlisted schemes is provided in Financial Model. Per section 5.1.5 of CAZ Option Appraisal Guidance, these payments are considered transfers and not included in the value for money assessment.

Table 2.7 Cost of CAZ Charges by vehicle class over the scheme period (£m, 2018 present value)

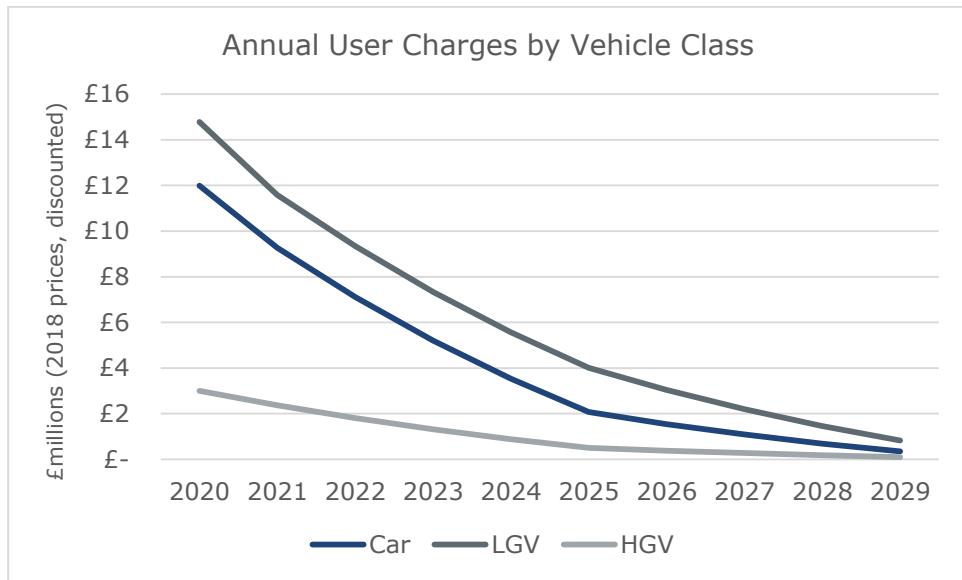
	CAZ D	CAZ D+
Car	£ 48	£ 47
Taxi/PHV	£ -	£ -
LGV	£ 66	£ 68
HGV	£ 11	£ 12
Bus	£ -	£ -
Coach	£ -	£ -
Total	£ 125	£ 127

Table 2.7 shows that there is little variation amongst CAZ charges by vehicle classes between the CAZ D and CAZ D+ schemes. In both schemes LGVs are expected to pay the most in user charges, paying over 50% of user charges in both scenarios.

Along with paying an access fee to enter the CAZ, users of the CAZ driving non-compliant vehicles will also incur a time cost related to payment of the CAZ charge on the online platform. As it is anticipated that users will have the capability to autofill data or create a user profile, it is anticipated that this cost will be frontloaded and minimal over the scheme period. This cost is not assessed in the current numbers but will be updated when the revised traffic model outputs including mitigations are provided.

Figure 2.3 shows the forecast user charges by vehicle class for CAZ D+. The rate of reduction in user charges over time can be seen in this chart, which indicates that by 2029 the proportion of non-compliant vehicles that continue to pay the charge is around 5% of those that pay in 2020.

Figure 2.3 Annual user charges by vehicle class CAZ D+



2.3.8 Impact of parking charges

Parking charge impacts were estimated for cars only (i.e. potential impacts to LGV users were not estimated). The behavioural impacts of parking charges were estimated by applying the average cost of a parking stay in Birmingham, calculated to be £4.94, to a subset of trips to the CAZ zone that currently use on-street parking, found to be 15%. This results in behavioural responses from compliant and non-compliant users, who may elect to cancel or re-mode their trip, or to pay the charge. There is also a slight impact on upgrade rates, because non-compliant users who may have upgraded in the CAZ D scenario, now choose to forego journeys to the CAZ (through cancellation or re-mode response) and thus do not need to upgrade their vehicle anymore.

Using some high-level assumptions, the cost to users and revenue to BCC and to private off-street car parks have been estimated. These results should be treated as initial estimates, and will be updated after more detailed design work is undertaken.

Table 2.8 Revenues and costs to users of parking charges (£m 2018 discounted values)

CAZ D+	
Revenue to BCC	£ 20
Revenue to Private Car Parks	£ 28
Cost to Car users	-£ 48

2.3.9 Loss of Welfare from Changing Travel Behaviour

For car owners who change their behaviour in response to the CAZ incur a cost. The new action is favoured less than their baseline behaviour (otherwise they would have been doing it already). Hence these vehicle owners will incur an additional cost, termed welfare loss in economics.

The loss of welfare from changing travel behaviour was estimated using the rule of half (RoH) for trips foregone (cancelled), and trips re-moded (i.e. change to public transport). This method assumes that the disbenefit to the users fall along a continuum between £0 and the price of the charge. The midpoint is taken to be the average dis-benefit and multiplied by the number of trips foregone, or re-moded, to determine the overall welfare loss. This effect would only be felt by non-work car users, as it was assumed that business user trips would be replaced.

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The full effect of welfare loss would be incurred in 2020, and then would reduce in future years as more vehicles become compliant and trips re-instated, similar to the cost of paying user charges. For trips diverted around the CAZ, the welfare impact would be captured in the journey time and vehicle operating cost appraisal (see Table 2.9). In theory, the user will balance all the costs and benefits of the trip and therefore the estimated loss in welfare should capture the utility change as well as changes in fuel cost, operating cost, and travel time.

Table 2.9 shortlisted options, and their forecast welfare losses.

Table 2.9 Impact of trips foregone and re-moded

	CAZ D	CAZ D+
Number of trips cancelled (millions)	4.6	23.1
Number of trips re-moded (millions)	1.1	2.2
Consumer surplus (welfare) loss (£m)	-£ 21	-£ 47

Over the 10-year scheme lifespan, car users are forecast to incur a welfare loss of £21m in the CAZ D scheme compared to £47m in the CAZ D+.

The introduction of a CAZ in Birmingham would result in a change in travel patterns that could impose additional costs or benefits on transport users in terms of journey times and vehicle operating costs (VOC). For example, a reduction in traffic means less congestion, and hence time savings (i.e. a benefit to transport users), whereas vehicles changing route to avoid the zone may cause congestion and increase journey times (i.e. a cost to transport users). Changes in these costs were estimated using Department for Transport TUBA software. Full details on the method used to estimate the impact of each CAZ option on journey times and vehicle operating costs, and the results, are presented in the Economic Methodology Report. This analysis follows the same assumptions as user charges, resulting in impacts reducing beyond 2020 to reflect the forecast rate of replacement of non-compliant vehicles.

Table 2.10 Summary of travel time and vehicle operating cost impacts (£m, 2018 discounted values)

	CAZ D	CAZ D+
Travel Time	£ 15	£ 6
Vehicle Operating Costs	£ 8	£ 5
Total	£ 23	£ 11

Travel time and VOC benefits are expected to be around £23m and £11m for the CAZ D and CAZ D+ scenarios. These benefits are due mostly to net lower congestion throughout Birmingham and the region as a result of fewer trips that would enter the CAZ, because car users have cancelled or re-moded journeys

Distributional Impact Assessment Summary

The impacts of the CAZ D and D+ scheme, without mitigations, can be summarised as:

- Large beneficial impact to the most deprived communities in terms of improvement in air quality;
- Large adverse impact to Accessibility for Community Transport Dependent Groups;
- Large adverse impact to Accessibility for taxi dependent wheelchair users;
- Moderate adverse impact to personal affordability; and,

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- Moderate adverse impact to business affordability for SMEs and PHV drivers and Large adverse for hackney taxi drivers.

The impact of CAZ D+ scheme is likely to affect affordability (personal and business) more than a CAZ D alone due to the increased cost in parking, although this is not indicated in the quantified impacts on affordability since the increased cost of parking is not factored into the method. The main quantified difference was apparent in the monetised health and environmental impacts presented in section 7.2 of the Distribution Impact Appraisal Report (report E3) which showed a greater health benefit for CAZ D 'High' plus Additional Measures compared to CAZ D. The total combined health and environmental benefits for a CAZ D 'High' plus Additional Measures is £7.6m greater than for a CAZ D alone. This is likely to be an underestimate as it is based on agreed methods of monetisation and does not include all known health benefits for which there is no agreed method of monetisation.

A summary of key distributional impacts are summarised in table 2.11.

Table 2.11 summary of distributional impacts

Scenario	Impact	Affected Groups	Suggested Mitigation
CAZ C High	Increase in cost or decrease in availability of community transport	Disabled people	Sunset period for vehicles registered under Section 19 of the Transport Act 1985
CAZ C High with Additional Measures	Increase in cost or decrease in availability of school transport	Elderly people	
CAZ C High with Additional Measures	Increase in cost of business travel through requirement to pay CAZ charge/upgrade to CAZ compliant vehicle	Children	
CAZ C High with Additional Measures	Increase in cost of travel via private vehicle due to loss of free parking in Birmingham City Council controlled areas	SMEs within the CAZ who maintain a vehicle	Exemptions for business vehicles registered to SMEs which enter the CAZ on regular (e.g. twice or more per week) basis
CAZ C High with Additional Measures	Increase in cost of travel via private vehicle due to requirement to pay CAZ charge/upgrade to CAZ compliant vehicle	SMEs supplying businesses within the CAZ (locations currently unknown)	
CAZ D High and CAZ D High with Additional Measures	Increase in cost of travel via private vehicle due to requirement to pay CAZ charge/upgrade to CAZ compliant vehicle	Residents of the CAZ and surrounding areas, an area of high income deprivation, who have more limited ability to avoid the CAZ	None suggested
CAZ D High and CAZ D High with Additional Measures	Increase in cost of travel via private vehicle due to requirement to pay CAZ charge/upgrade to CAZ compliant vehicle	People with religious beliefs who attend the large places of worship within the CAZ area	Sunset period to allow residents of the CAZ time to make the necessary financial adjustments if needed
CAZ D High and CAZ D High with Additional Measures	Increase in cost of travel via private vehicle due to requirement to pay CAZ charge/upgrade to CAZ compliant vehicle	Guardians of children undergoing treatment at Birmingham Children's Hospital	Travel plans to help congregants to modify their travel mode

Scenario	Impact	Affected Groups	Suggested Mitigation
	Fare increase/reduction in availability of hackney taxis and PHVs		parking)
		Disabled people who have limited alternative modes of transport	Sunset period to allow residents time to make the necessary financial adjustments if needed
		Women	Financial incentive package for hackney taxi drivers to retrofit vehicles where possible or alternatively upgrade their vehicles to wheelchair accessible ULEVs
	Increase in cost of business travel	Hackney taxi owner/drivers and PHV owner/drivers	

2.4 Health and Environmental Impacts

2.4.1 Introduction

The key driver for action on air quality in Birmingham, through implementation of a CAZ, is the effect of poor air quality on human health. There are economic and social costs associated with the health and environmental impacts of poor air quality which are summarised in the following sections, drawing upon a variety of evidence and research. Secondary to this, there are also economic and social costs associated with the health impacts of physical inactivity and poor mental health. This chapter considers both the health and environmental impacts of a CAZ arising from changes in air quality within Birmingham, and also those health impacts that are not directly related to changes in air quality which may occur as a result of changes in traffic patterns and flows and their influence on the use of active travel modes and social cohesiveness. Where possible these have been described quantitatively, and elsewhere a qualitative approach has been used.

Health Impacts Associated with Air Quality

- Air pollution is linked to a wide range of illnesses and health conditions. The air pollutants from traffic emissions of most concern in terms of health impacts are particulate matter (PM) and nitrogen dioxide (NO₂). Long term exposure to air pollution can lead to the development of some of these health conditions, whilst short-term exposure can exacerbate existing conditions. Health conditions associated with air pollution are as follows:
 - Respiratory diseases – including asthma and chronic obstructive pulmonary disease (COPD)
 - Cardiovascular disease (heart disease and stroke)
 - Diabetes
 - Cognitive decline and dementia
 - Low birth weight, still births, infant death and poor organ development in children

¹⁸ Anderson, Z. (2010) Chronic Obstructive Pulmonary Disease and Long-Term Exposure to Traffic-related Air Pollution. A Cohort Study. American Journal of Respiratory and Critical Care Medicine. 183:4

¹⁹ Newby, D.E. et al. (2015). Expert position paper on air pollution and cardiovascular disease. European Heart Journal. Vol. 36(2), pp. 83-93b.

²⁰ Wang, B. et al. (2014). Effect of long-term exposure to air pollution on type 2 diabetes mellitus risk: a systematic review and meta-analysis of cohort studies. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25298376>

²¹ Power, M.C. et al. (2016). Exposure to air pollution as a potential contributor to cognitive function, cognitive decline, brain imaging, and dementia: A systematic review of epidemiological research. Neurotoxicology. Vol 56, pp.235-253

Children are particularly susceptible to the health impacts of poor air quality. This is because their immune system and lungs are not fully developed, and also because they tend to spend a larger proportion of the day outdoors and have higher metabolic rates. There is evidence to suggest that for children the health impacts of poor air quality can be initiated prior to birth through a mother's exposure to pollutants, with the potential for life long consequences. Children living in high pollution areas are four times more likely to have reduced lung function when they become adults.²³

Other groups that are at increased risk of exposure to poor air quality include car commuters, taxi drivers, bus and lorry drivers, all of whom spend a higher than average amount of time in close proximity to traffic pollutants^{24,25}. In addition, people living in areas of deprivation tend to be more susceptible to the health impacts of air quality as a result of living in poor housing conditions with greater exposure to pollutants and experiencing greater stress, which reduces the body's resilience to toxicants present in polluted air^{Error! Bookmark not defined.}

The link between mortality and long-term exposure to air pollution is also well evidenced²⁶. Cohort studies looking at the effects of air pollution on health over several years have shown that the deaths from respiratory and cardiovascular causes, in combination with other factors, increase with long term exposure to air pollution. This occurs at both high and low levels of pollution and relates mostly to fine particulate matter, such as particular matter of less than 2.5 µm diameter (PM_{2.5}). Research by Public Health England conducted in 2014 suggested that exposure to fine particles from road transport emissions was contributing to 1,460 premature deaths per annum in the West Midlands conurbation and 520 within the city of Birmingham.²⁷

The impacts of air pollution on human health, in turn, have a number of social and economic impacts such as impacts on quality of life, school attendance, reduced productivity (resulting from absence from work or sub-optimal performance at work due to ill-health), and increased health expenditure due to increased hospital admissions as well as prescribed medication to manage health conditions. The full monetary costs of these impacts are as yet unknown, but some techniques have been applied to calculate some costs associated with air pollution. These are set out in **Error! Reference source not found.**, and also include environmental damage costs. Improvements

As children are particularly susceptible to the health impacts of air pollution, some spatial analysis has been carried out of the likely benefits of the preferred CAZ option

Schools and Distribution of Nitrogen Dioxide at locations of key importance to children.

Figure 2.4 shows NO₂ concentrations across Birmingham under the 'Do Minimum' (i.e. if no CAZ were implemented) relative to the locations of nurseries and schools for children aged under 16. Those nurseries and schools that fall within areas where NO₂ concentrations are greater than 30 µg/m³ (as indicated by the orange and red contours) are considered to be most risk of experiencing NO₂ concentrations which exceed the legal limit of 40 µg/m³ NO₂. In the absence of a CAZ there would be 135 schools within Birmingham within this higher risk category, of which 57 are located within the CAZ area itself.

It should be noted that air quality can differ considerably over very short distances and periods of time, and therefore whilst schools located in areas where average NO₂ levels are below 30 µg/m³ are at lower risk of experiencing NO₂ exceedances this does not mean that exceedances could not occur at these locations, and

²² Morales, E. et al. (2015). Intrauterine and early postnatal exposure to outdoor air pollution and lung function at preschool age. *Thorax*. Vol. 70, pp.64-73.

²³ Royal College of Physicians. (2016). *every breath we take: the lifelong impact of air pollution*. Report of a working party. London: RCP.

²⁴ Wargo, J. 2002. Children's Exposure to Diesel Exhaust on School Buses. *Environment and Human Health*. Available at: <http://www.ehhi.org/reports/diesel/>

²⁵ Johns, T. 2016. How much diesel pollution am I breathing in? Available at: <http://www.bbc.co.uk/news/magazine-35717927>

²⁶ COMEAP. 2016. *Long-term Exposure to Air Pollution and Chronic Bronchitis*. A report by the Committee on the Medical Effects of Air Pollutant.

²⁷ Public Health England. 2014. *Estimating Local Mortality Burdens Associated with Particulate Air Pollution*.

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the converse is true for those located in areas where average NO₂ levels are below 30 µg/m³. Furthermore, there is no safe level of air pollution.

Figure 2.4 NO₂ concentrations across Birmingham under the 'Do Minimum' scenario

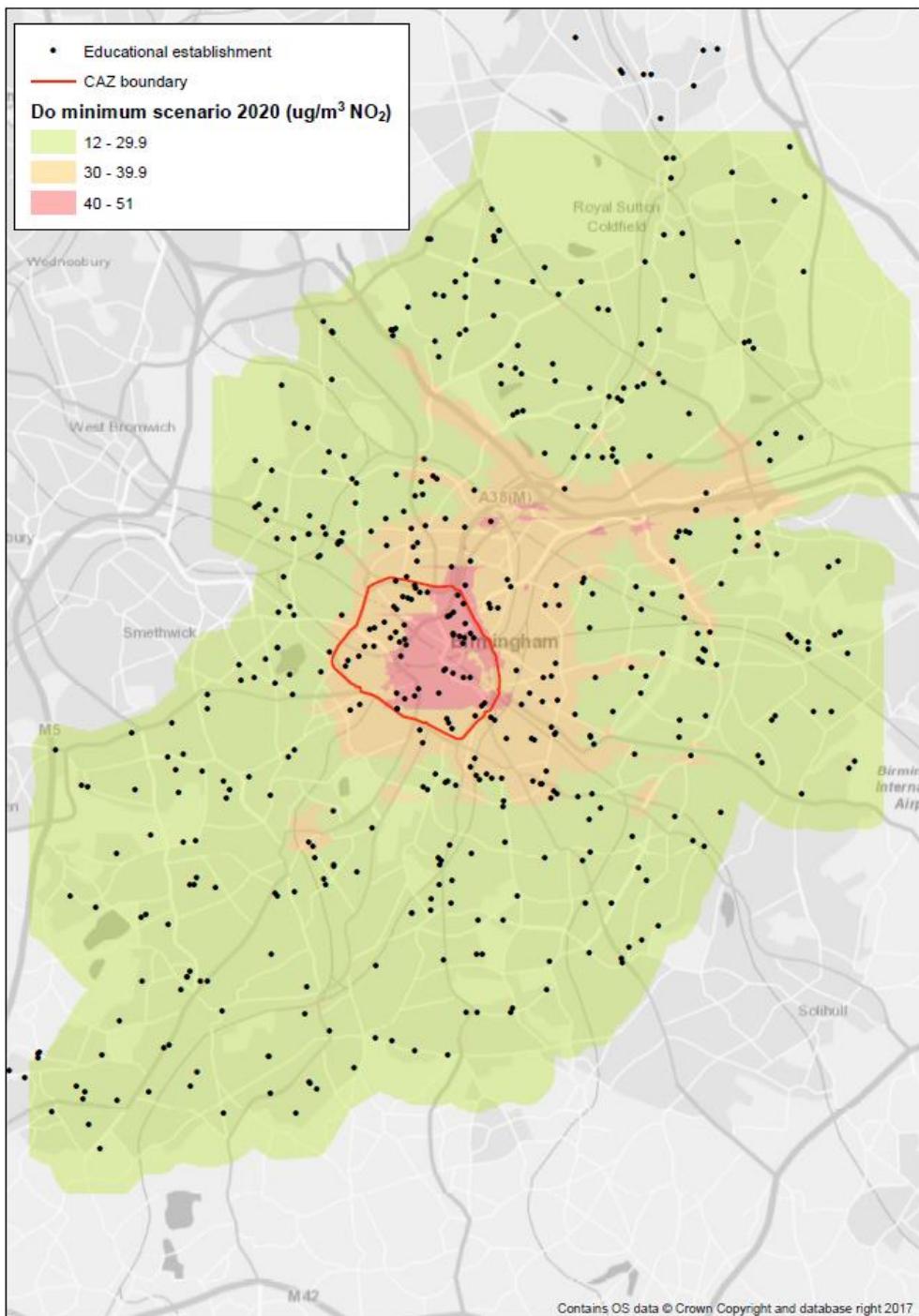
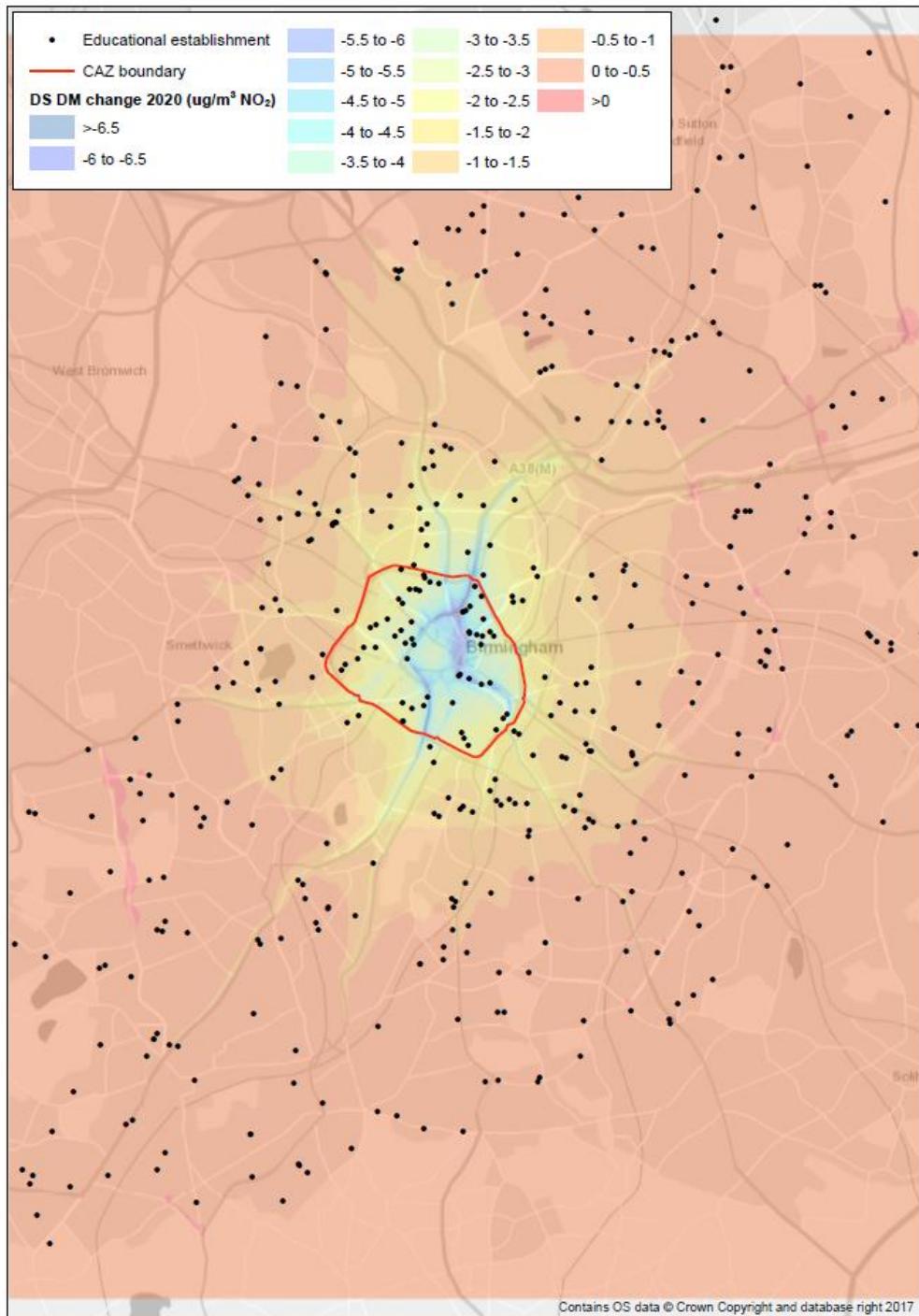


Figure 2.5 shows the degree of increase or decrease in NO₂ concentrations modelled following implementation of a CAZ D 'High' relative to locations of nurseries and schools as described above. Air quality modelling data is not currently available for the preferred option; however, it is not anticipated that the results discussed in this chapter would differ significantly between a CAZ D High scenario and the preferred option. Modelling work undertaken for the CAZ D 'High' scenario suggests that all of the nurseries and schools at highest risk of NO₂ exceedances as shown in Figure 2.6 would experience a reduction in NO₂ concentrations as a result of the CAZ.

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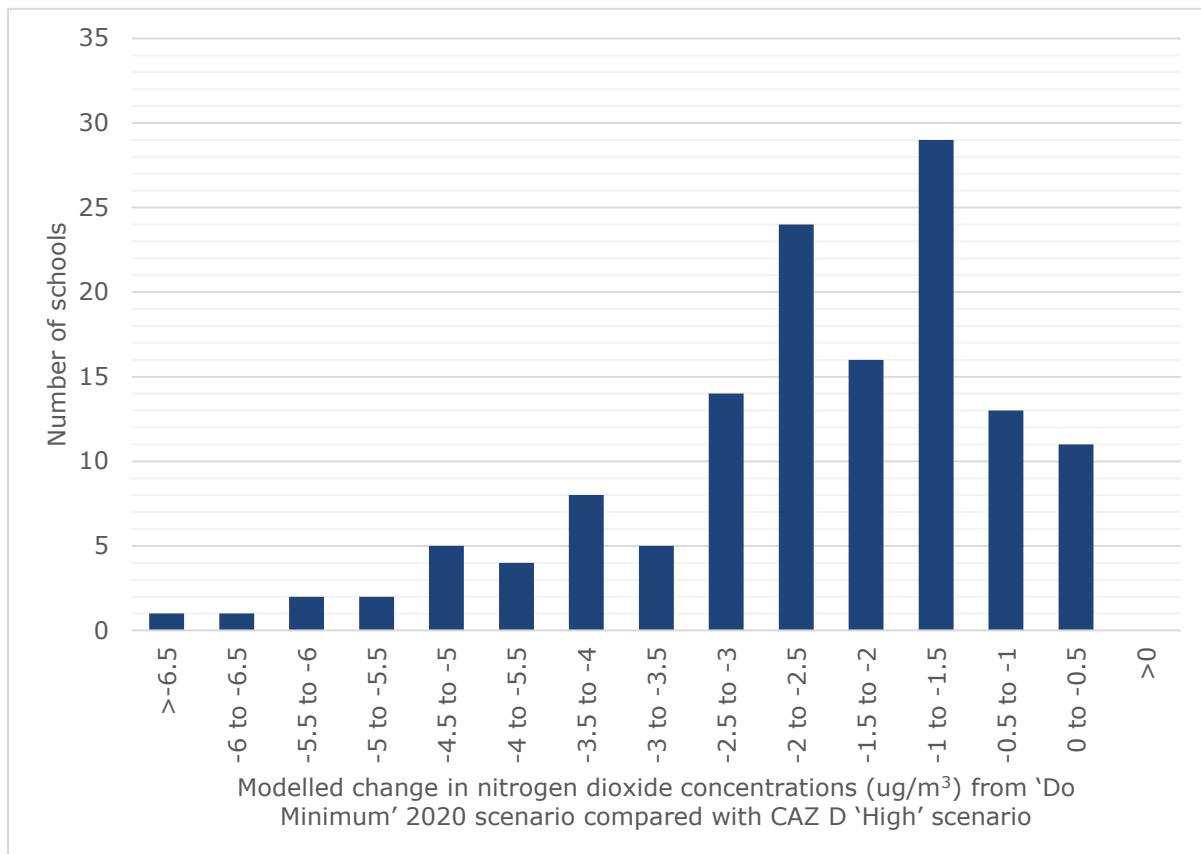
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Figure 2.5 Changes in NO₂ concentrations across Birmingham under a 'CAZ D High' scenario



In approximately half of cases this improvement would be relatively small, between 0 and -0.5 µg/m³, but others would experience reductions in excess of 6.5 µg/m³. Figure 2.6 shows the frequency distribution of improvements in NO₂ concentrations. Approximately 20% of those schools which fall within the higher risk banding for NO₂ exceedances in the absence of a CAZ would no longer do so with a CAZ in place. Current air quality modelling resulting suggest that one educational facility within the Birmingham area would experience a slight increase in NO₂ concentrations, and further work will be undertaken to validate the modelling and identify potential mitigation for this receptor.

Figure 2.6 Number of schools mapped within zones of 30 µg/m³ nitrogen dioxide concentrations in 'Do Minimum 2020' which be within areas of where NO₂ concentrations are predicted to decrease in a CAZ D 'High' scenario



Overall this analysis suggests that the preferred option would have a widespread beneficial impact on air quality at locations of key importance to children.

2.4.2 Health Impacts related to Behavioural Change

2.4.2.1 Relationship between traffic patterns, travel modes and health

Daily physical activity is hugely important for maintaining health²⁸, and inactivity directly contributes towards one in six deaths in the UK²⁹. It is estimated that physical inactivity costs the UK approximately £7.4 billion per year when the impact on NHS, social care, sickness absence from work and other factors are taken into account³⁰. The costs to business of absenteeism and presentism (working whilst sick can cause productivity loss and further poor health) are significant. In 2014 the cost of absences was approximately £14 billion³¹, of which approximately £5 billion can be attributed to physical inactivity³². The costs of presentism may be even more³³.

²⁸ Department of Health. 2011. Start Active, Stay Active: A report on physical activity from the four home countries' Chief Medical Officers. Available at: <https://www.gov.uk/government/publications/start-active-stay-active-a-report-on-physical-activity-from-the-four-home-countries-chief-medical-officers>

²⁹ Lee I. M. et al. 2012. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy.

³⁰ Public Health England. 2016. Working Together to Promote Active Travel: A briefing for local authorities. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/523460/Working_Together_to_Promote_Active_Travel_A_briefing_for_local_authorities.pdf

³¹ Confederation of British Industry/Pfizer. Fit for purpose. 2013. Absence and workplace health survey 2013. Available at: <https://www.centreformentalhealth.org.uk/managing-presenteeism>

³² Sustrans: The Role of Active Travel in Improving Health. Toolkit Part 1: How active travel can improve health and wellbeing in the workplace. Available at: <https://www.bma.org.uk/collective-voice/policy-and-research/public-and-population-health/transport/>

³³ Centre for Mental Health. 2011. Managing presenteeism. Available at: <https://www.centreformentalhealth.org.uk/managing-presenteeism>

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For most people, the easiest forms of physical activity are those that can be built into daily life, for example by using walking or cycling as an alternative to motorised transport for everyday journeys such as commuting to work or school^{Error! Bookmark not defined.}. Traffic speeds and volumes are known to influence how individuals choose to travel, with higher volumes of walking and cycling where traffic is less and vice versa³⁴. Active forms of travel, such as walking and cycling, are associated with a range of health benefits. These include improved mental health, reduced risk of premature death and prevention of chronic diseases such as coronary heart disease, stroke, type 2 diabetes, osteoporosis, depression, dementia and cancer³⁵. Research also suggests that countries with highest levels of active travel generally have amongst the lowest obesity rates³⁶.

High traffic volumes and speeds can reduce opportunities for positive contacts with other residents in a neighbourhood, contributing towards increased social isolation and reduced community cohesion³⁷³⁸. Individuals who are socially isolated are more likely to make use of public services due to lack of support networks and have increased likelihood of developing certain health conditions such as depression and dementia³⁹. They are also more likely to be physically inactive, which is again linked to increased likelihood of developing certain diseases as discussed above. People experiencing high levels of social isolation have significantly higher mortality levels than those with low or average levels of isolation⁴⁰. It has been estimated that better community cohesion could save the UK around £530 million per year⁴¹.

2.4.2.2 Health in Birmingham

The health of the people in Birmingham is generally worse than the national average as evidenced by several markers. Life expectancy is lower than the national average, and is heavily influenced by neighbourhood area. The city experiences higher rates of death than the national average from preventable diseases such as coronary heart disease, stroke and certain cancers, as well as high levels of diabetes amongst its residents^{Error! Bookmark not defined.}. All of these can be improved by increased levels of physical activity⁴². The proportion of people who are overweight or obese is also higher than the national average, as is the proportion of people with severe mental illnesses. In contrast, the proportion of adults who regularly undertake physical activity is relatively low⁴³.

2.4.3 Anticipated Behavioural Changes as a result of a CAZ

The introduction of a CAZ will increase the cost of travelling in and out of Birmingham centre for non-compliant HGVs, vans and car, both as a result of the CAZ charge and through the loss of free parking within the CAZ area. It is anticipated that following implementation of the CAZ, a significant proportion of non-compliant HGVs, LGVs and cars (between 29 and 47% depending on vehicle type) would either change their travel patterns to avoid the zone or cancel their trip altogether. It is anticipated that approximately 2 % of journeys made by car would instead be undertaken by public transport, cycling or walking. Whilst public transport is not a form of active travel in itself, many public transport users walk or cycle to points of access as part of their overall journey^{Error! Bookmark not defined.}.

³⁴ Appleyard, D. and Lintell, M. 1972. The environmental quality of city streets: The residents' viewpoint. Journal of American Institution of Planners. Vo. 38: pp84-101.

³⁵ British Medical Association. 2012. Healthy transport = Healthy lives. Available at: <https://www.bma.org.uk/collective-voice/policy-and-research/public-and-population-health/transport>

³⁶ Bassett D, Pucher J, Buehler R, Thompson D and Crouter S. (2008) Walking, cycling, and obesity rates in Europe, North America and Australia. *Journal of Physical Activity and Health*. Vol. 5, pp795-814.

³⁷ Appleyard, D. 1981. *Liveable Streets*. University of California Press.

³⁸ Hart, J and Parkhurst, G. 2011. Driven to excess: Impacts of motor vehicles on the quality of life of residents of three streets in Bristol UK. *World Transport Policy and Practice*, 17 (2). pp. 12-30. ISSN 1352- 7614.

³⁹ Social Finance. 2015. Investing to tackle loneliness. A discussion paper. Available at: https://www.socialfinance.org.uk/sites/default/files/publications/investing_to_tackle_loneliness.pdf

⁴⁰ Steptoe A et al (2013) Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences of the United States of America* vol 110 no 15, 5797-5801, doi: 10.1073/pnas.121968611

⁴¹ Public Health England. 2017. Promoting active travel. Available at: <https://trtl.co.uk/reports/2017-academy-symposium-presentation-carl-petrokofsky-public-health-england-4-6>

⁴² Birmingham City Council. 2015. A means to an end – increasing participation in sport and physical activity. Available at: https://www.birmingham.gov.uk/download/downloads/id/424/increasing_participation_in_sport_february_2015.pdf

⁴³ Public Health England (2017). Better mental health: JSNA toolkit. Available at: <https://www.gov.uk/government/publications/better-mental-health-jsna-toolkit>

2.4.4 Benefits of a CAZ

An increase in the number of journeys made on foot or cycle would be expected to have a beneficial impact on public health. The proportion of journeys anticipated to be re-moded to public transport, walking or cycling (2 %) appears small, but when considered against the population of Birmingham (over one million) the number of journeys and people affected are potentially significant. Reductions in traffic flows within the city centre and across the wider Birmingham area of changes to traffic patterns may also have a beneficial impact on health by further encouraging people to walk or cycle in preference to using a car, particularly for short journeys. Reductions in traffic flows may also help to improve social cohesiveness and reduce social isolation.

Whilst impacts of this nature cannot currently be quantified or monetised, it is anticipated that there would be beneficial health impacts associated with increased use of active travel modes and improved social cohesion. Most changes to traffic flows and increases in active travel journeys would likely occur within those areas within and in close proximity to the CAZ, however the CAZ would be important in contributing towards other Birmingham City Council initiatives in initiating a step change in the approach and mentality surrounding active travel with consequential improvements in public health.

2.5 Environmental Impacts of Air Pollution

NOx, NO₂ and PM₁₀ emissions not only affect human health but also have adverse impacts on the built and natural environment:

- PM₁₀ and Soiling - Soiling of buildings by combustion particulates is one of the most obvious signs of pollution in urban areas. Soiling is an optical effect (a visual darkening of exposed surfaces) by deposition of atmospheric particles. The soiling of buildings includes both residential dwellings and historic/cultural buildings and causes economic damages through cleaning costs and amenity costs;
- NOX, NO₂ and Damage to Cultural Heritage and Ecosystems - Emissions of NOX are linked with damage to building materials, historic buildings and objects of cultural value. Material corrosion occurs from acidic deposition and affects almost all materials. Increased nitrogen deposition in the form of NOX and NO₂ also pose a risk to biodiversity, through increased nitrogen deposition and overloading by nitrogen favourable species, reducing plant diversity in natural and semi-natural ecosystems.

In addition to reducing NOx and PM10 emissions, the introduction of a CAZ would result in reduced greenhouse gas – including carbon dioxide (CO₂) – emissions from road transport. These reductions would be generated as a result of actions by vehicle owners to replace or upgrade their vehicles to comply with the CAZ standards.

Monetised Benefits: CAZ D scheme

The introduction of a CAZ in Birmingham, therefore, is expected to generate a range of benefits:

- reduced costs from ill health;
- beneficial impact on productivity;
- reduced material damage (particularly to historical and cultural buildings);
- a positive effect on nature conservation/green sites within the CAZ boundaries;
- a positive effect on climate change through reduced greenhouse gas (GHG) (measured in CO₂ equivalent tonnes) emissions.

DEFRA's updated damage cost estimates are used to monetise these impacts for the Birmingham CAZ scenarios⁴⁴. The Economic Methodology Report sets out full details on the methodology that has been used to quantify and monetise these benefits for each CAZ option.

⁴⁴ The damage cost values used reflect the JAQU national data inputs for local economic models

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It is noted that the damage cost estimates from DEFRA do not account for all the improved health outcomes associated within improved air quality and behavioural changes associated with the CAZ. For example, they do not account for the impact of NO₂ on hospital admissions and therefore the morbidity impact is potentially underestimated.

Implicit in this analysis is the comparison against the “do minimum” scenario, where costs due to the impacts listed above are incurred by society.

Table 2.12 presents the total estimated reduction in NO_x and PM₁₀ emissions and the monetised benefits of reduced emissions in the first year and over the lifetime of the scheme. This table deals with the mass emissions changed as a result of the scheme (i.e. the total change measured in tonnes). The legal targets for air quality are set in terms of a level of concentrations of pollutants that must not be exceeded. Thus, the legal limits cannot be expressed in terms of tonnes and are not directly comparable.

The monetary benefit shown here is attributable to the behavioural change that results from the CAZ. The CAZ is expected to result in users upgrading to cleaner vehicles or changing travel behaviour to result in less emissions from transport.

Table 2.12: Total Health and Environmental Benefits of Reduced NO_x and PM₁₀ Emissions (2018 discounted values)

Pollutant	unit	CAZ D	CAZ D + AM
NO _x	tonnes	3595	3918
	£m	£ 21	£ 30
PM ₁₀	tonnes	57	76
	£m	£ 4	£ 8
Total	£m	£ 25	£ 38

Table 2.12 shows that CAZ D+ provides the highest total health and environmental benefits resulting in a reduction of roughly 3,900 tonnes of NO_x emissions and 76 tonnes of PM₁₀ emissions over the appraisal period. CAZ D provides the next largest total health and environmental benefits of roughly 3,600 tonnes of NO_x emissions and 57 tonnes of PM₁₀ emissions over the appraisal period.

DEFRA’s updated damage cost estimates have been used to monetise some of these impacts for the Birmingham CAZ scenarios. However, the damage cost estimates from DEFRA do not account for all the improved health outcomes associated within improved air quality and behavioural changes associated with the CAZ. For example, they do not account for the impact of NO₂ on hospital admissions and therefore morbidity impacts are potentially underestimated

Figure 2.7 shows the monetised value of the reductions in emissions of NO_x and PM₁₀ over the appraisal period. From this it can be seen that the opening year results in around £7m of benefits from reductions from NO_x and around £2m in benefits from reductions in PM₁₀. These benefits decline steadily over time reaching about £0.4m for NO_x and £0.1m for PM₁₀ in 2029.

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Figure 2.7 Forecast emissions reductions over appraisal period CAZ D+

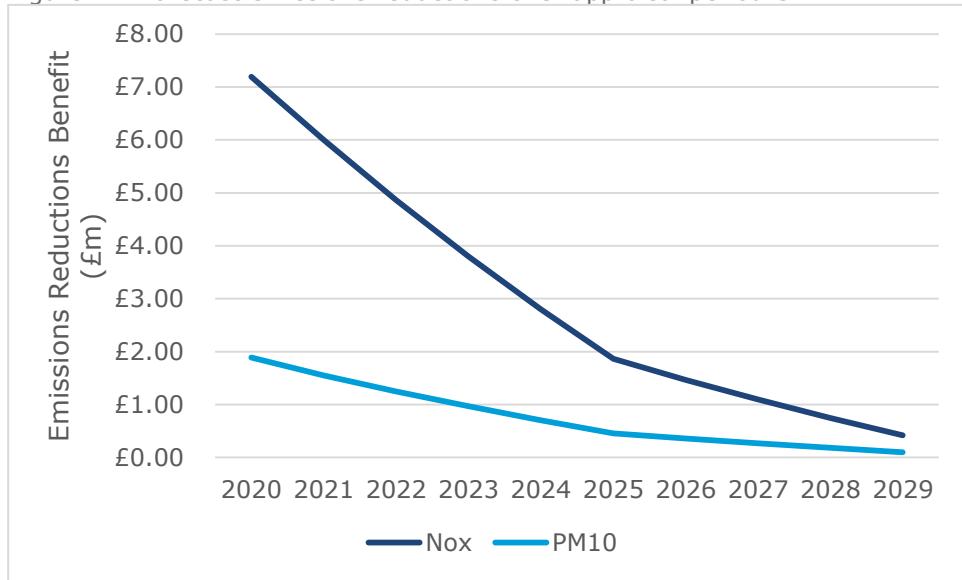


Table 2.13 also presents the total estimated reduction in greenhouse gas (GHG) emissions and the monetised benefits of reduced GHG emissions in the first year and over the lifetime of the scheme. This was assessed based on the change in total vehicles kilometres driven, as well as the change in terms of fleet, having been upgraded to newer cars with lower carbon emissions. Table 2.13 shows that over the appraisal period the CAZ D scheme would result in a net reduction of around 106,000 tonnes of greenhouse gas emissions. In monetary terms this amounts to around £6m over the appraisal period. Carbon impacts from the CAZ D+ scenario have been estimated, and the monetary valuations do not differ greatly from the CAZ D-only value.

Table 2.13 Total Quantified and Monetised Benefits of Reduced GHG Emissions (£m, 2018 discounted values)

Pollutant	unit	CAZ D	CAZ D +
Greenhouse Gases	Tonnes CO₂e	106k	106k
	£m	£ 6	£ 6

Summary of Health and Environmental Benefits

Reductions in air pollution and travel behavioural changes will bring a number of social, environmental and economic benefits. These include:

- benefits to human health;
- improved productivity (as a consequence of health improvements);
- Reduced material damage (particularly to historical and cultural buildings);
- a positive effect on nature conservation/green sites within the CAZ boundaries;
- a positive effect on climate change through reduced greenhouse gas (GHG) (measured in CO₂ equivalent tonnes) emissions.

Given the strong links between both air pollution and travel mode and a variety of health impacts, particularly on children, all reductions in air pollutant concentrations associated with the implementation of the CAZ D 'High' with Additional Measures are expected to bring benefits. Although initial changes in pollutant concentrations by 2020 may be modest and the predicted modal shift towards active travel

relatively small, the accumulation of small changes, when considered across the population, is likely to bring benefits to public health outcomes in Birmingham. The results of ongoing air quality modelling will be reported in the Distributional Impact Appraisal Report which will be submitted to support the business case.

2.6 Mitigation and exemptions

Given its statutory equality duty, BCC wants to ensure that compliance of NO₂ emissions will not create any significant dis-benefits to disadvantaged groups. Mitigations and exemptions have been created for groups identified by the Distributional Impact Assessment. The following describes the processes for creating the mitigation and exemption packages.

2.6.1 Mitigation measures

Designing mitigation measures to request funding from the Clean Air Fund (CAF) involved the following steps:

- Creation of a longlist of measures: A wide range of measures were considered which could mitigate the negative impacts of the CAZ introduction. This list was deliberately broad and considered all options that could be enacted to help targeted user groups.
- Assessing the longlist measures: Each measure on the longlist was assessed against the primary and secondary Critical Success Factors (CSF) described in Appendix 1A.
- Reviewing the shortlist of measures: All measures were compared assessed against the CSFs mentioned above and a qualitative decision was made whether to progress the measure to the shortlist. During this process the details of the measure in question was finalised.
- The short list measures were then analysed and quantified before a final decision was made on the items taken forward to the final package of mitigations seeking CAF allocation.

The decision process evaluation the longlist of mitigations and creating the shortlist is summarised in Table 2.14.

Table 2.14 Mitigation measure shortlisting summary

Mitigation measure	Primary CSF: delay reaching compliance	Secondary CSFs	Decision to bring forward to short list
Mobility package for private vehicle owners	No	Unless scheme is targeted cost will become excessive	Yes – but limit package to low income residents of the CAZ and low-income individuals working within the CAZ
Scrapage scheme for private vehicle owners	No	Logistical and feasibility issues relating to the proof of scrappage, must be targeted to limit cost	Yes – but limit package to low-income residents of Birmingham and target at those who regularly enter CAZ
ULEV taxi grant	No	State aid and double funding issues	No
ULEV taxi leasing scheme	No	Would require significant funding or, alternatively, a large loan amount	Not in this form. Edited to include a limited number of taxis for the council to lease on a 'Try before you buy' basis
Taxi scrappage scheme	No	Feasibility and logistical issues, objection from the taxi trade	No

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Mitigation measure	Primary CSF: delay reaching compliance	Secondary CSFs	Decision to bring forward to short list
ULEV taxi operational support package	No	Satisfies all secondary CSFs and positive feedback received from trade	Yes – Combined award where drivers receive equal funding for either retrofit solution or ULEV operational support package
Taxi retrofit fund	No	Satisfies all secondary CSFs and positive feedback received from trade	
SME grant for HGVs/LGVs	No	State aid and double funding issues	Not in this form. Edited to include a fund for HGVs only where fleets can apply for a funding award to aid with either retrofit technology or the upfront cost of a compliant vehicle. Coaches added to this scheme.
Retrofit scheme for HGVs/LGVs	No	Issues with technology readiness for HGVs, for LGVs the cost of retrofit compares poorly with cost of new vehicle	
Freight consolidation centre	No	Would require significant investment, negative feedback from Birmingham fleets, not feasible in the timeframe available	No
Free public charging electricity credit for LGVs	No	Satisfies all secondary CSFs	Yes
Marketing and educational campaign	No	Satisfies all secondary CSFs	Yes
Additional bus services	No	Costs are not considered reasonable in relation to CAF45	No (could be developed at a later date outside of the CAF framework)
Improving Birmingham's cycling and walking infrastructure	No	Costs and timeframe are not considered feasible in relation to CAF	No (could be developed at a later date outside of the CAF framework)

From this assessment seven mitigation measures were brought forward to the final package of mitigation measures. These mitigations are summarised in Table 2.15. A full description of the method of quantification and a detailed assessment against the CAF objectives for each mitigation is provided in the appended CAF application.

The total cost of the mitigation measures is £32.7m in 2018 prices. An additional 5% has been added to the mitigation measure cost to account for administering the specific measures. Adding this administration cost brings the total to £34.3m and nominalising the figures in accordance with their spend profile brings the total CAF allocation request to £36.2m.

⁴⁵ Birmingham Clean Air Zone Feasibility – Additional Measures Study, 2018

Table 2.15 Mitigation package summary

Ref	Measure	Type	Group impacted	Summary of mitigation measure	Distributional analysis	Cost (volume x cost per user)
M1a	Mobility Package for low income individuals	20c	Low income private car owners who work or live within the CAZ	Individual receives £1000 mobility credit offered in form of SWIFT travel card	Class D CAZ will force residents to either upgrade vehicle or pay charges if they wish to enter. For many individuals, there may not be alternatives and upgrading their vehicle is not feasible.	£5.65 million (5,650 x £1,000)
M1b	Scrapage scheme for low income individuals	20c	Low income private car owners	With evidence of scrapping a non-compliant car individual receives either: £2,000 cash payment toward the purchase of a compliant car (not eligible for PiG). £2,000 mobility credit. Credit to be supplied on a SWIFT card with no expiration for use.	Class D CAZ will force residents to either upgrade vehicle or pay charges if they wish to enter. For many individuals, there may not be alternatives and upgrading their vehicle is not feasible.	£10.86 million (5,430 x £2,000)
M2	Hackney carriage support package	20b	Hackney carriages	Drivers offered £5,000 as: support payments to be paid towards operational expenses of ULEV vehicles (4 annual instalments of £1,250) support for an LPG retrofit of their current or newly purchased vehicle	Changes in licencing conditions will force over 90% of the 1280 vehicles currently operational to change (upgraded/retrofit). All options on the market require significant capital expenditure.	£5.0 million (1000 x £5,000)
M3	Council hackney carriage leasing scheme	20b	Hackney carriages	BCC bulk purchase 50 ULEV taxis through public procurement tender and lease them to the drivers who are most vulnerable as well as on a try-before-you-buy basis		£2.75 million (50 x £55,000)

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Ref	Measure	Type	Group impacted	Summary of mitigation measure	Distributional analysis	Cost (volume x cost per user)
M4	'Free miles' for ULEV LGVs	20b	Van fleets	ULEV van drivers receive £750 credit to spend on BCC public charging network	SMEs operating coaches/HGVs/LGVs or relying on road transport will be disproportionately impacted. Vehicle capital costs are high and many fleets must enter CAZ as part of business operation.	£0.75 million (1000 x £750)
M5	HGV & Coach compliance fund	20b	HGV and Coach fleets	Fleets compete for £15,000 funding package to contribute towards: Installing a retrofit solution Upfront or lease costs of a compliant vehicle	SMEs operating coaches/HGVs/LGVs or relying on road transport will be disproportionately impacted. Vehicle capital costs are high and many fleets must enter CAZ as part of business operation.	£7.5 million (500 x £15,000)
M6	Marketing and educational campaign	20b	Owners of non-compliant vehicles (All types)	Educational and marketing campaign to provide information on the CAZ and reach out to groups eligible for support through mitigation measures	Groups not aware of the measures will receive no support	£0.2 million
M7	Residents parking scheme	TBC	TBC	TBC	TBC	TBC

2.6.2 Exemptions

The first stage of the identifying and evaluation mitigation options was to develop an initial longlist of mitigation solutions to moderate the impact groups identified as disproportionately impacted by the CAZ. In practise this involved identifying groups impacted by the scheme, then identifying a mechanism for lessening their disbenefit from CAZ implementation. This was based on the conclusions of the distributional impact analysis (DIA) report. The groups and targeted exceptions that comprised the longlist are shown in Table 2.16.

Table 2.16 Groups impacted by the CAZ

ref	Group	Description
1	CAZ HGVs and coaches	HGVs registered within the CAZ
2	HGVs travelling to the CAZ	HGVs registered within the Birmingham City area with existing finance agreements
3	SME van and LGV owners	Vans and LGV registered to SMEs within the CAZ
4	Vans within Birmingham City area	Vans registered within the Birmingham City area travelling to the CAZ with an existing finance agreement
5	Residents inside the CAZ	All residents in the CAZ
6	Workers whose job is inside the CAZ	Workers whose job is inside the CAZ and live outside the CAZ
7	Income deprived	Income deprived living in the CAZ
8	Income deprived	Income deprived living outside the CAZ, travelling inside the CAZ to work (commute)
9	Income deprived	All income deprived travelling inside the CAZ
10	Key workers whose job is inside the CAZ	Key workers living within the CAZ
11	Key workers whose job is inside the CAZ	Key workers living outside the CAZ, travelling inside the CAZ to work (commute)
12	Hospital visitors	All visitors of Birmingham Children's hospital
13	Community and school transport	All holders of Section 19 permits
14	Night workers	All travelling inside CAZ for work purposes during unsocial hours
15	Faith groups	All travelling to larger or more unique places of worship within the CAZ
16	Disabled vehicle owners	Vehicles with a 'disabled' or 'disabled passenger vehicles' tax class

To evaluate the potential to exempt these groups from paying the CAZ charge, the increased number of trips, in AADT terms, was estimated for each of the exemptions on the longlist. This volumetric assessment was used to inform an initial sifting of the longlist to remove those measures that would impact the compliance date. Only the exemption for all workers within the CAZ was excluded at this point as to the increase in non-compliant cars entering the CAZ would likely make compliance in 2022 unachievable.

The next level of sifting, evaluation the shortlist, involved eliminating areas of overlap between the different exemption options to ensure the most efficient package is created. Table 2.17 summarises which exceptions are included in the overall package, and the rationale for including or excluding each option.

Table 2.17 Exemption shortlist

ref	Group	Description of exemption	Included in package	Rationale
1	CAZ HGVs/LGVs and coaches	HGVs registered within the CAZ	Y	Businesses with HGVs/LGVs or coaches registered within the CAZ are not numerous and they will have little time to upgrade their vehicles.
2	HGVs/LGVs travelling to the CAZ	HGVs registered within the Birmingham City area with existing finance agreements	Y	HGVs/LGVs registered in the Birmingham City area with existing lease agreements will have little time to change travel patterns and can no immediately upgrade their vehicle.
3	SME van/LGV owners	Vans/LGV registered to SMEs within the CAZ	Y	SMEs within the CAZ will not have the flexibility of large organizations to rearrange their fleet to avoid incurring CAZ charges.
4	Vans/LGV within Birmingham City area	Vans/LGV registered within the Birmingham City area travelling to the CAZ with an existing finance agreement	Y	The majority of vans in the Birmingham City area are for work purposes. The vans with existing lease agreements will have little time to change travel patterns and can no immediately upgrade their vehicle.
5	Residents inside the CAZ	All residents in the CAZ	Y	Residents have little opportunity to change behavior to avoid the CAZ
7	Income deprived	Income deprived living in the CAZ	N	Overlaps with option 5 so excluded
8	Income deprived	Income deprived living outside the CAZ, travelling inside the CAZ to work (commute)	Y	There is little opportunity to change behavior to avoid the CAZ. In addition, the insecure nature of income deprived individuals means their access to employment should be protected
9	Income deprived	All income deprived travelling inside the CAZ	N	There is more opportunity to change behavior to avoid the CAZ. In addition, the mobility and vehicle upgrade mitigation measures also offers some relief to this group
10	Key workers whose job is inside the CAZ	Key workers living within the CAZ	N	Overlaps with option 1 so excluded
11	Key workers whose job is inside the CAZ	Key workers living outside the CAZ, travelling inside the CAZ to work (commute)	Y	Key workers provide essential services to society so should not have costs imposed that may incentivise them to change jobs
12	Hospital visitors	All visitors of Birmingham Children's hospital	Y	Birmingham Children's hospital is a regional specialist so there is little opportunity to change behavior to avoid the CAZ. The vulnerable nature of patients mean family members should not be dis-incentivised from visiting them
13	Community and school transport	All holders of Section 19 permits	Y	Community and school transport are often provided by small operators and local charities that provide important access to services (health and social care, education and training) for people who may otherwise be isolated.
14	Night workers	All travelling inside CAZ for work purposes during unsocial hours	N	The DIA only identifies key workers as those who work unsociable hours as a group who should be protected from the costs. As income deprived workers are covered in option 7, this exemption was not taken forward for packaging.
15	Disabled vehicle owners	Vehicles with a 'disabled' or 'disabled passenger vehicles' tax class	Y	There is little opportunity to change mode to access the CAZ.

Table 2.18 presents the final exemption package with the forecast increase in AADT for each exemption. Exemptions from paying the CAZ charge for non-compliant vehicles meeting the requirements will last through 2020 (1 year)

Table 2.18 Final mitigation package

ref	Exemption	Proportional increase in CAZ D+ AADT
E1	CAZ HGVs/LGVs and coaches	0.05% AADT increase overall 1.35% increase of HGV AADT
E2	HGVs/LGVs with existing finance agreements	0.15% AADT increase overall 3.50% increase of HGV AADT
E3	SME Vans/LGV within the CAZ	0.20% AADT increase overall 1.60% increase of LGV AADT
E4	Vans/LGV with existing finance agreements	0.45% AADT increase overall 4.10% increase of LGV AADT
E5	CAZ residents	0.85% AADT increase overall 1.10% increase of car AADT
E6	Income deprived working within the CAZ	1.30% AADT increase overall 1.65% increase of car AADT
E7	Key workers working within the CAZ	1.05% AADT increase overall 1.35% increase of car AADT
E8	Hospital and GP visits	0.05% AADT increase overall 0.07% increase of car AADT
E9	Community and school transport and vehicles registered with disabled status	0.04% AADT increase overall 0.37% increase of LGV AADT

2.6.3 Interrelations between mitigations and exemptions

The exemption and mitigation measures that have been proposed are both designed to minimise the negative impacts identified by the distributional impact analysis. As such, there is expected to be overlap between the groups targeted by the mitigations and those eligible for exemptions. Details of how exemptions are integrated into the implementation of the mitigation measure are covered in detail in the delivery plan of each mitigation measure (See CAF Report). However, each follows a general approach, as set out below.

- Receiving support through one of the mitigation measures proposed in no way affects an individual's/organisation's eligibility for an exemption, and vice versa.
- The implementation of the mitigation measures will be extended through early 2021 this allows individuals/organisations to continue to use their vehicle during the exemption period and is organised so that the mitigation measure is available at the end of the exemption.
- Those that are eligible for mitigation measures but are not eligible for exemptions can receive the mitigation packages/funding to coincide with the implementation date of the CAZ.

2.6.4 Mitigations and exemptions impacts on compliance

The impact the mitigation measures will have on the date of compliance have not been fully modelled, however BCC does not see this a concern for a number of reasons:

- The mitigations measures are designed to help individuals and organisations switch to cleaner compliant vehicles earlier than they normally would.

- For commercial fleets, especially in the case of taxis and HGVs, it is assumed that the vast majority would switch their vehicle as a result of the CAZ irrespective of any mitigation measures. Therefore, the measures should not impact the rate of compliance but instead make it financially easier for those who are forced to switch their vehicles.

The exemptions are not anticipated to impact compliance dates as the impacted participants only make up a small proportion of daily traffic, under 4% of AADT. Additionally, as exemptions are only valid through 2020, these will not impact compliance being achieved in 2021.

2.6.5 Sensitivity Test

The scaling factor used to uplift the number of vehicles impacted by the Birmingham CAZ scheme is based on a direct proportional relationship between population and the number of vehicles entering London's Low Emission Zone. A sensitivity test had been undertaken on the CAZ D+ scenario to explore how sensitive the estimated cost to upgrade for transport users is to the assumed scaling factor. The test is set up to vary the scaling factor by intervals of $\pm 20\%$ between -100% (no non-compliant vehicles) and +100% (doubling the number of compliant vehicles).

Figure 2.8 Upgrade Cost Sensitivity for the CAZ D+ Scenario (£m, 2018 discounted values)

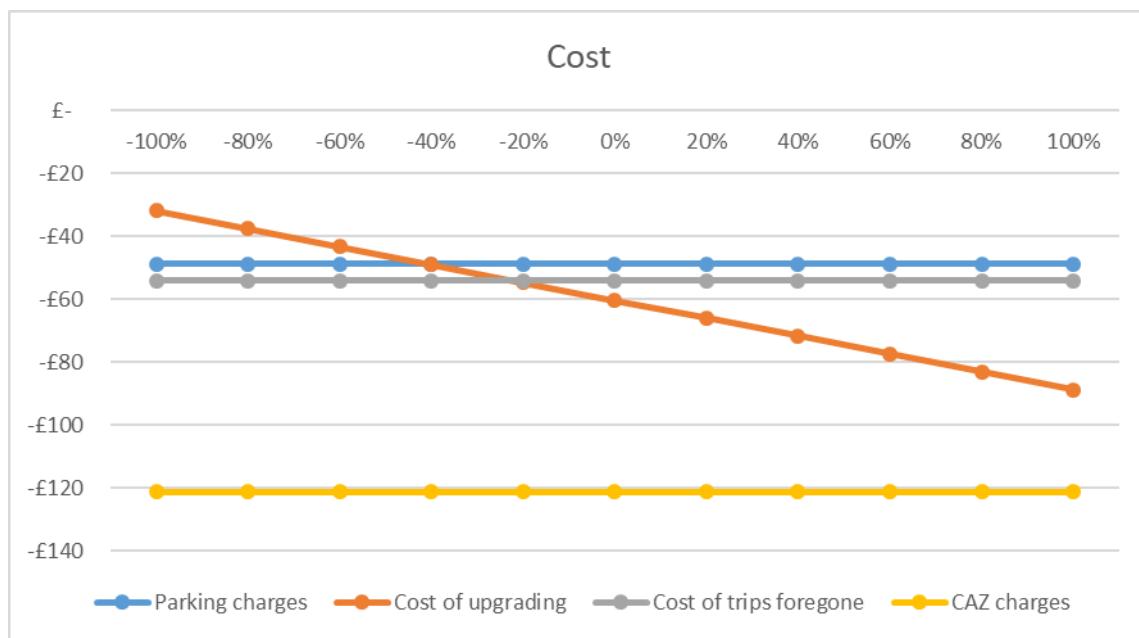


Figure 2.8 plots changes in cost to upgrade for transport users versus percent changes to the assumed scaling factor. The cost of parking charges, CAZ charges and welfare costs are not impacted by the scaling factor since these are estimated as a function of observed and forecast AADT (this captures frequency of entry to the CAZ). The cost of upgrading varies proportionally with the scaling factor, a 20% change in the scaling factor is found to drive a 10% change in the cost of upgrading.

However, overall this assumption has minimal impact on the overall cost to transport users which varies by 2% with a 20% change in the scaling factor. This indicates that changes in the scaling factor have a low impact on overall benefits.

2.7 Cost Benefit Analysis

2.7.1 Introduction

Table 2.14 summarises the monetised cost and benefit estimates. This enables a direct comparison of the cost and benefits to derive a Net Present Value (NPV) associated with each option.

It is important to note that user charges and revenues will offset each other, such that the impact on the NPV will be neutral. It is anticipated that the revenue generated will be invested in initiatives to realise the vision set out in 'Movement for Growth' for a greatly improved transport system which supports economic growth and regeneration, social inclusion and improves air quality and the environment.

Monetised Costs and Benefits

Table 2.19 Net Present Value (NPV) presented for each option, central values (£m, 2018 discounted values)

Analysis of Monetised Costs and Benefits (AMCB)	CAZ D	CAZ D+
Benefits - health and environmental	£25	£38
Benefits - reduced CO2 emissions	£6	£6
Benefits to transport users - changes in journey time and vehicle operating costs	£23	£11
Cost to Transport Users - Parking charges	£ -	-£48
Cost to Transport Users - upgrading	-£66	-£54
Cost to Transport Users - welfare (trips foregone)	-£21	-£47
Private Sector Benefits - Parking revenues	£ -	£28
Present Value of Benefits (PVB)	-£33	-£66
Costs to BCC	-£76	-£76
Revenues from Parking Charges	£ -	£20
Present Value of Costs (PVC)	-£76	-£56
Net Present Value (NPV)	-£109	-£122
% of GVA	-0.03%	-0.04%

Table 2.19 summarises all the financial and welfare impacts of the CAZ scenarios into benefits, costs and a net present value. Net present values of CAZ D is -£109m, compared to -£122m for CAZ D+. It is important to note that all CAZ and parking payments made by users are considered disbenefits to the users, but the equivalent amount is credited as revenue for private parking operators or BCC, respectively.

2.7.2 Costs relative to the local economy

In terms of wider economic impacts to the Birmingham Economy, one way to put the costs in perspective is to compare them to the Gross Value Added (GVA) of the local economy. Table 2.20 shows the NPV of each option as a proportion of Birmingham's economy over the 10-year period. It can be seen that the CAZ D+ scenario's NPV is equivalent to a loss of 0.04% of GVA over the 10-year period (note that some of the costs may be felt outside Birmingham, and so the analysis here is likely an overestimate). Another way to understand this impact is to put in the perspective of the amount of days of growth foregone as a result of the impact of the CAZ, this is the 'opportunity cost'. Using this estimate, estimates that the CAZ D+ is approximately equivalent to foregoing 11 weeks of growth, over the 10-year appraisal period.

Table 2.20 Expected GVA impacts due to cost of CAZ compliance and user charges over 10-year period (£m, 2018 discounted values)

	CAZ D	CAZ D + AM
NPV	-£ 109	-£ 122
% of GVA	-0.03%	-0.04%

2.8 Summary of Key Points and Conclusions

- The initial traffic and air dispersion modelling undertaken by BCC has demonstrated that implementation of a Clean Air Zone and additional measures in Birmingham would not be sufficient to ensure compliance with NO₂ concentration limits in all locations by 2020 in any of the modelled scenarios. AQ modelling of the CAZ D+ high charge scenario forecasts that compliance will be achieved in 2021, apart from one location that BCC will continue working on to see if compliance can be achieved before 2022.
- The CAZ D+ scenario is the preferred option as it is most likely to achieve compliance in the shortest possible time, which remains the primary critical success factor
- The Cost Benefit Analysis (CBA) of four scenarios, suggests that the CAZ D would generate a NPV of £109m, while the CAZ D with additional measures would generate a NPV of £122m.
- Although the quantified health and non-health benefits are significant for CAZ D+ (valued at approximately £38m) and there are additional benefits and savings in terms of reduced CO₂ emissions, journey times and vehicle operating costs, these are outweighed by the projected costs to the public, BCC, and Government.
- The analysis presented in this Economic Case rests on some key assumptions, some of which are uncertain, and a number of potentially significant health and non-health impacts that have not been quantified or monetised.
- The initial results from the distributional impacts appraisal show that:
- The following groups have been identified as potentially experiencing a disproportionate or differential adverse impact as a result of the implementation of the scheme.
 - Residents of the CAZ, and also surrounding areas (CAZ D scenarios only)
 - Disabled people (all scenarios)
 - Children (all scenarios)
 - People with religious beliefs (CAZ D scenarios only)
- In terms of impacts on business affordability, the following groups would be most adversely affected:
 - SMEs within the CAZ

- Suppliers to SMEs within the CAZ
- Taxi drivers
- Under a CAZ D scenario impacts on personal affordability and accessibility would arise from potential increase in cost or decrease in availability of community transport or school transport services, with a differential adverse impact on the disabled, elderly and children. Exemptions for vehicles registered under sections 19 and 22 of the Transport Act 1985 would mitigate for this impact.
- Under a CAZ D scenario, the increased cost of private travel would have a differential or disproportionate impacts on residents of the CAZ and nearby areas with high levels of income deprivation, for disabled people who have limited alternative forms of transport available to them, and to people accessing Birmingham's Children Hospital and large places of worship within the CAZ area. It may be appropriate to allow a sunset period for residents of the CAZ and for cars with disabled tax class, and that long stay patients at Birmingham's Children's Hospital be exempted from the CAZ charge for a time limited period. Travel plans would help enable congregants of large places of worship within the CAZ make changes to their travel modes in response to the scheme.
- Implementation of the scheme would have a disproportionate or differential adverse impact on business affordability for certain groups of SMEs who are more susceptible to the scheme as a result of their location, the nature of their operations or interactions with other Birmingham City Council policies. These include a small number of SMEs within the CAZ area who maintain their own vehicle, SMEs which supply businesses within the CAZ (locations currently not identified) and taxi drivers. It is suggested that vehicles registered to SMEs which frequently traverse the CAZ boundary could receive discounts and a financial incentives package be provided to hackney taxi drivers to support their transition to ULEVs and ensure that a reduction in number of wheelchair accessible taxis does not compound the impact on accessibility for disabled people.

3 Financial Case

3.1 Introduction

The Financial Case assesses the potential financial impacts to Birmingham City Council (BCC) of setting up, running and enforcing a Clean Air Zone (CAZ) in Birmingham City Centre.

As discussed in the Economic Case, the results of the traffic and air quality modelling conducted indicates that a CAZ D scheme plus additional measures (CAZ D+) is most likely to deliver compliance with the EU limit values for air quality in the shortest possible time. The Financial Case focuses on this option.

The CAZ D+ scheme implements charges on all class D vehicles (buses, coaches, taxis, heavy goods vehicles, light goods vehicles and cars) that do not meet the defined emission standards. The additional measures assessed in the preferred scheme are:

- Implementing parking charges on free parking in BCC controlled areas; and,
- Network changes at select locations on the A38 and at the junction of Dartmouth Middleway with Lister and Great Lister Streets.

3.1.1 Purpose

The purpose of this financial case is to support the application for drawdown from the DEFRA Implementation Fund and the Clean Air Fund (CAF). The bid for the Clean Air Fund grant drawdown is set out in more detailed in the CAF Report. The financial case for the implementation fund grant assesses the potential affordability of the costs to BCC of setting up and operating CAZ D+ scheme, and the potential revenues that would be generated through the scheme's operation.

The intention is that any surplus CAZ charging revenues generated would be spent future City Council initiatives to improve air quality.

The Finance case also presents identified mitigation measures toward targeted groups impacted by the implementation of the CAZ scheme. Funding from the Clean Air Fund (CAF) is requested for these mitigations.

The Financial Case is structured as follows:

- sub-section 3.1.4 estimates the capital and operating costs for the CAZ D scheme and the additional measures;
- section 3.5 estimates the revenues that would be generated through the operation of the CAZ D scheme and the additional measures;
- section 3.7 combines the costs and revenue streams to present a financial appraisal;
- sub-section 3.7.1 identifies potential funding sources;
- sub-section 2.6.3 discusses sensitivity tests performed; and,
- sub-section 3.8.3 presents key findings.

The appendices include a further breakdown of the assumptions behind the cost build up and a full set of financial statements. Additional information on the mitigations applying for the Clean Air Fund can be found throughout the POBC and in the appended document, BCC CAF application, which provides all of the CAF information in a single location.

3.1.2 Units of account

The figures presented in the Financial Case are in nominal values, unless otherwise stated.

3.1.3 Assumptions and limitations

Scheme costs are largely calculated with bottom up estimates where a per item cost is applied to an estimated required quantity. Per item costs are taken from similar schemes, technical advisor market intelligence, or market data where it was available from market soundings, and optimism bias is applied in line with HMG Green Book

Guidance. These costs have been reviewed by BCC while they are concurrently undertaking market engagement. The costs will be refined through the procurement process and detailed design development as the scheme progresses towards the Full Business Case. The sources and further details are set out in the assumptions sheet of the financial model.

Scheme revenues are calculated from traffic model outputs. The traffic model assumptions are taken from similar schemes and modified to the local context. Local user responses to the implementation of a charged CAZ may differ from the forecast values.

3.1.4 Project Costs

The costs for introducing and maintaining the CAZ are split into two categories: implementation costs (capital costs) and operating and maintenance costs (O&M). Where available, costs were estimated using local information and local data. Some of the costs (e.g. costs of signs and ANPR cameras) were derived from per item cost estimates and a forecast of the number of assets required, based on an analysis of the estimated cordon boundary area and the required infrastructure that would likely need to be introduced. In other cases, costs were estimated on the basis of additional analysis, simplifying assumptions, professional judgement or relevant cost information from similar local schemes.

Details on how each cost was estimated are summarised in the following tables and further details are set out in the Financial Model. The majority of the costs are determined by the area of the CAZ. However, some operational costs, transaction fees for example, are calculated from forecast traffic volumes. It was assumed that BCC can reclaim any Value Added Tax (VAT) that it incurs, therefore, all costs presented here are in factor costs (excluding VAT).

3.1.5 Treatment of risk and market engagement

Due to the current scheme design stage the cost forecasts use optimism bias (OB) levels recommended by WebTAG. As design progresses and market engagement provides increased data points, it is anticipated that there will be sufficient information to perform a quantified risk assessment (QRA). With the application of a QRA, the optimism bias will be reduced and calculated risk contingency pots will be created for drawdown.

The optimism bias rates applied to implementation costs, 44% for road projects and 200% for IT projects, are the OB levels that WebTAG recommends to apply at the Strategic Preferred Option Business Case stage. The WebTAG recommended OB levels reduce for projects at Preferred Option Business case stage. However, as a quantified risk assessment has not been performed, the SOBC recommended OB levels have been maintained. When increased market sounding is received, these OB levels will be reduced.

The WebTAG recommended OB for road projects at POBC stage of 15% is applied to ANPR camera and sign maintenance costs as the cost build up for these is based on established practices and in the case of the signs, is building off of the Birmingham PFI agreement with Amey. This level of OB was also applied to ongoing air quality monitoring and transaction fees as there is more certainty around these assumptions.

Birmingham City Council is currently engaging the market to attain implementation and operating cost quotes. One supplier has provided indicative pricing for the installation and maintenance of the ANPR cameras. The quote received provides an implementation cost 19% below the ANPR camera acquisition and installation capex estimate. However, the quote provided assumes that all equipment will be mounted on existing posts and that all connections will be made available at installation points by BCC. The market sounding does indicate that the ANPR camera capex forecast is reasonable. However, the main risk elements of installation have not been accounted for in the indicative pricing supplied by the market. Accordingly, the optimism bias level for cameras installation and maintenance has not been modified.

Birmingham City Council has a current contract with Amey that includes the maintenance of signs on the BCC network, this is referred to as the Birmingham PFI contract. The signs currently being maintained are almost identical to those being installed. The PFI agreement will be expanded to include these signs and it is anticipated that with increased clarity on contract negotiations that the optimism bias associated with sign maintenance will be reduced.

3.2 CAZ D and Additional Measures Implementation Costs

Implementation costs are the expenses required for the initial design and set-up of the CAZ. BCC will procure the civil engineering contractors and technology suppliers via existing Framework Agreements. This enables BCC to go to market with proven contractors who know and have experience of undertaking works on BCC's road networks. The existing framework procurement routes are further explained in the Commercial case.

