

Greater Manchester's Clean Air Plan to tackle Nitrogen Dioxide Exceedances at the Roadside

Evidence Submission for a new GM Clean Air Plan

Appraisal Report



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1 Introduction

1.1 Background

- 1.1.1 The government has instructed many local authorities across the UK to take quick action to reduce harmful roadside levels of Nitrogen Dioxide (NO₂) with the Secretary of State (SoS) for Environment, Food and Rural Affairs issuing Directions under the Environment Act 1995 in 2017 requiring them to undertake feasibility studies to identify measures for reducing NO₂ concentrations to within legal limit values, defined as the long-term annual mean legal limit of 40 µg/m³ for NO₂. In Greater Manchester, the ten local authorities, the Greater Manchester Combined Authority (GMCA) and Transport for Greater Manchester (TfGM) are working together to develop a Clean Air Plan to tackle NO₂ exceedances at the roadside, herein known as Greater Manchester Clean Air Plan (GM CAP).
- 1.1.2 In March 2019, the 10 GM Authorities agreed the submission of the Outline Business Case (OBC)¹ that proposed a package of measures that was considered would deliver compliance in GM in the shortest possible time and by 2024 at the latest. This involved a Charging Clean Air Zone (CAZ) Class C with additional measures.
- 1.1.3 In July 2019, the SoS issued a Direction under section 85 of the Environment Act 1995 requiring the 10 GM Authorities to implement the local plan for NO₂ compliance for the areas for which they were responsible, including a Charging CAZ Class C with additional measures. There was also an obligation to provide further scenarios appraisal information to demonstrate the applicable Class of Charging CAZ and other matters to provide assurance that the local plan would deliver compliance in the shortest possible time and by 2024 at the latest.
- 1.1.4 The SoS subsequently issued a Direction to the 10 GM Authorities in March 2020 that required them to take steps to implement that local plan for NO₂ compliance so that compliance with the legal limit for NO₂ is achieved in the shortest possible time, and by 2024 at the latest, and so that exposure to levels above the legal limit for NO₂ is reduced as quickly as possible.
- 1.1.5 A statutory consultation on the proposals took place in Autumn 2020.

¹ <https://cleanairgm.com/technical-documents/#outline-business-case>

- 1.1.6 The GMCA – Clean Air Final Plan report on 25th June 2021² endorsed Greater Manchester’s Final CAP and policy in compliance with this direction, following a review of all of the information gathered through the GM CAP consultation and wider data, evidence and modelling work. Throughout the development of the previous Plan, JAQU reviewed and approved all technical and delivery submissions. The Plan was agreed by the ten Greater Manchester local authorities. Within this document, this is referred to as the Previous GM CAP.
- 1.1.7 The GMCA – Clean Air Final Plan report on 25th June 2021³ endorsed the plan and policy, following a review of the information gathered through the statutory consultation and wider data, evidence and modelling work. Under the Previous GM CAP, GM was awarded £123 million by government to deliver the scenario following consultation that comprised of a GM-wide CAZ and supporting vehicle upgrade funds aimed at encouraging vehicles upgrades to secure compliance and mitigating the impacts of the CAZ. The funds included measures addressing buses, Private Hire Vehicles (PHVs), Hackney Carriages, coaches, minibuses, Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs).
- 1.1.8 In September 2020, the Air Quality Administration Committee (AQAC) approved the establishment and distribution of the bus replacement funds. The following month, AQAC agreed that applications for funding would open for HGVs in November 2021 and that in January 2022, applications for funding would open for PHVs, Hackney Carriages, coaches, minibuses and LGVs.
- 1.1.9 On 20th January 2022, AQAC considered the findings of an initial review of conditions within the supply chain of LGVs in particular following Covid-19 related impacts, which were impacting the availability of compliant vehicles and supply-side constraints resulting in price increases, particularly in the second-hand market⁴. AQAC agreed that a request should be made to the SoS to pause opening of the next phase of Clean Air Funds. This was to allow an urgent and fundamental joint policy review with government, to identify how a revised policy could be agreed to deal with the supply issues and local businesses’ ability to comply with the GM CAP.
- 1.1.10 On 8th February 2022, AQAC noted the submission of a report “Issues Leading to Delayed Compliance Based on the Approved GM CAP Assumptions”. The report concluded that on balance, the latest emerging evidence suggested that with the approved plan in place, it was no longer likely that compliance would be achieved in 2024. Government subsequently issued a new Direction⁵ which confirmed that the March 2020 Direction had been revoked and required that by 1st July 2022 the GM authorities should:

² <https://democracy.greatermanchester-ca.gov.uk/documents/s15281/GMCA%20210621%20Report%20Clean%20Air%20Plan%20-%20FINAL%20FINAL.pdf>

³ [GMCA 210621 Report Clean Air Plan - FINAL FINAL.pdf \(greatermanchester-ca.gov.uk\)](https://democracy.greatermanchester-ca.gov.uk/documents/s18685/ARUP%20Technical%20Note.pdf)

⁴ <https://democracy.greatermanchester-ca.gov.uk/documents/s18685/ARUP%20Technical%20Note.pdf>

⁵ [The Environment Act 1995 \(Greater Manchester\) Air Quality Direction 2022 \(publishing.service.gov.uk\)](https://publishing.service.gov.uk)

- review the measures specified in the local plan for NO₂ compliance and associated mitigation measures; and
 - determine whether to propose any changes to the detailed design of those measures, or any additional measures.
- 1.1.11 The Direction also states that the local plan for NO₂ compliance, with any proposed changes, must ensure the achievement of NO₂ compliance in the shortest possible time and by 2026 at the latest. It should also ensure that human exposure to concentrations of NO₂ above the legal limit is reduced as quickly as possible.
- 1.1.12 On 1st July 2022, AQAC noted that 'Case for a new Greater Manchester Clean Air Plan'⁶ document and associated appendices would be submitted to the SoS as a draft document subject to any comments of GM Authorities.
- 1.1.13 On 17th August 2022, AQAC agreed to submit the 'Case for a new Greater Manchester Clean Air Plan' to the SoS as a final version and approved the Case for a New Plan - Air Quality Modelling Report for submission to JAQU.
- 1.1.14 The 'Case for a new Greater Manchester Clean Air Plan' set out that challenging economic conditions, rising vehicle prices and ongoing pandemic impacts meant that the original plan of a city-region charging CAZ was no longer the right solution to achieve compliance, instead proposing an investment-led, non-charging GM CAP.
- 1.1.15 The primary focus of the 'Case for a new Greater Manchester Clean Air Plan' was to identify a plan to achieve compliance with the legal limit value for NO₂ in a way that considered the cost-of-living crisis and associated economic challenges faced by businesses and residents. This would be achieved through an investment-led approach combined with wider measures that the GM Authorities are implementing and aimed to reduce NO₂ emissions to within legal limits, in the shortest possible time and at the latest by 2026.
- 1.1.16 The 'Case for a new Greater Manchester Clean Air Plan' proposed using the remaining funding that the government has awarded to GM to the GM local authorities for the Previous GM CAP to deliver an investment-led approach to invest in vehicle upgrades, rather than imposing daily charges, and deliver new Zero Emission Buses (ZEBs) as part of the Bee Network⁷ (a London-style integrated transport network for Greater Manchester). The new plan would ensure that the reduction of harmful emissions would be at the centre of GM's wider objectives. Within this document, this plan is referred to as the 'Investment-led Plan'.

⁶ https://assets.cfmassets.net/tlpgbv1k6h2/7jtkDc5AODypDQlw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

⁷ The Bee Network is Greater Manchester integrated transport system joining together bus, Metrolink, rail and active travel <https://tfgm.com/corporate/business-plan/case-studies/bee-network>

- 1.1.17 The GM Authorities committed to a participatory approach to the development of the new plan to ensure that the GM Authorities' proposals would be well-grounded in evidence in terms of the circumstances of affected groups and possible impacts of the new plan on them, and therefore the deliverability and effectiveness of that plan.
- 1.1.18 Between August and November 2022, the GM Authorities carried out engagement and research with key stakeholders – vehicle-owning groups and representatives of other impacted individuals, such as community, business, environment and equality-based groups. This activity included targeted engagement sessions with all groups, and an online survey and supporting qualitative research activity with vehicle-owning groups.
- 1.1.19 Input from those engaged informed the ongoing policy development process as the GM Authorities developed the package of measures forming the Investment-led Plan.
- 1.1.20 Having submitted the 'Case for a new Greater Manchester Clean Air Plan'⁸ in July 2022, the GM Authorities were asked by government in January 2023⁹ to:
- Provide modelling results for a benchmark CAZ to address the persistent exceedances identified in central Manchester and Salford, in order for these to be compared against your proposals.
 - Identify a suitable approach to address persistent exceedances identified in your data on the A58 Bolton Road in Bury in 2025, and to propose a suitable benchmark.
 - Set out how the measures you have proposed will be modelled and evidenced overall, and to ensure that they are modelled without any unnecessary delay.
- 1.1.21 The GM Authorities undertook the work required to supply this further evidence and on 8th March 2023 submitted the report 'Approach to Address Persistent Exceedances Identified on the A58 Bolton Road, Bury'¹⁰. GM Authorities also worked to address the remaining two requests from government by June 2023 on the basis of providing further information to support its Investment-led Plan and testing the proposal against a suitable benchmark CAZ, herein referred to as the 'CAZ Benchmark'. However, new evidence emerged from government in April 2023, as set out below, which would fundamentally change the number and spatial distribution of forecast modelled exceedances across GM.

⁸ https://assets.ctfassets.net/tlpgbvy1k6h2/7jtkDc5AODypDQIw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

⁹ <https://democracy.greatermanchester-ca.gov.uk/documents/s24937/Appendix%201.%20Ministerial%20Letter%20to%20GM%20with%20attachment.pdf>

¹⁰ <https://democracy.greatermanchester-ca.gov.uk/documents/s24939/Appendix%203.%20GM%20CAP%20A58%20Bury%20Measure%20Report%20DRAFT%20for%20AQAC%20Approval%20Feb%202023.pdf>

- 1.1.22 In April 2023, government advised TfGM that it was to pause any new spending on bus retrofit as it had evidence that retrofitted buses have poor and highly variable performance in real-world conditions¹¹.
- 1.1.23 This followed a JAQU-funded study to quantify nitrogen oxide (NO_x) and NO₂ emissions from buses under real-world driving conditions in three cities across the UK, including Manchester (monitoring took place in Manchester City Centre between 21st November and 12th December 2022). The monitoring indicated that retrofitted buses were not reducing emissions as expected, with significant variation in performance between bus models with retrofit technologies. Furthermore, emissions of primary-NO₂ (as opposed to NO_x) were highly variable, potentially worsening roadside NO₂ concentrations despite an overall reduction in NO_x emissions.
- 1.1.24 Government therefore commenced a six-month focused research programme to quickly investigate the causes of this poor performance and scope how it could be improved, anticipated to be reported in Autumn 2023.
- 1.1.25 In the light of government's new evidence, JAQU issued revised general guidance to authorities producing CAPs nationwide. In summary, this required that air quality modelling should no longer assume any air quality benefits from a retrofitted bus.
- 1.1.26 The GM Authorities have incorporated the revised guidance from JAQU into modelling work to produce this Appraisal Report and supporting documentation which was submitted in December 2023.
- 1.1.27 To date the outputs of this study have not been made available to GM. In the absence of the government's bus retrofit study, GM has incorporated the revised guidance, as agreed with JAQU, into the modelling which underpins the development of its CAP to produce a report that appraises the ability of the Investment-led Plan and the CAZ Benchmark to deliver compliance with the legal limit value in the shortest possible time and by no later than 2026.

1.2 Purpose of Document

- 1.2.1 In light of government evidence and the revised technical guidance on bus retrofit, this document sets out the revised Do Minimum air quality position and appraises the Investment-led Plan and a CAZ Benchmark to deliver compliance with the legal limit value in the shortest possible time and by no later than 2026.
- 1.2.2 This document is also supported by a series of technical reports, as listed below, which have been produced to summarise the latest position in terms of the modelling outputs and air quality monitoring:
- AQ1: Local Air Quality Modelling Tracking Table (AQ1);

¹¹ <https://democracy.greatermanchester-ca.gov.uk/documents/s27699/Appendix%201.%20Letter%20from%20DfT%20to%20Greater%20Manchester%20regarding%20Bus%20Retrofit%20Update.pdf>

- AQ2: Local Plan Air Quality Modelling Report (AQ2);
- AQ3: Local Plan Air Quality Modelling Report (AQ3);
- T1: Local Plan Transport Modelling Tracking Table (T1);
- T2: Local Plan Transport Model Validation Report (T2);
- T3: Local Plan Transport Modelling Methodology Report (T3);
- T4: Local Plan Transport Model Forecasting Report (T4); and
- Analytical Assurance Statement (AAS).

1.3 Core Objectives for the Investment-led Plan

1.3.1 The Investment-led Plan has been developed in accordance with the following core objectives set out in the 'Case for a new Greater Manchester Clean Air Plan':

- To reduce NO₂ concentrations to below the legal limits in the shortest possible time and by 2026 at the latest;
- Achieve compliance in a way that is fair to businesses and residents, and does not damage business or cause financial hardship to people in GM; and
- Ensure the reduction of harmful emissions is at the centre of GM's wider aim for delivering the Bee Network's core objectives.

1.3.2 The core objectives align with the Critical Success Factor (CSF) criteria, set out in JAQU guidance, which have been applied to the appraisal of an Investment-led Plan against a CAZ Benchmark and set out in **Section 8**.

2 Air Quality Position in Greater Manchester

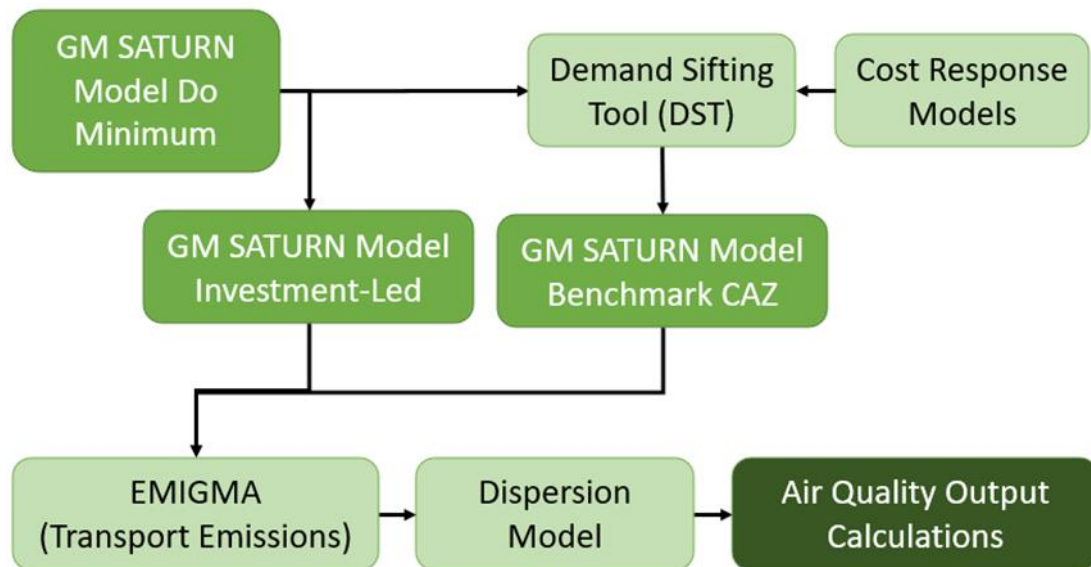
2.1 Introduction

- 2.1.1 This chapter outlines the Do Minimum air quality assessment methodology and results. Air quality in GM has been modelled as part of the GM CAP, and areas of exceedance of the legal limit values identified. The Do Minimum in context of the GM CAP refers to the air quality position in 2025 and 2026 without any associated GM CAP measures that have not already been funded and implemented. This takes into account that government provided the GM Authorities with £123 million of funding for the Previous GM CAP, £17.5 million of which has been spent and implemented – of this, £16 million has been spent on upgrading the bus fleet.
- 2.1.2 The GM CAP is underpinned by an evidence base derived from data collection, research, analysis and modelling. Throughout the technical development process from 2017 to date, the GM Authorities have used best practice methodology and assumptions and worked closely with government, including, for example, by delivering updates to incorporate the impacts of Covid-19 to the GM CAP in accordance with national guidance.
- 2.1.3 The modelling approach has been developed in line with JAQU guidance. The purpose of the modelling process is to quantify the impact of traffic by vehicle type on emissions and consequently on concentrations of NO₂ at the roadside in GM.
- 2.1.4 The air quality problem for GM is assessed with reference to the Do Minimum forecast, which takes into account other investment/interventions that are planned, funded and committed, where they have an impact on travel, traffic or the road network. This includes Previous GM CAP committed and spent funds, as referenced above, as these vehicles have been upgraded and are now in operation on GM's roads. The forecast appraisal years were developed for the Previous GM CAP commencement date for the GM CAP (2021 – not updated), the current expected Investment-led Plan commencement date (2025) and a further year to inform the trajectory of improvement to compliance with the limit values (2026) and also earliest likely full opening year for the CAZ Benchmark.

2.2 Methodology

- 2.2.1 The overall modelling process has remained consistent throughout the development of the GM CAP, whilst updates have been made at relevant stages to take account of a number of factors including reflecting changes to revised vehicle fleet age assumptions (due to Covid-19) or as a response to policy refinements as a result of public consultations.
- 2.2.2 A brief summary of the Do Minimum modelling input steps feeding into the appraisal is presented in **Figure 2-1**. For a full description of the modelling methodology, please see the associated Technical Reports T1-4 and AQ1-3.

Figure 2-1 Overview of the Do Minimum Modelling Process



2.3 Do Minimum Position

- 2.3.1 The Do Minimum modelling baseline has been updated since the Summer 2022 position and subsequently as part of the work to underpin the 'Approach to address persistent exceedances identified on the A58 Bolton Road, Bury' report, submitted in March 2023.
- 2.3.2 The Do Minimum position in 2025 and 2026 takes into account committed schemes outside of the GM CAP such as schemes associated with the City Centre Transport Strategy (CCTS) and vehicle upgrades from other funding sources such as the Zero Emission Bus Regional Area (ZEBRA) fund. This builds on the Do Minimum developed as part of the Previous GM CAP and refined as part of the modelling to support the 'Case for a new Greater Manchester Clean Air Plan' in Summer 2022.
- 2.3.3 The following changes have been made to the Do Minimum modelling since January 2023:
- Transport Appraisal Guidance (TAG)¹² updates including vehicle electrification updates;
 - Changes to bus retrofit assumptions and programme;
 - Changes to ZEBRA scheme (Stockport);
 - Changes to bus service patterns (including updated routings and frequencies); and
 - Updates to CCTS schemes.

¹² <https://www.gov.uk/guidance/transport-analysis-guidance-tag>

TAG guidance updates including vehicle electrification updates

- 2.3.4 The TAG Data Book provides transport data and parameter values for input to highway models and appraisals. This includes values of time and vehicle operating costs for assignment modelling, plus forecast proportions of car, LGV and other vehicle kilometres using petrol, diesel and electric propulsion.
- 2.3.5 An updated version of the TAG Data Book was published in May 2023 (V1.21). The Do Minimum modelling was updated to reflect this revision. Further details can be found in AQ3 report.
- 2.3.6 The vehicle fleet proportions used in the Do Minimum model were based on national forecasts produced by the Department for Transport (DfT). Since the previous iteration of modelling for the January 2023 position, fleet forecasts in the TAG Data Book (May 2023) have been revised to reflect the latest forecast fleet assumptions from DfT's Environmental Analysis team. This revision includes fleet proportions for electric vehicles based on the sales statistics and policy commitments.
- 2.3.7 The updated forecast shows reductions in petrol and diesel car kilometres relative to the previous forecasts, with a corresponding 10 percentage point increase in electric car kilometres. Further information on the updates to electric vehicle (EV) car projections can be viewed in *T3 Appendix B*.

Changes to bus retrofit assumptions and programme

- 2.3.8 In 2022, JAQU funded a study to quantify NO_x and NO₂ emissions from Clean Vehicle Retrofit Accreditation Scheme (CVRAS)¹³ retrofitted buses under real-world driving conditions in three cities across the UK, including Manchester. Monitoring took place in Manchester City Centre between 21st November and 12th December 2022.
- 2.3.9 The monitoring indicated that retrofitted buses were not reducing emissions as expected, with significant variation in performance between bus models with retrofit technologies. Furthermore, emissions of primary-NO₂ were highly variable, potentially worsening roadside NO₂ concentrations despite an overall reduction in NO_x emissions.
- 2.3.10 At this stage, government is not proposing any changes to the CAZ compliance status of buses that have already been retrofitted with Selective Catalytic Reduction (SCR) technology whilst they carry out further studies. However, they do not recommend any further retrofit purchases are made until this research is completed.

¹³ The government developed the CVRAS to provide independent evidence that a vehicle retrofit technology will deliver the expected pollutant emissions reductions and air quality benefits. The scheme enables drivers, technology manufacturers, businesses and local authorities to be confident that the retrofit technologies being used provide the appropriate emissions reductions for free entry to a clean air zone. Retrofitted vehicles which meet the requirements of a CAZ as accredited under this scheme will be exempt from a charge. [Clean air zone framework - GOV.UK \(www.gov.uk\)](https://www.gov.uk/clean-air-zone-framework)

2.3.11 Between 2015 and 2019, TfGM awarded £3.1m of Clean Bus Technology Fund (CBTF) funding to retrofit 170 buses. In 2020, as part of the GM CAP, government awarded a further £14.7m to retrofit all remaining retrofittable buses. As of October 2023:

- 968 individual vehicle grants had been awarded (£15.12m);
- 956 vehicles had been fully retrofitted;
- £14.93m had been paid out (for 956 vehicles); and
- 12 vehicles were in the process of being retrofitted.

2.3.12 Given government's recommendation to pause any further retrofit purchases, TfGM has contacted those operators with vehicles in the process of being retrofitted. Whilst the retrofit option was closed to new applicants, operators have made a financial commitment, for example, by placing a deposit that is non-refundable and therefore are committed to completion of the retrofit of their vehicle.

2.3.13 In light of government's new evidence, JAQU issued revised general guidance applicable to CAZ authorities nationwide, along with GM-specific guidance. The general guidance requires that air quality modelling should not assume any benefits from a retrofitted bus. The GM-specific guidance gave the GM Authorities the option to develop a bespoke process to model emissions from retrofitted buses which utilises the available monitoring data. Upon review of remote sensing survey data provided by JAQU, it was determined that it would not be possible to produce a robust and defensible bespoke GM fleet methodology due to sample sizes of specific buses and the scale of variability. Therefore, to enable the GM Authorities to develop the Investment-led Plan as quickly as possible, the GM Authorities progressed with applying the JAQU standard guidance for bus retrofits.

2.3.14 Incorporating this revised guidance into the modelling for the GM CAP has impacted the Do Minimum scenario underlying all of the GM Authorities' modelling work and scheme development to date and, given the large number of retrofitted buses in the region, the impact is significant.

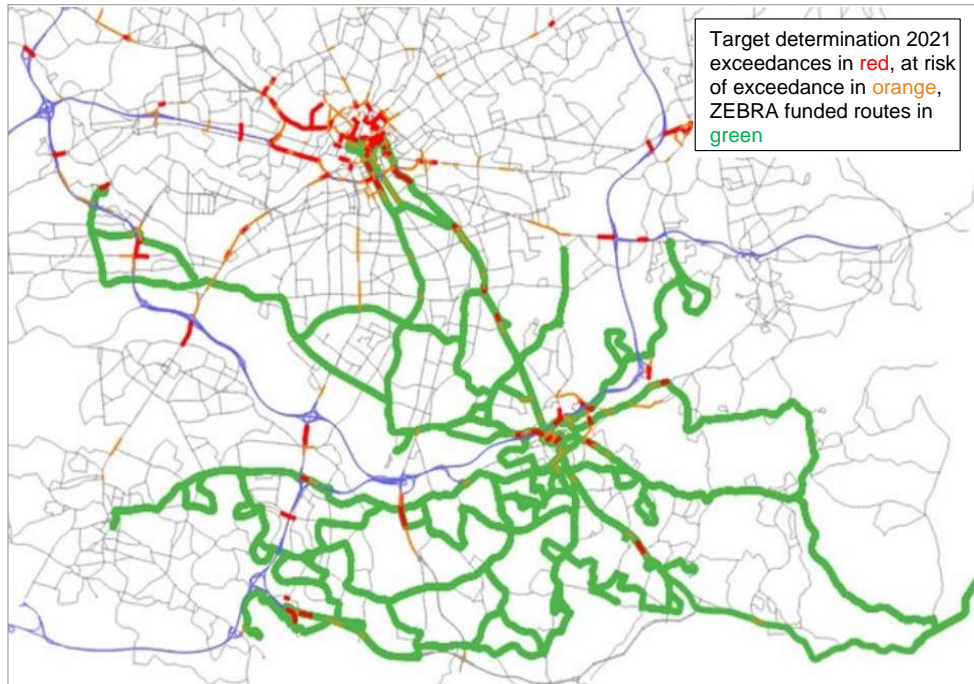
Changes to ZEBRA scheme (Stockport)

2.3.15 £35.8 million has been awarded to the GM Authorities after a joint bid to DfT submitted by GMCA, TfGM, Stockport Council and Stagecoach Group PLC to replace 170 diesel buses that operate from Stockport Bus Depot with zero emission technology. The ZEBRA scheme would convert approximately 10% of the GM bus fleet to Zero Emission technology and result in a reduction of carbon dioxide equivalent (CO₂e) emission from the bus fleet of approximately 100,000 tCO₂e by 2038¹⁴.

¹⁴ <https://democracy.greatermanchester-ca.gov.uk/documents/s18864/15%20GMCA%2020220128%20Zero%20Emission%20Bus%20Regional%20Areas%20ZEBRA%20Fund%20Bid.pdf>

2.3.16 The Stockport ZEBRA scheme was previously assumed to be delivered within the 2025 Do Minimum. However, delays to the programme are now projecting that the ZEBs operating out of the Stockport depot will not be operational until Autumn 2025. **Figure 2-2** shows the ZEBRA affected routes operating from the Stockport depot.

Figure 2-2 ZEBRA Funded Bus Routes, from the Stockport depot



2.3.17 A conservative assumption within the Do Minimum modelling has been applied to remove benefits associated with this scheme for 2025 and assumes that the interim fleet operating will be retrofitted vehicles. This assumption means that the emission and concentration predictions along these bus routes, which are predominantly on the corridors from central Stockport towards the Regional Centre¹⁵, will likely be over-predicted in 2025 because buses are expected to transition from retrofit diesel to electric midway through the year.

Changes to bus fleets and service patterns

2.3.18 The Do Minimum modelled bus services data were updated to include up-to-date information for routings, frequencies and vehicle deployment based on 2023 services. This reflects changes to service patterns between 2019 and 2023 following the impact of the Covid-19 pandemic and investment into cleaner bus fleets in GM.

2.3.19 The Do Minimum modelling has been updated to reflect the inclusion of a fleet of zero emission buses which have been deployed on routes into the Regional Centre. This includes further zero emission buses that are already funded and are planned to be in operation from 2024.

¹⁵ The Regional Centre is defined as the area covering Manchester and Salford City Centres.

