FEBRUARY 2024

DRAFT AIR QUALITY ACTION PLAN 2021-2026

Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	14 September 2023	Client Review	YES	Tom Stenhouse	Project Director (AECOM)
2	24 November 2023	Amendments	YES	Tom Stenhouse	Project Director (AECOM)
3	24th January 2024	Submitted to client		Denyse Holman/David Gribben	Environment Protection Manager /Senior EHO

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Executive Summary

This Air Quality Action Plan (AQAP) presents a series of Actions that will be undertaken by the Council to reduce emissions and improve air quality across the County, and specifically within the Durham City Air Quality Management Area (AQMA). The AQMA was first declared in 2011 due to concentrations of nitrogen dioxide (NO_2), predominantly from road vehicles, being above the national health-based objective for annual mean concentrations. (Ref 1)

Air pollution is associated with adverse health impacts and is specifically recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions.

There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas (Ref 5).

Air quality across the city has been relatively stable for several years, albeit with a reduction in annual mean NO_2 concentrations observed during the COVID-19 pandemic in 2020 and 2021. Concentrations monitored in 2022 increased compared to the previous two years, but generally remained below pre-pandemic levels with only one location in the city exceeding the NO_2 annual mean objective in 2022.

A computer model (ADMS-roads) to simulate the dispersion of pollutants was built for the city to inform the AQAP, using up to date vehicle emissions evidence, topography and other information. Specific vehicle emissions information was obtained from an ANPR (Automatic Number Plate Recognition) survey from 2019 and projected forwards cautiously to represent the potential future vehicle fleet.

The model predicted continuing areas in exceedance of the annual mean NO_2 objective. Concentrations of particulates were well below national objectives, although it was recognised that concentrations of $PM_{2.5}$ (fine particulates) were predicted to exceed the relatively more stringent World Health Organisation guideline threshold at some locations. This target of 10 $\mu g/m^3$ was published in the Environmental Targets 2023 and is to be achieved by 2040.

The model determined that the main contributors to poor air quality are diesel cars, LGVs, and buses (on specific roads), although petrol cars were also determined to be a significant contributor to particulate concentrations.

The model identified the following areas with the highest NO_2 concentrations in the city: Alexandria Crescent, Sutton Street, Gilesgate (close to Gilesgate roundabout), and Church Street. Concentrations of 32-40 $\mu g/m^3$ were predicted near the Neville's Cross Junction, Crossgate Peth, North Road, Framwellgate, Claypath, New Elvet, the junction between Sunderland Road and Dragon Lane, and the junction between Dragon Lane and Front Street. Monitoring undertaken in 2022 showed that only one location, Gilesgate Bank, exceeded the annual mean objective. An additional 8 sites, located on Church Street, Gilesgate, and Sutton Street, recorded concentrations in 2022 that were above 36 $\mu g/m^3$. These locations are in line with the highest modelled NO_2 concentrations.

Therefore, whilst air quality is improving, there are still locations that exceed, or are close to exceeding, the annual mean NO_2 objective within the AQMA. In terms of tackling this, the priorities were to look at Cross-city traffic and City-centre-destination traffic.

Some Actions from the previous AQAP have been retained, all be it in a modified format. The modelling studies undertaken to support this AQAP identified themes to be developed into new Actions.

The development of the action measures firstly involved a consultation with internal departments to explore how the themes could be further developed as actions and to identify any cross-cutting policies and strategies that could link into air quality. The initial actions were then taken to the Air Quality Corporate Steering Group who through a series of meetings continued to develop these to establish 21 draft actions to be taken forward for consultation. In order to involve the local community in the development of the actions, a local engagement event was held to obtain opinions and views on the actions and suggestions for any alternatives. As a result, two additional actions were identified.

Each Action has been assigned a priority, based on whether there is secured funding for the action, the expected cost, timescale, public support and impact on air quality (both within and outside of the AQMA). The draft actions are listed below:

1. Increase the parking capacity of Durham City Park and Ride sites to help incentivise the use of the Park and Ride service across the City.

   A stretch Action will be to investigate the feasibility of new sites on routes where there is currently no provision.

2. Screen any proposed development in accordance with the latest up to date guidance on air quality. Support any development with air quality and traffic assessments that take into consideration cumulative development, where screening identifies there may be a significant adverse effect on air quality.

3. Impose conditions that comply with the provision of Policy 21 (Delivering Sustainable Transport) of the County Durham Plan.

4. Encourage the uptake of Electric Vehicles (EVs) across the County by supporting the provision of EV charging including fast and rapid charging and EV filling stations where this is appropriate.

5. Engage further with Park and Ride operators to introduce Zero Emission buses on park and ride routes and implement funding opportunities through liaison with TNE.

6. Use parking policy and a revised pricing strategy for Council owned car parks and Council on street parking to assist in tackling traffic congestion within Durham City by encouraging modal shift to cleaner, more sustainable travel modes. In addition, investigate the introduction of other policies such as emission based car parking charges, to further encourage modal shift.

7. Investigate extending the existing number of days and/or hours of operation of all Park and Ride sites

8. Work with bus operators to track the emissions classification of buses on routes of specific areas of concern, to inform which buses should be operating within the AQMA to provide cleaner exhaust emissions.

   Stretch Action to identify and implement, where appropriate, any funding streams for retrofitting buses, purchasing hybrids and /or alternatives where they may have the greatest benefits for air quality within Durham.

9. Work with major employers in Durham City and assist with the development, implementation and enforcement of workplace travel plans including reporting, evidencing uptake and regular review.

10. Develop web pages and other forms of social marketing to increase awareness of air quality issues and promote behavioural change.

11. Identify opportunities to install complimentary additional services to the Park and Ride service across the City Centre and development sites e.g., cycle storage/micro mobility/bicycles and e-bikes plus improved services at Park and Ride sites such as parcel pick-up and delivery and extending EV charging facilities.

12. Implementation of a scheme to offer the use of EV vans on a free trial for 2 to 3 weeks to small and medium enterprises to promote the uptake of Electric Vehicles.
13. Define and Implement a Public Awareness Campaign focusing on air quality.
14. Improve journey quality offer for users at public transport hubs and Durham city bus station with improved vehicles, priority arrangements to further encourage modal shift alongside improved Real Time Passenger information.
15. Improve environmental facilities in the Bus Station including Green Wall / Water Harvesting and Photovoltaics
16. Review the licensed vehicle taxi fleet operating in Durham. Subject to the outcome of this review, an update of the previous taxi emission study on the Durham Taxi fleet may be required.
17. Use variable message signs (VMS) to provide information regarding air quality.
18. Review the work previously undertaken in relation to green infrastructure within the AQMA, and where practicable implement the recommendations made.
19. Obtain a better understanding of the freight and delivery fleet operating in Durham, potentially followed by a feasibility study for the introduction of a freight micro-consolidation scheme to serve Durham City to improve air quality from the shipping of goods into and out of the city.
20. Implement the Strategic Cycling and Walking Delivery Plan 2019-2029
21. Investigate Intelligent transport systems in more detail including SCOOT improvements and funding opportunities west of Durham City Centre and implement bus priority measures on the major bus corridors.

Responsibilities and Commitment

This AQAP was prepared jointly by the Durham County Council's Community Protection Service and external consultants with the support and involvement of several different internal departments as listed below:

Denyse Holman -Environment Protection Manager- Community Protection Service
David Gribben -Senior Environmental Health Officer- Community Protection Services
Public Health
Spatial Policy
Low Carbon Economy Team
Transport and Contract Services
Environment & Design Team
AECOM Ltd -Air Quality Consultants

This AQAP has been approved by the following key Council Members and Officers:

Councillor Mark Wilkes Portfolio Holder for Neighbourhood Services and Climate Change	
Amanda Healey Director of Public Health	
Joanne Waller Head of Community Protection and Chair of the Air Quality Corporate Steering Group	

This AQAP will be subject to regular reviews not exceeding 5 years and appraisal of progress will be reported to the Environment and Sustainable Communities Overview and Scrutiny Committee. Progress each year will be detailed in the Annual Status Reports (ASRs) produced by Durham County Council, as part of our statutory Local Air Quality Management duties.

If you have any comments on this AQAP, please send them to:

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Figures

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1 Introduction

This report presents the development of the updated Air Quality Action Plan (AQAP) on behalf of Durham County Council.

Durham County Council is a unitary authority, in the north of England and so the single County administrative area encompasses the former districts. The County administration incorporates departments for Community Protection, Planning, Traffic Management, Sustainable Transport, Climate Change and Public Health.

This Air Quality Action Plan (AQAP) will supersede the existing plan and presents committed Actions to reduce emissions and improve air quality across the County, and specifically within the Durham City Air Quality Management Area (AQMA).

The plan has been developed as part of the legal duties in relation to air quality under Part IV of the Environment Act 1995 and Regulations made thereunder.

It has been compiled having regard to the Defra Local Air Quality Management Technical Guidance (LAQM.TG (22)) and the Policy Guidance PG22.

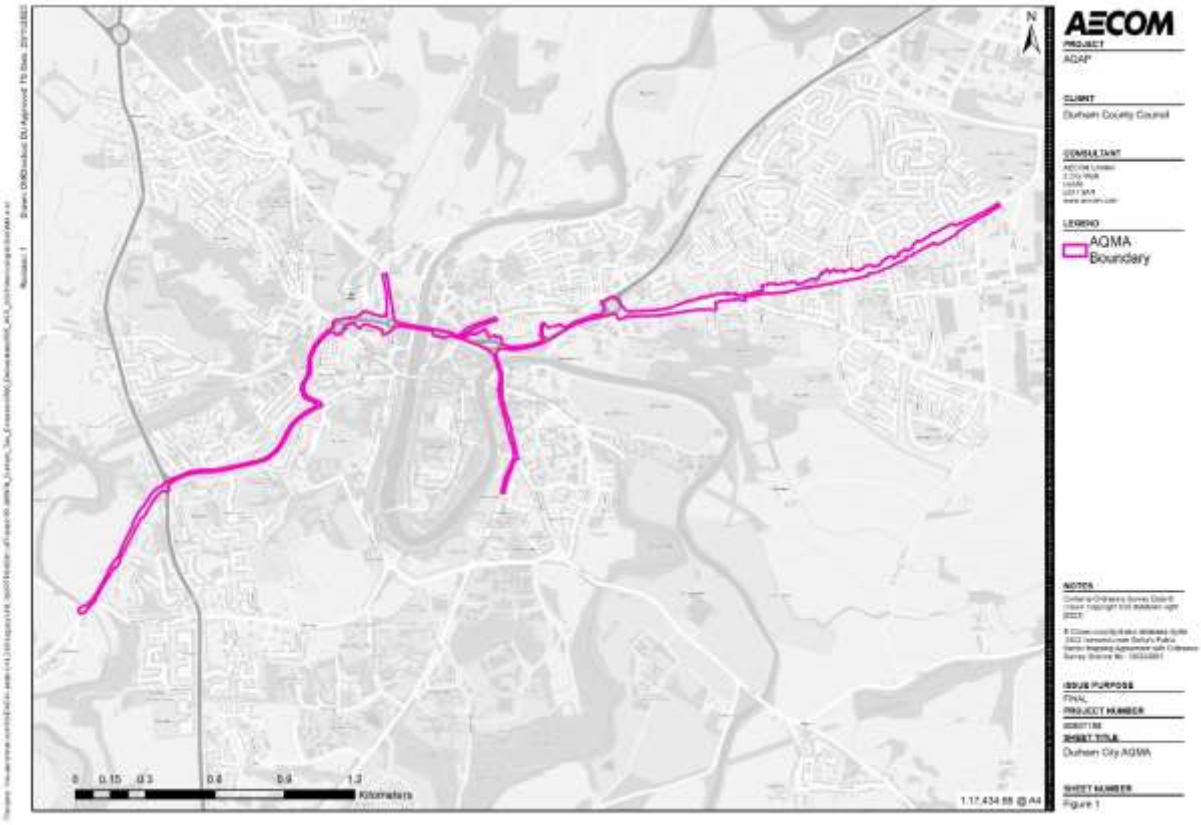
In Durham City, the main pollutant of concern is Nitrogen Dioxide (NO_2), with the primary source being from road vehicle exhaust emissions. Durham County Council (DCC) have declared an air quality management area, (AQMA) in the city, due to monitored exceedances of the annual mean NO_2 objective.

Further information regarding the Durham City AQMA is published online at https://www.durham.gov.uk/article/3825/Air-quality-in-Durham-City (Ref 1). The extent of the Durham City AQMA is shown in Figure 1 and encompasses, or is adjacent to, approximately 745 properties within a city-wide population of approx. 50k.

No significant new emission sources were identified since the 2023 ASR, and the most significant source of atmospheric pollution continues to be emissions from road traffic, although it should be noted that there was a nationwide reduction in journeys during the COVID-19 pandemic affecting both monitoring values and public exposure. Traffic levels throughout 2022, following the COVID-19 pandemic, remain slightly lower than pre-pandemic levels, although traffic numbers are more uniform throughout the day, with less distinctive increases in traffic numbers during peak hours.

New Elvet Bridge reopened in October 2021 following a 15-month closure for essential works. During this period, traffic was redirected across the city of Durham. This reopening has allowed traffic to use New Elvet Bridge and has contributed to the concentrations increasing in New Elvet and along Church St. This reflects the increase in traffic within the area following the opening of New Elvet Bridge.

Figure 1. Extent of Durham City AQMA



2 Summary of Current Air Quality in County Durham

2.1 Summary of Air Quality and Emissions Baseline (Dispersion Modelling)

A new detailed dispersion model was built for Durham City using the latest version of the EFT and ADMS-roads, including road gradients and the advanced street canyon module. The fleet profile was based on the ANPR survey undertaken on Millburngate bridge in 2019 and projected forwards cautiously to represent a future fleet.

It should be noted the air quality modelling was undertaken in 2021 using a base year of 2019 as it was the most recent year for which air quality monitoring data was available at the time the work was undertaken (see Section 2.2). Therefore, it does not incorporate the latest data recorded post-COVID.

More detailed information regarding the baseline air quality modelling can be found in Appendix B.

The model predicted continuing areas in exceedance of the annual mean NO_2 objective at relevant receptors. These are as follows: Alexandria Crescent and Sutton Street, Gilesgate (particularly in the area close to the Gilesgate roundabout), and Church Street and junction with Hallgarth Street (see Figure A-6).

Modelled concentrations between 32 to 40 µg/m^3 were predicted near the Neville's Cross Junction, Crossgate Peth, North Road, Framwellgate, Claypath, New Elvet, the junction between Sunderland Road and Dragon Lane, and the junction between Dragon Lane and Front Street (see Figure A-6).

The annual mean concentrations of PM_{10} were well below the objective, although concentrations of $PM_{2.5}$ were predicted to exceed the 2040 UK target of 10 µg/m^3 at a few receptors located on Gilesgate, close to the Gilesgate Roundabout (see Figure A-7).

2.2 Air Quality Monitoring

Durham County Council operates an automatic (continuous) monitor located in Durham City, and a network of non-automatic (i.e. passive) diffusion tubes at locations across the county; comprising 48 sites in 2022, including 26 sites located within the AQMA.

Measured pollutant concentrations in Durham City have historically been persistently close to, or exceeding the annual mean NO_2 objective, although in 2022 only one site, DT149 on Gilesgate Bank, exceeded the annual mean objective following bias adjustment. This site is located within the Durham City AQMA, and previously reported an exceedance in 2018, 2019, and 2021.

Annual mean NO_2 monitoring data from 2018 to 2022 are shown in Table 1. NO_2 concentrations within Durham City have increased since 2021 in some areas, such as Church Street and Claypath, due to increased traffic numbers although the measured levels were below the annual mean objective in 2022. However, elsewhere in the City, such as along Sutton Street, concentrations have shown a decrease when compared with 2021 concentrations. Despite traffic levels returning closer to pre-COVID levels, less distinctive peaks are present during peak hours, suggesting that there is less congestion leading to lower annual mean concentrations.

No exceedances outside of the AQMA were recorded.

There were no exceedances of the 1-hour mean at the Leazes Road continuous monitor. In addition, as there were no annual means over 60µg/m^3 recorded at any of the diffusion tubes, there were unlikely to be any exceedances of the 1 hour mean objective across the city.

It should also be noted that New Elvet Bridge was closed in July 2020 for essential works, which resulted in traffic being diverted to other areas in Durham and therefore lower NO_2 concentrations at locations on Church St, New Elvet occurred during this period. New Elvet Bridge was reopened in October 2021 and concentrations along Church Street and in the surrounding areas of the bridge saw increases in NO_2 concentrations as a result of increased traffic flows, which is important in terms of interpreting the long-term trends in this area pre, during and post-pandemic.

Annual mean NO_2 concentrations were within 10% of the annual mean objective at 8 sites in 2022, which suggests that there is a risk of exceedance at these locations. This includes sites on Church Street (including DT12 and DT117), Gilesgate (DT155 and DT162) and Sutton Street (DT130). The majority of these sites saw a decrease in concentrations from 2021 to 2022, with the exception of DT19 and DT117 (Church St) which had an increase in concentrations between 2021 and 2022. These sites are located adjacent to Church Street, with increased traffic levels likely as a result of the opening of New Elvet Bridge.

Durham County Council currently monitor particulates (PM_{10} and $PM_{2.5}$) using indicative equipment that is not suitable for LAQM purposes. However, the intention is to review the air quality monitoring network across the County to decide whether it is fit for purpose to monitor long term trends of both nitrogen dioxide and particulate levels.

Table 1. Annual Mean NO_2 Monitoring

Site ID	Location	X	Y	Site Type	2018	2019	2020	2021	2022
			Automatic Monitoring						
	Leazes Road	427130	542676	Roadside	-	**46.4**	35.8	**41**	**40**
			Passive Monitoring						
23	5 Menceforth Cottages	426895	551717	Roadside	34.8	32.9	26.6	32.1	29.5
26	Lamp post opp. 1 Blind Lane	427411	552670	Roadside	**42.3**	38	29.8	31.9	32.9
101	Riverside Cricket Ground	428211	550438	Urban Bknd	13.1	10.9	8.8	10.2	10.2
129	1 Menceforth Cottages	426910	551708	Roadside	35.3	33	26.9	31.4	29.6
157	Bridge St, Pub	427477	551650	Roadside	**41.8**	**40.9**	32.5	38.4	36
1	Dragonlane Traffic Lights, Durham	429657	543114	Roadside	36.4	36.3	28.4	**36**	33.1
8	Highgate North	427121	542868	Roadside	38.4	38.4	29.5	30.2	34.2
11	Crossgate Traffic Lights	426838	542298	Roadside	33.5	35.6	31.6	32.7	30.8
12	1 Colpitts Terrace	426768	542368	Roadside	**44.1**	**44.3**	39.7	**42.3**	36.9
19	1 Church Street	427689	542078	Roadside	**41.2**	**44.8**	25.5	26.1	37.1
20	80 Gilesgate	428385	542740	Roadside	36.7	39.8	34.8	34.7	36
42	97 Claypath	427476	542618	Roadside	32.6	34.6	26	30.5	30.2
59	The Sands	427649	542994	Urban Bknd	16.6	17.5	13.7	13.3	14.2

Site ID	Location	X	Y	Site Type	2018	2019	2020	2021	2022
70	The Peth Westbound	426654	542102	Roadside	**45.8**	**44**	34.2	**39**	35.9
79	Nevilles Cross Bank Eastbound	426138	541933	Roadside	**48.1**	**46.2**	38.3	**44.3**	39.1
81	88 Claypath	427529	542647	Roadside	31.6	31	25.3	26.2	28.8
106	5 Belle Vue Tce, Dragonville	429658	543118	Roadside	36.3	39.2	26.4	32	29.4
115	Auton House (Nevilles Cross Bank Eastbound)	426133	541939	Roadside	32.2	32.3	26	30.2	28.2
116	3 Church Street	427686	542072	Roadside	**44.2**	**46.7**	28.4	25.1	38.5
117	33 Church Street	427672	542066	Roadside	**40.1**	**44.2**	26.6	25.1	37.3
118	Heaviside Road lamp post	428422	542887	Urban Bknd	14.7	15.6	11.7	12.1	12
130	1 Sutton Street	426808	542461	Roadside	**46.2**	**47.8**	38.8	**46.7**	37.8
132	7 High St South	425352	540650	Roadside	32.9	32.6	24.1	29.7	28.6
133	MotorCycle Shop, High St North	425325	540636	Roadside	32.8	32.5	26.4	29.2	30
136	52 Highgate	427133	542767	Roadside	31.3	32.5	25.3	31.1	29.9
137	Archery Rise	426437	542027	Roadside	37.4	37	31	37.6	35
139	5 Church St	427676	542051	Roadside	36.3	39.1	21.7	22.4	31.8
140	9 Church St	427663	542014	Roadside	37.5	39.4	22	22.2	33.2
141	28 Church St	427655	542023	Roadside	31.9	31.1	17.7	19.1	25.8
142	29 Church St Lampost	427665	542041	Roadside	35.4	38.6	21.5	19.9	32.3
145	Gilesgate Roundabout	428180	542699	Roadside	**41.6**	**40.9**	32	38.5	35.4
146	35/36 Sutton St	426796	542458	Roadside	35.4	35.8	28.9	36.9	33.8
149	68/68A Gilesgate	428272	542715	Roadside	**48.2**	**48**	38.8	**45.1**	**44.1**
150	1-2 Durham Road	430769	537643	Roadside	31.6	31.5	25.2	29.3	29.3
151	6 Sutton Street	426809	542489	Roadside	39	39.7	34.2	**41**	34.4
154	Colpitts Hotel Pub	426772	542405	Roadside	**43.9**	**44.6**	**40.9**	**45.7**	38
155	75/76 Gilesgate	428323	542720	Roadside	**45.7**	**40.9**	34.2	36.4	36.7
156	Co-op Durham Road	430783	537657	Roadside	30.4	27.4	21.7	27.9	26.6
162	62 Gilesgate	428231	542713	Roadside	-	**46.7**	35.4	**42.6**	**38**
164	1 Booths Bungalows	429969	542322	Roadside	-	22.6	16.4	17.9	16
166, 167, 168	Continuous Monitor Leazes Road Roundabout	427130	542676	Roadside	-	**41.8**	32.7	**41.4**	**40**
169	Providence Row/Claypath Traffic Lights	427614	542689	Kerbside	-	34.2	20.8	24.5	25.5

Site ID	Location	X	Y	Site Type	2018	2019	2020	2021	2022
	Victoria Inn, Hallgarth Street	427739	541985	Roadside	-	25.1	15.3	16	19.3
171	1 Coronation Terrace	430017	542339	Roadside	-	19.1	17.3	22.7	20.2
172	9 Providence Row	427586	542820	Roadside	-	-	18	21.8	21.8
173	25 Chapel Street, West Auckland	418199	526238	Roadside	-	-	-	-	19.1

Note: **Bold** text denotes exceedance of the annual mean objective, underlined text denotes concentrations within 10% of the annual mean objective.

3 Air Quality Priorities

3.1 Public Health Context

Air pollution is the greatest environmental risk to public health. Outdoor air pollution is estimated to have an effect equivalent to 29,000 to 43,000 deaths a year in the UK, and exposure to ambient air pollution contributes to 4.2 million deaths annually worldwide.

Particulate matter (PM10 and PM2.5) nitrogen dioxide (NO2), and ozone (O3) are key pollutants that reduce life expectancy and have been associated with a range of health effects, including respiratory and cardiovascular disease, and can contribute to cognitive decline and dementia. (Ref 2).

Public Health has established a Plan that links in with the Climate Change agenda but is also targeted towards reducing the health impacts of air quality on vulnerable groups.

The Index of Multiple Deprivation (IMD) 2019, illustrated on Figure A-14. is based on lower super output area (LSOA) from Census areas with a mean of 1,500 inhabitants. There are LSOA within Durham City that fall within the most deprived decile and also others within the least deprived decile.

In terms of areas which are predicted to continue to have elevated pollutant concentrations, Church Street is within an area of low deprivation (8th decile) including a substantial part of Durham University, but directly borders an area of higher deprivation (5th decile) including HMP Durham. Alexandria Crescent and Sutton Street are in a residential area of low deprivation (7th decile). Church Street is within an area of moderate deprivation (5th decile) and directly borders areas of the highest deprivation (1st decile) and lowest deprivation (10th decile).

The ability of the population to engage with actions on air quality is directly linked to socio-economic indicators. For example, it is unrealistic to expect wide uptake of personal electric vehicles in areas of high deprivation where incomes are low and access to a vehicle of any kind is low, and where access to public transport will be important. However, actions to encourage the adoption of new technology may be more successful in areas of low deprivation. Further the lower socio-economic groups are more likely to have poorer outcomes and shorter life expectancy.

3.2 Planning and Policy Context

Key documents that may affect the development of the Actions were identified and reviewed in the internal consultation process, discussed in section 4.1. These have subsequently been updated. Key documents in the development of the final Actions are presented below:

Land-Use Planning & Development Control: Planning for Air Quality (Institute of Air Quality Management (IAQM and Environmental Protection UK) January 2017.

The above is used for assessing and therefore for identifying positive and adverse air quality impacts arising from developments. Therefore, it forms a key document in relation to the implementation of the action measure for the screening and, where required, the mitigation of any proposed development.

Climate Emergency Response Plan (CERP)

The second Climate Emergency Response Plan was adopted by our Council in June 2022 and is committed to reaching Net Zero by 2030, with an 80% real carbon reduction to emissions, which will have positive benefits for air quality. As part of CERP2, the Council seeks to reduce its own carbon footprint, and the wider County carbon footprint, through supporting low carbon vehicles, active travel, and a reduction of unnecessary vehicle use through better affordability and increased public access to fast internet, and public or shared transport.

CERP 2 is currently being updated and the actions contained in the transport section will significantly overlap with the actions highlighted in the Air Quality Action Plan.

Northeast Transport Plan 2021-2035

The Northeast Transport Plan sets out the region's transport ambitions to 2035. It comprises around 243 schemes worth £6.8bn of transport investment. The Plan will boost the health, environment, and economy of the Northeast, covering several local authority areas (Durham, Gateshead, South Tyneside, Sunderland, Newcastle Upon Tyne, North Tyneside, and Northumberland).

The objectives in the plan include a healthier Northeast, appealing sustainable transport choices, and a safe and secure transport network. The vision of the Northeast Transport Plan is 'moving to a green, healthy, dynamic and thriving North East'. The objectives and vision of the Plan will support the shift to a more sustainable and healthier way of life through lowered emissions, better air quality and travel choices.

The County Durham Plan

Objective 18 of the County Durham Plan aims to improve air quality through sustainable transport through reducing the need to travel or to travel through more sustainable modes.

The following policies within the County Durham Plan are specifically relevant to improving Air Quality:

CDP Policy 21 - Delivering Sustainable Transport

CDP Policy 21 addresses the transport implications of development through Transport Assessments, Transport Statements and Travel Plans. It aims to ensure that the Council, developers, and other stakeholders deliver sustainable transport choices as development sites come forward through the planning system. Implicit within policy 21, is that sustainable transport should be prioritised in new developments over the private car.

Importantly, mode shift enables a reduction in congestion on both local and national roads, which subsequently reduces unacceptable air pollution and carbon emissions. Policy 21 is also supported by the Parking and Accessibility Supplementary Planning Document 2023 which encourages the consideration of sustainable transport modes in new developments.

The Supplementary Planning Document (SPD) sets out car parking standards for residential development, minimum standards for cycle parking and minimum requirements for EV charging bays, disabled parking, and associated design guidance on residential developments, to facilitate public transport. The SPD seeks to limit private car parking at destinations where there is frequent public transport and/or where an area is covered by a Local Cycling and Walking Infrastructure Plan.

CDP Policy 22 – Durham City Sustainable Transport

CDP Policy 22 aims to reduce the dominance of car traffic, address air quality and improve the historic environment by delivering interventions in Durham City, namely demand management including influencing changes in travel behaviour through residential or employer travel plans and via sustainable transport improvements including improvements to existing city centre transport infrastructure such as walking and cycling improvements.

To create a more sustainable transport network in Durham City, there is a need for a positive strategy that manages the demand for car usage by creating highway space for sustainable transport modes. This policy aims to deliver this positive strategy, and in alignment with the Durham City Air Quality Action Plan and the Durham City Sustainable Transport Delivery Plan, seeks to reduce air pollution in the city centre.

The detail around transport interventions in Policy 22 in Durham City was articulated in the Durham City Sustainable Transport Delivery Plan (DCSTDP) 2019 to 2035. The DCSTDP set out how modal shift can be practically achieved in the city by identifying packages of demand management and infrastructure improvements to reduce traffic.

The Plan aims to promote greater use of cleaner, greener public transport which will have positive benefits for air quality through reduced levels of carbon and nitrogen emissions. It is important to note that relief roads which were initially part of CDP Policy 22 were removed by the Inspector during the examination of the County Durham Plan.

CDP Policy 31 - Amenity and Pollution

CDP Policy 31 aims to restrict the development which has the potential to lead to, or be affected by, unacceptable levels of air quality and other sources of pollution. Any major planning or development schemes within the catchment area of the Durham City Air Quality Management Area will need to be assessed to determine any impact on air quality and showing any ameliorating design measures.

Durham County Council Strategic Cycling and Walking Delivery Plan 2019-29

This plan aims to create better cycling and walking infrastructure over the county for the next ten years. The vision for the strategy is to make cycling and walking part of Durham's culture and to make them safe, affordable, enjoyable, everyday modes of transport for everyone. Modal shift from cars to cycling, walking and public transport helps reduce air pollution and carbon emissions, contributing to better air quality.

Local Cycling and Walking Infrastructure Plans (LCWIPs) are a key delivery mechanism of the Strategic Cycling and Walking Delivery Plan. LCWIPs are a strategic approach to identifying cycling and walking improvements at the local level which enable a long-term approach to planning for cycling and walking. These plans are referenced in the County Durham Plan, policy 21, and will be created in at least 12 key towns across County Durham and will detail network plans for walking and cycling which identify preferred routes and core zones for further development. They will help to prioritise a programme of infrastructure improvements for future investment. The benefits of cycling and walking is that it encourages modal shift away from the private car, improves poor air quality by reducing congestion and is considered a zero-emission travel mode.

One of the action measures specifically covers the implementation of the DCC Strategic Cycling & Walking Delivery Plan.

The Vision for County Durham 2019-2035

The County Durham Vision was adopted in 2019 and sets out the long-term vision for the county as a place where there are more and better jobs, people live long and independent lives, and our communities are well connected and supportive. The vision for connecting communities will support active travel and aim for a reduction in congestion, as well as

support the uptake of electric vehicles, which will improve air quality. Specifically, paragraph 3.5 (page 11) of the Vision highlights that further traffic interventions will be considered to reduce congestion and prevent declining air pollution in Durham City.

The Council's Plan 2022-26

Priority actions within the Plan include the implementation of the local Air Quality Action Plan with the aim of improving air quality within Durham City to meet the standards set within the National Air Quality Strategy

Hackney Carriage and Private Hire Licensing Policy 2023 to 2027

New Applications (Newly Licensed Vehicles) - New applications for all vehicle licences will only be accepted for vehicles manufactured to the emissions standard "EURO 6" or higher.

Renewal Applications (Existing Vehicles / Continued Licensing)- After the 1st of April 2025, renewal applications for licensed vehicles meeting Euro 4 or lower will not be accepted. After the 1st of April 2026, renewal applications for licensed vehicles meeting Euro 5 or lower will not be accepted.

Car Parking Policy

A revised updated/parking policy document is currently being drafted, and this should be agreed sometime during 2024. In addition, a review of car parking charges has taken place across the County. Consequently, free parking after 14:00 in Durham City has been removed and, if plans are approved there will be an increase in on and off-street parking.

3.3 Road Emission Source Apportionment

The Actions presented in this report are intended to be targeted towards the predominant sources of emissions within the city with reference to the source apportionment exercise presented below.

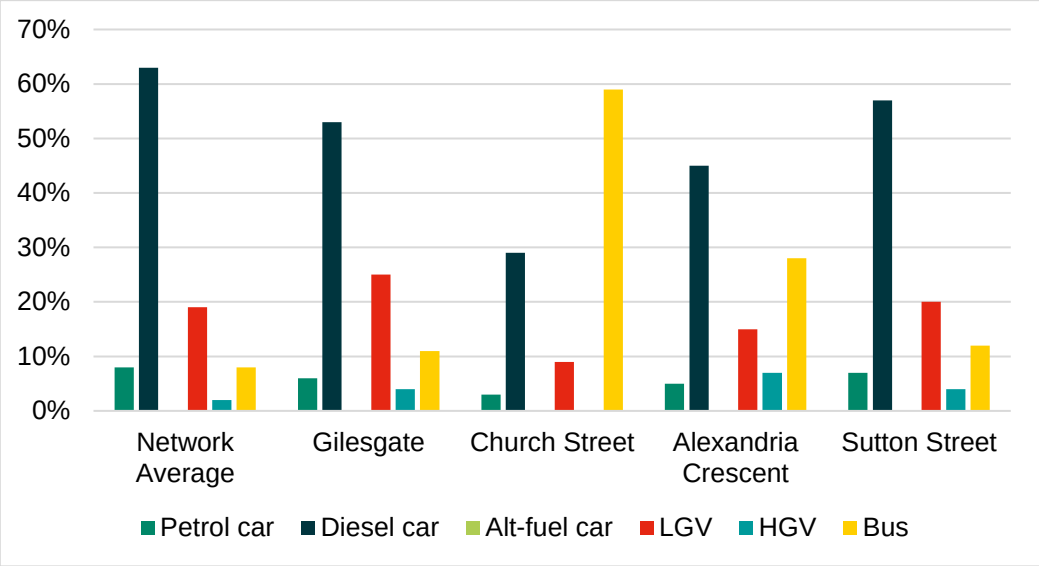
Road emission source apportionment due to diesel vehicles, LGVs, and buses for NO_X and for $PM_{2.5}$ are presented in Figure A-8. to A-13 for the projected 2024 assessment year. The emission breakdown by vehicle was assigned to receptors on the basis of the nearest road and so does not include the complex source apportionment near junctions where receptors may be exposed to emissions from more than one road.

A summary of source apportionment of road NO_X is presented in Table 2 and Figure 2, showing the average source apportionment across Durham City, and also in the air quality hotspot areas (those predicted to have concentrations of NO_2 in excess of 40 µg/m^3 in 2024.)

Table 2. Road NO_X Source Apportionment, 2024

Location	Petrol car	Diesel car	Alt-fuel car	LGV	HGV	Bus
Network Average	**8%**	**63%**	**0%**	**19%**	**2%**	**8%**
Gilesgate	6%	53%	0%	25%	4%	11%
Church Street	3%	29%	0%	9%	0%	59%
Alexandria Crescent	5%	45%	0%	15%	7%	28%
Sutton Street	7%	57%	0%	20%	4%	12%

Figure 2 Road NOX Source Apportionment, 2024



Diesel cars account for an average of 63% of NO_X emissions from roads, making up more than 50% of NO_X emissions from roads at a majority of receptors (83%). However, in most of the air quality hotspots contributions from diesel cars are relatively low, under 60%.

In Gilesgate LGVs and buses make up a larger proportion of contributions than average, with cars, although still the primary source, a slightly smaller proportion than the average. A number of bus routes run through Gilesgate including long-distance buses to destinations as far as South Shields, and Hartlepool.

In Church Street buses are the primary contribution, being on an important bus route through the university to a park and ride. Cars and LGVs make up a much smaller proportion than average.

In Alexandria Crescent buses also make up a higher-than-average contribution. Being on a main route through town it is on many bus routes including long distance buses to destinations as far as Newcastle and Darlington. Sutton Street is on some bus routes including local city buses that stop at nearby Durham bus station and therefore buses are also a larger contributor than average here. HGVs through Alexandria Crescent are also higher than average, a reflection of the use of the A690 as a major through route.

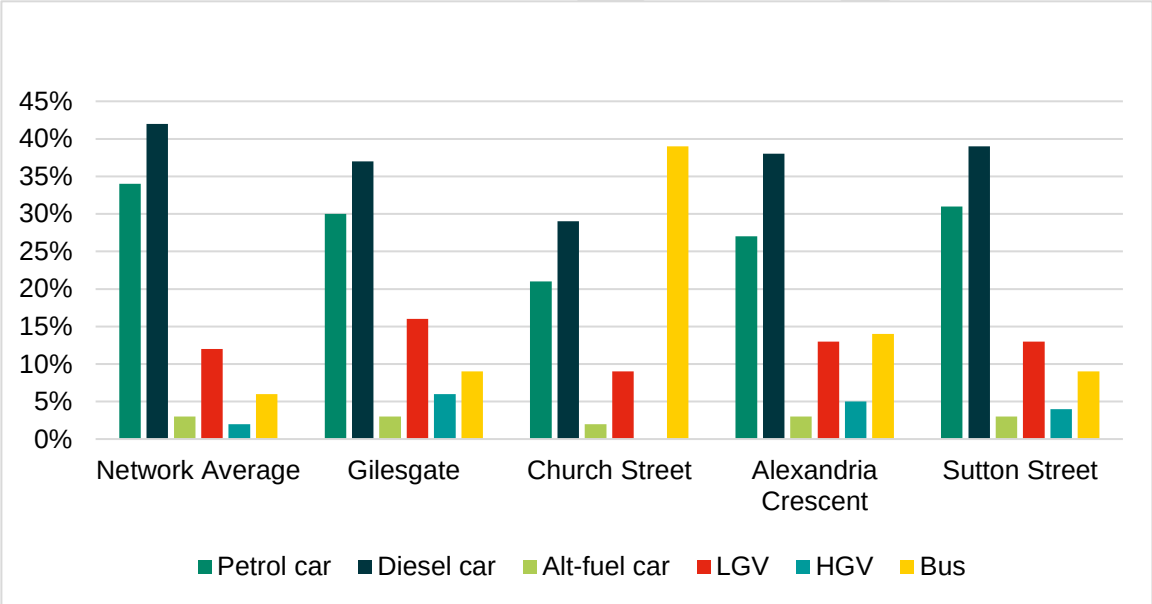
Similarly, a summary of source apportionment of road $PM_{2.5}$ are presented in Table 3 and illustrated in Figure 3.

