MAY 2020

NORTH STAFFORDSHIRE LOCAL AIR QUALITY PLAN

UNAPPROVED OUTLINE BUSINESS CASE

Staffordshire County Council

NEWCASTLE UNDER LYME BOROUGH COUNCIL

City of Stoke-on-Trent

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1 Strategic Case

1.1 Introduction

Stoke-on-Trent City Council (SoTCC), Newcastle-under-Lyme Borough Council (NuLBC) and Staffordshire County Council (SCC) are committed to working together to transform the urban area of North Staffordshire into a cleaner and healthier area.

In October 2018, Stoke-on-Trent and Newcastle-under-Lyme Councils (who have responsibility for Environmental Health) were issued a Ministerial Direction to produce a local air quality plan to address their respective nitrogen dioxide (NO_2) problems related to roadside traffic pollution. Given their proximity to one another and nature of the urban area, they were tasked with producing a joint plan.

As the highway authority for the Borough of Newcastle-under-Lyme, SCC has been assisting the authorities and together the three authorities have developed a plan to tackle NO_2 exceedances at the roadside – known as the North Staffordshire Local Air Quality Plan (NSLAQP).

This Plan will help to protect and promote the health of the local population by improving air quality and reducing the impact of air pollution on the environment. In so doing, the local authorities are complying with the UK Air Quality Plan and bringing NO_2 air pollution within statutory limits in the shortest possible time.

The joint approach has also been necessary because it is recognised that air pollution does not respect local authority boundaries and therefore a consistent and co-ordinated approach is required to maximise air quality benefits for all people living and working in North Staffordshire. By working together, the authorities can also minimise the risk of unintended consequences and help to ensure, as far as possible, alignment between the NSLAQP and wider authority strategies.

This OBC explains how the authorities have determined the Preferred Option which forms the NSLAQP for Stoke-on-Trent and Newcastle-under-Lyme. The Preferred Option, which is described in detail in section 1.15 comprises a package of measures, including:

- The installation of bus gates, ANPR cameras and advanced direction signing at two locations (A50 Victoria Road and A53 Etruria Road) that restrict access to buses, cycle users and taxis during peak times (Monday to Friday from 7am to 10am and 4pm to 7pm). If deliverable, a ULEV exemption may also be added to the scheme in the Full Business Case (FBC).
- Traffic management measures adjacent to Victoria Road to ensure local communities are not negatively impacted by traffic re-routing to avoid the bus gate.
- Improvements to signal timings along the A53 to maximise air quality benefits, and the installation of new signalised pedestrian crossing facilities to enhance pedestrian connectivity and relocation of an existing bus stop.
- Expansion of the existing bus retrofit programme being delivered as part of the separate NuLBC Ministerial Direction so that buses travelling along two key corridors (Bucknall New Road and Victoria Road) are retrofitted to achieve Euro VI emission standards.

- Enhanced bus infrastructure on routes that pass through or are parallel to the exceedance locations including the provision of real time passenger information (RTPI) screens, new bus shelters, accessible kerbs and CCTV.
- Package of monitoring and evaluation to assess the impact of the different measures and identify when compliance is achieved.

1.2 Purpose of this case

This Strategic Case which forms part of the Outline Business Case (OBC) sets out the underlying rationale for the NSLAQP, including a robust case for change in relation to the requirements of the Ministerial Direction to tackle predicted annual mean NO_2 exceedances in the North Staffordshire area. It describes how the proposed package has been identified and how it will reduce NO_2 and promote improved air quality across Stoke-on-Trent and Newcastle-under-Lyme.

The Strategic Case demonstrates that the proposed package achieves the Government's Critical Success Factors, and aligns with wider growth, health and environmental strategies for the region. This OBC explains why this proposed package is the optimum solution to bring illegally high roadside NO_2 levels within legal limits as soon as possible.

1.3 The need for change

Air pollution affects the health of people living, working and travelling in North Staffordshire. Pollutants such as NO_2 which is the harmful oxide of nitrogen (NO_X), and particulate matter ($PM_{2.5}$ and PM_{10}) that are not visible to the naked eye are found at dangerous levels in many urban areas and on busy roads. Road transport causes two-thirds of NO_X emissions and nearly 80% of PM emissions at the roadside. The main sources of road-based NO_X emissions are diesel vehicles with older vehicles typically more polluting than newer vehicles. Large vehicles such as lorries are the most polluting from the exhaust pipe.

Breathing in polluted air contributes to the equivalent of approximately 200 deaths a year in North Staffordshire. Both long- and short-term exposure to air pollution are known to adversely affect health. It affects people's lungs in the short and long term, worsening respiratory issues such as asthma or bronchitis, as well as cardiovascular problems, and reduces life expectancy. The most vulnerable in society are hit hardest – children, older people and those already in poor health. Everyone is at risk, but people who spend more time in areas with a high concentration of air pollution are most affected – which can include drivers.

The UK Government has illustrated its vision to deliver a cleaner, healthier environment that benefits people and the economy. Although air quality in the UK has improved significantly over recent decades, it is recognised that there is still plenty of room for improvement, whilst meeting the objective of supporting economic growth. This is especially important, given the correlation between poor air quality and health-related diseases. To deliver change, the problem needs to be targeted at source. However, action must be geographically relevant, ensuring that any interventions must align with the interests of local people, given that people are the main driver for improving air quality.

This is why the proposed package, that comprises the NSLAQP, includes physical traffic management measures and targeted bus network enhancements to reduce vehicle use, encourage the use of cleaner vehicles and help embed a longer-term shift in travel choice. The

package will bring illegally high roadside NO_2 levels within legal limits and as a result will deliver wider benefits including:

- Quality of life improvements for the population of North Staffordshire
- Reduction in pollution-related health and wellbeing impacts and years of life lost
- More sustainable transport options, such as cleaner buses

1.3.1 Ministerial Direction

In December 2015, the UK Government published the plan for 'Tackling nitrogen dioxide in our towns and cities – UK overview document' naming the first wave of five cities, Birmingham, Leeds, Southampton, Nottingham and Derby, to implement Clean Air Zones (CAZ).

In July 2017, the UK Government published the UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations – An Overview,[1] which set out the Government's plan to achieve a cleaner and healthier environment along with actions to lower NO_2 air pollution to levels that comply with established EU limits in the shortest possible time. As a result, the Government initially identified 28 local authorities with the worst NO_2 problems in the country and directed them to produce local air quality plans. These plans aim to detail how each authority will attempt to reduce its NO_2 concentrations to compliant levels in the shortest time.

In March 2018, the Government continued pursuing the Ministerial Direction to further advise more authorities to address their NO_2 issues. A further 33 local authorities were required to produce plans on potential pollution mitigation measures to be implemented in their areas.

In October 2018, another supplement to the NO_2 plan was issued in which a further eight local authorities were directed to produce a local air quality plan to address their respective NO_2 problems. These 'third wave' authorities included both SoTCC and NuLBC; owing to their proximity to one another, they were tasked with producing a joint plan pertaining to their pollution issues. SCC is assisting the authorities in its role as highway authority for Newcastle-under-Lyme.

1.4 Area of interest

The October 2018 Ministerial Direction required the authorities to assess other areas of the city and borough where local modelling identified predicted exceedances in NO_2 concentrations and to consider the displacement effects of any measures that may be implemented to tackle these exceedances. The study area is shown in Figure 1-1 and covers the central urban areas and the surrounding communities in both Newcastle-under-Lyme and Stoke-on-Trent. Together these areas form part of the North Staffordshire conurbation which is identified in the Midlands Connect Strategy as one of four Strategic Economic Hubs highlighting the regional significance of the area as illustrated in Figure 1-2.

[1] UK plan for tackling nitrogen dioxide concentrations, Detailed plan, Defra, July 2017

Figure 1-1: Study area

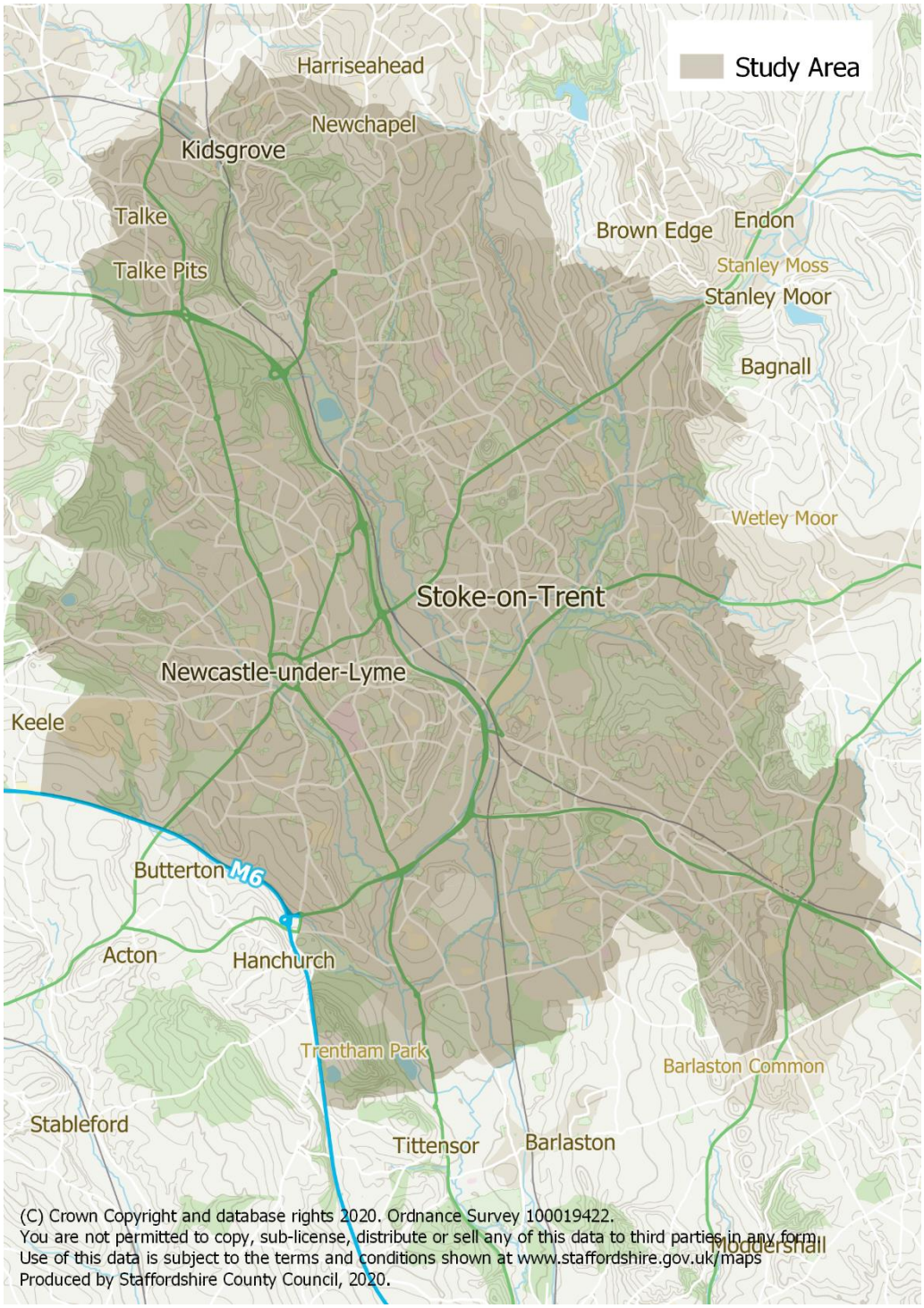
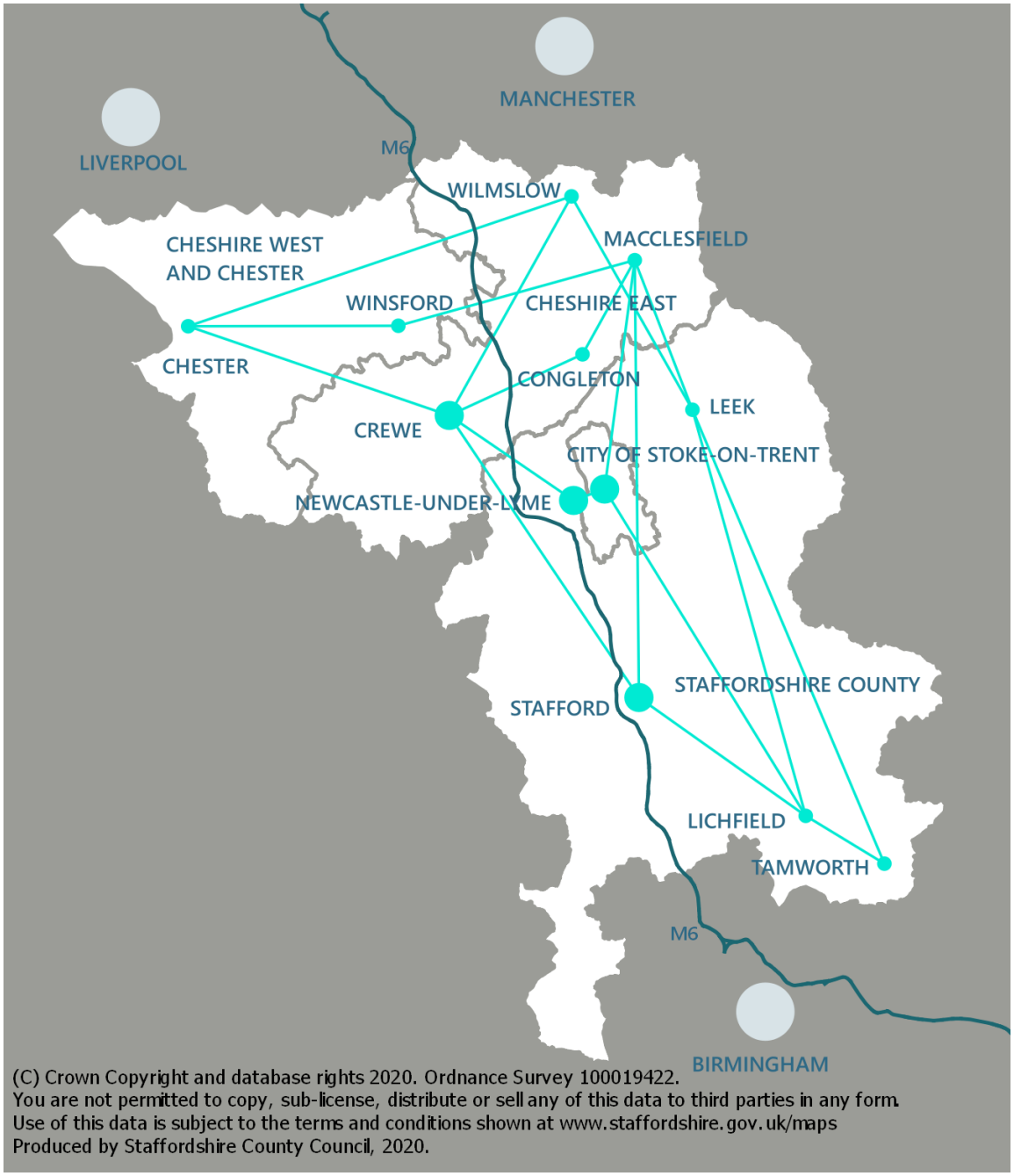


Figure 1-2: Regional significance



1.5 Policy and strategic fit

The NSLAQP has a strong strategic fit with national, regional and local policy and shows how investment in the proposed package will further the aims of each local authority and the Government. The relationship with the various policies and strategies is discussed below.

1.5.1 UK Air Quality Plan, 2017

The national Air Quality Plan outlines how the UK Government aims to fulfil its commitment to improve air quality in the shortest possible time in accordance with the Ambient Air Quality Direction 2008 (2008/50/EC, the 'Air Quality Direction') requirements. The Direction sets the legal limits for concentrations of air pollutants, such as particulate matter and nitrogen dioxide, that are recognised to impact public health and even contribute to the genesis of potent greenhouse gases. These legal limits were introduced into English law by the Air Quality Standards Regulations in 2010, in which the EU limit values for NO_2 are as follows:

- The annual mean concentration of NO_2 cannot exceed 40µg/m3 (micrograms per cubic metre) at a given location
- The hourly mean concentration of NO_2 cannot exceed 200µg/m3 more than 18 times per year at a given location

One potential area of uncertainty surrounding these laws is the possible amendments that may be made to the regulatory framework now the UK has left the European Union (EU). However, the UK Government has not announced that it intends to change any aspect of air quality law.

The UK Government has made commitments to reduce air pollution in towns and cities by targeting behaviour change amongst communities, employers, education establishments and policy makers. The Plan notes that the UK Government is currently committed to investing over £2.7 billion for air quality improvements and cleaner transportation. This includes funding for:

- £1 billion – Ultra low emission vehicles
- £290 million – National Productivity Investment Fund
- £11 million – Air Quality Grant
- £89 million – Green Bus Fund
- £27 million – Clean Bus Technology Fund and Clean Vehicle Technology
- £1.2 billion – Cycle and Walking
- £100 million – National Road Network

The national plan document is clear that addressing air quality problems must be done in a way that 'does not unfairly penalise ordinary working families who bought diesel vehicles in good faith'. The NSLAQP has been developed to:

- reflect the needs of the local residential and business community to ensure working families and businesses are not unfairly penalised
- contribute to the Government's target by reducing roadside NO_2 to below EU limit values in the shortest possible time.

1.5.2 Clean Growth Strategy, 2017

The Government's Clean Growth Strategy is focussed on growing the economy whilst cutting greenhouse gas emissions. The Strategy includes a number of key policies including Accelerating the Shift to Low Carbon Transport and also acknowledges the commitment made to address air quality which it states, "remains the largest environmental risk to public health in

the UK". The NSLAQP will help to support these ambitions by actively encouraging a shift to more sustainable modes of travel.

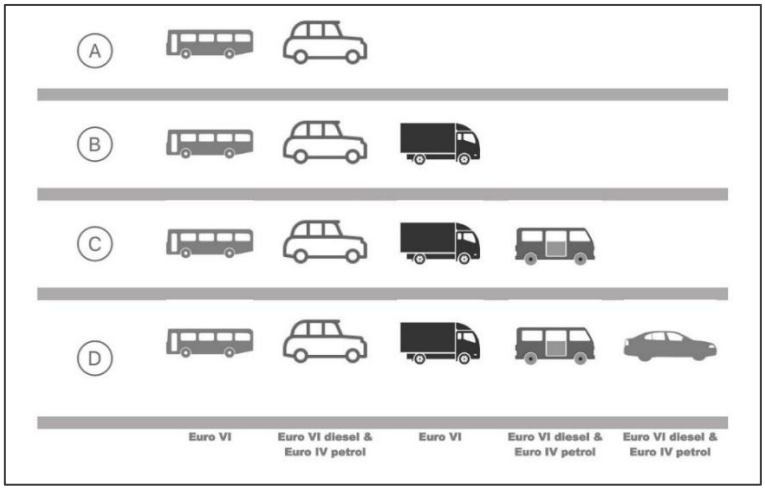
1.5.3 Clean Air Zone Framework, 2017

The Clean Air Zone Framework (2017) was designed to help support local authorities in their approach to implementing and operating a CAZ.[2]. The framework also classifies CAZs into two main categories:

- Charging CAZ – These are zones in which vehicle owners are required to pay a charge to enter or move within the zone, depending on whether the vehicle meets the emissions standard. A charging CAZ is also the Benchmark scenario which is used to compare alternative measures against, with respect to finding the optimal solution to meet compliance in the shortest possible time.
- Non-charging CAZ – These are simply geographic areas used as a focus to improve air quality using a range of measures (excluding charge-based access restrictions). These measures may include traffic management options, travel planning, workplace parking, optimising of traffic signal timings and exploring vehicle retrofitting and new fuels.

Charging CAZs are grouped into four classes, with class A being the least severe and class D impacting the greatest range of vehicles. Figure 1-3 the minimum fuel standard required for each vehicle type within each CAZ class that would meet emissions regulations and ultimately avoid the CAZ charge.

Figure 1-3: CAZ classes and euro standards



It is recognised that a CAZ D scheme will likely result in the greatest reduction in air pollution, as it will impose a charge on the greatest number of vehicle types. However, consideration must be given to other factors, including: governmental emphasis on achieving compliance to within the legal limits in the shortest possible time; and the potential impacts on individuals and businesses. Therefore, other classes of CAZ and non-CAZ schemes should also be considered.

2 Clean Air Zone Framework (2017). Department for Environment Food and Rural Affairs, DfT

In fact, the 2017 Air Quality Plan and the 2019 Clean Air Strategy state that if a local authority can identify measures other than charging zones that are as effective at reducing NO_2, those measures should be preferred as long as the local authority can demonstrate that this will deliver compliance as quickly as a charging CAZ.

The NSLAQP has been developed to achieve compliance without the need for a charging zone, and the proposed interventions, set out in the Preferred Option (see section 1.15), will enable the Councils to bring NO_2 levels below the EU limit values quicker than a CAZ.

1.5.4 Supplement to UK Air Quality Plan, 2018

The Supplement sets out the additional work carried out since publication of the 2017 Plan with local authorities identified as having shorter term NO2 exceedances.

In March 2018 the Government directed 33 English local authorities with shorter-term NO2 problems ("the third wave local authorities") to carry out studies to find out whether there are measures they can take to reduce NO2 air pollution in their areas in the shortest possible time. The 33 local authorities were identified based on national PCM modelling. It was determined that local authorities know their own areas best, and it is possible that local assessment will identify measures that could speed up compliance within statutory limits.

Examples of the potential measures that the third wave local authorities could explore have been identified in a consultation for the Supplement to the Air Quality Plan, including:

- Encouraging use of public transport, cycling, walking, park and ride schemes and car clubs, including via communications campaigns;
- Delivering measures to optimise traffic flow (e.g. via changes to traffic signalling); and
- Working with local businesses and accessing clean technology.

The Government provided support to each local authority for the development of feasibility studies. As a result of the feasibility studies the Government directed eight local authorities (including NuLBC and SoTCC) to carry out a more detailed study to develop a plan to identify the most suitable measures to address the exceedance in the shortest possible time. The NSLAQP responds to this Supplement.

1.5.5 25 Year Environment Plan, 2018

This Plan is the 'sister' document to the Government's Clean Growth Strategy and sets out the Government's ambition to leave our environment in a better state than we found it. The Plan includes six key policy targets, including achieving clean air by meeting legally binding targets to reduce emissions of five damaging air pollutants to halve the effects of air pollution on health by 2030. The NSLQP supports the ambitions of the 25 Year Plan.

1.5.6 Clean Air Strategy, 2019

This Strategy spans many sectors that generate air pollution, including transport. The strategy sets out actions required from all parts of Government and society and offers the prospect of new legislation to create a more coherent framework for action to tackle air pollution. This will be 'underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem.

The Strategy includes an aim to reduce emissions of nitrogen oxides (to which transport is a major contributor) against the 2005 baseline level by 55% by 2020, and by 73% by 2030.

The NSLAQP should help contribute to this national target at a local level.

1.5.7 Stoke-on-Trent and Newcastle-under-Lyme Core Spatial Strategy (2006-2026)

The Stoke-on-Trent and Newcastle-under Lyme Core Spatial Strategy 2006-2026 was jointly produced with the assistance of both SoTCC and NuLBC. This approach helps to make sure that the two Councils are working together to achieve the best results for both areas. It seeks to ensure that public and private investment is properly co-ordinated, with a focus on promoting the principles of sustainable development. The Core Spatial Strategy has its own Strategic Aims, Spatial Principles and Area Spatial Policies for the area.

Several policies and aims are included in the Core Spatial Strategy, for example:

- To facilitate delivery of the best of healthy urban living in the development of the conurbation
- To reduce the need to travel, improve accessibility and increase the opportunities for development of sustainable and innovative modes of travel to support the regeneration of the plan area
- Improvement in the levels of productivity, modernisation, and competitiveness of existing economic activities, whilst attracting new functions to the conurbation
- Improving the accessibility and therefore the social inclusion of previously poorly connected communities to maximise the range of services and facilities available to people
- Public transport access to the city centre will be enhanced by the development of bus routes along radiating roads and linking to improvements for all public transport modes within the centre and to a new bus station
- Public places and green spaces within the city centre will be improved for the benefit of pedestrians and better connections provided between Central Forest Park, Festival Park, and Hanley Park via the city centre
- Addressing the environmental impacts of travel including congestion, air quality and noise pollution.

The NSLAQP will support the realisation of these aims by helping to improve air quality, the health of the urban environment and encouraging a shift to sustainable modes of travel.

1.5.8 Joint Local Plan (2013-2033)

SoTCC and NuLBC, supported by SCC, are working together to guide the future development of both areas up to 2033. The Joint Local Plan (2013-2033) looks to ensure that long-term policies and plans are in place to make sure that the borough and city manage and meet the needs of local people and businesses.

The Joint Local Plan will shape where new residential developments and transport infrastructure will be erected in both Stoke-on-Trent and Newcastle-under-Lyme. To achieve the development goals in the region, a minimum of 199 hectares of employment land and 27,800 new homes will

need to be introduced in the 2013-2033 timeframe. New housing along with job protection and creation are crucial for the future prosperity of the region.

This 2033 vision for the Joint Local Plan is[3]:

Together Stoke-on-Trent and Newcastle-under-Lyme are great places to live, learn, work and visit with active, healthy and prosperous communities at their heart. By 2033 the area will provide a great central innovative hub for investment and growth, having increased the amount of high quality employment, retail and residential choice, whilst protecting and enhancing the distinctive historic built and cultural heritage, natural environment and landscapes and minimising the impact on climate change within their urban and rural areas.

There are six key aims to support this vision and to achieve:

- UK central hub for innovation and investment
- Healthy and active communities
- Dynamic and diverse neighbourhoods
- Utilising our natural assets and resources
- Strong city centre and market town with a diverse network of towns and villages
- Making our historic past work for the future

1.5.9 Stoke-on-Trent Local Transport Plan

The three goals of the Stoke-on-Trent LTP3 are:

- Economy - improving the local economy through increasing productivity for existing businesses and encouraging new investment by making the area more attractive.
- Environment - improving the local environment through reducing the impact of traffic (air and noise) and moving towards more sustainable transport technology and modes, coupled with improving the appearance of local areas. The following objectives are relevant to the NSLAQP:
    - Reducing air pollution
    - Reducing noise impacts of transport
    - Reducing carbon emissions
- Health - caring for local health through improving access to transport, transport safety and encouraging walking and cycling.

1.5.10 Etruria Valley Link Road

The Etruria Valley Link Road (EVLR) Project being led by SoTCC is a crucial transportation improvement scheme. It will provide connectivity between the Etruria Valley development area, the A500, and key centres for employment, retail and commerce. The scheme is also expected

[3] Joint Local Plan Preferred Options consultation, January 2018

to reduce congestion and speed up journey times on the congested A500 and A53 when it opens in 2022.

The core scheme includes the following key elements:

- Construction of a new viaduct spanning the WCML railway and Fowlea Brook flood plain from the A500/Wolstanton junction into the Etruria Valley site.
- Improvements to the two existing dumb-bell roundabouts at the A500/Wolstanton junction including a dedicated segregated left-turn from the southbound A500 slip road into the Etruria Valley site.
- To the east of the new viaduct, new highway infrastructure running south to north from the end of Shelton Boulevard to Newport Lane with pedestrian/cycle only access to the existing Newport Lane route
- A new west to east road linking the new viaduct to Festival Way which also includes a new canal bridge crossing.

The scheme also includes the following off-site Mitigation Measures:

- Improvement to the existing Festival Way/Marina Way roundabout.
- Signalisation of the approach to the A53 Etruria Road/Festival Way roundabout.
- Improvement to the existing A527 Grange Lane/B5368 High Street junction.

In addition to the investment from Government into the EVLR Project, Highways England has also commenced the delivery of lane-widening improvements to the A500 between the Porthill and Wolstanton junctions aligned to the EVLR Project and in line with their 2015-2020 Road Investment Strategy Delivery Plan. The scheme is expected to be completed in 2020. The EVLR Project will help to reduce NO_2 levels and as a committed scheme was included within the future Base/Do Minimum scenarios as part of the development and appraisal of the NSLAQP.

1.5.11 Newcastle-under-Lyme Borough Integrated Transport Strategy (2015-2026)

SCC produces eight Integrated Transport Strategies, one for each District/Borough. They include current transport policies, strategies and proposals for Staffordshire and have now replaced the 2011 Local Transport Plan. Delivery of the transport strategies helps to achieve SCC's vision for Staffordshire and three interconnected priority outcomes that are identified in the County Council's Strategic Plan for 2018 to 2022:

- Have access to more good jobs and share the benefits of economic growth
- Be healthier and independent for longer
- Feel safer, happier and more supported in their community

The Newcastle-under-Lyme Borough Integrated Transport Strategy will be revised to incorporate the highway measures that are required to deliver the Ministerial Direction. A further update will be produced to support the emerging Joint Local Plan.

1.5.12 Transforming Cities Fund programme

The development of the NSLAQP has taken place in parallel with development of bids for funding to the Department for Transport's Transforming Cities Fund (TCF). The two initiatives are considered complementary, with the proposed TCF-funded works reinforcing the NSLAQP.

The aim of the Transforming Cities initiative for Stoke-on-Trent is to improve public transport connectivity by addressing key barriers associated with journey times and journey quality. SoTCC was awarded £5.6m in funding in response to its 'Tranche 1' funding bid in early 2019 for major improvements to progress development of an integrated transport hub to create seamless transfer between rail and bus.

The Council's Tranche 2 bid was submitted in November 2019 and updated bid is due to be submitted in July 2020 and includes further plans to revolutionise public transport in the city. The plans aim to improve connectivity between the commercial, transport, retail and university hubs to encourage a shift from private vehicles to public transport. If funding is secured the schemes will also help to improve air quality in the city and therefore help to de-risk the achievement of air quality compliance through the NSLAQP.

1.5.13 Town and Future High Streets

NuLBC has been invited to submit Implementation Plans for Town Funds and Future High Street Funds. They will be submitted in Summer 2020. Details will be emerging shortly, but it is expected that they will include transport improvements in Newcastle-under-Lyme town centre that will support air quality objectives. These will be major bids of up to £25m and with the NSLAQP will help to support the broader aims and objectives for the region.

1.5.14 Council Strategic Plans

Each Council has a Strategic Plan, the SoTCC Strategic Plan (2020-2024) includes five strategic priorities including: supporting vulnerable people; enabling residents to fulfil their potential; helping businesses to thrive; working with communities to make them healthier, safer and more sustainable; and being an innovative and commercial Council. The SCC Strategic Plan (2018-2022) identified five priorities including: Economic growth; and Health, Care and Wellness. The NuLBC Council Plan (2018-2022) sets out four priorities including creating a healthy, active and safe borough. The NSLAQP has the potential to support these ambitions to make North Staffordshire a healthier and happier place to live.

1.6 Air quality in North Staffordshire

This section considers the wider air quality issues in the area by considering the existing Air Quality Management Areas and reviewing current and future schemes being brought forward to deliver improvement before the specific issue associated with NO_2 exceedance is described.

1.6.1 Air Quality Management Areas

As a result of the Environment Act 1995, local authorities have a duty to assess the local air quality and compare concentrations of recorded pollutants to legally set objectives. In instances where exceedances are identified, authorities are required to declare an Air Quality Management Area (AQMA) and therefore prepare an Air Quality Action Plan (AQAP).

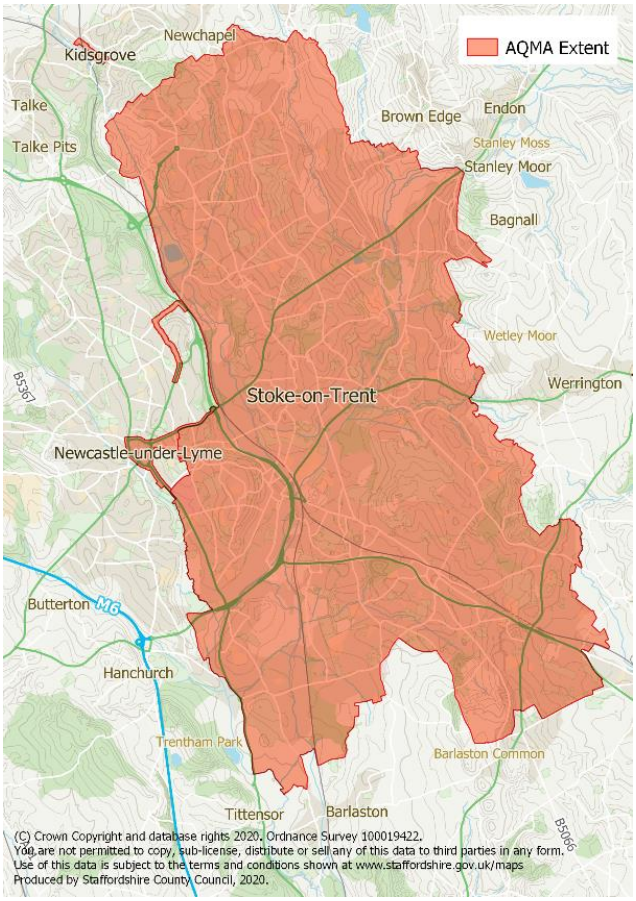
The whole of Stoke-on-Trent was declared as an AQMA for NO_2 in 2006 and although the long-term pollutant monitoring throughout the city generally shows an improving trend of air quality in Stoke-on-Trent, the only pollutant in which levels exceed legal values is nitrogen dioxide. The

AQMA applies to the whole city to allow for the fact that future monitoring may reveal other areas that are also subject to poor air quality and it also ensures solutions to air pollution exceedances do not involve pushing a problem to a nearby location.

Newcastle-under-Lyme has an AQMA covering Newcastle-under-Lyme Town Centre including the ring road A53, King Street, George Street, and London Road to the boundary with the City of Stoke-of-Trent AQMA. There are also AQMAs covering Porthill/Wolstanton, and Kidsgrove.

Figure 1-4 shows the extents of both AQMAs for Stoke-on-Trent and Newcastle-under-Lyme.

Figure 1-4: Air quality management areas



1.6.2 Air quality in Stoke-on-Trent

In 2013 SoTCC produced an Air Quality Strategy, replacing the 2002 Local Air Quality Strategy, and setting out how the Council will continue to work towards improving air quality in the city. The Strategy acknowledges that the main pollutant of concern is NO_2 and makes commitments to work with partners on AQAPs, consider all options available, assess the wider economic, social and environmental impacts of action plans, and seek contributions to action from industry, transport and individuals.

In 2014 SoTCC declared an AQAP under the 2013 Strategy. The AQAP sets out a series of actions that have been identified to reduce levels of NO_2 city-wide, including actions for selected hotspots. The measures contained within the action plan are those considered to be the most cost effective and appropriate for Stoke-on-Trent. It focuses largely on transport-related schemes and feeds into a range of relevant documents produced by the authority, including the Local Transport Plan and the Local Development Framework. There are a variety of schemes proposed and completed, most notably this includes traffic management improvements and specific road/junction improvements to lower NO_2 emissions derived from congestion and traffic.

Each year the Council sends an Annual Status Report (ASR) to Government about air quality. The 2019 ASR from SoTCC acknowledges the work being undertaken to comply with the Ministerial Direction, the NSLAQP is an integral part of the ASR. The actions to improve air quality across the city will be documented in a Third Wave Local Plan and sit alongside the Council's existing AQAP.

1.6.3 Air quality in Newcastle-under-Lyme

Newcastle-under-Lyme does not have a standalone Air Quality Strategy, however, in 2018 the Council published an AQAP identifying air quality related policy, including: the Joint Newcastle-under-Lyme and Stoke-on-Trent Core Spatial Strategy, Newcastle-under-Lyme Local Plan saved policies, Staffordshire LTP3, the Newcastle-under-Lyme Borough Integrated Transport Strategy and Staffordshire Freight Strategy. The AQAP details how the Council is going to be improving air quality in the four Air Quality Action Areas and across the borough as a whole.

Newcastle-under-Lyme has dual transport pressures due to its location as a link to the M6 motorway, and close links to Stoke-on-Trent, thus local transport issues are addressed alongside regional and shared issues with neighbouring Stoke-on-Trent.

Each year the Council sends an ASR to Government about air quality. The 2019 ASR from NuLBC acknowledges the work being undertaken to comply with the Ministerial Direction, the NSLAQP is an integral part of the ASR. The Report identifies a range of priorities centred on:

- The amount of traffic on the road can be reduced
- Assessing and improving the vehicles using the roads within the Borough
- Road traffic can be better managed to reduced stop-start, idling and congestion.
- Traffic light signalling systems can be improved to enable a more fluid movement of traffic, particularly around the Town Centre ring road.
- Residents can be encouraged to take up other forms of transport, including public transport, cycling and walking

1.6.4 Current and future schemes to improve air quality

SCC and SoTCC, as the two highway authorities, recognise the importance of improving the highway network and encouraging sustainable travel. Transport policies are supported by the planning authorities in the adopted and emerging Joint Local Plan. The overarching goals of these transport policies, such as the Core Spatial Strategy and Stoke-on-Trent Local Transport Plan (LTP3), are to reduce the need to travel and improve accessibility across the region.

SCC sets out its transport objectives and strategy in the Newcastle-under-Lyme Borough Integrated Transport Strategy[4] which was published in May 2015. A key objective within the Transport Strategy is delivering transport improvements that help to improve air quality. The strategy is being delivered through a number of funding sources including developer contributions, DfT bidding opportunities and the County Council's Integrated Transport block. Some of the current schemes identified that will support the AQAP include:

- Newcastle-under-Lyme town centre road signing review to help ease delays on the ring road
- Newcastle-under-Lyme town centre Traffic Regulation Order (TRO) amendments and provision for cycle users to control traffic movements within the ring road and improve accessibility for cycle users
- HGV routing around Newcastle-under-Lyme to improve access to local industrial estates

Furthermore, SoTCC and SCC continue to invest in network improvements to keep traffic flowing, including ongoing maintenance and upgrades to signals and messaging. Furthermore, the EVLR Project, described earlier in section 1.5.10, will help to address problems associated with congestion on the A500 and the surrounding local highway network.

The authorities' 'Air Aware' strategy went live in 2019. Air Aware is a campaign currently funded by DEFRA until the end of March 2020 across Staffordshire and Stoke-on-Trent to raise awareness of the impact of poor air quality and inspire long-term behaviour change. It is centred around a 'monthly message' targeting schools, commuters and businesses. Travel to school surveys completed at six schools that have been targeted by the campaign indicate an average 12% reduction in car journeys to school over an 18-month period. The communications activities associated with the NSLAQP will seek to build on local awareness of air quality – already established through the Air Aware campaign.