2.3.20 Further details in relation to changes in specific services can be found in *T3 Report*.

Updates to CCTS schemes

2.3.21 There have been substantial changes to transport measures within the Regional Centre in recent years, with further planned changes into the future as part of the CCTS¹⁶.

2.3.22 The CCTS was developed by TfGM, Manchester City Council and Salford City Council and provides a strategy to guide how transport is improved across the Regional Centre over the next two decades. The strategy is a sub-strategy to the GM Transport Strategy 2040 and was published in 2021 following consultation in 2020.

2.3.23 The primary aim of the CCTS is for 90% of all trips to the Regional Centre in the morning peak to be made on foot, by cycle or on public transport before 2040. The strategy sets out proposals to further improve the Regional Centre's public transport and active travel networks and reduce car-based trips over the longer term. Within this, there are a number of planned interventions identified in the context of the GM CAP, in particular those schemes which will be delivered prior to 2025.

2.3.24 A detailed review of the completed and planned schemes within the Regional Centre has been undertaken to identify the measures required for inclusion within the Do Minimum modelling. This includes:

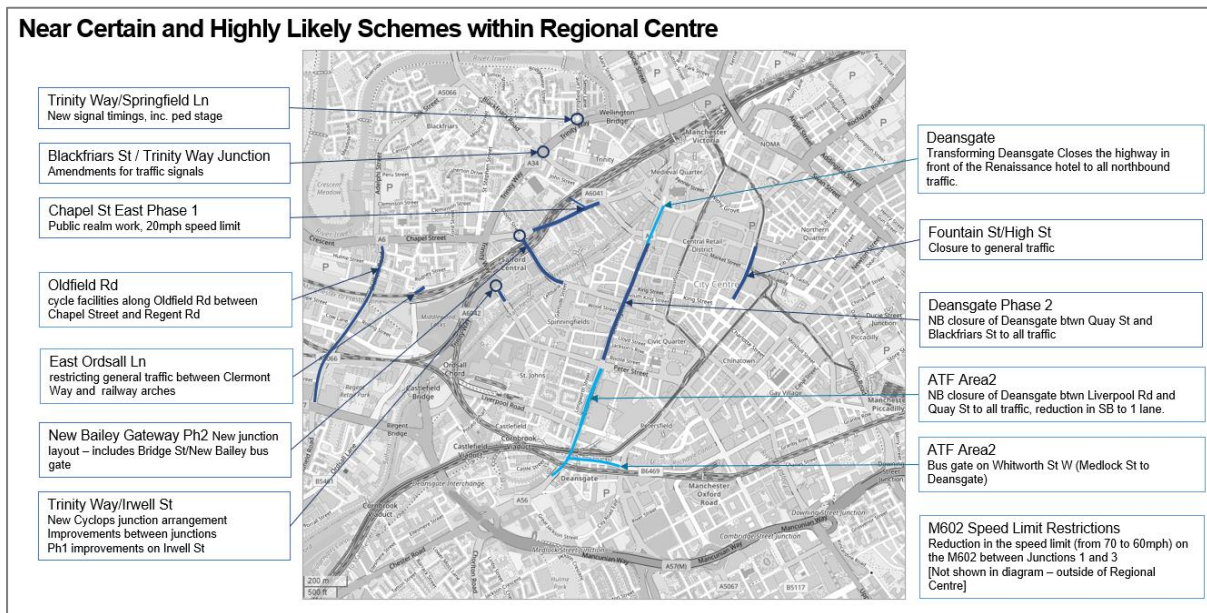
- Recently completed and built schemes within the Regional Centre comprising bus priority, active travel and traffic restriction; and
- Near certain and highly likely schemes included within CCTS which will be delivered by 2025 and should therefore be incorporated within the Do Minimum model.

2.3.25 The Regional Centre schemes mainly comprise management and small-scale road and junction improvement schemes, including road closures for through traffic, to improve conditions for public transport, walking and cycling. The network impacts of these infrastructure interventions, such as rerouting, are reflected within the current modelling for the GM CAP.

2.3.26 A summary of the committed and planned schemes to be delivered by 2025 is shown in **Figure 2-3**.

¹⁶ [City Centre Transport Strategy | Bee Network | Powered by TfGM](#)

Figure 2-3 Committed and Planned CCTS Schemes for Delivery by 2025



2.3.27 To ensure consistency of modelling and to reflect appropriate timescales for delivery, the 2026 modelling also retains the same CCTS schemes as represented in the 2025 modelling. The demand impacts associated with the implementation of the CCTS schemes have also been incorporated into the updated Do Minimum. Further information on the CCTS schemes and related impacts can be viewed in *T3 Appendix A*.

2.4 Updated Air Quality Position

2.4.1 This section summarises the updated Do Minimum air quality position forecast in 2025 and 2026 following network and demand updates described in the earlier sections and listed below:

- TAG guidance updates including vehicle electrification updates;
- Changes to bus retrofit assumptions and programme;
- Changes to ZEBRA scheme (Stockport);
- Changes to bus service patterns; and
- Updates to CCTS schemes.

2.4.2 Further information on the updated air quality position is reported in the *AQ3 Report*.

- 2.4.3 **Table 2-1** shows the distribution of non-compliant sites across GM, both by spatial type and also in terms of how close they are to compliance. By 2025, the first full opening year of the Investment-led Plan, the transition towards cleaner vehicles that would be expected without further action for GM CAP, as well as a reduction in background concentrations, would lead to a very substantial reduction in the number of sites in exceedance of the limit value. It is anticipated that 12 sites would be non-compliant (two of which will be compliant under the expected ZEBRA scheme electrification), with no sites predicted to experience annual mean concentrations greater than $45 \mu\text{g}/\text{m}^3$. A further 76 sites would be compliant but experience annual mean concentrations close to but below the limit value.
- 2.4.4 By 2026, the ZEBRA scheme bus fleet will be fully operational, and along with the natural replacement of other vehicles plus the reduction in background concentrations each year, concentrations are forecast to have improved further. There are forecast to be five exceedance sites, four within the Inner Relief Route (IRR) and one in Wigan.
- 2.4.5 Extrapolation of the concentrations beyond 2025/26 is likely to be pessimistic due to the assumptions made about the GM bus fleet for the Do Minimum scenario modelling, but this indicates that GM is not predicted to become fully compliant with the legal limit for NO_2 until after 2027.

Table 2-1 Predicted annual mean NO₂ concentrations at points on the GM road network – 2025, 2026 Updated Do Minimum (without the GM CAP)

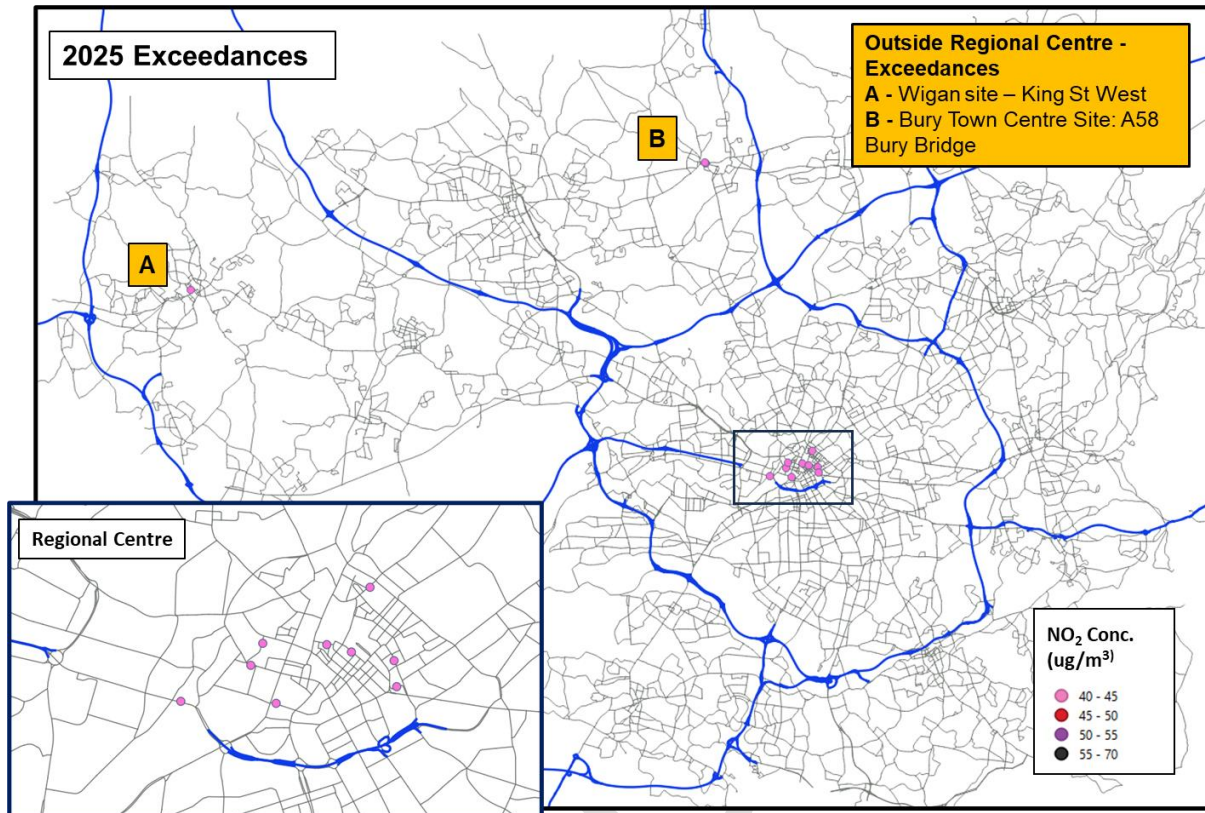
Road classification ¹⁷	Compliant sites		Non-compliant sites			
	Very compliant (Below 35 µg/m ³)	Compliant but marginal (35 to 40 µg/m ³)	Non-compliant (>40 to 45 µg/m ³)	Very non-compliant (>45 to 50 µg/m ³)	Extremely non-compliant (>50 µg/m ³)	Total non-compliant (>40 µg/m ³)
2025						
Inside IRR	246	19	8	0	0	8
Other urban centres	226	10	1	0	0	1
Other locations	1980	47	3	0	0	3
Total	2452	76	12	0	0	<u>12</u>
2026						
Inside IRR	256	13	4	0	0	4
Urban centres	230	6	1	0	0	1
Other locations	2013	17	0	0	0	0
Total	2499	36	5	0	0	<u>5</u>

2.4.6 **Figure 2-4** shows the spatial distribution of the 12 NO₂ exceedance sites across GM modelled to remain without action in the updated Do Minimum in 2025. The spatial concentration of exceedances are clustered, with nine out of the twelve located in the Regional Centre. There are three outlier exceedance sites: two exceedance sites located at the A58 Bolton Road, Bury and one exceedance site located at the King Street West exceedance site in Wigan. The magnitude of exceedance at each of these sites falls within the 40-45 ug/m³ bracket.

¹⁷

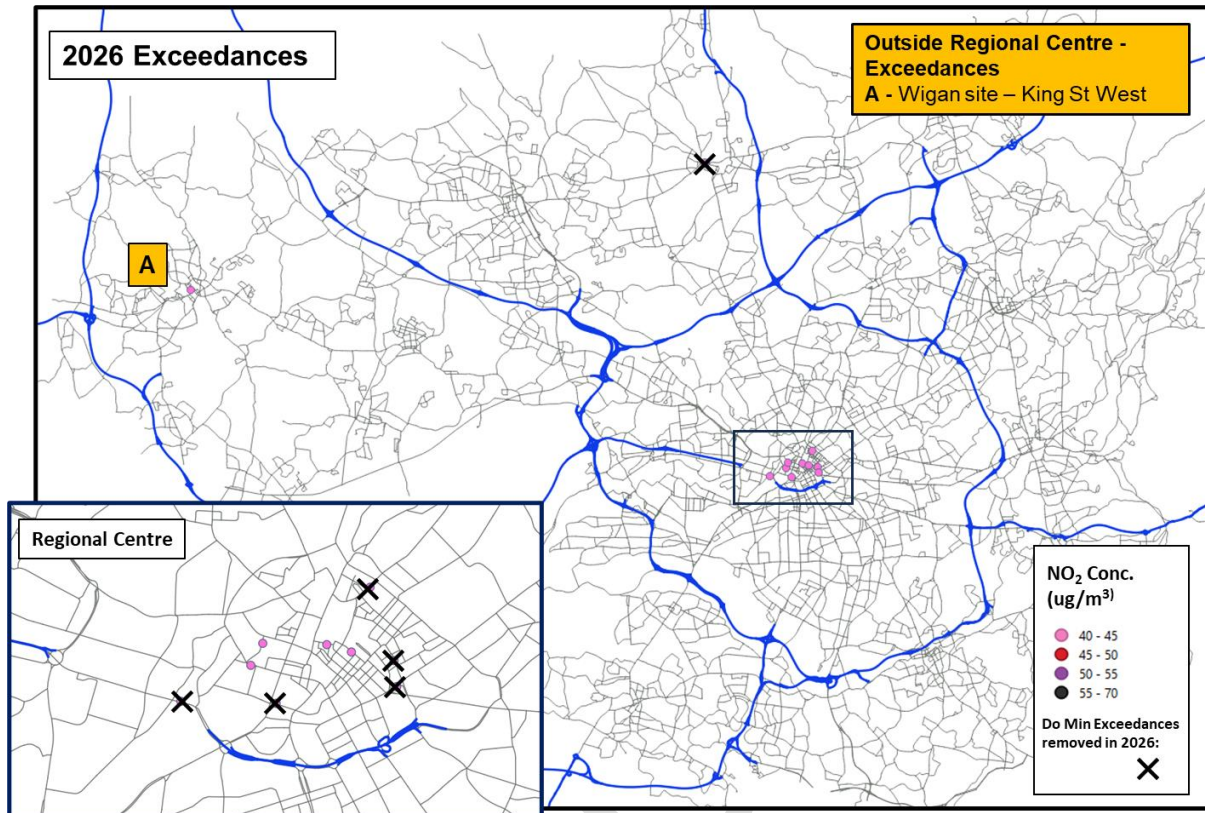
“Inside Inner Relief Route” is the area encircled by the IRR. “Urban centres” are areas that met a definition used for the purposes of air quality modelling for OBC Option testing. “Other locations” are roads outside of Urban centres and the IRR.

Figure 2-4 Spatial distribution of predicted annual mean NO₂ exceedance sites – 2025 Updated Do Minimum (without the GM CAP)



2.4.7 As shown in **Figure 2-5**, there are five sites predicted to remain in exceedance in 2026. Four sites are to remain in the Regional Centre (A34 Quay Street, Gartside, King Street and New York Street) with one outlier site located in King Street West, Wigan remaining. All of the remaining exceedance sites in 2026 are modelled to be in exceedance of the 40-45 ug/m³ band.

Figure 2-5 Spatial distribution of predicted annual mean NO₂ exceedance sites – 2026 Updated Do Minimum (without the GM CAP)



2.5 Summary

- 2.5.1 The GM CAP modelling process has remained consistent throughout the development of the plan whilst updates have been made at relevant stages to reflect the latest position. This latest iteration of the Do Minimum position takes account of committed and spent Previous GM CAP funding provided by JAQU, largely associated with the Clean Bus Fund (CBF).
- 2.5.2 The revised Do Minimum baseline position shows that there are twelve exceedance sites predicted in 2025 without action which reduces to five sites in 2026. The spatial distribution of these exceedance sites is consistent with earlier iterations of the modelling with a high concentration of sites within the Regional Centre which have been brought into non-compliance due to the application of the JAQU guidance on bus retrofits to reflect no air quality benefit from a retrofitted bus.

3 Appraisal Approach

3.1 Background

3.1.1 The GM Authorities have worked with government throughout the development of the GM CAP and progressed through optioneering at the OBC stage, including an appraisal report¹⁸ prior to new evidence emerging over 2021/2022 that led the GM Authorities conclude that a charging scheme was no longer the right solution for GM.

3.1.2 This appraisal approach now considers the GM Authorities' Investment-led Plan benchmarked against a Regional Centre Charging Class C CAZ (the CAZ Benchmark) using government's CSFs.

3.1.3 This chapter provides an overview and hierarchy of each CSF. The Investment-led Plan and the CAZ Benchmark are appraised against these CSFs as set out in **Section 8**.

3.2 Success Factors – Overview

3.2.1 The GM Authorities' Investment-led Plan and the CAZ Benchmark have been assessed against the government's CSFs. The CSFs used to assess the two approaches are consistent with those used during the OBC stage and comprise of the following CSFs set out by JAQU.

3.3 Critical Success Factors

3.3.1 The primary objective of the GM CAP is to achieve compliance in the shortest possible time. This is considered to be the Determining Success Factor by which a programme is appraised.

Primary Critical Success Factors

3.3.2 Primary CSFs (set out during the Strategic Outline Case (SOC) process to understand a wider range of impacts of different measures beyond those considered critical within the JAQU guidance and consistent with those used at OBC stage).

- Reduction in NO₂ emissions: the likelihood that the measure/scenario will contribute significantly to a reduction in NO₂ concentrations, enough to achieve compliance with the legal limit values¹⁹ in the shortest possible time.

¹⁸

https://assets.ctfassets.net/tlpgbvy1k6h2/uCbNfiDpTY49uAUTFEzVO/b3ae7ceb4e8be0dcb36008fba4939ce9/Options_Appraisal_Report.pdf

¹⁹ The EU Ambient Air Quality Directive set the legal limit value of an annual mean of 40ug/m³, which was transposed into UK legislation under the Air Quality Standards Regulations 2010. The requirement to meet compliance with the legal limit is set out by the Environment Act 1995 (Greater Manchester) Air Quality Direction 2022. Under this direction the GM Authorities are obliged to meet the legal limit.

- Feasibility: the likelihood of the measure being implemented in the shortest possible time to deliver the desired NO₂ reduction and achieve compliance.

Secondary Critical Success Factors

3.3.3 Secondary CSFs (developed during the OBC stage in discussion with JAQU).

- Strategic fit with local strategies and plans: ensuring the alignment of the scenario with longer term economic, social and environmental goals and that the risk of unintended consequences is minimised.
- Value for money: an indication of the costs and benefits of each scenario.
- Distributional impact: in order to understand the potential impacts, both positive and negative, on different locations and groups within society, with a particular focus on the most vulnerable individuals. It is of vital importance that the Plan does not result in significant economic or social impacts for the region or those living, working or doing business within it.
- Deliverability - A series of measures assessing the deliverability of the scenarios in terms of:
 - Affordability of the cost of implementation.
 - Supply-side capacity and capability.
 - Achievability of delivering the scenario.

4 Investment-led Plan

4.1 Overview / Background

4.1.1 The 'Case for a new Greater Manchester Clean Air Plan'²⁰ set out the GM Authorities' case for an investment-led, non-charging GM CAP to target action at the most polluted places. This could be delivered using a three-pillared approach including:

- Funding for electric buses;
- Funding to support vehicle upgrades; and
- Working in partnership with delivery bodies and other stakeholders to develop targeted solutions.

4.1.2 In light of government's new evidence on bus retrofit and having incorporated the revised guidance from JAQU into the GM Authorities' modelling, it is now considered that targeted investment in zero emission buses and taxis would provide the most effective means to achieve compliance under an Investment-led Plan. This would be supplemented by local highway-based measures at known persistent exceedance locations at A57 Regent Road and A34 Quay Street. A summary of the measures is shown in **Table 4-2**, with each measure then being set out in more detail below.

²⁰ https://assets.ctfassets.net/tlpgbvy1k6h2/7jtkDc5AODypDQlw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

Table 4-2 Investment-led Plan Summary of Measures

Investment-led Plan	Description
GM-Wide Measures	
Funding for ZEBs	<p>Funding will be allocated to purchase ZEBs that operate on services that pass remaining exceedance sites in 2025 to achieve compliance in the shortest possible time and by 2026.</p> <p>The funding allocated to this measure is £39.7 million for the purchase of 64 ZEBs.</p>
Bus Electric Charging Infrastructure	<p>Funding to provide electric charging infrastructure to support the additional 64 ZEBs which are required to operate on modelled exceedance routes to achieve compliance at these locations by 2025 alongside other investment-led measures. Based on the bus services identified for upgrade, these operate out of three different depots. In addition, the Manchester City Centre Free Bus is based at Manchester Piccadilly Approach.</p> <p>The funding will be used to increase the existing charging capacity at Bolton bus depot whilst providing new charging capacity at Middleton, Queens Road and at Piccadilly Approach.</p> <p>The funding allocated to this measure is £11.5 million.</p>
Taxi Measures	<p>The taxi measures comprise of two components:</p> <ul style="list-style-type: none"> • Funding for taxis; and • A GM-wide consistent emission standard <p><u>Funding for taxis</u></p> <p>Taxi funding will be delivered in the form of a grant or vehicle finance contributions for the upgrade of Hackney Carriages and PHVs licensed in GM to cleaner vehicles. Eligible applicants will be offered a running cost grant towards the running costs of a new Zero Emissions Capable (ZEC) vehicle, or a contribution towards a replacement vehicle, which may be taken as a lump sum grant or access to vehicle finance. There are two funding options proposed for taxis:</p> <ul style="list-style-type: none"> • Core Fund: This fund will be available for GM-licensed, non-compliant Hackney Carriages and PHVs. The funding allocated to this measure is £22.5 million. • EV Hackney Fund: this fund will be available for GM-licensed, Internal Combustion Engine (ICE) compliant Hackney Carriages. The funding allocated to this measure is £7.9 million. <p>The per-vehicle funding amounts are consistent across both funding options and have been uplifted by inflation accrued between the finalisation of the Previous GM CAP (2021) up to and including the proposed fund operating in 2024. The per-vehicle funding amounts are split into funding for upgrade to wheelchair accessible vehicles (WAVs) and funding for upgrade to non-wheelchair accessible vehicles (non-WAVs), as follows:</p> <p><u>Upgrade to WAV</u></p> <ul style="list-style-type: none"> • Up to £12,260 towards the running costs of a new purpose-built WAV ZEC replacement vehicle. This option is available when the compliant replacement vehicle acquired with GM CAP funds has also been eligible for a government plug-in grant; or • Up to £12,260 towards a second-hand purpose-built WAV ZEC replacement vehicle; or • Up to £6,280 towards a compliant purpose-built WAV replacement vehicle (Euro IV petrol or Euro VI diesel or better).

Investment-led Plan	Description
	<p><u>Upgrade to non-WAV</u></p> <ul style="list-style-type: none"> • Up to £7,530 towards the running costs of a new ZEC replacement vehicle; or • Up to £7,530 towards a second-hand ZEC replacement vehicle; or • Up to £3,770 towards a compliant replacement vehicle (Euro 4 petrol or Euro 6 diesel or better); or • Up to £6,280 towards a compliant replacement 6+ seater vehicle (Euro IV petrol or Euro VI diesel or better). <p>All funding is subject to meeting eligibility criteria set out in <i>Appendix 2: Clean Taxi Fund - Eligibility Criteria & Funding Administration</i>.</p> <p><u>GM-wide consistent taxi emission standard</u></p> <p>The majority of GM Authorities have already agreed to implement vehicle emission standards as part of the conditions to license taxis with that particular authority however the dates for implementation are not consistent across GM and not all authorities have agreed to establish this standard. The Investment-led Plan includes proposals for a consistent emission standard (Euro 4 petrol, Euro 6 diesel) across the 10 GM local authorities to be implemented by 31st December 2025 following a transition start date on the 1st January 2025.</p>
Local Measures	
Signal optimisation at A57 Regent Road	Signal timing adjustment to A57 Regent Road green times applied at the junctions of A57 Regent Road / Oldfield Road and M602 J3 West arm approach to the junction. Supplementary adjustments are to be applied to parallel routes, namely: Oldfield Road / Middlewood Street, Ordsall Lane / Middlewood Street / Hampson Street and Hampson Street / Trinity Way. By implementing these signal changes, traffic flow will become steadier, reducing unnecessary accelerations and deceleration, and leading to a reduction of emissions through the exceedance site.
Speed reductions on A57 Regent Road	Implementation of a speed reduction from 40mph to 30mph on A57 Regent Road between Oldfield Road and M602. The aim of this measure is outside of off-peak and overnight periods during free-flow conditions for drivers to perceive Regent Road as less attractive and reduce traffic flow leading to a reduction of emissions.
Measures to reduce through traffic at A34 Quay Street area	Implementing measures to reduce through traffic on Gartside Street, Lower Byrom Street, Great John Street and Atherton Street will reduce through and turning traffic on Quay Street. The measures may differ by location, but are likely to include signing, surface treatments and urban realm improvements. The aim of this measure is to perceive these roads as low speed and low capacity and therefore avoid them unless necessary.
Local Measures - Total	The funding allocated to the package of local measures at the A57 Regent Road and the A34 Quay Street is £5.0 million.

4.2 Bus Investment

4.2.1 Investment in cleaner buses represents the most important mechanism for reducing exceedances under the Investment-led Plan and is grounded in the ability now provided by GM operating a bus franchising scheme.

4.2.2 The GMCA is delivering a bus franchising scheme for local services across all 10 districts in GM. TfGM is responsible for operating the franchising scheme on behalf of the GMCA and has the authority to manage franchise agreements in respect of local services, including the specification of fleet requirements and deployment.

4.2.3 The delivery of bus franchising is underway with the first phase (Tranche 1) live as of September 2023. The implementation of bus funding across the region is being delivered in three tranches:

- Tranche 1 (24th September 2023) – covering Bolton, Wigan and parts of Salford and Bury;
- Tranche 2 (24th March 2024) – covering Oldham, Rochdale and parts of Bury, Salford and north Manchester; and
- Tranche 3 (5th January 2025) – covering Stockport, Tameside, Trafford and the remaining parts of Manchester and Salford.

4.2.4 As part of bus franchising, GM has set out its vision for better buses for GM and how it wants to see the bus system develop to 2030 through its Bus Strategy²¹. GM wants its bus system to:

- Provide consistent and attractive car-free connectivity for all;
- Connect to other parts of the Bee Network and longer distance public transport;
- Support attractive urban places, including town centres and new developments;
- Have a positive impact on public health and the environment;
- Provide people with more travel options in the day and night; and
- Be accountable and a source of shared local pride.

²¹

https://assets.ctfassets.net/nv7y93idf4iq/6c6HrEMbs6OJBmFa0P8HFo/bdd8114c64ae8acb26174ba864b72315/GM_Bus_Strategy_-_PUBLICATION.pdf

4.2.5 The GM Bus Strategy highlights that transport currently accounts for around a third of carbon emissions in Greater Manchester. Local authorities have declared a Climate Emergency and the city-region aims to be completely carbon neutral by 2038. To achieve this, more people need to choose to travel by bus and other more sustainable forms of transport. TfGM's ambition is for the full electrification of GM's bus fleet (and supporting infrastructure) by 2032, with 50% of the fleet to be zero emission by 2027. As more vehicles are replaced with zero emission alternatives, the positive environmental difference that buses can make will grow.