$PM_{2.5}$ emissions are more widely distributed by source, although diesel cars still make up an average of 42%, meaning they are still the dominant source city-wide. Petrol cars make more of a contribution to $PM_{2.5}$ than they do to NO_X, an average of 34%. Otherwise, similar distributions of sources in the key air quality hotspots are seen as for NO_X.

Table 3. Road PM2.5 Source Apportionment

Location	Petrol car	Diesel car	Alt-fuel car	LGV	HGV	Bus
Network Average	**34%**	**42%**	**3%**	**12%**	**2%**	**6%**
Gilesgate	30%	37%	3%	16%	6%	9%
Church Street	21%	29%	2%	9%	0%	39%
Alexandria Crescent	27%	38%	3%	13%	5%	14%
Sutton Street	31%	39%	3%	13%	4%	9%

Figure 3. Road PM2.5 Source Apportionment



3.4 Background Emission Source Apportionment

Defra's background maps include source apportionment information. The average percentage of background emissions of NO_X and $PM_{2.5}$ due to each source across Durham City are presented in

Table 4 and Table 5 respectively, as well as the maximum percentage in any one grid square.

Table 4. NO_X background source apportionment

Pollutant	Roads	Industry	Domestic	Rural	Other
Study Area Average	23%	9%	14%	41%	14%
Maximum per Source	34%	11%	31%	51%	27%

Source: Defra (Ref 3)

The main contribution to NO_X emissions within the study area (i.e. Durham City) is due to rural sources from the areas surrounding Durham. Roads, domestic, and other source

contributions vary across the city depending on the area, whilst industry consistently has a low contribution.

Table 5. $PM_{2.5}$ background source apportionment

Pollutant	Roads	Industry	Domestic	Secondary	Residual and Salt	Other
Study Area Average	2%	4%	4%	57%	31%	3%
Maximum per Source	3%	7%	6%	60%	39%	5%

Source: Defra (Ref 3 3)

For $PM_{2.5}$ the main contribution is due to secondary sources. This means that they are not directly emitted in particulate form but are formed via reactions in the atmosphere from pollutants including NOx, sulphur-containing compounds and ammonia. Residual and salt make up the next largest contribution, while direct emissions from industry, domestic, road, and other sources only make up a small proportion.

Therefore, a focus on road emissions was identified as representing the most viable option for the development of Actions.

3.5 Required Reduction in Emissions

A total of 32 receptors were predicted, from the modelling, to be non-compliant with the annual mean NO_2 objective in the future baseline.

As set out in LAQM Technical Guidance TG22, Chapter 7, paragraph 7, any required percentage reductions of local emissions should be expressed in terms of NOx due to local road traffic. This is because the primary emission is NOx and there is a non-linear relationship between NOx and NO2 concentrations. Total modelled annual road source emissions at receptors also need the addition of background contributions of non-road NO_x from sources outside the study area (such as significant regional roads, industrial sources, and agriculture). The determination of the background concentrations is discussed further in Section 3.4.

The required reduction in NO_X emissions to achieve compliance with the annual mean NO_2 objective at the receptors locations is presented in Table 6

The equivalent reduction in NO2 required is also provided for reference.

As noted above, monitoring undertaken in 2022 showed that only one location, Gilesgate Bank, exceeded the annual mean objective. An additional 8 sites, located on Church Street, Gilesgate, and Sutton Street, recorded concentrations in 2022 that were above 36 µg/m^3. These locations are in line with the highest modelled concentrations, although it is recognised that no further reduction in NO_X emissions would be required if these locations continue to be compliant.

Table 6. Required NO_X Reduction to Achieve Compliance with Annual Mean NO_2 Objective in Future Baseline, µg/m³

Receptor name	Location	NO_2 Background	Modelled Road-NO_X	Modelled Total NO_2	Equiv. Compliant Road-NO_X	Required Reduction to Achieve Compliance	
						Road NO_X	Total NO2
R0189	Church Street	14.6	69.1	47.4	51.7	-33.6%	-15.6%
R0875	A181 Gilesgate	11.7	74.5	47.0	57.7	-29.1%	-15.0%

Receptor name	Location	NO_2 Background	Modelled Road-NO_X	Modelled Total NO_2	Equiv. Compliant Road-NO_X	Required Reduction to Achieve Compliance	
						Road NO_X	Total NO2
R0307	Church Street	14.6	65.8	46.0	51.7	-27.3%	-13.1%
R0386	Church Street	14.6	65.2	45.8	51.7	-26.1%	-12.6%
R1299	Alexandria Crescent	12.1	70.3	45.7	56.8	-23.6%	-12.4%
R1271	Alexandria Crescent	12.1	69.2	45.2	56.8	-21.8%	-11.6%
R1088	Alexandria Crescent	12.1	68.6	45.0	56.8	-20.7%	-11.1%
R0873	A181 Gilesgate	11.7	69.5	45.0	57.7	-20.3%	-11.0%
R1302	Alexandria Crescent	12.1	67.5	44.5	56.8	-18.8%	-10.2%
R1362	Alexandria Crescent	12.1	65.8	43.8	56.8	-15.8%	-8.7%
R0867	A181 Gilesgate	11.7	66.4	43.7	57.7	-14.9%	-8.4%
R0863	A181 Gilesgate	11.7	64.4	42.9	57.7	-11.6%	-6.7%
R0848	A181 Gilesgate	11.7	63.1	42.3	57.7	-9.2%	-5.4%
R0051	Hallgarth Street	14.6	56.5	42.1	51.7	-9.4%	-5.0%
R0833	A181 Gilesgate	11.7	62.1	41.9	57.7	-7.6%	-4.5%
R0834	A181 Gilesgate	11.7	62.1	41.9	57.7	-7.6%	-4.5%
R0407	A690 Sutton Street	12.1	60.2	41.4	56.8	-5.9%	-3.5%
R0845	A181 Gilesgate	11.7	61.0	41.4	57.7	-5.6%	-3.4%
R0853	A181 Gilesgate	11.7	60.5	41.2	57.7	-4.8%	-2.9%
R0418	A690 Sutton Street	12.1	59.4	41.1	56.8	-4.5%	-2.7%
R0881	A181 Gilesgate	11.7	60.1	41.0	57.7	-4.1%	-2.5%
R0099	Hallgarth Street	14.6	53.6	40.9	51.7	-3.8%	-2.1%
R0858	A181 Gilesgate	11.7	59.1	40.6	57.7	-2.4%	-1.5%

Receptor name	Location	NO_2 Background	Modelled Road-NO_X	Modelled Total NO_2	Equiv. Compliant Road-NO_X	Required Reduction to Achieve Compliance	
						Road NO_X	Total NO2
R0469	A690 Sutton Street	12.1	58.2	40.6	56.8	-2.3%	-1.4%
R0182	Church Street	14.6	52.7	40.4	51.7	-2.0%	-1.1%
R0183	Church Street	14.6	52.7	40.4	51.7	-2.0%	-1.1%
R0481	A690 Sutton Street	12.1	57.6	40.3	56.8	-1.3%	-0.8%
R0489	A690 Sutton Street	12.1	57.4	40.3	56.8	-1.1%	-0.7%
R0402	Alexandria Crescent	12.1	57.4	40.3	56.8	-1.0%	-0.6%
R0159	Hallgarth Street	14.6	52.0	40.1	51.7	-0.6%	-0.4%
R0441	Church Street	14.6	52.0	40.1	51.7	-0.5%	-0.3%
R0888	A181 Gilesgate	11.7	57.8	40.0	57.7	-0.1%	>0.1%

3.6 Key Priorities

The focus of concern in the administrative area is predominantly high concentrations of NO_2 in Durham City, although it is recognised that fine (PM_{10}) and ultra-fine ($PM_{2.5}$) particulate matter can have health effects at concentrations below the National Air Quality Objectives. In January 2023, the Environment Targets (Fine Particulate Matter) (England) Regulations was published which introduces additional targets relating to $PM_{2.5}$. As a result, further work will be undertaken to determine the significance of $PM_{2.5}$ within the AQMA.

The review of the baseline conditions indicates that, whilst air quality is improving across Durham City, there are still locations that exceed, or are close-to the annual mean NO_2 objective on major routes through the AQMA due to road traffic emissions. In terms of tackling this, the priorities are:

- Cross-city traffic; and,
- City-centre-destination traffic.

The source apportionment of the road emission sources evidenced that, as indicated in the development of the previous AQAP, the main emissions from road sources are diesel cars and LGVs, along with buses on specific roads.

These priorities were then developed into series of action themes (see Table 9) which have been used to formulate the draft action plan measures.

4 Consultation and Stakeholder Engagement

As part of updating the action plan, an initial internal consultation with sections in the Council took place. This involved officers from the Spatial Policy, Climate Change and Traffic Management Teams. This was followed by meetings of the Air Quality Corporate Steering Group, a Members Briefing and a local engagement event.

The next stage will be to consult with statutory consultees followed by a wider public consultation on the draft plan.

These stages are summarised in Figure 4 below:

Figure 4 Consultation Process for the Review & Revision of the AQAP

1. Internal Consultation Meetings (based on themes and initial consideration of potential actions).

2. Members Briefing Meeting -Discussions on the 2 targeted action measures & other suggestions for measures.

3. The further development and refinement of the action measures during discussions at the AQ Corporate Steering Group Meetings.

4. The local stakeholder engagement event – the review of the proposed action measures and suggestions for alternative measures

5. Statutory Consultation on the draft Air Quality Action Plan and the wider public consultation.

6. Review and Revision of the Air Quality Action Plan to take into consideration the feedback from the consultation.

4.1 Internal consultation

During the meetings with internal stakeholders, the outcome of the baseline assessment was presented. The themes detailed in Section 5.1 were outlined to explore possible action measures around these. Specifically, they were used as a basis for developing strategic action measures focussed on traffic travelling across the city and potential targeted measures towards traffic travelling into the centre of the city.

In addition, this provided an opportunity to identify any relevant strategies, policies and plans that potentially would link into the process of drafting the air quality actions and highlighted any barriers.

4.1.1 Air Quality Corporate Steering Group

The development of new actions was undertaken through regular meetings of the Air Quality Corporate Steering Group, representing relevant departments within the Council, and which replaced the former Air Quality Technical Working Group and Air Quality Corporate Steering Group. Members of the Air Quality Corporate Steering Group include:

- Councillor Mark Wilkes - Portfolio Holder for Neighbourhoods and Climate Change
- Joanne Waller - Head of Community Protection (Chair)
- Mark Jackson - Head of Transport and Contract Services
- Steve Bhowmick - Environment and Design Manager
- Stephen McDonald -Net Zero Manager
- Mike Allum - Spatial Policy Manager
- Ian Harrison-Business Compliance Strategic Manager
- Denyse Holman - Environment Protection Manager
- Dave Lewin - Strategic Traffic Manager
- Joanne Mitchell - Fleet Business Manager
- Peter Ollivere - Policy Team Leader
- David Gribben - Senior Environmental Health Officer
- Sean Barry - Public Health Advanced Practitioner
- Lyndsey Waters- Multi-Media Officer
- Carol Ann Graham - Executive Support Assistant

The Air Quality Corporate Steering Group enabled technical oversight under the political steer of the portfolio holder for Neighbourhoods and Climate Change.

The Group met regularly during the development of this Plan and considered the outcome of the internal consultation. This led to the review of the existing actions and the drafting of new actions.

In subsequent meetings of the Group the wording of the actions continued to be refined and the prioritisation of measures approved. The group agreed the timescales for implementation, the availability of funding and potential costs for each of the action measures.

4.1.2 Member's Briefing

Given the political importance of the two proposals (the micro-consolidation of deliveries and emission-based car parking charges), a Member's Briefing was held to discuss these in more detail. This involved the relevant Cabinet Portfolio holders, local ward members,

officers representing traffic management, public health, climate change , Community Protection and AECOM.

In relation to micro-consolidation of Deliveries of Goods into and from the city – it was agreed that a feasibility study should be completed subject to funding. The emission-based car parking charges proposal was agreed in principle; however, it was highlighted that there was a review of car parking policy taking place and any emission-based scheme should take into consideration this review going forward.

At the meeting the possibility of adopting targeted measures at some air quality 'hot spot' locations in the city were discussed. However, there was some divided opinion on such proposals and so it was decided to focus on strategic measures at this point in the process.

4.2 External Consultation

4.2.1 Local Engagement Event

Once the 21 action measures had been established and the wording agreed it was decided by the Corporate Steering Group to hold a local community engagement event with key stakeholder groups. The purpose of this was to obtain views on the proposed actions together with suggested alternatives prior to statutory consultation. This was a targeted event encouraging participation from the Area Action Partnerships, the Parish Councils, locally elected Members and MPs, the City of Durham Trust, Durham University and local community groups.

4.2.2 Statutory Consultation

Schedule 11 of the Environment Act 1995 requires local authorities to consult the bodies listed in Table 7.

Table 7. Statutory Consultation

Consultee	Consultation Undertaken
The Secretary of State	No
The Environment Agency	No
The highways authority	No
All neighbouring local authorities	No
Other public authorities as appropriate, such as Public Health officials	No
Bodies representing local business interests and other organisations as appropriate	No

4.2.3 Public Consultation

As part of the statutory consultation process, the wider public will be invited to offer comments on the plan, which will be posted on the Council's website. All feedback received will be duly considered prior to the finalisation of the plan.

Further information in relation to the responses provided during each stage of the consultation are summarised in Appendix F

5 Actions

The following section reviews the actions within the current AQAP and outlines the development of the final Actions adopted in the updated AQAP.

5.1 Preliminary Action Themes

The detailed modelling of emissions and pollutant concentrations, and the source apportionment study, identified the themes that could be developed into new Actions, either individually or as complementary and enabling measures' (e.g. cycle delivery within the AQMA linked to micro-consolidation), for both commercial and private deliveries

The Actions themes which were identified are summarised and consolidated in Table 8.

Table 8. Summary of Preliminary Action Themes

Theme	Emission Source	Action	Constraints and Opportunities	Potential Appraisal and Implementation Considerations
Through traffic	Passing through - effectively regional traffic	Requires further review of mechanism to encourage fleet improvement and reduced personal motor travel	Strategic approach to a national problem, so poor cost / benefit	Review of fleet projections, and consider effects of increasing rate of change. Review effect of peak-spreading flows to understand if redistributed average may have any impact.
	Dragonville retail centre	Variable parking layout / access / parking charge	Focus on traffic from west passing through the city	May be difficulties to model as behavioural effect will be subtle
Destination traffic	Street parking - residential	Variable parking based on emissions	Significant local opposition - in reality, this needs to happen	Amendments to resident permit charges based on vehicle fuel / age.
	Street parking - pay	As above	Measures such as a surcharge for diesel may be viable if it can be enforced; e.g. owners to register with a local database for lower fees, or otherwise claim back parking fees for a low-emission vehicle. On-street parking may also use an existing parking provider enabling variable fees.	

Theme	Emission Source	Action	Constraints and Opportunities	Potential Appraisal and Implementation Considerations
	DCC pay parking	Shift users to Park & Ride	Assume there is limited P&R capacity	
	Private pay parking		Limited CC control and may require controls on access roads.	
Background	Residential heating	Campaign to service boilers and improve insulation	May have minimal effect	
	Residential burning	Campaign, survey of domestic sources	May have minimal effect	
	Transport	As 'through' traffic		
Bus		Retrofit / renewal	Commercial restrictions	Update revised bus profile used in projection
		Hybrid geofencing	Technical / cost restrictions, potential viability issues of running hybrid-electric motors on steep hills, and commercial risks of installing equipment for buses that may be relocated[1].	Model bus emissions contribution based on the number of hybrids operating in key areas
LGV		Limited access times		Reduce LGV flows / emissions proportionally to represent controls
		CAZ emission-based restriction	Would need operator grants, or evidence that few are affected (in which case it is not worthwhile) and would likely cost to implement. A parking app may be used, as described above. As above, this would need automatic or manual	Adjust proportion of LGV on CC links to represent controls.

[1] Example of commercial geofencing at https://www.focustransport.org/2019/09/new-buses-with-geofencing-for-brigton.html

Theme	Emission Source	Action	Constraints and Opportunities	Potential Appraisal and Implementation Considerations
			enforcement as many vans would stop very briefly.	
		Access limited to zero-emission operation, i.e. signage, as cheaper than a CAZ.	Geofencing and / or speed limit to restrict non-compliant vehicles, or enforcement, as above.	Model LGV emissions contribution
Active travel	Car	Improved resource and support for micro-e (in addition to AT) to support accessibility to deprived groups with links to IMD score for car ownership.	Limited segregated space to enable this	Likely not possible to model, as behavioural effect will be subtle.
	LGV	Focus on cargo bikes and whether a distribution / micro-distribution hub could be implemented by the Council or with partners to utilise the city layout a defined centre, with a large commercial / light-industrial areas near the motorway.		Link to LGV measures

The Actions in the current AQAP were previously categorised based on the target of each measure, e.g. bus and taxi, active travel, planning, etc. However, whilst this was logical in terms of the development of new Actions from zero base, for the purposes of the new AQAP it was decided to focus on the key emission sources.

Cross-city traffic that does not stop in the city centre is a significant proportion of the total flow in Durham City as the Milburngate Bridge is a strategically important east-west river crossing with limited viable alternative routes. However, this is a coarse definition as it may include journeys with a destination at the Dragonville retail area to the east of the city centre, which has a parking capacity of 3261 short-term spaces (Ref 4).

Traffic with a destination in the city centre are most likely to use the 1962 pay parking spaces in commercial carparks operated by the Council and private firms, as well as the on-street and residents parking areas managed by the Council. It is assumed that vehicles using one of the three park-and-ride car parks with 1225 spaces will not enter the city.

The council control approximately 53% of all car parking spaces within the city (see Appendix C Table 22 for further details)

The source apportionment of background emissions indicates that background contributions include relatively significant proportions of road and domestic emission sources. Regional transport emissions from areas outside the city may be tackled with strategic measures to improve the vehicle fleet and reduce reliance on private cars.

Targeted measures may be used in geospatially discrete residual hot-spots, such as junctions, and may include consideration of junction redesign, moving stop-lines, or technological measures such as geofencing hybrid drive-cycles for buses and LGVs. As discussed above, there will be a relatively significant proportion of pre-Euro 6 LGVs still operational, which will contribute much of the 19% of the NOX emissions from transport (see Table 2) and so there would be benefit to targeting this portion of the fleet.

Strategic measures cover larger areas, and therefore have the benefit of improving air quality across a wider proportion of the city.

5.2 Review of Existing Actions

Once the action themes had been established, a review was undertaken of the 17 Actions included within the existing AQAP (See Table 9), to decide which could be retained, modified or discarded. Further detail, in relation to progress on the Actions in the existing plan, is outlined in Appendix E.

Table 9. Review of Existing Actions

ID	Measure	Review Outcome
1	The introduction of a UTMC or SCOOT system to coordinate traffic through a network of junctions within Durham City and reduce congestion	Completed
2	The retrofitting of emissions abatement systems on diesel engines on buses using routes within the declared AQMA	Incorporated with modification into new action.
3	Encourage the operation of hybrid buses using routes within the declared AQMA	Incorporated with modification into new action.
4	Ensuring the park and ride buses are compliant with the Euro VI emission standard	Completed
5	The development of cycleways to encourage modal shift across Durham city that link into national and county cycle routes in accordance with the draft Durham City Sustainable Transport Strategy	Incorporated with modification into new action.
6	The promotion of Smarter Travel Choices with businesses in the city to encourage large employers within the city to implement car sharing and pooling or the use of alternative forms of travel	Incorporated with modification into new action.
7	To undertake detailed dispersion modelling of air quality emissions from any development growth and infrastructure in and around Durham City as shown in the emerging Local Plan that may potentially have an impact on air quality within and on the periphery of the declared AQMA. The outcome of this will enable opportunities to mitigate any detrimental impacts and potential benefits.	Study Completed.

ID	Measure	Review Outcome
8	The establishment of the current Air Quality and Planning Guidance Note as a Supplementary Planning Document (SPD). This sets out the requirement on developers when proposing new development within the city and its environs set out in the emerging Local Plan.	Not completed as alternative measure undertaken.
9	The establishment of an Air Quality Strategy that will integrate the strategic policies covering air quality in the emerging Local Plan, the measures detailed within the LTP, the draft Durham City Sustainable Transport Strategy and the carbon reduction strategy in focusing and addressing air quality issues in Durham City.	Not completed due to difficulties keeping the document up to date.
10	To raise awareness of air quality by undertaking a campaign that will integrate with and will involve other campaigns elsewhere in the Council to improve air quality.	Incorporated with modification into new action.
11	Variable messages and car park direction signing system to direct traffic to available parking.	Completed
12	Explore the provision of travel and driver information integrated with the UTMC and to explore the provision of information on air quality through the use of texts, email alert and social networking	Completed
13	To explore whether it is viable or not to progress the introduction of variable charges for residential parking permits with preferential rates for low polluting vehicles (with regard to local air quality effects).	Not completed. The introduction of residential parking permits was not considered feasible by Traffic Mgt.
14	To explore whether it is viable or not to extend existing park and ride routes and/or the provision of further park and ride sites, taking into consideration the emerging County Durham Plan and Sustainable Transport Strategy for Durham City.	Incorporated with modification into new actions.
15	Explore the options for additional highway infrastructure in line with the Durham Sustainable Transport Strategy, taking into account environmental, financial and planning considerations to enable the removal of through traffic from the City centre and contribute to the overall reduction of traffic emissions.	Not completed due to external decisions on the County Durham Plan.
16	To assess the significance of taxi vehicular emissions in Durham City.	Study Completed.
17	To work with the Environment and Design Team to complete a Green Infrastructure (GI) feasibility study for the AQMA in Durham City.	Study Completed.

Following the internal consultation (see Section 4.1) there were concerns that the list of actions would not achieve the required reduction in emissions. Two additional proposals were therefore put forward for consideration. These were:

- Implementation of variable parking operated by the Council based on emissions standards.

- Micro-consolidation of goods and waste to reduce the effects of deliveries, and specifically LGVs in the city centre.

A modelling exercise was undertaken in relation to these two proposals to quantify what the potential air quality benefits would be. (See Appendix C)

5.3 COVID-19

It was recognised that the COVID-19 lockdown has changed how individuals and businesses treat working from home, flexible working and the overall approach to public / personal transport, and also increased adoption of active travel and cycling.

It has also affected personalised and home deliveries, with a reported increase in white-van couriers carrying retail and grocery goods.

Furthermore, there is an extensive body of evidence that long-term exposure to PM increases mortality and morbidity from cardiovascular and respiratory infections and diseases. The strongest evidence for effects on health is associated with fine particles - PM2.5 (Ref 5). Therefore, consideration of air quality and exposure must be considered in the Council resilience and sustainability planning.
Ref:-www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution

Whilst it may be difficult to extrapolate this behaviour forwards as society moves away from lockdown restrictions, it is considered inevitable to expect some residual behavioural change as people travel at different times and modes.

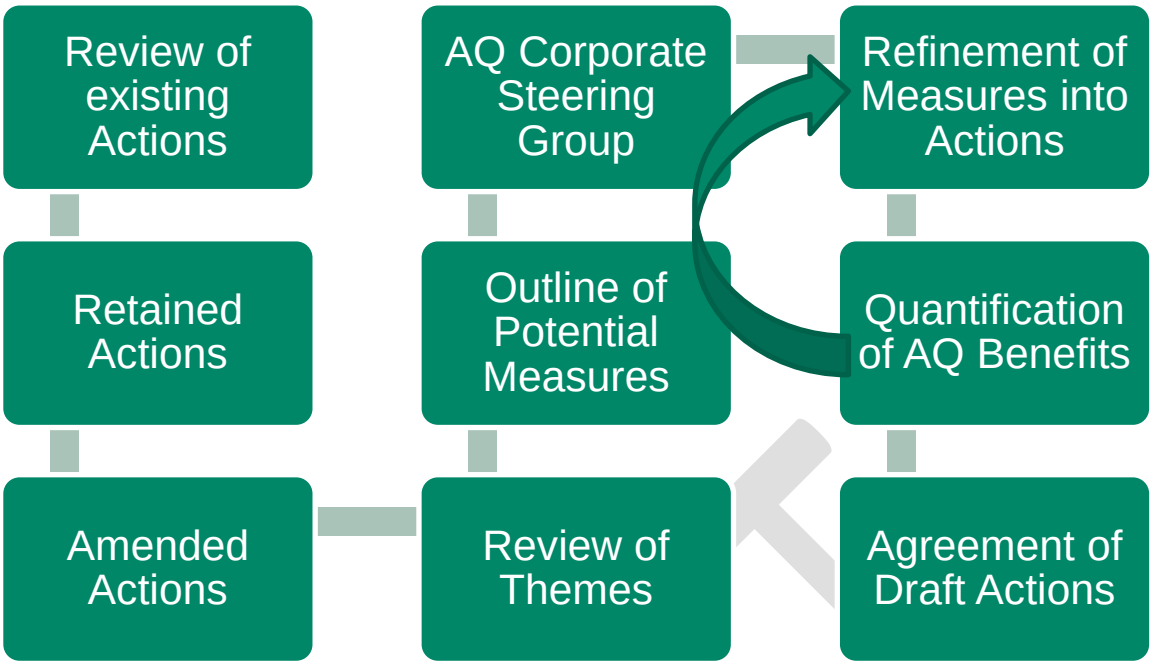
5.4 Development of New Actions

Following the initial review of the actions, the outcomes were discussed with the Air Quality Corporate Steering Group and also at a Member's briefing (See Section 4.1.1 and 4.1.2 above)

From the outset it was decided to focus on strategic actions as opposed local measures. Support was not forthcoming for introducing targeted interventions for local hot spot areas, as these were seen as difficult to implement and air quality benefits were unknown. Strategic actions however would benefit air quality across the whole of the city

The process of developing the Actions and consultation with the Air Quality Corporate Steering Group are outlined in Figure 5. The cycle of refining the measures and reporting the quantification of benefits was a key part of the process.

Figure 5. Outline of AQAP Development Process



During the development of the actions, the wider concerns and priorities of the Council and the individual departments, were discussed and also several themes that would not be taken forward at this stage:

- Domestic emissions, which will continue to be managed using LAQM process and Clean Air Act provisions and will be reviewed and reported on in the ASR.
- Targeted measures for specific hotspots will not be progressed at this stage but may be developed further if air quality does not improve in the 'hotspot' areas.
- Clean Air Zones (CAZ) were excluded from the Plan as the evidence related to the destination traffic did not support such a measure. Furthermore, the Action themes based on parking were considered able to capture part of the same traffic (i.e. older, high-emitting vehicles) in a more targeted and local way.

Feedback from the local engagement event on the proposed 21 action measures was then reported to the air quality corporate steering group and as a result no changes were considered necessary except for some minor rewording. The feedback obtained was also used to score the public support element of the prioritisation exercise (see section 5.5) Further information in relation to this feedback is included in Appendix F.

The list of suggested alternative actions from the local engagement event is also included in Appendix F. The corporate steering group decided to include two actions from the list, however, these will be considered together with any suggestions that may arise from the statutory/public consultation.

The other suggestions from the local engagement event were either held in reserve (to be reconsidered at a later stage if necessary) or discarded. Appendix F details the actions to be included or kept in reserve and Appendix G details those actions that it was decided to discard.

5.5 Final Actions

A list of 21 draft action measures was then produced that could then be prioritised and consulted upon.

Each action was scored by firstly determining the potential cost benefit, which comprises of the costs and benefits to air quality. Further information regarding the determination of air quality benefits for those actions that can be readily quantified is provided in Appendix C.

A feasibility score was then applied which takes into consideration the availability of funding and timescales for implementation. It was recognised that further monitoring would be required to understand, more fully, the long terms air quality trends in the city, in relation to some of the actions where there was going to be a significant cost attached.

Feedback from the local engagement event was used to score public support.

The overall score for each action was then determined by multiplying the air quality benefit, feasibility, and public support scores.

A calculated overall score obtained for each of the actions was then assigned a high, medium or low rank category.

The actions were then ranked from 1 to 9 accordingly.

The prioritisation and scoring method are explained further in Appendix H. The rank score and category for each action measure are as detailed in table 10 below.

Table 10 Prioritisation of the Actions

Rank Category	Rank Score	Action Measure
High	1=	Increase the parking capacity of Durham City Park and Ride sites to help incentivise the use of the Park and Ride service across the City. A stretch Action will be to investigate the feasibility of new sites on routes where there is currently no provision.
High	1=	Screen any proposed development in accordance with the latest up to date guidance on air quality. Support any development with air quality and traffic assessments that take into consideration cumulative development, where screening identifies there may be a significant adverse effect on air quality.
High	1=	Impose conditions that comply with the provision of Policy 21 (Delivering Sustainable Transport) of the County Durham Plan.
Medium	2=	Encourage the uptake of Electric Vehicles (EVs) across the County by supporting the provision of EV charging including fast and rapid charging and EV filling stations where this is appropriate.
Medium	2=	Engage further with Park and Ride operators to introduce Zero Emission buses on park and ride routes and implement funding opportunities through liaison with TNE.

Medium	3	Use parking policy and a revised pricing strategy for Council owned car parks and Council on street parking to assist in tackling traffic congestion within Durham City by encouraging modal shift to cleaner, more sustainable travel modes. In addition, investigate the introduction of other policies such as emission based car parking charges , to further encourage modal shift.
Low	4=	Investigate extending the existing number of days and/or hours of operation of all Park and Ride sites
Low	4=	Work with bus operators to track the emissions classification of buses on routes of specific areas of concern, to inform which buses should be operating within the AQMA to provide cleaner exhaust emissions. Stretch Action to identify and implement, where appropriate, any funding streams for retrofitting buses, purchasing hybrids and /or alternatives where they may have the greatest benefits for air quality within Durham
Low	4=	Work with major employers in Durham City and assist with the development, implementation and enforcement of workplace travel plans including reporting, evidencing uptake and regular review.
Low	4=	Develop web pages and other forms of social marketing to increase awareness of air quality issues and promote behavioural change
Low	5=	Identify opportunities to install complimentary additional services to the Park and Ride service across the City Centre and development sites e.g., cycle storage/micro mobility/bicycles and e-bikes plus improved services at Park and Ride sites such as parcel pick-up and delivery and extending EV charging facilities.
Low	5=	Implementation of a scheme to offer the use of EV vans on a free trial for 2 to 3 weeks to small and medium enterprises to promote the uptake of Electric Vehicles.
Low	6	Define and Implement a Public Awareness Campaign focusing on air quality
Low	7=	Improve journey quality offer for users at public transport hubs and Durham city bus station with improved vehicles, priority arrangements to further encourage modal shift alongside improved Real Time Passenger information.
Low	7=	Improve environmental facilities in the Bus Station including Green Wall / Water Harvesting and Photovoltaics

Low	7=	Review the licensed vehicle taxi fleet operating in Durham. Subject to the outcome of this review, an update of the previous taxi emission study on the Durham Taxi fleet may be required.
Low	7=	Use variable message signs (VMS) to provide information regarding air quality.
Low	7=	Review the work previously undertaken in relation to green infrastructure within the AQMA, and where practicable implement the recommendations made.
Low	7=	Obtain a better understanding of the freight and delivery fleet operating in Durham, potentially followed by a feasibility study for the introduction of a freight micro-consolidation scheme to serve Durham City to improve air quality from the shipping of goods into and out of the city.
Low	8	Implement the Strategic Cycling and Walking Delivery Plan 2019-2029
Low	9	Investigate Intelligent transport systems in more detail including SCOOT improvements and funding opportunities west of Durham City Centre and implement bus priority measures on the major bus corridors.

6 AQAP Measures

Table 11 shows the Durham County Council AQAP measures. It contains:

- a list of the actions that form part of the plan
- the responsible individual and departments/organisations who will deliver this action
- estimated cost of implementing each action (overall cost and cost to the local authority)
- expected benefit in terms of pollutant emission and/or concentration reduction
- the timescale for implementation
- how progress will be monitored

The Steering Group will meet every 3 to 4 months throughout the lifetime of the Action Plan. The officer responsible for each action will establish a Task and finish sub-group to deliver specific measures and they will provide further sub-actions as necessary. In addition, they will also define further measurable milestones and report progress to the Steering Group as required.

Table 11. AQAP Measures

Rank Score	Measure	Category/Lead Officer	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
9	Investigate Intelligent transport systems in more detail including SCOOT improvements and funding opportunities west of Durham City Centre and implement bus priority measures on the major bus corridors	Traffic Management (Head of Transport & Contract Services)	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	**Delayed Action:** Action to be reviewed 12 months after the adoption of the AQAP to allow further monitoring to be undertaken and longer-term trends to be assessed.	>2 years from adoption.	None	No	Not Funded	£100k - £500k	Planning	Reduced emissions from congestion may be significant in specific, discrete locations. Benefits would not necessarily include all areas of the AQMA.	Extent of congestion at peak hours		It was recognised that there are likely to be considerable costs associated with the design stage (Roundabouts & Junctions). Costs have not been confirmed but would be funded by highways budget.
=7	Obtain a better understanding of the freight and delivery fleet operating in Durham, potentially followed by a feasibility study for the introduction of a freight micro-consolidation scheme to serve Durham City to improve air quality from the shipping of goods into and out of the city	Freight and Delivery Management (Head of Transport & Contract Services)	Freight Consolidation Centre	Within 12 months of the AQAP being adopted, a review will be undertaken to understand the freight and delivery fleet operating in Durham. **Delayed Action:** The feasibility study to be delayed for 12-months after the adoption of the AQAP, to allow the review to be completed and further monitoring to be undertaken to allow longer term trends to be assessed.	<2 years from adoption.	None	No	Not Funded	£10k - 50k	Planning	The review of the existing delivery fleet will indicate the potential magnitude of opportunity to reduce emissions from light goods vehicles. Undertaking a feasibility study will have minimal impact. However, if such a scheme is implemented there will be Targeted benefits at hotspots and city-wide benefits. Benefits may be achieved across the whole city and particularly on routes with high proportions of LGV traffic, as demonstrated by the source apportionment.	Obtaining a better understanding of the freight and delivery fleet in Durham, and completion of a feasibility study if required.	No progress to date. It is recognised that many large companies are already adopted EV vehicles.	Costs will be low to produce preliminary study. Implementation will be subject to specification and cost shared with partners.
3	Use parking policy and a revised pricing strategy for Council owned car parks and	Traffic Management (Head of Transport &	Emission Based Parking	**Delayed Action:** This Action to be delayed 12-months after the	A scheme may be introduced <2 years if a 'pay	None	No	Funded	£10k - 50k	Planning	Preliminary assessment has indicated that emissions may be reduced by up to 0.8	Revenue and utilisation, and / or analytics from	No progress to date. In the interim, the current car parking policy to be reviewed.	The outcome of the review of parking policy in the city is critical in relation to

Rank Score	Measure	Category/Lead Officer	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
	Council on street parking to assist in tackling traffic congestion within Durham City by encouraging modal shift to cleaner, more sustainable travel modes. In addition, investigate the introduction of other policies such as emission based car parking charges , to further encourage modal shift.	Contract Services)		adoption of the AQAP to allow further monitoring to be undertaken and longer-term trends to be assessed. To also allow for the outcome of parking policy to be finalised.	by phone' system is introduced.						µg/m^3. Of the non-compliant properties projected in the future baseline, 6 of these properties were predicted to be compliant.	app-based parking		this option. There is currently free parking in the city after 14:00 and the focus of this action is to encourage the use of the Park & Ride system If free parking is retained then this would negate the objective. There is an overall concern with regard to the accessibility and engagement of users to adopt pay by phone parking payment, with a significant risk of disenfranchising the most at-risk members of society.
=1	Increase the parking capacity of Durham City Park and Ride sites to help incentivise the use of the Park and Ride service across the City . A stretch Action will be to investigate the feasibility of new sites on routes where there is currently no provision.	Alternatives to private vehicle use (Head of Transport & Contract Services)	Bus based Park & Ride	The extension of the Sniperley Park & Ride facility by 260 spaces is anticipated to be complete by July 2024. Potential further locations of new sites and expansion of existing sites to be defined within 12-months of the AQAP2 being adopted.	<2 years	DCC	No	Funded (Sniperley)	£10k - 50k	Planning	The assessment of the Sniperley P&R scheme predicted that the development will have a beneficial impact on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at modelled sensitive receptor locations. The number of vehicle trips into the city centre was predicted to reduce, and there will therefore be a positive impact on air quality in the Durham City AQMA	Measure usage of the P & R service.	The expansion of the Sniperley Park and Ride is currently being progressed.	
=4	Investigate extending the existing number of days and/or hours of operation of all Park and Ride sites	Alternatives to private vehicle use (Head of Transport & Contract Services)	Bus based Park & Ride	Investigate opportunity for extended operation of the P&R within 12-months from adoption of the AQAP to determine the economic opportunities / risks and a	<2 years	None	No	Funded	£10k - 50k	Planning	Benefits may be proportional to the increased uptake of Park and Ride patronage, where this leads to reduced parking demand in the city centre.	Completion of investigation and definition of outcome	No progress to date.	

