

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

Approach to Address Persistent Exceedances Identified on the A58 Bolton Road, Bury



Salford City Council



Oldham Council



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Version Status:	DRAFT FOR APPROVAL	Prepared by:	Transport for Greater Manchester on behalf of the 10 Local Authorities of Greater Manchester
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Date:	January 2023		

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1 Introduction and Context

1.1 Purpose of Report

1.1.1 This report outlines Greater Manchester's approach to address persistent exceedances of nitrogen dioxide identified on the A58 Bolton Road, Bury, setting out the results of modelling carried out in October to December 2022 to forecast air quality in Greater Manchester (GM) in future years. However, it specifically addresses the exceedances predicted at the A58 Bolton Road, Bury.

1.1.2 It has been produced in response to a request from Rebecca Pow, Minister for Environmental Quality and Resilience, on 26 January 2023, which asked the Greater Manchester Authorities to:

“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.”

1.2 Background

1.2.1 The Government has instructed many local authorities across the UK to take quick action to reduce harmful roadside levels of Nitrogen Dioxide (NO₂) following the Secretary of State (SoS) for Environment, Food and Rural Affairs issuing a Direction 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 in the “shortest possible time”. In Greater Manchester, the 10 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).

1.2.2 In March 2019 the GM Authorities agreed the submission of the Outline Business Case (OBC) that proposed a package of measures that was considered would deliver compliance in Greater Manchester in the shortest possible time, at the lowest cost, least risk and with the least negative impacts. This involved a Charging Clean Air Zone Class C with additional measures.

1.2.3 In July 2019 the SoS issued a Direction under section 85 of the Environment Act 1995 requiring the 10 Greater Manchester local authorities to implement the local plan for NO₂ compliance for the areas for which they were responsible, including a Charging Clean Air Zone Class C with additional measures, but with an obligation to provide further options appraisal information to demonstrate the applicable class of Charging Clean Air Zone and other matters to provide assurance that the local plan would deliver compliance in the shortest possible time and by 2024 at the latest.

- 1.2.4 The SoS subsequently issued a Direction to the ten Greater Manchester local authorities in March 2020 that required them to take steps to implement the 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.
- 1.2.5 A statutory consultation on the proposals took place in Autumn 2020.
- 1.2.6 The GMCA – Clean Air Final Plan report on 25 June 2021¹ endorsed Greater Manchester’s Final CAP and policy 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.
- 1.2.7 On 20 January 2022, the GM Air Quality Administration Committee considered the findings of an initial review of conditions within the supply chain of Light Good Vehicles (LGVs) in particular, which were impacting the availability of compliant vehicles. The Committee agreed that a request should be made to the SoS to pause opening of the next phase of Clean Air Funds to enable an urgent and fundamental joint policy review with Government to identify how a revised policy can be agreed to deal with the supply issues and local businesses’ ability to comply with the GM CAP.
- 1.2.8 On the 8 February 2022 a new Direction was issued by the SoS that confirmed that the March 2020 Direction to implement a Class C charging Clean Air Zone (CAZ) had been revoked and required that proposals for a new plan be submitted to the SoS by 1st July 2022, which should:
- 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.
- 1.2.9 The Direction also states that compliance with the legal limit value for nitrogen dioxide should be achieved in the shortest possible time and no later than 2026 and exposure to levels above the legal limit for nitrogen dioxide is reduced as quickly as possible.
- 1.2.10 Within this document, this new plan, and any subsequent further development of the new plan, is referred to as the New GM CAP.

¹ Also considered by the Greater Manchester authorities through their own constitutional decision-making arrangements.

1.3 New GM CAP Objectives

1.3.1 In July 2022, the Greater Manchester Authorities submitted the Case for a New GM CAP² to the Secretary of State. The core objectives of the New GM CAP are threefold:

- To reduce NO₂ concentrations to below the legal limits in the shortest possible time and by 2026 at the latest;
- To 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
- To ensure the reduction of harmful emissions is at the centre of GM's wider objective for delivering the Bee Network's³ core objectives.

1.3.2 The New GM CAP takes an investment-led, non-charging, approach that aims to encourage upgrade to cleaner vehicles, leading to better air quality. This will be facilitated by providing funding packages to the most polluting vehicles travelling in locations experiencing NO₂ exceedances.

1.3.3 The core objectives address the legal requirement on GM local authorities to achieve compliance in the shortest possible time and by 2026 at the latest. However, this is balanced with achieving compliance in-line with GM's wider transport objectives and in a way which will not damage business or cause financial hardship, especially in light of the ongoing impacts of the COVID-19 pandemic on vehicle availability and the challenging inflationary economic climate.

1.4 A58 Bolton Road, Bury

1.4.1 The GM CAP addresses NO₂ exceedances at the roadside that can be found in all ten Greater Manchester Authorities. This large spatial area contains a variety of locations of persistent poor air quality, caused by a range of differing circumstances. Whilst the exceedances located close to the Regional Centre can be aligned to some form of charging CAZ, this is not the case for the A58 Bolton Road, Bury.

1.4.2 The A58 Bolton Road, Bury, is a dual carriageway over the River Irwell, serving traffic from the confluence of the A58, B6196 & B6213 roads to and from the Bury town centre ring road. The contribution from HGVs is low on this link, with the majority of emissions derived from private cars and LGVs. However, there is also a material proportion of emissions from diesel buses.

² [Appendix 1 - Case for a new Greater Manchester Clean Air Plan.pdf \(ctfassets.net\)](#)

³ The Bee Network is a vision for GM to deliver an integrated London-style transport system. The transport system will see buses, trams, rail as well as cycling and walking being joined together to revolutionise travel across the city-region.