4.2.6 To date GM has the following ZEBs in operation / planned:

- 35 electric buses funded by government's Ultra-low Emission Bus (ULEB) scheme, operated by Stagecoach on the 111 and 43 routes connecting Manchester City Centre, Manchester Airport, five hospitals and three universities. This fleet will be adopted into the franchise model at the commencement of Tranche 3 franchise operations.
- 100 electric buses funded from government's City Region Sustainable Transport Settlement (CRSTS):
 - 50 buses now operating out of Bolton depot and used for services in Tranche 1 of franchising – Bolton, Wigan, parts of Bury, Salford and Manchester.
 - 50 buses to be delivered in March 2024 to support the ongoing roll-out of bus franchising, with services in Bury, Rochdale and Oldham and parts of Manchester, Salford and Tameside coming under local control from 24th March 2024.
- 170 electric buses will run in Stockport from Q3 of 2025. Funding was secured from DfT's ZEBRA scheme following a joint bid by GMCA, TfGM, Stockport Council and Stagecoach Group PLC.
- Around 250 more buses to be delivered between 2024 and 2027 (committed franchising funded from CRSTS).

4.2.7 Based on the level of exceedance at each GM site in 2025 and the proportion of buses that pass the exceedance sites, the proportion of Original Equipment Manufacturer (OEM) Euro VIs and ZEBs required to achieve compliance has been identified. This approach recognises that the updated exceedance position assumes no air quality benefits from retrofitted buses and therefore a bus solution could be an effective means of achieving compliance.

4.2.8 Development of the Investment-led Plan has sought to use conservative assumptions to provide robustness for the initial results derived from a bus-based solution. These assumptions include the following:

- No air quality benefit from retrofitted buses in line with JAQU Standard Guidance (as explained in **Section 2.3**).

- No Stockport depot electrification by 2025 associated with ZEBRA – delivery currently expected in Q3 of 2025.
- Prior to the electrification of the Stockport depot, an interim fleet will be operated consisting of 100% Euro V vehicles that have been retrofitted. In reality, there may be some OEM Euro VI fleet in operation from this depot prior to electrification.

4.2.9 Initial deployment of vehicles in Tranche 1 and 2 of franchising will deliver 100 ZEBs operating out of the Bolton and Oldham depots. The Investment-led Plan targets deployment of ZEBs at the following persistent exceedance locations based on the inability to achieve compliance at this location through OEM Euro VI upgrades alone:

- A57 Regent Road, Salford / Great Bridgewater Street– Only one bus service passes these exceedance locations and all buses operating on this route (six) require upgrade to ZEBs using the GM CAP funds.
- A58 Bolton Street, Bury – nine bus services pass this exceedance location. Of the 64 buses operating on this route, 47 require upgrade to ZEBs using the GM CAP funds. This is due to:
 - 10 buses having already been upgraded as part of bus fleet electrification rollout in Tranche 1 of bus franchising.
 - Seven buses having been deployed as OEM Euro VI. No further uplift to ZEB is required to achieve compliance at this location.
- King Street, Manchester – four bus services pass this exceedance location. Of the 51 buses operating on this route, 11 require upgrade to ZEBs using the GM CAP funds. This is due to:
 - 40 buses having already been upgraded as part of bus fleet electrification rollout in Tranche 1 of bus franchising.
- A34 Quay Street, Manchester – two bus services pass this exceedance site. All 11 buses operating on this route require upgrade to ZEBs using the GM CAP funds although the upgrade of these vehicles are captured as part of the King Street exceedance site.

4.2.10 A summary of the bus service requirements by exceedance location can be found in **Table 4-3**. Whilst compliance cannot be achieved at the A57 Regent Road and A34 Quay Street through bus measures alone, upgrading the buses operating on services passing these exceedance locations make an important contribution to reducing NO₂ concentrations at this site and being able to demonstrate compliance at this location with supporting investment-led measures. The services requiring additional ZEBs at King Street also pass the A34 Quay Street exceedance site and therefore the total number of buses requiring ZEB upgrade has been updated to reflect this.

Table 4-3 Summary of bus service requirements by exceedance location

Remaining Exceedance Site (2025)	Can compliance be achieved based on service fleet upgrade?	Number of in-scope services	Number of Services that require additional ZEB upgrade	Number of in-scope buses on each exceedance site	Number of buses that require additional ZEB upgrade
A57 Regent Road / Great Bridgewater Street	No	1	1	6	6
A58 Bolton Street	Yes	9	7	64	47
King Street	Yes	4	2	51	11
A34 Quay Street	No	2	2	11	11
Total		16	12	132	75
Buses that pass multiple exceedance sites					-11
Revised Total					64

4.2.11 **Table 4-4** illustrates the changes to fleet type (OEM Euro VI / ZEB) and depot electrification that is required to deliver compliance in 2025 at King Street, Manchester and A58 Bolton Road, Bury whilst reducing the level of non-compliance at the A57 Regent Road, Great Bridgewater Street and A34 Quay Street. This assumes delivery of committed franchising service upgrades to OEM Euro VI and ZEB.

Table 4-4 Summary of fleet and depot change requirements to achieve compliance

Route	Tranche	Depot	Bus Type	Additional Vehicles *	Indicative Changes to Fleet Type	Exceedance
36	1	Bolton	ZEB	20	19 additional ZEBs into Bolton along with additional electrification capacity.	King Street, Manchester
37	1	Bolton	ZEB	20		King Street, Manchester
471	1	Bolton	ZEB	19		A58 Bolton Street, Bury
472	1	Bolton	ZEB	10		A58 Bolton Street, Bury
474	1	Bolton	ZEB			A58 Bolton Street, Bury
Free Bus 1	2	Queens Road	ZEB	7	41 additional ZEBs required in Queens Road along with depot electrification upgrade / additional capacity plus dual charger at Piccadilly Approach.	King Street / A34 Quay Street, Manchester
Free Bus 2	2	Queens Road	ZEB	4		King Street / A34 Quay Street, Manchester
98	2	Queens Road	ZEB	16		A58 Bolton Street, Bury
480	2	Queens Road	ZEB	5		Regent Road, Salford / Great Bridgewater Street, Manchester
33/33B	2	Queens Road	ZEB	6		
B1	2	Queens Road	ZEB	3		A58 Bolton Street, Bury
469	2	Middleton	ZEB	4	4 additional ZEBs required in Middleton along with depot electrification additional capacity.	
511	1	Bury Small Franchise	OEM Euro VI	2	Additional 7 OEM Euro VI required. Redeployment of fleet, no funding request for vehicles.	
512	1	Bury Small Franchise	OEM Euro VI	5		

- 4.2.12 From a review of bus services operating past remaining exceedance sites which are modelled to remain in 2025 after the deployment of OEM Euro VI buses, the peak vehicle requirement to operate these services was identified (including spares). The depot the services operate out of and which tranche of bus franchising the services were allocated to was also noted. It is modelled that four services operating past the A58 Bolton Street, Bury exceedance site did not require upgrade to ZEB to achieve compliance at this location with upgrade to OEM Euro VI sufficient, alongside other service upgrades.
- 4.2.13 64 buses would require upgrade to achieve compliance at King Street (Manchester) and A58 Bolton Street (Bury) based on the peak vehicle requirement to operate the services past these exceedance locations. This excludes the ZEBs which are being rolled out as part of the bus franchising programme. Whilst this peak vehicle requirement also includes six buses operating past the Regent Road and Great Bridgewater Street exceedance sites, due to the low number of buses versus scale of improvement needed, compliance cannot be achieved without additional measures. The buses identified for upgrade that pass the King Street (Manchester) exceedance site also pass the A34 Quay Street site (Free Bus 1 & 2).
- 4.2.14 The bus vehicle upgrade requirement also includes spare vehicles to operate the full service. This accounts for vehicle charging and maintenance when the bus is not in service. It should be noted that a higher spare vehicle requirement is needed to operate ZEBs due to the lower mileage that can be achieved by these vehicles before the vehicle requires charging compared to an Internal Combustion Engine(ICE) vehicle range.
- 4.2.15 Based on changes to service patterns and expected franchising deployment, and deployment of ZEBs, three exceedance sites remain (A57 Regent Road, A34 Quay Street and Great Bridgewater Street) after the deployment of buses across the three tranches.
- 4.2.16 From a deliverability perspective, the requirement to operate an additional 64 ZEBs is dependent on there being adequate supporting electric vehicle charging infrastructure at depots to operate these services. The GM Authorities have undertaken analysis to determine this requirement which is set out as a separate measure.

Bus Electric Charging Infrastructure

- 4.2.17 To meet the ZEB service requirements at exceedance sites, depot upgrades are required to support the higher provision of electric vehicles across four sites: Bolton, Queens Road, Middleton depots and Manchester Piccadilly. The scale of upgrade varies by depot based on the current provision of electric charging infrastructure to support the existing franchised operation.
- 4.2.18 A summary of the infrastructure requirements by depot are set out below:

- **Bolton:** Extension of existing electrification works undertaken in 2023. No additional electrical supply from the power network operator (Electricity North West) is required to facilitate the proposed capacity increases. High and low voltage supply and chargers, associated civils and systems are required. Depot upgrades will support an additional 19 ZEBs operating out of this location.
- **Queens Road:** There is a limited number of existing chargers available to service three existing vehicles and would therefore require further charging capacity. Requires incoming supply along with all charging infrastructure. Due to depot constraints (internal layout), a gantry-based solution is required to minimise works footprint and impact on bus operations during construction. Depot upgrades will support an additional 41 ZEBs operating out of this location.
- **Middleton:** It is considered that two dual chargers and low voltage infrastructure modifications would provide sufficient charging infrastructure capacity to support the four ZEBs planned to be operated out of this depot. There are wider electrification works planned by GM which are planned to be funded from other sources.
- **Manchester Piccadilly:** Similar to the Middleton depot, it is considered that two dual chargers would provide sufficient charging infrastructure to support the operation of the 11 buses which operate the Regional Centre Free Bus. Whilst these buses depot in Queens Road, the nature of their operation requires enroute charging.

Bus Measures Summary

- 4.2.19 Bus measures represent the most important mechanism for reducing exceedances under the Investment-led Plan and are grounded in the ability of TfGM to operate a bus franchising scheme. TfGM is responsible for operating the franchising scheme on behalf of the GMCA and has the authority to manage franchise agreements in respect of local services, including the specification of fleet requirements and deployment.
- 4.2.20 Based on the level of exceedance at each GM site in 2025 and the proportion of buses that pass the exceedance sites, the proportion of OEM Euro VIs and ZEBs required to achieve compliance has been identified. Deployment of sufficient OEM Euro VI and ZEBs at the twelve exceedance locations predicted in 2025 would result in three remaining exceedances in 2025 (A57 Regent Road, Great Bridgewater Street and A34 Quay Street) which require additional measures to achieve compliance.

4.3 Taxi Measures

Background

- 4.3.1 The GM Authorities were awarded £20.3 million in Clean Air Funding as part of the Previous GM CAP to support the upgrades of non-compliant Hackney Carriages (£10.1m) and PHVs (£10.2 million) to mitigate against the impact of a Charging Class C CAZ. The funds have yet to be opened however there has been spend associated with the Early Financial Support scheme to reimburse those who evidenced that they upgraded their vehicle in response to the introduction to a CAZ. This amount totals £115,000 for Hackney Carriages and £23,000 for PHVs.
- 4.3.2 As set out in **Table 4-5**, there are currently approximately 13,750 GM taxis (Hackney Carriages and PHVs) licensed in GM. A summary of the GM-licensed Hackney Carriage and PHV statistics are summarised below:
- There are 1,181 non-compliant GM-licensed Hackney Carriages operating in GM. This equates to 62% of the total GM-licensed Hackney Carriages.
 - There are 2,343 non-compliant GM-licensed PHVs operating in GM. This equates to 20% of the total GM-licensed PHVs given the larger number of total PHVs operating in the city region.
 - From the non-compliant Hackney Carriages, 96% are WAV vehicles.
 - Conversely, only 6% of non-compliant PHVs are WAV vehicles.
 - Whilst the proportion of Hackney Carriages operating in GM but licensed to a non-GM local authority is small, 41% of PHVs operating in GM are licensed to an authority outside of the city region despite having a resident address in GM. This is associated with the ability of PHVs to operate freely outside of its licensed authorities and cheaper and quicker licensing applications associated with certain licensing authorities such as Wolverhampton.

Table 4-5 GM Taxi Composition by Compliance Status (June 2023)

Type	GM Licensed Taxi fleet			GM Licensed Taxi fleet share		
	Compliant	Non-compliant	Total	Compliant	Non-compliant	Total
Hackney Carriage	709	1,181	1,890	38%	62%	100%
PHV	9,512	2,343	11,855	80%	20%	100%
Total	10,221	3,524	13,745	74%	26%	100%

4.3.3 The GM Authorities undertook a consultation in 2020 on the implementation of Minimum Licensing Standards (MLS) across the 10 GM local authorities. However, MLS did not progress to implementation as a consistent set of standards across the GM local authorities, with trade concerns about the additional financial burden to be compliant with the suite of more stringent driver and vehicle standards.

4.3.4 Two of the main vehicle standards associated with the MLS were regarding vehicle age and emissions:

- Emissions: To require licensed vehicles to be compliant with the minimum emission standards as set out in the government’s CAZ Framework²² (i.e. Euro IV petrol or Euro VI diesel), as follows:
 - For all new to licence vehicles – from the date policy is determined in district²³.
 - For existing fleets – to begin transitioning as soon as the policy is in place and to complete transitioning by 1st April 2024.
 - To note the strong ambition to move existing fleets to ZEC as soon as possible.
- Vehicle Age: Due to existing Euro standards for vehicle emissions, the age of the vehicle dictates what the maximum emissions are at the date of manufacture. Therefore, the following vehicles age policies were planned to be implemented:
 - PHV – under five years coming on to fleet and a maximum age limit of 10 years off.
 - PHV WAV – under seven years coming on to fleet and a maximum age limit of 15 years off.
 - Purpose built Hackney Vehicle Carriage (HVC) – under seven years coming on to fleet and a maximum age limit of 15 years off.

²² The CAZ Framework sets out the principles for the operation of clean air zones in England. Accessed at: <https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england/clean-air-zone-framework>

²³ Vehicles that have not been licensed with that local authority in the current year prior to renewal.

- Air quality metrics and impacts and testing data to be reviewed over the next 2-3 years by the Licensing Network and risks or proposed amendments brought back to Members as necessary.
- That the above policy be implemented for new to licence vehicles as soon as the policy takes effect. That existing fleets begin transitioning and are compliant with the policy by 1st April 2024.

4.3.5 Whilst both standards would bring forward vehicle upgrades, the emission standard provides strong alignment with the GM CAP .

4.3.6 The taxi measures represent an important mechanism for reducing exceedances under the Investment-led Plan and are grounded in the ability of the GM Authorities to reduce emissions through licensing conditions with supporting funding. The taxi measures comprise of two components:

- A GM-wide consistent emission standard; and
- Funding for taxis.

Taxi Measure: GM-wide consistent taxi emission standard

4.3.7 As part of the Investment-led Plan the 10 GM local authorities have agreed to implement a consistent emission standard (Euro 4 petrol / Euro 6 diesel) in anticipation of supporting vehicle funding and governance arrangements. The GM Authorities are confident that governance arrangements to enable this can be delivered.

4.3.8 The scale of change on GM-licensed Hackney Carriage and PHV drivers is dependent on their licensed authorities' current position on emission standards for their fleet. To assume a robust air quality benefit from an emission standard, the implementation dates have been aligned to the requirements of the Direction on the 10 GM local authorities, to achieve compliance in the shortest possible time and by 2026 at the latest.

4.3.9 As vehicle owners will renew their licence over the course of a calendar year, linked to the date when they first licensed to the authority, a transitional date is to be implemented from the 1st January 2025 with a transitional end date for the 31st December 2025. This will require any vehicle owners relicensing their vehicles during 2025 to license a compliant vehicle (minimum of Euro VI diesel or Euro IV petrol). On this basis modelling has assumed that all GM-licensed vehicles in 2026 will be compliant vehicles.

4.3.10 The current and required implementation timescales of emission standards across the 10 GM local authorities is set out in **Table 4-6**. In the majority of authorities the Investment-led Plan proposal requires the bringing forward of existing proposals by 3 months.

Table 4-6 GM Emission Standards – Current position (Dec-23) and GM CAP requirements

GM Local Authority	Current Position on existing vehicles (Dec-23)	GM CAP Measure – Emission Standard Requirements
Bolton	No agreement	Agree emission standard 31 Dec 25
Bury	Approved for Apr 2026	Bring forward to Dec 25
Manchester	Approved for Apr 2026	Bring forward to Dec 25
Oldham	Approved for Dec 2025	n/a
Rochdale	No agreement	Agree emission standard 31 Dec 25
Salford	Approved for Apr 2026	Bring forward to Dec 25
Stockport	No agreement	Agree emission standard 31 Dec 25
Tameside	Apr 2024 – being revised to Dec 25	n/a
Trafford	Approved for Apr 2026	Bring forward to Dec 25
Wigan	Approved for Apr 2026	Bring forward to Dec 25

Taxi Measure: Funding for taxis

- 4.3.11 To support vehicle upgrades to a cleaner taxi fleet, it is proposed that the Clean Taxi Fund (CTF) is retained and opened as part of the Investment-led Plan. A review of the taxi fleet operating in GM has been conducted alongside feedback from the trade gathered in 2022. Further information on the background research into taxis is shown in *Appendix 1: Hackney Carriage and PHV Evidence Note*.
- 4.3.12 Taxi funding will be delivered in the form of a grant or vehicle finance contributions for the upgrade of Hackney Carriages and PHVs licensed in GM to cleaner vehicles. Eligible applicants will be offered a running cost grant towards the running costs of a new ZEC vehicle, or a contribution towards a replacement vehicle, which may be taken as a lump sum grant or access to vehicle finance.
- 4.3.13 The per-vehicle funding amounts are consistent across both funding options and have been uplifted by inflation accrued between the finalisation of the Previous GM CAP (2021) up to and including the proposed fund anticipated to open in 2024. The per-vehicle funding amounts are split into funding for upgrade to WAVs and funding for upgrade to non-WAVs.

4.3.14 Following research and engagement, the GM Authorities have revised the financial support required for Hackney Carriages and PHVs. The Investment-led Plan responds to increases in new and second-hand vehicle prices and vehicle availability constraints in the taxi market, particularly for Hackney Carriages. Further information on taxi vehicle prices, vehicle availability and feedback received from the trade following engagement activities undertaken in 2022 are reported in Appendix 1: Hackney Carriage and Private Hire Vehicle Evidence Note.

4.3.15 The CTF is proposed to have two routes to funding as summarised below:

- **Core Taxi Fund:** Funding would be provided to GM-licensed, non-compliant Hackney Carriages and PHVs owners to upgrade to compliant vehicles. This funding route is consistent with the eligible vehicle population defined as part of the Previous GM CAP and targets vehicle upgrades for GM-licensed non-compliant vehicle owners.
- **Electric Hackney Fund:** Funding would be provided to GM-licensed compliant ICE (petrol/diesel) Hackney Carriages to upgrade to ZEC vehicles. This funding route has been developed based on feedback received from the trade in 2022 through engagement and research and taking account of other CAP city funding schemes such as Bradford City Council which provide a similar offer. The targeted funding route for Hackney Carriages recognises the vehicle supply issues for compliant petrol/diesel Hackney Carriages and the concentration of this taxi type within the Regional Centre, aligning with the spatial concentration of exceedances in GM. Provision of funding for compliant ICE vehicles to upgrade to an electric vehicle may lessen the Hackney Carriage supply chain issues by increasing availability of second-hand compliant Hackney Carriages for purchase.

4.3.16 The proposed funding levels for Hackney Carriages and PHVs across both funding routes are consistent and outlined below in **Table 4-7**. The funding offers are split into funding for upgrade to WAVs and funding for upgrade to non-WAVs.

4.3.17 Running cost grants and vehicle finance contributions are designed to be able to be taken up in conjunction with existing grants available from government's Office for Zero Emission Vehicles (OZEV) funds but cannot be used in conjunction with other GM CAP funding. GM CAP grants for replacement vehicles cannot be used in conjunction with government's OZEV Funds, which are principally for support during vehicle purchase.

4.3.18 The financial support for taxis takes into account inflationary increases in prices since the finalisation of the Previous GM CAP policy in 2021 up to the anticipated opening of the Investment-led Plan funds in 2024. The inflationary uplift has been calculated based on the cumulative total of inflation based on Q4 values from the Bank of England's Monetary Policy Committee Report, published in November 2023²⁴. This uplift is considered to provide an equitable increase for both Hackney Carriage and PHV owners and operators and responds to the increases in the cost of new and second-hand vehicles since the development of the Previous GM CAP.

Table 4-7 Taxi Funding Offer

Vehicle type (upgrade to)		Offer available (per vehicle)	Change from previous policy funding amount (2021)
Purpose-built WAV	Zero Emission Capable (ZEC)	Up to £12,560 towards the running cost of the replacement vehicle. (vehicle finance).	↑ Increase of £2,560
	Second-hand ZEC	Up to £12,560 towards the cost of the replacement vehicle.	↑ Increase of £2,560
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle.	↑ Increase of £1,280
	Compliant Vehicle (Retrofit)	No retrofit option to be offered given government's evidence on efficacy of retrofit technology.	✗ Removed
Non-WAV	ZEC	Up to £7,530 towards the running costs of the replacement vehicle (or vehicle finance).	↑ Increase of £1,530
	Second-hand ZEC	Up to £7,530 towards the cost of the replacement vehicle (vehicle finance).	↑ Increase of £1,530
	Compliant Vehicle 6+ seater (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle (grant or vehicle finance).	↑ Increase of £1,280
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £3,770 towards the cost of the replacement vehicle (grant or vehicle finance).	↑ Increase of £770

²⁴ <https://www.bankofengland.co.uk/monetary-policy-report/2023/november-2023?ref=pmp-magazine.com>

Vehicle type (upgrade to)		Offer available (per vehicle)	Change from previous policy funding amount (2021)
	Compliant Vehicle (Retrofit)	No retrofit option to be offered given government's evidence on efficacy of retrofit technology.	✗ Removed

- 4.3.19 The retrofit option has been removed based on poor and highly variable performance from retrofit solutions on buses. Additionally, offering a retrofit option to taxis would likely increase the average age of the fleet and would potentially conflict with local authority age policies. Feedback has also been received by the trade in 2022 that funding towards vehicle replacement was preferred over a retrofit option.
- 4.3.20 The proposed eligibility criteria and administration of funds has been included in *Appendix 2: Clean Taxi Fund - Eligibility Criteria & Funding Administration*. Whilst the Investment-led Plan CTF seeks to retain the core elements of the Previous GM CAP CTF, the eligibility criteria considers the two proposed routes to funding and proposes to provide funding directly to applicants, in-line with other CAP cities, to remove unnecessary complexity from the fund administration, increasing the flexibility to applicants and taking onboard feedback from the trade.
- 4.3.21 The CTF as a standalone measure is not modelled to deliver a quantifiable air quality benefit however it helps to support earlier upgrades of taxis, to minimise the risk that GM-licensed PHVs will continue to operate their non-compliant vehicles with a non-GM local authority where the same standards do not apply, and provides mitigation against negative socio-economic consequences which could arise from bringing forward vehicle upgrades outside their natural upgrade cycle.

Taxi Measures Summary

- 4.3.22 The implementation of a consistent emission standard across the 10 GM local authorities by the 31st December 2025 coupled with supporting vehicle upgrade funding is modelled to contribute to achieving compliance at A57 Regent Road. However, achieving compliance at this location also requires the implementation of other Investment-led measures namely bus investment and local measures.

- 4.3.23 In addition to the modelled air quality benefit at the A57 Regent Road, contributing to achieving compliance at this location in 2025, the taxi measures adds resilience to the Investment-led plan, distributing additional air quality benefits across GM with a higher-than-average benefit in the Regional Centre, aligned to the concentration of modelled exceedance sites, due to the nature of taxi operations in GM and operating restrictions, particularly for Hackney Carriages. The CTF supports the emission standard in delivering this by helping to support earlier upgrades of taxis and minimising the risk that non-compliant vehicles will be re-licensed with a non-GM local authority where the same standards do not apply.
- 4.3.24 Consistent with the Previous GM CAP, taxis are underrepresented within the highway model and thus it is expected that taxis will deliver a greater benefit to GM than assumed within the CAP modelling. A newer, cleaner fleet will also bring operating and safety benefits to the fleet, delivering wider improvements to the City Region whilst adding resilience to the Investment-led Plan.

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4.4 Local Measures

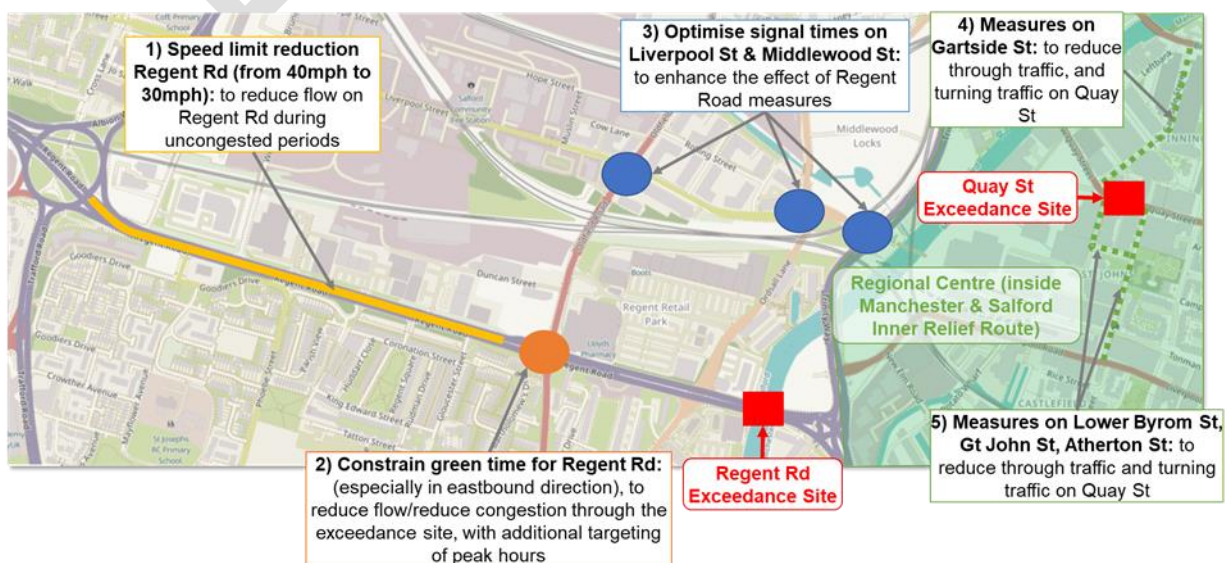
4.4.1 **Section 4.3** identified that there are three remaining exceedance sites after the deployment of bus and taxi measures. These sites are: A57 Regent Road, Great Bridgewater Street and A34 Quay Street. Whilst the deployment of ZEBs at these locations has been shown to be effective, there is not a sufficient number of buses that pass the A57 Regent Road, Great Bridgewater Street and A34 Quay Street to bring these locations into compliance in 2025. In addition, there are local conditions at the exceedance site location at Great Bridgewater Street such as the canyoning effect of a road bridge which influence the NO₂ concentrations at this location. Taxi measures support reduction in NO₂ concentrations at each exceedance location, in addition providing a wider resilience benefit to those already achieving compliance, however the level of reduction is not sufficient to achieve compliance at the three exceedance sites. Therefore, a series of targeted local measures are proposed to reduce NO₂ exceedance concentrations at these sites.

4.4.2 The local measures at A57 Regent Road and A34 Quay Street summarised above have been shown by modelling to be effective in reducing NO₂ concentrations to compliant levels at these locations. Modelling undertaken to represent these local measures has also shown that the implementation of local measures for the A34 Quay Street site were also effective in achieving compliance at Great Bridgewater Street.