Rank Score	Measure	Category/Lead Officer	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
				reasonable operating model in terms of patronage.										
=5	Identify opportunities to install complimentary additional services to the Park and Ride service across the City Centre and development sites e.g., cycle storage/micro mobility/bicycles and e-bikes plus improved services at Park and Ride sites such as parcel pick-up and delivery and extending EV charging facilities.	Promoting Travel Alternatives (Head of Transport & Contract Services)	Active Travel Infrastructure	A preliminary study to be completed 12-months after AQAP2 has been adopted and to allow further work to be completed in relation to Actions 4 & 5.	Feasibility report <2 years	DCC	No	Not Funded (but see final column)	£10k - 50k	Planning	Benefits may be achieved across the whole city.	Publication of a report on collocation of facilities at the Park and Ride and feedback from the provider, including consideration given to the provision of multi-modal travel hubs at alternative locations such as the bus or railway station/car parks.	There are existing proposals to provide hubs across the city where e-bikes can be provided for travel around the city centre.	No approved funding, but there is a live bid for funding for a cycle hub in Durham City which is close to the National Cycle Route
=2	Engage further with Park and Ride operators to introduce Zero Emission buses on park and ride routes and implement funding opportunities through liaison with TNE.	Promoting Low Emission Transport (Head of Transport & Contract Services)	Company Vehicle Procurement - Prioritising uptake of low emission vehicles		< 2 years. This will be carried out in accordance with the renewal of the contract in October 2024 with a possible extension of 2 years to October 2026.	None	No	Funded	£10k - 50k	Planning	Potential impacts with the introduction of zero emission vehicles on three Park and Ride bus routes are predicted to be up to 0.3 tonnes of NO_x per year and 143 tonnes of CO_2 per year.	The number of low-, and zero-emissions vehicles operational on Park and Ride routes will be used to indicate progress on this Action.	No progress to date. A milestone for this action is to report engagement with P&R operators, and identify potential options within the constraints of the contract programme.	It is recognised that there is opportunity to further reduce emission from the Park and Ride buses although this is subject to contractual agreement.
=4	Work with bus operators to track the emissions classification of buses on routes of specific areas of concern, to inform which buses should be operating within the AQMA to provide cleaner	Vehicle Fleet Efficiency (Head of Transport & Contract Services)	Testing Vehicle Emissions	Within 6-months from adoption of the AQAP, a review of the specific vehicles operating on bus routes will be undertaken to determine which may be targeted	< 2 years for tracking and identifying emissions from buses on routes of concern	DCC	No	Funded	£10k - 50k	Planning	Effects are subject to the number of bus journeys affected, the technology adopted and the year of adoption, compared to a pre-existing fleet of mixed age and fuel technologies.	Changes in bus fleet operation and use of UELV or ZEV	No progress to date.	Funding cannot be obtained through a Bus Service Improvement Plan, and so implementation may be subject to commercial restrictions and / or external funding opportunities.

Rank Score	Measure	Category/Lead Officer	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
	exhaust emissions. Stretch Action to identify and implement, where appropriate, any funding streams for retrofitting buses, purchasing hybrids and /or alternatives where they may have the greatest benefits for air quality within Durham			to reduce emissions.							Were all buses to be immediately converted to zero emissions, there would be a change from 32 non-compliant properties predicted in the baseline to 7 non-compliant properties. The maximum annual mean NO_2 change was predicted to occur at the Hallgarth/Church Street junction, with further benefits predicted at Gilesgate, Sutton Street and Alexandra Crescent.			
=7	Improve journey quality offer for users at public transport hubs and Durham city bus station with improved vehicles, priority arrangements to further encourage modal shift alongside improved Real Time Passenger information.	Transport Planning and Infrastructure (Head of Transport & Contract Services)	Public transport improvements-interchanges stations and services		Planned to be completed in 2023	DCC	No	Funded	£10k – 50k	Planning	Action is not possible to quantify as subject to locking-in behavioural change.	Passenger numbers and/or outcomes of satisfaction surveys.	No progress to date. A milestone for this action is to report scope of potential investment to be undertaken.	
=7	Improve environmental facilities in the Bus Station including Green Wall / Water Harvesting and Photovoltaics	Transport Planning and Infrastructure (Head of Transport & Contract Services)	Public transport improvements-interchanges stations and services	A preliminary study to be completed within 12-months from the AQAP2 being adopted.	<2 years	DCC	No	Funded	£50k - £100k	Planning	Beneficial impacts are expected, which may be quantified on individual basis.	Report on installation and maintenance	No progress to date.	
=4	Work with major employers in Durham City and assist with the development , implementation and enforcement of workplace travel plans including reporting, evidencing uptake and regular review.	Promoting Travel Alternatives (Head of Transport & Contract Services)	Encourage / Facilitate home-working	12 months after the adoption of the AQAP2 a strategy will be established on how this action will be delivered e.g. appointment of an officer or re-designation of an existing post.	<2 years	None	No	Not Funded	£10k – 50k	Planning	Case studies may indicate potential range of wider benefits. No data on workplace parking, but a preliminary view of data indicates a potential benefit of up to a 0.5% reduction in emissions from city centre traffic. Other benefits may be achieved from cross-city traffic where routes	Reporting from employers based on pro-forma updates quarterly and / or annually		The impact of this action is uncertain following different working patterns adopted by most employees following the Covid pandemic. It was mentioned that an employee has been contracted to be engaged on this type of project. This will be dependent on funding

Rank Score	Measure	Category/Lead Officer	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
											lead to major employers.			being made available to support a full-time post. Although, the policies in the County Durham Plan support such actions that link in to Travel Plans.
8	Implement the Strategic Cycling and Walking Delivery Plan 2019-2029	Promoting Travel Alternatives (Head of Transport & Contract Services)	Promotion of cycling		The 3 schemes that are already supported by funding are due for completion by March 2024. Further details of these have been included in the Council's Air Quality Status Report submission 2023.	DCC	No	Funded	£10k – 50k	Planning	A potential 25% mode shift may be achievable on a given route dependent on the targeted investment into cycling infrastructure. Outcomes of mode shift may be quantified after implementation.	Reporting progress on Actions	No progress to date. A milestone for this action is to plan and provide high quality cycling and walking networks that are safe and usable for more people. Manage and protect cycling and walking networks to ensure quality of experience for users. Encourage and enable greater participation in cycling and walking across all demographic groups. The overall plan is published here https://www.durham.gov.uk/article/11677/Strategic-Cycling-and-Walking-Delivery-Plan-2019-2029	
=7	Use variable message signs (VMS) to provide information regarding air quality.	Public Information (Head of Transport & Contract Services)	Via other mechanisms	A protocol for posting specific messages relating to emissions and air quality to be defined within 6-months of the AQAP being adopted.	Action operational, with further messages to be agreed	DCC	No	Funded	£10k - 50k	Planning	Impacts not possible to quantify.	Number of signs operational and messages posted. Engagement may be measured through surveys.	Some signage has already been implemented promote non-car travel in the city. A protocol for posting specific messages relating to emissions and air quality to be defined within 6-months of the AQAP being adopted.	
=1	Screen any proposed development in accordance with the latest up to date guidance on air quality. Support any development with air quality and traffic assessments that take into consideration cumulative development, where screening identifies there may be a	Policy Guidance and Development Control (Head of Community Protection Services)	Air Quality Planning and Policy Guidance		Application of guidance being implemented.	DCC	No	Funded	£10k - 50k	Planning	Action will inform mitigation and also complement other Actions	Track metrics for number of assessments triggered, and how many quantify cumulative AQ effects	Policy already in place.	

Rank Score	Measure	Category/Lead Officer	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
	significant adverse effect on air quality.													
=1	Impose conditions that comply with the provision of Policy 21 (Delivering Sustainable Transport) of the County Durham Plan.	Policy Guidance and Development Control (Spatial Policy Manager)	Air Quality Planning and Policy Guidance		Application of guidance being implemented.	DCC	No	Funded	£10k - 50k	Implem-entation	Beneficial with some potential emission reduction proportional to scale of proposed development.	Record how Policy 21 is being achieved.	Policy already in place.	
6	Define and Implement a Public Awareness Campaign focusing on air quality	Public Information (Head of Community Protection Services/Director of Public Health)	Other	Specification for the campaign to be defined within 12 months of the AQAP being adopted. Implementation to take place 12 months after the AQAP has been adopted.	<2 years	None	No	Not Funded	£10k - 50k	Planning	Action is difficult to quantify as involves behavioural change	Measurable indicators will be defined to align to the specific campaign actions, but may include web metrics or attendance numbers.	No progress to date.	
=4	Develop web pages and other forms of social marketing to increase awareness of air quality issues and promote behavioural change	Public Information (Head of Community Protection Services)	Via the Internet	Define a specification for online services within 12-months of the AQAP being adopted.	<2 years	None	No	Funded	£10k – 50k	Planning	Action is difficult to quantify as involves behavioural change	Record metrics for engagement; e.g. web traffic.	No progress to date.	
=7	Review the licensed vehicle taxi fleet operating in Durham. Subject to the outcome of this review an, update the previous taxi emission study on the Durham Taxi fleet may be required.	Vehicle Fleet Efficiency (Head of Community Protection Services)	Testing Vehicle Emissions	A review of the taxi licensing fleet operating in Durham City will take place within 12 months of the adoption of AQAP2.	<2 years	None	No	Funded	£10k - 50k	Planning	A review of the fleet currently operating in the City and a comparison with that assessed in 2019 will clarify whether this figure has changed significantly.	Review of the current licensed vehicle fleet within Durham, and completion of a report on the operational taxi fleet age / fuel profile if applicable.	No progress to date.	
=7	Review the work previously undertaken in to relation green infrastructure within the AQMA, and where practicable implement the recommendations made.	Other (Environment & Design Manager)	Other	Completion of review within 12 months of AQAP being adopted	<2 years	None	No	Funded	£10k - 50k	Planning	Localised effects subject to the design of individual schemes	Report on instances of implementation of green infrastructure and statement on the intended and actual effects.	No progress to date.	
=2	Encourage the uptake of Electric Vehicles (EVs) across the	Vehicle Fleet Efficiency	Promoting Low Emission	Define objectives and specific	In progress	DCC	NO	Funded	£10k - 50k	Implem-entation	Approximately 71% of NOx emissions were	Report on the implementation of measures.	Currently in Durham County, there are 229 public chargers, including 52 rapid chargers, equivalent to 43.9 per 100k people.	With 40% terraced housing in County Durham, it will be

Rank Score	Measure	Category/Lead Officer	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
	County by supporting the provision of EV charging including fast and rapid charging and EV filling stations where this is appropriate.	(Net Zero Manager)	Public Transport	measures within 6-months.							predicted to be from cars in 2024. Approx.. 1% of cars were predicted to be electric in the future baseline, and therefore any increase in electric cars would be proportional to this scenario. Measure will ensure the breakdown of the of the local fleet is in-line or exceeds, the regional trends and policy aspirations required to support Net Zero.	Change in operational car fleet with ANPR compared to projected national uptakes.	Rate of PiV ownership is slightly ahead of the regional average and comparable in terms of the number of chargers per capita; 229 public chargers, inc. 52 rapid, equiv. to 43.9 per 100k people (https://commonslibrary.parliament.uk/local-authority-data-electric-vehicles-and-charging-points/)	difficult to allow EV charging cabling on street or to decide which house to put it outside without causing neighbour parking issues.
=5	Implementation of a scheme to offer the use of EV vans on a free trial for 2 to 3 weeks to small and medium enterprises to promote the uptake of Electric Vehicles.	Vehicle Fleet Efficiency (Net Zero Manager)	Promoting Low Emission Public Transport		Currently operational	DCC	NO	Funded	£10k - 50k	Implem-entation	With four vans in the scheme, this was predicted to achieve a reduction in emissions of: - <0.1 tonnes of NOX per year; and, - 24 tonnes of CO_2 per year (excluding grid generation emissions)	Records of engagement with the scheme, and subsequent feedback from participants.	The Council has purchased four electric vans as part of a try before you buy scheme. The purpose of this project is to allow local businesses to trial the use of an electric van for a short period of time to see how compatible EVs are with their business. The vehicles are currently operated as part of the DCC fleet and the trials are planned to restart again within 12-months.	

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Appendix A Figures

Figure A-1. Modelled Road Network

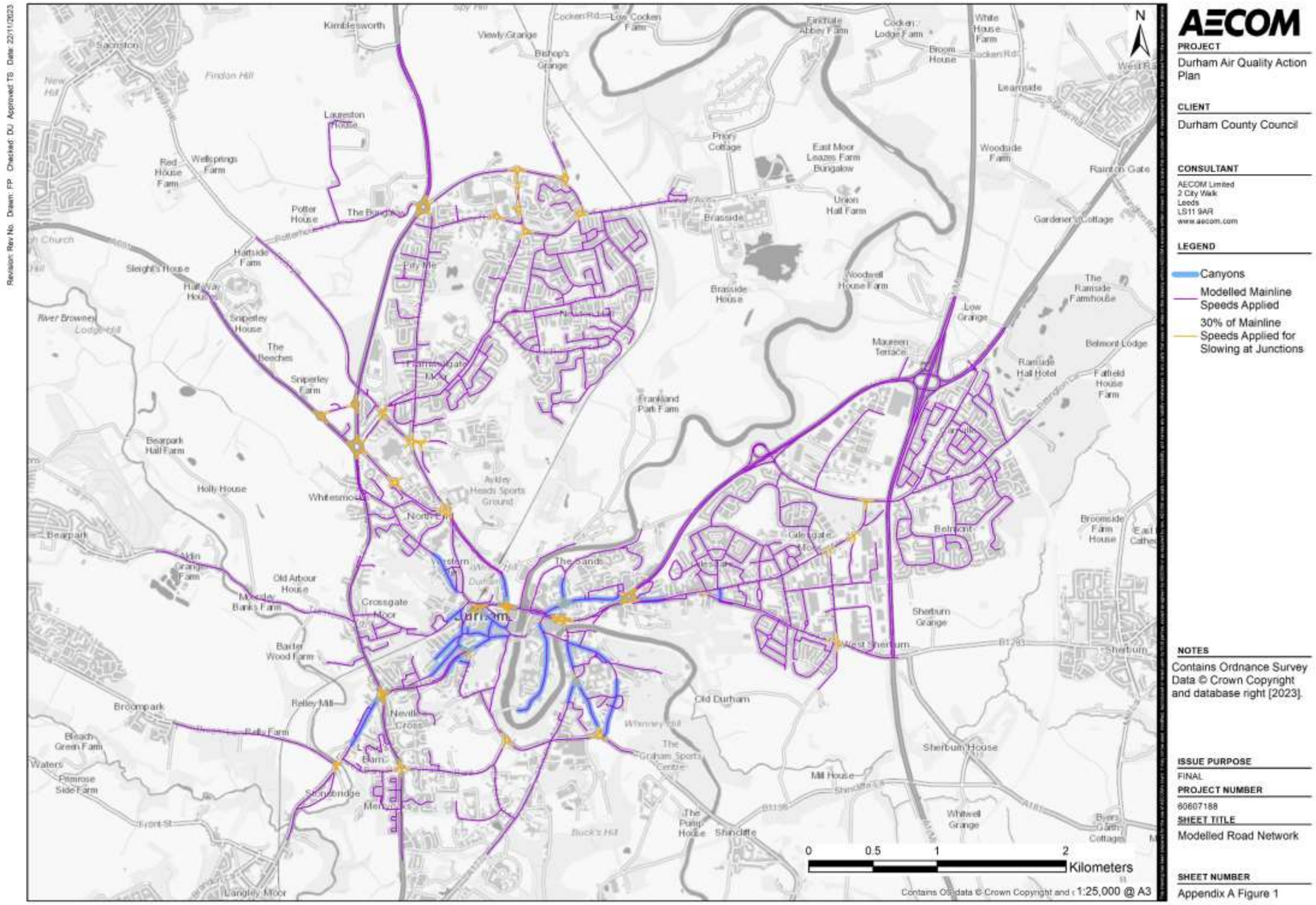
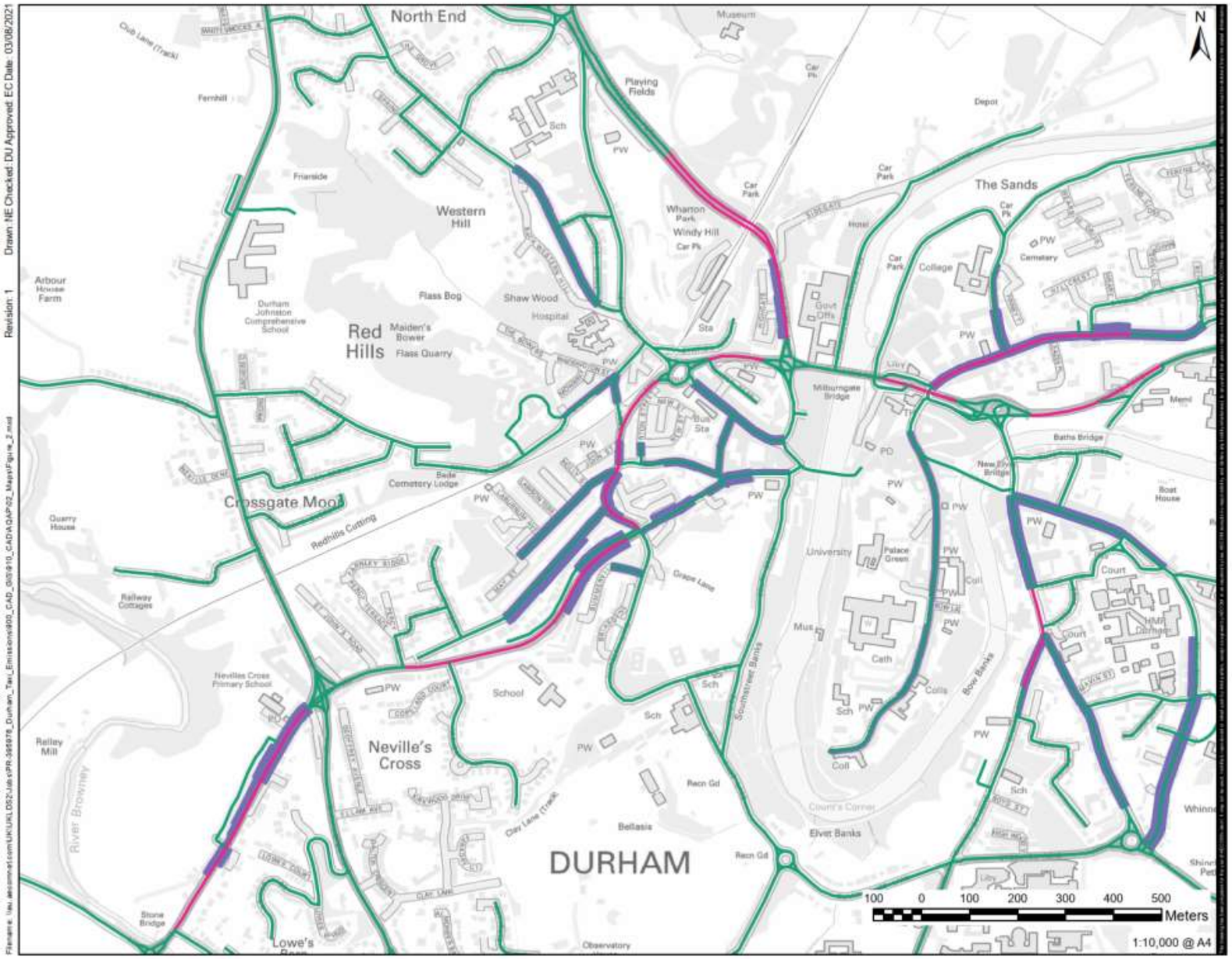


Figure A-2. Extra model features



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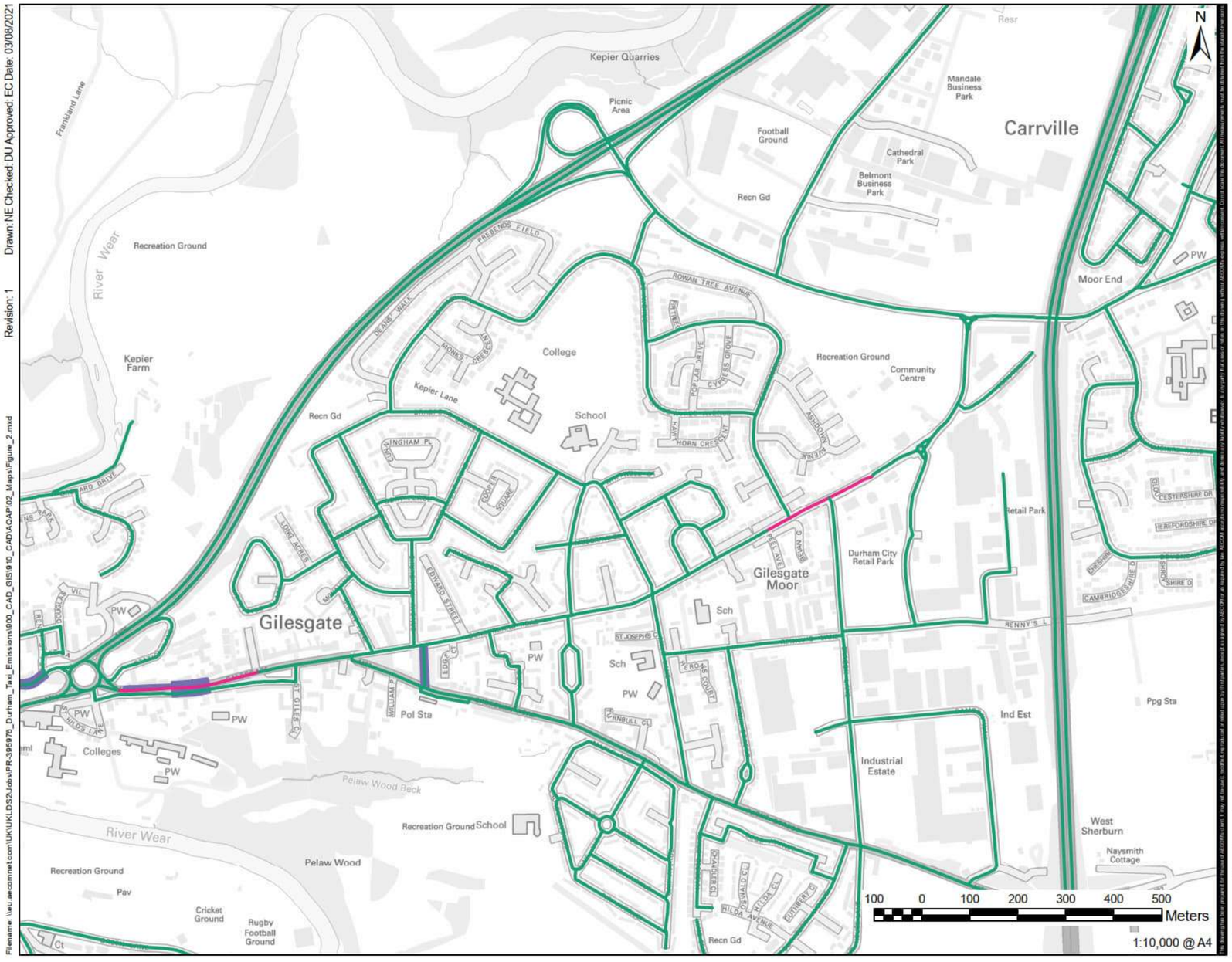

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LEGEND
Modelled road network
- No gradient applied
- Gradient applied

Modelled street canyons

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FINAL
PROJECT NUMBER
60607188
SHEET TITLE
Extra Model Features

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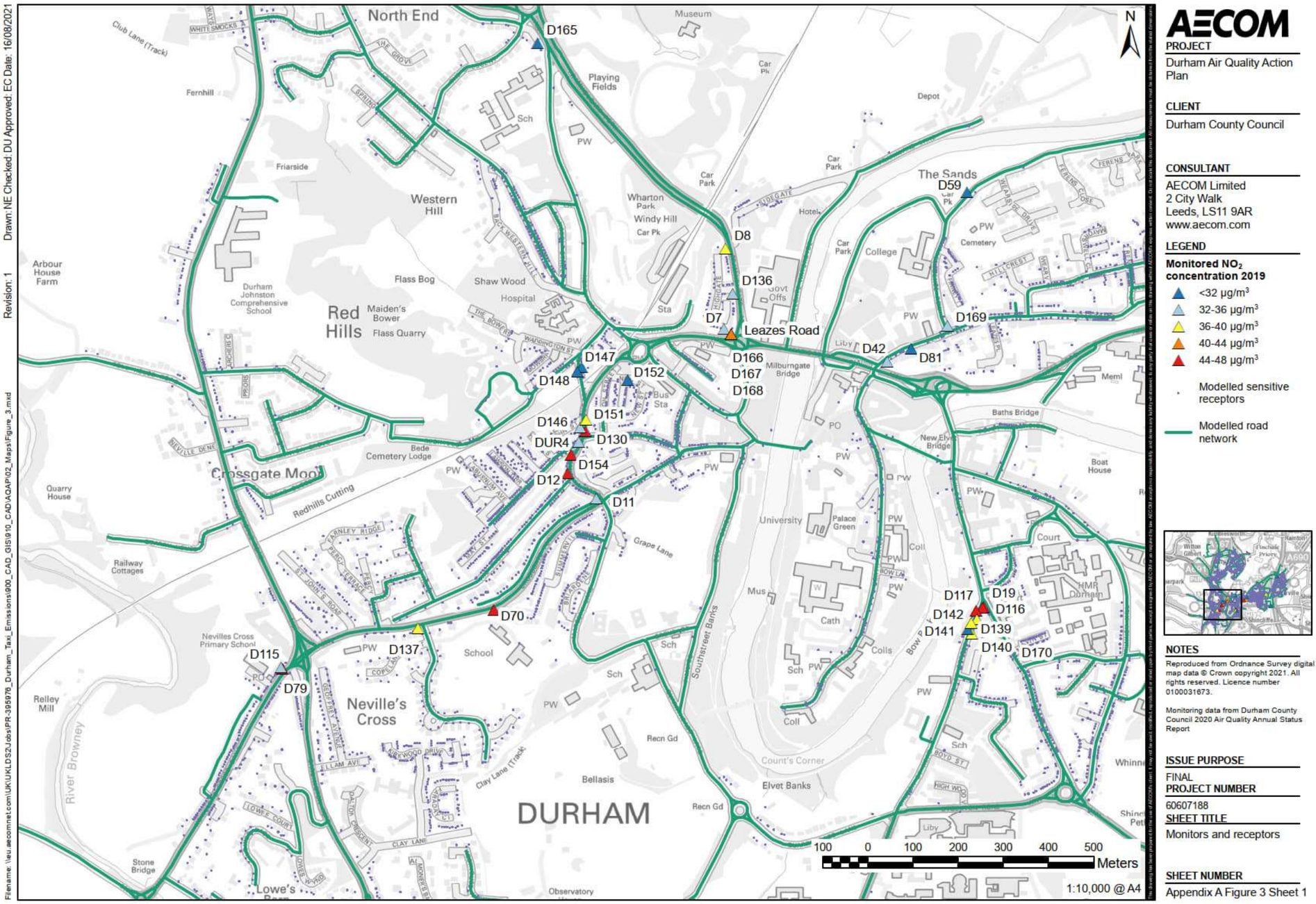
Appendix A Figure 2 Sheet 2

Figure A-3. Monitors and Receptors



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LEGEND

Monitored NO_2 concentration 2019
- <32 µg/m³
- 32-36 µg/m³
- 36-40 µg/m³
- 40-44 µg/m³
- 44-48 µg/m³

Modelled sensitive receptors

Modelled road network

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Monitoring data from Durham County Council 2020 Air Quality Annual Status Report

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SHEET TITLE
Monitors and receptors

SHEET NUMBER
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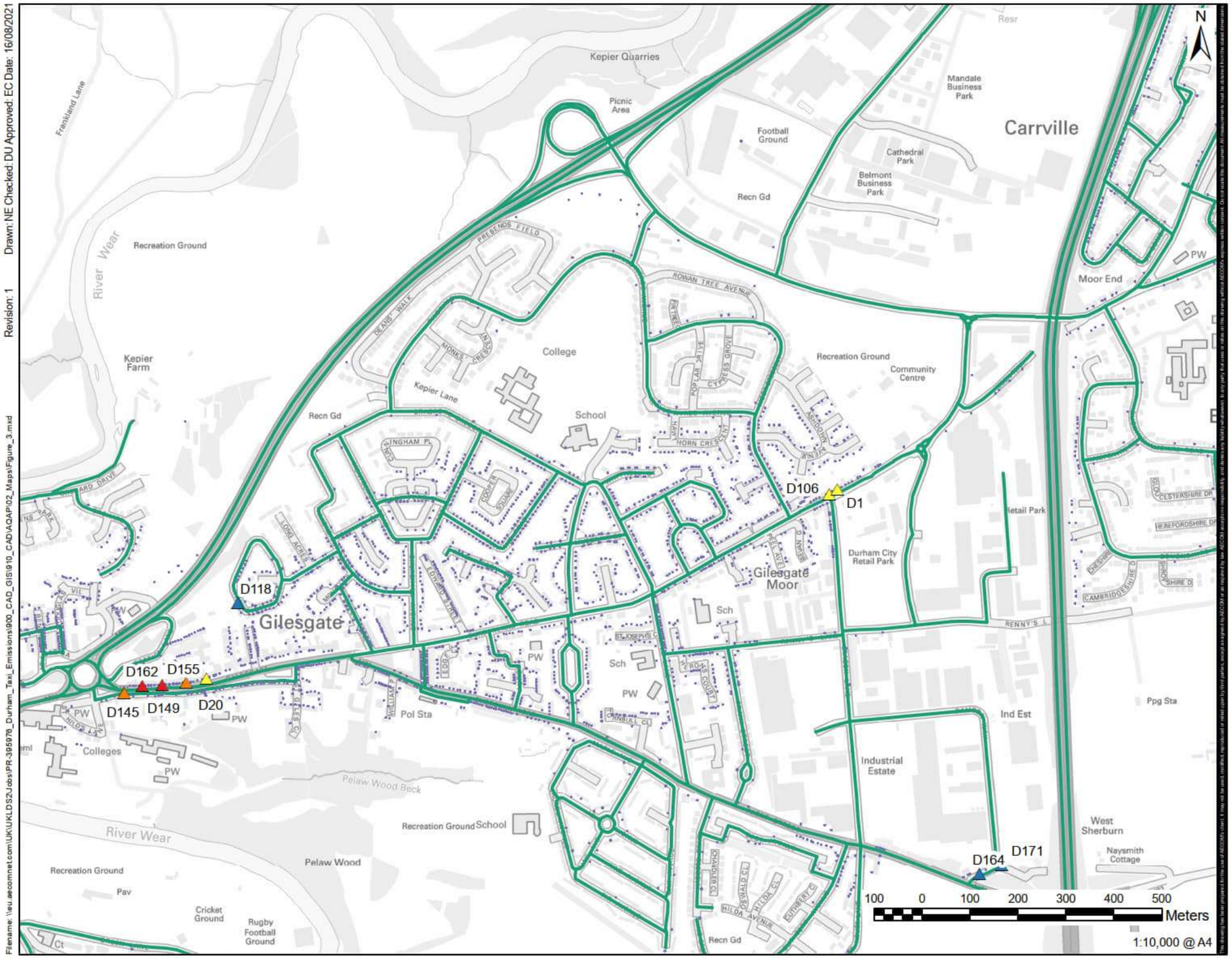
Filename: \\eu.aecomnet.com\UKIUKLDS2\Jobs\PR-395978_Durham_Taxi_Emissions\900_CAD_GIS\910_CAD\AQAP\02_Maps\Figure_3.mxd Revision: 1 Drawn: NE Checked: DU Approved: EC Date: 16/08/2021



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LEGEND

Monitored NO_2 concentration 2019
- <32 µg/m³
- 32-36 µg/m³
- 36-40 µg/m³
- 40-44 µg/m³
- 44-48 µg/m³

Modelled sensitive receptors

Modelled road network

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PROJECT NUMBER
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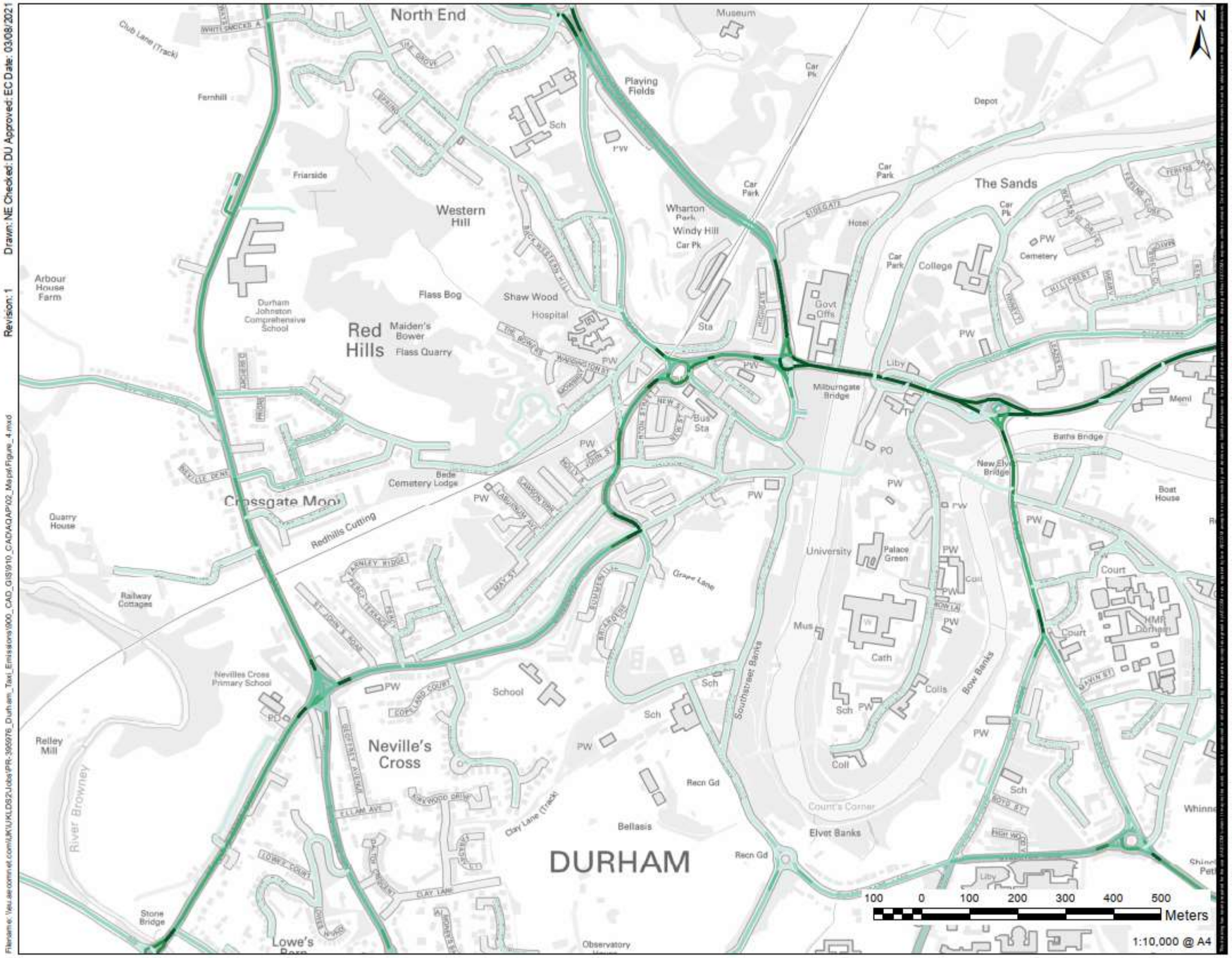
SHEET TITLE
Monitors and receptors

SHEET NUMBER
Appendix A Figure 3 Sheet 2

Figure A-4. Road NO_X emissions



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LEGEND
Modelled NO_X emissions 2024
- <0.02 g/km/s
- 0.02-0.04 g/km/s
- 0.04-0.06 g/km/s
- 0.06-0.08 g/km/s
- 0.08-0.10 g/km/s
- >0.10 g/km/s