In addition to these planned measures the Councils are also developing a funding submission to the Clean Air Fund (CAF) to support individuals and businesses impacted by the NSLAQP. The proposals will introduce measures that will make it easier, more attractive or more affordable for individuals and businesses to change to cleaner modes and will reduce transport costs for local people and businesses. The scope of the CAF submission is being developed alongside the completion of the business case process and submission of the FBC, but the proposed measures currently being explored include:

- A restriction on taxi use of the bus gates to those only licensed within Stoke-on-Trent or Newcastle-under-Lyme, to support policy objectives to maintain service quality for local business;
- A diesel vehicle scrappage scheme, to support the acceleration of fleet renewal and/or modal shift to sustainable modes, across the urban area; and
- Complementary 'nudge' measures targeted at promoting and encouraging a greater shift to public transport.

[4] https://www.staffordshire.gov.uk/Transport/transportplanning/District-integrated-transport-strategies/Documents/draftnewcastleboroughtransportstrategy.pdf

1.7 Future air quality problems

A critical early part of developing the NSLAQP involved establishing the extent of air quality problems, in terms of exceedances of the annual mean NO_2 limit values. This built on an initial picture from investigations that led to the issue of the Ministerial Direction, which was based on local automatic air quality monitoring data and on Defra national level PCM modelling.

The Councils progressed to review the work requirements, engaging with JAQU throughout that review, and developed their modelling and technical resources to complete the feasibility study and identify a Preferred Option, as presented in this OBC. Early stages of this review identified that further exceedances were likely to be identified, requiring much more robust and detailed transport and air quality modelling to be completed, in order to determine a robust appraisal and hence a Preferred Option.

The Strategic Outline Case (SOC) was submitted in line with the requirements of the Ministerial Direction, in January 2019. The SOC set out the existing problems and explained the start of the work to develop a robust initial evidence and the specific, measurable and achievable objectives and how these will be achieved. It also explained the options development process and set out the options that had been identified at that stage, together with options that may be taken forward. The options considered included:

- City centre/A53 chargeable access restriction
- City centre/A53 traffic management scheme, plus Council boundary scale Low Emission Strategy
- City centre/A53 Workplace Parking Levy, plus Council boundary scale Low Emission Strategy
- Council boundary scale Workplace Parking Levy, plus Council boundary scale Low Emissions Strategy
- Etruria Valley Road and A500 Improvements, plus Council boundary scale Low Emission Strategy

Following the SOC, work progressed to refine the baseline and reference case assessments and culminated in the completion of the Initial Evidence Submission (IES) in October 2019. The suite of reports that form the IES conclude that in 2022, the study area will contain three links on the local road network where NO_2 concentrations are predicted to exceed the legal limits. The locations of these exceedances are identified in Figure 1-5, shown in red.

The work undertaken has also highlighted that within the study area there are sections of the Strategic Road Network (SRN) where NO_2 concentrations are predicted to exceed the legal limits. The locations of these exceedances are identified in Figure 1-6. It is important to note that the SRN is outside the scope of this project and does not form part of the consideration of options in the NSLAQP. However, engagement with Highways England is ongoing to seek their support for the Preferred Option – the risk associated with this is captured within the risk register as described within the Management Case and attached in Appendix 18.

In identifying the Preferred Option for tackling the exceedances on the local road network, caution has been taken to ensure that NO_2 concentrations on links where NO_2 concentrations

are close to the EU limits (within 5µg/m^3), shown in orange, are not adversely affected to the point where they are predicted to exceed the limits.

The three predicted NO_2 exceedance locations on the local road network, based on the local modelling are:

- The A53 (Etruria Road) between Victoria Street and Basford Park Road. The maximum predicted annual mean NO_2 concentration in 2022 along these links is 43µg/m^3.
- The A5008 (Bucknall New Road) between Potteries Way and Lindop Street. The maximum predicted annual mean NO_2 concentrations in 2022 along this link is 42µg/m^3.
- The section of the A50 (Victoria Road) between Maud Street and Hitchman Street. The maximum predicted annual mean concentration in 2022 along this link is 46µg/m^3.

The background to the identification of these three locations is contained in the IES. The conclusion reached from the modelling of current and future air quality is that intervention is needed to bring about compliance with annual mean NO_2 limit values in the shortest time possible.

Options were developed and assessed to establish the best way of achieving compliance, and the Preferred Option which forms the NSLAQP has looked to help address NO_2 without having significant economic disbenefits for local residents and businesses.

Figure 1-5: NO_2 exceedance locations on local road network in 2022 from local modelling

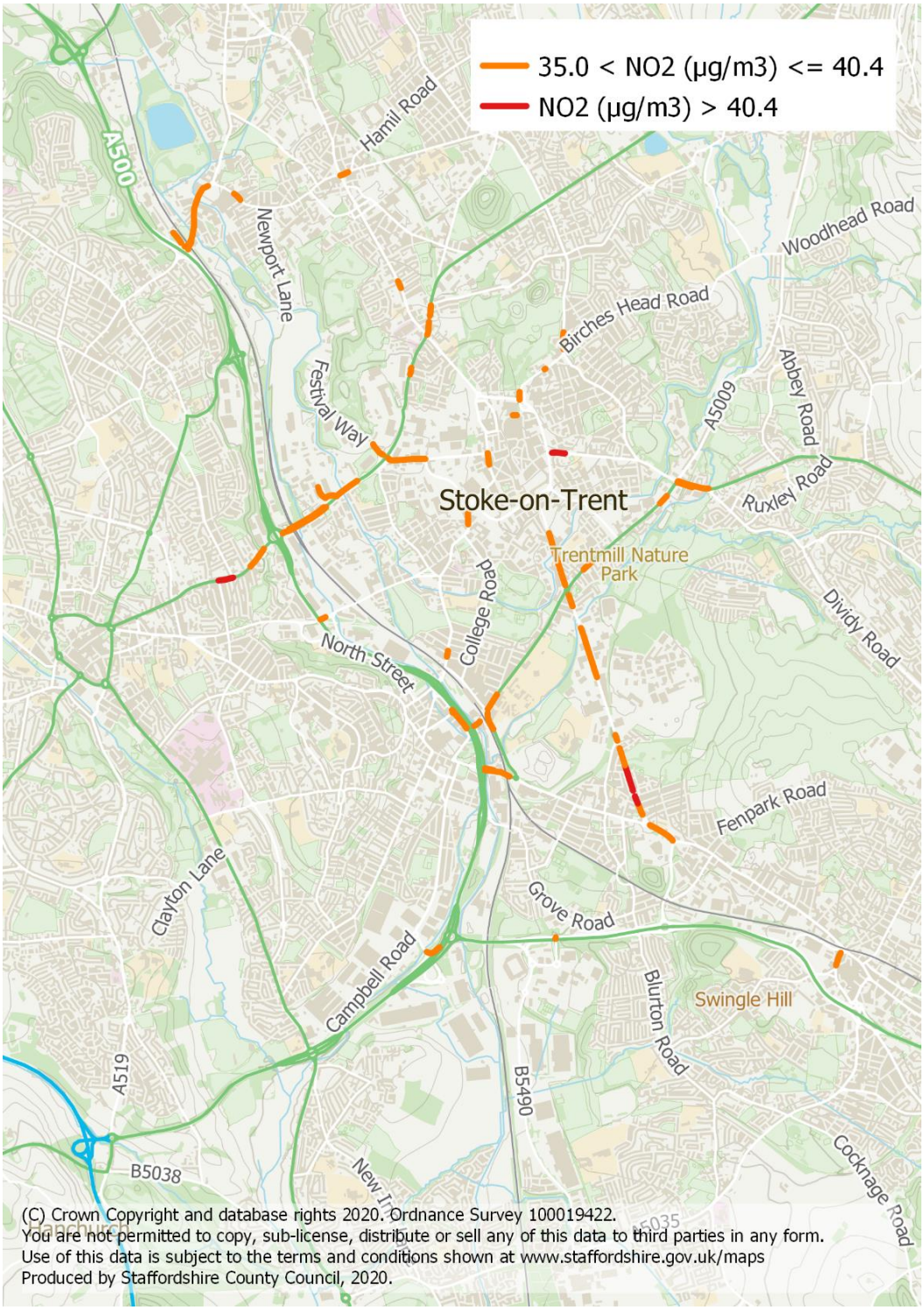
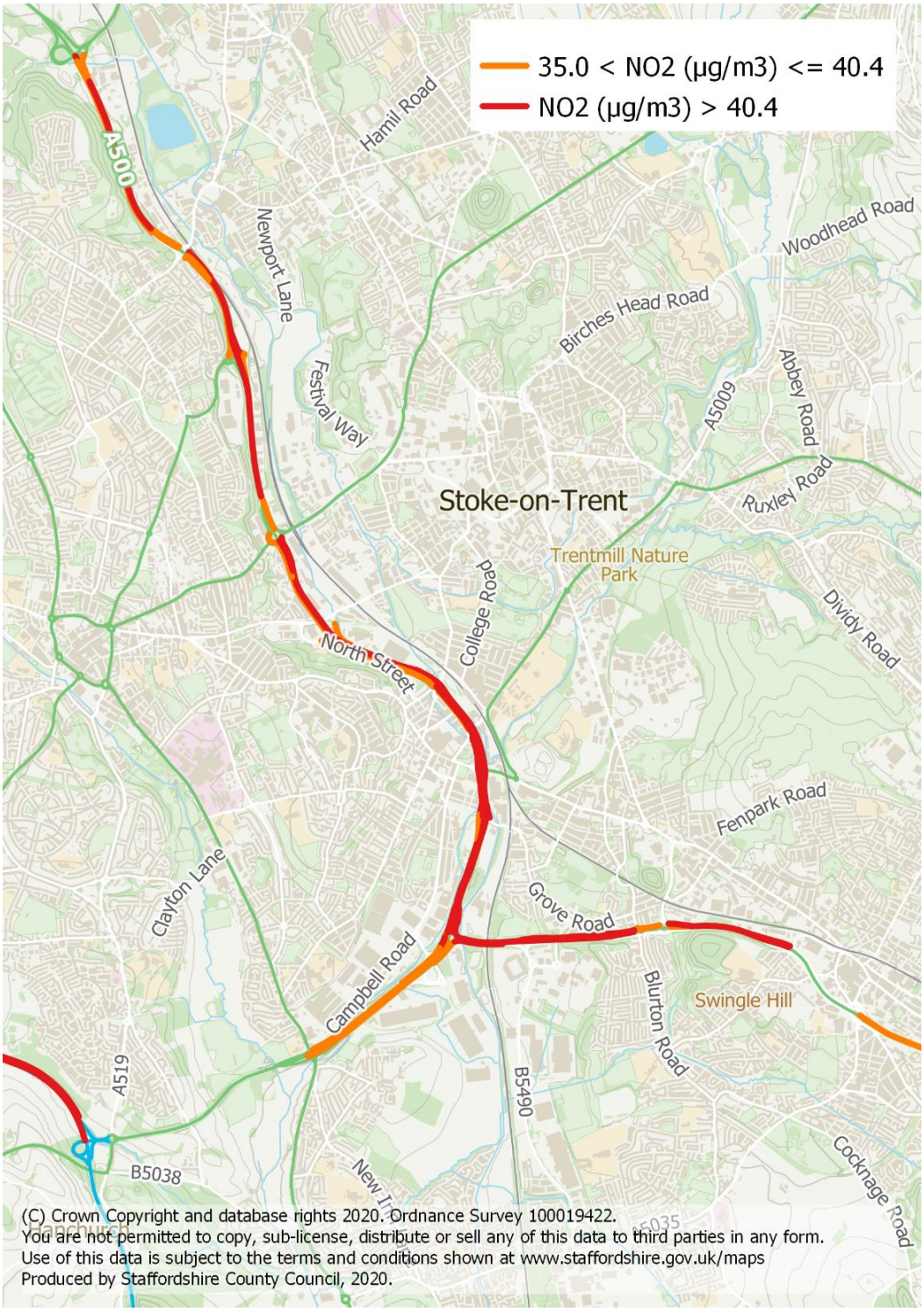


Figure 1-6: NO_2 exceedance locations on Strategic Road Network in 2022 from local modelling



1.8 Causes and problems

The predicted NO_2 concentration exceedance locations shown in Figure 1-5 above are on the key road corridors that connect key commercial and residential hubs together and provide connectivity to transport hubs and the SRN. As a result, these corridors are heavily trafficked and therefore suffer congestion, especially during peak periods. Targeted interventions have been identified and developed on a corridor-basis to address the problem and avoid displacement.

The tables below summarise NO_2 concentration data at locations on the local road network (Table 1-1) and on the SRN (Table 1-2) that are close to (above 39) or exceed the limit value in the 2022 reference case.

Table 1-1: NO_2 modelled concentration levels on local road network (2022 baseline)

Location (local road network)	NO_2 concentration ($\mu g/m^3$)	Exceeds limit value
Victoria Road at the south end near City Rd/King St junction	45.6	Y
A53 between Basford Park Rd and Victoria Street	42.7	Y
Bucknall New Road close to the junction with the A50	42.2	Y
Quadrant Road/Town Road	40.4	N
A5272 Chell Street between Eldon St and Acton St	40.0	N
A527 Porthill Road	39.8	N
Lichfield Street	39.5	N

Table 1-2: NO_2 modelled concentration levels on Strategic Road Network (2022 baseline)

Location (SRN)	NO_2 concentration ($\mu g/m^3$)	Exceeds limit value
A500	53.2	Y
M6 J16 to 15	47.6	Y
A50	47.3	Y

The three exceedance locations on the local authority highway network (as shown in Table 1-1) are discussed further below.

1.8.1 Exceedance along the A53

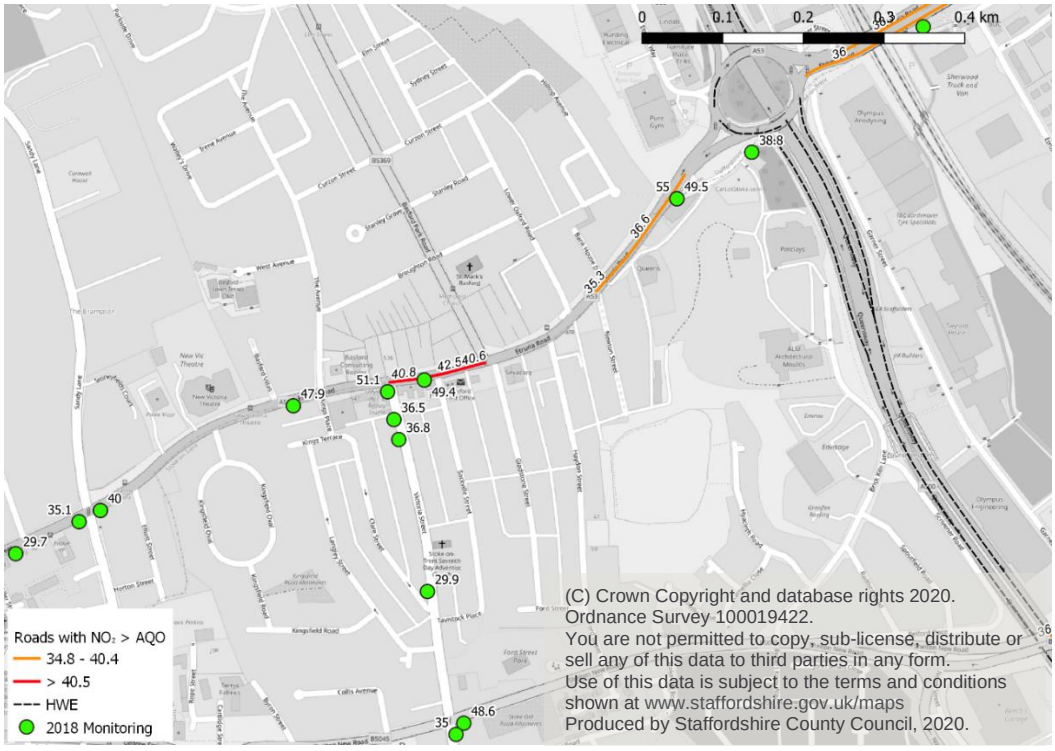
The first of the three exceedance locations can be found along the A53 corridor, as shown in Figure 1-7 below. This link sits on the boundary between Newcastle-under-Lyme and Stoke-on-Trent, therefore tackling the predicted exceedance requires the collaboration of three authorities: NuLBC, SoTCC and SCC. This section of road is heavily congested during peak

periods and also has a significant uphill gradient, exacerbating NO_2 emissions. The A53 joins the A500 which also suffers from heavy congestion.

Table 1-3: Traffic data on A53 (2022 baseline)

Description	Data/Description	
AADT flows	20,900	
HGV %	3%	
Daily average speed	26kph WB	7kph EB
Local v Non-Local trips	Select link analysis from the NSMM transport model has identified that the majority of trips are local. Of the trips passing through the exceedance location 81% had an origin and 91% had a destination within the NSMM internal zones.	

Figure 1-7: Annual mean NO_2 concentrations along the A53 west (2022 baseline)



1.8.2 Exceedance along Bucknall New Road

The second of the three exceedance locations can be found along Bucknall New Road close to the junction with Potteries Way, as shown in Figure 1-8 below. There are slow traffic speeds entering this junction that contribute to these pollution levels. Furthermore, approximately 14 bus routes operate along this road in both directions, with most of the buses used being older

and more polluting vehicles. Additionally, the dispersion of pollutants is likely to be inhibited by the proximity of nearby buildings to the roadside forming a street canyon.

Table 1-4: Traffic data on Bucknall New Road (2022 baseline)

Description	Data/Description	
AADT flows	15,200	
HGV %	3%	
Daily average speed	15kph WB	41kph EB
Local v Non-Local trips	Select link analysis from the NSMM transport model has identified that the majority of trips are local. Of the trips passing through the exceedance location 71% had an origin and 85% had a destination within the NSMM internal zones.	

Figure 1-8: Annual mean NO_2 concentrations in Hanley (2022 baseline)

1.8.3 Exceedance along Victoria Road

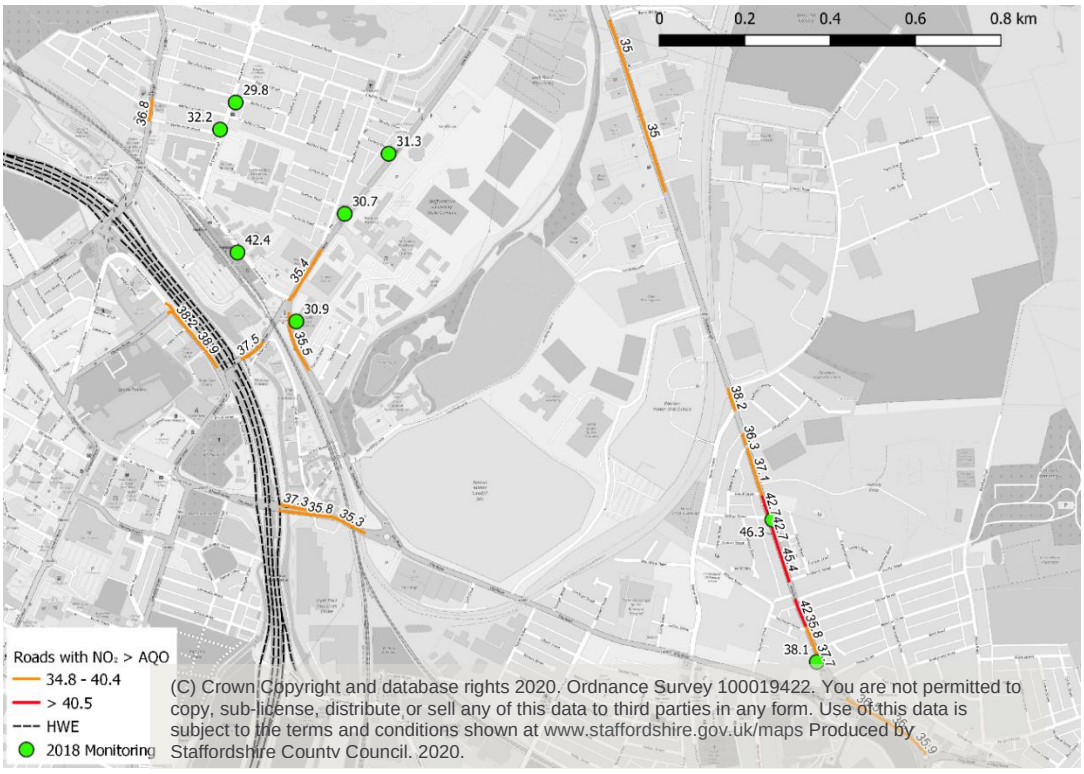
The highest annual mean roadside concentrations are found at the south end of Victoria Road, as shown in Figure 1-9 below. This road experiences high levels of congestion at all times of the day, with the contribution to NO_2 emissions being split across all types of vehicles. Fenton

Industrial Estate is accessed from Victoria Road only, meaning goods vehicles use this route frequently. The A52 intersects the north end of Victoria Road, with the A52 being a heavily congested route as well. The exceedances are exacerbated by the relatively low traffic speeds and narrow street canyons i.e. a narrow street with relatively tall buildings on both sides, along particular segments of this road.

Table 1-5: Traffic data on Victoria Road (2022 baseline)

Description	Data/Description	
AADT flows	23,800	
HGV %	5%	
Daily average speed	25kph WB	25kph EB
Local v non-local trips	Select link analysis from the NSMM transport model has identified that the majority of trips are local. Of the trips passing through the exceedance location 84% had an origin and 90% had a destination within the NSMM internal zones.	

Figure 1-9: Annual mean NO_2 concentrations along Victoria Road (2022 baseline)



1.8.4 Source apportionment

A source apportionment exercise of road emissions by vehicle type was calculated for an average of links, and for each link shown to be in exceedance of the annual mean limit levels

under the Do Minimum scenario. The pie charts shown in Figure 1-10 to Figure 1-12 show the results of the source apportionment of NO_X concentrations at the location of the maximum predicted annual mean NO_2 concentration along each of the three-exceedance links for the 2022 baseline.

While diesel cars, LGVs and HGVs are responsible for most of the emissions, there are notable contributions from buses particularly on the A5008 and to a lesser extent on the A50.

Figure 1-10: Source apportionment Victoria Road

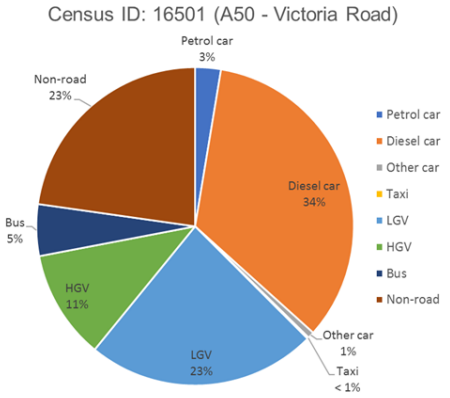


Figure 1-11: Source apportionment Bucknall New Road

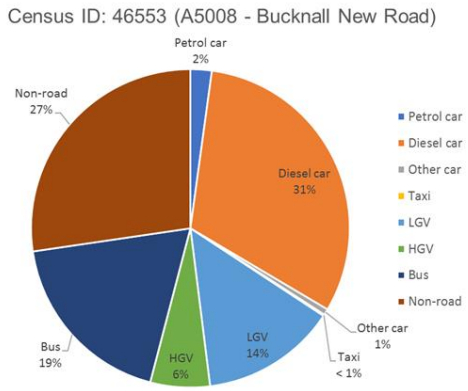
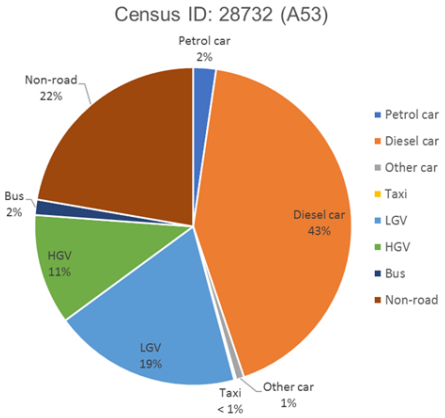


Figure 1-12: Source apportionment A 53 Etruria Road



1.9 Case for change

It is widely recognised that air pollution poses the largest environmental public health risk in the UK and it continues to threaten the lives of more vulnerable members of the population. In England, the annual number of deaths attributed to air pollution is roughly 25,000 and there is countless evidence that details the correlation between poor air quality and increased prevalence of respiratory and cardiovascular diseases. The impacts of pollution usually surface in the long-term and the problems caused by it are experienced disproportionately by the elderly, infants and those with existing chronic ailments. The impacts are greater on those who reside, work or are educated in more deprived areas. Stoke-on-Trent is one of England's most deprived local authorities[5] based on domains such as income, employment, education and health – this increases the need to address air pollution and health problems in this area.

The Department for Environment, Food & Rural Affairs (Defra) estimates that NO_2 contributes to curtailing life expectancy by an average of 5 months, which ranges from healthy individuals experiencing negligible effects to susceptible individuals whose poor health is seriously worsened by NO_2 pollution. The overall population burden is estimated to result in over 23,000 premature deaths in the UK per year[6].

Data from the Public Health Outcomes Framework[7] indicates that the 'under 75 mortality rates from respiratory disease', between 2015 and 2017, was 49.8 per 100,000 for Stoke-on-Trent and 34.3 per 100,000 for England. It can be deduced that the negative impacts of poor air quality in Stoke-on-Trent are likely to be a contributing factor to the higher than average mortality rates experienced in the city. Table 1-6 compares the number of hospital admissions for respiratory diseases in North Staffordshire, Stoke-on-Trent and England as a whole. It highlights that the number of admissions in both North Staffordshire and Stoke-on-Trent

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[5] Ministry of Housing, Communities & Local Government – The English Indices of Deprivation 2019

[6] Air Quality, A Briefing for Directors of Public Health, March 2017, Defra and Public Health England

[7] Public Health Outcomes Framework, Healthcare and premature mortality, https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000044/pat/6/par/E12000005/ati/102/are/E06000021/iid/40701/age/163/sex/4 [accessed 02/05/19]

frequently exceeds the national average for these types of diseases, which could directly be linked to poor air quality in the local areas.

Table 1-6: Hospital admissions for respiratory diseases (per 100,000 people) [8]

Indicator Name	England	NHS North Staffordshire CCG	NHS Stoke-on-Trent CCG
Emergency hospital admissions for COPD, all ages	248	261	463
Emergency hospital admissions for asthma in adults aged 19 years and over	90	87	128
Hospital admissions for asthma (under 19 years)	185	254	260
Emergency hospital admissions for pneumonia	463	598	794
Emergency hospital admissions for respiratory disease	1523	1983	2566

For the county of Staffordshire approximately 5% of deaths in adults over 30 can be attributed to fine particulate matter ($PM_{2.5}$) air pollution[9]. In Newcastle-under-Lyme this figure is estimated at 4.7% and for Stoke-on-Trent is estimated at 4.9%. The financial burden associated with the health impacts of air pollution is estimated to cost approximately £16 billion[10]. It is widely acknowledged that measures to tackle NO_2 concentrations can have beneficial effects on concentrations of particulate matter, thereby widening the health benefits.

Additionally, air pollution problems can be multi-faceted as they not only impact public health, but also incur social costs and contribute to damaging the natural environment. Economically, sickness and ill health caused by air pollution can accumulate and severely impact on economic productivity due to absenteeism. From an environmental perspective, excessively high NO_2 concentrations can have detrimental impacts on animals, plants and biodiversity by accelerating harmful processes such as acidification and eutrophication.

The case for change was evidenced in the feasibility study and strengthened through further air quality modelling, where local modelling highlighted three areas of exceedance within Stoke-on-Trent and Newcastle-under-Lyme, with other PCM links experiencing near exceedance levels, as outlined above. These NO_2 exceedances do not comply with EU regulations and thus the Ministerial Direction presented to Stoke-on-Trent and Newcastle-under-Lyme focuses on addressing non-compliance with the statutory limit for roadside NO_2 concentrations.

The NSLAQP has been developed to bring NO_2 concentrations in line with the Ministerial Direction whilst maintaining all three Councils' aims and objectives for the local area. Intervention will target traffic patterns and behaviours in Stoke-on-Trent and Newcastle-under-Lyme as a result of road transport being recognised as one of the primary contributors to air

[8] Public Health England – INteractive Health Atlas of Lung conditions in England

[9] 2018 Air Quality Annual Status Report In fulfilment of Part IV of the Environment Act 1995 Stoke-on-Trent City Council June 2018

[10] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

pollution. The wider impacts resulting from this scheme have also been carefully considered to avoid any unintended consequences.

1.10 Spending objectives

Underpinned by the rationale for intervention and the case for change, the three Councils – SoTCC, NuLBC and SCC have defined spending objectives to shape a clear way forward.

The primary spending objective for the NSLAQP is:

- **Compliance** – to achieve the statutory limit values for roadside NO_2 concentration limits in the shortest possible time

The associated secondary objectives for the NSLAQP include:

- **Value for money** – demonstrating that for Central Government and the Councils the scheme delivers value for money
- **Fair and proportionate** – minimising the impacts on local residents and businesses, including disadvantaged groups
- **Support local objectives** – enabling and aligning with local objectives including improving health and encouraging a shift to sustainable transport
- **Enabling transition to lower emission economy** – minimising the impacts on economic growth and development across North Staffordshire

To support the realisation of these spending objectives, a number of Critical Success Factors were identified to appraise and refine the options to ensure the NSLAQP delivers the outcomes sought by the national Air Quality Plan and supports local policies.

1.11 Critical success of the NSLAQP

The UK Government is focussed on tackling air quality issues and aims to address the exceedingly high levels of NO_2 concentrations found at a national level. The breach of EU air quality limits is attributable to traffic problems and, as such, the UK Government is determined to enhance vehicle innovation and promote safer, cleaner travel. This is typified by the publishing of strategies such as the Clean Air Strategy which outlines the need to shift to greener infrastructure by encouraging the public to use cleaner transport modes and encourage the use and uptake of zero emission vehicles and focus on controlling major sources of air pollution.

The primary critical success factor in this study is that the package of measures that form the NSLAQP must 'bring about compliance with NO_2 limit values in the shortest possible time'.

Additionally, in developing the NSLAQP, the assessment has taken account of the need to:

- Deliver a high level of confidence that compliance with the EU Limit Value will be achieved
- Minimise the social and economic impacts on local communities and residents

Secondary success factors, as per JAQU guidance, have also been considered – these include:

- Likely value for money

- Affordability
- Distributional impacts
- Strategic and wider air quality
- Supply side capacity and capability
- Achievability

This OBC demonstrates how the NSLAQP aligns with each of these factors.

Ultimately, by working together SoTCC, NuLBC and SCC have sought to develop a package of measures that will reduce NO_2 concentrations at exceedance locations to below the EU Limit in the shortest time possible. In addition to achieving this, the Councils have sought to ensure the NSLAQP supports the wider strategic goals of the region to minimise any risk of unintended negative economic, social or environmental consequences.

1.12 Scope of the NSLAQP

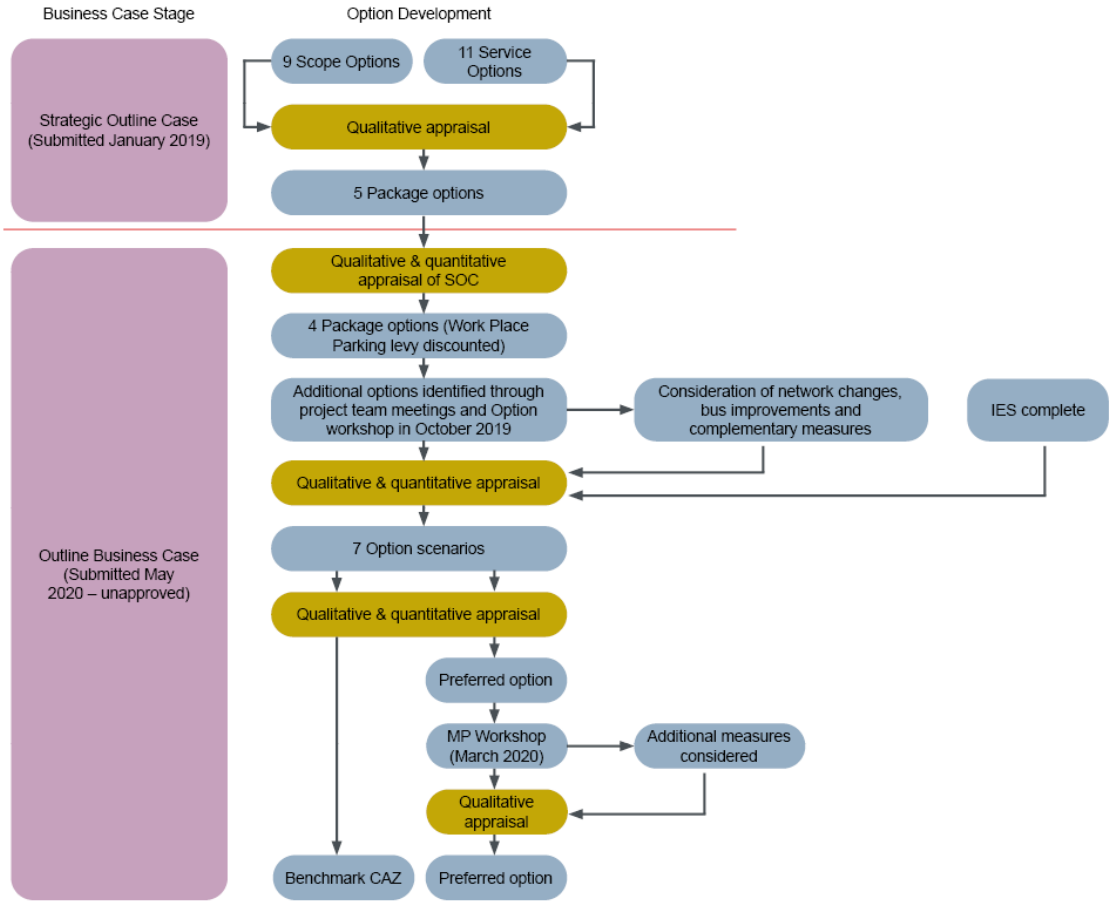
The NSLAQP has been developed to respond to the problems, issues and objectives identified in previous sections to achieve compliance in the shortest possible timeframe whilst minimising the impact on local people and supporting wider policy aims. The geographic extent of the NSLAQP represents the most feasible, practical and deliverable solution to bring forward compliance in SoTCC and NuLBC. Consideration has been given to the potential for vehicle displacement as a result of the introduction of measures and to the fact that it may be unavoidable for high emitting vehicles to be driven into an area (i.e. the delivery of goods or services).

When considering the options, the geographical extent of the NSLAQP has taken in to account that certain roads in the study area are not under the control of SoTCC or SCC as the Highways Authorities. The SRN is the responsibility of Highways England and is outside the scope of this work.

1.13 Identification of the Preferred Option

The identification of the Preferred Option has built on the work undertaken in the preparation of the SOC and has been supplemented by further option development and appraisal as summarised in Figure 1-13. This approach has involved additional option identification workshops and the qualitative and quantitative testing of options to ensure the best package has been selected to address the exceedance locations and promote ongoing improvements in air quality.

Figure 1-13: Summary of option appraisal



1.13.1 Options development

A thorough option development and appraisal process has been undertaken to identify and evaluate the impact of different scenarios against the objectives. This process is described below with further detail provided within the Economic Case.

The SOC, as submitted in January 2019, included a longlist and shortlist of measures. A qualitative assessment of the longlist of measures was undertaken to identify a shortlist of Preferred Option packages to take forward to the next stages of the business case process. The shortlist was developed by assessing each option against a list of critical success factors as defined in JAQU guidance and included both charging and non-charging measures

A summary of the shortlist of options and how they have been taken forward into this OBC is given in Table 1-7 below.

Table 1-7: Progress of SOC shortlist options to OBC stage

Shortlisted options in SOC	Development as part of the OBC
City centre/A53 chargeable access restriction	Various options for a chargeable CAZ were developed including analysis of different classifications (C and D) and different boundaries. This analysis has informed the Preferred Option and Benchmark Option.
City centre/A53 traffic management scheme, plus Council boundary scale Low Emission Strategy	Various traffic management measures were developed and appraised and a range of complementary measures were identified as part of a Low Emissions Strategy. This has informed the final Preferred Option.
City centre/A53 Workplace Parking Levy, plus Council boundary scale Low Emission Strategy	Initial analysis was conducted on the possible impacts of a Workplace Parking Levy and it was found that the reduction in traffic flows in the conurbation would be minimal. A summary of this work is included as Appendix 2. The WPL measure was not considered further.
Council boundary scale Workplace Parking Levy, plus Council boundary scale Low Emissions Strategy	
Etruria Valley Road and A500 Improvements, plus Council boundary scale Low Emission Strategy	The EVLR Project including the widening of the A500 are committed schemes and were therefore included as part of the baseline/Do Minimum scenario.

The project team, comprising the three Councils and their consultants, undertook further option development work. This included internal officer meetings and workshops to identify and review potential options including early engagement with local councilors and key stakeholders. The options developed can be broadly categorised under six headings:

- Clean Air Zone
- Traffic Management including changes to network operation, for example, banning turns, restricting traffic during peak periods, improving existing links, creating one-way systems, and implementing speed restrictions
- Junction improvement and traffic signal optimisation
- Retrofitting the bus fleet
- Bus network enhancement including improved bus stops and shelters, real-time information and promotion of low emissions buses

- Complementary measures including a wide range of options such as Electric Vehicle infrastructure, park and ride, marketing and behaviour change programmes, car sharing, parking strategies and eco-driving campaigns.

To support the development of options for testing an options development workshop was held in October 2019 involving: Council officers, specialist consultants, Cabinet members from all three local authorities, Highways England, Royal Stoke University Hospital, NuLBC town centre manager, NuLBC and SoTCC planning officers and JAQU.

The main purpose of this event was to work collaboratively to identify potential options to tackle the predicted exceedances, including traffic management and highway interventions, as well as potential charging CAZ options to tackle all or some of the exceedances. The workshop highlighted possible measures at each exceedance location and it was agreed that a minimum of five tests would need to be undertaken by the authorities and their specialist consultants, to determine whether localised traffic management and associated measures could deliver the compliance outcome for each location, or whether a wider Benchmark CAZ D would ultimately form the Preferred Option to deliver the compliance required.