4.4.3 The package of targeted local measures can be summarised into a series of three schemes as shown in **Figure 4-6**:

- Signal optimisation at A57 Regent Road and adjacent parallel routes;
- Speed restrictions on A57 Regent Road; and
- Measures to reduce through traffic at the A34 Quay Street area.

Figure 4-6 Overview of local measures



- 4.4.4 The description of these measures and how they would be delivered are summarised below.

Signal optimisation at A57 Regent Road & adjacent parallel routes

- 4.4.5 Signal timing adjustments were applied within the modelling on A57 Regent Road, namely at the A57 Regent Road / Oldfield Road junction and the M602 J3 west arm approach. These adjustments would be supported by further adjustments to parallel routes at the junctions of Oldfield Road / Middlewood Street, Ordsall Lane / Middlewood Street / Hampson Street and Hampson Street / Trinity Way.
- 4.4.6 These adjustments would be conducted to improve average speeds through the exceedance site and constrain overall traffic flows travelling eastbound along Regent Road to increase capacity on parallel routes. Signal optimisation has been modelled to have a materially beneficial impact on compliance at the A57 Regent Road exceedance site by improving the flow of traffic, leading to a reduction in congestion and a resulting emission benefit.
- 4.4.7 The proposed changes to signal timings would be implemented through GM Urban Traffic Control²⁵ and agreement with Salford City Council and delivered by 31st December 2024, which allows sufficient time to capture the full year air quality benefit of this scheme being in place in 2025.

Speed reductions on A57 Regent Road

- 4.4.8 Multiple modelling scenarios were also undertaken for a speed reduction from 40mph to 30mph on the A57 Regent Road between Oldfield Road and the M602. The measure would reduce the number of vehicles travelling past the Regent Road exceedance sites with some displacement to nearby parallel routes, thus reducing the modelled NO₂ concentrations at this exceedance site. The displaced trips are being accommodated by the adjustments to signals at the junctions of Oldfield Road / Middlewood Street, Ordsall Lane / Middlewood Street / Hampson Street and Hampson Street / Trinity Way.
- 4.4.9 The implementation of the speed reduction would be delivered through a Traffic Regulation Order issued by Salford City Council by 31st December 2024 which allows sufficient time to capture the full year air quality benefit of this scheme being in place in 2025.

²⁵ Transport for Greater Manchester's Urban Traffic Control (UTC) team provides a high quality traffic signal control service to the 10 district councils of Greater Manchester and National Highways, using a range of technologies including optimised traffic signal control through SCOOT (Split Cycle Offset Optimisation Technique) and MOVA (Microprocessor Optimised Vehicle Actuation).

Measures to reduce through traffic at A34 Quay Street area

- 4.4.10 Modelling on this section has shown that achieving a 10mph flow on local roads feeding into A34 Quay Street to be an effective means of reducing traffic volumes on adjacent routes and therefore delivering air quality benefits on Quay Street and delivering compliance at this exceedance site. Manchester City Council will implement, subject to consultation, local measures that deliver an average speed of 10mph, as applied in the transport modelling.
- 4.4.11 The measures may differ by location, but could include signing, surface treatments and urban realm improvements. The aim of the measure is that road users will perceive these roads as low speed and low capacity and therefore avoid them unless necessary. The roads under consideration include Gartside Street, Lower Byrom Street, Great John Street and Atherton Street.
- 4.4.12 The modelling shows that overall annual mean NO₂ concentrations would be at compliant levels with these local traffic management measures in place by Autumn 2025.

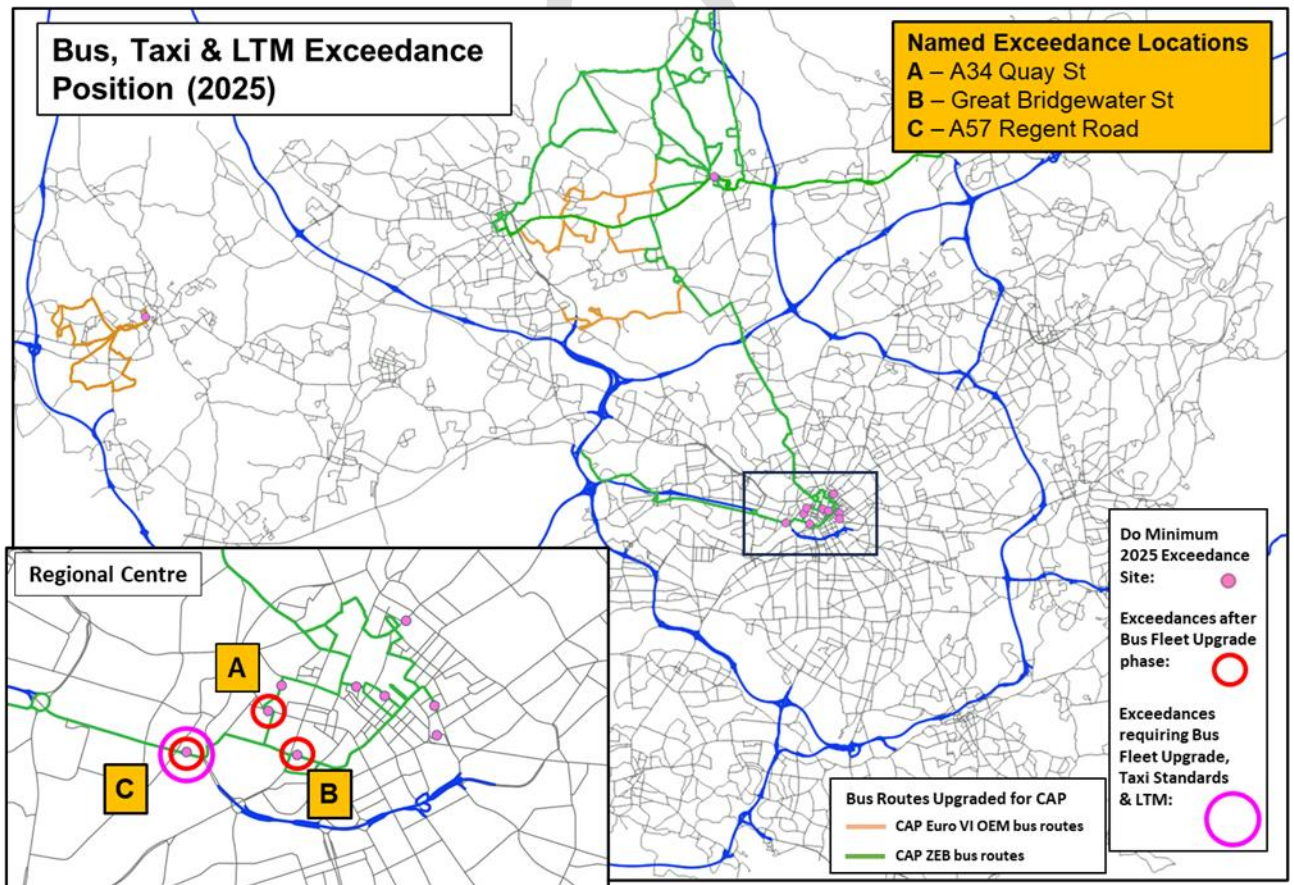
4.5 Air Quality Impact

- 4.5.1 This section provides an overview of the modelled impact from an Investment-led Plan on the remaining points of exceedance in 2025. This includes the reduction in NO₂ concentrations at each exceedance site in addition to the total number of remaining exceedance sites. Further information on the air quality impact of the Investment-led Plan is reported in the *AQ3 Report*.
- 4.5.2 **Table 4-8** and **Figure 4-7** shows the distribution of non-compliant sites across GM, both by spatial type and also in terms of how close they are to compliance based on the implementation of an Investment-led Plan. The results presented show the modelled impact of the package of measures including bus, taxi and targeted local highway measures.
- 4.5.3 The results show that there are no exceedance sites above the legal limit values in 2025 under the Investment-led Plan. The Plan reduces the number of exceedances from 12 to zero in 2025. Compliance is achieved with the legal Direction a full year ahead of the back stop date of 2026. The results also show that the number of sites close to exceedance reduces as a result of the Plan. Health benefits continue to be delivered by reductions in NO₂ concentrations, even below the limit values.

Table 4-8 Predicted annual mean NO₂ concentrations at points on the GM road network – 2025 Investment-led Plan (with GM CAP)

Road classification ²⁶	Compliant sites		Non-compliant sites			
	Very compliant (Below 35 µg/m ³)	Compliant but marginal (35 to 40 µg/m ³)	Non-compliant (>40 to 45 µg/m ³)	Very non-compliant (>45 to 50 µg/m ³)	Extremely non-compliant (>50 µg/m ³)	Total non-compliant (>40 µg/m ³)
2025						
Do Minimum	2452	76	12	0	0	12
Investment-led Plan	2475	65	0	0	0	0

Figure 4-7 Spatial distribution of predicted annual mean NO₂ exceedance sites – 2025 Investment-led Plan (with GM CAP)



²⁶

“Inside Inner Relief Route” is the area encircled by the IRR. “Urban centres” are areas that met a definition used for the purposes of air quality modelling for OBC Option testing. “Other locations” are roads outside of Urban centres and the IRR.

- 4.5.4 **Table 4-9** shows the incremental contribution of the three main components of the Investment-led Plan (bus, taxi and local highway measures). The results demonstrate that of the 12 remaining sites modelled to be in exceedance in 2025, bus is predicted to deliver compliance at nine of the 12 sites.
- 4.5.5 Taxi measures are required to achieve compliance at the A57 Regent Road, however, compliance cannot be achieved without supporting bus and local measures. Due to the concentration of taxis operating in the Regional Centre, particularly Hackney Carriages based on their operating conditions/restrictions, the taxi measures also provide strong resilience to the GM CAP, both in terms of the alignment of their operation with the spatial distribution of exceedances and also accounting for the known under-representation of taxi trips within the CAP modelling suite.
- 4.5.6 The local highway measures are shown to be an effective targeted intervention at the A34 Quay Street, Great Bridgewater Street and the A57 Regent Road. Due to the close proximity, interaction between locations and relative scale of the required air quality improvements, measures targeted to achieve compliance at the A34 Quay Street are also effective at Great Bridgewater Street.

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Table 4-9 Investment-led Plan (2025) Exceedance Sites by NO₂ Concentrations

Point ID	Road name	Local Authority	Do Min (µg/m ³)	With Bus Measure (µg/m ³)	With Bus & Taxi Measure (µg/m ³)	With Bus & Taxi & Local Traffic Measure (LTM) (µg/m ³)	Total ILP Change in NO ₂ conc. (µg/m ³)
2237_3790_DW	A58	Bury	42.4	40.3	40.1	40.1	-2.3
3790_3652	A58	Bury	40.8	38.7	38.5	38.5	-2.3
1322_3273	A34 Quay St	Manchester	45.2	41.2	41.0	37.9	-7.3
8547_47130	King St	Manchester	43.1	40.2	40.1	40.1	-3.0
3272_8542_DW	Gartside St	Manchester	42.5	36.8	36.8	37.4	-5.1
1263_5429	New York St	Manchester	42.4	39.7	39.5	39.5	-2.9
3016_6022_DW	A6 Whitworth St	Manchester	41.7	35.9	35.8	35.9	-5.8
1324_3276_DW	Great Bridgewater St	Manchester	41.6	40.7	40.5	37.4	-4.2
1286_15128	A6	Manchester	40.6	32.5	32.4	32.4	-8.2
8546_14050	A664	Manchester	40.5	40.4	40.3	40.3	-0.2
1349_2993_DW	A57	Salford	41.2	41.1	40.9	40.3	-0.9
3103_3435_DW	King St West	Wigan	43.1	39.4	39.4	39.3	-3.8

4.6 Costs

Overall funding position

- 4.6.1 The costs related to the business case, implementation and operation of the GM CAP are either directly funded or underwritten by government acting through JAQU and any net deficit over the life of the GM CAP will be covered by the New Burdens Doctrine, subject to a reasonableness test²⁷.
- 4.6.2 The GM Authorities have been awarded a total of £196.2 million (excluding electric vehicle charging infrastructure) in respect of the GM CAP. The government grants have been awarded as set out in **Table 4-10**.

²⁷ The New Burdens Doctrine is part of a suite of measures to ensure council taxpayers do not face excessive increases. <https://www.gov.uk/government/publications/new-burdens-doctrine-guidance-for-government-departments>

Table 4-10 GM Authorities CAP funding award by government

Grant	£m
CAP Development Phase	31.7
CAZ Implementation	26.0
CAZ Operation	7.6
Vehicle Funds (including Bus)	122.3
Vehicle Funds Administration	6.1
Vehicle Funds Operation	2.5
Total	196.2

4.6.3 Expenditure to November 2023 and forecast to March 2024 (including committed grant awards) against the £196.2 million grants awarded by government is summarised in **Table 4-11**.

Table 4-11 Existing and forecast GM CAP expenditure

Area of Expenditure	Spend to date £m
Development Phase	32.7
CAZ (implement and operate)	32.7
Financial Support Scheme (Vehicle Grants, Implementation and Operation)	26.2
Forecast for Dec 23-Mar 24	3.1
Grand Total	94.7
Grant Remaining	101.5

4.6.4 The GM Authorities propose that the grant value remaining should be repurposed to contribute to the future funding required for the Investment-led Plan.

Upgrade of non-compliant vehicles

4.6.5 Clean Air Funding was awarded by government to help owners upgrade non-compliant vehicles (buses, coaches, HGVs, LGVs and taxis) and mitigate against the negative socio-economic impact of a GM-wide Class C charging CAZ.

4.6.6 The Previous GM CAP, agreed in Summer 2021, set the funding amounts per vehicles and eligibility criteria. Funds opened in:

- May 2020 for bus retrofit applications (as a continuation of government's CBTF)
- September 2021 for bus replacement applications
- November 2021 for HGV upgrade applications

- 4.6.7 As set out in **Table 4-12**, the value of funding committed to the end of November 2023 is £19.04 million. The GM Authorities' proposed Investment-led Plan focuses on buses, taxis and local traffic management measures to deliver compliance with legal limit values for NO₂ and therefore under the GM Authorities' proposal non-committed funds would be redistributed.
- 4.6.8 In this scenario funding for HGVs will be closed to new applicants. Applicants that have an existing funding award will be given to 1st January 2025 to spend the committed monies.
- 4.6.9 On this basis, to the end of November 2023 this would mean retaining £20.2 million for taxis (PHV and Hackney Carriages), with £83.83 million to reallocate as shown in **Table 4-12**.

Table 4-12 The GM CAP existing grant payments and funding reallocations

Purpose	Value of Grant (net of Admin costs) £m	Value Committed ²⁸ £m	Vehicles Upgraded	Recommendation
HGVs	7.60	2.52	205	close to new
PHVs	10.23	0.02	6	retain allocation
Coaches	4.45	0.00	0	reallocate funding
Minibus	2.00	0.01	1	reallocate funding
LGVs	70.00	0.07	14	reallocate funding
Hackney Carriages	10.10	0.12	20	retain allocation
Bus Retrofit	15.44	15.12	956	reallocate funding
Bus Replacement	3.25	1.18	69	reallocate funding
Total	123.07	19.04	1,271	

Investment-led Plan Costs

- 4.6.10 The whole life costs of the Investment-led Plan and the CAZ Benchmark have been estimated. The figures have been developed using high level assumptions and based on previous costs.
- 4.6.11 A high level of contingency has been applied and it should be noted that no commercial discussions have been held with suppliers.
- 4.6.12 This section sets out a summary of the proposed funding allocations required to deliver the Investment-led Plan. The funding allocations cover the three main components including bus, taxi and targeted local measures investment in addition to termination costs associated with the CAZ forming part of the Previous GM CAP, implementation and operating costs and the development costs to deliver the Investment-led Plan.

²⁸ Value Committed is the value of the total number of applicants who have applied and have been awarded a grant. At the end of November 2023, 180 Applicants had been awarded funding but are yet to upgrade.

4.6.13 The costs related to bus, taxi and local highway measures are:

- Bus Investment – £51.2 million
 - £39.7 million to purchase 64 ZEBs; and
 - £11.5 million for the electrification required on Piccadilly Approach and at Bolton, Queens Road and Middleton depots.
- Taxi Investment – £30.5 million
 - Funding requirement is derived from the total eligible vehicle population on the basis that every taxi owner will take-up the grant – the GM Authorities’ proposal is to fund every eligible vehicle.
 - £22.5 million CTF for non-compliant, GM-licensed Hackney Carriages and PHVs.
 - £7.9 million Electric Hackney Upgrade Fund for GM-licensed Hackney Carriages to upgrade to a ZEC vehicle.
- Local Traffic Management – £5.0 million (current allocation – cost estimates to be confirmed following further scheme design development).

Overall Investment-led Plan Costs

4.6.14 A summary of the costs for the Investment-led Plan is shown in **Table 4-13**.

Table 4-13 Summary of Investment-led Plan Costs

Area	Cost
Early termination of CAZ services	(£2.1m)
Vehicle upgrade funding and administration	(£86.7m)
Development and implementation	(£11.5m)
Net surplus / (deficit) from operation and decommissioning	(£24.1m)
Total cost	(£124.4m)

4.6.15 A high level breakdown of each of the areas, and some of the associated key assumptions are provided as follows.

Early Termination of CAZ Services

4.6.16 Under the agreement with Egis Projects SA, TfGM secured the right to terminate either in full or in part the contract for the GM CAZ Service. As any termination would be under the Termination for Convenience clause, TfGM would serve a 90 day notice. As the notice would be served less than 60 months after the commencement of the contract in July 2021, an Early Termination Payment would become payable to Egis Projects SA. The Early Termination Payment for termination (at any point between April and September 2024) is £2.1 million.

Vehicle Upgrade Funding and Administration

4.6.17 **Table 4-14** details the costs related to the bus and taxi measures, as well as the associated development, implementation and operational costs.

4.6.18 Some of the key assumptions are provided in the table and a general contingency of 5% has been applied to the costs in the table.

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Table 4-14 Investment-led Plan - Vehicle Upgrade Funding and Administration Costs

Area	Cost	Key Assumptions
Fund implementation costs	£0.1m	Estimated cost of mobilising and implementing fund solution (costings derived based on scale of potential funding applications).
ZEBs	£39.7m	-
Depot electrification	£11.5m	-
HGV fund	-	-
LGV fund	-	-
Coach & minibus fund	-	-
Taxi Core Fund	£22.6m	-
Taxi Electric Hackney Upgrade Fund	£7.9m	-
Fund operational costs	£0.8m	Assumes cost of £500k per annum (operating over 18 months) to reflect 8 staff members @ £60k pa (fully loaded staff costs).
General contingency	£4.1m	A contingency of 5% has been applied against fund costs.
Total cost	£86.7m	-

Development and Implementation Costs

4.6.19 **Table 4-15** details the costs related to decommissioning and removal of the existing CAZ infrastructure, the provision of the local highway measures, the costs associated with the broad engagement exercise, as well as the associated development and implementation costs.

4.6.20 Under the Investment-led Plan there is no requirement for the CAZ signage and therefore all existing signs will be removed. ANPR cameras not required for monitoring and evaluation can also be removed; however it is assumed that 75 cameras will be relocated for the purpose of monitoring and evaluation. It is assumed that elements of the CAZ Office Service and Operating Body (TfGM) will be required to collect, process and maintain the ANPR data, and manage the contract, related to the cameras required for monitoring and evaluation. Costs have been developed based on existing contractual costs, however it is possible that further savings related to the cameras and associated back-office costs could be identified when the requirements for the ANPR cameras are confirmed at the next stage.

4.6.21 Some of the key assumptions are provided in the table and a general contingency of 20% has been applied to the costs in the table to reflect rough order of magnitude of costings at this stage.

Table 4-15 Investment-led Plan – Development and Implementation Costs

Area	Cost	Key Assumptions
Signage update	£0.3m	Costs based on all existing signs being decommissioned - no new signs are required.
Camera update	£1.3m	Costs based on all existing cameras being decommissioned, and cameras relocated. 75 cameras are required. No additional savings assumed from excess camera sales.
Mobilisation costs	£0.3m	Mobilisation cost based on % assumption of the original mobilisation cost for the Previous GM CAP.
CAZ Office Service / Operating Body (TfGM)	£2.2m	Establishment of Operating Body cost based on % assumption of the original Operating Body for the Previous GM CAP.
Penalty Enforcement Service	-	-
Marketing, consultation & comms	£0.5m	Marketing costs taken as a % of the original marketing costs assumed for the Previous GM CAP
Highways measures	£5.0m	Based on initial estimates for implementing the Highways Measures.
General contingency	£1.9m	Contingency has been assumed at 20% of all costs to reflect rough order of magnitude of costings at this stage.
Total cost	£11.5m	

Revenue, Operational and Decommissioning Costs

4.6.22 **Table 4-16** details the costs related to the operation and decommissioning of the Investment-led Plan. Unlike the CAZ Benchmark, there is no revenue / income generated from the Investment-led Plan. The decommissioning relates to the demobilisation and decommissioning of all elements of the Investment-led Plan after compliance has been evidenced (and does not include any costs relating to the existing CAZ infrastructure, which are included in the development and implementation costs identified in **Table 4-15** above).

- 4.6.23 As noted in the development and implementation section above, it is assumed that 75 cameras will be relocated for the purpose of monitoring and evaluation and it is assumed that elements of the CAZ Office Service and Operating Body (TfGM) will be required related to this. The associated costs have been developed based on existing contractual costs (using a pro-rata percentage of the expected quantity of work compared to the previous GM-wide CAZ). As noted in the development and implementation section above, it is possible that further savings to the cameras and associated back-office costs could be identified when the requirements for the ANPR cameras are confirmed at the next stage.
- 4.6.24 Some of the key assumptions are provided in the table and a general contingency of 20% has been applied to the costs in the table to reflect rough order of magnitude of costings at this stage.

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Table 4-16 Investment-led Plan - Revenue, operational and decommissioning costs

Area	Cost	Key Assumptions
Total CAZ income (incl. penalty revenue & JAQU processing costs)	N/A	-
Existing contract costs	(£4.9m)	Reflects costs incurred from April 24 through to Sep 24 before 'new plan' comes into effect
CAZ Office Service costs	(£6.2m)	CAZ Office Service cost based on % assumption of the original CAZ Office Service for the Previous GM CAP.
Field equipment costs	(£1.8m)	Field Equipment cost based on % assumption of the Field Equipment Cost for the Previous GM CAP.
Operating Body (TfGM)	(£3.2m)	Operating Body cost based on % assumption of the original Operating Body for the Previous GM CAP.
Signage costs	-	-
Monitoring & evaluation costs	(£2.3m)	Monitoring & Evaluation costs are unchanged from the Previous GM CAP assumptions (difference due to timing of monitoring)
Penalty Enforcement Service	-	-
Other costs	(£1.6m)	Costs include opex relating to electricity, highways measures opex, security of employment costs and merchant costs.
Decommissioning costs (at close)	(£0.1m)	Decommissioning costs have been apportioned according to the volume of cameras and signage in service against the original decommissioning costs for the Previous GM CAP.
Operational contingency	(£4.0m)	Contingency at 20% of total operational costs
Net surplus / (deficit)	(£24.1m)	

4.6.25 As set out in **Table 4-17**, when considering whole life costs, the Investment-led Plan is estimated to require an additional £22.9m of funding.

Table 4-17 Investment-led Plan - Whole life costs including additional funding requirement

	Cost
Early termination of CAZ services	(£2.1m)
Vehicle upgrade funding and administration	(£86.7m)
Development and implementation	(£11.5m)
Net surplus / (deficit) from operation and decommissioning	(£24.1m)
Whole life total cost	(£124.4m)
Available funding	101.5m
Additional funding required from government	£22.9m

4.7 Delivery Schedule

- 4.7.1 The GM Authorities have developed an indicative, high level delivery schedule for delivering both the Investment-led Plan and the CAZ Benchmark. The Investment-led Plan delivery schedule has been informed by recent procurement undertaken as part of bus franchising, intelligence gathered from funding activities associated with the Previous GM CAP and similar highway schemes undertaken by Manchester and Salford local authorities in respect of the local highway measures.
- 4.7.2 Based on this delivery schedule, the GM Authorities are anticipating to commence implementation from February 2024, starting with ZEB fleet upgrades and local highway measures. Funding associated with the CTF is anticipated to go-live in August 2024 and to remain open to new applicants until the end of 2025. The schedule assumes a timely response from government following the GM Authorities' submission, with a possible consultation on the directed scenario scheduled to commence in March 2024.
- 4.7.3 **Table 4-18** sets out the proposed timescales for the implementation of the Investment-led Plan.

Table 4-18 Investment-led Plan - Delivery Schedule

Theme	Task	Proposed Start	Proposed End
Policy development	Development pre-consultation	Nov 23	Jan 24
	Update post-consultation	Jun 24	Jul 24
Data, evidence and modelling	Generic modelling, bus and location measures	Jul 23	Nov 23
	JAQU investigations modelling, bus and location measures	Oct 23	Dec 23
	Validation of the GM Authorities' proposal against JAQU investigations modelling	Dec 23	Dec 23
	Package modelling (pre-consultation)	Dec 23	Feb 24
	Package modelling (post-consultation)	May 24	May 24
Consultation	Consultation preparation	Dec 23	Feb 24
	Consultation (6 weeks)	Mar 24	Apr 24
	Consultation analysis	Apr 24	May 24
Governance	Governance (evidence submission to JAQU)	Nov 23	Dec 23
	JAQU review and Direction	Jan 24	Feb 24
	Governance (final plan)	Jul 24	Jul 24
Implementation	Implementation of changes to bus fleet	Feb 24	Dec 24
	Implementation of highway infrastructure changes	Feb 24	Aug 25
	Regent Road Go live	Dec 24	Dec 24
	Quay Street Go live	Sep 25	Sep 25
	CTF Mobilisation and contractual agreements	Feb 24	May 24
	CTF design	Apr 24	May 24

Theme	Task	Proposed Start	Proposed End
	CTF development / implementation	May 24	Jul 24
	CTF go live	Aug 24	Aug 24
	Taxi Emission Standard implemented	Jan 25	Dec 25

Schedule Assumptions

4.7.4 The delivery schedule for the Investment-led Plan has been informed and developed from a wide range of sources and considers the work undertaken on the Previous GM CAP, as well as the recent procurement activities and depot electrification undertaken as part of bus franchising, and experience from highway schemes undertaken by the local authorities in respect of the local highway measures.

4.7.5 There are however a number of assumptions that need to be made with the development of the schedule, some of which apply to both the Investment-led Plan and the CAZ Benchmark, and others specific to one or the other. The key assumptions are set out below:

- It is assumed that the same workstreams and methodologies will be applied as with the Previous GM CAP, such as policy development, data, evidence and modelling (DEM), consultation, governance and implementation. However, it is assumed that no further stakeholder engagement and research will be required to provide further evidence to the DEM or policy workstreams. If this is subsequently required, following feedback from government, there could be a delay to a number of activities which could affect the go-live dates.
- Both the Investment-led Plan and the CAZ Benchmark schedules use the decision by government as the start point for the further activities in the schedule. It is assumed that government will provide a response by mid-February 2024 that gives a clear instruction to enable the GM Authorities to mobilise the teams required for the next stage of the GM CAP. A delay in the response by government affects the Investment-led Plan and the CAZ Benchmark differently.
- For the Investment-led Plan, a delay in the response by government will cause a direct equivalent delay to the activities associated with the taxi funding (through the CTF).
- For the Investment-led Plan, the schedule allows for a broad engagement exercise / consultation, but it this is not a statutory requirement. The public engagement exercise / consultation would focus on the funding for taxis and is assumed to be for a period of 6 weeks.