In the Procurement Delivery Model, it has now been decided that separately contracted contractors for the civil works (i.e. civil engineering, sign installation etc.) and technology will be the most effective way to deliver the works; this recognising the specialist nature of the technology design. It is proposed that the supply and installation of each technology aspect (i.e. ANPR Cameras) will be by the specialist contractor that will then be a Nominated Subcontractor within the Main Contract (Civil Package). The civils contractor will manage the technology contractor within their contract with the risk associated with delivery passed directly to themselves. For civil related works BCC will use the NEC3 Engineering and Construction (Option C) contract for the works delivery.

Table 3.1 identifies five broad categories of installation costs:

- Design - this includes the costs of designing the CAZ (including the costs of scoping/feasibility studies to produce local plans) and the costs of consultation and marketing. Behavioural change support (mitigation efforts) in response to CAZ measures may also be needed but have not been estimated at this stage.
- Air Quality monitoring - the CAZ will require additional air quality monitoring stations.
- Signs - signs will be required on main (strategic) roads and entry points along local (distributor) roads crossing the CAZ boundary. Main road signs have higher costs as they include power supply and communication infrastructure.
- ANPR cameras – there will be costs associated with the purchase and installation of ANPR cameras that are required to enforce the CAZ. The cameras capture the number plates of vehicles and check vehicle details to identify those that fail to meet the required emissions standards, and hence which are required to pay a charge.
- Back office payment and enforcement function (IT and staff office accommodation) – IT includes the provision of a control room to monitor the camera network, IT equipment for staff and staff recruitment costs. Costs are currently based on a BCC standalone system with BCC in ongoing discussions with JAQU regarding system specificities.

Table 3.1: Derivation of implementation cost estimates

Cost Item	Description	Costing Method	Key assumptions
Design	Design and implementation costs	Assumed as 50% of construction costs. Construction costs consist of the all implementation cost items, save Design	Professional judgement based on similar projects at this stage
	Marketing and Communications costs	Based as a proportion London ULEZ proposed cost	London ULEZ marketing and communications budget = £5.1m. The 14% pro-rata was derived as the proportional length of Birmingham A4540 to the London ULEZ cordon (London North and South circular roads' length). The marketing cost is split evenly between implementation and

Cost Item	Description	Costing Method	Key assumptions
			operating costs.
	Feasibility study	Actual costs	The feasibility study cost was provided by project management consultants. Cost still to be finalized
Air quality	Air Quality monitoring set up costs	Assumed number of sites	8 additional AQ monitoring sites assumed
Signs	Number of main road (strategic) signs	Bottom up per unit cost assumption based on proposed CAZ area	Along each major route feeding into cordon crossing the CAZ
	Cost per main road (strategic) sign	Costs taken from similar schemes	Cost of equipment, installation, power supply and communications
	Number of local road (distributor) signs	Bottom up per unit cost assumption based on proposed CAZ area	2 signs for each camera
	Cost per local road (distributor) sign	Costs taken from similar schemes	Cost of equipment and installation, assumed unlit and no communications
ANPR cameras	Number of cameras	Bottom up per unit cost assumption based on proposed CAZ area	One per each lane of entry and exit across cordon. Includes two cameras at each outer ring crossing for monitoring flows.
	ANPR Camera cost	Costs taken from similar schemes	Cost of equipment, installation, power supply and communications. Assumes that cameras are installed on new poles, though may be possible to use existing poles for some
Back office payment and enforcement function (IT and staff recruitment)	Control room	Provisional estimate	Based on similar schemes and discussion with Birmingham bus lane enforcement scheme. This is an area of uncertainty due to the need to agree final arrangements with JAQU.
	Staff recruitment	Bottom up estimate	Recruitment and IT set up cost assumed at £5k (£2k for IT and £3k for recruitment)
Additional Measures - Parking	Remove all free parking from BCC controlled areas and replaced with paid parking spaces	Provisional estimate	Capital construction costs estimate. Costs include allowance for new meters, and signage
Additional Measures - Network Changes	Network Changes described in Section 0.	Associated Infrastructure works and signage	Capital construction costs estimate

Cost Item	Description	Costing Method	Key assumptions
Decommissioning	Costs associated with removing scheme infrastructure.	Bottom up assessment or removing scheme related infrastructure	Removal cost per item applied to all scheme related infrastructure.

Table 3.2 shows the estimated costs for each of the implementation cost items. Optimism bias (OB) has been added to each item. The total implementation cost is estimated -£20.76m for the CAZ D+ scheme implementation and £24.40m including decommissioning costs. £1.26m of DEFRA grant funding (Feasibility Grant, Air Quality Grant and National Clean Air Grant) has already been made available to BCC for feasibility works included in these cost estimates.

Table 3.2: Implementation cost estimate

Cost	Cost (£)	Optimism Bias (%)	Optimism Bias (£)	Total
Total CAZ D+ capex and decomm	-24,392,396			

3.2.1 Additional Measures

Additional schemes are included in the proposed clean air zone, these are referred to as Additional Measures. The Additional Measures costed are the following.

- Implementation of charged parking - Remove all free parking from BCC controlled areas with the implementation of paid parking spaces.
- Network changes
- Banning the route of traffic travelling northbound on Suffolk Street Queensway (A38) that exits onto Paradise Circus to then access Sandpits Parade. Ban southbound traffic from Paradise Circus accessing the A38.
- Closing Lister Street and Great Lister Street at the junction with Dartmouth Middleway. This allows more green time for the A4540.

The capital cost of the additional measures is forecast at £1.6m. As these local measures will improve air quality in the CAZ, funding is sought from the DEFRA national funding for locally implemented CAZ schemes.

3.3 CAZ and Additional Measures Operating and Maintenance Costs

Operating and maintenance costs are the ongoing costs required to maintain the CAZ on an annual basis. Table 3.3 identifies eleven broad categories of operating costs:

- Sign maintenance – required maintenance for road signs. It has been assumed that these assets will be transferred to the PFI operator for maintenance and the costs reflect the charges for such assets under the PFI scheme.
- ANPR camera maintenance – required maintenance for ANPR cameras.
- IT support and maintenance – annual maintenance charge to support IT back office.
- Air quality monitoring – continual monitoring if air quality sites to calibrate modelling to assess compliance with air quality standards.
- Staffing – salary costs of workers to administer the scheme, assess representation and appeals, and monitor AQ compliance and benefit realisation.
- Office accommodation – ongoing rental costs of physical office location CAZ staff.
- Transaction Fees – these represent the third part payment facilitation fees (i.e. credit card transaction charges).
- Collection fees – cost of pursuing delinquent payments.
- Parking enforcement – cost of patrolling and enforcing paid parking on-street and off-street in BCC for BCC controlled spaces.
- DVLA Database Query - Fees paid to check number plate registration data
- Sinking Fund - Fund created for risk mitigation and to cover decommissioning

Table 3.3: Derivation of operating costs estimate (see financial model for additional details)

Cost	Description	Costing Method	Key assumptions
Sign maintenance	Annual maintenance per main road (strategic) sign	Bottom up per unit cost assumption	Based on maintenance costs for similar assets. Includes HE support, power supply and communications
ANPR camera maintenance	Annual maintenance per camera	Bottom up per unit cost assumption	Based on maintenance costs for similar assets. Includes camera maintenance, power supply and communications
IT support and maintenance	Annual maintenance charge to support the IT back office. Hardware and software and data handling and storage	Bottom up cost assessment applying an average cost per ANPR camera	Based on maintenance costs for similar assets. Includes support for hardware and software and data storage. Updates
Air quality monitoring	Analysis of air quality testing	Bottom up staffing assessment	Staffing required for additional 8 monitoring sites, 1 FTE at £30k/yr.
Staffing	Enforcement staff costs	Bottom up staffing assessment	Representation / appeal rate based on London Congestion Charge Zone data
	Admin staff costs	Bottom up staffing assessment	Team of staff allocated to manage and administer the scheme
Office accommodation	Cost of accommodating BCC staff responsible for CAZ	Bottom up assessment based on staffing levels	100sq ft. per employee and average Birmingham office space rental costs
Marketing and communication	Marketing and Communications costs	Based as a proportion London ULEZ proposed costs	The marketing cost is split evenly between implementation and operating costs
Transaction fees	Fees paid to payment facilitators	Cost as a proportion of revenue	Transaction fee of 1% based on assessment of current market transaction processing fees
DVLA database query	Fees paid to check number plate registration data	Cost applied to every vehicle entry into the CAZ	Birmingham bus lane enforcement pays £0.11 per number plate query with the Driver and Vehicle Licensing Authority. 75% savings assumed due to implementation of JAQU centralized database or IT solution to reduce the need to query every vehicle entry into the congestion zone on every occasion.
Delinquent payment collection fees	Cost of pursuing delinquent payments	Assumed cost and revenue neutral	Collection fees assumed to cover the cost of collection
Parking penalties and	Cost of enforcing and pursuing penalty notices and	Assumed cost and revenue neutral	Penalty parking fees assumed to cover the cost of collection and enforcement

Cost	Description	Costing Method	Key assumptions
enforcement	delinquent payments		
Sinking fund	Fund created for risk mitigation and to cover decommissioning	Accrual to sinking fund is calculated as a proportion of O&M costs	An additional 15% is added to O&M costs and is accrued during the first seven years of scheme operation. Fund grows to cover renewals and a year of annual operating costs as a risk mitigation measure.

Operation of the technology-related aspects of the CAZ scheme will be under the remit of Service Birmingham who will be compensated by BCC. Maintenance of infrastructure, such as signs, will be under the remit of BCC. Air quality monitoring will be conducted by BCC. It is assumed that the control room and billing system for the CAZ charges will be highly automated. Staffing and overhead costs, such as office space, will be the responsibility of BCC. It is assumed that a proportion of revenue collected will be paid to intermediary financial services providers (i.e. credit card transaction services fees). It is assumed that delinquent payments that are sent to an external collections agency for collection will be revenue neutral (i.e. cost of employing collections agency paid for by the fee). It is assumed that parking schemes will be under the remit of BCC and that the operating costs of the parking schemes will be covered by penalty charge notice revenue.

Table 3.4 provides the estimated costs for each of the items included in the operating costs.

Table 3.4: Annual operating cost estimate (2020)

Cost	Cost (£)	Optimism Bias (%)	Optimism Bias (£)	Total
Total CAZ D+ O&M incl SF	-7,311,950			

Operating cost are assumed to be incurred in each year from 2020-2029 (inclusive). All costs include real price growth where staff wages are grown at Average Wage Earnings (AWE) and all other costs are grown at the retail price index (RPI).

3.3.1 Decommissioning

It is assumed that the CAZ infrastructure will be decommissioned at the end of the ten-year scheme period, in 2030. Decommissioning costs relate to removing scheme infrastructure and are forecast from a per item cost build up. This results in a forecast decommissioning cost of £3.6m.

3.3.2 Sinking Fund

A sinking fund will be established to provide mitigation against potential realised risks during operation. The fund's target capacity was determined as the cost of decommissioning and a year of operating costs. The yearly contribution to reach this amount was calculated by multiplying the forecast annual operating costs by 10% to be accrued over the first seven years of scheme operation. The sinking fund will be ring-fenced within the Clean Air Zone accounts to ensure its availability as a contingency fund for realised risks and decommissioning costs. The details of the sinking fund management are being considered but may follow the principles adopted by BCC for its PFI schemes.

3.4 Total Financial Costs

The total financial cost for CAZ D+ over the period 2018-2030 is estimated to be £77.6m in nominal prices.

Table 3.5 details the total financial costs, excluding the sinking fund for the CAZ D+ scheme and also excludes the mitigation measures.

Table 3.5: Financial costs of CAZ D+

(£m, nominal)	CAZ D+

Implementation Costs	-20.8
Decommissioning Cost	-3.6
Total Implementation and Decommissioning Costs	-24.4
O&M Costs	-53.2
Decommission Cost	-20.8

Mitigation measures and exemptions

Mitigation measures are proposed to help target groups with the transition to the Clean Air Zone scheme. Table 3.6 describes the mitigation measures proposed, including how the group is impacted by the scheme and the proposed budget required for the mitigation measure. Funding for the mitigation measures is sought through the Clean Air Fund.

The total cost of the mitigation measures is £32.7m in 2018 prices. An additional 5% has been added to the mitigation measure cost to account for administering the specific measures. Adding this administration cost brings the total to £34.3m and nominalising the figures in accordance with their spend profile brings the total CAF allocation request to £36.2m.

Table 3.6 Mitigation measure summary table

Ref	Measure	Type	Group impacted	Summary of mitigation measure	Distributional analysis (how group is impacted)	Cost
M1a	Mobility Package for low income individuals	20c	Low income private car owners who work or live within the CAZ	Individual receives £1000 mobility credit offered in form of SWIFT travel card	Class D CAZ will force residents to either upgrade vehicle or pay charges if they wish to enter. For many individuals, there may not be alternatives and upgrading their vehicle is not feasible.	£10.86 million (5,430 x £2,000)
M1b	Scrapage scheme for low income individuals	20c	Low income private car owners	With evidence of scrapping a non-compliant car individual receives either: <ul style="list-style-type: none"> ▪ £2,000 cash payment toward the purchase of a compliant car (not eligible for PiG). ▪ £2,000 mobility credit. Credit to be supplied on a SWIFT card with no expiration for use. 	Class D CAZ will force residents to either upgrade vehicle or pay charges if they wish to enter. For many individuals, there may not be alternatives and upgrading their vehicle is not feasible.	£5.65 million (5,650 x £1,000)
M2	Hackney carriage support package	20b	Hackney carriages	Drivers offered £5,000 as: <ul style="list-style-type: none"> ▪ support payments to be paid towards operational expenses of ULEV vehicles (4 annual instalments of £1,250) ▪ support for an LPG retrofit of their current or newly purchased vehicle 	Changes in licencing conditions will force over 90% of the 1280 vehicles currently operational to change (upgraded/retrofit). All options on the market require significant capital expenditure.	£5.0 million (1000 x £5,000)
M3	Council hackney carriage leasing scheme	20b	Hackney carriages	BCC bulk purchase 50 ULEV taxis through public procurement tender and lease them to the drivers who are most vulnerable as well as on a try-before-you-buy basis	Changes in licencing conditions will force over 90% of the 1280 vehicles currently operational to change (upgraded/retrofit). All options on the market require significant capital expenditure.	£2.75 million (50 x £55,000)
M4	'Free miles' for ULEV LGVs	20b	Van fleets	ULEV van drivers receive £750 credit to spend on BCC public charging network	SMEs operating coaches/ HGVs/LGVs or relying on road transport will be disproportionately impacted. Vehicle capital costs are high and many fleets must enter CAZ as part of business operation.	£0.75 million (1000 x £750)
M5	HGV & Coach compliance fund	20b	HGV and Coach fleets	Fleets compete for £15,000 funding package to contribute towards: <ul style="list-style-type: none"> ▪ Installing a retrofit solution ▪ Upfront or lease costs of a compliant vehicle 	SMEs operating coaches/ HGVs/LGVs or relying on road transport will be disproportionately impacted. Vehicle capital costs are high and many fleets must enter CAZ as part of business operation.	£7.5 million (500 x £15,000)
M6	Marketing and educational campaign	20b	Owners of non-compliant vehicles (All types)	Educational and marketing campaign to provide information on the CAZ and reach out to groups eligible for support through mitigation measures	Groups not aware of the measures will receive no support	£0.2 million

A package of exemption measures will be implemented for targeted groups to lessen the impacts of the CAZ on them. There are no costs associated with these exemptions, however, they will result in certain vehicles not being charged to enter the CAZ and will result in an associated drop in revenue. Impacts on traffic flows have been forecast and are currently being modelled. When these model runs are complete the revenue figures will be updated to reflect the impact of mitigations and exemptions.

A summary table of the exemptions measures is provided in Table 3.7.

Table 3.7 Package of exemption measures

Ref	Exemption	Description
E1	CAZ HGVs and coaches	Vehicles registered within the CAZ will receive an exemption from the CAZ charge. Max 2 vehicles per company.
E2	HGVs with existing finance agreements	HGVs registered in the Birmingham City area travelling to the CAZ with and existing finance agreement beyond 2020 will be exempt from the CAZ charge.
E3	SME Vans	Vans registered to SMEs within the CAZ will receive an exemption from the CAZ charge. Max 2 vehicles per company.
E4	Vans with existing finance agreements	Vans registered within the Birmingham City area travelling to the CAZ with and existing finance agreement beyond 2020.
E5	CAZ residents	All private car and van owners who are residents of the CAZ, as defined by DfT registration information, will be exempt from the CAZ charge.
E6	Income deprived working within the CAZ	Income deprived residents of the Birmingham metropolitan area traveling into the CAZ for work will be exempt from the CAZ charge.
E7	Key workers working within the CAZ	Key workers and volunteers travelling to work in the CAZ will be exempt from the CAZ charge. Commuting trips are multiplied by the proportion of key workers to total workers found in the UK economy.
E8	Hospital and GP visits	Visitors to select hospitals, GP offices and care homes will be exempt from paying the CAZ charge. General assumptions were applied to Hospital, GP and care home capacities to derive the proportion of visiting traffic that would be in non-compliant vehicles.
E9	Community and school transport	Vehicles that serve the community and are classified as Section 19 operators will be exempt from the CAZ charge.

3.5 Project Revenues

This section describes the revenue forecast from charging non-compliant vehicle owners who enter the CAZ. The intention is that revenues will be utilised for future City Council initiatives aimed at improving air quality in the city.

3.5.1 CAZ Revenue

Charging CAZ schemes are based on charging an entry fee to vehicles that do not meet the required emission standards. Multiple charge levels were tested and the behavioural changes that would result at different charge levels can be seen in the Transport Modelling Forecast Report.

Traffic modelling forecasts that air quality compliance is not achieved in 2020 in any of the revenue scenarios. Therefore, the highest feasible⁴⁶ charge level that was tested is used for the CAZ scheme. As behaviour changes are influenced by price, it is assumed that the highest charge rate will achieve compliance in the shortest possible time. Additional testing is planned to assess when air quality compliance will be achieved.

Table 3.8 sets out the charges used in the traffic model to estimate the impact of the CAZ D+ scheme. The base charges are consistent with the charges that have been set for the London ULEZ scheme.

Table 3.8: CAZ Charge and Penalty Charge by vehicle type

Vehicle	Car	LGV	HGV	Bus	Taxi
CAZ Charge	£12.50	£12.50	£100.00	£100.00	£12.50
Penalty Charge	£120.00	£120.00	£120.00	£120.00	£120.00
Penalty Charge (discounted)	£60.00	£60.00	£120.00	£120.00	£60.00

The charges are set at different levels for different vehicle types to reflect the contribution each type of vehicle makes on a per-vehicle basis to air pollution and to ensure that vehicles with the highest emissions are incentivised to comply with the standard. The car and LGV charges have been set at this level to enable those people making infrequent trips to continue to do so if they do not want to change their vehicle.

This charge structure also reflects the fact that while cars make up the majority of the traffic, they make a smaller contribution to air pollution on a per vehicle basis. In contrast, HGVs, coaches and buses make a large contribution to air pollution on a per vehicle basis. A daily charge of £100 reflects this and is intended to deter older more polluting vehicles. Charges may be adjusted to reflect additional research as work is progressed.

It is assumed that the charge levels remain constant in current prices (i.e. £12.50 in 2020 and £12.50 in 2029) and, hence, fall in real terms. The charge is planned as a daily charge, so vehicles that have entered will not have to pay twice for re-entering on the same date. The behavioural response of users was estimated based on a stated preference survey data modified to be applicable to the Birmingham context. The results of the behavioural modelling can be seen in the Economic Case.

The traffic model was used to forecast the number of non-compliant cordon-crossing flows in the Do Minimum and the CAZ D+ scenarios. The number of non-compliant cordon-crossing flows in the CAZ D+ scenario was multiplied by the charge level per vehicle to determine the revenue. Table 3.9 displays the Average Annual Daily Traffic (AADT) of cordon crossing flows output from the traffic model in the Do Minimum scenario. Table 3.10 displays the number of cordon crossing flows output from the traffic model in the CAZ D+ scenario. The AADT traffic from the modelled year, 2020, is assumed constant through the scheme lifespan.

Table 3.9: AADT cordon crossing flows in Do Minimum scenario, by vehicle type

⁴⁶ High charge levels were set to be equal to charge levels in London ULEZ

	Car	Taxi / PHV	LGV	HGV	Bus
Compliant	126,719	1,890	13,067	4,588	3,269
Non-compliant	38,790	4,810	9,148	2,453	2,196
Total	165,509	6,700	22,214	7,042	5,465

Table 3.10: AADT cordon crossing flows in CAZ D+ scenario by vehicle type

	Car	Taxi / PHV	LGV	HGV	Bus
Compliant	148,617	6,884	16,848	6,555	5,466
Non-compliant	2,959	0	3,496	87	0
Total	151,576	6,884	20,345	6,642	5,466

The number of non-compliant vehicles entering the CAZ is expected to reduce over time as a result of two major factors:

With the introduction of a charge, owners are incentivised to exchange their non-compliant vehicle for a compliant vehicle earlier than they would have done without the scheme.

Older, non-compliant, vehicles dropping out of the fleet as they are exchanged at the normal replacement rate with compliant vehicles.

As a result, the revenues collected are expected to decrease. The revenue analysis was conducted for opening year (2020) and factors applied to each subsequent year to account for this decrease.

3.5.2 Penalty Charges

Penalty charges are charges paid by users who do not pay the daily CAZ charge within a pre-determined timeframe. These users are subject to a penalty charge notice (PCN) and required to pay a fine. The assumed penalty charge rates are found in Table 3.8, with discount penalty charge rates applicable if the penalty is paid within a pre-determined timeframe.

If a user receives a PCN but believes they have received it in error (i.e. they have paid the charge or were exempt) they have the opportunity to make their case as a representation online or in writing. A decision will be made whether to accept this representation or reject it. Users then have an option to appeal the rejection, which will be taken to an independent adjudicator.

Compliance rates and penalty payment rates are sourced from London congestion charge data. London congestion charge requires next charging day by midnight and allows 14 days for discounted PCN rate.

Based on data from the London congestion charge, we have made the following assumptions about penalty charges based on TfL congestion charge data where available:

- Rate of unpaid charges that receive a penalty charge notice is 5%.
- Rate of penalty charges paid is 70%.

- 30% of PCNs go unpaid. Non-payment includes non-paying delinquent charges, as well as charges that successfully represent or appeal their case and have penalty charges dropped. No revenue is assumed to be collected from either.
- Rate of appeals on PCNs is 1% of all PCNs, which is included in the 30% non-payment figure.
- Rate of PCNs paid within discount time period is 66%.

3.5.3 Parking Revenue

The removal of free on street parking (which is controlled by BCC), to be replaced with charged parking, would result in the scheme generating additional revenue for BCC. This revenue stream was based on a study of parking spaces and charges, the ULEZ behavioural response model, and assumptions regarding payment options by users. Although parking revenues change as part of the impact of changes associated with the CAZ, the revenues form part of BCCs parking revenue stream rather than the CAZ income stream for financial management and reporting purposes.

Based on analysis of parking spaces within the CAZ area, approximately 15% of trips ending in the CAZ use free of charge on-street parking spaces. These users will face a new decision after the parking charges are introduced; whether to pay the charge or change their behaviour. This decision falls to both compliant and non-compliant users. User responses were forecast using the London ULEZ stated preference survey and a calculated average parking charge.

Table 3.11 shows the behavioural responses expected of the slightly over 22,000 cars that utilise the free parking spaces on a regular basis. It shows that the majority will continue to park in the CAZ area and pay for parking. The next largest group will avoid the zone, choosing to make a trip elsewhere. Fewer will cancel their trip and the smallest response group is those who choose to shift travel modes.

Table 3.11: Behavioural responses of those impacted by new charging on-street parking (average day users)

	Non-compliant	Compliant
Pay Charge	152	14,100
Avoid Zone	110	5,781
Cancel Trip	32	1,638
Mode Shift	10	508
Total	304	22,027

In order to convert these parking paying users into revenue figures, they were split into three categories of parking users based on assumptions:

- 40% of these users continue to park on-street
- 60% park in off-street lots
- Of which 20% are owned by BCC, the remaining being privately owned

On-street and BCC owned off street parking will result in revenue to BCC. Off-street private parking was calculated as a benefit to private operators in the economic case, but is not included in the financial case.

The average rate for parking was calculated to be £4.94 per user per stay for off-street parking and £1.93 per user per stay for on-street parking. The off-street parking rate is derived from a study of current off-street parking charges for longer stays. The on-street parking rate is taken from an independent study Jacobs' performed, the Birmingham City Centre Parking Review. The assumptions applied to factor the revenue results were as follows.

- Annualisation factor of 250 was applied to account for a larger proportion of revenue accruing to weekdays.
- It was assumed 40% of on-street users pay for an annual permit, resulting in a fee discounted by 80%.
- It was assumed that 60% of off-street users will purchase a season ticket/monthly pass, resulting in a fee discounted by 20%.

3.6 Results

3.6.1 CAZ Revenue

In 2020, CAZ revenues are expected to be approximately £43.6m in 2020, dropping to £5.2m in 2029 as a greater number of vehicles achieve compliance with the emission standards. Revenue from parking charges remains consistent at £2.8m throughout the ten-year period. It is anticipated that the revenue generated will be invested in initiatives to realise the vision set out in 'Movement for Growth' for a greatly improved transport system that supports economic growth and regeneration, social inclusion and improves air quality and the environment.

Table 3.12 shows that CAZ D+ is expected to generate £232.2m over the appraisal period.

Table 3.12: Total revenue forecast

	Total revenue forecasts (£m, nominal)
CAZ revenue	232.2
Non-CAZ revenue	28.4
Total	260.6

3.7 Financial Appraisal

The financial appraisal involves comparing costs and revenues to ascertain the scheme's net financial position. Table 3.13 shows that the annual revenues generated from the scheme are greater than the public expenditure required to set up and operate the scheme.

Table 3.13: Financial appraisal of CAZ D High plus Additional Measures

(£m, nominal)	Total values
Implementation costs	-20.8
Revenue	260.6
Operation costs	-59.2
Decommissioning costs	-3.6
Net cash flows	177.0

Table 3.14 provides the financial profile for the CAZ D+. These items show that the costs of implementing the scheme are forecast to be less than opening year net cash flows. Operating costs remain relatively stable throughout the scheme while revenues experience a significant decrease due to increased user compliance with the defined emission standards. However, revenues exceed costs throughout the forecast period, resulting in net positive cash flows throughout the scheme evaluation period.

Table 3.14 CAZ D+ scheme financial profile

(£m, nominal)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Capex	-20.8											
CAZ revenue		43.7	41.3	35.7	29.9	23.9	17.6	14.7	11.7	8.5	5.2	
CAF grant revenue	16.2	14.9	1.8	1.9	1.5	0.0	0.0	0.0	0.0	0.0	0.0	
Parking revenue		2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	
O&M		-6.6	-6.5	-6.3	-6.1	-5.9	-5.6	-5.6	-5.6	-5.5	-5.4	
Sinking fund	-3.6	-0.7	-0.6	-0.6	-0.6	-0.6	-0.6					7.3
CAF mitigation spend	-16.2	-14.9	-1.8	-1.9	-1.5							
Decomm												-3.6
Net cash flows (excluding) parking revenue)	-24.4	36.4	34.2	28.8	23.2	17.4	11.4	9.1	6.1	3.0	-0.2	3.7
Net cash flows	-24.4	39.2	37.0	31.6	26.0	20.3	14.2	11.9	8.9	5.8	2.6	3.7
Capex	-20.8											

3.7.1 Funding

Based on the current available funding guidelines issued by DEFRA, BCC will be applying for funding to support the CAZ and other transport initiatives to aid improving air quality in Birmingham. Delivery of this scheme is not dependent on any other funding requirements

BCC is applying for the DEFRA implementation fund dedicated to funding locally implemented CAZ schemes. It is assumed the full fund drawdown of £24.40m will occur at the beginning of 2019.

BCC is also requesting allocation from the Clean Air Fund to provide mitigation measures to those impacted by the scheme. The total fund request is £36.2m. A breakdown of funding requested is provided in Table 3.15 and the spend profile indicated in Table 3.16.

Table 3.15 Capital expense and mitigation expense funding source and use

		Implementation Fund	Clean Air Fund
Totals		-24.4	-36.2

Table 3.16 Implementation fund and CAF spend profile

(£m, nominal)	2019	2020	2021	2022	2023
Implementation Fund	-24.392				
Clean Air Fund	-16.166	-14.857	-1.774	-1.886	1.519
total	-40.558	-14.857	-1.774	-1.886	1.519

3.8 Accounting Treatment

3.8.1 CAZ

The initial cost to establish the Clean Air Zone (implementation measures) will be treated as capital and related assets depreciated in accordance with BCC accounting policies. [BCC to check marketing and initial feasibility, (design ok)] Certain assets purchased by BCC will be transferred to and maintained under BCC's PFI contract for an annual charge. The assets are on balance sheet and the revenue costs accounting for as a charge along with other PFI operational costs.

The grant will be held on balance sheet and amortized (taken to revenue) over the life of the relevant asset.

Operating costs are expensed.

Clean Air Funding

Except where an asset is created which is owned by BCC, the cost of mitigation measures and related funding will be treated as revenue for accounting purposes.

3.8.2 Sensitivities

Sensitivity tests were run flexing assumptions to ascertain the impact implementation costs and net cash Assumptions to test were identified by their relative uncertainty, sensitivity to changes, and ability to significantly alter modelled results. A summary table of the most impactful sensitivities runs is provided in Table 3.17.

Table 3.17 Sensitivity test summary table (£m, nominal)

Sensitivity area	Test description	Impact
Implementation cost	Optimism bias lowered from 44% to 15%	Capital cost, excluding decommissioning, drop £3.2m to £17.5m, a drop of 16%. Operations and maintenance costs drop 7% over the life of the scheme to £55.1m
Revenue	Enforcement revenue accounts for 32% of CAZ revenue. Charges not paid in the required payment period decrease from 5% to 2%. This is equal to reducing the penalty charge by 60%.	Revenue decreases by 40.0m over the scheme duration. This is a drop of 17%. However, as penalty processing staff costs also drop, the scheme remains with positive net cash flows until the final year where the deficit quadruples to £800k, which is covered by the sinking fund.
Operating costs	Querying a car registration on the DVLA database costs £0.11. A 75% cost reduction was assumed to due efficiencies with the creation of a permitted vehicle list to be held locally and updated periodically. These costs still make up 36% of all operating costs. This savings was reduced to 65%.	Operating costs increase by 13%. This results in the negative net cash flow in the final year of operations increasing to £1.2m. This deficit is covered by the sinking fund.

The sensitivity tests indicate that flexing the assumptions seen to have the least certainty, highest sensitivity and biggest impact on modelled outputs has moderate impacts on forecast cash flows. The test lowering the level of optimism bias applied had a significant impact on implementation costs.

However, it is possible that as the scheme design progresses that additional cost will surface and/or additional areas requiring risk contingencies will be identified.

The sensitivities on revenue and costs resulted in largely similar outputs. Both tests resulted in the scheme remaining with net positive cash flow until the final year of operations, with the deficit in the final year of operations covered by the sinking fund.

3.8.3 Key Findings

Cost and revenue forecasts indicate that the revenues generated from operating the CAZ D+ scheme exceed the setting up and operating of the scheme. The surplus is significant in initial years and drops to an operating loss in the final year of the scheme as the proportion non-compliant cars in car and HGV fleets is just 6% and 7% of the base year make up. There would therefore be an opportunity for BCC to reinvest revenues in initiatives to accelerate the take up of low/zero emission vehicles, improve air quality through other measures, or help mitigate the costs to society.

Appendix: Summary cost tables

Summary tables of implementation and operations and maintenance costs, with detail defining their derivation, are provided here.

Table 3.18 Summary table of implementation costs

Item	Description	Units	Unit Cost (£, 2018)	Total Cost (£, 2018)	Total Costs + OB% (£, nominal)
	Cameras close to outer cordon signs to monitor flow. 28 cameras total				
Total implementation and decommissioning cost (nominal)				-24,392,396	

Table 3.19 Summary table of operations and maintenance costs

Item	Description	Units	Unit Cost	Annual Cost	Total costs
			(£, 2018)	(£, 2018)	over 10 yrs. + OB (£, nominal)
	<p>An additional 15% is added to O&M costs and is accrued during the first six years of scheme operation. Fund grows to cover decommissioning costs and half of annual operating costs as a risk mitigation measure. This cost is incurred only for 5 years (2020-2025).</p> <p>Changes annually as based on operating cost. Refer to the financial model for the cost profile</p>				
Total O&M with sinking fund (nominal)			-62,876,091		

Table 3.20 Revenue cash flow

Income	Note	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CAZ D Charges	Nominal			31,341,609	27,070,431	23,603,046	19,927,920	16,012,239	11,827,926	9,972,747	7,987,939	5,866,975	3,602,952	
Penalty Revenue	Nominal			12,336,260	14,225,532	12,115,923	10,006,314	7,896,705	5,787,096	4,733,228	3,679,360	2,625,492	1,571,624	
CAF - revenue	Nominal	16,166,241	14,857,927	1,774,980	1,886,941	1,519,973	0	0	0	0	0	0	0	
[blank]	Nominal													
Total		16,166,241	58,535,796	43,070,943	37,605,910	31,454,207	23,908,944	17,615,021	14,705,974	11,667,299	8,492,467	5,174,575	0	
Other Revenues														
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total parking revenue				2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	
Costs														
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total				-22,169,876	-8,885,608	-8,811,649	-8,245,379	-6,490,315	-6,210,214	-5,618,872	-5,572,343	-5,503,404	-5,408,253	3,478,964
Net Cash flow CAZ D - excluding parking revenue				36,365,919	34,185,335	28,794,262	23,208,828	17,418,629	11,404,808	9,087,103	6,094,956	2,989,063	-233,678	3,478,964
Net Cash flow CAZ D - including parking revenue				39,205,695	37,025,111	31,634,038	26,048,604	20,258,405	14,244,584	11,926,879	8,934,732	5,828,839	2,606,099	

Table 3.21 Income and Expense and Balance Sheet

I&E	Price	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Income													
Total		58,535,796	43,070,943	37,605,910	31,454,207	23,908,944	17,615,021	14,705,974	11,667,299	8,492,467	5,174,575		
Other Income													
Parking operating income	nominal	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776
Total		2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776
Costs													
Operating Costs	nominal	-6,645,328	-6,462,259	-6,293,439	-6,113,113	-5,900,171	-5,646,269	-5,618,872	-5,572,343	-5,503,404	-5,408,253	0	
Sinking Fund	nominal	-666,622	-648,370	-631,269	-612,293	-590,143	-563,945	0	0	0	0	0	7,104,616
CAF mitigation measures	nominal	-16,166,241	-1,774,980	-1,886,941	-1,519,973	0	0	0	0	0	0	0	
Decommissioning	nominal												-3,625,652
Depreciation	nominal												
Total		-23,478,190	-8,885,608	-8,811,649	-8,245,379	-6,490,315	-6,210,214	-5,618,872	-5,572,343	-5,503,404	-5,408,253	3,478,964	
Net Impact without parking charges		35,057,605	34,185,335	28,794,262	23,208,828	17,418,629	11,404,808	9,087,103	6,094,956	2,989,063	-233,678	3,478,964	
Net impact with parking revenue		37,897,382	37,025,111	31,634,038	26,048,604	20,258,405	14,244,584	11,926,879	8,934,732	5,828,839	2,606,099	3,478,964	
Balance Sheet													
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Assets													
Tangible Assets		20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	
Accumulated Depreciation		0	2,539,957	5,079,914	7,619,871	10,159,827	12,699,784	14,313,176	15,926,568	17,539,960	19,153,352	20,766,744	
NBV Tangible Assets		20,766,744	18,226,787	15,686,831	13,146,874	10,606,917	8,066,960	6,453,568	4,840,176	3,226,784	1,613,392	0	

Birmingham City Council
Clean Air Zone

Sinking Fund	3,625,652	4,292,274	4,940,643	5,571,912	6,184,206	6,774,349	7,338,294	7,338,294	7,338,294	7,338,294	7,104,616	0
Total Related Assets												
Liabilities												
Capital Grant	-	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744	20,766,744
Amortization	0	-2,539,957	-5,079,914	-7,619,871	-	10,159,827	12,699,784	14,313,176	15,926,568	17,539,960	19,153,352	20,766,744
Balance of Capital Grant	-	20,766,744	18,226,787	15,686,831	13,146,874	10,606,917	-8,066,960	-6,453,568	-4,840,176	-3,226,784	-1,613,392	0
Provision for decommissioning	-362,565	-725,130	-1,087,696	-1,450,261	-1,812,826	-2,175,391	-2,537,956	-2,900,522	-3,263,087	-3,625,652	0	
Total Programme Liabilities	-	21,129,309	18,951,918	16,774,526	14,597,134	12,419,743	10,242,351	-8,991,524	-7,740,698	-6,489,871	-5,239,044	0

NOTE1: no MRP as grant funded

4 Commercial Case

4.1 Introduction

This Commercial Case details the commercial viability and deliverability of Birmingham's Clean Air Zone (CAZ). The following section covers the procurement, tendering and contract strategy to be used to engage the contractors and suppliers to deliver the scheme. The key viability factors identified by Birmingham City Council (BCC) are:

- Time (speed or certainty of completion date)
- Cost (price level or cost certainty)
- Quality (functionality and performance)

Consideration for these key criteria has been made throughout the development of this case and provide a basis for the recommendations and proposals delivered herein. It must be stated that the key criteria of Time, Cost, and Quality may be considered interdependently and are accepted as potentially conflicting in being able to mitigate one without compromising another. Therefore, emphasis on only one of the key criteria will almost certainly have a negative effect upon the others.

It has been agreed that a CAZ D plus a package of additional measures will be implemented, therefore the City Council will need to support the project with capital work activities. The CAZ 'D' will include civils work typically comprising of camera bases/foundations, poles and sign installations and the technology work, typically comprising of installation of Automatic Number Plate Recognition (ANPR) cameras and the supporting system / interfaces.

As defined in Section 5.11 of the Management Case a back office system will be required to manage and administer the charging and penalty functionalities of the CAZ. The decision as to whether the system will be delivered by the City Council or centrally by Government is still outstanding, however it is anticipated that a viable procurement route will be available via one of the City Councils currently available frameworks. The City Council have carried out some exploratory supply chain engagement, using their supply chain for similar enforcement systems to gauge a benchmark. Whilst this business case is written on the assumption that the system will be delivered by the City Council and indicative pricing has been provided for in the Financial Case, a robust procurement strategy cannot be defined until the decision from Government is made on the delivery and operating model.

As stated above, a package of additional measures is being proposed as an enhancement to the CAZ D which will aid the City Council in achieving compliance with the emission limits set out by the EU. The additional measures being proposed consist of network alterations and the installation of car park charging infrastructure, both of which are types of schemes which the City Council has experience of delivery, thus increasing viability of the additional measures being proposed. The additional measures will be implemented using frameworks which are currently available to the City Council, utilising the NEC3 Contract options to manage the works. The package of additional measures being proposed are further defined throughout this business case however they are summarised below:

- Network changes:
- Ban northbound traffic on the Suffolk Street Queensway (A38) which exits onto Paradise Circus then accesses Sandpits Parade;
- Ban southbound traffic from paradise Circus accessing the A38;
- Close Lister Street and Great Lister Street at the junction with Dartmouth Middle Way;
- Car park charging – all currently free parking which is located within the CAZ which is controlled by the City Council will be converted into spaces which have a charge applied.

The procurement approach set out in this case accounts for the fact that the CAZ D plus additional measures will be implemented on the City Council's highway network; a number of the infrastructure assets which are being introduced will form part of the existing maintenance agreements in place under the

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Highway Maintenance and Management PFI (HMMPFI) contract. For details of the interface, please see Management Case section 5.12.

4.2 Procurement Strategy**4.2.1 Works and/or Services to be procured**

The main construction works and supporting detailed design and any additional measures are to be procured through the approach detailed below. The work type and outline scope are as detailed in Table 4.1;

Table 4.1 Work Type and Outline Scope

Type	Scope (outline of works to be procured)
Design (Consultancy support)	CAZ detailed design Project definition scoping
Civils (Contractors)	Signing Foundations Poles Sign posts and/or gantries, Highway accommodation works Main roads (strategic) signs and Local road (distributor) signs. Additional Measures packages that may be required e.g. minor highway alterations, parking enforcement marking / signing and supporting on street equipment.
Technology (Suppliers / Contractors)	ANPR Camera (including communications). Considerations also made regarding the back office requirements for data storage, monitoring and charging combined with any new software requirements

4.2.2 Procurement Routes to Market

It was initially thought that a centralised procurement activity would be undertaken for all cities requiring the implementation of a CAZ. However, the decision has now been made to run separate procurement activities per local authority. This decision was made due to the uniqueness of each cities requirements in relation to one another, whilst there are similarities in terms of the required infrastructure the scale and complexity of the schemes varies largely.

The City Council have identified a benefit to procuring the civil engineering contractors and technology suppliers via existing Framework Agreements. The rationale behind the decision to engage under existing Frameworks is based upon the relationships formed with the existing contractors and the ability for the tender to avoid the Official Journal of the European Union (OJEU), meaning it will not be subject to the potentially prolonged procurement times associated with this process. It also enables BCC to go to market with proven contractors whom, particularly with the civils works, have experience of undertaking works on BCC's road network whilst interfacing with the PFI contractor. The PFI contractor is responsible for the maintenance of some of the infrastructure which is located on the Birmingham highway, infrastructure which may need to be modified in order to enable the CAZ construction activities, therefore managing that interface is crucial to ensuring timely access is granted.

Table 4.2 shows the existing framework Procurement Routes identified by BCC and their associated Contract Lengths:

Table 4.2 Existing Available Frameworks

Type	Description	Framework Procurement Route	Framework Start Date	Framework End Date ** ^{note}
Design	All design and implementation	BCC's Multi-Disciplinary Transportation Professional Services Framework (WMTPS)	October 2015	September 2019 (to be extended to facilitate the CAZ procurement delivery)
Civil; Infrastructure works	All civil works	Birmingham City Council Highways and Infrastructure Works Framework	October 2014	October 2018 (to be extended to facilitate the CAZ procurement)
Technology; ANPR cameras and supporting systems	All works relating to the ANPR Camera and supporting systems (including Communications)	Crown Commercial Services (CCS) Traffic Management Technology 2 Framework;	October 2016	October 2020

** Note - All potential existing frameworks are viable in terms of framework start and end dates.

The availability of existing framework Procurement Routes is imperative to the efficient mobilisation of procurement activities and a key factor of deliverability for the project. Alternative traditional Procurement Routes do support viability but will impede on the ability to comply with the project programme, thus having effect on deliverability within timescales.

4.2.3 Contractor Delivery Model

Based on the intended utilisation of existing procurement frameworks as the route to market, it has been identified that engaging with independent specialist contractors for the civil (i.e. civil engineering, sign installation etc.) and technology works will allow the detailed design element of the scope to be developed by the specialist contractor(s) concurrently with the procurement of the main civils contractor, reducing the risks to programme and incompatibility with the existing BCC provisions. This recognises the specialist nature of the technology design and the proposal to use suppliers currently appointed by the City Council for the operation and maintenance of similar existing systems.

Upon approval of detailed design works, the specialist contractor(s) will become a Nominated Subcontractor within the Main Contract (Civil works package), where the Main Contractor will manage the construction-phase works with risk associated to delivery passed directly to themselves.

This model supports the viability factors of Time, Cost and Quality by enabling efficient on-boarding of contractors including improved contract development timescales, reduced cost risks through project-wide collaboration and creation of a project environment that stimulates innovation, improving quality of works and delivery.

4.2.4 Procurement Delivery Models

To deliver the CAZ, BCC have identified that a procurement delivery model involving a combination of Early Contractor Involvement (ECI) and Design & Build (D&B) methodologies will provide the optimum balance of Time, Cost and Quality.

The D&B approach is one which is well recognised and known to mitigate schedule pressures by consolidating the tendering process into a single tender, as opposed to splitting the work into separate contract awards. It also enables contracts to be placed with low scope definition maturity.

In addition to the Design and Build approach the adoption of ECI is considered critical in this circumstance. The ECI stage will enable detailed designs to be developed by the specialist technology contractor(s) prior to Main Contractor appointment, thus, due to the interdependency of some Civils and Technology works, optimising lead-times for civils works designs by the Main Contractor. This approach also provides an environment for collaboration among stakeholders, increasing opportunity for innovation throughout design and construction. Having earlier contractor input into design solutions, delivery and sequencing of works etc. will also help to reduce risk within the scheme and therefore further supports deliverability of the project.

4.2.5 Tendering Model Options

The most suitable and likely tendering routes available to BCC are adoption of a direct award for Technology works and an optimised two stage tendering process for Civils works. Elaboration on the benefits and considerations made are detailed below:

Tendering Model - Civils

- A two stage tendering route will enable a focus during the Pre-Qualification stage on contractor quality and capability requirements in order to effectively filter down to a preferred contractor who has demonstrated the relevant experience and methodology to give assurance that the delivery complexities and programme challenges can be met. As well as the qualitative and

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capability related criteria, this stage will also involve a commercial element, such as the contractor being asked to tender on preliminaries, overheads and profit costs.

- The implementation of this Pre-Qualification stage will provide scope for obtaining Time, Cost and Quality assurance from the contractors prior to Contract Award, whilst also ensuring an efficiency is realised in the Tender Evaluation process through the reduced number of Tender Proposals and the improved pre-emptive understanding of the proposal by BCC, enabled due to the collaborative development.

Tendering Model - Technology

- In support of the deliverability of the project it is proposed to utilise the Crown Commercial Services (CCS) Traffic Management Technology 2 Framework as procurement route to market. This will provide the ability to make a Direct Award to Siemens and Imperial for the ANPR system and appropriate interfaces to the existing Penalty Charge Notice system used within BCC. It is considered this approach will de-risk the implementation and commissioning of the ANPR system which is a critical element of the effective delivery and enforcement of the CAZ, thus further supporting viability and deliverability of the overall scheme of works.

4.3 Phasing of the Construction works

The actual phasing of the construction works will be critical in achieving end key milestones for CAZ operation. The dates below highlight the current timescales around the delivery of the project:

- Engagement with Lot 4 Contractors for Expressions of Interest on the design and build Contract – June 2018;
- Pre-Qualification (to reduce tenders down to 2/3/4) – September 2018;
- Pre-Qualification Evaluation – October 2018;
- Tender Period D&B and ECI Contract – October/November 2018;
- FBC to DEFRA Approval – December 2018;
- BCC FBC Approval – December 2018 / January 2019;
- Evaluation – December 2018;
- Appoint Design and Build Contractor(s) including ECI – January 2019;
- Stage 1 – ECI to support Detailed Design and undertake Construction Planning January 2019 to April 2019;
- Stage 1- ECI contractor(s) to develop and to agree a Final Target cost - January 2019 to April 2019;
- Stage 1 – If D&B/ECI Contractor(s) Final Target Price with approved budget in January FBC proceeds to stage 2 and appoint for Main Works Contract;
- Construction Lead in – April 2019;
- Stage 2 – Main Works Contract - Construction Period – May 2019 to December 2019 (Camera Installation May 2019 to September 2019);
- CAZ Enforceable – January 2020;
- Post Implementation Review Mid 2020.

4.4 Preferred Types of Contract

The intention is to use existing frameworks, relevant to the specific areas of scope to deliver the CAZ. This approach limits the need for a full OJEU procurement, supporting the need to deliver the CAZ as quickly as practically possible, whilst allowing work to be commissioned through both competitive and direct award routes already known by BCC.

4.4.1 CAZ Design and Development

Several contracts have been placed by the City Council to deliver the feasibility study, including the programme management, outline design and various elements of traffic and air quality monitoring. These contracts have all been placed using existing City Council frameworks, namely the Highways and Infrastructure Professional Services Framework and the CCS Professional Services Framework. Where further support in the form of professional services is required (not yet confirmed) the City Council will appoint an appropriately qualified consultant via one of the above mentioned frameworks. Utilising one of the established frameworks for the appointment of professional services is deemed to be the most viable option as a contract(s) will be entered into with consultants who are a known entity to the City Council and have experience of working with their processes and procedures.

4.4.2 CAZ Implementation (Civils) Works

For Civils related works BCC will use the NEC3 Engineering and Construction (ECC) contract for the works delivery, as this is the basis of the Highways and Infrastructure Framework call-off contracts and is the predominant form of contract used for construction works in the UK. The Framework allows the use of various options however BCC will adopt the following:

Option C – Target Cost contract with Activity Schedule**4.4.3 Benefits to Option C include:**

- Enables the tender documentation to be issued earlier and therefore meet planned tender issue programme dates;
- Can prevent contractor from overpricing risk;
- Ability to manage changes to the scope of the works and any potential future changes through change controls;
- Offers more flexibility in accommodating on-going design development;
- Seen as accommodating post contract change better;
- BCC pays actual defined cost plus contractor's fee and has re-assurance on the cost of the activity rather than the price;
- The use of a sensible percentage share model between the Contractor and BCC should provide the right incentive for both parties to look to deliver works under target to the best possible cost.

During the lifetime of the contract, the Main Contractor will update their price (i.e. Target Cost) based on the latest available designs. It must be noted that whilst the preferred option presented by this business case has undergone extensive optioneering and deliverability reviews, the final scheme is still subject to approval and therefore the scope of work will not be confirmed until FBC submission.

A Cost Plan is being developed to accurately price the scheme based on the design information given to date. The exercise will serve as a tool which can be used as a reasonable benchmark and negotiating tool in helping to agree on a final Target Cost provided by the Contractor. As the Target Cost should be a genuine pre-estimate of the most likely outturn cost for the Project as defined in the Contract documentation, it will be built up in the same way and contain all the same items as a Contractor will include in a traditional tender. It must be noted that at FBC submission stage a robust project cost will be fully defined.

The Target Cost will include the expected cost of everything for which the Contractor is responsible including risk. The target cost will comprise of the following;

- Direct costs: These are the estimated most likely costs for undertaking the physical construction works;
- Indirect costs: These are the specific project costs necessary to support the direct cost element of the project delivery. These will be defined in a separate document. Nevertheless, typical examples will include site facilities, project insurances and so on.

Once BCC is satisfied with the Target Price position, contract documentation can be finalised and contractor(s) allowed to start construction.

4.4.4 CAZ Implementation (Technology) Works

To support the procurement of the intended Technology works it is proposed to use the Crown Commercial Services (CCS) Traffic Management Technology 2 Framework.

4.4.5 Benefits of this approach include:

- Established procurement route;
- Not subject to OJEU timescales for advertising opportunity to tender;
- Ability to access proven suppliers / contractors to deliver compatible systems to de-risk integration / timescales for implementation;
- Compatible with procurement for the main contractor;
- Ability to manage changes to the scope of the works and any potential future changes through change controls.

Obvious financial risks to BCC associated with a target cost contract have been identified, should the target be incorrect or the share percentage not be capped. It is therefore most important that a robust, yet challenging target is set, prior to contract award.

To maintain continuity with the procurement preference it has been decided that the technology elements will be nominated under one contractor who will be centrally managed by the main civils contractor. This has been identified as the most appropriate way to manage the risks to delivery and establishes the one contractor to manage the coordination of works across the BCC network and its interaction with the (HMMPFI), as outlined in section 4.1.

4.5 Service Streams and Required Outputs

The required services and outputs are summarised in Table 4.3: -

Table 4.3 Service Streams and Outputs

Service / Objective	Provider	Scope	Output	Key Stakeholder(s)	Flexible for change in scope	Flexible for future changes
Civils Works / deliver the civil engineering works and manage the technology works as Main Contractor to support the CAZ implementation	Existing contractors from BCC frameworks	Detailed Design as Design / Build contractor, coordination of the technology contractor.	Detailed Design / Coordination with all parties (BCC / PFI contractor / technology contractor / public) and build of works.	BCC	✓	✓
Technology Works / deliver the ANPR and PCN hardware and software to support the CAZ implementation	Proposed that Siemens and Imperial are engaged as existing contractors.	Provision and installation of ANPR and PCN hardware and software. Coordination with the main contractor and existing BCC information and communication technology (ICT) provider(s)	Detailed Design and implementation of the solution and integration with existing / DEFRA systems.	BCC / DEFRA	✓	✓
Design and Project Management Support / the effective delivery of an outline design for the appointment of contractors. Support to the project management / technical assurance and delivery / commissioning of systems / works.	Engaged through existing BCC framework (WMTPS) as required.	Support as required to provide project management / technical specialists in support of delivery	Project Management and Controls / Technical Reports / Specifications to support the design and delivery of the scheme justification / delivery.	BCC / JAQU / DEFRA	✓	✓

4.6 Risk Allocation and Transfer

The procurement, tendering and contracting approach has been developed to reflect the principle of risk being owned by the party best placed to mitigate or manage that risk, including the consequence should a risk event arise.

BCC have maintained a live Risk Register throughout the feasibility stage which will transition into delivery and be amended to incorporate delivery risks as they emerge. As the Risk Register is developed the cost implications of the risks being realized will be incorporated, enabling the development of a robust and justifiable contingency allocation.

After the Tender stage and once the Main Contractor is appointed an initial risk workshop will be undertaken. During this workshop the risks will be allocated to the party who will manage that risk through the design phase. In the Risk Register the risk owner will be named and the mitigation measures to be undertaken recorded. The contractor will have submitted a price for managing elements of this risk such as undertaking trial holes and advanced preparation and agreement of traffic management proposals as part of the ECI element, supporting viability by enabling transfer of risk from BCC to the contractor.

Through the ECI phase a clear and robust delivery schedule will be developed which will identify interdependencies between activities and the different contract parties. All elements of risk associated with the design will pass to the contractor to manage and either remove or mitigate through the design process. The outcomes will be reviewed in line with the BCC integrated schedule to evaluate and understand cross-schedule interdependencies.

During the design stage regular reviews of the Risk Register will be undertaken to track progress and ensure that the correct party is still identified to manage the risk. Through the life of the design stage the size of the contingency allocation should be reduced, with a final risk workshop held at the completion of the ECI and design stage prior to construction commencing.

Figure 4.1 Procurement risk register

Clean Air Zone							Civils Design and Build Risk							
Level	Probability/Likelihood	%	Cost Impact (£k)	Prog Impact (wks)	Impact Level			Contract Value	£5,000,000					
									RAG Status		Risk Owner			
1	Improbable	10%	< 5	< 1.00	VL						BCC			
2	Remote	25%	10	2	L	KEY								
3	Occasional	50%	40	3	M	Red	Risk missed its target and needs immediate attention		DB - Design and Build Contractor					
4	Probable	75%	75	4	H	Amber	Risk may not be completed within timescales							
5	Frequent	90%	> 150	> 5	VH	Green	Risk on target for completion within timescales							
Risk ID	Risk Description	Prob	Cost Impact	Prog Impact	Highest Impact Score	RAG Status	Owner	Comp Date	Progress/Mitigation	Further Actions	Likelihood	Cost Impact (£k)	Time Impact (wks)	Cost Prob (£k) (wks)
Approvals and Procedures														
A1	Target Cost Over Budget	5	5	4	25	Red	BCC/DB		Develop Target Price through D&B stage		90%	150	4.0	135 3.6
A2	Delay in Agreeing Fees	3	2	1	6	Amber	BCC				50%	10	1.0	5 0.5
A3	Starting in advance without agreeing fees - leading to problems in design	5	1	1	5	Green	BCC				90%	5	1.0	4.5 0.9
A4	Non-approval/late approvals by City Council	5	5	5	25	Red	BCC				90%	150	5.0	135 4.5
A5	Delay in Safety Audit	5	2	3	15	Amber	DB				90%	10	3.0	9 2.7
A6	Procurement Strategy Approval - civils	2	2	3	6	Amber	BCC		Procurement strategy submitted to BCC Procurement for approval		25%	10	3.0	2.5 0.75
A7	Procurement Strategy Approval - Camera's	5	2	5	25	Red	BCC		Procurement strategy submitted to BCC Procurement for approval		90%	10	5.0	9 4.5
Change/Uncertainty of Design/Scope														
U1	Design changes leading of prolongation of design - by Client	5	4	2	20	Red	BCC				90%	75	2.0	67.5 1.8
U2	Council changes arising from change in political control	3	3	3	9	Amber	BCC				50%	40	3.0	20 1.5
U3	Uncertainty in Specification	2	4	5	10	Amber	BCC				25%	75	5.0	18.75 1.25
U4	Increase in scope (by client)	3	4	5	15	Amber	BCC				50%	75	5.0	37.5 2.5
U5	Quantities uncertainty	3	3	1	9	Amber	DB				50%	40	1.0	20 0.5
U6	Changes due to Public Consultation	5	5	5	25	Red	BCC				90%	150	5.0	135 4.5
U7	Lack of Availability of Resources	3	1	4	12	Amber	BCC				50%	5	4.0	2.5 2
U8	Management of Back Office	3	1	4	12	Amber	BCC				50%	5	4.0	2.5 2

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At the completion of the design and ECI stage any risk that has not been designed out by the contractor may be reallocated back to BCC to manage. As the project progresses through pre-contract stages, the contingency allocation should have been significantly refined down from the initial risk register produced. BCC can then include this contingency allocation in the final approvals for the scheme and ensure sufficient funds are available to cover the remaining risks.

Warranties for the design element of the works package will be included in the Contract Documents and therefore the design risk will remain with the Design and Build Contractor. As noted above an element of risk will be managed through the NEC Contract using the NEC Option C – Target Price. This mechanism allows the financial performance of the contractor to be rewarded for any underspend or the Employers financial risk exposure to be limited if any overspend occurs.

Prior to commencement of the construction stage, negotiations will take place with the contractor to discuss the possibility of transferring some of the remaining risk(s) to the contractor to own and to manage. The cost of this will then be included in the contractor's target price and be removed from BCC's contingency allocation. This will give BCC further cost certainty on the overall scope of works.

In relation to delivery and Programme risks, BCC will apportion and potentially transfer risk(s) to those best placed to own these due to their involvement in undertaking elements of the works. This will help to ensure that the proposed ownership of risk provides value for money to the council.

Payment Mechanisms

Due to the programme drivers and challenges that will be encountered in co-ordination and delivery of work between both civil related and technology related construction works (based on procuring these separately), then consideration of some form of incentivisation model will be considered. There are a number of incentive models that may be adopted as follows;

- Contractor Share Percentage – Allows the financial performance of the contractor to be rewarded for any underspend or the Employers financial risk exposure to be limited if any overspend occurs;
- Milestone Incentives - Contractor(s) can be incentivised against meeting key dates of a particular contract or programme;
- KPI Incentives - Contractor(s) can be incentivised on meeting performance level set against key performance indicators for the project or programme.

Through collaborative discussions on the most appropriate Payment Mechanisms to all project stakeholders, a win-win scenario can be created ensuring positive negotiations take place, further supporting the deliverability of the CAZ D plus additional measures.

4.7 Payment Terms

Payment terms are determined in the existing frameworks operated by BCC in accordance with the provisions provided within.

4.8 Social Value

Compliance with the Birmingham Business Charter for Social Responsibility (BBC4SR) is a mandatory requirement that will form part of the conditions of this contract. The contractors undertaking this project work under the Council's Highways and Infrastructure Framework Agreement are certified signatories to the BBC4SR and will provide additional actions proportionate to the value of each contract awarded. The actions will be monitored and managed during the contract period.

4.9 Accounting treatment

The capital expenditure for the works will initially be capitalised and will then be depreciated. The assumption for this depreciation is that this will be done over a 10-year period on a straight line basis e.g. 10% per year; the detailed approach to this is covered in the financial case. Accounting treatment is further defined in Section 3.8 of the Financial Case.

4.10 Summary of Commercial Case

The current intention is to deliver the CAZ using existing Framework Agreements already procured and/or accessible by BCC.

The proposed model would use existing Frameworks to appoint separate contractors for the civils works (through the Council's Highways and Infrastructure Works Framework) and for the technology (ANPR, through the CCS TMTF2 Framework) components of the CAZ.

This avoids OJEU and associated extended procurement timescales and enables BCC to procure Contractors (certainly civils) who are known to BCC and who have past knowledge and experience of working on BCC's road networks.

It is proposed to use the NEC Option C target cost contracting option for the civil works and an incentivised model to help drive cost and programme certainty through collaboration and interaction between the civils and technology contractor.

The intended approach is considered the most appropriate way to manage the risks associated with time, cost and quality in delivering the CAZ 'D' plus additional measures, thus demonstrating the viability of the project. The inclusion of industry-recognised best practice methodologies such as Early Contractor Involvement and Framework utilisation also demonstrates the ability of BCC to deliver the project congruent to scope requirements, specifically value for money to the public purse.

As stated earlier in this case, there are some areas of the scope of work which are still subject to confirmation from Government before a robust commercial case and assessment of procurement routes can be undertaken, areas which are to be confirmed:

- The back office charging system – discussions are underway between the City Council and JAQU as to whether the system will be implemented and managed at a local or national level;
- The ANPR Cameras – finalisation of the ANPR camera specification is awaited from JAQU before the procurement activities required can commence;
- The additional measures – whilst the additional measures will be delivered using existing frameworks and standard contract options the full details of the schemes are still being developed;
- The mitigation measures – a deliverable plan is detailed in the CAF Report and summarised in section 5.10, however the commercial requirements and subsequent implications are not yet known.

5 Management Case

5.1 Introduction

This case sets out the reassessed management methodology, governance processes and delivery plan for the Birmingham Clean Air Zone. The Clean Air Zone programme sits within the wider Birmingham clear air programme (Brum Breathes). The measures will be implemented using existing frameworks and will be subject to established processes for the management of highways works.

It should be noted that the final implementation and operational arrangements for the CAZ back office charging system are dependent on the outcome of the work JAQU is carrying out on central elements of a charging system available to all local authorities operating a CAZ. Birmingham is actively engaged with JAQU on these arrangements and the position set out at this point may be revised as a result. The City Council have representation on the Charging Infrastructure Board which provides a forum for discussion and decision making around the back office charging system. The POBC is drafted on the basis that BCC operates an autonomous charging system.

This Management Case serves to outline methodology the City Council will apply to manage various aspects of the programme including; development, implementation and operational phases. This section lays out proposed timelines, governance processes, programme structure, change control, risk management, stakeholder management, reporting and monitoring, contract management, operational management and benefits realisation.

In addition to the programme/project management methodology set out in this Management Case, the programme will follow principles of 'Managing Successful Programmes' (MSP) and PRINCE2 methodologies, in line with the standard City Council practise. This will ensure a consistent approach across the programme and enable adherence to the recognised programme/project lifecycle, which the City Council have a working knowledge and experience of. Furthermore, the CAZ Programme actively engages with and adheres to the JAQU governance process (see Figure 5.5).

A suite of mitigation measures are being proposed by the City Council (see CAF Report), to address concerns raised during the public consultation by key stakeholders. Whilst in general terms the standard governance processes will be followed (see Figure 5.4), individual delivery plans are being developed for each mitigation measure which may require bespoke governance arrangements, as the measures do not align with the infrastructure projects 'normally' delivered by the City Council.

5.2 Programme and Project Management, Structure and Methodology

5.2.1 Brum Breathes Programme Structure

In response to the mandated need to address air quality issues in Birmingham, the City Council has initiated a programme of work which will implement air quality improvements in and around the City Centre. This programme is known as 'Brum Breathes'; the overarching aim is to influence those travelling into, through and around the City Centre to use alternative modes of transport; ultimately achieving the vision of reduced traffic and increased pedestrianised areas, thus improving the city's air quality. The Brum Breathes Programme has been divided into five sub-programmes to aid efficient delivery; each sub-programme is briefly described below.

5.2.1.1 Early Measures

A series of early measures were identified to be implemented as 'quick wins', enabling the city to close the gap between compliance with the EU Directive for Clean Air in the shortest possible time. These measures have been divided into five projects:

- Network Signing Strategy and VMS – To improve the efficiency of the city's signing network, incorporating Variable Message Signs (VMS) in order to streamline traffic flows into and around the city centre, reducing congestion and improving air quality.
- Bus Priority Measures – The implementation of four new bus priority lanes, at pre-defined locations around the city centre in order to improve public transport and ease congestion.

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- Traffic Signalling – To implement software improvements to intersections in the city centre which will improve efficiency of signal changeovers therefore reducing waiting time, easing congestion and improving air quality.
- Technology Air Quality Monitoring - In order to improve the city's air quality data set, air quality monitors will be installed by this project at 3 strategic locations around the city centre.
- Customer Experience Monitoring- this project is a promotional scheme for which Transport for West Midlands (TfWM) are responsible. The scheme will promote use of buses as more 'air quality' friendly mode of transport.

5.2.1.2 Clean Air Zone

See 5.2.2.

5.2.1.3 Air Quality Policy

There will be a review and further development of planning policies/guidance to ensure that development proposals consider air quality and are accompanied by an appropriate scheme of mitigation measures where negative impacts are identified. Furthermore, there will be an additional review of transport policies/guidance to ensure alignment with Air Quality Strategy and CAZ requirements.

5.2.1.4 Environmental Developing Infrastructure

Throughout the CAZ programme there will be initiatives to create infrastructure for low/zero emission fuels. In addition to this, there will be further development and implementation of proposals to improve the existing BCC fleet through a structured vehicle replacement strategy and fleet retrofit programme. Through this, it is also planned to introduce 22 hydrogen buses into the fleet operating within Birmingham.

5.2.1.5 Behaviour Change

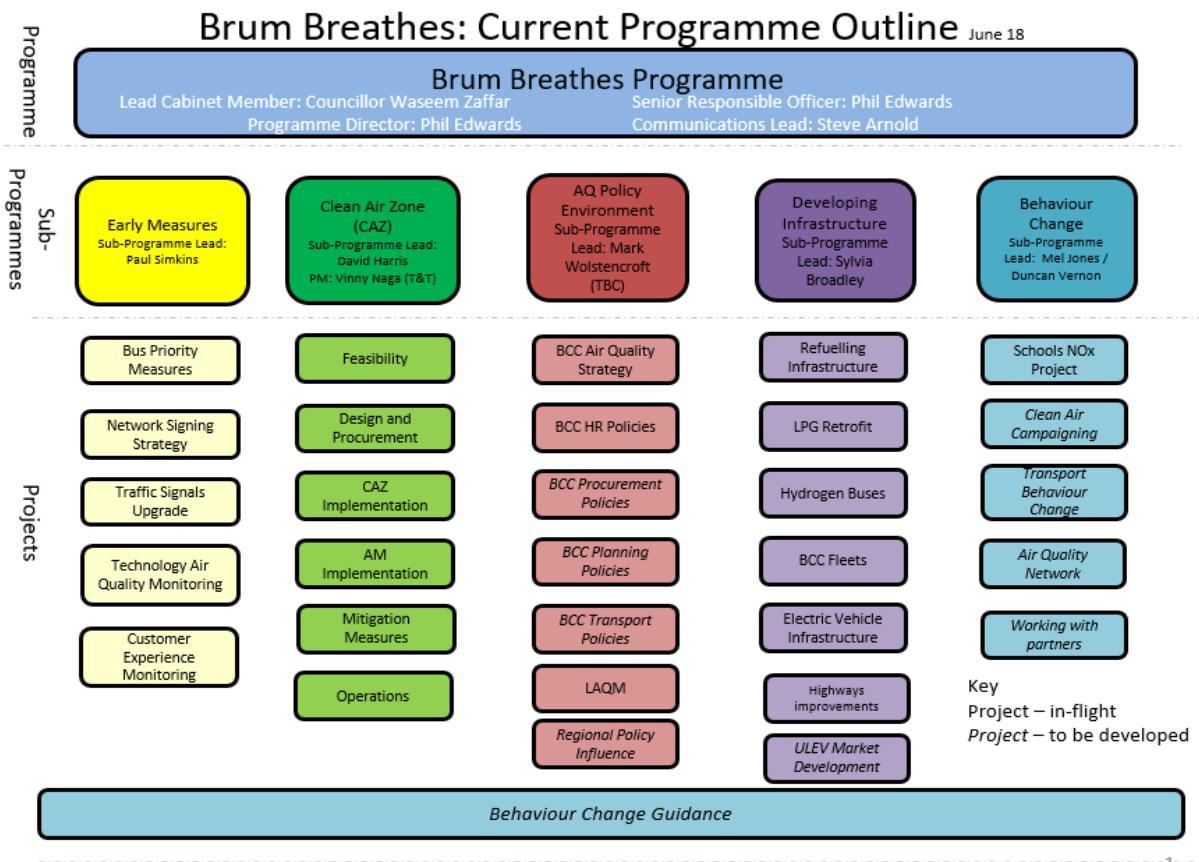
The plan is to develop and agree an approach that embeds behavioural change into all areas of activity within the CAZ programme. This is championed through engagement with partner organisations to explore ways of working together to promote awareness of air quality issues and develop solutions.

Figure 5.1 shows the Brum Breathes Programme structure.

Birmingham City Council

Clean Air Zone

Figure 5.1 Brum Breathes Programme Structure



5.2.2 Clean Air Zone Programme Structure

The CAZ Programme has been divided into six work streams, each of which have a series of work packages sitting under them (see Figure 5.2). The programme has been divided to enable a structured and manageable delivery which generally follows the project lifecycle set out in PRINCE2, as below.

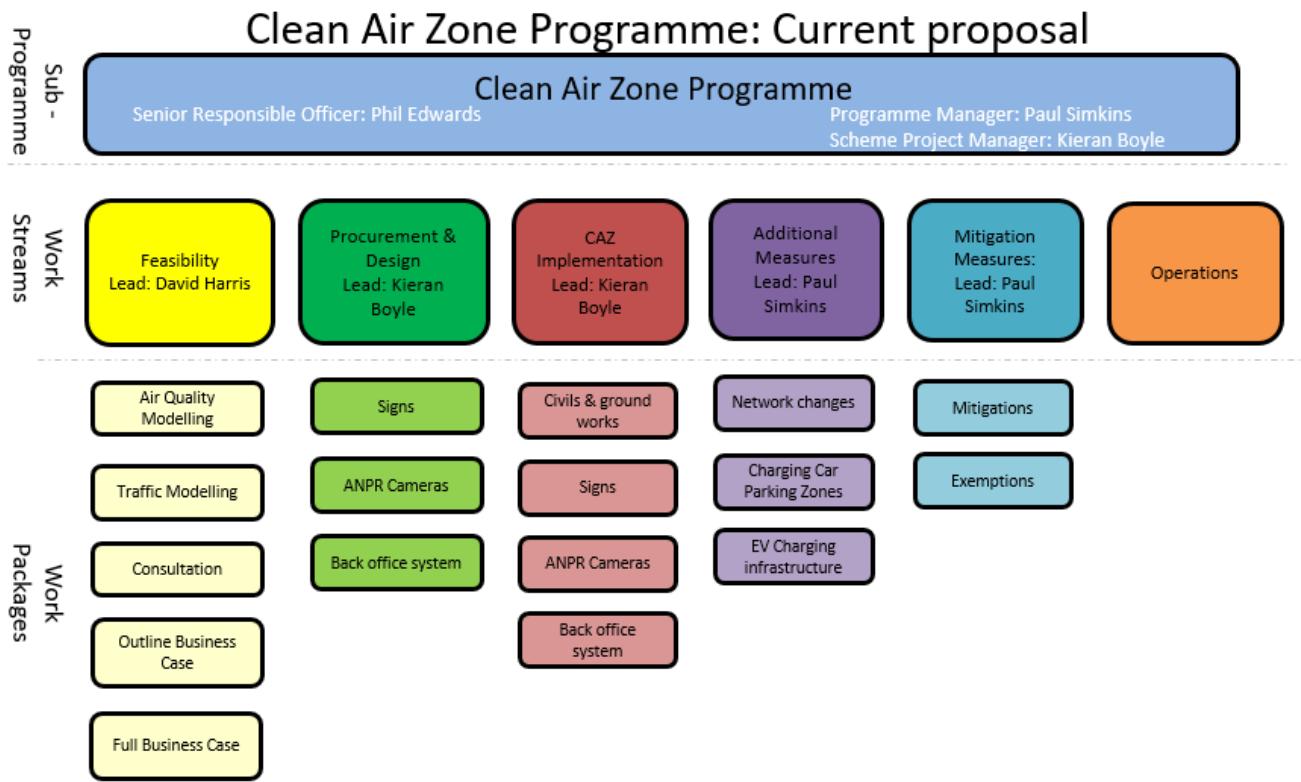
Table 5.1 PRINCE2 alignment

Lifecycle phase	CAZ work stream
Initiation Stage	Feasibility
Delivery Stage	Procurement and Design CAZ Implementation Additional Measures Mitigation Measures
Final Delivery Stage	Operations

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Clean Air Zone

Figure 5.2 CAZ Programme Structure



The following narrative provides a brief description of each work stream:

- Feasibility – this work stream is focused on the production and coordination of a robust set of business cases (POBC and FBC) and involves the coordination of the various inputs into each iteration of the business case(s). Inputs include extensive air quality and traffic modelling which is being undertaken by specialist consultants in order to model the anticipated impact of implementing the scheme. Additionally, financial and economic modelling is being undertaken, including a detailed distributional analysis.
- Procurement and Design – this work stream is focused on the delivery of the outline design of the CAZ boundary and indicative locations for the boundary signs and Automatic Number Plate Recognition (ANPR) cameras. Subsequently to the conclusion of the outline design, the detailed design will be commissioned which will develop on the designs provided during outline design phase, firming up the finer details. Also managed under this work stream is the procurement of the necessary hardware; signs, poles, ANPR cameras, etc. The development of a design for the back office charging system will also be delivered under this work stream.
- CAZ Implementation – this work stream will manage the physical implementation of the schemes which are designed in the 'Procurement and Design' phase, including site works, testing and commissioning.
- Additional Measures Implementation – this work stream will deliver the additional measures which are being proposed as necessary to achieve compliance with the EU Directive for Clean Air; changes to the transport network and the conversion of currently free parking zones into charging car parking zones. This work stream will manage the full project lifecycle of the additional measures, i.e. the outline and detailed designs, implementation and testing/monitoring.

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Clean Air Zone

- Mitigation Measures Implementation – similarly to the above this work stream will manage the full project lifecycle of the mitigation measures. However, as stated above the governance and management methodology is still being finalised and full details will be provided in the FBC. The mitigation measures will be funded from the Clean Air Fund (CAF) which is a separate funding pot to the one which is dedicated to the delivery of the CAZ D plus the additional measures. The CAF Report provides a detailed explanation of the proposed mitigation measures and exceptions, including an estimate of the funding requirements and a delivery plan for each. The delivery plan is summarised in section 5.10.
- Operations – Upon completion of the three implementation work streams, the programme will transition into the operational phase. The assumption taken in this POBC is that the City Council will be responsible for the operation of the system, however discussion are ongoing with JAQU to finalise/agree the operating model.