The outcomes of the workshop and further review work informed the development of seven scenarios to be tested in the transport model and where appropriate in the air quality models. The measures were packaged together to create the most effective solution to deliver compliance in the shortest timeframe possible and consideration was also given to produce packages that were both time and cost effective.

The seven option scenarios are summarised in Table 1-8.

Table 1-8: Option summary

Options	CAZ	Traffic Management	Junction improvements	Bus retrofit	Bus network enhancement	Complementary measures
Option 1: Benchmark	CAZ D Full boundary Charge: • Cars/Taxis - £5 • LGVs - £9 • HGVs - £35 • Buses - £5	n/a	n/a		n/a	n/a
Option 2:	n/a	Basford Park right turn ban Victoria Rd northbound peak restrictions (except buses) on the southern end of Victoria Road	Junction improvements at both ends of Academy Road	50% retrofit on Bucknall New Road 100% retrofit on Victoria Road	n/a	n/a
Option 3:	CAZ D Local boundary on Victoria Road Charge: • Cars/Taxis - £5 • LGVs - £9 • HGVs - £35 • Buses - £0	A53 westbound peak restrictions except buses, cycle users and taxis	n/a	100% retrofit on Bucknall New Road 100% retrofit on Victoria Road	n/a	n/a
Option 4:	n/a	A53 westbound peak restriction except buses, cycle users and taxis Victoria Rd northbound peak restrictions on southern end of Victoria Rd except buses, cycle users and taxis	Signal improvements at Albert St and Basford Park	75% retrofit on Bucknall New Road 100% retrofit on Victoria Road	n/a	n/a
Option 5:	CAZ C Full boundary Charge: • LGVs - £9 • HGVs - £35 • Buses - £5	n/a	n/a		n/a	n/a

Option 6:	n/a	A53 westbound peak restriction except buses, cycle users and taxis Victoria Rd northbound peak restrictions on southern end of Victoria Rd except buses, cycle users and taxis	Signal improvements at Albert St and Basford Park	75% retrofit on Bucknall New Road 100% retrofit on Victoria Road	Improved bus stops and shelters Bus wrap advertising Real-time information	Travel planning Vegetation planting/removal Cycling/walking infrastructure EV infrastructure
Option 7: Preferred Option	n/a	A53 westbound peak restriction except buses, cycle users and taxis Victoria Rd northbound peak restrictions on southern end of Victoria Rd except buses, cycle users and taxis	Signal improvements at Albert St and Basford Park	75% retrofit on Bucknall New Road 100% retrofit on Victoria Road	Improved bus stops and shelters Bus wrap advertising and RTPI	n/a

The analysis of NO_2 concentration for the seven option scenarios is shown in Table 1-9.

Table 1-9: Option scenarios and NO_2 concentrations

Option	Description	NO_2 concentration in 2022					
		A53		Bucknall New Road		Victoria Road	
		Baseline	With measures	Baseline	With measures	Baseline	With measures
1	CAZ D – Full boundary Benchmark	42.7	33.4	42.2	30.9	45.6	36.1
2	Traffic Management (1)		41.7		40.8		40.1
3	CAZ D – Local boundary + Traffic management		39.9		37.0		34.8
4	Traffic Management (2)		38.9		39.4		39.3
5	CAZ C		39.7		35.4		41.4
6	Traffic Management (3)		38.6		39.3		39.2
7	Traffic Management (4) Preferred Option		38.9		39.4		39.3

This work has demonstrated that a non-CAZ option can achieve compliance and will support wider objectives – therefore, the Preferred Option for the NSLAQP is a range of traffic management measures, junction improvements, bus retrofitting and bus network enhancements as outlined in section 1.15. This option achieves compliance in the shortest possible time and helps to deliver objectives associated with traffic reduction at the three exceedance locations. Further details on the Air Quality and Transport modelling can be found within the accompanying AQ1-3, T1-4 and Analytical Assurance Statement.

As per JAQU guidance, a Benchmark CAZ D option has also been identified.

It is important to note that the Preferred Option can be full constructed and operational in 2022 and will therefore bring NO_2 compliance in 2022. By comparison, the design and delivery of the

Benchmark CAZ D is a considerably lengthier process would not be operational or achieve compliance until 2023. As discussed within the Management Case the Benchmark CAZ D would not adhere to the primary Critical Success Factor of deliverance in the shortest timeframe possible.

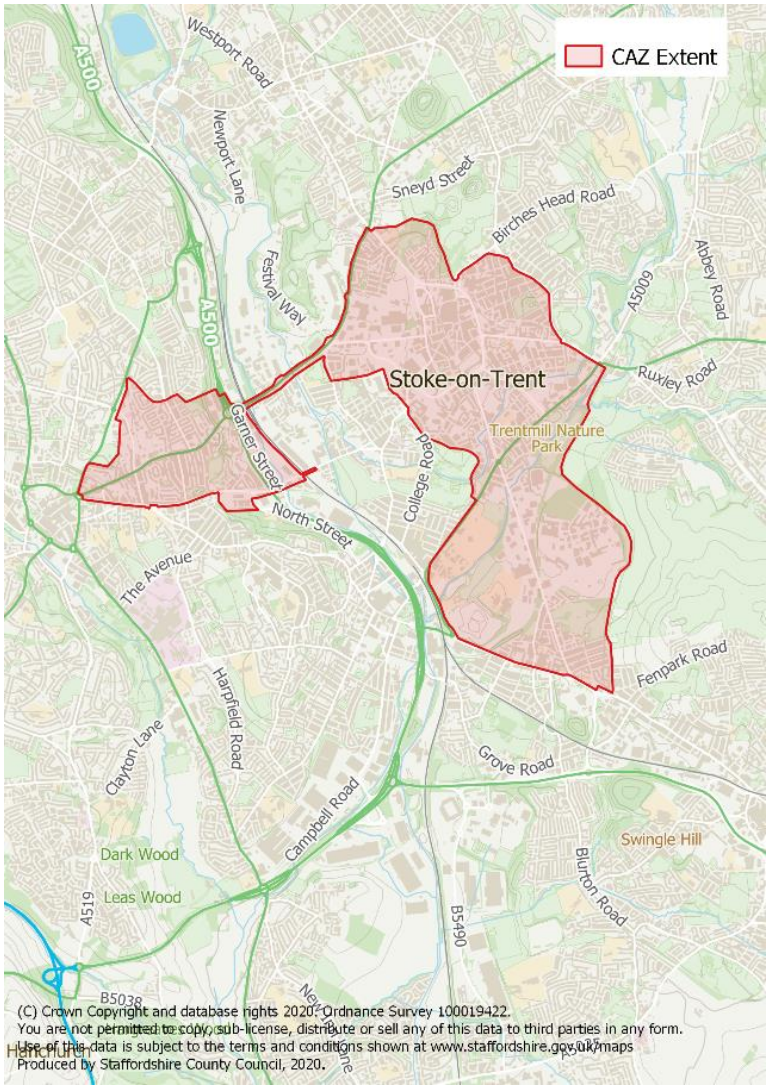
The following sections describe the Benchmark CAZ D and the Preferred Option in further detail. Technical details on the full options appraisal and analysis can be provided upon request.

1.14 The Benchmark CAZ D

Based on the work undertaken during the options appraisal stage, the Benchmark CAZ was defined as a class D. The boundary is shown in Figure 1-14 below and covers the main areas affected by NO_2 in Newcastle-under-Lyme and Stoke-on-Trent including: Hanley, Victoria Road and east Newcastle-under-Lyme, as well as the A53 Etruria Road between Newcastle-under-Lyme and Hanley. The proposed charge rates for non-compliant vehicles would be:

- Cars/Taxis - £5
- LGVs - £9
- HGVs - £35
- Buses - £5

Figure 1-14: Boundary for CAZ D Benchmark option



1.15 The Preferred Option

Through the option appraisal the Preferred Option has been developed to include a range of measures targeting the specific areas of NO_2 exceedances, as described below and summarised in Figure 1-15:

1.15.1 A50 Victoria Road bus gate

A bus gate will be installed on the A50 Victoria Road exit of the King Street/City Road/Victoria Road junction. Traffic will be restricted to buses, cycle users and taxis between Monday and Friday from 7am to 10am and 4pm to 7pm. A ULEV exemption, allowing ultra-low emission vehicles to drive through the bus gate will be assessed and if considered deliverable will be added to the scheme in the FBC.

The splitter island will be widened and the kerbs re-aligned to provide a single lane bus gate on the exit to A50 Victoria Road. An ANPR camera will be located at the bus gate to monitor compliance and two rotating prism signs will be installed at the entrance to the bus gate. The prism signs will enable the display of multiple messages and will be blank when the bus gate is not in use. Bus gate advanced direction signing will be provided on the local highway network on all approaches to the Victoria Road/City Road and A50/King Street junctions, including Prism and Variable Message Signs

An indicative design drawing is attached in Appendix 3.

1.15.2 A53 Etruria Road bus gate

A two-lane bus gate will be installed on the A53 Etruria Road westbound exit of the A53/A500 roundabout, with appropriate amendments to the existing road markings at the bus gate and on the circulatory carriageway. Traffic will be restricted to buses, cycle users and taxis between Monday and Friday from 7am to 10am and 4pm to 7pm. A ULEV exemption, allowing ultra-low emission vehicles to drive through the bus gate will be assessed and if considered deliverable will be added to the scheme in the FBC.

Two rotating prism signs will be installed at the entrance to the bus gate to enable the display of multiple messages and will be blank when the bus gate is not in use. Two ANPR cameras will be installed to manage compliance. Advanced direction signing will include prism signs on all approaches to the A500/A53 Etruria Road roundabout. Changes to destination signs on the A500 mainline carriageway in both directions are also proposed. This will include appropriate re-routing to the hospital and will also include variable message signs.

An indicative design drawing is attached in Appendix 3.

1.15.3 Traffic management east and west of Victoria Road

Traffic management measures will be required on roads to the east and west of Victoria Road in order to ensure that the adjacent local communities are not adversely impacted by traffic re-routing through these areas when the bus gates are in operation.

The following measures will be required to the East of Victoria Road:

- Replace existing worn and ineffective road humps in Beville Street, Stanier Street, Wileman Street, Philip Street, Elliot Road, Wedgwood Road, Warrington Street and Vivian Road and enhance the impact of the scheme by providing additional humps and carriageway re-surfacing.
- Provide new road humps and carriageway re-surfacing along Park Street, Minerva Road, Frederick Street, Cumberland Street and Clarence Street.
- Introduce one-way operation (direction of travel west to east) in Wileman Street (part) and Stanier Street (part).
- Provide an environmental weight restriction on the traffic calmed routes to prevent inappropriate large vehicles travelling through the area.
- Extend the existing 20mph zone to cover the whole traffic calmed area.

The following measures will be required to the West of Victoria Road:

- Replace existing worn and ineffective road humps in Manor Street, George Street, Edward Street and Hitchman Street and enhance the impact of the scheme by providing additional humps and carriageway re-surfacing.
- Provide new road humps and carriageway re-surfacing in Maud Street, Fountain Street and William Street. This includes two raised tables to improve safety at Christ Church C of E Primary School.
- Enhance signage to improve the enforcement of the existing environmental weight restriction in Manor Street.
- Closure of Hitchman Street at its junction with Victoria Road, maintaining access for pedestrians and cycle users.
- The existing western footway along Victoria Road at Hitchman Street will be extended to enhance the pedestrian environment.
- Introduction of a 20mph zone to include the whole traffic calmed area.

An indicative design drawing is attached in Appendix 3.

1.15.4 Transport improvements along A53 Etruria Road

The bus gate on A53 Etruria Road will significantly reduce traffic flows in the peak periods along this corridor and improve bus reliability. This will necessitate the review of signal timings at junctions along the corridor in order to maximise air quality benefits.

The increase in spare capacity along the corridor will create the opportunity for the provision of signal controlled pedestrian crossing facilities on all arms of the A53/Gladstone Street/Basford Park Road junction and the A53/Albert Street/Sandy Lane junction.

An existing bus stop on the A53 Etruria Road is located on the hill where it is observed that traffic can queue behind buses serving the stop. It is recommended that the bus stop is relocated to the east of Kingsfield Oval, opposite the New Vic Theatre where it is likely to have a reduced impact on air quality. Accessibility will be enhanced through the provision of bus access kerbs and levelled footways. Real Time Bus Passenger Information will also be provided along the A53 corridor.

An indicative design drawing is attached in Appendix 3.

1.15.5 Bus retrofit programme

To deliver compliance on Bucknall New Road and Victoria Road the buses that use these routes will be retrofitted to achieve Euro VI emission standards. This involves the installation of appropriate exhaust modification depending on vehicle type and age and associated e-cooling fan to minimise ongoing maintenance. This will be an expansion of the existing bus retrofit programme being delivered on the A53 as part of the separate NuLBC Ministerial Direction.

A total of 75% of buses that travel along the Bucknall New Road corridor and all buses travelling along Victoria Road require this improvement to ensure that compliance is achieved. Funding will be required for the retrofitting of 50 buses to ensure that the appropriate number of scheduled services can continue to operate on Bucknall New Road and Victoria Road. The two main operators are First Bus and D&G and the smaller operators include Scraggs and Stantons of Stoke.

To market the cleaner bus fleet, enhance their visibility and encourage greater bus use, it is recommended that all buses that have been retrofitted are provided with a new branding in the form of a partial bus wrap. To monitor bus operator use of retrofit vehicles, ANPR cameras will be installed on Victoria Road, Bucknall New Road, at the junction with St Ann Street, and on the A53 to the east of the junction with Albert Street/Sandy Lane.

1.15.6 Bus infrastructure improvements

Enhanced bus infrastructure will be installed on routes that pass through or are parallel to the exceedance locations. This includes bus routes:

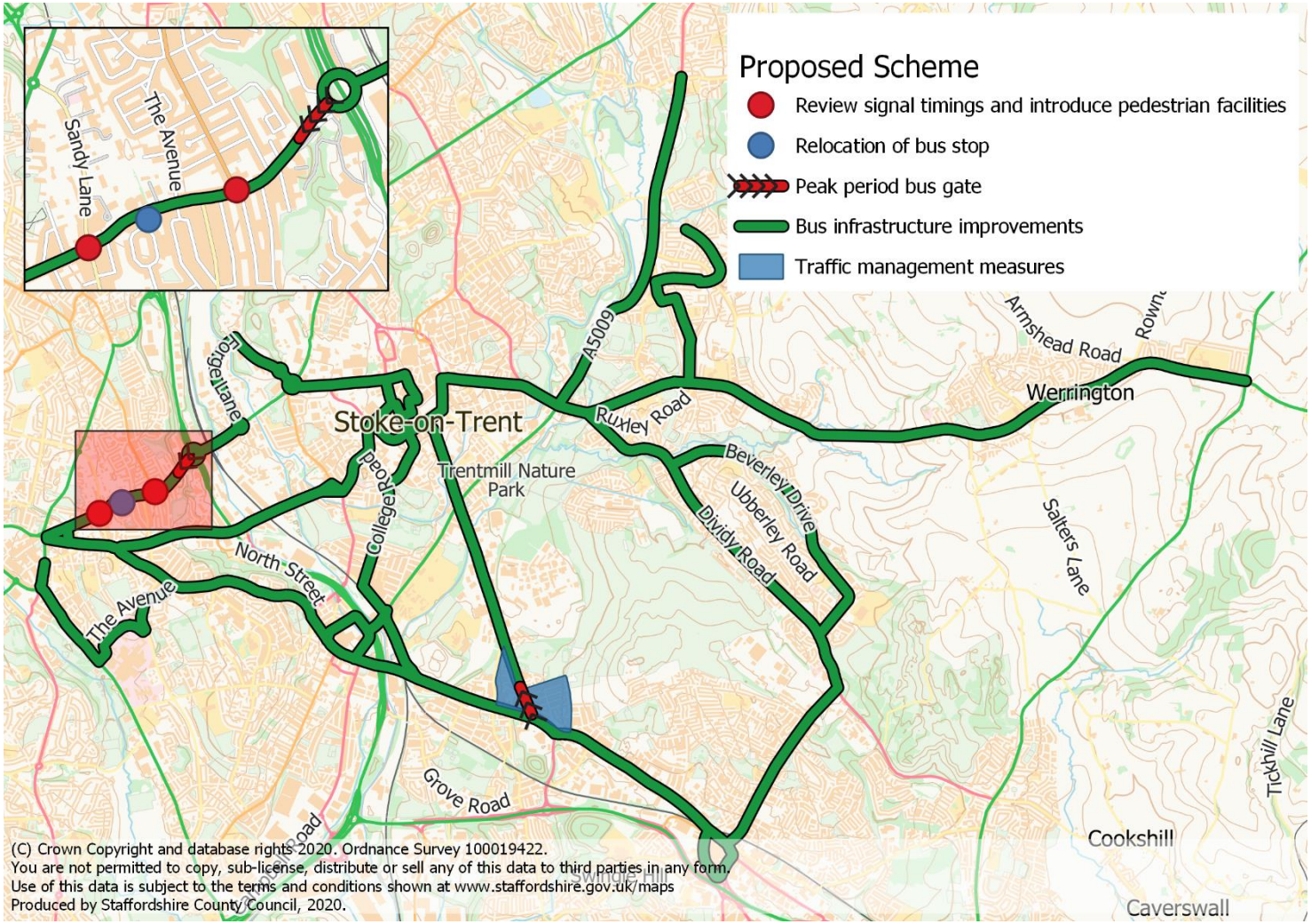
- To Abbey Hulton, Milton, Bentilee and Longton that use Bucknall New Road
- Along Victoria Road and parallel routes along the College Road and A5007 City Road
- Along A53 between Newcastle town centre and Hanley City centre, and parallel routes along the A52 and Shelton New Road

The improvements are required to ensure that bus patronage is maximised along corridors that are at risk of air quality exceedances and where traffic modelling suggests that traffic flows and journey times may increase as traffic re-routes to avoid the bus gates. The package includes:

- 89 real time bus passenger information (RTPI) screens
- 17 new bus shelters of which 8 are replacement and 9 are new facilities
- 27 accessible kerbs at bus stops
- Installation of CCTV at 71 bus stops

An indicative design drawing is attached in Appendix 3.

Figure 1-15: Summary of the proposed NSLAQP



1.15.7 Impact of the Preferred Option

It is acknowledged that the two bus gates predominantly redistribute existing traffic. Flow difference plots with and without the Preferred Option are included in Appendix 4 and illustrate this redistribution of traffic on the network. Table 1-10 below summarises the traffic flows and speeds with the NSLAQP in place.

Table 1-10: Traffic data (2022)

Description	A53		Bucknall New Road		Victoria Road	
	Baseline	With Preferred Option	Baseline	With Preferred Option	Baseline	With Preferred Option
AADT flows	20,900	18,000	15,200	15,400	23,800	19,700
HGV %	3%	3%	3%	3%	5%	5%
Daily average speed	26kph WB 7kph EB	27kph WB 6kph EB	15kph WB 41kph EB	15kph WB 41kph EB	25kph WB 25kph EB	25kph WB 25kph EB

The targeted bus network enhancements have been developed to support the bus gate and bus retrofit solution and align with wider aspirations of the TCF to encourage a shift from private vehicles to public transport. The bus network enhancements are based on UK good practice coupled with local experience of what worked in previous Local Sustainable Transport Funds packages. The measures include improvements to bus stops and shelters, and real time bus passenger information and will be targeted on corridors where there are areas of exceedance/or areas approaching exceedance.

Table 1-11 and Figure 1-16 below illustrate the results of the NO_2 concentration modelling in 2022 on the local road network with the Preferred Option in place. Table 1-12 and Figure 1-17 illustrate the results of the NO_2 concentration modelling in 2022 on the SRN with the NSLAQP in place.

Table 1-11: NO_2 concentrations on local road network (2022)

Location (local road network)	NO_2 concentration baseline ($\mu g/m^3$)	NO_2 concentration with Preferred Option ($\mu g/m^3$)
Victoria Road	45.6	39.3
A53	42.7	38.9
Bucknall New Road	42.2	39.4
Quadrant Road/Town Road	40.4	39.7

A5272 Chell Street	40.0	38.8
A527 Porthill Road	39.8	39.8
Lichfield St	39.5	38.3

Table 1-12: NO_2 concentrations on SRN (2022)

Location (SRN)	NO_2 concentration baseline ($\mu g/m^3$)	NO_2 concentration with Preferred Option ($\mu g/m^3$)
A500	53.2	53.5
M6 J16 to 15	47.6	47.6
A50	47.3	48.0

This data illustrates that the Preferred Option will reduce NO_2 concentrations across the local road network to achieve compliance.

Figure 1-16: NO_2 concentration modelling on local road network in 2022 with Preferred Option

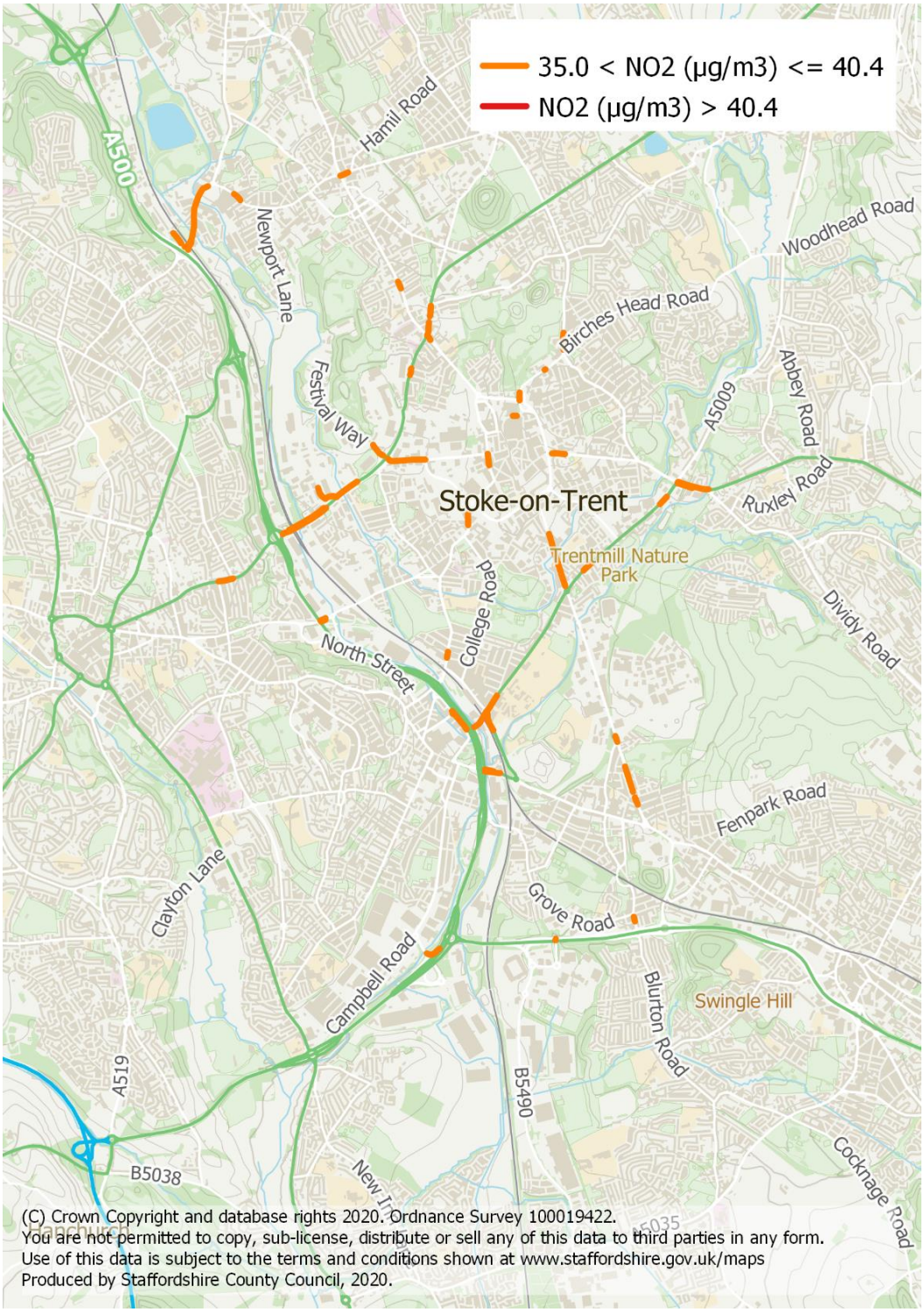
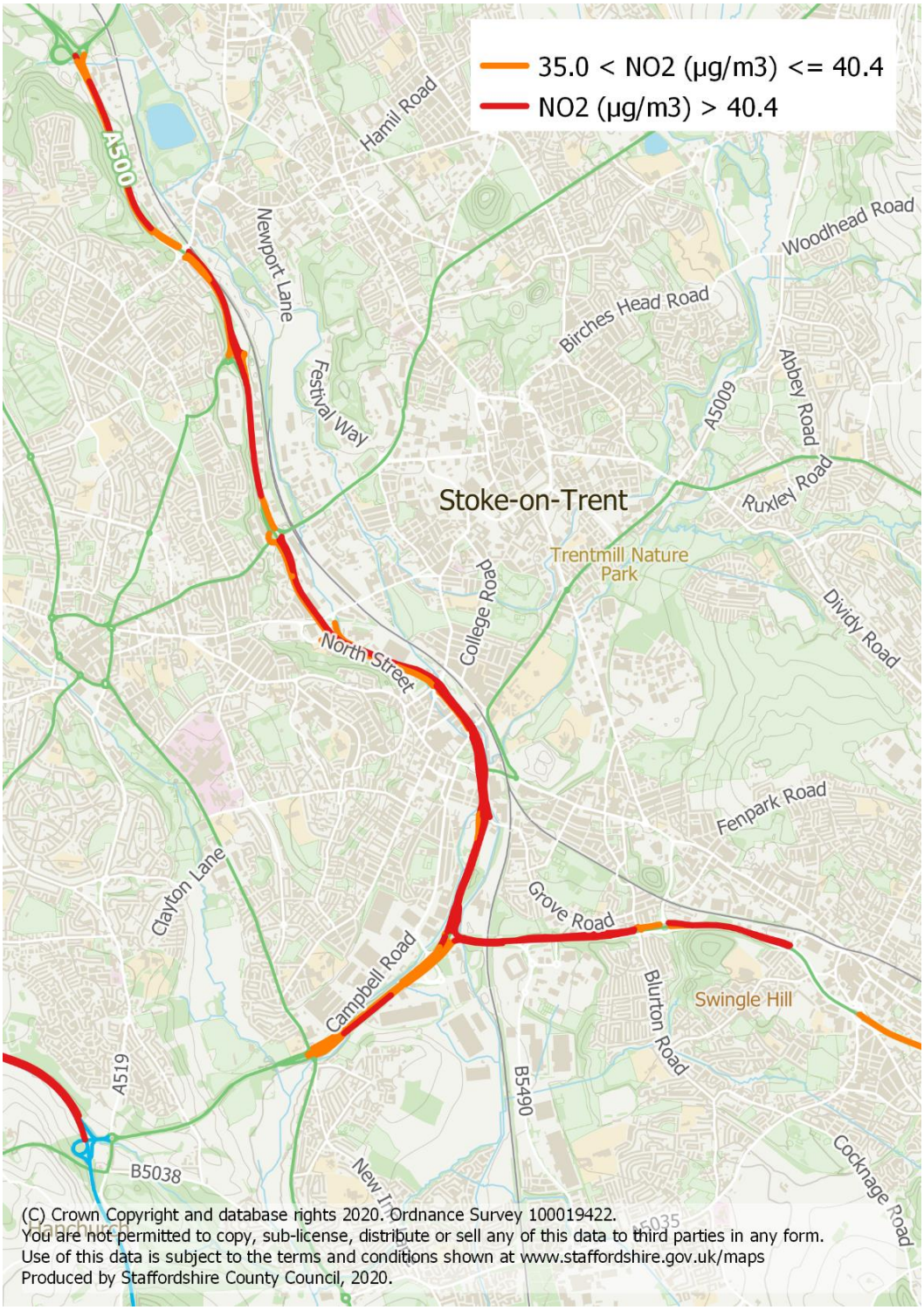


Figure 1-17: NO_2 concentration modelling on SRN in 2022 with Preferred Option



1.16 Stakeholder engagement

Stakeholder engagement is a key activity in successfully delivering the NSLAQP as discussed within the Management Case. The authorities' approach and strategy to engage stakeholders is focussed around five strands:

- Early engagement with key stakeholders
- Engagement with stakeholders as part of the stated preference survey work
- Developing a communication strategy and plan
- Stakeholder engagement survey
- Stakeholder consultation

1.16.1 Early engagement with stakeholders

During the OBC development process early engagement has taken place with key stakeholders to discuss and understand their attitudes towards the proposed scheme to help inform options and manage potential conflict. Specifically, meetings and discussions have been held with:

- Officers and Cabinet Members for SoTCC, NuLBC, and SCC
- Joint Air Quality Unit (JAQU)
- Highways England
- Local Partnerships
- Department for Transport (DfT)
- Department for Environment, Food & Rural Affairs (Defra)
- Transport operators
- Ambulance service
- Road haulage association
- University Hospital

Engagement with these key groups will continue as the project progresses and further engagement with other groups that are affected is planned to take place after the OBC is finalised.

1.16.2 Engagement as part of the stated preference survey work

To inform the development of the OBC it was identified that a programme of stated preference surveys would be required to help determine the local transport reactions and preferences to a charging CAZ. The surveys, across all vehicle types, were undertaken during September and early October 2019. These surveys involved direct engagement and dialogue with drivers, businesses, operators and associations to help understand the likely responses of local people to the introduction of a charging CAZ. The survey was covered via the Councils' own news channels and in local media.

Whilst the key objective of the surveys was to gather data and views, the surveys also helped to raise local understanding and awareness of the need for action, the potential plans and the work being undertaken. The results of the work have been used to influence various aspects of the options appraisal, including the sensitivity of travel demand to charging levels associated with a charging CAZ. A report summarising the stated preference survey work is attached as Appendix 1.

1.16.3 Developing a communications plan

A stakeholder management and communications plan has been developed to support the scheme through its development, implementation and delivery stages and is provided as Appendix 1. Due to the high-profile nature of the work, it is key that this plan is executed appropriately and effectively.

The aim of the Plan is to engage stakeholders, raise awareness and understanding of the NSLAQP and to minimise impacts of the scheme. Key objectives include:

- Delivering coordinated communications across the different authority areas to keep stakeholders informed and updated
- Promoting key health messages and the health reasoning for improving air quality
- Ensuring appropriate levels of engagement and consultation take place

Key aspects and tasks involved in the development of the Plan include:

- Stakeholder mapping and analysis to define stakeholder and public personae. These will be based on common attributes of the relevant groups to help the team understand stakeholders' needs, experiences, behaviours and goals and create a marketing and communication plan to target these.
- Analysis of existing Council websites, local news and related social media channels to establish any trends that can be used to support the ongoing development of the NSLAQP and communications plan. For example, understanding topics of greatest engagement, reviewing the impact of language used and considering how and when people engage.

Using this intelligence and understanding the approach to effective communication and engagement for the NSLAQP is based around two phases:

- Building an understanding of the key issues around air quality in Stoke-on-Trent and Newcastle-under-Lyme and why action is needed through open engagement (discussed further in section 1.16.4)
- Gathering feedback and opinion on the proposed options to address the air quality challenges in Stoke-on-Trent and Newcastle-under-Lyme through targeted consultation (discussed further in section 1.16.5)

1.16.4 Stakeholder engagement survey

To support the development of the OBC and find out how poor air quality affects the local community and measure awareness of the simple actions that can help improve air quality the three Councils launched an online air quality survey in February 2020. The survey was open until 30th April and anyone aged 16 or over who lives in, or travels to, Stoke-on-Trent or Newcastle-under-Lyme was invited to complete it.

A summary of the survey is attached as Appendix 5 – some of the headlines from the survey include:

- 459 respondents (27% work in Newcastle-under-Lyme and 39% work in Stoke-on-Trent)
- 33% are regular visitors to Newcastle-under-Lyme and 30% to Stoke-on-Trent
- 86% use a car when travelling to and through Newcastle-under-Lyme and Stoke-on-Trent
- 34% would generally describe the air quality in their local area as good, 46% would describe it as poor
- When considering the activities that respondents would be willing to do to improve air quality in their local area and reduce exposure to air pollution
    - 69% claim they would walk or cycle instead
    - 41% claim they would consider switching to a less polluting vehicle
    - 35% would consider using public transport
    - Only 7% would be willing to pay a charge to enter areas

As a result of the COVID-19 pandemic the survey results were lower than anticipated, therefore, the Councils are currently considering re-issuing the survey later in the year. However, these results help our understanding of stakeholder awareness, knowledge and perceptions about air quality and improvement methods and have been used to inform the development of the communications plan.

1.16.5 Stakeholder consultation

Following submission of the OBC, the work will focus on engaging and consulting on the measures set out in the NSLAQP. Analysis of this will then feed into finalising the plan as part of the FBC to ensure that it is deliverable and supported by key stakeholders. At present a total of four consultation events are planned to take place in central locations close to the affected sites, which will be easily accessible by the community.

The consultation events will be an opportunity for the Councils to understand how stakeholders feel about the chosen measures, and what support and information different stakeholder groups will require to help them adapt to any change/disruptions caused by implementation of the NSLAQP.

As a result of COVID-19 and the revised OBC submission timescales the timings for the delivery of the stakeholder consultation events is yet to be agreed but the intention is that the communications plan to be a live document that evolves as the communication activities take place with further detail provided at FBC.

In addition to wider consultation activities, the delivery of the NSLAQP involves the implementation of a TRO. As such, the Councils will follow appropriate statutory procedures to consult, advertise and make the Orders.

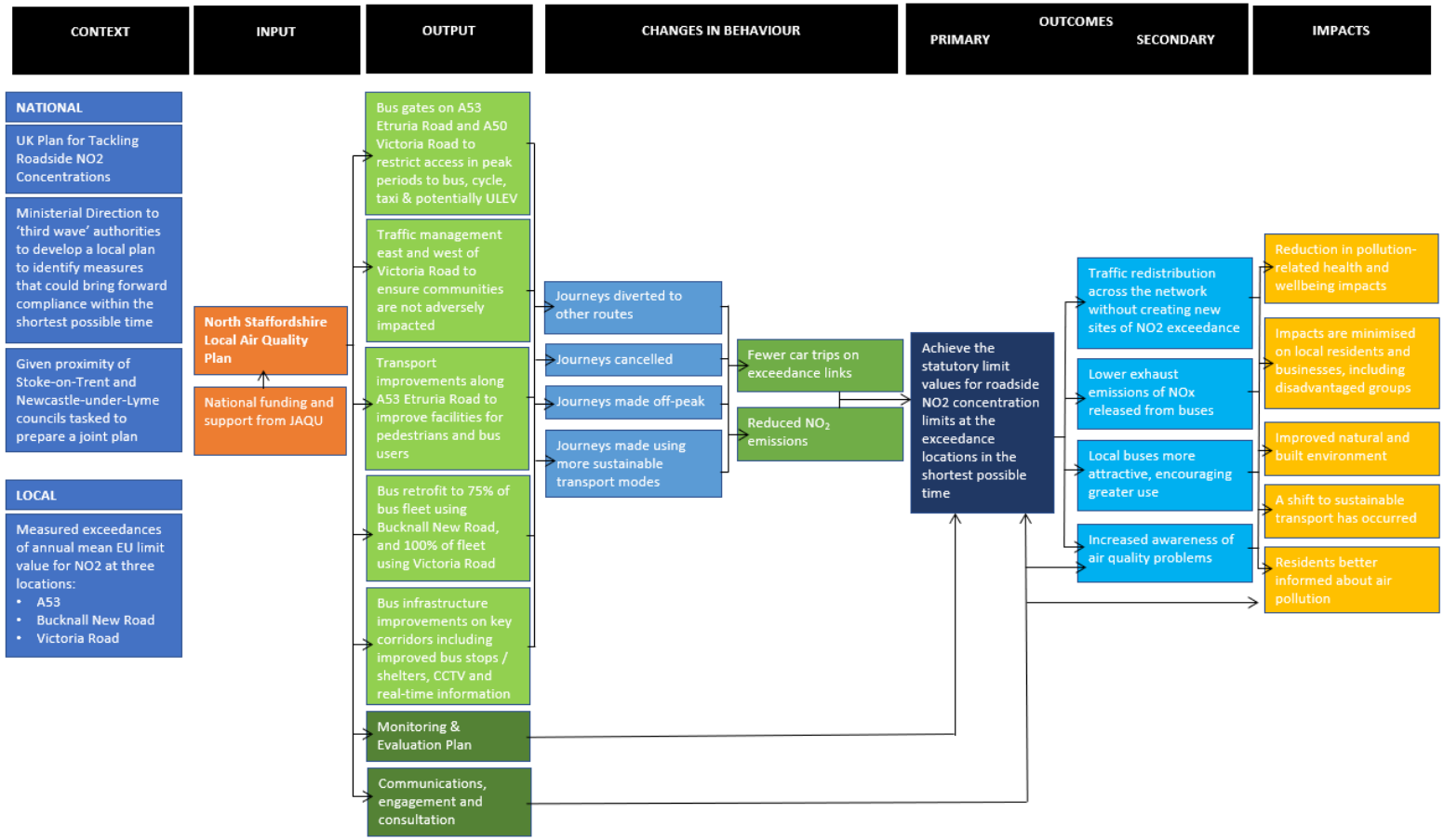
1.17 Benefits, risks, constraints, dependencies of the project

1.17.1 Benefits

A logic map is a systems-oriented approach to represent the 'theory of change' that underlies a policy. In summary, it relates to the introduction of inputs (such as resources and funding) which produce outputs (the proposed options) resulting in outcomes and then impacts, from which the benefits flow. The logic map, in Figure 1-18 below, sets out the change process which underpins the development of the OBC. The map demonstrates how the inputs, delivered through the timely receipt of funds from the Implementation Fund, will generate the outputs (the components of the preferred scheme that are delivered) that then drive a set of outcomes related to traffic and air quality objectives.