- The start of consultation is directly linked to the response by government. There would be flexibility to move the start of the consultation and this would not affect the go-live dates for the bus and local highway measures, but it would have a direct effect on the go-live date for the taxi funding. Whilst this does not affect the compliance date (as this is driven by the implementation of the emission standards) this could prejudice the potential early upgrades of taxis and the associated air quality benefits.
- Bus franchising is delivering to the timescales noted previously (September 2023, March 2024 and January 2025) and therefore the bus measures are generally not driven by the by other activities in the schedule.

4.7.6 Overall, there is a high degree of confidence that the timescales of the Investment-led Plan can be achieved, delivering compliance in 2025.

4.8 Risks

4.8.1 The GM Authorities' approach to risk management is proactive and focuses on avoidance, transfer or taking mitigating action, rather than solely making financial provision for risk impacts. Risks have and will continue to be actively reviewed and managed as part of the GM Authorities' Performance Management Plan (PMP), as referenced in **Section 4.9**, so that the GM Authorities have the mechanisms in place to monitor the effectiveness of the measures implemented as part of the Investment-led Plan. **Table 4-19** illustrates some of the main implementation and operational risks associated with the Investment-led Plan.

4.8.2 As part of managing risk the GM Authorities have sought to apply pessimistic modelling assumptions to represent bus and taxi changes associated with the Investment-led Plan, which are set out in detail in the AQ3 report, adding resilience to the Plan's modelling compliance in 2025. These include:

- for roads where exceedances are not forecast, a high proportion of retrofitted Euro V buses have been assumed. Pessimistic assumptions on bus service fleet have been applied in lieu of known future year operational fleet, because the bus specification for these services has not yet been fully determined. This means that extrapolation of concentrations beyond 2025/2026 is likely to over-predict bus emissions and under-predict the rate of improvement as the fleet is also electrified at roads not forecast to be in exceedance with the Investment-led Plan in place in 2025.
- The assumption that taxi owners upgrade to the same fuel type as their existing vehicles, whereas there is a real-world trend for a switch away from diesel towards petrol hybrid or fully electric vehicles;
- there is no allowance for diesel Hackney Carriages to upgrade to ZEC models;

- the modelling has not assumed that the CTF will open before 2025 however the CTF could potentially open in 2024 Q3, enabling earlier upgrades than modelled; and
- taxi emissions are modelled based on the GM-wide average fraction of taxi flow of 7% as a proportion of total car trip demand, based on the evidence from ANPR data used for Target Determination. However, ANPR evidence indicates that the prevalence of taxi movements is greater in the Regional Centre, and inside the IRR is approximately 25% in 2023.

Table 4-19 Investment-led Plan - Summary of Key Risks

Risk Name / Description	Risk Minimisation / Mitigation
Shortage of available ZEBs to deploy on modelled exceedance routes	<ul style="list-style-type: none"> • Consider options to redeploy cleaner buses from Tranche 3. • Review and monitor performance of taxi measures to understand whether the underrepresentation of taxis is resulting in a material impact to compliance based on the shortfall of ZEBs. • Review opportunities to deploy local measures at the sites which remain in exceedance based on the shortfall of ZEBs.
Delays to bus depot electrification to charge newly purchased ZEBs	<ul style="list-style-type: none"> • Consider options to base new ZEBs at other depots where there is sufficient charging capacity. • Consider use of temporary charging infrastructure which does not require grid connections.
GM-licensed, non-compliant taxis re-license to a non-GM local authority to avoid the upgrade requirement to be compliant with the proposed emission standard requirement.	<ul style="list-style-type: none"> • This risk is largely contained to the GM-licensed PHVs who can operate outside of its licensed authority without restriction. • The provision of supporting funding through the CTF, coupled with the relatively low cost to upgrade to a second-hand, compliant PHV will act as safeguard against those wishing to re-license to a non-GM local authority. • Local authorities have their own standards regarding emissions and licensing which may restrict an existing non-compliant vehicle owner to move to another licensing authority albeit this is not standardised across licensing authorities.
Impediments to the implementation of Local Highway Measures at A34 Quay Street / A57 Regent Road	<ul style="list-style-type: none"> • Determine whether an incremental benefit from the local highway measures at these locations would be sufficient to achieve compliance alongside with the full implementation of the bus and taxi measures. This could be conducted via sensitivity testing. • Investigate alternative local measures to deliver a similar air quality benefit at this location.
The modelled air quality benefit from the Local Highway Measures is not achieved	<ul style="list-style-type: none"> • Consider whether further benefits can be secured / assumed from delivered bus and taxi measures. • Consider short-term scheme design changes at the relevant locations. • Investigate alternative local measures to deliver a similar air quality benefit at this location.
Modelling uncertainties	<ul style="list-style-type: none"> • Throughout the technical development process from 2017 to date, the GM Authorities have used best practice methodology and assumptions and worked closely with government. Where there is modelling

Risk Name / Description	Risk Minimisation / Mitigation
	<p>uncertainty, pessimistic assumptions have been applied to add resilience into the assumed modelled outcomes.</p> <ul style="list-style-type: none"> • Sensitivity testing to be conducted and provided to government following this submission as referenced below. • Any changes will be managed via the Investment-led Plan PMP and associated adaptive planning process. • Outcome of government review into bus retrofit performance will be reviewed and monitored with the assumptions used to underpin both scenarios.
<p>Implementation of the Investment-led Plan does not reduce NO₂ to levels predicted within the model</p>	<ul style="list-style-type: none"> • Pessimistic assumptions have been applied, where applicable, to add robustness in the modelled air quality outcomes of this scenario. • Engagement with partner organisations such as National Highways and Public Health England and alignment with other relevant areas of work. • Implement appropriate monitoring for compliance and evaluation, captured through the preferred scenario's PMP. Feedback should inform the effectiveness of the solutions implemented and give an opportunity to address / adapt the plan within the operational phase. • Consider flexibility or sufficient sensitivity ranges to improve effectiveness. • Consideration may be given to including further projects / measures within the programme if compliance is not achieved. • Consider the commissioning of ongoing research in advance of implementation.
<p>Challenging timescales for Investment-led Plan implementation affecting staff wellbeing and causing delay to implementation</p>	<ul style="list-style-type: none"> • Continually monitor resources at a programme level with Sponsors in order to ensure levels are appropriate for the projects and if not, work to recruit to the appropriate level. • Ensure 1-2-1s with line managers are taking place for all staff and any issues raised immediately with Programme Manager and Sponsors. • Follow procedures for staff with regards to sickness and return to work. • Ensure the wellbeing site is highlighted to all working on the programme and utilised if needed (EAP for staff).
<p>Legal challenge against the Investment-led Plan</p>	<ul style="list-style-type: none"> • Ongoing monitoring and evaluation into effectiveness of the measures in complying with the Direction, ongoing review of legal risks.
<p>Operational resources underestimated</p>	<ul style="list-style-type: none"> • Develop operating model based on estimated volumes of work and validate with similar activities / authorities where possible. • Closely monitor capacity and demand. • Recruit additional roles.
<p>Unforeseen economic effects</p>	<ul style="list-style-type: none"> • Review through Monitoring and Evaluation. • Any changes will be managed via the PMP and associated adaptive planning process.
<p>Unavailability of compliant vehicles</p>	<ul style="list-style-type: none"> • Monitor taxi funding take up during operations and procurement of ZEBs. • Collect and consider feedback from affected owners as part of the application process.

Risk Name / Description	Risk Minimisation / Mitigation
	<ul style="list-style-type: none"> Consider alternative approaches through PMP process.
Unable to assess full impact of the Investment-led Plan due to unforeseen changes to economic / non-economic circumstances	<ul style="list-style-type: none"> Continual monitoring of the data, feeding into the benefits realisation plan at regular intervals. Ensure ability to be flexible to respond to unanticipated changes to the projects. Close liaison with the project team for early assessment of potential impact of any changes identified.
If there are issues down to system integration, issues or a change to the proposals for grants/finance, this will delay the go live	<ul style="list-style-type: none"> The CTF is proposed to be administered via the Flexigrant payment system which has been used for the administration of bus funding. The distribution of funding will be monitored on an ongoing basis.

4.8.3 Some of the main identified risks associated with the Investment-led Plan, and proposed approaches to risk mitigation and minimization are set out below. The GM Authorities would address these through its PMP, summarised below.

4.8.4 A series of sensitivity tests are planned to be submitted to government following this submission which would provide confidence on the level of risks assumed under each scenario and the materiality of the risk to achieving the requirements of the Direction.

4.9 Performance Management

4.9.1 As part of the Investment-led Plan, the GM Authorities would monitor the measures implemented to ensure they are successful in achieving compliance in the shortest possible time.

4.9.2 The PMP would be supported by a Monitoring and Evaluation Plan and a Benefits Realisation Plan – these plans would be completed if an Investment-led Plan was directed by the government. The following section provides a high-level overview of the approach to monitoring for the Investment-led Plan and the benefit realisation process.

4.10 Monitoring and Evaluation

4.10.1 Monitoring will be required to ensure that the Investment-led Plan measures remain appropriate throughout the lifetime of the interventions. Therefore, the GM Authorities will conduct local monitoring and evaluation in order to:

- Provide accountability to the 10 GM local authorities, JAQU and the general public in showing that objectives have been met;
- Adapt the programme if it is not delivered as planned or has unexpected impacts;
- Understand the efficacy of the interventions; and
- Build an evidence base for future projects.

4.10.2 The Monitoring and Evaluation Plan will include monitoring of the outputs and outcomes of the scheme, including what is delivered, how it performs, and the wider impacts of those measures. Specifically, the monitoring will consider:

- Outputs of the Investment-led Plan in terms of what has been delivered and when;
- The taxi compliance rate and taxi fund uptake (and any reasons for non-uptake, e.g. affordability issues);
- The fleet age mix in the forecasts vs. the GM ANPR data sets and the TAG Data Book forecast for uptake of EVs;
- The performance of local traffic interventions covering speeds and flows;
- The outcomes of the JAQU funded study to quantify NO_x and NO₂ emissions from retrofit buses under real-world driving conditions;
- Bus service deployment to ensure that lower emitting buses are deployed on routes that target the remaining exceedance sites; and
- Results of NO₂ monitoring against the long-term annual mean legal limit of 40µg/m³.

4.11 Benefits Realisation

4.11.1 The Benefits Realisation Plan would set out the review process that has been put in place to ensure that benefits of the Investment-led Plan are realised and dis-benefits minimised. This review process would investigate the following questions:

- Has the Investment-led Plan been delivered as expected to date and is it on track for delivery of future elements?
- Is the Investment-led Plan performing as expected?
- Are the outcomes of the Investment-led Plan as expected?
- Have there been changes in wider factors to which the Investment-led Plan is sensitive?

5 CAZ Benchmark

5.1 Background

5.1.1 The development and testing of the CAZ Benchmark has been undertaken by the GM Authorities in accordance with a request received by a letter²⁹ from government in December 2022 in response to the 'Case for a new Greater Manchester Clean Air Plan' submission in July 2022³⁰.

5.1.2 Government stated in their response to the GM Authorities' approach to a non-charging scheme that they require a comparison, in line with government's agreed standard approach with all local authority NO₂ plans, against a suitable CAZ Benchmark to demonstrate it is as effective in reaching compliance in the shortest possible time.

5.1.3 The Minister for Environmental Quality and Resilience wrote to the GM Authorities in January 2023 following a meeting with the GM Mayor and the Clean Air Portfolio Lead. The Minister's letter included the following request which was consistent with JAQU correspondence in December 2022. The following requests were made:

- Provide modelling results for a CAZ Benchmark to address the persistent exceedances identified in central Manchester and Salford, in order for these to be compared against your proposals.
- Identify a suitable approach to address persistent exceedances identified in your data on the A58 Bolton Road in Bury in 2025, and to propose a suitable benchmark.
- Set out how the measures you have proposed will be modelled and evidenced overall, and to ensure that they are modelled without any unnecessary delay.

5.1.4 The development and testing of the CAZ Benchmark responds to the first of the above requests from government. The GM Authorities submitted evidence to government in March 2023³¹ that identifies a suitable approach to address persistent exceedances identified on the A58 Bolton Road in Bury.

²⁹

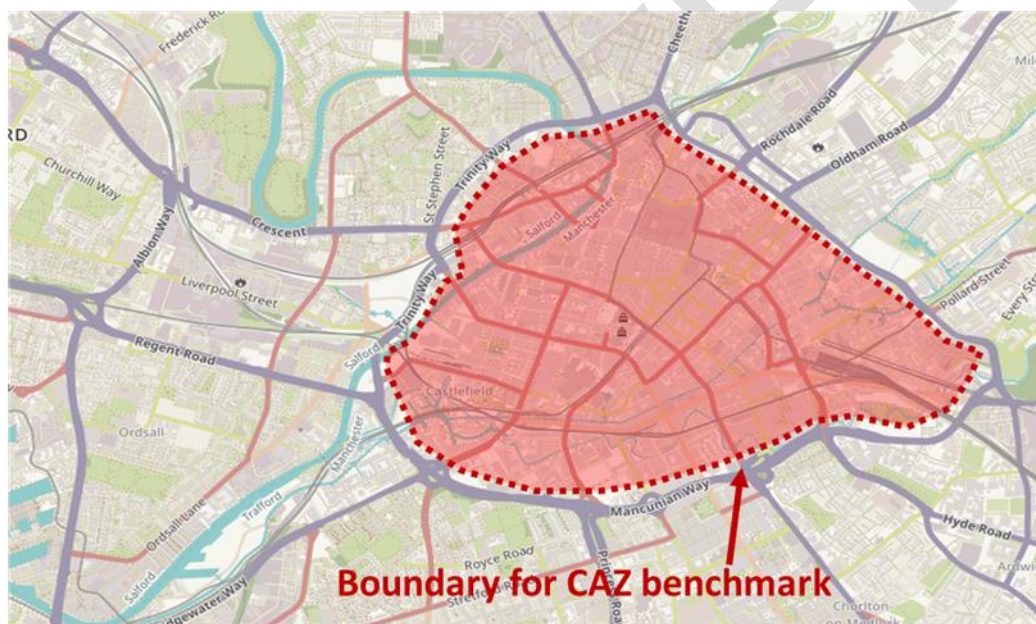
https://assets.ctfassets.net/tlpgbvy1k6h2/3EZ3zDp9wNKC8H66OiwPDY/3fe5db47f3c945387dee716669ca4559/Minister_for_Environmental_Quality_and_Resilience_to_GM_Mayor_and_Clean_Air_Portfolio_Lead.pdf

³⁰ https://assets.ctfassets.net/tlpgbvy1k6h2/7jtkDc5AODypDQlw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

³¹ https://assets.ctfassets.net/tlpgbvy1k6h2/6ZLaE1x4Sq125zSDIEgroJ/566f9f8bc8894b9545c5c75eb6b491b4/GM_Mayor_and_Clean_Air_Portfolio_Lead_to_Minister_for_Environmental_Quality_and_Resilience.pdf

5.1.5 Through discussions with government, the CAZ Benchmark based on the Regional Centre was identified and agreed with government, by letter to the GM Authorities in December 2022³². Government noted that that a CAZ Benchmark would be expected to include all city centre locations predicted to be non-compliant in 2025. The CAZ Benchmark boundary was therefore developed, as shown in **Figure 5-8**, and uses the inside of the Manchester and Salford IRR as the natural boundary for the CAZ Benchmark. Although the A57 Regent Road, as a persistent exceedance site, is located outside the CAZ boundary it is impacted by Regional Centre flows as a key radial to/and from the Regional Centre thus benefitting from any Regional Centre air quality improvements. Further information regarding the modelled assumptions for the CAZ Benchmark are set out in *T4 Report Appendix A*.

Figure 5-8 CAZ Benchmark Boundary



5.1.6 The GM Authorities have continued to work closely with JAQU officials to agree the CAZ Benchmark criteria. This includes the Class of CAZ which forms part of the Benchmark test. The GM Authorities have agreed that a Class B (buses, coaches, Hackney Carriages, PHVs and HGVs) and Class C (buses, coaches, Hackney Carriages, PHVs, HGVs, LGVs and minibuses) would be tested on the basis of which CAZ better achieves compliance with the GM Authorities' legal Direction. As part of the CAZ Benchmark model runs, a Class C CAZ was modelled initially to determine whether it would achieve compliance and therefore determine the requirement to run the CAZ B test.

³²

https://assets.ctfassets.net/tlpgbv1k6h2/3EZ3zDp9wNKC8H66OiwPDY/3fe5db47f3c945387dee716669ca4559/Minister_for_Environmental_Quality_and_Resilience_to_GM_Mayor_and_Clean_Air_Portfolio_Lead.pdf

5.1.7 Under the CAZ Benchmark vehicles within the relevant vehicle classes that do not meet the minimum emissions standards would be charged to drive within the zone. A summary of the relevant CAZ parameters and associated measures covered in the CAZ Benchmark as developed in conjunction with JAQU, can be viewed in **Table 5-20**.

5.1.8 As part of the testing of the CAZ Benchmark, the GM Authorities have assumed supporting mitigation funds in addition to a charging CAZ C based on the GM Regional Centre as per the Previous GM CAP. The supporting mitigation funds have been uplifted in-line with inflation, taking into account inflationary rises from 2021 (finalisation of the Previous GM CAP) up to and including 2024. This uplift is consistent with the uplift in taxi funding proposed as part of the Investment-led Plan.

Table 5-20 Benchmark Regional Centre CAZ Summary of Measures

The CAZ Benchmark scheme	Description
Key Characteristics	
Boundary	Covers all local roads within the GM Regional Centre (inside the Manchester and Salford IRR as shown in Figure 5-8).
Times of operation	24 hours a day, 7 days a week.
Vehicles affected	The following vehicles in-scope have been derived based on a Class C CAZ: <ul style="list-style-type: none"> • Buses³³ • Coaches • HGVs • LGVs • Minibuses • Licensed Hackney Carriages • Licensed PHVs
Daily charges	Daily charges would apply for each day a non-compliant vehicle is used within the GM CAZ boundary with one charge imposed per vehicle, per 'Charging Day' (midnight to midnight). <ul style="list-style-type: none"> • Buses³⁴ - £60 per 'Charging Day' • Coaches - £60 per 'Charging Day' • HGVs - £60 per 'Charging Day' • LGVs - £10 per 'Charging Day' • Minibuses - £10 per 'Charging Day' • Licensed Hackney Carriages - £7.50 per 'Charging Day' • Licensed PHVs - £7.50 per 'Charging Day'
Penalty for non/late payment of daily charge	£120 (in addition to the daily charge) would be applied to all relevant vehicles (reduced to £60 plus the daily charge if paid within 14 days of the Penalty Charge Notice being issued).

³³ It should be noted that a bus which has been retrofitted in accordance with the government CVRAS accredited bus retrofit scheme is considered to be a compliant vehicle, based on the approach set out by JAQU and other CAZ cities, and thus are not subject to a CAZ charge.

³⁴ Government have confirmed that a CVRAS-accredited retrofitted bus should be treated as a compliant vehicle with a CAZ.

The CAZ Benchmark scheme	Description
Funding for commercial vehicles	<p>The Clean Commercial Vehicle Fund (CCVF) would provide funding for the upgrade of LGVs, HGVs, minibuses and coaches through the provision of grants or vehicle finance contributions. Funding is targeted to support eligible small and micro businesses, sole traders, self-employed, charities, social enterprises and individuals in GM that travel to/and from the Regional Centre. For the purposes of this benchmark test, GM registered businesses naturally planning to upgrade their vehicles by 2026 have been assumed to also take up funding.</p> <p>Eligible applicants would be offered a grant towards a replacement vehicle, which may be taken as a lump sum grant or access to vehicle finance. The funding levels are as follows:</p> <ul style="list-style-type: none"> • HGVs: up to £15,070 towards replacement depending on vehicle size. • LGVs: up to £5,650 towards replacement depending on vehicle size. • Coaches: up to £40,180 towards replacement. • Minibuses: up to £6,280 towards replacement. <p>Funding levels have been uplifted since the Previous GM CAP to reflect changes in inflation.</p>
Funding for taxis	<p>The CTF would provide funding in the form of a grant or vehicle finance contributions for the upgrade of non-compliant Hackney Carriages and PHVs licensed in GM. Eligible applicants would be offered a running cost grant towards the running costs of a new ZEC vehicle or a contribution towards a replacement vehicle, which may be taken as a lump sum grant or access to vehicle finance. The funding offers are split into funding for upgrade to WAVs and funding for upgrade to non-WAVs, as follows:</p> <p><u>Upgrade to WAV</u></p> <ul style="list-style-type: none"> • Up to £12,560 towards the running costs of a new purpose-built WAV ZEC replacement vehicle. This option is available when the compliant replacement vehicle acquired with GM CAP funds has also been eligible for a government plug-in grant; or • Up to £12,560 towards a second-hand purpose-built WAV ZEC replacement vehicle; or • Up to £6,280 towards a compliant purpose-built WAV replacement vehicle (Euro 4 petrol or Euro 6 diesel or better). <p><u>Upgrade to Non-WAV</u></p> <ul style="list-style-type: none"> • Up to £7,530 towards the running costs of a new ZEC replacement vehicle; or • Up to £7,530 towards a second-hand ZEC replacement vehicle; or • Up to £3,770 towards a compliant replacement vehicle (Euro 4 petrol or Euro 6 diesel or better); or • Up to £6,280 towards a compliant replacement 6+ seater vehicle (Euro 4 petrol or Euro 6 diesel or better). <p>Funding levels have been uplifted since the Previous GM CAP to reflect changes in inflation.</p>

The CAZ Benchmark scheme	Description
Exemptions	
National permanent exemptions	<p>Government's CAZ Framework sets out a list of permanent exemptions for all CAZs. Vehicle types covered here are:</p> <ul style="list-style-type: none"> • Historic vehicles • Military vehicles • Disabled passenger vehicles • Specialist emergency service vehicles
Permanent local exemptions by GM	<p>The list of vehicle types proposed to be eligible for a permanent exemption, consistent with those forming part of the Previous GM CAP, are shown below for completeness:</p> <ul style="list-style-type: none"> • Specialist HGVs • Non-road-going vehicles • Vehicles used by emergency services • Community minibuses • Showmen's vehicles • Driving within the zone because of a road diversion • Disabled tax class vehicles • LGVs and minibuses adapted for a disabled user • Driver training buses • Heritage buses not used for hire or reward
Permanent local discount by GM	<p>The list of vehicle types which are proposed to be eligible for a permanent local discount, consistent with those forming part of the Previous GM CAP, are shown below for completeness:</p> <p>Owners or registered keepers' vehicles in the DVLA Private HGV Task Class and meeting the definition of a "special vehicle" in paragraph 4(2)(bb) of Schedule 2 to the Vehicle Exercise and Registration Act (VERA) would be subject to the LGV daily charge of £10 a day, rather than the HGV daily charge of £60 a day.</p>

5.1.9 The CAZ Benchmark would cover all local roads within the Regional Centre and would operate 24 hours a day, seven days a week. Stationary vehicles would not be charged.

5.1.10 Daily charges would apply for each day a non-compliant vehicle is used within the GM Regional Centre CAZ, with one charge imposed per vehicle, per 'Charging Day' (midnight to midnight), regardless of how much the vehicle travels within the GM Regional Centre CAZ in that 24-hour period. The GM Regional Centre CAZ charges for non-compliant vehicles would be as follows:

- Buses - £60 per 'Charging Day'.
- Coaches - £60 per 'Charging Day'.
- HGVs - £60 per 'Charging Day'.
- LGVs - £10 per 'Charging Day'.

- Minibuses - £10 per 'Charging Day'.
- Licensed Hackney Carriages - £7.50 per 'Charging Day'.
- Licensed PHVs - £7.50 per 'Charging Day'.

5.1.11 The relevant charge for non-compliant vehicles used within the GM CAZ would be paid via a Central Government Payment Portal. The government portal would allow a user to pay six days before the day of travel (Charging Day), any time on the Charging Day or six days following the Charging Day.

5.1.12 The penalty for no or late payment would be £120 in addition to the daily charge. This would be applied to all relevant vehicles and reduced to £60 (plus the daily charge) if paid within 14 days of the Penalty Charge Notice being issued.

5.1.13 Private cars and motorcycles would not be included. Vehicles travelling through GM on the National Highways Strategic Road Network (SRN) would also be excluded.

5.1.14 As part of the development of the CAZ Benchmark, the list of national and local exemptions and discounts is consistent with the Previous GM CAP. Further information can be found in GM Air Plan Policy following Consultation³⁵ (2021).

5.2 CAZ Benchmark – Clean Commercial Vehicles Fund

5.2.1 The CCVF would provide financial support to eligible applicants for the upgrade of non-compliant HGVs, LGVs, coaches and minibuses through the provision of grants and vehicle finance contributions. The CCVF would be targeted at small and micro businesses, sole traders, the self-employed, charities, social enterprises and individuals in GM that travel to/and from the Regional Centre. For the purposes of the benchmark test, GM registered businesses with LGVs and HGVs who have naturally planned to upgrade their vehicles by 2026 have been assumed to be eligible for funding.

5.2.2 Eligible applicants would be offered a contribution towards a replacement vehicle which may be taken as a lump sum grant or access to vehicle finance. CCVF can be comprised of grant-only, grant plus vehicle finance or vehicle finance-only with a total capped amount. The funding structure of the CCVF is consistent with the Previous GM CAP CCVF with the funding offer for HGV and LGV split by weight class.

HGV and LGV Support

5.2.3 The funding levels for HGVs and LGVs are outlined in **Table 5-21**.

³⁵ https://assets.ctfassets.net/tlpqbyv1k6h2/2VNncClzeiAvGh3CrVn0oo/d45528de22e593c9be285ddf5b26373b/Appendix_1_-_GM_Clean_Air_Plan_Policy_following_Consultation.pdf

Table 5-21 CAZ – CCVF HGV and LGV Funding Offer

Vehicle	Offer available (per vehicle)
HGV	Up to £15,070 towards a compliant replacement vehicle, dependent on the size of non-compliant vehicle for replacement, as follows: <ul style="list-style-type: none"> • 44t HGV (up to 44t HGV) – up to £8,160 • 32t rigid HGV (over 26t and up to 32t rigid HGV) – up to £15,070 • 26t rigid HGV (over 18t and up to 26t rigid HGV) – up to £11,300 • 18t rigid HGV (over 7.5t and up to 18t rigid HGV) – up to £8,790 • Up to 7.5t rigid HGV (over 3.5t and up to 7.5t rigid HGV) – up to £6,280
LGV	Up to £5,650 towards a compliant replacement vehicle, dependent on the size of non-compliant vehicle for replacement, as follows: <ul style="list-style-type: none"> • under 1.6t LGV – up to £4,400 • over 1.6t and up to 3.5t LGV – up to £5,650

5.2.4 The previous funding award from JAQU covering grants and vehicle finance contributions was £70m for LGVs and £7.6m for HGVs. This included JAQU estimated delivery costs of 5% and excluded operating and Quantified Risk Assessment (QRA) costs.