1.4.3 Analysis conducted at the Outline Business Case⁴ stage showed that very little of the traffic on the A58 was entering Bury town centre, but rather the bridge is serving east-west traffic movements and access to the strategic road network even though this is located many miles away.

1.5 Minimum vehicle emission standards for the GM CAP

1.5.1 The Government's Clean Air Zone Framework⁵ sets out minimum emission standards when a charging Clean Air Zone is developed as part of a local plan to reduce NO₂ to compliant levels. In the development of the New GM Clean Air Plan, GM is following these standards to ensure that it is providing funds to support investment in vehicle upgrades to meet those standards that will achieve real air quality benefits and so that the GM CAP is consistent with other clean air schemes within the UK.

1.6 Mechanisms to improve emissions standards

1.6.1 The Government's Clean Air Zone framework outlines that authorities should explore all possible routes to reduce emissions from buses, taxis and PHVs through existing non-charging routes, for example using licensing standards, or working with bus operators through any of the new mechanisms in the Bus Services Act 2017 to raise the emission standards of vehicles entering the area. Adopting this approach, the following steps have been taken:

1.6.2 **Taxi⁶ Standards** – The Greater Manchester authorities have collectively developed a common set of Minimum Licensing Standards (MLS) for Hackney carriages and private hire services that cover the whole of GM. The MLS complement the GM Clean Air Plan, as MLS requires that vehicle emission standards meet the Government's CAZ framework standards.

1.6.3 **Bus Franchising** – Buses are being brought under local control and will be run by Transport for Greater Manchester (TfGM), on behalf of Greater Manchester Combined Authority (GMCA), in the biggest change to public transport in the city-region in over 30 years.

⁴

https://assets.ctfassets.net/tlpgbvy1k6h2/uCbNfiDpTY49uAUTFEzVO/b3ae7ceb4e8be0dcb36008fa4939ce9/Options_Appraisal_Report.pdf

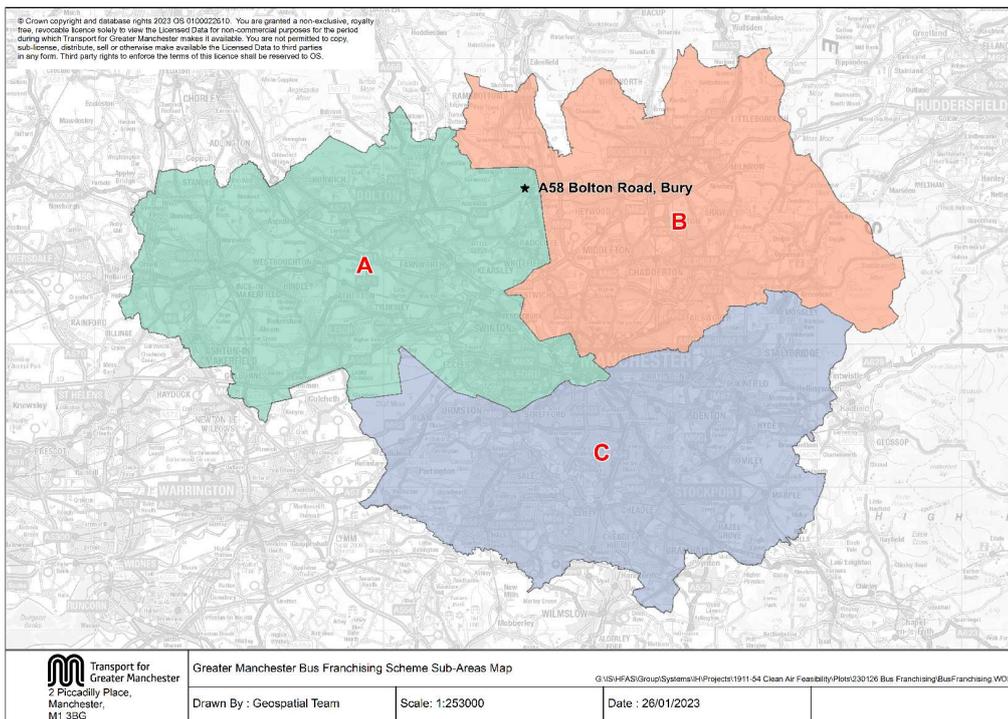
⁵ <https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england/clean-air-zone-framework>

⁶ There are two types of vehicles that the general public call "taxis"

- Hackney carriages are licensed to pick up people who wave for the vehicle to pull over and stop at the roadside or from an authorised taxi rank. Hackney carriages are often purpose built "black cabs" but don't have to be (depending on local policy) and they may also do pre-booked work.
- Private hire vehicles (PHVs) are only permitted to pick people up via a pre-arranged booking. This might be over the phone, on the web or using an app based booking system. In this document, if referring to a specific vehicle type, "hackney carriage" or "private hire vehicle" will be used. If referring to this form of public transport generally, "taxi" will be used.