Achievement of these outcomes secures the desired impacts for the preferred scheme, which in terms of the project delivery relate to achieving and maintaining compliance with the Ministerial Direction and an improved awareness regarding air quality. These are closely aligned to the primary critical success factor and the secondary critical success factors. The success of the outputs in achieving the desired impacts is then confirmed through the monitoring and evaluation process (to be provided as a separate document with the final OBC). The more important and significant impacts on society relate to improved air quality and its consequences for public health and these are linked to the project impacts through the benefits assessment.

Figure 1-18: Logic map



The Ministerial Direction as a whole, aims to improve air quality which would ultimately improve health in the local area. The Preferred Option actions this Direction by achieving compliance at current sites of exceedance, as well as providing a range of quantifiable and non-quantifiable benefits. A more detailed assessment of these benefits is presented in the Economic Case.

Table 1-13: Wider benefits resulting from the project

Benefit	Impacts
Health and well-being	The correlation between poor air quality and poor public health is noted in numerous studies. In 2013, the World Health Organisation's (WHO) International Agency for Research on Cancer (IARC) classified particulate matter (PM) as a cause of lung cancer. Other cardiovascular and respiratory diseases are also contributed to by air pollution, which can lead to premature deaths. Emerging evidence from the Royal College of Physicians (amongst others) indicates links with other adverse health effects including diabetes, cognitive decline and dementia, and effects on the unborn child.[11] Therefore, improving air quality can deliver improved health benefits, including: • Reduced morbidity • Reduced mortality • Reduced public health expenditure • Reduced absenteeism and therefore increased worker productivity Road transport is responsible for 80% of NO_2 concentrations at the roadside and the growth in diesel cars has exacerbated this problem.[12] Defra and DfT have identified the need for local knowledge to aid finding a solution to the local air quality problems and so the NSLAQP focuses on removing higher polluting vehicles from the roads, such as non-compliant buses, as well as discouraging road travel during peak times.
Natural and Built Environment	Improvements in air quality can also lead to positive externalities associated with the natural and built environment, such as: • Reduced impact on ecosystems • Reduced impact on climate change • Reduced damage to soil, crops and rivers • Reduced impact on the local townscape

[11] Royal College of Physicians - 'Every breath we take. The lifelong impact of air pollution' (2016)

[12] Defra & DfT – 'UK plan for tackling roadside nitrogen dioxide concentrations' (2017)

Encourage a shift to sustainable transport	Restrictions on vehicle access along certain routes during peak times, and investment to improve bus infrastructure facilities will encourage a shift to public transport, specifically bus, as individuals seek to reach their destination in the most efficient and timely manner. Bus operators will benefit in the Preferred Option scenario as they will receive subsidies to upgrade and/or retrofit their vehicles, allowing them to continue to operate in the local areas.
Support local residents, businesses and disadvantaged groups	The Preferred Option has sought to minimise the impact on local people and businesses by not applying a charging CAZ and by providing enhanced public transport options.
Residents better informed about air pollution	The associated communications and engagement that will support the delivery of the measures will help to raise awareness of the problems caused by air pollution.

1.17.2 Wider Policy Benefits

The improvement of air quality can have both direct and indirect impacts which can contribute to benefits for wider policies.

Vulnerable people, such as elderly people, children and people with pre-existing health conditions such as respiratory and cardiovascular conditions, are more likely to be seriously affected because of air pollution. Studies have suggested that the most deprived areas of Britain contain a disproportionate share of poor air quality.

The natural environment will also be affected as a result of air pollution. NO_2 contributes to acidification and eutrophication of soil and watercourses, which effects animal and plant life and biodiversity. NO_2 also impacts on local ozone production contributing to public health impacts, damages in agricultural crops, forests and plants. Cleaner air will lead to increased productivity through improvements in public health, leading to reduced workplace absence and effect the creation of an environment that is appealing to businesses and the public alike. Particulate matter, NO_2 and ozone were estimated to have had the total cost of up to £2.7 billion of productivity losses in the UK, 2012[13].

The reduction of petrol and diesel vehicles through innovative transport technologies and increasing active travel uptake, will improve air quality whilst positively impacting other policies. For example, some studies suggest that physical inactivity is associated with higher mortality rates than smoking. Due to the decline in petrol and diesel vehicles there should be a reduction in traffic congestion as more people walk, cycle or even use public transport, improving the health of the public as people become more active, relieving pressure on the healthcare sector.

[13] Clean Air Strategy, 2019, Defra

1.17.3 Risks

As well as there being a multitude of benefits, there are a number of risks that must also be taken into account. Three risk workshops were held in early 2020 to support a quantitative assessment of risk. Through this process the top risks associated with the NSLAQP have been identified – these are presented and discussed in further detail within the Management Case and identify how the Councils plan to manage and mitigate the risk.

The top five project risks identified are:

- Coronavirus results in change in national policy or leads to design, build and procurement delay
- Highways England require network upgrades to deliver capacity improvements on the SRN
- The public/businesses do not accept the proposals
- Data protection/GDPR issues arise
- Utility costs are higher than expected due to timescales and site access

1.17.4 Constraints

Constraints are aspects that are externally imposed and need to be identified and managed from the outset. For the NSLAQP the following constraints have been identified and considered in the preparation of this OBC:

Physical constraints – some physical constraints were identified when developing the Preferred Option, where highway boundaries, environmental landscapes or building lines prevent the implementation of some specific measures. These constraints were taken into consideration and alternative measures were developed in order to prevent any negative consequences resulting from the proposed scheme.

Financial constraints – the Councils do not have the resources to deliver the NSLAQP without funding support from the Government. For this reason, the delivery of the plan is dependent upon funding from the Government's Implementation Fund.

Time-related constraints – the Ministerial Direction requires compliance to be delivered within the shortest timeframe possible. This constricts the time that the local authorities have to plan, develop and implement a scheme. The Preferred Option is relatively simple and quick to procure and implement as discussed within the Commercial and Management Cases. The Preferred Option can be delivered in 2022, whereas the complexity associated with the charging CAZ would mean a CAZ would not be delivered until 2023. The local authorities are committed to developing a wider and more holistic strategy in the future, aligning with other local plans in the area, so that air quality and environmental issues continue to be mitigated against whilst bringing about an array of economic and social benefits as well.

Planning and legal constraints – the proposed measures that form the NSLAQP have been developed to be relatively straightforward to implement, without the need for complex or time-consuming planning or legal procedures.

Stakeholder acceptability – the Preferred Option has been developed based on early engagement and has a high degree of stakeholder acceptance compared to the Benchmark CAZ D option.

Technological constraints – the proposed scheme involves the retrofitting of some the existing bus fleet along key corridors. To ensure this is feasible, discussions have taken place with the bus operators during the development of the Preferred Option.

Impacts on vulnerable groups – distributional impacts have been considered within the study (as detailed within the Economic Case) as it was recognised that some measures could disproportionately negatively affect vulnerable population groups. The NSLAQP has been developed to minimise the potential negative impacts on vulnerable groups.

1.17.5 Dependencies

Dependencies are the actions or developments required of others that need to be considered where the ultimate success of the NSLAQP is dependent upon them. Two key dependencies have been identified:

- Decision making processes
- Other transport schemes

There is the potential for decision making processes to constrain the delivery of the programme, especially with multiple authorities and approval bodies involved. The delay in approvals could happen at both a local level (i.e. if there is a decision to review strategy) or at a national level (i.e. if there is a delay in funding being approved). The local authorities have taken steps to mitigate against this through robust project governance and frequent review of the project plan. Possible approvals delays have also been outlined in the risk register (as described in the Management Case).

The delivery and success of the NSLAQP is dependent on a variety of stakeholders, of which their support and engagement throughout the whole development and implementation process of the scheme is vital. Highways England is one of these key stakeholders, particularly as the A500 and A50, which is operated by Highways England, provides a strategic link through the middle of Stoke-on-Trent and Newcastle-under-Lyme. The A50 and A500 already experience significant levels of NO_2 concentrations and so any increase in traffic along these routes could exacerbate these issues.

The local authorities consider that the impacts of the Preferred Option on the SRN can be made acceptable with the potential for signing mitigation at the A50/A500 junction. This has not been included in the scheme costs but has been recognised in the risk register. The authorities have sought engagement with Highways England from an early phase in the feasibility study and since completion of the IES the project team and Highways England have begun to work collaboratively. Highways England are also working to develop their own proposals which should complement the Preferred Option. Future collaborative working is expected to involve the project team, Highways England, JAQU and DfT in order to reach an acceptable solution.

2 Economic Case

2.1 Introduction

The Economic Case outlines the work undertaken to assess and identify the optimum solution by considering the Value for Money (VfM) of each of the shortlisted options, and their evaluation against the critical success factors (CSF) aligned with the project.

The core stages of analysis included within this Economic Case are as follows:

1. Assessment of the CSFs in relation to this project
2. Review of the appropriateness and development of the options shortlisted within the Strategic Outline Case (SOC)
3. A Cost-Benefit Analysis (CBA) of the Benchmark and Preferred Option
4. A Distributional Impact Analysis of the Benchmark and Preferred Option

In October 2018, Stoke-on-Trent City Council (SoTCC) and Newcastle-under-Lyme Borough Council (NuLBC), who both have responsibility for environmental health, were issued a Ministerial Direction to produce a local air quality plan to address their respective nitrogen dioxide (NO_2) problems. Given their proximity to one another, they were tasked with producing a joint plan.

As the highway authority for the Newcastle-under-Lyme area, Staffordshire County Council (SCC) has been assisting the authorities and together, the three authorities have developed a plan to tackle NO_2 exceedances at the roadside – known as the North Staffordshire Local Air Quality Plan (NSLAQP).

The Economic Case supports the identification of the preferred scheme through the evaluation of the Net Present Value (NPV) of the shortlisted option, whilst ensuring that the preferred scheme continues to deliver compliance within the shortest timeframe possible.

This Economic Case intends to identify the optimum solution that brings about air quality compliance through an extensive analysis of the shortlisted options' costs, benefits and distributional impacts to different socio-economic groups.

2.2 Case for change

The need for change has been evident through the feasibility study and further strengthened through the air quality modelling outputs that detected and indicated three exceedance locations in the areas of Stoke-on-Trent and Newcastle-under-Lyme, as outlined in the Strategic Case.

The NSLAQP has been developed in order to meet the Ministerial Directions and deliver compliance, whilst underpinning the vision, aims and objectives of all three councils and ensuring at the same time that there are no unintended consequences resulting from the delivery of the preferred scheme.

The need to achieve compliance levels of NO_2 concentrations within the shortest timeframe possible was a key consideration during the options development process among other objectives that are of secondary importance.

2.3 Critical Success Factors (CSF)

The CSFs are the key objectives of which a project should be delivering to so as to ensure that the project brief is met and successful.

The primary CSF in this project, as outlined by the Ministerial Direction, is for both NuLBC and SoTCC to deliver a scheme that complies with NO_2 limits in the shortest timeframe possible. The options taken forward to the shortlist must pass the primary CSF test. Cost is only considered once the options are proven to be equally effective in achieving compliance in the shortest possible timeframe.

The secondary CSFs are considered where more than one option adhere to the primary pass/fail CSF. The secondary CSFs help determine which option might be optimal relative to other criteria. These factors are outlined in Table 2-1 below.

Table 2-1: Secondary critical success factors

Secondary CSF	Description
Value for money	• Is the option economically advantageous and provides value for money? • Does it minimise risks and uncertainties? • Does it maximise benefits and minimises costs for Government, the local authority and wider society?
Distributional impacts	• Does the scheme significantly discriminate against specific groups in the society?
Strategic and wider air quality fit	• Does the scheme meet the primary air quality objective and support the longer-term requirement to maintain compliance?
Supply side capacity and capability	• Are there willing and capable suppliers to deliver all measures of the scheme?
Affordability	• Has the option got the potential to generate revenue which can be reinvested in the scheme to cover any ongoing costs in both the short and long term?
Achievability	• Can the measure bring forward compliance with the NO_2 objective? • Can the measure be delivered given available local authority financial resources and skills? • Is the measure likely to be delivered given available funding from Government? • Have all the technical issues been resolved that could affect deliverability?

2.4 Option identification

2.4.1 Long list assessment

The CSFs were applied to an initial long list of measures that were determined during the Feasibility Study and SOC stages in order to identify a shortlist of options to be taken forward to the Outline Business Case stage. The longlist of measures identified during the Feasibility

Study can be found in Appendix 6. The longlist of measures considered at SOC stage looked at the potential scope of the Preferred Option, the service solution options available and the delivery and funding routes. These measures included:

- City centre targeting commercial vehicles
- City centre targeting public transport/taxis
- City centre targeting private vehicles
- City centre targeting all vehicles
- Within council boundary targeting public transport/taxis
- Within council boundary targeting private vehicles
- Within council boundary targeting all vehicles
- Focusses around specific exceedance area targeting all vehicles
- Chargeable Access Restriction – Class A/B
- Chargeable Access Restriction – Class C/D
- Traffic management scheme ('Smart Traffic')
- Air Quality/Low Emission Strategy (LES)
- Employee parking strategy/priority parking
- Park & ride scheme
- Etruria Valley Link Road (EVLR) development
- A500 improvements
- Information campaign/improve driver awareness
- Business travel plans
- Freight consolidation centre

The longlist to shortlist sifting process considered the factors, as detailed in Table 2-2, that were used to refine and develop the shortlist of options to be taken forward to OBC stage.

Table 2-2: Factors considered in the development of the shortlist of options

Considerations	Details
Scope	The Preferred Option needs to meet the requirements of the Ministerial Direction and deliver compliance in the shortest possible timeframe.
Service solution	The assessment reviewed the relative merits of the various technologies available in each option and their relative costs, ease of understanding and their potential to contribute to the objectives.
Service delivery	The assessment considered deliverability factors in relation to technical issues, time to deliver and risks associated with technology

	and enforcement. It considered internal and external resource requirements, dependencies, marketing, communication and stakeholder impacts.
Implementation	The assessment reviewed whether there would be contractors available and able to implement the scheme, whilst adhering to the shortest possible time requirement
Funding	The assessment considered the value for money of the options, particularly in relation to determining the best value way to deliver compliance in the shortest possible time.

Considering the above factors, the SOC provided the following shorter list of options:

- A city centre/A53 chargeable access restriction (Class A/B)
- A city centre/A53 traffic management scheme, plus council boundary scale LES
- A city centre Workplace Parking Levy (WPL), plus council boundary scale LES
- A Council boundary scale WPL, plus council boundary scale LES
- Etruria Valley Link Road (EVLR) Project and A500 improvements, plus council boundary scale LES

Going forward, the above list was used as a starting point for the transport and air quality modelling for the OBC. However, following further air quality modelling, additional locations of NO_2 exceedance were identified, not only along the A53 corridor, but also on the A50 Victoria Road and Bucknall New Road.

The EVLR Project obtained planning permission in late 2019 and was therefore considered to form part of the future year reference case as a committed scheme, rather than being included in an option package.

The WPL was analysed using transport model data and Nottingham's WPL experience (the only such operational scheme) and concluded that very few non-compliant cars would be removed from the network on the basis of:

- The number of through trips
- The number of exemptions
- the number of employers that would cover the levy
- The number of employees that would pay the levy
- The single journey purpose policy focus

Further detail on this analysis can be found in Appendix 2. It should also be noted that there was no political support for such a measure and in the example of Nottingham, it has been used more as a revenue raising measure rather than a measure to remove non-compliant vehicles from the network.

2.4.2 Shortlist of Options

The optioneering process involved an initial options development workshop, which was attended by council members and officers from the three authorities, as well as various stakeholders and consultants. A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis approach was used throughout the refinement of the longlist to shortlist in combination with the consideration of each of the CSFs.

Appendix 7 shows various tests that were carried out in the transport model only to test particular traffic management measures in isolation. Combining the results from these tests and discussions had at the options development workshop, Options 1-7 evolved, forming the shortlist of options (represented in Appendix 8).

The air quality modelling work found that the NO_2 exceedances along Victoria Road in particular, were being driven by all vehicle types. As a result, it was deemed that a class D CAZ would be the only charging solution that might be feasible. This CAZ D (also known as Option 1) has been identified as the benchmark option, as required by JAQU, against which the Preferred Option must be tested against for delivery of the primary CSF of achieving compliance in the shortest possible time. A CAZ C was also tested to see if a less stringent CAZ class would meet the primary CSF. However, this was not the case and the CAZ D was found to be the only CAZ class that achieved compliance. The CAZ D will form the default option if an alternative option cannot be found that delivers compliance in the shortest possible timeframe.

Following the air quality modelling, Option 3 and 4 were found to achieve compliance. Option 3 was discounted as it included a small CAZ boundary, which would not meet the primary CSF in being implemented in the shortest possible timeframe in comparison to Option 4.

Option 6 was developed as an extension of Option 4 and included additional complementary measures with the aim of mitigating against any negative distributional impacts that might arise as a result of the scheme. However, Option 6 did not bring about significant reductions in NO_2 compared with Option 4 and would also not prove to perform better than Option 4 against the secondary CSFs, namely:

- Value for money – the additional complementary measures would likely deliver few benefits to society for the relative additional cost
- Affordability – with fewer measures to implement that would continue to achieve compliance, proves Option 4 would be cheaper to implement

The most impacting and deliverable measures from Option 4 and 6 were collated to form Option 7, where elements were included to mitigate the impacts on vulnerable groups.

A further options workshop was held, following concerns raised by some Members and officers regarding the potential traffic impacts of Option 7. The workshop recommended amendments to Option 7 to further mitigate against any negative impacts that might arise from the scheme.

Consequently, the final shortlisted options taken forward for detailed economic appraisal are the benchmark charging CAZ D and a package of non-charging traffic management measures, Option 7, which will herein be referred to as the Preferred Option. Table 2-3 details the final shortlist of options.

Table 2-3: Summary of the resulting shortlist of options

Option	Details
Benchmark CAZ D	Bounded area incorporating all areas of modelled NO_2 exceedances. All non-compliant vehicles will be charged based on the vehicle type when entering or passing through this boundary. • Car = £5 • Taxi = £5 • LGV = £9 • HGV = £35 • Bus = £5

Preferred Option	• A50 Victoria Road bus gate, operational Monday to Friday between 07:00-10:00 and 16:00-19:00. ANPR cameras will be used to restrict access except for buses, taxis and cyclists.
	• A53 Etruria Road two-lane bus gate, operational Monday to Friday between 07:00-10:00 and 16:00-19:00. ANPR cameras will be used to restrict access except for buses, taxis and cyclists.
	• Traffic management measures on roads to the east and west of Victoria Road, including:
	  ○ Traffic calming
	  ○ One-way restrictions
	  ○ Speed restrictions
	  ○ Weight restrictions
	  ○ Extension of footways
	  ○ Carriageway re-surfacing
	• Transport improvements along the A53 Etruria Road in the form of signalised pedestrian crossing facilities and the relocation of a bus stop to avoid unnecessary queuing.
	• Targeted bus retrofit programme where 75% of buses using Bucknall New Road and 100% of buses using Victoria Road will be retrofitted to achieve Euro VI emissions standards.
	• Bus infrastructure improvements will be installed on routes that pass through or are parallel to the identified exceedance locations. The improvements will include Real Time Passenger Information (RTPI) screens, new bus shelters, accessible kerbs at bus stops and installation of CCTV at bus stops.
	
	An ultra-low emission vehicle (ULEV) exemption, allowing ULEVs to drive through the bus gate, will be assessed in the air quality model and if

	considered deliverable, will be added to the scheme in the Full Business Case (FBC).

2.5 Economic appraisal methodology

2.5.1 Overview of approach and assumptions

As stated in JAQU's Option Appraisal Guidance, only the shortlisted options that pass the primary and secondary CSFs will be accepted. The Preferred Option will result from an economic analysis that will assess the deliverability of the final shortlisted options in the shortest possible time, the NPV and the distributional impacts.

Transport modelling was undertaken using the North Staffordshire Multi-Modal (NSMM) transport model and air quality modelling was undertaken using the RapidAir model. Further details on how the transport and air quality modelling has been carried out can be found in the technical reports (T1-4 and AQ1-3). Outputs from the models were used in the economic assessment following both JAQU and TAG guidance.

It should be noted that:

- All impacts are presented in real terms in a 2018 price base year
- All impacts are discounted to 2019 by applying a discount factor of 3.5%
- All impacts are corrected to market prices
- All impacts are assessed over a 10-year appraisal period from 2022-2031.

The transport and air quality models have assessed 2022 as the opening year of both options, despite the Benchmark CAZ D later being found to not be deliverable until 2023 (see the Management Case for more details). As a result, the economic assessment undertaken has assumed both options' appraisal periods to be between 2022 and 2031, to remain in line with the modelling outputs and allow for direct comparison.

The technical reports (E1-3) should be referred to for more information on the full economic methodologies and results presented.

2.5.2 Scope of economic impacts assessed

The implementation of a CAZ or a traffic management scheme will deliver a wide range of impacts that will be assessed either quantitively or qualitatively. The scope of impacts considered in this analysis are the following:

- Air quality emissions
- Greenhouse gas impacts
- Travel time impacts
- Fuel and Vehicle Operating Cost (VOC) impacts
- Indirect tax
- Welfare costs of trip cancellation
- Vehicle upgrades

- Bus improvements
- Implementation and operating costs
- Revenue
- Distributional impacts

2.6 Cost-benefit analysis

The headline results of the economic analysis are set out in the following sections. Costs have been presented as negative values and benefits are presented as positive values. Further details of the CBA can be found in the E1 Economic Methodology Report and E2 Economic Model.

2.6.1 Air quality impacts

Reducing air pollution emitted by road transport sources is a primary CSF of the Ministerial Direction. Table 2-4 shows the total reduction in NO_x and $PM_{2.5}$ concentrations across all vehicles for both the Preferred Option and the Benchmark CAZ D compared with the Reference Case scenario.

Table 2-4: Emissions savings compared to the Reference Case

Impact	Benchmark CAZ D	Preferred Option
NO_x change (annual tonnes/year)	-555	-101
$PM_{2.5}$ change (annual tonnes/year)	-35	-3
Total air quality impacts (annual tonnes/year)	**-590**	**-104**

(Cumulative discounted impact (PV) from 2022-31)

The monetised impact of a change in NO_x and $PM_{2.5}$ emissions due to the implementation of both options is presented in Table 2-5. The robust economic assessment methodology is set out extensively in the E1 report.

It is assumed that benefits reduce over time as the reference case experiences natural fleet renewal and gradually aligns with the impacts generated from implementing the options.

Table 2-5: Monetised air pollutant impacts

Impact	Benchmark CAZ D	Preferred Option
NO_x change	8,543	1,534
$PM_{2.5}$ change	10,325	807
Total air quality impacts	**18,868**	**2,341**

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

As shown in Table 2-5, the Benchmark CAZ D charging scheme is expected to generate a significantly greater benefit of £18.9m over the ten-year appraisal period, while the Preferred Option generates a benefit of £2.3m.This is expected as the impacts of the Benchmark CAZ D on air quality are predicted to be significantly greater and more widespread than that of the Preferred Option, although both achieve NO_2 compliance levels as instructed by the Ministerial Direction.

For the purpose of the economic assessment it has been assumed that both options are implemented in 2022. However, as set out in the Management Case, the Benchmark CAZ D can only be implemented from 2023. Hence the Preferred Option in practice will deliver emissions reductions and associated health benefits sooner. By assuming the Benchmark CAZ D begins to deliver emissions reductions in 2022, the analysis overstates the size of the air pollution benefits associated with this option.

2.6.2 Greenhouse gas (GHG) impacts

The policies implemented in both options will affect, either directly or indirectly, on the travel patterns of the general population; this change of travel behaviour will consequently affect the levels of greenhouse gas emissions and specifically CO_2.

Changes to travel time and distance for both the Preferred Option and the benchmark CAZ will impact on the levels of greenhouse gas emissions.

With respect to the Benchmark CAZ D, in order for vehicle owners to avoid paying the charge imposed they might either:

- Upgrade their vehicle to compliant ones
- Change their route or potentially even their destination
- Shift to public transport, walking or cycling
- Cancel their trip altogether

The greenhouse gas emissions, as a result of this behavioural change, is expressed in monetary terms in Table 2-6. Changes in GHG emissions have been derived from Transport User Benefit Appraisal software (TUBA) for both the Preferred Option and the Benchmark CAZ D. In the case of the Benchmark CAZ D these results were combined with carbon values from BEIS' Green Book Supplementary Guidance to assess the impact on GHG emissions from vehicles being upgraded.

Table 2-6: Monetised GHG impacts

Impact	Benchmark CAZ D	Preferred Option
Cumulative difference in CO_2 emissions 2022 - 2031 (£000s)	5,346	-518
BEIS carbon prices 2022 – 2031 (£/tonne)	3,103	0
GHG impacts (£000s)	**8,449**	**-518**

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019)

As the Preferred Option will likely lead to rerouting around the proposed bus gates but does not explicitly encourage upgrading to cleaner vehicles, it can be expected that the impact of GHGs is negative. This might be offset to an extent with a mode shift to bus travel through the bus infrastructure improvements that are proposed as of the Preferred Option.

On the other hand, the Benchmark CAZ D encourages vehicle upgrade due to the charge imposed and so it is expected that GHG emissions will drop and result in the significant monetised benefit as identified in Table 2-6 through cleaner vehicles operating in North Staffordshire.

2.6.3 Travel time impacts

The response of vehicle owners to change route or destination or shift their mode of transport will inevitably affect traffic volume and ultimately journey times in both scenarios.

Regarding the Preferred Option, changes in traffic flow levels can be expected as drivers reroute around the proposed bus gates. Some drivers may also shift to bus travel as a result of the bus network enhancements.

In response to a charging CAZ D, a proportion of vehicle owners are expected to upgrade their vehicles, whilst some might switch from a more polluting diesel-fuelled vehicle to petrol. Alternatively, some individuals might choose to change their route, cancel their trip or pay the imposed charge. This change in behaviour will likely impact traffic flow on selected routes in and around the CAZ boundary and as a result, journey times would be affected.

All of the aforementioned changes are captured using DfT's TUBA software. For the Preferred Option, TUBA represents 253 working days during the AM, inter-peak (IP) and PM periods which includes the peak-times when the bus gates would be in operation. In the case of the Benchmark CAZ D, TUBA analyses 24 hours in a day for 365 days in the year, which is representative of when the CAZ would be enforced.

Table 2-7 indicates the impact on travel time for transport users, expressed in monetary terms as per TAG guidance.

Table 2-7: Travel time impacts

Impact	Benchmark CAZ D	Preferred Option
Travel time impacts	32,989	-48,261

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

As indicated in Table 2-7, the Preferred Option is expected to note an increase in journey times from the rerouting that results from the proposed peak-time bus gates. The Benchmark CAZ D reduces travel times as the daily charge imposed to non-compliant vehicle owners will reduce traffic congestion within the CAZ boundary.

However, it is important to note that this analysis does not include the implications of the CAZ charge and so these impacts would in fact represent disbenefits greater than that of the Preferred Option. The annualised cost to the user as a result of the CAZ charge is presented in Table 2-16.

2.6.4 Fuel and Vehicle Operating Cost (VOC) impacts

For the Preferred Option the rerouting of vehicles and possible shift to bus travel will impact on fuel consumption and VOC, such as tyre wear, maintenance and depreciation.

With the Benchmark CAZ D, it can be expected that some drivers will upgrade their vehicles to compliant vehicles, whilst others might switch to petrol-based vehicles as opposed to diesel-based vehicles as compliant petrol cars can be significantly older than compliant diesel cars and represent a cheaper upgrade. Others may reroute to avoid the charging boundary impacting on journey distances. As a result, changes to fuel consumption and VOC will occur.

These impacts are captured in TUBA and in the economic model of assessing the upgrading of vehicles. Fuel and non-fuel VOC impacts are expressed in monetary terms in Table 2-8. The Preferred Option leads to increased travel time whilst overall the Benchmark CAZ D results in reduced travel time. It should be noted that the negative impact of cancelled journeys within the Benchmark CAZ D scenario are assessed in section 2.6.6 welfare costs.

Table 2-8: Fuel change and VOC impacts

Impact	Benchmark CAZ D	Preferred Option
Fuel VOC impacts	2,356	-4,991
Non-fuel VOC impacts	29,238	-3,375

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

2.6.5 Indirect Tax

Changes in fuel consumption and expenditure, as discussed in the section above, will also impact on the indirect tax revenue paid by users in the form of fuel duty.

Indirect tax impacts have been estimated through TUBA and are expressed in monetary terms in Table 2-9.

Table 2-9: Indirect tax impact

Impact	Benchmark CAZ D	Preferred Option
Indirect tax	23,399	-2,270

(2018 prices, discounted to 2019, £000s)

The higher proportion of indirect tax generated as a result of the Benchmark CAZ D follows the pattern of changes in travel time and is likely driven by the higher non-fuel VOC benefits as presented in the sections above.

2.6.6 Welfare costs of trip cancellation

The Preferred Option is not expected to result in the cancellation of any trips and so no loss of utility has been estimated.

On the other hand, the expected trip cancellation associated with the Benchmark CAZ D will adversely affect individuals' utility function since transport users will not be able to go to their preferred destination point. The welfare loss calculation takes into consideration a range of impacts associated with switching transport behaviour, not just the utility of making the trip but also the time required to travel, changes in fuel and operating costs as well as journey quality.

JAQU guidance states that the loss of utility is equal to half of the relevant CAZ charge as individuals will weigh up the cost of paying the charge against the monetary value of the journey purpose and where the journey value outweighs the CAZ charge then payment of the charge is expected.

Table 2-10 indicates the welfare loss resulting from the cancellation of trips in the Benchmark CAZ D scenario, expressed in monetary terms as per TAG.

Table 2-10: Welfare loss due to trip cancellation

Impact	Benchmark CAZ D
Welfare loss – cancelled trips (vehicles/year)	2,234,394
Welfare impacts of trip cancellation (£000s)	**-27,047**

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 201)

The consumer welfare loss is estimated to be approximately £27m in the Benchmark CAZ D scenario. This demonstrates that there is a significant loss in welfare to the user.

2.6.7 Vehicle upgrade

As a result of the Benchmark CAZ D some vehicle owners will respond to the CAZ charge by either scrapping or selling their non-compliant vehicle and buying a second-hand or new compliant vehicle. Table 2-11 presents the impacts associated with upgrading to compliant vehicles.

It should be noted that the measures in the Preferred Option do not explicitly encourage owners to upgrade their vehicles and so the Preferred Option has been excluded from the vehicle upgrade analysis since it will not generate significant impacts.

Table 2-11: Vehicle upgrade impacts

Impact	Benchmark CAZ D
Vehicle upgrade	-26,399

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

2.6.8 Bus infrastructure improvements

The Preferred Option includes a range of bus infrastructure improvements involving the following:

- Real time passenger information (RTPI) at bus shelters
- Addition of new shelters
- Accessible kerbs at bus stops
- CCTV at bus shelters

The aforementioned interventions have been appraised as part of the economic assessment and a summary is presented in Table 2-12. The total NPV for these improvements has been calculated and presented in more detail in the E1 report. The Benchmark CAZ D does not include any specific bus infrastructure improvements and so has not been included in this assessment.

Table 2-12: Bus infrastructure impacts

Impact	Preferred Option
Bus infrastructure improvement	34,844

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

The bus infrastructure improvements will generate a benefit of £34.8m which relate to improved journey quality, security and accessibility. The specific benefits associated with these improvements are discussed in more detail throughout the E3 Distributional Impact Analysis.

Bus retrofitting also forms part of the Preferred Option, in particular along Bucknall New Road and Victoria Road, where 75% and 100% of buses, respectively, will be retrofitted. These impacts are presented in Table 2-13.

Table 2-13: Bus retrofitting impacts

Impact	Preferred Option
Bus retrofitting	-773

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

Bus retrofitting delays the purchase of new vehicles meaning that older vehicles will be in operation for longer. This would reduce the costs associated with vehicle upgrade but would subsequently increase fuel and non-fuel VOCs that accompany older vehicles. Whilst the bus retrofitting measures appears as an overall disbenefit, the benefits derived from this measure can be captured in the air quality assessment through the use of cleaner buses in the short-term.

2.6.9 Revenue

2.6.9.1 Preferred Option

The Preferred Option is not directly associated with the generation of revenue, however some revenue is likely to be received due to enforcement activity associated with the two bus gates. Table 2-14 forecasts the predicted revenue associated with Penalty Charge Notices (PCNs) based on currently enforced bus gates within North Staffordshire.

Adjustments have been made to account for the times of operation which the proposed bus gates will be enforced. It has also been acknowledged that existing bus gates do not have the communications and engagement support that will accompany the Preferred Option and so contraventions of the proposed bus gates are likely to be lower. There is likely to be a spike in PCNs issued following the opening of the new bus gates, however, this may not necessarily result in additional revenue as there may also be a higher rate of appeal to PCNs in the initial few months of the scheme. This trend is likely to drop off significantly after the first year of operation as drivers acclimatise to the bus gate restrictions and so any revenue generated from PCNs is likely to be limited in the medium to longer term. Charge levels are fixed and were set by Central Government in 2008, therefore adjustments for inflation have not been applied. It is therefore assumed that income from the bus gates will remain constant after the first year of operation.

At this stage, the cost to the user is assumed to be equal to the revenue generated to government.

Table 2-14: Bus gate revenue through PCNs

Year	Bus gate income
2022	£87
2023	£40
2024	£39
2025	£38
2026	£36
2027	£35
2028	£34
2029	£33
2030	£32
2031	£31
Total	**£404**

(2018 prices, discounted to 2019, in market prices, £000s)

2.6.9.2 Benchmark CAZ D

The Benchmark CAZ D includes a bounded area where charges will be levied on all non-compliant vehicle types. Through the ten-year appraisal period it is expected that due to the greater amount of non-compliant vehicles in the early years of the project's implementation, the revenue generated from these charges will be high, with a gradual decline over time as more and more vehicle owners upgrade their vehicles. It has been assumed that revenue in the year 2031 will be £0 as this is when decommissioning will commence.

The total estimated revenue generated to both local and Central Government from the charging CAZ D is represented in Table 2-15. It should be noted that 20% of this revenue will be taken by Central Government to pay for the Central CAZ Service. The remaining 80% will be revenue out of which the significant CAZ operating costs will need to be paid.

Table 2-15: CAZ D revenue to the government

	Car Business	Car Commuting	Car Other	Taxi	LGV Personal	LGV Freight	HGV	Buses	Total
2022	£1,327	£7,035	£16,840	£7	£2,030	£12,965	£1,935	£151	**£42,290**
2023	£1,158	£6,139	£14,695	£7	£1,839	£11,748	£1,408	£122	**£37,117**
2024	£999	£5,295	£12,676	£6	£1,660	£10,599	£915	£95	**£32,246**
2025	£849	£4,502	£10,777	£6	£1,490	£9,515	£453	£69	**£27,661**
2026	£684	£3,625	£8,677	£5	£1,199	£7,661	£365	£56	**£22,272**
2027	£529	£2,802	£6,707	£4	£927	£5,921	£282	£43	**£17,215**
2028	£383	£2,030	£4,860	£3	£672	£4,291	£204	£31	**£12,475**
2029	£247	£1,308	£3,131	£2	£433	£2,764	£132	£20	**£8,035**
2030	£119	£632	£1,512	£1	£209	£1,335	£64	£10	**£3,882**
2031	£0	£0	£0	£0	£0	£0	£0	£0	**£0**

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, in market prices, £000s)

The cost of the CAZ charge to the user differs from the revenue generated to the government as it is expected that the local authorities will pay a fee to process card payments. Further details on how the resultant CAZ revenue was derived can be found in the E1 report. The cost of the charge to the user can be seen in Table 2-16.

Table 2-16: Benchmark CAZ D cost to the user

	Car Business	Car Commuting	Car Other	Taxi	LGV Personal	LGV Freight	HGV	Buses	Total
2022	£1,354	£7,166	£17,153	£8	£2,058	£13,160	£1,951	£155	**£43,004**
2023	£1,182	£6,253	£14,969	£7	£1,865	£11,925	£1,420	£125	**£37,745**
2024	£1,019	£5,394	£12,913	£6	£1,682	£10,759	£922	£97	**£32,793**
2025	£867	£4,586	£10,978	£6	£1,510	£9,658	£457	£71	**£28,133**
2026	£698	£3,692	£8,839	£5	£1,216	£7,776	£368	£57	**£22,651**
2027	£539	£2,854	£6,832	£4	£940	£6,010	£284	£44	**£17,508**
2028	£391	£2,068	£4,951	£3	£681	£4,355	£206	£32	**£12,687**
2029	£252	£1,332	£3,189	£2	£439	£2,805	£133	£21	**£8,172**
2030	£122	£644	£1,541	£1	£212	£1,355	£64	£10	**£3,948**
2031	£0	£0	£0	£0	£0	£0	£0	£0	**£0**

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, in market prices, £000s)

2.7 Implementation costs

The implementation costs of each option are indicated in Table 2-17. These are the total costs over the 10-year appraisal period and are inclusive of risk, contingency and optimism bias. These elements are discussed in more detail in sections 2.10 and 2.11.

A further breakdown of the costs can be found in the Financial Model in Appendix 11 and 12.

Table 2-17: Implementation costs

Cost component	Benchmark CAZ D	Preferred Option
Total implementation cost	-198,561	-14,482

(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

The capital and operating costs are significantly lower under the Preferred Option compared to the Benchmark CAZ D, accounting for £14.5m and £198.6m respectively.

2.8 Comparing the options

An NPV has been generated for both schemes through the combination of their associated costs and benefits. A positive NPV indicates that the scheme would bring about various benefits, whilst a negative NPV is associated with disbenefits. Table 2-18 and Table 2-19 indicate the NPV for the Preferred Option and the Benchmark CAZ D, respectively. Figure 2-1 provides a diagrammatic summary of the NPVs for both options.