The table below provides details of the responsible person/organisation for the management and or delivery of each of the work packages under each work stream.

Table 5.2 CAZ Programme management/delivery matrix

Work stream	Work Package	Management	Delivery
Feasibility	Air quality modelling	Turner & Townsend	Air Quality Consultants Jacobs
	Traffic modelling		Steer Group
	Consultation		BCC Turner & Townsend Pell Frischman
	Business Case		Turner & Townsend Jacobs
Design	Signs	BCC with support from Turner & Townsend	Jacobs (outline design) Detail Design TBC See (note 2)
	ANPR		Jacobs (outline design) Detail Design
	Back Office (IT Infrastructure)	TBC (See note 1)	TBC (See note 1)
Implementation	Signs	BCC with support from Turner & Townsend and Jacobs	TBC (See Note 2)
	ANPR	BCC with support from Turner & Townsend and Jacobs	TBC
	Back office (IT infrastructure)	TBC (See note 1)	TBC (See note 1)
	Civils/ground works	BCC with support from Turner & Townsend and Jacobs	TBC (See Note 2)
Additional Measures	Network Changes	BCC	TBC
	Car Park Charging	BCC	TBC
	EV Charging infrastructure	BCC	BCC (see Note 3)

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Note 1: This POBC is based on the assumption that the back office charging system will be supplied by the City Council and managed at a local level. Government are proposing to implement a centrally managed system which all local authorities implementing a CAZ will connect into. The City Council have discussed the possibility of a locally managed system with Government and are preparing a proposal for doing so, this proposal will be developed and the way forward agreed with Government prior to FBC submission.

Note 2: A procurement activity is currently underway to obtain a supplier for undertaking detailed design and construction of the CAZ signing scheme; contract award is currently targeted for December 2018.

Note 3: The procurement of the ANPR cameras will be undertaken using one of the City Council's existing frameworks, it is currently anticipated that a single camera supplier will be selected. The camera supplier will be provided as the Nominated Supplier in the design and build contract for the civils work (see note 2). Procurement is currently targeted for December 2018, however a finalised camera specification is awaited from JAQU to finalise the procurement route.

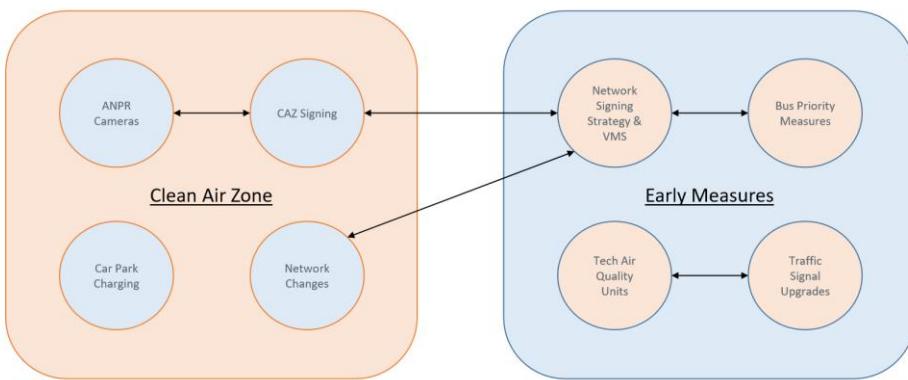
Note 4: This scheme of work is being delivered by the City Council under a separate programme of work, however due to the fact that the implementation of the scheme is one of the enablers to achieving compliance with the EU Directive for Clean Air it has been shown under the CAZ Programme for information only.

5.3 Programme/Project Interdependencies

Whilst each sub-programme under the Brum Breathes programme is being managed independently, certain interdependencies exist between the CAZ and Early Measures programmes; illustrated below in Figure 5.3. The interdependencies shown in Figure 5.3 highlight the considerations which must be taken when developing the designs and subsequently implementing each of the work packages.

For example, the CAZ Signing and Network Signing Strategies must be developed in consideration for one another. Both schemes will be installing/modifying signs on Birmingham's transport network and therefore the risk of 'clashes' between the two is reasonably high.

Figure 5.3 Project/Programme Interdependencies



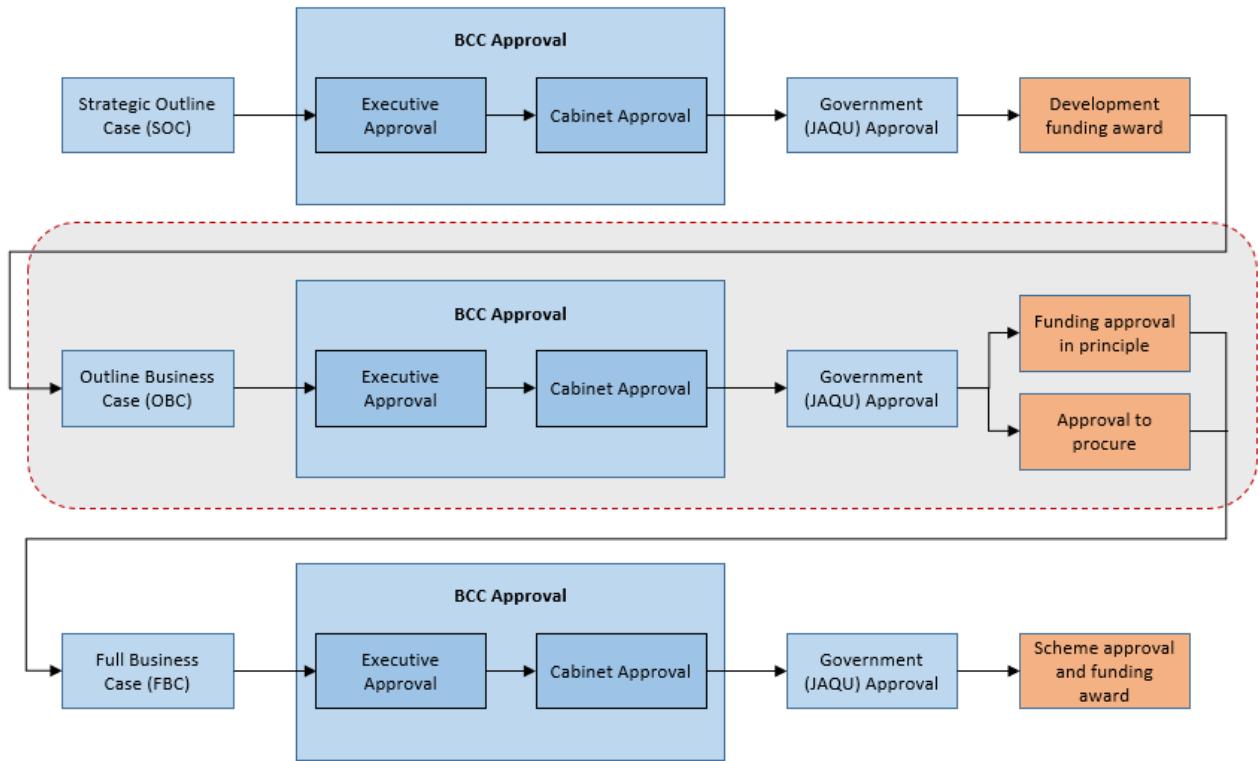
5.4 CAZ Governance

As stated above, the CAZ Programme has been divided into a number of work streams and subsequently sub-divided into work packages, each work stream is subject to governance as per standard Government and City Council processes. As this programme of work is being funded by Government the mechanisms for receiving the required funds are triggered via the governance process as illustrated in Figure 5.3. The current stage of work is highlighted; POBC submission.

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Figure 5.4 Government governance process for business case approval



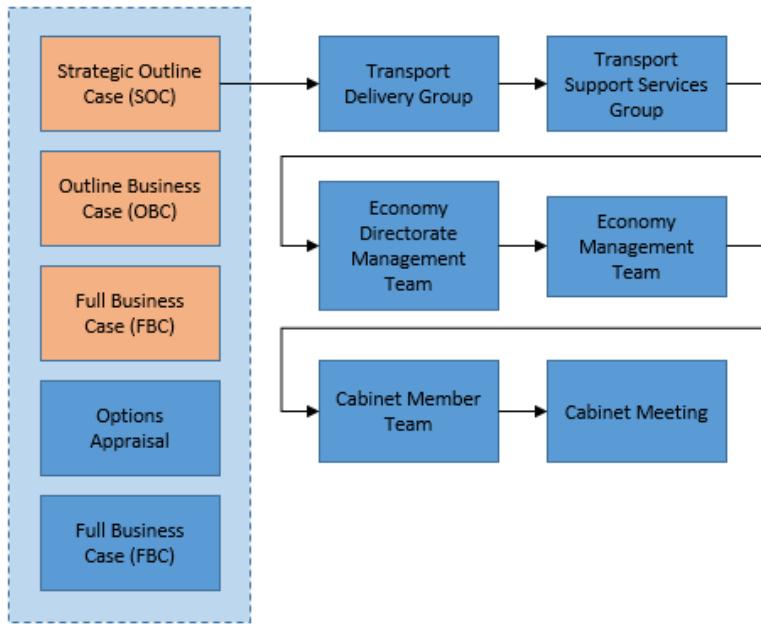
As per Figure 5.4, each development of the business case (SOC, POBC and FBC) is a more developed version of the last. The POBC approval is intended to provide approval in principle for the grant funding under the Implementation Fund and the Clean Air fund allowing the authority to move to procurement. Final approval of funding is generally made based on the FBC following procurement; prior to submission to Government each business case undergoes review and approval by the City Council via the governance process which is illustrated in Figure 5.5.

In addition to gaining approval to proceed with the scheme from Government and being awarded with the required funding to implement the scheme, City Council approvals also need to be gained in order to proceed with the submission of business case(s), accept the funding grants, procure services and proceed with the design and implementation of the works. Figure 5.5 shows the governance steps, submissions and approvals required.

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Clean Air Zone

Figure 5.5 BCC Governance process



As per Figure 5.5 each of the documents which are shown on the left hand side of the diagram are subject to the City Councils governance process and are submitted to the process individually to gain the appropriate approvals. Each document is accompanied by two cabinet reports, one which is shared in the public domain and one which contains commercially sensitive information is retained by the City Council as private. The Options Appraisal and FBC which are shown in 'blue' in Figure 5.5 are the internal City Council approval documents which allow the City Council to accept the funding grant(s) given by government and proceed with the procurement of services to deliver the programme.

Table 5.3 below shows the responsible person(s) for approving each stage of City Council governance as per Figure 5.5.

Table 5.3 Responsible party for approval of City Council governance

Approval gate	Role	Name
Transport Delivery Group	BCC Head of Infrastructure Delivery	Peter Parker
Transport Support Services Group	Assistant Director of Transport and Connectivity	SRO (Philip Edwards)
Economy Directorate Management Team	Chief Finance Officer	Simon Ansell
	Chief Legal Officer	Tarndip Sidhu
	Chief Procurement Officer	Charlie Short
Economy Management Team	Corporate Director of Economy	Waheed Nazir
Cabinet Member Team	Transport and Environment	Cllr Waseem Zaffar
	Finance and Resources	Cllr Brett O'Reilly
Cabinet Meeting	Birmingham City Council Cabinet	

Schedule Management

5.4.1 Key Milestones and Stage gate

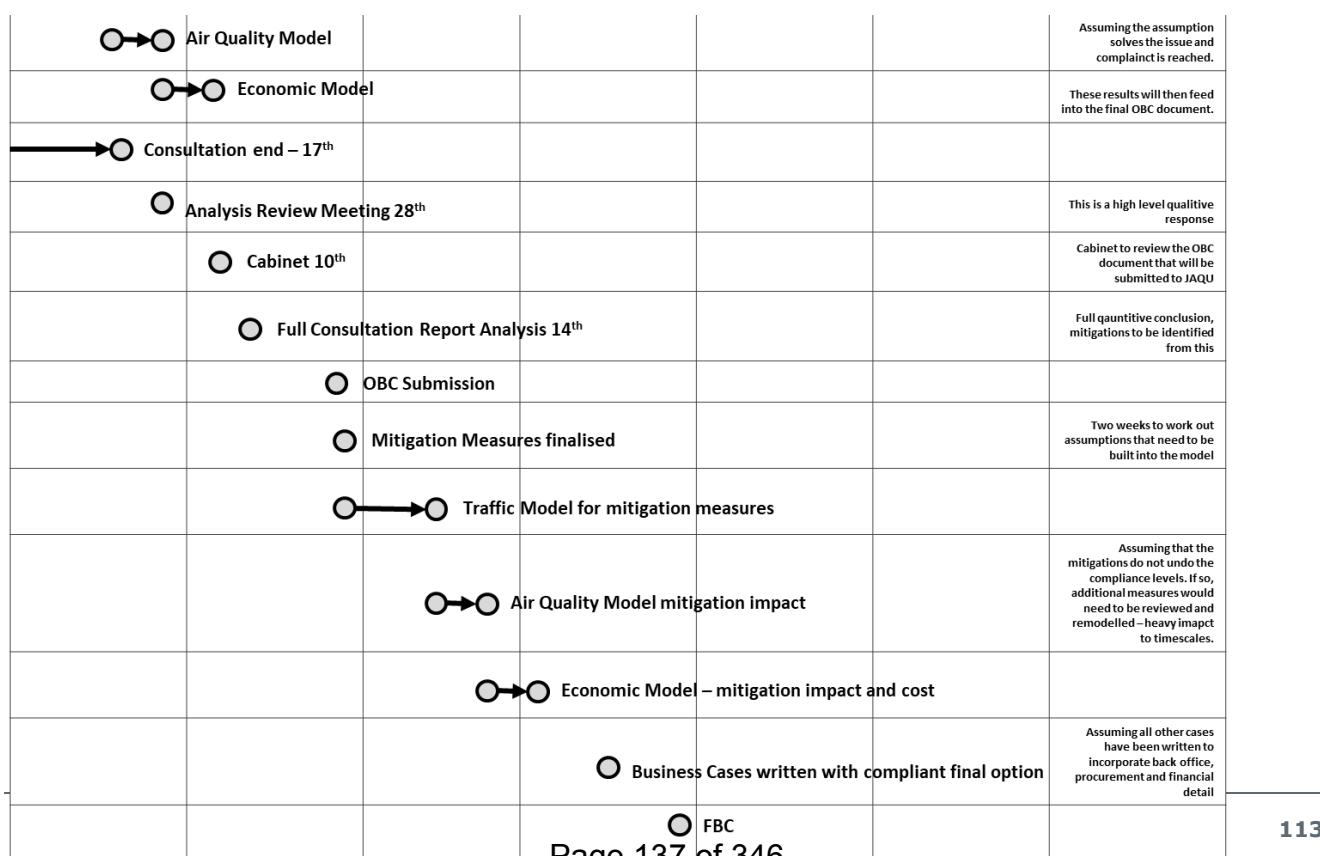
This Management case focuses on ensuring the right governance, resources and plans are in place to implement the new arrangements in line with the timeline. Following the progression of the programme past POBC stage, a critical path will be developed and monitored on a weekly basis to assess programme progress across all work packages. It will also provide opportunities for schedule acceleration. The overall high level programme plan overview is shown in Appendix 4A. The Stage gate dates are summarised Table 5.4.

Table 5.4 Stage gates

Stage gate Activity	Current Forecast Date
1 – Strategic Outline Case	March 2017
2 – Preferred Option Business Case	15 September 2018
3 – Full Business Case	December 2018
4 - Implementation	December 2019
5 – Benefits Realisation	January 2021

At this current submission the critical stages between Preferred Option Business Case and Full Business Case are shown below in Figure 5.6

Figure 5.6 OBC to FBC, high level milestones



Currently there are assumptions placed on each of the timescales, these can be seen highlighted in the risk / assumption column above in Figure 5.6. With the final scope of works being subject to ongoing refinement and to the detailed design work the delivery programme is of high risk which has therefore provided very little float. Birmingham City Council recognises the volume of work that is to be undertaken in such a short period of time which in doing places the schedule at risk from a variety of issues, including finalising the back office charging arrangements which are subject to external factors including the JAQU central charging system work. Programme certainty will increase as work is progressed following the submission of the POBC.

The programme for implementation can be found in Appendix 4B, the delivery stage of the programme is dependent on FBC submission and the release of funds from Government. There will be continuous engagement with Government in order to realise the date of which funding will be released. Any variation from the proposed December 2018 date will be captured in the updated programme impacting on the critical path, this will be evidenced at FBC stage.

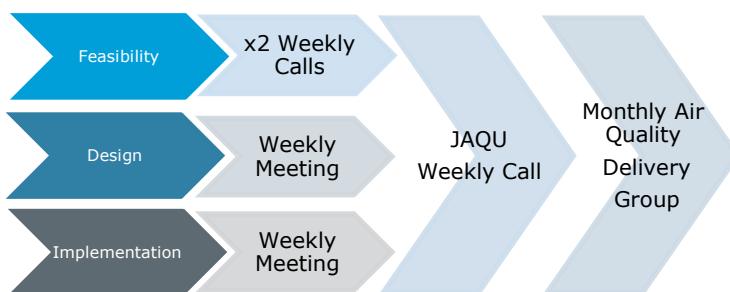
5.4.2 Reporting Arrangements

To monitor programme progress; risk, issues and opportunities; each work stage within CAZ has individual weekly project meetings with the relevant specialists and officers from the City Council involved. These can be seen in the diagram below. The updates from each are then collated and shared at the Air Quality Delivery Group monthly and to JAQU weekly, as shown in Figure 5.7.

As mentioned above, a monthly briefing note and presentation to Air Quality Delivery Group is provided. At this meeting the overall Air Quality programme is discussed and then each work packages within the programme is presented by the Project Governance team from each retrospective project. In respect to the CAZ, the update information collated from the CAZ programme work stage such as Feasibility, Design and Procurement and Implementation are shared with the wider Air Quality programme leads.

The Delivery Group then provides updates to the Executive Group meetings on a bi monthly basis. During the delivery phase, the Procurement and Implementation teams will provide an increased level of reporting. Regular reports will be required as part of any contracts which are let to the supply chain, detail from which will be included in the updates and reports given by the Procurement and Implementation teams.

Figure 5.7 Reporting Procedure for CAZ



5.5 Change Management

All projects require a fully integrated change control process to be put in place which includes: identifying and capturing potential change; assessing the impact of potential change and identifying mitigations; managing the potential change through the approval process; and assuring that the change is properly implemented across the project as shown below in Table 5.5.

By implementing a robust change control procedure, the following benefits are realised:

- Any movements to the agreed baseline are properly understood, controlled, recorded and reported
- The review and approval of changes are carried out by the correct people
- The process allows a single, consistent and auditable mechanism for managing project baselines

Upon finalisation and approval of the Preferred Option Business Case, the project will have a baseline from which change can be measured, this baseline will also detail risks and considerations for the elements of scope uncertainty which remain, i.e. the back office charging system.

5.5.1 Change Management Matrix

A Change Management Matrix has been created to manage and delegate responsibility for any contractual changes. It should be noted that changes made to specific projects may impact on other overlapping projects with the change managed accordingly. The matrix forms basis to delegate responsibility to implement contractual changes based on cost [and/or schedule deviations].

Table 5.5 Change management matrix

Role	<£25k	£25k - £100k	£100k - £200k	£200k - £1m	>£1m
Programme Manager	✓				
Head of Infrastructure Delivery		✓			
Assistant Director of Transportation and Connectivity			✓		
Corporate Director of Economy				✓	
Cabinet Member					✓

5.6 Risk & Contingency Management

Risks have been identified and scored within the detailed risk register appended to this document in Appendix 4C. Risks will continue to be reviewed and assessed as part of the risk workshops and by the Project Manager with the outputs being distributed across the CAZ programme teams. Key risks are regularly reported to the Air Quality Delivery Group. The below table displays the highest priority risks.

Figure 5.8 Risk Register

RAID LOG - Birmingham City Council																	
ID.	Date Raised	Risk influencer	Risk Description	Consequence	Effect	Owner	Likelihood (1-4)	Impact (1-4)	Risk Score	Mitigation Action	Mitigation owner	Residual likelihood	Residual impact	Residual Mitigation Score	Date Updated	Comments	Status
R-004	01/08/17	Programme	There is a risk that compliance may not be achieved by the 2020 deadline.	The council may receive sanctions including fines for failing to meet compliance in time. Residents and businesses in Birmingham still impacted by poor air quality.	Reputational damage to Birmingham City Council for non compliance	BCC	4	4	16	Robust modelling which identifies interventions which make a big impact. See if there is potential to expand those initiatives to achieve compliance by 2020. Look at when compliance will be reached, needs to be shortest possible time.	BCC	3	4	12	14/08/18	Consequences are dependent upon Government decisions - yet to be communicated.	Open
R-005	01/08/17	Funding	There is a risk that JAQU's funding approvals process is prolonged for final delivery of preferred option	Potential for project slippage and failure to meet compliance within the respective timescales. Govt not recognising that there are significant local impacts from not having the funding in place	Additional measures are not delivered in time	BCC	4	4	16	Demonstrating to JAQU the impacts of a prolonged approval process for funding. Revised timeline that reduces the legal limits (e.g. consultation).	BCC	3	4	12	14/08/18	There are now 45 cities under the recent court ruling, potentially resulting in less available funding to fulfil the obligations	Open
R-009	01/08/17	Implementation	Insufficient Grid Capacity in Birmingham for EV charging	Lack of uptake to purchase electric vehicles due to infrastructure limitations. The consequence would be that it will take longer to meet the Air Quality Requirements.	Slow transition to cleaner vehicles	BCC	3	4	12	Undertake a study to establish best locations with grid capacity to install EV charging points. Out to procurement with an EV partner, for commercial, taxi and public	BCC	2	3	6	23/02/18	Additional power, how will we charge electric cars. Work underway with opportunities through renewable energy	Open
R-010	01/08/17	Modelling	The current city traffic model (Saturn) does not account for road networks outside of the city centre.	Delays to the overall programme and implementation of CAZ initiatives. Further funding not available to improve areas outside of City Centre. Raise issues around validity on the evidence	Incorrect assessment of impacts due to limitations of existing baseline data. Remodelling = further delays	BCC	3	4	12	Model contingency plans for traffic data and their impact on Air Quality and devise whether additional measures are required to meet Air Quality compliance. Updates to the model are underway to encompass the wider footprint	BCC	2	2	4	23/02/18	Make sure that the work is underway currently	Open
R-011	01/08/17	Consultation	CAZ has an impact on Highways England network resulting in H.E objecting to CAZ	The consequence would be that lack of engagement could potentially mean retrospective changes, increasing the cost to the council. Adverse comments at the consultations phase	Delay to Implementation	BCC	2	3	6	Ensure a robust communication and engagement strategy to enable the most useful and most recent information to be available to inform BCC.	BCC	2	2	4	22/08/17	M6 - knock on consequences	Open
R-012	01/08/17	Programme	Insufficient Public Transport Capacity to support modal shift. (programme risk)	Increased difficulty in encouraging people to change modes of transport	It will take longer to meet the Air Quality requirements.	BCC	2	3	6	Already working with TfWM for certain corridors, and specifically uplifting mode share, eg extra buses	BCC	2	2	4	22/08/17	National policy, can anything drive transport issues In terms of compliance the number of patronage level	Open
R-013	01/08/17	Consultation	Lack of response to public consultation, particularly from the most affected residents.	The project may take longer to deliver compliance and change driver behaviours to improve air quality. Proceed with an option that the public doesn't support	Political back lash	BCC	1	2	2	Thorough engagement and consistent communications regarding the key benefits in terms of local health. Potential to undertake focus groups	BCC	1	2	2	14/08/18	Consultation strategy needs to be set out, implement mechanisms which will most likely garner a response	Open
R-014	01/08/17	Modelling	There is a risk our assumptions from the transport and AQ modelling are incorrect.	Inaccurate modelling results may cause delay to the programme. The consequence would be additional cost for interventions as a result of poorer air quality than predicted. The consequence would be a legal challenge from the Government resulting in cost and delay.	Programme delays in going back to reevaluate the modelling	Adrian Phillips	2	3	6	Independent verification undertaken on all results and these will be matched with what JAQU has provided as indicative areas of poor air quality.	Adrian Phillips	1	3	3	23/02/18	BCC air quality modelling assumptions have been approved by JAQU	Close
R-015	01/08/17	Political	Political members may be unsupportive of CAZ.	Unsupportive members may cause the decision making and schedule to be delayed significantly	Programme delays - Cost overruns	BCC	2	3	6	Proactive communications and engagement with influential political stakeholders and demonstrate impact to cost and schedule from lack of decision making.	BCC	1	2	2			Open

To support management of risks at FBC the programme team will undertake a qualitative scheduling risk analysis (QSRA), to establish confidence levels on delivery of the programme as well as provide insight into tasks which carry the lowest confidence of being completed on time. This process will encapsulate risk impacts on the schedule and provide proactive means of monitoring progress and issues which may arise. At this stage standard appropriate levels of Optimism Bias have been applied rather than a QRSA assessment as detailed in the Economic Case. This includes 44% Optimism Bias on all non-IT items and 200% for all IT related items (NB back office charging system), as per the HMG Green Book Guidance. By including this optimism bias in the funding estimate, the City Council are effectively building in suitable contingency to mitigate risk of the funding request being insufficient to undertake works; resulting in a short fall.

The QRSA work, the detailed design process and post POBC procurement exercises will be used to refine the cost contingencies included in the financial case at FBC reducing the Optimism Bias and providing more specific cost contingencies.

5.7 Stakeholder Management

A Stakeholder Engagement Plan and subsequent Public Consultation were both developed in-line with the BCC Air Quality Engagement and Consultation Strategy. This strategy document sets out the proposed approach to a long term programme of engagement and consultation to support the development of an air quality policy statement alongside a range of specific measures including the Clean Air Zone.

The Stakeholder Engagement Plan included in Appendix 4D details the project stakeholders and the approach to consultation with each group was developed in advance of the consultation events. The consultation stakeholder map comprises a detailed breakdown of all stakeholders, for confidentiality reasons only a sample of the key stakeholders have been extracted from the full map and shown below in Table 5.6.

The engagement with external stakeholders during consultation has been carefully considered to ensure a meaningful consultation. The process for this involved working with the expert teams at the City Council who have previous experience in working with the individual groups interested and affected by the CAZ, including businesses, individuals and media.

The consultation could potentially have a significant impact on the assumptions used throughout the Strategic and Economic Cases and therefore upon completion of analysis of consultation, amendments to the main air quality model will need to be incorporated and reanalysed before submission of FBC.

Table 5.6 Key Stakeholders

Stakeholder sector	Stakeholder example (not comprehensive)
Individuals	Younger people
	Disabled people
	Pregnant women
	People from BME communities
	City centre residents
	City centre workers
	Residents along major roads
	People frequently driving to the city centre in diesel cars
	People driving significant distances in Birmingham within job
Business & Economy	Business Improvement Districts (especially city centre)
	Chamber of Commerce

Stakeholder sector	Stakeholder example (not comprehensive)
	Federation of Small Businesses
	Greater Birmingham and Solihull LEP
	Individual businesses
Education & Skills	Universities
	Colleges
	Schools
Environment & Sustainability	Environmental Groups
Health & Wellbeing	Public Health England/Lap
	Clinical Commissioning Groups
	Hospitals, GP surgeries, etc.
Housing & Communities	Housing Associations
	Tenants' and residents' groups
Media, Communication & Marketing	Local Press/Media
	BBC WM
	West Midlands Growth Company
Science & Technology	Universities
	Science Parks
Transport	Transport for West Midlands
	Highways England
	Public Transport operators
Political	Birmingham Councillors
	Birmingham MPs/MEPs
	WM Mayor
	WMCA
	Other WM elected members/LAs

A thorough and comprehensive public consultation is being undertaken. The consultation is specific to the CAZ and does not request feedback on the implementation of other Brum Breathes programmes. A clear and thorough narrative was produced which informed all presentations, materials and discussions during the consultation activities. This consultation will receive responses via BCC and the BeHeard website which is a Birmingham City council website where all consultations are accessible as well as paper questionnaires, emails and a number of public drop-in sessions and business seminars.

This consultation comprises a single six-week consultation with early engagement of local businesses and taxis already being partially undertaken as part of the Freight & Logistics work package. It was not deemed possible to undertake a standard two-phase consultation given the timescales set to deliver the FBC. Legal advice received by BCC determined that compliance with the FBC date took precedence over an enhanced public consultation.

Consultants have been appointed to undertake detailed analysis of the consultation feedback. This analysis will inform the following:

- future scenario design assumptions,
- design to take into account specific issues raised,
- implementation proposals and methods for the CAZ structures and systems,
- recommended amendments to the Air Quality Policy Statement
- whether further consultation is required,

Stakeholder engagement will continue beyond consultation, in line with the Stakeholder Engagement Plan. The engagement plan will be developed further in detail for FBC.

5.8 Use of Specialist Advisors

In order to deliver a preferred option for achieving compliance with the EU Directive, specialist advisors, consultants and contractors have been procured to ensure that the relevant expertise is utilised and the options appraisal/business case is as robust as is possible. The specialist advisors and consultants have been procured to advise on matters such as air quality and traffic modelling, impact assessments, economic and financial modelling and programme management. All specialist advisors are required to report to the City Council Programme Manager, either directly or indirectly (if procured indirectly) via their designated point of contact.

- **Programme Management & Governance** – Turner & Townsend is conducting programme and project management services. Their knowledge of Birmingham and depth of experience on complex programmes such as the delivery of the West Midlands Combined Authority (WMCA), Midland Metro Alliance (MMA) will be critical in delivering the programme.
- **Traffic and Air Quality Modelling** – SDG have a wealth of experience in transport economics and modelling. They are providing expertise in producing the transport modelling elements which will be fed into the Airviro models to provide emissions data on road links. Jacobs have a number of experienced individuals that have worked with Airviro models and clients such as Travel for Greater Manchester and Leeds City Council, providing key support in producing and delivering their air quality requirements.
- **Additional Measures** - WSP have individuals involved with Leeds that are ahead of the other four cities identified in the initial plan for implementing a CAZ. They are providing support for the Airviro modelling and additional measure works which is being led by an individual that has worked on similar initiatives in local authorities previously.
- **Integrated Impact Assessment** – Jacobs are leading work on defining the cost and benefits analysis for each option, as well as impact assessments for health, equality and economy. The outputs of their findings will feed into the full business case. The team they have put forward has experience in delivering IIA's for business cases across transport and other sectors.
- **Freight & Logistics** – Jacobs are leading this work to determine what businesses can do to assist with reducing poor air quality in and around the CAZ. This work involves communication with businesses to establish impacts to them as well as providing them with guidance to prepare for a CAZ in Birmingham.
- **Consultation** – Turner & Townsend are conducting project management services for the consultation, aligning with their management of the overall CAZ programme. Jacobs are providing technical expertise given their wider design involvement. Pell Frischmann are organising the consultation events as well as undertaking data capture and management. Detailed consultation feedback data analysis will be undertaken once consultation is complete.
- **Procurement & Implementation** – Jacobs have produced the procurement strategy based on their specialist knowledge and ongoing design involvement. The Infrastructure Development team are to appoint specialists as required in line with the procurement strategy.

- **Economic and Financial modelling** – Jacobs have been procured to develop the economic and financial models which input into the POBC and FBC utilising their expertise in these fields.
- Contract Management (Implementation)
- Purchasing of future equipment, services and suppliers necessary in order to implement the CAZ will be the responsibility of the Infrastructure Delivery team, who will liaise with the Procurement and Commercial teams on a regular basis to procure and manage these suppliers. Where possible, existing Framework arrangements will be used to engage the supply chain. Where specialist resource is required and is not available via an existing framework; Procurement and Commercial teams will be engaged for support. The Procurement Strategy is detailed in section 4.2.

Where new design work is required, the council shall use the NEC 3 Professional Services WMTPS Framework. This will enable the use of option A and E for the delivery of the design work. In addition to this, all Civils work shall be delivered using option C of the NEC 3 Engineering and Construction (ECC) contract. To fulfil NEC requirements, the council shall appoint a NEC Project Manager to manage the contract with the intention of achieving the council's project objectives. The NEC Project Manager should then report to the ECC Supervisor and work collaboratively to make assessments of the works completed to date and quotations for Compensation Events etc., ensuring all works are delivered in accordance with the contract. The NEC project manager should then take responsibility for the management of the following BCC documents:

- QF164 – Early Warning Notice
- QF166 – Project Manager Instruction
- QF169 – Compensation Event Notice
- QF179 – NEX Form Register

The ECC supervisor will be provided by a consultant from the appropriate lot and appointed under a Professional Services Contract commission.

5.9 Delivery of the Mitigation Measures and Exemptions

As briefly outlined above, a series of mitigation measures and exemptions are being proposed in response to findings of the consultation. The proposed measures were selected by following an established long list/short list process; creating a long list measures which could mitigate the negative impact of the introduction of a CAZ D, each measure on the long list was then assessed against a Primary Critical Success Factor (CSF) which can be found in section 1.5.2, resulting in a short list of those measures which met the Primary CSF. The short list was then assessed against several Secondary CSF's to determine the best options in terms of value for money, distributional analysis, strategic fit with other policies, affordability and achievability.

For details of the exemptions please refer to section 2.6.2, details of the outline delivery plan are provided in the CAF Report however the final delivery plan will be finalised for the FBC submission.

The mitigation and exemption measures that are being proposed have been designed to minimise the negative impacts identified by the distributional impact analysis. As such, there is expected to be significant overlap between the groups targeted by the exemptions and those eligible for exemptions. Details of how exemptions are integrated into the implementation of the mitigation measure are covered in detail in the delivery plan of each measure (CAF Report), however the general approach is summarised below:

- Receiving support through one of the mitigation measures proposed in no way affects an individual's/organisation's eligibility for an exemption and vice versa.
- The implementation of the mitigation measures will be extended to early 2021, this allows individuals/organisations to continue to use their vehicle during the exemption period and is organised so that beginning of the mitigation measure coincides with the end of the exemption.
- Those that are eligible for mitigation measures but are not eligible for exemptions can receive the mitigation packages/funding to coincide with the implementation date of the CAZ.

It should be noted that it is not anticipated that the implementation of any of the mitigation measures or exemptions will have a negative impact on the year of forecast compliance.

The mitigation measures which are being proposed following the long list/short list process are detailed in the Table 5.7.

Table 5.7 Mitigation measure summary

Ref	Measure	Summary
M1a	Mobility Package for low income individuals	Individual receives £1000 mobility credit offered in form of SWIFT travel card
M1b	Scrapage scheme for low income individuals	With evidence of scrapping a non-compliant car individual receives either: £2,000 cash payment toward the purchase of a compliant car. £2,000 mobility credit. Credit to be supplied on a SWIFT card with no expiration for use.
M2	Hackney carriage support package	Drivers offered £5,000 as: support payments to be paid towards operational expenses of ULEV vehicles (4 annual instalments of £1,250) support for an LPG retrofit of their current or newly purchased vehicle
M3	Council hackney carriage leasing scheme	BCC bulk purchase 50 ULEV taxis through public procurement tender and lease them to the drivers who are most vulnerable as well as on a try-before-you-buy basis
M4	'Free miles' for ULEV LGVs	ULEV van drivers receive £750 credit to spend on BCC public charging network
M5	HGV & Coach compliance fund	Fleets compete for £15,000 funding package to contribute towards: Installing a retrofit solution Upfront or lease costs of a compliant vehicle
M6	Marketing and educational campaign	Educational and marketing campaign to provide information on the CAZ and reach out to groups eligible for support through mitigation measures
M7	Residents parking scheme	TBC

The CAF Report provides details of the delivery plan for each mitigation measure; summarised below:

- M1a - Mobility Package for low income individuals:
 - Step 1: Using the national definition of low income (60% below the national median) and working in collaboration with the City Council's benefits team, who have experience of providing financial

assistance to those on a low income, the City Council will contact all affected people to inform them of the scheme and provide details of how to register. Communication will be carried out via targeted marketing campaigns and direct contact being made in some cases. The validation of those who register will be undertaken following the established process used by the BCC benefits team who currently provide support for 120,000 people classed as low income.

- Step 2: The mobility credit will be supplied via SWIFT, a scheme which operated in the West Midlands providing travel cards which can be used on a number of different travel modes and with any public transport operator in the West Midlands area.
- M1b - Scrappage scheme for low income individuals
 - Step 1: Validation of eligibility will be as per the Mobility package (see above) however a further step will be added to confirm proof of vehicle scrappage. This validation will follow an established process and is not thought to present any logistical challenges at this stage.
 - Step 2: The vehicle owner can then apply for credit to be added to a SWIFT account in which case the process would be as per the detail given for the Mobility Package (see above). Alternatively the owner could apply for the monies to be put towards the purchase of a compliant vehicle, in which case proof of purchase would need to be provided to the City Council for them to reimburse £2,000 of the purchase cost.
- M2 – Hackney carriage support package/M3 – Council hackney carriage leasing scheme: delivery plan to vary depending on whether the driver is requesting funds for a retrofit technology or for offsetting the costs of a ULEV vehicle:
 - Retrofit technology: registration for the scheme will be up to the responsibility of the driver, who will submit their details and book a slot for the retrofit to be carried out; £5,000 will then be deducted from the total cost.
 - Operational finance package for ULEV vehicles: any driver who purchases a ULEV Hackney carriage post September 2018, will be eligible for reimbursement. Proof of purchase must then be provided to the City Council who will validate with the manufacturer and upon successful validation will make four consecutive annual payments of £1,250 to the driver.
- M4 – 'Free miles' for ULEV LGV's
 - Any 'plug in' van will be eligible for the scheme, once the vehicle is purchased the driver must submit their details and proof of purchase to the City Council. They will then be provided with a reference code to register with the EV network provider who will issue the credit amount to their account, credit which can be used anywhere on Birmingham's EV network
- M5: HGV and coach compliance:
 - Stage 1: A targeted marketing and communications scheme will be undertaken to ensure that all fleets are aware of the funding which is on offer and the requirement on them to register themselves.
 - Stage 2: As only a limited amount of funding is available, the funding will be granted following a competition which will be run by the BCC procurement team who have experience in writing and designing funding assessments.
 - Stage 3: the funding will be awarded with an expiration date of January 2021 and the retrofit technology or the purchase/lease of a compliant vehicle be allowed to be implemented at any point in this time frame.
- M6 – Marketing and educational campaign:
 - Funding has already been secured for this scheme and suppliers identified to undertake the marketing campaign which is planned to launch in October 2018 and will continue until December 2019. The intention is for the City Council to provide updates and information in relation to the implementation of the CAZ and/or the mitigation measures.
- M7 – Residents parking scheme
 - Details TBC

5.10 Operations

Upon completion of the implementation phases the programme will transition into the operational phase, where enforcement of the CAZ D plus additional measures will become live. This POBC is based on the assumption that the 'back office system' which will provide the processing and administration of the charges and PCN's will be managed locally by the City Council. It should be noted that at this stage, this operating model is one of three options and discussions are ongoing between the City Council and JAQU to determine the most appropriate model. See below for details of the options:

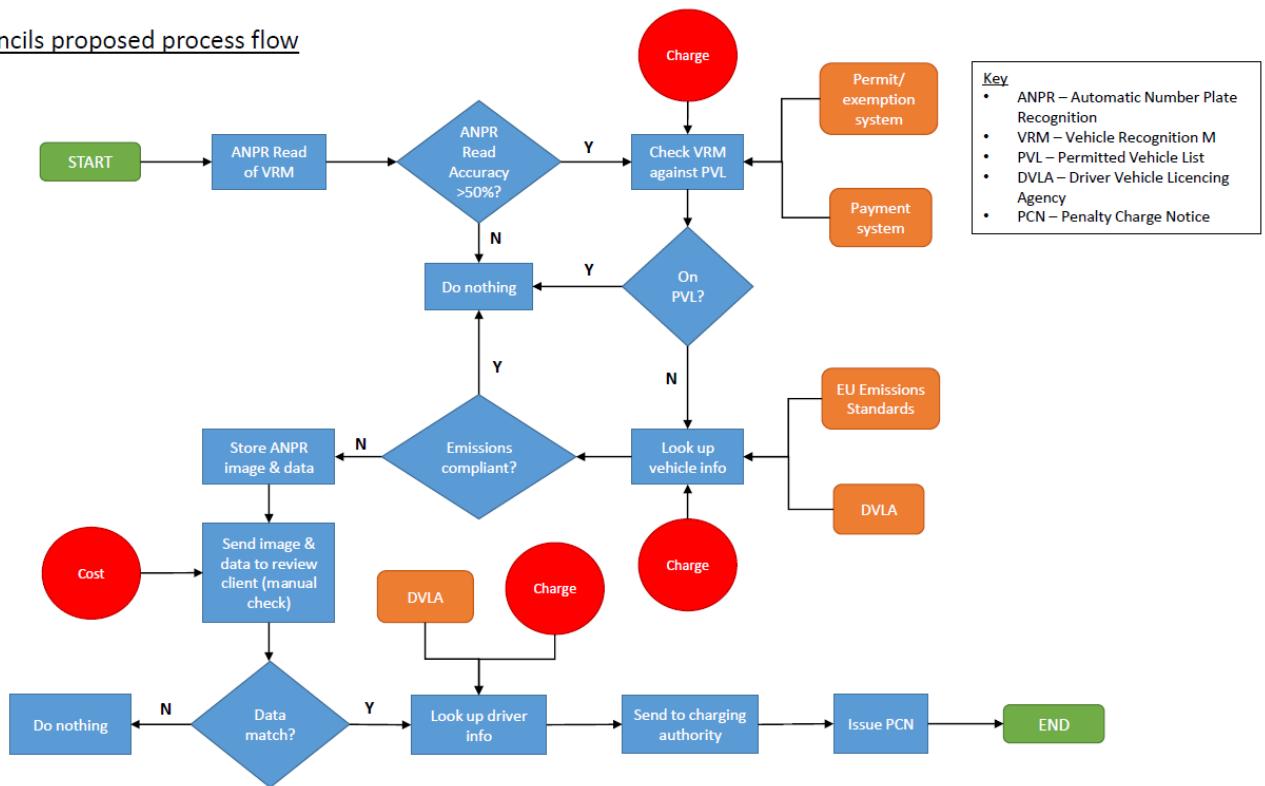
- Birmingham implements a back office system which is locally located and managed in its entirety by the City Council (or their supply chain), this is the preferred option of the City Council and is the one being proposed in this POBC;
- Birmingham implements a back office system which will act as the central system for all other local authorities who are implementing a charging CAZ;
- Central Government implement a back office system which is located in London and acts as the central charging system for all local authorities, including Birmingham.

As above, the decision as to which option is agreed as the way forward is still outstanding, regular conversations take place between the City Council and Government with a decision expected to be made in good time for the FBC submission.

The reasoning behind Option 1 being the preferred option, is that the City Council have a back office charging system currently in operation for their bus lane enforcement (BLE) which is very similar in its requirements to that of the CAZ system. Discussions with the suppliers of the BLE system indicate that relatively simple modifications could be made to expand the system and incorporate the requirements of CAZ. Figure 5.9 provides an indication of the system architecture/process flow which the City Council propose to implement. From the figure below, it is shown that a number of interfaces are required to external databases, such as the DVLA and the Euro Emissions. It is currently proposed that the City Council would use their supply chain partner Service Birmingham to operate and administer the back office charging system, as is the case with the BLE system.

Figure 5.9 City Council Charging System Proposal

City Councils proposed process flow



5.11 Maintenance

A number of assets will be delivered by the CAZ Programme, as such, maintenance of these assets will be required both on a preventative and corrective basis. At this stage the delivery of maintenance is still being finalised however the below detail summarises what are currently the preferred options for each asset type:

- Signs: The City Council have an existing Private Finance Initiative (PFI) with their supplier Amey, for the maintenance of certain highways assets, this includes signs as a standard item. As such, the City Council propose to vary the PFI to increase the number of signs covered to include those being delivered by the CAZ, the maintenance regime which is currently in place would therefore apply to the CAZ signs.
- ANPR Cameras: Unlike signs, ANPR Cameras are not covered under the Amey PFI, as such the City Council plan to set up a service and maintenance contract with the supplier of the ANPR Cameras, the currently preferred supplier is Siemens. An indicative yearly maintenance cost has been provided by Siemens which is included in the Financial Case of this POBC;
- Camera poles: At present there are two options for mounting the ANPR cameras; (1) the cameras will be mounted on existing lighting columns or (2) new poles will be erected for the camera mounting. The maintenance will be dependent upon the option chosen;
- Option 1 – the existing lighting columns are not included in the PFI, however an electrical contractor is under contract to provide service and maintenance, the contract would be varied to include any additional hardware which is required for the CAZ ANPR cameras;
- Option 2 – new camera poles would not be classed as a standard item under the Amey PFI, and therefore a separate SLA would be set up with an appropriately qualified electrical contractor for the service and maintenance of the new poles;
- Back office system: The maintenance of the back office system would be undertaken by the supplier(s) of the hardware and software. If Birmingham is to proceed with the implementation of a local system, this is likely to be supplied by Siemens (ANPR cameras and system interfaces) and Imperial (charging system including database look-ups). As such, maintenance contracts will be established with each of these suppliers for the service and maintenance of the parts of the system which they are supplying.

5.12 Monitoring During Implementation

In order to better monitor the impact of the CAZ, Birmingham City Council have been working to expand the network or RTMS within and immediately around the city centre CAZ area. Four new sites have been / are in the process of being brought on line within the city centre area. The first has involved relocating an AURN Affiliated Site from Tyburn Road to an urban background site within the city centre CAZ area. This site is situated at St Mark's Crescent, it is now operational and is designated 'Birmingham Ladywood'. This site monitors for NO2 and will also monitor for PM10 and PM2.5. The City Council have also brought a new site on line within the city centre area, an urban roadside site situated at 'Colmore Row'. This site will monitor for NO2. Two more sites are in the process of being commissioned, both urban roadside, and situated on the A38 running through the city, designated 'Lower Severn Street' and 'St Chads Queensway'. Both of these will monitor for NO2.

The monitoring will be reported and compared against the Target Determination results for Birmingham, as the programme grows in maturity there will be a more detailed strategy and plan produced to monitor delivery progress with adequate reporting which encapsulates all necessary details. This will be detailed in full in the FBC.

5.13 Post Project Evaluation

The post project evaluation will be managed by the BCC Infrastructure Projects Delivery team, an external consultant may be commissioned to undertake this phase of work however this will be confirmed in the FBC. Benefits will be realised once the early measures, CAZ and additional measures are in place. The benefits are listed in Table 5.8. Air quality compliance will be demonstrated through data averages covering the period January 2020 to December 2020 using the monitoring outlined in the Economic Case. During the ten year appraisal period benefits are anticipated to continue increasing post implementation as modal shift occurs and modern, less polluting, vehicles and technologies become more prevalent.

The direct post project evaluation is expected to be undertaken in January 2021 to reflect on the completed implementation and benefits realisation period covering January 2020 to December 2020. The scope of this evaluation will be in line with HMT Magenta Book which sets out criteria for evaluation. Encompassing examination of benefits realisation, actual cost comparison against planned, lessons learnt throughout project delivery and any opportunities to increase the CAZ benefits through further works.

Baseline data has been collected for the, detailed in section 1.3. The post project evaluation will additionally be undertaken by qualitatively measuring where necessary against the success criteria as detailed in Table 5.8:

Table 5.8 Benefit and Evaluation Criteria

Benefit	Evaluation Criteria
Reduced impact on human health	Measured through improved health outcomes and reduction in health expenditure (e.g. hospital admissions, mortality impacts and chronic bronchitis impacts)
Increased productivity	Evaluated through work absenteeism caused by ill health
Reduced damage on built environment	Measured by surface cleaning costs and amenity costs
Improved journey times for both private and public transport due to reduction of traffic load and consequently more reliable PT services.	Measures by assessing journey times against baseline for both public and private journeys.
Increased travel by sustainable modes such as walking, cycling and public transport	Evaluated through questionnaires and comparisons with baseline data
Reduction in accident rates on the roads	Quantifiable data available from police records against baseline.
Reinvestment in local transport policies which aim to improve air quality and support the delivery of the plan.	Evaluation of new schemes and initiatives post implementation.

The above outlines the success criteria that will enable the City Council to assess whether the impacts of the CAZ has had the desired impacts as outlined above. A full detailed ten year evaluation plan is being produced and will be evidenced at the submission of the Full Business Case

6 Appendices

6.1 Appendix 1

6.1.1 Appendix 1A

Critical Success Factors and High Level Appraisal of Options against Critical Success Factors

Introduction

This appendix:

- identifies the longlist of options that have been considered to reduce the specific sources of local exceedances of NO₂ concentrations in Birmingham;
- lists the Critical Success Factors which have been used to appraise the longlist of alternative options; and,
- Describes the assessment that has been undertaken to date to reduce the longlist of options to a shortlist of options, for detailed appraisal in the Preferred Option Business Case.

Longlist of Options

The longlist of options is set out in Table 6.1. The longlist of additional measures (104 in total) is set out in Table 1 (p3-26) of the "Birmingham Clean Air Zone Feasibility Additional Measures Study."

Table 6.1 Longlist of Options

Option		Commentary
L1	Do Minimum	Baseline option to demonstrate why taking action is necessary
L2	Class A Clean Air Zone (CAZ A)	A charging CAZ A Class A vehicles (Buses, coaches, taxis and private hire vehicles) that do not meet Euro emission standards would be charged.
L3	Class B Clean Air Zone (CAZ B)	A charging CAZ B Class B vehicles (Class A plus Heavy goods vehicles (HGV's))
L4	Class C Clean Air Zone (CAZ C)	A charging CAZ C Class C vehicles (Class B plus Large vans, minibuses, small vans/light commercials) that do not meet Euro emission standards would be charged.
L5	Class D Clean Air Zone (CAZ D)	A charging CAZ D Class D vehicles (Class C plus cars) that do not meet Euro emission standards would be charged.
L6	Non charging CAZ -with additional measures	A non-charging CAZ with additional measures

Option		Commentary
L7	Class A Clean Air Zone (CAZ A) - with additional measures	A charging CAZ A with additional measures
L8	Class B Clean Air Zone (CAZ B) - with additional measures	A charging CAZ B with additional measures
L9	Class C Clean Air Zone (CAZ C) - with additional measures	A charging CAZ C with additional measures
L10	Class D Clean Air Zone (CAZ D) - with Additional Measures	A charging CAZ D with additional measures

It is clear from Table 6.1 that three broad types of options have been identified:

- 4 charging CAZ options (class A, B, C and D);
- 4 packages of options, with additional measures considered in conjunction with a CAZ scheme (class A, B, C and D);
- a non-charging CAZ with a package of measures.

Additional Measures: Option Generation

In order to identify measures that could be considered in conjunction with a CAZ to achieve compliance, a desk top study was undertaken to review existing evidence on local, regional and national measures to improve air quality. In addition, BCC, Transport for West Midlands and key experts from Birmingham CAZ work streams were consulted to identify further measures to take through an initial sifting process. This generated a total of 104 potential options (as noted above, these measures are set out in Table 1 of the "Birmingham Clean Air Zone Feasibility Additional Measures Study").

Critical Success Factors

The Critical Success Factors that have been used to evaluate the long-list of options and additional measures are set out, together with details on how each CSF is considered and scored.

Primary (Pass/fail) Critical Success Factor (CSF)

The primary CSF is:

- **CSF1 Compliance:** Deliver a scheme that leads to compliance with NO2 concentration limits (annual mean NO2 concentration of 40µg/m²) in the shortest possible time.

Assessment against the primary CSF only has two outcomes: pass or fail. Following JAQU guidance, all options that fail to meet the primary objective will be rejected.

This CSF directly supports Spending Objective SO1 (set out in section 1.5.1).

Key questions that were asked in the case of additional measures include:

- **CSF1.1** Is the measure likely to materially contribute to achieving compliance?
- **CSF1.2** Is the measure already being applied on a local, regional and/or national basis?
- **CSF1.2i** If 'Yes'; can it be up scaled and accelerated?
- **CSF1.2ii** If 'No'; is the option viable given the timeline for compliance?
- **CSF1.2iii** If 'No', is the option viable post 2020?

Only measures and packages of measures that are likely to lead to compliance as quickly as possible have been accepted. Options that are not expected to deliver compliance in the same calendar year as the fastest combination of options have been rejected.

Secondary Critical Success Factors

Options that meet the Primary Critical Success Factor will be considered against the following secondary CSFs:

- **CSF2 Value for money:** This CSF considers the full range of costs and benefits to society of the proposed option (such as the health benefits of improved air quality and the costs to the public in complying with a measure) rather than just looking at the financial impacts to determine if the measure is viable within an economic context. Key questions to consider include:
 - **CSF2.1** Do the likely overall benefits to society of this option exceed the overall costs to society?
 - **CSF2.2** Has the option been designed to deliver effectively while maximising benefits and minimising cost?
 - This CSF directly contributes to Spending Objective SO2 (see section 1.5.1).
- **CSF3 Evidence based:** This CSF considers to what extent, the case for an option is based on real-time local evidence of air quality, emission sources, and levels of air pollution in Birmingham or in specific pollution hotspots, and (where applicable) the potential benefits and impacts are capable of being modelled. Key questions to consider include:
 - **CSF3.1** Is the need and the likely contribution of this option based on real-time local evidence of air quality, emission sources, and levels of air pollution in Birmingham or in specific pollution hotspots?
 - **CSF3.2** Can the option be represented within the CAZ traffic and air quality modelling in order to assess the benefits and impacts?
 - This CSF directly contributes to Spending Objective SO3 (see section 1.5.1)
- **CSF4 Distributional impacts:** This CSF considers the potential impacts on key groups of the proposed option, in order to determine whether there is likely to be a disproportionate impact on one or more particular groups. Key questions to consider include:

- **CSF4.1** Is the option likely to be acceptable within a social context?
- **CSF4.2** Does the option significantly affect one or a number of particular groups of stakeholders?
- **CSF4.3** Is there potential to insure some groups or provide mitigation against the detrimental impacts of this option?
- **CSF4.4** Does this measure protect and enhance social equality?
- This CSF directly contributes to Spending Objective SO4 (section 1.5.1).
- **CSF5 Strategic and wider air quality fit:** This CSF considers how the proposed option interacts with other local policies already in place, in particular the transitioning to a low emission and healthier economy by 2030Key questions to consider include:
 - **CSF5.1** Does the option fit and/or complement other existing and planned policies?
 - **CSF5.2** How does the option affect overall exposure and to what extent does it reduce overall exposure?
 - **CSF5.3** Does the option permit sustained improvement to human health within short timescales?
 - **CSF5.4** Does the option support the promotion of a low emission economy?
 - **CSF5.5** Does this option facilitate local growth and ambition?
- This CSF directly contributes to Spending Objective SO5 (section 1.5.1).
- **CSF6 Supply side capacity and capability:** This CSF considers whether or not there is sufficient commercial capacity or capability in the supply chain to successfully deliver the proposed option and whether or not this is available. This CSF reflects the considerations made in the Commercial Case. Key questions to consider include:
 - **CSF6.1** Are there capable suppliers or contractors available to provide the required services or facilities required by this option?
 - **CSF6.2** Is there a sufficiently well-developed market to support the efficient delivery of the option?
- **CSF7 Affordability:** This CSF considers if this option can be delivered given the potential resources available (for example staffing levels) and management structures in place as outlined in the management case. This CSF reflects the considerations made in the Financial Case. Key questions to consider include:
 - **CSF7.1** Is this option likely to be financially viable?
 - **CSF7.2** Is the option likely to be affordable in both the short and long run in comparison to other options considered?
- **CSF8 Achievability:** This CSF considers if this option can be delivered given the potential resources available (for example staffing levels) and management structures in place as outlined in the management case. This CSF reflects the considerations made in the Commercial and Management Cases. Key questions to consider include:
 - **CSF8.1** Can the option be delivered on a local scale?
 - **CSF8.2** Can this option be targeted geographically?
 - **CSF8.3** Given market limitations, are adequate resources available (currently or can be obtained in sufficient time) to manage and implement such an option successfully?
 - **CSF8.4** Is the option based on proven / existing technology?

The Critical Success Factors largely reflect the CSFs suggested by JAQU. However, some of the secondary CSFs and the key questions have been modified to reflect the criteria adopted in the initial sifting of additional measures and the second phase of appraising additional measures. In the initial sifting process, for example, each potential additional measure was assessed against the following criteria:

- **CSF1.1** Is the measure likely to materially contribute to achieving compliance?
- **CSF1.2** Is the measure already being applied on a local, regional and/or national basis?
- **CSF1.2i** If 'Yes'; can it be up scaled and accelerated?
- **CSF1.2ii** If 'No'; is the option viable given the timeline for compliance?
- **CSF1.2iii** If 'No', is the option viable post 2020?
- **CSF4.1** Is the option likely to be acceptable within a social context?

The more detailed second phase of appraising additional measures identified and used the following criteria to appraise each option:

- CSF3.2 Representation within CAZ traffic and air quality scenarios modelling;
- CSF5.3 Sustained improvement to human health within a short timeline;
- CSF8.2 Ability for measure to be targeted geographically;
- CSF5.4 Promotion of a low emission economy;
- CSF5.5 Facilitate local growth and ambition;
- CSF4.4 Protect and enhance social equality;
- CSF7.1 Financial viability.

In addition to the criteria, each measure underwent an appraisal to determine if any of the following anticipated category responses – in terms of traffic flow and vehicle use – are applicable:

- Reduce – reduce congestion, remove traffic from the network or links;
- Shift – encourage modal shift;
- Improve – encourage transition to cleaner vehicles.

Appendix A1 illustrates the relationship of the CSFs to the Spending Objectives (section 1.5.1) and the initial sift, and multiple criteria analysis, assessment criteria.

Scoring System

The options presented in Table 6.1 will be assessed against the CSFs according to the scale presented in Table 6.2.

Table 6.2 Scoring criteria for Options

Primary (Pass/ Fail) CSF	P	Pass
	F	Fail
Secondary (Scored) CSF	✓✓	Excellent
	✓	Good
	-	Satisfactory or no score
	✗	Poor

An alternative scoring system has been developed and applied to appraise and rank the performance of additional measures, as detailed in Table 6.3. This scoring method focuses on the potential of a measure to contribute to the primary objective, whilst preserving and/or promoting the other criteria. Therefore, a positive potential score indicates that a particular measure in question is considered to have a higher potential in terms of upholding the criterion and contributing to the primary objective versus the other measures being assessed. The opposite is true for a negative score.

Table 6.3 Option appraisal scoring against MCA framework criteria

Score	Potential to uphold respective criterion and contribute to primary objective
+3	Large positive potential
+2	Medium positive potential
+1	Small positive potential
0	Neutral
-1	Small negative potential
-2	Medium negative potential
-3	Large negative potential

Assessment of the Long-list of Options Using the CSFs

The assessment that has been conducted to date has involved:

- Undertaking detailed traffic and air dispersion modelling to determine if the introduction of a 'class C' or 'class' CAZ scheme in Birmingham would be sufficient to pass the primary CSF; and
- A detailed and rigorous appraisal of additional measures.

CAZ Options

The initial traffic and air quality modelling that has been undertaken by BCC to date, has demonstrated that implementation of a charging 'class C' or 'class D' Clean Air Zone (CAZ), would be insufficient to pass the project's primary CSF.

Under a class C CAZ, exceedances are still predicted to occur on the A38 and ring road. It is estimated that additional reductions of up to 11% and 31% would be required, outside and inside the CAZ, respectively, to achieve compliance. Even if all the vehicles restricted by 'category C' which entered the zone had a compliant engine, the levels of NO₂ would still be too great. This reflects the fact that over 80% of the vehicles entering the CAZ area are private cars (or private hire vehicles) and these are not restricted by a CAZ C scheme.

Under a class D CAZ (where non-compliant cars are subject to charging), concentrations of NO₂ reduce by an additional 1.5 µg/m³ inside the CAZ, with a medium charge, and by 1.8 µg/m³ for a high charge, beyond the CAZ C high scenario. There are still places, however, where the legal limits are predicted to be exceeded on the A38 and ring road. It is estimated that additional reductions of up to 9% and 19% are required, outside and inside the CAZ, respectively, to remove these exceedances.

Although a CAZ 'A' and CAZ 'B' scheme have not been explicitly modelled, it is clear that if a 'class C' or 'class D' CAZ would be insufficient to ensure compliance, then a CAZ 'A' or CAZ 'B' scheme would also be insufficient.

Options L2 - L5 in Table 6.1 have therefore been rejected.

Appraisal of Additional measures

The appraisal of additional measures has been delivered in 3 phases:

- Phase 1 involved assessing the longlist of additional measures (104 in total) against some high-level criteria to eliminate those that clearly do not contribute to the Critical Success Factors. A total of 31 options were identified within the context of contributing to the primary objective;
- Phase 2 involved developing and applying a Multi Criteria Analysis (MCA) framework to rigorously appraise each option taken forward from Phase 1 to identify those that should be taken forward for further development. This involved assessing each option against multiple criteria and scoring each measure. A measure scoring +10 ('medium positive potential') was recommended to proceed to Phase 3. Also each measure had to achieve a positive score on two criteria (i.e. potential impact on human health and ability to be represented within quantitative traffic and air quality modelling). In addition to these determinants, extra weight was given to those measures which are more likely to have an impact across at least one more category response themes (i.e. reduce/shift/improve). A total of 18 options were recommended for further development in Phase 3. The outcomes of the MCA appraisal and associated justification for the scores assigned to each measure, are summarised in Table 3 of "Birmingham Clean Air Zone Feasibility Additional Measures Study". In addition, this study identifies a further 14 additional measures that have the potential to contribute to further improving air quality post 2020 in support of the wider spending objectives and local air quality policy. These are presented in Table 4 of the aforementioned study;
- Phase 3 involved considering whether traffic and air quality modelling approaches could be developed for the selected measures to determine the potential for measures to be represented within the respective CAZ modelling scenarios. This resulted in a shortlist of 11 additional measures/packages of measures to be taken forward for quantitative traffic and air dispersion modelling.

Shortlist of Options

The shortlisted packages of options from Table 6.1 are presented in Table 6.4.

Table 6.4 Shortlisted Options

Shortlisted Options		Commentary
1.	Class C Clean Air Zone (CAZ C) - with additional measures	A charging CAZ C
2.	Class C Clean Air Zone (CAZ C) - with additional measures	A charging CAZ C with additional measures
3.	Class C Clean Air Zone (CAZ D)	A charging CAZ D
4.	Class C Clean Air Zone (CAZ D) - with Additional Measures	A charging CAZ D with additional measures

The shortlist of additional measures for further consideration, as part of the above CAZ options, are:

- Increase LPG refuelling for Hackney Carriages, the installation of rapid EV infrastructure for taxi and private hire vehicles, retrofitting of black taxis to LPG and zero emission buses/retrofitting of public transport fleet;
- Parking Strategy – remove free parking, parking charging and permits graded by vehicle standard or zone charges;
- Speed Enforcement – average speed enforcement along the A38 and near Dartmouth Circus to manage traffic and smooth flows;
- Speed reduction – reduce speed limits on certain routes and use variable speed limits
- Public Transport Improvement Measures - Highway/infrastructure improvements to bus services to make them more viable and accessible to the public and increase bus priority schemes, restrict traffic on Moor Street Queensway to bus, taxi and cycle only and close Park Street to all traffic;
- Incentivise or subsidise sustainable travel by up to 50% to improve public transport patronage;
- Ban the route of traffic travelling northbound on Suffolk Street Queensway that exits onto Paradise Circus to then Access Sand pits parade;
- Ban the route of traffic travelling northbound on Suffolk Street Queensway that exits onto Paradise Circus and St Chads;
- Close junction on Dartmouth Middleway between Lister Street and Great Lister Street to avoid stop start traffic and reduce congestion;
- Re-signing and rerouting scheme for the A38 and banning all through traffic (and HGVs only) on the A38 around Paradise Circus diverting traffic to A4540;
- Enhanced bus partnership with the wider area of Birmingham.

Birmingham City Council

Clean Air Zone

6.1.2 Appendix 1B

Summary table of impacts

CAZ Option Summary										
Option	Air Quality Impact	Exceedance Locations	Impact		Costs	Summary				
			Congestion / Travel Time / Operating Costs	Users - Welfare	Users - Charges	Health/ Environmental	Vehicle Upgrade	Implementation	+ves:	-ves
CAZ C Inside the Ring Road (A4540) (Higher price band)	Improvement in emissions does not achieve sufficient reductions in order to meet compliance in 2020 Predicted concentrations are still above the NO ₂ limit on the A38 and ring road. Additional reductions of up to 11-31% are required (outside and inside the CAZ, respectively).	A4540 Lawley Middleway Garrison Circus (Outside CAZ) = 41.8 µg/m ³ A4100 Digbeth = 41.5 µg/m ³ A38 between Children's Hospital and Dartmouth Circus = 42.6 µg/m ³ Suffolk St Queensway (nr Beak St) = 45 µg/m ³	Negative but small impact:- £6m	No welfare impacts as cars not impacted	Negative impacts on taxi, LGV, HGV owners = - £112m	CAZ C delivers lower benefits in terms of emissions of NO _x and PM ₁₀ although the differences are not very large when measured in gross emissions (i.e. tonnes rather than concentrations). ~£24m	Both CAZ C & D share similar costs across vehicle types - CAZ C is slightly better as it does not include cars:- £37m	£45m across 10 years Costs for both CAZ scenarios are similar	Affects fewer vehicles (resulting in lower upgrade costs); Less significant economic impacts	Delivers compliance later ~ 2022 Reduced wider health benefits Does not achieve compliance in 2020

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CAZ C + Additional Measures Inside the Ring Road (A4540) (Higher price band) City Centre Network Changes + Signing & Rerouting Further retrofits/upgrades - Taxis, LGVs Parking Measures	Improves air quality with reductions in the number of exceedance locations to 17 exceedance locations remaining	A4540 Lawley Middleway - Garrison Circus (Outside CAZ) = 42.0 $\mu\text{g}/\text{m}^3$ A4100 Digbeth = 39.9 $\mu\text{g}/\text{m}^3$ A38 between Children's Hospital and Dartmouth Circus = 42.3 $\mu\text{g}/\text{m}^3$ Suffolk St Queensway (nr Beak St) = 45.1 $\mu\text{g}/\text{m}^3$	Negative impact: -£22m	Welfare impacts from cancelled trips due to parking charges = -£40m	Negative impacts on taxi, LGV, HGV owners = - £162m	The CAZ D plus additional measures represents £36m in total benefits over the 10-year period - additional improvements of £12m compared the CAZ C alone.	Both CAZ C & D share similar costs across vehicle types - CAZ C is slightly better as it does not include cars: -£35m	£47m across 10 years + ongoing costs of Additional Measures (being calculated)	Affects fewer vehicles (resulting in lower upgrade costs); Less significant economic impacts	May deliver compliance later, but due to better distributional impacts it may be worth investigating the level of difference between this option and CAZ D plus additional measures
CAZ D Inside the Ring Road (A4540) (Higher price band)	Improves air quality further by reducing emissions from cars but predicted concentrations would still be above NO ₂ limit on the A38 and ring road in 2020.	A4540 Lawley Middleway - Garrison Circus (Outside CAZ) = 41.5 $\mu\text{g}/\text{m}^3$ A4100 Digbeth = 40.3 $\mu\text{g}/\text{m}^3$ A38 between Children's Hospital and Dartmouth Circus = 40.6 $\mu\text{g}/\text{m}^3$ Suffolk St Queensway (nr Beak St) = 42.7 $\mu\text{g}/\text{m}^3$	Shows benefits in terms of transport user travel time and vehicle operating cost savings: £23m	welfare impacts from cancelled trips due to CAZ charges = -£21m	Negative impacts on taxi, LGV, HGV, and cars Greater impact on population = - £176m	CAZ D delivers additional benefits in terms of emissions of NO _x and PM ₁₀ although the differences are not very large when measured in gross emissions (i.e. tonnes rather than concentrations). ~£26	Would result in cars upgrading as well as other vehicles upgrade costs -£55m	£53m across 10 years Costs for both CAZ scenarios are similar	Delivers compliance faster ~ 2021 Greater health benefits More upgrades under CAZ D delivers greater CO ₂ emission savings and other secondary benefits	Affects more vehicles (hence greater upgrade costs); More significant economic impacts Does not achieve compliance in 2020
CAZ D +	Significant	A4540 Lawley	Shows	welfare	Negative	The CAZ D	Cost of	£55m across 10	Delivers	Additional

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Additional Measures Inside the Ring Road (A4540) (Higher price band) City Centre Network Changes + Signing & Rerouting Further retrofits/ upgrades - Taxis, LGVs Parking Measures	reductions in the number of exceedance locations from 12 with a CAZ D alone, to 6 exceedances in 2020 with additional measures	Middleway - Garrison Circus (Outside CAZ) = 41.5 $\mu\text{g}/\text{m}^3$ A4100 Digbeth = 38.8 $\mu\text{g}/\text{m}^3$ A38 between Children's Hospital and Dartmouth Circus = 40.3 $\mu\text{g}/\text{m}^3$ Suffolk St Queensway (nr Beak St) = 42.7 $\mu\text{g}/\text{m}^3$	benefits in terms of transport user travel time and vehicle operating cost savings, though less than CAZ D alone = £11m	impacts from cancelled trips due to parking and CAZ charges = -£54m	impacts on taxi, LGV, HGV, and cars Greater impact on population = - £224m	plus additional measures represents £38m in total benefits over the 10-year period - additional improvements of £12m compared the CAZ D alone.	compliance for users who upgrade their vehicle is estimated to be lower than the CAZ D. This is because some users face an additional parking charge in the city centre and will thus choose to change mode or avoid the CAZ zone = -£54m	years + ongoing costs of Additional Measures (being calculated)	compliance faster ~ 2021 (but could be 2020 depending on impact of upgrade to petrol and Euro6d) CAZ D plus additional measures represents £38m in total benefits over the 10-year period - additional improvements of £12m compared the CAZ D alone.	welfare impacts due to cancelled trips due to parking charges are expected to result in a consumer surplus loss of around £54m, over the 10-year period.
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6.1.3 Appendix 1C

Longlist to Shortlist Tests

Table 6.5 Other Measures Considered

Type	Tests	Reason to Exclude	Additional Testing
Network	Average speed enforcement near to Dartmouth Circus to manage traffic and smooth flows.	Analysis of modelled speeds indicated that average speeds were lower than the optimal speeds for limiting emissions, so no benefit in reducing the speed limit.	None
	Average speed enforcement along the A38 to manage traffic and smooth flows	Analysis of modelled speeds indicated that average speeds were lower than the optimal speeds for limiting emissions, so no benefit in reducing the speed limit.	None
CAZ Variations	Ban on HGV and LGVs on the Eastern section of the ring road (A4050)	The reconfiguration of junctions along on the A4050, as a result of HS2 construction means that HGVs cannot be U-turned on the ring road. This would prevent access to the HS2 construction site and freightliner terminal which means it is not a feasible option.	None
	Outer CAZ C Charge (Within A4040)	The options tested already increases traffic on the A4040 and on Highways England motorway network. An additional CAZ will worsen these impacts to an unacceptable level. A City Centre CAZ results in a relatively high number of vehicles to be bought/ swapped. An additional outer CAZ will affect a significantly larger number of vehicles with significant likelihood that this would put pressure on the 2 nd hand market. The cost and practicality of implementing the option will be prohibitive.	An updated SATURN model is being produced adding network detail outside of the City Centre allowing for a more robust assessment of impacts outside of the City Centre. An outer CAZ will be tested in this model to assess the impacts of removing through traffic on AQ in the City Centre. This could help support policies, such as signage to remove through traffic.
	Outer CAZ D Charge (Within A4040)	The options tested already increases traffic on the A4040 and on Highways England motorway network. An additional CAZ will worsen	As above.

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Type	Tests	Reason to Exclude	Additional Testing
		<p>these impacts to an unacceptable level.</p> <p>A City Centre CAZ results in a relatively high number of vehicles to be bought/ swapped. An additional outer CAZ will affect a significantly larger number of vehicles with significant likelihood that this would put pressure on the 2nd hand market.</p> <p>The cost and practicality of implementing the option will be prohibitive.</p>	
	Higher charges during the peaks.	Legal AQ limits cannot be achieved when applied across the whole day so no little benefit likely in reducing charges in the off peak.	This can be considered when more detailed implementation of the scheme is considered for FBC.
	Incentivisation of petrol over diesel	No practical/ legal process to do this has been identified.	To be considered if sensitivity testing indicates that this will provide benefits and if a practical solution can be identified.
Public Transport	Incentivise or subsidise sustainable travel by up to 50% to improve public transport patronage	Ongoing work with TfWM and operators to develop an option that can deliver mode shift for reasonable costs.	Ongoing
Car Sharing	Incentivise Car Sharing	Ongoing work with TfWM to develop a car sharing policy	Ongoing

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Table 6.6 Additional Measures to Test

Type	Test ID	Summary	Results	POBC
Fleet (low emission)	Fleet 1	<p>Increase LPG refuelling for Hackney Carriages and the installation of rapid EV infrastructure for taxi and private hire vehicles.</p> <p>Retrofitting of black taxis to LPG</p> <p>Assumptions tested:</p> <ul style="list-style-type: none"> 85 taxis upgraded to Electric vehicle 441 PHVs upgraded to Electric Vehicle 65 taxis retrofitted to LPG 	<p>Electric Vehicle upgrade estimated to remove 1.6% of total vehicle kilometres from the City Centre network in a CAZ D scenario. Given that taxi and PHVs are predominately the AQ impacts are amplified and provide a significant reduction in NO₂ emissions.</p> <p>LPG retrofit has a less significant impact on overall AQ levels, but will provide benefits at locations with high taxi flows.</p>	Include in POBC
	Fleet 2	Zero emission buses (new Hydrogen buses)	Reduction in emissions focused on key corridors	Include in POBC
Parking	Parking 1	Remove all free parking from BCC controlled areas. Replaced with paid parking spaces. Assume cost of parking in line with BCC off-street parking.	<p>Around 15% of traffic parking in the City Centre currently parks on free on street parking. Our modelling indicates that this will reduce car demand with free parking by around 30%. This leads to around a 2.5% reduction in overall vehicles KMs, resulting in a reasonably significant reduction in emissions, although this is limited in the key locations (failing the legal limits) as the impacts are focused on the outer areas of the City Centre.</p> <p>An additional benefit is that it raises revenues of the City Centre which will be re-invested in mitigating the effects of the CAZ.</p>	Include in POBC

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Type	Test ID	Summary	Results	POBC
Network Changes	Network 1	Ban traffic entering (SB) or leaving (NB) Suffolk Street Queensway (A38) from Paradise Circus, other than local access.	<p>Provides a reduction in overall traffic levels and reduces delays on the A38 at a key location, forecasted to exceed legal emission levels.</p> <p>Reduces traffic through Paradise Circus an area with high pedestrian flows linking one of Birmingham's main cultural quarters, to the shopping/ business district and New Street Station. Paradise is the focus of one the city centre's main masterplan areas, so removing traffic will support this regeneration.</p>	Include in POBC
	Network 2	Close Lister Street and Great Lister Street at the junction with Dartmouth Middleway. This allows, more green time for the A4540.	<p>Reduction in delay on the A4540 ring road, including less traffic needing to stop (and accelerate away from the junction) due to the removal of the signal stage for traffic crossing the road.</p> <p>This also provides a mitigation for increases in traffic caused by the CAZ charge for through trips on the A38.</p>	Include in POBC
	Network 3	Ban on CAZ through trips for all vehicle types.	<p>Provides significant improvement to air quality in the City Centre. However, this causes significant increases on the Eastern section of the ring road which exceeds the legal NO₂ limits.</p> <p>In addition, the model shows large increases on local roads outside of the CAZ area which worsens AQ on these local residential roads.</p> <p>There are also issues with the practicality of implementing this option on the ground.</p>	Exclude from POBC
	Network 4	Ban on CAZ through trips for LGV and HGV vehicles.	As above	Exclude from POBC
	Network 5	CAC C or D on the ring Eastern section of the ring road.	<p>Significant diversion to local roads outside the CAZ increasing emissions on these smaller residential roads.</p> <p>There is a need to reduce overall traffic (not just non-compliant) to meet compliance so the CAZ does not solve the issue on its own.</p>	Exclude from POBC

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Type	Test ID	Summary	Results	POBC
Public Transport	PT_1	Highway/infrastructure changes to provide bus priority 4 corridors were tested, as agreed with TfWM who said they could delivered by 2020 ID 19 & 21	Impact on mode shift forecast to be small, less than 1% reduction in overall trips into the City Centre, with high costs to implement.	Exclude from POBC

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6.1.4 Appendix 1D.