5.2.5 The eligible vehicle population for HGVs and LGVs that are assumed to take-up the funding, based on a Regional Centre CAZ, have been derived through identifying;

- Vehicles that travel to/and from the Regional Centre based on the GM CAP transport model outputs; and
- Vehicles that are forecast to naturally upgrade up to and including 2026 which aligns with the anticipated 'go-live' date for the CAZ.

5.2.6 A summary of the HGV and LGV eligible vehicle population for funding is shown in **Table 5-22** below.

Table 5-22 Eligible HGV and LGV population

Type	Vehicle Served	Funding Amount
LGV (2026)	12,695	£68,164,290
HGV (2026)	1,174	£12,748,544

5.2.7 Further information regarding the splits between vehicle volumes travelling to/and from the Regional Centre with those upgrading naturally is included within *T4 Appendix 1*.

5.2.8 Financial support via the provision of grants and vehicle finance contributions would be available prior to the introduction of the CAZ Benchmark.

Coach and Minibus Support

5.2.9 The funding levels for coach and minibus are outlined in **Table 5-23**.

Table 5-23 CAZ - CCVF Coach and Minibus funding offer

Vehicle	Offer available (per vehicle)
Coach	Up to £40,180 per vehicle (where retrofit is not available)
Minibus	Up to £6,280 per vehicle

5.2.10 JAQU has awarded £4.2m of funding towards the upgrade of coaches and £1.9m towards the upgrade of minibuses (which are not a licensed Hackney Carriage or PHV or used on a GM registered bus service). This includes JAQU estimated delivery costs of 5% and excludes operating and QRA costs.

5.2.11 The eligible vehicle population for coaches and minibuses that are assumed to take-up the funding, based on a Regional Centre CAZ, have been derived through identifying vehicles that travel to/and from the Regional Centre based on the GM CAP transport model outputs. This is set out in **Table 5-24** alongside the required supporting funding for these vehicle types in the CAZ Benchmark test.

Table 5-24 Eligible Coach and Minibus populations for funding

Type	Vehicle Served	Funding Amount
Coaches (2026)	35	£1,398,682
Minibuses (2026)	243	£1,527,296

5.2.12 Based on research conducted in preparation for the Previous GM CAP, coach upgrades are very expensive, reaching up to £280,000 for a new vehicle or £142,000 - £180,000 for a second-hand compliant vehicle. The coach upgrade grant will cover 20% of the estimated cost for a second-hand compliant coach at the mid-value of £160,000. When taken as vehicle finance, the higher value will also increase the opportunity for operators to secure a finance agreement. This value will also facilitate access to vehicle finance if required.

5.2.13 Under the Previous GM CAP, it was identified that the upgrade to a new minibus would typically cost approximately £40,000. It is anticipated that the availability of second-hand minibuses would be limited, meaning that it is likely that owners and operators would have to upgrade to a new vehicle. The proposed contribution of £5,000 seeks to mitigate the cost burden on minibus owners by providing over 10% of the upgrade cost.

5.2.14 The coach and minibus figures highlighted above have not been adjusted for inflation since the Previous GM CAP was developed. It is likely that vehicles are now more expensive and the uplifted funding offer, based on inflation, will ensure that a similar proportion of the upgrade cost is covered.

Taxi support

5.2.15 The CTF would offer funding through grant or vehicle finance contributions towards the upgrade of non-compliant Hackney Carriages and PHVs licensed with one of the 10 GM local authorities.

5.2.16 Eligible applicants would be offered a contribution towards a replacement vehicle that can be taken as a lump sum grant or access to vehicle finance.

5.2.17 Financial support via the provision of grants and vehicle finance contributions would be available prior to the introduction of the CAZ Benchmark.

5.2.18 The funding levels for Hackney Carriages and PHVs is outlined in **Table 5-25**. The funding offers are split into funding for upgrade to WAVs and funding for upgrade to non-WAVs. The funding structure of the CTF is consistent with the Previous GM CAP CTF with the funding offer split by WAV and fuel type.

Table 5-25 CAZ CTF – taxi funding offer

Vehicle type (upgrade to)		Offer available (per vehicle)
Purpose-built WAV	New ZEC	Up to £12,560 towards the running costs of the replacement vehicle.
	Second-hand ZEC	Up to £12,560 towards the cost of the replacement vehicle.
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle.
Non-WAV	New ZEC	Up to £7,530 towards the running costs of the replacement vehicle.
	Second-hand ZEC	Up to £7,530 towards the cost of the replacement vehicle.
	Compliant Vehicle 6+ seater (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle.
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £3,770 towards the cost of the replacement vehicle.

- 5.2.19 Running cost grants and vehicle finance contributions are designed to be able to be taken up in conjunction with existing grants available from government's OZEV Funds but cannot be used in conjunction with other GM CAP funding. GM CAP grants for replacement vehicles cannot be used in conjunction with government's OZEV Funds.
- 5.2.20 The core funding award from JAQU of £20.3m (including JAQU estimated delivery costs of 5%) includes £14m for the PHV grant and vehicle finance package and £6.3m for the Hackney Carriage grant and vehicle finance package.
- 5.2.21 The eligible vehicle population for Hackney Carriages and PHV that are assumed to take-up the funding, based on a Regional Centre CAZ Benchmark, have been derived through identifying vehicles that travel to/and from the Regional Centre based on the CAP transport model outputs. This is set out in **Table 5-26** alongside the required supporting funding for these vehicle types in the CAZ Benchmark test.

Table 5-26 Eligible Hackney Carriage and PHV populations for funding

Type	Vehicle Served	Funding Amount
Hackney Carriage (2026)	617	£5,485,646
PHV (2026)	1,401	£7,248,376

5.3 Air Quality Impact

- 5.3.1 This section provides an overview of the modelled impact from the CAZ Benchmark on the remaining points of exceedance in 2025 and 2026. This includes the reduction in NO₂ concentrations at each exceedance site in addition to the total number of remaining exceedance sites. Further information on the air quality impact of the CAZ Benchmark is reported in the *AQ3 Report*.
- 5.3.2 **Table 5-27** shows the distribution of non-compliant sites across GM, both by spatial type and also in terms of how close they are to compliance based on the implementation of the CAZ Benchmark.
- 5.3.3 The results shown that the anticipated number of exceedance sites below the legal limit values in 2025 are modelled to reduce from 12 to eight sites under the CAZ Benchmark. There is also an increase in the number of sites predicted to have concentrations of less than 35 µg/m³.
- 5.3.4 The number of exceedance sites below the legal limit values in 2026 is modelled to reduce further to two sites; however, compliance with the legal Direction is not achieved in the assessment years under a CAZ Benchmark.

Table 5-27 Predicted annual mean NO₂ concentrations at points on the GM road network – 2025 and 2026 CAZ Benchmark

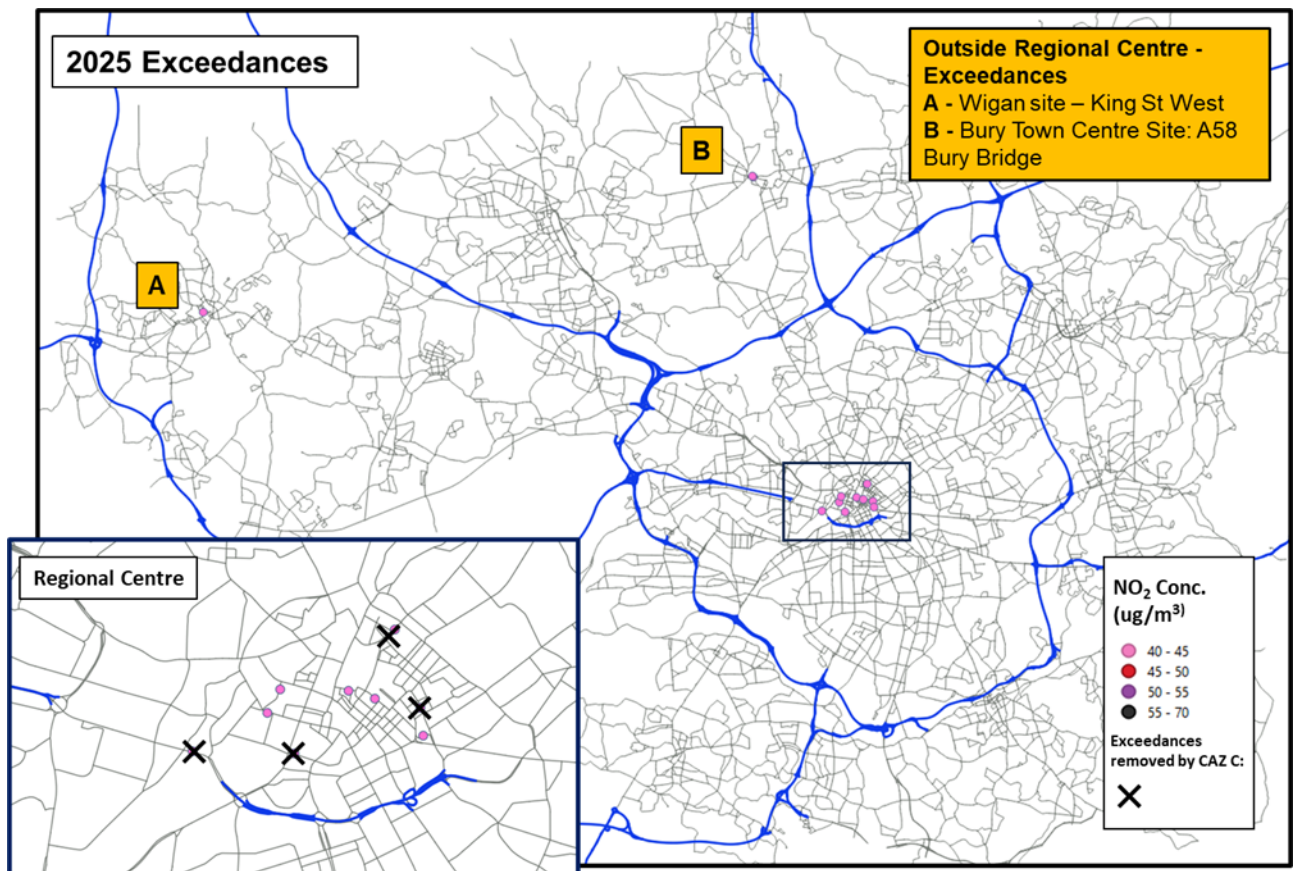
Road classification ³⁶	Compliant sites		Non-compliant sites			
	Very compliant (Below 35 µg/m ³)	Compliant but marginal (35 to 40 µg/m ³)	Non-compliant (>40 to 45 µg/m ³)	Very non-compliant (>45 to 50 µg/m ³)	Extremely non-compliant (>50 µg/m ³)	Total non-compliant (>40 µg/m ³)
2025						
Do minimum	2452	76	12	0	0	12
CAZ Benchmark	2459	73	8	0	0	8
2026						
Do Minimum	2499	36	5	0	0	5
CAZ Benchmark	2505	33	2	0	0	2

- 5.3.5 **Figure 5-9** shows the spatial distribution of the eight NO₂ exceedance sites modelled to remain with a Regional Centre CAZ C in 2025. The spatial concentration of exceedances is unchanged with the Do Minimum, clustered in the Regional Centre with five out of the eight sites located in the city centre. There are three outlier exceedance sites: two exceedance sites located at the A58 Bolton Road, Bury and one exceedance site located at the King St West exceedance site in Wigan. The scale of exceedance at each of these sites falls within the 40-45 µg/m³ bracket.
- 5.3.6 Of the total change in emissions due to the CAZ Benchmark at the most persistent exceedances, c.55% of the NO_x reduction comes from LGVs upgrading to become compliant (130 to 450 veh/day) and c.35% from HGVs upgrading to become compliant (10 to 35 veh/day), with the remainder of emission changes arising from taxi upgrades and some minor changes to overall vehicle flows.
- 5.3.7 Of the sites that become compliant due to the CAZ Benchmark, Great Bridgewater St and A57 Regent Road receive the greatest improvements of -2.2 µg/m³ and -0.9 µg/m³ respectively.

³⁶

“Inside Inner Relief Route” is the area encircled by the IRR. “Urban centres” are areas that met a definition used for the purposes of air quality modelling for OBC Option testing. “Other locations” are roads outside of Urban centres and the IRR.

Figure 5-9 Spatial distribution of predicted annual mean NO₂ exceedance sites – 2025 CAZ Benchmark (with GM CAP)



5.3.8 **Figure 5-10** shows the spatial distribution of the two NO₂ exceedance sites modelled to remain with a Regional Centre CAZ C in 2026. One site is located inside the GM Regional Centre IRR and the other site is located in Wigan. The Wigan site is a significant distance from the GM Regional Centre and therefore traffic is less likely to be travelling to the IRR as a destination. Therefore, this site is not impacted by the CAZ and would need to be tackled using a different measure.

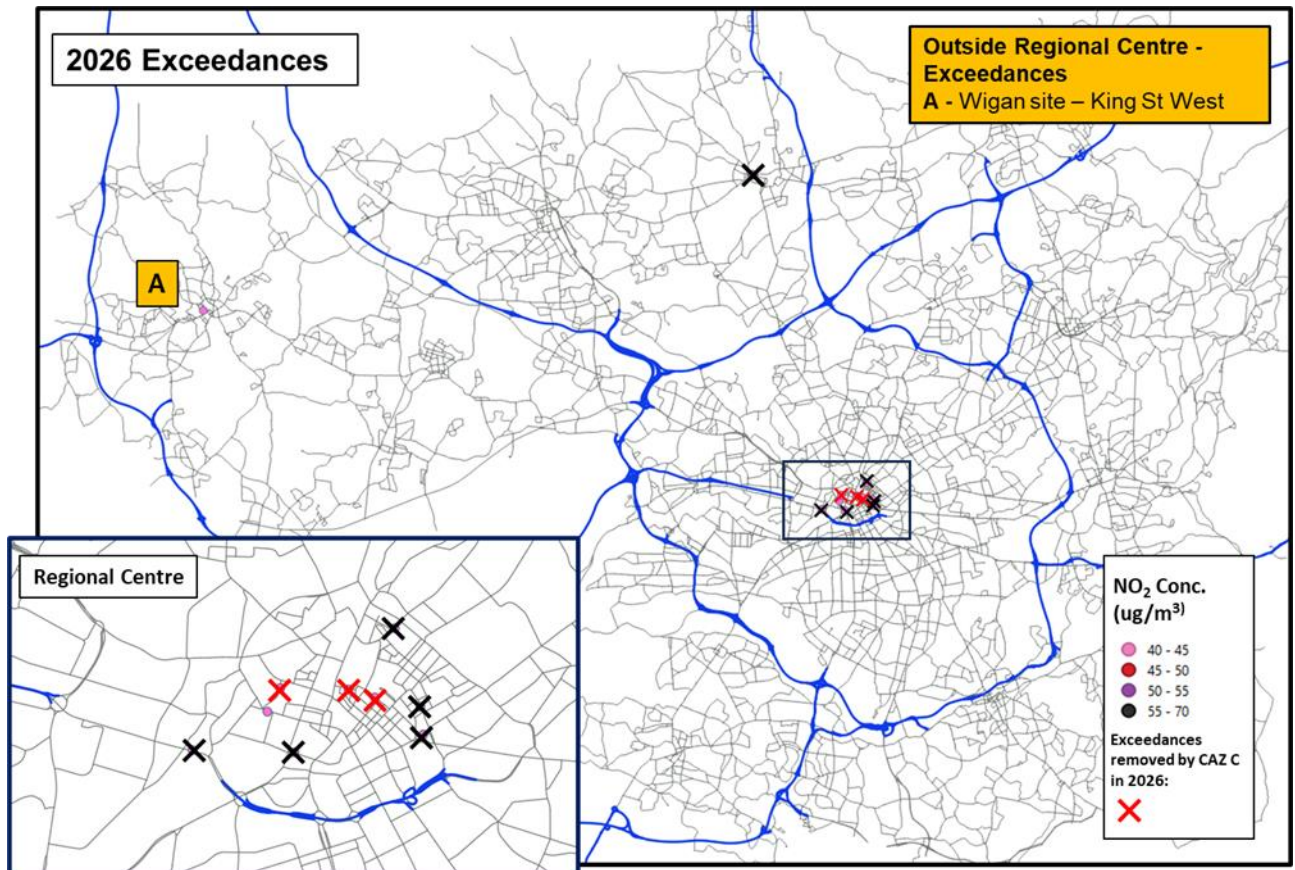
5.3.9 The Regional Centre site which is still non-compliant with the CAZ in effect is located at A34 Quay St, exhibiting an NO₂ value of 42.0 µg/m³ following an improvement due to the CAZ of -1.3 µg/m³.

5.3.10 Of the total change in emissions due to the CAZ Benchmark, 56% of the NO_x reduction comes from LGVs upgrading to become compliant (280 veh/day) and 39% from HGVs upgrading to become compliant (20 veh/day), with the remainder generated by taxi upgrades.

5.3.11 Of the sites that become compliant as a result of the CAZ Benchmark, Gartside, King St and York St received reductions of between -1.3 to -1.0 µg/m³.

5.3.12 Both the 2025 and 2026 CAZ Benchmark scenarios have been modelled as operational for the full year, so the modelled impact on NO₂ in 2025 is greater because there are less non-compliant vehicles forecast to be in the fleet in 2026 as a result of natural year-on-year fleet turnover. However, the viable CAZ opening date is not likely to be until later in 2025, and therefore the impacts are likely overstated.

Figure 5-10 Spatial distribution of predicted annual mean NO₂ exceedance sites – 2026 CAZ Benchmark (with GM CAP)



5.3.13 **Table 5-28** shows the modelled impact of a Regional Centre Class C CAZ on the remaining 8 sites modelled to be in exceedance based on the Do Minimum in 2026. The results are shown for 2026 only as compliance is not modelled to be achieved in this earlier forecast year.

5.3.14 The results show that whilst the CAZ Benchmark does provide an air quality improvement at A34 Quay Street, reducing the NO₂ concentrations by 1.3 µg/m³, the reduction is not sufficient to achieve compliance of 40.4 µg/m³. Meanwhile, the CAZ Benchmark has a limited impact outside of the Regional Centre with the other remaining exceedance site at King St West, Wigan modelled to have no change from the CAZ Benchmark.

Table 5-28 CAZ Benchmark (2026) Exceedance Sites by NO₂ Concentrations

Point ID	Census ID	Road name	Local Authority	Annual mean NO ₂ conc (µg/m ³)	Change in Annual mean NO ₂ conc (µg/m ³)
2237_3790_D W	38354	A58	Bury	40.0	-0.1
3790_3652	38354	A58	Bury	38.6	0.0
1322_3273	27975	A34 Quay St	Manchester	42.0	-1.3
8547_47130	N/A	King St	Manchester	39.8	-1.3
3272_8542_D W	N/A	Gartside St	Manchester	39.8	-1.0
1263_5429	N/A	New York St	Manchester	39.3	-1.2
3016_6022_D W	46165	A6	Manchester	31.4	-0.4
3103_3435_D W	N/A	King St West	Wigan	43.1	0.0

5.4 Costs

Overall Funding Position

- 5.4.1 The costs related to the business case, implementation and operation of the GM CAP are either directly funded or underwritten by government acting through JAQU and any net deficit over the life of the GM CAP will be covered by the New Burdens Doctrine³⁷, subject to a reasonableness test.
- 5.4.2 The GM Authorities have been awarded a total of £196.2 million (excluding electric vehicle charging infrastructure) in respect of the GM CAP. The government grants have been awarded as set out in **Table 5-29**.

³⁷ The New Burdens Doctrine is part of a suite of measures to ensure Council Taxpayers do not face excessive increases. [New burdens doctrine: guidance for government departments - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/guidance/new-burdens-doctrine)

Table 5-29 GM Authorities CAP funding award by government

Grant	£m
CAP development phase	31.7
CAZ implementation	26.0
CAZ operation	7.6
Vehicle funds (including bus)	122.3
Vehicle funds administration	6.1
Vehicle funds operation	2.5
Total	196.2

5.4.3 Expenditure to November 2023 and forecast to March 2024 (including committed grant awards) against the £196.2 million grants awarded by government is summarised in **Table 5-30**.

Table 5-30 Existing and forecast GM CAP expenditure

Area of Expenditure	Spend to date £m
Development phase	32.7
CAZ (implement and operate)	32.7
Financial Support Scheme (vehicle grants, implementation and operation)	26.2
Forecast for Dec 23-Mar 24	3.1
Grand total	94.7
Grant remaining	101.5

5.4.4 The GM Authorities have assumed that the grant value remaining would be repurposed to contribute to the future funding required for the CAZ Benchmark.

CAZ Benchmark Costs

5.4.5 The whole life costs of the Investment-led Plan and a CAZ Benchmark have been estimated. The figures have been developed using high level assumptions and based on previous costs.

5.4.6 A high level of contingency has been applied and it should be noted that no commercial discussions have been held with suppliers.

5.4.7 This section sets out a summary of the proposed funding allocations required for a CAZ Benchmark. Even though a GM-wide CAZ has already been fully designed and substantially implemented, the vast majority of this work cannot be re-used. All of the existing signage would need to be removed and new design undertaken, with new signs installed for the CAZ Benchmark. It is assumed for the costings that the majority of the ANPR camera locations would need to be re-designed and estimated 150 cameras re-located onto new poles, and all the other cameras removed. The funding allocations cover the development, implementation and operating costs to deliver the CAZ Benchmark.

5.4.8 A summary of the costs for the CAZ Benchmark is set out in **Table 5-31**.

Table 5-31 Summary of CAZ Benchmark Costs

Area	Cost
Early Termination of CAZ Services	N/A
Vehicle Upgrade Funding and Administration	(£107.2m)
Development and Implementation	(£13.1m)
Net Surplus / (Deficit) from Operation and Decommissioning	(£37.2m)
Total Cost	(£157.5m)

5.4.9 A high-level breakdown of each of the areas, and some of the associated key assumptions are provided as follows:

Early Termination of CAZ Services

5.4.10 It is assumed that under the CAZ Benchmark, the CAZ services would be largely retained and therefore no termination right, or costs, are triggered.

Vehicle Upgrade Funding and Administration

5.4.11 The following table details the costs related to the funding that would be provided to help owners upgrade non-compliant coaches, HGVs, LGVs and taxis and to mitigate against the economic impact of a CAZ Benchmark, as well as the associated development, implementation and operational costs. It is assumed that no funding would be required to upgrade buses and the upgrades completed for the Previous GM CAP will be sufficient.

5.4.12 Some of the key assumptions are provided in **Table 5-32** and a general contingency of 5% has been applied to the costs in the table.

Table 5-32 CAZ Benchmark - Vehicle Upgrade Funding and Administration Costs

Area	Cost	Key Assumptions
Fund Implementation Costs	£0.5m	Estimated cost of mobilising and implementing fund solution (costings derived based on scale of potential funding applications).
Zero Emission Buses	-	-
Depot Electrification	-	-
HGV Fund	£12.7m	-
LGV Fund	£68.2m	-
Coach & Minibus Fund	£2.9m	-
Taxi Core Fund	£12.7m	-
Taxi Electric Hackney Upgrade Fund	-	-
Fund Operational Costs	£5.0m	Proportioned by expected volumes against forecast cost and volume for the previously developed GM-wide CAZ.
General Contingency	£5.1m	A contingency of 5% has been applied against fund costs.
Total Cost	£107.2m	

Development and Implementation

5.4.13 **Table 5-33** shows the costs related to decommissioning and removal of the existing CAZ infrastructure, the costs for the installation of the CAZ Benchmark infrastructure, the costs associated with the consultation, as well as the associated development and implementation costs.

5.4.14 Even though a GM-wide CAZ has already been fully designed and substantially implemented, the vast majority of this work cannot be re-used. All of the existing signage would need to be removed and new design undertaken, with new signs installed for the CAZ Benchmark. It is assumed for the costings that the majority of the ANPR camera locations would need to be re-designed and estimated 150 cameras re-located onto new poles, and all the other cameras removed.

5.4.15 75 cameras would be required to enforce the CAZ Benchmark with a further 75 cameras relocated for the purpose of monitoring and evaluation. It is assumed that the same CAZ Office Service and Operating Body (TfGM) would be required that was developed for the previous GM-wide CAZ. Costs have been developed based on existing contractual costs (using a pro-rata percentage of the expected quantity of work).

5.4.16 Some of the key assumptions are provided in the table below and a general contingency of 20% has been applied to the costs in the table to reflect rough order of magnitude of costings at this stage.

Table 5-33 CAZ Benchmark – Development and Implementation Costs

Area	Cost	Key Assumptions
Signage update	£0.8m	Costs based on all existing signs being decommissioned, and 570 new signs being provided.
Camera update	£1.6m	Costs based on all existing cameras being decommissioned, and cameras relocated. 150 cameras are required. No additional savings assumed from excess camera sales.
Mobilisation costs	£0.5m	Mobilisation cost based on % assumption of the original mobilisation cost for the previously developed GM-wide CAZ.
CAZ Office Service / Operating Body (TfGM)	£6.8m	Operating Body cost based on % assumption of the original Operating Body for the previously developed GM-wide CAZ.
Penalty Enforcement Service	£0.2m	-
Marketing, consultation & comms	£1.0m	Marketing costs taken as a % of the original marketing costs assumed for the previously developed GM-wide CAZ.
Highways measures	-	-
General contingency	£2.2m	Contingency has been assumed at 20% of all costs to reflect rough order of magnitude of costings at this stage.
Total cost	£13.1m	

Revenue, Operational and Decommissioning Costs

- 5.4.17 **Table 5-34** details the costs related to the operation and decommissioning of the CAZ Benchmark. Revenue / income is generated from the CAZ Benchmark, unlike the Investment-led Plan where there is no revenue / income. The decommissioning relates to the demobilisation and decommissioning of all elements of the CAZ Benchmark after compliance has been evidenced (and does not include any costs relating to the existing CAZ infrastructure, which are included in the development and implementation costs identified in **Table 5-33** above).
- 5.4.18 The costs have been developed based on existing contractual costs (using a pro-rata percentage of the expected quantity of work compared to the Previous GM CAP).
- 5.4.19 Some of the key assumptions are provided in the table and a general contingency of 20% has been applied to the costs in the table to reflect rough order of magnitude of costings at this stage.

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Table 5-34 CAZ Benchmark - Revenue, Operating and Decommissioning Costs

Area	Cost	Key Assumptions
Total CAZ income (incl. penalty revenue & JAQU processing costs)	£13.4m	Based on updated traffic journey volumes under a CAZ Benchmark. All penalty assumptions remain in line with the Previous GM CAP.
Existing contract costs	(£4.9m)	Reflects costs incurred from April 24 through to Sep 24 before 'new plan' comes into effect.
CAZ Office Service costs	(£16.4m)	CAZ Office Service cost based on % assumption of the original previously developed CAZ Office Service.
Field equipment costs	(£2.3m)	Field Equipment cost based on % assumption of the Field Equipment Cost for the Previous GM CAP.
Operating Body (TfGM)	(£11.9m)	Operating Body cost based on % assumption of the original Operating Body for the Previous GM CAP.
Signage costs	(£0.1m)	Signage opex has been proportioned based on volume of signs versus contracted signage opex for the original signage contract volume.
Monitoring & evaluation costs	(£2.5m)	Monitoring & Evaluation costs are unchanged from the Previous GM CAP assumptions (difference due to timing of monitoring).
Penalty Enforcement Service	(£0.7m)	Costs driven by forecast volume of penalty notices issued and associated administration.
Other costs	(£3.1m)	Costs include opex relating to electricity, highways measures opex, security of employment costs, merchant costs and KADOE ³⁸ .
Decommissioning costs (at close)	(£0.3m)	Decommissioning costs have been apportioned according to the volume of cameras and signage in service against the original decommissioning costs for the Previous GM CAP.
Operational contingency	(£8.4m)	Contingency at 20% of total operational costs.
Net surplus / (deficit)	(£37.2m)	

5.4.20 As set out in **Table 5-35**, when considering whole life costs, the CAZ Benchmark would require an estimated additional £56.0m of funding.