- 1.6.4 Under franchising, GMCA will coordinate the bus network and contract bus companies to run the services. This will enable GMCA to develop an integrated, multimodal public transport network that can meet the demands of both passengers and the city-region's economy.
- 1.6.5 Bus franchising will enable the integration of the bus network across bus services and with other modes of transport, significantly increasing the efficiency of the network. It will allow the introduction of integrated ticketing and a single, clear point of customer information. Critically for the GM CAP, it allows Greater Manchester to invest in buses with the confidence that they have control of the strategic delivery. Crucially, franchising allows TfGM to specify the vehicles to be used on the network.
- 1.6.6 The Franchising Scheme applies to the entire Greater Manchester area, which has, in turn, been divided into three franchising scheme 'sub-areas' (namely Franchising Scheme Sub-Areas A, B & C) to allow the transition from the existing deregulated market to a franchised model to take place over a period of time.
- Tranche 1 (Sub-Area A) will principally cover the north-west of Greater Manchester (operational start date of 24 September 2023),
 - Tranche 2 (Sub-Area B) will principally cover the north-east of Greater Manchester (operational start date of no later than 31 March 2024), and
 - Tranche 3 (Sub-Area C) will principally cover the south of Greater Manchester (operational start date of 5 January 2025).
- 1.6.7 The extent of each sub-area is set out in the map below, **Figure 1-1**. The electric buses that will be deployed to the A58 are all available as part of Tranche 1 and 2.

Figure 1-1 Greater Manchester Bus Franchising Delivery Areas



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2 JAQU Guidance

2.1 Overview

- 2.1.1 JAQU have published a range of guidance documents, detailing the methodology that local authorities are required to follow for the development of their Clean Air Plans.
- 2.1.2 The Options Appraisal Package guidance⁷ sets out that local authorities should compare their potential options against a benchmark of a 'suitable charging Clean Air Zone' (CAZ). The appraisal of the GM CAP included a range of CAZ options during its development, however the current preferred proposal is an investment-led, non-charging, Clean Air Plan.
- 2.1.3 The guidance also states that where a local authority believes a charging CAZ is likely to be unsuitable as the benchmark because they have appropriate evidence and rationale for this assessment they must provide this to JAQU. As part of the review process, JAQU will work with local authorities to agree a suitable benchmark option.
- 2.1.4 In the light of this guidance and the GM CAP's appraisal development to date, JAQU's technical team agreed that a charging CAZ is not an appropriate benchmark for the exceedances modelled at the A58 Bolton Road, Bury and that deployment of Zero Emission Buses is the only appropriate solution at this site.

2.2 A58 Bolton Road, Bury

- 2.2.1 As set out in Section 2 the A58 Bolton Road, Bury, is a dual carriageway over the River Irwell, serving traffic from the confluence of the A58, B6196 & B6213 roads to and from the Bury town centre ring road. There are modelled exceedances on both of the carriageways, but these essentially both represent the same traffic flows. The contribution from HGVs is low on this link, with the majority of emissions derived from private cars and LGVs. However, there is also a material proportion of emissions from diesel buses.
- 2.2.2 Analysis conducted during the Outline Business Case⁸ showed that very little of the traffic on the A58 was entering Bury town centre, but rather the bridge is serving east-west traffic movements and access to the strategic road network even though this is located many miles away.

⁷ JAQU, Options Appraisal Package Guidance, 2018

⁸ [Options Appraisal Report \(ctfassets.net\)](https://www.ctfassets.net)

2.2.3 GM has therefore concluded that a charging CAZ would be ineffective or inappropriate as a measure to tackle the exceedances at the A58. Applying a CAZ boundary to the town centre would impact relatively few vehicle movements, and therefore not cause the intended behaviour change. The alternative of placing a CAZ on the A58 exceedance location at the river crossing would lead to substantial vehicle re-routing, which is not considered a desirable response. As a result, a charging CAZ at this location is not considered further.

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3 Updates to the Do Minimum and CAP Measures Scenarios

3.1 Do Minimum Scenario Methodology

- 3.1.1 The modelling reported herein is generally consistent with the methodology approach set out in the Case for a New GM Clean Air Plan⁹ which was submitted to Government on 1 July 2022.
- 3.1.2 That report sets out how the relevant methodological changes have been reflected within the modelling to forecast the air quality without the GM CAP in place since the modelling was updated following the Summer 2021 consultation. The model incorporates impacts of the Covid-19 pandemic on air quality, and other changes that have been made to reflect the newest evidence on investment in ultra-low emission buses, as well as any other methodological changes that have been made to the 'Do Minimum' modelling methodology.
- 3.1.3 As part of the New GM CAP development following the July submission, the representation of transport schemes at the regional centre has been significantly updated to represent a number of schemes that have already been built or will be before 2025. However, these do not materially impact on the A58 Bolton Road, Bury, which is located approximately 15 miles to the north.

3.2 Modelled Scenarios:

- 3.2.1 The Do Minimum scenario (i.e. No GM CAP) represents what would be forecast to happen in the absence of all GM CAP proposals. In reality, this is overly pessimistic because funds for buses and HGVs have been available and successfully applied since these aspects of the GM CAP opened in 2021. This scenario is used to enable appraisal of the full impact of the GM CAP itself.
- 3.2.2 Incremental modelling has been undertaken to understand how the next available components of the GM CAP improve air quality. This includes the following scenarios which cumulatively build on the Do Minimum position:
- Increment 1: Clean Bus Fund;
 - Increment 2: Electric Bus; and
 - Increment 3: Taxi Minimum Licensing Standards.
- 3.2.3 Each scenario is set out in more detail subsequently, with the air quality modelling results provided in the next section.