Planned Sensitivities

These planned sensitivities are still under discussion with JAQU and the final list of sensitivities run may be different than the list in Table 6.7.

Table 6.7 Planned Sensitivities

Model Elements	Tests	Purpose	Method
Traffic Growth	1) Low Growth - City Centre traffic is flat + existing model assumptions for outer areas. 2) Low/ Medium Growth - TEMPRO trip growth for City Centre (rather than PRSIM growth updated with TEMPRO demographic/ land use), with PRISM growth for outer areas (lower than TEMPRO directly). 3) High Growth - Apply TEMPRO trip growth to the outer areas on existing City Centre growth.	Impact of different levels of traffic growth. Uncertainty around growth of the city and highway mode share. PRISM forecasts higher City Centre growth and lower wider Birmingham growth highway trip growth than taken directly from TEMPRO, so this will test the difference between the two models. <i>NB - PRISM is updated with TEMPRO demographic growth and trip generation/ mode share generated by PRISM based on locally calibrated data.</i>	Mixture of quantitative assessment of likely impacts and Full model rerun.
Behavioural Responses to Charging	1) Apply published JAQU responses 2) Apply TfL ULEZ responses directly 3) Emerging research implemented into BCC CAZ.	Uncertainty around response to charge tested by using other projects research looking at Clean Air Charging.	Mixture of quantitative assessment of likely impacts and Full model rerun.
Cost to Upgrade	1) Assume JAQU latest, new vehicle costs to current assumptions. 2) Apply JAQU behavioural assumptions on new vehicle upgrades 3) Apply JAQU behavioural assumptions on new vehicle upgrades, and assume all old non-compliant vehicles scrapped (£0 sale value and no fee for scrappage) 4) Assume HGV users assess cost to upgrade over 3 rather than 5 years.	Uncertainty around cost to upgrade, people's choice of upgrade vehicle and impact on secondary market in large increase in vehicle purchasing/ sales.	Mixture of quantitative assessment of likely impacts and Full model rerun.
Base Year Correction	1) Scale up HGV flows based on mismatch between base year and observed counts crossing the screen line.	Impact of errors in base year model assessed, particularly the PM peak models overall impact on results.	Post model Factoring

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	2) Scale up PM peak flows by 5% 3) Scale down PM peak flows 5%		
Taxi	1) Develop test that does not force an upgrade to compliant vehicle based on licensing rules. 2) Factor flows at key locations based on traffic counts/ ANPR to ensure that taxi/ phv proportions are correctly captured, and that any benefits to the policy is correctly captured.	Impact of Taxi Assumptions.	Full model rerun (only taxis changed)
Congestion	1) Increase delays by 5% 2) Decrease delays by 5% 3) Assess Delays at key locations and if applicable increase modelled speeds by more than above.	Impact of congestion on AQ. Risk that over/ underestimation of delay is impacting AQ results and where to focus policy.	Post model Factoring
Fleet	1) Latest assumptions on when Euro classes enter the fleet tested (this test is underway). 2) Assume age of fleet increases over time (less compliant vehicles naturally enter the fleet) 3) Assume petrol proportion increases over time. 4) Assume more people upgrade to electric.	Uncertainty in change in fleet makeup.	Mix of full model rerun and post model factoring.
Parking	1) Low Parking Test - assume proportion of traffic will have access to parking permits reducing cost of parking for frequent users. As being developed in current policy. 2) High Parking Test - Removing free parking pushes up cost to park in off-street parking.	Test on impact of parking policy.	Mixture of quantitative assessment of likely impacts and Full model rerun.
Strategic Rerouting	1) Test preferred policy in new SATURN model with better detail in the wider model to better understand strategic rerouting/ rat-running.	Better understand impacts beyond City Centre.	Mixture of quantitative assessment of likely impacts and full model rerun.

	2) Test rerouting option of an outer CAZ to demonstrate full impact of an outer CAZ and potential for removing wider area rerouting.		
Trip distribution	Compare with analysis being undertaken by wider team, using ANPR, postcode data etc. to ensure that knowledge of trip distribution in the area is being correctly collected.	Build in checks on observed data to ensure synthetic matrices do not under/ overestimate key movements and that this biases the results.	Comparative Analysis
Mode Shift/ Distribution etc. of full policy	Depending on available time/ budget changes in demand/ distribution will be assessed by: <ul style="list-style-type: none"> • Benchmarking sensitivities and deriving responses to measures to apply to demand matrices • Rerun of PRISM demand model 	Check removal of highway capacity and increased cost to drive is reflected in traffic growth.	Mixture of quantitative assessment of likely impacts and Full model rerun.
Copert Emissions Factors	BCC awaiting advice from JAQU on how to respond to this issue, including evidence referenced by the T-IRP, and whether JAQU will respond to the T-IRP on behalf of all cities. Potential tests might include adjustment of the emissions factors for certain vehicle types/fuels/Euro standard.	Determine if changes to fleet due to CAZ interventions are appropriate	Applications of uplifts in EFT. Comparison of modelled NO _x outputs.
Met data	Use of hourly sequential met data.	Test whether use of statistical (and scaled data by SMHI) met data impacts dispersion	Run Base, DM and CAZ in airviro.
Verification using f- NO ₂ from CMs	Use of local NO _x to NO ₂ relationship vs EFT to test f- NO ₂	Uncertainty in f- NO ₂ in emissions factors	Apply road NO _x from CM only, and then total not from DTs (if sufficient no. of analysers)

6.2 Appendix 2**6.2.1 Appendix 2A****High Level Appraisal of Options against Critical Success Factors****Introduction**

This appendix:

- identifies the longlist of options that have been considered to reduce the specific sources of local exceedances of NO₂ concentrations in Birmingham;
- lists the Critical Success Factors which have been used to appraise the longlist of alternative options; and,
- Describes the assessment that has been undertaken to date to reduce the longlist of options to a shortlist of options, for detailed appraisal in the Preferred Option Business Case.

Longlist of Options

The longlist of options is set out in Table 6.8. The longlist of additional measures (104 in total) is set out in Table 1 (p3-26) of the "Birmingham Clean Air Zone Feasibility Additional Measures Study."

Table 6.8 Longlist of Options

Option		Commentary
L1	Do Minimum	Baseline option to demonstrate why taking action is necessary
L2	Class A Clean Air Zone (CAZ A)	A charging CAZ A Class A vehicles (Buses, coaches, taxis and private hire vehicles) that do not meet Euro emission standards would be charged.
L3	Class B Clean Air Zone (CAZ B)	A charging CAZ B Class B vehicles (Class A plus Heavy goods vehicles (HGV's))
L4	Class C Clean Air Zone (CAZ C)	A charging CAZ C Class C vehicles (Class B plus Large vans, minibuses, small vans/light commercials) that do not meet Euro emission standards would be charged.
L5	Class D Clean Air Zone (CAZ D)	A charging CAZ D Class D vehicles (Class C plus cars) that do not meet Euro emission standards would be charged.
L6	Non charging CAZ -with additional measures	A non-charging CAZ with additional measures
L7	Class A Clean Air Zone (CAZ A) - with	A charging CAZ A with additional measures

Option		Commentary
	additional measures	
L8	Class B Clean Air Zone (CAZ B) - with additional measures	A charging CAZ B with additional measures
L9	Class C Clean Air Zone (CAZ C) - with additional measures	A charging CAZ C with additional measures
L10	Class D Clean Air Zone (CAZ D) - with Additional Measures	A charging CAZ D with additional measures

It is clear from Table E1 that three broad types of options have been identified:

- 4 charging CAZ options (class A, B, C and D);
- 4 packages of options, with additional measures considered in conjunction with a CAZ scheme (class A, B, C and D);
- A non-charging CAZ with a package of measures.

Long list option assessment

In order to gauge the primary CSF's relation to the longlisted options traffic and air quality modelling undertaken on CAZ C and CAZ D options to determine their relative position to achieving compliance. These model runs demonstrated that implementation of a charging 'class C' or 'class D' Clean Air Zone (CAZ), would be insufficient to achieve AQ compliance in 2020. As CAZ D has great impacts on traffic due to including the car vehicle class, it will achieve compliance in the shortest possible time and was brought forward.

Under a class D CAZ (where non-compliant cars are subject to charging), concentrations of NO₂ reduce by an additional 1.5 µg/m³ inside the CAZ, with a medium charge, and by 1.8 µg/m³ for a high charge, beyond the CAZ C high scenario. There are still places, however, where the legal limits are predicted to be exceeded on the A38 and ring road. It is estimated that additional reductions of up to 9% and 19% are required, outside and inside the CAZ, respectively, to remove these exceedances.

Although a CAZ 'A' and CAZ 'B' scheme have not been explicitly modelled, it is clear that if a 'class C' or 'class D' CAZ would be insufficient to ensure compliance, then a CAZ 'A' or CAZ 'B' scheme would also be insufficient.

Options L2 - L5 in Table 6.8 have therefore been rejected.

Appraisal of Additional measures

The appraisal of additional measures has been delivered in 3 phases:

- Phase 1 involved assessing the longlist of additional measures (104 in total) against some high-level criteria to eliminate those that clearly do not contribute to the Critical Success Factors. A total of 31 options were identified within the context of contributing to the primary objective;

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- Phase 2 involved developing and applying a Multi Criteria Analysis (MCA) framework to rigorously appraise each option taken forward from Phase 1 to identify those that should be taken forward for further development. This involved assessing each option against the CSF and scoring each measure. A total of 18 options were recommended for further development in Phase 3. The outcomes of the MCA appraisal and associated justification for the scores assigned to each measure, are summarised in Table 3 of "Birmingham Clean Air Zone Feasibility Additional Measures Study".
- Phase 3 involved considering whether traffic and air quality modelling approaches could be developed for the selected measures to determine the potential for measures to be represented within the respective CAZ modelling scenarios. This resulted in a shortlist of 11 additional measures/packages of measures to be taken forward for quantitative traffic and air dispersion modelling.

Shortlist of Options

The shortlisted packages of options from Table 6.8 are presented in Table 6.9.

Table 6.9 Shortlisted Options

Shortlisted Options		Commentary
1.	Class C Clean Air Zone (CAZ C) - with additional measures	A charging CAZ C
2.	Class C Clean Air Zone (CAZ C) - with additional measures	A charging CAZ C with additional measures
3.	Class C Clean Air Zone (CAZ D)	A charging CAZ D
4.	Class C Clean Air Zone (CAZ D) - with Additional Measures	A charging CAZ D with additional measures

The shortlist of additional measures for further consideration, as part of the above CAZ options, are:

- Increase LPG refuelling for Hackney Carriages, the installation of rapid EV infrastructure for taxi and private hire vehicles, retrofitting of black taxis to LPG and zero emission buses/retrofitting of public transport fleet;
- Parking Strategy – remove free parking, parking charging and permits graded by vehicle standard or zone charges;
- Speed Enforcement – average speed enforcement along the A38 and near Dartmouth Circus to manage traffic and smooth flows;
- Speed reduction – reduce speed limits on certain routes and use variable speed limits
- Public Transport Improvement Measures - Highway/infrastructure improvements to bus services to make them more viable and accessible to the public and increase bus priority schemes, restrict traffic on Moor Street Queensway to bus, taxi and cycle only and close Park Street to all traffic;
- Incentivise or subsidise sustainable travel by up to 50% to improve public transport patronage;
- Ban the route of traffic travelling northbound on Suffolk Street Queensway that exits onto Paradise Circus to then Access Sand pits parade;
- Ban the route of traffic travelling northbound on Suffolk Street Queensway that exits onto Paradise Circus and St Chads;

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- Close junction on Dartmouth Middleway between Lister Street and Great Lister Street to avoid stop start traffic and reduce congestion;
- Re-signing and rerouting scheme for the A38 and banning all through traffic (and HGVs only) on the A38 around Paradise Circus diverting traffic to A4540;
- Enhanced bus partnership with the wider area of Birmingham.

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6.2.2 Appendix 2B

Option Shortlist Tests

Table 6.10: Other Measures Considered

Type	Tests	Reason to Exclude	Additional Testing
Network	Average speed enforcement near to Dartmouth Circus to manage traffic and smooth flows.	Analysis of modelled speeds indicated that average speeds were lower than the optimal speeds for limiting emissions, so no benefit in reducing the speed limit.	No
	Average speed enforcement along the A38 to manage traffic and smooth flows	Analysis of modelled speeds indicated that average speeds were lower than the optimal speeds for limiting emissions, so no benefit in reducing the speed limit.	No
CAZ Variations	Ban on HGV and LGVs on the Eastern section of the ring road (A4050)	The reconfiguration of junctions along on the A4050, as a result of HS2 construction means that HGVs cannot be U-turned on the ring road. This would prevent access to the HS2 construction site and freightliner terminal which means it is not a feasible option.	No
	Outer CAZ C Charge (Within A4040)	<p>The options tested already increases traffic on the A4040 and on Highways England motorway network. An additional CAZ will worsen these impacts to an unacceptable level.</p> <p>A City Centre CAZ results in a relatively high number of vehicles to be bought/ swapped. An additional outer CAZ will affect a significantly larger number of vehicles with significant likelihood that this would put pressure on the 2nd hand market.</p> <p>The cost and practicality of implementing the option will be prohibitive.</p>	<p>An updated SATURN model is being produced adding network detail outside of the City Centre allowing for a more robust assessment of impacts outside of the City Centre.</p> <p>An outer CAZ will be tested in this model to assess the impacts of removing through traffic on AQ in the City Centre. This could help support policies, such as signage to remove through traffic.</p>
	Outer CAZ D Charge (Within A4040)	<p>The options tested already increases traffic on the A4040 and on Highways England motorway network. An additional CAZ will worsen these impacts to an unacceptable level.</p> <p>A City Centre CAZ results in a relatively high number of vehicles to be bought/ swapped. An additional outer CAZ will affect a significantly larger number of vehicles with significant likelihood that this would put pressure on the 2nd hand market.</p> <p>The cost and practicality of implementing the option will be prohibitive.</p>	As above.
	Higher charges during	Legal AQ limits cannot be achieved when applied across the whole day so no little	This can be considered when more detailed

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Type	Tests	Reason to Exclude	Additional Testing
	the peaks.	benefit likely in reducing charges in the off peak.	implementation of the scheme is considered for FBC.
	Incentivisation of petrol over diesel	No practical/ legal process to do this has been identified.	To be considered if sensitivity testing indicates that this will provide benefits and if a practical solution can be identified.
Public Transport	Incentivise or subsidise sustainable travel by up to 50% to improve public transport patronage	Ongoing work with TfWM and operators to develop an option that can deliver mode shift for reasonable costs.	Ongoing
Car Sharing	Incentivise Car Sharing	Ongoing work with TfWM to develop a car sharing policy	Ongoing

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Table 6.11 Additional Measures to Test

Type	Test ID	Summary	Results	POBC
Fleet (low emission)	Fleet 1	<p>Increase LPG refuelling for Hackney Carriages and the installation of rapid EV infrastructure for taxi and private hire vehicles.</p> <p>Retrofitting of black taxis to LPG</p> <p>Assumptions tested:</p> <ul style="list-style-type: none"> 85 taxis upgraded to Electric vehicle 441 PHVs upgraded to Electric Vehicle 65 taxis retrofitted to LPG 	<p>Electric Vehicle upgrade estimated to remove 1.6% of total vehicle kilometres from the City Centre network in a CAZ D scenario. Given that taxi and PHVs are predominately the AQ impacts are amplified and provide a significant reduction in NO₂ emissions.</p> <p>LPG retrofit has a less significant impact on overall AQ levels, but will provide benefits at locations with high taxi flows.</p>	Include in POBC
	Fleet 2	Zero emission buses (new Hydrogen buses)	Reduction in emissions focused on key corridors	Include in POBC
Parking	Parking 1	Remove all free parking from BCC controlled areas. Replaced with paid parking spaces. Assume cost of parking in line with BCC off-street parking.	<p>Around 15% of traffic parking in the City Centre currently parks on free on street parking. Our modelling indicates that this will reduce car demand with free parking by around 30%. This leads to around a 2.5% reduction in overall vehicles KMs, resulting in a reasonably significant reduction in emissions, although this is limited in the key locations (failing the legal limits) as the impacts are focused on the outer areas of the City Centre.</p> <p>An additional benefit is that it raises revenues of the City Centre which will be re-invested in mitigating the effects of the CAZ.</p>	Include in POBC
Network Changes	Network 1	Ban traffic entering (SB) or leaving (NB) Suffolk Street Queensway (A38) from Paradise Circus, other than local access.	<p>Provides a reduction in overall traffic levels and reduces delays on the A38 at a key location, forecasted to exceed legal emission levels.</p> <p>Reduces traffic through Paradise Circus an area with high pedestrian flows linking one of Birmingham's main cultural quarters, to the shopping/ business district and New Street Station. Paradise is the focus of one of the city centre's main masterplan areas, so removing traffic will support this regeneration.</p>	Include in POBC
	Network 2	Close Lister Street and Great Lister Street at the junction with Dartmouth Middleway. This allows, more green time for the A4540.	<p>Reduction in delay on the A4540 ring road, including less traffic needing to stop (and accelerate away from the junction) due to the removal of the signal stage for traffic crossing the road.</p> <p>This also provides a mitigation for increases in traffic caused by the CAZ charge for through trips on the A38.</p>	Include in POBC
Network		Ban on CAZ through trips for all	Provides significant improvement to air	Exclude from

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Type	Test ID	Summary	Results	POBC
	3	vehicle types.	<p>quality in the City Centre. However, this causes significant increases on the Eastern section of the ring road which exceeds the legal NO₂ limits.</p> <p>In addition, the model shows large increases on local roads outside of the CAZ area which worsens AQ on these local residential roads.</p> <p>There are also issues with the practicality of implementing this option on the ground.</p>	POBC
	Network 4	Ban on CAZ through trips for LGV and HGV vehicles.	As above	Exclude from POBC
	Network 5	CAC C or D on the ring Eastern section of the ring road.	<p>Significant diversion to local roads outside the CAZ increasing emissions on these smaller residential roads.</p> <p>There is a need to reduce overall traffic (not just non-compliant) to meet compliance so the CAZ does not solve the issue on its own.</p>	Exclude from POBC
Public Transport	PT_1	Highway/infrastructure changes to provide bus priority 4 corridors were tested, as agreed with TfWM who said they could delivered by 2020 ID 19 & 21	Impact on mode shift forecast to be small, less than 1% reduction in overall trips into the City Centre, with high costs to implement.	Exclude from POBC

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6.3 Appendix 3

6.3.1 Appendix 3A

financial statements

Table 6.62 Revenue cash flow

Income	Note	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CAZ D Charges	Nominal			31,341,609	27,070,431	23,603,046	19,927,920	16,012,239	11,827,926	9,972,747	7,987,939	5,866,975	3,602,952	
Penalty Revenue	Nominal			12,336,260	14,225,532	12,115,923	10,006,314	7,896,705	5,787,096	4,733,228	3,679,360	2,625,492	1,571,624	
CAF - revenue	Nominal	16,166,241		14,857,927	1,774,980	1,886,941	1,519,973	0	0	0	0	0	0	
[blank]	Nominal													
Total				58,535,796	43,070,943	37,605,910	31,454,207	23,908,944	17,615,021	14,705,974	11,667,299	8,492,467	5,174,575	0
Other Revenues														
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
On-Street Parking CAZ D	Nominal			1,848,459	1,848,459	1,848,459	1,848,459	1,848,459	1,848,459	1,848,459	1,848,459	1,848,459	1,848,459	
Off-Street Parking CAZ D	Nominal			991,318	991,318	991,318	991,318	991,318	991,318	991,318	991,318	991,318	991,318	
Total parking revenue				2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	
Costs														
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
ANPR maintenance	Nominal			-779,835	-802,695	-826,660	-852,343	-879,406	-907,336	-936,174	-965,956	-996,725	-1,028,520	
Sign Maintenance	Nominal			-530,199	-545,587	-561,920	-580,002	-599,115	-619,026	-639,779	-661,421	-684,002	-707,575	
AQ monitoring	Nominal			-19,331	-19,876	-20,475	-21,198	-21,969	-22,789	-23,664	-24,597	-25,591	-26,652	
Communications	Nominal			-37,826	-38,935	-40,097	-41,343	-42,656	-44,011	-45,410	-46,854	-48,347	-49,889	
Office costs	Nominal			-109,019	-96,704	-87,092	-76,421	-64,018	-49,580	-43,405	-36,132	-27,605	-17,646	
Staffing costs	Nominal			-1,669,293	-1,532,028	-1,429,634	-1,320,424	-1,190,585	-1,036,489	-982,226	-915,157	-832,883	-732,581	
Transaction costs	Nominal			-666,421	-648,549	-577,711	-499,192	-411,372	-312,706	-269,361	-220,502	-165,613	-104,129	
DVLA costs	Nominal			-2,000,829	-2,059,480	-2,120,968	-2,186,863	-2,256,299	-2,327,960	-2,401,948	-2,478,362	-2,557,305	-2,638,882	
[blank]	Nominal													
Appeals review costs	Nominal			-516,401	-447,737	-399,729	-349,860	-296,367	-238,847	-203,422	-165,188	-123,882	-79,215	
Sinking Fund	Nominal			-1,013,893	-984,491	-957,235	-927,090	-892,116	-850,997				5,415,307	
Decommissioning	Nominal													-3,625,652
CAF mitigation expenses	Nominal			-16,166,241	-14,857,927	-1,774,980	-1,886,941	-1,519,973	0	0	0	0	0	
Total				-22,200,974	-8,951,061	-8,908,462	-8,374,709	-6,653,901	-6,409,741	-5,545,387	-5,514,170	-5,461,953	-5,385,089	1,789,655
Net Cash flow CAZ D - excluding parking revenue														
				36,334,821	34,119,882	28,697,448	23,079,498	17,255,043	11,205,280	9,160,587	6,153,128	3,030,513	-210,514	
Net Cash flow CAZ D - including parking revenue														
				39,174,597	36,959,658	31,537,225	25,919,274	20,094,819	14,045,056	12,000,363	8,992,905	5,870,290	2,629,262	

Birmingham City Council

Clean Air Zone

Table 6.13 Income and Expense and Balance Sheet

I&E	Price	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Income													
CAZ operating income	nominal	43,677,869	41,295,963	35,718,969	29,934,234	23,908,944	17,615,021	14,705,974	11,667,299	8,492,467	5,174,575		
CAF - revenue grant	nominal	16,166,241	14,857,927	1,774,980	1,886,941	1,519,973	0	0	0	0	0		
CAF	nominal												
Total		59,844,109	56,153,890	37,493,949	31,821,175	25,428,917	17,615,021	14,705,974	11,667,299	8,492,467	5,174,575		
Other Income													
Parking operating income	nominal	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776		
Total		2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776	2,839,776		
Costs													
Operating Costs	nominal	-6,329,154	-6,191,591	-6,064,286	-5,927,646	-5,761,785	-5,558,745	-5,545,387	-5,514,170	-5,461,953	-5,385,089	0	
Sinking Fund	nominal	-1,013,893	-984,491	-957,235	-927,090	-892,116	-850,997	0	0	0	0	0	5,415,307
CAF mitigation measures	nominal	-16,166,241	-14,857,927	-1,774,980	-1,886,941	-1,519,973	0	0	0	0	0	0	
Decommissioning	nominal												-3,625,652
Depreciation	nominal												
Total		-23,509,288	-22,034,008	-8,796,501	-8,741,677	-8,173,874	-6,409,741	-5,545,387	-5,514,170	-5,461,953	-5,385,089	1,789,655	
Net Impact without parking charges		36,334,821	34,119,882	28,697,448	23,079,498	17,255,043	11,205,280	9,160,587	6,153,128	3,030,513	-210,514	1,789,655	
Net impact with parking revenue		39,174,597	36,959,658	31,537,225	25,919,274	20,094,819	14,045,056	12,000,363	8,992,905	5,870,290	2,629,262	1,789,655	
Balance Sheet		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Assets													
Tangible Assets		20,762,348	20,762,348	20,762,348	20,762,348	20,762,348	20,762,348	20,762,348	20,762,348	20,762,348	20,762,348		
Accumulated Depreciation		0	2,076,235	4,152,470	6,228,705	8,304,939	10,381,174	12,457,409	14,533,644	16,609,879	18,686,114	20,762,348	
NBV Tangible Assets		20,762,348	18,686,114	16,609,879	14,533,644	12,457,409	10,381,174	8,304,939	6,228,705	4,152,470	2,076,235	0	
Sinking Fund		1,013,893	1,998,384	2,955,618	3,882,708	4,774,824	5,625,821	5,625,821	5,625,821	5,625,821	5,415,307	0	
Total Related Assets													
Liabilities													
Capital Grant		-20,762,348	-20,762,348	-20,762,348	-20,762,348	-20,762,348	-20,762,348	-20,762,348	-20,762,348	-20,762,348	-20,762,348	-20,762,348	
Amortisation		0	-2,076,235	-4,152,470	-6,228,705	-8,304,939	-10,381,174	-12,457,409	-14,533,644	-16,609,879	-18,686,114	-20,762,348	
Balance of Capital Grant		-20,762,348	-18,686,114	-16,609,879	-14,533,644	-12,457,409	-10,381,174	-8,304,939	-6,228,705	-4,152,470	-2,076,235	0	
Provision for decommissioning		-362,565	-725,130	-1,087,696	-1,450,261	-1,812,826	-2,175,391	-2,537,956	-2,900,522	-3,263,087	-3,625,652	0	
Total Programme Liabilities		-21,124,914	-19,411,244	-17,697,574	-15,983,905	-14,270,235	-12,556,565	-10,842,896	-9,129,226	-7,415,557	-5,701,887	0	

NOTE1: no MRP as grant funded

6.4 Appendix 4

Appendix 4

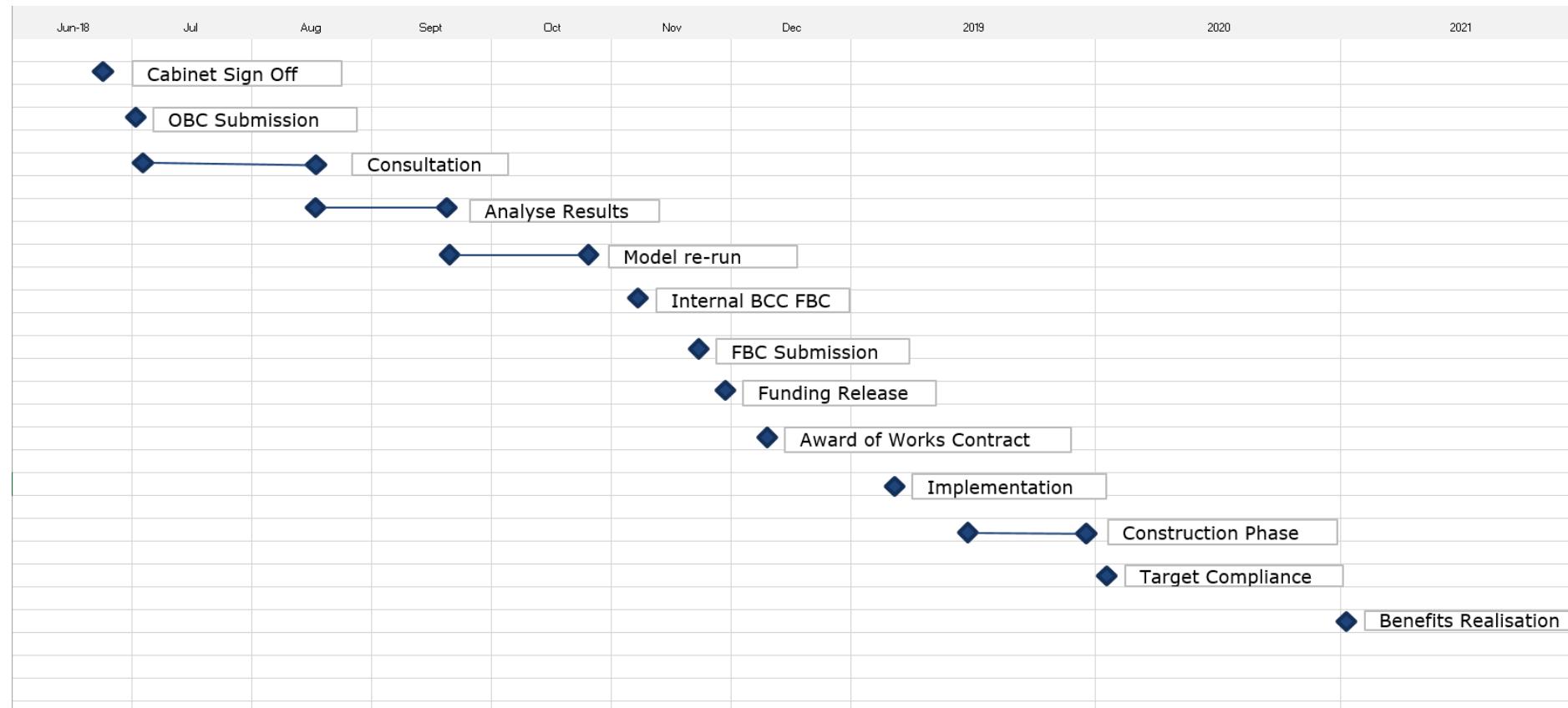
Birmingham City Council

Clean Air Zone

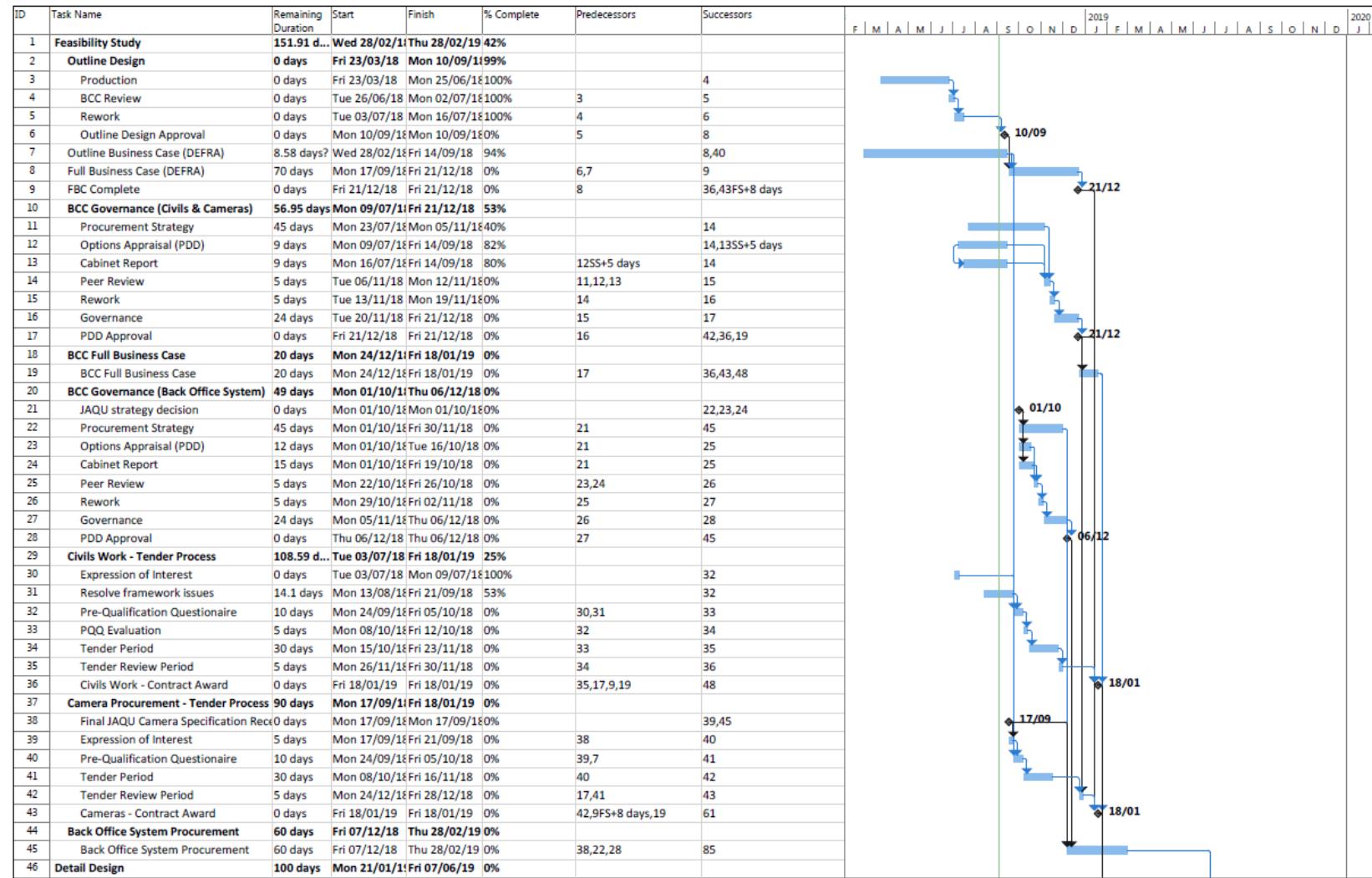
NB the Contract Award dates appear inconsistent for works/civils. It is D&B? Define "Implementation Contractor (this procurement is how in B to be awarded in 2019 –major procurement before FBC. To discuss?

6.4.1 Appendix 4A

Milestone Programme (note target compliance earlier than forecast)



6.4.2 Appendix 4B Delivery Programme (chart to be included)



Birmingham City Council

ID	Task Name	Remaining Duration	Start	Finish	% Complete	Predecessors	Successors	2019	2020		
								F M A M J J A S O N D	J F M A M J J A S O N D	J	
47	Civils Work - Phase 1	70 days	Mon 21/01/19	Fri 26/04/19	0%						
48	Mobilisation	10 days	Mon 21/01/19	Fri 01/02/19	0%	36,19	49,50,51				
49	Undertake Early Contractor Involvement	50 days	Mon 04/02/19	Fri 12/04/19	0%	48	52				
50	Detailed Design	50 days	Mon 04/02/19	Fri 12/04/19	0%	48	52,55SS+2 days				
51	Development of Target Cost	50 days	Mon 04/02/19	Fri 12/04/19	0%	48	53				
52	BCC Design Review	10 days	Mon 15/04/19	Fri 26/04/19	0%	50,49					
53	BCC Review of Target Cost	10 days	Mon 15/04/19	Fri 26/04/19	0%	51	59				
54	Civils Work - Phase 2	70 days	Wed 06/02/19	Tue 14/05/19	0%						
55	Detailed Design	50 days	Wed 06/02/19	Tue 16/04/19	0%	50SS+2 days	56SS,57				
56	Development of Target Cost	50 days	Wed 06/02/19	Tue 16/04/19	0%	55SS	58				
57	BCC Design Review	10 days	Wed 17/04/19	Tue 30/04/19	0%	55					
58	BCC Review of Target Cost	10 days	Wed 17/04/19	Tue 30/04/19	0%	56	59				
59	Appointment of Contractor for Phase 1	10 days	Wed 01/05/19	Tue 14/05/19	0%	53,58	70				
60	Cameras - Phase 1	100 days	Mon 21/01/19	Fri 07/06/19	0%						
61	Mobilisation	10 days	Mon 21/01/19	Fri 01/02/19	0%	43	62,63,64				
62	Undertake Early Contractor Involvement	65 days	Mon 04/02/19	Fri 03/05/19	0%	61	65				
63	Detailed Design	65 days	Mon 04/02/19	Fri 03/05/19	0%	61	65				
64	Development of Target Cost	65 days	Mon 04/02/19	Fri 03/05/19	0%	61	66				
65	BCC Design Review	15 days	Mon 06/05/19	Fri 24/05/19	0%	63,62	67				
66	BCC Review of Target Cost	15 days	Mon 06/05/19	Fri 24/05/19	0%	64	67				
67	Appointment of Contractor for Phase 1	10 days	Mon 27/05/19	Fri 07/06/19	0%	66,65	78,84				
68	Construction	119 days	Wed 15/05/19	Mon 28/10/19	0%						
69	Civils Work - Phase 2	109 days	Wed 15/05/19	Mon 14/10/19	0%						
70	Mobilisation	14 days	Wed 15/05/19	Mon 03/06/19	0%	59	71,72				
71	Procurement	25 days	Tue 04/06/19	Mon 08/07/19	0%	70	73				
72	RAMS	25 days	Tue 04/06/19	Mon 08/07/19	0%	70	73				
73	Traffic Management and Controls	10 days	Tue 09/07/19	Mon 22/07/19	0%	71,72	74				
74	Installation	50 days	Tue 23/07/19	Mon 30/09/19	0%	73	75,81SS+10 days				
75	Works Verification	10 days	Tue 01/10/19	Mon 14/10/19	0%	74	90				
76	Cameras Phase 2	101 days	Mon 10/06/19	Mon 28/10/19	0%						
77	Cameras	101 days	Mon 10/06/19	Mon 28/10/19	0%						
78	Mobilisation	10 days	Mon 10/06/19	Fri 21/06/19	0%	67	79,80				
79	Camera Delivery	10 days	Mon 24/06/19	Fri 05/07/19	0%	78	81				
80	RAMS	15 days	Mon 24/06/19	Fri 12/07/19	0%	78	81				
81	Installation	50 days	Tue 06/08/19	Mon 14/10/19	0%	74SS+10 days,79,80	82SS+10 days,90				
82	Modular testing	50 days	Tue 20/08/19	Mon 28/10/19	0%	81SS+10 days	90				
83	Back Office System	100 days	Mon 10/06/19	Fri 25/10/19	0%						
84	Mobilisation	10 days	Mon 10/06/19	Fri 21/06/19	0%	67	85,86				
85	Equipment Delivery	10 days	Mon 24/06/19	Fri 05/07/19	0%	84,45	87				
86	RAMS	15 days	Mon 24/06/19	Fri 12/07/19	0%	84	87				
87	Installation	60 days	Mon 15/07/19	Fri 04/10/19	0%	85,86	88				
88	Modular testing	15 days	Mon 07/10/19	Fri 25/10/19	0%	87	90				
89	Commissioning	45 days	Tue 29/10/19	Mon 30/12/19	0%						
90	Integrated testing	45 days	Tue 29/10/19	Mon 30/12/19	0%	75,82,88,81	91				
91	Programme Completion	0 days	Mon 30/12/19	Mon 30/12/19	0%	90					

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Appendix 4C

Risk Register

ID	Date Raised	Risk Influence	Risk Description	Consequence	Effect	Owner	Likelihood 1-4	Impact 1-4	Risk Score	Mitigation Action	Mitigation owner	Residual Likelihood	Residual Impact	Residual Mitigation Score	Last Updated	Comments	Status
R-004	01/08/17	Programme	There is a risk that compliance may not be achieved by the 2020 deadline.	The council may receive sanctions including fines for failing to meet compliance in time. Residents and businesses in Birmingham still impacted by poor air quality.	Reputational damage to Birmingham City Council for non compliance	BCC	4	4	16	Robust modeling which identifies interventions which make a big impact. See if there is potential to expand those initiatives to achieve compliance by 2020. Look at when compliance will be reached, needs to be shortest possible time.	BCC	3	4	12	14/08/18	Consequences are dependent upon Government decisions - yet to be communicated.	Open
R-005	01/08/17	Funding	There is a risk that JAQU's funding approvals process is prolonged for final delivery of preferred option	Potential for project slippage and failure to meet compliance within the respective timeframes. Govt not recognising that there are significant local impacts from not having the funding in place	Additional measures are not delivered in time	BCC	4	4	16	Demonstrating to JAQU the impacts of a prolonged approval process for funding. Revised timeline that reduces the legal limits (e.g. consultation).	BCC	3	4	12	14/08/18	There are now 45 cities under the recent court ruling, potentially resulting in less available funding to fulfil the obligations	Open
R-009	01/08/17	Implementation	Insufficient Grid Capacity in Birmingham for EV charging	Lack of uptake to purchase electric vehicles due to infrastructure limitations. The consequence would be that it will take longer to meet the Air Quality Requirements.	Slow transition to cleaner vehicles	BCC	3	4	12	Undertake a study to establish best locations with grid capacity to install EV charging points. Consider procuring with an EV partner, for commercial, taxi and public	BCC	2	3	6	23/02/18	Additional power, how will we charge electric cars. Will go away with opportunities through renewable energy	Open
R-010	01/08/17	Modeling	The current city traffic model (Saturn) does not account for road networks outside of the city centre.	Delays to the overall programme and implementation of CAZ initiatives. Further funding not available to improve areas outside of City Centre. Raise issues around validity on the evidence	Incorrect assessment of impacts due to limitations of existing baseline data. Remodelling - further delays	BCC	3	4	12	Model contingency plans for traffic data and their impact on Air Quality and devise whether additional measures are required to meet Air Quality compliance. Updates to the model are underway to encompass the wider outcome	BCC	2	2	4	23/02/18	Make sure that the work is underway currently	Open
R-011	01/08/17	Consultation	CAZ has an impact on Highways England network resulting in H.E objecting to CAZ.	The consequence would be that lack of engagement could potentially mean retrospective changes, increasing the cost to the council. Adverse comments at the consultations phases	Delay to Implementation	BCC	2	3	6	Ensure a robust communication and engagement strategy to enable the most useful and most recent information to be available to inform BCC.	BCC	2	2	4	22/08/17	M6 - knock on consequences	Open
R-012	01/08/17	Programme	Insufficient Public Transport Capacity to support modal shift. (programme risk)	Increased difficulty in encouraging people to change modes of transport.	It will take longer to meet the Air Quality requirements.	BCC	2	3	6	Already working with TfWM for certain corridors, and specifically uplifting mode share, eg extra buses	BCC	2	2	4	22/08/17	National policy, can anything drive transport issues. In terms of compliance the number of ratification level	Open
R-013	01/08/17	Consultation	Lack of response to public consultation, particularly from the most affected residents.	The project may take longer to deliver compliance and change driver behaviours to improve air quality. Proceed with an option that the public doesn't support	Political back lash	BCC	1	2	2	Thorough engagement and consistent communications regarding the key benefits in terms of local health. Potential to undertake focus groups	BCC	1	2	2	14/08/18	Communication strategy needs to be set out, implement mechanisms which will most likely garner a response	Open
R-014	01/08/17	Modelling	There is a risk our assumptions from the transport and AQ modelling are incorrect.	Inaccurate modelling results may cause delay to the programme. The consequence would be additional cost for interventions as a result of poorer air quality than predicted. The consequence would be a legal challenge from the Government resulting in cost and delay.	Programme delays in going back to reevaluate the modelling	Adrian Phillips	2	3	6	Independent verification undertaken on all results and these will be matched with what JAQU has provided as indicative areas of poor air quality.	Adrian Phillips	1	3	3	23/02/18	BCC air quality modelling assumptions have been approved by JAQU	Close
R-015	01/08/17	Political	Political members may be unsupportive of CAZ.	Unsupportive members may cause the decision making and schedule to be delayed significantly	Programme delays - Cost overruns	BCC	2	3	6	Proactive communications and engagement with influential political stakeholders and demonstrate impact to cost and schedule from lack of decision making.	BCC	1	2	2			Open

Birmingham City Council

ID	Date Raised	Risk Influencer	Risk Description	Consequence	Effect	Owner	Likelihood (1-4)	Impact (1-4)	Risk Score	Mitigation Action	Mitigation owner	Residual Likelihood	Residual Impact	Residual Mitigation Score	Date Updated	Comments	Status
R-016	01/08/17	Legislation	There is a risk of lack of guidance and legal understanding in how the traffic regulation order approval can be used to implement the scheme.	Potential for judicial review as a result of objections.	Significant delay to delivery	BCC	4	4	16	Gather political support to ensure approval of TRO. TRO to include evidence concluded from modeling. Ensure alignment with overall programme.	BCC	1	3	3	22/07/18	Review before we can accept TRO, we can still go ahead and implement, will politicians support that.	Open
R-017	01/08/17	Funding	There is a risk that JAQU doesn't understand the complexity and scale involved in BCC completing their Feasibility Study	The consequence would be there is the possibility of a delay to agreeing a preferred solution impacting timescales to achieve compliance.	Negative impact on the wider economy. Impact on deprived areas and smaller businesses	BCC	2	3	6	Provide JAQU with draft modeling results to prevent delays in achieving a preferred solution. Consistent engagement to keep JAQU informed of developments and progress on the overall Air Quality Programme.	BCC	1	2	2			Open
R-018	01/08/17	Consultation	The risk is managing objections raised through the Consultation process within set timescales.	The consequence would be additional rework to preferred option could drive delays in deploying CAZ interventions. Delay to developing the preferred option	delay on the delivery	Adrian Phillips	2	3	6	Whilst developing the preferred option consider issues that may be raised during the consultation and build in contingency.		1	3	3			Open
R-019	01/08/17	Economy	The risk is future residential / industrial developments in and around the CAZ will increase traffic.	There may be a requirement to increase investment in public infrastructure or accept failure to meet Air Quality compliance.	Will not achieve compliance	Adrian Phillips	2	3	6	Model proposed infrastructure developments and their impact on Air Quality and devise whether additional measures are required to meet Air Quality compliance.	Adrian Phillips	1	3	3			Open
R-018	23/02/18	Procurement	Supplier is not appointed in July/August ahead of BCC Civils framework (expiring in Sept 2018 (4 year limit)	Delay in securing a supplier with no indication of when the next civils framework will be issued	Significant delay on the delivery	BCC	3	4	12	Early contract engagement with suppliers under NDA arrangements	BCC	1	3	3	14/08/18	Extension to Framework	Open
R-019	01/08/17	Procurement	Lack of interest from suppliers during Invitation to Tender process	Delays to the programme due to need to re-tender	Delay to delivery	BCC	2	3	6	Pre assessment through market research on appetite for the products on offer.	BCC	1	2	2	14/08/18	There is an appetite from the market	Open
R-020	01/08/17	Funding	There is a risk that the capital costs for the CAZ interventions exceed initial forecast spend.	Failure to deliver all interventions to improve Air Quality and reach compliance resulting in a financial penalty to the council.	Delay in compliance	BCC	2	3	6	Ensure budget is sufficient to deliver the respective interventions. Close monitoring of financials during the delivery of the various interventions. Appropriate contingencies	BCC	1	2	2	01/08/17	Implementation risk, procurement strategy before FBC, FBC will finalise costs	Open
R-023	01/08/17	Resources	There is a risk that there is a lack of resource in terms of capacity and capability within BCC to deliver the project.	Slippage in the programme which would mean a fine as a result of not being compliant.	Delay in compliance	Adrian Phillips	1	3	3	Create and manage a resource tracker for the overall programme delivery to ensure no project slippage.	Adrian Phillips	1	2	2	09/04/18	Resource tracker created, raised awareness of annual leave absences and needs for further resources	Open
R-024	01/08/17	Political	There is a risk that there is a delay to scheme approval. Internal scheme approval -	Delay to draft scheme submission and scheme approval could mean that Birmingham City Council miss the requirements of the proposed secondary	Delay in compliance	Adrian Phillips				Constant management of the programme plan and review of critical activities to prevent slippage.						Delaying implementation of proposal	

ID	Date Raised	Risk Influencer	Risk Description	Consequence	Effect	Owner	Likelihood (1-4)	Impact (1-4)	Risk Score	Mitigation Action	Mitigation owner	Residual Likelihood	Residual Impact	Residual Mitigation Score	Date Updated	Comments	Status
		Mitigation, has to make it work (ministerial direction)	Government led scheme - forced to timescales etc.	legislation to mandate the implantation of a CAZ in Birmingham resulting in punitive measures.			1	4	4		Adrian Phillips	1	2	2			Open
R-021	01/08/17	Political	There is a risk of political disagreement on the preferred option.	Reputational damage to Birmingham increase in time and / or cost.	Delay in compliance	BCC	1	4	4	Execute a robust communications plan to gather political support. Keep influential stakeholders informed of developments and use their powers to prevent a backlash.	BCC	1	2	2	01/08/17	If we have a CAZ then public perception	Open
R-022	01/08/17	Technological	There is a risk that there is no knowledge or information on the proposed CAZ options resulting in lack of understanding 'back office' technical requirements.	No defined CAZ option may result or over estimation / training / skills needed on the back office requirements for back office staff. Therefore may potentially make it difficult to assemble the financial, commercial and management case for the CAZ full business case.	Delay in compliance	BCC	3	3	9	As the project moves closer to a defined option, definition of the back office technical functions will be further defined	BCC	2	1	2	14/08/18	Still valid, but need a better understanding of the project requirements before any work on what is needed for back office staff, or if this element of the project will be outsourced to a 3rd party supplier	Open
R-023	23/02/18	Technological	There is a risk that cashless payment systems for the CAZ charging zone are not user friendly.	No off the shelf system currently available.	Reputational damage	BCC	1	3	3	Ensure proper testing prior to user roll out.	BCC	1	1	1	14/08/18	We don't know what system will be introduced	Open
R-024	23/02/18	Consultation	There is a risk that Local election could result in a delay in statutory consultation from March to June therefore delaying final submission of FBC.	Significant as it would mean Birmingham would not be compliant with the legislation by 2020	Longer to meet compliance	BCC	4	3	12	Undertake regular updates with Executive and Members at BCC look at reducing timescales after consultation. Have a shorter consultation period	BCC	3	2	6	09/04/18	PREFERRED Option is not ready to consult in March, have reduced consultation period and condensed timescales after consultation	Open
R-025	23/02/18	Programme	There is a reputational risk that Defra penalise for late submission of Full Business Case as there is lack of support in understanding the local constraints	Not able to introduce proposed option	Reputational damage	BCC	3	3	9	Regular dialogue within the project team and JAQU of status of feasibility work.	BCC	3	3	9	23/02/2018	New Risk identified at the latest workshop	
R-026	23/02/18	Resources	There is a risk that specialists with technical and air quality knowledge is stretched as the number of cities identified to address AQ nationally increased from 5 to 45.	Specialist resources will be in the highest demand.	BCC	4	3	12	One of the first cities identified to address AQ, therefore ahead of the others. Can provide useful lessons learned to other cities moving forward	BCC	3	4	12	14/08/2018	JAQU updated at last catch up - continual updates on the status of feasibility	Open	
R-027	01/08/17	Funding	The approved Budget of additional funding does not cover consultation requirements	Restrictions to consultation advertising and activities	Reduced awareness and engagement in consultation.	BCC	3	4	12	Cost Tracker to be produced and managed throughout by T&T, with approvals from BCC. This is to be submitted to JAQU who are aware of additional funding needed for consultation	BCC	1	3	3	21/06/2018		Open
R-028	01/08/17	Programme	Engagement with education sectors is not feasible within agreed programme i.e. universities break for Summer holiday in May	students do not get the opportunity to participate in consultation - or consultation is delayed to enable engagement	Delay to consultation or consultation not all-inclusive	BCC	4	2	8	Mitigation includes engagement with university senior staff members via business briefings to ensure message is relayed to back staff and students. Public Drop in session at the University of Birmingham main plaza.	BCC	3	1	3	21/06/2018		Open

Birmingham City Council

ID	Date Raised	Risk Influence	Risk Description	Consequence	Effect	Owner	likelihood (1-4)	Impact (1-4)	Risk Score	Mitigation Action	Mitigation owner	Residual likelihood	Residual Impact	Residual Mitigation Score	Last Updated	Comments	Status
R-029	01/08/17	Consultation	Consultation does not sufficiently represent/ engage with those affected (geography / equality)	Equality analysis demonstrates requirement for further consultation.	Programme delay and extra cost	BCC	3	3	9	Engage with BCC equality experts when planning consultation advertising and events	BCC	3	1	3	21/06/2018		Open
R-030	01/08/17	Governance	There is a risk of delay in getting preferred option approved for consultation	Prevents progress of project & consultation	Programme delay and re-work	BCC	2	4	8	Early engagement with key stakeholders ahead of approvals to identify potential issues.	BCC	3	1	3	14/09/2018	BCC Cabinet decided upon CAZ D+AM to consult upon	Open
R-031	01/08/17	Governance	There is a risk that there is a lack of key information required for consultation - CAZ design not far enough progressed	High level consultation only	Programme delay and re-work	BCC	1	4	4	Continued engagement with technical team to build the clearest understanding of CAZ possible.	BCC	1	2	2	21/06/2018		Open
R-032	01/01/17	Delivery	There is a risk that there is a lack of forthcoming guidance and CAZ branding being developed in time to begin implementation phase	Assumptions used to progress procurement and tenders may change as a result of JAQU guidance and therefore work can not be scoped or costed appropriately for FBC.	Programme delays and lack of detail to progress to FBC.	BCC	2	4	8	Continued engagement with JAQU, attendance at all implementation webinars to ensure JAQU answer any questions and BCC can raise any issues.	BCC	2	2	4	21/06/2018		Open
R-033	01/01/17	Delivery	Limited time to undertake detailed site work at design phase	Improper positioning of signs and cameras leads to obscure lines of sight and increased street clutter. Potential unsuitability of location.	Delays to delivery programme and rework of tenders.	BCC	1	4	4	Continued collaboration with the design team and the infrastructure delivery team to ensure efficiencies and knowledge is shared at all times.	BCC	1	2	2	21/06/2018		Open
R-034	01/01/17	Delivery	The CAZ boundary may be amended following consultation to take account of schools, grounds owned by neighbouring local authorities, health centres and other community buildings.	The consequence would be that initial design of sign and camera location may no longer be appropriate.	Delays to delivery programme and additional costs, variations to scope.	BCC	2	4	8	Ongoing review of design process throughout consultation to ensure amendments and comments are taken into consideration post consultation analysis.	BCC	2	2	4	21/06/2018		Open
R-035	01/01/17	Delivery	Some of the signage and camera locations are situated on adjacent authorities' or privately owned highway networks.	The consequence could be that the authority stakeholder does not agree to the location of the signcamera.	Delay to programme, additional costs and possible rework of design.	BCC	3	3	9	Communication with JAQU to raise this as an issue, national assurance that authorities such as Highways England are on board with Clean Air Zones and have a clear understanding of requirements. Communication directly with these authorities where there may be potential infrastructure on the network.	BCC	2	2	4	21/06/2018		Open
R-036	01/01/17	Delivery	The guidance issued by JAQU in regards to signage design is different to draft designs worked with to date.	The consequence would be a design change because the foundation and post designs are based on the draft sign faces.	Additional cost and programme delay.	BCC	3	2	6	Using assumptions and previous experience to design to the best of ability a sign design that is as close to JAQU guidance as possible. Continual communication with JAQU to understand the general intention.	BCC	2	1	2	21/06/2018		Open
R-037	08/06/18	Delivery	The back office system is still unknown, whether it will be managed centrally or locally.	The consequence would be that the lack of scope clarity means the work can not be progressed any further which will cause further delays in the schedule and uncertainty in the FBC.	Additional cost and programme delay.	BCC	4	4	10	Ongoing work with selected supplier to propose a more localised solution. Continual engagement with JAQU to understand the process.	BCC	3	3	9	08/08/2018		Open

6.4.3 Appendix 4D

Stakeholder Management Plan

The table correlates stakeholders with communications channels. It is likely that some people will also find out about the consultation directly via our response channels, i.e. BCC website, Be Heard website and materials in libraries, but we will not rely on this.

A wider stakeholder engagement plan is being created for overarching engagement on Air Quality in Birmingham.

dark purple indicates a primary channel for engaging the stakeholder; light purple indicates a secondary channel for engaging the stakeholder.

Stakeholder sector	Stakeholder example (not comprehensive)	Social media	Existing email & other E comms	Traditional media (press release)	Stakeholder & community networks – incl. Councillors	One of: Roadside signs (recommend), Radio ads, Bus rear ads	Public transport user messaging	Printed flyers (distribution strategy tbc)
Individuals	Younger people	Dark Purple	Light Purple	Light Purple	Light Purple	Light Purple	Dark Purple	Light Purple
	Disabled people	Dark Purple	Light Purple	Dark Purple	Light Purple	Light Purple	Light Purple	Light Purple
	Pregnant women	Dark Purple	Light Purple	Light Purple	Light Purple	Light Purple	Light Purple	Light Purple
	People from BME communities	Dark Purple	Light Purple	Dark Purple	Light Purple	Light Purple	Dark Purple	Light Purple
	City centre residents	Dark Purple	Dark Purple	Dark Purple	Light Purple	Light Purple	Dark Purple	Light Purple
	City centre workers	Dark Purple	Dark Purple	Dark Purple	Light Purple	Light Purple	Dark Purple	Light Purple
	Residents along major roads	Dark Purple	Dark Purple	Light Purple	Dark Purple	Dark Purple	Dark Purple	Light Purple
	People frequently driving to the city centre in diesel cars	Dark Purple	Light Purple	Dark Purple	Dark Purple	Dark Purple	Light Purple	Light Purple
	People driving significant distances in Birmingham within job	Dark Purple	Light Purple	Dark Purple	Dark Purple	Dark Purple	Light Purple	Light Purple

Stakeholder sector	Stakeholder example (not comprehensive)	Social media	Existing email & other E comms	Traditional media (press release)	Stakeholder & community networks – incl. Councillors	One of: Roadside signs (recommend), Radio ads, Bus rear ads	Public transport user messaging	Printed flyers (distribution strategy tbc)
Business & Economy	Business Improvement Districts (especially city centre)							
	Chamber of Commerce							
	Federation of Small Businesses							
	Greater Birmingham and Solihull LEP							
	Individual businesses							
Education & Skills	Universities							
	Colleges							
	Schools							
Environment & Sustainability	Environmental Groups							
Health &	Public Health England/Lap							
Wellbeing	Clinical Commissioning Groups							
	Hospitals, GP surgeries, etc.							
Housing & Communities	Housing Associations							
	Tenants' and							

Stakeholder sector	Stakeholder example (not comprehensive)	Social media	Existing email & other E comms	Traditional media (press release)	Stakeholder & community networks – incl. Councillors	One of: Roadside signs (recommend), Radio ads, Bus rear ads	Public transport user messaging	Printed flyers (distribution strategy tbc)
	residents' groups							
Media, Communications & Marketing	Local Press/Media							
	BBC WM							
	West Midlands Growth Company							
Science & Technology	Universities							
	Science Parks							
Transport	Transport for West Midlands							
	Highways England							
	Public Transport operators							
Political	Birmingham Councillors							
	Birmingham MPs/MEPs							
	WM Mayor							
	WMCA							
	Other WM elected members/LAs							
BCC	BCC departments							

INDEPENDENT CONSULTATION ANALYSIS REPORT:

CLEAN AIR ZONE FOR BIRMINGHAM

DRAFT

Date: 6 September 2018

Version: 1.8

Status: Draft Report

Please note: this document has yet to undergo quality control checking, so some errors may be present. A final version will be issued.

Author: TONIC

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EXECUTIVE SUMMARY

Introduction

Birmingham City Council have found that pollution in the air, mainly caused by vehicles on the roads, is having a harmful effect on the health of people living, working and studying in the city of Birmingham.

A Clean Air Zone (CAZ) is a designated area where targeted action is taken to improve air quality. CAZs aim to reduce all types of air pollution, including nitrogen dioxide and particulate matter, so that people breathe in fewer of these pollutants. The Government expects Birmingham, and a number of other cities, to introduce a Clean Air Zone (CAZ) from January 2020.

Between 4 July and 17 August 2018, Birmingham City Council ran a public consultation on proposals to introduce a CAZ for the city centre. This would mean that the most polluting vehicles would have to pay a charge to enter the zone.

Preparing this Report

Responses to the consultation were analysed and are reported on here on behalf of Birmingham City Council by TONIC (www.tonic.org.uk), an independent organisation specialising in public consultations and social research.

Who took part in the consultation?

10,392 individuals responded to the consultation, along with 386 responses from organisations and businesses. In addition, 394 responses to a petition organised by the Motorcycle Action Group were submitted to Birmingham City Council by the close of the consultation. Birmingham City Council also ran a number of stakeholder and public events to discuss the issues and answer questions.

Individuals

- 78% of respondents live in Birmingham, with 60% working in the area, 45% visiting Birmingham for leisure and shopping and 4% studying there
- 15% were aged under 29, with 26% aged 30-39, 22% aged 40-49, 18% aged 50-59 and 16% aged 60 or over
- 39% had dependent children in their household
- 54% were male and 36% female, with 10% not answering this question or preferring not to state their gender
- 16% had one or more physical or mental health conditions or illnesses lasting, or expected to last, for 12 months or more
- 62% described their ethnicity as white British, with 19% describing themselves as Asian/Asian British, 4% were from “other White backgrounds” and 3% were Black African/Caribbean/Black British
- 66% described their sexual orientation as heterosexual, 3% as gay or lesbian and 2% as bisexual, with 22% preferring not to say
- 35% described themselves as having no religion, while 33% said they were Christian, and 16% were Muslim

Organisations

SECTOR

11% of organisations that responded were from the transport industry. 9% were third sector or charitable organisations, and 8% were from the retail sector and 7% coming from the production sector.

ORGANISATION SIZE

51% were micro organisations (with 0-9 employees), 38% were SMEs (with 10 – 249 employees) and 10% were large organisations (with over 250 employees).

NUMBER OF SITES

67% of organisations who responded had one or more sites within the CAZ, 35% had sites in Birmingham but outside the CAZ, and 29% had sites outside Birmingham.

Headline findings from analysis of the consultation responses

Individuals

VEHICLE OWNERSHIP AND MAIN VEHICLE

90% owned or leased cars, of which 84% said their car was their main vehicle. 44% had a diesel fuelled main vehicle, with 42% having petrol fuelled. 3% had main vehicles which used other fuels, such as electric, LPG or hybrid.

PURPOSE OF JOURNEYS INTO THE CAZ

When travelling into the CAZ area for work, shopping and leisure or visiting friends and family, more than half of respondents usually drive their own vehicle (for work 56%, shopping 55%, leisure or visiting friends and family 56%). In addition, 42% drive their own vehicle for medical appointments, 37% for other activities, 23% for taking children to school/activities, 22% for worship and 17% for education or study. 24% use public transport to go shopping.

FREQUENCY OF JOURNEYS INTO THE CAZ

Of the people driving into the CAZ area, just under half of respondents (48%) drive in for work and education or study on 3 or more days in a typical week. Driving in for shopping (44%) and leisure or visiting family or friends (39%) that entered the CAZ were the most likely to be on a fairly regular basis, namely from 1 day a month to 2 days per week.

BEING CHARGED TO ENTER THE CAZ

51% stated they would be charged to drive their main vehicle into the CAZ, with 28% saying they would not be charged. 13% stated they did not know whether they would be charged or not. Of the respondents living within the CAZ area, only 44% said that they would be charged to drive their main vehicle in the CAZ.

JOURNEYS INTO THE CAZ

When asked about trips they make through the proposed CAZ without stopping, around 1 in 3 respondents stated they travel in the following ways:

- 30% travelled infrequently, from “never” to less often than 1 day per month
- 36% travelled fairly regularly, from 1 day per month to 2 days per week
- 34% travelled regularly, on 3 or more days per week

IMPACT ON BEHAVIOUR

28% stated there would be no change for them if the CAZ was introduced as they would not be charged due to them not driving in the area or because their vehicle would not be included in the charge. 19% stated they would change their journeys so that they did not enter the CAZ, for example, by taking a different route or choosing to visit shops outside the zone. Of those who would be affected by the CAZ charge, the main themes emerging in comments were that some people felt they would need to leave their job, others would shop or undertake leisure activities elsewhere, and some spoke about how they or others would struggle financially.

OPINION

Opinions were divided on the overall impact of the proposed CAZ, with support for the health benefits, but concerns about the impact on themselves and their families, Birmingham as a city, and particularly on businesses in Birmingham:

- 44% saying it would be positive for the health of people in Birmingham and 12% saying it would be negative. Notably 45% did not know if it would improve health or did not give an answer
- 25% said it would be positive for themselves and their family, with 52% saying it would be negative
- 13% said it would be positive for businesses in Birmingham and 72% said negative
- 32% felt it would be positive for Birmingham as a city and 52% felt the impact would be negative

Analysis of the comments received shows that the main areas of support were for improvements in air quality and health, that this would result in or necessitate a better public transport system and an improved feel to the city centre. The main areas of concern voiced about the CAZ were around residents and commuters experiencing financial difficulties, difficulties for businesses, financial inequality, fears about increased public transport costs, and increasing congestion and pollution elsewhere meaning there was no positive impact on air quality or health.

VEHICLES TO INCLUDE IN THE CAZ CHARGE

Over half of respondents felt that buses and coaches (55%), lorries (76%), taxis and private hire vehicles (52%), and vans and minibuses (65%) should be included in the CAZ restrictions. Nearly half (49%) felt that motorcycles and mopeds should not be included in the restrictions, compared to 39% who felt they should be included. Opinion was more evenly split with regards to cars, with 47% saying they should not be included in the CAZ restrictions and 43% saying they should be.

LEVEL OF THE CAZ CHARGE

52% of respondents felt that buses and coaches should be charged under £50 per day for entering the CAZ, with 39% feeling that lorries should have this level of charge. The level of support for charges reduced as the amount of the daily charge increased, with only 9% supporting a charge of £150 or over per day for lorries and 6% supporting this level of charge for buses.

The most commonly chosen daily CAZ charge for cars, motorcycles, vans and taxis, was under £5.

EXTRA SUPPORT FOR SPECIFIC GROUPS

More than two-thirds of respondents felt that there should be support for the following groups:

- People attending worship in the CAZ area (76%)
- SMEs operating in the CAZ area (71%)
- People living in or close to the CAZ area (70%)
- People with limited income (68%)
- Disabled people (68%)

Over half (56%) felt that taxi operators should be given extra support regarding the CAZ.

Although fewer than half of respondents indicated that these groups required extra support, more people said they 'agree' they should receive extra support than disagree:

- Larger businesses and organisations operating in the CAZ area (43% agree they should receive support, 30% disagree)
- Parents and guardians of patients at Birmingham Children's Hospital (42% agree, 29% disagree)

Respondents' views were more mixed regarding whether businesses and organisations outside the CAZ area should receive extra support, with 36% saying they should receive support, 35% saying they should not and 29% saying that they neither agree nor disagree or don't know.

SUPPORT FOR THEMSELVES

38% stated they would need extra support if a CAZ was introduced, with 45% saying that they would not need support.

Organisations

VEHICLE OWNERSHIP

64% of organisations responding own vehicles, with 19% having some vehicles on long term lease. 10% have short term lease vehicles and 24% of organisations did not report having any vehicles.

This equated to approximately 3,216 diesel cars, 2,526 coaches or buses, 1,320 diesel vans or minibuses, 614 petrol cars, 460 Heavy Goods Vehicles and 361 cars fuelled by other sources (e.g. electric, LPG, hybrid).

Organisations estimated the percentage of their fleet that would not be charged to enter the CAZ. 35% of organisations said that all of their vehicles would be charged, with 25% stating that either most or all of their vehicles would not be charged.

Respondents estimated that, on average, 61% of their fleet would be affected by the CAZ charge, with 39% not affected. However, when this was applied to the number of vehicles that organisations gave details about, it is more evenly split, with 50% (259,550 vehicles) being charged to enter the CAZ and 50% (256,476) not being charged.

When this data is broken down by size of organisation, it appears that the larger the organisation, the higher the percentage of their fleet is compliant with the CAZ requirements and would not be charged to enter the area.

JOURNEYS INTO THE CAZ AREA

Organisations estimated that for:

- Transporting goods or people, 13% made over 250 trips per week into the CAZ and 47% made between 1 and 249 trips per week
- Supplying goods and services, 14% made over 250 trips per week into the CAZ and 64% made between 1 and 249 trips per week
- Receiving deliveries or collections, 8% had over 250 trips per week into the CAZ and 72% had between 1 and 249 trips per week

OPINION ON THE CAZ

Organisations showed a similar pattern to the responses by individuals, with support for the health benefits, and concerns about the impact on their organisations, Birmingham as a city, and particularly on businesses in Birmingham:

- 44% said it would be positive for the health of people in Birmingham and 5% said it would be negative. Notably 51% did not know if it would improve health or gave no answer
- 13% stated that the CAZ would have a positive impact on their organisation, with 74% saying it would have a negative impact
- 11% said it would be positive for businesses in Birmingham and 77% said negative
- 29% felt it would be positive for Birmingham as a city and 50% felt the impact would be negative

Analysis of comments shows there were positive views about the potential of the CAZ for improvement in air quality and health, however others felt these issues would not improve. The main areas of concern were about the proposed CAZ creating difficulties for business owners, resulting in subsequent job losses, as well as creating increased congestion and pollution in areas surrounding the CAZ.

VEHICLES TO INCLUDE IN THE CAZ CHARGE

Over half of organisations that responded felt that buses and coaches (61%), lorries (70%), taxis and private hire vehicles (54%), and vans and minibuses (52%) should be included in the CAZ restrictions. Over half felt that motorcycles and mopeds (57%) and cars (51%) should not be included in the restrictions.

LEVEL OF THE CAZ CHARGE

43% of organisations that responded felt that lorries (HGVs) should be charged under £50 per day for entering the CAZ, with only 5% feeling that buses and coaches should have that same level of charge. 70% felt that buses should be charged between £100 and £149 per day to enter the CAZ, with the general view being that pricing should be lower for lorries than for buses and coaches.

The most commonly chosen daily CAZ charges by organisations for cars, motorcycles, vans and taxis, was under £5.

EXTRA SUPPORT FOR SPECIFIC GROUPS

Over half of the organisations that responded felt there should be support regarding the CAZ for SMEs operating in the CAZ area (82%); for people attending worship in the CAZ area (74%); people with limited income (71%); those with disabilities (71%); and those living in or close to the CAZ area (70%); as well as larger businesses and organisations operating in the CAZ area (63%); and taxi operators (63%). Half (50%) felt that businesses and organisations outside the CAZ area should receive support. Although fewer than half of respondents indicated that parents and guardians of patients at Birmingham Children's Hospital should receive extra support, more organisations said they 'agree' they should receive extra support (45%) than disagree (20%).

SUPPORT FOR THEMSELVES

72% stated their organisations would need extra support if a CAZ was introduced, with 16% saying they would not need any support.

Themes Emerging from Analysis of Comments Received (from both individuals and organisations)

PROPOSED CAZ AREA

There was some support for the location outlined in the proposed CAZ area, with others asking for it to cover a larger area. Some suggested the zone should be smaller, only covering the inner ring road or excluding certain areas, such as the Jewellery Quarter, industrial areas and the A38. Many also used their comments on this question to voice concerns about the impact on individuals, families and businesses through resultant financial hardship, job losses and increased congestion and pollution in areas surrounding the CAZ.

OTHER IDEAS FOR ACTIONS TO IMPROVE BIRMINGHAM'S AIR QUALITY

The main suggestions made by respondents were:

- Make improvements to public transport either before or in conjunction with the introduction of the CAZ
- Improve the cycle network
- Improve the road system to aid traffic flow, along with more effective traffic light synchronisation and better managed roadworks
- Introduce more green spaces and tree planting in the city
- Develop the rail network further to enable more journeys to be made by train
- Create a system of effective and affordable Park & Ride schemes to allow people to drive near to the CAZ and either walk or take a bus to their final destination
- Extend the tram system further than is currently planned
- Introduce a travel pass system to allow certain groups to have cheaper or free access to the CAZ for work, worship, hospital visits, visiting family members and for residents living inside the CAZ
- Promote walking and increase pedestrianisation of city centre areas
- Provide more charging points for electric vehicles

EXTRA SUPPORT

Respondents asked for extra support, reductions or exemptions for a number of groups, which included:

- Visitors to and staff at Birmingham Children's Hospital
- People with disabilities and their carers
- Those living within the CAZ being made exempt or receiving discounts
- Financial support for those on low incomes
- Small businesses within the CAZ
- Commuters and those working within the CAZ
- Taxi and private hire vehicle drivers

The types of support that were suggested for these groups included:

- General financial support
- Introduction of a vehicle trade-in scheme
- Phased introduction or more time before charging begins
- Subsidised bus travel and/or bus passes
- Discounts or exemption from paying the charge

Some felt that no support should be available for any groups.