Table 2-18: Preferred Option NPV

Impact to the user	Preferred Option
Air quality	2,341
Greenhouse gases	-518
Travel time	-48,261
Fuel and non-fuel VOC	-8,366
Indirect tax	-2,270
Bus improvements	34,071
Bus gate cost to user	-404
Impact to the government	
Indirect tax (wider public finances)	2,270
Bus gate revenue to government	404
Implementation costs	-14,482
NPV	**-35,215**

Notes: +ve values denote revenue; -ve values denote a cost

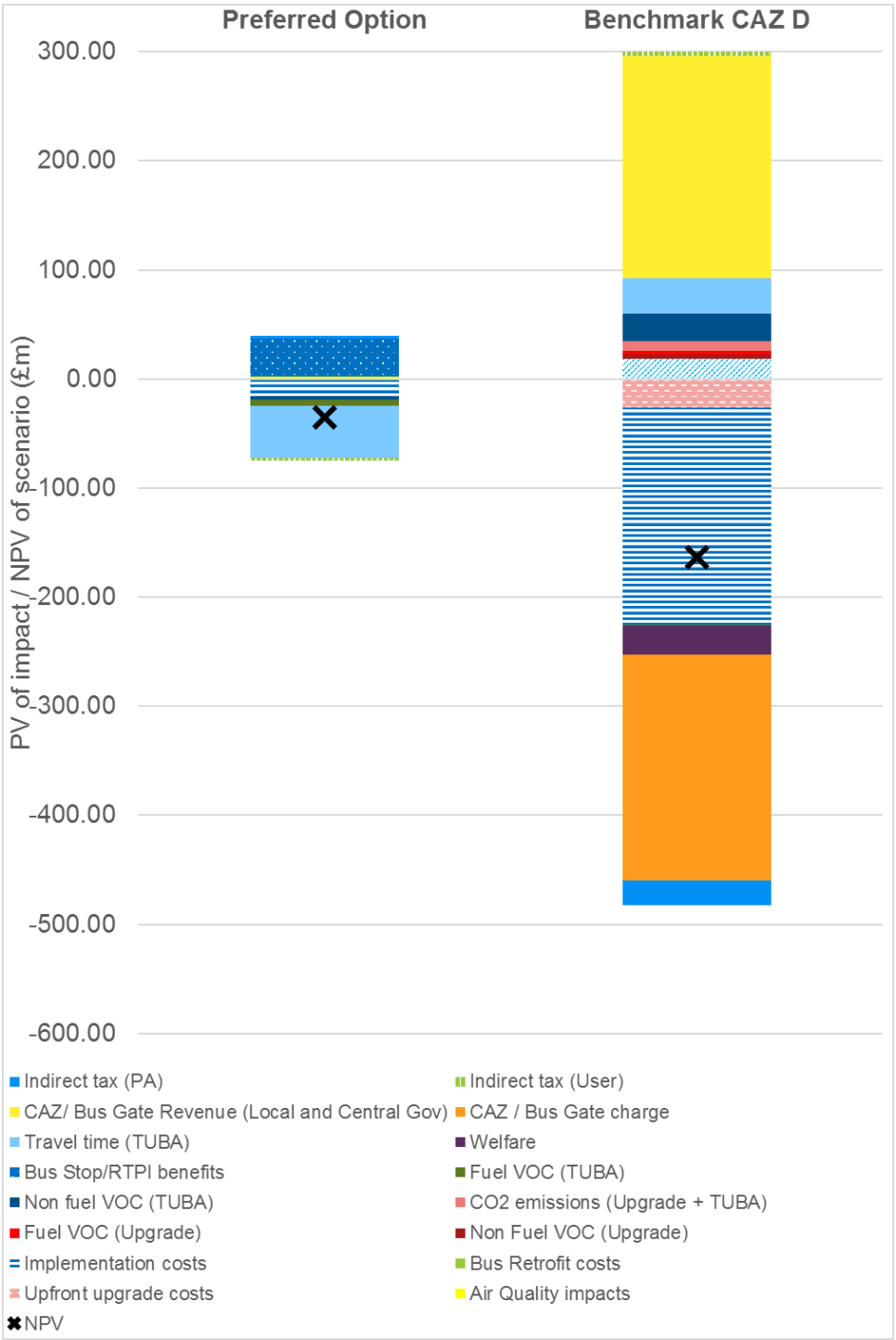
(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

Table 2-19: Benchmark CAZ D NPV

Impact to the user	Benchmark CAZ D
Air quality	18,868
Greenhouse gases	8,449
Travel time	32,989
Fuel and non-fuel VOC	31,593
Indirect tax	23,399
Welfare	-27,047
Vehicle upgrade	-26,399
CAZ charge cost to user	-206,641
Impact to the government	
Indirect tax (wider public finances)	-23,399
CAZ charge revenue to government	203,191
Implementation costs	-198,561
NPV (£000s)	**-163,557**

Notes: +ve values denote revenue; -ve values denote a cost
(Cumulative discounted impact (PV) from 2022-31, 2018 prices, discounted to 2019, £000s)

Figure 2-1: NPV for the Preferred Option and the Benchmark CAZ D



From an economic perspective, the Preferred Option performs better than the Benchmark CAZ D, where the Preferred Option has a significantly less NPV of -£35.2m compared to -£163.6m for the Benchmark CAZ D. The negative NPVs imply that the costs outweigh the benefits in both cases.

Although the Benchmark CAZ D is expected to deliver greater improvements in air quality than the Preferred Option, these benefits are outweighed by its significantly higher implementation and operating costs. Therefore, in relation to the secondary CSF of presenting value for money, it can be noted that the Preferred Option delivers this over the Benchmark CAZ D.

2.9 Non-quantifiable impacts

2.9.1 Wider impacts

Due to limitations in data and methodologies available, it was not possible to assess some impacts quantitatively, as so the following impacts have instead been assessed qualitatively:

- Air quality impacts outside of the modelling domain
- Active travel benefits
- Noise
- Accidents

It was found that both options will deliver additional air quality emission reductions outside of the modelling domain. The impacts in the Benchmark CAZ D are likely to have greater significance, both positively and negatively on the current assessment of air quality.

The impacts of active travel on both the Preferred Option and Benchmark CAZ D are likely to be limited as neither option directly incentivises modal shift towards active travel. It may in fact be a fallout from the improvements to bus infrastructure in the Preferred Option where private car users might shift to bus travel, which often is accompanied by additional walking to form the full journey.

Noise benefits might occur as a result of the reduction in traffic flow, particularly along the bus gate routes and within the CAZ boundary. However, this might be offset through noise disbenefits occurring in areas where traffic is rerouting through. There may also be a similar impact to the level of accidents in the North Staffordshire area. The impacts on noise and accidents are unlikely to be significant in light of a full impact assessment. Further details of these assessments can be found in the E1 and E3 reports.

Additional impacts were identified for the Benchmark CAZ D but were deemed less significant to be taken forward to full assessment. These included transaction costs and welfare loss associated with upgrading vehicles.

The full qualitative assessment can be found in the E1 report.

2.10 Risks and uncertainties

Economic modelling approximates the real world and assumptions are used to calculate future costs and benefits. Naturally, there will be uncertainties involving the validity of these assumptions, as well as those that are incorporated in the transport and air quality models,

where the outputs form the basis of much of the economic appraisal. Using data from areas outside of North Staffordshire to form assumptions or even using expert judgement where no data is available, are potential sources where uncertainty might arise.

A Quantitative Risk Assessment (QRA) has been undertaken to identify and cost for any possible risks to the project, for both the Preferred Option and the Benchmark CAZ D. The key risks to the project are based around:

- Deliverability
- Political acceptance
- Cost uncertainties

Three risk workshops were held and focussed on the identification of risks, mitigation of risks and the quantification of the risks. Risks were quantified based on the assumed cost to the project that would incur if the risk were to be realised. As a result, a quantified risk layer has been calculated and incorporated into the economic cost-benefit analysis. See the Management Case for further information on the QRA.

2.11 Optimism bias

Optimism bias (OB) should be applied to account for human's tendency to favour optimism, more specifically, where scheme costs and delivery time may be underestimated.

OB has been applied following TAG guidance. For the road infrastructure based elements of both options, an OB level of 15% has been assigned which is applicable to standard engineering scheme elements at OBC stage. For other equipment and development projects, as defined in the Green Book, an OB of 105% has been assigned to the elements of which this relates, taken as a midpoint between the lower and upper bounds that are suggested in the guidance. In this instance this relates to the IT elements of the schemes.

A sensitivity test adjusting the OB upper and lower bounds has been conducted. More details on this can be found in the section below and in the E1 report.

2.12 Sensitivity tests

Sensitivity tests have been undertaken to test the impact of altering assumptions underpinning the economic appraisal. The analysis involves developing lower and upper bounds for significant assumptions and input values used in the economic appraisal. The following sensitivity tests have been undertaken:

- Behavioural responses to a charging zone through a 0% vehicle upgrade scenario in face of a CAZ D
- Damage costs
- Carbon prices
- Welfare costs – associated only with the CAZ D option
- Scrappage cost and vehicle upgrade impact – associated only with the CAZ D option
- Optimism bias

The full sensitivity test assessments can be found in the E1 report and the E2 economic model.

Table 2-20 and Table 2-21 provide a summary output of the sensitivity tests undertaken for the Preferred Option and the Benchmark CAZ D respectively. The analysis demonstrates that both options are sensitive to the assumptions. However, the sensitivity tests demonstrate that uncertainty around parameters does not influence the relative comparison of the options in terms of NPV.

Table 2-20: Preferred Option sensitivity tests – NPV

Area of uncertainty	Description	Low	Central	High
Damage cost	Lower and upper bound damage costs from UK AQ damage cost update 2019	-37.25	-35.22	-29.15
Carbon price	BEIS low/high assumptions	-34.92	-35.22	-35.51
Optimism bias	For non-IT elements: low (3%), central (15%) and high (44%) For IT elements: low (10%), central (105%) and high (200%)	-33.69	-35.22	-38.87

(2018 prices, discounted to 2019, £m)

Table 2-21: Benchmark CAZ D sensitivity tests - NPV

Area of uncertainty	Description	Low	Central	High
Behavioural response	Vehicle upgrade is assumed to be zero	-	-163.56	-115.88
Damage cost	Lower and upper bound damage costs from UK AQ damage cost update 2019	-179.53	-163.56	-117.62
Carbon price	BEIS low/high assumptions	-160.12	-163.56	-158.99
Welfare cost	Low (0%), central (50%) and high (100%)	-136.51	-163.56	-190.60
Scrappage cost and vehicle upgrade impact	Low (20%), central (25%) and high (30%)	-155.06	-163.56	-178.16
Optimism bias	For non-IT elements: low (3%), central (15%) and high (44%) For IT elements: low (10%), central (105%) and high (200%)	-87.13	-163.56	-246.40

(2018 prices, discounted to 2019, £m)

2.13 Distributional analysis

The objective of the Distributional Impact (DI) Assessment is to identify how the benefits and costs are distributed among different groups, either from a social or economic perspective.

The DI appraisal consists of the following key indicators

- Air quality
- Affordability for businesses
- User benefits
- Personal affordability
- Accidents
- Noise
- Accessibility
- Severance
- Security

The DI process involves the following stages as shown in Table 2-21. The full detailed analysis of the DI assessment can be found in the E3 report.

Table 2-21: DI assessment process

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

2.13.1 Air quality

The air quality assessment was carried out quantitatively and was undertaken to determine the change in NO_2 emissions by Lower Super Output Area (LSOA) for both options. The analysis was undertaken for each income quintile and for vulnerable groups, in particular the low-income population, youngest (under 16) and elderly (over 65).

2.13.1.1 Preferred Option

The Preferred Option provides an overall improvement in air quality most notably within the central impact area. This is to be expected as the measures proposed as part of the Preferred Option target the A53 Etruria Road, Bucknall New Road and the A500 Victoria Road, all of which fall within the central impact area. Beyond the central impact area, the majority of LSOAs observe a slight improvement in air quality following scheme implementation, with a few LSOAs, predominantly situated adjacent to the A500, noting a small worsening in air quality. The extent of this impact is negligible in comparison to the 2022 Reference Case.

The Preferred Option reduces the impacts of air quality across all sensitive receptors tested, in particular, nurseries, playgrounds, public open spaces and nature reserves. The analysis suggests that there will be a disproportionate benefit for more deprived areas and areas with

higher numbers of children. All in all, the Preferred Option is expected to deliver positive impacts in air quality, whilst in fact benefiting particular vulnerable groups.

2.13.1.2 Benchmark CAZ D

The Benchmark CAZ D shows a more significant improvement in air quality. It too notes a greater change within the central impact area than compared to across the wider North Staffordshire area. With the introduction of the charging zone, non-compliant vehicles are likely to be discouraged from entering the charging zone, which covers the same area as the central impact area. Again, air quality improvements across the wider area is not of any great magnitude in comparison to the 2022 Reference Case.

The Benchmark CAZ D reduces the impact of air pollution across all sensitive receptors, specifically for residential education. This is a result of both Staffordshire University and Keele University being positively impacted from the scheme. The analysis suggests that the Benchmark CAZ D will not have a disproportionate impact on any vulnerable group although it can be noted that benefits might be greater for more deprived areas and areas with higher numbers of children.

2.13.1.3 Summary assessment

The analysis has revealed that both the Benchmark CAZ D and the Preferred Option will generate a positive distributional effect in terms of air quality. The most deprived areas, as well as the areas with the higher proportion of children, will experience the greatest benefits under both options. The Benchmark CAZ D is expected to generate a greater magnitude of benefits than the Preferred Option.

Table 2-22 summarises the distributional impacts of air quality as a result of the Benchmark CAZ D and Preferred Option.

Table 2-22: Air quality – summary assessment

Impact	Benchmark CAZ D	Preferred Option
Air quality	✓✓	✓✓

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ✖: *Slight adverse*, ✖✖: *Moderate adverse*, ✖✖✖: *Large adverse*

2.13.2 Affordability for businesses

Analysis undertaken to assess affordability for businesses is primarily a qualitative assessment of the perceived impacts to businesses. Where possible, data has been included to support the assessment and conclusions. However, given the complex responses by businesses and the myriad of other factors that will impact their decisions, businesses' responses cannot be certain.

2.13.2.1 Preferred Option

The measures proposed in the Preferred Option does not place a direct cost on vehicle owners although businesses are likely to be affected through having to reroute around the peak-time bus gates. This rerouting is likely to have a small adverse impact on businesses' vehicle operating costs through increased fuel and non-fuel related costs.

The main impact from the Preferred Option might be felt by businesses based in Fenton Industrial Estate accessing from the south during the peak periods when the bus gate is in

operation. However, this would represent a small proportion of all businesses within North Staffordshire and should not have a significant impact on affordability for businesses.

The only business type to see any direct impact are bus operators. Measures to encourage the use of buses, such as RTPI and retrofitted buses are expected to have a positive impact on bus patronage.

2.13.2.2 Benchmark CAZ D

The Benchmark CAZ D would significantly impact all businesses based within the charging area, the immediate surrounding area, and North Staffordshire as a whole. Those that rely on vehicles to move goods and services would be most affected as an introduction of a charge would increase businesses' costs. In order to avoid paying the CAZ charge, businesses will need to upgrade their vehicle to a compliant standard or adopt another approach such as altering their supply routes or supplier, relocating their business or exiting the market altogether. All behavioural responses will carry some burden to the business.

HGV and LGV vehicle types are most significantly impacted under the Benchmark CAZ D primarily due to the higher charge imposed and the higher cost of purchasing a compliant vehicle.

Micro and small businesses are also likely to be at greater risk from the implementation of the Benchmark CAZ D as they are less likely to have the available capital to purchase a compliant vehicle, they do not have large fleets where non-compliant vehicles could be redistributed to operate in areas outside of the CAZ boundary, and they are more likely to have locally-focused operations therefore facing the charge more frequently. This is of significant important in North Staffordshire as 92% of all businesses based within the CAZ boundary are classified as micro or small businesses.

Taxi drivers are noted to be some of the poorest in the community and so any additional cost to their operation would place further strain on their businesses and families.

It is anticipated that there will only be a limited impact on bus operators as the CAZ charge has been purposely set at a level where the charge can be absorbed by the bus operators to avoid any further withdrawals of operators from the North Staffordshire area.

Not only does the charge impose a direct cost on businesses but the subsequent rerouting around the charging zone could also impact their fuel and non-fuel VOCs. This impact is examined more thoroughly in the cost-benefit analysis.

2.13.2.3 Summary assessment

With the Benchmark CAZ D imposing direct costs to businesses through the introduction of a charge, it is apparent that the impact of the Preferred Option on business affordability is less. Micro and small businesses face a greater risk under the Benchmark CAZ D as the Preferred Option does not discriminate against vehicle age or type. The costs of rerouting to businesses under the Preferred Option are smaller than potential costs and induced behavioural changes imposed under the Benchmark CAZ D, Table 2-23 summarises these impacts.

Table 2-23: Affordability for businesses – summary assessment

Impact	Benchmark CAZ D	Preferred Option
Affordability for businesses	XX	X

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ×: *Slight adverse*, ××: *Moderate adverse*, ×××: *Large adverse*

2.13.3 User benefits

Results from TUBA have been used in the distributional assessment of user benefits, focussing on time benefits, VOCs, indirect tax and user charges at an LSOA level. Both the Preferred Option and Benchmark CAZ D are anticipated to significantly impact on traffic flows and as such, user benefits are an important consideration in this distributional analysis.

2.13.3.1 Preferred Option

Under the Preferred Option, the operation of peak period bus gates on Victoria Road and Etruria Road will lead to a mixture of improved and longer travel times. Whilst journeys that would otherwise utilise the bus gates are likely to be longer, it may be that journeys utilising adjacent routes make journey time savings due to reductions in overall traffic.

This user benefit analysis focussed on AM and inter-peak (IP) trips for cars and LGVs only. As a result, a more negative assessment under the Preferred Option may have been observed due to the one-way bus gate restrictions not being captured in the PM period. Nonetheless, the analysis noted a moderate adverse impact across all quintiles and so no specific distributional effect is experienced. Considering the size of impact however, the reduction in user benefits will be greatest for the most deprived households.

2.13.3.2 Benchmark CAZ D

The population predicted to disbenefit the most from the implementation of the Benchmark CAZ D lives within the CAZ boundary or its vicinity. This population is relatively poor and so these impacts will be exacerbated. The analysis suggests that a moderate adverse impact will be felt across all quintiles and so no specific distributional effect. However, the most deprived households will experience the greatest reduction in user benefits.

2.13.3.3 Summary assessment

Both options show a moderate adverse impact across all IMD quintiles and as such, show no disproportionate effect. Considering the size of these impacts however, the Benchmark CAZ D notes a much greater disbenefit to the most deprived quintile. The most deprived quintile will in fact experience an even greater impact as the same cost placed on the most deprived quintile compared to the least deprived will represent a greater proportion of their disposable impact and therefore a greater disproportionate effect. Hence it could be concluded that although both options will have an adverse effect on the most deprived households, the Benchmark CAZ D will have a greater disproportionate effect. Table 2-24 summarises these impacts.

Table 2-24: User benefits – summary assessment

Impact	Benchmark CAZ D	Preferred Option
User benefits	XXX	XX

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ×: *Slight adverse*, ××: *Moderate adverse*, ×××: *Large adverse*

2.13.4 Personal affordability

Personal affordability is concerned with changes in the monetary cost of travel which forms part of the decision-making process for travellers. The most significant impacts of the costs of travel are on young people, the elderly and low-income households. Although low-income households spend less money on transport in absolute terms, this expense can represent a larger proportion of their total income (Social Exclusion Unit, 2003). People with disabilities may also suffer significant disbenefits when faced with higher costs due to limited transport choices.

As North Staffordshire contains a larger proportion of low-income households than the national average, the potential impacts of the Preferred Option and the Benchmark CAZ D on personal affordability will be particularly important as they will impact accessibility and community severance.

2.13.4.1 Preferred Option

The Preferred Option will increase costs to individuals who have to reroute around the proposed bus gates through an increase in VOC (fuel costs and non-fuel related costs). The cost of this impact is relatively small. The Preferred Option may also provide positive indirect impacts to households through the improvements to bus infrastructure. Public transport is more commonly used by vulnerable people and so these improvements might have a positive distributional effect.

2.13.4.2 Benchmark CAZ D

The disbenefits to users noted in the section above, as a result of the Benchmark CAZ D, suggests that this option would have a greater disproportionate adverse effect on more deprived households. This analysis has been supplemented by including the impact of the CAZ charge and by using a proxy for all costs based on ownership of non-compliant vehicles.

It was found that poorer households make significantly more trips into the CAZ boundary and are more likely to own non-compliant cars. This therefore suggests that a higher proportion of costs will fall greatest on areas with greater levels of deprivation, greater numbers of elderly residents and those with disabilities. It is again important to note that the same cost placed on the most deprived quintile will represent a greater proportion of their disposable income and would therefore have an even greater impact.

2.13.4.3 Summary assessment

The Benchmark CAZ D is expected to disproportionally impact vulnerable groups through the imposition of a direct charge to travellers in a way that the Preferred Option does not. In fact, in terms of personal affordability, the Preferred Option may bring about some benefits to the most deprived quintile through improvements to bus infrastructure. The results of these impacts are shown in Table 2-25.

Table 2-25: Personal affordability - summary assessment

Impact	Benchmark CAZ D	Preferred Option
Personal affordability	XXX	X

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ✗: *Slight adverse*, ✗✗: *Moderate adverse*, ✗✗✗: *Large adverse*

2.13.5 Accidents

TAG guidance states that certain groups are known to be at greater risk of experiencing transport related accidents. These include children and the elderly (particularly, as pedestrians or cyclists), young males, people with a disability, Black and Minority Ethnic (BME) communities, people without access to a car and people on low incomes. The changes in traffic flow resulting from both the Preferred Option and the Benchmark CAZ D might lead to changes in accident rates.

2.13.5.1 Preferred Option

In the Preferred Option, potential accident risk impacts are concentrated in areas around the two proposed bus gates on the A53 Etruria Road and the A50 Victoria Road. The option results in a combination of benefits and disbenefits, as traffic is primarily rerouted rather than being removed through modal shift. However, there is an overall small net benefit. 2.2% of road links are predicted to experience a reduction in traffic flows greater than 10%, while 1.3% of road links are predicted to experience an increase. Roads where significant increases are predicted include Manor Street, Porthill Bank Road, and some road links which form connections to the A500. Traffic management measures will be implemented on the roads to the east and west of Victoria Road in order to ensure that the adjacent local communities are not adversely impacted by traffic rerouting through these areas when the bus gate is in operation. The scheme aims to alter the nature of the areas to signal to drivers to proceed with greater care and so minimise the level of accidents.

Distributional analysis of these impacts demonstrates that low-income households will benefit disproportionately, as will households with a registered disability, as both these areas are located in LSOAs with a high proportion of these groups. No distributional effects are predicted to occur for the over 65 and under 16 groups.

2.13.5.2 Benchmark CAZ D

The Benchmark CAZ D is substantially more aggressive, and as a result delivers small reductions in traffic flows across a wider area as the result of modal shift; together with decreases in traffic flows inside the boundary and increases outside as non-compliant vehicles reroute to avoid the charge. 9.3% of all road links in the modelled domain are predicted to experience significant reductions in traffic flows under this option.

As the CAZ boundary encompasses an area with a high proportion of low-income households and a high proportion of residents with a registered disability, these groups will benefit disproportionately from the scheme. The over 65 group will not benefit as much as other groups, whilst no distributional effects were predicted for the under 16 group.

2.13.5.3 Summary assessment

Both options are found to deliver disproportional benefits towards low-income households and residents with a disability. Due to the Benchmark CAZ D's greater impact on traffic flows, particularly within the CAZ boundary, it is expected that the impact on accidents as a result of this option is greater than that of the Preferred Option (see Table 2-26).

Table 2-26: Accidents – summary assessment

Impact	Benchmark CAZ D	Preferred Option
Accidents	✓✓	✓

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ✗: *Slight adverse*, ✗✗: *Moderate adverse*, ✗✗✗: *Large adverse*

2.13.6 Noise

The implementation of both the Preferred Option and the Benchmark CAZ D will lead to changes in traffic flows through rerouting of vehicles, potentially leading to changes in noise levels. Specific modelling of changes in noise has not been undertaken for either option. Instead, the change in Annual Average Daily Traffic (AADT) between the 2022 Reference Case and each option has been used as a proxy for changes in noise.

2.13.6.1 Preferred Option

In the Preferred Option, no road link is predicted to experience a change in traffic volume greater than 50% or change in speed greater than 10 kph; as such, this option is considered to have negligible impacts on noise.

2.13.6.2 Benchmark CAZ D

In the Benchmark CAZ D, no road link is predicted to experience a change in traffic volume greater than 50% or change in sped greater than 10kph. With the introduction of a CAZ, vehicle upgrades may lead to older (generally louder) vehicles being replaced with newer vehicles that are subject to tighter noise limits in accordance with Regulation (EU) No 540/2014. However, these changes are small and as such are not expected to result in a perceivable reduction in noise levels.

2.13.6.2.1 Summary assessment

Neither option is expected to produce significant noise impacts and so the DI from both options are negligible, as can be seen in Table 2-27.

Table 2-27: Noise - summary assessment

Impact	Benchmark CAZ D	Preferred Option
Noise	-	-

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ✗: *Slight adverse*, ✗✗: *Moderate adverse*, ✗✗✗: *Large adverse*

2.13.7 Accessibility

The approach for the appraisal of distributional impacts on accessibility involved a qualitative assessment of how the implementation of the Benchmark CAZ D and the Preferred Option may affect access to community facilities for vulnerable groups. An additional quantitative assessment was carried out for the Preferred Option only, focussing on the bus infrastructure improvements.

While there may be some indirect effects on public transport travel time or timetables due to changes in traffic volumes, there are no planned changes to scheduled bus timetables, routes

or fares included in either option. However, there is potential that changes to public transport services would be made by operators in response to either scheme to reflect changes in demand as an indirect effect that is not yet known. Neither of the options introduce physical barriers to the network and so any resulting limitations around travel are inherently associated with affordability related to the increased costs of travel by car or community transport.

2.13.7.1 Preferred Option

The A53 Etruria Road and A50 Victoria Road bus gates will act as a physical barrier to private vehicles but not to buses. However, limiting the bus gate restrictions to peak times and to one direction of travel only will help to mitigate any negative distributional impacts associated with private vehicle travel. Vulnerable groups using public transport might be positively impacted through faster journey times at peak times.

Pedestrian access to the existing bus stops along the A53 Etruria Road will be enhanced through improvements to the signalised pedestrian crossing facilities on this route.

Improvements to bus infrastructure could serve to improve accessibility through bus users as there will be an increased availability of information through RTPI as well as the provision of accessible kerbs at bus stops. The bus infrastructure measures associated with the Preferred Option are anticipated to deliver a disproportionate benefit to more deprived households, those with a higher proportion of children and disabled and those with a lower proportion of elderly residents

2.13.7.2 Benchmark CAZ D

As there are no direct changes to public transport proposed within the Benchmark CAZ D the impacts on accessibility have been assessed to be neutral.

2.13.7.2.1 Summary assessment

The Preferred Option actively looks to improve accessibility to vulnerable groups through enhanced RTPI facilities, accessible kerbs and bus gates. On the other hand, the Benchmark CAZ D provides no mitigating measures to dampen the negative impacts on accessibility associated with the CAZ charge and boundary. Therefore, the Preferred Option has a slight beneficial impact compared to the Benchmark CAZ D's impact of slight adverse (see Table 2-28).

Table 2-28: Accessibility - summary assessment

Impact	Benchmark CAZ D	Preferred Option
Accessibility	-	✓

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ×: *Slight adverse*, ××: *Moderate adverse*, ×××: *Large adverse*

2.13.8 Severance

Severance is defined as the separation of residents from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows. Community severance effects are not equally experienced amongst the people in an affected area, with disabled people, the elderly and children being particularly vulnerable to disruption in their travel

patterns. As the changes in severance associated with both of the options are relatively small, a full distributional analysis was not considered proportionate.

2.13.8.1 Preferred Option

The majority of severance impacts from the Preferred Option are improvements resulting from the diversion of traffic from congested road links, potentially improving the ability of pedestrians to take their preferred line to nearby amenities. As the bus gates will operate at peak times, benefits to severance will be felt particularly strongly at these times. The amenities affected cover a wide range of groups. In particular, residents using amenities on the A53 will benefit from the additional signalised pedestrian crossings along this road.

Manor Street is the only route to be assessed with a slight adverse impact on severance as it acts as a displacement route from the bus gate on the A50 Victoria Road. This route is of relevance as it acts as the entrance to Christ Church C of E Primary School and so will impact children. Additional measures form part of the Preferred Option to help alleviate the impacts of possible increased traffic flow on this route including the provision of new road humps, carriageway resurfacing and enhanced signage.

However, reductions in traffic are predicted along City Road and Victoria Road which will improve the ability of pedestrians to access nearby amenities, in particular the retail facilities along these routes.

2.13.8.2 Benchmark CAZ D

The Benchmark CAZ D leads to moderate changes in traffic flows across a wide area in the model domain, particularly around the City Centre. In particular, the reduction in AADT flows on the portions of Potteries Way which partly encircles the City Centre will improve accessibility to the wide range of amenities located in there, affecting all groups. Smaller improvements in severance are also noticed along a number of routes around the model domain.

However, displacement of traffic around the CAZ boundary leads to some areas of adverse impact. Of particular relevance are impacts on North Road, which will impact access to North Road Academy and Honey Bears Day Nursery, which are relevant to vulnerable parents with pushchairs and children.

2.13.8.3 Summary assessment

The Preferred Option is expected to produce a combination of low-magnitude, locally constrained positive and negative severance impacts. In contrast, the Benchmark CAZ D is expected to produce low-magnitude positive impacts over a relatively wide area with a small number of locally focussed negative impacts. As the measures in the Preferred Option are closely targeted on local areas of exceedance, the overall impacts on severance are smaller than those of the Benchmark CAZ D, which affects traffic flows across a larger area. The summary of these impacts are noted in Table 2-29.

Table 2-29: Severance - summary assessment

Impact	Benchmark CAZ D	Preferred Option
Severance	✓	✓

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ✖: *Slight adverse*, ✖✖: *Moderate adverse*, ✖✖✖: *Large adverse*

2.13.9 Security

Research evidence citied in the TAG guidance demonstrates that there are several groups with particular concerns about their personal security. Women, younger people, older people, people with disabilities and BME communities all tend to perceive risk more acutely when using public transport. Furthermore, public transport users tend to be from lower income groups, and as such may be disproportionately affected, even more so in the North Staffordshire region where it is one of the poorest in the country.

This section presents an assessment of improvements in security for public transport users, based on the measures included in the Preferred Option. The Benchmark CAZ D does not include any measures that will directly affect security when using public transport, so impacts from this option were scoped out.

2.13.9.1 Preferred Option

The Preferred Option includes a substantial investment in CCTV cameras at bus stops which will have a positive impact on both the actual and perceived security of bus users. It might also encourage those who previously had concerns regarding the security of the bus network to in fact utilise it.

The proposed CCTV camera locations are predominantly in areas with a relatively low-income population, with a high ratio of persons with disabilities and a high proportion of BME. As previously described, these demographic groups are likely to travel by public transport and therefore will benefit disproportionately from these security improvements.

2.13.9.2 Summary assessment

The implementation of CCTV cameras across the bus network in the Preferred Option will deliver benefits to bus users, who are often from vulnerable groups. There is no existing formal surveillance at the majority of bus stops within North Staffordshire and therefore the baseline level for formal surveillance can be considered to be poor. Installation of effective CCTV cameras at 71 locations across the study area will result in a high level of formal surveillance.

With no specific measures applied to enhance or detract from security in the Benchmark CAZ D option, the impacts to vulnerable groups in this scheme is neutral, as seen in Table 2-30.

Table 2-30: Security – summary assessment

Impact	Benchmark CAZ D	Preferred Option
Security	-	✓✓

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ✖: *Slight adverse*, ✖✖: *Moderate adverse*, ✖✖✖: *Large adverse*

2.14 Comparing the options

The overall impact to vulnerable groups is found to be more beneficial in the Preferred Option. The Preferred Option only notes disbenefits in both affordability areas and user benefits. The Benchmark CAZ D also notes disbenefits in these areas, but to a greater extent. Table 2-31 summarises the distributional impact analysis.

Table 2-31: Summary of the distributional analysis

Impact	Benchmark CAZ D	Preferred Option
Air quality	✓✓	✓✓
Affordability for businesses	XX	X
User benefits	XXX	XX
Personal affordability	XXX	X
Accidents	✓✓	✓
Noise	-.	-
Accessibility	-	✓
Severance	✓	✓
Security	-	✓✓

✓✓✓: *Large beneficial*, ✓✓: *Moderate beneficial*, ✓:*Slight beneficial*, -: *Neutral*, ✗: *Slight adverse*, ✗✗: *Moderate adverse*, ✗✗✗: *Large adverse*

2.15 Summary

The economic assessment determines that the NPV of the Preferred Option is -£35.2m compared with -£163.6m of the Benchmark CAZ D and as such, greater benefits are generated in the Preferred Option relative to its cost. The implementation and operational costs of the Benchmark CAZ D are significantly higher than that of the Preferred Option.

The main benefits related to the Preferred Option come in the form of improvements in air quality, distributional benefits related to bus infrastructure improvements and improved accessibility and security for vulnerable groups. Disbenefits associated with the Preferred Option include longer journey times resulting from the proposed bus gates and consequential rerouting.

On the other hand, the Benchmark CAZ D identifies its greatest benefits in improved air quality, improved travel time and reductions in accidents, particularly within the CAZ boundary. However, the Benchmark CAZ D brings about numerous disbenefits including a loss in welfare, reduced user benefits and disbenefits associated with both business and personal affordability.

Although the sensitivity analysis shows that the NPV of each option is sensitive to the assumptions, it demonstrates that the uncertainty around parameters does not influence the relative comparison of the options in terms of NPV.

Both options adhere to the primary CSF of reducing NO_2 concentration levels below the directed limit, however, the Preferred Option does so in the shortest possible time whilst also being better value for money than the Benchmark CAZ D and thus satisfying additional CSFs. Therefore, the Councils propose that this is the Preferred Option to be taken forward to FBC stage and implementation.

3 Commercial Case

3.1 Introduction

Stoke-on-Trent City Council (SoTCC), Newcastle-under-Lyme Borough Council (NuLBC) and Staffordshire County Council (SCC) are committed to working together to transform the urban area of North Staffordshire into a cleaner and healthier area.

In October 2018, Stoke-on-Trent and Newcastle-under-Lyme (the authorities with responsibilities for environmental health) were issued a Ministerial Direction to produce a local air quality plan to address their respective nitrogen dioxide (NO_2) problems. Given their proximity to one another, they were tasked with producing a joint plan.

As the highway authority for the Newcastle-under-Lyme area, SCC has been assisting the authorities and together, the three authorities have developed a plan to tackle NO_2 exceedances at the roadside – known as the North Staffordshire Local Air Quality Plan (NSLAQP).

This Plan will help to protect and promote the health of the local population by improving air quality and reducing the impact of air pollution on the environment. In so doing, the local authorities are complying with the UK Air Quality Plan and bringing NO_2 air pollution within statutory limits in the shortest possible time.

The joint approach has been necessary because it is recognised that air pollution does not respect local authority boundaries and therefore a consistent and co-ordinated approach is required to maximise air quality benefits for all people living and working in North Staffordshire. By working together, the Councils can also minimise the risk of unintended consequences and help to ensure, as far as possible, alignment between the NSLAQP and other authority strategies.

The NSLAQP for Stoke-on-Trent and Newcastle-under-Lyme comprises of a package of measures:

- A50 Victoria Road bus gate, operational Monday to Friday between 07:00-10:00 and 16:00-19:00. ANPR cameras will be used to restrict access except for buses, taxis and cyclists
- A53 Etruria Road two-lane bus gate, operational Monday to Friday between 07:00-10:00 and 16:00-19:00. ANPR cameras will be used to restrict access except for buses, taxis and cyclists
- Traffic management measures on roads to the east and west of Victoria Road, including:
    - Traffic calming
    - One-way restrictions
    - Speed restrictions
    - Weight restrictions
    - Extension of footways
    - Carriageway re-surfacing

- Transport improvements along the A53 Etruria Road in the form of a review of signal times, signalised pedestrian crossing facilities and the relocation of a bus stop to avoid unnecessary queuing
- Targeted bus retrofit programme where 75% of buses using Bucknall New Road and 100% of buses using Victoria Road will be retrofitted to achieve Euro VI emissions standards
- Bus infrastructure improvements will be installed on routes that pass through or are parallel to the identified exceedance locations. The improvements will include Real Time Passenger Information (RTPI) screens, new bus shelters, accessible kerbs at bus stops and installation of CCTV at bus stops.

An Ultra-Low Emission Vehicle (ULEV) exemption, allowing ultra-low emission vehicles to drive through the bus gate, will be assessed and if considered deliverable will be added to the preferred scheme in the Full Business Case (FBC). If this is added to the preferred scheme, information in relation to procurement will be approved in advance of the FBC.

The local authorities will also seek further funding through the Clean Air Fund (CAF) for additional measures that will look to mitigate any impacts that might arise as a result of the scheme.

A separate Ministerial Direction[14] concerns the retrofitting of buses operating along the A53 corridor. This is separately funded by JAQU and excluded from this Outline Business Case (OBC).

3.2 Purpose of this case

This Commercial Case presents the key services that are to be funded through the Implementation Fund. It describes the proposed delivery route for the key services and the preferred procurement strategy. It demonstrates that the Preferred Option can be effectively delivered through a workable and viable procurement strategy and sets out how the three Councils will work together to procure the necessary services.

3.3 Key services and procurement requirements

Where there are insufficient resources or skills in-house, works and services will need to be procured from external providers. The local authorities intend to utilise existing contracts and undertake appropriate tendering processes using existing frameworks where available, in order to procure services to progress the scheme to OBC. The use of existing contracts and frameworks will help to reduce the time taken in the procurement process and therefore adhere to the Ministerial Direction of delivering the scheme in the shortest possible timeframe.

In the development of the Preferred Option and preparation of the OBC, a number of key services have been procured using contracts that are already in place. Further details are provided in section 3.5 outlining these contracts to undertake the following activities:

- Project management support

[14]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746119/air-quality-no2-plan-direction-2018-implement-measures.pdf

- Transport modelling
- Dispersion modelling
- Preliminary design
- Business case reporting, including economic analysis and distributional impact analysis
- Automatic Number Plate Recognition (ANPR) data collection
- Stated preference (SP) surveys
- Risk workshops
- Design costing
- Communications and marketing support.

To progress the Preferred Option from OBC to FBC and to implement it, the Councils propose to make use of internal resources and utilise existing contracts and frameworks to carry out the following works and services:

- Project management support throughout the project
- Business case reporting to support development of the FBC
- Communications and marketing support including planned stakeholder engagement events between OBC and FBC
- Detailed scheme design and costing
- Implementation, maintenance and operation of the Preferred Option

3.4 Performance measures

3.4.1 Output based specification

The Commercial Case is based on strategic outcomes and outputs against which alternative procurement and contractual options are assessed.