⁹ Available at:

<https://assets.ctfassets.net/tlpgbv1k6h2/7jtkDc5AODypDQlw0cYwsl/67091a85f26e7c503a19ec7ae b2e8137/Appendix 1 - Case for a new Greater Manchester Clean Air Plan.pdf>

3.3 Increment 1: Clean Bus Fund Grants

- 3.3.1 The Clean Bus Fund (CBF) Grants scenario represents what is forecast to happen with incorporation of approved GM CAP CBF grants. The test is based upon the number of buses in each Greater Manchester operator's fleet where funding is available and vehicles could be retrofitted or replaced. The test was implemented assuming that all upgraded services would be compliant with Euro VI emission standards, with adjustments made to each specific operator's fleet mix to represent an increased proportion of newer (Euro VI) compliant buses running their service routes, so reducing forecast emissions.
- 3.3.2 For those buses in an operator's fleet where no upgrade support funding had been allocated (to either replace or retrofit), these buses were for the purposes of the modelling locked at their existing Euro standard age, because under the proposed New GM CAP there is no longer a proposed disincentive CAZ charge to encourage upgrade. This is 387 vehicles, out of the GM operator bus fleet of 2,313 buses. This is considered a pessimistic approach. These older non-compliant buses are more likely to be used on less profitable or lower frequent routes, which would be less likely to run along the last key links of compliance.
- 3.3.3 Under the CBF grants scenario, the percentage of GM route mileage operated by Euro VI compliant buses increased by approximately 25% relative to the Do Minimum (i.e. No GM CAP) scenario.
- 3.3.4 It should be noted that the approach for modelling the air quality impacts of the CBF scenario is somewhat different to that used for modelling buses in general in the do-minimum scenario, as information about the uptake of the CBF grants (and the resulting fleet mix) is only available at operator level, rather than service level as was the case for the majority of the bus services in the core do-minimum. Operator average fleet mix figures have therefore been applied when modelling traffic emissions for the CBF increment.
- 3.3.5 A potential consequence of this approach is that modelled emissions from buses may increase at selected sites (following the introduction of the CBF), as the forecast fleet mix is based on the average for the whole of the fleet for each operator, which has the potential to be older than the fleet mix for individual services as applied in the Core modelling. (This outcome is also associated with the assumption that the fleet mix for buses that do not upgrade will remain fixed, based on their existing Euro standard composition). Emissions contributions from buses at almost all sites do fall, however, as would be expected.

- 3.3.6 The air quality impacts of the changes to the bus fleet modelling methodology described above are likely to be small, with the possible exception of sites where emissions from buses predominate and where the operator average fleet mix is older than the service fleet mix used for the core modelling. This may, however, help to highlight sites where measures to target the local bus fleet mix might be necessary for the GM CAP, (possibly using licensing powers), to ensure that the cleanest vehicles in each operator's fleet are used on these routes.
- 3.3.7 Whilst it is not certain that all operators would now utilise an approved grant in the absence of a CAZ charge to penalise use of their non-compliant buses, many buses have already been upgraded and are on the road. Therefore, given known on-going CBF investment into bus fleets and the transition to bus franchising in GM, which can set emissions standards at service level, it is considered that this test is the most likely scenario to represent the nature of the air quality problem in GM after application of the CBF.
- 3.3.8 Bus Retrofit funding was confirmed as a continuation of Clean Bus Technology Funds and has been distributed since December 2020. The Greater Manchester Air Quality Administration Committee approved the establishment and distribution of the bus replacement funds on 21 September 2021. Grants have been made using the scheme eligibility criteria as set out in the 2021 GM Clean Air Plan Policy¹⁰ to impacted vehicle owners. To end of January 2023, the awards that have been made are shown in **Table 3-1**.

Table 3-1 Progress with Bus Retrofit and Replacement Delivery

Purpose	Value of Total Grant	Value Committed ¹¹	Value Paid out ¹²	Vehicles Upgraded
Bus Retrofit	£15,439,200	£15,121,000	£13,784,000	887
Bus Replacement	£3,248,000	£1,200,000	£1,104,000	69

- 3.3.9 In summary, the modelling for the CBF grant increment indicates that bus emissions are forecast to reduce 44% in 2025 compared to the updated Do Minimum forecast for that year, delivering localised improvements in air quality along bus routes and at sites with heavy bus flows. The results for Greater Manchester as a whole show that total NOx emissions from all vehicles combined are forecast to fall by approximately 3% relative to the new Do Minimum in 2025.

¹⁰ [GM Clean Air Plan Policy following Consultation](#)

¹¹ Value Committed is the value of the total number of applicants who have applied and have been awarded a grant

¹² Value Paid out is the value of the total number of grants paid out once a non-compliant vehicle has been traded in for a compliant vehicle and is on the road.

3.4 Increment 2: Full electric bus fleet test

- 3.4.1 Electric buses can be very effective at reducing road traffic emissions, especially at sites with high bus flows. The purpose of this test was to investigate the air quality impacts that investments in electric buses could deliver on key routes, beyond Euro VI diesel models.
- 3.4.2 The City Region Sustainable Transport Fund Settlement (CRSTS) has provided confirmed funding to enable the investment into electric bus provision rapidly and at scale in GM. This test identifies where electric bus fleet would further bring forward compliance on persistent locations of exceedance. The test was implemented in the modelling by assuming that the whole bus fleet would be fully electric, without making any changes to service patterns or frequencies in the forecasts. The results (which are presented for each increment in the next section) have been used to define the deployment strategy of electric buses within the wider programme, to services crossing exceedance locations, to deliver earliest compliance in support of the GM CAP. Therefore, whilst these results are representative at a local level for points of exceedance where electric buses are implemented, the mass emissions improvements for GM as a whole from this scenario will be significantly overestimated.
- 3.4.3 In summary, the modelling for the full electric bus increment shows that 100% electrification of relevant bus services delivers a further improvement of -1.5 ug/m³, and that electrification of a minimum of 74% of bus trips passing along the relevant section of the A58 is sufficient to deliver compliance in 2025.