INFORMATION REQUIRED TO COMPLETE THE CONSULTATION

The majority of both individuals (74%) and organisations (73%) felt that the information provided enabled them to make an informed comment in the consultation, with 14% of individuals and 15% of organisations saying that more information was required, with the main additional information requested including:

- Increased honesty as to why the CAZ is being introduced
- What the actual charges will be for specific vehicle types
- Detailed plans for the improvement to the local public transport system
- A better map of the proposed CAZ with greater detail provided on the chosen area
- Information on the types of help and support that may be offered
- Information on alternate or additional plans to tackle Birmingham's air pollution
- Information about plans for how the money generated by the CAZ charge will be used
- A comprehensive list of compliant vehicles
- Information on the projected economic impact of introducing the CAZ
- Details of any plans for help and support that would be made available to businesses that were negatively impacted by the CAZ
- Details on the projected impact the CAZ may have on individuals
- More information on the current levels of air pollution and how the CAZ will impact positively on this
- Sources for the evidence used in the consultation material

1. CONSULTATION PROCESS

1.1 Background

This chapter provides an overview of the consultation process, outlining the methods of communication used by Birmingham City Council to promote the consultation as well as engaging with members of the public, businesses and other stakeholders.

The consultation was launched on Wednesday 4 July 2018 and ran for 6 weeks until Friday 17 August 2018.

The aim of the consultation process was to seek feedback from individuals and organisations on the proposals for a Class D Clean Air Zone (CAZ) for Birmingham. Specifically identifying:

- Feedback and thoughts on the CAZ proposals;
- The impact that the proposals would have on individuals and organisations;
- What support/mitigation is needed for particular groups of people/vehicles; and
- Suggestions for any further measures which we have not included.

1.2 Publicising the consultation

Throughout the consultation key messages were shared alongside a call to action asking people to read the CAZ proposals and respond to the consultation:

- Clean air is a basic human right for every single person who lives in, works in and visits Birmingham
- Air pollution is responsible for up to 900 early deaths a year in Birmingham – this is unacceptable and must be addressed now
- We are already tackling air pollution in many ways – the Clean Air Zone will be just one
- If we don't tackle poor air quality together now, there will be serious implications for future generations
- Improving our air quality is everyone's responsibility

A press release and media briefing were held to coincide with the publication of Cabinet decision papers on 19 June.

Birmingham City Council, along with its partners, used a number of different channels of communication to spread the word about the CAZ consultation. This included:

- Existing stakeholder and community networks
- Existing email and other electronic communications (corporate BCC, departmental and schools)
- Public drop-in sessions
- Roadside signage on approach to the CAZ area
- Radio and press advertising

- Public transport user messages, e.g. on bus stops
- Printed flyers delivered to all residential and commercial properties in and near to the proposed CAZ
- Traditional media
- Social media activity including Facebook and Twitter
- Public and stakeholder events.



Whilst engaging with businesses and organisations we have also encouraged them to raise awareness of the Clean Air Zone with their clients, suppliers and other business contacts.

1.3 Response channels

Where contact was made through a channel other than Be Heard, we encouraged people to also complete the questionnaire online or on paper, if they were able to.

A face to face drop-in session for Councillors was held alongside a Full Council meeting on 10 July, with a presentation and materials pack available for Ward Forums on request.

Other response channels included:

1.3.1 Online - Be Heard

All publicity directed citizens to www.birmingham.gov.uk/caz, from where they were sent to the Be Heard website where separate surveys for individual citizens and for businesses/organisations were available.

The following documents were available to view or download on the Be Heard site:

- Consultation Summary Document
- Air Quality Modelling Report
- Transport Modelling Forecasting Report
- Additional Measures - CAZ Feasibility Report
- Frequently Asked Questions

- Acronyms and Abbreviations
- Clean Air Zone Briefing Presentation
- Printable posters (colour and black & white)

Between 1 July and 17 August there were 46,241 unique visitors to the Birmingham City Council Clean Air Zone page.

Respondents were asked to submit their feedback about the proposals through the online questionnaire, including closed and open questions and providing the opportunity for respondents to give additional comments. Some businesses felt that the questionnaire was not suitable for their organisation and submitted a response via email to the Clean Air mailbox.

For those people who did not wish to or were not able to respond to the questionnaire online, paper copies and consultation summary documents were available in all 37 libraries across Birmingham. In addition to this, technical documents were available at the Library of Birmingham and available upon request for those who could not access the document online. Paper copies of the questionnaire were also sent in the post to individuals upon request.

1.3.2 Email correspondence

All email correspondence sent via cleanair@birmingham.gov.uk was logged, acknowledged and responded to where relevant and appropriate. Emails from 275 citizens relating to the Clean Air Zone were logged.

1.3.3 Dedicated phone line

A dedicated phone line was available throughout the consultation during office hours, with a voicemail available outside of these times. 80 calls were received, logged in the correspondence log and dealt with accordingly.

1.3.4 Public drop-in sessions

Twelve face to face public drop-in sessions were held. The events were held in multiple locations across Birmingham, as shown below. The events attracted different levels of interest, with an average of 33 attendees per event.

Location	Approximate number of attendees
Acocks Green Library	11
Ladywood Community Centre	36
Stirchley Baths	15
Handsworth Wellbeing Centre	14
Heartlands (Hospital) Education Centre	0
All Saints Community Centre	42
Mere Green Community Centre	11
Chris Bryant Centre, Erdington	0
The Fort Shopping Park	14

One Stop Shopping Centre	41
University of Birmingham	40
High Street, City Centre	88

In addition, two lunchtime drop-in events for Birmingham City Council staff were held, at Woodcock Street and Lancaster Circus.

1.3.5 Stakeholder Communication

Four stakeholder seminars were held for organisations and businesses wishing to find out more information about the proposals and to feedback their concerns, comments and ideas. An invitation email was sent using the existing BCC corporate and departmental databases to approximately 26,000 businesses and organisations inviting them to register interest in the stakeholder seminars. Emails were sent from the Clean Air mailbox by the Business Development Team, with further reminder emails sent.

The sessions each ran for three and a half hours and included a presentation, Q&A, and an interactive group session. The table below shows the number of people who attended to represent an organisation or business.

Date	Venue	Attendees	Businesses/organisations represented
Wednesday 11 July	The Old Library, Digbeth	58	42
Wednesday 18 July	The Old Library, Digbeth	46	35
Monday 30 July	Transport for West Midlands offices, 16 Summer Lane	17	15
Thursday 9 Aug	The Old Library, Digbeth	60	46
	Total	181	138

In addition to the seminars, various stakeholders were engaged through private briefings and third-party events.

1.3.6 Taxi events

Five events specifically for taxis and private hires were held by the licencing team for taxi drivers to come and talk to BCC officers about its Clean Air Zone proposals and to find out what specific concerns were for taxi drivers. An invitation was sent by the licencing team to the taxi reps, inviting their members to any of the five events.

2. METHODOLOGY

2.1 TONIC

Responses to the consultation were collated and analysed on behalf of Birmingham City Council by TONIC, an independent organisation specialising in public consultation analysis and social research. You can read more about them here: www.tonic.org.uk. The results of this analysis are set out in this report.

2.2 Confidentiality

All responses to the survey for individuals were made anonymously and confidentially, with no personal details being requested that could identify the respondent, however postcodes were collected in order to ascertain how people living in different locations responded to the survey. Respondents to the survey for organisations were asked to provide a contact name, email address and postcode of the main site for the organisation. All data were stored securely within the UK in accordance with all Data Protection Act requirements by TONIC, who are registered with the Information Controller's Office (Reference ZA273132).

2.3 Consultation Survey

The survey was a mixture of qualitative and quantitative questions, with the qualitative questions requesting people's comments in order to explain their views and suggestions.

2.4 Analysis of Consultation Responses

2.4.1 Quantitative Analysis

We conducted analysis of all responses to the quantitative questions. Percentage figures have been rounded to the nearest whole number for the majority of questions and, as a result, not all response totals may equal 100%.

Response numbers to each of the quantitative (or "closed") and qualitative (or "open") questions varied. We have included response numbers for each question.

Those who responded to this consultation constitute a self-selecting sample, and therefore appropriate caution should be applied when interpreting and utilising the response numbers in this report. Public consultation is not a referendum or a vote on whether a specific proposal should be carried out or not, instead, public consultation is a way of "actively seeking the opinions of interested and affected groups"¹ in relation to a proposal or set of options.

¹ Organisation for Economic Co-operation and Development (OECD)

2.4.2 Qualitative Analysis

Each of the qualitative question responses was read, analysed, coded, and assigned to a theme or themes relevant to the question asked.

We conducted a thematic analysis of the qualitative questions. Thematic Analysis is a simple and flexible form of qualitative analysis that is commonly used in social research. We have chosen this approach as it provides a way of summarising patterns in a large body of data, highlights similarities and differences across the data set, and can generate unanticipated insights².

Our use of Thematic Analysis is driven by the consultation questions; all data relevant to the consultation questions is read and coded. Our analysis process is data driven, providing an overall analysis of themes relevant to the consultation, and comprises six steps:

- **Step 1:** A detailed reading of the data to become familiar with the text
- **Step 2:** Initial codes are then manually ascribed to the data, organising the data into meaningful groups relevant to the consultation questions
- **Step 3:** Codes that are conceptually related to one another are grouped together and identified as themes. A theme is defined as capturing something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set
- **Step 4:** The themes are reviewed to determine whether they are internally coherent (i.e., all data within them are conceptually linked) and distinct from each other
- **Step 5:** We then define and name the themes with the aim of capturing the essence of the data they comprise. This stage also involves the identification of subthemes, which help to provide structure to the analysis. The relationship between the codes, subthemes and themes is then captured in a thematic map and coding workbook
- **Step 6:** Finally, we write up the results, providing a narrative summary of the relationship between codes, subthemes and themes, often including examples from the data to illustrate the essence of each theme

While the numbers of respondents mentioning particular themes and issues have been recorded and noted, caution should be applied in viewing and using the figures alone to support a particular position. A large proportion of respondents chose not to provide answers to all the qualitative questions in the consultation; therefore, it is difficult to view these numbers as indicative of the views of the entire set of respondents. Furthermore, it is to be expected that responses which required more background knowledge of the subject, and/or nuanced insight would be submitted in smaller number than responses which corresponded to a more general opinion of the issue.

It is important, therefore, that views and suggestions are taken on their individual merits and qualities, rather than their apparent popularity.

² Braun and Clarke (2006)

That said, being able to view the number of respondents who highlighted a particular theme does provide valuable insight into key drivers for the views expressed in the quantitative questions.

We have set a minimum number of 7 responses by organisations and 50 responses by individuals mentioning a theme for them to be included in the analysis tables in this report. A list of additional themes mentioned by fewer respondents is set out after each question.

We have attempted to faithfully capture and summarise comments received and are not fact checking nor censoring the contributions made by respondents.

2.5 Structure of the Report

This report provides an overview of the responses received to this consultation, setting out the main themes that emerged. The ordering of arguments does not denote the level of importance for a particular theme.

Given the number and variety of consultation responses received, in order to present our analysis in a way that reduces duplication and makes sense to the reader, we have grouped themes together in the most relevant locations within this report.

3. RESPONDENT DEMOGRAPHICS

3.1 INDIVIDUALS

3.1.1 SUMMARY

10,392 individuals responded to the consultation using the questionnaire, with the following characteristics.

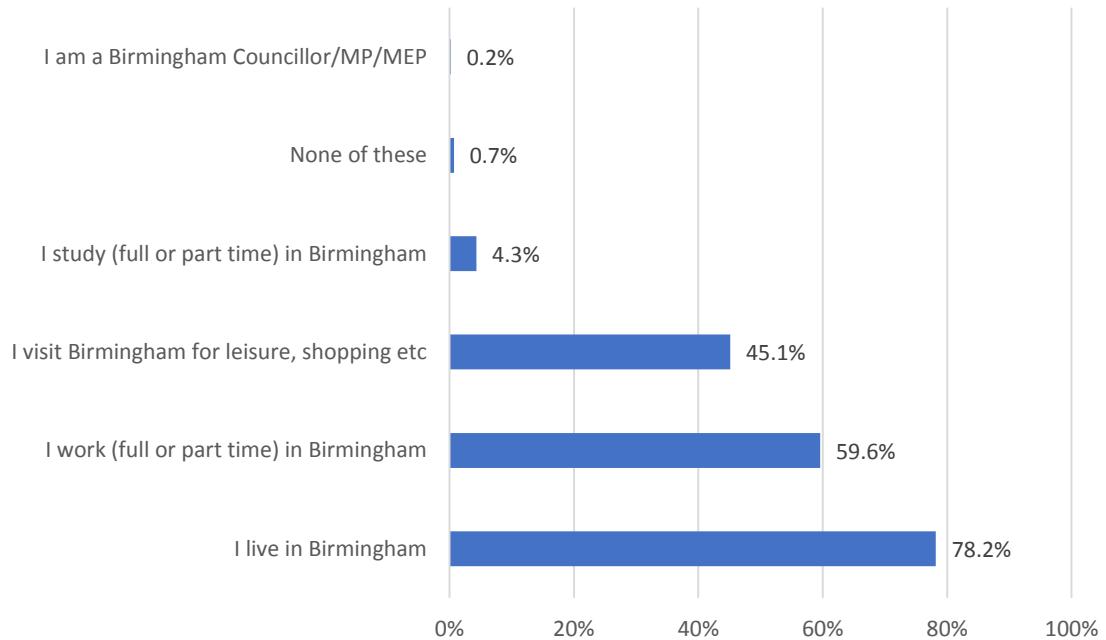
In addition, 394 responses to a petition organised by the Motorcycle Action Group were submitted to Birmingham City Council by the close of the consultation (see appendix 5.3 for the details of this petition).

3.1.2 DEMOGRAPHICS

RELATIONSHIP TO BIRMINGHAM

78% of respondents live in Birmingham, with 60% working in the area, 45% visiting Birmingham for leisure and shopping and 4% studying there.

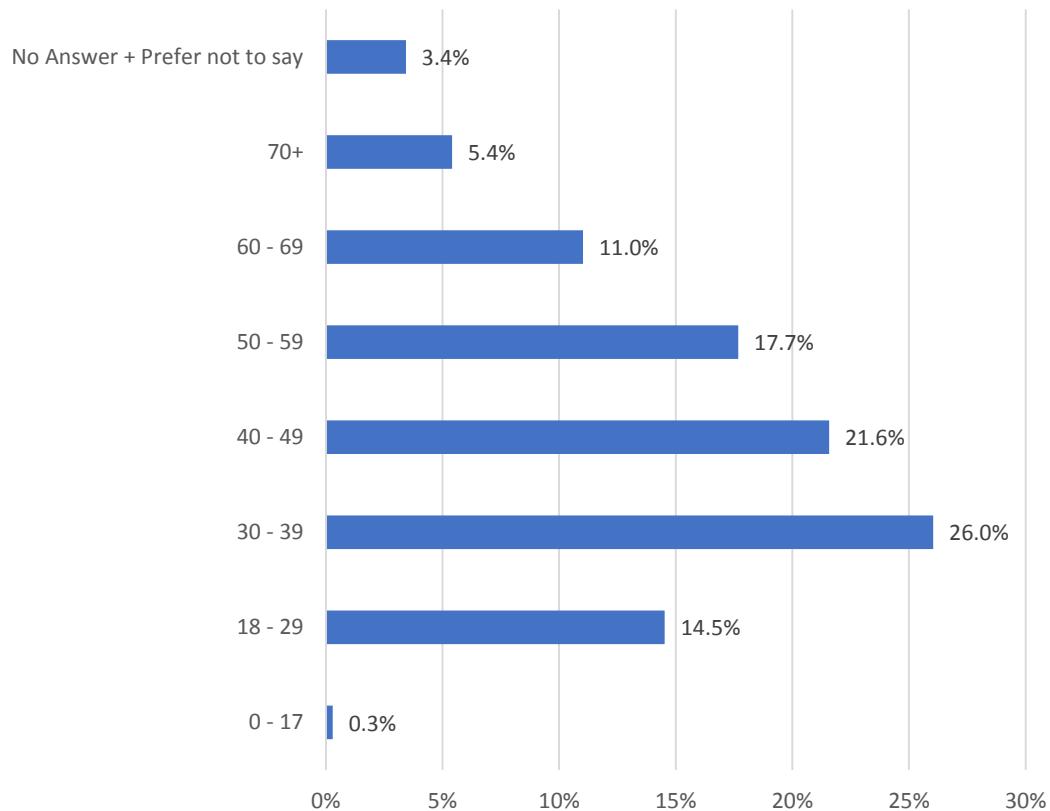
iQ01. Which of the following apply to you?



3.1.3 AGE

15% were aged under 29, with 26% aged 30-39, 22% aged 40-49, 18% aged 50-59 and 16% aged 60 or over. 3% gave no answer or preferred not to say.

iQ29. Which age group applies to you?



Comparison to Birmingham Population

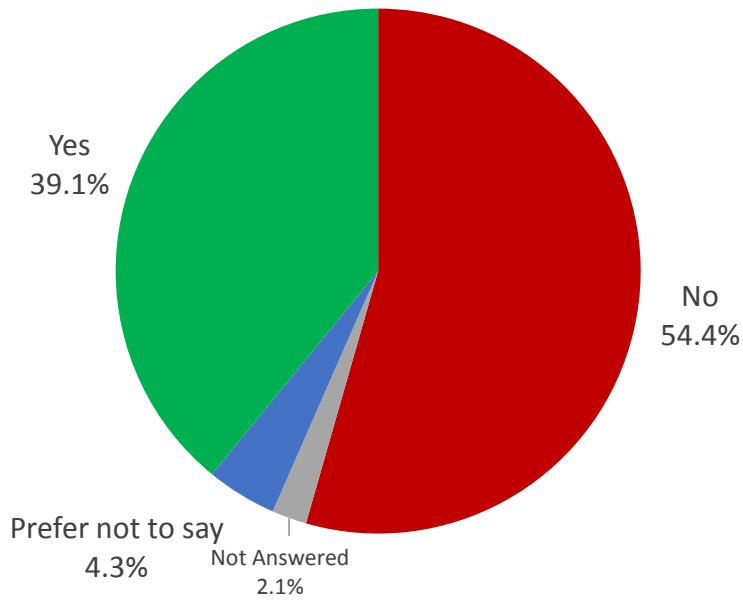
The under 18s age group is significantly under-represented, as might be expected in this type of consultation. As a result, other age groups are over-represented in the respondents to the survey, with the exception of those aged over 70+ where this is an under-representation.

Age Group	% of survey respondents	% of Birmingham Population (Census 2011)	Difference
0 - 17	0.3%	23.9%	-23.6%
18 - 29	14.5%	14.0%	+0.5%
30 - 39	26.0%	15.5%	+10.5%
40 - 49	21.6%	12.7%	+8.9%
50 - 59	17.7%	12.0%	+5.7%
60 - 69	11.0%	9.1%	+2.0%
70+	5.4%	13.0%	-7.5%

DEPENDENT CHILDREN

39% had dependent children in their household, with 54% not having dependent children living at home.

iQ30. Do you have any children under 18 in your household?



Comparison to Birmingham Population

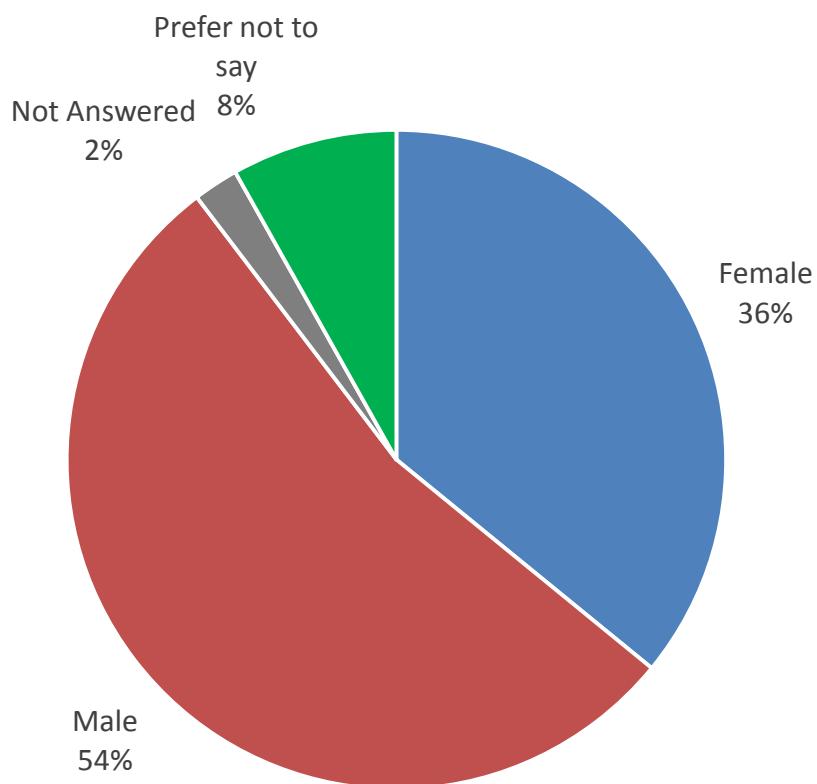
The survey has a small over-representation of respondents from households with dependent children, when compared to the Birmingham population.

Population - Households with Dependent children Based on Household projections for England and local authority districts (DCLG 2014-based - Released 2016)	Survey	Diff
33%	39%	+6%

GENDER

54% of respondents were male and 36% female, with 10% not answering or preferring not to state their gender.

iQ31. Sex/Gender: What is your sex?



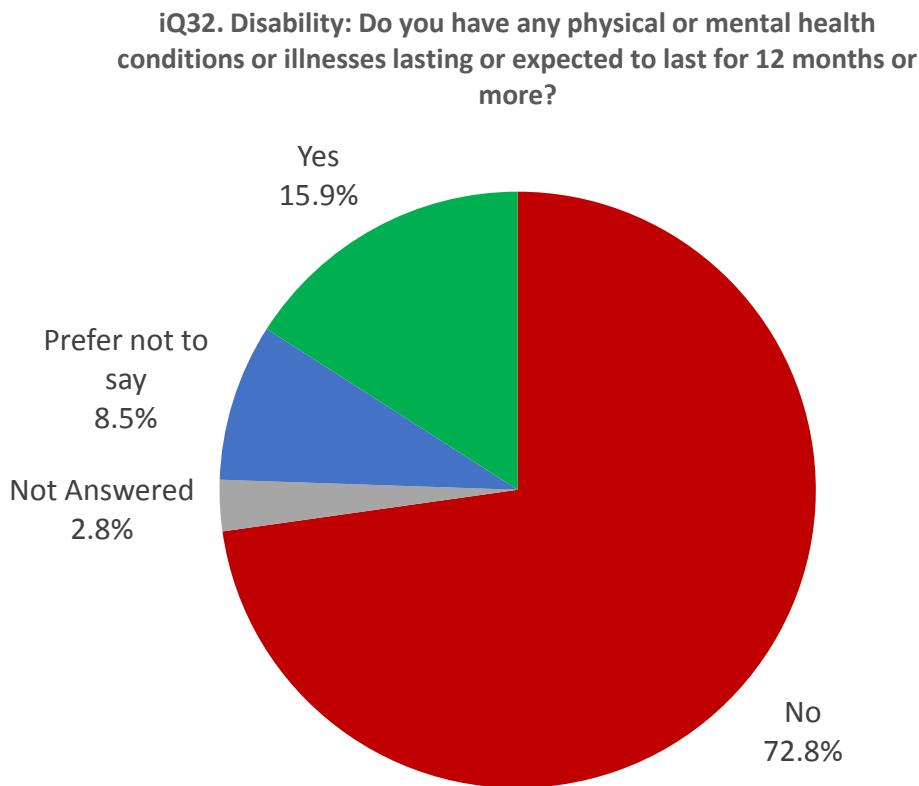
Comparison to Birmingham Population

The survey has an under-representation of respondents who are female, when compared to the Birmingham population. Given that 1 in 10 respondents withheld their gender, removing this group gives the gender split as 40% female and 60% male, which is still an under-representation of respondents who are female.

Gender (Data based on ONS Mid-2016 Population Estimates)	% of total population	Survey	Diff
Male	49.5%	53.6%	+4.2%
Female	50.5%	35.9%	-14.6%

DISABILITY

16% of respondents reported having a disability (defined as having a physical or mental health condition or illness lasting or expected to last for 12 months or more). 73% said they did not have a disability and the remaining 11% either did not answer or preferred not to say.



Comparison to Birmingham Population

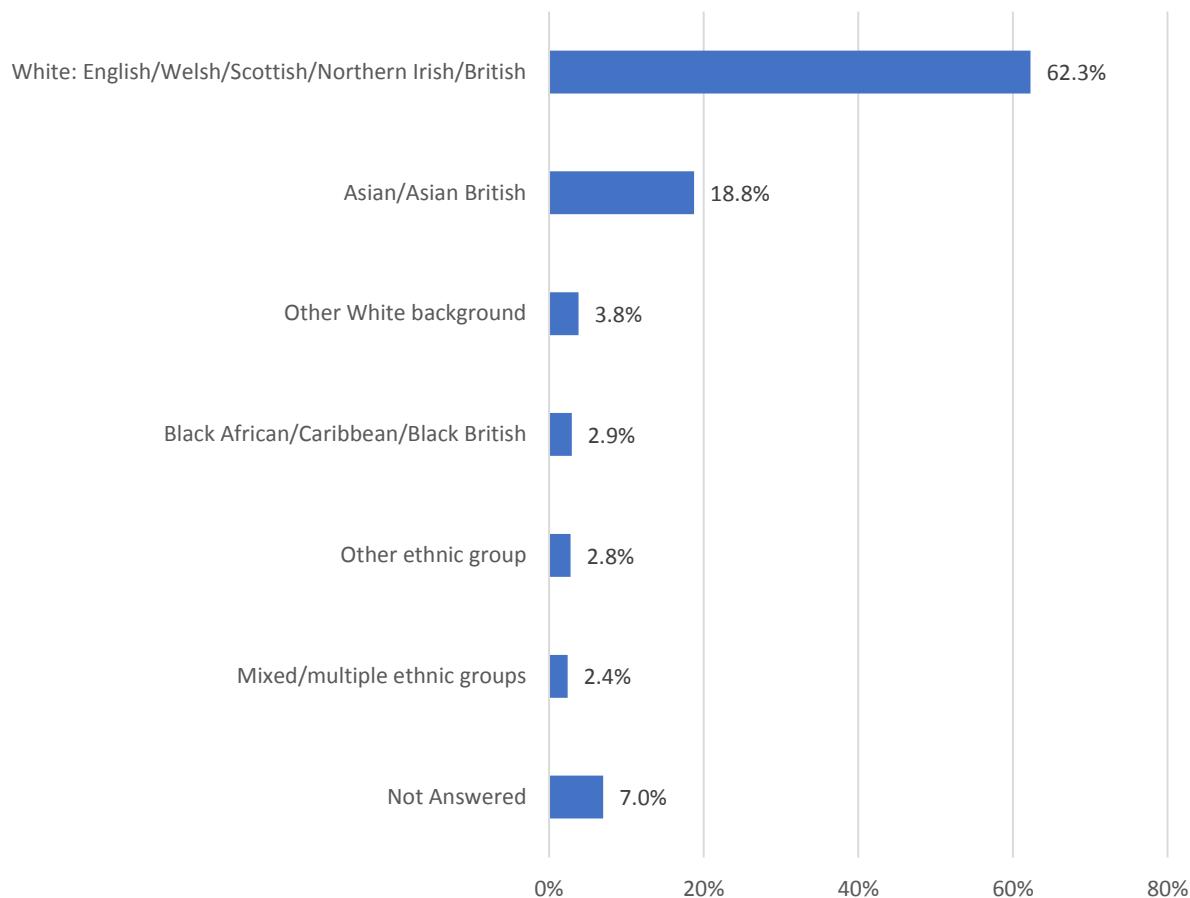
The survey has a slight under-representation of respondents with a disability, when compared to the Birmingham population.

Population (Data from Census 2011 for Birmingham – ONS)	Survey %	Difference
18.4%	15.9%	-2.5%

ETHNICITY

62% described their ethnicity as white British, with 19% describing themselves as Asian/Asian British, 4% were from other White backgrounds and 3% were Black African/Caribbean/Black British. 3% were from other ethnic groups and a further 2% from Mixed or Multiple ethnic groups.

iQ33. Ethnicity: What is your ethnic group?



Comparison to Birmingham Population

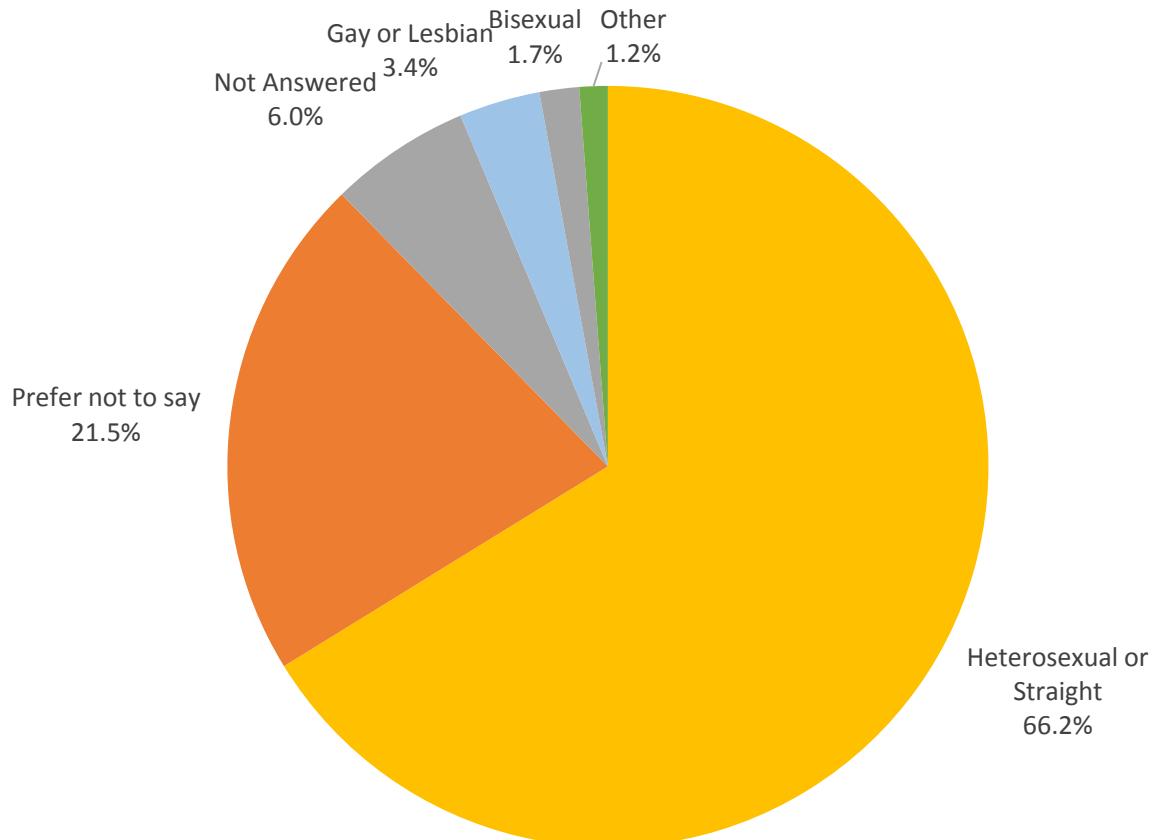
The survey has an under-representation of respondents from Asian/Asian British and Black/African/Caribbean/Black British ethnic backgrounds, when compared to the Birmingham population. This has resulted in an over-representation of people from white ethnic groups.

COMPARISON with Birmingham Population Data from Census 2011 for Birmingham - ONS	% Total Population	Survey %	Diff
White	58%	66%	+8%
Asian/Asian British	27%	19%	-8%
Black/African/Caribbean/Black British	9%	3%	-6%
Mixed/multiple ethnic groups	4%	2%	-2%
Other ethnic group	2%	3%	+1%

SEXUAL ORIENTATION

66% described their sexual orientation as heterosexual, 3% as gay or lesbian and 1.7% as bisexual, with 21.5% preferring not to say.

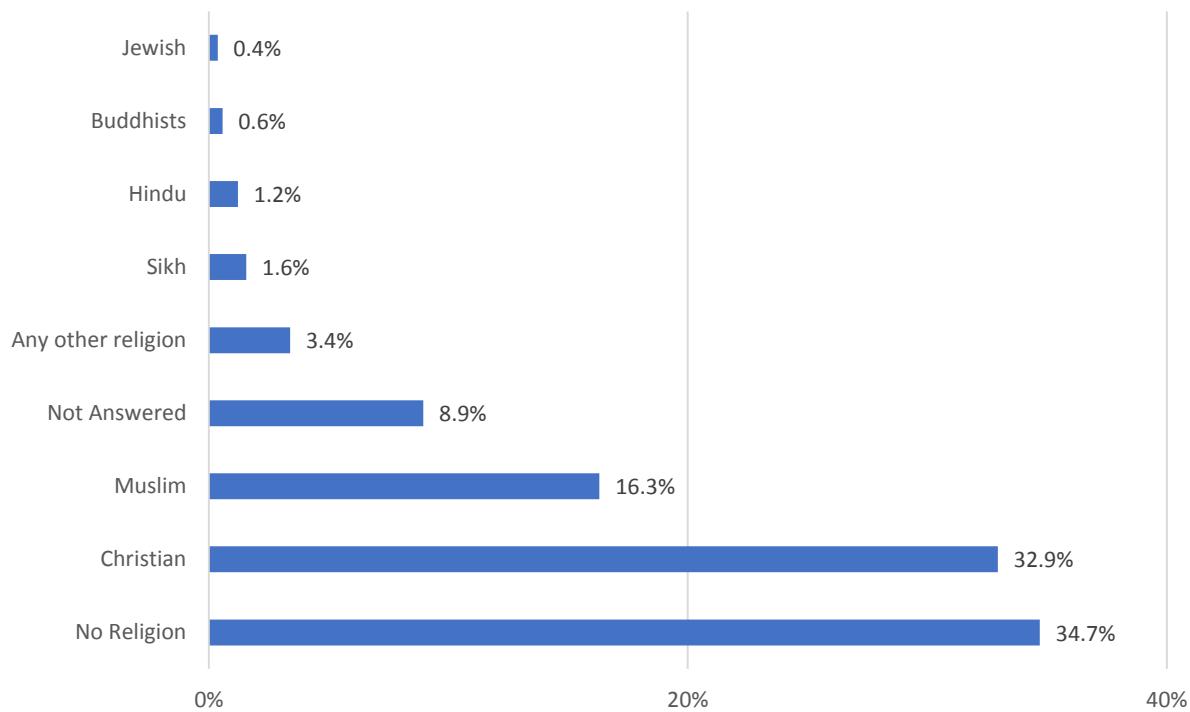
iQ34. Sexual Orientation: What is your Sexual Orientation?



RELIGION

35% described themselves as having no religion, while 33% said they were Christian, and 16% were Muslim. 9% did not give an answer.

iQ35. Religion: What is your religion or belief?



Comparison to Birmingham Population

The survey has an under-representation of people who identify as being from Christian and Muslim faiths, due to a large over-representation of people stating that they have “no religion”.

COMPARISON with Birmingham Population Data from Census 2011 for Birmingham - ONS	% Total Population	Survey %	Difference
Christian	46%	33%	-13.1%
Muslim	22%	16%	-5.5%
No religion	19%	35%	+15.4%
Religion not stated	7%	9%	+2.4%
Sikh	3%	2%	-1.5%
Hindu	2%	1%	-0.9%
Other religion	0.5%	9%	+8.4%
Buddhist	0.4%	0.6%	+0.1%
Jewish	0.2%	0.4%	+0.2%

LOCATION OF RESPONDENTS

By District

District of Residence	Count
Birmingham District (B)	7,538
Sandwell District (B)	476
Solihull District (B)	382
Dudley District (B)	273
Walsall District (B)	257
Bromsgrove District	144
City of Wolverhampton District	78
Lichfield District	74
Coventry District (B)	48
Redditch District (B)	46
Tamworth District (B)	45
North Warwickshire District (B)	41
Cannock Chase District	32
South Staffordshire District	30
Wyre Forest District	29
Worcester District (B)	27
Wychavon District	24
Shropshire	24
Nuneaton and Bedworth District	23
Warwick District	20
Telford and Wrekin (B)	19
East Staffordshire District (B)	18
Stratford-on-Avon District	17
Stafford District (B)	13
Malvern Hills District	5
Rugby District (B)	4
County of Herefordshire	2
City of Stoke-on-Trent (B)	1
Newcastle-under-Lyme District	1

By District

Ward of Residence	Count
Moseley	375
Ladywood	331
Brandwood & King's Heath	284
Harborne	270
Bournville & Cotteridge	240
Edgbaston	217
Weoley & Selly Oak	210
Sutton Vesey	207
Soho & Jewellery Quarter	202
Quinton	195
North Edgbaston	181
Perry Barr	154
Stirchley	153
Bournbrook & Selly Park	149
Sparkhill	142
Sparkbrook & Balsall Heath East	141
Hall Green North	141
Bordesley & Highgate	140
Billesley	137
Erdington	129
Balsall Heath West	127
Handsworth Wood	125
Longbridge & West Heath	122
Bartley Green	118
Oscott	117
Alum Rock	114
Acocks Green	113
Sheldon	111
Sutton Walmley & Minworth	111
Aston	110
Stockland Green	103
Small Heath	102
King's Norton North	100
Bromford & Hodge Hill	92
Hall Green South	92
Northfield	86
Sutton Wylde Green	84
Kingstanding	80
Sutton Trinity	72
Allens Cross	72

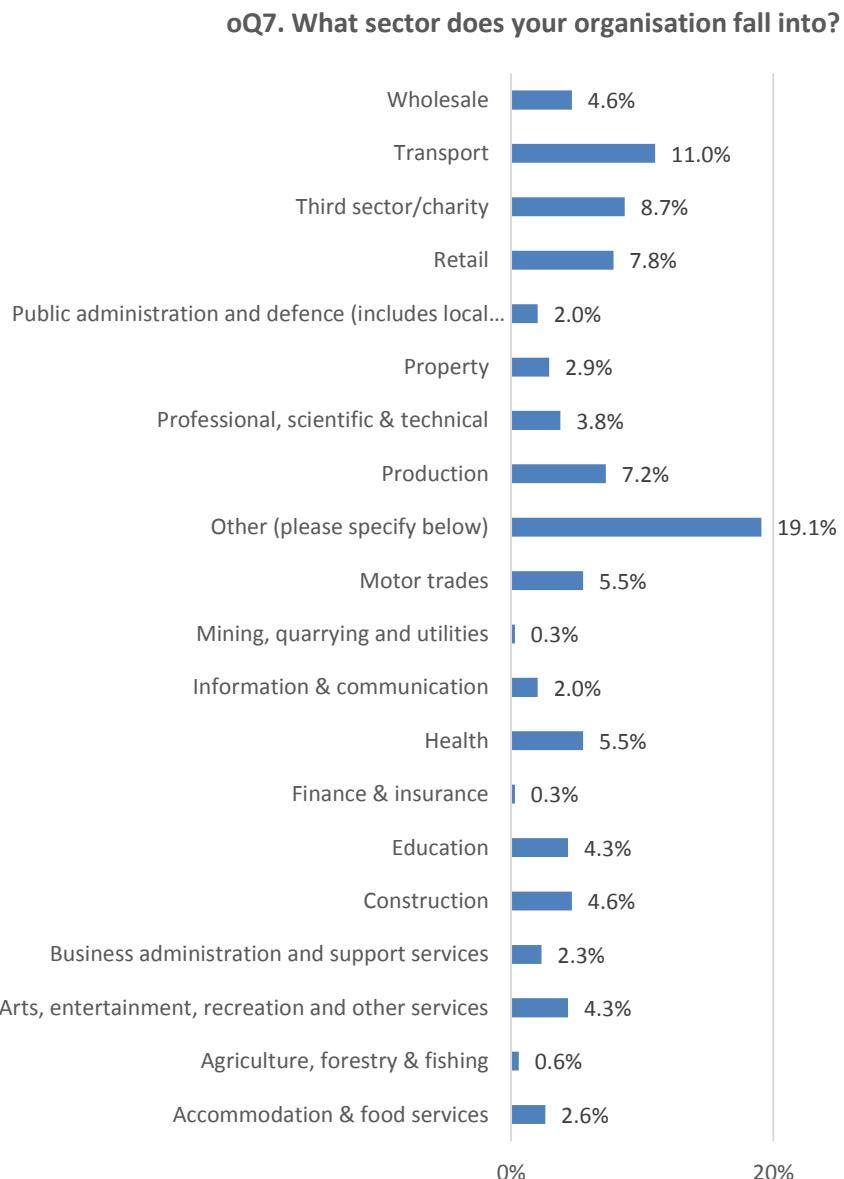
Ward of Residence	Count
Yardley East	71
Sutton Mere Green	69
Glebe Farm & Tile Cross	65
Frankley Great Park	64
Lozells	63
Bordesley Green	62
Sutton Roughley	61
Highter's Heath	59
South Yardley	58
Perry Common	57
Birchfield	56
Gravelly Hill	55
Yardley West & Stechford	54
Pype Hayes	54
Rubery & Rednal	54
Tyseley & Hay Mills	53
King's Norton South	53
Ward End	52
Sutton Four Oaks	52
Druids Heath & Monyhull	52
Heartlands	46
Sutton Reddicap	44
Newtown	41
Handsworth	39
Shard End	38
Nechells	37
Garretts Green	32
Holyhead	30
Castle Vale	18

3.2 ORGANISATIONS

oQ7. What sector does your organisation fall into?

11% of organisations and businesses that responded to the survey described themselves as being in the transport industry. 9% were third sector or charitable organisations. 8% were from the retail sector, and 7% coming from the production sector.

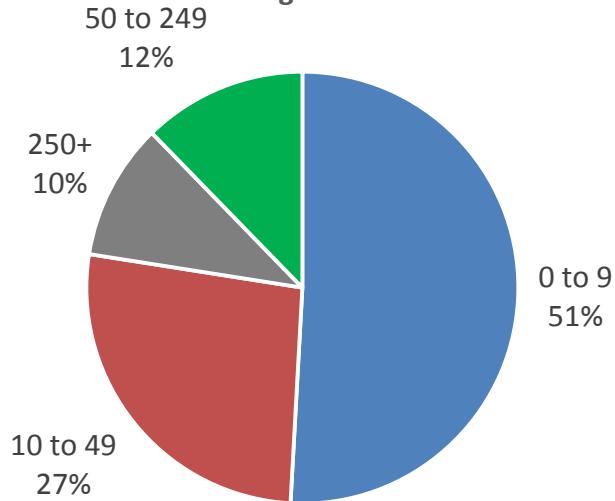
19% were from other sector categories.



oQ9. How many employees does your organisation have in Birmingham?

Of the organisations that responded to the survey, 51% had between 0-9 employees (micro), with 27% having 10-49 employees and 12% having 50 to 249 employees, meaning 38% were SMEs. 10% have over 250 employees, categorised as a large business.

oQ9. How many employees does your organisation have in Birmingham?



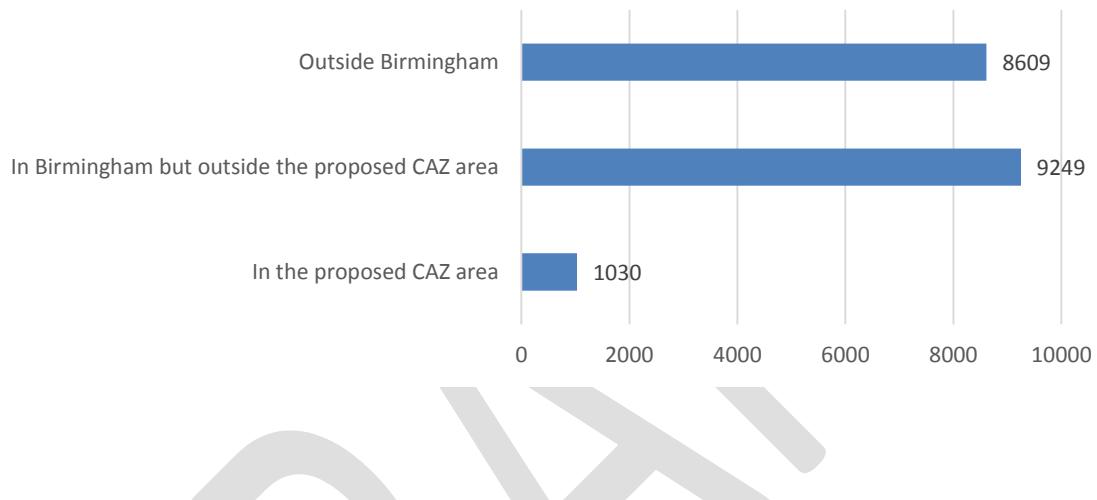
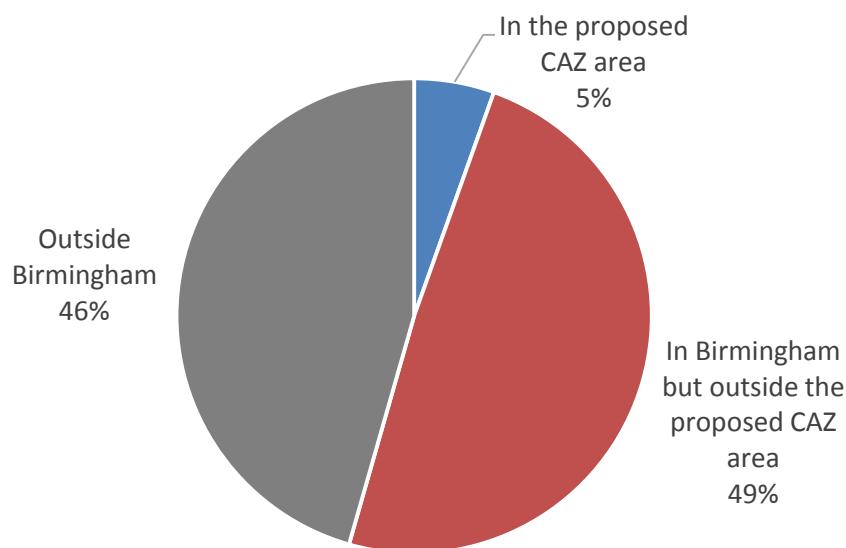
There was an under-representation from micro organisations (with fewer than 10 employees), with SMEs and Large organisations being over-represented.

Birmingham Businesses by size (Source: BIS UK Business: Activity, size and Location 2017)	BIS data	Survey	Difference
Micro	83.3%	50.29%	-33%
SME	16.1%	38.44%	+22%
Large	0.5%	10.1%	+10%

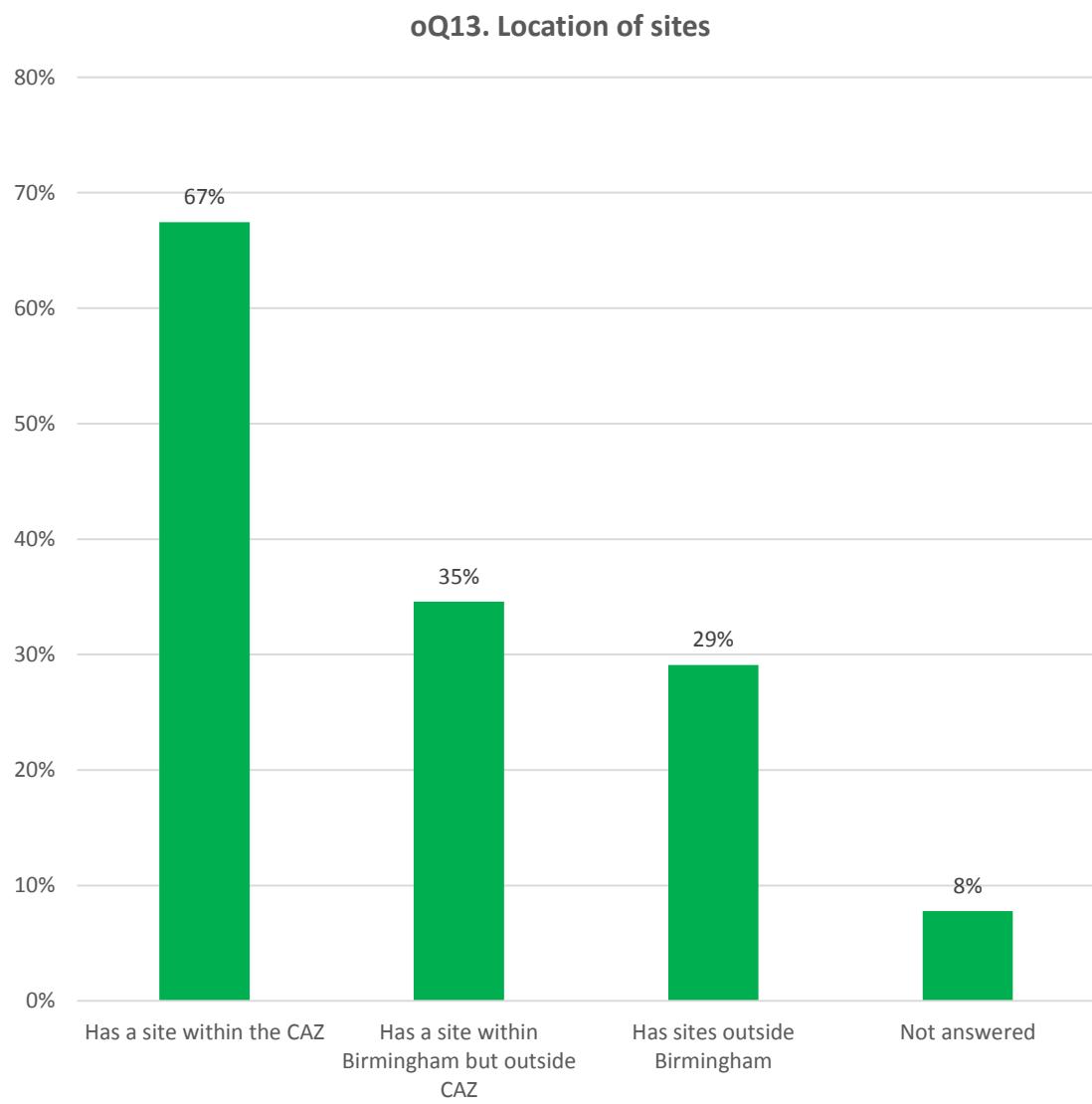
oQ13. How many sites does your organisation have?

Of the organisations that provided this data, they stated that they had 1,030 sites within the CAZ, 8,609 sites in Birmingham but outside of the CAZ, and 8,609 sites outside Birmingham.

This means that 5% of the sites are inside the CAZ, 49% in Birmingham but outside the CAZ and 46% outside Birmingham.

**oQ13. How many sites does your organisation have?
(Total sites - all responses)****oQ13. How many sites does your organisation have?
(% of total sites by location)**

67% of organisations who responded had one or more sites within the CAZ, 35% had sites in Birmingham but outside the CAZ, and 29% had sites outside Birmingham.



4. FINDINGS

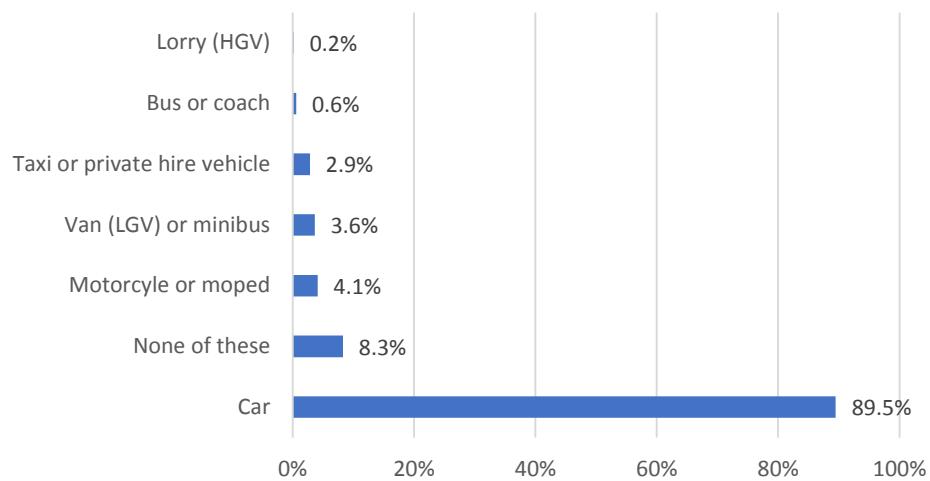
4.1 RESPONDENTS' VEHICLES AND HOW THEY USE THEM

4.1.1 INDIVIDUALS

iQ03. Do you own or lease any of the following vehicles?

89.5% of respondents owned or leased cars, 4% had motorcycles or mopeds and a similar number had a van or minibus. 3% owned or leased a taxi or private hire vehicle. 8% did not have any of the vehicles stated.

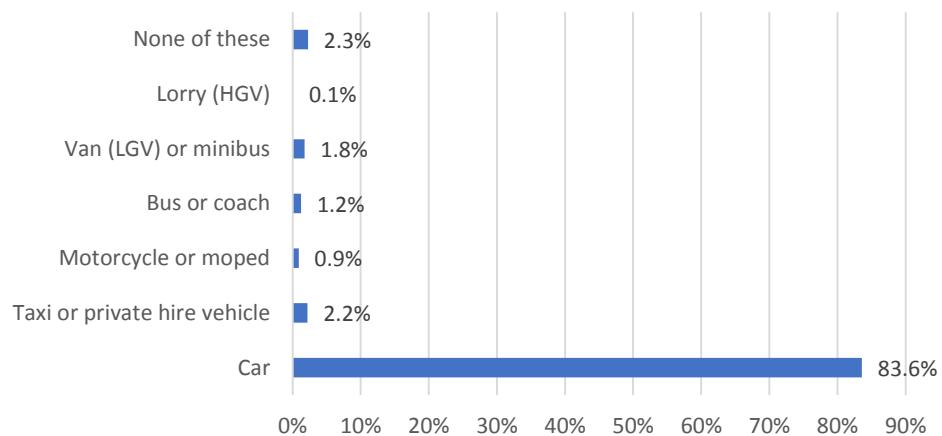
iQ03. Do you own or lease any of the following vehicles?



iQ04: Which of the above would you say is your main vehicle?

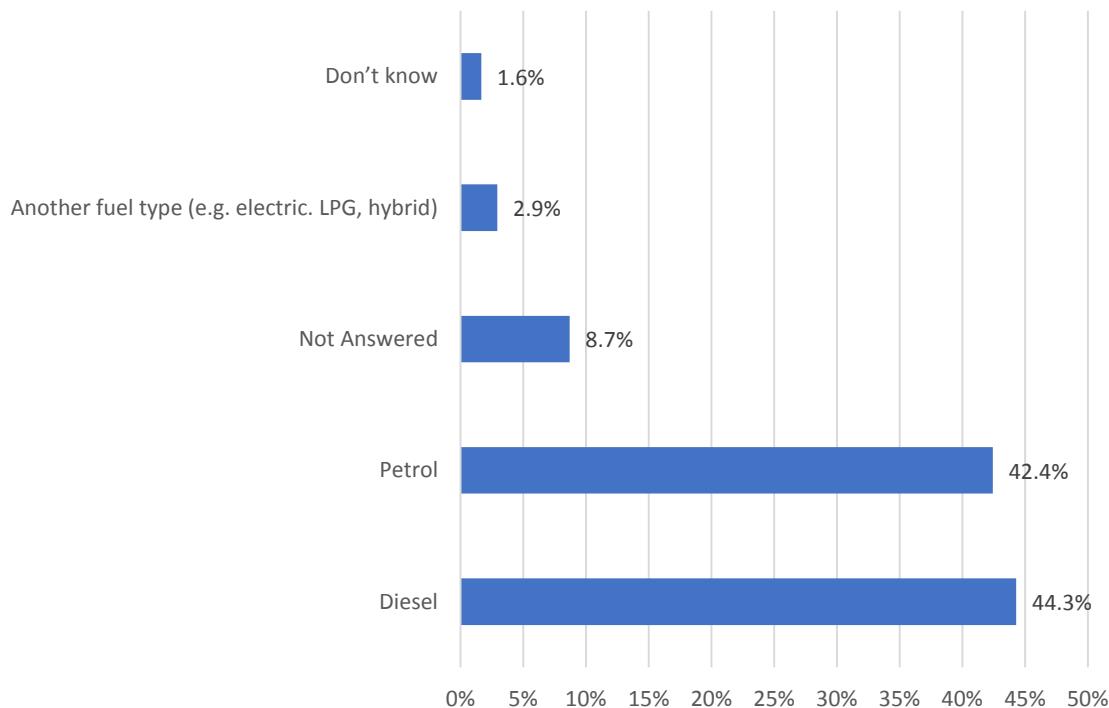
84% said their car was their main vehicle, with 2% saying their taxi or private hire vehicle was their main vehicle.

iQ04. Which of the above would you say is your main vehicle?



iQ05. What type of fuel does your main vehicle use?

44% of respondents had a diesel fuelled main vehicle, with 42% having petrol fuelled. 3% had main vehicles with used other fuels, such as electric, LPG or hybrid.

iQ05. What type of fuel does your main vehicle use?

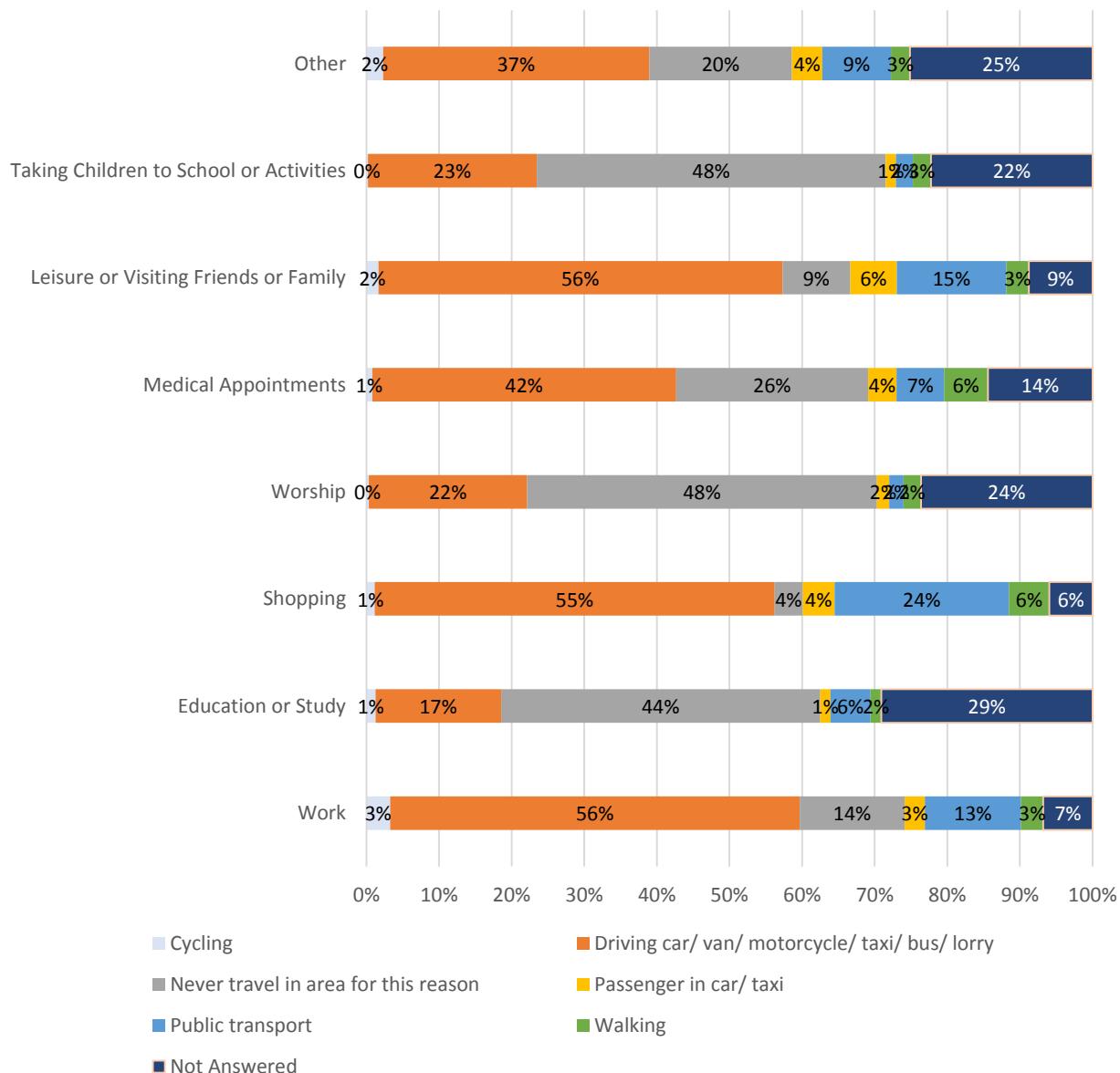
iQ07: Thinking about the different journeys you make in the proposed Clean Air Zone area, how do you usually travel?

More than half of respondents usually drive their own vehicle into the CAZ for work (56%), shopping (55%) and leisure or visiting friends and family (56%). In addition, 42% drive their own vehicle for medical appointments, 37% for other activities, 23% for taking children to school/activities and 22% for worship.

24% use public transport to go shopping.

All other reasons for making journeys into the CAZ by various modes of transport were made by fewer than 1 in 5 respondents.

iQ07: Thinking about the different journeys you make in the proposed Clean Air Zone area, how do you usually travel? By usual method transport



iQ08: If you drive a vehicle within the proposed Clean Air Zone area, on how many days in a typical week is this for the following reasons?

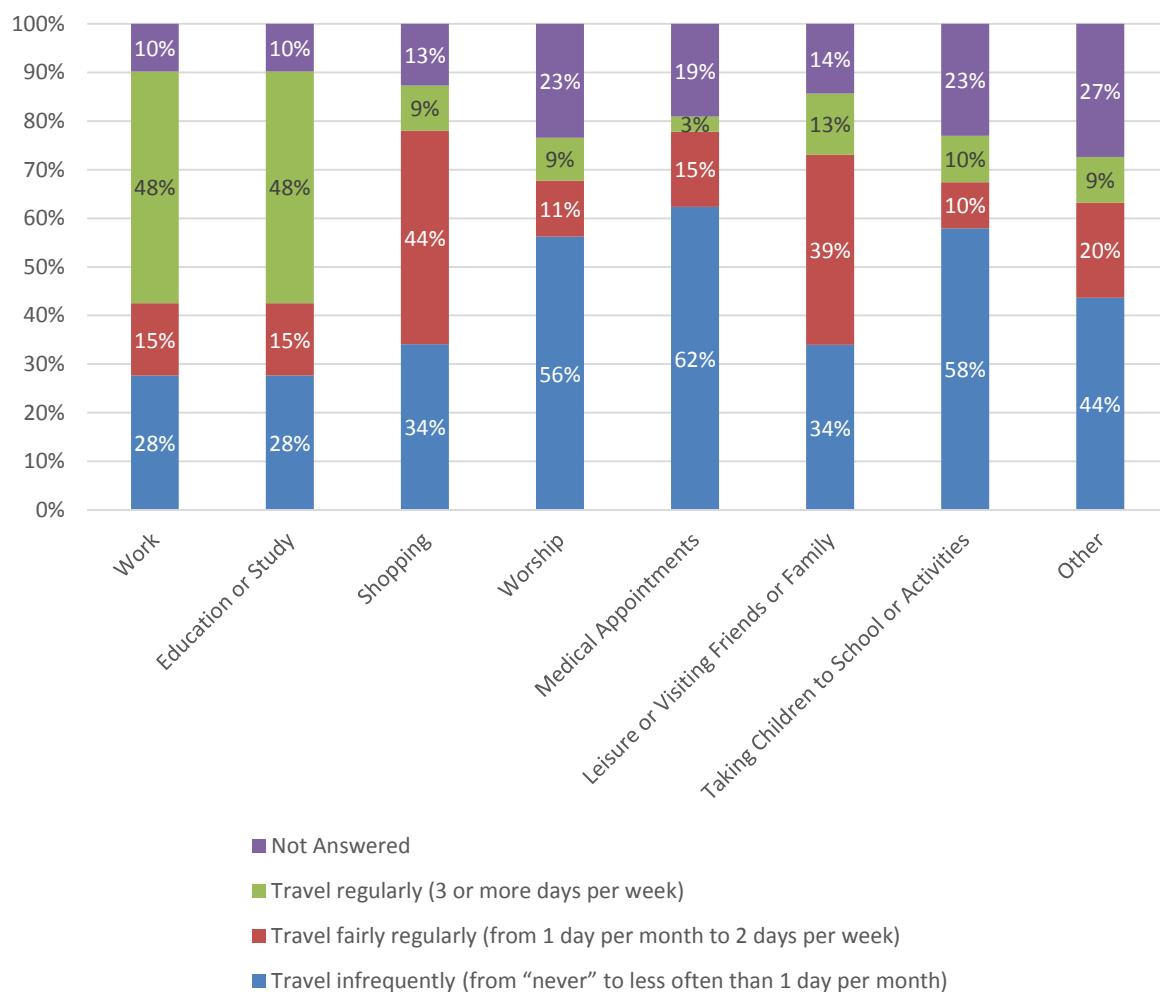
Just under half of respondents (48%) drive into the proposed CAZ area for work and education or study on 3 or more days in a typical week.

Journeys for shopping or leisure (44%) or visiting family or friends (39%) that entered the CAZ were the most likely to be on a fairly regular basis, namely between 1 day a month to 2 days per week.

Over half of respondents said they would either never need to enter the CAZ or only do so less often than one day a month to undertake journeys for worship (56%), medical appointments (62%) and taking children to school or activities (58%).

iQ08: If you drive a vehicle within the proposed Clean Air Zone area, on how many days in a typical week is this for?

By usual method of transport

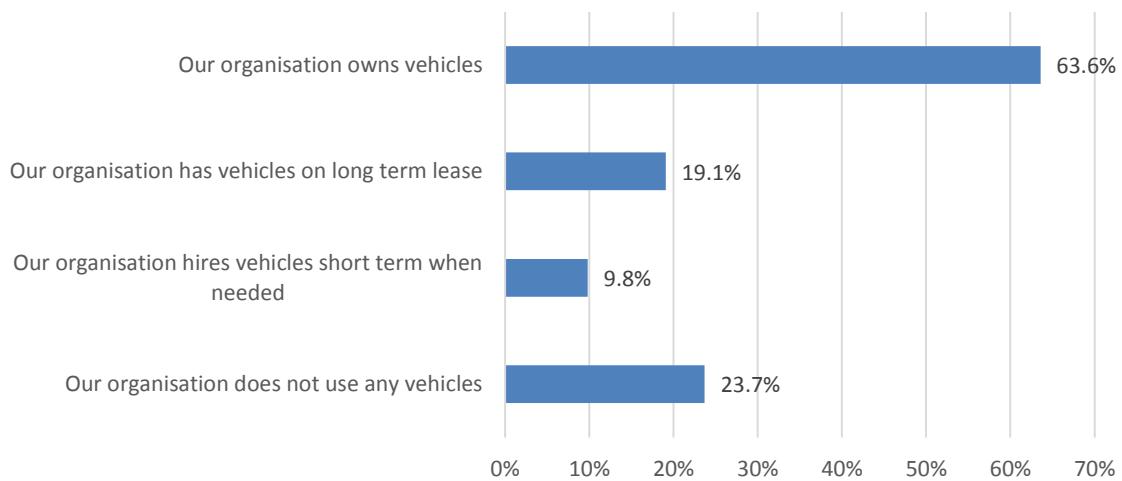


4.1.2 ORGANISATIONS

oQ10. Does your organisation own or lease any vehicles in Birmingham?

64% of organisations own vehicles, with 19% having some vehicles on long term lease. 10% have short term lease vehicles and 24% of organisations did not report having any vehicles.

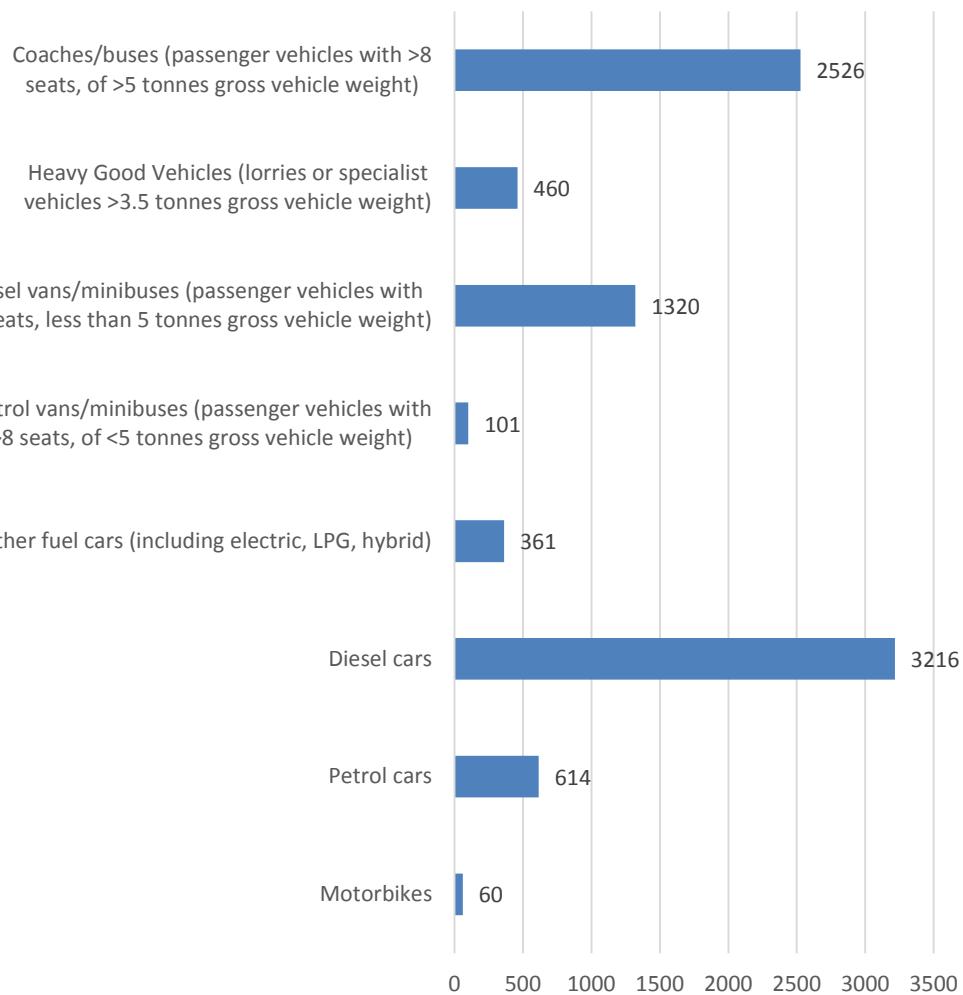
oQ10. Does your organisation own or lease any vehicles in Birmingham?



oQ11. Thinking about the vehicles which you own or have on long term lease in Birmingham, roughly how many of each of the following do you have?

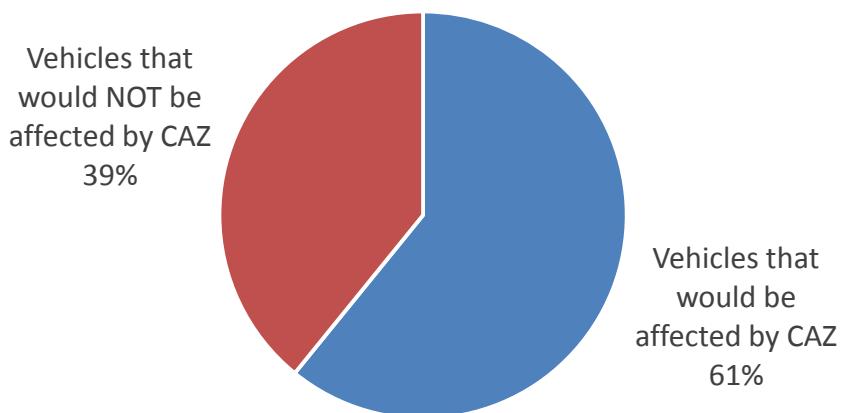
Organisations that provided this data in the survey, accounted for 3,216 diesel cars, 2,526 coaches or buses, 1,320 diesel vans or minibuses, 460 Heavy Goods Vehicles and 361 cars fuelled by other sources (e.g. electric, LPG, hybrid).

**oQ11. Thinking about the vehicles which you own or have on long term lease in Birmingham, roughly how many of each of the following do you have?
(Total - all organisations)**

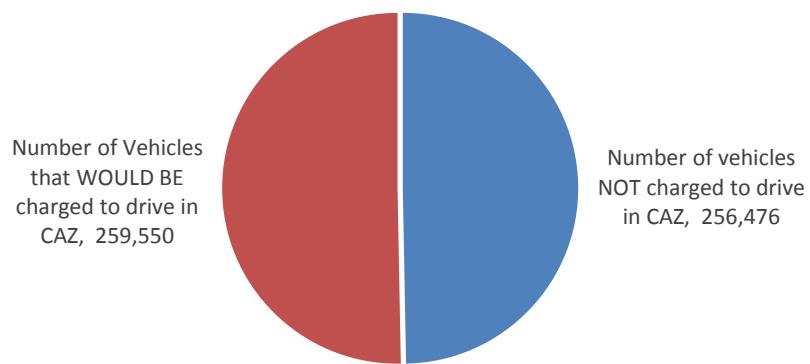


oQ12. Roughly what proportion of your current fleet would NOT be charged to drive in the proposed Clean Air Zone?