The outcomes which the preferred procurement strategy and contract is based on are:

- Achieve cost certainty, or certainty that the scheme can be delivered within the available funding constraints
- Minimise further preparation costs with respect to scheme design by ensuring best value and appropriate quality
- Obtain contractor experience and input to the construction programme to ensure the implementation programme is robust and achievable
- Obtain contractor input to risk management and appraisals, including mitigation measures, to capitalise at an early stage on opportunities to reduce construction risk and improve out-turn certainty, thereby reducing risks to a level that is ‘as low as reasonably practicable’

3.5 Procurement strategy

A range of contracts are available to deliver the varying nature of the activities within the project. The local authorities propose to use these existing contracts and utilise existing frameworks which will expedite timescales of delivery. Where necessary, these frameworks and contracts can be tailored to address the requirements of the project, including adapting any terms and conditions.

3.5.1 Procurement management

Three levels of project hierarchy exist in relation to key decision-making such as procurement and approvals:

- The Joint Officer Group (JOG) – comprises of key officers and consultants involved in the project, chaired by the project Senior Responsible Officer (SRO)
- The Joint Advisory Group (JAG) – comprises of key members and senior officers of all three local authorities, chaired by a senior member of one of the three authorities
- The Cabinets and Chief Officer Delegated Decisions of the three authorities – where recommendations are taken for key decisions.

In addition to the above, support is provided from several internal teams within each local authority, including procurement, legal, finance, risk management, communications and engagement and delivery partners/consultants. These teams form sub-groups that liaise with both the JOG and JAG. The legal sub-group plays a key role in ensuring that the appropriate legal agreements are in place between the authorities and their respective contractors. The procurement sub-group will provide the opportunity for the procurement managers to oversee and deal with any issues that arise to ensure that timescales and budgets are met.

JOG, JAG, the Cabinets and the legal and procurement teams from each local authority have been involved in determining the preferred procurement strategy for the key services required to deliver the Preferred Option. This has included looking at the range of contracts and frameworks available.

Each lead authority/organisation will be responsible for the individual procurement requirements for each scheme element and this will be set out in the local authority Delivery Agreement and the agreement with the bus operators as described in the Management Case. The Delivery Agreement will be a key document that will be included in the FBC. The proposed procurement strategy has been discussed with Local Partnerships acting in a critical friend capacity and has been agreed by the three Councils who are committed to working together. This commitment has been demonstrated through the development of this OBC and the forming of the JOG and JAG, as discussed in the Management Case. These groups have an agreed Terms of Reference and have worked collaboratively to identify the Preferred Option and agree the preferred joint procurement strategy - this joint working arrangement will evolve and continue to exist, as discussed below.

3.5.2 Procurement options

The Councils, through agreement at the JOG and JAG meetings, propose to utilise existing frameworks and contracts where possible which will ensure rapid mobilisation. These existing contracts have already been demonstrated to deliver value for money and achieve quality

requirements. A summary of the existing frameworks and contracts available to the Councils are summarised in Table 3-1.

Single or open tendering can be used to procure works to provide a greater degree of competition, but this option can extend delivery timescales and prevents early contractor involvement.

Table 3-1: Existing frameworks and contracts

Framework/contracts	Contract length	Services covered
Crown Commercial Services (CCS) Project Management and Full Design Team Services (PMFDTS) (RM3741) (open to all local authorities)	May 2017 – May 2021	Awarded by NuLBC: Project management Transport modelling Dispersion modelling Business case reporting ANPR data collection SP surveys & analysis Risk workshops Communications & marketing support
Infrastructure+ (Awarded to Amey)	2014 – 2034	Awarded by SCC and available for use by SoTCC for the design, costing and delivery of all works on the local highway network within the Preferred Option. Works can be completed on the trunk road network through this contract following completion of a Section 6 agreement between the local highway authorities and Highways England. Highways England have indicated that this is their preferred delivery method
Midlands Highway Alliance (MHA) Professional Services Partnership 3 (MHA-PSP3) (Amey are on the Framework)	April 2019 – April 2022 with the possibility of a one-year extension	The framework was used to allow SoTCC to use Amey for the design and costing of the works on the local highway network included in the OBC
JMW contract	2017 – 2025 (with contract break points)	Awarded by SCC and available for SoTCC to use for the delivery of Real Time Passenger Information (RTPI)
JC Decaux Agreement	March 2002 - December 2022 with an option to extend	SoTCC's existing commercial contract for bus shelters
Crown Commercial Services Traffic Management Technology (Lot 2 and Lot 15 (RM1089)	October 2016 – October 2021	Framework available to use by SoTCC and SCC for delivery of ANPR cameras, CCTV and traffic data

Eastern Shires Procurement Organisation (ESPO) Framework, Lot 664-17, Lot 5 Highways, Transport and Logistics, (Goods and Services). ESPO Framework 628 – Security and Surveillance	To be determined	Framework available to use by SoTCC and SCC for delivery of ANPR cameras and CCTV
Stoke-on-Trent Street Lighting PFI Contract (SSE Contracting)	2003 for period of 25 years	The contract is awarded to SSE Contracting and is available for use by SoTCC for signs, VMS and Prism within Stoke-on-Trent
Stoke-on-Trent internal Highways Commercial Works Team		Commercial team within SoTCC available to deliver highway works within Stoke-on-Trent
Highways Multi-Lot Framework Contract (Stoke-on-Trent)	August 2019 and is a 2 year +1 +1 year contract, subject to performance monitoring	Available for use by SoTCC for highway works. Framework was OJEU tendered and a contractor would be selected from the framework through a mini tender process to ensure value for money
SOTCC Framework 'CCTV, Intruder Alarms and Access Control Services'	April 2020 and is a 2 + 1 +1 year term up to March 2024.	Available for the provision of all CCTV equipment requirements of SoTCC
CVRAS accredited (Clean Vehicle Retrofit Accreditation Scheme)		A competitive tender across the five CVRAS providers
Municipal Trading arrangements compliant with the Public Contract Regulations 2015	Contract arrangements reviewed every 3 years	Contract available for diffusion tube purchase and data analysis

3.5.2.1 Crown Commercial Services

Crown Commercial Services (CCS) operates a series of frameworks which are open to any public sector body across the UK and are free for the local authorities to use. The frameworks are fully EU compliant, saving time and money in conducting procurement exercises. The PMFDTS provides fast access to building, asset design and management services focused on improving value to the public sector. NuLBC appointed Sweco for the modelling and business case work through Lot 5 - Civil and Structural Engineering Services and Environmental Services. This lot covers core services such as civil engineering, structural engineering and public health engineering, as well as non-core service disciplines including, but are not limited to, environmental services advisors (including air), lead designers, principal designers, risk advisors and technical authors.

During implementation, CCS Traffic Management Technology (Lot 2) (RM1089) could be used to purchase and install the ANPR cameras required to monitor the bus gates and retrofitted buses and CCTV at bus shelters. This framework covers traffic signals and CCTV, parking and access control, street lighting, intelligent transport systems and professional services.

The CCS framework (Lot 15) Traffic Management Technology could also be used for traffic data collection. Existing equipment in Staffordshire and Stoke-on-Trent is supplied by CA Traffic who are on Lot 15.

The CCS framework uses simple call-off contracts where local authorities can either use a form of agreement based upon NEC3 Professional Service Agreement or a CCS standard form through direct award or mini-competition. Sweco, with their sub-consultants Ricardo, were direct awarded the work due to their prior experience in undertaking transport modelling and air quality modelling for the local authorities.

3.5.2.2 Infrastructure +

SCC chose Amey in March 2014 as its strategic partner of choice for Infrastructure+ (I+) following a rigorous and highly competitive twelve-month procurement process. It provides Amey with exclusivity to deliver capital works up to the value of £0.5m and the ability to deliver works above this value, with no fixed upper limit, subject to the demonstration of 'Best Value'. This is demonstrated on a scheme by scheme basis through the production of a Best Value Business Case which is considered for approval through the I+ governance boards. The partnership has been specifically designed to build capacity, add value and ensure highway projects are delivered in the most efficient manner. The partnership seeks to:

- Maintain and improve the condition and usability of physical assets
- Reduce cost of delivering the services and reach the lowest whole life cost of asset ownership
- Involve communities in decisions and delivery of infrastructure
- Improve customer satisfaction in SCC and to enhance its reputation

Amey is co-located in SCC's offices. Amey designers and specialists have worked alongside the three authorities and have been involved throughout the production of the OBC. The contract is also used by private developers (s.278 projects) offering a further 'commercial test' of the end-to-end value it provides as a design and or design and delivery solution. SCC remains a member of the MHA and uses it to provide an extra opportunity to benchmark I+.

I+ is set up in a way that means it is fully available to the City and Borough/District Councils to 'call-off' services as required without the need for further procurement. They can do this via SCC or directly to Amey. The specification provides for all elements of infrastructure and environmental professional/consultancy services and delivery of improvement or maintenance works.

3.5.2.3 Midlands Highway Alliance (MHA)

SCC and SoTCC are members of the MHA. SCC uses it to provide an extra opportunity to benchmark I+. SoTCC has used this framework to enable Amey to complete the design and costs included in the OBC.

3.5.2.4 Stoke-on-Trent Internal Commercial Team for Civil Engineering Delivery.
One procurement option available for the delivery of the Highway Civil Engineering works is to utilise SoTCC's in-house Commercial Team. The Commercial Team operate on a competitive commercial basis. They are both local, very experienced and have an excellent track record of delivering projects to time and budget; working from their own Highways Depot in Stoke-on Trent they operate with low overheads. This team either use their own resources for undertaking the work or using their OJEU compliant 'Highways Multi-Lot Framework Contract' in which they have access to up to 17 contractors within 5 Lots, depending on the type of work being undertaken.

3.5.2.5 Highways Multi-Lot Framework Contract
The £16m Highways Multi-Lot Framework Contract covers all highway construction works. The successful contractors have all submitted and met the required contract Quality and Health & Safety Assessment criteria. Contractors within each Lot are invited to submit a mini-tender for each new commission, whose award will be based solely on lowest price.

3.5.2.6 JMW Contract
RTPI can be delivered using the contract awarded by SCC to JMW as an 8-year contract ending in 2025 and can be used to deliver RTPI within Staffordshire and Stoke-on-Trent. The contact was procured via a full OJEU process. JMW finished first in all criteria as per the evaluation process, including quality, pricing and demonstration (60% quality and 40% price).

The contract allows for collaborative working, enabling SoTCC to complete their own due diligence to make a decision on whether to use of SCC's contract with JMW.

3.5.2.7 JC Decaux Agreement
The JC Decaux Agreement has been awarded by SoTCC for the provision and maintenance of all bus shelters in Stoke-on-Trent.

3.5.2.8 Eastern Shires Procurement Organisation (ESPO) Framework
The Eastern Shires Procurement Organisation (ESPO) Framework, Lot 664-17, Lot 5 Highways, Transport and Logistics, (Goods and Services) is available for ANPR and CCTV installation and maintenance. It has 26 suppliers but not all of whom will have the specific capability to bid for this commission. ESPO is a public sector owned professional buying organisation, offering 25,000 products, over 120 frameworks and bespoke procurement contracts. ESPO provide a standard form of contract and call-off terms which each organisation completes or slightly amends to suit each contract.

ESPO Framework 628 – Security and Surveillance is also available for the purchase and maintenance of CCTV cameras.

3.5.2.9 SOTCC Framework 'CCTV, Intruder Alarms and Access Control Services'
SoTCC's Framework 'CCTV, Intruder Alarms and Access Control Services' is available to use for the delivery of CCTV in bus shelters. This would ensure consistency and conformity with other equipment and systems purchased by SoTCC. The framework agreement was awarded to Bryan Enterprises Ltd t/a Security Services. This framework is currently used for the provision of all of SoTCC's CCTV equipment requirements.

3.5.2.10 Clean Vehicle Retrofit Accreditation Scheme (CVRAS)
There are currently five accredited suppliers of retrofit technology, but not all suppliers are able to fit technology to all types of buses/engines, thereby limiting the market. In addition to the retrofit works, some buses require an EFAN system which replaces the hydraulic fan systems and ensures efficient operation of the bus post retrofitting. EFAN systems are not CVRAS accredited but funding for their fitment has been accepted for appropriate vehicles under a range of Clean Bus Technology Fund (CBTF) schemes run around the country. There is only one supplier for EFAN. The CBTF is being utilised as a template for eligibility and monitoring.

3.5.2.11 Stoke-on-Trent City Council Street Lighting PFI Contract
This complex contract awarded to SSE Contracting is now a well-established £103m PFI contract in the City, having operated successfully since 2003. It is a cost-effective solution for the design, build and operation of SoTCC's Lighting and Street Furniture. This contract includes the efficient and cost-effective design, installation and maintenance of new illuminated and non-illuminated signs on the highway over the 25-year contract.

3.5.2.12 Municipal Trading Arrangements compliant with Public Contract Regulations 2015
The diffusion tubes and the analysis of them is undertaken via Municipal Trading arrangements between local authorities. SCC procure diffusion tubes for both SoTCC and NuLBC (along with many other local authorities). Through these arrangements, the Councils remain compliant with the Public Contract Regulations 2015 and the Council's own Constitution. Municipal trading ensures value for money as it drives value from volume which has been proven through the comparison of quotations for diffusion tubes for Local Air Quality Management purposes.

3.5.2.13 Market capacity
It is acknowledged that there is some risk regarding market capacity, however, feedback from supplier workshops hosted by JAQU and other local authorities suggest there is sufficient capacity in the market to deliver the required works and services. To minimise risk, early engagement with the market has commenced and will take place through to FBC. The procurement risks are discussed further in section 3.7.

3.5.3 Procurement routes
The procurement of the deliverables associated with the development of the OBC and FBC are summarised in Table 3-2. JAQU and Local Partnerships approved the use of Amey to help the authorities prepare indicative costs for the OBC.

Table 3-2: Procurement of deliverables to OBC and FBC

Deliverable	Company	Procurement route	Lead authority	Status
Transport modelling	Sweco	CCS Framework	NuLBC	Live
Dispersion modelling	Sweco & Ricardo	CCS Framework	NuLBC	Live
Business case reporting	Sweco	CCS Framework	NuLBC	Live

ANPR data collection	Sweco & Nationwide Data Collection	CCS Framework	NuLBC	Complete
Stated Preference survey implementation	Sweco & Watermelon Research	CCS Framework	NuLBC	Complete
Project management support	Pete Price	Direct award	NuLBC	Live
Preliminary and detailed design and costing	Amey	Infrastructure+	SCC	Live
Communications and marketing support	Sweco & Ricardo	CCS Framework	NuLBC	Live

The proposed procurement route for the implementation of the key services/deliverables within the Preferred Option is summarised in Table 3-3. This will be reviewed by JAQU and Local Partnerships and once the FBC is approved the contracts with the selected contractors will be signed.

Table 3-3: Proposed procurement route of key services/deliverables at implementation

Proposed procurement route	Key service/ deliverable	Indicative cost of deliverables (excluding contingencies, risk, inflation)	Lead contracting authority	Local approval processes
Amey (I+) proposed for SCC. SoTCC preferred route - to be confirmed	Highway Civil Engineering Works on the local highway network	Around £3m + £1m ten-year maintenance (Staffs and Stoke combined total)	Joint SCC and SoTCC	SoTCC Cabinet approval / SCC / I+ Board
SoTCC Lighting PFI contract	Signs, Prism, VMS on SoTCC's local highway network	£1m install + £170k ten-year maintenance (SCC, SoTCC and Highways England combined total)	SoTCC	SoTCC Chief Officer Delegated Approval
Supplier to be confirmed	Direction signing on trunk road	Cost included in the total above	Highways England	Highways England approval process

Eastern Shires Procurement Organisation (ESPO) Framework, Lot 664-17, Lot 5	ANPR cameras	£650k install + £270k ten-year maintenance + £180k 5-year replacement (Staffs and Stoke combined total)	SoTCC	SoTCC Cabinet Approval and SCC Chief Officer Delegated Approval
Clean Vehicle Retrofit Accreditation Scheme	Bus retrofit	£0.96m	Bus operators (First, D&G Scraggs and Stantons)	Bus operator approvals
JMW	RTPI	£500k install + £300k ten-year maintenance	SCC	SoTCC Cabinet approval
J C Decaux	shelters	£0	SoTCC	SoTCC Chief Officer Delegated Approval
SoTCC Framework 'CCTV, Intruder Alarms and Access Control Services'	CCTV	£280k install + ten-year maintenance	SoTCC	SoTCC Chief Officer Delegated Approval
Municipal Trading Arrangements compliant with Public Contract Regulations 2015	Diffusion tubes	£470k+ ten-year data analysis	NuLBC and SoTCC	NuLBC and SoTCC Chief Officer Delegated Approval
CCS RM1089 - Traffic Management Technology 2 – Lot 15	Traffic counts	£73k install + £200k operation	SoTCC and SCC	SCC and SoTCC Chief Officer Delegated Approval

3.5.3.1 Highway Civil Engineering Works

It is proposed that the Highway Civil Engineering works will be procured through either or both of the following:

- Staffordshire Infrastructure+ Contract with Amey

- Stoke-on-Trent internal Highways Commercial Works Team

It is proposed that the design, delivery and maintenance of physical measures on the local highway network within Staffordshire will be delivered by Amey through the County Council's I+ partnership. This would include the purchase, installation and maintenance of advanced direction signs on Staffordshire's local highway network at Porthill and on the A527 at Wolstanton and towards Newcastle-under-Lyme town centre. The supply chain for signs that is expected to be chosen by Amey would be agreed in their Best Value Business Case.

As the project is valued over £500,000 a project specific Best Value Business Case would need to be considered by the I+ Operational Commissioning Board/Strategic Partnership Board before final approval is given to use Amey. If SoTCC choose to use the I+ partnership for detailed design and delivery, they will also require Cabinet approval.

The benefit of using Amey is that they have already engaged in ECI for the project to understand the key constraints and provide construction support. Access to the I+ framework has already been beneficial to the project in undertaking additional ground investigation works, initial designs and costs, avoiding lengthy tendering processes. Amey will continue to provide ECI until a procurement route is selected.

SoTCC could choose to utilise Stoke-on-Trent City Council's in-house Commercial Team, rather than I+. This team has the option of either using their own resources for undertaking the work or they can draw on their OJEU compliant Highways Multi-Lot Framework Contract. The Commercial Team have an excellent track record of delivery of projects to time and budget, working from their own Highways Depot in Stoke-on Trent they operate with low overheads.

It is proposed that the installation of the advanced direction signs on the trunk road would be delivered by the chosen contractor through a Section 6 agreement with Highways England allowing the local authority's contractor to work on Highways England's network. Alternatively, Highways England could choose to use their own contractor through a Section 274 agreement. The purchase of the advanced direction signs is expected to be through Highways England's own panel of suppliers who they would receive quotes from and assess tenders based on quality and value for money. Further details will be confirmed at FBC.

3.5.3.2 Signs, Prism and Variable Message Signs (VMS) in Stoke-on-Trent

The majority of the signs on the local highway network that are required for this project are at locations that are maintainable by SoTCC. The use of Stoke-on-Trent City Council Street Lighting PFI Contract for the procurement of advanced direction signs, Variable Message Signs and Prism signs in Stoke-on-Trent is therefore proposed as the preferred procurement route. The contract has already been awarded to SSE Contracting which will help to reduce delays in procurement. The specification for the VMS signs has already been established through a very recent procurement exercise by SoTCC.

If signs are not designed and installed by the PFI contractor they would need to be subject to additional charges for checking, and accruing onto the Contract, which would add to delay in their installation.

SoTCC is contractually obliged to use the PFI for all street lighting changes and new illuminated street furniture including signs and bollards. SoTCC retains the option to seek separate tenders or quotations for all non-illuminated street furniture. However, due to the size and purchasing

power of SSE, they have demonstrated value for money on previous cases where separate quotations have been sought.

3.5.3.3 ANPR cameras

In order to minimise delays, the preferred procurement route for ANPR is the ESPO Framework. The main advantage is that this will ensure that there is compatibility of the camera specification with SoTCC's existing back-office hardware and software. There is the option to make a direct award or seek a mini tender.

ESPO provide a standard form of contract and call-off terms which each organisation completes or slightly amends to suit each contract. This again saves time and costs related to the drafting of new agreements by SoTCC's legal team.

Each Lot within the ESPO Framework has evaluated one or more suppliers against criteria such as financial stability, track record, experience and technical and professional ability within their market. This framework is structured to enable customers to define their own specific requirements and either make a direct appointment or run a further competition to identify the best solution if required.

3.5.3.4 Bus retrofit

First Bus Group have recently undertaken a competitive tender across CVRAS providers for the whole of the fleet. First have identified a single supplier based on cost and experience to supply and fit CVRAS accredited retrofit solutions to the fleet. For the E Fans solution there is only one supplier in the market making this equipment.

First provided two comparator prices as evidence to show best value for the chosen supplier. Costings for both technologies have been discussed with Defra officials within JAQU and are in line with other similar projects undertaken by Councils in the UK. It is expected that the other main operator, D&G, will follow the same process.

The local authority will enter into a legal agreement with the bus company to secure the retrofit of qualifying buses with appropriate emissions abatement technology to bring them up to Euro 6 emission standards. The agreement will detail the financial arrangements; monitoring, reporting and change; deliverability and technical consideration. Contract management procedures will be active throughout the contract.

3.5.3.5 Real Time Passenger Information

The preferred procurement route for RTPI is the contract awarded by SCC to JMW through a full OJEU procurement process. This will speed up the process of delivery and is expected to offer value for money. It will ensure a consistent approach to RTPI delivery across North Staffordshire, making sure that any new infrastructure ties in with existing infrastructure within Staffordshire. An open procurement process may not fit with the current RTPI provision in Staffordshire.

3.5.3.6 Bus shelter

The preferred procurement route is to utilise the existing JC Decaux Agreement. No capital or maintenance costs are allocated to this element of the project as the proposal is that the 17 required sites will be prioritised for shelter provision and sought as part of a refreshed Agreement with JC Decaux. This is the most appropriate option that is expected to enable quick

delivery and demonstrate good value for money. An open procurement exercise would add time to delivery and ongoing maintenance costs and does not fit with SoTCC's management of bus shelters in the city

3.5.3.7 CCTV

The Preferred Option is to use the existing SoTCC framework that is available to use for the purchase and maintenance of CCTV at bus shelters. CCTV units and ancillaries such as communications to the CCTV hub are expected to be included under the Framework. Open procurement has been discounted due to the availability of this framework.

The ESPO Framework 628 – Security and Surveillance could be utilised, but the SoTCC framework is preferred due to delivery timescales and consistency/conformity with other equipment and systems purchased through SoTCC's own framework.

3.5.3.8 Diffusion tubes

The preferred route is the use of the existing Municipal Trading Arrangement with SCC. The quality of analysis is key to the performance of this contract, the spread in the bias correction factors and the precision of tubes analysed in previous years has been considered. Additional information on the QA/QC framework that is used to evaluate the performance of analytical laboratories that supply and analyse the diffusion tubes, namely the AIR-PT scheme is considered. This is completed in accordance with the procedures detailed in Local Air Quality Management Technical Guidance TG16.

The performance is reviewed annually upon collation of the annual results. The contract arrangements are reviewed every 3 years to ensure value for money is being maintained.

3.5.3.9 Traffic counts

The preferred procurement route is Crown Commercial Services (CCS) RM1089 - Traffic Management Technology 2 – Lot 15. SCC recommend a direct award to CA Traffic who are on the framework. SCC have compared the pricing of CA Traffic against alternate suppliers on the RM1089 catalogue, and it is considered that value for money can be achieved. CA Traffic already support and maintain existing equipment within Staffordshire and Stoke-on-Trent and there are benefits of maintaining continuity of the supplier. Loop cutting and the installation of cabinets is expected to be completed by Telent Ltd in Stoke-on-Trent and Crown Cutting in Staffordshire.

3.6 Payment mechanisms

3.6.1 Key Performance Indicators

Part of the agreed procurement strategy includes the use of Key Performance Indicators (KPIs) once the preferred contracts have been approved. This aims to motivate contractors and suppliers to deliver value for money. The KPIs will vary with each contract but it is expected that they will be focussed on:

- Client satisfaction – quality of output
- Client satisfaction – availability
- Time – delivery to agreed programme
- Cost – delivery to agreed budget

- Innovation
- Social value

For example, there are specific KPIs for capital schemes awarded through the I+ partnership. However, generally I+ contract awards are primarily based on performance within the wider service. Each month, the Delivery Partnership Boards for the various I+ activities meet and review the performance of each service area and collaboratively work together on delivering improvement.

The I+ partnership is based around a standard contract but is subject to governance arrangement with agreed long-term objectives and outcomes that will inform contract performance targets and payments.

3.6.2 Payment terms

The payment schedule and mechanism will be in line with the provisions of the chosen contracts and frameworks. Payments for systems and infrastructure provision are expected to be based on delivery milestones. There is expected to be flexibility in contract payment terms over the life of the project as changes might be required to the operation of the schemes to follow government policy or as a result of behavioural change.

The terms of payment will be in line with the local authorities' standard terms of payment. Payment will be made to the contractor/supplier by monthly valuation with a BACS payment within 30 days after the due date for payment, receipt of invoice or delivery of goods/services.

Sub-contracts within a contract, for the purpose of fulfilling the main contract specification, shall also require payments to be made by the contractor to the sub-contractor within a specified period not exceeding 30 days from the receipt of a valid invoice.

The contractor will be expected to provide regular information outlining how the activity on the programme relates to the operation of the programme before any payments are approved.

Allocated risks will be tied into the payment approach where payments could be withheld if deliverables are not considered to be met and contractors are expected to hold appropriate levels of insurance provision in case of such risks being realised.

The details relating to financial arrangements with suppliers will be duly updated at the FBC stage.

3.7 Risk allocation and transfer

The risk registers are discussed in the Management Case and attached in Appendix 18 and 20. It is a live document that will be updated regularly throughout the life of the project to ensure risks are identified and mitigated through effective programme management. The key risks to the project include:

- Highways England insist on having network upgrades
- Design and build procurement risks and public criticism due to the coronavirus
- Public/business acceptance to bus gates and criticism of the scheme

- Timescale and delay issues relating to retrofitting, terms and conditions, permits, roadworks, detailed design and road safety audits
- Insufficient funding from JAQU and higher than expected utility costs
- Implementation issues including camera interface software, power location, data protection, back office agreements and bus gate enforcement
- Scheme cost increase related to Victoria Road community consultations and introduction of ULEV bus gate exemptions

Three risk workshops were led by Bentley Project Management and attended by officers from each of the authorities who have expertise on the measures to be delivered in the Preferred Option. Each workshop covered the following areas:

- Identification of the risks
- Mitigation of the risks
- Quantification of the risks

Following these workshops, a risk register and Quantified Risk Assessment (QRA) was produced and analysed against the required contingency needs for the project. An effective risk management strategy will be in place to minimise the impact of risks whilst ensuring potential opportunities are maximised. The risks have been categorised and allocated an owner to ensure that they are managed effectively.

The authorities' approach to risk is dynamic and proactive. Identified risks are not just accounted for through financial provisions but are managed and mitigated against in the first instance.

Table 3-4 outlines the key risks identified at the OBC stage in the process. It describes how these risks will be managed between OBC and FBC.

It is considered that the risks identified in the risk register are currently owned by the three authorities or JAQU as the Implementation Funding agreement has not been finalised and delivery timescales have not been approved. Once the individual contracts have been approved, risks will be apportioned appropriately between the contractors and the local authorities. During implementation it is expected that risks will be allocated to the party that is best placed to manage them. Risks will be reviewed at contract award stage before FBC approval through a further risk workshop. A final shared risk register will be produced at FBC to allocate ownership and determine the value of the residual risks to be included within target costs.

Table 3-4: Risk allocation

Risk	Risk allocation at OBC	Description
Highways England insist on having network upgrades	JAQU and DfT	Delays to the project related to extended Highways England negotiations and new junction improvements, resulting in a requirement for increased funding from JAQU or other DfT funding sources
Design, build, procurement risks and public criticism due to the coronavirus	JAQU	Decisions related to progressing or delaying the scheme due to coronavirus would be made by JAQU
Public/business acceptance to bus gates and criticism of the scheme	Local authorities	Resources will be provided by JAQU to enable intensive consultations managed by the local authorities
Timescale and delay issues relating to retrofitting, terms and conditions, permits, roadworks, detailed design and road safety audits	Local authorities	Management procedures in place through the governance process
Insufficient funding from JAQU and higher than expected utility costs	JAQU and Local authorities	Local authorities will need to review project delivery timescales and costs in accordance with final JAQU funding approval
Implementation issues including camera interface software, power location , data protection, back office agreements and bus gate enforcement	Local authorities	Management procedures in place through the governance process
Scheme cost increase related to Victoria Road community consultations and introduction of ULEV bus gate exemptions	JAQU and local authorities	Resources will be required from JAQU to deliver scheme amendments between OBC and FBC. If these resources are not approved, the local authorities will manage feedback to MPs and local communities

3.8 Contract length

A key requirement for the successful implementation of the project is compliance with NO_2 concentration limits within the shortest possible time and therefore the Councils will ensure delivery is as quick as possible.

An indicative programme can be found in Appendix 14, which outlines the timescales for the delivery of the Preferred Option. The key milestones and associated dates are provided in the Management Case.

The programme includes the anticipated duration of each of the contracts to allow for all elements of the scheme to be delivered within the designated timeframe. Break clauses will be considered during the drafting of individual contracts.

By using existing frameworks and contracts and engaging early with contractors, particularly those who already have a relationship with the three authorities, the risk of extended procurement processes and costs are minimised, helping to deliver additional programme certainty.

3.9 Human resource

Some services have been resourced internally within the local authorities such as transport planners, environmental health officers, air quality officers, traffic managers, finance, legal and procurement personnel.

Other services have been resourced externally through contracted consultants. Their fees have been agreed either through the Framework of the contract or through the contract itself. Revenue costs have been factored into the final cost and are presented in the Financial Case.

3.10 Contract management

The contracts procured fall under the local authorities' responsibility to ensure that the contract scopes and budgets are adhered to. The three Councils will work together through the governance process identified in the Management Case in the monitoring of the contracts. Support in this is provided internally by the local authorities' designated project manager, transport planners, environmental health officers, air quality officers, traffic managers, procurement, legal and finance teams.

To date, the NEC3 suite of contracts has been used to procure the relevant consultants and the Councils plan to continue using the NEC3 suite of contracts to develop and deliver the Preferred Option. This form of contract is well understood through the supply chain and relies on a pre-defined risk register to allocate and manage anticipated risk. It is currently expected that the engineering works will be awarded under the NEC3 suite, utilising the 'Engineering and Construction Contract (ECC), Option C – Target Cost with Priced Activity Schedule'.

The construction contract will be managed in accordance with SoTCC and SCC's Contract Management Manuals. The contract data will define the works information for the contract that will include scheme drawings and the specification.

Any failure on the part of the service provider to deliver contracted services on time, to specification or price then contract management will intervene. Contract failures will be

investigated thoroughly with any disputes or disagreements between the parties resolved in accordance with the outlined arbitration process.

Successful delivery of these contracts relies on high quality project management skills with cost control expertise and sufficient support services in place. This is required throughout the project's lifespan and will be carried out through the governance process identified in the Management Case.

3.11 Procurement success factors

Throughout the lifecycle of the project, the identified governance arrangements described in the Management Case will track, monitor and audit progress and quality.

The JAG will receive updates on the status of the outputs (and the likelihood of benefit realisation), considering them against the primary and secondary Critical Success Factors (CSFs) and expected benefits (as described in Section 1.11 of the Strategic Case).

During project implementation, the JOG will continue to liaise with JAQU's Account Manager to determine and agree any appropriate actions that might be required to maintain progress in accordance with the requirements of the Ministerial Direction and grant conditions.

3.11.1 Change management

Where changes to contracts are required in order to deliver the NSLAQP, these will be managed through a structured change management process. To ensure there is control over any contractual changes, the JOG will review and discuss necessary changes and the SRO will have delegated powers to authorise changes associated with cost or programme within a threshold of the agreed contract terms. This threshold will be agreed at FBC.

3.11.2 Social value

The Public Services (Social Value) Act 2012 requires bodies who commission public services to think about how they can also secure wider social, economic and environmental benefits. This is supported by SCC (and their contractors Amey), SoTCC and NuLBC.

As part of the procurement strategy for the procurement activities outlined in the Commercial Case, Social Value will be considered in the evaluation of any tenders with the aim of maximising the Social Value opportunities from the investments made in delivering the NSLAQP.

SoTCC's Stronger Together message provides a clear vision for the city and its objectives provide a framework and set of principles through which the Council delivers its services and a template for viewing Social Value in the City. Sitting beneath this vision are five strategic priorities and these set the agenda for SoTCC's interventions:

- Support vulnerable people in our communities to live their lives well
- Enable our residents to fulfil their potential
- Help businesses to thrive and make our city prosperous
- Work with our communities to make them healthier, safer and more sustainable
- An innovative and commercial council, providing effective leadership to help transform outcomes

The Council recognises that its procurement activity can play an important role in delivering the Stronger Together objectives.

Amey's Social Value Plan sets out their plan to achieve their goal through living their values and thereby maximising on the huge potential they must create positive social impact in the communities in which they operate. It is guided by the following commitments:

- Social value will form an integral part of our overall business strategy, corporate planning and decision making
- We will engage our employees to understand our social value policy and priorities, and how these are relevant to their day-to-day work
- We will embed social value into procurement activity

3.12 Benchmark CAZ D

Initial investigation demonstrates that the Benchmark CAZ D option would require a complex legal agreement which could add around one year to the programme. The Preferred Option is a simpler commercial procurement exercise and can be delivered quicker.

A lengthy procurement process would also be required to deliver a CAZ. The Benchmark CAZ project plan is provided in the Management Case and outlined in more detail in Appendix 14. It identifies that a turnkey solution for the back office function, cameras and civil works would take up to 17 months from starting the design and specification to awarding the contract. The process would include:

- Design and specification for a turnkey solution
- Approval of specification
- Supplier engagement
- Publish tender
- Tender evaluation
- Cabinet approvals
- Award of contract

The procurement and installation of ANPR cameras including operation and maintenance would be part of a turnkey solution utilising the appropriate framework. The supporting systems would include supporting software to interface with local and external systems and host data. The CAZ payment system would be provided centrally by JAQU and the associated pay.gov.uk central payments system.

The turnkey solution would include the final design and installation of signage on the strategic and local road network and enforcement of CAZ charges. This would be the most efficient manner of delivery for a joint project involving three authorities and where only two of those have the legal powers to deliver a CAZ.

Procurement would be led by SoTCC with a procurement sub-group to support the process. the project would also need to procure specialist legal support to provide advice to develop

charging orders. The complexity of the arrangements would necessitate each local authority to procure additional legal resources as the existing in-house resources would be insufficient.

Challenges to procurement include the operational level CAZ agreement and the cost recovery model which are not yet fully developed by JAQU, which may result in changes to responsibilities and there being limited experience within the sector that can be drawn upon as specific operational parameters have evolved since initial procurement was undertaken by Leeds and Birmingham. There is a lack of published business cases from consortium projects upon which to take best practise.

4 Financial Case

4.1 Introduction

Stoke-on-Trent City Council (SoTCC), Newcastle-under-Lyme Borough Council (NuLBC) and Staffordshire County Council (SCC) are committed to working together to transform the urban area of North Staffordshire into a cleaner and healthier area.

In October 2018, Stoke-on-Trent and Newcastle-under-Lyme (the authorities with responsibilities for Environmental Health) were issued a Ministerial Direction to produce a local air quality plan to address their respective nitrogen dioxide (NO_2) problems. Given their proximity to one another, they were tasked with producing a joint plan.

As the highway authority for the Newcastle-under-Lyme area, Staffordshire County Council has been assisting the authorities and together, the three authorities have developed a plan to tackle NO_2 exceedances at the roadside – known as the North Staffordshire Local Air Quality Plan (NSLAQP).

This Plan will help to protect and promote the health of the local population by improving air quality and reducing the impact of air pollution on the environment. In so doing, the local authorities are complying with the UK Air Quality Plan and bringing NO_2 air pollution within statutory limits in the shortest possible time.

The joint approach has been necessary because it is recognised that air pollution does not respect local authority boundaries and therefore a consistent and co-ordinated approach is required to maximise air quality benefits for all people living and working in North Staffordshire. By working together, the Councils can also minimise the risk of unintended consequences and help to ensure, as far as possible, alignment between the NSLAQP and wider authority strategies.

The NSLAQP for Stoke-on-Trent and Newcastle-under-Lyme comprises of a package of measures:

- A50 Victoria Road bus gate, operational Monday to Friday between 07:00-10:00 and 16:00-19:00. ANPR cameras will be used to restrict access except for buses, taxis and cyclists
- A53 Etruria Road two-lane bus gate, operational Monday to Friday between 07:00-10:00 and 16:00-19:00. ANPR cameras will be used to restrict access except for buses, taxis and cyclists
- Traffic management measures on roads to the east and west of Victoria Road, including:
    - Traffic calming
    - One-way restrictions
    - Speed restrictions
    - Weight restrictions
    - Extension of footways
    - Carriageway re-surfacing

- Transport improvements along the A53 Etruria Road in the form of a review of singal times, signalised pedestrian crossing facilities and the relocation of a bus stop to avoid unnecessary queuing
- Targeted bus retrofit programme where 75% of buses using Bucknall New Road and 100% of buses using Victoria Road will be retrofitted to achieve Euro VI emissions standards
- Bus infrastructure improvements will be installed on routes that pass through or are parallel to the identified exceedance locations. The improvements will include Real Time Passenger Information (RTPI) screens, new bus shelters, accessible kerbs at bus stops and installation of CCTV at bus stops.

A ULEV exemption, allowing ultra-low emission vehicles to drive through the bus gates, will be assessed and if considered deliverable will be added to the preferred scheme in the Full Business Case (FBC). The local authorities will also seek further funding through the Clean Air Fund (CAF) for additional measures that will look to mitigate any impacts that might arise as a result of the scheme.

A separate Ministerial Direction concerns the retrofitting of buses operating along the A53 corridor. These are separately funded by JAQU and excluded from this Outline Business Case (OBC).