NOTES

ISSUE PURPOSE
FINAL

PROJECT NUMBER
60607188

SHEET TITLE
Road NO_X emissions

SHEET NUMBER
Appendix A Figure 4 Sheet 1

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Revision: 1
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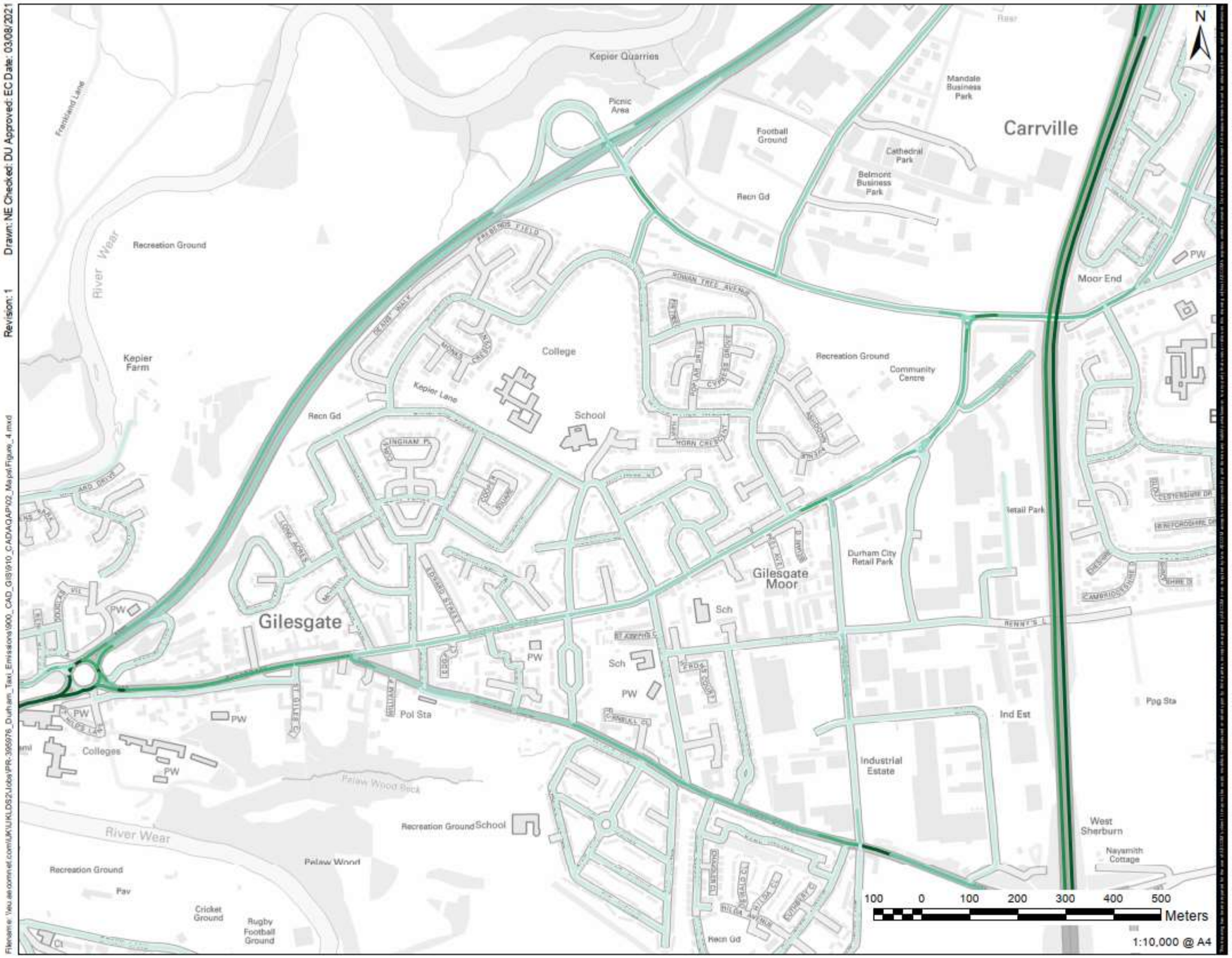

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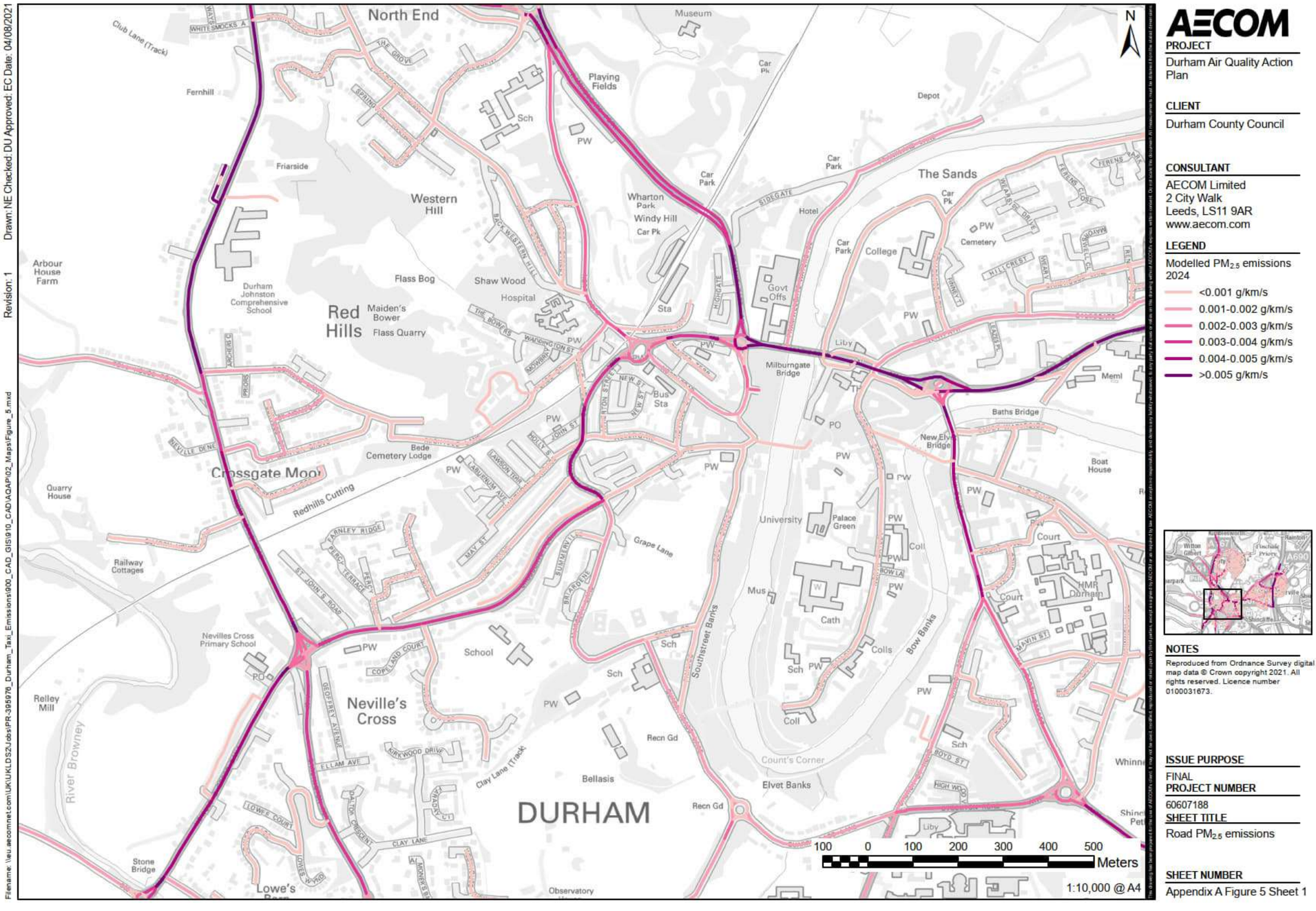
LEGEND
Modelled NO_x emissions 2024
- <0.02 g/km/s
- 0.02-0.04 g/km/s
- 0.04-0.06 g/km/s
- 0.06-0.08 g/km/s
- 0.08-0.10 g/km/s
- >0.10 g/km/s

NOTES

ISSUE PURPOSE
FINAL
PROJECT NUMBER
60607188
SHEET TITLE
Road NO_x emissions

SHEET NUMBER
Appendix A Figure 4 Sheet 2

Figure A-5. Road $PM_{2.5}$ emissions



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LEGEND
Modelled $PM_{2.5}$ emissions 2024
- <0.001 g/km/s
- 0.001-0.002 g/km/s
- 0.002-0.003 g/km/s
- 0.003-0.004 g/km/s
- 0.004-0.005 g/km/s
- >0.005 g/km/s

NOTES

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SHEET TITLE
Road $PM_{2.5}$ emissions

SHEET NUMBER
Appendix A Figure 5 Sheet 1

Revision: 1 Drawn: NE Checked: DU Approved: EC Date: 04/08/2021

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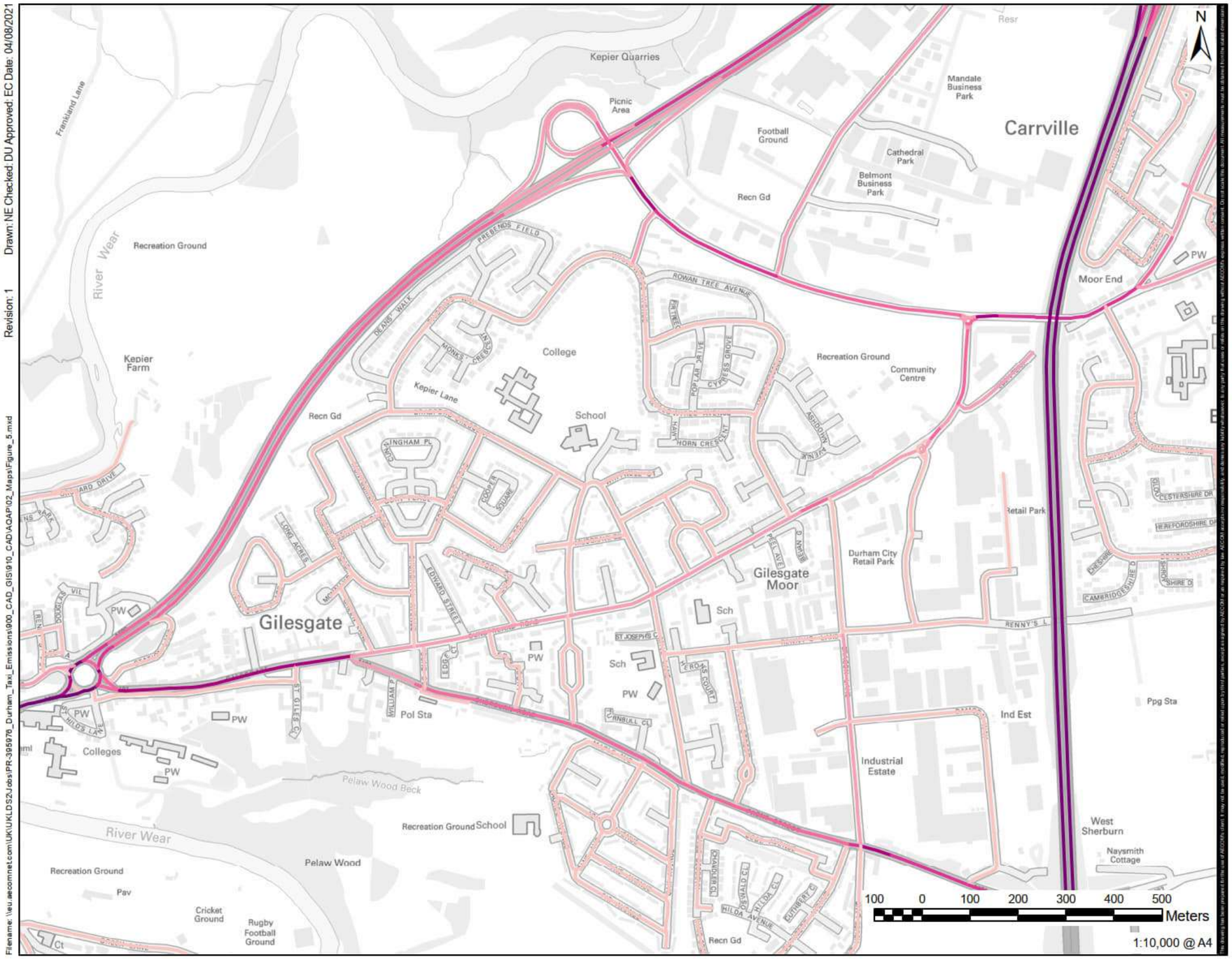

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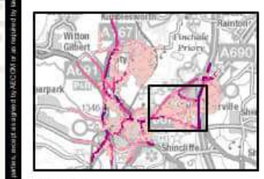
LEGEND
Modelled $PM_{2.5}$ emissions 2024
- <0.001 g/km/s
- 0.001-0.002 g/km/s
- 0.002-0.003 g/km/s
- 0.003-0.004 g/km/s
- 0.004-0.005 g/km/s
- >0.005 g/km/s



NOTES

ISSUE PURPOSE
FINAL
PROJECT NUMBER
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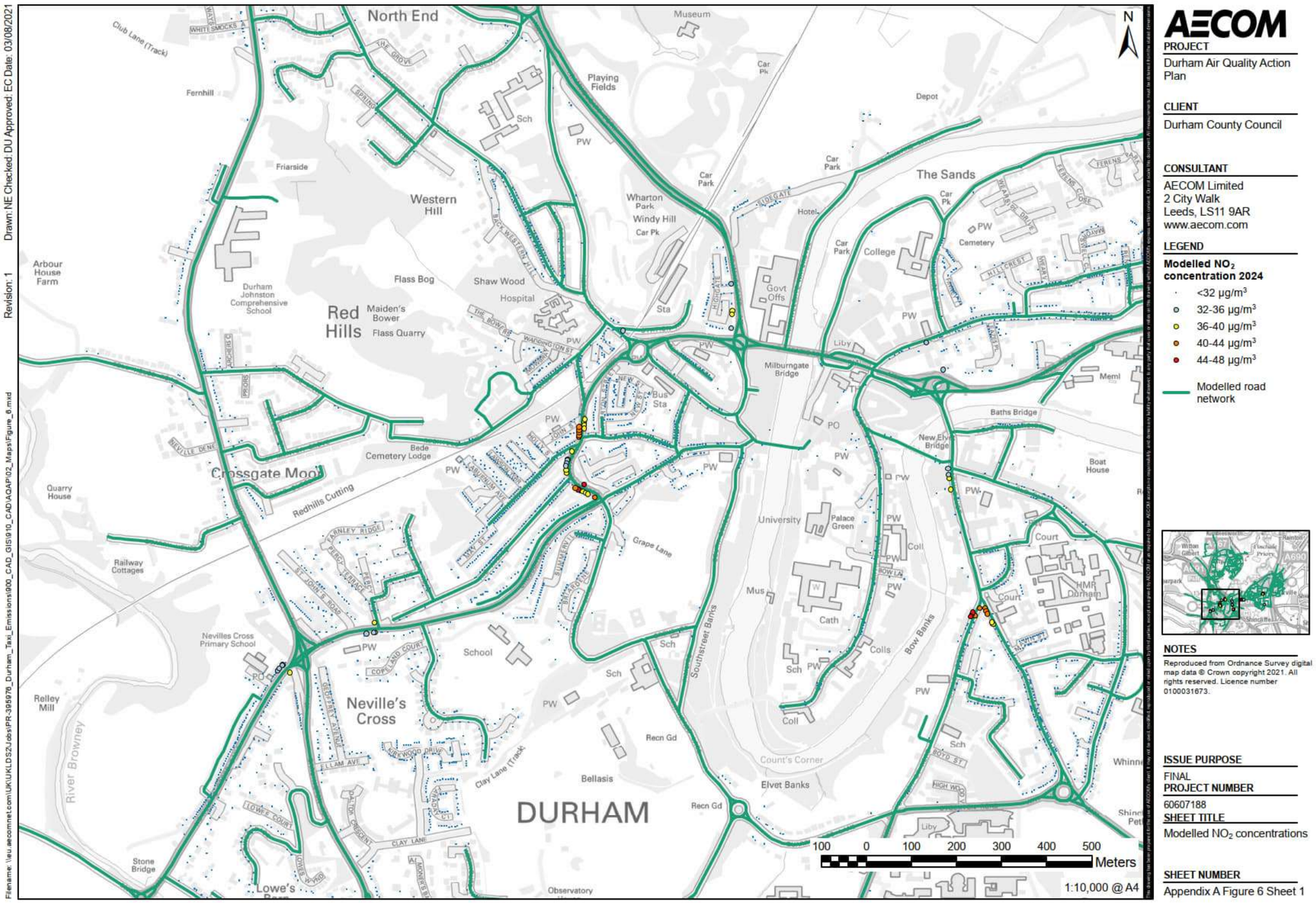
SHEET TITLE
Road $PM_{2.5}$ emissions

SHEET NUMBER
Appendix A Figure 5 Sheet 2

Figure A-6. Future baseline 2024 modelled NO_2 concentrations



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LEGEND

Modelled NO_2 concentration 2024
- <32 µg/m³
- 32-36 µg/m³
- 36-40 µg/m³
- 40-44 µg/m³
- 44-48 µg/m³

Modelled road network

NOTES

ISSUE PURPOSE
FINAL

PROJECT NUMBER
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SHEET TITLE
Modelled NO_2 concentrations

SHEET NUMBER
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Revision: 1 Drawn: NE Checked: DU Approved: EC Date: 03/08/2021

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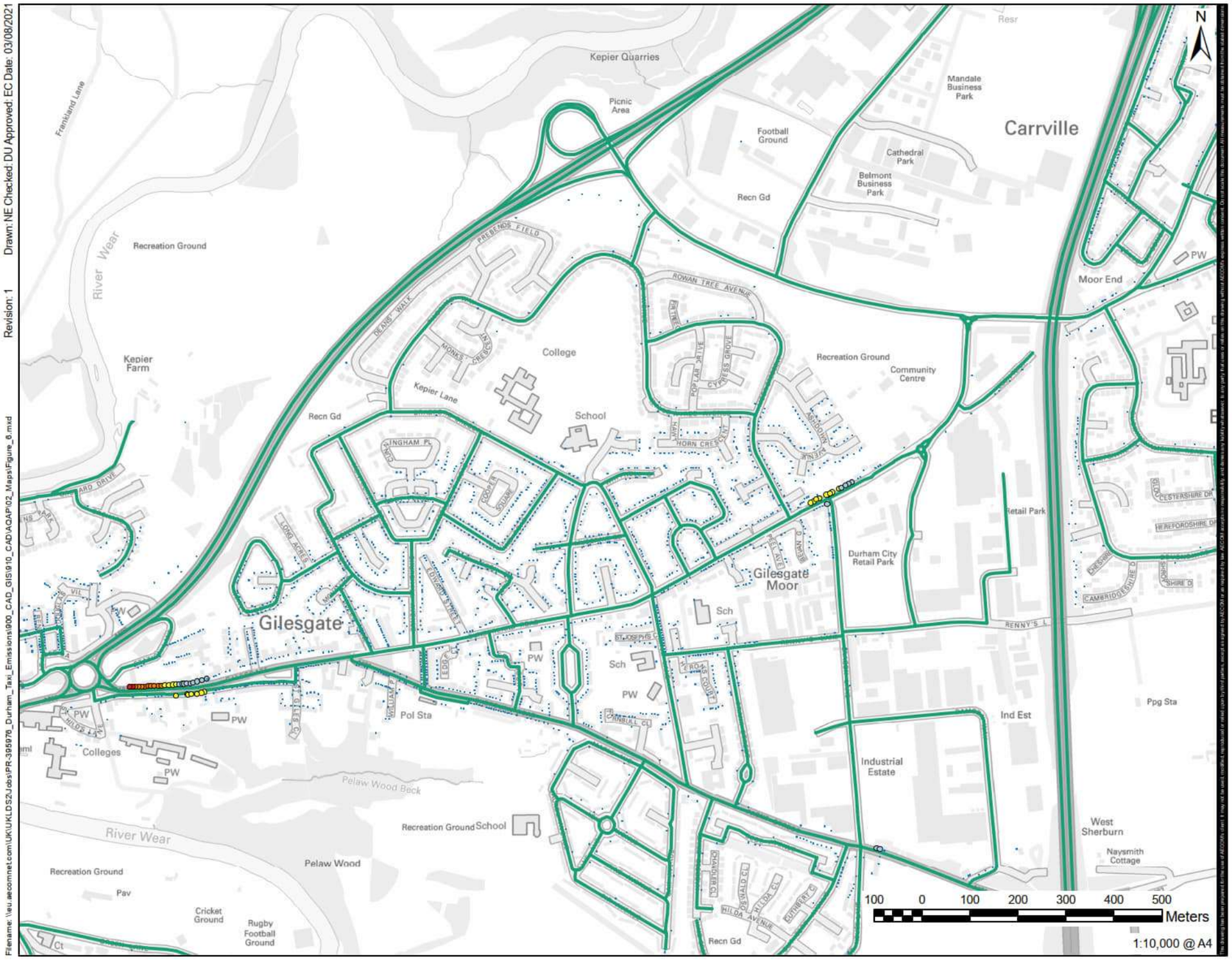

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LEGEND

Modelled NO_2 concentration 2024

- <32 µg/m³
- 32-36 µg/m³
- 36-40 µg/m³
- 40-44 µg/m³
- 44-48 µg/m³

Modelled road network

NOTES

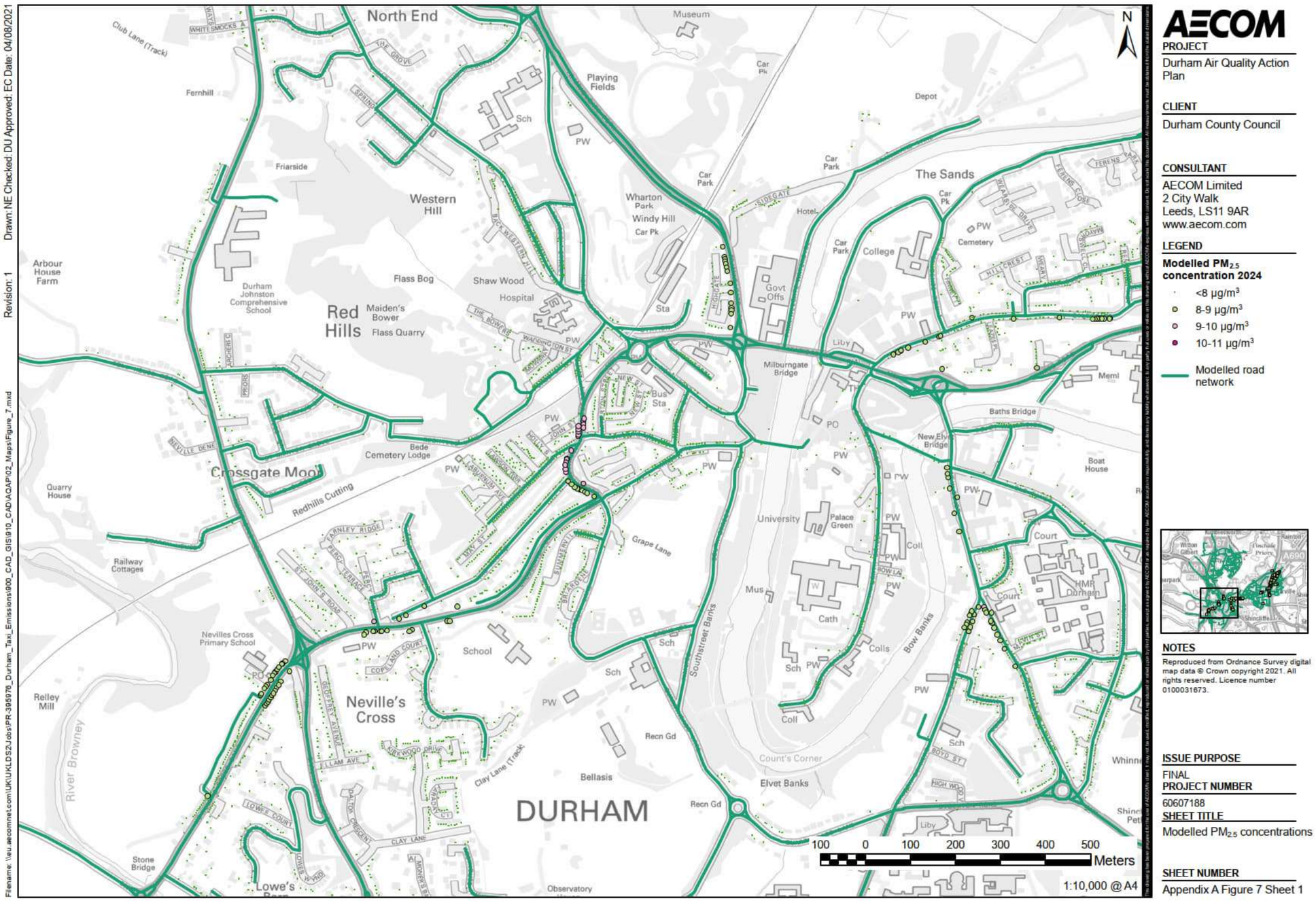
ISSUE PURPOSE
FINAL

PROJECT NUMBER
60607188

SHEET TITLE
Modelled NO_2 concentrations

SHEET NUMBER
Appendix A Figure 6 Sheet 2

Figure A-7. Future baseline 2024 modelled $PM_{2.5}$ concentrations



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LEGEND

Modelled $PM_{2.5}$ concentration 2024

- <8 µg/m³
- 8-9 µg/m³
- 9-10 µg/m³
- 10-11 µg/m³

Modelled road network

NOTES

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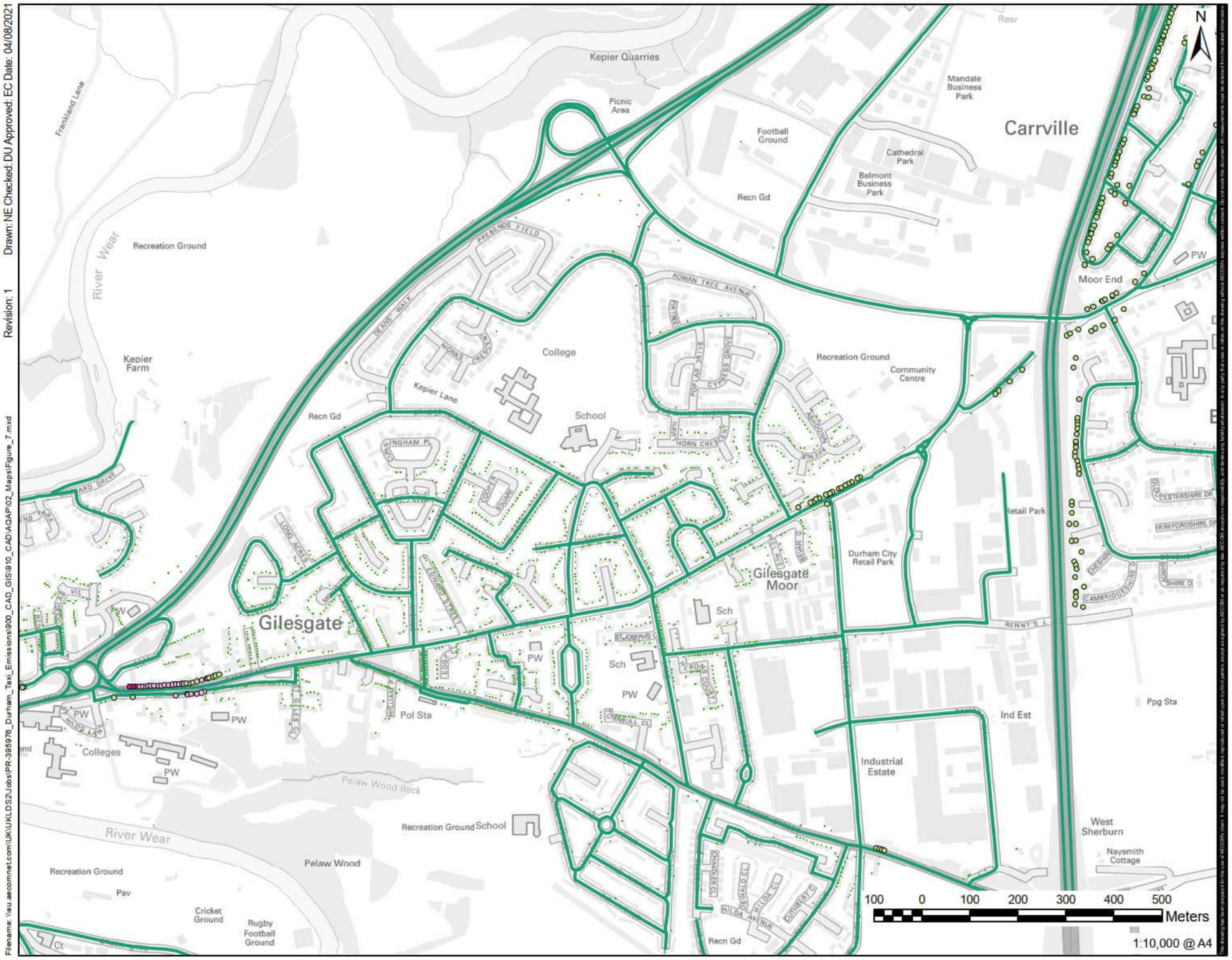
PROJECT NUMBER
60607188

SHEET TITLE
Modelled $PM_{2.5}$ concentrations

SHEET NUMBER
Appendix A Figure 7 Sheet 1



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LEGEND

Modelled $PM_{2.5}$ concentration 2024

- <8 µg/m³
- 8-9 µg/m³
- 9-10 µg/m³
- 10-11 µg/m³

Modelled road network

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Appendix A Figure 7 Sheet 2

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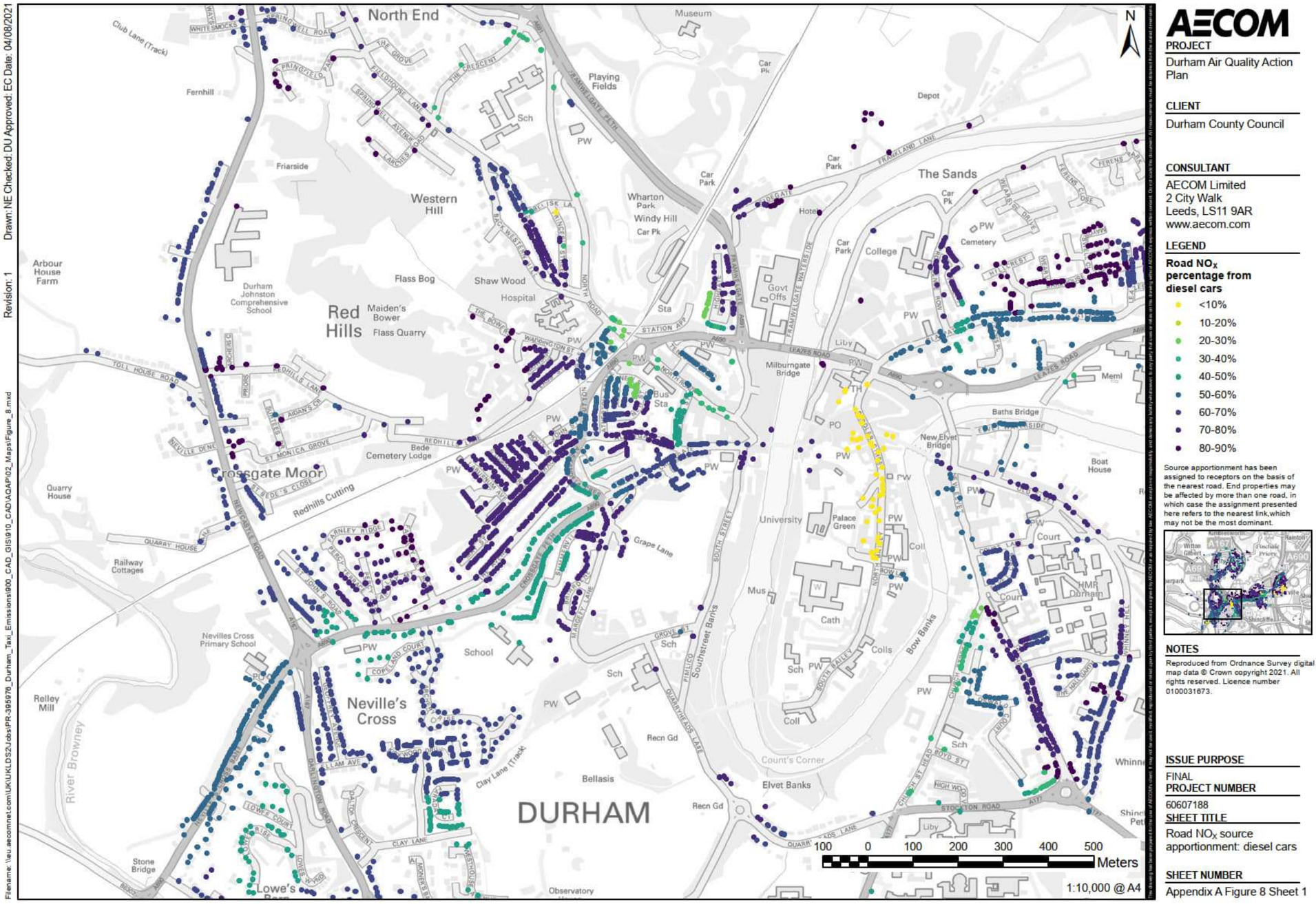
Figure A-8. Road NO_x source apportionment: diesel cars



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LEGEND

Road NO_x percentage from diesel cars

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- 80-90%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.

NOTES

ISSUE PURPOSE
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PROJECT NUMBER
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SHEET TITLE
Road NO_x source apportionment: diesel cars

SHEET NUMBER
Appendix A Figure 8 Sheet 1

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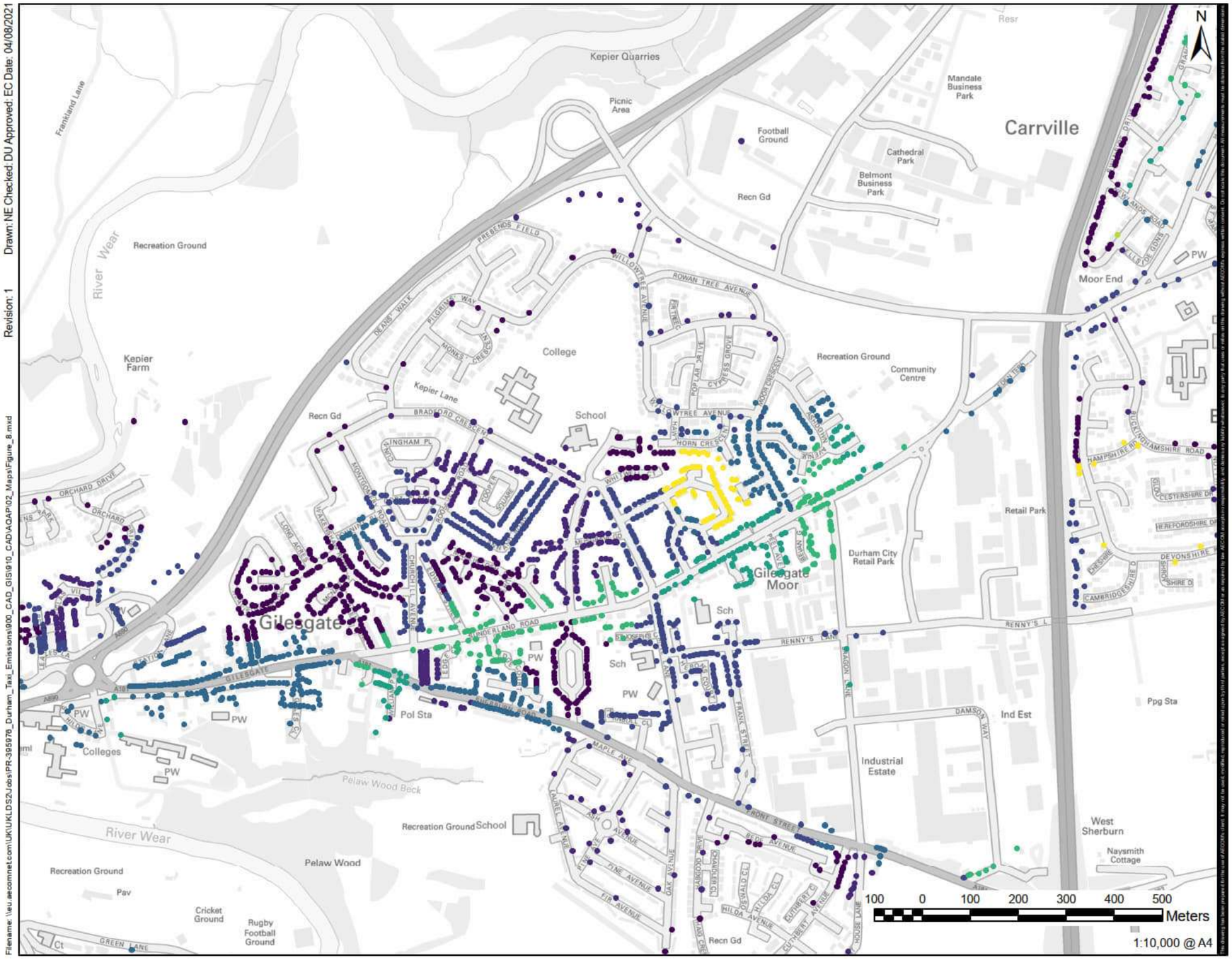

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LEGEND

Road NO_X percentage from diesel cars

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- 80-90%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.