3.5 Increment 3: Minimum Licensing Standards

- 3.5.1 The introduction of Minimum Licensing Standards (MLS) will require that all GM licensed Hackneys and PHVs comply with vehicle emissions standards that are consistent with those set out in the Governments Framework. The implementation of this, together with supporting GM CAP funding, will provide the mechanism for behavioural response for taxis responding to the GM CAP.
- 3.5.2 It is noted that a proportion of the overall PHV fleet are considered 'out of area', e.g. PHVs licensed to other authorities (such as Wolverhampton or Sefton), though based in GM, or visitor journeys where an origin or destination of the trip is outside of GM. For these PHVs it is assumed that they will not respond to MLS and will also not be eligible for funding to upgrade their vehicles.

- 3.5.3 The impacts of the introduction of the MLS were therefore represented in the modelling by assuming that:
- All non-compliant Hackney Cabs would upgrade to become Euro 6 compliant;
 - All non-compliant PHVs licensed with GM local authorities would upgrade to become Euro 6 compliant;
 - All non-compliant PHVs licensed with non-GM local authorities would remain non-compliant; and
 - All GM authorities implement the MLS vehicle standards.
- 3.5.4 The proportions of PHVs that are registered with GM authorities have been estimated using ANPR collected at sites within GM for the CAP study, which was then cross-referenced with local authority licensing information. The same ANPR data has also been used for the development of the compliant and non-compliant highway matrices that are used with the do-minimum Saturn models, and also includes the impacts of the Covid-19 fleet upgrade delays to the GM CAP. For the taxi fleet this has assumed a 1 year loss of vehicle renewals.
- 3.5.5 The information from the ANPR data was combined with the MLS vehicle upgrade assumptions described above to derive updated fleet-mix forecasts for input to the Taxi modelling. These were then applied to the Taxi flows from the Saturn model to derive updated compliant and non-compliant taxi flow splits for input to the emissions calculations.
- 3.5.6 The change to the behavioural assumptions associated with the MLS resulted in an increase in the proportions of compliant taxis of approximately 27 percentage points in 2023, (from 71% compliant in the previous do minimum to 95% compliant for the updated do minimum), and 13 percentage points in 2025, (from 86% compliant for the old do minimum to 99% compliant for the updated do-minimum).
- 3.5.7 The rate of uptake of electric taxis for upgraded vehicles were estimated based on the recent newly registered Hackney and PHV vehicles that are electric-powered, from the GM authorities database (May 2022). This estimated that approximately 3% of taxi and private hire car drivers who operate a compliant vehicle would either purchase an electric vehicle or choose to lease an electric vehicle¹³. The MLS increment modelled the cumulative impacts of the introduction of the Minimum Licensing Standards, which will require that all GM licensed Hackneys and PHVs comply with the Government's vehicle emissions standards. The results for this increment represent the Air Quality impacts of the MLS when combined with the impacts of the Electric Bus scenario.

¹³ Based on existing EV proportion within the fleet and recent trend in EV uptake over the last couple of years.

- 3.5.8 The emissions results for the test indicate that taxi emissions are forecast to fall by approximately 14% relative to the do-minimum scenario in 2025. This means that total road traffic NOx mass emissions for GM would fall by approximately an additional 1% beyond the levels forecast by the electric bus test.

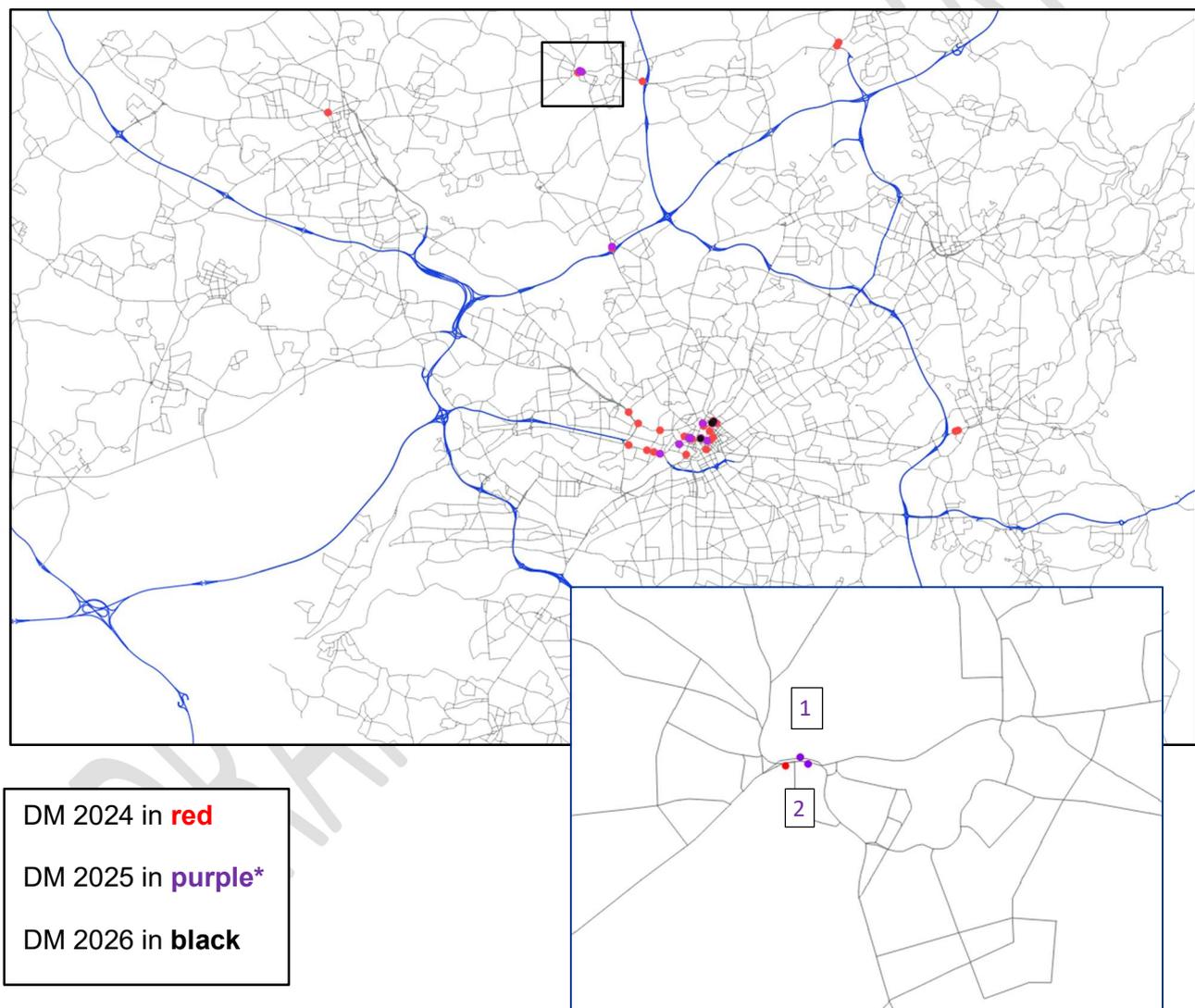
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4 Air Quality Results in the Do Minimum and Test Scenarios