³⁸ KADOE (Keeper of a Vehicle at the Date of an Event) is a service that provides access to the DVLA's Vehicle Keeper data, which is required for a CAZ.

Table 5-35 CAZ Benchmark - Whole life costs including additional funding requirement

	Cost
Early termination of CAZ services	N/A
Vehicle upgrade funding and administration	(£107.2m)
Development and implementation	(£13.1m)
Net surplus / (deficit) from operation and decommissioning	(£37.2m)
Whole life total cost	(£157.5m)
Available funding	101.5m
Additional funding required from government	£56.0m

5.5 Delivery Schedule

5.5.1 The GM Authorities have developed an indicative high level delivery schedule for the CAZ Benchmark, which has been informed by intelligence gathered from the procurement of services, agreement of contracts and associated infrastructure delivery as part of the Previous GM CAP. However, timescales have been adapted based on the CAZ Benchmark relating to the Regional Centre, as opposed to GM-wide, where efficiencies can be sought based on a smaller geographical zone or more effective processes, and governance can be adopted given the GM Authorities' work to date.

5.5.2 Based on this delivery schedule, the GM Authorities would anticipate to commencing mobilisation for the teams from February 2024 to develop and implement the CAZ, if it was selected by government as the preferred scenario, with 'go-live' potentially in December 2025. The supporting mitigation vehicle funds would be opened, prior to the CAZ, in June 2025. The schedule assumes a timely response from government following the GM Authorities' submission of evidence with a possible consultation on the CAZ Benchmark scheduled to commence in March 2024.

5.5.3 **Table 5-36** sets out the proposed timescales for the implementation of a CAZ Benchmark.

Table 5-36 CAZ - Delivery Schedule

Theme	Task	Proposed Start	Proposed End
Policy development	Development pre-consultation	Nov 23	Feb 24
	Update post-consultation	Jul 24	Aug 24
Data, evidence and modelling	Generic modelling, CAZ and location measures	Jul 23	Dec 23

Theme	Task	Proposed Start	Proposed End
	JAQU investigations modelling, CAZ and location measures	Oct 23	Dec 23
	Validation of the GM Authorities' proposal against JAQU investigations modelling	Dec 23	Dec 23
	CAZ modelling and reporting	Oct 23	Feb 24
	Package modelling, economic modelling and sensitivity testing (pre-consultation)	Nov 23	Mar 24
	Package modelling, economic modelling and sensitivity testing (post-consultation)	Jun 24	Aug 24
Consultation	Consultation preparation	Jan 24	Mar 24
	Consultation (8 weeks)	Mar 24	May 24
	Consultation analysis	May 24	Jul 24
Governance	Governance (evidence submission to JAQU)	Nov 23	Dec 23
	JAQU review and Direction	Jan 24	Feb 24
	Governance (final plan)	Sep 24	Oct 24
Implementation	CAZ & Financial Support Scheme (FSS) Mobilisation and contractual agreements	Feb 24	Jun 24
	CAZ design	Jun 24	Mar 25
	CAZ works	Mar 25	Dec 25
	FSS design	Jun 24	Dec 24
	FSS development / implementation	Dec 24	Jun 25
	FSS go live	Jun 25	Jun 25
	Discounts and exemptions go live	Sep 25	Sep 25
	CAZ go live	Dec 25	Dec 25

Schedule Assumptions

5.5.4 The delivery schedule for the CAZ Benchmark has been informed and developed from the work undertaken on the Previous GM CAP. There are however a number of assumptions that need to be made with the development of the schedule, some of which apply to both the Investment-led Plan and the CAZ Benchmark, and others specific to one or the other. The key assumptions are set out below:

- It is assumed that the same workstreams and methodologies would be applied as with the Previous GM CAP, such as policy development, DEM, consultation, governance and implementation. However, it is assumed that no further stakeholder engagement and research would be required to provide further evidence to the DEM or policy workstreams. If this is subsequently required, following feedback from government, there could be a delay to a number of activities which could affect the go-live dates. With the CAZ Benchmark there is also the possibility that further stakeholder engagement and research could be required as a result of the policy development work, or from the consultation feedback, which again presents a risk to the go-live dates.
- Both the Investment-led Plan and the CAZ Benchmark schedules use the decision by government as the start point for the further activities in the schedule. It is assumed that government will provide a response by mid-February 2024 that gives a clear instruction to enable the GM Authorities to mobilise the teams required for the next stage of the GM CAP. A delay in the response by government affects the Investment-led Plan and the CAZ Benchmark differently.
- For the CAZ Benchmark, a delay in the response by government would cause a direct equivalent delay to the critical path activities in the schedule, therefore if a response was provided by government in mid-March 2024, all the critical path activities in the schedule, and hence the go-live date for the CAZ Benchmark, would be one month later.
- Consultation would be held, which for the CAZ Benchmark is a statutory requirement. It is assumed the consultation would be for a period of eight weeks, which is the same duration as the previous consultation for the GM-wide CAZ.
- The start of consultation is directly linked to the response by government. There would be flexibility to move the start of the consultation and this would not affect the go-live dates for the FSS or CAZ Benchmark as the consultation is not on the critical path.
- Further policy development work is required for the CAZ Benchmark to determine the policy requirements for allocation of the mitigation funding. The outcomes from the consultation may also lead to further policy development and therefore there are timescale risks associated with this.

- Even though a GM-wide CAZ has already been fully designed and substantially implemented, the vast majority of this work cannot be re-used, with the exception of most of the standard details. All of the signage locations, and the majority of the ANPR camera locations would need to be re-designed. The design and implementation teams have been fully demobilised, and it may not be possible to get any of the previous expertise back on the project.
- With the CAZ Benchmark, there are significantly more activities and a higher number of activities on the critical path (compared to the Investment-led Plan) and therefore this brings greater risks to the ability to forecast and achieve the schedule. The schedule has been developed using the previous timescales and logic, however this work has not involved any of the suppliers and therefore the timescales could be significantly different from those assumed.

5.5.5 Overall, there is a lower degree of confidence that the timescales of the CAZ Benchmark can be achieved and as a result the 'realistic' scenario has been provided in the table above. Changing any of the assumptions has an impact on the schedule, but this central case is relatively realistic as the timescales would help manage additional items that aren't scheduled, and any risks or delays that occur.

5.5.6 With an 'optimistic' schedule it could be possible to bring the schedule forward by seven months so that the go-live would be in May 2025, however with a 'pessimistic' schedule there are a number of risks that could push the schedule back by a few months, or to over a year beyond the 'realistic' go-live date of December 2025. Some of the assumptions related to the 'optimistic' and 'pessimistic' schedules are detailed below.

5.5.7 It should be noted that all assumptions and durations would need to be agreed with the design and installation teams before any of the schedule could be confirmed.

'Optimistic' schedule

5.5.8 Signage and ANPR design could be reduced by three months and commence part way through the mobilisation, rather than at the end mobilisation, which would save over one month further. This however has a higher degree of risk and the duration of the activity may subsequently be increased if sufficient resources from the design team are not mobilised in time. The design period is also extremely short and would need verification from the design team.

5.5.9 Contractual arrangements with CAZ suppliers could commence part way through the mobilisation period for the TfGM staff and the lead advisor (assuming there is sufficient staff to do this). This would also be ahead of any design being undertaken so could result in the need for further subsequent commercial discussions.

- 5.5.10 Mobilisation of the CAZ suppliers could commence part way through the commercial discussions to enable the teams to be mobilised part way through the development of the design and ready to commence works as soon as the design completed. Though again this increases the risk of further commercial discussions and rework.
- 5.5.11 The change to the schedule logic however results in the installation period clashing with the Christmas period, which could increase the installation period (subject to commercial discussions to mitigate this).
- 5.5.12 It is assumed that no new lighting columns are required for the ANPR cameras and all ANPR cameras are installed on new poles by the CAZ suppliers. However, if this is not possible and new lighting columns are required, the installation durations could increase.

'Pessimistic' schedule

- 5.5.13 The 'realistic' and 'optimistic' schedules assume that the CAZ suppliers wish to continue with a CAZ Benchmark and that terms can be negotiated. If this isn't the case, re-procurements would be required. It is expected that the equivalent of the previous Competitive Dialogue process wouldn't be required for the overall CAZ service, however, as an example, the total duration for the signage procurement previously was one year, so to reprocure the signage, ANPR / CAZ Service and debt recovery contracts, could add another nine months to one year to the 'realistic' schedule.
- 5.5.14 The duration in the 'realistic' schedule from completion of the installations, to go-live is relatively short, and these activities haven't been undertaken previously in GM. There are technical dependencies for CAZ delivery such as integration and set up with Central JAQU Service; including onboarding processes and shaping the service design/ architecture. This also covers integration with Gov.Pay, DVLA, and any other providers; and service integration to a customer contact centre including charge payment via Gov.Pay and Go Cardless, and payment service provider. There is therefore a risk that these durations could significantly increase.

5.6 Risks

- 5.6.1 The GM Authorities' approach to risk management is proactive and focuses on avoidance, transfer or taking mitigating action, rather than solely making financial provision for risk impacts. Risks have and will continue to be actively reviewed and managed as part of the GM Authorities' PMP. **Table 5-37** illustrates the some of the main implementation and operational risks associated with the CAZ Benchmark and potential ways to mitigate/minimise those risks.

Table 5-37 CAZ Benchmark - Summary of Key Risks

Risk Name / Description	Risk Minimisation / Mitigation
Local public acceptability	<ul style="list-style-type: none"> • A full public consultation and stakeholder engagement process would be run in 2024 to inform locals of potential CAZ impacts. • Adequate signage and marketing provided to alert Regional Centre road users of the need to ensure their vehicles are compliant. Where vehicles are not compliant, funding will be offered to support upgrade. • Engagement and research conducted with local political groups and stakeholders to ensure the CAZ Benchmark is reflective of local economic conditions.
Requirement for supporting infrastructure (signage and ANPR cameras)	<ul style="list-style-type: none"> • Signage and cameras to be repurposed, where possible, based on a Regional Centre Zone. • Proportion of funding allocation to be ring-fenced for use in providing supporting infrastructure.
Interface with changes to bus retrofit	<ul style="list-style-type: none"> • CVRAS-accredited retrofitted buses upgraded to Euro VI standard considered to be 'compliant' with a CAZ and therefore unaffected by CAZ charges.
Modelling uncertainties	<ul style="list-style-type: none"> • Throughout the technical development process from 2017 to date, the GM Authorities have used best practice methodology and assumptions and worked closely with government. • Sensitivity testing to be conducted and produced to government following this submission of evidence. • Any changes will be managed via the PMP and associated adaptive planning process. • Outcome of government review into bus retrofit performance will be reviewed and monitored with the assumptions used to underpin both scenarios.
Implementation of the CAZ Benchmark does not reduce NO ₂ to levels predicted within the model	<ul style="list-style-type: none"> • Ensure the modelling design process is robust with adequate assurance during implementation. • Engagement with partner organisations such as National Highways and Public Health England and alignment with other relevant areas of work. • Implement appropriate monitoring for compliance and evaluation, captured through the preferred scenario's PMP. Feedback should inform the effectiveness of the solutions implemented and give an opportunity to address / adapt the plan within the operational phase. • Consider flexibility or sufficient sensitivity ranges to improve effectiveness. • Consideration may be given to including further projects / measures within the programme if compliance is not achieved. • Consider the commissioning of ongoing research in advance of implementation.
Challenging timescales for CAZ Benchmark implementation affecting staff wellbeing and causing delay to implementation	<ul style="list-style-type: none"> • Continually monitor resources at a programme level with Sponsors in order to ensure levels are appropriate for the projects and if not, work to recruit to the appropriate level. • Ensure 1-2-1s with line managers are taking place for all staff and any issues raised immediately with Programme Manager and Sponsors. • Follow procedures for staff with regards to sickness and return to work. • Ensure the wellbeing site is highlighted to all working on the CAZ Benchmark and utilised if needed (EAP for staff).
Legal challenge against the CAZ Benchmark	Ongoing monitoring and evaluation into effectiveness of the measures in complying with the Direction, ongoing review of legal risks.

Operational resources underestimated	<ul style="list-style-type: none"> • Develop operating model based on estimated volumes of work and validate with similar activities / authorities where possible. • Closely monitor capacity and demand. • Recruit additional roles.
Unforeseen economic effects	<ul style="list-style-type: none"> • Review through Monitoring and Evaluation. • Any changes will be managed via the Investment-led Plan PMP and associated adaptive planning process.
Unavailability of compliant vehicles	<ul style="list-style-type: none"> • Monitor funding take up during operations. • Collect and consider feedback from affected owners as part of the application process.
Unable to assess full impact of the GM CAP given unforeseen changes to economic / non-economic circumstances	<ul style="list-style-type: none"> • Continual monitoring of the data, feeding into the benefits realisation plan at regular intervals. • Ensure ability to be flexible to respond to unanticipated changes to the projects. • Close liaison with the project team for early assessment of potential impact of any changes identified.
Third party agreements (JAQU, data sharing; Gov.pay, PSP, Go Cardless, TEC, etc.) are not finalised in time, causing detrimental impact for meeting critical implementation milestones	<ul style="list-style-type: none"> • Proactive dependency management and project planning activities. • Early commencement of agreement drafting/reviews/ approvals.
Limited local authority resource availability on lighting column installations	Team to engage with Local Authorities to understand their resource capacity and optioneering for alternative procurement.
Penalty charge notices are unpaid	Analyse and understand reasons for unpaid penalty charge notices and amend policy and process to improve collection rate and/or reduce debt registration issued.
Operating body requires a greater level of resource to support the operation of the scheme	Regular resource planning reviews and lessons learnt from other CAZ schemes.
New service enhancements are introduced (e.g., payment channels)	Liaison with JAQU and legal to mitigate against the need for new payment channels and other change requests.
If there are issues down to system integration, issues or a change to the proposals for grants/finance, this will delay the go live	Change requests to be prioritised and discussed as necessary and request suppliers to provide formal impact assessment of any change requests to understand potential mitigation.
As a result of post contract change, the implementation costs of CAZ Office System (e.g., additional software and system build requirements) are higher than the contract agreed values. Capital cost of developing CAZ Office System is underestimated	Monitoring cost of the contacts.
CAZ is unable to recruit staff and have to use contract roles during the implementation phase.	Active recruitment campaign.

5.7 Performance Management

5.7.1 The PMP would be supported by a Monitoring and Evaluation Plan and a Benefits Realisation process, to be completed if a CAZ is directed by government. The following provides a high-level overview of the approach to monitoring and evaluation and benefits realisation.

5.8 Monitoring and Evaluation

5.8.1 Monitoring will be required to ensure that the policy contained in the GM CAP remains appropriate throughout the lifetime of the interventions. Therefore, the GM Authorities will conduct local monitoring and evaluation in order to:

- Provide accountability to the 10 GM local authorities, JAQU and the general public in showing that objectives have been met;
- Adapt the programme if it is not delivered as planned or has unexpected impacts;
- Understand the efficacy of the interventions; and
- Build an evidence base for future projects.

5.8.2 The Monitoring and Evaluation Plan will include monitoring of the outputs and outcomes of the scheme, in other words, of what is delivered, how it performs, and the wider impacts of those measures. Specifically, the Monitoring and Evaluation Plan will consider:

- Outputs of the GM CAP in terms of what has been delivered and when;
- Impact of the CAZ, in terms of behavioural responses to the scheme, and uptake of the Funds;
- Impact on traffic volumes and composition, including the profile of the vehicle fleet;
- Impact on traffic emissions and air quality, including the number of locations in exceedance of legal limits of NO₂ concentrations and impact on other pollutants;
- Impacts on vehicle owners in scope for the scheme and other vulnerable groups; and
- Other research as required to understand the explanations or causes for the results that emerge.

5.9 Benefits Realisation

5.9.1 The Benefits Realisation Plan will detail the benefits and disbenefits that have been identified and sets out the review process that has been put in place to ensure that those benefits are realised and dis-benefits are minimised. This review process involves a quarterly review, that will investigate the following questions:

- Has the GM CAP been delivered as expected to date and is it on track for delivery of future elements?
- Is the GM CAP performing as expected?
- Are the outcomes of the GM CAP as expected?
- Have there been changes in wider factors to which the GM CAP is sensitive?

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6 Value for Money

6.1 Value for Money Approach

- 6.1.1 This section describes the approach taken to assess the Value for Money (VfM) of the Investment-led Plan and the CAZ Benchmark scenarios.
- 6.1.2 VfM is normally assessed by considering the extent to which the monetised benefits (and unquantified benefits) outweigh the costs. The key decision in most cases is whether action is preferable to inaction i.e., is this scheme worth doing? Inaction is not an option in this instance. There is a legal imperative to act where it is possible to do so, and this action must be sufficient to achieve compliance in the shortest possible time. Therefore, the question is not 'is it worthwhile to act?' but 'is this the best course of action, of the scenarios available to achieve a set objective?'
- 6.1.3 The VfM assessment for each scenario has been undertaken in context of the GM Authorities' appraisal via the CSFs, as shown in **Section 8** and therefore a proportionate approach has been taken based on the classification of VfM as a Secondary Success Factor. The GM Authorities' appraisal approach is based on guidance set out by HMT³⁹, JAQU and DfT.
- 6.1.4 The Green Book states that shortlisted scenarios, which deliver on the SMART Objectives, should be assessed by either Cost Benefit Analysis (CBA) or Cost Effectiveness Analysis. As the benefits that any scenario for the GM CAP needs to deliver are fixed (i.e. meeting compliance), Cost Effectiveness Analysis is considered the most appropriate approach to analysing VfM for this programme.
- 6.1.5 Therefore, a cost-effectiveness approach to VfM has been undertaken to compare the financial costs of both the Investment-led Plan and the CAZ Benchmark, with the lowest cost scenario considered to be the most cost effective and hence offer better relative VfM. This quantified assessment of NO₂ compliance will be supported by a qualitative benefit analysis of the extent to which each scenario also supports other local transport, air quality and health policy objectives. In this way, the assessment of VfM will be primarily a relative assessment of the cost-effectiveness between each scenario in meeting policy objectives.
- 6.1.6 To support the relative cost-effectiveness between the two scenarios, a secondary, supplementary, absolute statement of VfM will be made using CBA for the preferred scenario only. This will subsequently be conducted following government's decision on the preferred scenario. While the CBA will derive an absolute VfM metric, the purpose is to supplement the relative cost-effectiveness analysis. The GM Authorities' approach to assess the standard set of metrics covering transport policy investment has been set out in **Table 6-38**. The potential impact has been considered for both scenarios to determine what assessment type is appropriate to conduct on each case.

³⁹ https://assets.publishing.service.gov.uk/media/623d99f5e90e075f14254676/Green_Book_2022.pdf

Table 6-38 Summary of VfM impacts

Impact	Magnitude of Impact	VfM – Assessment Type
Economy		
Business travel times and reliability	Low	Qualitative
Business costs and revenues	Medium	Quantified via financial analysis
Wider Economic Impacts	Very Low	Not included
Social		
Commuter / other travel times and reliability	Low	Qualitative
Amenity benefits	Low	Qualitative
Accidents, Physical, Landscape, Option Values, Severance	Very Low	Not included
Environment		
Carbon emissions	Medium - High	Quantified, via EMIGMA (emissions model)
Local air quality emissions	Medium - High	Quantified, via EMIGMA
Noise	Low	Qualitative
Public Accounts		
Capital costs	Medium	Quantified
Operating costs	Medium	Quantified

6.1.7 The monetisation of benefits from EMIGMA via TAG damage costs workbook for both scenarios to support the environmental benefits has not been included as part of this submission and will be provided to JAQU following this submission.

6.2 Value for Money Assessment

6.2.1 **Table 6-39** sets out the assessment of VfM impact, based on the identified metrics and proposed assessment type, for the Investment-led Plan and the CAZ Benchmark.

Table 6-39 Assessment of VfM impacts

Impact	Assessment
Economy	
Business travel times and reliability	<ul style="list-style-type: none"> Both GM CAP scenarios would result in businesses upgrading to newer vehicles, meaning that they are less likely to be affected by reliability issues. These vehicles are also more likely to be fuel efficient, improving travel times and costs. The relative scale of benefits from vehicle upgrades is higher in the CAZ Benchmark scenario compared to Investment-led Plan as the latter is constrained to provision of funds for taxis only. The Investment-led Plan proposes to provide additional funding to support the upgrade of retrofitted buses to OEM Euro VI or ZEB, whereas there is no such assumed investment as part of the CAZ Benchmark scenario due to the funding already invested through the CBF on retrofitted and replaced buses. The newer bus fleet may incentivise a higher public transport use under the Investment-led Plan scenario; however, the likely trip transfer is assumed to be low. The introduction of a charging zone under the CAZ Benchmark could have travel time disbenefits for businesses. Businesses operating with non-compliant vehicles will be faced with a choice: pay the daily charge and use the most efficient route in the Regional Centre or avoid the daily charge and re-route around the Regional Centre. Although the assumed number of trips are low, those who select the latter option may experience an increase in journey times. Overall, it is concluded that the CAZ Benchmark is likely to have a relative higher adverse impact compared to the Investment-led Plan on the basis that the potential trip rerouting impact is more widespread albeit in both scenarios' impacts are considered to be low.
Business costs and revenues	<ul style="list-style-type: none"> The CAZ Benchmark scenario has the potential to result in higher business costs compared to the Investment-led scenario. Under a Regional Centre Class C, businesses that operate within the Regional Centre are likely to be disproportionately adversely impacted by the CAZ. This may be directly or indirectly in the case that customers or the supplier chain are impacted by operating non-compliant buses. Whilst the provision of financial support for affected vehicles is expected to reduce the adverse impact, it does not eliminate the adverse impact on non-compliant vehicles that are travelling to/and from the Regional Centre. There is anticipated to be a limited adverse impact from the Investment-led Plan on taxis, associated with the alignment of a consistent emission standard across the 10 GM local authorities by 31st December 2025, which may require taxi owners / operators to upgrade their vehicle earlier than they otherwise would have done so. However, this is likely to be outweighed in most cases by the provision of financial support to non-compliant, GM-licensed taxis. There is also financial support proposed for ICE compliant, GM-licensed Hackney Carriages to upgrade to a ZEC Hackney Carriage. It should be stated that the impact of implementation of a consistent emission standard is not equal across the 10 GM local authorities based on their current status of emission standards; however, for five of the 10 GM local authorities, it will result in bringing forward the emission standard date by approximately three months. Overall, it is concluded that the Investment-led Plan would provide a low positive impact on business costs on revenues on the basis of provision of funds to support bus upgrades and upgrade of compliant taxis to ZEC vehicles, which therefore goes beyond the population that would be affected by the implementation of a consistent emission standard. By comparison, the charge associated with the CAZ Benchmark would potentially adversely impact all non-compliant vehicle types under a Class C and whilst the supporting mitigation funding would lessen the cost of upgrade.
<ul style="list-style-type: none"> Social 	

Impact	Assessment
Commuter / other travel times and reliability	<ul style="list-style-type: none"> • Modelling identifies limited changes to travel time in both scenarios due to local re-routing associated with the Regional Centre CAZ and the local highway measures at A57 Regent Road and A34 Quay Street associated with the Investment-led Plan. • There are a number of cancelled trips as a result of the CAZ Benchmark scenario. However, the number is low and so this is not expected to have a material impact on travel times / reliability. • Consistent with the 'economy' assessment, the CAZ Benchmark is likely to have a relative higher adverse impact compared to the Investment-led Plan on the basis that the potential trip rerouting impact is more widespread albeit both scenario impacts are considered to be low.
Amenity benefits	<ul style="list-style-type: none"> • Both scenarios incentivise upgrades to newer vehicle fleets. The CAZ Benchmark scenario is estimated to fund a higher number of vehicles compared to the Investment-led Plan, although albeit these will be largely private commercial vehicles. • The Investment-led Plan focuses fleet upgrades on new buses and on new and second-hand taxis. • In both scenarios, the amenity benefits are likely to be low, albeit upgrades to newer buses and taxis provider wider benefits to passengers. • The CAZ Benchmark is expected to provide a wider amenity benefit to different vehicle owners from the upgrades of eligible vehicles that are captured as part of CAZ Class C, albeit the level of benefit is low. However, the Investment-led Plan is likely to achieve a higher amenity benefit from buses and taxis, compared to these vehicles under a CAZ Benchmark.
<ul style="list-style-type: none"> • Environment 	
Carbon emissions	<ul style="list-style-type: none"> • Both scenarios deliver a reduction in carbon emissions and associated benefits from investment in newer fleets and local highway measures associated with the Investment-led Plan. It is modelled that both scenarios deliver a higher emissions reduction in the Regional Centre than elsewhere in GM due to the extent of the CAZ boundary and the emissions benefit derived from buses and taxis, which have higher volumes operating in the Regional Centre. • The quantified benefit derived from EMIGMA and monetised via TAG GHG Valuation workbook has not been included in this submission and is anticipated to be provided to government in January 2024 following completion of outputs. • The carbon emissions reduction from the Investment-led Plan is modelled to be higher than the CAZ Benchmark, although the spatial distribution of benefits is broadly similar between the two scenarios with a higher concentration of benefits located in the Regional Centre.
Local air quality emissions	<ul style="list-style-type: none"> • Similar to the carbon emissions benefits, both scenarios deliver a reduction in local air quality emission and associated benefits from investment in newer fleets and local highway measures associated with the Investment-led Plan. It is modelled that both scenarios deliver a higher emissions reduction in the Regional Centre than elsewhere in GM due to the extent of the CAZ boundary and the emissions benefit derived from buses and taxis which have higher volumes operating in the Regional Centre. • The quantified benefit derived from EMIGMA and monetised via TAG damage costs (air quality valuation workbook) has not been included in this submission and is anticipated to be provided to government in January 2024 following completion of outputs. • The local air quality emissions reduction from the Investment-led Plan is modelled to be higher than the CAZ Benchmark, although the spatial distribution of benefits is broadly similar between the two scenarios with a higher concentration of benefits located in the Regional Centre.
Noise	<ul style="list-style-type: none"> • In both scenarios, there is expected to be a low positive noise impact from the GM CAP measures. The upgrade to newer and quieter vehicles, particularly zero emission buses, taxis and hybrid taxis, is expected to result in some low positive

Impact	Assessment
	<p>localised impacts. The spatial distribution of these impacts is expected to be experienced in the Regional Centre and the most in both scenarios, aligning with the distribution of bus and taxi operations in addition to affected vehicles associated with the Regional Centre CAZ.</p> <ul style="list-style-type: none"> • Similar to the 'amenity' benefit scoring, the anticipated benefit from both scenarios is expected to be small.
<ul style="list-style-type: none"> • Public Accounts 	
Capital costs	<ul style="list-style-type: none"> • The capital cost for both scenarios cover the development and implementation costs associated with the proposals in addition to the cost to deliver the measures. The CAZ Benchmark consists mostly of supporting vehicle mitigation funding whereas the Investment-led also provides funding for local highway measures and new ZEB and supporting infrastructure. • As the costs have been used to inform the scenario cost effectiveness, and not compared against monetised benefits in this submission, the costs have not been discounted to 2010 prices. The costs presented in this submission reflect current (2023) prices. • The capital cost for the Investment-led Plan (£97.4 million) is less than the CAZ Benchmark costs (£115.2 million) These figures are also inclusive of a 5% contingency allowance across the total cost of each scenario.
Operating costs	<ul style="list-style-type: none"> • The operating costs for each scenario comprise of costs to operate the vehicle fund, decommissioning costs, CAZ revenues (where relevant) and CAZ service termination fees (where relevant). Whilst the CAZ Benchmark is forecast to deliver an income through daily charge and penalty revenues, the income is outweighed by the operating cost expenditure to manage the operating body for the zone, CAZ office service costs, penalty enforcement costs, signage costs etc. • As the costs have been used to inform the scenario cost effectiveness, and not compared against monetised benefits in this submission, the costs have not been discounted to 2010 prices. The costs presented in this submission reflect current (2023) prices. • The operating cost for the Investment-led Plan, consistent with the capital costs, are expected to be less (£27.0 million) compared to the CAZ Benchmark scenario (£42.2 million)

6.3 Value for Money Summary

6.3.1 Crucially, the Green Book states that only scenarios that deliver on the SMART Objectives should be considered as representing VfM. For the GM CAP, the SMART Objectives are taken as the Determining and Primary Success Factors, in terms of NO₂ compliance. The first step in demonstrating VfM for any scenario is therefore to demonstrate compliance in the shortest possible time. The Investment-led Plan, as demonstrated in **Section 4.5**, passes this test and responds directly to the legal Direction placed on the 10 GM local authorities. The CAZ Benchmark, however, fails to meet this test and is not modelled to achieve compliance in the shortest possible time and by 2026 at the latest with two exceedance sites modelled to remain in 2026.