NOTES

ISSUE PURPOSE
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PROJECT NUMBER
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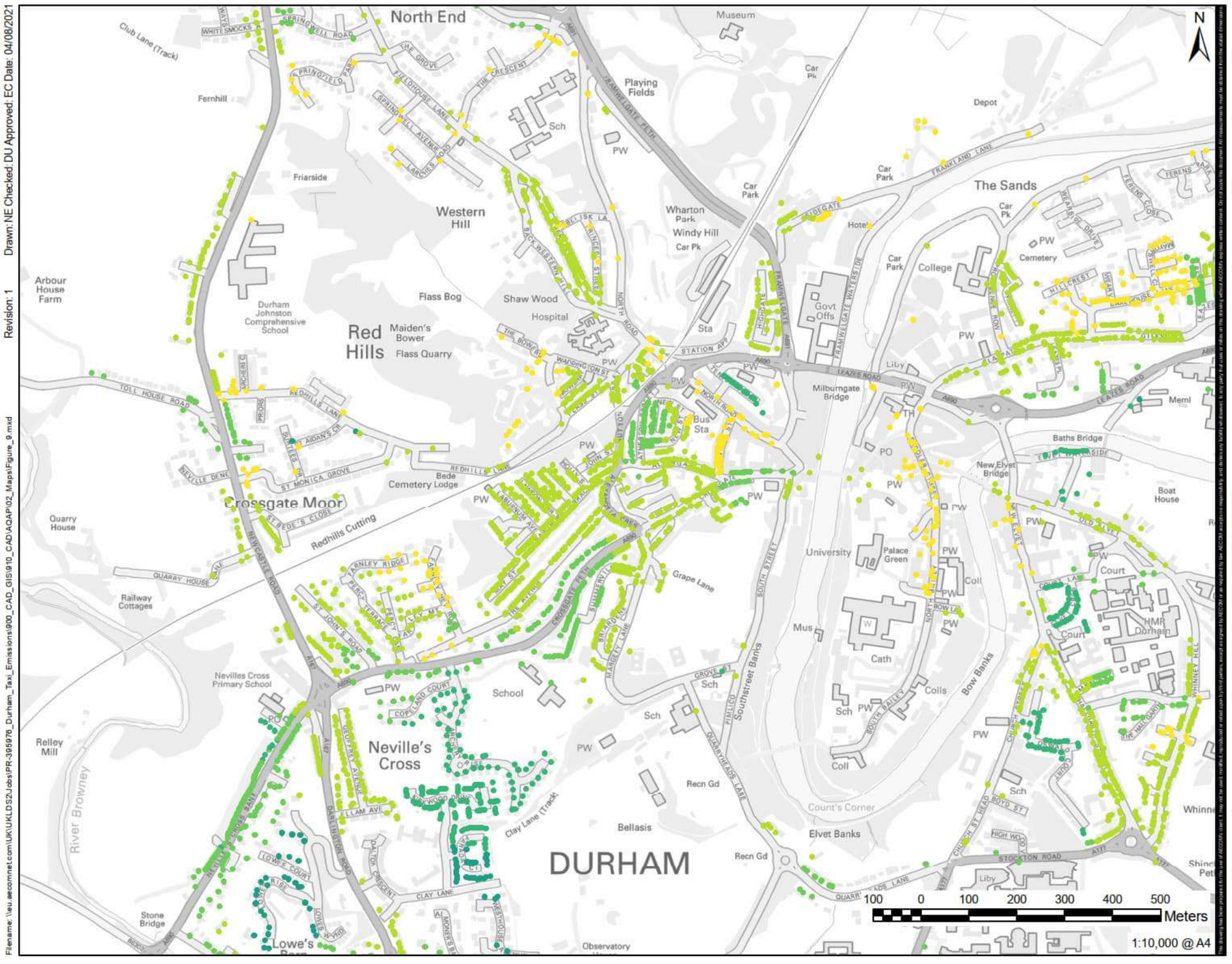
SHEET TITLE
Road NO_X source apportionment: diesel cars

SHEET NUMBER
Appendix A Figure 8 Sheet 2

Figure A-9. Road NO_x source apportionment: LGVs



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LEGEND

Road NO_x percentage from LGVs

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.

NOTES

ISSUE PURPOSE
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SHEET TITLE
Road NO_x source apportionment: LGVs

SHEET NUMBER
Appendix A Figure 9 Sheet 1

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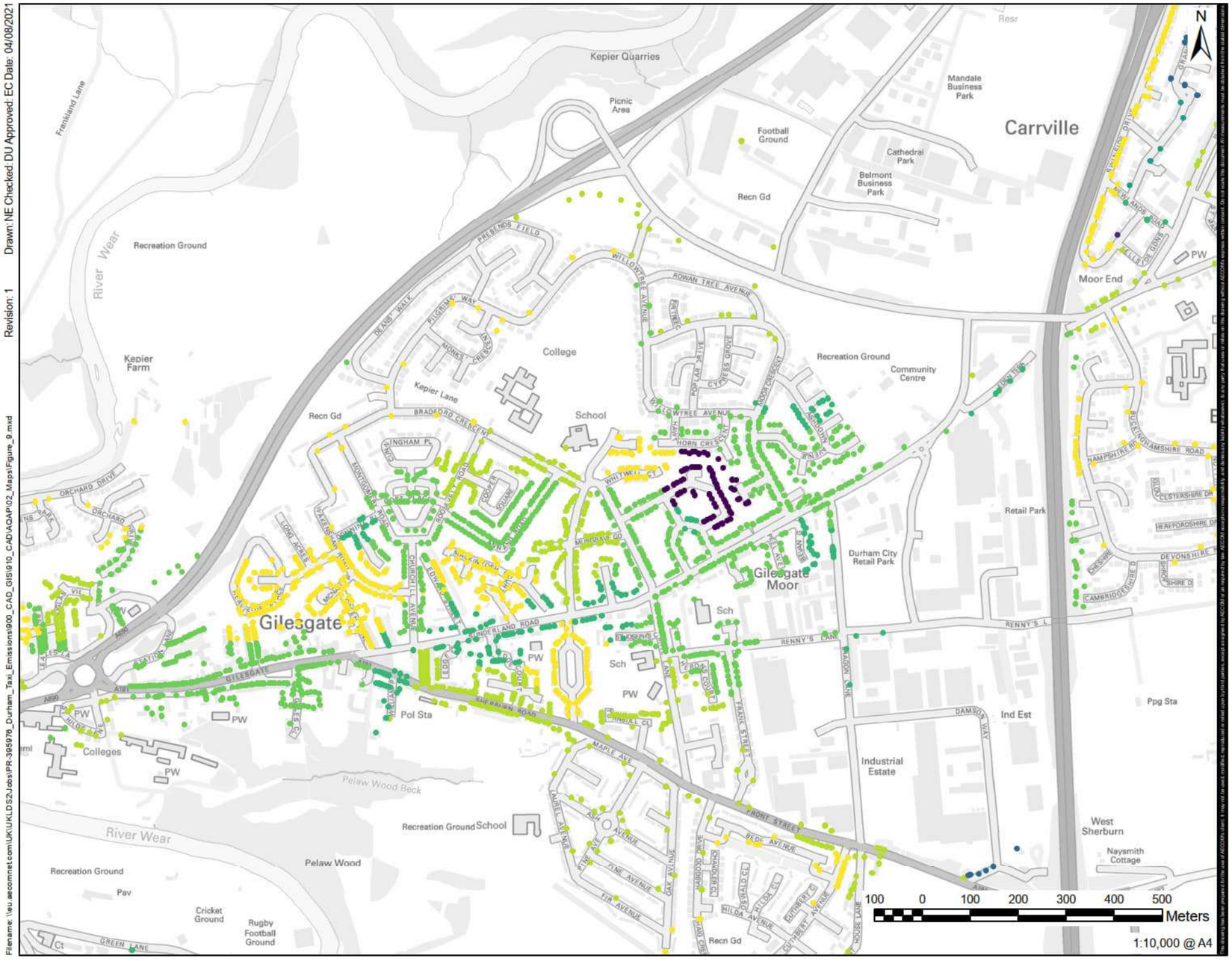

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LEGEND

Road NO_x percentage from LGVs

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link, which may not be the most dominant.

NOTES

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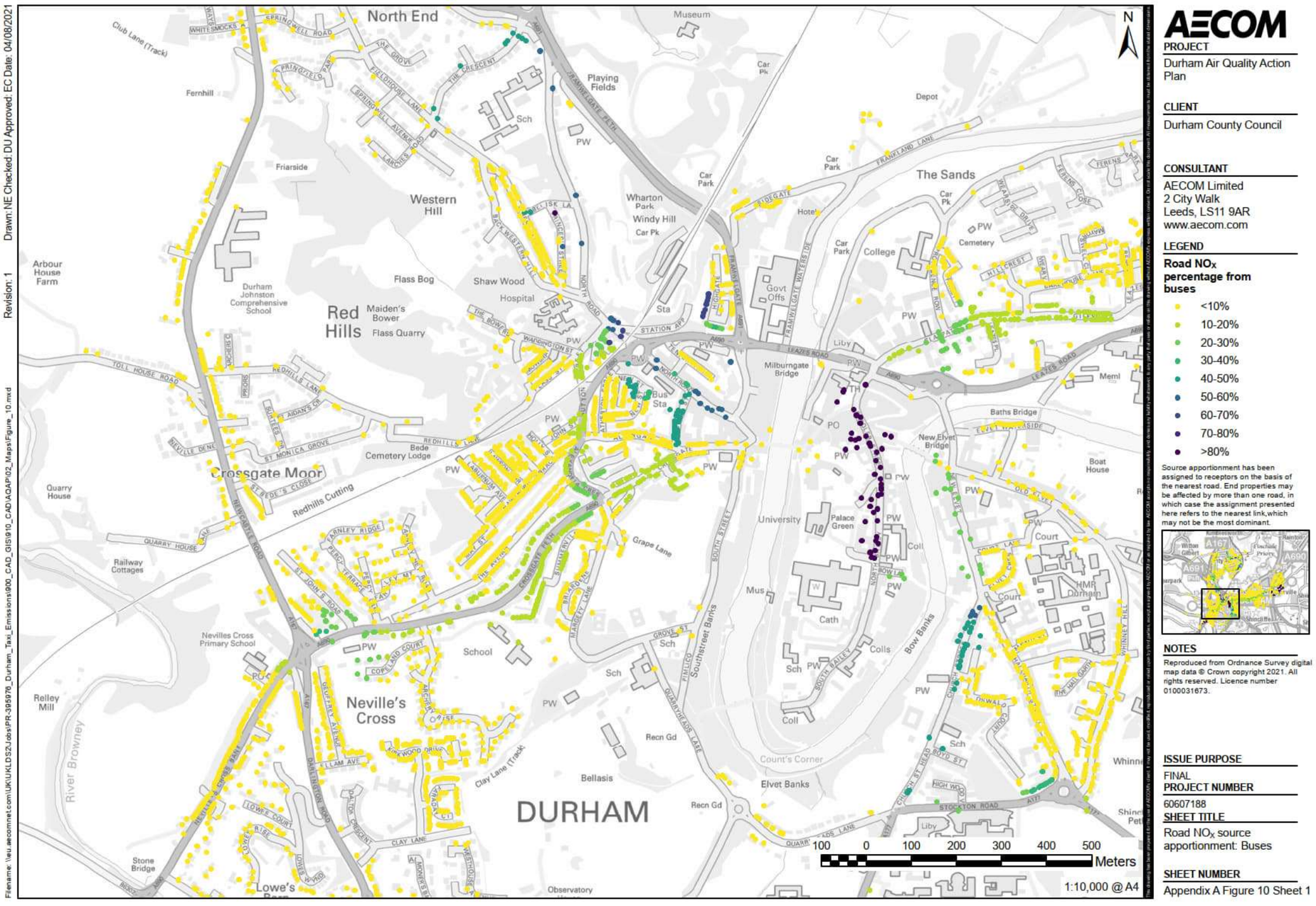
FINAL
PROJECT NUMBER
60607188
SHEET TITLE
Road NO_x source apportionment: LGVs

SHEET NUMBER
Appendix A Figure 9 Sheet 2

Figure A-10. Road NO_x source apportionment: Buses



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LEGEND

Road NO_x percentage from buses

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.

NOTES

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SHEET TITLE
Road NO_X source apportionment: Buses

SHEET NUMBER
Appendix A Figure 10 Sheet 1

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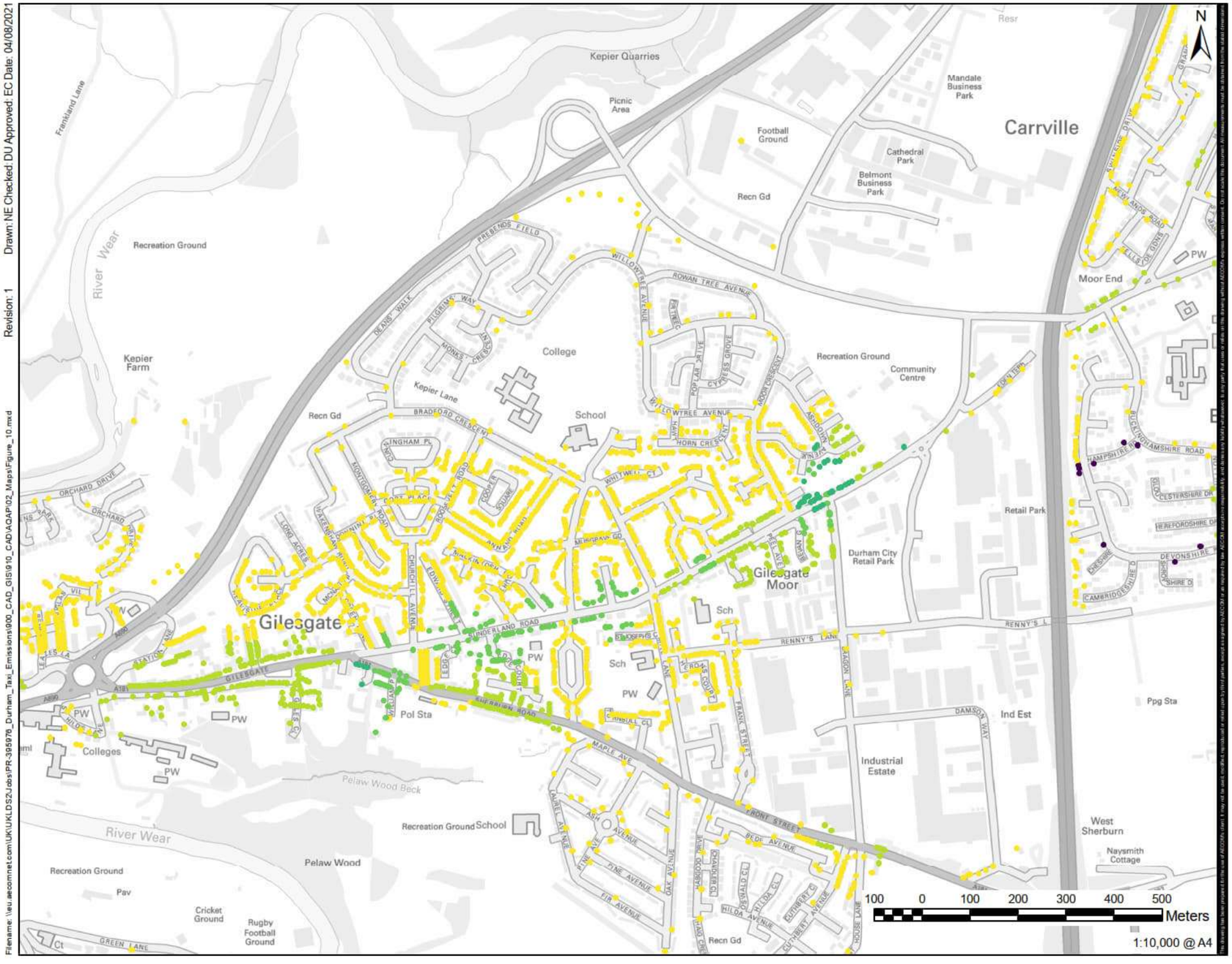

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LEGEND

Road NO_x percentage from buses

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.

NOTES

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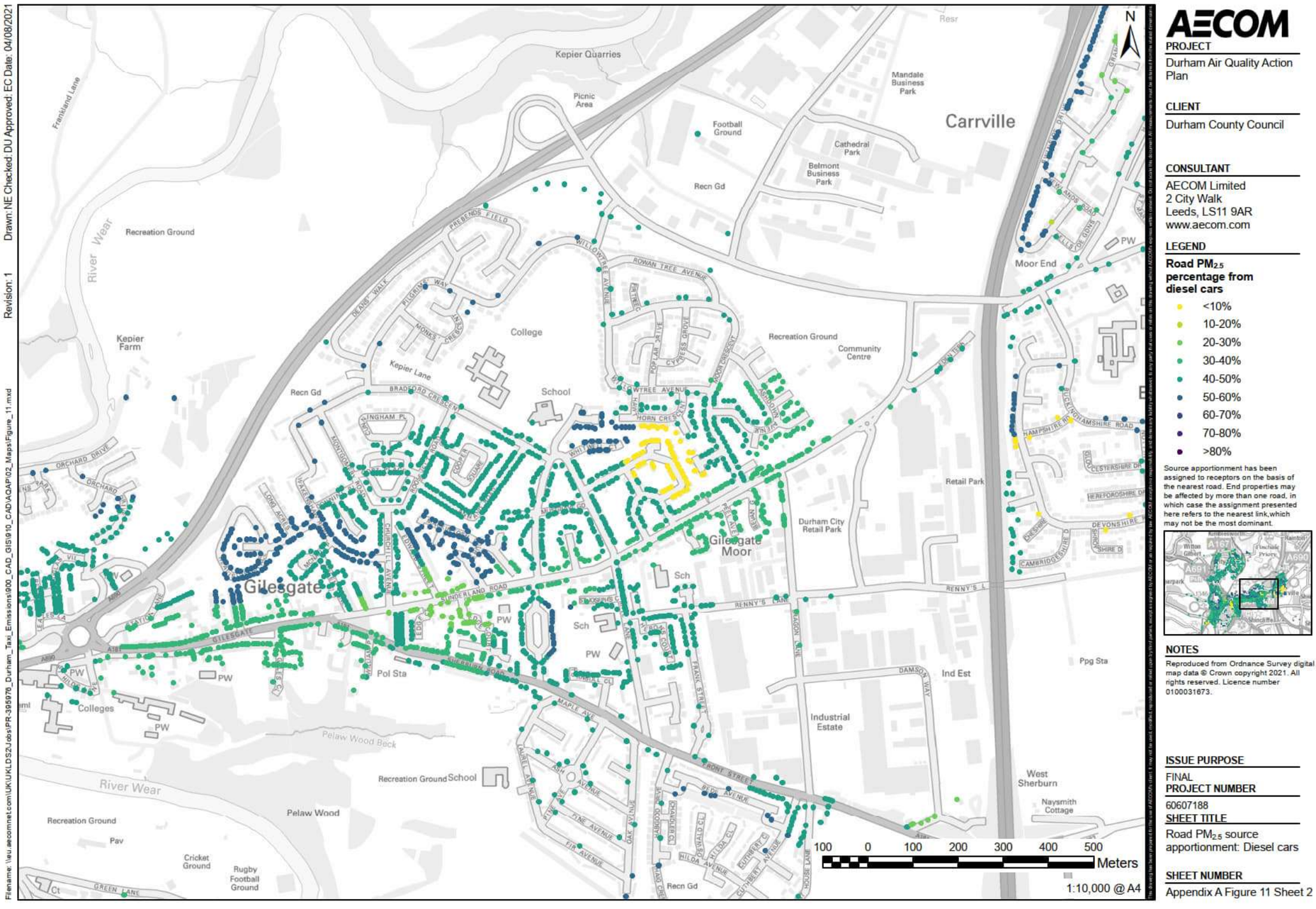
FINAL

PROJECT NUMBER
60607188

SHEET TITLE
Road NO_x source apportionment: Buses

SHEET NUMBER
Appendix A Figure 10 Sheet 2

Figure A-11. Road $PM_{2.5}$ source apportionment: diesel cars



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LEGEND

Road $PM_{2.5}$ percentage from diesel cars

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.

NOTES

ISSUE PURPOSE
FINAL

PROJECT NUMBER
60607188

SHEET TITLE
Road $PM_{2.5}$ source apportionment: Diesel cars

SHEET NUMBER
Appendix A Figure 11 Sheet 2

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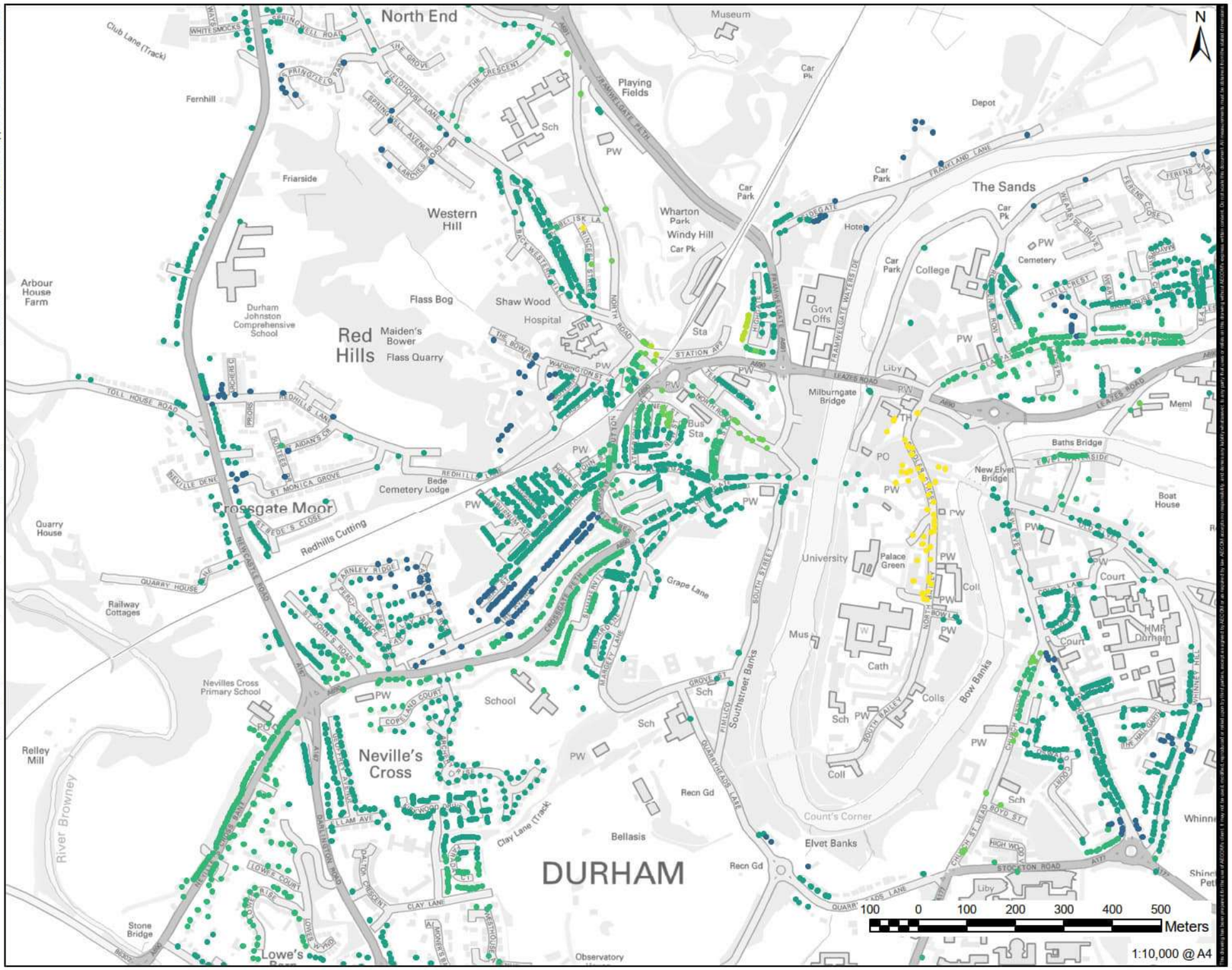

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LEGEND

Road $PM_{2.5}$ percentage from diesel cars

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
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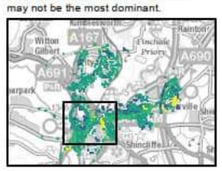
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.



NOTES

ISSUE PURPOSE
FINAL

PROJECT NUMBER
60607188

SHEET TITLE
Road $PM_{2.5}$ source apportionment: Diesel cars

SHEET NUMBER
Appendix A Figure 11 Sheet 1

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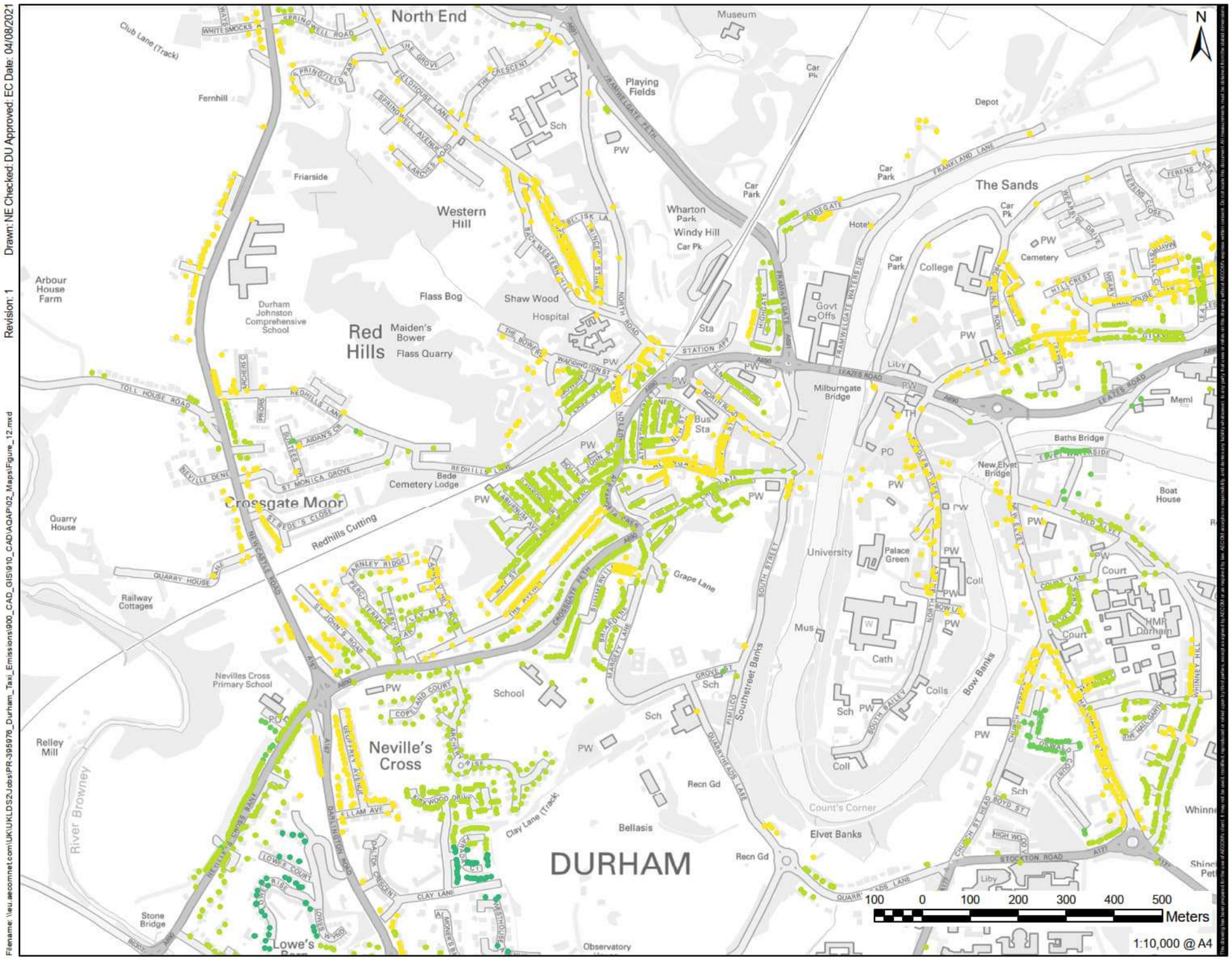
Figure A-12. Road $PM_{2.5}$ source apportionment: LGVs



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LEGEND

Road $PM_{2.5}$ percentage from LGVs

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.

NOTES

ISSUE PURPOSE
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SHEET TITLE
Road $PM_{2.5}$ source apportionment: LGVs

SHEET NUMBER
Appendix A Figure 12 Sheet 1

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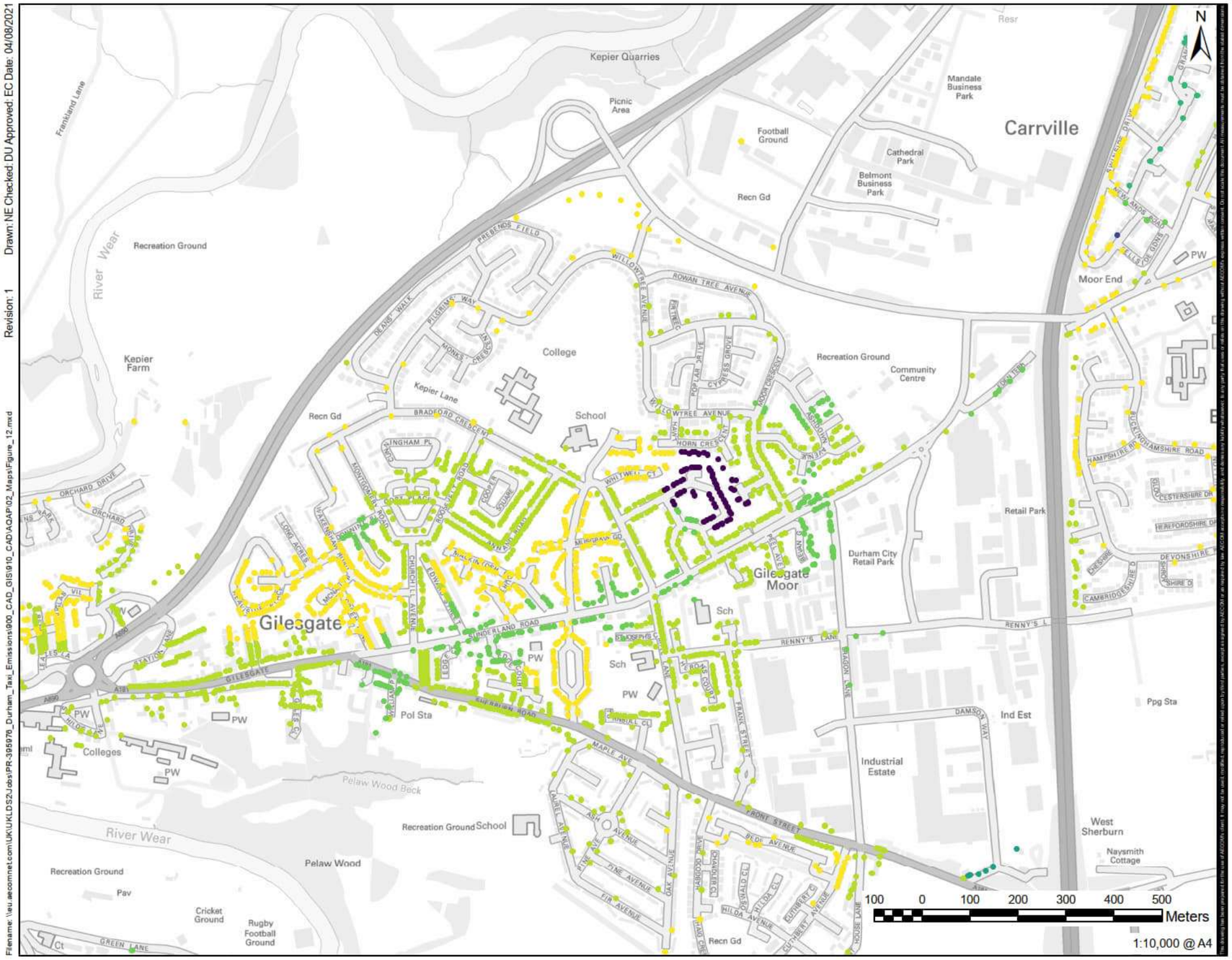

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LEGEND

Road $PM_{2.5}$ percentage from LGVs

- <10%
- 10-20%
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- 70-80%
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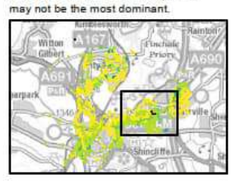

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ISSUE PURPOSE
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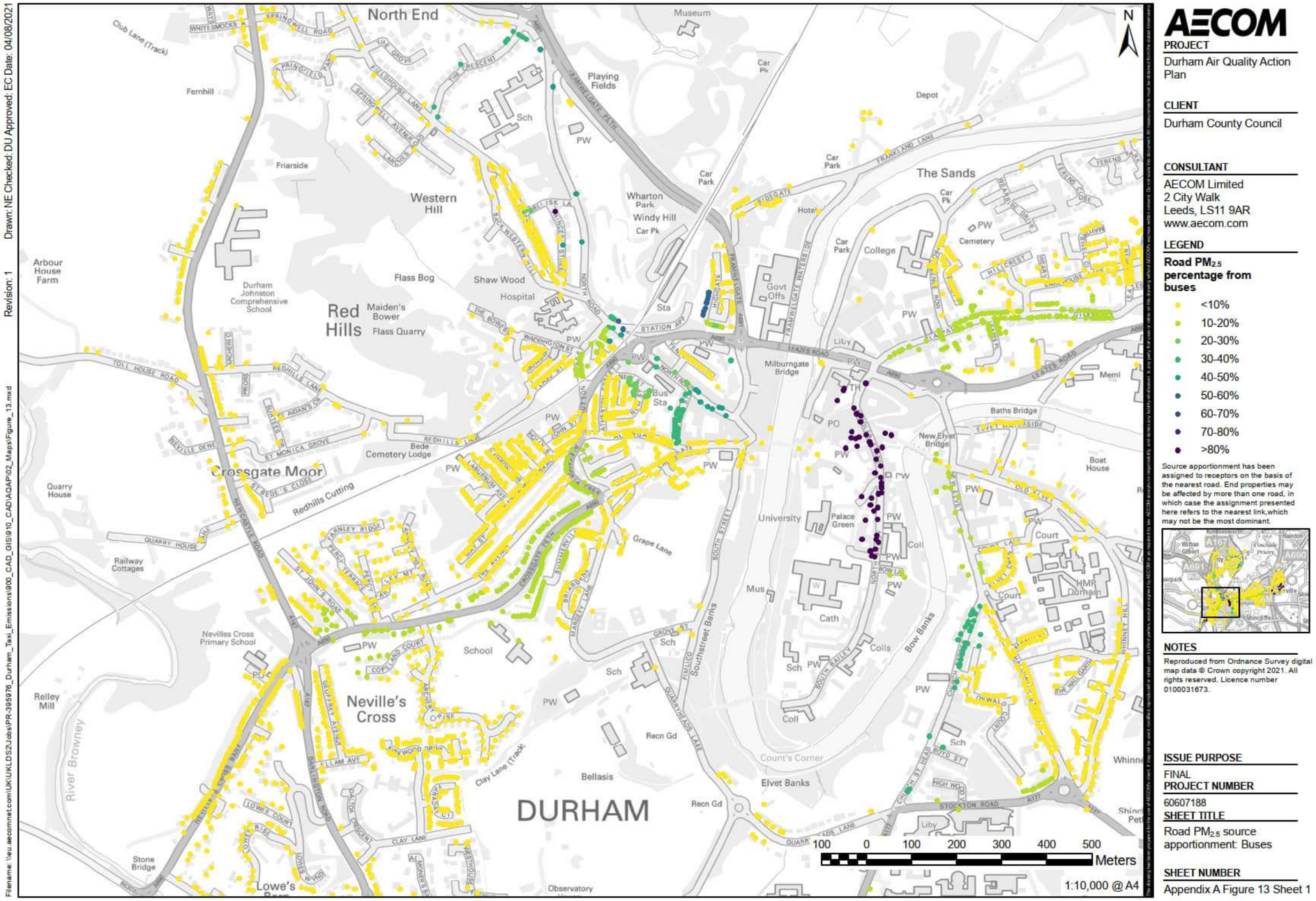
PROJECT NUMBER
60607188

SHEET TITLE
Road $PM_{2.5}$ source apportionment: LGVs

SHEET NUMBER
Appendix A Figure 12 Sheet 2

Figure A-13. Road $PM_{2.5}$ source apportionment: Buses



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LEGEND

Road $PM_{2.5}$ percentage from buses

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.