4.1 Do Minimum (i.e. no GM CAP)

- 4.1.1 The location of the predicted exceedances in 2025 are shown in **Figure 4-1** with the spatial pattern continuing to resemble that in the 'Option for Consultation' and 'Previous GM CAP' modelling iterations. The modelling forecasts that the A58 Bolton Road, Bury, will be compliant by 2026 as a result of the natural upgrade of vehicle fleet over time.

Figure 4-1 Greater Manchester Do-Minimum Exceedance Points in 2024, 2025 and 2026



*Exceedances in the Do Minimum (i.e. No GM CAP) scenario for 2025 have marked with an ID number to reference against the detailed model results tables.

- 4.1.2 The air quality modelling data and emissions source apportionment is provided in Table 4-1 for 2025, for the two sites predicted to be in exceedance. This table shows how each vehicle type contributes to the total road transport emissions on a given road link, and how this varies.
- 4.1.3 As set out in previously, the A58 Bolton Road, Bury, is a dual carriageway bridging the River Irwell, serving traffic from the confluence of the A58, B6196 & B6213 roads to and from the Bury town centre ring road. There are modelled exceedances on both of the carriageways but these essentially both represent the same traffic flows. The contribution from HGVs is low on this link, with the majority of emissions derived from private cars and LGVs. However, there is also a material proportion of emissions from diesel buses. Concentrations here are predicted to be 42.8 ug/m³ in 2025.

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Table 4-1 Predicted annual mean NO₂ concentrations and source apportionment at key compliance points on the Greater Manchester road network - 2025 Do Minimum (i.e. No GM CAP)

Map ID	Point ID	x	y	Census ID	Road name	Location Type	Local Authority	Annual mean NO ₂ conc (µg/m ³)	BG ¹⁴ NOx conc (µg/m ³)	BG NO ₂ conc (µg/m ³)	Road NOx contrib (µg/m ³)	Road NO ₂ contrib (µg/m ³)	Traffic Flow (veh per day)	NOx contribution by vehicle type (%)				
														Bus	Taxi	HGV	LGV	Car
1	2237_3790_DW	379830	410975	38354	A58 Bolton Rd	Wider GM	Bury	42.8	20.1	14.4	66.3	28.4	80,290	16%	5%	17%	24%	38%
2	3790_3652	379874	410937	38354	A58 Bolton Rd	Wider GM	Bury	41.2	20.1	14.4	63.1	26.8	80,290	16%	5%	17%	24%	38%

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¹⁴ BG: Background air pollution concentrations that are not produced by the modelled road network included with GM's modelling process. This includes emissions from other non-road traffic emissions sources for example industry, aircraft, rail and local heating.

4.2 Air quality Increment 1: CBF Grants

- 4.2.1 When the CBF grants have been utilised by the relevant operators to upgrade non-compliant buses to Euro VI diesel, this will lead to an improvement in air quality across bus corridors, and a reduction in the number of predicted exceedances.
- 4.2.2 The exceedance at the A58 Bolton Road, Bury, is predicted to remain on the downwind (north) side of the dual carriageway. The concentration is 41.6 ug/m³, showing an improvement due to the CBF of -1.2 ug/m³.

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Table 4-2 Predicted annual mean NO₂ concentrations and source apportionment at key compliance points on the Greater Manchester road network - 2025 Do Minimum with CBF Grants

Map ID	Point ID	x	y	Census ID	Road name	Location Type	Local Authority	Annual mean NO ₂ conc (µg/m ³)	BG ¹⁵ NOx conc (µg/m ³)	BG NO ₂ conc (µg/m ³)	Road NOx contrib (µg/m ³)	Road NO ₂ contrib (µg/m ³)	Traffic Flow (veh per day)	NOx contribution by vehicle type (%)					Change in NO ₂ conc (µg/m ³)	
														Bus	Taxi	HGV	LGV	Car	From DM	Incremental
1	2237_3790_DW	379830	410975	38354	A58 Bolton Rd	Wider GM	Bury	41.6	20.1	14.4	61.8	27.2	80,290	9%	6%	19%	26%	41%	-1.2	-1.2
2	3790_3652	379874	410937	38354	A58 Bolton Rd	Wider GM	Bury	40.1	20.1	14.4	59.0	25.7	80,290	9%	6%	19%	26%	41%	-1.1	-1.1

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¹⁵ BG: Background air pollution concentrations that are not produced by the modelled road network included with GM's modelling process. This includes emissions from other non-road traffic emissions sources for example industry, aircraft, rail and local heating.