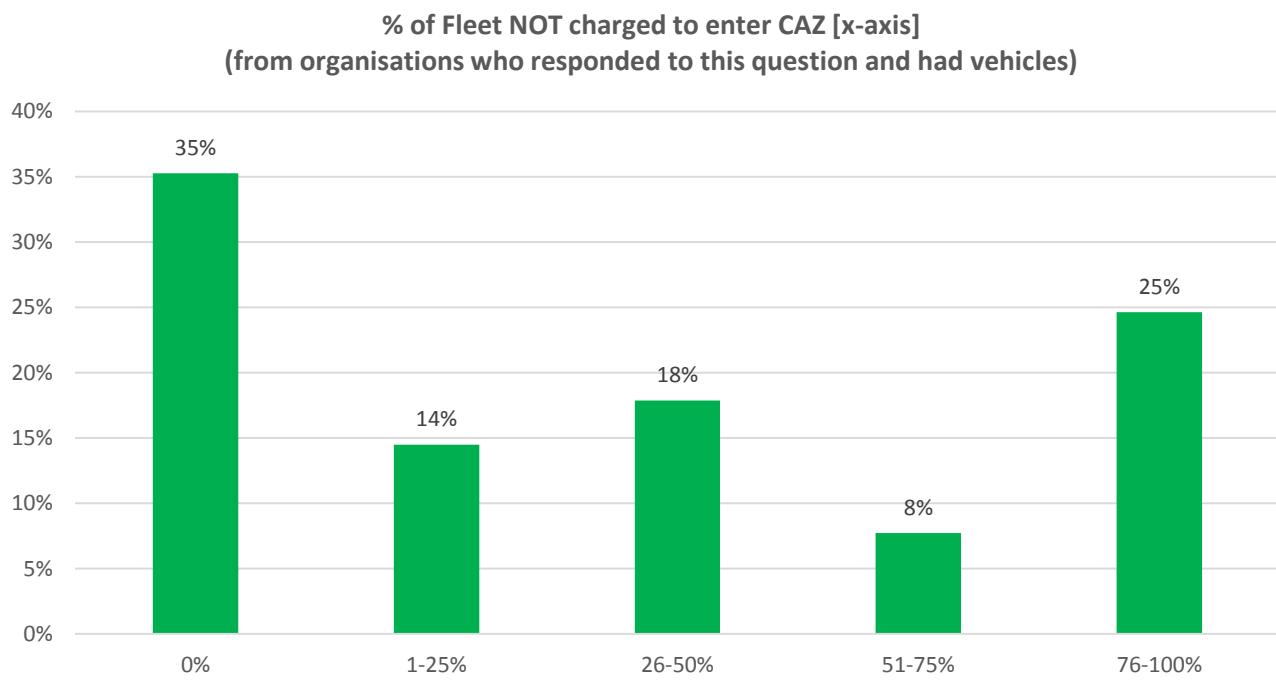
Organisations that gave details on the number of vehicles they owned, estimated that on average 61% of their fleet would be affected by the CAZ charge, with 39% not affected.

oQ12. Roughly what proportion of your current fleet would NOT be charged to drive in the proposed Clean Air Zone?

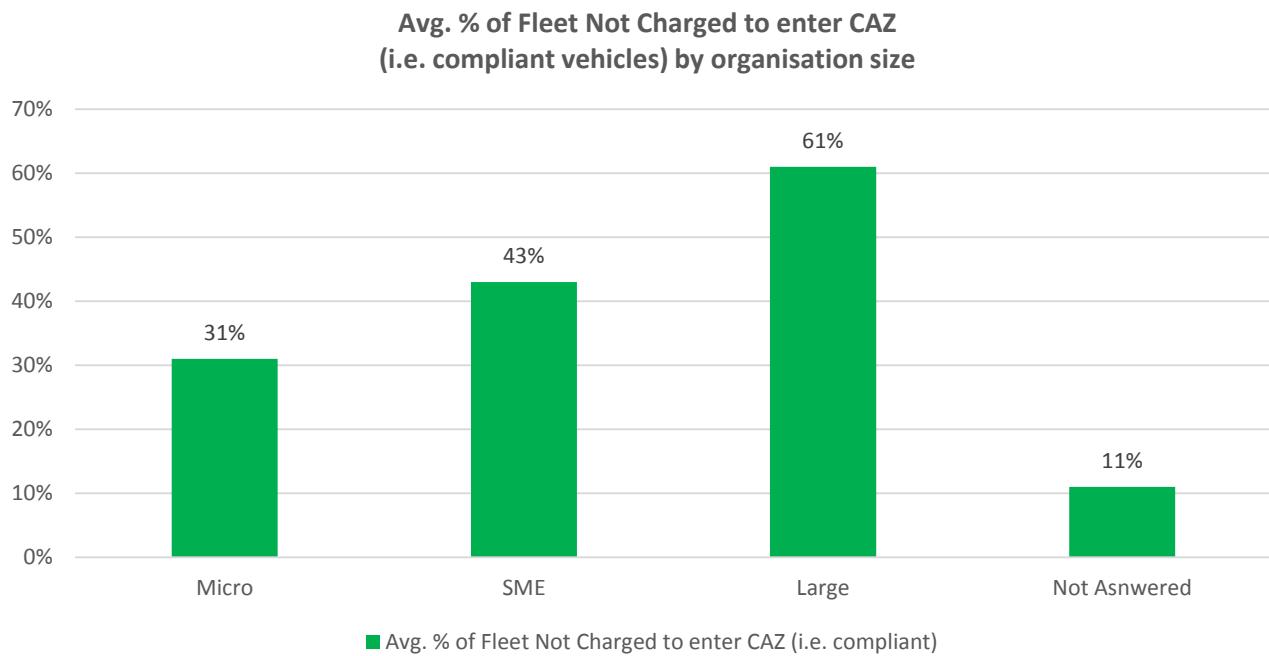
However, when this is applied to the number of vehicles that organisations gave details about, it is more of an even split, with 50.3% (259,550 vehicles) being charged to enter the CAZ and 49.7% (256,476) not being charged.

oQ12. Roughly what proportion of your current fleet would NOT be charged to drive in the proposed Clean Air Zone?

Organisations estimated the percentage of their fleet that would not be charged to enter the CAZ. This revealed that 35% of organisations said that all of their vehicles would be charged (0% column in the graph below), with 25% stating that either most or all of their vehicles would not be charged (76-100% column in the graph below).



When this data is broken down by size of organisation, it appears that the larger the organisation, the higher the percentage of their fleet is complaint with the CAZ requirements and would not be charged to enter the area.

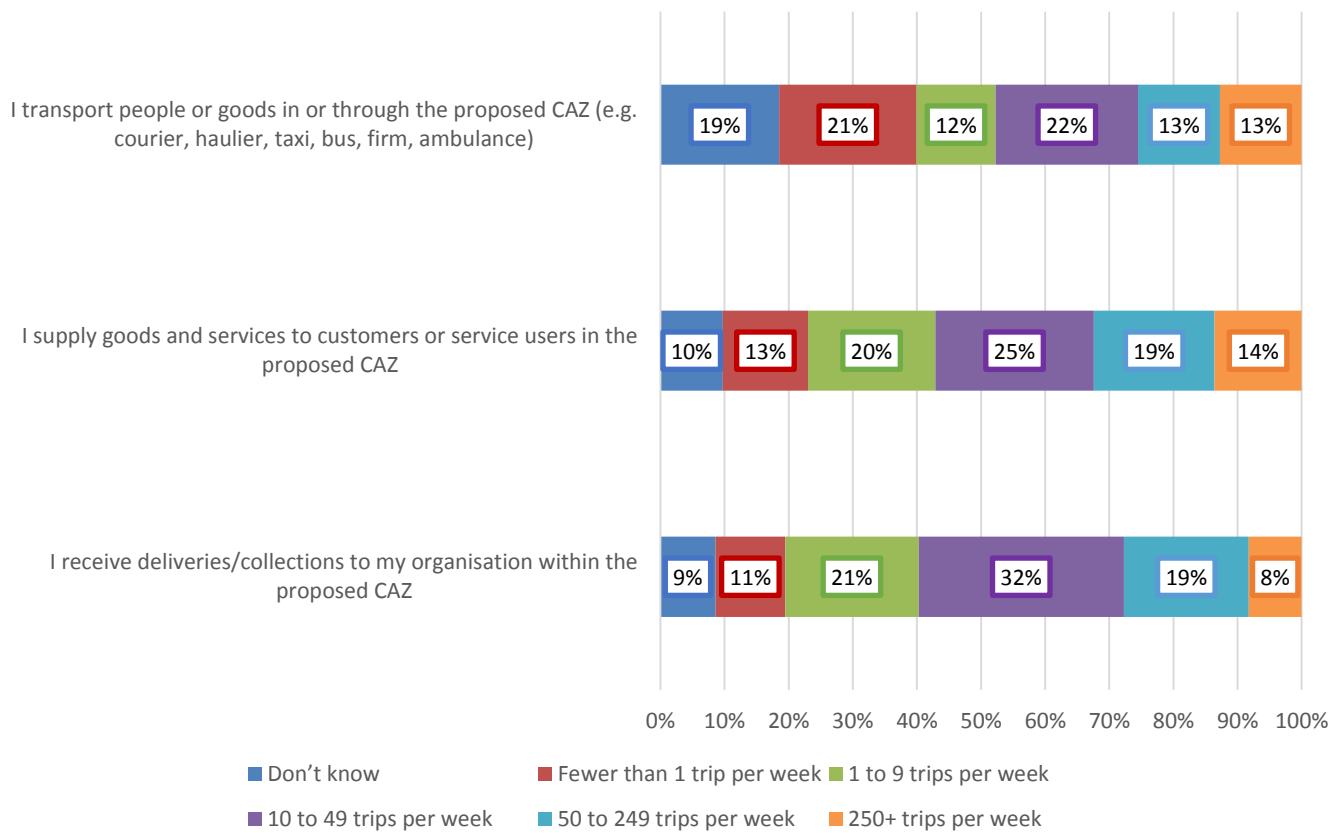


oQ14. Roughly how many vehicle trips per week are made in the proposed CAZ area as part of your organisation's operation?

Organisations estimated that for:

- Transporting goods or people, 13% made over 250 trips per week into the CAZ and 47% made between 1 and 249 trips per week
- Supplying goods and services, 14% made over 250 trips per week into the CAZ and 64% made between 1 and 249 trips per week
- Receiving deliveries or collection, 8% had over 250 trips per week into the CAZ and 72% had between 1 and 249 trips per week

oQ14. Roughly how many vehicle trips per week are made in the proposed CAZ area as part of your organisation's operation?

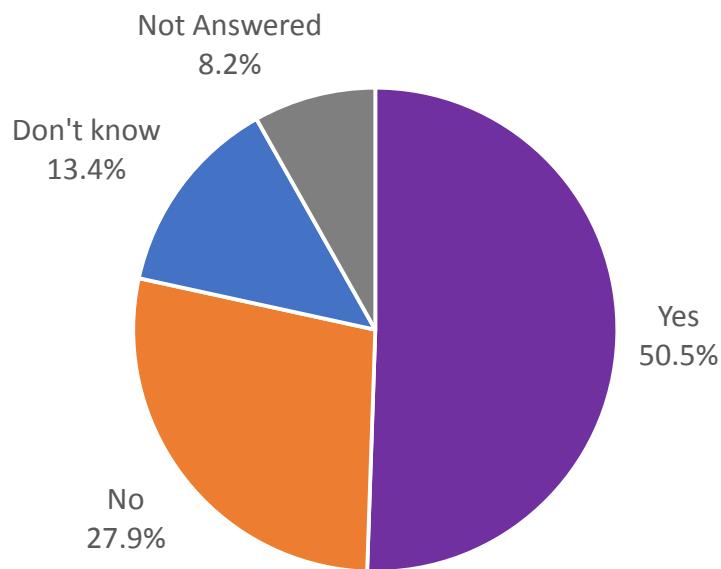


4.2 RESPONDENTS' VIEWS ON THE POTENTIAL IMPACT OF THE CAZ

iQ06: Do you think you will be charged to drive your main vehicle in the CAZ?

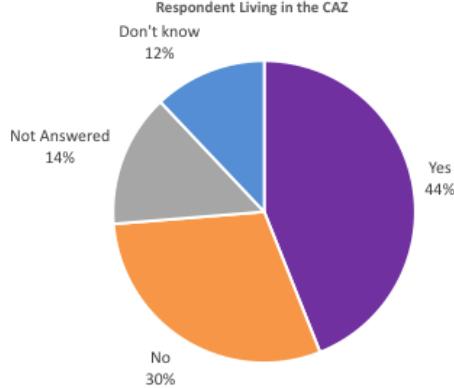
50.5% of individuals stated that they would be charged to drive their main vehicle into the CAZ, with 28% saying that they would not be, and 13% stating that they did not know whether they would be charged or not. 8% did not give an answer to this question.

iQ06. Do you think you will be charged to drive your main vehicle in the CAZ?



When looking at the location of where respondents live, there was a decrease (from 50.5% to 44%) in the proportion of residents within the CAZ stating that they would be charged for their main vehicle to enter the CAZ.

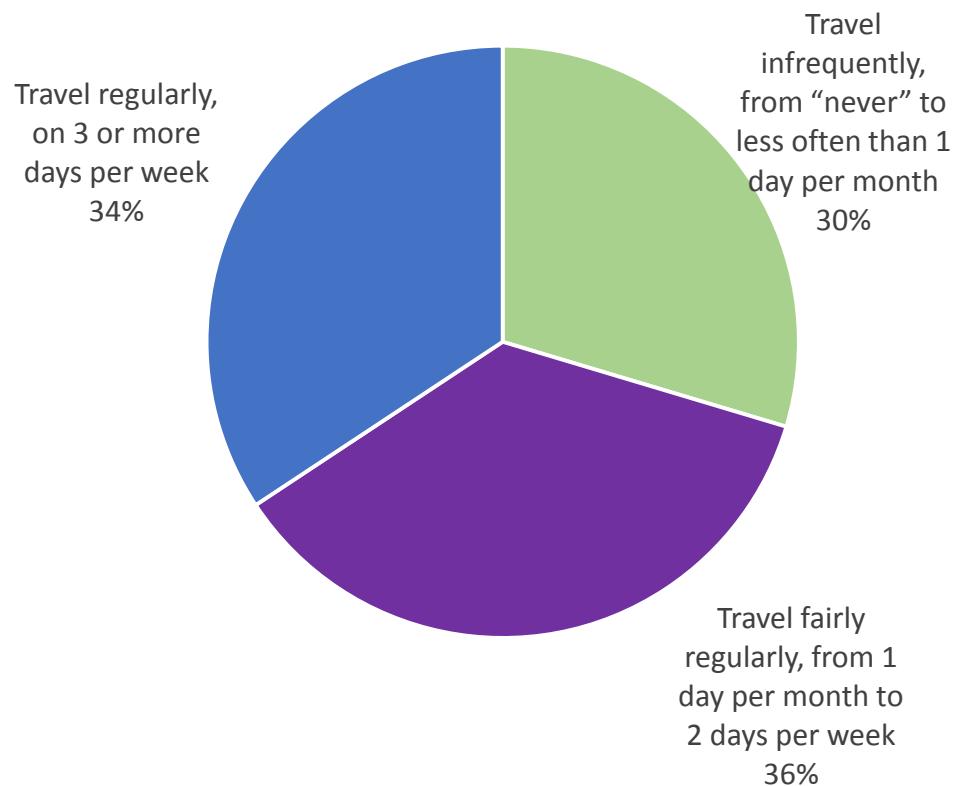
iQ06. Do you think you will be charged to drive your main vehicle in the CAZ? Respondent Living in the CAZ



iQ09. How often do you make trips where you drive through the proposed clean air zone area but do not stop within it?

Responses to this question about driving through the proposed CAZ but not stopping in to were fairly evenly split, with around 1 in 3 respondents stating they travel in the following ways:

- 30% travelled infrequently, from “never” to less often than 1 day per month
- 36% travelled fairly regularly, from 1 day per month to 2 days per week
- 34% travelled regularly, on 3 or more days per week

iQ09. How often do you make trips where you drive through the proposed clean air zone area but do not stop within it?

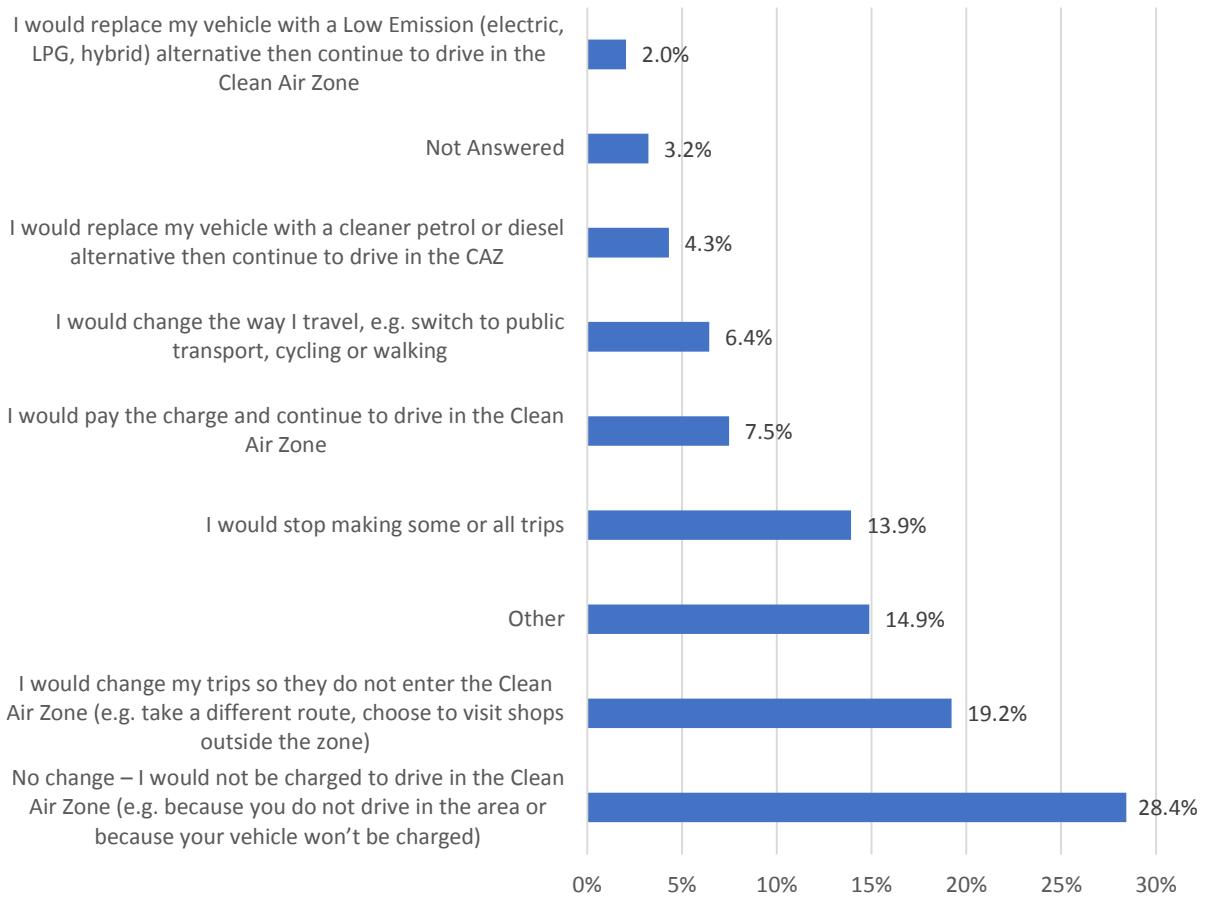
iQ19: If a Clean Air Zone was introduced, which of the following do you think you would do?

Individuals

28% stated there would be no change for them if the CAZ was introduced as they would not be charged because they do not drive in the area or because their vehicle would not be charged.

19% stated that they would change their trips so that they do not enter the CAZ, for example, by taking a different route or choosing to visit shops outside the zone.

iQ19: If a Clean Air Zone was introduced, which of the following do you think you would do?



Other actions respondents would take

[2,218 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
I would...	Leave my job	481	21.7%
	Shop and undertake leisure activities elsewhere	306	13.8%
	Struggle financially	262	11.8%
	Avoid driving into the CAZ	202	9.1%
	Leave Birmingham	141	6.4%
	Use public transport	115	5.2%
	Use alternative routes	112	5.1%
	Refuse to pay the charge	103	4.6%
	Purchase a compliant vehicle	89	4.0%
	Close or relocate my business	84	3.8%

THEMES EXPLORED

I would...

Respondents who provided other reasons to what they would do if the Clean Air Zone was introduced said they would:

Leave my job

Many respondents stated that it would be no longer financially viable to either travel to work or work within the Clean Air Zone, and that they would be forced to leave their employment, either to seek work that did not require them to travel to/within the Clean Air Zone, or to claim unemployment benefits, which they felt may actually render them better off, given the increased level of outlay associated with working.

“I would leave my job. Free parking was taken from staff some years ago, so staff who have to bring their cars in for personal reasons have to pay for parking. To then have to pay to enter the CAZ would be a further charge that could not be sustained within current pay levels.” (Individual)

Among those who raised this theme, delivery drivers and others whose jobs or personal situation necessitated them travelling within the CAZ – such as those who drove children to

school on their way to work – stated that the increased financial burden of paying an unavoidable charge would be too much to bear. For these workers, switching to public transport would not be an option, giving their need to make repeated journeys within the CAZ, or to transport goods, equipment, or people. Social workers and carers for those with disabilities or other vulnerabilities were among this group.

Certain groups of commuters also felt that switching to public transport was not an option for them, given the lack of suitable routes and links, and the increased journey length when compared to driving – often cited as being three or four times as long – and that their requirement to pay the charge – expected to amount to an extra £60 per week – would leave them with no option other than to seek employment elsewhere.

Shop and undertake activities elsewhere

Respondents who raised this theme said that they would cease to shop, socialise, or engage in other non-work activities within the Clean Air Zone, and that they would shop elsewhere. Particularly mentioned were shopping centres such as Merry Hill and Solihull, which were noted as containing many of the same stores that the city centre contains, with the added benefits of free parking and no CAZ charge.

For many respondents, the introduction of the CAZ would render the city centre a “ghost town”, with businesses forced to close, job losses, struggle for landlords to rent out properties, and future investment made unappealing due to both the charge to enter the city centre and the predicted reduction in flourishing retail stores, restaurants, bars, clubs, and other establishments.

These issues are explored in more detail in questions and themes below.

Struggle financially

Some said that they expected the implementation of the CAZ would leave them struggling financially, pointing out that upgrading their vehicle or paying to use public transport would be impossible given their current level of disposable income. Unlike those who mentioned the theme above, however, those who raised this theme did not feel that they would be able to change their work or life situation, and that the charge may leave them substantially out of pocket, or even push them into debt.

“I don't know what I would do. I could not afford to change my car and I would not be able to afford the charge to enter the City. This is already causing me stress.” (Individual)

Avoid driving into the CAZ

Some stated that they would cease driving into the Clean Air Zone and stop visiting and socialising within Birmingham city centre, but rather use and visit locations which were free to drive to. Some stated that parking fees were already off-putting enough, and that the CAZ charge would make travelling to the city centre unviable.

Leave Birmingham

Some respondents said that they would leave Birmingham and relocate to a city which didn't charge a fee to drive into its central area.

"As a resident within the proposed zone, we are already paying £2400 to the council in council tax. We would move out of Birmingham to a place where we could use our car freely." (Individual)

"I will not pay to drive in a city that I already pay excessive Council tax. I will move before I am held to ransom." (Individual)

"Bye bye Birmingham. It was good knowing you but there are plenty of small pretty towns who'll take my money instead." (Individual)

Use alternative routes

Respondents said that they would use alternative, uncharged routes to bypass the Clean Air Zone: in general, using the Ring Road rather than travelling directly to their destination via the city centre.

Many who stated this as their method of avoiding the CAZ charge pointed out that they would actually be travelling further, and thereby producing more total pollution, as well as possibly adding to traffic congestion.

"I would have to circumnavigate the CAZ and therefore use more fuel and create more pollution. The inner-city will be a ghost town and the suburbs will get gassed." (Individual)

"Given that I cannot physically move my place of employment, or afford a daily charge for commuting, I would re-route all of my trips through the outer suburbs of Birmingham. In short all that this will achieve is to relocate the pollution and congestions issues into a wider residential area." (Individual)

Refuse to pay the charge

Some respondents stated that would refuse to pay the CAZ charge, feeling that they could avoid doing so by way of legal challenges, delays and difficulties in enforcement of fine collections, or by altering their car number plate.

"I would drive through [the CAZ] without paying. We all know the legislation to legally chase up the fines will come years later." (Individual)

"I will place black tape on my number plate and drive through." (Individual)

"I would not pay it as under British Law, you are innocent until proven guilty, and I can prove that my petrol car made in 2003, does not cause high pollution." (Individual)

Purchase a compliant vehicle

Some respondents said that they would upgrade or trade-in their current vehicle to one that complied with the requirements of the CAZ – though, for some of these, whether that would be financially viable was another question.

“I don't know what I would do. None of these are good options. I would probably be forced to save up to buy a newer car, which I really can't afford to do.” (Individual)

“I will buy a cheap 07 plate petrol vehicle as I have no other choice.” (Individual)

“I would be forced to re-finance and purchase a newer vehicle. I would not be able to afford to drive to work every day and pay the CAZ.” (Individual)

Close or relocate my business

Some business owners said that they would relocate their business to a location outside the CAZ, so as to avoid paying the charge, as well as saving their employees, customers, and others who needed to drive to their current location – such as delivery drivers – from having to do so.

This was proposed not only in order to save themselves and others money but was seen by some respondents as a necessary survival tactic, with the implementation of the CAZ being predicted to have a dire impact on businesses' income and customer base – many of whom felt they were already struggling to continue.

“I run a small business in the CAZ and I think deliveries will be affected. I may have to move my business away from Birmingham.” (Individual)

“I will simply move my company and 850 staff out of the area as some of them have no choice but to use cars and the supply chain will be more expensive due to charging delivery vehicles.” (Individual)

“I would move our business to Coventry and make the employees who don't come to Coventry redundant.” (Individual)

Other business owners currently operating within the CAZ also mentioned that they would close down their businesses entirely.

“I will close my business, fire the 64 members of staff who are already proposing an extra £50 per week pay increase, and retire to Portugal.” (Individual)

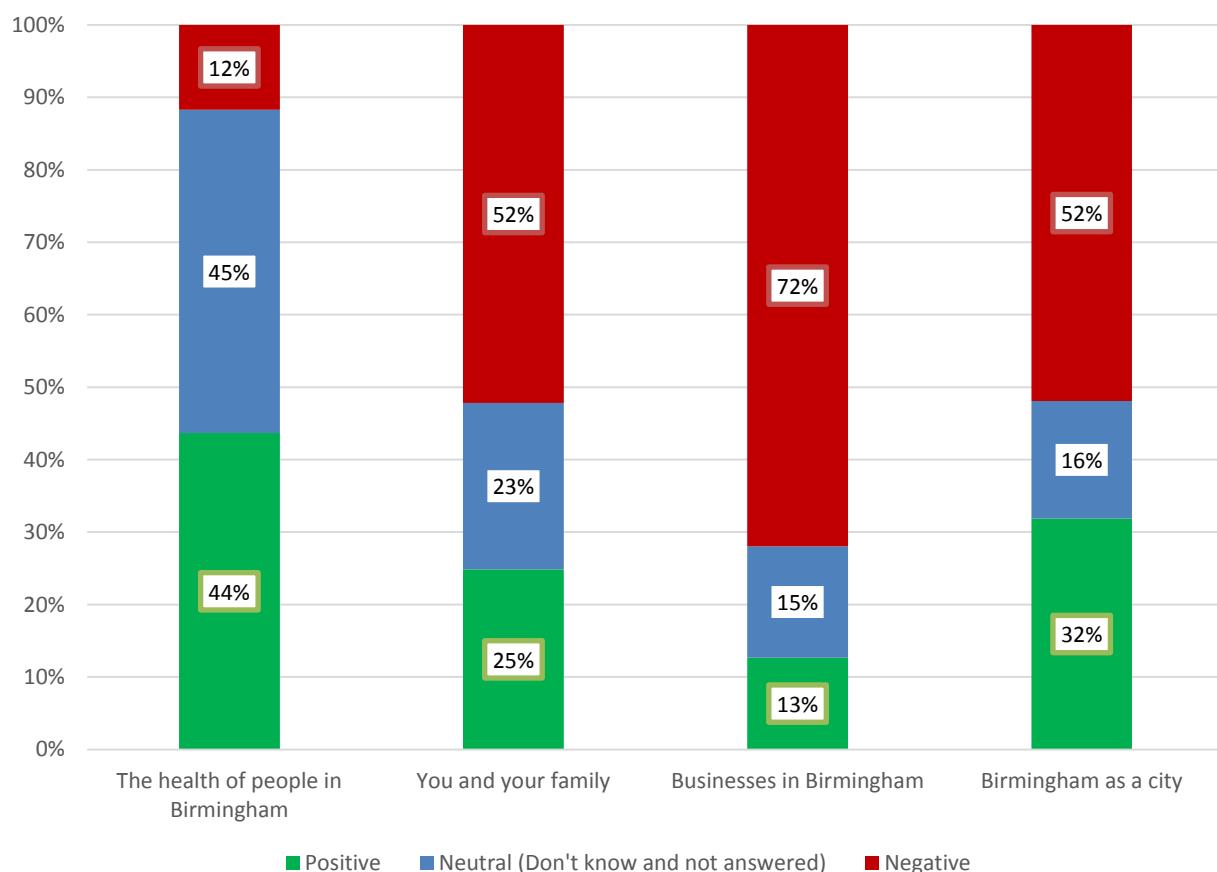
Other themes raised by a smaller number of respondents

- Some respondents said that, in the event of the CAZ being implemented, they would campaign against it
- Some stated that they would protest the condition of public transport, seeking improvement, and a delay in the introduction of the CAZ until public transport was brought up to what they felt was an acceptable standard
- Some said they walk to work, or cycle
- Some, such as residents and the disabled, said that they would ask for discounts and/or exemptions to paying the charge
- Some respondents said that they would drive to the boundary of the CAZ and complete their journey on foot
- Some said that they would use taxis more often
- A small number said that they would sell the car (without stating how they would then proceed to undertake the journeys they currently make)
- Some stated that they ask their employers if they would be able to work-from-home

iQ20: If a Clean Air Zone was introduced what do you think would be the overall impact for the following?***Individuals***

Opinions were divided on the overall impact of the proposed CAZ, with support for the health benefits, but concerns about the impact on themselves and their families, Birmingham as a city, and particularly on businesses in Birmingham:

- 44% saying it would be positive for the health of people in Birmingham and 12% saying it would be negative. Notably 45% did not know if it would improve health or did not give an answer
- 25% said it would be positive for themselves and their family, with 52% saying it would be negative
- 13% said it would be positive for businesses in Birmingham and 72% said negative
- 32% felt it would be positive for Birmingham as a city and 52% felt the impact would be negative

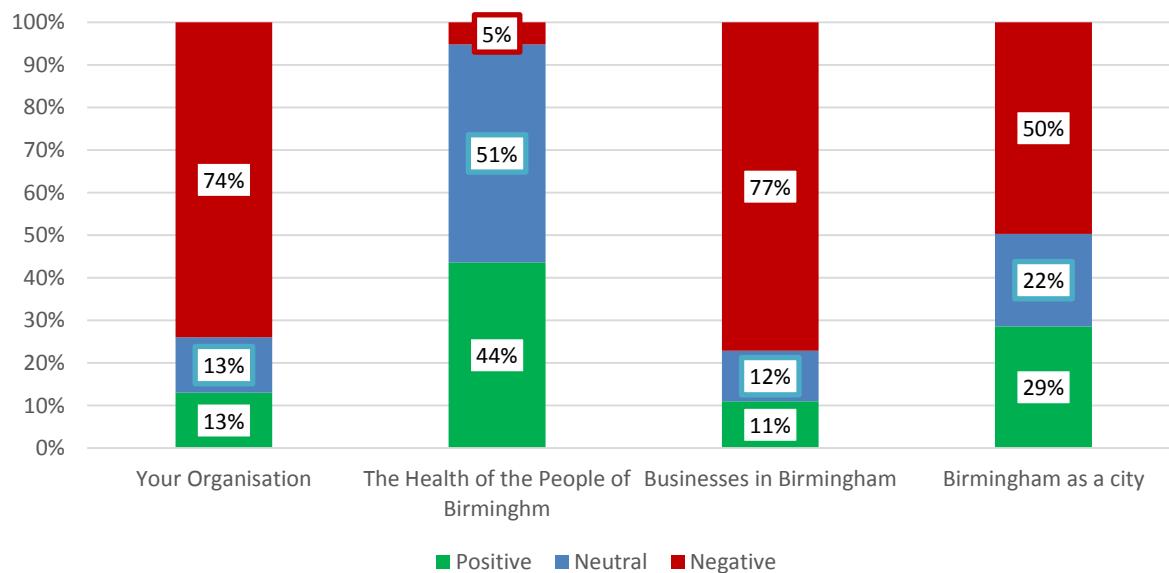
iQ20: If a Clean Air Zone was introduced what do you think would be the overall impact for the following?

Organisations

Organisations showed a similar pattern to the responses by individuals, with support for the health benefits, and concerns about the impact on their organisations, Birmingham as a city, and particularly on businesses in Birmingham:

- 44% said it would be positive for the health of people in Birmingham and 5% saying it would be negative. Notably 51% did not know if it would improve health or gave no answer
- 74% stated that the CAZ would have a negative impact on their organisation, with only 13% saying it would have a positive impact
- 11% said it would be positive for businesses in Birmingham and 77% said negative
- 29% felt it would be positive for Birmingham as a city and 50% felt the impact would be negative

oQ19: If a Clean Air Zone was introduced what do you think would be the overall impact for the following?



iQ21/oQ20: Please explain the overall impact you think a Clean Air Zone would have for you and your family, and for Birmingham and the people who live, work and study here

HEADLINE THEMES

Individuals

[7,780 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Positive	Improvement in air quality and health	1987	25.5%
	Improvements to public transport	663	8.5%
	Improved feel in the city centre	336	4.3%
	Improved cycling experience	292	3.8%
	May attract new business	128	1.6%
	City centre will feel safer	107	1.4%
	Promotes Birmingham as a “forward thinking city”	97	1.2%
Negative	Financial difficulties for residents and commuters	2881	37.0%
	The CAZ will create difficulties for businesses	2808	36.1%
	The CAZ will lead to financial inequality	1235	15.9%
	No positive impact on pollution or health	962	12.4%
	Increased congestion and pollution elsewhere	893	11.5%
	Increases in travel costs	846	10.9%
	Negative for tourism and investment	573	7.4%
	The CAZ will lead to job losses	501	6.4%
	Business price rises	361	4.6%
	Increased commute time	345	4.4%
	The CAZ charge will make visiting friends and family prohibitively expensive	273	3.5%

Organisations

[314 responses to this question]

Position	Theme	No. of Responses mentioning this theme	% of those who answered this question mentioning this theme
Positive	Improvement in air quality and health	62	19.7%
	Improved feel in the city centre	8	2.5%
Negative	The CAZ will create difficulties for businesses	226	72.0%
	The CAZ will lead to job losses	81	25.8%
	Increased congestion and pollution elsewhere	42	13.4%
	No positive impact on pollution or health	28	8.9%
	Financial difficulties for residents and commuters	18	5.7%
	Difficulty attracting employees	18	5.7%
	The CAZ will lead to financial inequality	10	3.2%

THEMES EXPLORED

Positive

Improvement in air quality and health

Respondents welcomed the opportunity to improve the air quality of the city centre, believing that health would improve, the experience of walking and shopping would be more pleasant, and that breathing the air would be more pleasant. The idea that there would be less traffic and congestion also added to this sentiment, while respondents also expected that more green spaces would be added, further enhancing the look and feel of Birmingham city centre.

Health benefits were also expected to arise from an increase in the number of people walking and cycling.

“We feel that that a well implemented CAZ will help improve air quality in Birmingham. The UK Government’s own evidence shows that charging clean air zones are the most effective way to reduce pollution to legal levels in ‘the shortest time possible’. Improving air quality means that people who live, work and study in Birmingham will lead healthier lives.”
(Organisation)

“The Clean Air Zone is likely to result in the increased well being of our workers, leading to reduced absenteeism and greater productivity. The health problems resulting from exposure to air pollution have a high cost to people who suffer from illness and premature death, to our health services, and to business. In the UK, these costs add up to more than £20 billion every year. We expect the health of the city to improve significantly.”
(Organisation)

“The current levels of pollution are terrible. It makes it uncomfortable to walk to work in the city centre and unpleasant to open the windows once there. I worry about my health as a result. Tackling this would make a good difference to people in Birmingham.” (Individual)

“It would make it a healthier place to live - both in terms of reducing pollution and encouraging people to participate in active travel, thereby improving their health through exercise. The city would also be cleaner, quieter and a more pleasing place to be.”
(Individual)

“Improving air quality across our towns and cities will make a real difference to nation’s heart and circulatory health – data from Public Health England indicates that just a 1µg/m³ reduction in PM2.5 concentrations this year could prevent 50,000 new cases of coronary heart disease in England by 2035. Birmingham has a key role to play in this – we urge you to take bold action.” (Organisation)

Improvements to public transport

While many noted that they felt the city’s public transport network and infrastructure was currently inadequate to support a move away from private transport, others felt that the introduction of the CAZ would help bring about necessary improvements, given the need to support the proposed shift away from vehicular travel, and that there were many opportunities for the transport network to expand, in terms of routes, connectivity, and operating hours.

Also expected was a decrease in bus journey time, given the projected reduction in traffic congestion, which it was believed would further encourage their use.

Respondents also believed that the introduction of the CAZ charge would lead to more train stations being opened or reopened, as well as the further development of the Midland Metro tram system.

“More affordable public transport will become available, providing a practical alternative to private car use.” (Individual)

“As long as good, cheap, reliable public transport is a priority in the plan there should be no major negative impact on the city. In fact, it might encourage more people to visit.”
(Individual)

“There would be increased use of public transport and more investment in public transport links, with hopefully reduced travel costs.” (Individual)

“It would lead to less cars on the road and better public transport -- and not just more buses, but commuter trains including introducing passenger connections to Balsall Heath, Moseley and Kings Heath.” (Individual)

“The main impact would be that we finally improve our transport infrastructure to a level achieved in many other European cities.” (Individual)

Note: More details on respondents' view on public transport are included in the summary of answers to iQ26/oQ25, below.

Improved feel in the city centre

As noted above, respondents believed that a reduction in both traffic levels and associated pollution would improve the experience of walking and shopping within the city centre.

Frequently mentioned was the sentiment that the city would feel safer when walking, and particularly when crossing roads, while it was also expected that more areas would be pedestrianised or made into parks or seating areas.

“The cleaner air and overall healthier environment would, we believe, make Birmingham a more attractive place in which to live, work, and study, and should consequently attract more visitors. This will result in increased well-being and positive economic activity. Traffic free areas or pedestrianised streets to restrict vehicular traffic as well as improving air quality will also make for safer and more attractive areas people can visit, walk and cycle in.” (Organisation)

“Improved health for residents, and improved image for the city. A clean, green city would be good for attracting investment and visitors, as well as improving the quality of life for residents.” (Individual)

Improved cycling experience

Respondents felt that a reduction in both traffic and air pollution levels would aid the cycling experience, while the charge for entering the CAZ in a motorised vehicle would encourage greater numbers of commuters to choose cycling as a means of travelling to work. This projected increase in the number of cyclists was in turn expected to encourage the development of Birmingham's network of cycle routes and lanes, as well as locking and storage facilities.

“It would create a safer environment for cyclists and encourage greater use of cycling as an option. A large number of people are put off cycling due to safety concerns and the lack of infrastructure. Fewer cars in the city will help address this.” (Organisation)

“Many of our staff cycle to work and a reduction in the most polluting vehicles would make journeys a lot more enjoyable.” (Organisation)

“I already cycle to work every day, and the health impact for me has already been really positive. I think the Clean Air Zone is a great step forward for our city, and combined with other measures (cleaner buses, extended tram ways and more cycle lanes) we can have more healthy transport solutions.” (Individual)

May attract new business

In contrast to a large number of respondents who said that they believed the introduction of the Clean Air Zone would have a detrimental effect on business, some felt that lower levels of pollution and an increased sense of ambience and walkability in the city centre would significantly increase footfall, which would in turn attract new businesses and investment.

“Businesses would be fine. Birmingham would be seen to be a forward thinking city, reducing its reliance on cars, promoting public transport and the importance of green, public spaces. Making Birmingham more attractive would increase the number of businesses and people that want to relocate here.” (Individual)

“Less vehicles and less pollution will make the city centre a more pleasant place for pedestrians. This will result in more investment in Birmingham.” (Individual)

“Birmingham would be seen worldwide as a progressive city that people would want to visit, which will in turn benefit local businesses. Improved air quality would also encourage other major businesses to move to Birmingham, as they can attract staff by offering better air quality than other cities.” (Individual)

Promotes Birmingham as a “forward thinking city”

Respondents felt that the implementation of the CAZ would send a signal to other cities, both within the UK and overseas, and earmark Birmingham as a “forward thinking city” which both cared for its residents and was seeking new and innovative ways to tackle the challenges faced by the urban modern world.

“We would be living in a forward-looking city which sets an example to the rest of the world on reducing air pollution. Our health would improve and so would our reputation.” (Individual)

“The CAZ would be good for Birmingham's image as a progressive city. It would make people want to come and live here, which would drive business. Businesses would adapt.” (Individual)

“If people blend journeys with combinations of public transport and 'final mile' walking/cycling, this holistic approach will benefit Birmingham as a whole by creating an impression of a forward thinking, progressive city which puts sustainability and people at the heart of its policy making.” (Individual)

Negative

Financial difficulties for residents and commuters, and financial inequality

Respondents felt that the introduction of the CAZ charge would lead many into financial difficulties. As noted below, there was a widespread feeling that city centre businesses would struggle, leading to job losses; while many residents and workers felt that their already tight budgets would fail to stretch to the substantial outlay of a CAZ charge which may total in the thousands of pounds over the course of a year. Some stated that they would have to give up their jobs, with some feeling that they would be better off claiming benefits instead of working.

Linked to this perception and expectation, respondents also said that they felt the CAZ would create a greater sense of “financial inequality” between those who were able to afford either the daily charge or a newer, pollution-compliant vehicle, and those who would neither be able to upgrade their car nor factor in the cost of entering the city centre in their budget for commuting, parking, and maintenance. Some stated that they felt the CAZ charge was “a permit to pollute”, which the more well-off would pay without difficulty or objection – which appeared to contradict the aims of the CAZ, in reducing traffic volume, rather than raising income for the council.

“It will kill retail in the city centre and cost jobs. It will punish the poorest, some of whom may have to give up work or miss out on skills/education opportunities. It is one of the most myopic, destructive and ridiculous ideas that this city council has ever had.” (Individual)

“The impact will be massive. Those who work for a minimum wage in the city will be forced out of their jobs, impacting on our benefits systems. The whole infrastructure of society could be adversely impacted for very little gain: the health of those in Birmingham is affected by low wages versus the cost of living; drugs and alcohol; crime; and poor living conditions. Air pollution is very low down on the list of things that impact the people of Birmingham.” (Individual)

“We have three schools in the city centre and this would increase the cost of transport for our students. We serve a high proportion of communities with deprivation and this could have a monetary negative impact. We appreciate the potential health impact is a positive but are not sure this will outweigh the financial difficulties for our families.” (Organisation)

“We provide food to some of the most vulnerable people in Birmingham. Many have spent decades trying to get their lives together and become part of regular society. We generally find that key to this is securing employment. To force vulnerable people to pay £6+ a day for the privilege of having a minimum wage job in Birmingham City Centre is truly monstrous. Without our organisation to provide more than 140,000 meals a year after the CAZ forces our closure, most of these vulnerable people will suffer further.” (Organisation)

“I cannot afford a new car. I have two kids to drop off and pick up from nursery and school, and I cannot use public transport as I cannot afford the extra childcare costs caused by a longer journey. I live hand to mouth at the moment. This is going to affect me and my kids,

less food on the table, less heat in the winter. You are taxing the poor. This is not equitable.” (Individual)

“I used public transport for years, so I am no snob. But my job in the city centre and my caring commitments mean I must now use a (small) car. My employer will not foot the bill for sure, so I will be faced with an unavoidable new tax of hundreds of pounds a month. That will cripple families on a budget.” (Individual)

The CAZ will create difficulties for businesses and reduced employment

A very large number of respondents felt that businesses located within the CAZ would be negatively impacted. In the retail sector, it was felt that shoppers would choose to go elsewhere – out of town shopping centres such as Merry Hill, for example, where parking is plentiful, there will be no CAZ charge, and most of the same shopping opportunities are available – while businesses providing services or working in industry felt that increased transport and delivery costs, and the necessity of either passing these on or swallowing them, would make it very difficult for them to compete with businesses located in places without a pay-to-enter zone.

Of particular mention were garages, mechanics, and MOT testing stations located within the CAZ, which necessitated people bringing their cars to them. If customers had to pay a significant fee both when depositing and collecting a vehicle, it was asked, what would be the incentive for them to choose a business located within the CAZ as opposed to one located outside?

Other issues raised addressed problems created for employees, whose wages may be insufficient to fund either the CAZ charge or the increased cost of public transport. Businesses predicted, therefore, that they may both lose current workers and struggle to attract new employees, who would be put off by the prospect of paying a significant percentage of their wages in order to travel to work, on top of other fees such as parking.

Many predicted that the introduction of the CAZ would lead to businesses closing, significant job losses, large numbers of empty properties, and widespread financial hardship caused not only by loss of income, but by an increased strain on the welfare system due to rises in unemployment and those claiming benefits. Many respondents feared that the area within the Ring Road would be irrevocably damaged by the introduction of the CAZ.

“We employ 100 people in our Birmingham Office, and 50% of these rely on private transport as they travel from a distance of up to 30 miles or more, and then have to pay for parking in Birmingham.

If the CAZ is introduced this will cost our employees up to £24 per day (£12 for the CAZ charge and £12 for parking). On an average we pay a salary of £25,000pa – this would mean a 25% reduction in their salary, which we believe will encourage our workforce to seek work outside of the city. The remaining 50% travel by public transport and continually comment that the buses and trains are late and overcrowded.

[We pride ourselves] on customer service and if we cannot retain or attract the right talent, then this is going to be drastically affected. We believe this going to have a significant impact on Birmingham for all visitors, employees, customers and suppliers." (Organisation)

"As an automotive engineering business (MOT testing and repairing vehicles) it is impossible for our customers to visit us without the use of their cars. They may therefore move their custom to a garage outside the CAZ, and employees may choose to work elsewhere (outside the CAZ) to avoid the charges. Potentially, the business could become non-viable, closing completely or moving to a location outside the CAZ." (Organisation)

"My business would go bankrupt if we had to pay for each vehicle we own. We would have to sell up and move out the area." (Organisation)

"There will be a significant negative impact on businesses in the city centre as a result of this charge. People will use the suburbs or alternative locations such as Solihull or Merry Hill for shopping - or, more likely, the internet instead." (Individual)

"Our company represents over 30 tenanted businesses in this area and this proposed charge will not only affect them, but also their staff and customers. For ourselves, we worry about our two part-time handymen/cleaners. One works six days a week and this levy could potentially cost him £72 per week! It would hardly be worth him coming to work. The other chap only works two days at three hours per day, and the fee would be almost 50% of his wage. I'm sure this situation will be repeated across all of our tenants and similar employer/employees. There's surely another way to remedy air pollution than financial penalties, which would mainly hit the poorer in society." (Organisation)

No positive impact on pollution or health

Respondents stated that they felt there would be little or no positive impact on pollution levels or health, citing the impact of fifteen years of the Congestion Charge in London, which they believed appeared to have done little to improve air quality, nor to significantly reduce issues of congestion and travel times.

As noted below, some respondents also felt that pollution would merely be moved elsewhere in the city, and perhaps even to areas which were more residential in nature, so that the health benefits for those living and working in the CAZ would be balanced out – and even outweighed – by those living in areas which may see increased traffic and congestion.

Also, as mentioned above, it was pointed out that journeys which bypassed the CAZ by taking longer routes along the Ring Road may generate higher emissions output than were they to take the direct route through the city centre.

"I don't think it will have any impact on improving the health of the Birmingham population. People whose health is affected by air quality do not live within the CAZ, more likely close to the arterial roads coming into the city centre. If you want to improve the impact of poor air quality on population health, you need to be planting trees and evaluating use of green spaces." (Individual)

“I’d like more information on the surrounding infrastructure - how will this impact on suburbs like Kings Heath for example, where we already suffer from dangerously high levels of pollution from traffic flow? What will be done to ensure the clean air zone isn’t simply pushing those drivers into the surrounding areas?” (Individual)

“I am worried it will push the problem further out of the Clean Air Zone, into the town centres and residential areas where it will do more harm as it will affect more people. A clean air policy is good, we need to address the problem, but it has to include the whole of Birmingham to make an impact. Birmingham does not just consist of a city centre.” (Individual)

“I think it would have no long term benefit. The Congestion Zone in London has delivered no reduction in traffic. The same would happen here therefore no benefits would be realised.” (Individual)

Increased congestion and pollution elsewhere

Respondents felt it was unlikely that less cars and other vehicles would use the roads, but rather that traffic would use different roads, in order to avoid the charge, and that this would create congestion and pollution elsewhere, outside the Ring Road.

Some stated that they felt previously uncongested residential areas would be negatively impacted, and that pollution in these areas would be likely to increase, merely ‘shifting’ the problem of vehicle emissions, rather than eradicating it.

Some respondents also pointed out that these residential areas may contain more homes with families and children than areas located within the Clean Air Zone, possibly increasing the possibility of the very health issues the CAZ is seeking to address.

It was also stated that pollution generated outside the Zone – and particularly along the Ring Road, where pollution levels were felt likely to increase, may easily drift inside the Zone due to air currents.

“The A38 through the city centre is a problem. If you charge people to cross the city, they are going to find other routes, and as the infrastructure is not there at the moment to support this, these previously cleaner air places will get choked up with the emissions from the displaced traffic. As the M5 and M42 are already heaving, the burden will just multiply, and health will suffer as a result in a wider area.” (Individual)

“One of our concerns is around the knock on effects of the CAZ, and the implications of extra traffic using the Ring Road rather than the A38 is concerning – we worry that without some other changes to infrastructure in the city that the traffic on the roads would be significantly higher, leading to congestion, delays, and pushing the problem of emissions into the neighbourhoods where we work. It would also likely push parking to the neighbourhoods immediately outside the inner ring road, which would again cause

problems and increase the need for controlled parking schemes in these areas which add costs and hassle for residents in these areas.” (Organisation)

“For people commuting across the city like myself to their place of work, the only choice will be to drive around the Zone, meaning more miles, more pollution, and just moving pollution from one area to another. The route I would take instead passes through more schools and hospitals than at present. How does improve pollution in the city?” (Individual)

Increases in travel costs

Respondents felt that a significant negative impact of the Clean Air Zone would be an increase in travel costs: either through paying the charge itself, or through switching the public transport, which was already seen as being more expensive (as well as inconvenient) than driving, even when petrol prices, maintenance and running costs, and parking fees were taken into account.

Respondents also believed that the CAZ charge due to be paid by bus companies, as well as the cost of making improvements to their fleet of vehicles, would be passed on to the customer, further raising fares which were already seen as expensive, and prohibitively so.

Many who predicted a significant increase in travel costs believed that this would add to issues of financial hardship and struggle.

“Travel costs will go up – bus companies will either pass on the charge to customers, or pass on the cost of replacing their fleet.” (Individual)

“If bus and taxi fares go up people might as well just pay the CAZ charge, which defeats the object.” (Individual)

“The travel companies will increase their prices to cover the costs of the daily charges and prices in shops in the city centre will likely increase too. People who live in London are paid higher wages to reflect the charges and expenses associated with living there. But we won't get pay rises to counter these additional costs and I don't know how you expect people to be able to afford to pay the charges, or to be able to switch to a newer car. Not everyone is in the position to buy a new car, and not everyone can get public transport, it is not practical or feasible. The charge is very worrying for me and my family as it would be an extra expense I cannot afford and would have a negative impact.” (Individual)

“Travel costs will be excessive for those on limited financial income such as pensioners and workers on minimum wage.” (Individual)

Negative for tourism and investment

Respondents felt that having to pay a charge to drive into the Clean Air Zone to visit, for example, the city's museums would have a negative impact on tourism, which would further add to repercussions and difficulties for businesses.

Some also questioned whether Birmingham would appear as appealing to new investment, given the perceived implications of the CAZ charge, and the expectation that it may lead to an economic downturn for businesses located in and operating within the Clean Air Zone.

Business price rises

Related to the expectation that businesses would be negatively impacted by the introduction of the CAZ charge, respondents felt that the costs associated with the charge – for deliveries, etc. – would be passed on by businesses, resulting in price rises for goods and services, and requiring greater outlay by shoppers and users who may already have seen their economic budget affected by either paying to enter the city, or by using public transport (whether with increased fares or otherwise). This again was seen as a possible factor in ideas that the CAZ would lead to financial hardship and inequality, as outlined elsewhere.

Increased commute time

Respondents pointed out that a shift from travelling by car to public transport would significantly increase their travel time to and from work. Some stated that this would be at least double – increasing, for example, from forty minutes each way, to over an hour and a half – while others stated that there simply weren't any suitable public transport options for them to use in order to travel to the city from where they lived.

Parents who took children to school, meanwhile, felt that any expectation for them to use public transport instead of their own vehicles was misguided and unreasonable, with several respondents noting that they made multiple drops in different parts of the CAZ before making their way to work. Doing such a journey on public transport, with two or more children, necessitating several different bus journeys, was seen as impossible to achieve within a reasonable timeframe, and the charge felt as punitive and unfair.

“You cannot encourage people to use public transport as it's not a viable option for many. From where I live the bus take one hour ten minutes, whereas driving takes twenty minutes.” (Individual)

“For me with children and school runs, [if I use public transport] I will never get to work on time, children will not get to school on time, cost of transportation will increase, it will be a nightmare to get in and out of town.” (Individual)

The CAZ charge will make visiting friends and family prohibitively expensive

Some respondents stated that the cost of the CAZ charge would make them less likely to visit friends and family who either lived within the Zone, or who lived in places which required them to drive through the Zone.

This was seen as resulting in a “social cost” to people, lessening levels of positive interaction, and possibly leading to issues of isolation and increased unhappiness.

"My children have moved to other parts of the country, a Clean Air Zone would probably mean that I would visit them rather than they visit me here in the city. It is also more likely to deter other members of my extended family from visiting us in Birmingham." (Individual)

"The impact of the CAZ on me and my family would be extremely negative. My elderly father drives to visit me approx. once a month and would not be able to afford or be willing to pay the charge for driving through the Clean Air Zone. He is uncomfortable driving routes other than that he knows so would get lost driving around. The CAZ charge will without doubt result in considerably less time as a family due to no more visits." (Individual)

"I would have to move to another part of the country. I would have to pay you every time I wanted to go and see my friends and family. I would no longer be able to do my leisure activities at weekends because public transport doesn't go there and basically, I would be stuck in my home when I wasn't at work. I'd become depressed and probably suicidal eventually and instead of preventing a premature death you'd be creating one. Thanks for everything BCC..." (Individual)

Other themes raised by a smaller number of respondents

- Some said they were unable to comment on what impact they thought the CAZ might bring without knowing more specific information about the scale of the charges, who would be affected, and what help and support might be available, and to whom
- Some expressed concern about any possible future changes to the area of the CAZ, or regulations involving aspects such as charging, applicable hours, and compliancy requirements, which they felt may "shift the goalposts" and create further difficulties for Birmingham's residents, workers, and businesses
- Some felt that the issue of pollution caused by emissions from petrol and diesel vehicles was one which ought to be addressed at the level of the manufacturers themselves, rather than the end user, suggesting that "the government could consider imposing statutory obligations on car manufacturers to achieve a minimum percentage of car production, import and/or sales in the UK to be ultra-low emission vehicles." China and California were presented as examples of other parts of the world where such schemes are already in place

4.3 RESPONDENTS' IDEAS, PROPOSALS AND COMMENTS ON THE CAZ

iQ10/oQ15: Do you have any comments on the proposed area of the Clean Air Zone?

HEADLINE THEMES

Individuals

[6,733 responses to this question]

POSITION	THEME	No. of Responses mentioning this theme	% of respondents mentioning this theme
Supportive	General support for the zone as proposed	775	11.5%
	The CAZ should be larger	388	5.8%
	Other areas should be included	135	2.0%
	The Ring Road itself should be included	69	1.0%
Opposed	The CAZ will cause financial hardship	982	14.6%
	There will be a negative effect for business	853	12.7%
	The CAZ will increase congestion elsewhere	660	9.8%
	The A38 through the city centre should not be included	603	8.9%
	The CAZ will increase pollution elsewhere	555	8.2%
	The CAZ should be smaller, covering only the main city centre	311	4.6%
	It creates difficulties for those working at and visiting the children's hospital	265	3.9%
	The Jewellery Quarter should be excluded	119	1.8%
	Other areas should be excluded	62	0.9%
	The CAZ creates unfair difficulties for those located just inside its border	39	0.6%

Organisations

[254 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Supportive	General support for the zone as proposed	28	11.0%
	The CAZ should be larger	9	3.5%
Opposed	There will be a negative effect for business	99	39.0%
	The Jewellery Quarter should be excluded	32	12.6%
	The CAZ will increase congestion elsewhere	25	9.8%
	The CAZ will lead to job losses	21	8.3%
	The proposed CAZ is too large, and should be focused on the city centre only	18	7.1%
	Industrial areas should be excluded	10	3.9%
	The CAZ creates unfair difficulties for those located just inside its border	9	3.5%
Neutral	The expressways and tunnels should not be included – particularly the A38	20	7.9%

Note: Several themes highlighting perceived negative consequences of the CAZ were mentioned many times in responses to iQ10/oQ15, and while the number of respondents mentioning them in these questions is noted in the table above, they have been moved and detailed in the responses to iQ21/oQ20, which more directly addresses “the impact of the CAZ on Birmingham”.

These themes are:

- *The CAZ will cause financial hardship*
- *There will be a negative effect for business*
- *The CAZ will increase congestion elsewhere*
- *The CAZ will increase pollution elsewhere*
- *The CAZ will lead to job losses*

THEMES EXPLORED

Supportive

General support for the proposed area of the Clean Air Zone

Many respondents stated that they agreed with the proposed area for the Clean Air Zone and that they welcomed the expected improvements in air quality and health, as well as traffic congestion and travel time. For many, it “made sense” that the Ring Road was being used as the boundary, and that this would make it easy for people to understand where the CAZ began, and where vehicles would be charged to enter, while the exclusion of the Ring Road itself would allow drivers the option of traversing the city without being forced to pay a charge.

“The Clean Air Zone in size, scope and its application to all vehicles except Euro 4 petrol and Euro 6 diesel is an appropriate, justifiable, necessary and proportionate first step to improving air quality in the city of Birmingham.” (Individual)

“The area chosen is about as logical as can be delivered. It is easy to describe and gives those drivers wanting to pass around the city centre without going through it another option. It covers most of the sites where high pollution levels have been identified. If the Clean Air Zone helps to get some of the most polluting vehicles off the roads entirely then this will have benefits not just inside the zone but also along the A4540 boundary and beyond.” (Individual)

The CAZ should be larger

Some respondents who approved of the proposal for the Clean Air Zone also said that they felt it should be larger, covering other areas which they felt suffered from congestion and pollution, and believing that this would help improve air quality levels over a greater area.

“While we support the area of the proposed CAZ charging zone and agree that its boundary is logical, the air quality modelling shows that the charging zone and the package of additional measures proposed will mean that harmful levels of NO₂ will continue to exceed the annual mean legal limit values at many locations both within and outside the CAZ. In order to deliver full compliance, additional reductions in NO_x of between 3 and 19% would still be required, and the city would not be compliant until 2021. We think that this state of affairs is totally unacceptable, particularly as BCC is required to achieve compliance as soon as possible. We therefore believe that BCC should urgently investigate various other options in order to meet this legal requirement, including looking at whether further areas of the city need to be covered by a CAZ charging zone.” (Organisation)

Specific areas which were suggested for inclusion were:

- The Ring Road itself, including Five Ways and Bordesley Circus
- A34
- A435 Alcester Road, including Camp Hill, Moseley and Kings Heath
- A441 Pershore Road
- A456 Hagley Road
- Bristol Road at Selly Oak
- A452 Chester Road
- A5127 Lichfield Road
- A453 College Road and Jockey Road
- A4040 Stechford Lane
- A4040 Bromford Gyratory
- St James Road
- Harborne
- Erdington High Street
- All roads within 1km of Gravelly Hill Interchange
- All major residential areas within the M6/M5/M42

Of these areas, Kings Heath was by far the most frequently mentioned.

Opposed

The A38 through the city centre should not be included

Respondents felt that the expressways and tunnels which allow traffic to traverse the city and travel between motorways, without stopping in the city itself, should be excluded from the CAZ. The A38 was seen as an essential link between the north and south of the city. Respondents felt that including the A38 in the CAZ may actually increase congestion and pollution, given the perception that many drivers would seek alternate routes which may significantly add to the number of miles travelled, as well as the number of cars using, for example, the Ring Road.

“I do not believe that the A38 expressway should be included, and if main routes such as this are included then people will look for other routes, thereby increasing traffic around other areas. This will create further issues for the council and more anger amongst working Brummies.” (Individual)

“I think the A38 should be excluded because it would put too much pressure on the A4540, which is already at its maximum capacity, especially during peak hours. In principle the idea of a CAZ in Birmingham is fantastic but in practice the infrastructure to cope with traffic diverted from the city centre is not in place. The A4540 would need triple lanes with an additional bus lane. This proposal would cause absolute chaos on the A4540.”
(Organisation)

“The A38 runs straight through the CAZ and presumably carries a lot of through traffic. That can't be pushed onto the Ring Road without causing tremendous traffic problems and additional pollution (e.g., stop/start). It is 13 miles from Gravelly Hill to Hopwood via the A38/A38M, and 25 miles via the M42. Pushing the pollution elsewhere or creating more cannot be a sensible approach.” (Organisation)

It creates difficulties for those working at and visiting the children's hospital

Many respondents felt that the application of charges for those working at and visiting Birmingham Children's Hospital were unwelcome and unfair – particularly when many visits were unavoidable, for unpleasant and unhappy reasons, and perhaps undertaken several times a week, all adding increased stress and strain to those presumably already undergoing a difficult time, as well as possibly already suffering from a financial burden caused by taking time from work.

Hospital workers were also highlighted, given that many would be working shifts which would either require them to own and run their own vehicle, or to attempt a long, uncomfortable, or perhaps impossible journeys using public transport very late at night. The charge, therefore, was seen as punitive for those carrying out essential and service-oriented work.

Note: The issue of the impact the CAZ may have on hospital visitors and staff is explored further below, in answers to iQ23/25 and oQ22/24.

The Jewellery Quarter should be excluded

Of particular concern to respondents – and especially to many businesses and organisations – was the Jewellery Quarter, which was not seen as suffering particularly from either pollution or congestion, and was felt by many to require special attention and thought given the unique and independent nature of the businesses that operate there, which it was felt should be protected and encouraged, and which may be in danger should this area be subject to the charge.

“Birmingham's Jewellery Quarter is historic employing thousands of people in both retail and manufacturing. Trade has already reduced massively over the last few years with recession, internet and many other factors. People travel from all over the country to visit the area and sometimes just for repairs. If they have to pay the CAZ charges on top of parking and fuel, they may decide to just go locally. Our staff drive in too from all over and public transport is not always direct, so this in itself would cause huge problems. Overall this would impact massively on trade and in turn will close a large percentage of the Quarter, resulting in huge job losses.” (O)

“I do not feel the Jewellery Quarter should be included. Many people visit either as low paid workers or to purchase goods and the area is not well served with public transport. If furniture is being delivered to or supplied from my gallery it would be impossible to use anything other than a commercial vehicle, and many of the exhibitors would be discouraged from exhibiting by the proposed cost. I understand the City Council is very keen to

encourage the development of the jewellery Quarter and this proposal would discourage it.” (O)

As raised above, business owners in the Jewellery Quarter predicted many great challenges and changes should the CAZ come into force, from their own increased expenses in travelling to work, to those of their staff and customers, as well as delivery drivers who may be forced to pass on costs.

Some predicted that the introduction of the CAZ may be the “tipping point” in terms of keeping their businesses running:

“We are struggling to make ends meet at the moment. The footfall in the Quarter is getting smaller due to online shopping and parking charges, and an extra £11.50 per day would put most of us out of business. [Birmingham City Council] would lose all of the rents and parking fees. I hope that you will reconsider.” (O)

“Footfall to the Jewellery Quarter has significantly fallen, and with rent and overheads rising annually we are greatly impacted financially. To introduce a congestion charge will significantly impact negatively on future footfall.” (O)

“As the vast majority of businesses in the Jewellery Quarter are small, independent businesses, the charge will most likely put many out of business, myself included. Even though there appears to be a reduction in cost proposal for business owners, our customers will not want to travel to the area because of this charge. We, as a business, are in agreement that there should be a congestion charge for the city centre itself, but change the boundary to exclude the Jewellery Quarter in Hockley.” (O)

It was also pointed out that the inclusion of the Jewellery Quarter appeared to be more motivated by the desire to make the area of the Zone easy to understand and convenient, rather than in order to address any particular issue of pollution or congestion:

“The Jewellery Quarter has low pollution issues, as shown by the detailed council pollution maps. It seems wholly unfair to lump this area in with the core centre of Birmingham just to make the map easier. It is a historic manufacturing area and transport is key to manufacturing. Seeing as it doesn’t have a pollution issue then I see little to no justification in including the whole Jewellery Quarter.” (O)

“We are outside the pollution area but have been included solely because we are inside the Ring Road.” (O)

Other areas should be excluded

Other areas which respondents felt should be excluded from the Clean Air Zone included:

- Summer Lane and neighbouring industrial areas
- Digbeth and Cheapside, which were seen as important business areas which, by their natures, required significant numbers of vehicles to enter the CAZ, as well as being less polluting than other areas
- Calthorpe Academy, a school employing 150 staff, located around 80 metres inside the Clean Air Zone, as well as other unnamed schools located within the CAZ
- Birmingham City University, whose car park was described as being “within the CAZ by a marginal amount”, and Aston University, which, combined, total around 40,000 students and several thousand staff, as well as provide venues for conferences and help support local businesses – all of which it was felt would be negatively impacted by the introduction of a vehicle charge
- Broad Street

The CAZ creates unfair difficulties for those located just inside its border

A small number of respondents proposed that it seemed unfair that they may have to pay the CAZ charge to access places of work which may be located just inside the Ring Road, with some saying that their journeys involved driving around 100 metres into the Clean Air Zone, parking their cars for the day, then driving 100 metres out at the end of the day.

This was contrasted with those who may spend a large part of the day driving many miles within the CAZ – taxi and delivery drivers, for example – who would be introducing infinitely greater levels of pollution to the CAZ.

While these respondents may have supported the philosophy behind the implementation of the Clean Air Zone, they felt that potentially unfair anomalies such as these should be addressed.

“I work for Birmingham City Council and use my car for work purposes. I salary sacrifice for car parking at Millennium Point. I would enter CAZ to park about [300 metres inside] and would incur charges to do my job. I could park on the other side of the Ring Road, however a number of staff have been mugged in this area. Safe parking costs me £60 a month; I do not need a further daily charge in addition.” (Individual)

“In principle the CAZ is a good idea and necessary in order to safeguard our children's future - however my yard/office is located in Blews Street, which along with Pritchett, Manchester, Brewery and New John Streets forms a little industrial estate immediately adjacent to the Middleway that is home to a number of businesses that would be affected by the CAZ. I would propose that these streets are made exempt from the charge.” (Organisation)

“We have been based in Pritchett Street since 1893. We fall within the proposed CAZ by 100 yards. I think the area should be reduced so many SMEs like ours would not fall into the



CAZ. How can it be fair that an SME 100 yards away from us will not have to pay any charges and we will?" (Organisation)

"I work just 25 metres inside the Clean Air Zone. Your proposals suggest that I may end up having to pay £30 per week to drive 25 metres into the zone to earn my living. Like many businesses/organisations, your proposals will very likely cause a crisis for employers within the zone, who will lose staff due to this penalty charge. I fully agree with the suggestion of improving the air quality in the City, but until there is an effective and plausible public transport alternative, this plan as I understand it will only make Birmingham a business free zone. At the moment I can double my journey time to work (and increase the costs) by travelling on public transport, or I can simply find another job – which is probably my best option. I think you need to revisit this plan!" (Individual)

Other themes raised by a smaller number of respondents

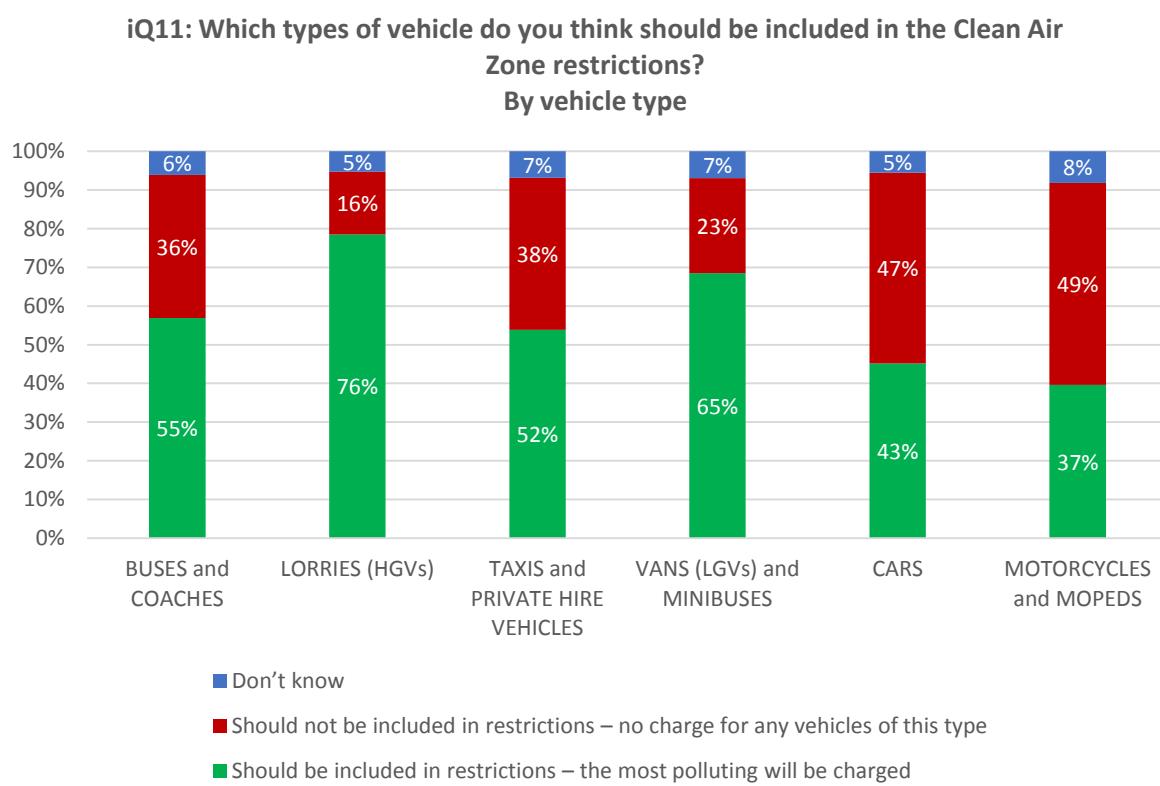
- The airport should be included, given that it also produces pollution
- The question was asked why the whole city centre needed to be included, rather than only the areas which had been deemed to be suffering from high and unsafe levels of pollution
- Some felt that using the Ring Road to outline the proposed boundary of the Clean Air Zone was being done as a matter of convenience, rather than one which utilised logic, and that it didn't take into account: a) areas of low pollution, as above, that lie within the Ring Road, and don't necessarily require action to address problems which exist elsewhere; and b) the effects on businesses located within the Ring Road, but not necessarily in areas suffering from either congestion or diminished air quality

iQ11: Which types of vehicle do you think should be included in the Clean Air Zone restrictions?***Individuals***

Over half of respondents felt that buses and coaches (55%), lorries (76%), taxis and private hire vehicles (52%), and vans and minibuses (65%) should be included in the CAZ restrictions.

Nearly half (49%) felt that motorcycles and mopeds should not be included in the restrictions, compared to 39% who felt they should be included.

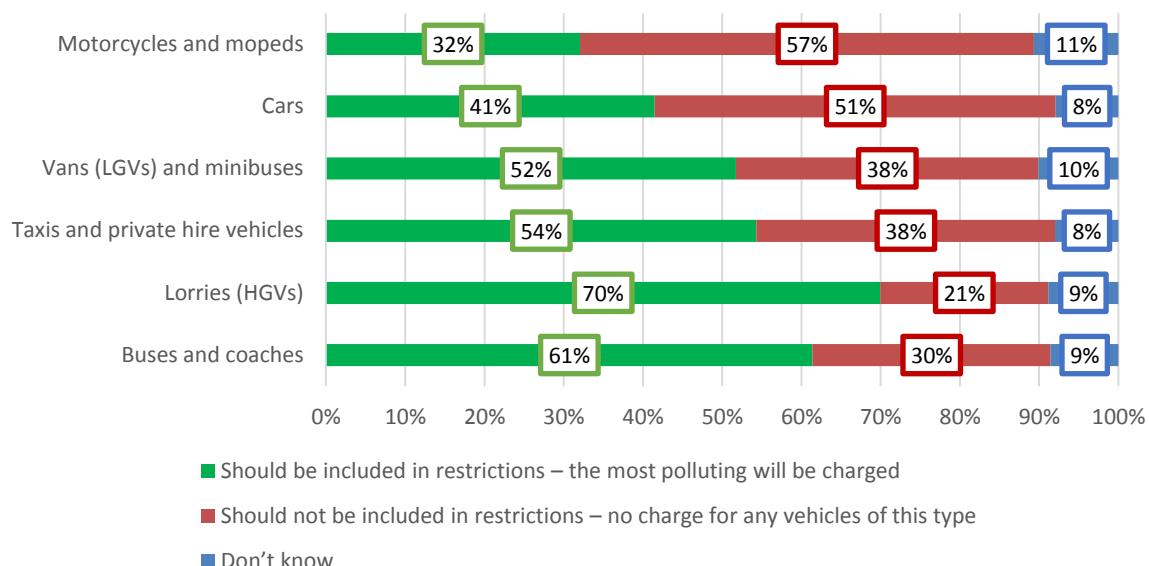
Opinion was more evenly split with regards to cars, with 47% saying they should not be included in the CAZ restrictions and 43% saying they should be.



oQ16: Which types of vehicle do you think should be included in the Clean Air Zone restrictions?***Organisations***

Over half of organisations that responded felt that buses and coaches (61%), lorries (70%), taxis and private hire vehicles (54%), and vans and minibuses (52%) should be included in the CAZ restrictions.