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PROJECT NUMBER
60607188
SHEET TITLE
Road $PM_{2.5}$ source apportionment: Buses

SHEET NUMBER
Appendix A Figure 13 Sheet 1

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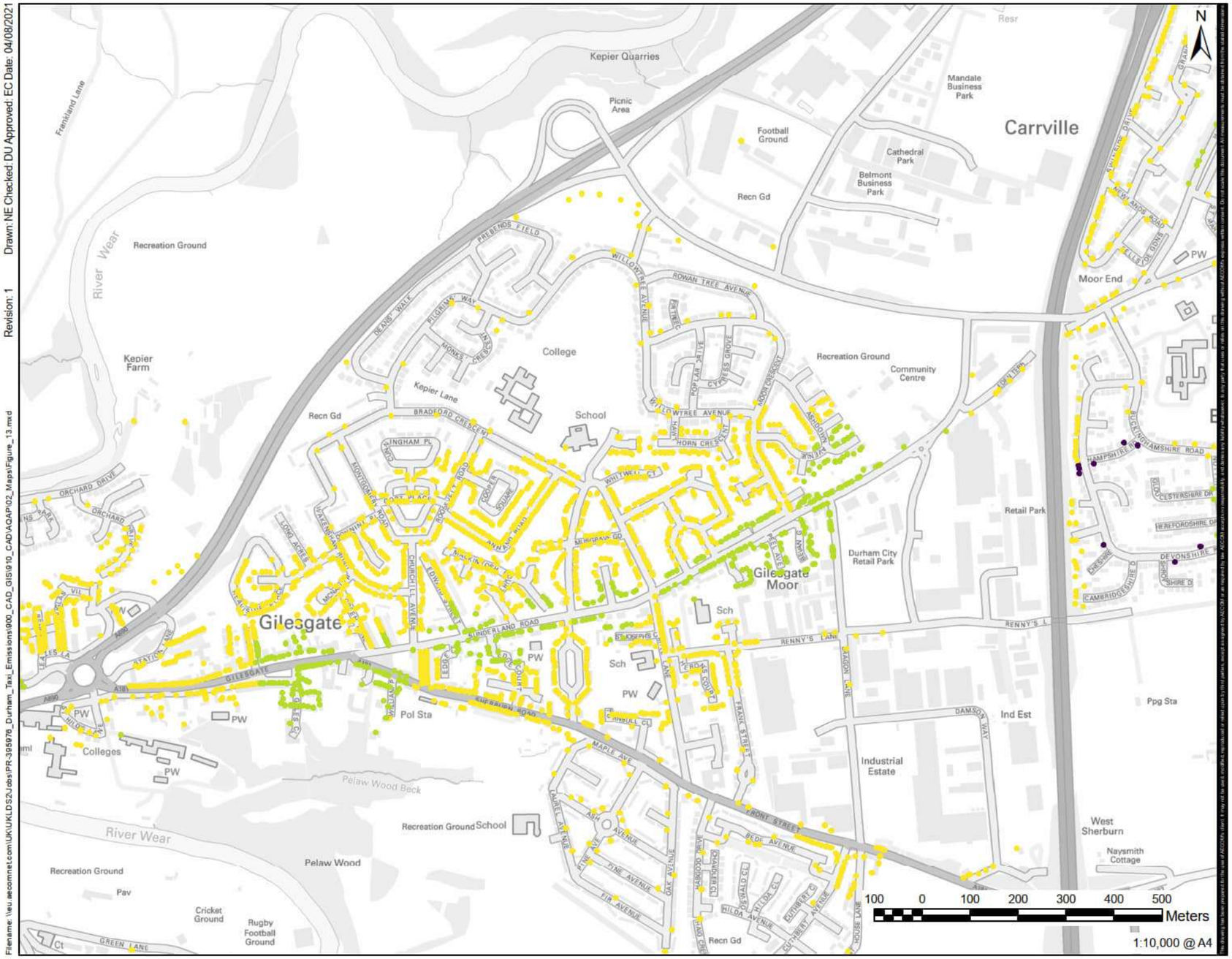

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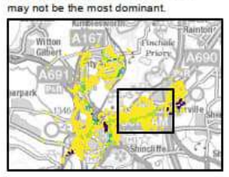
LEGEND

Road $PM_{2.5}$ percentage from buses

- <10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Source apportionment has been assigned to receptors on the basis of the nearest road. End properties may be affected by more than one road, in which case the assignment presented here refers to the nearest link,which may not be the most dominant.



NOTES

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60607188

SHEET TITLE
Road $PM_{2.5}$ source apportionment: Buses

SHEET NUMBER
Appendix A Figure 13 Sheet 2

Figure A-14. Indices of multiple deprivation

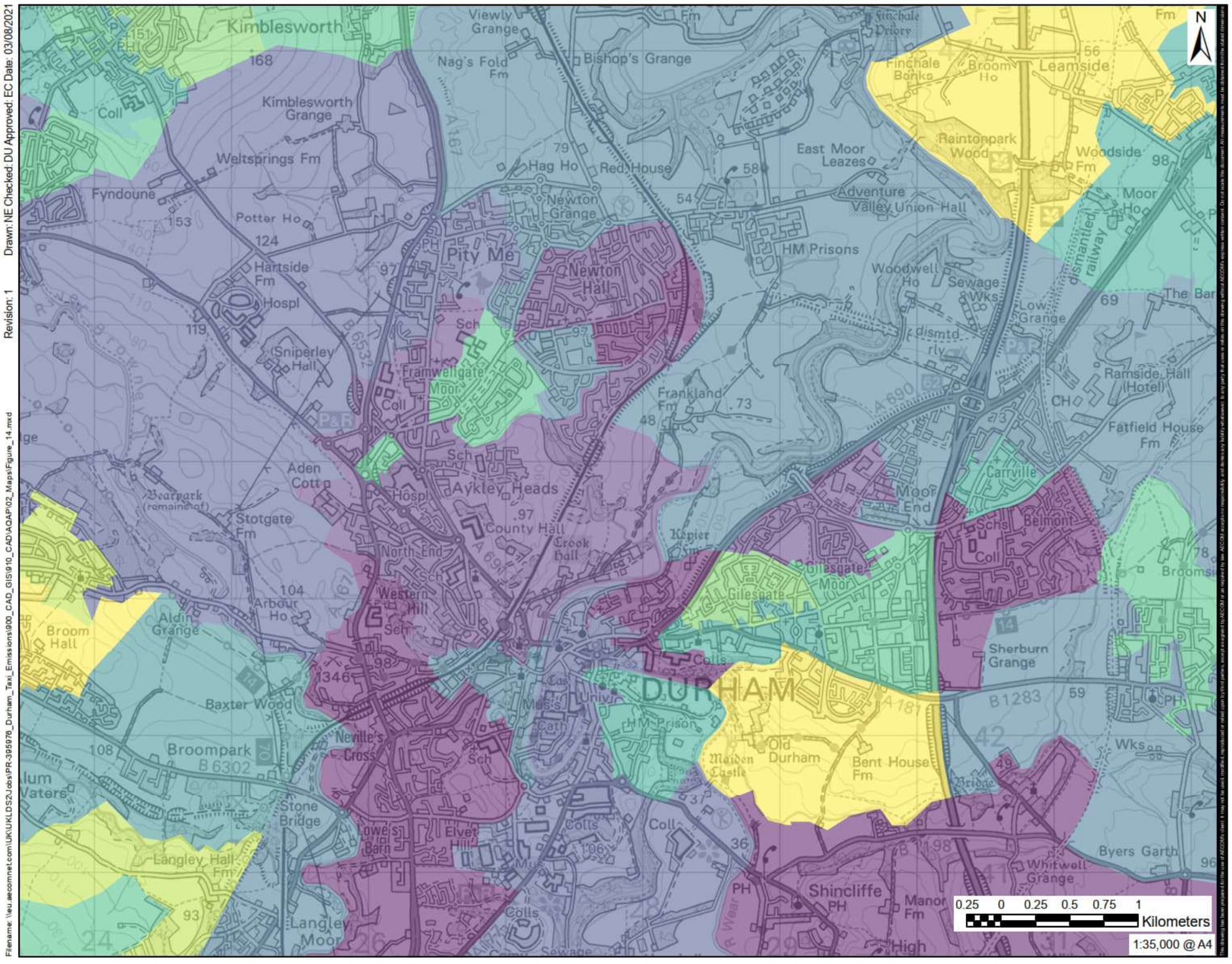


Figure A-15. Residual Non-compliant Properties with Micro-consolidation

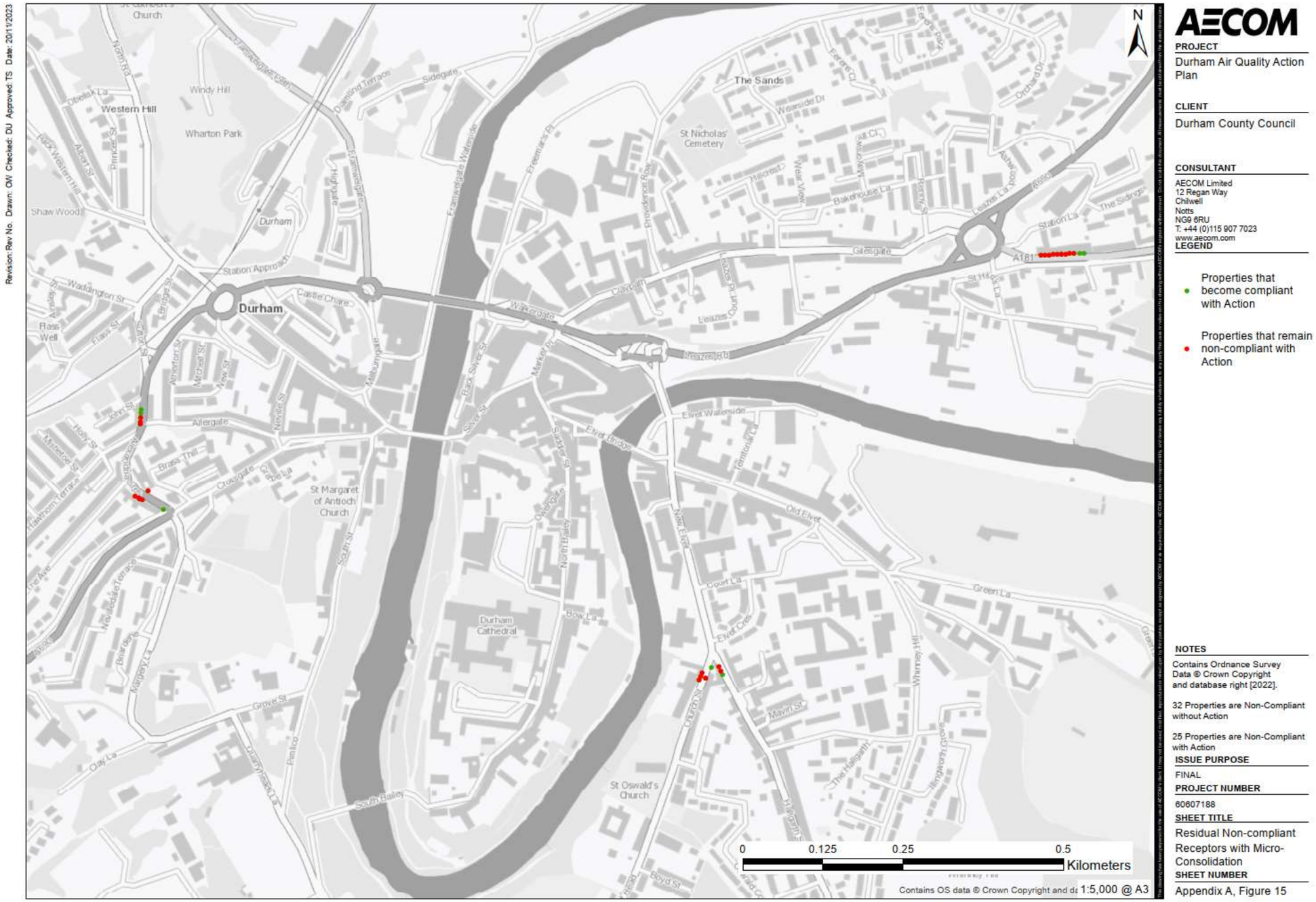
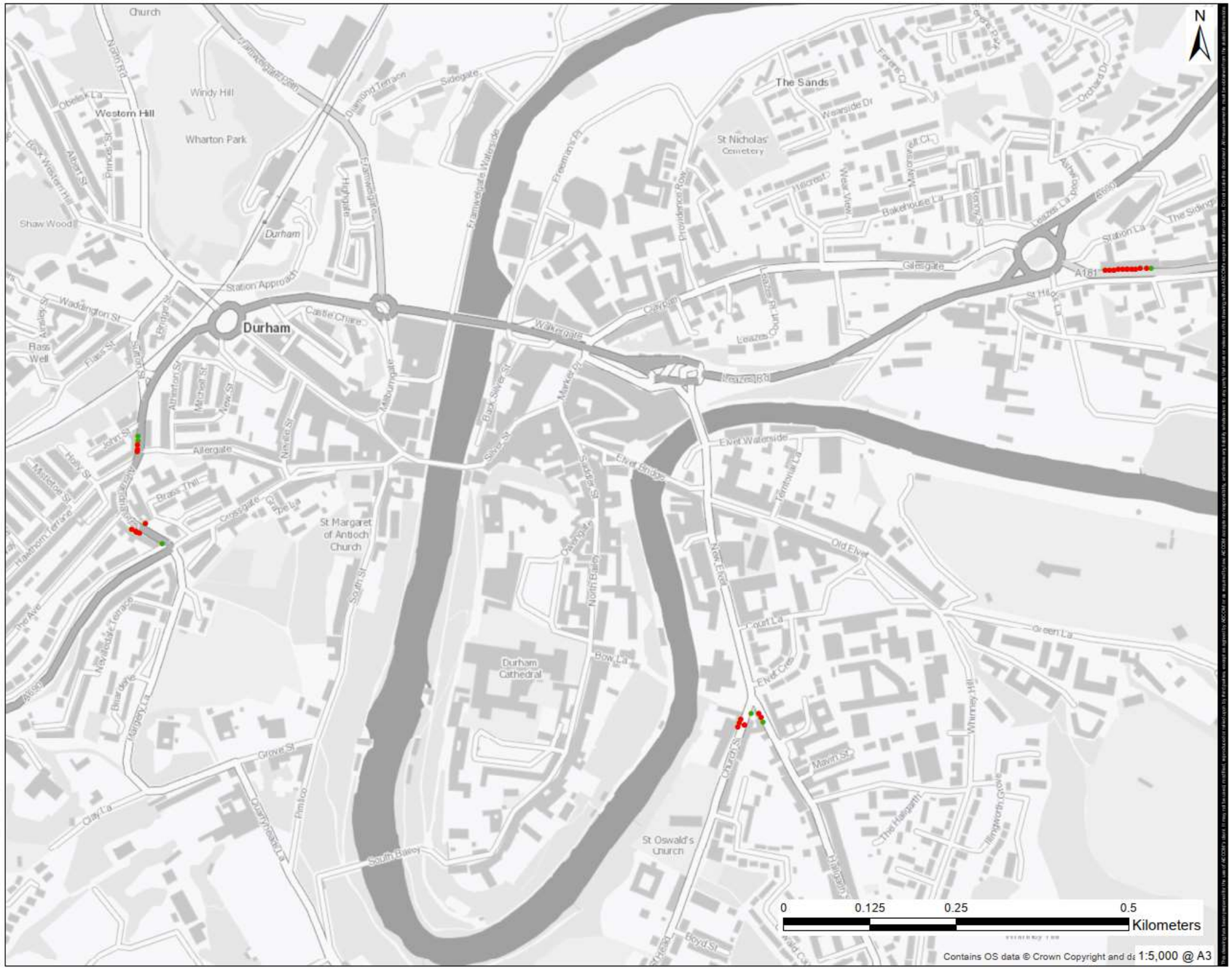


Figure A-16. Residual Non-compliant Properties with Emissions-based Car Parking Charges



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LEGEND

Baseline

- Properties that become compliant with Action
- Properties that remain non-compliant with Action

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32 Properties are Non-Compliant without Action

26 Properties are Non-Compliant with Action

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PROJECT NUMBER
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SHEET TITLE
Residual Non-compliant Receptors with Emissions-based Car Parking Charges

SHEET NUMBER
Appendix A, Figure 16

Figure A-17. Residual Non-compliant Properties with both Emissions-based Car Parking and Micro-consolidation

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LEGEND

Baseline

- Properties that become compliant with Action
- Properties that remain non-compliant with Action

NOTES

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32 Properties are Non-Compliant without Action

22 Properties are Non-Compliant with Action

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PROJECT NUMBER
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SHEET TITLE
Non-Compliant Receptors with both Emissions-based Car Parking Charges and Micro-consolidation

SHEET NUMBER
Appendix A, Figure 17

Appendix B Baseline Air Quality Modelling

B.1 Baseline Dispersion Modelling Methodology

A baseline emission dispersion model for NO_X, PM_{10} and $PM_{2.5}$ was built, covering the whole of Durham City (and as such including the AQMA which the AQAP addresses).

The detailed modelling used ADMS-Roads version 5 (Ref 6), an air dispersion model for road sources. ADMS-Roads is a modern dispersion model with an extensive published track record of use in the UK for the assessment of local air quality effects, including model validation and verification studies.

The details of the dispersion model are presented below. The model includes a number of advanced features to account for the unique characteristics of air dispersion in Durham.

B.1.1 Model Domain

The modelling exercise considered all transport model road links in Durham City, including those within the city centre AQMA, as shown in Figure A-1.

B.1.2 Assessment Years

Modelling was performed for the 2019 base year, and a projected year of 2024.

The base year of 2019 was chosen as it was the most recent year for which air quality monitoring data was available at the time the modelling work was undertaken (in 2021). A base year of 2019 is also the last year of data prior to COVID-19 lockdowns, and therefore is not influenced by the impact of restrictions.

To compensate for uncertainty and ensure the study was realistically cautious, data for the year of 2022 was used to represent the projected future baseline year of 2024 in terms of emissions and pollutant backgrounds, such as delayed fleet turnover. This is a conservative assumption, which is particularly appropriate so as to account for the slowed fleet renewal that has been observed due to the Covid-19 pandemic. These data were obtained in 2018 and used to inform the Local Plan study issued in 2019 prior to the COVID-19 pandemic. Therefore, the traffic flow information for 2024 was not adjusted and it was assumed that traffic volumes would reset to where they would be had the Covid-19 pandemic not occurred.

Monitoring undertaken by DCC in 2022 was provided by the Council in 2023 (after the modelling work was performed). Monitoring results for the past five years are presented in Appendix A.

Automatic monitoring of NO_2 was undertaken at one site on Leazes Road. An annual mean concentration of 40 $\mu g/m^3$ was recorded at this site in 2022, a decrease from the 41 $\mu g/m^3$ recorded in 2021.

Diffusion tube monitoring was undertaken at 46 sites in 2022. Only one exceedance of the annual mean NO_2 objective was recorded. This was recorded at DT149, with a concentration of 44.1 $\mu g/m^3$.

In general, a decrease in concentrations from 2021 was recorded across the City in 2022, and concentrations were much lower than the 2019 (pre-pandemic) levels. This has been recognised in the development of the Actions (see Section 5.2), where some of the more significant items have been proposed to be delayed until a review of further data recorded post-2022 can determine whether the concentrations recorded in 2022 were indicative of long-term trends post-Covid.

B.1.3 Traffic Data

The traffic data for a 2015 base year and the 2024 ‘Do-Minimum’(i.e. future conditions without intervention) scenario were provided to AECOM in 2018 by Jacobs (DCC’s Transport Consultant) for assessment of the Durham County Plan (Ref 7). 24-hour annual average daily traffic (AADT) data, split by car/LGV/HGV/bus proportions, and modelled link speeds were obtained.

The 2015 dataset was grown to 2019 using a growth factor of 0.36%. Previously, for the purposes of assessing the Local Plan, this data was projected to 2017 using 0.18% based on NTEM forecasts for Durham City and so 0.36% represents the linear continuation of this trend as a proportional and reasonable approach.

In selected areas where traffic has to slow down or stop (roundabouts, signalised junctions, junctions with a stop line onto a major road), the modelled mainline speeds were not considered appropriately representative of actual speeds. Therefore, speeds were reduced to 30% of their mainline modelled speeds in links leading to, and from, stop lines. Junctions at which this protocol were used are shown in Figure A-1.

B.1.4 ANPR Data

Information about the Durham City vehicle fleet was obtained from an Automatic Number Plate Recognition (ANPR) survey carried out on the 17th July 2018 and again on 15th June 2019. The survey was undertaken on the Millburngate Bridge and recorded flows in both directions to capture data representative of the wider Durham City fleet.

ANPR data was collected in both 2018 and 2019 to inform the Local Plan, and there was not considered to be any significant difference between the two datasets. However, for the purposes of this study the 2019 data was projected to the future year to ensure consistency with the other model parameters and minimise any potential uncertainties related to the projection method. As discussed above, the projected future baseline year was 2024, but used a fleet projected only to 2022 to represent the slower rate of change in the fleet (e.g. fewer Euro 6 cars, etc) as a realistic, cautious approach.

The ANPR survey obtained the vehicle registration data of each individual vehicle passing the camera. This data has been cross referenced with DVLA records to provide additional vehicle detail including propulsion type and Euro class.

The ANPR data was used to define the detailed fleet profile; e.g. the car proportion of the fleet was split into petrol car, diesel car, and alternatively fuelled cars in the base year. The baseline fleet split was projected into the future using the vehicle proportions in the DEFRA Emissions Factor Toolkit (EFT, Ref 8) to enable the same to be carried out for the 2024 scenario.

Bus fleet composition in 2018 was obtained from DCC (Ref 9) and was assumed to be directly applicable to 2019. This information superseded the information obtained about buses from the ANPR study, which was limited to a single location, as it provided a more complete picture of the wider Durham bus fleet. More recent data reported in the 2023 DCC ASR were not available at the time the model was built, and so were not used in the model.

Analysis of the fleet used in the model and the projection of the future baseline scenario are discussed further in Section 0.

B.1.5 Model Input Data

ADMS-Roads calculates concentrations of pollutants emitted from vehicles using the following parameters:

- Meteorological information from a suitable nearby met station;
- Emission factors from Defra EFT tool version 10.1, published August 2020, which account for fleet size, composition, and speed; and gradient of road;
- Locational information of the modelled road links and receptors from Arc-GIS; and,
- Terrain information.

The particular inputs chosen for the modelling described here are given in Table 12.

Table 12. General ADMS-Roads Model Conditions

Variables	*ADMS-Roads* model input
Surface roughness at source	0.5 m
Minimum Monin-Obukhov length for stable conditions	10 m
Meteorological data	1 year (2019) hourly sequential data from Newcastle Airport meteorological station
Emissions	NO_X, PM_{10}, $PM_{2.5}$

Variables	*ADMS-Roads* model input
Emission factors	EFT Version 10.1 emission factor dataset
Emission profiles	No
Receptor locations	x, y coordinates determined by GIS, z=1.5m
Model output	Long-term annual mean NO_X concentrations Long-term annual mean PM_{10} concentrations Long-term annual mean $PM_{2.5}$ concentrations

B.1.6 Meteorological Data

Hourly sequential meteorological data for 2019 for the Newcastle Airport meteorological station were used. This station is approximately 30 km to the north of Durham at a similar elevation and is considered representative of meteorological conditions in Durham.

The parameters required by the model included: date, time, wind direction (angle wind blowing from), wind speed (at 10m above ground level), surface air temperature (degrees Celsius), and cloud cover (oktas – or eighths of sky covered). Summary data for the site is presented in and the wind rose for Newcastle Airport is presented below in Illustration 1), indicating that the dominant wind direction for 2019 was from the west. This data is in line with that for 2018 and 2020 indicating that the dataset has not been unduly influenced by atypical weather conditions.

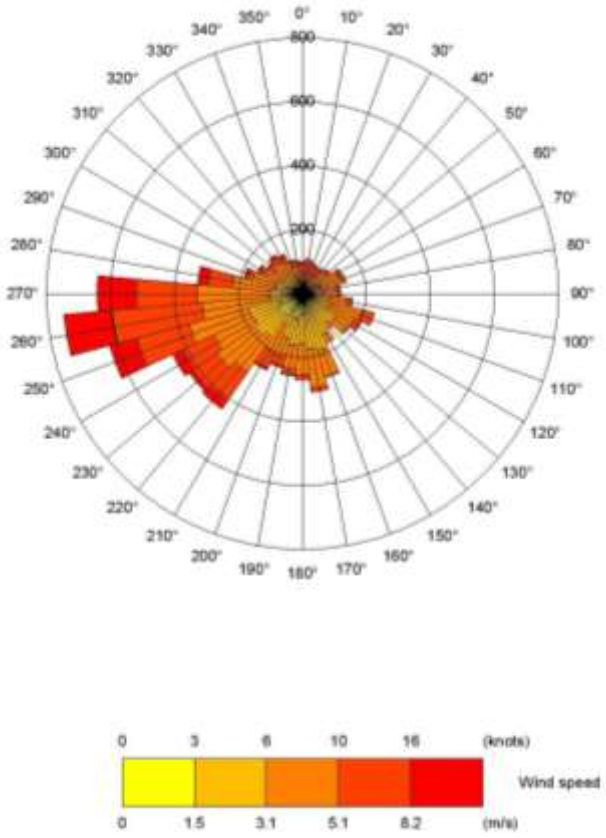


Illustration 1: Wind rose diagram of Newcastle Airport, 2019

Table 13. Summary meteorological data for Newcastle Airport, 2019

Parameter	Value
Annual precipitation total (mm)	No data
Calm (%)	2.3
Low wind speeds >0 ≤1.5 m/s (%)	16.2
Maximum wind speed (m/s)	17.0
Average wind speed (m/s)	3.9
Most frequent wind direction (deg.)	260
Maximum temperature (°C)	28
Minimum temperature (°C)	-7
Average temperature (°C)	9.1
Average cloud (octas)	3

Source: ADM (Ref 10)

B.1.7 Emissions

Emission factors were calculated based upon the information presented in the 'Traffic Data' section using Defra's Emissions Factor Toolkit (EFT) v10.1 (Ref 8). This was the most recent toolkit available at the time of undertaking the modelling.

Traffic flow data was input using the 'Alternative Technologies' traffic format, so that the ANPR-derived fleet information could be properly utilised. The 'simple entry euro compositions' were also used to account for the age of the fleet in Durham as determined from the ANPR study. Outputs of NO_x, PM_{10}, and $PM_{2.5}$ were selected for air quality modelling, including breakdown by vehicle, to enable source apportionment to be carried out.

The input information for the base year was used directly from the ANPR data (the survey also being carried out in 2019). For the future year, the fleet split and euro class composition were projected forward to 2022 from the 2019 baseline for use.

AADT flows were used to obtain emission rates. The use of period traffic data was investigated but it was found that within the AQMA the modelled AM peak speeds did not differ very much from the modelled AADT speeds, suggesting that peak congestion is not a strong influence in this location. Therefore, modelling AADT was considered appropriate.

The EFT makes allowances for road gradients affecting emission rates from HDVs. To account for this in the model, where a major road, or a road in a key risk location was steep, the gradient of the road was calculated using elevation data at each end of the road, and the length of the road itself.

Roads modelled as gradients are shown in Figure A-2. .

B.1.8 Receptors

Receptor locations were chosen using OS Mastermapping (Ref 11) and OS Addressbase plus (Ref 12). Residences, schools and medical facilities were identified using Addressbase and receptor points were added at the building façade closest to the nearest road.

To keep model run times down, not every such receptor within Durham was modelled. Instead, the closest receptor to each modelled link was modelled to represent potential worst-case exposure. In addition, all schools and all medical facilities were modelled. Finally, all receptors within 200m of roads within the AQMA were modelled to ensure that this key area was fully considered.

In total 5,947 receptors were modelled. Of these, six were medical facilities, 104 were schools or other educational facilities, and 5,837 were residences. These receptors are shown in Figure A-3.

B.1.9 Street Canyons

Street canyons are characterised by continuous sections of buildings on either side of roads, which limits dispersion and therefore can contribute to pollution hot spots.

Canyons were accounted for in the ADMS-roads model by using the 'advanced canyons module'. Roads were manually selected as being canyons, and the canyon dimensions were calculated based on buildings data (including heights) from OS Mastermapping. Canyon widths were then manually adjusted where necessary to ensure that relevant monitoring and receptor points were inside the canyon.

Roads modelled as canyons are shown in Figure A-2. .

B.1.10 Background Air Quality

Defra publish estimates of 'background' pollutant concentrations for each square kilometre, based on national modelling studies. The most recent background concentration maps (Ref 13), have informed this section.

Background pollutant concentrations are added to modelled road contributions to obtain total predicted concentrations. For this purpose, background concentrations for County Durham were taken from Defra's background maps for the years 2019 and 2022 (to represent, conservatively, 2024).

To ensure that Defra's background maps are reflecting the measured conditions in Durham City, they were compared to concentrations measured by council monitors in background locations in 2019 (for NO_2) (Ref 14). The results are presented in Table 14.

Table 14: Comparison of Defra background NO_2 concentrations to monitored NO_2 concentrations in 2019

Site ID	Site Type	Monitored			DEFRA Background			Ratio
		Grid Coordinate		Annual Mean NO_2 ($\mu g/m^3$)	Grid Coordinate Centre		Annual Mean NO_2	
		X	Y		X	Y		
D59	Urban Background	427653	542992	17.5	427500	542500	13.4	1.31
D118	Urban Background	428424	542887	15.6	428500	542500	10.6	1.47
							Average	1.39

Source: Defra (Ref 13), DCC (Ref 14)

The comparison reveals that on average in Durham City, measured NO_2 background concentrations are 39% higher than those predicted by the Defra backgrounds map. Therefore, a factor of 39% has been applied to the NO_2 Defra backgrounds used in modelling in order to bring them in line with measured concentrations.

There is no background monitoring of PM in Durham so therefore this comparison could not be carried out. Background concentrations of PM_{10} and $PM_{2.5}$ have been left as predicted by Defra.

Defra background concentrations include contributions from a variety of sources, including roads, rail, and industry. For use in the following screening and modelling, the Defra 'Sector Removal' tool (Ref 15) was used to remove the contribution to the background concentrations from sources that are directly modelled, ensuring that they are not double-counted. Contributions from motorways, primary A-roads, and trunk A-roads 'in-square' have been removed in this way, while minor roads and 'out-of-square' contributions have not been removed, as some, but not all of these sorts of contributions have been modelled – leaving them in the background concentrations therefore is the more conservative approach.

Adjusted background concentrations for Durham City, as used in modelling (with both adjustment and sector removal) are presented in Table 15.

Table 15. Adjusted Defra background concentrations in Durham City

Year	Annual Mean Background Concentration ($\mu g/m^3$)		
	NO_2	PM_{10}	$PM_{2.5}$
2019	9.4 to 16.2	9.8 to 13.1	6.0 to 7.4
2022 (to represent the interim year 2024)	8.4 to 14.6	9.4 to 12.7	5.7 to 7.1

Source: Defra (2020) (Ref 3)

B.1.11 NO_X to NO_2 Conversion

To enable comparison between total NO_2 concentration (which is the data that air quality monitoring provides) with the NO_X concentration contributed by the modelled roads (which is the data that ADMS-Roads outputs), a conversion was applied.

For road transport emissions a 'NO_X to NO_2' conversion spreadsheet published by Defra to calculate the road NO_2 contribution from modelled road NO_X contributions. The tool uses borough-specific data to calculate annual mean concentrations of NO_2 from dispersion model output values of annual mean concentrations of NO_X. Due to the location of the study, the 'All other urban UK traffic' traffic setting was selected.

B.1.12 Model Verification – NO_2

DCC monitors NO_2 using a combination of continuous monitoring stations and diffusion tubes. The model verification process was undertaken through comparison with this DCC monitoring data.

The following monitoring locations were not included in the verification procedure (and the rationale for exclusion provided):

- D59, D118 – background locations are not suitable for model verification.
- D152 – monitoring location is on an unmodelled road within the study area.
- D70 – kerbside monitors are only suitable for use when representative of receptors. In this case the monitor was not considered representative.
- DUR4 – monitoring was only carried out in this location for two months of 2019 which is insufficient to represent the annual concentration.

The results of the monitoring were compared to modelled results for the remaining 41 locations, for 2019, in line with the method outlined in (LAQM.TG (22)) (Ref 17). Details of this comparison can be found in Table 16.

The model was divided into four zones geographically to account for the differences between the modelled and monitored concentrations. The zones were defined based on the characteristics of the roads and to group the monitoring locations with similar verification values in the statistical analysis of the adjustment (discussed below). The final application of one main zone and three smaller zones was considered to be the best fit. A different bias adjustment calculation was applied to each zone.

Modelled receptors were assigned to the zones based on the geographic locations and proximity to the roads demonstrating the characteristics used to define each zone, e.g. properties close to Crossgate Peth where the steep hill and canyon contributed to the definition were assigned to this zone.

All monitors used for verification are shown in Figure A-3.

Table 16. Summary of NO_2 Verification of Detailed Dispersion Modelling

Site ID	2019 Measured Total NO_2 Concentration (µg/m^3)	2019 Measured Road NO_X Contribution (µg/m^3)	2019 Modelled Road NO_X Contribution(µg/m^3)	Zone	Road NO_X Factor
Leazes Rd	46.4	63.1	33.5	General	1.9
D7	32.1	31.2	17.8	General	1.7
D8	38.4	44.7	18.3	General	2.4
D11	35.6	43.9	17.4	General	2.5
D12	44.3	63.7	32.4	General	2.0
D19	44.8	59.3	32.8	General	1.8
D42	34.6	36.4	19.3	General	1.9
D79	46.2	71.6	38.0	General	1.9
D81	31.0	28.9	13.1	General	2.2
D115	32.3	39.9	32.0	General	1.2
D116	46.7	63.8	37.7	General	1.7
D117	44.2	57.9	47.6	General	1.2
D130	47.8	72.1	32.2	General	2.2
D136	32.5	32.0	20.6	General	1.6
D139	39.1	46.3	35.0	General	1.3
D140	39.4	47.0	20.6	General	2.3
D141	31.1	29.1	20.6	General	1.4

Site ID	2019 Measured Total NO_2 Concentration (µg/m^3)	2019 Measured Road NO_X Contribution (µg/m^3)	2019 Modelled Road NO_X Contribution(µg/m^3)	Zone	Road NO_X Factor
D142	38.6	45.2	22.3	General	2.0
D146	35.8	44.3	38.8	General	1.1
D147	20.0	12.1	8.8	General	1.4
D148	21.8	15.5	8.8	General	1.8
D151	39.7	53.0	32.6	General	1.6
D154	44.6	64.4	32.4	General	2.0
D163	20.6	15.9	9.8	General	1.6
D164	22.6	15.4	8.5	General	1.8
D165	17.1	4.4	9.0	General	0.5
D166	42.1	53.1	33.5	General	1.6
D167	41.4	51.5	33.5	General	1.5
D168	42.0	52.8	33.5	General	1.6
D169	34.2	35.6	10.1	General	3.5
D170	25.1	21.2	20.5	General	1.0
D171	19.1	12.6	5.9	General	2.1
			General Zone Average Bias Adjustment Factor:		**1.66**
D20	39.8	54.2	13.5	Gilesgate	4.0
D145	40.9	56.7	19.4	Gilesgate	2.9
D149	48.0	73.6	17.7	Gilesgate	4.2
D155	40.9	56.7	13.9	Gilesgate	4.1
D162	46.7	70.4	19.4	Gilesgate	3.6
			Gilesgate Zone Average Bias Adjustment Factor:		**3.67**
D1	36.3	45.2	11.4	Dragons Ln	4.0
D106	39.2	51.7	11.8	Dragons Ln	4.4
			Dragons Lane Zone Average Bias Adjustment Factor:		**4.18**
D137	37.0	47.0	9.5	Crossgate Peth	4.9
			Crossgate Peth Zone Average Bias Adjustment Factor:		**4.93**

In the general zone, the unadjusted model under-predicted annual mean concentrations of NO_2 at 31/32 locations (97%). To account for this bias, the average factor of the difference between the modelled and measured road NO_X contributions (1.66) was used to adjust the model output at all receptors, for both years. The RMSE value for the general zone adjusted model was 4.6 µg/m^3, which is 12% of the annual average NO_2 objective, which is within acceptable limits according to Defra Technical Guidance.

In the Gilesgate zone, the unadjusted model under-predicted annual mean concentrations of NO_2 at all locations. To account for this bias, the average factor of the difference between the modelled and measured road NO_X contributions (3.67) was used to adjust the model output at all receptors, for both years. The RMSE value for the Gilesgate zone adjusted model was 3.5 µg/m^3, which is 9% of the annual average NO_2 objective, which is within ideal limits according to LAQM.TG22.

In the Dragons Lane zone, the unadjusted model under-predicted annual mean concentrations of NO_2 at all locations. To account for this bias, the average factor of the difference between the modelled and measured road NO_X contributions (4.18) was used to adjust the model output at all receptors, for both years. No RMSE could be calculated as this zone comprises only two monitors.

In the Crossgate Peth zone, the unadjusted model under-predicted annual mean concentrations of NO_2 at the monitor. To account for this bias, the factor of the difference between the modelled and measured road NO_X contributions (4.93) was used to adjust the model output at all receptors, for both years. No RMSE could be calculated as this zone comprises only one monitor.

B.1.13 Model Verification – PM_{10} and $PM_{2.5}$

DCC monitors PM using two AQ mesh monitors at roadside locations. Monitored concentrations of PM_{10} and $PM_{2.5}$ at these locations were found to be lower than the Defra predicted background concentrations for those grid squares. This makes verification to these monitors impossible because the respective proportions of background and road contributions cannot be inferred.