4.3 Air quality Increment 2: the Full Electric Bus test scenario

- 4.3.1 This scenario investigates what the potential improvement to air quality would be if electric buses were in operation, and has been modelled with 100% electric buses (i.e. zero NO_x emissions from buses). This information can be used to prioritise where the CRSTS funding would deploy buses to assist in delivering the maximum improvements to air quality and work towards compliance in the shortest possible time.
- 4.3.2 The air quality modelling data and emissions source apportionment is provided in **Table 4-3** for 2025.
- 4.3.3 The A58 Bolton Road, Bury, is predicted to be in compliance with electric buses in operation. The concentration is 40.1 ug/m³, showing an improvement due to electric buses of -1.5 ug/m³. Therefore, in order to deliver compliance in 2025, a minimum of 74% of the bus trips passing along this section of the A58 would need to be electrified to deliver compliance with concentrations below 40.5 ug/m³, based on the modelling¹⁶.

¹⁶ Nitrogen dioxide levels are measured against the long-term annual mean legal limit value which must not exceed 40µg/m³. Government specifies that concentrations of 40.4µg/m³ and below are to be rounded down to 40µg/m³ and are therefore considered to be within the annual mean legal limit.

Table 4-3 Predicted annual mean NO₂ concentrations and source apportionment at key compliance points on the Greater Manchester road network - 2025 Full Electric Bus Test

Map ID	Point ID	x	y	Census ID	Road name	Location Type	Local Authority	Annual mean NO ₂ conc (µg/m ³)	BG ¹⁷ NOx conc (µg/m ³)	BG NO ₂ conc (µg/m ³)	Road NOx contrib (µg/m ³)	Road NO ₂ contrib (µg/m ³)	Traffic Flow (veh per day)	NOx contribution by vehicle type (%)					Change in NO ₂ conc (µg/m ³)	
														Bus	Taxi	HGV	LGV	Car	From DM	Incremental
1	2237_3790_DW	379830	410975	38354	A58 Bolton Rd	Wider GM	Bury	40.1	20.1	14.4	56.2	25.7	80,290	0%	6%	20%	28%	45%	-2.7	-1.5
2	3790_3652	379874	410937	38354	A58 Bolton Rd	Wider GM	Bury	38.6	20.1	14.4	53.2	24.1	80,290	0%	6%	20%	28%	45%	-2.6	-1.5

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¹⁷ BG: Background air pollution concentrations that are not produced by the modelled road network included with GM's modelling process. This includes emissions from other non-road traffic emissions sources for example industry, aircraft, rail and local heating.

- 4.4 Air quality Increment 3: Minimum Licensing Standards scenario
- 4.4.1 This scenario investigates what the potential improvement to air quality would be if GM Minimum Licensing Standards (MLS) were in operation.
- 4.4.2 The air quality modelling data and emissions source apportionment is provided in **Table 4-4** for 2025.
- 4.4.3 The A58 Bolton Road, Bury is predicted to be in compliance with MLS. The concentration is 39.9 ug/m³, showing an improvement due to MLS of -0.2ug/m³.

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Table 4-4 Predicted annual mean NO₂ concentrations and source apportionment at key compliance points on the Greater Manchester road network - 2025 MLS

Map ID	Point ID	x	y	Census ID	Road name	Location Type	Local Authority	Annual mean NO ₂ conc (µg/m ³)	BG ¹⁸ NOx conc (µg/m ³)	BG NO ₂ conc (µg/m ³)	Road NOx contrib (µg/m ³)	Road NO ₂ contrib (µg/m ³)	Traffic Flow (veh per day)	NOx contribution by vehicle type (%)					Change in NO ₂ conc (µg/m ³)	
														Bus	Taxi	HGV	LGV	Car	From DM	Incremental
1	2237_3790_DW	379830	410975	38354	A58 Bolton Rd	Wider GM	Bury	39.9	20.1	14.4	55.7	25.5	80,290	0%	6%	21%	29%	45%	-2.9	-0.2
2	3790_3652	379874	410937	38354	A58 Bolton Rd	Wider GM	Bury	38.4	20.1	14.4	52.8	23.9	80,290	0%	6%	21%	29%	45%	-2.8	-0.2

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¹⁸ BG: Background air pollution concentrations that are not produced by the modelled road network included with GM's modelling process. This includes emissions from other non-road traffic emissions sources for example industry, aircraft, rail and local heating.

5 CRSTS Zero Emission Bus

5.1 Funding and Deployment

- 5.1.1 In April 2022, Greater Manchester was awarded its City Region Sustainable Transport Settlement (CRSTS) and an allocation of £115m from that award has been made towards Zero Emission Buses with the aim that a third of the bus fleet in Greater Manchester will be zero emission by 2027. These funds will be used to fund the incremental costs of updating buses to zero emission over above the cost of new diesels.
- 5.1.2 On 29th July 2022¹⁹ GMCA agreed that 50 Zero Emission Buses would be purchased to be deployed across the first franchised area (Wigan and Bolton) from Tranche 1 of Bus Franchising.
- 5.1.3 The CAP Programme team has worked closely with the GM Bus team to ensure that bus deployment under the franchising scheme will deliver the required number of electric buses on the routes, which would still be in exceedance with the CBF in place.
- 5.1.4 For the Bury Bridge A58, analysis has been undertaken to establish the required proportion of bus flows which would be required to deliver compliance in 2025. This has allowed TfGM to identify the specific services which currently pass the exceedance point on the A58 Bolton Road Bury and allocate Zero Emission Buses to these routes as part of the Tranche 1 deployment. The services passing the exceedance points are shown in Table 5-1.