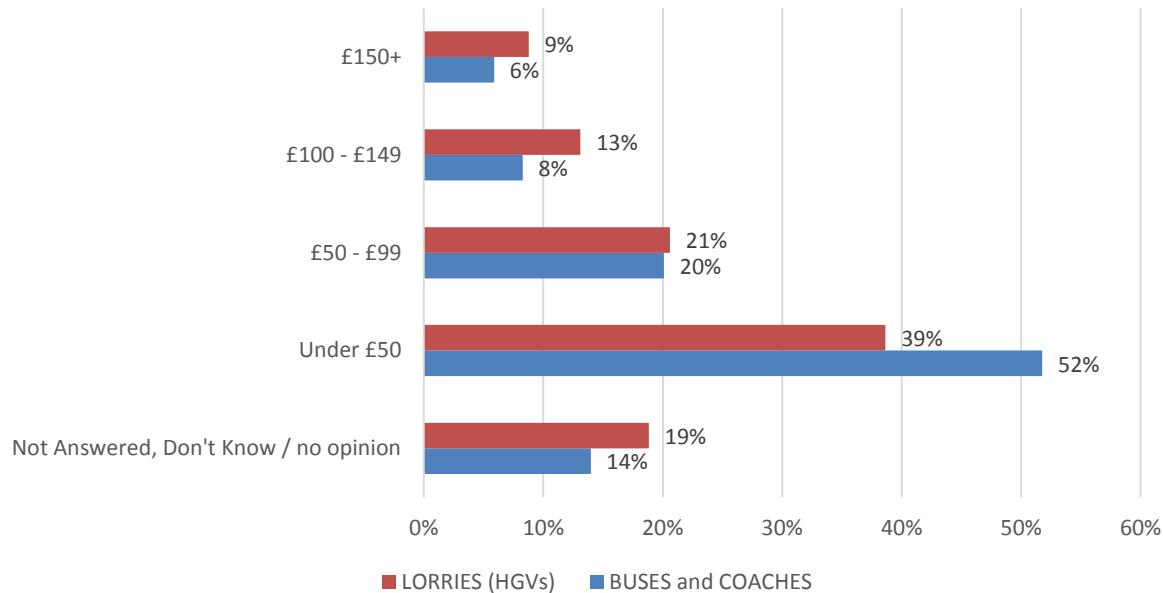
Over half felt that motorcycles and mopeds (57%) and cars (51%) should not be included in the restrictions.

oQ16. Which types of vehicle do you think should be included in the Clean Air Zone restrictions?

iQ12-17 / oQ17: If the vehicles below are included in the restrictions, what do you think the daily charge for driving in the Clean Air Zone should be?**Buses and Coaches; Lorries (HGVs)*****Individuals***

52% of respondents felt that buses and coaches should be charged under £50 per day for entering the CAZ, with 39% feeling that lorries should have the same level of charge.

The level of support for charges reduced as the amount of the daily charge increased, with only 9% supporting a charge of £150 or over per day for lorries and 6% supporting this level of charge for buses.

iQ12-13: If the vehicles below are included in the restrictions, what do you think the daily charge for driving in the Clean Air Zone should be?**Buses & Coaches; Lorries (HGVs)**

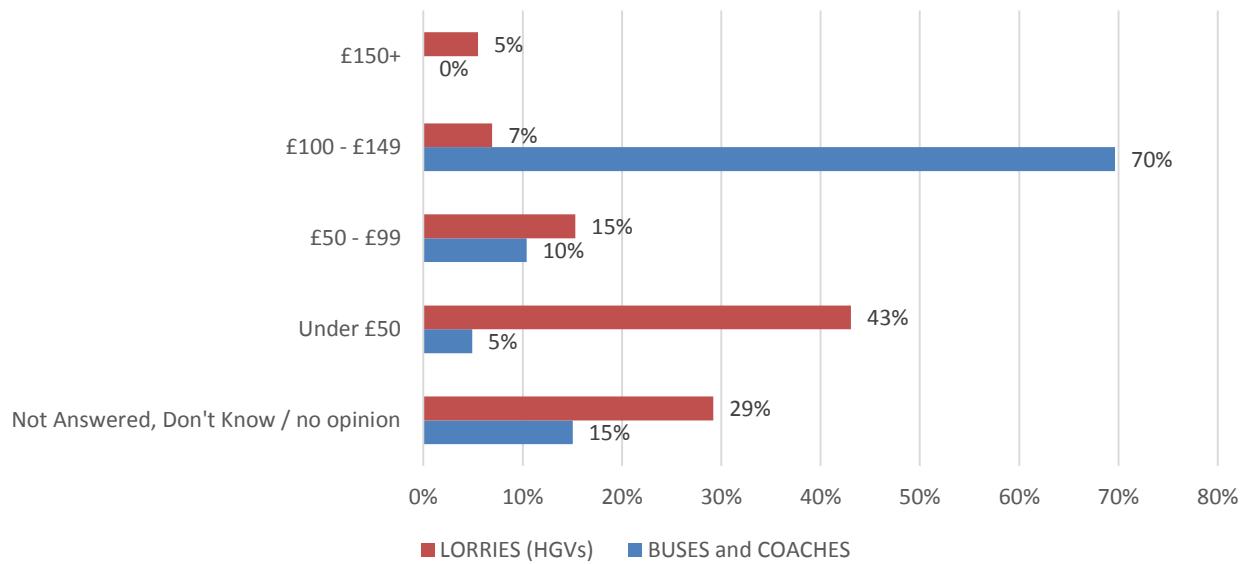
Organisations

43% of organisations that responded felt that lorries (HGVs) should be charged under £50 per day for entering the CAZ, with only 5% feeling that buses and coaches should have the same level of charge.

70% felt that buses should be charged between £100 - £149 per day to enter the CAZ, with generally the view that pricing should be lower for lorries than for buses and coaches.

oQ17: If the vehicles below are included in the restrictions, what do you think the daily charge for driving in the Clean Air Zone should be?

Buses & Coaches; Lorries (HGVs)

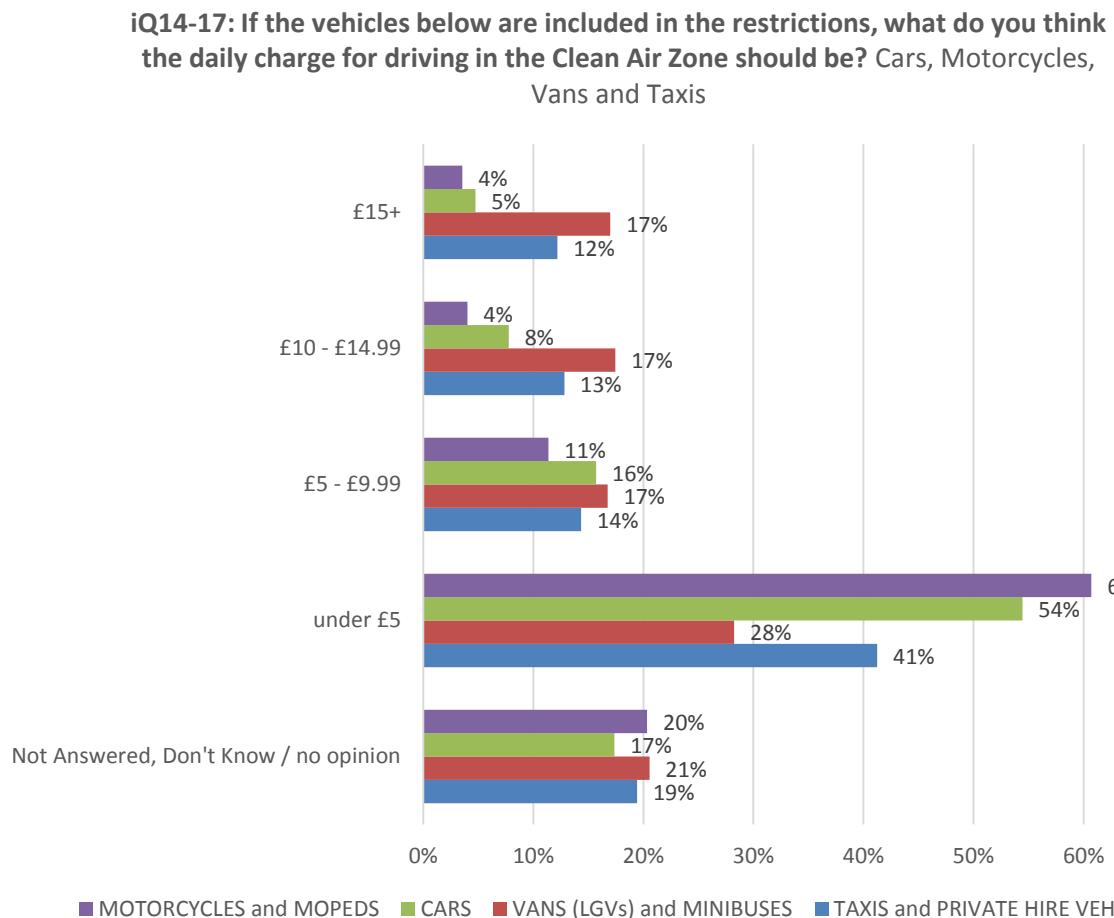


Cars, Motorcycles, Vans and Taxis

Individuals

The most commonly chosen daily CAZ charges for cars, motorcycles, vans and taxis, were for this to be under £5:

- 61% felt motorcycles and mopeds should be charged under £5
- 54% felt cars should be charged under £5
- 41% felt taxis and private hire vehicles should be charged under £5
- 28% felt vans (LGVs) and minibuses should be charged under £5, with 17% each saying they should be charged £5-9.99, £10 to £14.99 and £15 or over



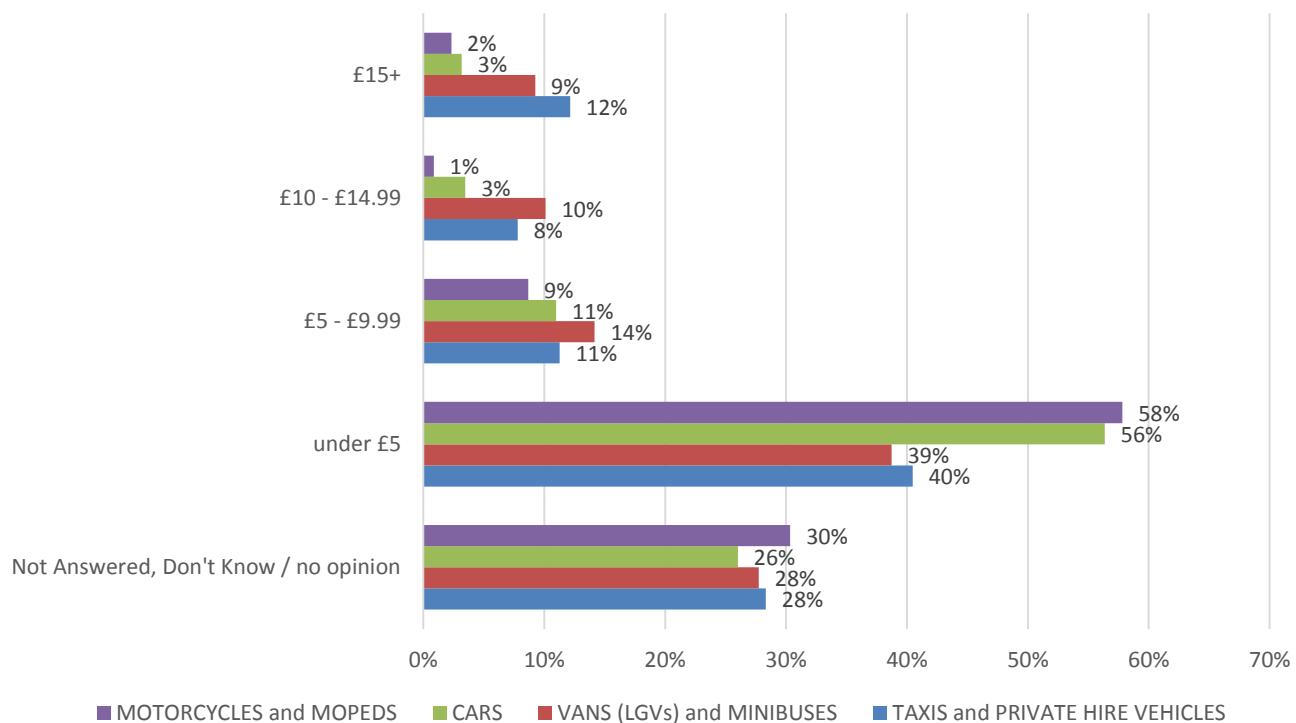
Organisations

The most commonly chosen daily CAZ charges by organisations for cars, motorcycles, vans and taxis, were for this to be under £5:

- 58% felt motorcycles and mopeds should be charged under £5
- 56% felt cars should be charged under £5
- 40% felt taxis and private hire vehicles should be charged under £5
- 39% felt vans (LGVs) and minibuses should be charged under £5

oQ17: If the vehicles below are included in the restrictions, what do you think the daily charge for driving in the Clean Air Zone should be?

Cars, Motorcycles, Vans and Taxis



iQ18/oQ18: Do you have any comments on which vehicles should be charged to drive in the Clean Air Zone and how much those charges should be?

HEADLINE DATA

Individuals

[5,796 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Exempt	Buses	388	6.7%
	Private cars	287	5.0%
	Motorcycles and scooters	206	3.6%
	Taxis	153	2.6%
	Workers and commuters	132	2.3%
	Electric/hybrid	111	1.9%
	Lorries and HGVs	80	1.4%
Charged	Only lorries/HGVs should be charged	499	8.6%
	All vehicles producing pollution should be charged	287	5.0%
	Buses and coaches should be charged	285	4.9%
	Taxis should be charged	197	3.4%
Neutral	There should be no charge for anyone	1620	28.0%
	Charging should be based on pollution	584	10.1%
	Comments on Euro emissions standards	221	3.8%

Organisations

[222 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Exempt	Buses	15	6.8%
	Commuters	15	6.8%
	Motorcycles and scooters	11	5.0%
	Private cars	9	4.1%
	Delivery vehicles	8	3.6%
Charged	Only lorries/HGVs should be charged	18	8.1%
	Buses and coaches should be charged	16	7.2%
	All vehicles which produce pollution should be charged	10	4.5%
Neutral	Charging should be based on pollution	30	13.5%

THEMES EXPLORED

Vehicle Types: Views on which should be exempt, and which should be charged

Buses

Respondents felt that buses should be excluded from the CAZ charge on the grounds that they believed the charge would be passed on to the customers, and that bus fares were already prohibitively expensive. It was believed, therefore, that in order to encourage car users to switch their method of travel to public transport, prices must either be kept as they are, or, preferably, be reduced and/or supported by a range of passes and other subsidies.

“I don’t think buses should be charged - this may impact on fare prices which will drive people away from using public transport rather than encouraging them to ditch their private transport and take buses and trains.” (Individual)

“Buses used for school trips should be a lower rate otherwise the cost will be passed onto students and may well prohibit trips in future.” (Individual)

It was also stated, however, that buses should be among the range of vehicles that would be subject to the charge, given that they were seen as strong polluters. Incentives, therefore, were encouraged to move buses away from diesel engines and towards greener fuel sources, such as hydrogen.

“Buses are the absolute worse and should have the biggest charge applied to them to get them to upgrade. This is because of the constant stopping and starting; on some there’s a bus stop every fifty metres and every time they get going you can see the disgusting smoke and heat billowing out of the huge exhausts. They also make all the road users behind them stop and start as well further exacerbating the problem.” (Individual)

“I think buses should be charged at the top end of the scale – they tend to use much older and heavier polluting vehicles and need to be encouraged to invest in more modern vehicles or pay the price for their pollution.” (Organisation)

Private cars

Some respondents felt that all private cars should be excluded from the CAZ charge as, unlike buses, taxis, and HGVs, etc. it would not be possible for those making journeys in their own vehicles to offset or recoup the cost of paying the charge, and that charging private vehicles would negatively impact commuters, workers, shoppers, and those socialising within the Zone.

Private cars were also believed to be responsible for a much smaller share of the pollution produced, perhaps making only one small trip per day, whereas other vehicles (such as buses and taxis) would cover many miles within the CAZ.

“Individual private cars may only make one journey in a day and cannot offset the cost elsewhere, so should not have to pay as much as other vehicles. The price should definitely be based on situation.” (Individual)

Motorcycles and scooters

There was support for motorcycles and scooters to be made exempt from the charge for entering the CAZ, with respondents pointing out that their smaller engines produced relatively little in the way of pollution in comparison to larger vehicles, while the size of motorcycles and scooters, and their ability to bypass traffic hold-ups was seen as highly beneficial in helping to reduce congestion.

“I do not think it is appropriate to charge motorcycles to ride through the CAZ; if anything, motorbikes and scooters should be promoted as an alternative means of transport, and as a way of meeting and improving the targets for the air quality. Not only are the emissions negligible to that of cars, they would help to massively reduce congestion in and around Birmingham. I think it is extremely short-sighted and unreasonable to expect a motorbike/scooter bike rider to pay to use the roads in the CAZ, especially if they are expected to pay the same rate as high polluting cars such as fuel thirsty Range Rovers.” (Individual)

Taxis

Taxis were singled out as being deserving of the CAZ charge due to the perception that many of them ran old and heavily polluting engines; that they often idled without going anywhere; that they made many, many trips per day within the city centre area; and that, as a business, they a) profited from polluting within the Clean Air Zone; and b) could pass on their costs to the customer (which would be minimal when spread across the business of a whole day).

Some pointed out that the charge could be used to encourage taxi firms and drivers to switch to greener engines or electric vehicles.

Some respondents felt that taxis should be excluded from the CAZ charge on the grounds that they, in effect, provided a public service by transporting workers and visitors, and that, like buses, any charge would be passed on to the customer. Taxi drivers themselves, meanwhile, responded that the introduction of a daily charge would have a serious impact on their business and livelihood, to the extent that they may have to seek employment elsewhere.

“As taxis bring money through passengers entering in and out of the city I find that charging them to help our city is a scandal.” (Individual)

“These charges you are thinking of are extortionate. We are not London and please note people’s income is far less than there, but the charges are similar or more! These will just intact the public as taxis, buses etc will just increase their tariffs/prices for which we will have to pay for! This is not right!” (Individual)

In addition to the survey responses, feedback was received from taxi and private hire drivers during a trade briefing event, in which concerns were raised that having to pay the CAZ charge would force many drivers out of work, leaving Birmingham City Council to support them. Drivers felt that the Council would be required to support the trade by providing information regarding the costs and implications involved due to the introduction of the CAZ, as well as details on the different retrofitting options available for cars and Hackney Cabs.

The following studies were requested by drivers so as to furnish them with sufficient information in order to most successfully navigate any upcoming transition:

1. Financial Implications for taxi drivers
2. Impact to the movement of disabled people across the city
3. Detail on what taxi drivers want and need, such as retrofits and support
4. A list of retrofit options and suitable compliant vehicles
5. Birmingham City Council were asked to consider applying for additional Commonwealth Games funding in order to help taxi drivers buy compliant hackney cabs that would be beneficial in helping disabled people coming to see the Games

Drivers also felt that they should have been better briefed, and received more notice and publicity regarding the consultation document and the proposal process for the CAZ as a whole.

With regard to the desire to move more and more in the direction of electric taxis, concerns were raised about the availability – and perceived current shortage – of electric charging facilities.

Workers and commuters

Some respondents felt that those who travelled into the proposed Clean Air Zone for purposes of work should not have to pay the charge due to the unavoidable financial implications, and the burden this may place on them when making unavoidable and necessary journeys. For many, switching to public transport was seen as impractical, given increased costs and journey times, while the current standard of public transport was also seen as an obstacle. For a large number of respondents, public transport issues were felt to require addressing and correcting first, before any widespread rollout of a CAZ charge could take place. Workers and commuters, therefore, were felt deserving of exemption given the perceived lack of viable alternative methods of transporting themselves to and from their places of work.

“Are we not penalising those who are doing their utmost to get to work and make a living? If we require them to incur additional costs, either through loans (debt) or congestion charges, may they not decide it’s not worth it? What subsidies are the council offering to these workers?” (Individual)

"We feel that people travelling to work and leaving their car parked up all day on street or car park should not be charged as can't see how they are having impact on clean air zone. Our factory is 100 yards off the ring road and we have 60 employees, of which there are approximately 40 cars on our car park, but they do not move all day – of the 40 cars at least 25 will be in the criteria of being charged." (Organisation)

Electric/hybrid

Respondents felt that vehicles which produced little or no pollution should be exempt from paying the CAZ charge, and that charging all other vehicles would encourage people to move more quickly to using electric cars.

It was, however, pointed out that there are not sufficient charge points in Birmingham city centre to support a large scale move towards using electric-powered vehicles, while others pointed out that their living situation – for example, living in terraced housing, apartment buildings, or places where parking close to home was difficult or impossible – also precluded the purchase of an electric vehicle, given the issue of overnight charging.

"All vehicles that are not electric or fuel cell powered [should be charged]. That should also include trains and planes." (Individual)

"The infrastructure [for electric cars] needs to be in place before people can be charged for entering the city centre. I can't bring an electric car to Birmingham as my commute is too long and there are a limited number of charge points." (Individual)

"All should be charged that pollute. Make exceptions for electric only powered vehicles." (Individual)

Lorries and HGVs

Many respondents felt that lorries and HGVs should be subject to the CAZ charge – and some felt that only lorries and HGVs should be subject to the charge – as these vehicles were seen as particularly polluting, as well as causing congestion, while some pointed out that they were mainly operated by big businesses who would easily be able to afford and swallow the charge.

Others however felt that charging lorries and HGVs would lead to costs being passed on to customers, as well as potentially having wide-ranging negative effects on businesses and investment within the city centre, such as construction projects, which may be rendered financially unviable given a CAZ charge which could run into the hundreds of thousands.

Some pointed out that, unlike commuters and residents who could use public transport, lorries and HGVs had no recourse to an alternative; while some felt that limiting lorries and HGVs to quieter hours – such as in the very early morning – may provide a solution.

"HGVs constitute only 5% of vehicle miles travelled and make up just 2% of vehicles on the road, yet emit 21% of total transport-derived NO_x and 16% of transport greenhouse gas emissions. This is a good reason to target HGVs with the heaviest charges." (Organisation)

All vehicles which produce pollution should be charged

Some felt, given that the aim of the proposal was to reduce pollution, that all pollution-producing vehicles should be charged, with only electric cars being made exempt. Introducing a charge and then making allowances and exceptions, as well as offering discounts and support, was seen as contrary to the primary goal of improving air quality within the city centre, and, for some, appeared to support the notion that the prime aim of the charge was to raise money for the council.

"I think low charges on only some vehicles won't lead to the widespread change you hope for. If charges are the only method of encouraging a change of habit, they need to be high and on all vehicles." (Individual)

"I don't see why lorries, vans, buses, coaches, taxis, and other commercial vehicles should be exempt entirely from the charge, because they're the vehicles causing the lion's share of the pollution. They should have to pay like everybody else." (Individual)

"The charges should apply to all motorised vehicles that fail to meet the engine standards otherwise the CAZ will not be effective in its aim." (Organisation)

Neutral

There should be no charge for anyone

Across several questions, there were a number of respondents who stated that they opposed the CAZ charge in totality, and that they felt there should have been an opportunity to select this option, or that the proposed introduction of the charge should have been "put to the vote".

Note: The number of respondents stating this, as quoted in the table above, has been collated from responses provided across all questions.

Charging should be based on pollution

As noted above, respondents felt that the CAZ charge, designed as it is to address issues of pollution, should be tailored to the actual amount of pollution an individual vehicle produces. This was felt to be within the means of modern technology, which could allow for a more nuanced and individualised system which would more fairly and accurately measure and charge vehicle users, as well as ensure that those who drove the most polluting vehicles, and/or travelled the most miles within the CAZ, were charged more than users whose vehicles polluted less.

"I don't think all cars should be treated and charged the same. I agree all cars should be charged as part of the scheme – however in the proposed system Euro 5 diesel vehicles will be charged the same as any previous Euro versions. Therefore, if I own a Euro 5 diesel currently but also own a Euro 2 diesel vehicle, there is no financial incentive to use the Euro 5 vehicle, even though it will produce much less NOx (and other emissions). By not including a tiered rate it [may not] target the worst polluters." (Organisation)

"Basing the charge on the age of the engine is not wise. Nano-liquids turn old engines into new: I improved a 15-year-old car with 136k on the clock from 63 mpg to 78.5 mpg. Let customers prove their emissions so they do not have to change to newer, more expensive vehicles. MOTs provide accurate measures of emissions, and older engines may test better than you think." (Organisation)

"A lot of dirty diesel vehicles are used on a daily basis by freight companies and I think it is fair that they pay substantially more than private individuals who drive less and pollute less." (Individual)

"My understanding is that this is a daily charge, but it should also take into account the amount of time the vehicle is in the zone for. If it is passing through once then it should receive a low charge; but if operating several hours within the zone, then the charge should be high." (Individual)

Comments on European emissions standards

Respondents replied with a range of comments on the proposed use of the Euro emissions standards in order to select which vehicles will be liable to pay the charge. Some felt the system should be more nuanced, with more polluting cars charged more than those which polluted less, rather than a blanket charge for all cars which fell outside the required categories. Some felt, for example, that a diesel car which met Eurostandard 5b, and therefore fell just short of the requirement for exemption, should not be charged as much as one in the Euro 3 or 4 category.

It was also stated by respondents that there ought to be a possibility to use a vehicle's actual emissions output, measured during the MOT test, rather than the European emissions standard to which it had been designated. Some stated that their own vehicles had been modified to reduce emissions and felt that this should be taken into account with regard to the CAZ charge. It was also pointed out that many tests had shown that Eurostandards designations were inaccurate, and that test conditions did not reflect real world conditions. There was the danger, it was felt, that cars which produced more pollution would be exempt from the charge, while some of those which produced less pollution would be subject to it.

Diesel engines were also singled out as being unfairly punished. A number of respondents pointed out that they had bought diesel-powered vehicles on the recommendation of the government, while some felt that certain non-compliant diesel vehicles were less polluting than petrol cars which had been proposed for exemption.

With regard to diesels, it was also pointed out that the idea that new diesels are less polluting than old diesels may be inaccurate, with a number of studies put forward to support this, such as: <https://www.telegraph.co.uk/news/2018/01/31/suppressed-rigged-diesel-tests-monkeys-showed-new-cars-harmful/>

It was therefore proposed by respondents that emissions levels be measured on a case-by-case basis, rather than using the European emissions standards, which may not accurately reflect real world conditions or the actual emissions levels of Birmingham's cars – especially in light of the UK's upcoming cessation from the European Union.

Other themes raised by a smaller number of respondents

- Private cars being used as High Occupancy Vehicles (HOVs) should receive a discount or be exempt from the charge
- Vehicles registered to charities were felt deserving of exemptions or discounts
- Vehicles which “visibly polluted” – e.g., by “belching black smoke” – should be liable to on-the-spot fines
- Breakdown vehicles which may be called into the CAZ were proposed for exemption
- “Historic vehicles” were proposed for exemption
- It was suggested that the criteria by which charging, discounts and exemptions were eventually defined would be subject to regular review, to ensure that the aim of the Clean Air Zone was being met as efficiently as possible

iQ26/oQ25: Is there anything else which can be done to improve Birmingham's air quality?

HEADLINE DATA

Individuals

[6,893 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Suggestion	Make improvements to public transport	3470	50.3%
	Improve the cycle network	828	12.0%
	Improve the road system to aid traffic flow	806	11.7%
	Introduce more green spaces	777	11.3%
	Develop the rail network	612	8.9%
	Create a Park & Ride system	553	8.0%
	Extend tram system	512	7.4%
	Introduce travel passes	409	5.9%
	Address roadworks issues	299	4.3%
	Promote walking and increase pedestrianisation	284	4.1%
	Address buildings and industry emissions	247	3.6%
	More charging points for electric cars	224	3.2%
	Fines/incentives for businesses	169	2.5%
	Create a fleet of electric shuttle buses	162	2.4%
	Address the issue of 'engine idling'	157	2.3%
	Address emissions from trains	135	2.0%
	Reroute HGVs	118	1.7%
	Encourage electric taxis	98	1.4%
	Introduce live pollution monitors	96	1.4%
	Address 'school run' issues	89	1.3%
	Address problems caused by burning rubbish and bonfires	76	1.1%
	Reduce bus lanes	73	1.1%
	Reduce or remove the M6 toll charge	58	0.8%
	Encourage carshare schemes	53	0.8%
	Cease building within the city centre	51	0.7%

Organisations

[250 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Suggestion	Make improvements to public transport	106	42.4%
	Improve the cycle network	32	12.8%
	Improve the road system to aid traffic flow	31	12.4%
	Introduce more green spaces	24	9.6%
	More charging points for electric cars	15	6.0%
	Tackle roadworks issues	14	5.6%
	Address the issue of 'engine idling'	13	5.2%
	Create a Park & Ride system	12	4.8%
	Promote walking and increase pedestrianisation	12	4.8%
	Develop the rail network and Midland Metro	8	3.2%

THEMES EXPLORED

Suggestions

Make improvements to public transport

A large number of respondents felt that the most important thing which could be done to improve Birmingham's air quality was to invest in and develop the public transport system. Newer, more environmentally-friendly buses could be purchased, travelling expanded routes and operating at all hours of the day and night. Cheaper and more flexible tickets could be introduced, allowing transfers not only between different bus services, but also between other modes of transport, such as tram and train. Security and safety could be improved, making buses more appealing to travel on, while the local rail and tram network could be expanded, with new stations opening, and stations that had previously been closed reopened, such as Moseley, Kings Heath, and Hazlewell.

For many, improving the public transport system was the single most important factor in offering a desirable alternative to travel by car and enticing those travelling into the CAZ to reduce the use of their private vehicles, and thereby reduce air pollution – and, for many, a prerequisite in terms of implementing the CAZ: improvements in public transport being seen as needing to come first, and to be put in place, before the CAZ could fairly and realistically be introduced.

Across a range of questions, Birmingham's public transport provision was widely seen as being inadequate for both current purposes and the extra demands that the Clean Air Zone would put on it. Respondents stated that their commute times would be greatly increased; that fares were prohibitively high; and that routes were inconvenient for their journeys between home and work – especially noted by those who were required to travel outside normal working hours, such as shift workers, as well as parents, who may currently drop off multiple children at different schools before continuing their journey to work. When compared to travel by private car, journeys such as these were seen as unfeasible if using the current public transport network, while many also stated that they felt unsafe using public transport – particularly late at night – with a perception that crime and antisocial behaviour – including drug use on buses and trains – was rife.

Respondents also repeatedly pointed out that comparisons with London's Congestion Charge were inappropriate, given the vast difference in transport coverage in both area and connectivity, as well as the operating hours themselves. Some felt that a much-improved public transport network ought to be put in place before such a charge could be proposed to Birmingham, expressed in sentiments such as:

"It's all very well looking to move people on to public transport, but the public transport isn't there. London's transport system works 24/7. Birmingham is a completely different city." (Individual)

Improve the cycle network

Respondents felt that the amount of people cycling into the CAZ could be increased by improving facilities such as segregated cycle lanes and secure bike locking. Some noted that this already appeared to be taking place, while others pointed out that routes to areas such as Soho, Camp Hill, Harbourne, and Bearwood lacked provision, and that other routes were yet to be linked up. Some respondents highlighted Manchester as a city which appeared to be successfully promoting cycling and encouraged Birmingham to follow its lead. Bringing cycling to children through workshops and classes was seen as one way of doing this, as well as ensuring that cycling was as safe as possible on the city's roads and streets, and canal towpaths.

Cycle hire schemes, similar to London's 'Boris Bikes' were also proposed as an effective means of getting people on two wheels.

"Build more segregated cycleways (especially westwards), there is a lack of provision for people who come into the city along the Hagley Road." (Individual)

"Why isn't there a serious investment in cycling? Birmingham is a great city to cycle in: not too hilly and easy commuting. I'm an unfit 40 year old woman who has got a bike through Cycle to Work and would use it every time I came into the city if it was cycling friendly. Everyone I know says they aren't doing it because it's unsafe.

You are building more bus lanes (which are some of the worst polluters) yet not building proper cycling lanes (with a very small number of exceptions). The changes that have been made (with the exception of the route to the university) are actually offensive in that its box ticking while not achieving anything and actually putting cyclists at risk." (Individual)

"Birmingham needs more cycle routes like the two cycle highways being built on the A34 and A38, and people need more safe places to store their bikes. Schemes like the bike storage facility being considered for the One Centenary Square office building are a good idea." (Individual)

"I cycle regularly from Moseley to central Birmingham via the Rea Valley route. I'm sure you're aware of its inadequacies – there are several points where cyclists are simply dumped onto a road shared with buses and cars. Cycle lanes really do need to be protected with bollards in my view, or completely separate from the road. There could also be more bike lock up points, including integrated bike locks (I have to carry a very heavy D-lock with me at the moment). And more needs to be done in terms of enforcing the 1.5 metre overtaking guidance - there has not been a single cycle ride into the city that I can remember where I haven't feared for my life at some point." (Individual)

"I think the canal tow paths should be utilised as cycle paths, but they would need to be surfaced and painted with appropriate signage as well as bright lighting and CCTV cameras for additional security." (Individual)

Improve the road system to aid traffic flow

Respondents felt that certain aspects of the city's road system were inefficient and led to vehicles unnecessarily stopping and starting. Of particular concern was the way in which traffic lights were synced, which seemed to many users to be ripe for improvement; the current system being deemed responsible for causing traffic congestion, delays, and pollution.

Specific areas mentioned included:

- Pedestrian (zebra) crossing at Navigation Street, which it was felt was responsible for substantial congestion during rush hour, and would be better served by being replaced with timed traffic lights
- The junction of the A34 and the Ring Road, wherein traffic from/to the A34 was seen as being given priority. It was suggested traffic flow would be better served by prioritising the Ring Road.
- Likewise, the Ring Road was also mentioned in terms of lanes becoming right or left turns only, which necessitated thru-traffic to change lanes to carry straight on
- Traffic light sequencing at Dartmouth Circus, Holloway Head, and Queensway (for access to New Street station) was viewed as inefficient
- Modifying traffic regulations for certain parts of the day, such as restricting right turns across Bristol, Hagley, and Stratford roads during rush hour

- In Balsall Heath, Moseley and Edgbaston, it was suggested that some roads were closed several years ago in a bid to combat prostitution, and that now that this is no longer an issue, the roads should be reopened
- On Longmore St, in Balsall Heath, approaching the Belgrave Middleway, it was suggested that most city-bound traffic wants to go straight ahead, crossing over the Middleway into Highgate – but instead this is restricted to buses and taxis only, forcing cars to turn left onto the Middleway and blocking the following two roundabouts

“Birmingham’s traffic flow is useless. Anything that is in place to stop a car wastes energy, increases journey time, increases fuel use, and increases emissions. Birmingham is like an old village that got overgrown: lots of side roads, roundabouts, traffic lights, and traffic calming. These ‘distractions’ interfere with the flow of traffic along very few arterial roads. The main arterial roads need to be dual carriageway, red routes: they often pass through constrained streets with lanes blocked by parked cars and buses stopping, leading to badly thought out pinch points. Get the traffic moving and pollution will reduce.” (Individual)

“Sequencing of traffic lights is needed and more intelligent traffic lights so that traffic spends less time stationary and therefore polluting.” (Individual)

“Re-timing traffic lights is a top priority: there are a very large number of traffic lights that can be turned off during low use hours – e.g., at roundabouts in and out of the proposed zone. My observations indicate that traffic lights in the Sandwell council area are a lot better at managing traffic flow than any that come under Birmingham. There are some traffic lights that turn red when you approach them when there is no other traffic about – for example, at 4am in the morning. How is this helping pollution?” (Organisation)

“Many traffic lights that give you the option of going straight or turning still only have one lane. When one car needs to turn this can hold up a massive queue of cars wanting to travel straight. Many times, only one or two cars move through the traffic lights at a time. Where possible a secondary timed turn light needs to be introduced to help with congestion on single lane roads – especially near schools/shopping areas.” (Individual)

“It’s essential to keep traffic flowing more freely. A significant amount of emissions build-up comes from stationary traffic held in endless jams and congestion hotspots. For instance, the traffic light sequence on the A453 College Road intersection with the Ford garage means every day hundreds of cars are stuck on a red light for minutes while no traffic comes out of the slip road. Traffic gets needlessly backed up all along this stretch of road and several tons of emissions needlessly pollute each year.” (Organisation)

“If you want people to use the Ring Road and not drive into town, you need to change the sequencing, so the Ring Road traffic gets priority (bus gates/lights apart). The worst current example is the A34 at the north of the city. The inbound and outbound traffic gets far more priority than the ring road. This needs to change.” (Individual)

Introduce more green spaces

Respondents proposed that trees could be planted, parks created, and 'green walls' introduced, to not only aid the quality of the air, but also to improve the feel and ambience of the city, making it more pleasant to walk and cycle through, and thereby further reducing traffic and pollution.

"We need more trees – and we need to stop relying on the 'more trees than Paris' statistic, because most of them are in Sutton Park: the city centre itself is still very grey. New Street's paving is awful and needs redoing, perhaps with landscaping down the middle. Corporation Street is grey and needs trees. I appreciate the tram lines make this tricky, but they manage it in Manchester. Let's see more parks and boulevards to soak up the co2 and make Birmingham beautiful." (Individual)

"The Council should investigate the idea of introducing 'City Trees' which absorb huge amounts of dust, particles, Nitrogen Oxide and CO₂. They have been installed in Glasgow and Newcastle. There may be government money available for this, plus an opportunity for sponsorship (through a company name checking the installation) as has been done in Newcastle." (Organisation)

"I am sad that more trees and green spaces have not been included as something that is being considered. Birmingham has less tree cover than other European cities, and ambitious projects are underway in Manchester (City of Trees), Liverpool (Mersey Forest), and Leeds (White Rose Forest). Birmingham will be in danger of falling behind. Trees planted in the right place can minimise the impact of air pollution, minimise the risk of flooding, and have a positive impact on the population's mental and physical health." (Organisation)

"There are many societal benefits to enhanced and newly created Natural (Green and Blue) Infrastructure, including carbon sequestration, flood water management, and improved air quality. Studies proving improved air quality include an Atkins study of the ivy green screen grown along Bristol Street which concluded: "The Green Screens along the A38 can reasonably be said to be capturing particulates from the air and improving the local air quality." (Organisation)

"Green infrastructure and encouraging biodiversity should be included as a part of the work to improve Birmingham's air quality. Mexico City has developed vertical gardens on main roads to improve not only air quality, but also biodiversity and wellbeing." (Organisation)

Develop the rail network and Midland Metro

As noted above, as part of an improved and expanded public transport network, respondents felt that there was room to further develop the rail system. Ideas put forward, as well as the proposed reopening of stations along the Camp Hill line, included:

- Building a station at City Hospital, on the line between Smethwick and New Street
- Expanding parking at suburban railway stations and making it free

- Extending the tram system to residential areas, as well as improving the fare structure, frequency, and operating hours
- Providing more carriages and seating space, so that people do not have to stand or experience claustrophobic conditions – especially during rush hour
- Having local trains running later into the night
- Constructing an underground tube system

The provision of an underground tube system similar to the London Underground was felt long overdue for the nation's second-largest city, with respondents feeling an underground system was the solution to Birmingham's transport needs, with even a simple system (to begin with) making a big difference in reducing people's dependence on their cars, and therefore reducing emissions.

Create a Park & Ride system

Respondents felt that a key component in reducing vehicle traffic in the city centre would be to implement an effective and widespread Park & Ride system, whereby commuters could easily switch from car to bus and complete their journeys using public transport. To make the system viable, several factors were felt to be required, such as:

- Free parking
- Frequent, fast, and comfortable buses
- Economical fares (more economical than current)
- Several facilities spread around the main arteries leading into the Ring Road and the city

Cities such as Nottingham and Oxford were mentioned in this regard as locations who had done this well, and who had been seen to benefit in terms of both pollution and traffic flow because of this.

“I think you should include Park & Ride services (electric buses) on the outskirts of the city centre: Maypole, Hagley, Longbridge, Gravely Hill, etc. Also, make it free to park at the train stations in those areas too, then people have a real choice over the service they use.”
(Individual)

“The city needs more Park & Ride infrastructure to encourage people to leave their vehicles outside of the CAZ. There is currently very minimal Park & Ride in the city, which limits the options people have to travel around Birmingham city centre without their vehicle. This simple measure could decrease the emissions in a short amount of time and would have less of an impact on people's lives.” (Organisation)

Introduce travel passes

Linked to the suggestions for improvements to public transport, respondents felt that a range of travel passes, similar to those available in other cities, would greatly increase the likelihood that those travelling into and within the CAZ would utilise public transport. London's Oyster Card system was favourably mentioned, as well as other types of day

passes, week passes, and tickets which allowed transfers to be made between either a number of buses or between different modes of transport, such as bus and train.

Greater flexibility and available options were encouraged, which would in turn benefit the user in terms of convenience and finance, and make using public transport a more appealing and viable choice.

Address roadworks issues

Respondents felt that more could be done to ensure roadworks were carried out and completed in an efficient manner, with responses showing that this was not currently believed to be the case. Cones closing off roads for no apparent reason was one objection, as was seeing roads closed but no work being carried out. Also, respondents felt that different roadworks projects could be better coordinated, as problems with congestion from one set of roadworks was often compounded and increased when another road was simultaneously being worked on.

This issue was often frequently mentioned in conjunction with the perceived problems of inefficient traffic light synchronisation.

Promote walking and increase pedestrianisation

Creating more pedestrianised zones was seen as a way to both reduce traffic within the CAZ and to enhance the walking and cycling experience for city centre users.

Address buildings and industry emissions

Some respondents felt that more could be done to address issues of pollution being caused by large buildings, factories, and industries.

“More taxes imposed on businesses that cause pollution, especially those polluting the air.” (Individual)

“Move polluting businesses such as heavy industry out of the city centre and closer to the motorway network so that delivery vehicles don’t pollute the atmosphere.” (Individual)

“Close the factories and businesses spewing out dirty pollution.” (Individual)

More charging points for electric cars

Respondents, while supporting the drive to make more cars within the city electric, noted that there were currently few electric charge points, and that far more charge points would need to be introduced to successfully encourage drivers to consider an electric car a viable option. Others also noted that charging an electric car was impractical for those living in apartment buildings, or on terraced streets where parking outside their own home may not be possible.

Some also questioned how the necessary and large-scale installation of electric charge points would be paid for.

“The take up of electric cars in Birmingham is hindered by the very poor availability of charging points (I drive an all-electric car so speak from experience).” (Organisation)

“Install ‘pay as you go’ charging points: the current system of subscription-only use is very user-unfriendly as one has to plan one’s parking/charging very carefully or subscribe to all networks, which gets very expensive. ‘Pay as you go’ is no subscription required (even if with higher charges for use) and makes Electric cars much more attractive.” (Individual)

“Work should be done with partners – e.g., supermarkets and other places where people tend to drive – to substantially increase the number of working electric car charging points.” (Organisation)

Fines/incentives for businesses

A number of respondents believed that businesses could be encouraged to introduce more environmentally-friendly and less polluting practices by way of fines and/or financial incentives, not only with regard to their premises and the way they operate, but also in encouraging their staff and customers to embrace and utilise sustainable transportation, such as cycling, walking and public transport. More businesses, it was proposed, should install showers and locker rooms so that commuters who may choose to cycle to work were better provided for. Car share schemes were also encouraged.

Respondents also felt that businesses, planners and architects could be encouraged to include features such as solar roofs, green terraces and green walls, enhancing both their immediate environment, and the city as a whole.

Create a fleet of electric shuttle buses

Some respondents felt that Birmingham could adopt a model used in other places, whereby free shuttle buses operate within the city centre, and that these shuttle buses should be powered by electricity, thereby not increasing pollution, and by their being free, offering great appeal to those who may be persuaded to leave their cars at home.

“Manchester has a free shuttle bus that runs all around the city for short hops.” (Individual)

Address the issue of ‘engine idling’

A number of respondents raised the issue of vehicles which appeared to sit with their engines idling when not moving, not only unnecessarily adding to overall air pollution, for no apparent reason, but also creating both noise and air pollution in the immediate vicinity, which was seen as discouraging to and unpleasant for pedestrians.

Chief among the perceived perpetrators of unnecessary engine idling was taxi drivers, bus drivers, parents waiting for their children to come out of school, and diesel trains standing in New Street station.

“Stop parents from sitting in their cars ticking over while waiting for their kids to come out of school. I have already complained about this in Newtown, but nothing has been done about it. There are nearly 100 cars sitting outside Nishkam School on Farm Street and Great King Street North, and the majority are still running their engines.” (Individual)

“Use enforcement agencies to prevent stationary vehicles leaving their engines running.” (Organisation)

“Stop taxis idling their engines while parked on ranks.” (Individual)

Address emissions from trains

Respondents believed that diesel trains in the city’s railway stations were responsible for a large amount of pollution, with engines left running while idle, greatly diminishing the immediate air quality, as well as the air quality of the city in general. The council, therefore, was encouraged to take steps to address this issue (if, indeed, it is a factor in air quality issues).

“Diesel trains stand in the station, which can be for a considerable time. This needs to be stopped.” (Organisation)

“Diesel trains using New Street station are a significant source of air pollution. The semi-underground nature of the station means that pollution from diesel trains can be trapped at platform level. Researchers from Birmingham University have found harmful concentrations of pollutants to be present at platform level which could have adverse health effects for both passengers and station staff. Cross Country Trains account for most of the diesel powered trains using New Street Station. Since the Department for Transport are currently undertaking a public consultation on the new Cross Country Rail Franchise, we would like to suggest that Birmingham City Council engage with this consultation and draw attention to the problem of emissions from diesel trains using New Street station. This reduction could be achieved by using bi-mode trains which would be able to operate on electric power using the overhead line equipment when on the approaches to, and within the station. Such trains are already in service with a number of other train operating companies.” (Organisation)

“Ban diesel powered trains from the city rail network, or introduce a large charge for their use. Although the above-ground changes at New Street station have improved the travel experience for people in general, once at platform level the choking stench of diesel fumes is instantly apparent. Electric trains only, all across the Midlands.” (Individual)

Reroute HGVs

Banning HGVs from certain areas of the city and forcing them to take different routes to their destination, avoiding narrow and congested thoroughfares, or certain hours of the day, was seen as a way in which pollution may be able to be reduced.

Encourage electric taxis

Respondents felt that efforts to assist taxi drivers to trade their vehicles for environmentally-friendly electric taxis would help greatly improve the quality of air in the city centre, as well as help signal Birmingham's intent to become a world leader in clean air policy.

"Electric taxis or private hire cars should be allowed to use some of the bus lanes or bus only roads in the city centre, as this will attract drivers to buy electric vehicles." (Individual)

"The upcoming taxi licensing changes are an important step, as Birmingham seems to have a lot of very old taxis. It might be feasible for all taxis to be hybrid petrol or electric, and running in electric mode only in the city centre." (Individual)

Introduce live pollution monitors

Some respondents felt that live pollution monitors could be installed throughout the city, so that motorists and pedestrians who would otherwise remain unaware of the exact scale of pollution in their vicinity – what was called "an invisible issue" – could see either how well or how poorly the air around them was doing. Exposing the population directly to the actual pollution levels through such live monitors, it was believed, would inspire and encourage them to take action and make changes themselves, as the issue was made personalised.

Address 'school run' issue

Some pollution problems were felt to have their source in the issue of parents driving their children to school. For some, children were driven unnecessarily small distances, when they might otherwise be able to walk or cycle (given a safe and supportive infrastructure), while others, as above, noted the prevalence of idling engines while parents were waiting for their children to emerge.

Some felt that pollution caused by parents may be addressed by the providing a greater number of school buses, or by providing bus passes to children.

Respondents also noted the significant decrease in traffic hold-ups and problems during school holidays, as well as faster journey times, and encouraged the council to look into finding ways to allow traffic to flow more freely during term-time also.

Address problems caused by burning rubbish and bonfires

Some respondents stated that they believed a good deal of pollution was caused by illegal fires, by garden fires, and by homes with wood-burning stoves or coal fires, and that this should be addressed.

“Ban people burning rubbish – there is often smoke from my neighbours that enters our flat. I cannot believe it is allowed in this city.” (Individual)

“Garden fires cause a lot of pollution. And the removal of green waste services has led to a lot of people burning garden waste, which causes terrible smoke.” (Individual)

“Reportedly, domestic fuel burning accounts for a similar proportion of air pollution as traffic. How about a daily levy on households which light fires during the winter?” (Organisation)

Reduce bus lanes

There were a number of respondents who felt that, rather than aiding traffic flow, the number of bus lanes within the city’s central areas actually added to congestion by reducing the amount of available road to travel on, for little added benefit. Bus lanes, it was felt, were under-utilised and caused frustration for motorists who sat stuck in traffic next to an empty bus lane which, if made available for all vehicles, would greatly reduce congestion.

“Bus lanes create congestion, increasing pollution. Buses are the biggest polluters in the city and most are running round half empty most of the day.” (Individual)

“‘Build more bus lanes’? Are you crazy? They cause a lot of the pollution by clogging up the traffic and causing issues which did not exist previously – e.g., outside Birmingham Conservation Centre and on Pershore Road.” (Organisation)

Reduce or remove the M6 toll charge

Respondents felt that reducing, or preferably removing the M6 toll charge, would have a large impact on lessening levels of pollution within the city, due to the increased numbers of drivers who would use the motorway rather than seeking alternative, free routes which took them on smaller, more congested roads.

Cease building within the city centre

Respondents noted that allowing new buildings such as office blocks and high rises to be constructed within the area of the CAZ appeared in contradiction to the stated aims of reducing pollution, given that all new buildings would necessarily attract new people, and that new people would bring with them new cars, and require more services which also relied on transportation.

Construction was also felt to impact heavily on the air quality of the city, with respondents stating that they felt large amounts of pollution was created by dust particles and emissions from machinery with large diesel engines such as cranes and diggers.

There was also concern that too many high-rise buildings would trap fumes in the city, causing additional harm.

Some felt that decreasing building and developing green areas and parks – as well as “green buildings”, as mentioned above – would give them a welcome and wanted feeling of “civic pride” which was currently lacking.

Encourage motorbikes and scooters

Respondents felt that as much as possible should be done to encourage motorbikes and scooters, which, as mentioned above, were seen as low-level polluters, and of benefit to issues of traffic congestion. Ways to do this included:

- Continue to allow motorcycles to use bus lanes
- Create dedicated motorcycle and scooter lanes
- Provide secure free parking
- Provide covered parking with lockers to store gear in
- Exempt motorcycles and scooters from the CAZ charge

Other ideas put forward by a smaller number of respondents

- The city centre should be made as unappealing as possible to cars, by way of speed and access restrictions, parking fees, one-way streets, and any other means
- Birmingham City Councillors could lead by example, giving up their vehicles and switching to public transport, cycling, or walking
- Measures should be taken against the airport and aeroplanes, which were seen as a significant source of pollution for the city
- Certain days could be designated “car-free days”, wherein all vehicular travel would be banned from a central area
- Similarly, it was suggested that individual vehicles would only be allowed access on, for example, alternate days, using a system based on licence plate numbers (e.g., odd numbers one day, even numbers the next)
- Free parking was proposed for electric vehicles
- A window could be provided for delivery vehicles to operate in, such as late at night, or in the early hours of the morning
- The Council could put a stop to the building of car parks within the Clean Air Zone, which may only serve to encourage more traffic
- Cars’ emissions levels could be checked on an individual basis, with the worst offenders obliged to pay an increased rate, while cleaner cars would receive a reduction
- A ban on cigarette smoking within the city centre was proposed, in order to lessen pollution and to provide a nicer experience for pedestrians and shoppers

- Other areas outside the CAZ were encouraged to be targeted for a reduction in traffic congestion and pollution
- A ban on diesel-powered street generators was proposed
- It was suggested that the A38 should be a thoroughfare only, with no exit available from which to access the city centre

DRAFT

4.4 RESPONDENT'S IDEAS FOR MITIGATIONS FOR THE CAZ

iQ22/oQ21: To what extent do you agree or disagree that there should be extra support for the following people?

Individuals

More than two-thirds of respondents felt that there should be support for the following groups:

- People attending worship in the CAZ area (76%)
- SMEs operating in the CAZ area (71%)
- People living in or close to the CAZ area (70%)
- People with limited income (68%)
- Disabled people (68%)

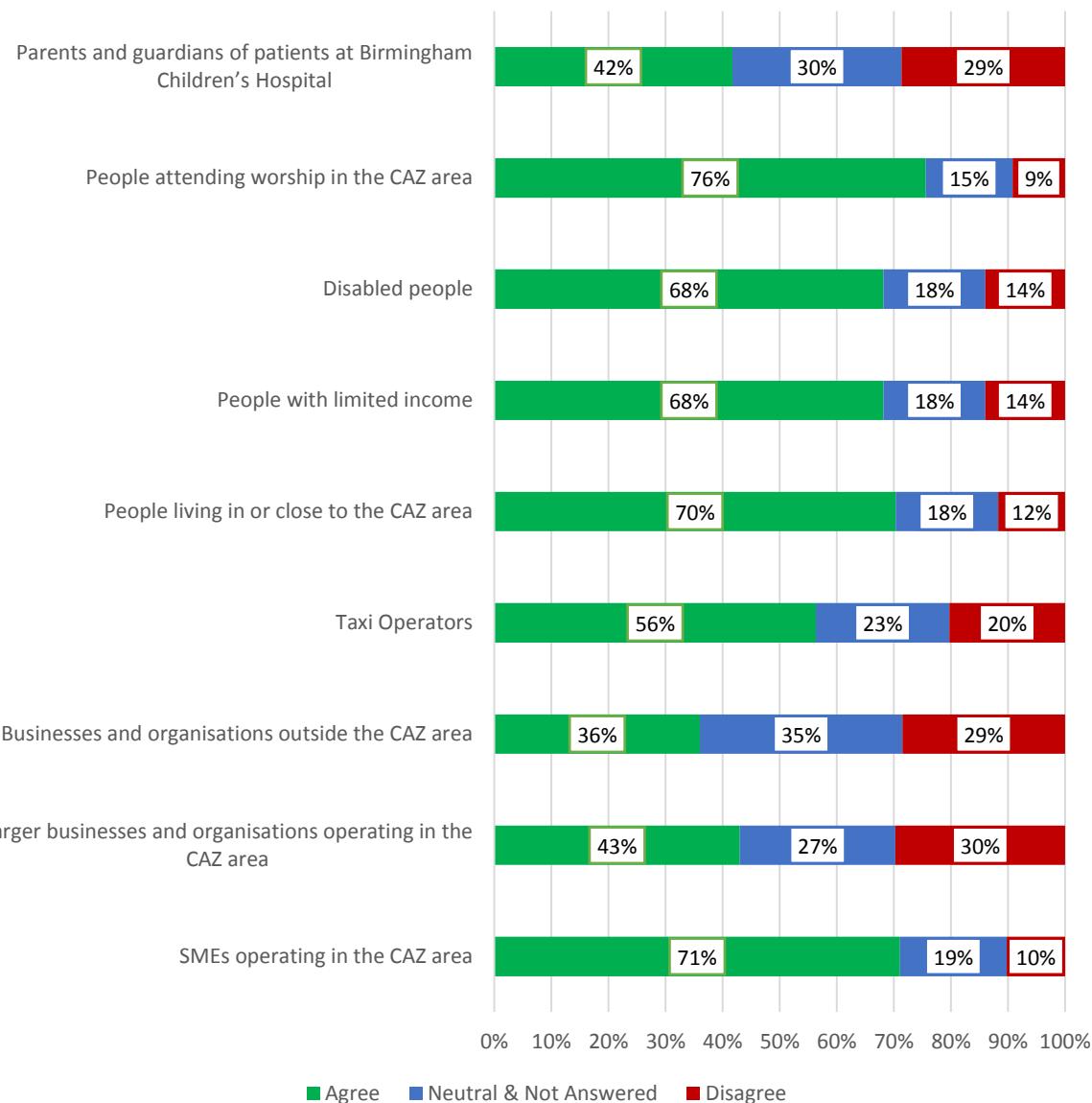
Over half (56%) felt that taxi operators should be given extra support regarding the CAZ.

Although fewer than half of respondents indicated that these groups required extra support, notably they were still the largest single response category for receiving extra support:

- Larger businesses and organisations operating in the CAZ area (43%)
- Parents and guardians of patients at Birmingham Children's Hospital (42%)

Respondents views were more mixed regarding whether businesses and organisations outside the CAZ area should receive extra support, with 36% saying they should receive support, 35% saying they should not and 29% saying that they did not know or had no opinion.

iQ22: To what extent do you agree or disagree that there should be extra support for the following people?



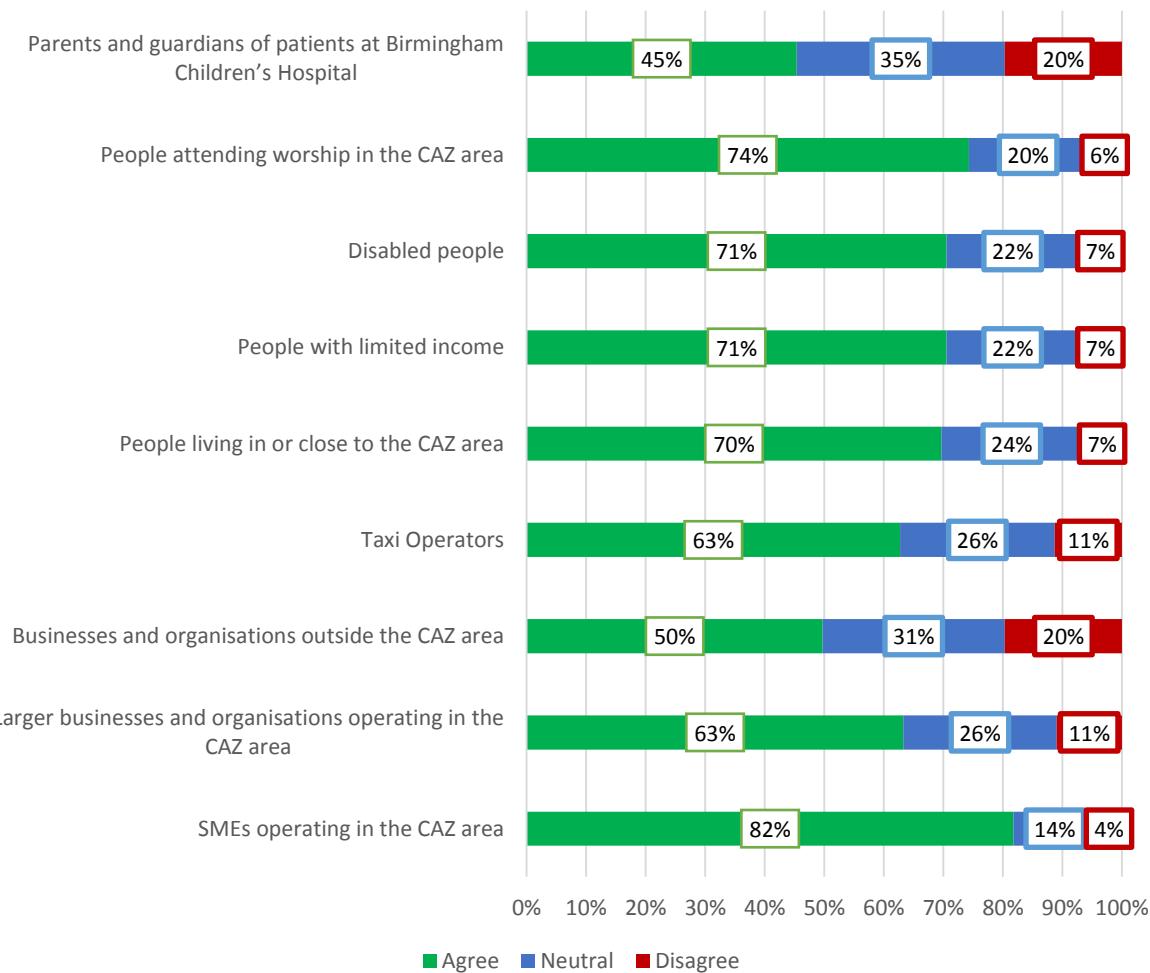
Organisations

Over half of organisations that responded felt that there should be support regarding the CAZ for the following groups:

- SMEs operating in the CAZ area (82%)
- People attending worship in the CAZ area (74%)
- People with limited income (71%)
- Disabled people (71%)
- People living in or close to the CAZ area (70%)
- Larger businesses and organisations operating in the CAZ area (63%)
- Taxi operators (63%)
- Businesses and organisations outside the CAZ area (50%)

Although fewer than half of respondents indicated that parents and guardians of patients at Birmingham Children's Hospital (45%) should receive extra support.

oQ21: To what extent do you agree or disagree that there should be extra support for the following people?



iQ23/oQ22: Do you have any comments on the type of support which could be provided, and who it should be for?

iQ25/oQ24: What kind of support do you think you would need and why?

Notes on these questions:

We have combined the responses from the above questions as this was felt to be the most accurate way to reflect respondents' views. The reason for this was mainly due to responses to iQ25/oQ24 often, though not always, reflecting general suggestions for support, rather than ideas of specific support that the respondents themselves would need. Furthermore, the same kinds of answers were received across both questions. Combining the answers across all questions, therefore, reduces both duplication and dilution, and more accurately reflects the response levels for each suggestion. Reasons "why" support was required were rarely provided, other than as compensation for the increased financial outlay that the introduction of the charge would necessitate.

HEADLINE DATA

Individuals

[6,010 unique responses across both questions]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Support needed for	Necessary visitors to and staff at the Birmingham Children's Hospital	1,009	16.8%
	Exemptions for the disabled and their carers	846	14.1%
	Those living within the CAZ should be exempt or receive discounts	751	12.5%
	Support for those on low income	490	8.2%
	Small and local businesses	257	4.3%
	Commuters and workers	234	3.9%
	Taxi drivers	124	2.1%
	Those travelling to within the CAZ for purposes of worship	121	2.0%
	Support for the elderly	96	1.6%
	Staff and students of places of education, as well as parents and carers	95	1.6%
	Those regularly passing through the CAZ, but not stopping	72	1.2%

Support required	General financial support	1539	25.6%
	Introduction of a vehicle trade-in scheme	1059	17.6%
	Phased introduction/more time before charging begins	321	5.3%
	Subsidised bus travel and/or bus passes	216	3.6%
	Monthly/annual passes	113	1.9%
	Help finding a job or home elsewhere	110	1.8%
	Discounts for entering the CAZ during off-peak hours	71	1.2%
	Transport information	60	1.0%
Opposed to support for	There should be no support for anyone	303	5.0%
	No support for those travelling to a place of worship	87	1.4%
	No support for large businesses	69	1.1%

Organisations

[308 unique responses across both questions]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Support needed for	Those living and/or working within the CAZ should be exempt or receive discounts	34	11.0%
	Necessary visitors to the Birmingham Children's Hospital	26	8.4%
	Exemptions for the disabled and their carers	16	5.2%
	Support for those on low income	12	3.9%
	Small and local businesses	11	3.6%
	Taxi drivers	9	2.9%
Support required	Discount or exemption from paying the charge	71	23.1%
	Introduction of a vehicle trade-in scheme	69	22.4%
	General financial support	35	11.4%
	Phased introduction/more time before charging begins	32	10.4%
	Financial and logistical help to relocate	16	5.2%
	Reduced business rates and/or rent	14	4.5%
	Subsidised bus travel and/or bus passes	10	3.2%
Opposed to support for	There should be no support for anyone	10	3.2%
	No support for those travelling to a place of worship	8	2.6%

THEMES EXPLORED

Support is needed for...

Necessary visitors to the Birmingham Children's Hospital

As mentioned above, respondents felt that provision and support should be made for those who had to undertake necessary visits to the children's hospital, such as parents who were visiting sick offspring, or those undergoing treatment which may require several visits per week. Requiring such cases to travel on public transport was not seen as viable or compassionate, and it was felt that the outlay of the CAZ charge may be an expense and consideration that would add unwanted stress at what may well be a very challenging time – particularly for those struggling with a reduced or low income.

“In respect of parents and guardians visiting patients at Birmingham Children's Hospital, I think that it should be either free for them for the duration of their child's stay at the hospital or heavily discounted. This should not be means tested as the parents/guardians will already be under enough stress with their child in the hospital, then making them worry about having to disclose sensitive financial information in order to get a discount would be additional, unnecessary stress on them.” (Individual)

“Parents of children attending the hospital, one off visits and long term, should be completely exempt as they have no control over attendance. In many instances public transport is also not an option.” (Organisation)

“Visitors to Birmingham Children's Hospital should not be required to 'claim back' or be 'reimbursed' or any other scheme that places an unnecessary stress upon them when visiting children in hospital. Visitors should be able to easily provide their number plate details, in or near the entrance, ensuring that no charge is levied against them.” (Individual)

“Any hospital related trip should not be taxed. People shouldn't have to choose between getting their loved ones care or seeing them before they potentially die and road tax.” (Individual)

Exemptions for the disabled and their carers

Respondents felt it was unrealistic to expect those with physical disabilities to stop using their cars and travel by public transport, with disabled respondents stating that they would find this uncomfortable, scary, or impossible. Some of the benefits of being able to drive include being able to travel door-to-door, whereas the use of public transport would invariably require walking distances which may not be feasible.

Similarly, those who drove into the Clean Air Zone in order to care for the disabled were felt to be deserving of support in paying the charge, given the necessity of their role, as well as the service they provide.

“I think those who have severe mobility should be exempt, given both their extremely limited choices and the well-researched fact such persons usually have below average incomes.” (Individual)

“For blue badge holders, financial help should be provided from central government to enable them or their carers to upgrade to a compliant low or zero emission vehicle. Some additional blue badge parking spaces should be made available in the city centre taken from general parking provision, given the prediction that there will be 9% less car traffic entering the city centre.” (Organisation)

“I really don't think disabled people should have to pay the charge. Public transport is not accessible enough for many disabled people, and this charge could prevent them from socialising and getting out of the house.” (Individual)

Those living within the CAZ should be exempt or receive discounts

Respondents who currently reside in the CAZ related confusion regarding plans for how the charge would be applied to them (also noted in Q28), with some pointing to the 90% discount available to those who live within London's Congestion Charge Zone.

Some felt it was unfair that their cars would be charged each day they left the driveway or garage, even if the journey they undertook was a short one.

Some residents stated that they would be forced to seek housing accommodation elsewhere, and that the charge would be seen as punitive and retrospective for those who happened to have chosen to live with its boundaries.

“My wife and I already pay £1600 per year council tax plus £450 for parking permits for living in the Jewellery Quarter. If charging was applied to us, then we would be moving outside of the CAZ to avoid these charges.” (Individual)

“The area within the proposed zone contains social housing and people on low incomes – I don't think they should be penalised purely for where they live.” (Individual)

“People living inside the CAZ shouldn't be expected to pay this charge, the notice is very short, and it would affectively price them out of the city centre – they would have no choice but to leave.” (Individual)

“I think there should be exemptions or absolute nominal charging, such as a weekly £5 flat rate, for residents within the CAZ.” (Organisation)

Support for those on low income

Respondents felt that those on low income – particularly low income workers – should receive support in the shape of exemptions to paying the CAZ charge and assistance in purchasing a newer, compliant vehicle. It was pointed out that, for many, having and running a car is a lifeline, in terms of children, family, and work, and that added financial

strain which may impact of any of these could prove devastating, and add to the problem of poverty and even homelessness within Birmingham.

It was also pointed out that, though granting “extra time” in being required to pay the charge would be welcomed, it may be unlikely that the circumstances of those on low income would sufficiently or substantially change during that time, and therefore support would still be required at the end of this period.

“Poor people should get financial support to change their car to a cheaper, cleaner model. Their car may be their lifeline for family, school, and work. Taking that away could devastate families further. In Birmingham we have enough working poor and homeless: let’s not let poor planning and policy create more of them.” (Individual)

“What do you expect the ‘extra time’ for people on limited income to achieve? If they are on fixed or limited incomes that’s unlikely to change significantly. Instead they should pay less, or nothing at all.” (Individual)

“People on low income should be offered some kind of reduced rate, in order for their quality of life to remain unchanged. These charges (at their current suggested rates) pose a threat to some of the most vulnerable people who live in the city, and could have a serious impact on Birmingham already critical homeless problem.” (Individual)

Small and local businesses

Small businesses were earmarked as requiring support – and particularly those who relied on and used vehicles, such as couriers, or those receiving or making a lot of deliveries. Some suggested that an exemption period of a number of years be granted, to allow the businesses to relocate outside the Zone.

As above with those on low income, however, it was pointed out that any exemption period would merely “postpone the inevitable”, given that the business’s circumstances may likely remain the same throughout the period, and that further solutions must be found.

“There is nothing here for SME users who [will] access [the CAZ] occasionally. We are not the problem in Birmingham. Those issues are caused by those who use it every day. I want 25 free passes a year. After that, charges may apply, based on the size of the fleet, not on the vehicle used.” (Organisation)

“Your proposed support for SMEs currently doesn't go far enough and leaves the owners of microbusinesses exposed. These people are the most in need of financial support and it appears they have currently been forgotten about.

The smallest businesses usually don't own a company car; they rely on their personal car and claim the mileage through their business. This is how we have operated for the last 6 years and our car is fundamental to our ability to work as we need it to transport goods and visit clients.

SMEs with personal vehicles used for business purposes (this can be evidenced easily through mileage claims in the company return) should also be offered financial support upgrading their vehicle.” (Organisation)

“Independent businesses (SMEs) could get a certain number of deliveries each week that would be exempt from the charge, or they could pay a reduced rate for their deliveries. Alternatively, they could make deliveries without paying a charge between 09:30 and 16:00.” (Individual)

“SMEs will need additional support due to constant financial pressures. This could be through tax relief, subsidies, or top-up cards with applied funds registered to the vehicle.” (Individual)

“I would expect SMEs similar to ours to receive a full refund on behalf of the company vehicles, employees’ vehicles, and suppliers’ vehicles.” (Organisation)

Commuters and workers

Some respondents felt that commuters and workers should receive discounts and/or exemptions, or that they should be offered extended ‘sunset periods’ in order to make necessary changes to their travel plans and work and living situations, given the speed with which the Clean Air Zone is proposed to come into effect.

“Support should be directed towards the people who work in shops in the city centre who are going to lose their jobs when the centre becomes like a ghost town.” (Individual)

“If your job is based in the city centre there should be a significant discount, or it should be free. People will not be able to afford to work and this will have a negative effect on the economy.” (Individual)

“What about people who are employed yet do not receive company vehicles and cannot afford a new car? Why is there no mention of them?” (Individual)

“People who have to pass through for work are more important than those who do so for worship – workers don’t have a choice.” (Individual)

Taxi drivers

Respondents felt that the impact of the CAZ charge may be especially felt by taxi drivers, whose position was already seen as vulnerable. Respondents mentioned that the fleet of cabs was aging and in need of replacement, and that there was an opportunity for providing assistance there which would not only benefit the city, in terms of pollution, but also the drivers themselves (and, by extension, their families). Some feared that the introduction of the CAZ charge may force taxi drivers to seek work elsewhere, or into unemployment.

“I support the initiative to provide finance to the hackney carriage fleet necessary for them to introduce new electric hybrid taxis (such as the London Electric Vehicles Taxi Company’s

Model TX). I would not support any scheme limited to retrofitting a few catalytic converters or introducing slightly better diesel engines. A wholesale effort is needed to replace these ageing vehicles and half-hearted measures would be a sign only of political insecurity and lack of ambition.” (Individual)

“The Taxi drivers need support and assurances that their trade/livelihood will be protected in the future before they will invest in expensive vehicle replacements. The trade has been shown total disregard for over 20 years now by BCC and this needs to stop. If the council had protected the trade in the first place, then the city wouldn’t have such an old fleet of taxis requiring such drastic measures and the financial implications for the drivers would have been less harsh. Drivers will lose their homes because of this.” (Individual)

“Charging taxis is ridiculous when the proposed outcome is to stop traffic entering the zone - taxis are the backbone of the “last mile” in the city, particularly outside the stations and post night time events.” (Individual)

It was also suggested that an annual pass should be made available to taxi drivers, rather than a daily charge.

Those travelling to within the CAZ for purposes of worship

Some respondents felt that those travelling to within the CAZ for purposes of worship should be eligible for discounts or exemptions, countering the argument that worship was a choice, and not especially different from other leisure activities by stating that they may have been attending a particular church for many decades, and have a well-established social network developed that would be devastating to sever.

Others pointed out that much worship takes place on a Sunday morning, when levels of traffic congestion – and therefore pollution – are light.

Concerns were also raised that charities associated with churches and other places of worship may suffer, including food banks which relied on people driving food to them, as well as those who operated minibuses and vans in order to serve vulnerable members of the community.

Respondents addressing concerns involving the Birmingham Central Mosque pointed out that the building is directly adjacent to the proposed boundary of the Clean Air Zone, with just a few metres separating its southern wall and the Belgrave Middleway. Granting exemptions for those attending the mosque, therefore, was seen as fair and reasonable, and not in contradiction with the council’s aim of reducing pollution in central Birmingham.

“There could be exemptions for Sunday morning service, at either St Chad’s or St Philip’s cathedral. I would suggest no charges between 06:00 to 13:00 every Sunday.” (Individual)

“Birmingham Central Mosque falls within the area and hundreds of people travel to the mosque on a daily basis, five times a day so I think the charge should not apply. Similarly, with the Church near St Alban’s academy.” (Individual)

"I attend Central Mosque regularly in Highgate. I cannot walk very well due to ongoing health problems. Prayers can be late, and I do not feel safe on public transport." (Individual)

"The Church of England parish of St Alban and St Patrick, Highgate is entirely enclosed within the proposed boundary, but does not appear to be highly polluted on your map – no more so than areas outside the proposed boundary. The church is located in an area of high deprivation and low income, and is dependent on members of the congregation who live outside the proposed zone to keep it open and available for the people of Highgate. The parish is not well served by public transport. The Birmingham Central Mosque is located in the same area and attracts many worshippers from outside the zone for Friday prayers, so a change in the boundary would not only benefit Christian worshippers." (Individual)

"I would like the roads immediately behind Birmingham Central Mosque to be exempt because people from all over the city travel to it and they rely on donations." (Individual)

"We would need special badges and waivers for our congregation, those visiting the church, and those donating food to the church. It is unfair that charges are brought for people who worship at a particular place of their choice: it is not as simple as 'just choose another place of worship' because we have been serving the inner city for many years and have built up a strong community here." (Organisation)

Support for the elderly

Respondents felt that the elderly who rely on their cars and may not be able to use public transport for hospital visits, shopping, and general getting around should also be eligible for exemptions and discounts, given the importance of their vehicle and their mobility to them.