AQ mesh monitors are not a reference method, and the results have not been calibrated to a reference method so one possible reason for this situation is that the AQ mesh monitors are not accurately recording particulate concentrations. Alternatively, it is suggested the Defra maps may overestimate background concentrations, or a combination of both factors.

Therefore, in the absence of verifiable particulate monitoring, the adjustment factors that were calculated for NO_X were applied to the modelled PM_{10} and $PM_{2.5}$ as a cautious approach in accordance with the guidance in LAQM.TG(22).

B.2 Baseline and Projected Emissions

B.2.1 Fleet Profiles

The emissions were a product of the fleet age and fuel-technology profiles recorded by ANPR, and projected forwards to the assessment years using EFT. The future fleet projections were based on 2022 to represent 2024 in order to cautiously represent the delaying effects of COVID-19 and the optimistic fleet turnover used in the EFT tool.

These data indicated that in 2019 the light-engine vehicles; car and LGV, were predominately Euro 5, but with a large Euro 6 and Euro 6C component, with comparable splits between petrol and diesel. However, by 2022 this will have shifted closer to the Euro 6 and 6c classifications, with a proportion of diesel cars assigned as Euro 6d, although there was still a significant proportion of vehicles within the Euro 5 category.

HGVs were predominantly Euro VI in 2019, whilst buses were split approximately 50/50 between Euro V-SCR and Euro VI. However, by 2024 these vehicles would almost all be Euro VI. There were negligible articulated HGVs recorded by the ANPR and so the majority of HGV were assigned as rigid vehicles.

Figure 6. 2019 Car and LGV Profile from ANPR

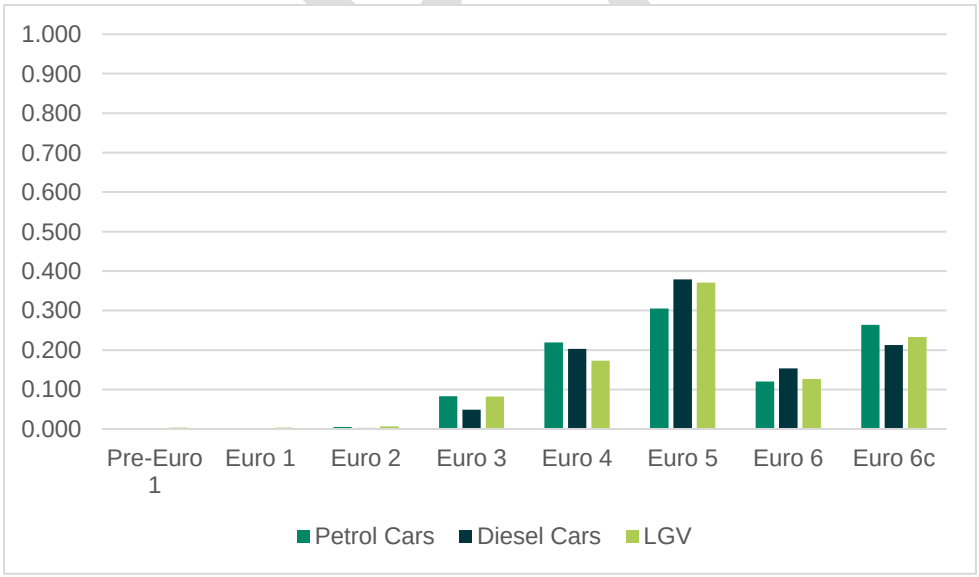


Figure 7. Projected 2024 Car and LGV Profile

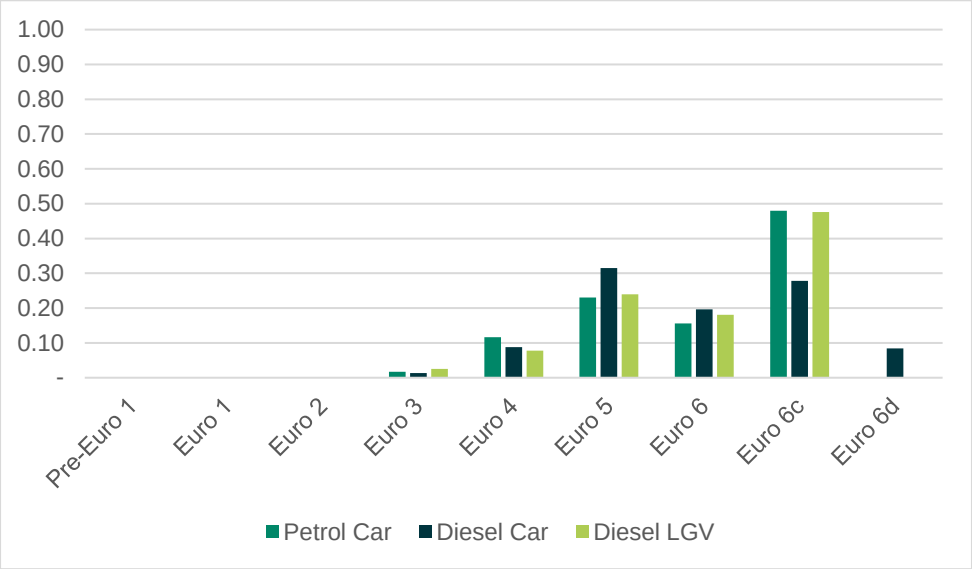


Figure 8 2019 HGV and Bus Profile from ANPR

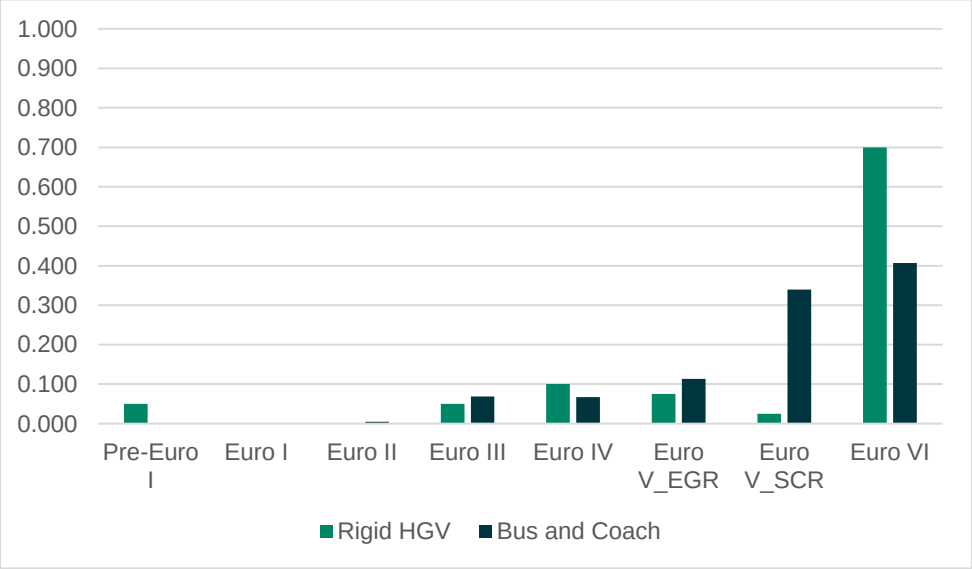
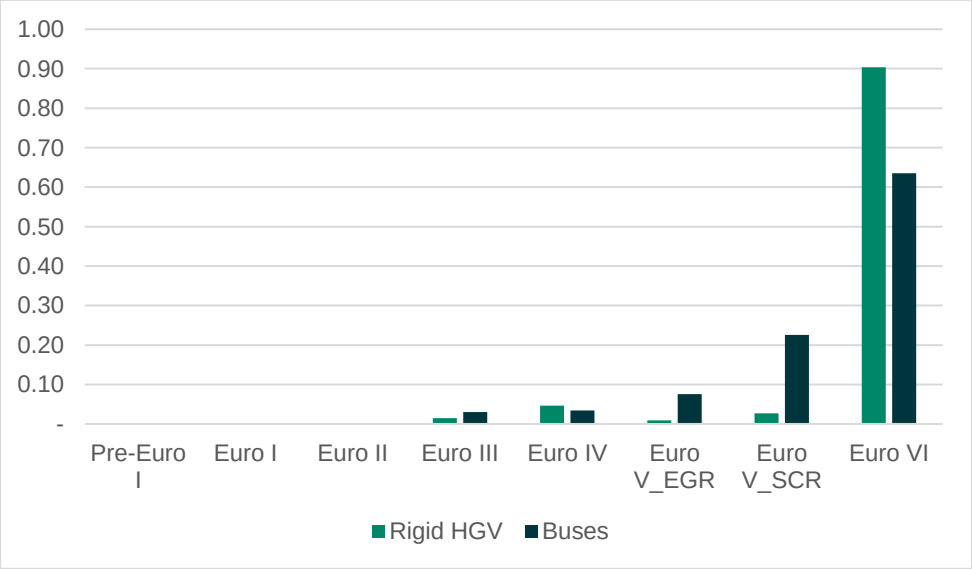


Figure 9. Projected 2024 HGV and Bus Profile



The fuel technologies recorded by the ANPR, and those used in the projected future baseline, are presented below. The 2022 fleet projection was used to represent 2024 within the model, to provide a more cautious approach. Figure 10 highlights that, in the projected year, petrol and diesel cars were the largest proportion of the fleet, although there were a large number of full-hybrid petrol, plug-in hybrid petrol, full hybrid diesel cars, and battery EV in the projected year than in the base year. A trend towards a lower percentage of petrol/diesel cars and a high percentage of hybrid and BEV cars indicate that the fleet will shift to more sustainable means and lower emissions in the future.

Figure 10. Car Fuel Technology

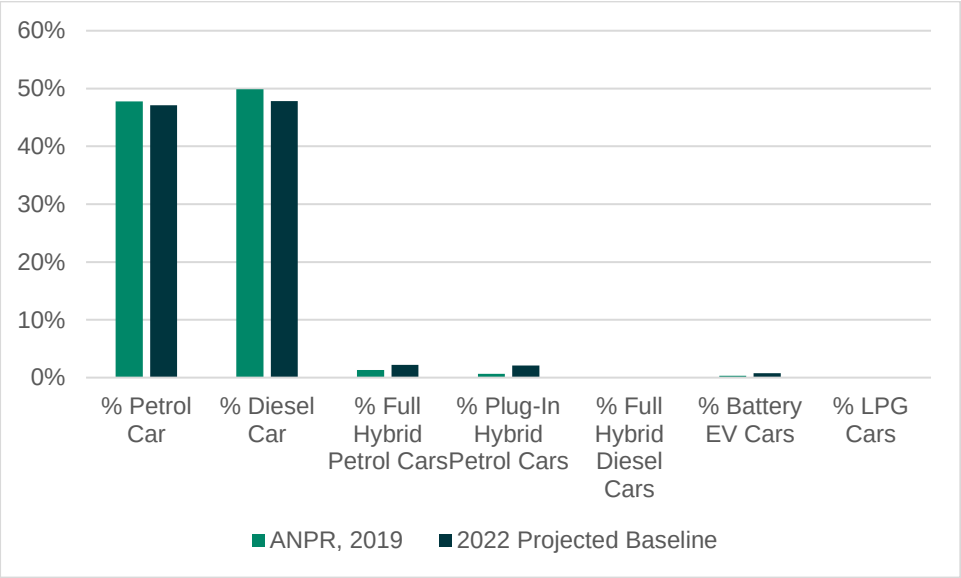


Figure 11. LGV Fuel Technology

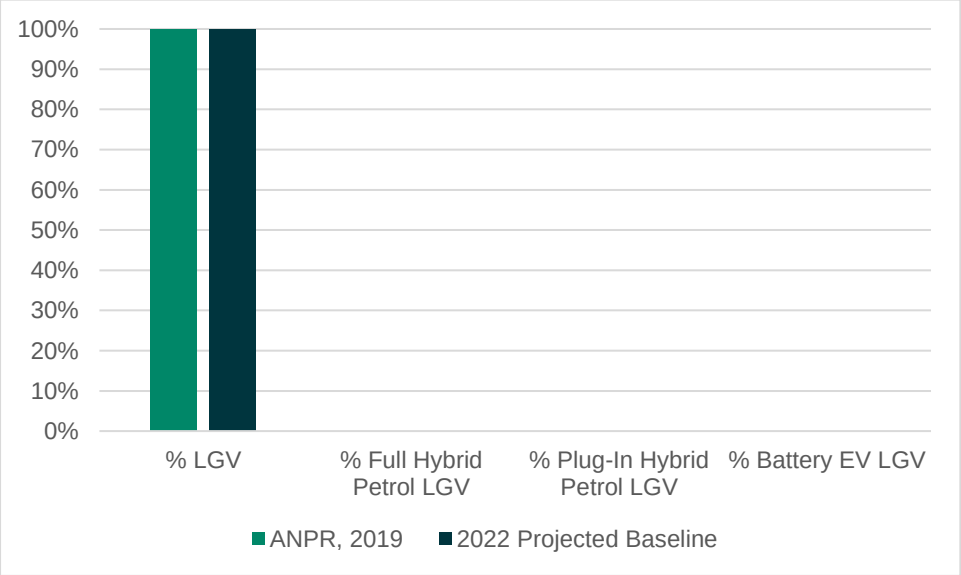
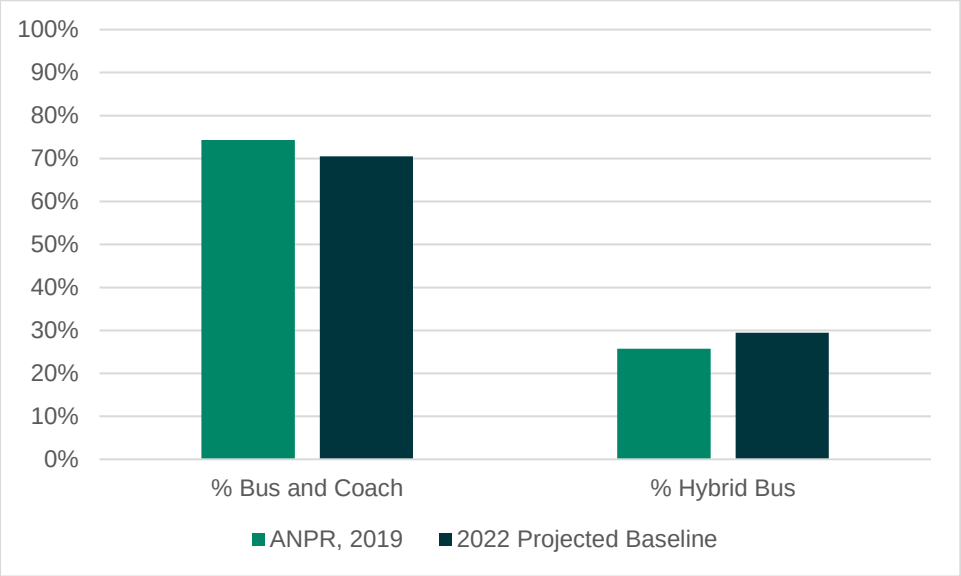


Figure 12. Bus Fuel Technology



B.2.2 Predicted Emissions

Modelled two-way emissions from roads (i.e. not taking account of dispersion) are presented in Figure A-4. (NO_X) and Figure A-5. ($PM_{2.5}$)

High emissions are produced by the major roads in the area, including the A690, the A1(M), the A167 and the A691. The effect of congestion / slow speeds around junctions can also be seen in a number of locations.

The highest emissions in the city were generally on links approaching junctions due to reduced speed, although there was a long section from the Leazes Road / Gilesgate roundabout through the city and across Millburngate Bridge to the junction with Framwellgate.

The majority of the minor roads were predicted to have relatively low emissions at locations away from junctions although, as discussed below, due to the effects of canyons features these lower emission rates do not necessarily correlate to low pollutant concentrations.

B.2.3 Baseline and Projected Concentrations

It should be noted that the most recent monitoring data for DCC demonstrates that concentrations have decreased when compared to the pre-pandemic (2019) levels.

This is not wholly consistent with the projected concentrations within this modelling assessment, which were based on 2019 concentrations and therefore do not include the consideration of the impact of COVID-19. As modelling was completed in 2021, it was unknown whether COVID-19 would have a long-lasting impact on air quality, and no data was available to estimate trends.

The development of the final actions has considered the trends following the pandemic, and the possibility of a 'new normal' in travel conditions across Durham City.

B.2.4 NO_2 Results

The results of the NO_2 modelling are presented in Figure A-6. . Table summarises the number of modelled receptors that are predicted to fall within the stated concentrations bands for NO_2 in 2024. Data for 2024 are presented here as these future conditions are the focus of this study, although pollutant concentrations are predicted to decrease compared to the 2019 verification year.

For NO_2, when considering the model uncertainty, concentrations below 32 $\mu g/m^3$ tend to indicate a very low risk of exceedance of the annual mean objective; 32 to 36 $\mu g/m^3$ may be taken to be a low risk, 36 to 40 $\mu g/m^3$ a possible risk, 40 to 44 $\mu g/m^3$ a likely risk, and over 44 $\mu g/m^3$ a very likely exceedance. These limits are broadly consistent with the RMSE calculated for each model zone.

Whilst absolute values for the number of properties within each band are provided in Table 17, these should be considered in the context of the confidence limits. Therefore, whilst 9 properties are reported to exceed 44 $\mu g/m^3$,

this is an indication of the extent of the exceedance and should be considered with reference to the distribution of the highest concentrations, as discussed below and presented in Figure A-6. .

Table 17. Summary of Modelled Exposure to Annual Mean NO_2 in 2024

Annual mean NO_2 concentration band	Total number of modelled receptors	Number of modelled receptors outside AQMA
<32 µg/m^3	5,824	5,406
32 to 36 µg/m^3	34	3
36 to 40 µg/m^3	39	2
40 to 44 µg/m^3	23	2
≥44 µg/m^3	9	0

The modelled exceedances of the annual mean objective value are clustered in a handful of areas across the city. Annual mean concentrations above 40 µg/m^3 are predicted in three areas:

- Alexandria Crescent and Sutton Street (11 receptors, within the AQMA, maximum predicted concentration 45.7 µg/m^3)
- Gilesgate, close to Gilesgate roundabout (12 receptors, within the AQMA, maximum predicted concentration 47.0 µg/m^3)
- Church Street and junction with Hallgarth Street (9 receptors, of which 6 are within the AQMA, maximum predicted concentration 47.4 µg/m^3, and 3 are around the junction with Hallgarth Street, including extending slightly outside the AQMA, maximum predicted concentration 42.1 µg/m^3).

Concentrations between 32 to 40 µg/m^3 were predicted in the additional areas of Neville's Cross Junction, Crossgate Peth, North Road, Framwellgate, Claypath, New Elvet, the junction between Sunderland Road and Dragons Lane, and the junction between Dragons Lane and Front Street.

B.2.5 PM_{10} Results

Table 18 summarises the number of receptors that are predicted to fall within the stated concentrations bands for PM_{10}. The highest modelled PM_{10} concentration was 16.9 µg/m^3 which is substantially below the annual mean objective of 40 µg/m^3 and therefore no receptors were considered at risk of exceedance.

Table 18. Summary of Modelled Exposure to Annual Mean PM_{10} in 2024

Annual mean PM_{10} concentration band	Total number of modelled receptors	Number of modelled receptors outside AQMA
<32 µg/m^3	5,947	5,413
32 to 36 µg/m^3	0	0
36 to 40 µg/m^3	0	0
40 to 44 µg/m^3	0	0
≥44 µg/m^3	0	0

B.2.6 $PM_{2.5}$ Results

The results of the $PM_{2.5}$ modelling are presented in Figure A-7. Table 19 summarises the number of receptors that are predicted to fall within the stated concentrations bands for $PM_{2.5}$.

For $PM_{2.5}$, almost all receptors were predicted to experience concentrations within the 2040 UK annual mean target of 10 µg/m^3. When considering the model uncertainty, concentrations below 8 µg/m^3 tend to indicate a very low risk of exceedance of the target; 8 to 9 µg/m^3 may be taken to be a low risk, 9 to 10 µg/m^3 a possible risk, 10 to 11 µg/m^3 a likely risk, and over 11 µg/m^3 a very likely exceedance.

Table 19. Summary of Modelled Exposure to Annual Mean $PM_{2.5}$ in 2024

Annual mean PM_{10} concentration band	Total number of modelled receptors	Number of modelled receptors outside AQMA
<8 µg/m^3	5576	5,210
8 to 9 µg/m^3	321	203
9 to 10 µg/m^3	47	0
10 to 11 µg/m^3	3	0
>11 µg/m^3	0	0

The modelled exceedances of the $PM_{2.5}$ 2040 target are located on Gilesgate, close to Gilesgate roundabout (3 receptors, maximum predicted concentration 10.2 µg/m^3).

Concentrations between 8 to 10 µg/m^3 are distributed throughout the city including several areas within the AQMA, Claygate, the junction between Dragons Lane and Front Street, and in Belmont and Carrville close to the A1(M).

These results are indicative only, due to the being unable to verify the results to real monitored data, although the AQ Mesh monitoring indicate that concentrations will be largely below the WHO guideline.

Appendix C Quantification of Actions

Actions have been developed based on the conclusions from the baseline assessment and consultation. The resulting air quality impacts for the following were appraised quantitively and discussed further in the following Sections:

- Freight Micro-Consolidation Feasibility Study
-
- Emissions-based Car Parking Charges
- Increased Parking Capacity at Park and Ride sites
- Introduce Zero Emissions Buses on Park and Ride routes.
- Tracking Classification of Buses
- Workplace Travel Plans
- Strategic Cycling and Walking Delivery Plan 2019-2029
- Update of the Taxi Emission Study
- Free Trial for EV Vans

Quantitative appraisal was not possible for the remaining Actions due to uncertainty of the potential outcome of the implementation or the nature of the measure, and so the magnitude and extent of local air quality effects for these has been described subjectively.

C.1 Freight Micro-Consolidation Feasibility Study

Obtain a better understanding of the freight and delivery fleet operating in Durham. Subject to the outcome of this, undertake a feasibility study for the introduction of a freight micro-consolidation scheme to serve Durham City to improve air quality from the shipping of goods into and out of the city.

In 2019, The AECOM freight specialist team provided support for this project by reviewing the potential effects of implementing micro-freight distribution options in Durham City based on similar work undertaken on behalf of York City Council (Ref 18):

- Pedestrian portering service using walking and active travel (e.g. cycling) to replace LGV trips using small consolidation and distribution hubs, and,
- Zero-emission deliveries (cycle or electric vehicles) to replace LGVs, also potentially based on local or regional consolidation and distribution.

The potential effects of implementing these options were using three nominal geographical extents in addition to utilising distribution based at the three park and ride sides, where it was assumed each consolidation hub would serve a relatively small local area.

The details of the potential implementation and tested scenarios are provided in Table 20.

Table 20. Tested Freight Consolidation Scenarios

Distribution Hub Location	% Change LGV Traffic			
	Pedestrian Portering		Zero Emission Vehicles	
	Low	High	Low	High
East of City around Dragonville	10.0%	12.0%	18.0%	20.0%
Park and Ride Sniperley	18.0%	20.0%	20.0%	22.0%
North of City centre (west of river)	15.0%	15.0%	18.0%	20.0%
Park and Ride Howlands	18.0%	20.0%	20.0%	22.0%
South of City Centre (east of river)	8.0%	10.0%	18.0%	20.0%
Park and Ride Belmont	18.0%	20.0%	20.0%	22.0%

The outcome from the tests is presented in Table 21. The change in local air quality was calculated using a simple method based on the proportional change in road-source NO_X at the nearest to each receptor modelled in the baseline. Therefore, with consideration to the overall confidence applied to this review, the results are indicative of the potential magnitude and effect that may be achieved (discussed below). These results indicate very similar change may be achieved with each of the four options in terms of the highest concentrations and the number of resultant compliant properties.

The distributed benefits would occur across wide areas, with notable emissions reductions in areas where relatively high concentrations were predicted as exceeding or at risk of exceeding the annual mean objective, including:

- East of the city around Dragonville, as this would benefit the route through Gilesgate, and where a hub may also be incorporated into the large commercial and retail sites in this area.
- The area west of the city centre would also be beneficial as this includes Nevilles Cross and Crossgate, as well as North Road and Framwellgate.

The residual non-compliant properties (i.e., those still non-compliant after the implementation of Action 2) are indicated in Figure A-15.

Table 21. Freight Consolidation Test Results

		Projected Baseline	Pedestrian Portering		Zero Emission Vehicles	
			Low	High	Low	High
Max. Change in Annual Mean NO_2 vs Baseline		-	-2.0%	-2.0%	-2.5%	-2.7%
Max. Annual Mean NO_2, µg/m^3		47.4	47.2	47.2	47.1	47.1
No. of Receptors Annual Mean NO_2 >40 µg/m^3	Total	32	26	26	25	25
	East of City around Dragonville	0	0	0	0	0
	Park and Ride Sniperley	0	0	0	0	0
	North of City Centre (west of river)	11	8	8	8	8
	Park and Ride Howlands	0	0	0	0	0
	South of City Centre (east of river)	21	18	18	17	17
	Park and Ride Belmont	0	0	0	0	0

The tested scenarios are based on relatively high-level assumptions and at this stage no specific locations have been identified where hubs may be located, apart from potentially around the park and ride sites. However, as indicated by the assessment results, it would be most beneficial in terms of targeting the highest (i.e. non-compliant) pollutant concentrations to focus on the areas west of the river (11 non-compliant properties), and south of the city centre to the east of the river (21 non-compliant properties).

However, in terms of the greatest benefits that may be realised, Dragonville includes the corridors of Gilesgate, Sunderland Road and Sherburn Road where pollutant concentrations are persistently high and there are

extensive residential areas representing relevant exposure. As mentioned above, as there are also existing commercial and retail business in this area that may offer additional opportunities for the operation of a hub.

An initial review of the current freight and delivery fleet within Durham will be undertaken to determine what kind of vehicles are operating in the city, what fuel technology they use and how old they are. It may also identify major operators, such as courier firms, who may be suitable partners or stakeholders. The outcome of this review will determine whether to proceed to a full feasibility study using an updated ANPR survey to determine fleet breakdowns.

C.2 Emissions-based Car Parking Charges

Use parking policy and a revised pricing strategy for Council owned car parks and Council on street parking to assist in tackling traffic congestion within Durham City by encouraging modal shift to cleaner, more sustainable travel modes. In addition, investigate the introduction of other policies such as emission based car parking charges, to further encourage modal shift.

Car parking in the city is divided into two main types; residents parking permits managed by the Council, and also paid parking operated variously by the council, private commercial companies, network rail and the NHS trusts. (See Table 22)

For the purposes of this study, it was assumed that vehicles traveling to the major retail outlets, park and ride, rail and hospital sites do not pass the city centre and so this traffic was excluded from being targeted. Furthermore, spaces assigned to loading, waiting and blue badge were excluded. Whilst this is a simplification, it is appropriate in the context of this preliminary study.

The paid parking traffic were converted to trips based on the duration of each stay and a nominal utilisation to represent unused spaces. This was used to calculate the proportion of journeys using paid parking.

Parking permits are enforced on approx. 83 residential streets, comprising 9621 individual permits (Ref 19). The data presented in Table indicates that approx. 20.1% of traffic entering or leaving in the city centre originates on permit parking.

The location of the residual non-compliant properties (i.e. those still non-compliant after the implementation of Emission-based car parking are indicated in Figure A-16.

Table 22. Car Parking Provision in Durham

Type	Spaces	Utilisation	AADT	Duration	Proportion
City Centre, Council	129	90%	929	2-hour stays	2%
City Centre, Other	1882	75%	11292	2-hour stays	20%
Rail	519	75%	779	Long-stay	1%
P&R, Council	1225	90%	2205	Long-stay	4%
Retail	3261	75%	19566	2-hour stays	34%
Hospital	643	100%	5144	2-hour stays	9%
On-street, paid	1713	100%	13704	2-hour stays	24%
On-street, free	265	25%	4240	15-min stays, ex Blue Badge or Taxi	7%
Total	**9637**	**-**	**57858**		-
Total city-centre parking	**3989**	**-**	**30165**		-
Total council city-centre daily trips	**1842**	**-**	**14633**		-
Targeted proportion of trips (CC total vs Council parking)	-	-	-		49%

C.2.1 City Centre Traffic Breakdown

The Durham city centre is a major regional route due to the Gilesgate Bridge, and so a significant proportion of traffic is passing through the city, rather than destined for the city centre.

Traffic which passes through Durham city centre, but which has neither an origin nor destination (OD) within the city, account for approximately one third of all trips. A summary of the observed journeys in the city centre are presented in Table 23, with a breakdown of origin and destination (Ref 20).

Table 23. Journey Origin-Destination Summary in Durham City

Time Period	Central Destination	Central Origin	Through Traffic	Durham Internal Trips	Notes
AM	56%	11%	33%	4.2%	Internal traffic is a fraction of origin / destination
Interpeak	49%	18%	33%	6.9%	
PM	42%	22%	36%	5.8%	

Table 23 shows the approximate breakdown of traffic using either permit parking or pay and display, based on the assumption that trips originating in the AM peak would have stayed overnight in permit areas, whereas traffic coming into the city in the morning and during the day will be using the pay and display parking (see Table 22).

The effects of variable parking charges will be dependent on the implementation, which is outside the scope of this study. Therefore, a simple approach was used based on minimum Clean Air Zone standards, whereas vehicles that do not achieve either Euro 4 petrol or Euro 6 diesel standards would be subject to higher parking charges.

It was assumed the response to the potential measures would be 90% in accordance with the compliance response reported for the Clean Air Zone in Birmingham.

Table 24. Breakdown of Targeted Traffic for Parking Measures

Proportion of Traffic		Notes
Daily local traffic (permit parking)	20.1%	AM origin / PM destination / IP Origin
Daily external traffic (pay parking)	46.5%	AM destination / PM origin / IP destination
Targeted Pay Parking as Fraction of Flow (Table)	22.6%	Traffic coming into the central zones 1-3 daily as fraction of council parking
Pay Parking 90% Compliance Used in Test	20.3%	Proportion of car traffic responding to parking charges for high / low emissions
Targeted permit parking	20.1%	Traffic leaving the central zones 1-3 daily
Permit 90% compliance Used in Test	18.1%	Proportion of car traffic responding to permit charges for high / low emissions

The paid parking provision operated by the council was compared to the total available in the city centre to calculate the proportion of traffic that may be targeted by emissions-based pricing.

Overall, the analysis indicated that permit parking traffic represents approx. 88% of the paid parking, and so impacts to NO_X from cars would be very similar based on the same scenario based on 90% response to compliance based on the CAZ vehicle emissions standards.

As for the tests in Emission-based charging action (above), the change in local air quality was calculated using a simple method based on the proportional change in road-source NO_X at the nearest to each receptor modelled in the baseline. The outcome from the test is presented in Table 25.

There was a small benefit in terms of a reduction in the total number of properties exceeding the annual mean objective for NO_2. However, there are wider benefits throughout the city and specifically in the areas with persistently high annual mean pollutant concentrations, which are predominantly due to car traffic, such as:

- Nevilles Cross;
- Gilesgate;
- Claypath; and,
- New Elvet and Hallgarth.

Table 25. Car Parking Test Results Summary

	Projected Baseline	Pay Parking	Permit Parking
Max. Change in Annual Mean NO_2 vs Baseline	-	-1.9%	-1.7%
Max. Annual Mean NO_2, µg/m^3	47.4	47.1	47.1
No. of Receptors Annual Mean NO_2 >40 µg/m^3	32	26	26

There are a number of potential obstructions to the implementation:

- Enforcement would need to be undertaken by the existing Council resources and so additional training may be required.
- Residents parking does not have any viable alternative to either paying a higher rate or complying with the standard. Therefore, this may disproportionally affect households on lower incomes who are not able to replace a vehicle.
- The rate of compliance as a product of the charges has not been tested, and so where this is less than the nominal 90% used here then the outcomes would be proportionally different.
- Implementation of the parking control could require the adoption of app-based technology which, whilst widely adopted in the UK, may require adoption of specific procedural or contractual commitments by the Council.
- There is currently free parking in the city after 14:00 and the focus of this action is to encourage the use of the Park & Ride system. Therefore, if free parking is retained in the current form then it should be considered whether this would reduce the effectiveness of the objective.
- Only customers who are registered with a given phone system would be in a position to use it, and so the possibility of using the most suitable different provider for the payment system would need to be considered.
- There is an overall concern with regard to the accessibility and engagement of users to adopt pay by phone parking payment, with a significant risk of disenfranchising the most at-risk members of society.

C.3 Increased Parking Capacity at Park and Ride sites

Increase the parking capacity of Durham City Park and Ride sites to help incentivise the use of the Park and Ride service across the City. A stretch action will be to investigate the feasibility of new sites on routes where there is currently no provision.

An independent air quality assessment was undertaken to inform the planning application for the proposed Sniperly Park and Ride scheme (Ref 22).

It was determined that there would be a beneficial impact on NO_2, PM_{10}, and $PM_{2.5}$ as a result of the scheme in the modelled assessment years of 2023 and 2031. The number of vehicle trips into the city centre were predicted to reduce, thus leading to a positive impact on air quality.

The Park and Ride sites has the capacity to enable a reduction in the number of trips into the city centre, and it is expected that increasing the capacity at all park and ride sites will result in a beneficial impact on air quality.

Therefore, a feasibility study will be undertaken to determine the opportunity and potential outcome from the further expansion of Park and Ride provision.

C.4 Introduce Zero Emissions Buses on Park and Ride routes

Engage further with P&R operators to introduce improved Zero Emission buses on park and ride routes and implement funding opportunities through liaison with TNE.

A source apportionment study was undertaken by AECOM to determine the possible reduction in emissions as a result of introducing zero emission buses on all park and ride routes.

The number of buses per day was assumed using information regarding Howlands Farm Park and Ride. (Ref 21). A total of four buses per hour runs from each park and ride for a 12-hour period. This occurs for 6 days a week, providing an average daily flow of 41 buses (when averaged over seven days).

Emissions were calculated based on this daily flow and a fleet breakdown of 100% buses using the DEFRA Emissions Factor Toolkit (EFT, Ref 8).

Total NOx emissions from all three park and ride sites equated to 0.3 tonnes per year, and 143 tonnes of CO_2 per year, which indicates the maximum magnitude of the potential impact that may be achieved if all buses are replaced with zero exhaust-emissions (i.e. electric) vehicles.

C.5 Tracking Classification of Buses

Work with bus operators to track the emissions classification of buses on routes of specific areas of concern, to inform which buses should be operating within the AQMA to provide cleaner exhaust emissions. Furthermore, a stretch Action has been defined to identify and implement, where appropriate, any funding streams for retrofitting buses, purchasing hybrids and /or alternatives and where they may have the greatest benefits for air quality within Durham City.

A source apportionment study was undertaken by AECOM to determine the possible reduction in emissions as a result of introducing zero emission buses across Durham City.

The study assumed that all buses would immediately be replaced with zero emission buses. This gives an overall indication on the full impact of the action once completed.

NOx, PM_{10}, and $PM_{2.5}$ emissions the roads closest to each modelled sensitive receptor across the city were calculated based on the fleet breakdowns. Emissions were calculated using Defra's EFT (Ref 8). The emission outputs were then combined with the NO_2 background concentrations and adjusted based on the model verification factors. Defra's NOx to NO_2 Calculator was used to determine total and road-conditions NO_2.

The total emissions were determined assuming 0% buses by multiplying the total emissions by the percentage fleet breakdown minus the percentage of buses. The total NO_2 impact was then determined by the percentage difference in emissions with and without buses included within the fleet.

An overall benefit was observed from the modelled operation of zero-emissions buses within Durham City. An average impact of -0.5 µg/m^3 was determined overall. It was determined that only seven receptors continued to report an exceedance in the annual mean NO_2 objective following the removal of buses, compared to 32 exceedances with buses included.

The Church Street/Hallgarth Junction has been identified as a 'hotspot' for poor air quality, with several exceedances at sensitive receptors within this junction, although it is recognised that Hallgarth is outside the AQMA. At sensitive receptors located on this junction, a maximum NO_2 impact of -18.3 µg/m^3 was predicted. The largest impacts were anticipated on Church Street, adjacent to the Church Street/Hallgarth junction. However, it should be noted that this impact has likely been overestimated (as an outcome of this simplified assessment method) as it does not include the contribution of traffic from Hallgarth Street, which would contribute to the overall concentrations at these receptors. .

Table 26 highlights the receptors with exceedances predicted with buses included within the fleet, and the predicted impacts in NO_2 concentration with buses removed from the closest link.

Funding for this action cannot be obtained through a Bus Service Improvement Plan, and implementation may be subject to commercial restrictions and / or external funding opportunities.