¹⁹ [Delivering the Bee Network \(greatermanchester-ca.gov.uk\)](https://www.greatermanchester-ca.gov.uk)

Table 5-1 Proposed Electrification of Buses on the A58 Bolton Road, Bury

Route number	Route description	Bus journeys per typical weekday (during term-time)	No. electric buses required (in peak)	Route converted to electric for CAP
471	Rochdale - Sudden - Bury - Brightmet – Bolton	160	16	✓
98	Manchester - Whitefield - Radcliffe – Bury	119	9	✓
469	Tottington – Bury	119	2	✓
472	Bury - Walmersley - Ramsbottom - Holcombe Brook	44	5	✓
474	Bury - Holcombe Brook - Ramsbottom - Walmersley	43		
511	Bury - Walshaw - Ainsworth - Brightmet – Bolton	32	2	✓
480	Bolton - Tonge Moor - Tottington – Bury	31		
512	Farnworth - Radcliffe - Bury	29		
B1	Bury - Summerseat - Ramsbottom - Peel Brow	26		
TA02	Darwen - Edgeworth - Bury	6		
882	Tottington High School - Brandlesholme - Walmersley	4		
898	Elton High School - Chesham – Walmersley	2		
Total		615		

5.1.5 This analysis has confirmed that electrification of the highlighted services results in 84% of the total daily departures²⁰ that cross the A58, and that the total number of electric vehicles required can be funded from within the existing CRSTS funding package. The highlighted services (grey rows) are planned for electrification.

5.2 Delivery of Zero Emission Bus: Current Position

5.2.1 Tranche 1 Franchise contract awards were awarded on Friday 23 December 2022. 100 CRSTS funded Zero Emission Buses have been ordered and TfGM has established governance /planning processes to ensure that depot power upgrades and depot charging infrastructure are in place so that the electric buses are deployed onto the Bee Network.

²⁰ Note that the TA02 runs cross-border and the 882 and 898 are school services

5.3 Delivery of Zero Emission Bus: Risks

5.3.1 The key delivery risks to the deployment of Zero Emission Buses for Tranche 1 Wigan and Bolton onto the routes over the A58 are:

- Production and delivery of buses – The delivery of vehicles is to be staged through 2023/24.
- Provision of charging infrastructure – The delivery and installation of charging infrastructure is within the capabilities of the supply chain.
- Power supply to depots – Work to plan the electricity supply by the power network operator is well advanced.

5.3.2 TfGM is working with partners to proactively manage these risks and ensure mitigation measures are in place in order to reduce potential impacts should any delays occur.

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6 Summary

- 6.1 This report sets out the results of modelling carried out in October to December 2022 to forecast air quality in Greater Manchester (GM) in future years, at the A58 Bolton Road, Bury. This is a site of persistent poor air quality and is predicted to remain in exceedance, without any GM CAP measures in place, until 2026.
- 6.2 GM has been requested to consider a charging CAZ benchmark as a reference case to compare against the preferred GM option of an investment-led non-charging CAZ. However, JAQU's technical team have agreed that this CAZ benchmark is not appropriate at the A58 Bolton Road, Bury, due to the strategic nature of the traffic trips utilising this section of road, meaning a local urban centre focussed CAZ would be ineffective. A CAZ on the section of the A58 where the exceedance is predicted would likely lead to significant re-routing.
- 6.3 This report sets out the approach GM has taken to delivering compliance in the shortest possible time at the A58 Bolton Road, Bury.
- 6.4 The GM CAP has tested three incremental measures, delivering bus and taxi vehicle upgrades to improve air quality at the A58.
- 6.5 Whilst there are forecast to be exceedances at the A58, the Do Minimum scenario is considered pessimistic, because the GM CAP has already delivered a significant amount of support funding to buses to help them upgrade. Much of the approved funding in the Clean Bus Fund is already out on the GM network, with further funding still to be deployed.
- 6.6 The CBF scenario forecasts a significant reduction in concentrations of -1.2 ug/m^3 , meaning one of the two exceedances is removed. However, the CBF upgrades buses to compliant Euro VI diesel models. Euro VI diesel buses still release NOx emissions, especially under very slow congested conditions that are known to occur at the A58.
- 6.7 The New GM CAP has therefore prioritised the deployment of the CRSTS funding for electric buses onto the routes over the A58 by 2025. A fully electric bus fleet serving the routes on the A58 leads a further reduction of -1.5 ug/m^3 , and a maximum forecast concentration of 40.1 ug/m^3 in 2025, with no exceedances remaining. In order to deliver compliance in 2025, a minimum of 74% of the bus trips passing along this section of the A58 would need to be electrified to deliver compliance with concentrations below 40.5 ug/m^3 , based on the modelling. The bus services which will be electrified account for 84% of the bus trips, and therefore exceed the target proportion.
- 6.8 The taxi Minimum Licensing Standards, aided by support funding from the CAP leads to a further improvement at both remaining exceedances of -0.2 ug/m^3 . This measure would provide additional confidence the exceedances would have been eliminated by 2025 as a result of the GM CAP.

- 6.9 For the reasons set out above, GM has therefore prioritised the deployment of Zero Emission Buses, which will be brought into service with the regulated bus system in Wigan and Bolton, which will be a major contributor to resolving exceedances at the A58 to secure compliance at this location as part of the GM CAP.

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