4.2 Purpose of this case

This Financial Case is primarily concerned with affordability and funding requirements. It presents evidence of a robust estimation of the package costs (for both implementation and operation), the key funding risks, sources and forecast revenue generation.

The Financial Case is supported with a financial model that is submitted with this Outline Business Case (OBC) document, it identifies the scale and sources of proposed funding and timing of expenditure. This model will be updated as the costs and identified risks are amended as the project progresses towards FBC.

Costs and financial information are presented in detail for the Preferred Option that forms the NSLAQP, comparative details are then presented for the benchmark Clean Air Zone (CAZ), including revenue forecasts associated with the scheme.

4.3 Preferred Option

4.3.1 Summary of costs

The preferred package of measures, as identified in section 4.1, aims to address the identified air quality exceedances in the shortest possible time. As noted in the project plan (see Appendix 14) the measures will be delivered by May 2022.

Capital costs will be incurred on the following elements:

- Installation of the bus gate on the A50 Victoria Road which includes ANPR cameras and new signage, as well as the Traffic Regulation Order (TRO).
- Installation of the bus gate on the A53 Etruria Road, ANPR cameras, new signage and road resurfacing, as well as the TRO.

- Traffic management to the east and west of the A50 Victoria Road which includes road resurfacing, replacement of road humps and new signage.
- Transport improvements along the A53 Etruria Road which includes signalised pedestrian crossing facilities, a new bus stop, new kerbing and levelled footways.
- Bus retrofitting programme which includes the installation of exhaust modification and e-cooling fans to 50 buses.
- Bus infrastructure improvements which includes real time passenger information (RTPI) screens, new bus shelters, accessible kerbs at bus stops and CCTV cameras.
- Monitoring and evaluation costs which includes diffusion tubes to measure air quality, ANPR cameras to monitor the use of the bus retrofit, traffic counts and the costs associated with analysing relevant data.

Operating costs will be incurred on the following elements:

- Operation and maintenance associated with the ANPR system
- Maintenance associated with the bus gate, signals, signage, traffic management and bus network enhancements
- Other operating costs associated with overheads, staffing and customer service
- Monitoring and evaluation costs
- Communications and publicity
- Project management costs

4.3.2 Funding source

The three Councils do not have funding available for the implementation of the preferred package of measures identified from the modelling and appraisal process. These are measures that are additional to current spending commitments (which were included in the 'Do Minimum' scenario in the modelling and appraisal process).

The Council will therefore be seeking all funding from the Government's Implementation Fund to help achieve NO_2 compliance in the shortest possible time. It is expected that the funding will be provided by JAQU on an annual basis drawn down over the life span of the project. This will all be in accordance with the financial rules and regulations of the lead authority for the delivery phase of the project.

The bus gates, bus infrastructure and traffic management components of the NSLAQP will be delivered by the authorities using funding secured from the Implementation Fund. No local contributions are available or would be appropriate for these components of the scheme.

The bus retrofit component will be delivered directly by the bus operators involved, primarily First Group and D&G, using funding secured from the Implementation Fund. First Group have their own contracted provider and D&G have an identified supplier. No local contributions are available for this component of the scheme.

The Councils expect to put forward a bid to the Clean Air Fund (CAF) at FBC stage to support mitigating measures suggested by local Members of Parliament (MPs) that will complement the Preferred Option. As such, CAF measures have not been costed for nor included in the OBC's

Financial Case and the benefits of any CAF measures have not been included in the Economic Case.

Where possible, the Councils will seek to take advantage of other funding opportunities such as those from other government sources, or partnerships, in order to help support the wider air quality agenda and complement the outcomes of the Preferred Option, as detailed in the Strategic Case. Examples include:

- Funding for the provision of electric vehicle charging points
- Other Defra air quality funds
- DfT funding for highway and sustainable transport measures
- Transforming Cities Fund
- Town Funds
- Future High Street Funds
- ADEPT SMART Places funds

4.3.3 Assumptions and limitations

Detail on the derivation of scheme costs is set out in the following section. They have been developed by the local authorities and contractors procured to support the preparation of the OBC, including Amey and JMW. Scheme costs are calculated using bottom-up estimates where a per-item cost is applied to the estimated required quantity. Bus retrofit costs are based on the separate bus retrofit Ministerial Direction being delivered by Newcastle-under-Lyme Borough Council. The costs are taken from similar schemes, initial estimates from possible service providers and market intelligence. More details on these costings and assumptions can be found in Appendix 11.

To inform the OBC, preliminary designs of all engineering schemes on the local highway have been produced and are provided in Appendix 3. In general, the Benchmark CAZ D scheme has been based on assumptions, professional judgement, additional analysis and relevant costs from other proposed charging CAZ schemes.

Decommissioning costs have been included for the bus gates as it is assumed that they will not be required once there is clear evidence through the monitoring and evaluation process that NO_2 compliance can be maintained without them. Elements to be decommissioned include civil engineering works associated with reinstating parts of the highway to their original layouts prior to scheme implementation, signage on the local and strategic road networks, ANPR cameras and enforcement technology, and monitoring equipment. Decommissioning will take place when the evidence shows that compliance can be maintained without the bus gates in place. The year of decommissioning is currently unknown.

As detailed within the Commercial Case the Councils intend to procure the construction works and retrofit delivery through existing frameworks and contracts, ensuring value for money. The ANPR camera operation, penalty notices, Prism signage operation and CCTV operation will be incorporated into the existing back office function managed by SoTCC via the existing joint set up between SCC and SoTCC.

As explained in the Commercial Case, early contractor involvement has significantly benefited the production of the OBC providing confidence in delivery. Amey are SCC's strategic partner of choice for highway project delivery through the Infrastructure+ contract. They are co-located in SCC's offices. Amey designers and specialists have worked alongside the three authorities and have been involved throughout the production of the OBC. SoTCC has procured Amey through the Midlands Highways Alliance Professional Services Partnerships (MHAPSP3) for the support of work at OBC stage. At the design and delivery stage, SoTCC and SCC would look to use the Infrastructure+ contract for the procurement of the selected contractor. If the OBC is approved, the costs will continue to be further refined as the project progresses through the development of the FBC.

4.3.4 Cost derivation

Table 4-1 provides details on how cost estimates for each of the package elements have been derived as well as the key assumptions.

Table 4-1: Derivation of cost estimates

Measures	Costing method	Key assumptions / caveats
Bus gate on the A50 Victoria Road	Based on previous experience of similar measures and also using schedule of rates.	Costs based on preliminary designs and initial site investigations.
Bus gate on the A53 Etruria Road	Based on previous experience of similar measures and also using schedule of rates.	Costs based on preliminary designs and initial site investigations.
Traffic management to the east and west of the A50 Victoria Road	Based on previous experience of similar measures and also using schedule of rates.	Costs based on preliminary designs and initial site investigations.
Transport improvements along the A53 Etruria Road	Based on previous experience of similar measures and also using schedule of rates.	Costs based on preliminary designs and initial site investigations.
Bus retrofitting programme	Based on experience from retrofitting undertaken in Newcastle-under-Lyme and First Group's experience.	Costs taken from NuLBC's current retrofitting programme. Number of buses required for retrofitting determined through air quality modelling and discussions with bus operators. More detailed costs cannot be derived until it is known

		which precise vehicles will receive the retrofit.
Bus infrastructure improvements	Based on previous experience of similar measures and also using schedule of rates.	Costs based on preliminary designs and initial site investigations.
Back office cost for monitoring, data processing and charging	Based on previous experience of similar measures and also using schedule of rates.	Costs based on preliminary designs and initial site investigations.
Communications, engagement and consultation	Based on 1 Full Time Equivalent (FTE) and materials for three years.	
Monitoring and evaluation	Based on previous experience of similar measures.	Costs based on schedule of rates.
Decommissioning costs	Bottom up estimate. Estimate based on previous similar work.	Removal cost per item of scheme infrastructure.

4.3.5 Risks and contingency

A Risk Register and Quantified Risk Assessment (QRA) have been developed to identify and cost any possible risks to the project for both the Preferred Option and the CAZ benchmark. The full risk register for the Preferred Option can be found in Appendix 18. It is a live document that is updated regularly throughout the life of the project so to ensure risks are identified and mitigated through effective programme management. The key risks to the project are based around the:

- Deliverability of the Preferred Option
- Political acceptance of the required option
- Cost uncertainties of the Preferred Option

An effective risk management strategy is in place to minimise the impact of risks whilst ensuring potential opportunities are maximised. The risks have been categorised and allocated an owner to ensure that they are managed effectively.

Three Risk Workshops were led by Bentley Project Management and attended by officers from each of the authorities who have expertise in the specific areas of focus outlined in the Preferred Option. The workshops were set out as follows:

- Identification of the risks
- Mitigation of the risks

- Quantification of the risks

Following these workshops, a risk register and QCRA was produced and analysed against the required contingency needs for the project.

In the development of the financial model a financial risk layer has been calculated based on the work undertaken in the development of the risk register and QRA. Due to the early stage of the project, it has been decided that the 85th percentile will be incorporated into the financial model. The QRA identifies a risk allowance of £1,060,000. As the project progresses, the QRA will be adjusted as the status of identified risks change and new risks arise.

In addition, contingencies have been included as part of the construction scheme costs provided by the contractor. As such, the values stated include a 15% contingency for capital works to allow for any uncertainties within the development of the costs. This level of contingency has been based on guidance obtained from other similar schemes.

TAG unit A1.2 states that optimism bias is only applicable to the Economic Case and so it has not been included in the costs presented in this Financial Case. The costs presented in this Financial Case concerns the actual costs of the scheme that funding is being sought for. Details of how optimism bias has been applied to the economic assessment can be found in the E2 Economic Model.

4.3.6 Financial modelling

Table 4-2 below provides a summary of the capital and operational funding requirements to deliver the preferred package as developed in the financial model. The operating costs are included for a ten-year period.

These costs are based on resource accounting and budgeting (RAB) principles and show the resource costs over the lifetime of the proposal. They allow for inflation on top of the base cost estimates made at 2020 prices and include an allowance for uncertainty/contingency associated with the capital costs, as well as a risk allowance.

Table 4-2: Summary of costs (£000s)

Measure	Capital expenditure	Operating expenditure over 10 years	Total
A50 Victoria Road bus gate	755	242	**997**
A53 Etruria Road bus gate	1,012	308	**1,320**
Traffic management east and west of Victoria Road	2,111	-	**2,111**
Transport improvements along A53 Etruria Road	825	46	**871**
Bus retrofit programme	1,813	207	**2,020**
Bus infrastructure improvements	1,240	948	**2,188**
Back office cost for monitoring, data processing and charging	-	1,650	**1,650**
Communications, engagement and consultation	-	125	**125**

Monitoring and evaluation	86	991	**1,077**
Decommissioning costs	-	608	**608**
Total	**7,842**	**5,124**	**12,966**

As the implementation of a charging CAZ is not part of the preferred scheme, there will be no direct revenue generated; however, some revenue is likely to be received due to enforcement activity associated with the two bus gates which will be controlled by ANPR cameras. The authorities will operate the bus gate enforcement in accordance with their existing policies for civil enforcement. Table 4-3 forecasts the predicted revenue associated with Penalty Charge Notices (PCNs) based on currently enforced bus gates within North Staffordshire. Adjustments have been made to account for the times of operation which the proposed bus gates will be enforced. It has also been acknowledged that existing bus gates do not have the communications and engagement support that will accompany the Preferred Option and so contraventions of the proposed bus gates are likely to be lower. There is likely to be a spike in PCNs issued following the opening of the new bus gates, however, this may not necessarily result in additional revenue as there may also be a higher rate of appeal to PCNs in the initial few months of the scheme. This trend is likely to drop off significantly after the first year of operation as drivers acclimatise to the bus gate restrictions and so any revenue generated from PCNs is likely to be limited in the medium to longer term. Charge levels are fixed and were set by Central Government in 2008, therefore adjustments for inflation have not been applied. It is therefore assumed that income from the bus gates will remain constant after the first year of operation.

Table 4-3: Annualised revenue from PCNs in the Preferred Option (2020 prices) (£000s)

Year	Bus gate income
2022	£84
2023	£40
2024	£40
2025	£40
2026	£40
2027	£40
2028	£40
2029	£40
2030	£40
2031	£40
Total	**£447**

Table 4-4 presents the cashflow profile over ten years for delivery of the preferred package of measures. Prices have been adjusted for inflation per annum as outlined in TAG guidance.

Table 4-4: Preferred option cashflow profile for the 10-year appraisal period (£000s)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Capital costs	3,806	3,801	-	-	-	236	-	-	-	-	-
O&M costs	160	336	401	367	580	384	393	514	411	420	1,158
Revenue		-84	-40	-40	-40	-40	-40	-40	-40	-40	-40
Net cashflow	**3,966**	**4,053**	**361**	**326**	**540**	**580**	**352**	**474**	**371**	**380**	**1,118**

NB: Costs are shown as positive and revenues are shown as negative as per DfT Public Accounts table guidance

4.3.7 Sensitivity analysis

In line with JAQU guidance, a range of sensitivity tests have been undertaken to consider the impact of higher than expected capital and operating costs. Further details on this can be found in the financial model in Appendix 11.

Table 4-5: Sensitivity test summary for the preferred option

Sensitivity test	Test description	Impact
Increased capital costs	20% increase in capital costs	The greatest impact on an adjustment of capital costs occurs at the beginning and end of the project lifespan. Capital costs usually incur at the beginning of a scheme whilst it is being constructed. The spike at the end of the project is due to decommissioning costs. Even if capital costs were to increase by 20%, the Preferred Option would still be considerably cheaper to operate than the Benchmark CAZ D.
Increased operating costs	Operating costs increased by 20%	The impact on operating costs is less significant than the impact on capital costs as operating costs are spread across the 10-year period. Even if operating costs were to increase by 20%, the Preferred Option would still be considerably cheaper to operate than the Benchmark CAZ D.

Additional sensitivity tests have been conducted on both the Preferred Option and Benchmark CAZ D of which the results are set out in the Economic Case and subsequent technical reports.

4.3.8 Accounting treatment

As detailed within the Management Case, the development of the project has been led and overseen by the Joint Officer Group (JOG) and a Member-led Joint Advisory Group (JAG) with input from other Council departments as required. Of particular relevance to the Financial Case has been the involvement of finance, legal and procurement personnel.

Each of the Councils will provide written evidence from their responsible financial officers (as defined under Section 151 of the Local Government Act 1972) to demonstrate that the finance teams have been involved in developing the scheme through its various stages and have assessed the impact of the project on the authorities' balance sheets. The letters will be included along with the approved OBC submission and at FBC stage.

The accountancy treatment will follow the authority's guidance:

- As the bid consists of both capital and revenue expenditure, assets will be held on the balance sheet and the revenue costs associated with both sets of measures shown as operating costs are held in the income and expenditure account.
- Expenditure on the acquisition, creation or enhancement of assets is treated as capital expenditure.
- Depreciation on assets is not charged in the year of acquisition but is applied in the year of disposal and is calculated on a straight-line basis.
- Costs to establish the traffic management measures will be treated as capital expenditure and depreciated over the life of the asset.
- Expenditure that maintains but does not add to an asset's potential to deliver future economic benefits or service potential is charged as a revenue expense when it is incurred.
- Activity is accounted for on an accruals basis in the year that it takes place and not when cash payments are made or received.
- Grants used to finance the preferred scheme for which conditions have not been satisfied are held on the balance sheet as creditors and amortized (taken to revenue) over the life of the project.
- A provision has been created to account for decommissioning costs in accordance with Accounting Standard IAS37 for Provisions, Contingent Liabilities and Contingent Assets.

4.4 Benchmark CAZ D

4.4.1 Summary of costs

In accordance with JAQU guidance a benchmark charging CAZ option has also been considered.

The forecast project plan for the implementation of a charging CAZ (as discussed and included in Appendix 16) demonstrates that the measures will not be delivered until June 2023. Costs were benchmarked against Birmingham as they are delivering a CAZ D. Several meetings were held with Birmingham colleagues during the costing process. Final costs were not available as the scheme has not yet been delivered and due to commercial sensitivities, no CAZ schemes were able to share more than generic costs and processes. JAQU guidance regarding the specification of CAZ signage has also been applied in developing the costs.

Capital costs will be incurred on the following elements:

- CAZ D charging and enforcement system (purchased through a turnkey contract as a single system), including:
    - Signage
    - ANPR camera network
    - Central system
    - Local system
    - Other capital costs (specification, design, project management)

- Monitoring and evaluation costs for significant additional monitoring equipment

Operating costs will be incurred on the following elements:

- CAZ D charging and enforcement system, including:
    - Roadside equipment operation and maintenance
    - Enforcement vehicle operation and maintenance
    - Central system operation and maintenance
    - Local CAZ system costs
    - Other operating costs – accommodation costs, overheads, staffing, customer service
    - Payment process charges from pay.gov.uk
- Monitoring and evaluation costs
- Communications and publicity
- Project management costs (forming part of the turnkey solution)

4.4.2 Funding source

The three Councils do not have funding available for implementation of a charging CAZ and therefore all funding would be needed from the Government's Implementation Fund.

4.4.3 Assumptions and limitations

Detail on the derivation of scheme costs is set out in the following section, these have been developed by Amey (SCC's appointed contractor) and calculated through discussion and liaison with other local authorities, in particular Birmingham, that are in the process of procuring a charging CAZ scheme for implementation.

4.4.4 Cost derivation

Table 4-6 provides details on how cost estimates for each of the package elements have been derived, as well as the key assumptions.

Table 4-6: Derivation of cost estimates

Measures	Costing method	Key assumptions / caveats
CAZ D boundary signs	JAQU guidance, similar schemes and previous experience	Cost based on sign size and typical unit costs from other similar schemes. All boundary locations have been reviewed in detail to ascertain an accurate number of boundary signage required. Cost includes installation and reinstatement.

CAZ D boundary ANPR	Based on guidance from other similar schemes and previous similar experience.	Cost based on typical unit cost from other similar schemes. All boundary locations have been reviewed in detail to ascertain an accurate number of ANPR cameras required.
Other signage, ANPR and traffic management costs	Based on guidance from other similar schemes and previous similar experience.	Advanced signage has been costed separately with an allowance having been made. Cost based on typical unit cost for signage from other schemes.
Maintenance	JAQU guidance and similar schemes	Cost based on typical unit cost from other similar schemes. Costs based on per shift/day as applicable
Back Office Cost for monitoring, data processing and charging	Based on guidance from other similar schemes not yet operational.	Costs based on per shift as applicable.
Communications, engagement and consultation	Based on 1 FTE and materials.	-
Monitoring and evaluation	Based on guidance from JAQU and other similar schemes not yet operational.	Cost based on typical unit cost from other similar schemes.
Decommissioning costs	Bottom up estimate. Estimate based on previous similar work in terms of roadside equipment.	Costs are for removal of cameras and signs, including labour, van, materials and equipment.
Sinking fund	Based on guidance from other similar schemes not yet operational.	Value has been assumed to be equal to that of the decommissioning costs.

4.4.5 Risks and contingency

For completeness the same approach to risk identification and management has been adopted for the Benchmark CAZ as the Preferred Option to provide an accurate allowance for risk. The risk register is discussed in more detail in the Management Case.

In the development of the financial model a financial risk layer has been calculated based on the work undertaken in the development of the risk register QRA. Due to the early stage of the project, it has been decided that the 85th percentile will be incorporated into the financial model. The QRA identifies a risk allowance of £11,690,000. As the project progresses, the QRA will be adjusted as the status of identified risks change and new risks arise.

In addition, contingencies have been included as part of the construction scheme costs provided by the contractor. As such, the values stated include a 15% contingency for capital

works to allow for any uncertainties within the development of the costs. This level of contingency has been based on guidance provided by Birmingham City Council and other similar schemes that are not yet operational.

A sinking fund is in place in order to mitigate against any unforeseen risks that are realised throughout the operation of the scheme. The value of the sinking fund has been calculated as being equal to that of decommissioning costs. The sinking fund will be ring-fenced within the NSLAQP accounts to ensure its availability as contingency.

TAG unit A1.2 states that optimism bias is only applicable to the Economic Case and so it has not been included in the costs presented in this Financial Case. The costs presented in this Financial Case concerns the actual costs of the scheme that funding is being sought for. Details of how optimism bias has been applied to the economic assessment can be found in the E2 Economic Model.

4.4.6 Financial modelling

Table 4-7 below provides a summary of the capital and operational funding requirements to deliver the Benchmark CAZ as developed in the financial model.

These costs are based on RAB principles and show the resource costs over the lifetime of the proposal. They allow for inflation on top of the base cost estimates made at 2020 prices and include an allowance for uncertainty/contingency associated with the capital costs, as well as a risk allowance.

Table 4-7: Summary of costs (£000s)

Measure	Capital expenditure	Operating expenditure over 10 years	Total
CAZ D boundary signs	901	-	**901**
CAZ D boundary ANPR	11,330	-	**11,330**
CAZ D advanced signing local network	1,304	-	**1,304**
CAZ D advanced signing Highways England network (including gantries)	5,161	-	**5,161**
CAZ D internal ANPR and signing	5,724	-	**5,724**
Back office cost for monitoring, data processing and charging	3,513	42,706	**46,218**
Maintenance	5,474	11,765	**17,238**
Communications, engagement and consultation	-	2,394	**2,394**
Monitoring and Evaluation	191	1,000	**1,191**
Decommissioning Costs	-	2,027	**2,027**
Sinking fund	2,979	-	**2,979**
Total	**36,577**	**59,892**	**96,469**

The Benchmark CAZ D option will generate revenue through charging non-compliant vehicles to enter the CAZ boundary. Table 4-8 below presents the predicted revenue generation to the

local authorities associated with the charging CAZ. Revenue is assumed to be zero in the final year of appraisal (2031), as the scheme will no longer be operational. Inflation has not been applied, as it is assumed that charge levels will be fixed, in line with other penalty charge schemes. Further detail on how this revenue has been calculated can be found in the E1 Economic Methodology Report. As the Benchmark CAZ D will not become operational until 2023, this will be the first year of revenue. 20% of this total revenue (£43.1m over 10 years) will be taken by Central Government to pay for the Central CAZ Service. The remaining 80% (£172.3m over 10 years) will be used to fund the operating costs of the Benchmark CAZ D. Any surplus revenue will be reinvested into other local transport policies.

Table 4-8: Annualised CAZ D revenue to the local authorities (£000s) (2020 prices)

	Car Business	Car Commuting	Car Other	Taxi	LGV Personal	LGV Freight	HGV	Buses	Total
2023	£1,284	£6,807	£16,295	£7	£1,964	£12,545	£1,872	£146	**£40,922**
2024	£1,160	£6,148	£14,718	£7	£1,842	£11,766	£1,410	£122	**£37,173**
2025	£1,036	£5,489	£13,140	£7	£1,720	£10,987	£948	£98	**£33,425**
2026	£911	£4,830	£11,563	£6	£1,598	£10,208	£486	£74	**£29,677**
2027	£759	£4,025	£9,635	£5	£1,332	£8,507	£405	£62	**£24,731**
2028	£608	£3,220	£7,708	£4	£1,066	£6,805	£324	£50	**£19,784**
2029	£456	£2,415	£5,781	£3	£799	£5,104	£243	£37	**£14,838**
2030	£304	£1,610	£3,854	£2	£533	£3,403	£162	£25	**£9,892**
2031	£152	£805	£1,927	£1	£266	£1,701	£81	£12	**£4,946**
2032	£0	£0	£0	£0	£0	£0	£0	£0	**£0**

Table 4-9 presents the cashflow profile for delivery of the Benchmark CAZ D. Prices have been adjusted for inflation per annum as outlined in TAG guidance

Table 4-9: Benchmark CAZ D cashflow profile for the 10-year appraisal period (£000s)

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital costs	18,970	9,154	-	-	-	5,474	-	-	-	-	2,979
O&M costs	73	5,197	5,316	5,439	5,666	5,692	5,823	5,956	6,093	6,234	8,404
Revenue	-	-40,922	-37,173	-33,425	-29,677	-24,731	-19,784	-14,838	-9,892	-4,946	-
Net cashflow	**19,043**	**-26,571**	**-31,857**	**-27,986**	**-24,011**	**-13,565**	**-13,962**	**-8,882**	**-3,799**	**1,287**	**11,383**

NB: Costs are shown as positive and revenues are shown as negative as per DfT Public Accounts table guidance

4.4.7 Accounting treatment

As detailed above and within the Management Case the development of the project has been led and overseen by the JOG and JAG, with input from other Council departments as required. Of particular relevance to the Financial Case has been the involvement of finance, legal and procurement personnel.

The Benchmark CAZ D is not supported by the Councils and therefore the accountancy treatment for this option has not been explored in further detail.

4.5 Conclusion and financial approval

A proportionate yet robust approach has been adopted in the development of scheme costs and allowance for risk, contingency and sinking fund, which provides a high level of confidence in the scheme costs presented. Table 4-10 summarises the overall grant request from the three authorities from the Implementation Fund.

Table 4-10: Summary of cost estimates over 10 years (£000s)

	Preferred Option	Benchmark CAZ D
Capital costs	7,842	36,577
Operating & maintenance costs	5,124	59,892
Revenue	-447	-215,388
Net cash flows	**12,520**	**-118,920**

NB: Costs are shown as positive and revenues are shown as negative as per DfT Public Accounts table guidance

Cost and revenue forecasts indicate that the revenues generated from the Benchmark CAZ D exceed the capital and operating costs of the scheme. However, the overall capital and operating costs of the Preferred Option are considerably less than that of the Benchmark CAZ D. Crucially, the Preferred Option also meets the primary critical success factors of achieving air quality compliance in the shortest timeframe possible, unlike the Benchmark CAZ D, and therefore the local authorities do not support the Benchmark CAZ D option, which cannot be delivered until May 2023.

The North Staffordshire local authorities do not have sufficient funds available to deliver the preferred scheme and so funding is requested through the Government's Implementation Fund. It is expected that a grant will be received subject to approval. The funding will be drawn down over the course of the project as it is spent. It should be noted that if 100% of funding is not received, there is a real risk that the Councils will not be able to deliver 100% of the scheme required to achieve compliance in the shortest possible time.

A Clean Air Fund bid has not been costed for at this OBC stage but is currently expected to be included at FBC stage as the authorities look to potentially mitigate against any negative impact of the measures proposed in the Preferred Option that may emerge.

In the development of the business case, the Section 151 Officers will be involved in the governance process and hence kept fully informed. Letters from the s151 Officer from each of

the three authorities will be presented along with the approved OBC submission and at FBC stage. They will demonstrate that:

- As the responsible financial officer, they are comfortable with the financial position related to the delivery of the preferred option
- Delivery of the scheme is dependent on JAQU funding
- They approve the submission of this OBC and bid for funding

5 Management Case

5.1 Introduction

Stoke-on-Trent City Council (SoTCC), Newcastle-under-Lyme Borough Council (NuLBC) and Staffordshire County Council (SCC) are committed to working together to transform the urban area of North Staffordshire into a cleaner and healthier area.

In October 2018, Stoke-on-Trent and Newcastle-under-Lyme authorities, who both have responsibility for environmental health, were issued a Ministerial Direction to produce a local air quality plan to address their respective nitrogen dioxide (NO_2) problems. Given their proximity to one another, they were tasked with producing a joint plan.

As the highway authority for the Newcastle-under-Lyme area, SCC has been assisting the authorities and together, the three authorities have developed a plan to tackle NO_2 exceedances at the roadside – known as the North Staffordshire Local Air Quality Plan (NSLAQP).

This Plan will help to protect and promote the health of the local population by improving air quality and reducing the impact of air pollution on the environment. In so doing, the local authorities are complying with the primary aim of the UK Air Quality Plan and bringing NO_2 air pollution within statutory limits in the shortest possible time.

The joint approach has been necessary because it is recognised that air pollution does not respect local authority boundaries and therefore a consistent and co-ordinated approach is required to maximise air quality benefits for all people living and working in North Staffordshire. By working together, the Councils can also minimise the risk of unintended consequences and help to ensure, as far as possible, alignment between the NSLAQP and other authority strategies.

The NSLAQP for Stoke-on-Trent and Newcastle-under-Lyme comprises of a package of measures:

- A50 Victoria Road bus gate, operational Monday to Friday between 07:00-10:00 and 16:00-19:00. ANPR cameras will be used to restrict access except for buses, taxis and cyclists
- A53 Etruria Road two-lane bus gate, operational Monday to Friday between 07:00-10:00 and 16:00-19:00. ANPR cameras will be used to restrict access except for buses, taxis and cyclists
- Traffic management measures on roads to the east and west of Victoria Road, including:
    - Traffic calming
    - One-way restrictions
    - Speed restrictions
    - Weight restrictions
    - Extension of footways
    - Carriageway re-surfacing

- Transport improvements along the A53 Etruria Road in the form of a review of signal times, signalised pedestrian crossing facilities and the relocation of a bus stop to avoid unnecessary queuing
- Targeted bus retrofit programme where 75% of buses using Bucknall New Road and 100% of buses using Victoria Road will be retrofitted to achieve Euro VI emissions standards
- Bus infrastructure improvements will be installed on routes that pass through or are parallel to the identified exceedance locations. The improvements will include Real Time Passenger Information (RTPI) screens, new bus shelters, accessible kerbs at bus stops and installation of CCTV at bus stops.

An ultra-low emission vehicle (ULEV) exemption, allowing ULEVs to drive through the bus gate, will be assessed in the air quality model and if considered deliverable, will be added to the scheme in the Full Business Case (FBC).The local authorities will also seek further funding through the Clean Air Fund (CAF) for additional measures that will look to mitigate any impacts that might arise as a result of the preferred scheme.

A separate Ministerial Direction concerns the retrofitting of buses operating along the A53 corridor. These are separately funded by the Joint Air Quality Unit (JAQU) and excluded from this Outline Business Case (OBC) Management Case.

5.2 Purpose of this case

This Management Case sets out the framework that NuLBC, SoTCC and SCC are using to deliver the programme of measures to meet NO_2 compliance levels and achieve the primary aim. The purpose of the Management Case is to set out the framework through which the delivery of the preferred scheme will be managed and to determine whether the proposal is deliverable within the timescales.

In line with the JAQU guidance, the Management Case builds on the Strategic Outline Case (SOC) by:

- Outlining the arrangements required to ensure successful delivery of the Preferred Option
- Including an achievable project plan
- Putting together a risk management strategy and mitigation programme
- Identifying potential benefits through benefits realisation
- Developing an appropriate Monitoring and Evaluation Plan
- Highlighting resource requirements
- Developing a communications and marketing strategy

This case focuses on the detailed arrangements involved in ensuring the successful delivery of the Preferred Option, including the project governance arrangements and the approach taken to identify and mitigate risks associated with the project's development and delivery.

5.3 Project governance

A robust governance arrangement has been developed to ensure that the project is managed effectively; taking into consideration any potential risks that might arise, whilst continuing to adhere to the project timeline (outlined in Appendix 14). The three authorities' Cabinets play key roles as the final decision makers in the governance structure. Technical specialist consultants with relevant expertise and experience in other authorities' air quality local plans have been supporting the Council officers to carry out the more technical aspects of the project, alongside project management and coordination support.

The Joint Officer Group (JOG) comprises of relevant officer representation from each of the three Councils, as well as independent consultants and project management support. The JOG assesses the evidence and identifies the key deliverables of the project and makes appropriate recommendations to the Joint Advisory Group (JAG) and JAQU. The JOG deals with any exceptional issues arising from project activity and manages budget and resources accordingly,

The three authorities have set up the JAG, which includes relevant Cabinet members from each authority, to guide officers and consultants and to review progress and steer the decision-making process regarding identification of a Preferred Option for meeting the requirements of the Ministerial Direction. The JAG considers reports from the JOG in relation to making decisions that effectively coordinate all three Councils. Meetings occur at least quarterly and more frequently where the project plan identifies key decisions which require Cabinet approvals or approval of key submissions to JAQU. The JAG supports the production of effective and deliverable policies on strategic cross-boundary matters as well as considering the key infrastructure requirements associated with the delivery of the Preferred Option.

Fourteen JAG meetings have taken place as part of the OBC approval process. Table 5-1 summarises the approvals and decisions that have been made at these meetings:

Table 5-1: JAG approvals

Meeting date	Approval and decisions up to OBC
31st July 2019	Cllr Carl Edwards nominated as Chair
	Project Governance document approved
	Project plan & key milestones approved
3rd September 2019	Project Definition Document approved
	Stated Preference Surveys started
14th October 2019	Options Development workshop
28th October 2019	Progress Report approved for submission
30th October 2019	Leaders letter to Minister of State
6th November 2019	Preferred Options for modelling agreed
19th November 2019	IES submission
19th December 2019	Option 5 & 6 testing approved
	Financial report approved
	CAZ workshop report approved
	Member engagement report approved

29th January 2020	Highways England risk noted
	Option 4+ and CAZ D approved as options
	Preferred Option not approved
18th February 2020	Communications survey approved
	Stoke on Trent City Council appointed SRO role for implementation phase
6th March 2020	Report presented to O&S/Select committee
25th March 2020	MP's workshop complete
	Option 4 + approved
	JAG letter to Minister
	Joint response to JAQU in relation to COVID -19
	Additional OBC funding request submitted
	OBC – FBC funding re-assessed
30th April 2020	Preferred Option approved
	JAG approve the submission of the unapproved OBC
	Letter sent to the Parliamentary Under Secretary of State by the Chair
	Submission of Unapproved OBC
	Decision/approval

The action logs from the JAG will also be reported to the MPs who will be given the opportunity to scrutinise the decisions made. This will ensure that MPs are fully informed and will, help to reduce the risk of delays to the project.

Regular discussions between JAQU's account manager and relevant members of the project team are held on at least a weekly basis to monitor the project's progress, discuss any issues and to formulate a path towards timely and robust OBC and FBC submissions. It allows Government to be kept aware of the planned activity associated with the project, including any areas that require approvals and reviews by Government itself. The authorities will continue to submit the relevant documents (such as project tracker documents, technical notes and draft business cases) to JAQU as required by the grant conditions, throughout the lifetime of the project.

The project's Senior Responsible Officer (SRO) and project manager, along with senior Council officers, attend update meetings with JAQU's SRO, account manager and other technical support staff, where the project's progress and its strategic direction is discussed. The outcomes from these meetings are cascaded to both the JOG and JAG.

An independent project manager, with significant transport planning experience and having worked with one of the Government's "first wave" local authorities, has also been appointed. The project manager works as a key part of the JOG, working closely with all parties involved to ensure successful delivery of the OBC and FBC in line with the project plan that has been agreed with JAQU, following submission of a progress report in October 2018.

As the project progresses the governance and management arrangements will be reviewed regularly to ensure they remain fit for purpose. They will also be confirmed in the FBC. Handover of the SRO position from NuLBC to SoTCC will take place following the submission of the FBC, due to the fact that delivery of the project will mainly relate to highways and transport initiatives within the Stoke-on-Trent area. The project SRO role beyond FBC will be held by Stoke-on-Trent City Council's Strategic Manager for Population and Well-being. This will ensure the governance and management of the project is effective and relevant. Close working will continue between the technical specialists and Council officers through implementation and delivery of the scheme.

5.3.1 Governance structure

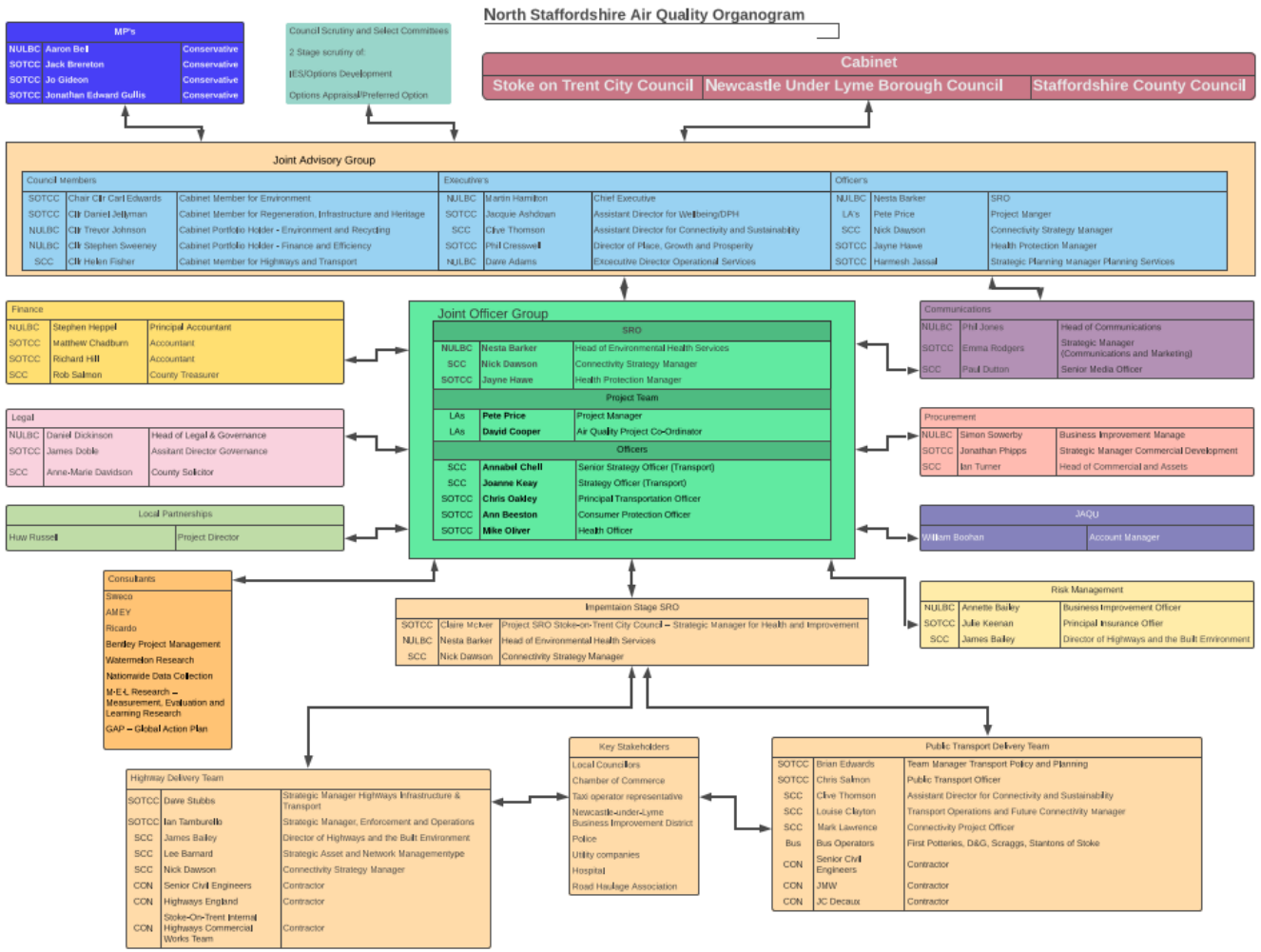
Three levels of project hierarchy exist in relation to managing progress and key decision-making:

- The JOG – comprises of key officers and consultants involved in the project, chaired by the project SRO
- The JAG – comprises of key members and senior officers of all three local authorities, chaired by a senior member of one of the three authorities. JAG action logs will be reported to the MPs who will be given the opportunity to scrutinise the decisions made
- The Cabinets of the three authorities – where recommendations are taken for key decisions. Prior to Cabinet(s) the intention is to take reports to the relevant cross-party Scrutiny and Select Committee to reduce the risk of a subsequent call-in.