Table 26. Impacts from Introduction of Electric Buses at Non-Compliant Receptors

Receptor ID	Location	NO_2 Concentration (with Buses) (µg/m^3)	NO_2 Concentrations (without Buses) (µg/m^3)	Predicted Impact (µg/m^3)
R0051	Hallgarth Street	42.11	42.11	0.0
R0099	Hallgarth Street	40.86	40.86	0.0
R0159	Hallgarth Street	40.14	40.14	0.0
R0182	Church Street	40.44	25.8	-14.6
R0183	Church Street	40.44	25.8	-14.6

Receptor ID	Location	NO_2 Concentration (with Buses) ($\mu g/m^3$)	NO_2 Concentrations (without Buses) ($\mu g/m^3$)	Predicted Impact ($\mu g/m^3$)
R0189	Church Street	47.37	29.07	-18.3
R0307	Church Street	46.03	28.43	-17.6
R0386	Church Street	45.76	28.3	-17.5
R0402	Alexandria Crescent	40.26	40.26	0.0
R0407	A690 Sutton Street	41.44	38.38	-3.1
R0418	A690 Sutton Street	41.12	38.09	-3.0
R0441	Church Street	40.12	25.65	-14.5
R0469	A690 Sutton Street	40.58	37.6	-3.0
R0481	A690 Sutton Street	40.33	37.37	-3.0
R0489	A690 Sutton Street	40.27	37.31	-3.0
R0833	A181 Gilesgate	41.87	38.92	-3.0
R0834	A181 Gilesgate	41.87	38.92	-3.0
R0845	A181 Gilesgate	41.40	38.49	-2.9
R0848	A181 Gilesgate	42.28	39.29	-3.0
R0853	A181 Gilesgate	41.19	38.3	-2.9
R0858	A181 Gilesgate	40.60	37.75	-2.9
R0863	A181 Gilesgate	42.85	39.82	-3.0
R0867	A181 Gilesgate	43.67	40.57	-3.1
R0873	A181 Gilesgate	44.96	41.75	-3.2
R0875	A181 Gilesgate	47.04	43.65	-3.4
R0881	A181 Gilesgate	41.02	38.14	-2.9
R0888	A181 Gilesgate	40.01	37.22	-2.8
R1088	Alexandria Crescent	44.99	36.63	-8.4
R1271	Alexandria Crescent	45.25	36.83	-8.4
R1299	Alexandria Crescent	45.68	37.16	-8.5
R1302	Alexandria Crescent	44.55	36.29	-8.3
R1362	Alexandria Crescent	43.82	35.73	-8.1

C.6 Workplace Travel Plans

Work with major employers in Durham City and assist with the development , implementation and enforcement of workplace travel plans including reporting, evidencing uptake and regular review.

Table indicates that long-stay parking accounts for 5% of the available parking provision, and which may be used by workers. Were each employee that uses long-stay parking to share a journey once a week I would achieve a 10% reduction in journeys to these sites each week.

This may, therefore, be equivalent to a potential 0.5% reduction in total journeys destined to the city (i.e. excluding through trips, or those using on-street permitted parking, or private parking spaces), with a corresponding reduction in emissions.

It was highlighted by the Air Quality Steering Group that the impact of this measure is uncertain following the adoption of different working patterns as a result of COVID-19. Therefore, further work to collect data on travel patterns may be undertaken through the employment of a travel planning officer.

C.7 Strategic Cycling and Walking Delivery Plan 2019-2029

Implement the Strategic Cycling and Walking Delivery Plan 2019-2029

Studies have been undertaken to assess the fraction of additional cycle trips given proper investment into cycling infrastructure. The studies have been summarised into a report produced for the Department of Transport. (Ref 23)

It was determined in these studies that the weighted average number of additional cycle trips (which originally would have been car trips) is 25%. Therefore, whilst a significant mode shift from car to cycle is unlikely to occur across the whole network, this indicates a potential 25% mode shift may be achievable on a given route dependent on the targeted investment into cycling infrastructure.

The Council has demonstrated commitment to the Actions within the Plan, with three ongoing cycling schemes that are already supported by funding due for completion by March 2024.

C.8 Update of the Taxi Emission Study

Review the licensed vehicle fleet operating in Durham. Subject to the outcome of this review, update the previous taxi emission study on the Durham Taxi fleet and determine whether further interventions are necessary.

A study was undertaken by AECOM in 2019 on behalf of the Council to assess the contribution of taxis to pollutant concentrations across the city (Ref 24).

The overall annual mean NO_2 concentration associated with taxi's was determined:

- Using Durham's Local Plan, the inferred contribution of taxis captured by ANPR to the overall NO_2 annual mean concentration around Milburngate Bridge can be considered to be approximately 1 $\mu g/m^3$.
- To put this into a bit more perspective, 'background' (i.e. at locations away from the roads) NO_2 concentrations in Durham city centre are approximately 15 $\mu g/m^3$, and concentrations measured at locations close to the bridge have been approximately 45 $\mu g/m^3$.
- Whilst the study reveals a relatively modest contribution of emissions from taxis to overall emissions and NO_2 concentrations it should be noted that due to the high volume of short city centre trips, a relatively small number of taxis contribute to the 1 $\mu g/m^3$ figure quoted above. (which represents 4% of the total NO_2 concentration at locations next to the bridge.).
- Therefore, measures to improve the licenced taxi fleet should be encouraged to prevent emissions from this sector increasing in future. Adoption of a regional common emissions standard would support this recommendation.

Therefore, whilst it was concluded there would be a beneficial impact in introducing zero emission taxis across the city, a review of the fleet currently operating in the city will be undertaken and compared to that assessed in 2019.

Following the outcome of this review, an update of the previous taxi emissions study may be undertaken to more accurately determine the extent and magnitude of potential improvements focussed on the taxi and private hire fleet operating in the City.

C.9 Free Trial for EV Vans

The implementation of a scheme to offer the use of 4 EV vans on a free trial for 2 to 3 weeks to Low and medium enterprises to promote the uptake of Electric Vehicles.

A source apportionment study was undertaken by AECOM to determine the possible reduction in emissions as a result of introducing zero emission EV vans.

The Council has purchased four electric vans as part of a try before you buy scheme. The purpose of this project is to allow local businesses to trial the use of an electric van for a short period of time to see how compatible EVs are with their business. There are four vans available for loan.

Emissions from four equivalent Euro 6 diesel vans were calculated using Defra's EFT (Ref 8), where it was assumed that all four vans would operate at 25mph and cover 17,500 miles per day (Ref 25)

The emissions from four diesel-fuelled vans were determined to be 0.06 tonnes of NO_X per year, and 24.20 tonnes of CO_2 per year. Therefore, there is the opportunity to reduce emissions of both NO_X and CO_2 using the electric vans used within the scheme, with proportional further benefits if operators then upgrade their fleet as a result of the trial experience.

This scheme outcomes after 1-year were:

- Number of applications: 50 applications from County Durham businesses
- Number of completed trials (external): 27
- Dropout rate: 46%
- Average trial length: 451 days / 27 trials = 17 days
- Total Distance travelled by external trials: 8314 miles
- Average Distance travelled = 308 miles
- Internal trials: DCC staff have borrowed the E-vans on 8 occasions (primarily Tony and Mavis, the Nissan ENV200's), averaging 8 days and 228 miles (1825 miles travelled by DCC staff in total).

The vehicles are currently operated as part of the DCC fleet and the trials are planned to restart again within 12-months.

Appendix D Baseline Monitoring Results

Table 27. DCC Monitoring Results

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%)	Valid Data Capture 2022 (%)	NO_2 Annual Mean Concentration (µg/m^3)				
						2018	2019	2020	2021	2022
Leazes Road	427130	542676	Roadside	99.3	99.3	-	**46.4**	35.8	**41**	**40**
23	426895	551717	Roadside	100	100.0	34.8	32.9	26.6	32.1	29.5
26	427411	552670	Roadside	92.3	92.3	**42.3**	38.0	29.8	31.9	32.9
101	428211	550438	Urban Background	84.6	84.6	13.1	10.9	8.8	10.2	10.2
129	426910	551708	Roadside	92.3	92.3	35.3	33.0	26.9	31.4	29.6
157	427477	551650	Roadside	100	100.0	**41.8**	**40.9**	32.5	38.4	36.0
1	429657	543114	Roadside	90.4	90.4	36.4	36.3	28.4	36.0	33.1
8	427121	542868	Roadside	92.3	92.3	38.4	38.4	29.5	30.2	34.2
11	426838	542298	Roadside	75	75.0	33.5	35.6	31.6	32.7	30.8
12	426768	542368	Roadside	84.6	84.6	**44.1**	**44.3**	39.7	**42.3**	36.9
19	427689	542078	Roadside	92.3	92.3	**41.2**	**44.8**	25.5	26.1	37.1
20	428385	542740	Roadside	92.3	92.3	36.7	39.8	34.8	34.7	36.0
42	427476	542618	Roadside	65.4	65.4	32.6	34.6	26.0	30.5	30.2
59	427649	542994	Urban Background	92.3	92.3	16.6	17.5	13.7	13.3	14.2
70	426654	542102	Roadside	84.6	84.6	**45.8**	**44.0**	34.2	39.0	35.9
79	426138	541933	Roadside	84.6	84.6	**48.1**	**46.2**	38.3	**44.3**	39.1
81	427529	542647	Roadside	75	75.0	31.6	31.0	25.3	26.2	28.8
106	429658	543118	Roadside	90.4	90.4	36.3	39.2	26.4	32.0	29.4
115	426133	541939	Roadside	92.3	92.3	32.2	32.3	26.0	30.2	28.2
116	427686	542072	Roadside	92.3	92.3	**44.2**	**46.7**	28.4	25.1	38.5
117	427672	542066	Roadside	92.3	92.3	**40.1**	**44.2**	26.6	25.1	37.3
118	428422	542887	Urban Background	92.3	92.3	14.7	15.6	11.7	12.1	12.0
130	426808	542461	Roadside	100	100.0	**46.2**	**47.8**	38.8	**46.7**	37.8
132	425352	540650	Roadside	100	100.0	32.9	32.6	24.1	29.7	28.6
133	425325	540636	Roadside	92.3	92.3	32.8	32.5	26.4	29.2	30.0
136	427133	542767	Roadside	100	100.0	31.3	32.5	25.3	31.1	29.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%)	Valid Data Capture 2022 (%)	NO_2 Annual Mean Concentration (µg/m^3)				
						2018	2019	2020	2021	2022
137	426437	542027	Roadside	100	100.0	37.4	37.0	31.0	37.6	35.0
139	427676	542051	Roadside	84.6	84.6	36.3	39.1	21.7	22.4	31.8
140	427663	542014	Roadside	92.3	92.3	37.5	39.4	22.0	22.2	33.2
141	427655	542023	Roadside	100	100.0	31.9	31.1	17.7	19.1	25.8
142	427665	542041	Roadside	67.3	67.3	35.4	38.6	21.5	19.9	32.3
145	428180	542699	Roadside	82.7	82.7	**41.6**	**40.9**	32.0	38.5	35.4
146	426796	542458	Roadside	73.1	73.1	35.4	35.8	28.9	36.9	33.8
149	428272	542715	Roadside	90.4	90.4	**48.2**	**48.0**	38.8	**45.1**	**44.1**
150	430769	537643	Roadside	100	100.0	31.6	31.5	25.2	29.3	29.3
151	426809	542489	Roadside	92.3	92.3	39.0	39.7	34.2	**41.0**	34.4
154	426772	542405	Roadside	92.3	92.3	**43.9**	**44.6**	**40.9**	**45.7**	38.0
155	428323	542720	Roadside	82.7	82.7	**45.7**	**40.9**	34.2	36.4	36.7
156	430783	537657	Roadside	92.3	92.3	30.4	27.4	21.7	27.9	26.6
162	428231	542713	Roadside	82.7	82.7	-	**46.7**	35.4	**42.6**	38.0
164	429969	542322	Roadside	100	100.0	-	22.6	16.4	17.9	16.0
166, 167, 168	427130	542676	Roadside	92.3	92.3	-	**41.8**	32.7	**41.4**	40.0
169	427614	542689	Kerbside	92.3	92.3	-	34.2	20.8	24.5	25.5
170	427739	541985	Roadside	92.3	92.3	-	25.1	15.3	16.0	19.3
171	430017	542339	Roadside	84.6	84.6	-	19.1	17.3	22.7	20.2
172	427586	542820	Roadside	76.9	76.9	-	-	18.0	21.8	21.8
173	418199	526238	Roadside	83.3	84.6	-	-	-	-	19.1

Appendix E AQAP Progress

Table 28. AQAP Progress

	Measure	Category	Classification	Organisations Involved	Funding Source	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	The introduction of a UTMC or SCOOT system to coordinate traffic through a network of junctions within Durham City and reduce congestion	Traffic Management	UTC, Congestion management, traffic reduction	DCC Traffic Management	DCC Traffic Management	Completed	23% average emissions reduction and up to 39% reduction on Claypath. Maximum 13 µg/m^3 NO_2 decrease near affected junctions.	Monitoring using traffic flow count data at the following locations in accordance with the previous years: (i) A690 Castle Chare (ii) A690 Crossgate Peth (iii) A690 Leazes Road (iv) Carrville Link and (v) Claypath , as well as subjective analysis of the queuing times, and compared with the modelled option to indicate whether the predicted emission reductions may be achieved	The operation of the traffic signalled junctions within Durham City has been synchronised since October 2016 via a UTC system. The additional interaction of the Scoot software is now fully functioning The UTC is therefore operational and coordinating traffic through Durham City. .	It has proved difficult to assess any further impact of implementing the SCOOT system due to the reduction in journeys as a result of the COVID-19 pandemic. The UTC could be extended to cover more junctions but is subject to a funding source being identified to fund the infrastructure required.
2	The retrofitting of emissions abatement systems on diesel engines on buses using routes within the declared AQMA	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Lead: DCC Sustainable Transport Team with support from Bus Companies (Arriva, Go North East)	Lead: DCC Sustainable Transport Team with support from Bus Companies (Arriva, Go North East)	Further fleet improvement is targeted for 2020/21	Up to 25% emissions reduction predicted on North Road, or 4.3 µg/m^3 NO_2	The composition of the bus fleets will be reported annually to track the number of vehicles that satisfy each emission standard, as well as new vehicles, those removed from the fleet, or those that have been upgraded or retrofitted with exhaust abatement.	The bus fleet in use on services in Durham AQMA has continued to evolve. The core of the fleet continues to be buses meeting Euro V emission standards, as there had been a lot of investment in new buses in that era and these vehicles still have a few years of life to go. The Council contracts for local services in Durham City now incorporate a requirement for vehicles with a Euro VI engine specification.	The bus companies priority within the region has been the operation of the newest buses within the Clean Air Zone (CAZ) established jointly by Newcastle & Gateshead.
3	Encourage the operation of hybrid buses using routes within the declared AQMA	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Lead: DCC Sustainable Transport Team with support from Bus Companies (Arriva, Go North East)	Lead: DCC Sustainable Transport Team with support from Bus Companies (Arriva, Go North East)	Further vehicle cascades are targeted and expected to continue, however no key dates have been identified at this stage.	Up to 25% emissions reduction predicted on North Road, or 4.3 µg/m^3 NO_2	The number of hybrid and micro-hybrid buses operating in the Durham fleet (as of August 2016) was: 10 Hybrid buses are operating on route 21d 6 Micro-hybrid buses are operating on route 22 20 Micro-hybrid buses are operating on route 20/20a 7 Micro-hybrid buses are operating on route X21	It is highly likely that any investment in full hybrid buses (especially with a material “full electric” range), or in electric buses, will be dependent on grant funding. Recent grant funding opportunities have been focussed on more metropolitan areas and have required match-funding. No DCC funding has been identified. Further investment in micro-hybrid buses is anticipated when current mid-life buses fall due for renewal; however, the large investment by both Arriva and GNE in recent years means there are a lot of Euro V buses that are not yet due for renewal	Other vehicle renewal has occurred in Arriva, GNE and other bus operator fleets through the cascade of newer buses displacing older buses with earlier Euro emission standards. The AQAP update indicated further benefits may be achieved were this to be expanded to include geofencing of battery-power operation.
4	Ensuring the park and ride buses are compliant with the Euro VI emission standard	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	DCC Sustainable Transport	DCC Sustainable Transport	Completed	Greatest impacts of 39% predicted on Claypath, or 13 µg/m^3 NO2	This Action was completed in 2016 and the park and ride buses have been upgraded to comply with Euro VI	This measure is complete. The Park and Ride buses are compliant with Euro VI emission regulations. Consideration of the type of buses was defined in the contract renewal in September 2021.	
5	The development of cycleways to encourage modal shift across Durham city that link into national and county cycle routes in accordance with the draft Durham City Sustainable Transport Strategy	Transport Planning and Infrastructure	Cycle network	DCC Sustainable Transport	DCC Sustainable Transport	On-going	Greatest impacts of 7% predicted on most affected roads, or <1 µg/m^3 NO_2	The length of new cycle routes and other facilities (such as high quality cycle parking) constructed will be reported annually	The County Durham Strategic Cycling and Walking Plan 2019-2029 has been produced, which can be found online and sets out the actions which will make cycling and walking part of Durham’s culture and to make them safe, affordable, enjoyable, everyday modes of transport for everyone. A local Cycling and Walking Infrastructure Plan has been established for Durham City.	An additional 4,372m of cycleways have been added since the previous report which has included the council taking advantage of the government's Covid-19 Active Travel fund grant

	Measure	Category	Classificat-ion	Organisations Involved	Funding Source	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
										to build the Pity Me / Framwellgate Moor cycleway . £2.8 million has been approved, made up of DfT TCF and DCC match funding , for the implementation of pedestrian crossing and safety improvements at the New Inn junction, upgraded active mode route between Newton Hall and Framwellgate Peth, and between County Hall and Sniperley. The works are being implemented between May 23 and March 24.
6	The promotion of Smarter Travel Choices with businesses in the city to encourage large employers within the city to implement car sharing and pooling or the use of alternative forms of travel	Promoting Travel Alternatives	Workplace Travel Planning	DCC Sustainable Transport	DCC Sustainable Transport	On-going.	Greatest impacts of 10% predicted on most affected roads, or 2 µg/m^3 NO_2	The Smarter Choices travel planning scheme will initially involve membership and commitment from major employers in the city. This is a key milestone that will enable the establishment of Travel Planning and Car Sharing schemes that can be used as 'best practice' and rolled out with other businesses in the city.	The Council continued to provide support and advice to large employers within the city to promote and encourage more sustainable travel where required but no data is available on the number of companies that have progressed travel planning or car sharing schemes. Engagement with major employers was limited to travel plans required as part of a condition for planning permission and delivery of the Walking Works package of interventions through the Living Streets project.	National Covid-19 restrictions and the requirement for staff to work from home where possible resulted in a change in travel patterns which has lead to a long-term impact on journeys by car and demand for alternative forms of transport.
7	To undertake detailed dispersion modelling of air quality emissions from any development growth and infrastructure in and around Durham City as shown in the emerging Local Plan that may potentially have an impact on air quality within and on the periphery of the declared AQMA. The outcome of this will enable opportunities to mitigate any detrimental impacts and potential benefits.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	DCC Sustainable Transport with support from DCC Pollution Control	DCC Sustainable Transport with support from DCC Pollution Control	On-going	No defined target	The completion of the assessment will have an ongoing point of implementation and so there will not be a definite milestone for completion. Note: The assessment will not determine whether the development or infrastructure is viable or not. The purpose is to identify impacts on air quality.	A detailed dispersion modelling study of the impact of the County Durham Plan was undertaken on emissions of air quality pollutants within and on the periphery of the declared Air Quality Management Area. The completed report was included as a supporting document to the pre-submission draft of the Plan that has been established. Such detailed dispersion modelling did not extend to the locality of the proposed relief roads situated to the west and north of the city, but these will be required in support of any planning applications for these infrastructure developments. The local plan was adopted in 2020 and can be accessed here: https://www.durham.gov.uk/article/7448/County-Durham-Plan-what-s-happened-so-far.	Detailed strategic-level modelling has been undertaken as part of the ongoing update to the AQAP to determine the future baseline and so further modelling is not proposed at this time..
8	The establishment of the current Air Quality and Planning Guidance Note as a Supplementary Planning Document (SPD). This sets out the requirement on developers when proposing new development within the city and its environs set out in the emerging Local Plan.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Lead: DCC Traffic Management with support from DCC Spatial Planning Team and DCC Pollution Control	Lead: DCC Traffic Management with support from DCC Spatial Planning Team and DCC Pollution Control	On-going	No defined target	Policy-based Actions will entail a single point of implementation, and so these will have a definite milestone for completion. The establishment of the SPD and AQS, which will initially be published in draft form before being finalised.	This note has been updated to reflect the latest Environmental Protection (UK) and Institute of Air Quality Management (IAQM) Guidance: Planning for Air Quality (January 2017). The progression of this is dependent on the adoption of the County Durham Plan as a Supplementary Planning Document (SPD) will be dependent on policies within the Plan. The Plan was adopted in 2020 and contains a number of policies relating to air quality. Requirements for developers when proposing new developments have been set out in the	The ongoing update to the AQAP has indicated that further benefits from expanding this Action are unlikely to be achieved and therefore it is not proposed to progress this in the revised AQAP.

	Measure	Category	Classification	Organisations Involved	Funding Source	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
									Planning Validation Checklist which can be accessed here: www.durham.gov.uk/media/3760/Planning-Application-Validation-Checklist/pdf/PlanningApplicationValidationChecklist.pdf.	
9	The establishment of an Air Quality Strategy that will integrate the strategic policies covering air quality in the emerging Local Plan, the measures detailed within the LTP, the draft Durham City Sustainable Transport Strategy and the carbon reduction strategy in focusing and addressing air quality issues in Durham City.	Policy Guidance and Development Control	Low Emissions Strategy	Lead: DCC Spatial Planning with support from DCC Pollution Control	Lead: DCC Spatial Planning with support from DCC Pollution Control	On-going	No defined target	The publication of the Strategy is a definite milestone for completion.	A draft air quality strategy that covers all the sections of the Council that may have an input and a role in relation to air quality has been established. The strategy now needs to be formally adopted by the Council and therefore will be reported to the applicable Committee of the Council.	
10	To raise awareness of air quality by undertaking a campaign that will integrate with and will involve other campaigns elsewhere in the Council to improve air quality.	Public Information	Via other mechanisms	Lead: DCC Pollution Control support from DCC Spatial Planning, Sustainable Transport and Climate Change	Lead: DCC Pollution Control support from DCC Spatial Planning, Sustainable Transport and Climate Change	On-going	No defined target	Publication of air quality documents Marketing material associated with the Smarter Choices programme Access to real-time air quality information on the air quality website. Creation of an LAQM portal that will encompass online tools for the Smarter Choices programme.	A web page on simple ways to help reduce air pollution is available on the Durham Council website detailing 10 measures which can benefit air quality. An air quality campaign was progressed in collaboration with the Living Streets initiative to support alternative modes of travel in preference to the use of private motor vehicles. In addition, events to raise awareness of air quality were held as part of the annual Clean Air Day. The web page detailing ways to reduce air pollution can be found here: https://www.durham.gov.uk/airquality.	Technical difficulties have delayed the creation of the LAQM portal.
11	Variable messages and car park direction signing system to direct traffic to available parking.	Public Information	Via other mechanisms	Lead: DCC Pollution Control Team with support from DCC Neighbourhood Communications and Sustainable Transport	Lead: DCC Pollution Control Team with support from DCC Neighbourhood Communications and Sustainable Transport	On-going	No defined target	The completion of the variable message signs to display information on parking availability will have a single point of implementation and so there will be a definite milestone for completion.	All signs have now been installed. However, in an update from Traffic Management (6th July 2022), the car park directional signing system is not yet operational. Software development work is also underway to integrate car park occupancy information into the Durham UTMC. The occupancy of 4 out of the 6 car parks in the city is fed into the UTMC system with work to also feed in the information from the remaining 2 car parks. Once the remaining car park occupancy information is fed into the UTMC system then this will be displayed on car park guidance variable message signs. There are currently 14 variable message signs located around Durham City that are used to display traffic information.	To feed information on the occupancy of the remaining 2 car parks into the UTMC system requires funding to support the software development that is required since both of these car parks operate a different system.
12	Explore the provision of travel and driver information integrated with the UTMC and to explore the provision of information on air quality through the use of texts, email alert and social networking	Public Information	Via other mechanisms	DCC Traffic Management	DCC Traffic Management	Integrated with UTMC system in December 2018.	No defined target	Publication of air quality documents Marketing material associated with the Smarter Choices programme Access to real-time air quality information on the air quality website. Creation of an LAQM portal that will encompass online tools for the Smarter Choices programme	Journey time information from the UTMC system is available on the Durham County Council website and information on 'Traffic & Travel' from the UTMC is shown in the form of Variable Message Signs. A project to publish comprehensive 'Traffic & Travel' information on the DCC website is being led by Corporate Communication. Development work has been completed and information on air quality is being fed from the air quality monitors into the UTMC system. However, strategies relating to the use of air quality information have not yet been developed. There are web cameras that are published on the Council's website that provide a snapshot of the condition of the road network. The cameras are positioned around Durham City.	
13	To explore whether it is viable or not to progress the introduction of variable charges for residential parking permits with preferential rates for low polluting vehicles (with regard to local air quality effects).	Promoting Low Emission Transport	Priority parking for LEV's	Lead: DCC Traffic Management with support from Pollution Control	Lead: DCC Traffic Management with support from Pollution Control	Completed	No defined target	The completion of the viability assessment will have a single point of implementation and so there will be a definite milestone for completion.	This action was deemed to be unfeasible. However, there is a proposed action in the revised AQAP to introduce an alternative parking charges scheme.	

	Measure	Category	Classification	Organisations Involved	Funding Source	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
14	To explore whether it is viable or not to extend existing park and ride routes and/or the provision of further park and ride sites, taking into consideration the emerging County Durham Plan and Sustainable Transport Strategy for Durham City.	Alternatives to private vehicle use	Bus based Park & Ride	Lead: DCC Traffic Management	Lead: DCC Traffic Management	On-going	No defined target	The completion of the viability assessment will have a single point of implementation and so there will be a definite milestone for completion.	A number of potential opportunities to expand the Park and Ride have been investigated. A planning application is be determined in mid June 2023, with expansion at Sniperley by 260 spaces. A funding package has been approved with DfT TCF and DCC match at a cost of £1.8m Subject to planning being approved, the scheme will be delivered between July 23 and July 24.	
15	Explore the options for additional highway infrastructure in line with the Durham Sustainable Transport Strategy, taking into account environmental, financial and planning considerations to enable the removal of through traffic from the City centre and contribute to the overall reduction of traffic emissions.	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	Lead: DCC Traffic Management	Lead: DCC Traffic Management	Aborted	No defined target	The Sustainable Transport Strategy will identify potential highway infrastructure options and these will then be explored further as individual schemes.	The proposed Western and Northern Relief Roads were removed from the County Durham Plan following a pre adoption Examination in Public (EiP). The National Planning Inspector, who chaired the EiP, reported subsequently that he did not agree that there was enough environmental justification for the additional highway infrastructure. The Council are therefore monitoring traffic levels across the City as part of our Annual Monitoring of the County Durham Plan. Should traffic levels rise to an unacceptable level and cause issues related to a decrease in air quality, the Council could review the need for additional highway infrastructure to remove traffic from the City Centre as part of the next version of the County Durham Plan or as part of a new transport strategy for the City	
16	To assess the significance of taxi vehicular emissions in Durham City.	Transport Planning and Infrastructure	Other	Lead: DCC Traffic Management with support from Pollution Control	Lead: DCC Traffic Management with support from Pollution Control	Completed	No defined target	A report has been undertaken and the emissions from taxis have been quantified.	An ANPR survey was undertaken to inform a modelling study examining the contribution of taxis (licenced by DCC) to air pollution in the city of Durham. The study determined that the contribution of taxis was relatively modest and did not require or warrant any further specific intervention. The vehicle fleet data collated during the ANPR survey may be used to inform further air quality modelling work including the ongoing AQAP update	
17	To work with the Environment and Design Team to complete a Green Infrastructure (GI) feasibility study for the AQMA in Durham City.	Policy Guidance and Development Control	Other policy	Environment and Design	Environment and Design	Completed	No defined target	The report has been published, but will be reviewed within the updated Air Quality Action Plan.	A report on where GI interventions may be progressed within the declared AQMA has been produced. A review of the literature available on research on the impact of Green Infrastructure (GI) on reducing levels of air quality pollutants was carried out.	

Appendix F Response to Consultation

Table 29. Summary of Responses to Consultation and Stakeholder Engagement on the AQAP

Consultee	Category	Response
Internal	Spatial Policy	Details provided on any relevant policies, strategies and plans.e.g EV charging strategy . Also identified any major planned developments which could impact on air quality
Internal	Low Carbon Team	Details provided on any relevant policies, strategies and plans.e.g CERP update .
Internal	Transport Planning	Details provided on any relevant policies, strategies and plans. Unable to clearly identity any new actions to support air quality improvements
Internal	Members Briefing	Agreed to progress to two further actions (emission-based car parking charges and micro consolidation of Deliveries) Also discussion around local actions v strategic measures. (Divided opinion)
Internal	Air Quality Corporate Steering Group	To refine the wording of proposed actions and draft additional actions. Approved ranking and scoring for prioritisation.
External	Local Engagement Event	Feedback obtained on support (or otherwise) of established draft action plan measures and suggestions provided for alterative measures. See summary of feedback and suggested list of alternative actions below.
External	Statutory Consultee	TO BE CONFIRMED
External	Public Consultation	TO BE CONFIRMED

Table 30 Public Engagement Event-Summary of Feedback on Draft Actions

Transport Policy Actions	Response
Workplace Travel Plans	There was support expressed for this action; Helpful where there is already a Travel Plan in place that can be used as a good example for employers in the city to use- suggestion made to use the Durham University Travel Plan. Requirement for the setting of ambitious targets.
Cycling	There was support for this action; This again should draw upon examples of transport models in other areas need to be considered such as Oxford & Cambridge. Provision of facilities on cycle and pedestrian routes- lighting, signposting
Green Infrastructure	There was again positive support for the provision of GI-a question was raised on the efficiency/impact that GI will actually achieve in relation to AQ. This included the suggestions for providing green roofs on bus shelters and the replacement of on street parking with trees. There was desirability for the provision of GI for residential areas combined with slower speed limits.
EV Charging Infrastructure	Recognised need for more EV charging points; EV charging infrastructure required in close to residential properties; suggest liaison with local communities for where EV charging infrastructure will be located.
Provision of EV Vans	There was support for the action; Extend the scheme to include EV Cargo Bikes.
Traffic Actions	
SCOOT	The question was raised as to whether more can be done although it was recognised this would be subject to the availability of funding. It was suggested that lane priority was required to buses. There was support for this action.
Freight Micro-Consolidation	Further specific aspects of such a scheme were raised such as where will this be located & what will be the hrs of operation. Some concerns were raised in relation to HGVs/LGVs using different routes. There was support for this action.
Parking Policy	This will be a way of forcing people to buy more expensive vehicles. It needs to be integrated with the better provision of public transport; a widening of the provision was also mentioned for emission based residential permits. There was mixed support for this action.
Actions in relation to buses and the P & R (Park & Ride)	
Increasing the Capacity of P&R sites and Provision of new sites	The comments made were around the use of the P & R facilities such as adjusting the times of the P & R, focussing on the occupancy of the vehicles using the P & R to promote car sharing and payment per car rather than per person. There was support for the action, however, in addition to improving existing facilities there is the need to identify new sites.
Extension of Hours of the P & R	See comments in relation to the previous action. There was support for extending hours of the operation of the service.

Zero Emission P & R Buses	The requirement for operating EV buses on the P & R routes. There was strong support for this action.
Bus Improvements	The comment was made that there are a lot of actions on P & R but not on buses. There was support for this action as it is necessary to target locations on bus routes.
Actions in relation to planning, sustainable development, taxis and campaign	
Planning	It is good to ensure that proposals are screened, and this needs to take into consideration the cumulative impacts. There was support for this, however, it was recognised that this is what we should be doing anyway.
Sustainable Development	Must include a link to bus routes (use of public transport) There was support for this, however, it was recognised that this is what we should be doing anyway.
Public Awareness Campaign	There was positive feedback that this is something that we should be doing. This should be targeted towards schools.
Taxis	The problem of taxi idling was mentioned. It was put forward that the action is weak as it stands. There was support for this action.

Public Engagement Event: List of Suggestions for Additional Actions

1. Ring/Relief Road
2. Pedestrianised Centre
3. Workplace car parking charges
4. Reduce weight limit to HGV's.
5. 30 mph through -out the city
6. Restrict car parking permits for students.
7. One-way systems – Church /Hallgarth Street, Lowes Barn Bank /Potters Bank
8. ULEZ
9. EV's given priority
10. Consolidate deliveries to student colleges (one delivery per day)
11. Link with P & R to bus stations and railway stations
12. More GI within planning development design
13. Ensure AQ is coordinated with Climate Change and Health Policy
14. Extend the use of Co- Wheels and Pool Cars to the Park and Ride
15. Prioritised lanes for buses
16. Look at ways of group car -sharing at Park and Ride Sites
17. Investigate other schemes – park and cycle; park and stride

Table 31 Alternative Suggestions for Air Quality Actions

Suggested Additional Actions	Include	Reserve
Ring/Relief Road		Y as part of the County Durham Plan review
Reduce weight limit to HGV's.		Y Could link into the micro consolidation action)
One-way systems – Church /Hallgarth Street, Lowes Barn Bank /Potters Bank		Y Fraught with difficulties … potentially increase queuing /congestion in other areas. Would need to know what the air quality benefits would be / further modelling and have a better understanding of the longer-term pollution trends in these areas.
ULEZ		Y. Would need to quantify what this would involve /air quality benefits against costs.
Consolidate deliveries to student colleges (one delivery per day)		Y. Could link this in with the micro consolidation
Link with P & R to bus stations and railway stations	**NEW ACTION Review Park and Ride routes and wider bus network routes around the city**	
P &R to incorporate more sites – to major employers, hospital, circular route	Y. Links in with 6 Above	
Provision of wider bus access especially employment areas	Y Links in with 6. Above	
Measure particulates as well as NO_2	Y **NEW ACTION** **Review the air quality monitoring network to ensure it is fit for purpose and can be used to determine longer term trends in nitrogen dioxide and particulate levels at hot spot locations across the city**	

Appendix G Reasons for Not Pursuing Action Plan Measures

Table 32. Action Plan Measures Not Pursued and the Reasons for that Decision

Action category	Action description	Reason action is not being pursued (including Stakeholder views)
Promoting Low Emission Plant	Domestic emissions	These will continue to be managed using LAQM process and tools.
Policy Guidance and Development Control	Targeted measures for specific hotspots	These will not be progressed at this stage but may be developed further through the expanded consultation stages.
Traffic Management	Clean Air Zones (CAZ)	Excluded from the Plan as this did not receive any support in the internal consultation as the socioeconomic risks were considered to be too great, and the evidence related to the destination traffic did not support such a measure. Furthermore, the Action themes based on parking were consider to capture part of the same traffic in more targeted and local way.
Traffic Management	Pedestrianised Centre (Local Engagement Event Suggestion)	Parts of the city are already pedestrianised.
Travel Alternatives	Workplace Car Parking Charges (Local Engagement Event Suggestion)	Council owned car parks could provide a viable alternative and therefore would not be feasible.
Traffic Management	30 mph speed restriction throughout the city. (Local Engagement Event Suggestion)	It is the DfT (Dept for Transport) intention to ensure that speed limits are credible to motorists and consistently applied throughout the country with the aim that they become self-evident and enforcing by their surroundings. Given the location a reduction from 40 to 30 mph would not be credible.
Traffic Management	Restrict car parking permits for students (Local Engagement Event Suggestion)	It is difficult and inappropriate to implement a scheme that differentiates student properties from others. There would also be cost implications for restricting the eligibility for second permits in student properties.
Traffic Management	EV vehicles given priority. .(Local Engagement Event Suggestion)	There is limited road space in Durham city, and this needs to be allocated to the buses.
Alternatives to Private Vehicle Use	Extend the use of Co-wheels and pool cars to the P & R. (Local Engagement Event Suggestion)	The current Council employee scheme is underutilised and therefore would not be financially viable.
Alternatives to Private Vehicle Use	Explore alternative ways of charging for vehicles at P & R. (Local Engagement Event Suggestion.)	To alter the current arrangement of pay per person to pay by car is not cost effective.
Promoting Travel Alternatives	Cheaper Bus Fares (Local Engagement Event Suggestion)	This is not something that the Council can control.

Appendix H Assessment Method Used to Prioritise the Actions

A cost benefit score was applied to all the 21 actions using costs and air quality benefits as defined in Table below:

Table 33 Determination of Cost Benefit Score

Costs	AQ Benefit (AQ magnitude & extent)
<£50k	Imperceptible impacts
Score 3	Score 1
>£50k - £200k	Reduced overall emissions.
Score 2	Score 2
>£200k	Emissions reduction sufficient to contribute to increased compliance in the AQMA.
Score 1	Score 3

A feasibility score was then derived for each of the 21 actions which takes into consideration any funding that has already been secured to support the action measures, and timescales for implementation as defined in Table below:

Table 34 Feasibility Score

Funding	Timescales
Not Secured	> 2 years from the adoption of the plan
Score 1	Score 1
Secured	< 2 years from the adoption of the final Action Plan
Score 2	Score 2

Finally, each action measure was then giving a score based on public support for the action, (obtained during the local engagement event) in terms of its perceived benefit on air quality as defined in Table below

Table 35 Public Support

Public Support		
Poor	Moderate	High
Score 1	Score 2	Score 3

The Overall score for each action was then determined by multiplying the Cost Benefit, feasibility, and public support scores. Overall scores were then ranked and grouped in terms of high, medium, and low priority based on the scores outlined in Table .

Table 36 Overall Score	Priority
0-36	Low
37-72	Medium
73-108	High