- 6.3.2 Based on scenario costs, the Investment-led Plan is forecast to be delivered at a lower cost (£124.4 million) compared to the CAZ Benchmark (£157.5m) with higher vehicle upgrade funding and administration costs, development and implementation costs, and operational and decommissioning costs associated with the CAZ Benchmark scenario.
- 6.3.3 Both scenarios are anticipated to generate low journey time performance and amenity benefits. Both scenarios comprise provision of financial support to upgrade to a newer fleet and is modelled to result in some minor, localised re-routing, with the Investment-led Plan re-routing associated with local measures. Across the qualitative assessment, the Investment-led Plan is considered to score either similar or better compared to the CAZ Benchmark. There are no instances where the CAZ Benchmark is shown to score higher compared to the Investment-led Plan.
- 6.3.4 Taking account of the primary CSFs in the context of the expected scenario benefits in addition to anticipated economy, social and environmental benefits from an Investment-led Plan and the CAZ Benchmark weighed against the forecast costs of both scenarios, the Investment-led Plan would deliver a higher VfM relative to the CAZ Benchmark scenario. Given that the Investment-led Plan delivers the primary aim of achieving air quality compliance in the shortest possible time and has been previously identified as the lowest cost scenario to do so, it is therefore considered to represent VfM.

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7 Equality Impacts

7.1 Equality Impacts Approach

- 7.1.1 The GM Authorities have undertaken a high-level assessment to understand the likely equality impacts from the Investment-led Plan and CAZ Benchmark scenarios appraised as part of this submission. The assessment draws on findings of previous iterations of Equality Impact Assessment (EqIA) and uses data, insights and findings from the Previous GM CAP consultation and engagement activity.
- 7.1.2 The assessment was carried out to enrich the submission of additional evidence with consideration of the likely disproportionate or differential impacts of each scenario. These impacts can be classed as positive or negative. This exercise has not been undertaken as part of the requirements of a formal EqIA which will be carried out on the implemented scheme, subject to government feedback, as part of the materials to be prepared for a public consultation.
- 7.1.3 The assessment considers the impact on the nine protected characteristics identified by the Equality Act 2010, including: age, disability, sex, gender reassignment, race / ethnicity, married / civil partnership, pregnancy and maternity, religion / belief, and sexual orientation. In addition, the majority of the 10 GM local authorities also consider additional characteristics within their agreed approach to the EqIA process. These are: low-income households, carers, veterans and homeless. These groups have been considered in this high-level assessment.

7.2 Equality Impacts Assessment

- 7.2.1 The EqIA finds that individuals with the following protected characteristics are likely to be differentially or disproportionately impacted by either scheme scenario:
- Age – very young children, young people and older people.
 - Disability – those with mobility, communication or learning impairments, individuals with long-term health conditions, particularly those related to respiratory problems or stamina/breathing/fatigue.
 - Sex – males likely to be disproportionately affected by both scheme scenarios.
 - Race – individuals from a minority ethnic background are likely to be directly, indirectly and disproportionately impacted by both scheme scenarios.
 - Religion/belief – individuals of Hindu, Muslim and Sikh faith are likely to be indirectly but disproportionately impacted by both scheme scenarios. This is as a result of intersecting identity with race/ethnicity.
 - Pregnancy/maternity – expectant mothers likely to be disproportionately impacted by both scheme scenarios.

- Further characteristics – it has been identified that people in low-income households and carers are highly likely to be disproportionately impacted by both GM CAP scenarios.

7.2.2 **Table 7-40** and **Table 7-41** consider the impacts of each scenario on the protected characteristic groups in addition to those which have been identified as likely to be disproportionately impacted by the GM CAP (low-income households and carers).

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Table 7-40 Investment-led Plan Impacts

Protected Characteristic	Positive Impact	Adverse Impact	Comment
Age	Yes	Yes	Prevalence of taxi trade in 55+ category. Risk to affordability posed by cost gap between funds and vehicle price. Older people and young children disproportionately benefit from improvements to air quality.
Sex	Yes	Yes	Majority of individuals in scope for funds likely to be male. Benefit from funds but face impacts to affordability by cost gap.
Disability	Yes	None	People with certain disabilities (particularly if these relate to respiratory problems) are likely to be more sensitive to changes in air quality and will benefit more quickly from improvements in air quality. Investment-led Plan can be delivered sooner than CAZ Benchmark, reducing exposure to harmful pollutants.
Ethnicity	Yes	Yes	Areas of poor air quality in GM often correlate with low-income communities. These communities often have greater populations of people from minority ethnic backgrounds ⁴⁰ . Prevalence of ethnic minority background among taxi trade. Benefit from funds but face impacts to affordability by cost gap.
Religion / faith	Yes	Yes	Intersectionality with ethnicity. Individuals of Sikh, Muslim and Hindu faiths face similar impacts.
Pregnancy / maternity	Yes	None	Expectant parents benefit disproportionately to improvements in air quality.
Low-income	Yes	Yes	Link between low-income households and living in areas of poor air quality. Disproportionate benefit from improvements to air quality. Low-income vehicle owners face additional difficulty upgrading vehicles.
Carers	Yes	None	Carers likely to be older – disproportionate benefit from improvements in air quality. Likely to be low-income and reliant on public transport and taxi.

⁴⁰ The Next Level: Good Lives for All in Greater Manchester (greatermanchester-ca.gov.uk) Figure 5: Overlapping geographical inequalities in GM shows correlation between deprived communities and higher concentrations of residents from an ethnic minority background.

Table 7-41 CAZ Benchmark Impacts

Protected Characteristic	Positive Impact	Adverse Impact	Comment
Age	Yes	Yes	Older people and young children disproportionately benefit from improvements to air quality. Prevalence of taxi trade in 55+ category – disproportionate financial impact of charging and the cost of upgrade.
Sex	Yes	Yes	Majority of individuals in scope for funds likely to be male. Benefit from funds but face impacts to affordability by cost gap.
Disability	Yes	Yes	People with certain disabilities (particularly if these relate to respiratory problems) are likely to be more sensitive to changes in air quality and will benefit more quickly from improvements in air quality. Likely to be reliant on public transport, taxi and community transport. Also at risk of being impacted by costs of travel incurred by CAZ Benchmark.
Ethnicity	Yes	Yes	Areas of poor air quality in GM often correlate with low-income communities. These communities often have greater populations of people from minority ethnic backgrounds ⁴¹ . However, CAZ Benchmark likely to be delivered later than Investment-led Plan. Prevalence of ethnic minorities among taxi trade. Ethnic minorities likely to rely on public transport – additional cost to customer passed down from CAZ Benchmark will disproportionately impact this group.
Religion / faith	Yes	Yes	Intersectionality with ethnicity. Individuals of Sikh, Muslim and Hindu faiths face similar impacts.
Pregnancy / maternity	Yes	None	Expectant parents benefit disproportionately to improvements in air quality. However, CAZ Benchmark delivered later than Investment-led Plan, exposing individuals to pollutants for longer.
Low-income	Yes	Yes	Low-income households likely to live in areas of poor air quality and disproportionately benefit from improvements. However, CAZ Benchmark scheduled for later delivery. Low-income owners of non-compliant vehicles face additional financial impact from charging and cost gap.
Carers	Yes	Yes	Carers likely to be older – disproportionate benefit from improvements in air quality. Individuals likely to be low-income and reliant on public transport and taxi. At risk of costs incurred as a result of the CAZ Benchmark.

⁴¹ The Next Level: Good Lives for All in Greater Manchester (greatermanchester-ca.gov.uk) Figure 5: Overlapping geographical inequalities in GM shows correlation between deprived communities and higher concentrations of residents from an ethnic minority background.

7.3 Equalities Impacts Summary

7.3.1 Based on the high-level assessment conducted on both scenarios, the impact on individuals with protected characteristics can be consolidated into three key themes. They are:

- Air quality – certain protected characteristics groups are likely to benefit disproportionately to improvements to air quality (age, disability, ethnicity, faith, pregnancy/maternity).
- Affordability – disproportionate impacts identified for those in certain age groups, sex, ethnicity, religion/faith & low-income groups.
- Wider impacts – disproportionate impact identified for individuals with disabilities, young and older people and individuals from ethnic minority background. E.g. potential impact of the CAZ on using public transport or taxi services.

7.3.2 From an equality perspective, the Investment-led Plan would deliver an air quality improvement that benefits individuals with protected characteristics. An air quality improvement is likely to be faster for the Investment-led Plan than the CAZ Benchmark due to the former achieving compliance earlier and being able to implement the Plan earlier.

7.3.3 Under the Investment-led Plan, the adverse financial impact on protected characteristic groups is to a lesser extent than the CAZ Benchmark.

7.3.4 The Investment-led Plan reduces the risk to health, jobs, livelihoods and businesses compared to a CAZ Benchmark.

8 Comparative Appraisal Summary

8.1 Appraisal Approach

- 8.1.1 As set out in **Section 3**, the appraisal approach has considered: an Investment-led Plan and a Regional Centre Class C CAZ, or CAZ Benchmark, using government's CSFs.
- 8.1.2 **Section 4** sets out the measures which underpin the Investment-led Plan including the Plan's appraisal against the CSFs. **Section 5** outlines the CAZ Benchmark with the associated CSF appraisal. This section provides a comparative appraisal between the two scenarios and provides JAQU with a clear framework to provide the GM Authorities with an instruction to proceed to implement either scenario following public consultation.

8.2 Appraisal Findings

- 8.2.1 For consistency, the below CSF appraisal, as shown in **Table 8-42**, has been conducted based on scoring of each scenario, based on professional judgement, against the scale criteria as set out by JAQU Option Appraisal Guidance and consists of the following two criteria:
- Determining Success Factor: Scored based on a Pass/Fail criteria.
 - Primary & Secondary Success Factor: Scored based on a four-point scale as follows:
 - ✓✓ Excellent
 - ✓ Good
 - - Satisfactory or no score
 - × Poor

Table 8-42 CSF Appraisal Summary

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM. The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO ₂ concentrations in 2026.
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme). The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.
The greatest reduction in NO ₂ concentrations at the roadside in each year prior to compliance being achieved?	N2	✓	x	AQ benefits from the deployment of cleaner (OEM Euro VI and zero emission) buses are planned to be delivered incrementally prior to 2025 which captures benefits ahead of the modelled full year compliance in 2025 for the Investment-led Plan. The different components of the local measures will deliver benefits ahead of 2025 alongside funding for taxis which is scheduled to be opened prior to 2025. The CAZ Benchmark 's realistic programme assumption to open the funds in June 2025 and 'go-live' with the zone in December 2025 will delay air quality benefits from this scenario beyond those accrued under an Investment-led Plan.
Compliance without putting other sites closer to exceedance (defined as concentrations of 38-40 µg/m ³) than without action?	N3	✓	✓	The Investment-led Plan is modelled to deliver compliance without putting other sites into exceedance. The implementation of ZEBs on routes past remaining exceedance sites are new to purchase and are not being redeployed from existing services elsewhere in GM. There is some local re-routing associated with the implementation of the local highway measures which inherently are modelled to cause some rerouting to reduce flow and speeds past the areas of remaining exceedance. The CAZ Benchmark is modelled to result in some minor rerouting for trips through the Regional Centre albeit the volumes are modelled to be minor.

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM. The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO ₂ concentrations in 2026.
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme). The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.
Feasibility Are the Measures proposed within the legal powers of the GM Authorities?	F1	✓✓	✓✓	The GM Authorities have the relevant legal powers to implement either scenario.
Can a governance route be developed to enable timely local government joint working as required for delivery?	F2	✓	✓	The GM Authorities have proposed a governance route that facilitates the local government co-operation required for delivery of both scenarios. Bus franchising is being rolled out across GM from September 2023 and the necessary governance arrangements are in place and live for the deployment of Euro VI and ZEB based on GM's requirements.
What is the likelihood of the Measures being effective?	F3	✓✓	✗	Only the Investment-led Plan measures are modelled to be effective and achieve compliance in the shortest possible time and by 2026 at the latest. Certainty of modelled compliance is being provided through GM's ability to specify particular buses on remaining exceedance locations through bus franchising, The GM Authorities are to implement targeted local highway measures and implementation of a consistent emission standard for GM-licensed taxis.

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	<p>The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM.</p> <p>The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO₂ concentrations in 2026.</p>
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	<p>The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme).</p> <p>The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.</p>
				<p>Conversely, the modelled results for the CAZ Benchmark show that this scenario is not effective in achieving the requirements of the Direction.</p>
Is delivery of the scenario subject to significant risks that make achieving compliance in the shortest possible time less likely?	F4	✓	✗	<p>The Investment-led Plan is aligned with GM strategic politically endorsed plans. There are risks associated with the delivery of electrification of depots, availability of ZEBs, LTM delivery at A57 Regent Road and A34 Quay Street and modelling uncertainties. These are set out in Section 4.8 and supporting mitigation and risk minimisation strategies have been identified.</p> <p>The CAZ Benchmark test has failed to produce modelled compliance by 2026. It is considered that the CAZ Benchmark cannot realistically be operational until December 2025 and does not achieve compliance.</p>
Secondary Success Factors				
Strategic fit with local strategies and plans Air quality and climate change	S1	✓✓	✓	<p>Both the Investment-led Plan and the CAZ Benchmark are modelled to deliver improvements in NO₂ concentrations, and also reduce PM and greenhouse gas emissions. However, the CAZ Benchmark fails to deliver the requirements of the Direction.</p>

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM. The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO ₂ concentrations in 2026.
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme). The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.
Transport	S2	✓✓	-	The Investment-led Plan acts to promote sustainable travel and will deliver a cleaner, newer bus and taxi fleet for GM passengers. The CAZ Benchmark acts to promote more environmentally friendly travel and will deliver incentives to upgrade HGVs, LGVs, taxis, coaches and minibuses that would otherwise be subject to a Daily Charge albeit the impact of the Daily Charge on impacted vehicles is not fully mitigated by the supporting funding.
Growth	S3	✓	-	The Investment-led Plan does not seek to impose charges on users which could restrict growth being brought forward by nine of the 10 GM local authorities via the Places for Everyone Joint Development Plan and Stockport's Local Plan. There is a risk that investment is deterred in the Regional Centre under the CAZ Benchmark associated with the impact of a charge for non-compliant vehicles.
Economy	S4	✓	-	The Investment-led Plan is not considered to have a negative impact on the economy. The implementation of a consistent emission standard across the 10 GM local authorities would require taxi owners and operators to respond to continue operating in GM, licensed to a GM local authority. However, the CTF measure does provide financial support for those upgrading to compliant vehicles.

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	<p>The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM.</p> <p>The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO₂ concentrations in 2026.</p>
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	<p>The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme).</p> <p>The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.</p>
				There is a risk that the CAZ Benchmark could affect economic performance by adding an additional financial burden for some businesses.
Value for money Estimated value for money of the scenario compared to the risk of inaction	V1	-	x	<p>It would be more cost effective to not provide financial support to buses and taxis and defer to natural upgrade cycles however this would result in GM not meeting the requirements of the Direction. The Investment-led Plan scenario achieves compliance in 2025 unlike the CAZ Benchmark scenario which fails to achieve compliance in 2025 or 2026.</p> <p>The CAZ Benchmark would generate revenues through daily charges on non-compliant vehicles travelling through the Regional Centre however this is expected to be outweighed by the costs to implement and operate this scenario.</p> <p>Costs to implement and manage both scenarios are higher than the expected quantifiable benefits however this is not the determining factor compared to the risk of inaction.</p>
Distributional impact Health benefits	Q1	✓✓	✓	All groups will experience health benefits from the scenarios. Those living in areas with the worst air quality and those most vulnerable to the effects of poor air quality will benefit the most. The health

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Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	<p>The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM.</p> <p>The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO₂ concentrations in 2026.</p>
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	<p>The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme).</p> <p>The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.</p>
				<p>benefits of the Investment-led Plan are likely to be more spatially distributed across the 10 Authority areas compared to the CAZ which is believed to concentrate the air quality benefits within the Regional Centre, aligned to the scenario's boundary.</p> <p>Under the Investment-led Plan, there is also expected to be a disproportionately higher benefit from those living in the Regional Centre through the operating patterns of buses and taxis.</p>
Accessibility (in terms of journey time and connectivity to opportunities and services)	Q2	-	-	<p>The Investment-led Plan does not have a material impact in relation to accessibility. At a local level, accessibility for residents in and around the Regent Road and Quay St areas could be impacted, depending upon design solution taken forward.</p> <p>The CAZ Benchmark is modelled to have limited rerouting for trips passing through the Regional Centre. However, this has been minimised based on the CAZ boundary to border the insider of the Manchester and Salford Inner Ring Road.</p>
Affordability (for users)	Q3	✓	✗	<p>The Investment-led Plan does not impose charges on users and is therefore considered to not have an adverse affordability impact. There is a small adverse impact on non-compliant taxi owners and operators as a result of the proposed consistent emission standards, however, this is expected to be balanced by</p>

Success Factor	Cod e	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	<p>The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM.</p> <p>The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO₂ concentrations in 2026.</p>
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	<p>The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme).</p> <p>The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.</p>
				<p>the provision of funding to support upgrades to all affected vehicles and additional funding to support compliant ICE Hackney Carriages to upgrade to cleaner, ZEC vehicles.</p> <p>The CAZ Benchmark would include a Daily Charge on non-compliant vehicles in the Regional Centre and therefore has an adverse impact on user affordability as supporting mitigation funding does not fully cover the impact of upgrading to a compliant vehicle.</p>
Impact on the local economy – considering low income workers, small businesses, town centres and key sectors	Q4	✓	✗	<p>The Investment-led Plan does not impose charges on users and is therefore considered to not have an adverse impact on the local economy, workers and users.</p> <p>The CAZ Benchmark includes a Daily Charge which is likely to disproportionately impact low income workers and small businesses, particularly those who require vehicle access to the Regional Centre on a frequent basis.</p>
Impact on the quality of life of local residents and on equalities	Q5	✓	-	<p>Both scenarios are modelled to provide air quality benefits and reduce human exposure to NO₂, leading to improvements in physical health. The CAZ Benchmark disproportionately benefits the Regional Centre whilst having a negligible impact to outer sites. Conversely, the Investment-led Plan is anticipated to have</p>

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	<p>The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM.</p> <p>The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO₂ concentrations in 2026.</p>
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	<p>The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme).</p> <p>The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.</p>
				<p>a more dispersed impact across GM albeit retaining a higher Regional Centre benefit associated with the operating patterns of taxis and buses.</p> <p>The Investment-led Plan is modelled to deliver compliance with the Direction in 2025 and thus has a higher beneficial impact on the quality of life of local residents and equalities compared to the CAZ Benchmark which fails to achieve compliance by 2026.</p>
Deliverability The Affordability of the cost of implementation (for the public sector)	D1	-	×	<p>Whilst the Investment-led Plan is modelled to achieve the core objectives, it is estimated that £23.9m of additional funding will be required from government based on the previously awarded funding amount.</p> <p>The CAZ Benchmark would include revenues from the CAZ which would contribute towards the operating costs of the CAZ. The CAZ boundary is based on a different geography (Regional Centre as opposed to GM-wide) to the Previous GM CAP and thus, there are additional signage and camera requirements which cannot be utilised from the Previous GM CAP. It is estimated that £57.0m of additional funding will be required from government based on the previously awarded funding.</p>

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM. The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO ₂ concentrations in 2026.
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme). The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.
				Whilst the costs of each scenario are above the total of the previous funding award by JAQU, minus the committed funding, the Investment-led Plan is cheaper than the CAZ Benchmark.
The Supply-side capacity and capability to deliver the Measures outlined in the scenario	D2	-	-	There are some concerns about supply side capacity within the taxi sector, particularly on the availability of second-hand Hackney Carriages which impacts both the Investment-led Plan and CAZ Benchmark. The GM Authorities have certainty on the ability to procure ZEBs to operate at remaining exceedance locations however there is an availability risk around the quantify of vehicles that the GM Authorities are seeking to procure.
The Achievability of delivering the scenario, considering issues such as difficulty with scale or obtaining resources to implement and operate a Measure/ scenario	D3	✓	-	The Investment-led Plan comprises of three core measures. They are: bus measures, taxi measures and local highway measures. <ul style="list-style-type: none"> The bus measures form part of the implementation of bus franchising across the city-region and it is considered that the number and distribution of ZEBs required can be delivered within the required timescales. However, delivery of ZEBs is contingent on both the availability of a sufficient number of ZEBs and the electrification of depots to provide the necessary EV charging infrastructure.

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	<p>The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM.</p> <p>The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO₂ concentrations in 2026.</p>
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	<p>The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme).</p> <p>The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.</p>
				<ul style="list-style-type: none"> The taxi measures comprise of provision of financial support to non-compliant, GM-licensed vehicle owners and the implementation of a consistent emissions standard across the 10 GM local authorities for all vehicles by the 31st December 2025. There is a risk that non-compliant taxis, licensed to a GM local authority, could re-license to a non-GM local authority to continue to operate their non-compliant vehicle. This risk is only associated to PHVs which have the ability to operate outside of their licensed authority. However, the provision of financial support to help non-compliant taxi owners upgrade provides mitigation and the incentive is likely to be attractive for vehicle owners to potentially bring forward their vehicle upgrade outside of their natural upgrade cycle. The local highway measures comprise of changes to speed limits, junction signals and measures to reduce through traffic. These measures are being delivered by Manchester and Salford Local Authorities and Urban Traffic Control. A delivery programme is being confirmed with the lead parties and there is an associated delivery risk with this. <p>The CAZ Benchmark is considered to be deliverable on the basis of the GM Authorities' prior knowledge of the scheme and ability to procure the necessary services/agree contracts. However, fundamentally, the CAZ Benchmark does not achieve compliance with the Direction. Furthermore, based on schedule estimates, the CAZ Benchmark cannot realistically be implemented until the end December 2025.</p>

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO ₂ concentrations in the shortest time?	C1	Pass	Fail	The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM. The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with two sites modelled to remain in exceedance with the legal limits of NO ₂ concentrations in 2026.
Primary Success Factors				
Reduction in NO₂ emissions Which scenario delivers... The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 12 in the Do Minimum (without scheme). The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 12 to 8; however, compliance is not achieved across all sites and the estimated realistic 'go-live' date is not until December 2025, limiting potential reductions in human exposure.

8.3 Appraisal Summary

- 8.3.1 The appraisal demonstrates that the Investment-led Plan is considered to perform better against the CSFs than the CAZ Benchmark modelled as part of this submission. Fundamentally, the Investment-led Plan meets the requirements of the Determining CSF:- compliance in the shortest possible time- by delivering compliance in 2025. By contrast, modelled compliance is not achieved in either 2025 or 2026 under the CAZ Benchmark which thus fails against the Determining CSF.
- 8.3.2 The Investment-led Plan performs better than the CAZ Benchmark against the Primary CSFs in that it delivers greater reductions in NO₂ exceedances in each year, and does so earlier than the CAZ Benchmark. However, both the Investment-led Plan and the CAZ Benchmark are considered to be feasible on the basis that the GM Authorities have the relevant legal powers and a clear governance route to implement either scenario (drawing on prior knowledge, in respect of the CAZ and the vehicle funds, assembled from the development activity undertaken on the Previous GM CAP).
- 8.3.3 The Investment-led Plan also performs better than the CAZ Benchmark against the Secondary CSFs. It is a better strategic fit in terms of air quality and climate change (delivering greater air quality benefits), transport (providing additional ZEBs that will continue to give benefits after compliance is achieved), growth and economy (by not imposing charges on users it removes the risk of restricting growth or damaging businesses). It is better VfM than the CAZ Benchmark, delivering better air quality benefits at a lower cost, and its distributional health benefits, affordability for users and quality of life impacts are preferable to the CAZ Benchmark. Finally, the Investment-led Plan is considered more affordable and therefore more deliverable than the CAZ Benchmark.

9 Next Steps

- 9.1.1 In discussions with government, it has been identified that there may be further technical assessment outputs to be submitted to government following this submission. This includes the reporting of sensitivity testing to test the robustness of the scenarios.
- 9.1.2 The GM Authorities will not conduct any public consultation until it has received government feedback, and the 10 GM local authorities will work to develop the supporting material required to consult on the plan it is directed by government to implement, such as undertaking a full EQIA.
- 9.1.3 The requirement for statutory consultation on the Previous GM CAP arose as a consequence of the use of Transport Act 2000 powers for road user charging and therefore the Investment-led Plan would not require statutory consultation. However, in line with the principles for the review outlined by the GM Authorities in July 2022⁴² to take account of views on elements of the GM Authorities' proposals, it is proposed that broad public engagement on the Investment-led Plan will be undertaken in line with good local authority practice, to ensure impacts are understood, and in particular to inform the ongoing equality impact analysis.
- 9.1.4 To implement the directed plan, the GM Authorities recognise that they will need to work closely with government to agree the requirements to monitor the effectiveness of the measures, defined in a PMP, Monitoring and Evaluation Plan and an adaptive planning process if alterations to the directed plan post-implementation are required.
- 9.1.5 Under an Investment-led Plan, some of the ANPR cameras procured as part of the Previous GM CAP would be used to monitor and evaluate the effectiveness of the scheme. GM wants to work with government to agree the use of the cameras for potential law enforcement activity related to the detection of crime, subject to the consideration of the outcome of public consultation.

⁴² <https://democracy.greatermanchester-ca.gov.uk/documents/b13130/GM%20Air%20Quality%20Administration%20Committee%20-%20Complete%20Pack%2001st-Jul-2022%2012.00%20Greater%20Manchester%20Air.pdf?T=9>