Those regularly passing through the CAZ, but not stopping

Respondents felt that charging drivers who didn't stop in the CAZ, and for whom the CAZ wasn't a destination, but was merely part of their route to somewhere else lying outside the CAZ – those who regularly used the A38, for example – should be offered discounts or exemptions. Doing this, it was felt, would help lessen congestion and pollution on the Ring Road, as well as unnecessary fuel consumption and wear and tear on the roads and vehicles.

Hospital and emergency workers

Respondents felt that those working in the emergency services – fire, police and ambulance – as well as workers at the children's hospital should either be exempt from the charge, or receive some other form of support. Many of these workers, it was pointed out, work a shift system, therefore using public transport may not be an option, as well as have the potential to delay their arrival in what may be an important situation.

“Hospital staff are going to be charged to go to work. Already one doctor was killed cycling. What about shifts? What about lone females late at night? And what about people delivering gifts, food supplies, or comfort?” (Individual)

“There should be support for staff providing support in the emergency services and health sector, and consideration for those working shifts where public transport is not an option and replacing vehicles is financially impossible. Those working in these services would be inclined to relocate should they be financially burdened by [the introduction of] the CAZ.” (Individual)

Other NHS staff who were highlighted as being potentially negatively impacted by the CAZ charge included:

- Staff whose primary place of work is within the proposed CAZ: Birmingham Children’s Hospital and Forward Thinking Birmingham, the Birmingham Chest Clinic, the Birmingham and Solihull Mental Health Trust, Birmingham Community Healthcare and local general practices
- Staff whose work requires them to travel within and through the zone to see patients – i.e., health visitors, community nurses, therapists and other allied health professionals
- Staff whose shift patterns or emergency response activities require them to work on more than one site and whose most efficient journey between sites takes them through the zone

Suggestions

General financial support

Respondents answered that they would require “financial support” – though, in general, it wasn’t elaborated on exactly what this constituted or what it would look like.

Introduction of a vehicle trade-in scheme

Respondents felt that a good way Birmingham City Council could support its citizens would be in instigating a vehicle trade-in scheme, similar to current scrappage schemes, which would enable those who wished to upgrade their current, non-compliant cars to electric, hybrid, or low polluting models which would be exempt from the charge.

“How about an option to sell your car into a scheme at the going rate and giving the opportunity for interest free loans for purchasing lower emission vehicles?” (Individual)

“Support should be to enable change of vehicle, rather than allowing continued use of the most polluting vehicles.” (Individual)

“There should be a vehicle scrappage scheme: i.e., financial incentives for people to change their car to ones with cleaner engines. Maybe the government should help to buy back

older cars with greater emissions so as giving people with these cars more of a chance to replace them if money is tight." (Individual)

"The most heavily polluting cars can be traded in for a discount on a cleaner travel option, helping people with limited resources switch to less polluting cars. Also, the new Clean Air Strategy should consider other kinds of scrappage schemes that would help people switch to other modes of transport, such as car sharing schemes, and public transport discounts." (Organisation)

Phased introduction/more time before charging begins

Respondents backed the suggestion for a phased introduction to charging, feeling that this would provide Birmingham's drivers with time to make any necessary adjustments, whether that be in the form of the vehicle they drive, their place of work, their residence, or in the way they budget for their needs, with periods of three to five years being suggested.

"You should have a longer lead time of five years for the introduction of any fee payable. This will give people the chance to plan and change their lives around the charge. Five years is a great period as many people take loans out on this term. It seems fair to enable people to organise themselves." (Organisation)

"Whilst it's okay to introduce the CAZ in 2020, I think realistically people need more time – e.g., five years - to plan their next car purchase. People don't tend to change cars regularly, and this feels very rushed already." (Individual)

"The implementation notice period of 18 months is too short for people to change vehicles. Four or five years notice would give people more time to change to a less polluting vehicle." (Individual)

Subsidised bus travel and/or bus passes

Respondents who felt that Birmingham public transport was either already too expensive for some, or that costs would increase in the future with the implementation of the CAZ charge, proposed that bus travel should either be subsidised, or that subsidised bus passes should be made available to qualifying individuals.

"Public transport costs need to be reduced. It's ridiculously expensive and prohibitive to many people." (Individual)

"I feel you shouldn't lose sight of the overall goal of improving air quality. So, for example, instead of providing discounts so people living in the CAZ can continue using their cars, why not offer them free or heavily discounted public transport?" (Individual)

"Maybe there could be discounted travel cards to assist people living and working in/near the CAZ area, to encourage them to use public transport." (Individual)

Monthly/annual passes

Some suggested that there should be an option to pay the CAZ charge on a monthly or annual basis, with a discount for bulk and upfront payment.

Help finding a job or home elsewhere

Some respondents believed that they would either lose their job, or that travelling to their work would no longer be financially viable, so that the help they would require would be in finding new employment.

Likewise, some respondents believed that either through unemployment or through financial hardship, living in the Birmingham area would no longer be possible, therefore the help they would require would be in relocating to another part of the country.

“I would be forced to leave my job, so I would move my family out of Birmingham. I would need help to move to a new city.” (Individual)

“The charge would at add least £7200 expense to our combined family budget, as we both work in the city. It would cause great financial hardship. We would look at relocating house and job.” (Individual)

“I would need help finding a new job with the same pay and benefits that is not placed within the CAZ.” (Individual)

Discounts for entering the CAZ during off-peak hours

Respondents felt that the charge for entering the CAZ during off-peak hours – late at night, or very early in the morning, for example, or on Sundays – should be either reduced or free, in line with London. Some expressed surprise that this was not the case, while others wondered whether a vehicle which entered just before midnight and left just after would be charged twice.

“While the simplicity of having a single charge for vehicles is appealing, the lack of peak and off-peak differentiation will be disproportionately hard for lower paid night workers when public transport is not available. The current proposals mean anyone working after midnight will effectively need to pay two charges.” (Organisation)

Transport information

Some respondents felt that they would require help in planning an alternative route into the CAZ using public transport.

Financial and logistical help to relocate

There were a number of organisations and businesses who stated that the help they would require would come in the shape of assistance relocating their business to an area which wouldn't be affected by the CAZ charge, in terms of both financial and logistical support.

“We would need grants to relocate, as well as compensation for the investment we have made at the current site. We must be allowed extra time to relocate the business if that's the final option.” (Organisation)

“The council should buy out businesses like mine, or provide compensation so that we can move out of the CAZ.” (Organisation)

“As we have customers visiting our textile wholesale warehouse a charge would discourage them from visiting, therefore there is a possibility of losing business. We use a daily courier collection for the main part of our business. Depending on the courier charge, we would have to pass this on to our customers. If I find that business is suffering, I will have to consider moving out of the Clean Air Zone. Would the Council be prepared to help financially with the move?” (Organisation)

Reduced business rates and/or rent

Businesses also stated that they felt a reduction in business rates and/or rent charges would help offset both the increased outlay the CAZ would necessitate, and the projected loss of earnings due to an expected reduction in number of customers and clients.

“Small businesses need rent reductions and support to aggressively market their business to make up for potential lost trade.” (Individual)

“At a time when we are facing a series of very tight budgets throughout the organisation, it would be extremely unhelpful if this additional cost was not mitigated in some financial way (e.g., reduction in rates, tax rebate, reduction of BID charge, or increase in BCC funding, etc).” (Organisation)

“We would need a reduction in rates to offset the increased costs incurred by this proposal. For us to be able to keep competitive in the global world we need as much help as possible. The amenity we have in this business helps other businesses and trades within the Birmingham area. If we are unable to compete we will be yet another casualty of a lost Birmingham trade.” (Organisation)

“Footfall will decrease massively, meaning less business and jobs being lost. A reduction in rent and rates would help when the business takes a downturn.” (Organisation)

Opposed to support...

There should be no support for anyone

Some respondents were opposed to any support being provided for anyone, feeling that the charge was being put in place to minimise pollution, and that providing support for certain members of society or criteria would be granting “permission to pollute”, and therefore defeating the purpose of the scheme. It was also stated that providing support for some and not for others would lead to issues of unfairness and envy, and possibly open loopholes for those who may be tempted to abuse the system.

It was also stated that anyone who can afford to run a private vehicle cannot be deemed to be of low income or in need of support.

No support for those travelling to a place of worship

Respondents objected to the idea that those travelling into the CAZ for purposes of worship would be offered support on the grounds that religious attendance is optional, can be undertaken at an establishment outside the CAZ, and is, in some ways, no different to other leisure activities and communal gatherings.

It was also felt that this may be difficult to monitor, and that such a discount scheme may be open to abuse and fraud.

“I do not think help should be given to any worshippers as I fail to understand why this is a need that requires financial help. It is entirely possible to worship by yourself in your own home and I think our public services should be separate from religion in every way possible. Religion is a choice not a need.” (Individual)

“It's ridiculous to offer support for people attending worship: it's an optional activity that can be done elsewhere. You may as well offer support for shopping, going to a gym, or drinking in a pub.” (Individual)

“If the charge is reasonable, I do not see why worshippers should be any different to those who earn their living within the CAZ.” (Organisation)

“Discounts or exemptions for worship would be even more open to abuse than Blue Badge fraud.” (Individual)

No support for large businesses

Respondents objected to support being provided for large businesses, believing that:

- Large businesses should be able to swallow any CAZ charge they may be liable for;
- Large businesses profit substantially from being located within the CAZ, and therefore should not be subsidised; and
- They would most likely pass on any increased costs and expenses to the customer.

“I do not believe large organisations should be supported to the same extent as small businesses. Companies such as Tesco generate enough revenue that as part of their corporate social responsibility (CSR) they should use compliant vehicles, no excuses. They should not get financial help when they generate so much money.” (Individual)

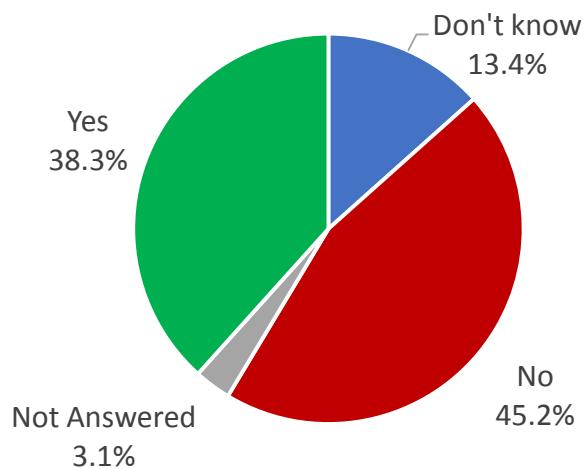
“Larger Businesses should not need much help as they have the purchasing power and ability to afford the initial changes themselves.” (Individual)

Other themes raised by a smaller number of respondents

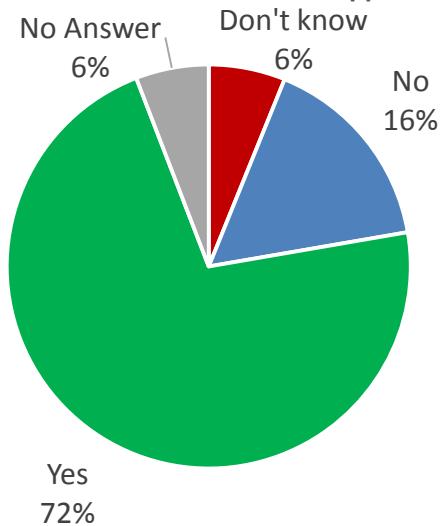
- Some felt support should be means tested, and based on needs and requirements
- Some felt support should be provided specifically for university students, in the form of bus passes or exemptions to paying the CAZ charge
- Some felt that the Council could encourage employers to increase opportunities to work-from-home, thereby reducing the need to commute
- Some proposed that charities such as food banks would require support to continue the work they do, and to receive donations
- Some felt that a system of support would be costly to implement and maintain, and difficult to administer
- Some felt that not enough information had been provided on what support might look like in order to make a fully informed decision, or provide sufficient input

iQ24. If a Clean Air Zone was introduced do you think you or your family would need extra support?***Individuals***

45% of respondents stated they would not need extra support if a CAZ was introduced, with 38% saying they would need support.

iQ24. If a Clean Air Zone was introduced do you think you or your family would need extra support?**oQ23. If a Clean Air Zone was introduced would your organisation need extra support?*****Organisations***

72% of organisational respondents stated that they would need extra support if a CAZ was introduced, with 16% saying that they would not need support.

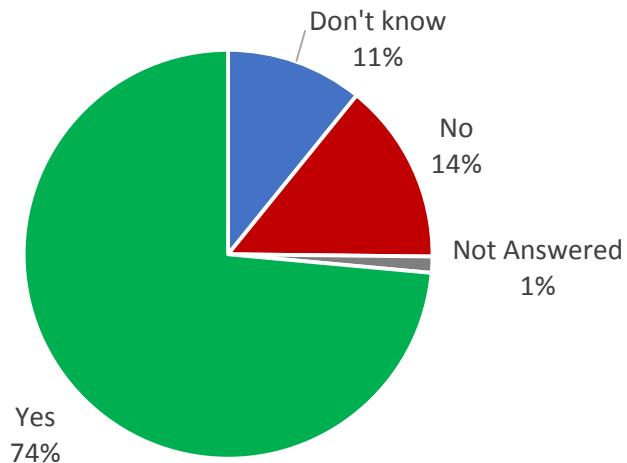
oQ23. If a Clean Air Zone was introduced do you think your organisation would need extra support?

4.5 FURTHER INFORMATION REQUIRED BY RESPONDENTS

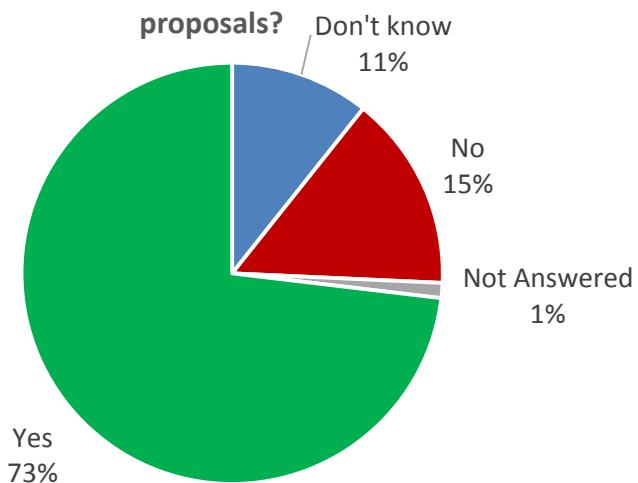
iQ27. Do you feel that the information provided has enabled you to make an informed comment on the proposals?

The majority of both individuals (74%) and organisations (73%) felt that the information provided enabled them to make an informed comment in the consultation, with 14% of individuals and 15% of organisations saying that more information was required in order to comment on the proposals.

iQ27. Do you feel that the information provided has enabled you to make an informed comment on the proposals?



oQ26. Do you feel that the information provided has enabled you to make an informed comment on the proposals?



iQ28/oQ27: What additional information would have helped you to comment on the proposals?

HEADLINE DATA

Individuals

[3,277 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Additional Information Requested	Increased honesty for why the CAZ is being introduced	355	10.8%
	What the actual charges will be	244	7.4%
	Plans for improvement to public transport	218	6.7%
	A better map of the proposed CAZ	211	6.4%
	Information on the types of help that may be offered	205	6.3%
	Information on alternate or additional plans to tackle Birmingham's pollution	193	5.9%
	Information about plans for the money generated by the CAZ charge	186	5.7%
	List of compliant cars	174	5.3%
	Projection model for the impact the CAZ may have on individuals	152	4.6%
	More information on the current level of pollution	124	3.8%
	Sources for evidence	119	3.6%
	Projection models for future pollution levels	118	3.6%
	Information aimed specifically at residents	117	3.6%
	Information on expectations for any economic damage	94	2.9%
	Plans for help offered to businesses negatively impacted by the CAZ	93	2.8%
	Specific details on how a 'phased introduction' would work	51	1.6%

Organisations

[139 responses to this question]

Position	Theme	No. of Responses	% of those who answered this question mentioning this theme
Additional Information Requested	Information on alternate or additional plans to tackle Birmingham's pollution	14	10.1%
	Information on expectations for any economic damage, and plans for help offered to businesses negatively impacted by the CAZ	11	7.9%
	More information on the current level of pollution	10	7.2%
	Sources for evidence	8	5.8%

THEMES EXPLORED

Additional Information Requested

Increased honesty for why the CAZ is being introduced

Respondents felt that they weren't being given the real reasons for the creation of the Clean Air Zone, believing that the charge was being introduced to generate income for the Council, and labelling it a "tax".

"Is this survey just a case of [the Council] having to ask because they are obliged, and then they can legally say that they consulted the public?" (Individual)

"I'd like the Council to have been honest about the EU fine forcing you to get your act together." (Organisation)

"You haven't been totally transparent with citizens of Birmingham. Why was there a private paper submitted to Cabinet? Rumour has it the proposed CAZ is just one phase of many phases and schemes to be proposed." (Individual)

"What influence [do] we actually have? Isn't this going to happen whatever we say? How much notice will you actually take?" (Individual)

"I'd like valid proof that this isn't just a cash cow for a badly managed council." (Organisation)

What the actual charges will be

Respondents felt that it was difficult to answer questions about charges, and financial implications of such charges, without knowing what the proposed charges actually were.

Information on alternate or additional plans to tackle Birmingham's pollution

Some respondents assumed that the proposed CAZ was either one of several possible plans to address the issue of Birmingham's air quality, or that there were other plans and schemes which were also in the process of being implemented, such as: the creation of green spaces; a move in public transport towards greener, less polluting engines; and increased pedestrianisation and cycle support.

Respondents felt, therefore, that it would have been helpful to have been informed of these plans, in order to better understand the Council's overarching vision for the city, and to have a full grasp of the measures being taken to address pollution.

Plans for improvement to public transport

As mentioned above, many respondents felt that the current public transport provision was inadequate, and that significant changes would need to be made in order for it to effectively support a move away from vehicular travel within the Clean Air Zone. It was assumed, therefore, that plans were in place to modernise and expand public transport in Birmingham, and that being informed of what these plans were would have been helpful during the consultation process.

“What is the proposed timeframe for [introducing] a fully integrated public travel service throughout the whole of Birmingham?” (Individual)

“We need more information on proposals for improved public transportation. It is not just lower fares that will entice people to use buses and trains and leave the car at home. We need more parking spaces available at local train stations. We need buses and trains so clean and modern that we can be proud of them. Birmingham's public transport services need to improve.” (Individual)

“There are no dates [indicating] when improvements to public transport will be happening.” (Individual)

A better map of the proposed CAZ

Some respondents felt that the map provided was unclear, and that better maps showing the proposed CAZ were available elsewhere online, such as at:

<https://www.birminghammail.co.uk/news/midlands-news/birminghams-new-clean-air-zone-14802158>

“A clearer map showing all of the roads included in the CAZ. The map in the summary proposals document is inadequate.” (Individual)

Information on the types of help that may be offered

While Questions iQ23/oQ22 and iQ25/oQ24 asked for responses on the types of help which the public may require or feel may benefit others, some felt it would have been useful had ideas for the proposed range of help and support been related: especially by those who felt they would be most particularly affected by the introduction of the CAZ charge, such as taxi drivers, commuters, and regular visitors to the children's hospital. Greater information on the possible help they may receive would have enabled them to make more informed responses, and to either feel more secure in their situation, or less reactive in their answers and feelings towards the CAZ in general.

“More definite information on the help to be made available to buses, taxis, the disabled, and those on low income would have been helpful.” (Individual)

“There were parts where you are suggesting that 'support' will be given, but it is not entirely clear how that will work for those needing that support. Though that is probably because each will differ, and you haven't done that yet.” (Organisation)

“It would have been useful to know the exact financial figures telling me how much I would get to support my taxi business. You say you could get devices fitted, but Birmingham licensing says there is no device approved to upgrade vehicles, nor is there any funding available.” (Organisation)

Information on alternate or additional plans to tackle Birmingham's pollution

Respondents felt that they would like to have received information about what they expected were the Council's alternative (or additional) plans for tackling the problem of pollution levels within the proposed Clean Air Zone, which it was presumed must also be in place.

For many, it was assumed that the introduction of the Clean Air Zone was currently nothing more than a possibility, and that its implementation was perhaps one option among several: information on these other options, then, would have been welcomed, as well as the opportunity to vote for and against them (a large number of respondents stated that they would like to have voted on the proposal for the CAZ, with some expressing surprise that there wasn't an option to do so in the consultation survey).

“The Council's published air quality modelling report models a number of additional measures alongside the various CAZ options. However, the consultation documents do not contain any firm commitment regarding which of these additional measures the Council intends to introduce with the proposed Class D CAZ. This may be due to the fact that further studies are necessary to assess the additional measures needed to deliver compliance in the shortest possible time, as well as the fact that funding is pending. This has not, however, been made clear as part of the published documents.” (Organisation)

“What alternative proposals were considered but rejected?” (Individual)

Information about plans for the money generated by the CAZ charge

Respondents stated that they would have liked to have received information about specific plans for the income generated by the CAZ charge, and how and where this would be spent. There was a general expectation that investment would be made in public transport, or in improving the conditions of the roads. Also requested were figures pertaining to consultation costs, and the implementation of the system (cameras, workforce, etc.). Some wondered whether the CAZ charge would be profitable and “worth the disruption”.

It was also suggested that all profits from charging for entering the Clean Air Zone should be ring-fenced for local road improvement and air quality initiatives, including those that encourage small businesses to change their mode of transport and promote increased use of public transport, walking and cycling.

List of compliant cars

While respondents were aware that they had been directed and were able to check their car's Eurostandards rating online, and whether it met London's ULEZ requirements, some felt that: a) this was related to London, not Birmingham; and b) that the system they were being directed to wasn't accurate or reliable enough in discerning whether their vehicles would be compliant or not. A link to an actual list of compliant cars, then, would have been welcomed by some, so as to more assuredly ascertain the status of their vehicle.

Projection model for the impact the CAZ may have on individuals

Respondents felt that, given the expected large scale impact – both financial and otherwise – on both businesses and the individuals who make up those businesses, it was presumed that Birmingham City Council would have undertaken predictions and modelling on how people might be affected. Such information, it was felt, would have enabled respondents to make more informed decisions with regard to their question answers, as well as enabling them to feel as prepared as possible, as early as possible, for the approaching changes which the introduction of the CAZ may bring.

“There's no assessment of the economic damage the charge will cause and the impact on health of pricing the poor off the roads and sending all the pollution to the middle ring road (where many of the poor live).” (Individual)

“Where is the impact assessment as to potential economic harm of implementing this?” (Individual)

“I would like to know your estimate of the number of jobs that will be lost and how many businesses will close.” (Organisation)

More information on the level of current pollution

It was felt that there was an opportunity to provide more detailed information on the current levels of Birmingham's pollution: on the areas affected; on how this compared to other cities, and to the nation as a whole; and on the potential and measured health risks such levels of pollution represented. Without knowing specifically the scale of the issue the city was faced with, respondents felt it difficult to make an accurate and informed judgment on what, if anything, needed to be done.

“I would have appreciated some information about current air pollution levels in Birmingham. It would have also been beneficial to learn by how much air pollution has increased over time, since, for example, 1900, 1950, 2000, etc.” (Individual)

“Emission maps of the wider West Midlands area with reference to the WHO safe limits would have been useful. These are available online but in a much lesser level of granularity than I have and don't show local issues.” (Organisation)

“Would be nice to see a breakdown of all the contributors to pollution in the city and the percentage they account for to see who are the worst ones.” (Individual)

Sources of evidence

Some felt that statistics and information could have been more thoroughly referenced, enabling survey respondents to fact check and to read more deeply about the information that was being presented to them.

Some also doubted the veracity of certain claims – including the headline figure of “900 premature deaths per year” – and would have liked to have known more about the sources of evidence for this, as well as other figures relating to congestion, pollution, and traffic flow.

Projection models for future pollution levels

Respondents stated that they would have liked to receive more specific information on Birmingham City Council's forecasts for how the creation of the CAZ would affect (and presumably improve) pollution levels, believing that computer modelling would be able to provide such predictions, as well as studies and evidence from other cities who had already implemented such schemes. Also, information pertaining to how changes in pollution levels would affect the health of the population would have been welcomed. Such information, it was felt, would have enabled respondents to clarify their feelings about the potential benefits of the Clean Air Zone, and to offer more informed responses to the questions.

“Where is the proof to show how these proposals will improve air quality?” (Organisation)

“There should be more about the forecasted impact [of the CAZ] on pollution levels.” (Organisation)

“What are the predicted pollution levels and how are they going to be monitored across the city?” (Individual)

Information aimed specifically at residents

Those currently living within the CAZ, being particularly affected by the charge, would have liked to have received further information about how it would affect them specifically. Questions were asked, for instance, about how their cars would be treated if they remained unmoving in the street, parked outside their residences. Or if they were driven just a few blocks on one day, and then driven a few blocks back the next. Residents also wondered what type of support they might receive – particularly given the substantial discount afforded to those living within the area of London’s Congestion Charge – as well as any other information which may affect their lives, and the decisions they may have to take in the upcoming period of time.

“What is going to be done for those who live inside the zone? More time to pay is a very vague idea.” (Individual)

“Will people living in the zone be charged to drive to and from their own homes?” (Individual)

“I didn't feel that the issues of residents in the area have been properly considered. Will they get discounted rates? What will they actually pay?” (Individual)

“I live one road inside the ring road and drive out to get to work and shop. Would you percentage the charge on time spent inside the CAZ, or blanket charge no matter where people drive inside? Maybe the outskirts of the zone should be reduced and inner areas higher, like a cool, warm and hot zone.” (Individual)

Information on expectations for any economic damage

Due to the view of many respondents that the introduction of the Clean Air Zone would have a negative impact on city centre businesses, and those employed and working in the CAZ, it was expected that the Council might have undertaken economic forecasts on any such financial changes, and that this information would have been required before an informed opinion could be offered: for example, small, no, or even positive financial changes would elicit a very different set of responses than forecasts which predicted large, negative changes.

Plans for help offered to businesses negatively impacted by the CAZ

Some respondents who felt that businesses would be negatively affected by the introduction of the CAZ assumed that the Council would have put plans in place to address any issues that might arise, and that it would have been helpful to be informed of these plans prior to answering the consultation questions.

Specific details on how a 'phased introduction' would work

Respondents wondered how the idea of a 'sunset period' or 'phased introduction' for the CAZ charge would work, feeling that information on what this would look like – how long it would last; who it would apply to; and how one would qualify for it, among other queries – would have helped them give better informed answers to the questions.

"How long is the extra time you propose to give people?" (Individual)

"It would have been helpful to have more specific information on the extra time to introduce the charge for low income citizens." (Individual)

"An indication of how long any extension will be before the introduction of CAZ for some groups would be helpful. Is this months or years?" (Individual)

Other themes raised by a smaller number of respondents

- Some wished to know the exact hours that the CAZ charge would be in effect; whether the charge would be in operation over a 24-hour period, 7 days per week, or whether there would only be a charge during peak hours
- Some asked for specific figures regarding traffic flow data within the CAZ and beyond
- Some asked for a breakdown of the amount of pollution each type of vehicle produced
- Some respondents wanted to know what the cost of implementing and maintaining the CAZ would be to the Council, and how this would be paid for
- Some would have liked to have known what plans the Council had formulated with regard to hospital visitors and staff
- A number of respondents questioned whether their comments would be heard
- Some asked for facts on the current level of electric vehicle charge points
- Some wished to know user figures for public transport, while questions were asked about pollution figures for public transport, and whether they took into account actual passenger levels, or assumed a full bus/train
- The level of air pollution caused by trains was requested
- Some asked what consideration was being made for parents and carers of those who currently attend schools located within the CAZ
- Some questioned why demographic information about sexuality and religion, for example, was being requested in such a survey
- Some wished to know whether Birmingham City Councillors would be liable to pay the charge, and whether they would be switching to using public transport, so as to lead by example

5. APPENDICES

5.1 Individual Citizens' Survey Questionnaire

- iQ01 Question 1: Which of the following apply to you?
- iQ02 Question 2: What is your full home postcode?
- iQ03 Question 3: Do you own or lease any of the following vehicles?
- iQ04 Question 4: Which of the above would you say is your main vehicle?
- iQ05 Question 5: What type of fuel does your main vehicle use?
- iQ06 Question 6: Do you think you will be charged to drive your main vehicle in the CAZ?
- iQ07 Question 7: Thinking about the different journeys you make in the proposed Clean Air Zone area, how do you usually travel? It doesn't matter whether your trip starts or ends in the area, or just passes through.
- iQ08 Question 8: If you drive a car/ van/ motorcycle/ taxi/ bus/ lorry within the proposed Clean Air Zone area, on how many days in a typical week is this for the following reasons?
- iQ09 Question 9: How often do you make trips where you drive through the proposed clean air zone area but do not stop within it (e.g. using the A38 tunnels to pass through)?
- iQ10 Question 10: Do you have any comments on the proposed area of the Clean Air Zone?
- iQ11 Question 11: Which types of vehicle do you think should be included in the Clean Air Zone restrictions?
- iQ12 Question 12: If the vehicles below are included in the restrictions, what do you think the daily charge for driving in the Clean Air Zone should be?
- iQ18 Question 18: Do you have any comments on which vehicles should be charged to drive in the Clean Air Zone and how much those charges should be?
- iQ19 Question 19: If a Clean Air Zone was introduced, which of the following do you think you would do?
- iQ20 Question 20: If a Clean Air Zone was introduced what do you think would be the overall impact for the following?
- iQ21 Question 21: Please explain the overall impact you think a Clean Air Zone would have for you and your family, and for Birmingham and the people who live, work and study here.
- iQ22 Question 22: To what extent do you agree or disagree that there should be extra support for the following people?
- iQ23 Question 23: Do you have any comments on the type of support which could be provided, and who it should be for?
- iQ24 Question 24: If a Clean Air Zone was introduced do you think you or your family would need extra support?
- iQ25 Question 25: If you answered 'yes' to the previous question, what kind of support do you think you would need and why?
- iQ26 Question 26: Is there anything else which can be done to improve Birmingham's air quality?
- iQ27 Question 27: Do you feel that the information provided has enabled you to make an informed comment on the proposals?
- iQ28 Question 28: What additional information would have helped you to comment on the proposals?
- iQ29 Question 29: Age: Which age group applies to you?
- iQ30 Question 30: Do you have any children under 18 in your household?
- iQ31 Question 31: Sex/Gender: What is your sex?
- iQ32 Question 32: Disability: Do you have any physical or mental health conditions or illnesses lasting or expected to last for 12 months or more?
- iQ33 Question 33: Ethnicity: What is your ethnic group?
- iQ34 Question 34: Sexual Orientation: What is your Sexual Orientation?
- iQ35 Question 35: Religion: What is your religion or belief?

5.2 Organisations' Survey Questionnaire

- oQ01 Question 1: What is the name of your organisation?
- oQ02 Question 2: What is your name?
- oQ03 Question 3: What is your job title/role in the organisation?
- oQ04 Question 4: What is your email address?
- oQ05 Question 5: May we contact you further about this consultation and the Clean Air Zone?
- oQ06 Question 6: Please tick to confirm you are authorised to respond on behalf of this organisation
- oQ07 Question 7: What sector does your organisation fall into?
- oQ08 Question 8: What is the postcode of your organisation's main site?
- oQ09 Question 9: How many employees does your organisation have in Birmingham?
- oQ10 Question 10: Does your organisation own or lease any vehicles in Birmingham?
- oQ11 Question 11: Thinking about the vehicles which you own or have on long term lease in Birmingham, roughly how many of each of the following do you have?
- oQ12 Question 12: Roughly what proportion of your current fleet would NOT be charged to drive in the proposed Clean Air Zone?
- oQ13 Question 13: How many sites does your organisation have?
- oQ14 Question 14: Roughly how many vehicle trips per week are made in the proposed CAZ area as part of your organisation's operation?
- oQ15 Question 15: Do you have any comments on the proposed area of the Clean Air Zone?
- oQ16 Question 16: Which types of vehicle do you think should be included in the Clean Air Zone restrictions?
- oQ17 Question 17: Price - Buses and coaches
Question 17: Price - Lorries (HGVs)
Question 17: Price - Taxis and private hire vehicles
Question 17: Price - Vans (LGVs) and minibuses
Question 17: Price - Cars
Question 17: Price - Motorcycles and mopeds
- oQ18 Question 18: Do you have any comments on which vehicles should be charged to drive in the Clean Air Zone and how much those charges should be?
- oQ19 Question 19: If a Clean Air Zone was introduced what do you think would be the overall impact for the following?
- oQ20 Question 20: Please explain the overall impact you think a Clean Air Zone would have for your organisation and for Birmingham and the people who live, work and study here.
- oQ21 Question 21: To what extent do you agree or disagree that there should be extra support for the following people?
- oQ22 Question 22: Do you have any comments on the type of support which could be provided, and who it should be for?
- oQ23 Question 23: If a Clean Air Zone was introduced do you think your organisation would need extra support?
- oQ24 Question 24: If you answered 'yes' to the previous question, what kind of support do you think you would need and why?
- oQ25 Question 25: Is there anything else which can be done to improve Birmingham's air quality?
- oQ26 Question 26: Do you feel that the information provided has enabled you to make an informed comment on the proposals?
- oQ27 Question 27: What additional information would have helped you to comment on the proposals?

5.3 Motorcycle Action Group Petition

The Motorcycle Action Group, in addition to their response to the consultation, sent 2 forms of petition, which were endorsed in total by 394 people. The details of these are below:

change.org

Motorcycle Action Group

Recipient:	Birmingham City Council, Councillor Waseem Zafar				
Letter:	<p>Greetings,</p> <p>Promote Motorcycles as a Solution to Improve Birmingham's Air Quality</p> <p>We the undersigned believe that charging PTWs of any age is contrary to the objective of Birmingham's proposed Clean Air Zone, and that promotion of a modal shift from single occupancy cars to PTWs should be included as a positive policy to address the air quality challenge.</p>				
<p><i>Figure 1: Petition part A: 216 printed names and locations</i></p> <p>Petition to Birmingham City Council</p> <table border="1"> <tr> <td>Petition summary and background</td> <td> <p>There is no evidence presented in the Birmingham City Council proposals to demonstrate that levels of pollution created by PTWs have been measured or modelled. The consultation paperwork clearly states "So far, we have not considered whether motorcycles/mopeds should be charged".</p> <p>Given reports from Transport for London (http://content.tfl.gov.uk/pt-emissions-study.pdf) demonstrating that small petrol cars emit an average of 6.5 times more Oxides of Nitrogen than small PTWs using bus lanes, and the Leuven study report (http://www.tmlieven.be/project/motorcyclesandcommuting/20110921_Motorfietsen_eindrapport_Eng.pdf) which demonstrated that a 10% modal shift from cars to PTWs results in a 40% reduction in congestion for all road users and a reduction of CO2 by 7.5%, NOx by 5.5%, PM2.5_exhaust by 4% and PM2.5_non-exhaust by 16%, there is a very strong case to promote a modal shift of this kind in Birmingham.</p> <p>Failure to implement, or at the very least to consider, such a policy is therefore a neglect of the council's statutory duty to consider all possible methods to improve air quality to legal levels "in the shortest possible time"</p> </td> </tr> <tr> <td>Action petitioned for</td> <td> <p>We, the undersigned, believe that charging PTWs of any age is contrary to the objective of Birmingham's proposed Clean Air Zone, and that promotion of a modal shift from single occupancy cars to PTWs should be included as a positive policy to address the air quality challenge.</p> </td> </tr> </table>		Petition summary and background	<p>There is no evidence presented in the Birmingham City Council proposals to demonstrate that levels of pollution created by PTWs have been measured or modelled. The consultation paperwork clearly states "So far, we have not considered whether motorcycles/mopeds should be charged".</p> <p>Given reports from Transport for London (http://content.tfl.gov.uk/pt-emissions-study.pdf) demonstrating that small petrol cars emit an average of 6.5 times more Oxides of Nitrogen than small PTWs using bus lanes, and the Leuven study report (http://www.tmlieven.be/project/motorcyclesandcommuting/20110921_Motorfietsen_eindrapport_Eng.pdf) which demonstrated that a 10% modal shift from cars to PTWs results in a 40% reduction in congestion for all road users and a reduction of CO2 by 7.5%, NOx by 5.5%, PM2.5_exhaust by 4% and PM2.5_non-exhaust by 16%, there is a very strong case to promote a modal shift of this kind in Birmingham.</p> <p>Failure to implement, or at the very least to consider, such a policy is therefore a neglect of the council's statutory duty to consider all possible methods to improve air quality to legal levels "in the shortest possible time"</p>	Action petitioned for	<p>We, the undersigned, believe that charging PTWs of any age is contrary to the objective of Birmingham's proposed Clean Air Zone, and that promotion of a modal shift from single occupancy cars to PTWs should be included as a positive policy to address the air quality challenge.</p>
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Figure 2: Petition Part B: 178 written names with signatures, postcodes and dates

Mitigation / Recommendation Cross Reference

Mitigation Measures			
Ref	Mitigation Measure	Key Theme from question 'What kind of support do you think you would need and why?'	% Individuals who answered this question mentioning this theme
M1	Scrapage scheme or mobility credit	• Make Improvements to public transport	N/A
		• Those living within the CAZ should be exempt or receive discount	12.5%
		• Support for those on low income	8.2%
		• General financial support	25.6%
		• Introduction of a vehicle trade-in scheme	17.6%
M2	Mobility Credit	• Make Improvements to public transport.	N/A
		• Those living within the CAZ should be exempt or receive discounts	12.5%
		• Support for those on low income.	8.2%
		• Commuters and workers	3.9%
		• General financial support	25.6%
		• Subsidised bus travel and/or bus passes	3.6%
M3	Taxi operational support package or LPG retrofit scheme	• Taxi Drivers	2.1%
		• General Financial Support	25.6%
		• Introduction of a vehicle trade-in scheme	17.6%
M4	Council Taxi leasing scheme	• Taxi Drivers	2.1%
		• General Financial Support	25.6%
		• Introduction of a vehicle trade-in scheme	17.6%
M5	Free Van Miles	• Small and local businesses	4.3%

	on BCC network	<ul style="list-style-type: none"> • Commuters and workers • General Financial Support 	3.9% 25.6%
M6	Companies with HGV's	<ul style="list-style-type: none"> • Small and local businesses 	4.3%
		<ul style="list-style-type: none"> • Commuters and workers 	3.9%
		<ul style="list-style-type: none"> • General Financial Support 	25.6%
M7	Marketing Campaign	<ul style="list-style-type: none"> • All 	N/A
Exemptions			
E1	CAZ HGC's and coaches	<ul style="list-style-type: none"> • Small and local businesses 	4.3%
		<ul style="list-style-type: none"> • Discount or exemption from paying the charge 	N/A
E2	HGVs with existing finance agreements	<ul style="list-style-type: none"> • Small and local businesses 	4.3%
		<ul style="list-style-type: none"> • Commuters and workers 	3.9%
		<ul style="list-style-type: none"> • Discount or exemption from paying the charge 	Combination of wider themes
E3	SME Vans	<ul style="list-style-type: none"> • Small and local businesses 	4.3%
		<ul style="list-style-type: none"> • Discount or exemption from paying the charge 	Combination of wider themes
E4	Vans with existing finance agreements	<ul style="list-style-type: none"> • Small and local businesses 	4.3%
		<ul style="list-style-type: none"> • Discount or exemption from paying the charge 	Combination of wider themes
E5	CAZ Residents	<ul style="list-style-type: none"> • Those living within the CAZ should be exempt or receive discounts 	12.5%
		<ul style="list-style-type: none"> • Discount or exemption from paying the charge 	Combination of wider themes
E6	Income Deprived working within the CAZ	<ul style="list-style-type: none"> • Commuters and workers 	3.9%
		<ul style="list-style-type: none"> • Discount or exemption from paying the charge 	N/A
E7	Key Workers	<ul style="list-style-type: none"> • Necessary visitors to and staff at the 	16.8%

	working within the CAZ	Birmingham Children's Hospital	
		• Commuters and workers	3.9%
		• Discount or exemption from paying the charge	Combination of wider themes
E8	Hospital and GP Visits	• Necessary visitors to and staff at the Birmingham Children's Hospital	16.8%
		• Discount or exemption from paying the charge	Combination of wider themes
E9	Faith Groups	• Discount or exemption from paying the charge	Combination of wider themes
E10	Community and School Transport	• Exemptions for the disabled and their carers	Combination of wider themes
		• Discount or exemption from paying the charge	Combination of wider themes

Birmingham Clean Air Zone

Mitigation measures

All mitigation measures are anticipated to last 1 year, unless noted otherwise.

ref	Mitigation measure	Target group	Target fleet	Description	Impacted group size
M1 (a)	Scrapage scheme or mobility credit	CAZ residents and low-income group	Private car/van	<p>Measure targeted at CAZ residents and low-income households that regularly travel to the CAZ.</p> <p>With evidence of scrapping a non-compliant car the target group will receive either:</p> <ul style="list-style-type: none"> - £2,000 cash payment toward the purchase of a compliant petrol car. - £2,000 mobility credit. Credit to be supplied on a SWIFT card with no expiration for use. 	<p>7,700</p> <p>Non-compliant vehicles estimated with DfT registration information for CAZ residents and as a proportion of AADT into the CAZ for low income. 50% uptake assumed.</p>
M1 (b)	Mobility credit	Low-income living or working within the CAZ	Private car/van	Mobility credit offered to low income non-compliant car owners living or working within the CAZ	<p>5,650</p> <p>Non-compliant vehicles estimated with DfT registration information for CAZ residents and as a proportion of commuting AADT into the CAZ for low income. 50% uptake assumed.</p>
M2	Taxi operational support package or LPG retrofit scheme	Taxi drivers on non-compliant Hackney carriages	Hackney carriages	<p>Taxi drivers with non-compliant Hackney Carriages will be offered support payments to be paid toward the purchase or lease of a ULEV vehicle. This is forecast as £5,000 over 4 years.</p> <p>Alternatively, the target group can choose to receive support (£5,000) for an LPG retrofit of their current vehicle, this includes those who must first</p>	<p>1,100</p> <p>Of current Hackney carriage fleet operating in Birmingham 1,150 are non-compliant with CAZ requirements.</p>

				purchase an eligible Euro 4 vehicle before carrying out the retrofit.	
M3	Council taxi leasing scheme			Birmingham City Council to purchase 50 ULEV taxis to lease out to most vulnerable drivers	50
M4	Free Van miles on BCC network	Drivers of electric Vans	Vans	ULEV van drivers can register to receive credit on Birmingham's public charging network	1,000 Element Energy electric vehicle forecasting model shows 1,000 EV vans operating in the Birmingham City Council area in a high uptake scenario in 2020.
M5	HGV	Companies with HGV	HGV and LGVs/Vans	HGV fleet operators within the West Midlands will be able to apply for a cash payment towards retrofit technology that will make their vehicles compliant or alternatively money towards the purchase/lease of a new/second-hand compliant vehicle. The applications will be judged against a set-criteria to target impacted groups.	500 Merit based applications will be reviewed with 500 receiving the mitigation funding.
M6	Marketing campaign	Educational outreach to all vehicle owners	All	Campaign to educate different user groups on benefits of ULEVs and inform non-compliant vehicle owners of options	

Exemptions

All exemptions are initially planned for one year. However, there may be political appetite to extend some of the measures where low impacts are not anticipated to delay the forecast compliance date.

ref	Exemption	Target Group	Target fleet	Description	Daily increase in non-compliant CAZ cordon crossings (AADT)	Proportional increase in CAZ D+ AADT
E1	CAZ HGVs and coaches	CAZ businesses	HGVs and coaches	Vehicles registered within the CAZ will receive an exemption from the CAZ charge. Max 2 vehicles per company. This is not limited to SMEs. 130 fleet size anticipated.	90	0.05% AADT increase overall 1.35% increase of HGV AADT
E2	HGVs with existing finance agreements	HGVs travelling to the CAZ	HGVs	HGVs registered in the Birmingham City area travelling to the CAZ with and existing finance agreement beyond 2020 will be exempt from the CAZ charge. 335 fleet size anticipated to be impacted.	240	0.15% AADT increase overall 3.50% increase of HGV AADT
E3	SME Vans	SME Van owners	Vans	Vans registered to SMEs within the CAZ will receive an exemption from the CAZ charge. 480 fleet size anticipated. Max 2 vehicles per company.	350	0.20% AADT increase overall 1.60% increase of LGV AADT
E4	Vans with existing finance agreements	Vans within Birmingham City area	Vans	Vans registered within the Birmingham City area travelling to the CAZ with and existing finance agreement beyond 2020. Van ownership within Birmingham City area was	850	0.45% AADT increase overall 4.10% increase of LGV AADT

				used as a proportion of those entering the CAZ. Vehicle fleet age was used to determine the number of vans that will be non-compliant and locked in a lease agreement. Average finance period is assumed to be 7 years. The vans captured in E3 have been subtracted from this to forecast a fleet impact of 1,200.		
E5	CAZ residents	Car and Van owners residing in the CAZ	Private cars/vans	All private car and van owners who are residents of the CAZ, as defined by DfT registration information, will be exempt from the CAZ charge. Anticipated 5,500 fleet impact.	1,500	0.85% AADT increase overall 1.10% increase of car AADT
E6	Income deprived working within the CAZ	Income deprived	Private cars/vans	Income deprived residents of the Birmingham metropolitan area traveling into the CAZ for work will be exempt from the CAZ charge. An impacted group of 3,500 is forecast by multiplying the CAZ commuting traffic by the proportion of the Birmingham Metropolitan area that is income deprived.	2,500	1.30% AADT increase overall 1.65% increase of car AADT
E7	Key workers working within the CAZ	Key workers	Private cars/vans	Key workers and volunteers travelling to work in the CAZ will be exempt from the CAZ charge. Commuting trips are multiplied by the proportion of key workers to total workers found in the UK economy. There may	1,900	1.05% AADT increase overall 1.35% increase of car AADT

				be overlap with E6. Non-compliant fleet of 1,500 anticipated to be impacted.		
E8	Hospital and GP visits	Hospital patients and visitors	Private cars/vans	Visitors to select hospitals, GP offices and care homes will be exempt from paying the CAZ charge. General assumptions were applied to Hospital, GP and care home capacities to derive the proportion of visiting traffic that would be in non-compliant vehicles.	100	0.05% AADT increase overall 0.07% increase of car AADT
E10	Community and school transport	Section 19 transport providers	Vans/minibuses	Vehicles that serve the community and are classified as Section 19 operators will be exempt from the CAZ charge. Eligible fleet of 100 defined through stakeholder engagement.	75	0.04% AADT increase overall 0.37% increase of LGV AADT

Title	Birmingham Clean Air Zone
Reference No	EQUA79
EA is in support of	New Service
Review Frequency	Six Months
Date of first review	07/01/2019
Directorate	Economy
Division	Transportation and Connectivity
Service Area	Infrastructure Projects
Responsible Officer(s)	<input type="checkbox"/> Nicholas Richards
Quality Control Officer(s)	<input type="checkbox"/> Janet L Hinks
Accountable Officer(s)	<input type="checkbox"/> Paul Simkins
Initial impact assessment	<p>The Ambient Air Quality and Cleaner Air for Europe Directive 2008 sets out emission limits for pollutants which all EU member states must comply with by 2020. The Environment Act 1995 and the Air Quality Standard Regulation 2010 draw down from the EU Directive and enforce compliance on Local UK Governments. In 2015 the Department for Environment, Food and Rural Affairs (DEFRA) updated air quality plans for the compliance with the EU Directives, these plans listed Birmingham City as one of five cities in the UK which require the implementation of a Clean Air Zone.</p> <p>The Joint Air Quality Unit (JAQU) has been set up by DEFRA and the Department for Transport (DfT) in order to aid in the delivery of these air quality plans; JAQU provide guidance and instruction for the implementation of air quality improvements.</p> <p>Birmingham City Council (BCC) has initiated the 'Brum Breathes' Programme with the aim of implementing a number of clean air initiatives, programmes and projects which will contribute towards improving air quality in the City Centre. The Brum Breathes Programme consists of five programmes, each made up of a number of projects and projects which will collectively improve air quality to a level which is acceptable to the EU Directive 2008. The five programmes which Brum Breathes constitutes are; Early Measures, Clean Air Zone, Air Quality Policy, Environment Delivering Infrastructure and Behavioural Change.</p> <p>This EA is focused on the Clean Air Zone Programme. In order to achieve compliance it is proposed to implement a CAZ D within Birmingham City Centre. This means that an area within the City Centre will be created where all commercial and domestic vehicles, other than motorbikes, which are not Euro 4 Petrol and Euro 6 Diesel compliant will be charged to enter the zone.</p> <p>Extensive air quality and traffic modelling has been undertaken to model various scenarios and the impact of the expected reduction in non-compliant cars. Whilst the CAZ D</p>

will significantly improve air quality, the modelling shows that compliance with the EU Directive will still not be achieved. As such, a number of Additional Measures have been selected to bring the City into compliance; creating the requirement for a "CAZ D+".

The Clean Air Zone (CAZ) will create an area within the City Centre, bounded by the Middle Ring Road (A4540), where control measures will be enforced to minimise air pollution and data collection technology will be installed which can be used to advise future measures. The programme consists of three initial projects, the impact of which will be enhanced by a series of additional measures. The initial projects are as follows; CAZ Signing Strategy, Automatic Number Plate Recognition (ANPR) cameras, IT and Accommodation. The additional measures which will also be implemented are; Charging Parking Zones, Low Emission Charging Points, and a Traffic Management Strategy Review.

The CAZ Signing Strategy project will implement a new signing network which will notify drivers on the approach to the City Centre that a Clean Air Zone is in operation, providing information of the charges which are being enforced.

'Countdown' signs will be installed along all approaches to the Middle Ring Road (A4540), providing drivers with an advance warning which is aligned to the decreasing distance. I.e. signs could be placed at the 3, 2 and 1 mile markers. As stated above, the new signing network will also include signs which inform drivers of how to check their vehicles compliance, the charges which must be paid for non-compliant vehicles and fines which will be enforced for those who fail to pay the charges. The implementation of this project will also involve the installation of any new infrastructure which is required and the provision of any required ground works.

The Automatic Number Plate Recognition (ANPR) project will complement the CAZ Signing Strategy project. The scope of work is to install a network of ANPR Cameras at the intersections where the approach roads meet the CAZ boundary, both on the incoming and outgoing roads. This camera network will provide the tool for enforcement of the CAZ, capturing images of the number plate of every vehicle which enters and leaves.

The 'back office' will be upgrade to enable appropriate software to check the number plates against a list of compliant vehicles and those which have paid the charge; identifying those vehicles which are not exempt and issuing the owner with a fine.

The successful implementation of the three projects briefly detailed above will result in a notable contribution towards improved air quality, the measures being implemented are expected to promote a significant behavioural shift, with many drivers opting for an alternative, more eco-friendly method of transport. It is anticipated that there will be wide ranging

health benefits for those working, living and visiting the city centre.

In addition to the Clean Air Zone to deliver compliance it is necessary to implement four additional measures which are;

Fleet upgrades – To provide a finance support package to Hackney Cab, LGV and private hire vehicle drivers to either retro-fit their vehicle to a compliant engine specification or to upgrade their vehicle to electric.

Parking – To remove all free parking from the city centre.

Network changes – To ban all but public transport to the Moor Street Queensway, Suffolk Street Queensway (northbound), southbound traffic from Paradise onto the A38 and Lister Street and Great Lister Street at the junction with Dartmouth Middleway.

Public transport – improvements to bus corridors.

The purpose of the Equality Analysis is to identify where or if the proposals affect the groups with protected characteristics positively or negatively and whether specific actions are required to address any adverse outcomes.

The consultation on the overall CAZ is ongoing and the results will be analysed to ensure that the consultation covers the relevant stakeholder especially those with protected characteristics. It will also be used to identify those areas where and what mitigation can be introduced and to whom.

Birmingham City Council has commissioned a distributional impact appraisal, together with a health impact assessment, to identify how the impacts of a proposed Clean Air Zone (CAZ) would be distributed across Birmingham's diverse population and business communities. These impacts would include positive health benefits as well as financial impacts.

Social and Equality Impacts

Income deprivation has been considered at lower super output level (LSOA)¹ relative to England and Wales, and relative to Birmingham. Compared to England and Wales as a whole, there are high levels of income deprivation within the CAZ and Birmingham in general. Owners of non-compliant vehicles resident within the CAZ and in close proximity to the CAZ (such as Nechells, Aston, Perry Barr, Tyburn, Soho and Sparkbrook) are potentially the worst affected financially by the proposed scheme, as due to their geographical location they would be least able to avoid entering and exiting the CAZ for everyday car journeys.

There is a higher rate of non-compliant cars associated with areas of income deprivation. It should also be noted that there is a relatively high proportion of households within the CAZ that have no access to a car. The adverse impacts therefore would be distributed among those households that are dependent on car use and which have non-compliant vehicles. It is notable that low income households across Birmingham are also among those who would benefit most from the effects of the CAZ in terms of reduced journey times and reduced petrol consumption due to reduced congestion around the city centre as well as from the health benefits of the proposed scheme.

Other social groups potentially adversely affected by the CAZ proposals would be those dependent on community transport and taxis, as without mitigation these forms of transport could be adversely affected to the extent that their availability decreases (see below). People vulnerable to these impacts would include the disabled, the elderly, women and children. It has therefore been recommended that these forms of transport are targeted for mitigation. There are some key community facilities within the CAZ whose users could be adversely affected by the combination of CAZ charges and parking charges. Examples would include staff and families of children in the Birmingham Children's Hospital, and congregants of those larger or more unique places of worship within the CAZ. These impacts could be mitigated through travel planning and ensuring convenient public transport is available at suitable times.

Business Impacts

The analysis has shown that some transport dependent businesses are more likely to have compliant fleets than others and so the impact of the CAZ would be distributed unequally across businesses. Taxi businesses would be faced with high upfront costs and few choices of response to the CAZ. Other types of business less able to afford the impacts of the CAZ appear to be private hire taxi companies, van companies with fleets that are owned by individuals rather than registered to the company, and SME HGV operators. A very high proportion of businesses within the CAZ are SMEs. Since all would be dependent on transport to some extent, any increase in costs from their suppliers as a result of entering the CAZ are likely to be passed on to these businesses, who in general would have less capacity to cope with increased costs than larger businesses.

Health Impacts

Health impacts would result from the reduction in air pollutants (particularly NO₂ and fine particles (PM10 and PM2.5) as well as behavioural changes from switching to active modes of transport (walking and cycling) and improved environmental conditions. Impacts on life expectancy from exposure to air pollutants, hospital admissions for respiratory and cardiovascular problems and productivity (labour, human capital and natural capital), have been quantified and monetised using JAQU's impact pathway approach. This has identified that in the first year of the CAZ there would be £3.2m (adjusted to 2020 values) in benefit from reduced health impacts from air pollution, and a further £56m (adjusted to 2020 values) in environmental benefits (from reduced impact of NO₂ on ecosystems, reduced impacts of PM10 on building soiling and reduced impacts of ozone depleting substances on greenhouse gas related environmental effects). Analysis has shown that income deprived communities would proportionately receive higher health benefits than the population as a whole, meaning that the CAZ would help address a health inequality associated with the more deprived communities typically being exposed to more air pollution. Spatial analysis of where the main air quality changes would occur have shown that there would be a 26% improvement in NO₂ pollution concentrations around schools and nurseries which are currently within the areas at greater risk of illegal levels of air pollution.

One of the aims of the CAZ is to nudge behavioural change, so that people use more active modes of travel where they can. Although it is not possible to quantify the likely level of change of the CAZ, across a population the increase in physical activity could contribute to significant improvements in overall public health.

Mitigation

It is proposed to target mitigation at those groups least able to cope with the changes brought by the CAZ. This would include taxi drivers faced with high upfront costs and limited choices of compliant vehicles; community transport; income deprived residents who live or work in the CAZ; key workers who work in the CAZ; disabled people, and SMEs. The types

of mitigation under consideration include exemptions, discounts, sunset periods, financial incentives to support businesses and enhanced infrastructure to support the transition to compliant modes of transport. Mitigation options are being consulted on and tested to check that they do not undermine the objectives of the CAZ. They would be subject to the availability of funding. The final mitigation package will be set out in the full business case for the CAZ.

Protected characteristic: Age

Age details:

Wider Community

Children, young people and the elderly can be more vulnerable to air pollution, concerns over personal security and would be more sensitive to any changes in pedestrian access.

Children would be adversely affected by any reduction in the availability of community transport servicing schools and community centres within the CAZ. They would also be adversely affected by the increased cost of community transport if this prevented them accessing schools and community centres within the CAZ, or if it prevented families of patients at Birmingham Children's Hospital from visiting them during their stay.

A high proportion of elderly people have limited mobility and therefore would be adversely affected by implementation of the CAZ through the potential reduction in availability of community transport and taxis, and also the potential increase in cost of community transport and private vehicle travel.

A Defra commissioned study in 2006 showed that there is a tendency for higher relative mean annual concentrations of NO₂ and PM₁₀ in the most deprived areas of the country. In areas which exceed emissions standards, the correlation is stronger. The most vulnerable human receptors include young people and the elderly. A report published by the Royal College of Physicians finds that children living in high pollution areas are four times more likely to have reduced lung function when they become adults (Royal College of Physicians, 2016.).

The entire CAZ has a very low proportion of people over the age of 65 by LSOA relative to distribution across England and Wales and there is no variation in the proportion of

people over the age of 65 within the CAZ (Figure 4.6, Appendix B). The areas with greater proportions of elderly people are in the Sutton Coldfield area in the northern part of Birmingham and the Northfield/Selly Oak areas to the south. This suggests that the elderly population is unlikely to be disproportionately affected by changes incurred within the CAZ.

Where transport is not provided by the school or local authority, then there would be a differential adverse impact on children attending special educational needs schools if introduction of the CAZ discourages or prevents families from supporting their attendance at the school. There are also several community centres within the CAZ that have been identified as providing services used principally by children and which may require transport to and from the premises.

All facilities of importance within the air quality modelling area for the preferred CAZ option would experience a decrease in NO₂ concentrations to some degree. Figure 7.3 shows the degree of increase or decrease in NO₂ concentrations modelled following implementation of the preferred CAZ option relative to locations of facilities of importance to children as described above. As shown in the greatest decreases in average NO₂ concentrations are generally seen within the CAZ areas itself and surrounding major arterial roads as they extend out of the CAZ, which is also where average NO₂ concentrations are highest under the Do Minimum scenario.

The proposed package of mitigation measures is intended to reduce the impacts of the Clean Air Zone on these groups particularly in relation to those in low income families and with a reliance on community transport.

Protected characteristic: Disability

Disability details:

Wider Community

The presence of a higher disability ratio may indicate a higher proportion of people sensitive to air quality due to long term illnesses. The disabled are also more likely to have concerns over personal security, severance and be dependent on community or public transport.

The CAZ includes areas where there are a high proportion of disabled residents based on the comparative illness and disability ratio component of the Index of Multiple

Deprivation (Figure 4.7, Appendix B). The central north section as well as the southern west part of the CAZ includes the highest proportion of disabled residents in the CAZ. There is only a small section within the centre with a low proportion of disabled residents.

The 2011 Census reported that 9% of the population of Birmingham (98,181 people) reported a long term health problem or disability that was significantly limiting their day-to-day activities. A similar percentage of the population reported their day-to-day activities were slightly limited by a health problem or disability. The official labour market statistics state that the total number of people claiming disability living allowance in Birmingham is 43,920 (approximately 4% of the population).

Vehicles used by Blue Badge holders must meet the CAZ emission standards unless the vehicle is registered with the DVLA with a 'disabled' or 'disabled passenger vehicle' tax class. If your vehicle meets neither of these conditions and you want to use your vehicle within the CAZ you will need to pay the charge. Support will be offered to low income groups to help them to adapt to the CAZ.

Protected characteristic: Gender

Gender details:

Wider Community

There is a very low proportion of female residents throughout the majority of the CAZ. There is a higher proportion of female residents in a small section in the southern part of the CAZ (Digbeth area) and one area, north east of the centre which includes a high proportion of female residents. This is in the vicinity of the Birmingham Children's Hospital and the high proportion of female residents is assumed to be due to the presence of key worker accommodation on the hospital site. Much of the remaining CAZ area has a low proportion of female residents by LSOA relative to distribution across England and Wales.

There could be a disproportionate and differential impact on women, who as a group are more frequent users of taxis and have a more negative perception or experience of alternative modes of public transport and active travel modes (walking and cycling).

Mitigation measures being considered will benefit women who may be adversely affected by CAZ proposals e.g. low income and key workers.

Protected characteristics: Gender Reassignment	Not Applicable
Gender reassignment details:	<p>It is not considered that the CAZ scheme is likely to disadvantage transgender people. Low income and key workers will be supported through the planned package of mitigations..</p>
Protected characteristics: Marriage and Civil Partnership	Not Applicable
Marriage and civil partnership details:	<p>It is not considered that the CAZ scheme is likely to disadvantage transgender people. Low income and key workers will be supported through the planned package of mitigations.</p>
Protected characteristics: Pregnancy and Maternity	Wider Community
Pregnancy and maternity details:	<p>There are health inequalities associated with pregnancy and air quality. There is emerging evidence on the links between high levels of emissions and effects on the unborn child. Evidence shows that air pollution can affect the growth of the unborn baby and may be linked to premature birth or even still birth. It is estimated that traffic-related air pollution exposure (particularly exposure to PM) of pregnant women accounts for more than one-fifth of all cases of low birth weight at term. Low birth weight is associated with low lung function, COPD, cardiovascular disease and early death in adulthood. Air pollution can also harm placental development, which affects the development of the unborn child and has been associated with several chronic diseases, including heart disease, obesity and type 2 diabetes. Poor foetal growth is linked to abnormal development of the kidneys, and to hypertension and kidney disease in later life.</p>
	<p>The introduction of the Clean Air Zone will have positive outcomes for this group.</p>
Protected characteristics: Race	Wider Community
Race details:	<p>Compared to England and Wales, much of Birmingham has a high proportion of its population that identifies as Black, Asian and Minority Ethnic (BAME). There is a generally high concentration of Birmingham's BAME population to be within the central part of Birmingham, with the highest concentrations to the east (Hockley, Winson Green and Handsworth areas) and west of the CAZ (Sparkbrook, Small Heath and Bordesley Green areas). The areas with the lowest proportion of BAME population are the Sutton Coldfield area in the northern part of Birmingham and the Northfield/Selly Oak areas to the south, but these still comprise populations</p>

in the top 40% proportion of BAME population compared to England and Wales as a whole.

There are however high proportions of LSOAs within the CAZ with high levels of income deprivation and BAME communities. Key issues are therefore likely to relate to travel within the CAZ and the proportion of residents within the CAZ that have non-compliant vehicles who would not be able to avoid the zone.

The impact on the taxi trade could have consequential impacts for BAME and low income communities, since a very high proportion of taxi drivers are from communities with high proportion of non-white residents and income deprived residents. Since taxis in Birmingham are all wheelchair accessible, whereas currently none of the private hire taxis are, a reduction in this type of vehicle will have an adverse impact on disabled people who may depend on them for access. It is therefore recommended that taxis are targeted for mitigation due to the combination of direct and indirect impacts arising from the proposed CAZ.

Other measures to reduce the impact on low income residents and workers are proposed as part of the mitigations package.

There would be an overall beneficial health impact within the study area under the preferred CAZ option and all other options, however, the magnitude of benefit would be greatest under the preferred CAZ option. When income distribution is considered relative to England and Wales, residents of those LSOAs which fall within quintile one for income deprivation would experience a disproportionately greater amount of the benefits associated with reductions in atmospheric concentrations of all three pollutant types (NO₂, PM10 and PM2.5) than those within less deprived quintiles.

Protected characteristics: Religion or Beliefs

Wider Community

Religion or beliefs details:

According to the 2011 census, Christianity was the highest represented religion in Birmingham with 46% of residents saying they were Christian. Whilst 22% of the population was Muslim and 19% had no religious beliefs..

The majority of people classifying themselves in one of the White or Black ethnic groups said that they were Christian, whereas the Muslim community was predominantly made up from the Asian population. In general, the Muslim population are concentrated closer to the city centre area with the Christian group generally further out towards the council boundary.

Within the proposed CAZ area there are 30 registered places of worship, including Roman Catholic, Presbyterian, Church of England, Greek Orthodox Churches, Synagogues, Mosques and Sikh Temples. Most are of a size that suggests their catchment is highly localised. However, Birmingham Central Mosque is an exception with a capacity of 20,000 and regularly attracts more than 4,000 worshippers for Friday services, suggesting that it attracts a significant number of visits from outside the CAZ area on a regular basis. Other places of worship with a significantly larger than average capacity (greater than 500 spaces) within the CAZ area include the Anglican, Greek Orthodox and Catholic Cathedrals, Camp Hill Seventh Day Church, Ladywood Seventh Day Adventist Church and Birmingham City Church.

Measures to support people attending places of worship are being considered to reduce the impact on these groups.

Protected characteristics: Sexual Orientation

Not Applicable

Sexual orientation details:

It is not considered that the CAZ scheme is likely to disadvantage transgender people. Low income and key workers will be supported through the planned package of mitigations.

Consulted People or Groups

Consultation is currently underway with the wider stakeholder group. The outcome of this consultation will shape the final form of the scheme and any possible mitigation measures as well as the additional measures.

Informed People or Groups

The Public Sector Equality Duty drives the need for equality assessments (Initial and Full). An initial assessment has been prepared from the outset based upon available knowledge and information.

Summary and evidence of findings from your EIA

In producing this Equality Assessment due regard has been given to the 3 aims of the General Duty. The overall CAZ scheme impacts directly on any of the groups with protected characteristics who will need to enter the zone in that they may be required to pay if they have a non-compliant vehicle. In addition there may be additional disbenefits with the removal of the free city centre parking and additional

controlled parking zones. This will have a specific impact on those who have mobility issues.

However the introduction of the CAZ and the subsequent improvement to air quality will provide a betterment for the public good; including the groups with protected characteristics.

The implementation of elements of the scheme especially the additional measures will be subject to more detailed consultation as well as the statutory Traffic Regulation process. Once the detailed design stage has been completed a more informed EA will be completed for the individual schemes identifying where and what mitigation measures have been introduced.

Submit to the Quality Control Officer for reviewing?

No

Quality Control Officer comments

I have reviewed the assessment on 30 August 2018 and it can be sent for approval by the Accountable Officer

Decision by Quality Control Officer

Proceed for final approval

Submit draft to Accountable Officer?

Yes

Decision by Accountable Officer

Approve

Date approved / rejected by the Accountable Officer

31/08/2018

Reasons for approval or rejection

Please print and save a PDF copy for your records

Yes

Content Type: Item

Version: 27.0

Created at 06/08/2018 04:33 PM by  Nicholas Richards

 Close

Last modified at 31/08/2018 12:43 PM by Workflow on behalf of  Paul Simkins

DIRECTION

ENVIRONMENT ACT 1995

Environment Act 1995 (Birmingham City Council) Air Quality Direction 2017

The Secretary of State, in exercise of the power conferred by section 85(5) of the Environment Act 1995(a), gives the following direction.

In accordance with section 85(6) a copy of this direction will be published in the London Gazette.

The Secretary of State makes this direction having determined that it is necessary in order to meet obligations placed upon the UK under the EU Ambient Air Quality Directive(b).

Citation, commencement and application

1.—(1) This direction may be cited as the Environment Act 1995 (Birmingham City Council) Air Quality Direction 2017 and comes into force on 20th December 2017.

(2) This direction applies to Birmingham City Council.

Interpretation

2. In this direction—

“the 2000 Act” means the Transport Act 2000(e);

“AQP” means the UK plan for tackling roadside nitrogen dioxide concentrations 2017, drawn up by the Secretary of State in accordance with regulation 26(1) of the Air Quality Standards Regulations 2010(d);

“the authority” means Birmingham City Council;

“feasibility study” means a study, conducted by the authority in accordance with HM Treasury’s Green Book approach, to identify the option that will deliver compliance with legal limits for nitrogen dioxide in a given area in the shortest possible time as part of the AQP;

“full business case” means a document that sets out detailed proposals for a scheme which has been identified through a feasibility study as the authority’s preferred measure to deliver compliance with the legal limit value for nitrogen dioxide in the shortest possible time;

“local transport policies” has the meaning given by section 108(5) of the 2000 Act(e).

(a) 1995 c25.

(b) 2008/50/EC OJ No. L 152, 11.06.08, p.1.

(c) 2000 c.38.

(d) S.I. 2010/1001. A copy of the plan is available at: <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>.

(e) Section 108(5) was inserted by section 7(1) and (2) of the Local Transport Act 2008 (c.26).

Duty to prepare and submit a full business case

3.—(1) The authority must as part of its feasibility study, prepare a full business case for the area for which it is responsible.

(2) The full business case must be submitted to the Secretary of State as soon as possible and by 15th September 2018 at the latest.

Inquiry in respect of a full business case

4.—(1) The authority must only exercise its power to hold a local inquiry, whether under section 170(2)(a) of the 2000 Act or otherwise, in relation to any scheme it identifies as part of its feasibility study and in preparing its full business case in accordance with this Article.

(2) The authority may only hold a local inquiry if it is necessary to do so, notwithstanding any other opportunities which the authority has or could have provided for representations to be made in relation to the scheme.

(3) Before an inquiry is held in accordance with paragraph (2), the authority must consult the Secretary of State and—

- (a) submit a proposed timetable for the completion of the inquiry, and
- (b) inform the Secretary of State whether the inquiry will be in addition to or instead of any other opportunity to make representations about the scheme identified in the full business case.

(4) Where the authority consults the Secretary of State under paragraph (3), the Secretary of State must give written consent to the timetable before the inquiry begins.

(5) In this direction, a reference to holding a local inquiry includes a reference to causing a local inquiry to be held.

Submission of the full business case to the Secretary of State

5. When submitting its full business case, the authority must provide the Secretary of State with the following information—

- (a) the date on which it is proposed that the scheme identified in the full business case will come into effect;
- (b) confirmation that all public consultation necessary in respect of the scheme identified in the full business case, has been completed (including where applicable consultation in accordance with section 170(1A), (1C) or (5)(a) of the 2000 Act(a));
- (c) a summary of any responses received in response to any consultation and of the changes (if any) made to the scheme identified in the full business case following that consultation;
- (d) where the full business case proposes a scheme in connection with which the authority intends to exercise powers under the 2000 Act, confirmation that the scheme facilitates the achievement of the local transport policies (where applicable) which apply in the authority's area;
- (e) confirmation that the full business case has been prepared in accordance with HM Treasury's Green Book approach;
- (f) confirmation—
 - (i) that no local inquiry has been held or is due to be held, or
 - (ii) that a local inquiry has taken place in accordance with the timetable agreed by the Secretary of State under Article 4 of this Direction.

(a) Section 170(1A) and (1C) were substituted, for subsection (1) as originally enacted, by section 111(2) of the Local Transport Act 2008. Section 170(1A) was amended by paragraph 110(2) of Schedule 6 to the Local Democracy, Economic Development and Construction Act 2009. Section 170(5) was amended by paragraph 6(2) of Schedule 5 to the Local Transport Act 2008.

Guidance

6. The authority, in taking steps under this direction, must have regard to relevant guidance issued by the Secretary of State.



Thérèse Coffey MP

Parliamentary Under Secretary of State

Department for Environment, Food & Rural Affairs

19th December 2017

EXPLANATORY NOTE

(This note is not part of the direction)

This direction directs Birmingham City Council to prepare and submit to the Secretary of State a full business case by 15th September 2018 in connection with its duties in respect of air quality under Part 4 of the Environment Act 1995 and as part of the UK plan for tackling roadside nitrogen dioxide concentrations 2017. The authority is already conducting a feasibility study under the previous UK plan. The full business case must set out detailed proposals for a scheme which is the authority's preferred measure to deliver compliance in its area with the legal limit value for nitrogen dioxide in the shortest possible time. Under section 85(7) of the Environment Act it is the duty of a local authority to comply with a direction given to it. A copy of this direction is available for inspection at Nobel House, 17 Smith Square, London SW1P 3JR.

PUBLIC

Report to:	CABINET
Report of:	CORPORATE DIRECTOR OF ECONOMY
Date of Decision:	10th September 2018
SUBJECT:	BIRMINGHAM CLEAN AIR ZONE SUBMISSION OF PREFERRED OPTION BUSINESS CASE TO GOVERNMENT
Key Decision: Yes	Relevant Forward Plan Ref: 005425/2018
If not in the Forward Plan: (please "X" box)	Chief Executive approved <input type="checkbox"/>
Relevant Cabinet Member(s) or	O&S Chair approved <input type="checkbox"/>
Relevant Executive Member:	OUNCILLOR WASEEM ZAFFAR, CABINET MEMBER FOR TRANSPORT AND ENVIRONMENT
Relevant O&S Chair:	OUNCILLOR LIZ CLEMENTS
Wards affected:	ALL

REPORT

* To be completed for all late reports, ie. which cannot be despatched with the agenda papers ie. 5 clear working days' notice before meeting.

Reasons for Lateness

The Clean Air Zone consultation closed on 17th August and received the most responses to any consultation ever undertaken to by the City Council.

The consultation response was not only large in number but also raised a substantial number of issues. The analysis undertaken has identified the key themes which were raised and these are summarised in the report.

Due to the volume of responses to the consultation additional time has been required to allow the consultation analysis to be completed and for the relevant information to be used to finalise the preferred option ahead of the proposed submission to Government by 15th September 2018.

It should be noted that at the time of writing this report, all of the responses from the consultation have been analysed and considered sufficiently in order to enable a proper view to be taken in the preparation of the Preferred Option Business Case.