The project organogram, Figure 5-1[15], sets out the key decision makers and the reporting mechanisms for those decision makers from officer and member groups. Inputs from JAQU and Local Partnerships are also outlined, with the latter providing a project assurance role for JAQU.

[15] Also found in Appendix 13

Figure 5-1: Project governance organogram



Support will be provided by several internal teams within each local authority, including procurement, legal, finance, risk management, communications and engagement and delivery partners/consultants. These teams form sub-groups that liaise with both the JOG and JAG. Table 5-2 identifies the lead officers at each of the local authorities for these teams.

To ensure continuity, the JOG and Project SRO will identify deputies for key support team roles and put succession plans in place to enable the seamless replacement of team members when necessary.

Table 5-2: Lead officers of the key support teams

Support Team	SoTCC	NuLBC	SCC
Procurement	Jonathan Phipps	Simon Sowerby	Ian Turner
Legal	James Doble	Daniel Dickinson	Ann-Marie Davidson
Finance	Matthew Chadburn & Richard Hill	Stephen Hepple	Rob Salmon
Risk Management	Julie Keenan	Annette Bailey	James Bailey
Communications and Engagement	Emma Rodgers	Phil Jones	Paul Dutton

5.3.1.1 Role of legal sub-group

With three local authorities involved in implementing and delivering the NSLAQP, the legal sub-group plays a key role in ensuring that the appropriate legal agreements are in place between the authorities and their respective contractors.

The following legal agreements will be required:

- Delivery Agreement between the three local authorities, outlining working, funding and scheme implementation arrangements
- JMW are the proposed contractor for the delivery of RTPI, as they have already been procured by SCC. SoTCC need to agree to the contract in order for RTPI to be delivered within the boundaries of Stoke-on-Trent
- Agreement to be drawn up between the local authorities and the bus operators in relation to retrofitting buses and bus wraps arrangements
- Highways England Section 6 Agreement to allow the selected contractor to deliver signs on the trunk road

Further details of the contracts can be found in the Commercial Case. The Delivery Agreement will be a key document that will be included in the FBC and is expected to confirm that all three authorities agree to the following:

- The role of SoTCC as Project SRO during the implementation stage

- The roles designated to the lead authorities/organisation for each scheme element of the Preferred Option, particularly in terms of procurement and risk management related to delivering to required timescales and budgets
- Financial accounting arrangements between the three authorities and how funding is paid to the designated lead authorities

The designated lead authority for each scheme element is shown in Table 5-3.

Table 5-3: Designated lead authorities

Scheme element	Designated lead authority/organisation
Overall project management	SoTCC
A50 Victoria Road bus gate	SoTCC
A53 Etruria Road bus gate	SCC
ANPR cameras	SoTCC
Back office operation for bus gates	SoTCC
Traffic management east and west of Victoria Road	SoTCC
Transport improvements along A53 Etruria Road	SCC
Bus retrofitting	Bus operator and SoTCC
RTPI	SCC and SoTCC
Bus shelters and CCTV	SoTCC
Air quality monitoring	NuLBC and SoTCC
Traffic monitoring	SCC and SoTCC

5.3.1.2 Role of procurement sub-group

The delivery routes and the associated procurement requirements for each element of the Preferred Option are detailed in the Commercial Case. Each lead authority/organisation will be responsible for the individual procurement requirements for each scheme element and this will be set out in the local authority Delivery Agreement and the agreement with the bus operators.

The procurement sub-group will provide the opportunity for the procurement managers to oversee and deal with any issues that arise to ensure that timescales and budgets are met. This is particularly relevant for scheme elements such as the purchase of ANPR cameras where it is currently expected that SoTCC will lead the procurement process for cameras to be installed both in Staffordshire and Stoke-on-Trent.

5.3.1.3 Role of finance sub-group

The role of the finance sub-group focuses on budget management and the distribution of funding for the scheme across the three authorities in line with the local authority Delivery Agreement.

5.3.1.4 Role of risk management sub-group

The risk management sub-group is in place in order to oversee, mitigate against and manage any potential risks arising from the scheme. Reviews of the risk register will also be agreed at this sub-group. Risks will evolve over the lifetime of the scheme and so the risk management sub-group will continue to be in place across the scheme's lifetime and will work to identify any upcoming risks and how best to manage them.

5.3.1.5 Role of communications and engagement sub-group

The communications and engagement sub-group are in place to promote and support engagement with stakeholders and the general public. The sub-group will deliver all communication and engagement activities, including surveys and consultation events, and will proactively and reactively manage any feedback and responses, as well as media coverage. More details of the role of the communications and engagement sub-group can be found in the Communication Plan in Appendix 23.

There will be two project delivery teams that report to JOG to ensure the seamless delivery of the project through its design and implementation. The lead officers from each of the local authorities for these two teams can be seen in Table 5-4.

Table 5-4: Lead officers of the project delivery teams

	SoTCC	NuLBC	SCC
Highway infrastructure	David Stubbs	N/A	James Bailey/Nick Dawson
Public transport infrastructure	Brian Edwards	N/A	Clive Thomson/Louise Clayton

5.3.2 Roles and responsibilities

An overview of the members and responsibilities for the different levels of project governance is provided in Table 5-5.

Table 5-5: Project governance

Governance Level	Members	Key Responsibilities & Outcomes
Joint Advisory Group	• Senior member and officer representation	• Consider reports from the Joint Officer Group relating to progress on the project, and in particular to consider and make

	from Newcastle-under-Lyme Borough Council • Senior member and officer representation from Stoke-on-Trent City Council • Senior member and officer representation from Staffordshire County Council	recommendations for the sign off of the Outline Business Case (OBC) and Full Business Case (FBC) as required by the respective decision maker in each authority • To ensure that decision making on key issues related to the project, including approval of the OBC and FBC, is coordinated effectively across the three Councils • To consider reports on specific aspects of the OBC and FBC development and seek to ensure an aligned approach to the three Councils' approach to approving the OBC and FBC and the subsequent delivery of any Preferred Option • To engage with relevant senior officers at the Department for Environment, Food & Rural Affairs (Defra) and JAQU, regarding the project • To support compliance with the duty to cooperate by working constructively to facilitate positive outcomes in respect of cross boundary matters • To support the production of effective and deliverable policies on strategic cross boundary matters • Support the consideration of key infrastructure requirements associated with the delivery of the Preferred Option
Joint Officer Group	• Project SRO • Project Manager (consultant) • Newcastle-under-Lyme Borough Council officers • Stoke-on-Trent City Council officers • Staffordshire County Council officers • Sweco (consultants)	• To manage and update the project plan as required • To ensure effective project management, including reviewing risks and impact assessments • To deal with any exceptional issues arising from project activity • To manage budgets and resources associated with the project and report issues accordingly • To consider and make recommendations to the Joint Advisory Group (JAG) • To agree the development of the Local Air Quality Plan incorporating outputs from transport and air quality modelling and associated option appraisals and deal with any cross-boundary issues

	• Ricardo Energy & Environment (consultants) • Selected highway contractor • Supported by procurement, legal, finance and communications officers as necessary	• To produce technical evidence to support the development of a Preferred Option and completion/submission of OBC and FBC. • Project delivery • Production of OBC and FBC for the Preferred Option. • Production of relevant reports for JAG and other decision-making meetings

5.4 Key stakeholders

There are a number of organisations who have a direct strategic role in the delivery of the NSLAQP and there are wider stakeholders who will be engaged through consultations during the design, implementation and operation stages of the project. These stakeholders are outlined in Table 5-6.

Table 5-6: Key stakeholders and their strategic roles

Stakeholder	Strategic Role
Joint Air Quality Unit (JAQU)	Delivering the UK Plan for tackling roadside nitrogen dioxide concentrations Developing and implementing national initiatives to improve air quality Providing funding to local authorities Guiding and managing local authorities to deliver the most effective air quality measures in the shortest timeframe possible
Local MPs	Overseeing and scrutinising the decisions made by the local authorities Engaging directly with JAQU on wider strategic issues
Newcastle-under-Lyme Borough Council	Second-tier authority and legally responsible for improving air quality to within statutory limits for NO_2 concentrations Supporting appropriate traffic management measures to tackle NO_2 levels in the area Monitoring NO_2 concentrations Engaging with local public to raise awareness of the changes and the need for change Managing the project until FBC stage and liaising with JAQU and technical consultants

Staffordshire County Council	The strategic highways and transport authority for Newcastle-under-Lyme and is therefore delivering the required traffic management measures to assist the improvements in air quality within the Borough/County boundary Monitoring traffic flows and fleet composition Engaging with local public to raise awareness of the changes and the need for change Liaising with JAQU and technical consultants Providing public health inputs
Stoke-on-Trent City Council	Unitary authority for the city part of the study area and legally responsible for improving air quality in Stoke-on-Trent to within statutory limits for NO_2 concentrations Implementing appropriate traffic management measures to tackle NO_2 levels in the area Monitoring NO_2 concentrations, traffic flows and fleet composition Engaging with local public to raise awareness of the changes and the need for change Managing the project post-FBC stage and liaising with JAQU and technical consultants Providing public health inputs
Technical Consultants	Delivering air quality modelling and transport modelling to develop options and possible mitigation measures Design and preparation of cost estimates for scheme delivery Conducting Stated Preference surveys Collecting ANPR data Conducting risk workshops and developing the Quantified Risk Assessment (QRA) and risk registers Developing the 5 business cases making up the OBC in preparation for submission Supporting the local authorities in the management and execution of the marketing and communications strategy Construction of the preferred scheme

Highways England	Government owned company, responsible for the management of the Strategic Road Network, which includes the A50 and A500 roads, which provide critical local network capacity as well as accommodating strategic traffic movements between the East Midlands and the M6, as well as other key linkages across Staffordshire and with parts of Cheshire. The interdependency between the local and strategic networks means careful consideration is required for close correlation of plans to manage or improve the networks. Effective engagement with Highways England is critical to ensure that key components of the Preferred Option are deliverable in line with the project plan and requirements of the Ministerial Directions.
Bus operators	There are two main bus operators within Stoke-on-Trent and Newcastle-under-Lyme: First and D&G. A number of smaller companies are also in operation within the area. Bus operators will be impacted through the bus retrofitting measures and Real Time Passenger Information (RTPI) provisions that are being made to the network. Early engagement was undertaken to ensure that the bus operators were in agreement with the proposed plans.
Local Partnerships	Appointed by JAQU to assist the local authorities in the development of the Commercial, Financial and Management Cases of the OBC, and to assist JAQU in reviewing the submissions. They also provide independent project assurance and expert support to the local authorities.
Wider stakeholders	Wider stakeholders will be consulted and engaged as the Local Air Quality Plan is progressed and delivered. This engagement will be overseen by the Communication and Engagement sub-group and recommendations and suggestions will be considered by the Highway and Public Transport Project Delivery Teams. Wider stakeholders will include Chamber of Commerce, local councillors, taxi operators, Newcastle-under-Lyme Business Improvement District, police, statutory undertakers, Royal Stoke University Hospital and Road Haulage Association

5.5 Engagement and communication strategy

A robust communication and stakeholder management strategy has been developed to achieve efficient and effective communication between the local authorities, relevant stakeholders and the general public. Delivery of the strategy will be managed by the communications and engagement sub-group. The plan aims to raise stakeholders' awareness and understanding of air quality and the consequences that might arise in a 'do nothing' scenario, reinforcing the reasons behind why this local plan is being implemented. It aims to identify any areas of concern at an early stage in order to be able to take appropriate action to mitigate the issue.

The communication strategy will be jointly led by the local authorities and supported by consultants. The strategy ensures that appropriate levels of consultation and communication are conducted throughout the project's lifespan. Regular and coordinated communication is delivered to stakeholders to keep them updated about developments in the project and the reasoning for these developments so that the authorities will be able to robustly defend any potential challenges to the scheme. The content of any comments, enquiries or objections received would need to be considered by the relevant Council services, including JOG and JAG as required, for them to have an input into providing an appropriate response. The communications teams would facilitate the best method in which to respond corporately, as is their usual role, according to the source, nature and extent of the comments received. Alongside this, the communication strategy promotes and offers assurances about mitigating actions that intend to alleviate the impacts arising from the scheme.

Each of the three local authorities had planned to obtain Cabinet approval of the Preferred Option ahead of its submission to JAQU as part of the OBC. The OBC document was to be presented at the authorities' Scrutiny and Select Committees in March and April 2020, followed by Cabinet approvals in May 2020.

In March 2020, some Members and officers raised concerns about the impact of aspects of the Preferred Option, backed by local Members of Parliament (MPs). This led to a short review period which involved a workshop being held on 16th March. This workshop recommended amendments to the Preferred Option to include measures that would mitigate any negative impacts that might arise from the original Preferred Option. These amendments were approved at JAG on 25th March.

The first phase of the communications and engagement strategy involved an online survey being circulated to the general public to gather information on people's current behaviours and attitudes towards air quality. The survey was divided into the following sections:

- Health and environmental issues
- Air quality
- Sources of information

The results of the survey were collated and analysed by an independent consultant, MEL Research Ltd.

The second phase includes hosting four stakeholder consultation workshops which will take place in the second half of 2020. These will engage the public and relevant stakeholders on the preferred scheme, whilst exploring existing attitudes and awareness of air quality. The local authorities and consultants will work together to ensure that sufficient evidence is presented at the workshops, so stakeholders are adequately informed. The feedback from the consultations will be analysed and incorporated in the FBC, confirming that the scheme is deliverable and supported by key stakeholders.

In addition to these engagements, the authorities' 'Air Aware' strategy went live in 2019. Air Aware is a campaign currently funded by Defra until the end of March 2020 across Staffordshire and Stoke-on-Trent to raise awareness of the impact of poor air quality and inspire long-term behaviour change. It is centred around a 'monthly message' targeting schools, commuters and

businesses. Travel to school surveys completed at six schools that have been targeted by Air Aware indicate an average 12% reduction in car journeys to school during an 18-month period.

Prior to implementation the communications plan will be updated to include an approach and activities to inform and engage local residents and stakeholders of the Preferred Option and its likely impacts.

Consultation at the scheme delivery stage will be carried out by the selected contractor, with support from the local authorities. This will include informal and formal consultations required as part of the Traffic Regulation Order (TRO) process.

More detail on the communication strategy and stakeholder management can be found in Appendix 23.

5.6 Project management

Effective project management ensures that all aspects of the project is delivered on time and to a high standard. It ensures that the various consultants and local authorities work together to achieve the project objectives. The project is managed in accordance with NuLBC and SoTCC's project management processes in accordance with PRINCE2 principles.

The project manager supports the project teams and coordinates the three local authorities' internal processes and relevant stakeholders. The project manager is instrumental in ensuring all project elements are managed, monitored and delivered in accordance with the project plan.

The project team (JOG) has been assembled and includes key members from each of the three local authorities and consultants. Fortnightly JOG meetings are held to discuss the status of the project work and to ensure that all parties are aligned; with further technical meetings scheduled either face-to-face or via conference call as appropriate. Weekly conference calls between JOG officers and JAQU are also conducted to report on the progress of the work identified in the project plan and to discuss issues, risks or additional requirements that have resulted, or may result in, deviations from the agreed plan.

Where specific expertise is required and is not contained within JOG, the project team tasks other Council officers and teams with specific works packages so that the optimal outcome can be achieved in that workstream. If resources are still not available internally, local authority procurement processes are followed to contract external consultants. The procurement process is discussed in more detail in the Commercial Case.

Officers from each of the authorities' finance, procurement, legal, risk and marketing teams also form part of the project team and are involved in the relevant processes.

The three authorities have engaged with BDB Pitmans for external legal advice in relation to the submission of a Progress Report in place of an OBC on the original Ministerial Direction deadline on 31st October. The authorities may continue to engage with them as necessary. Any additional external advice for specific services, such as from financial and procurement specialists, will be considered as appropriate as the project develops.

5.7 Programme

5.7.1 Preferred Option

The programme will be regularly reviewed and the project plan will be updated as a live document as the scheme progresses. The full project plan (Appendix 14) outlines all tasks in relation to the scheme leading up to OBC and through to final scheme opening. Appendix 15 summarises the implementation programme beyond OBC. It identifies responsibilities, accountabilities and dependencies with predecessor and successor actions. Resources and risks can be identified through the project plan and thereby managed in an appropriate manner. Funding requirements for the ten-year period of operation and decommissioning are detailed in the Financial Case.

The MPs' review of the emerging Preferred Option in March coincided with the outbreak of the coronavirus pandemic, and these two factors have led to the Scrutiny and Cabinet approvals no longer being possible within the timeframes, hence the requirement to submit this OBC as an unapproved document.

Dependent on Government advice, the authorities will seek approval of the Preferred Option through a Scrutiny/Cabinet process during summer 2020. However, the authorities are recommending a 'pause and review' phase to allow the impact of coronavirus on the Initial Evidence Submission (IES) to be reviewed.

The focus on traffic management and bus retrofit as the Preferred Option allows for the scheme to be delivered quickly and therefore within the timeframe set out in the Ministerial Direction. The project plan is a live document and will be refined between OBC and FBC. The extent of these changes will be dependent on the JAQU decision concerning the 'pause and review' phase. Table 5-7 sets out the key dates and milestones of the project for the Preferred Option at unapproved OBC stage.

Table 5-7: Programme key milestones – Preferred Option

Milestone	Date(s)
To OBC approval	
Strategic Outline Case (SOC) submission	31/01/2019
Initial Evidence Submission (IES)	08/10/2019
Engagement survey	26/02/2020
Unapproved OBC	15/05/2020
TiRP & DiRP submission	May 2020
OBC approval (by Cabinet and JAQU)	September 2020

To FBC approval	
Scheme delivery agreement between 3 authorities	September 2020 – February 2021
Stakeholder consultations	October – November 2020
Detailed Design	September 2020 – February 2021
FBC approval (by Cabinet and JAQU)	March 2021
TiRP & DiRP submission	April 2021
S151 officer sign off	February 2021
Implementation of the Preferred Option	
JAQU funds for implementation received	March 2021
TRO consultation period	April 2021 – June 2021
Orders confirmed	August 2021
HE approval process	January 2021 – August 2021
HE construction notice period	September 2021 – November 2021
Highway construction period	November 2021 – April 2022
Bus infrastructure lead-in period	April 2021 – June 2021
Bus infrastructure delivery period	June 2021 – April 2022
Full scheme operational	May 2022

The programme ensures that time is allocated to the completion of all necessary JAQU approval processes. It also includes adequate time for the following local approval processes:

- JAG approvals
- Local authority Cabinet meetings and relevant Scrutiny Committees
- Local authority Chief Officer Delegated Decisions
- Local authority S151 Officer sign-off
- Infrastructure+ Operational Commissioning Board and Strategic Partnership Board
- Highways England approvals
- Department for Transport (DfT) signage approvals

- Bus operator approvals related to the retrofit programme

5.7.2 Benchmark CAZ D

For comparison, Table 5-8 identifies the key programme milestones for the delivery of the Benchmark CAZ D option. This timeline is based on the assumption that there will be a framework in place to procure through. If this is not the case, then there is a risk that the programme will be delayed as a tender process will need to be undertaken instead. Compared to the Preferred Option, the design and delivery phase of the Benchmark CAZ D is a considerably lengthier process and would not adhere to the primary Critical Success Factor (CSF) of deliverance in the shortest timeframe possible, nor would compliance be achieved in 2022. The proposed implementation project plan for the Benchmark CAZ D is included in Appendix 16.

Table 5-8: Programme key milestones – Benchmark CAZ D

Milestone	Date(s)
Implementation of the Benchmark CAZ D	
Scheme design and procurement	October 2020 – February 2022
S151 officer sign off	March 2022
JAQU funds for implementation received	March 2022
Scheme delivery	April 2022 – May 2023
Scheme operational	June 2023

One potential risk that needs to be monitored is the ability of the local authorities to keep pace with the challenging timescale originally outlined. As a result of this, changes to the programme are made accordingly as milestone dates approach.

Budget expenditure is monitored on at least a monthly basis. Progress reports are prepared regularly and cross-referenced against the programme schedule. Any delays or emerging risks are recorded and reported to JAQU with mitigation measures outlined.

5.8 Financial management

The Project Manager and SRO are responsible for regular financial reporting to inform JAQU and relevant stakeholders of the project's progress. In addition, a Finance Sub-group for the project, including representatives from the three authorities' finance teams, has been formed and meets at critical project milestones. The Delivery Agreement to be finalised at FBC will confirm that all three authorities agree to the financial accounting arrangements between the three authorities and how funding is paid to the designated lead authorities.

Subject to approval by JAG, the SRO is responsible for submitting bids to the Implementation Fund, to secure funding to progress the feasibility study, submission of the OBC and FBC and delivery of the Preferred Option.

The authorities expect to deliver the preferred scheme using suppliers procured through Government frameworks. This approach reduces the possibility of delay between the funding being granted and the work being formally commissioned.

5.9 Change management

Where changes to work scope or detailed design are required in order to deliver the NSLAQP, these will be managed through the comprehensive governance structure that has been set up for the project. Changes to scheme details can occur following consultation periods and also once on site and any recommended changes will be reported and agreed through the JOG and JAG to ensure that the project outcomes can still be met. The comprehensive risk register will be reviewed, and all risks have been appropriately allocated to ensure that any changes to delivery timescales and costs for each element of the Preferred Option are managed within the total budget and delivery period.

To ensure there is control over any contractual changes, the local authority Cabinets are required to authorise changes in excess of £500,000.

More detailed information on the change management process in reference to the term of contracts can be found in the Commercial Case.

5.10 Contract management

The Councils are committed to investing the necessary level of resource to ensure effective contract management. More detail regarding Contract Management can be found in the Commercial Case.

5.10.1 Contingency

As described in the Commercial Case, the Councils will, as part of the procurement and contract strategy, strive to ensure that all elements are delivered to agreed cost and time to enable delivery and impact in the shortest possible time.

If implementation is delayed, the Councils will:

- Pursue contractual remedies against suppliers, and enact a contract break if necessary
- Ensure that JAQU are informed of any issues with delivery at the earliest opportunity
- Follow a risk-based approach with contractors, with regular reporting intervals and a ‘no surprises’ policy enshrined within contractual terms

5.11 Risk management

A Risk Register and Quantified Risk Assessment (QRA) has been developed to identify any possible risks to the project, for both the Preferred Option and the Benchmark CAZ D. The Preferred Option risk register will be a live document that is updated regularly throughout the life of the project so as to ensure risks are identified and mitigated through effective programme management.

The Benchmark CAZ D risk register and QRA have been completed for comparison purposes to inform the likely cost of delivering a CAZ D and to highlight the extent of the risks associated with delivering a CAZ D compared to the Preferred Option, particularly in terms of meeting the primary outcome of removing exceedances in the shortest possible time. It is not currently

expected that the CAZ D risk register will be reviewed and updated. An effective risk management strategy for the Preferred Option is in place to minimise the impact of risks whilst ensuring potential opportunities are maximised. The risks have been categorised and allocated an owner to ensure that they are managed effectively.

In line with this, three Risk Workshops were led by Bentley Project Management and attended by officers from each of the authorities who have expertise in the specific areas of focus outlined in the Preferred Option. The workshops were set out as follows:

- Identification of the risks
- Mitigation of the risks
- Quantification of the risks

Following these workshops, a risk register and QRA was produced and analysed against the required contingency needs for the project. The risk registers and QRA reports for both the Preferred Option and Benchmark CAZ D can be found in Appendices 17 to 20.

There are fifteen individual key risks identified for the Preferred Option and a further five finance-only risks. They are detailed in the appended risk register and QRA report and are grouped as follows:

- Highways England insist on having network upgrades
- Design and build procurement risks and public criticism due to the coronavirus
- Public/business acceptance to bus gates and criticism of the scheme
- Timescale and delay issues relating to retrofitting, terms and conditions, permits, roadworks, detailed design and road safety audits
- Insufficient funding from JAQU and higher than expected utility costs
- Implementation issues including camera interface software, power location, data protection, back office agreements and bus gate enforcement
- Scheme cost increase related to Victoria Road community consultations and introduction of ULEV bus gate exemptions

The project teams will continuously monitor and manage the risks associated with the project, in accordance with the authorities' accepted approach to risk management. The risk management sub-group will take the lead on managing and mitigating against any potential risks, with any high-level risks being escalated to the JAG for assessment and review. Risk allocation is detailed in the Commercial Case.

JAQU will continue to be informed of any risks that have the potential to impact on the delivery of the scheme. JAQU can also be re-assured that the following mitigation measures will be applied to help manage the risks:

- Early engagement with Highways England and DfT concerning the impact on the trunk road
- Ongoing engagement with JAQU on the impact of coronavirus

- Ongoing consultation with MPs to ensure potential refinements to the scheme are agreed at the earliest opportunity
- Dedicated communications officer employed to complete ongoing and intensive engagement to raise awareness of the scheme and why it is needed
- Early engagement with key stakeholders, including all bus operators
- Regular and extensive early contractor involvement with Amey through Infrastructure+
- Lessons learnt from the NuLBC bus retrofit Ministerial Direction
- Ensure Stoke-on-Trent City Council back office function is fully engaged ensuring potential IT issues are dealt with at the earliest opportunity
- Early completion of thorough site investigations
- Continued dialogue with statutory undertakers and all highway consultees
- Time allowed in the programme for detailed design, approval processes and consultations
- Regular review of the risk register, raising issues with JAQU at the earliest opportunity
- Use of existing contracts and frameworks to reduce the length of procurement processes at the same time as ensuring value for money

5.12 Benefits realisation

Evaluation and monitoring throughout the delivery of the programme is crucial to ensure benefits are realised. All benefits of the Preferred Option have been tracked and reported on, including evidence gathered through monitoring and evaluation work. Any benefits identified are accompanied by a recommendation on how potential issues or concerns relating to this benefit will be addressed. Table 5-9 summarises the benefits realised, whilst a detailed benefits realisation register can be found in Appendix 21.

Table 5-9: Summary of scheme benefits register

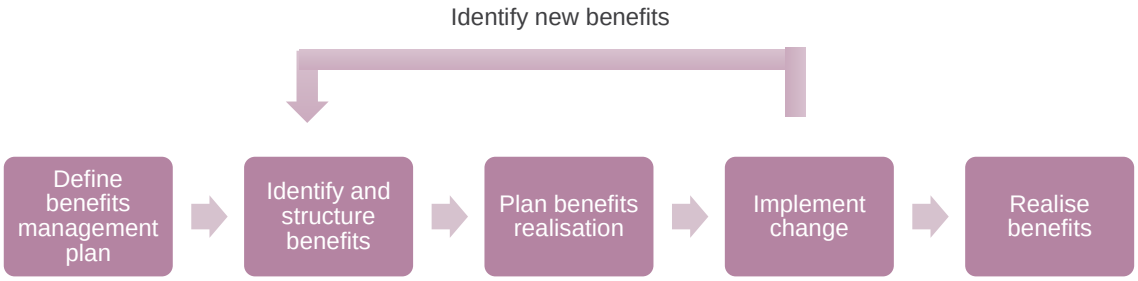
Primary outcome	How the benefit will be realised
Achieve the statutory limit values for roadside NO_2 concentration limits at the exceedance locations in the shortest possible time	Improved public health, better air quality should improve health and reduce the risk of illnesses such as heart disease, lung disease or asthma.
Secondary outcome	
Increased awareness of air quality problem	Residents and businesses better informed about air pollution
Local buses more attractive due to bus infrastructure improvements	Increase in bus patronage and journey quality
Traffic redistribution across the network without creating new sites of NO_2 exceedance	Traffic management measures aim to reroute traffic away from the exceedance sites without creating new exceedance locations.
Lower exhaust emissions of NO_x, PM and other pollutants released from buses	Bus retrofitting will reduce the amount of exhaust emissions released from more polluting, older bus engines, therefore reducing emissions across the designated bus routes.

Measures within the Preferred Option will be implemented as quickly as possible to ensure the realisation of benefits within the shortest timeframe possible. Effective realisation of benefits can lead to the enhancement of existing measures and the identification of further benefits.

The three authorities will ensure that flexibility throughout the implementation of the Preferred Option is considered so that measures can be altered during the consultation and approval process if necessary. This will ensure that the Preferred Option will be supported both publicly and politically and any risks are flagged at an early stage and mitigated against.

All benefits will be tracked and monitored. Figure 5-2 depicts the benefits management process of identifying and realising benefits.

Figure 5-2: Benefits management process



5.13 Monitoring and evaluation

JAQU will undertake a central evaluation of the NSLAQP. The central evaluation aims to understand the impacts of measures introduced through a local authority's local plan and ensure that local authorities are on track to reduce NO_2 concentrations in the shortest possible time. This will draw on both existing local and national monitoring.

The central evaluation will produce quarterly bulletins on the progress of local plans on reducing NO_2 concentrations and other key factors (such as changing traffic flows). This will be based on a comparison between the expected (as presented in the local authority's feasibility study) and the actual, monitored situation. The bulletins will be communicated regularly to local authorities. Should these bulletins show that a local plan is performing below expectation, JAQU will seek to determine the cause by working with the local authority.

North Staffordshire has an existing network of monitoring stations to monitor both traffic data and air quality. This existing network will be supplemented with new monitoring stations, particularly at sites of intervention and modelled exceedance.

JAQU stipulates that North Staffordshire should achieve compliance in the year 2022, demonstrated through annual average NO_2 concentration levels. It is currently expected that the Preferred Option will be delivered by May 2022. Data collected between June and December 2022 will determine whether the primary critical success factor of NO_2 compliance has been achieved, as stipulated by JAQU.

The authorities plan to share collected data with JAQU every three months, in line with guidance. Data will continue to be collected and shared with JAQU up to one-year after compliance is achieved. Bus patronage data will be reported locally.

Appendix 22 provides a more detailed Monitoring and Evaluation Plan.

Table 5-10 outlines monitoring outputs that are already in place across North Staffordshire. Table 5-11 outlines monitoring measures that will need to be implemented as part of the Preferred Option monitoring and evaluation plan. The tables identify which authority/organisation has been assigned each monitoring responsibility.

Table 5-10: Existing monitoring

Metric	Monitoring Method	Data Collection Frequency	Quantity	Data Type	Control
Air quality data	Diffusion tubes	Monthly	Network of 605 diffusion tubes collecting NO_2 data focussed on the previously identified Air Quality Management Areas (AQMAs)	NO_2 concentration levels	NULBC, SoTCC
Air quality data	Automatic Monitors	Quarterly	3 monitors (located in Hanley, Basford, Newcastle-under-Lyme)	NO_2 concentration levels	NULBC, SoTCC
Strategic Road Network traffic flow data	Automatic counts	Monthly	1 relevant site (located on the A50 between Stanley Matthews Way and A500, source - WebTRIS database)	1-way hourly vehicle flows by vehicle classification averaged over a month by day/hour	Highways England
Bus patronage	Bus operator ticket data	Monthly	Total patronage for Stoke-on-Trent and separately Staffordshire administrative areas only (excludes analysis by service) for concessionary fare purposes	Bus passenger numbers per service	Bus operators, SCC, SoTCC
Vehicle Fleet Composition	ANPR data	Undertaken in 2019	15 locations	Vehicle composition split by vehicle type, fuel type, euro standards and compliance	NULBC, SoTCC

Table 5-11: Measures in the Preferred Option that require additional monitoring

Metric	Monitoring Method	Data Collection Frequency	Quantity	Control
Air quality data	Diffusion tubes	Monthly	59 additional diffusion tubes to collect NO_2 data at the identified exceedance locations	NULBC, SoTCC
Local traffic data	Automatic Traffic Counts	Monthly	13	SoTCC, NULBC
Vehicle fleet composition	ANPR cameras	Monthly	5 locations	SCC, SoTCC
Vehicle fleet composition	ANPR	One off cordon study	15 locations	SCC, SoTCC
Bus patronage	Bus operator ticket data	Monthly	Data by fare stage providing a broad indication of the number of passengers on each bus service. Will require analysis.	Bus operators, SCC, SoTCC

5.14 Project assurance

Local Partnerships have been appointed by JAQU to assist the local authorities in the development of the Commercial, Financial and Management Cases of the OBC, and to assist JAQU in reviewing the submissions. They also provide independent project assurance and expert support to the local authorities, therefore maximising the likelihood of successful delivery.

Internally, project assurance is delivered through regular reporting to JAG and also by the SRO, the Project Manager and NuLBC's Finance Department who scrutinizes and manages the project's budget, ensuring the project remains to timeframe and cost. Any monetary risks are therefore able to be flagged at an early stage, so that this can be managed appropriately.

The independence of the project manager is crucial to the effective working across the three local authorities. The project manager is able to remain impartial when it comes to making key critical decisions that is likely to impact on each of the authorities. The project manager

frequently reviews the project programme in relation to the project's current progress and expected progress and outlines any risks that may arise as a result. This process provides a regular health check of the project and is regularly reported to JAQU. The project manager ensures that the authorities work closely together in order to achieve the common goal, that is, achieving roadside nitrogen dioxide levels compliance within the shortest timeframe possible.

5.14.1 Gateway reviews

It is not proposed to adopt a gateway review process as it is not a JAQU requirement.

5.15 Decommissioning

Decommissioning costs have been included for some elements due to the nature and type of scheme being implemented. It is assumed that the scheme will be in place and maintained for a ten-year period. When it can be demonstrated that the primary outcome has been achieved, agreement needs to be reached that the bus gates can be removed. It will be necessary to remove those elements of the project:

- That will no longer be required
- Where funding is no longer available to support the operational or maintenance element of the asset
- Where the asset is considered obsolete

Costs are associated with the removal and decommissioning of a wide range of elements, including:

- The civil engineering works associated with reinstating parts of the highway to their original layouts prior to scheme implementation
- Signage on the local and strategic road networks, including variable message signing
- CCTV and ANPR cameras and enforcement technology

The majority of the elements of the scheme, except for the bus gates, will still be considered appropriate and useful once the project lifetime has passed. In particular, the wider network management assets provide additional functionality to the system that can be utilised beyond the lifetime of the project, not only for addressing issues associated with the air quality agenda, but also for wider highway network management capabilities. Some elements will also be too costly or inappropriate to be decommissioned.

5.16 Benchmark CAZ D

In the event of the Benchmark CAZ D becoming the option for delivery, the management of the project, governance structures, key people involved, and communications would need to be significantly different to that proposed for the Preferred Option.

Project governance would need to be expanded to include:

- Financial sub-group for implementation period
- Procurement sub-group for OBC to FBC
- A model for continued liaison with the operating company

- A framework for contract compliance
- A significantly expanded role for the legal sub-group

Procedural differences include the need to undertake the formal process associated with traffic charging orders and associated consultation with the Traffic Penalty Tribunal.

Legal processes would be greatly expanded as each Local Authority would be required to enter into an Operational Level Agreement with the DfT. Legal agreement between the three authorities would be more extensive and a contract would be required between local authorities and the tender winner to deliver and operate the CAZ.

Engagement and communications would be significantly expanded and need to be ongoing throughout the operational period of the CAZ to provide updates to the local community. CAZ schemes are required to undertake statutory consultation between OBC and FBC which has previously resulted in scheme amendments.

Day to day project management would be undertaken by the operating company.

The financial management role would be expanded due to the significant income and expenditure associated with operating a CAZ and the associated financial obligations local authorities have. Management and disbursement of any CAZ income surplus would need to be agreed and the Low Emissions Strategy refreshed to reflect the potential funding stream.

Contract management would be expanded to include the significant operational and maintenance elements of a CAZ.

The monitoring and evaluation plan would be expanded to include:

- Monitoring of impacts of the economy and local businesses
- CAZ ANPR enforcement cameras would be available for fleet composition monitoring
- Expanded number of diffusion tubes to monitor NO_2 concentrations
- Expanded number of permanent traffic counters

Decommissioning the CAZ would also be a significantly larger process than for the Preferred Option.

6 Appendices

Appendices are attached as separate documents to this unapproved OBC. The full list of appendices is outlined below:

1. Stated Preference Survey Report
2. Workplace Parking Levy Review
3. Indicative Design Drawings
4. Flow Difference Plots
5. Comms Survey Summary
6. Longlist of Measures
7. Refined Longlist of Options
8. Refined Shortlist of Options
9. AST – Preferred Option
10. AST – Benchmark CAZ D
11. Financial Model – Preferred Option
12. Financial Model – Benchmark CAZ D
13. Project Organogram
14. Project Programme Outline
15. Implementation Programme Summary – Preferred Option
16. Implementation Programme Summary – Benchmark CAZ D
17. Quantified Risk Assessment – Preferred Option
18. Risk Register – Preferred Option
19. Quantified Risk Assessment – Benchmark CAZ D
20. Risk Register – Benchmark CAZ D
21. Benefits Realisation Plan
22. Monitoring & Evaluation Plan
23. Communications and Engagement Strategy
24. T1 – Transport Modelling Tracker Table
25. T2 – Transport Modelling Report
26. T3 – Model Methodology Report
27. T4 – Forecasting Report
28. AQ1 – Air Quality Tracker Table
29. AQ2 – Air Quality Modelling Methodology Report
30. AQ3 – Air Quality Modelling Results Report
31. AAS – Analytical Assurance Statement
32. TD1 – Target Determination 1
33. TD2 – Target Determination 2
34. E1 – Economic Methodology Report

35. E2 – Economic Model
36. E3 – Distributional Impact Analysis